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Pacific Islands Transport Sector Study

(In Seven Volumes) Volume VII: Solomon Islands — Transport Sector Survey

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Infrastructure Operations Division
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East Asia and Pacific Region

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ACRONYMS AND ABBREVIATIONS

ADB	-	Asian Development Bank
AIDAB	-	Australian International Development Assistance Bureau
ASAS	-	Australian Staffing Assistance Scheme
CEMA	-	Commodities Export and Marketing Authority of the Solomon Islands
IDA	-	International Development Association
MTA	-	Ministry of Tourism and Aviation
MTWU	-	Ministry of Transport, Works and Utilities
PMCs	-	Pacific Island member countries
PITSS	-	Pacific Islands Transport Sector Study
SIPA	-	Solomon Islands Port Authority
WPAS	-	Western Pacific Air Services

PREFACE

The Pacific Islands Transport Sector Study (PITSS) reviews the status of the transport sectors in the six Pacific Island member countries (PMCs) of the World Bank.

The PITSS is reported in two volumes: Volume One - A Regional Perspective on Transport Issues - presents an analysis of transport issues across the region. Volume Two - Country Surveys - provides a detailed examination of the transport sector in each PMC.

This survey of the transport sector in the Solomon Islands, is one in the series for the PMCs which, as a whole, represent Volume Two. Each sector survey presents an overview of transport, identifies areas of concern and suggests priorities for consideration by Government.

Maintenance of transport infrastructure is identified as a common major problem area. Therefore, for this particular area, a separate Maintenance Annex is attached to the country sector survey.

The PMCs share several areas of common concern with their transport sectors, including strategic planning, project evaluation, regulation, modal coordination, pricing and cost-recovery, commercialization, private sector participation, as well as the management of infrastructure and its maintenance. These areas are reviewed briefly in this survey and, on the basis of the surveys for all PMCs, subjected to comparative analysis in Volume One of this study.

PITSS was undertaken by the World Bank with financial support for consultants from the Australian International Development Assistance Bureau (AIDAB) South Pacific Facility. The study was structured and managed by Colin Gannon (Senior Economist). Major contributions to the sector surveys were made by David Bray and Ian Gordon (consultants).

The kind cooperation of the many government officials, industry representatives, and donor agency sponsored personnel (especially from the EEC) who assisted the mission is gratefully acknowledged.

CONTENTS

LIST OF TABLES

SELECTED DATA

Solomon Islands

Geography

Land Area	27,600 sq km
Sea Area	1,340,000 sq km

Population

Population (1987)/(1991), est.	288,000/345,000
Population Growth (1980-87)	3.4% per annum
Population Density (1987)	10 persons per sq km
Population of Capital, Honiara, (1991) est.	40,000

Economic

GDP/Capita (1987)/(1991)	US$420/US$560
Exchange Rates:	
1980	SI$0.8298 = US$1.00
1985	SI$1.4808 = US$1.00
1989 (September)	SI$2.3500 = US$1.00
1991 (March)	SI$2.6740 = US$1.00

Transport

Registered Vehicles (1986)	3,629
Vehicles/'000 Population (1986)	13
Length of Road (1988)	1,300 km
% of Road Sealed (1988)	5%

CHAPTER 1
INTRODUCTION

A. Review Context

1.1 This country survey presents an overview of the transport sector in Solomon Islands, identifies areas of current and emerging concern, indicates priorities, and suggests future strategies for the sector.[1]

1.2 To facilitate the present study, a desk review[2] of the transport sector was previously undertaken for each of the Pacific Member Countries (PMCs) of the Bank.[3] That review provided preliminary information on each country, including Solomon Islands, and working hypotheses on development needs in the transport sector. The present survey builds on this work to develop a current sector overview so as to establish first, directions for the formulation of strategies and priorities for each country, and second, the basis for selection of the specific issues addressed in Volume One of this Report.

1.3 The survey of Solomon Islands is complemented with similar surveys for the other PMCs. A regional overview which compares and contrasts, transport sector issues across all six PMCs is presented as Part I, Volume One of this Report.

B. Geography

1.4 The Solomon Islands archipelago stretches for some 1,600 kilometers to the south-east of Papua New Guinea. It is located between latitude 5 degrees and 12 degrees south and longitude 155 degrees and 173 degrees west (see map at end of text). The six main islands are rugged and mountainous; the numerous small islands are volcanic or coral atolls. More than 90 percent of the total land area of about 27,600 square kilometers consists of thickly forested hills and mountains. The only extensive coastal plain is located on Guadalcanal Island. Only 25 to 30 percent of the country's land area is suitable for agriculture, the remainder being too hilly, swampy or infertile, but this is still a considerable area per capita. The Solomon Islands has a declared sea area of 1.3 million square kilometers.

1.5 The climate is equatorial with heavy rainfall mainly on the windward coasts of the larger islands. Cyclones occur and cause extensive damage. The topography of the larger islands, and heavy rainfall, make for difficulty in the implementation of development projects, particularly communications. Subsequent maintenance costs are also high.

1.6 The capital is Honiara located on Guadalcanal Island; other principal townships are Auki on Malaita Island and Ghizo on Ghizo Island. The new port of Noro on South New Georgia Island is important to the future expansion of forestry and fishing industries.

C. DEMOGRAPHY

1.7 The population of Solomon Islands, predominantly Melanesian, was about 288,000 in 1987, and is estimated to be growing at about 3.5 percent per annum. This is one of the highest population growth rates in the world; the islands are considered by some political leaders to be under populated. The population growth is a reflection of a high crude birth rate of about 45 per thousand. There is virtually no emigration from the country.

1.8 The main internal migration stream is from Malaita to Guadalcanal and in particular to the capital Honiara where the annual population growth rate over the period 1976 to 1986 was 6.8 percent. The exceptional growth in the population of Honiara has been caused to a large extent by an influx of job seekers, mainly young men. In addition to creating a potential for social tension, this rate of growth places serious strains on health and education resources. The population of Guadalcanal in 1986 was about 80,800, of which about 30,500 (or 38 percent) lived in Honiara. Population is generally spread widely throughout the country, with Malaita also having about 80,000 people in 1986 and the remaining five provinces having populations of between about 15,000 and 55,000 each.

1.9 Apart from the special problems associated with population growth in Honiara, the whole country faces strains in the social services sector. For example, a UNESCO survey in 1985 suggested that only 56.5 percent of the population was literate. Another report suggested literacy in 1984 of no more than 15 percent (World Bank 1984). Health services are also under pressure with malaria being the main cause of morbidity. Difficulties associated with the disbursed nature of the centers of population exacerbate health and education problems.

D. ECONOMY[4]

1.10 Based on World Bank estimates, per capita GNP was about US$430 in 1988, placing the Solomon Islands in the low-income group of countries. The strong subsistence base and extended family system have helped to provide the basic needs of food and shelter for most of the population.

1.11 The natural resource base of the Solomon Islands helped to sustain an average GDP real growth rate of 4.5 percent per annum during 1981-1984. However, dramatic deterioration in commodity prices of the principal exports, damage inflicted by Cyclone Namu in May 1986, abandonment of some rice and forestry operations and institutional constraints, GDP growth slowed to 1.4 percent per annum in 1985-1986. There has been gradual recovery of the past three years which has resulted in GDP growth of 4.3 percent in 1988 and an estimated 5.2 percent in 1989.

1.12 Including subsistence activities, *agriculture* accounts for about one-third of GDP; the major crops being coconut, cocoa and palm oil.

1.13 The Solomon Islands, in addition, has a rich base of forestry and fishing resources. These two sectors account for about 10 percent of GDP and two-thirds of export earnings.

1.14 The *manufacturing* sector, although small, has grown strongly in recent years and accounts for 4 percent of GDP and 6 percent of formal employment. Most manufacturing activity is based on the processing of primary products, particularly fish, timber and palm oil.

1.15 *Development expenditure* by Government has averaged 7.5 percent of GDP during the 1980s, with the exception of 1987 when purchase of fishing boats increased the level to 16.5 percent of GDP.

1.16 The *public sector* plays a dominant role in the Solomon Islands. The Government accounts for about 60 percent of gross investment and 40 percent of total expenditure. In addition, there is extensive involvement by State owned enterprises in virtually all sectors of the economy.

CHAPTER 2
INSTITUTIONAL STRUCTURE

A. GOVERNMENT STRUCTURE

2.1 The Solomon Islands became a British Protectorate in 1893 and an independent country within the Commonwealth in 1978. The constitution provides for a parliamentary democracy with a uni-cameral 30 seat National Parliament. The Prime Minister is elected by the Parliament, who advises the Governor-General on the appointment of up to 15 ministers.

2.2 Honiara on the island of Guadalcanal is the capital and administrative center of the Solomon Islands and is where Parliament, Ministries and Departments are located. Seven provincial Governments and the Honiara Town Council exercise powers delegated by the Central Government. They may have such delegations revoked selectively if they fail to perform satisfactorily. Currently delegation extends to health, education, agriculture extension and public works (including roads and transport) and the implementation of some capital projects.

2.3 Transport sector responsibilities are spread across a number of Departments and Ministries. The Aviation subsector is wholly within the Ministry of Tourism and Aviation (MTA). Roads and some marine functions are the responsibility of the Ministry of Transport, Works and Utilities (MTWU). In addition, the Ministry of Agriculture and Lands has a role in rural roads development. Land transport regulatory and licensing functions are shared between the MTWU, the Police and the Internal Revenue Department of the Ministry of Housing and Government Services. The Solomon Islands Port Authority (SIPA) is responsible for the major ports, Honiara and Noro, and is ultimately responsible to the Minister of Commerce and Primary Industry. No specialized agency is responsible for developing transport sector policies and for taking an inter-sectoral view of the transport sector.

B. TRANSPORT AGENCY RESPONSIBILITIES

2.4 **Roads.** The planning, construction and maintenance of roads are the responsibility of the Ministry of Transport, Works and Utilities. The Ministry has a Works Division within which the Roads and Bridges Section is responsible for the construction and maintenance of roads, the Mechanical Engineering Section for the provision and maintenance of plant and equipment and the Technical Services Section for the design, documentation of works and for the testing of materials. The skill resources within the MTWU are very limited, especially in the senior technical and professional areas. There are only three professionally qualified engineers in the Ministry, one of whom is located in the Roads and Bridges Section. Most works of any major scale have been by means of donor projects in which the construction has been undertaken by international contractors. Some devolution of operational responsibilities to Provincial Government has commenced, but

the result has been unsuccessful in meeting maintenance requirements. The Ministry at present has no planning capacity, road upgrading projects are identified and prioritized in the course of aid projects.

2.5 **Land Transport Operations.** The road transport industry is primarily a private sector activity. Road transport is largely concentrated in an around Honiara, where formal public transport services including taxi services are provided. Informal public transport services are provided elsewhere, usually as an accompaniment to the movement of freight. Freight services are dominated by company owned (own-account) vehicles although limited independent freight hire services are available. The Ministry of Transport, Works and Utilities, Mechanical Engineering Section, is responsible for vehicle inspection and for driver training and licensing, but revenue from vehicle registration is collected by the Internal Revenue Department. Enforcement of road traffic and vehicle weights and dimension legislation is the responsibility of the Police.

2.6 **Shipping.** The Marine Division of the MTWU is responsible for maritime legislation and for the administration of marine matters. The functions include marine inspections and surveys and issue of licenses, the provision and maintenance of navigation aids and the organization of search and rescue operations. The Marine Division also operates and maintains the Government fleet engaged in the provision of inter-island shipping services.

2.7 **Ports.** The Solomon Islands Port Authority (SIPA) is responsible for the two major ports in the Solomon Islands, Honiara and Noro. A further port at Yandena (Russell Islands) is a copra export port for Lever's Pacific Plantations Pty. Ltd., which provides stevedoring and other services. Other ports are used for the export of logs of timber and there are numerous landings throughout islands used by local vessels. Maintenance of Government jetties and landings is the responsibility of the MTWU.

2.8 **Aviation.** The Ministry of Tourism and Aviation (MTA) is responsible for the operation management and maintenance of Government airports and for the provision of air traffic services and enforcement of air safety requirements. The Ministry is also concerned with international air service agreements and regulatory matters affecting domestic aviation.

2.9 **Policy.** Objectives for the transport sector as a whole or by mode are not clearly enunciated. The need for a national transport development plan had been identified during an Integrated Transport Study (Survey) funded by CFTC in 1987, but did not proceed. Changes to the allocation of functions to Ministries and major changes in Chief Executive Officer appointments, in addition to a major initiative by Government to privatize or commercialize many public sector functions, have made clarification of transport strategy difficult.

2.10 **Planning.** Major changes have been made to the planning functions within the civil service. The previous Ministry of Economic Planning has been abolished and an Economic Planning Unit established under the Ministry of Finance. This unit has a responsibility for multilateral aid, but the Policy Evaluation Unit within the Prime Minister's Office is also closely involved in this function. The responsibility for bilateral aid is primarily under the control of the Ministry of Home Affairs, which has responsibilities for the decentralization of Government functions to Provincial Governments. The Policy Evaluation Unit remains closely involved in bilateral aid considerations. The fragmented structure for planning increases the need for effective coordination, a role which is being undertaken by the Policy Evaluation Unit.

C. Private Sector

2.11 As noted previously the private sector is responsible for the provision and operation of bus and taxi services, which are concentrated within the Honiara area. The private sector also operates the majority of the vessels involved in inter-island transport of passengers and freight. Further informal marine services are also provided, mainly to transport passengers and goods between locations within islands. Western Pacific Air Services which is operated by the Seventh Day Adventist Church provides some domestic air services within the Solomon Islands. These services are available to the general public on the routes flown, which are directed to servicing the rural areas of the Solomon Islands.

D. Public Finance

2.12 The Solomon Islands relies heavily on a narrow tax base to fund recurrent expenditure. Taxes have provided 90 percent of total current revenue in recent years, of which tax on international trade has generated over 60 percent of tax revenue. During the 1980s the Governments revenue raising measures for both tax and non-tax revenue, have been insufficient to meet recurrent expenditures. A number of tax measures were announced in 1988 and 1989 including higher duty rates on a range of imported goods. Overall however, revenues rose only moderately from 23 percent of GDP in 1986 to 26 percent in 1989.

2.13 The Government has run a current account deficit throughout the 1980s, despite periods of expenditure restraint. Increases in current budget outlays in 1985-1986 to cover wage increases, transfers to the provinces and subsidies to public enterprises occurred with rises in development expenditures due to cyclone reconstruction and large investments in fishing vessels and airport expansion. This additional spending was largely financed by higher levels of grants. In 1989 the level of capital expenditure was constrained by the decision of the new Government to suspend aid.

E. Aid Environment

2.14 The suspension of aid during 1989 provided an opportunity for the Government to establish clearer priorities for financial and technical assistance. The Government's guidelines ask bilateral donors to finance 100 percent of project costs and to focus aid by province or by sector. In line with these new guidelines, no Government expenditure was budgeted for externally financed projects in the 1990 budget. The Solomon Islands Development Budget proposals for 1991 allocate a total of SI$121.8M for the development program of which SI$98.0M would be financed by overseas grants, $17.4M by concessionary loans (ADB, IDA, IFAD) and $6.4M through local funding. This level of funding is 50 percent higher than the total of SI$80.3M budgeted for 1990.

F. Human Resources

2.15 Human resource development is essential for the country's economic growth. Only 15 percent of the adult population is literate and barely 1 percent has been educated to tertiary (degree or diploma) level.

2.16 The decision by the Government to suspend aid in 1989 has resulted in a reduction in technical assistance as existing programs were completed. Major constraints have also been applied by the Government in the manning levels of Ministries in line with tightening of control over current expenditures.

2.17 Within the transport sector the Solomon Islands will need to continue its reliance on expatriates for professional and specialist technical expertise. Training continues to take place in some Ministries (eg. air traffic controllers in MTA) but it unlikely that current

human resource development will meet the needs of the public sector in the foreseeable future.

2.18 The situation is compounded by the policy of devolution of central Government functions to provincial Government and the intention to privatize appropriate areas of Government activity. For devolution to be successful Provincial Governments will need to be provided with the resources (including human resources) necessary to carry out the functions. Similarly, private enterprise will need to develop or acquire the necessary human resources for functions transferred from the public sector.

CHAPTER 3
ECONOMIC CONTEXT

A. Demand for Transport Services

3.1 Demand for transport services is generated principally from activities in the agriculture, fishing, forestry and service sectors. Much of this activity is directed to international trade. Exports dropped sharply as a result of Cyclone Namu in May 1986 and from changes in the external environment, which resulted in lower commodity prices for copra, palm oil and timber. Exports recovered in 1988 and 1989, with increased prices in major export commodities (copra, palm oil, fish and timber) see Table 3.1. Fish and timber predominate by value in the total export structure, accounting for 60 percent of the export trade in 1988. The heavy dependence on these items and on copra and palm oil is evident from the table.

3.2 The majority of imports (see Table 3.2) and exports pass through the Port of Honiara. Cargo movement through the Port of Noro has increased rapidly since the wharf was brought into operation in 1989 (see Section 4.19). Japan and Asian countries are the principal importers of commodities from Solomon Islands while Australia is the principal source of imports to the country (see Table 3.3).

3.3 *International* visitor arrivals fluctuated between 10,000 and 12,000 per annum during the 1980s, the peak year being 1987 with 12,555 visitor arrivals. Since 1987 the number of visitors have declined, the lowest visitor numbers occurring in the 1989 year (see Table 3.4).

3.4 The main visitor source markets for the Solomon Islands have been Australia, Papua New Guinea, New Zealand and the USA. Australia has traditionally generated the greatest number of tourists, with a market share fluctuating between 36 percent and 39 percent in the period 1987-1989 (see Table 3.5). However, in absolute terms the Australian market, as well as other market areas, has declined over the period. Cruiseship traffic has declined over the period in line with general trends in visitor traffic. In 1989 there were 5 cruiseship calls, a significant reduction from the 11 cruiseship calls in both 1987 and 1988. At present, the Solomon Islands is a minor destination for tourists, even on regional standards.

3.5 There are little data available to develop estimates of the domestic freight and passenger task performed. Estimates of freight and passenger movements between island centers and Honiara were prepared as part of an Australian Bureau of Transport Economics Study in 1979, but no further estimates of transport activity appear to have been undertaken. The Commodities Export and Marketing Authority of the Solomon Islands (CEMA) has data on the production of copra by location which reflect some part of the marine transport demand. Because of the archipelagic nature of the country and the general dispersal of population with a predominance of coastal settlement the demand for sea transport is high. All export commodities with the exception of production on the north coast of Guadalcanal and in the vicinity of Noro are carried by sea to Honiara.

Table 3.1: SOLOMON ISLANDS—EXPORTS BY MAJOR COMMODITY /a, 1985-1989

	1985	1986	1987	1988	1989
Copra					
Value	15.9	3.4	4.2	7.5	9.1
Volume	43.6	32.4	27.9	27.1	32.9
Palm Oil					
Value	8.4	3.2	3.4	5.9	7.9
Volume	18.6	14.5	11.6	13.6	14.2
Fish (fresh and frozen)					
Value	18.7	26.9	22.4	31.9	22.5
Volume	27.2	39.6	26.6	35.0	27.9
Fish (canned)					
Value	2.4	2.8	3.6	4.3	3.9
Volume	0.9	1.0	1.2	1.2	1.3
Logs					
Value	16.0	19.5	17.5	18.1	16.9
Volume /b	330.0	434.0	281.0	261.0	260.0
Sawn Timber					
Value	0.7	1.0	1.1	1.0	1.1
Volume /b	4.0	6.0	6.0	5.0	5.0
Cocoa					
Value	3.4	3.7	4.6	3.6	3.5
Volume	1.8	2.0	2.7	2.6	3.3
Other					
Value	4.7	5.4	7.3	9.5	9.6
Volume	-	-	-	-	-
Total Exports Value	**70.1**	**66.0**	**64.0**	**81.9**	**74.7**

/a Values are in millions of US dollars and volumes in 000s metric tonnes unless otherwise indicated.
/b Logs and Sawn Timber Volumes are in 000s cubic meters.

Source: Central Bank of Solomon Islands.

Similarly, the distribution of imported commodities from Honiara relies on sea transport. Demand for land transport is confined mainly to the north coast of Guadalcanal. Domestic air transport plays an important role in providing for business, recreation and public administration access for the transport of perishable commodities and for emergency needs.

B. COUNTRY DEVELOPMENT STRATEGY

3.6 Increased economic growth is forecast in all sectors of the Solomon Islands economy

Table 3.2: SOLOMON ISLANDS—MERCHANDIZE IMPORTS, 1980-89
(US$'000)

	1984	1985	1986	1987	1988
Food and live animals	10.3	10.6	9.9	10.1	16.7
Beverages and tobacco	2.9	2.7	2.4	2.1	3.2
Raw materials	1.0	0.6	0.5	0.4	0.8
Mineral fuels	15.0	14.1	11.3	10.0	11.1
Oils and fats	0.6	1.2	0.5	0.4	0.5
Chemicals	4.0	4.1	2.9	4.5	6.7
Manufactured goods	10.6	10.9	9.4	13.8	19.3
Machinery and transport equipment	15.7	18.2	18.1	19.6	29.8
Miscellaneous manufactures	5.3	6.6	4.7	6.2	9.3
Other /a	0.4	0.3	7.3	0.3	0.4
Total	**65.8**	**69.3**	**66.9**	**67.4**	**97.6**

/a Includes adjustment for cyclone relief in 1986.

Source: Central Bank of Solomon Islands.

Table 3.3: SOLOMON ISLANDS—TRADING PARTNERS, 1984 - 1988
(Percentage of Total)

	1984	1985	1986	1987	1988
Destination of export	100.0	100.0	100.0	100.0	100.0
Japan	33.2	51.9	37.0	35.6	34.5
Australia	2.3	2.3	4.0	3.7	4.7
Other Asian countries	14.3	11.1	33.1	21.6	22.2
United Kingdom	12.4	14.1	8.5	13.8	14.5
Netherlands	11.2	10.4	2.5	2.0	1.7
United States	0.0	2.5	0.1	5.2	0.1
Other countries	26.5	7.8	14.8	18.0	22.4
Origin of imports	100.0	100.0	100.0	100.0	100.0
Australia	36.3	37.2	40.0	41.4	45.5
Japan	15.0	19.6	16.9	19.1	16.2
New Zealand	8.1	9.0	7.7	7.9	8.3
Singapore	14.5	10.2	8.2	9.2	5.4
Other Asian countries	9.5	11.0	10.0	8.9	9.8
United Kingdom	3.3	4.0	4.1	4.4	5.3
Other countries	13.3	8.9	13.2	9.1	9.6

Source: Central Bank of Solomon Islands.

Table 3.4: SOLOMON ISLANDS—INTERNATIONAL VISITOR ARRIVALS, 1980-89

Year	No. of Arrivals	% change
1980	10,517	-
1981	11,171	6.2
1982	11,179	0.1
1983	11,113	(0.5)
1984	11,127	0.1
1985	11,974	7.6
1986	11,630	(2.9)
1987	12,555	4.8
1988	10,679	(15.0)
1989	9,860	(7.7)

Source: National Statistics Office.

(World Bank 1991), with GDP expected to grow by 4-5 percent per annum through the 1990s. Some growth in palm oil and copra production is expected in the near term but sustained growth in the agricultural sector will require crop diversification and policies to promote small holder development. Fisheries and timber production are areas in which growth can occur, particularly value added through development of fish processing and timber milling activities. Tourism has the capability of developing especially in 'niche' markets based on the range of natural attractions in the Solomon Islands. However, this will require more and better tourist infrastructure, development of internal transport links (particularly air transport) and stronger marketing.

3.7 The development scenario can be expected to increase the importance of Honiara as a collection center for the export of commodities and as a distribution center for imported requirements. Improvement in inter-island shipping and in the provision and maintenance of outer island wharves and jetties, which is presently a significant issue, will become increasingly important. The urgent need for better maintenance and further development of transport services has been noted recently (World Bank, 1991).

Table 3.5: SOLOMON ISLANDS—VISITORS BY COUNTRY OF RESIDENCE 1987-89

Country	1987	%	1988	%	1989	%
Australia	4,957	39.5	3,869	36.2	3,661	37.1
Papua New Guinea	1,316	10.5	1,334	12.5	1,111	11.3
New Zealand	1,463	11.7	1,294	12.0	1,107	11.2
USA	1,193	9.5	909	8.5	999	10.1
Other Pacific	1,047	8.3	1,040	9.7	896	9.1
Europe	1,139	9.0	772	7.2	657	6.7
Japan	540	4.3	584	5.5	539	5.5
Other Countries	900	7.2	887	8.3	890	9.0

Source: National Statistics Office.

Table 3.6: SOLOMON ISLANDS—PROJECTIONS OF GDP GROWTH, 1990-99

	Estimates	Projections	
	1985-1989	1990-1994	1995-1999
Subsistence	2.9	3.0	3.0
Agriculture	-1.8	4.0	4.0
Forestry	-5.8	4.0	4.0
Fishing	3.9	6.0	6.0
Manufacture	8.8	8.0	8.0
Other	5.6	5.0	5.0
Total	**2.8**	**4.6**	**4.7**

Source: World Bank (1991a).

CHAPTER 4
TRANSPORT SECTORS

A. LAND TRANSPORT

4.1 **Road Infrastructure.** There are no accurate figures for the total lengths of different classes of roads in the Solomon Islands. A Maintenance Report for the Solomon Islands Government (Roughton and Partners 1988) provides some estimates of the length of the road system derived from various sources (see Table 4.1). Of the estimated 1,300 km of roads in the country, 520 km are on Guadalcanal, 350 km on Malaita and 250 km in the Western Province. The remainder (some 13 percent of the total) are scattered throughout the other 4 provinces. The report notes that there is probably a much greater length of road in the country than the published figures. The figures are out of date as additional roads have been built since they were first published. There are more roads in plantation and logging areas,

Table 4.1: SOLOMON ISLANDS—MOTORABLE ROAD BY PROVINCE, 1988

Road Authority/Province	Gravel and Earth Roads	Sealed Roads	Total
MTWU	84	66	150
Honiara	71	35	106
Guadalcanal	265	-	265
(Guadalcanal island total)	(420)	(101)	(521)
Malaita	350	-	350
Western	260	-	260
Makira	70	-	70
Temotu	45	-	45
Central	40	-	40
Isabel	15	-	15
Total	**1,200**	**101**	**1,301**

Sources: 1985/86 Statistical Yearbook compiled by the Statistics Office, internal MTWU paper, "Roads and Bridges in Solomon Islands" and Honiara Town Council Road Register, compiled by Cameron McNamara, modified by Roughton & Partners, for sealed roads in MTWU authority.

many of which are now assumed to be public roads without formal declaration by the relevant authority. Many earth roads provide feeder access (typically for tractor vehicles) for cocoa and copra to coastal buying points.

4.2 **Road Investment** levels in the Solomon Islands are difficult to establish. Considerable lengths of roads are being built by logging companies to access logging areas. On Guadalcanal three areas currently are being logged; a western area by a Korean company, a central area by an Australian company and an eastern area by a Chinese company. Some roads continue to be used as public roads after their abandonment by the logging company. Plantation owners and other land owners have often built roads which, if used by the public, are assumed to be public roads. The Ministry of Agriculture and Lands builds roads as part of a specific agricultural development project.

4.3 Past investment on roads has been focussed on Guadalcanal and in particular on the north coast, east and west from Honiara. Data on the Land Transport Sector to 1989 is set out in Table 4.2.

4.4 The 1991 investment program covering the transport sector including Solomon Islands Government budget proposals, is set out in Table 4.3. The projects listed under the Ministry of Trade, Commerce and Industry and the Ministry of Transport, Works and Utilities which relate to the land transport subsector amount in total to SI$21.7M of which SI$16.0M is projected for expenditure in 1991. The program is directed substantially to Guadalcanal. These projects include the rehabilitation of the Guadalcanal weather (southern) coast road and the construction of a new bridge at Lungga on the North Coast Road between Honiara and Henderson Airfield (completed April 1992).[5]

4.5 Expenditure on *road maintenance* in the Solomon Islands has been inadequate. The Solomon Islands Rural Transport Project (TecnEcon, 1989) concluded that, since independence, the quality of transport services and the supporting infrastructure has deteriorated. The situation has arisen because of economic difficulties encountered by the Solomon Islands Government, and has been aggravated by recent events, notably the damage caused by the 1986 cyclone and the transfer of certain transport services and facilities to Provincial Governments who, in the event, lack the financial and manpower resources to address them adequately. Roughton & Partners (1988) concluded that "over the past few years road maintenance has been under-funded, under-resourced, mismanaged and neglected throughout the Solomon Islands".

4.6 The consultants estimate that the cost to maintain the present road system (based on estimates derived from costing of a project road) is SI$4.93 million (1988). This estimate presumes that the roads are at a maintainable standard or have been rehabilitated to a maintainable standard. The costs of rehabilitation are not included. The annual road maintenance budget allocation (1988) compiled by the consultants is set out in Table 4.4. The actual application of the funds cannot be determined. The total of SI$765,000 is significantly below the estimated requirement, even with effective application of the funds. The 1991 Recurrent Budget Estimates for MTWU show SI$150,000 as the 1990 allocation to the maintenance of roads and bridges, with an increase to SI$1,250,000 in 1991. This is a major initiative in addressing the financial requirements of road maintenance; actual allocation to priority areas is crucial to its impact.

4.7 There is considerable ambiguity regarding the exact assignment of *responsibility* for roads maintenance. Each Provincial Government is responsible for roads maintenance, but this responsibility appears not to have been exercised. The MTWU is often called upon to assist with maintenance in the provinces as none of the provinces has an effective maintenance organization. Roads

Table 4.2: SOLOMON ISLANDS—LAND TRANSPORT SECTOR DEVELOPMENT PROJECTS /a, 1981-1988

Project Title and Summary	Timing	Aid Agency	Cost
Bridges: Replacement of two bridges on Guadalcanal destroyed in 1986 cyclone	1986-	AIDAB	A$3,000,000
Guadalcanal Bridges. Two new bridges across River on main land to improve road communication and transport of export produce.	1981-85	AIDAB	A$2,350,000
Second Roads Project: Construction of roads based on technical assistance reports.	1988	ADB	US$4,000,000
Second Roads Project: Technical assistance for appraisal study.	1988	ADB	US$200,000
Second Roads Project: Feasibility for improvement of roads on Guadalcanal, low level bridges on Makira, road maintenance on Malaita. Total cost is $275,000 with cofinancing by SIG.	1986-	ADB	US$235,000
Guadalcanal Road Improvement. Upgrading/ rehabilitation of roads/bridges, equipment and consultants. Total cost of US$6.5M with cofinancing by IDA $2M, OPEC US$1.5M and SIG US$1M.	1984-87	ADB/IDA	US$6,500,000
Emergency Bridging	1981	ODA	£104,000
Guadalcanal Road East II	1980	ODA	£434,630
Guadalcanal Road East	1979	ODA	£264,035
Reconstruction Anakela Bridges	1979	ODA	£168,435
Cyclone Kerry Reconstruction: Rebuilding of bridge on Makira		ODA	38,800
Road Construction and Maintenance Units: Purchase of vehicles and other equipment to establish construction and maintenance units in Honiara and the provinces.	1987-88	Japan	

/a Only projects funded with aid from ADB, IBRD/IDA, and bilateral aid from Australia, the EC, France, Japan, NZ and UK.

Source: National Center for Development Studies, Canberra.

Table 4.3: SOLOMON ISLANDS—TRANSPORT SECTOR PROJECTS 1991 DEVELOPMENT BUDGET PROPOSALS (SI$)

Project	Source of Funds and Aviation	Total Approved	Expended Cash 1990	1991 Estimates Cash and non-cash
Tourism				
Air Traffic Training	SIG	675,000	9,252	650,000
Aeronautical Navigation Aids	EDF	1,075,000	56,318	122,790
Provincial Airfield Development	AIDAB	2,000,000	0	400,000
Calibration Flights Henderson Airport	NZ	58,150	0	58,150
Trade Commerce and Industry				
National Labor Based Road Construction	UNDP	750,000	0	325,000
Marine				
Cargo Vessels - construction of wooden vessels	AIDAB	305,190	0	305,190
Inter-island Vessels - construction of T class vessels	Japan	500,000	0	500,000
Marine Fleet Replacement and Expansion	Stabex	100,000	0	100,000
Honiara Port Upgrading	ADB	10,000,000	6,016,365	3,983,635
Transport Works and Utilities				
Rural Transport	EDF	1,400,000	0	1,400,000
	Stabex	1,700,000	0	1,200,000
Baunam Bridge Construction	UK	251,185	0	251,185
Poha Bridge Rebuilding	AIDAB	1,648,000	0	1,500,000
Lungga Bridge Construction	Japan	8,000,000	0	8,000,000
MTN Structural Review	AIDAB	305,190	0	305,190
Guadalcanal Transincular Road	EDF	7,142,200	0	2,500,000
Emergency Bridging Materials	UK	530,810	0	530,810
Transport Sector	-	35,909,915	6,081,935	22,131,950

Source: Government of Solomon Islands, 1991 Development Program Estimates.

which correspond with declared public roads before independence remain the responsibility of MTWU, but the road lengths accepted by MTWU differ from the lengths of declared roads. A clear distinction between public roads and private roads, an accurate inventory of public roads, and a clear definition of responsibility is required before an effective maintenance system can be implemented.

4.8 **Road Planning.** No comprehensive transport planning studies have been undertaken

Table 4.4: SOLOMON ISLANDS—ROAD MAINTENANCE DATA BY PROVINCE, 1988

Road Maintenance Authority	Length of Road System /a (1)	(2)	1988 Maintenance Vote /c (SI$)	Annual Maintenance Vote /e (SI$/km)
MTWU	145	/b	394,000/d	2,717
Honiara Town Council	110	/b	171,000	1,554
Provinces				
Guadalcanal	265	400	84,000	317
Central	40	133	11,000	275
Isabel	15	56	12,000	800
Makira	70	85	8,000	114
Malaita	350	380	31,000	89
Western	260	260	50,000	192
Temotu	45	80	4,000	89

/a No. 1 column is reproduced from source below. Column (2) is derived from data in the 1988 Provincial Development Plans.
/b Data not available in Provincial Development Plans.
/c The maintenance votes listed are the Road Maintenance Grant and do not include salaries/wages of personnel in road/bridge maintenance activities.
/d Includes airfield maintenance figures.
/e 1988 maintenance vote figures and Column (1) lengths.

Source: "Solomon Islands Integrated Transport Study (Survey)". Appendices. TecnEcon for Commonwealth Fund for Technical Cooperation, September 1987; and information from the Ministry of Transport, Works and Utilities, Honiara.

in the Solomon Islands. The Integrated Transport Study (Survey) (TecnEcon, 1987), reviewed the transport sector and identified key modal issues. The Solomon Islands Rural Transport Project (EEC 1989) extended this work in the road transport subsector. Other subsectors were to be the subject of separate studies. These studies, as yet, have not been initiated. The Rural Transport Project identified a number of project components which are currently being progressed under LOME III funding. The project components are:

- rehabilitation of selected bridges and wharves
- rehabilitation of the Guadalcanal weather coast road
- construction of the Asemanisha-Wango Bay road section, Makira Province
- a labor intensive feeder road construction program.

The project components include an initial (partial) inventory of selected roads, bridges and wharves (with the potential of extension to cover all transport infrastructure) and the establishment of a road maintenance unit, including a full program of training. This is a 2 year project extending from October 1990 to November 1992. This program focuses on the immediate needs of rehabilitation and is making a valuable contribution. Although the program has included broader issues (for example, in assisting the formulation of a New Roads Act), it does not directly address the needs for a roads development planning framework.

4.9 An organization review of the MTWU has been undertaken recently for the Government, funded by AIDAB (SMEC and Mayo Group, 1991). The objectives of the review were to:

- define the present role, objectives and goals of the MTWU;
- identify current resource constraints which limit achievement of operational goals;
- examine options for the upgrading of the Ministry, and
- recommend an upgrading strategy.

The first stage of the overview dealing with the organization and structure of the Ministry has been completed. The second stage involves a detailed manpower planning investigation and is nearing completion (as of late 1991). The first stage of the work concluded that:

(a) there has been a lack of service provision, despite previously adequate human resource base (excluding the last 12 months);

(b) there is no evidence of any policy direction or long term planning orientation;

(c) major works have been through donor projects in which the Ministry has taken a passive role, and

(d) a critical shortage of experienced professional staff now exists.

The SMEC-Mayo report does not support the privatization of the transport functions of the Ministry. Rather, the report recommends restructuring of the transport (and other) functions to make services more efficient and effective, the introduction of a corporate management planning approach, effective program budgeting, and the introduction of a user-pay approach to service provision.

4.10 **Vehicle Registration.** Vehicles are only required to be registered in Honiara (for Honiara and Tulagi), Auki, and Gizo and at points accessible by road from these centers. Statistics do not include vehicles operating elsewhere. However, as most roads outside of these areas are typically no more than tracks, suited only to tractors and trailers, the number of registered vehicles is likely to reflect the actual number of vehicles (excluding tractors/trailers) using the road system. The number of registered vehicles by year is set out in Table 4.5. A substantial increase in customs duties on cars and motorcycles in 1980 has reduced subsequent new vehicle registrations, although a large (an unexplained) increase in the registration of new motor cars and goods vehicles occurred in 1985. Of the 3,629 vehicles registered in 1986, 2,906 were registered in Honiara of which 560 were Government vehicles. Almost all Government vehicles are used in and around Honiara, and about 95 percent of the registered vehicles in the country were used in Honiara or on the north coast of Guadalcanal.

4.11 Traffic counts have been made on the north coast road of Guadalcanal since the 1970s, but there is no traffic volume data for other parts of the road system. Volumes range from 17,800 vehicles (1988, 12 hour count) close to the center of Honiara to 3,600 vehicles (1988, 12

Table 4.5: SOLOMON ISLANDS—REGISTERED VEHICLES, 1980 - 1986

	1980	1981	1982	1983	1984	1985	1986
Newly Registered Vehicles							
Motor cars	98	65	68	64	57	171	74
Public service vehicles	277	211	168	130	121	50	13
Goods vehicles	184	162	125	118	143	412	167
Motorcycles	133	100	68	35	35	48	36
Other	-	-	-	-	-	138	60
Total	**692**	**538**	**429**	**347**	**356**	**819**	**350**
Total Registered Vehicles							
Motor cars	814	939	926	-	-	1,048	1,022
Public service vehicles	145	170	207	-	-	200	209
Taxis	161	209	186	-	-	379	328
Goods vehicles	775	921	959	-	-	1,453	1,499
Motorcycles	288	293	295	-	-	268	253
Others	381	488	497	-	-	345	3,188
Total	**2,568**	**3,120**	**3,080**	**-**	**-**	**3,693**	**3,629**

Source: National Center for Development Studies, Canberra.

hour count) on the outskirts, reducing to 50 vehicles per day at Mberande Bridge some 40 km east of Honiara.

4.12 The *land freight industry* is almost entirely in the private sector. The MTWU maintains a fleet of vehicles for its own and general Government needs. There is no regulation of routes or rates for freight transport and no data on the freight task. The industry is dominated by company owned vehicles, particularly in the logging and oil palm industries, as well as for the transport of fuel. There are a number of operators which provide freight vehicles for hire.

4.13 Formal *public transport* services are provided by private bus companies operating a fleet of large buses and minibuses. Most services are operated within Honiara, but some services are provided both east and west from Honiara along the North Coast Road for a distance of approximately 40 km in each direction. The Government regulates fares and licenses routes for the bus services. Licensed taxis provide services at negotiated fares, mostly within Honiara. Informal public transport services are provided in other areas of the country, usually in open trucks without seats, and as an accompaniment to freight transport.

4.14 *Road safety* has been a matter of concern, although there is little statistical data on accident occurrence or on primary factors associated with accident causation. The extension of logging roads on Guadalcanal are built to minimum alignment standards in mountainous terrain and are used by heavy logging trucks and machinery.

These roads are effectively open to public use and represent a serious accident potential both now and in the future (when they transfer to public status). Logging road standards (including alignment), as initially constructed under logging leases, are supposed to reflect future transfer to the public sector.

B. Maritime Transport

Ports and Marine Facilities

4.15 There are two *declared ports* for international shipping at Honiara and Noro owned and operated by the Solomon Islands Port Authority (SIPA). A further port at Yandina (Russell Islands) is the copra export port for Lever's Pacific Plantation Pty. Ltd. which provides stevedoring, handling and warehousing services. Other ports are used exclusively for the export of logs and timber and there are numerous landings throughout the islands used by local vessels.

4.16 Cargo movement through Honiara has increased with the exception of 1987 (due to effects of the cyclone in 1986) up to, and including, 1990. For 1991, the first three months actual figures against forecast show a significant reduction in imports, with exports meeting forecast levels.

4.17 The Port of Honiara can accommodate general purpose and container vessels with a draft of up to 9.2 meters. An extension to the wharf was completed in 1982 and further works funded by ADB were completed in 1991. The total cost of the recent extensions is SI$10M funded by concessional loans from the ADB. The work has been directed to the strengthening of 72 meters of the existing wharf to enable the use of heavy forklifts up to the ship's side, extension and paving of the container yard and additional storage facilities, particularly for inter-island shipping. The works will enable more efficient working of cargo and stacking of containers.

4.18 The Port of Noro and an associated township have been developed to handle exports and import cargoes generated by the Solomon Tayo fish cannery and as an export center for copra. The port was constructed as grant in aid to the Solomon Islands Government at a cost of SI$7.8M, including a work boat, cargo handling equipment and warehousing. The port became operational in the first quarter of 1989.

4.19 Cargo movement through Noro in 1990 (29,840 revenue tonnes) showed a major increase over 1989 (14,640 revenue tonnes), but the difference in part was due to a 9 month operational year in 1989. The first two-month figures for 1991 are in line with forecasts. Major exports are canned fish and copra. Major imports are empty tin cans, salt and general cargo. Martime cargo movement for all ports is shown in Table 4.6.

4.20 There has been minimum investment in the maintenance of outer island wharves and jetties. There is no current inventory of the marine infrastructure outside of the major ports. A 1979 inventory of berths financed by AIDAB identified approximately 150 wharves, jetties and anchorages in the Solomon Islands of which around 40 were anchorages and the others wharves and jetties of various types of construction owned by local provincial administrations, missions, villages, churches, schools and by various private companies. An inventory of these facilities is part of the Rural Transport Project funded under LOME III. Rehabilitation of some selected facilities is also being undertaken as part of the program. No specified expenditure allocation for wharves and jetties is shown in the MTWU recurrent budget for 1991.

Ports Administration

4.21 The Solomon Islands Port Authority (SIPA) is responsible for the operation and maintenance of the Port of Honiara and Noro. SIPA, established by the Ports Act 1956, is required to operate commercially. The

Table 4.6: SOLOMON ISLANDS—MARITIME CARGO MOVEMENT, 1986 - 1990
(000's revenue tonnes)

	1986	1987	1988	1989	1990
Import	128.3	114.9	140.5	150.4	143.5
Export	47.8	35.7	37.6	46.6	61.9
Transhipment	3.4	0.5	0.3	0.2	1.8
Total	**179.5**	**151.1**	**178.4**	**197.2**	**207.2**
Overseas Vessels Berthed	265	279	251	266	-

Source: Solomon Islands Port Authority.

Authority is responsible for all operational functions, including the provision of navigational aids at the ports under its control. Government policy is that the Authority be autonomous and financially self sufficient. In addition, under loan covenants in the Project Agreement for the Second Honiara Port Project, financed largely by the ADB, financial performance targets are:

- an annual rate of return (on revalued net fixed assets) of not less than 5 percent.
- a debt service ratio of not less than 1.3.

The Authority has been able to meet all commercial operating costs and to generate a net surplus, but has not been able to achieve the minimum rate of return of 5 percent on net fixed assets.

4.22 SIPA provides all services, including stevedoring at Honiara and Noro. Port dues, pilotage, wharf cleaning, tonnage dues (wharfage) and berthage charges are applied to vessels employed on voyages calling at ports outside the Solomon Islands. A separate schedule of rates is applied to vessels involved in inter-island trade within the Solomon Islands. These rates are lower than the rate for overseas shipping. Tariffs were adjusted last in March 1991, after being pegged for some 3 years. (Port charges at Noro were increased by 20 percent in January 1992.) All revenue is retained by SIPA. Port facilities are grouped into Service Centers and are costed separately. The objective set by the Authority is that each Service Center is to meet costs plus a required rate of return. Figures provided by SIPA indicate that facilities used by local shipping do not meet costs and are heavily subsidized by direction of Government.

4.23 At Honiara (only) stevedoring services can be provided for two shifts per day (7.30 am to 12 midnight) 7 days per week. An incentive scheme operates based on the handling rate of containers and general cargo and on the stuffing and unstuffing rate for LCL containers. All operational staff receive the full calculated bonus payment (stevedores, drivers, cargo checks, supervisors) and non-operational staff (mechanics, carpenters, storemen, security guards, administration and supervisors) receive 50 percent of the calculated bonus. The bonus system makes no allowance for production increases resulting from new capital investment, and the bonuses are an over-calculation,

therefore, of the results from increased labor productivity.

Port Planning

4.24 The Authority proposed a Master Plan of Port Development for the Solomon Islands in 1989. The request was directed through Ministry of Trade, Commerce and Industry (the Ministry responsible for the Port Authority) and has been approved by Cabinet. The scope is to include Honiara and Noro and a potentially third port at Bina (Malaita). The study is understood to be arranged through EEC funding. No additional project proposals other than the completion of works at Honiara are shown in the 1991 Development Budget proposals for transport (Table 4.3). (Further development of Noro has been contemplated, however storage and land constraints, as well as demand prospects require careful assessment.)

Marine Regulation

4.25 The Marine Division of MTWU is responsible for provision and maintenance of navigation aids in Solomon Islands, for the survey and certification of vessels on the Solomon Island Register, and for search and rescue operations. The Division also operates and maintains the Government fleet (see below under Inter-Island shipping). The Marine Division sets the syllabus for the Marine training school and provides certificates of registration for seamen.

International Shipping

4.26 Solomon Islands is served well by international shipping lines. Bank Line, Chief Container Services, Kyoura, NGPL/Columbus, Sofrana and Pacific Forum Line each provide monthly services and the Barbican Line a 6 weekly service through Honiara. Services are provided to Europe, Australia, Papua New Guinea, Japan, Hong Kong, Singapore and New Zealand. Copra export is usually by contract or charter arrangement. The export of logs is handled directly by the logging companies, typically from a wharf at the main logging base camp; sawn timber is exported through Honiara by container.

Inter-Island Shipping

4.27 Inter-island shipping is an essential transport service for the movement of freight and passengers within the Solomon Islands. There are no recent studies of inter-island shipping. A two-part study by AIDAB (then ADAB) was carried out in 1979. The principal objectives of the 1979 study were to compile an inventory of marine infrastructure (wharves, jetties, shipping, shipyards), to measure the carriage of freight and passengers on an origin-destination basis, and to estimate future requirements based on projected production of copra by region and growth in income related freight movement.

4.28 In 1981 a reconnaissance mission report was prepared by the ADB - 'Solomon Islands Inter-island Shipping Problems and Potential', which examined agricultural development, social needs served by shipping and the existing marine infrastructure and its management. It found (at that time) that fleet capacity was substantially in excess of observed demand, but that organization and management of the fleet left much room for improvement.

4.29 In 1987 the 'Transport Sector Study - Solomon Islands (Survey)', conducted under CFTC funding, provided a description and analysis of the national transport system, with specific attention to questions of adequacy and efficiency of service. The study noted that reliable data on passenger and freight movements within the country were lacking and that as a consequence it was difficult to formulate a coherent and realistic marine transport policy and development plan. The following key issues and constraints were identified:

- the poor operating performance of the Government fleet and those vessels which had been devolved to the provinces;

- the allocation and devolution of vessels to the provinces had not been successful in improving services or bringing more efficiency and cost effectiveness to marine transport;

- the lack of adequate repair facilities for both Government and private vessels;

- the need for a route classification to be established so that a proper balance in services between Government and the private sector could be determined and an overall policy developed for subsidies on uneconomic routes;

- the need for a more rational approach to the question of subsidies to the Marine Division for operating uneconomic services;

- the need for better professional staffing levels in the Marine Division to enable it to carry out both its operational and regulatory functions efficiently;

- the need for a full review of the marine legislation to bring it into line with current maritime practices and the operating situation in the Solomon Islands.

4.30 The Commodities Export and Marketing Authority (CEMA) of the Solomon Islands has examined the logistics of the copra sector and in particular the upgrading of copra centers (export centers, marketing centers and buying points) and operations and policy development. To improve operations, a study of internal shipping was proposed, directed towards examining the capacity to meet the growing requirements of copra marketing and solutions to problems experienced through uncertainty in shipping schedules. The report notes that one of the major problems appears to be the manner of operation of private and Government shipping services, rather than the lack of capacity in the national fleet. Private vessels currently in service are not designed for the efficient freighting of copra. Because of communication difficulties there is a lack of information on copra available for loading at the local port level for shipment to regional ports. As a result effective scheduling of shipping visits cannot be developed.

4.31 CEMA is presently conducting a trial, using a 200 tonne capacity vessel under contract arrangement, to move copra from selected regional ports to Honiara on a *scheduled* service. The costs of such an arrangement will be compared with the present system of using available vessels *on call*. While this initiative may address problems in the movement of copra to export centers, it will not resolve the overall problems of the domestic movement of general freight and passengers between centers.

4.32 The inter-island shipping system comprises an *informal* and a *formal sector*. The informal sector provides transport services by small vessels, mainly canoes less than 6 meters in length. They perform an important social and commercial function and are used mainly for movement around islands, although some inter-island voyages occur. They are used for transport of copra to local buying points, of which there are 33 located throughout the Solomon Islands.

4.33 The *formal transport sector* comprises Government and private vessels (including mission vessels), registered in the Solomon Islands. The current Government fleet consists of 15 vessels operated by the Marine Division and 4 vessels devolved to Provincial Government (Guadalcanal and Malaita). There are 186 vessels in private ownership on register. Vessels range in size from 7.5 meters (8 G.T.) to 54.5 meters (518 G.T.), although the majority would be less than 30 meters (100 G.T.). There is no central scheduling system except for the

Marine Division vessels and four private enterprise vessels. The great majority of vessels do not run to fixed published schedules. Increased regular scheduling of services would appear desirable to enable planning of export crop harvesting, ordering of supplies and for personal travel, since the inter-island fleet performs the main transport task of moving passengers and freight in the Solomon Islands.

4.34 The Government fleet runs both around-island and inter-island services. The private fleet tends to operate inter-island routes, and on those services which are commercially viable. The passenger and freight rates on Government vessels are fixed, and outer island services are heavily subsidized.

4.35 Ernst and Young (1990) in a study of privatization and commercialization policies and strategies for the Solomon Island Government found that the Government fleet operated at a substantial loss. Whilst passenger and cargo rates are officially based on the cost of providing the services, this generally only involves the estimated cost of fuel and labor. Non-cash items are not taken into consideration and the estimated rates are compared to private shipper charges and adjusted accordingly. Nevertheless, many of the rates are retained at artificially low levels because the marine fleet is considered a social necessity. On the basis of the 1989 budget, rates appear to result in revenues which meet approximately half of operating costs. If costs were further increased by inclusion of depreciation (capital replacement) costs for the ships and port facilities, the rates would need to be increased in excess of 100 percent. The 1991 recurrent budget estimates indicate an expected revenue to expenditure ratio of 0.51, with a deficit approaching SI$2 million. The level of profitability of the private operators is not known.

Ship Repair Facilities

4.36 Sasape Marina Ltd., which is fully owned by the Investment Corporation of the Solomon Islands Government, provides ship repair and maintenance facilities and can slip vessels up to 300 tonnes. An assistance program through the Overseas Fisheries Assistance Corporation of Japan is presently being implemented, to increase equipment capability and improve the efficiency and effectiveness of the organization. Sasape Marina Ltd. received an initial loan of SI$600,000 from the Solomon Islands Government prior to 1989. No direct financial assistance has been received from the Government since, although assistance is currently being provided by Japan.

C. AVIATION

Air Routes

4.37 *International air services* are provided by the national carrier, Solomon Airlines, and by Qantas (using Ansett Airlines of Australia), Air Nuigini and Air Nauru. All services are by B737 aircraft with the exception of Air Niugini which operates F28 aircraft.

4.38 Solomon Airlines commenced operation as a fully Government owned corporation in 1988, leasing a B737 from Air Pacific. This arrangement concluded in 1989 because of the sale of the B737 aircraft by Air Pacific. Solomon Airlines elected to dry lease a B737-200 series for a period of 2 years (plus one year option) and commenced operation with this aircraft in 1990. (Partial privatization of Solomon Airlines with foreign equity has been considered a possibility.) Solomon Airlines business strategy includes arrangements with Air Vanuatu, Air Pacific and Air Niugini for block seat purchases. (A weekly service between Auckland and Niue was operated for the Niue Government, but was withdrawn recently.)

4.39 Solomon Airlines have taken an option to convert to a dry lease of a B737-400 series, because of Stage 3 noise limitations and the better operating efficiencies given the limited servicing options in the region for 200 series aircraft.

4.40 Solomon Airlines do not envisage changes to their network based on Honiara; in the medium to long term changes will depend primarily on the growth in tourism. However, in wet lease arrangements for their aircraft in the South Pacific, in areas which can be served through extension of their present network could prove attractive in increasing utilization. The airline has strong interests in development of Henderson Airport, provision of new ground equipment, a hangar and airport kitchen have been advanced as priority requirements. Revenue, inclusive of domestic services, has increased from SI$4 million in 1987 to SI$40 million in 1990. Real growth in revenue is less than implied by the figures because of devaluation over the period.

4.41 *Domestic services* are provided by Solomon Airlines and Western Pacific Air Services which is operated by the Seventh Day Adventist Church. Western Pacific Air Services (WPAS) operate services available to the general public on the routes flown, which are directed to serving the rural areas of the Solomon Islands.

4.42 Equipment operated by Solomon Airlines for domestic services consists of two Twin Otter (18 seat), 2 Islanders (9 seat), and one Aztec (5 seat). Scheduled services are based on the use of the Twin Otters and one Islander aircraft. The airline plans to phase out the Islander aircraft in the medium term and to acquire an additional Otter aircraft. Further equipment development would depend on increases in tourism. Solomon Airlines operate scheduled services to 19 regional airfields and also operate charter services on demand. The airline views provision of night landing facilities specifically at Munda, Gizo, Auki and Kira Kira, as a priority to increase aircraft utilization by extending operating hours. The level of fares on domestic services is controlled by the Solomon Island Government and are claimed by the airline to yield revenue below operating costs. No fare subsidy is paid by Government; thus domestic air services are cross-subsidized by international operations. Western Pacific Air Services operates to fewer airports and carries considerably less passengers (7,730 passengers in 1989) than Solomon Airlines (41,737). However, it carried substantially greater amounts of freight (139,667 kg in 1989 compared with 45,585 kg) and is planning to increase its freight capacity.

Airport Facilities and Investments

4.43 Henderson Airport on Guadalcanal is the international airport for the Solomon Islands and is located 12 km east of Honiara. It was developed originally during World War II, and has been upgraded gradually since 1981. Major improvements to date include extension of the runway to 2,000 meters, strengthening of the pavement, construction of a control tower and installation of navigational aids. There has been no corresponding improvement of terminal facilities and the passenger throughput capacity of the present terminal building is such that some delays are experienced at (peak) periods and for international services on B737 aircraft. A study of the development of the airport is currently being undertaken with Japanese aid. (Interim improvements can be made with modest investment; assistance for this approach has been proposed by AIDAB.) Air traffic movements through Henderson Airport are shown in Table 4.7. There has been a decline in international aircraft movements for the period shown, but some increase in international passengers and freight. Domestic air traffic movements have been essentially static over the period.

Operations and Administration

4.44 The Ministry of Tourism and Aviation (MTA) is responsible for the operation, management and maintenance of Government airports, for air traffic services and for air safety. The Ministry is also the authority for international air service agreements and for the development and enforcement of regulations affecting domestic aviation.

Table 4.7: SOLOMON ISLANDS—AIR TRAFFIC MOVEMENTS THROUGH HENDERSON INTERNATIONAL AIRPORT 1982-1986

	International			Domestic		
Year	Aircraft Movements	Passengers	Cargo (tons)	Aircraft Movements	Passengers	Cargo (tons)
1982	1,810	30,900	368	8,590	18,900	161
1983	1,600	30,800	333	7,900	20,200	174
1984	1,560	31,900	425	10,640	23,600	212
1985	1,500	35,000	411	8,950	22,200	215
1986	1,380	35,300	659	7,110	18,400	193

Source: Civil Aviation Division, Ministry of Tourism and Aviation.

4.45 The Ministry is required to consider the privatization of civil aviation functions in line with the current general policy of Government. Additionally, the division of responsibility for civil aviation matters between the Central Government and Provisional Governments is yet to be resolved. Present indications are that a single statutory authority will be proposed, responsible for general aviation policy, air navigation and air safety regulation, and for the operation and management of Henderson Airport and Munda Airport (the alternate to Henderson). Such an authority would be expected to operate with the objective of full cost recovery for services provided (funded by a revised mix of departure tax, fuel tax, airport concession rentals and landing fees). Operation and maintenance of other airports may be handed over to Provincial Governments; this would represent a reversion to a situation which has been tried without success in the past.

4.46 Staffing of senior executive, professional and specialist technical functions is predominantly by expatriates. The positions of Director Civil Aviation and Principal Civil Aviation Officer (Flight Standards) are filled by expatriate personnel, provided through the Australian Staffing Assistance Scheme (ASAS). Training of Solomon Islands staff is occurring within the civil aviation subsector and advantage is taken of overseas training programs and funding. The Solomon Island Government is funding the training of Solomon Islanders as air traffic controllers and as pilots (currently there are three trainee pilots). However, there remains a lack of experienced staff in the technical areas of civil aviation, although to date loss to private enterprise has not occurred as there is no demand for the particular skills in the private sector.

4.47 There are 31 *domestic airports* in the Solomon Islands, 21 of which are Government owned and 10 operated by private interests (tourist resorts, timber companies, church organizations and plantation operators). All except one airfield is licensed. Airfields vary in runway length from 650 meters to 1,200 meters, with surfaces of either coral, grass, gravel or sand. Terminal facilities are minimal or non-existent, and none of the airfields is equipped for night operations. The Western Province has 15 airstrips and appears well provided by comparison with other provinces.

4.48 The maintenance of regional airfields has been a major problem, with airstrips being closed at times because of lack of maintenance (typically lack of regular runway grading and control of vegetation). In the past, appropriation for airport maintenance has been to the Ministry of Transport, Works and Utilities. The Ministry of Tourism and Aviation now bids for, and receives, the appropriation, and uses MTWU as the agent to carry out the works. The 1991 budget allocation for airport maintenance is SI$150,000 for distribution among 21 airports, excluding Henderson Airport which has a specific maintenance provision of SI$11,800. This implies an average of SI$6,910 per annum to maintain each of the provincial airfields. This level of funding is judged insufficient to meet specific and cyclical maintenance requirements.

4.49 A recent study funded by AIDAB (Airplan, 1991) of eight existing provincial airports and four new provincial airport locations selected as priority projects by the Solomon Islands Government, estimates rehabilitation costs of the eight existing airfields at A$1.05 million. If Munda, one of the eight airfields, was upgraded as an alternate to Henderson Airport, the estimated costs would increase to A$4.7 million. Costs of A$850,000 are estimated for the four new airfields, although at this stage there is little quantifiable evidence for their economic justification. These costs do not include land acquisition or access road provision to the airfields. AIDAB has agreed to the provision of SI$2 million for these projects, commencing in the 1991/92 financial year. A further SI$1.075 million is being funded by the EDF for the provision of NDBs and DMGs at provincial airports (see Table 4.3).

4.50 Budgeted revenues and expenditures for 1991 indicate that expenditures are well in excess of revenue (see Table 4.8).

Table 4.8: SOLOMON ISLANDS—MINISTRY OF TOURISM AND CIVIL AVIATION CIVIL AVIATION INCOME AND EXPENDITURE, 1991 (SI$000s)

Revenue	
Air Service Licenses	5
Navigation Fees	15
Boarding Fees	400
Landing Charges	200
Other Fees and Receipts	21
Total	**641**
Costs	
Salaries, Allowances, Housing and Related Costs	475.1
Office and Administration	169.7
Operations, Licensing, Inspection and Training	203.9
Airfield Maintenance	161.8
Total	**1,010.5**

Source: Civil Aviation Division, Ministry of Tourism and Aviation.

CHAPTER 5
TRANSPORT SECTOR DEVELOPMENT NEEDS

A. INTRODUCTION

5.1 Factors that affect transport in the Solomon Islands include the archipelagic nature of the country, the general dispersal of the population with a predominance of coastal settlement, and a climate and topography that makes transport infrastructure difficult to construct and costly to maintain. Sea transport has traditionally been, and remains, the key mode for the movement of passengers and freight.

5.2 The demands on the domestic shipping sector do not appear to be met well by either the public or private sector. To date an integrated study of the transport sector has not been undertaken to assess transport development strategies on a miltimodal basis. A reconnaissance mission by the ADB in 1981 examined the existing marine infrastructure and its management in the context of agricultural development and the need to provide transport services to island communities. The finding by ADB that organization and management, rather than capacity of the fleet, was the central issue, remains valid.

5.3 Considerable road investment took place on Gaudalcanal during the 1980s with substantial investment in major port facilities at Noro and Honiara later in the period. Despite the level of funding, recent reviews have found that the condition of roads and other transport assets has deteriorated over the period (Solomon Islands Rural Transport Project - TecnEcon, 1989). Present policy is to address the rehabilitation of roads, bridges and jetties, rather than the construction of new facilities.

B. INSTITUTIONAL

5.4 **Investment Justification.** The national planning process was discontinued toward the conclusion of the third National Development Plan (1985-1989), and supplanted by a Program for Action 1989-1993. With reorganization of the governing party in 1990 this Program now has an uncertain status. The process has not promoted consistent objectives, policies and plans for development. The process of identification and justification of projects has changed as a result of changes in the structure and responsibilities of Government ministries. The Ministry of Economic Planning has been abolished and an Economic Planning Unit established in the Ministry of Finance. The identification of potential projects now appears to rest with the various Ministries with further assessment made by the Policy Evaluation Unit of the Department of the Prime Minister for multi-lateral donor projects or the Ministry of Home Affairs for bilateral donor requests. Overall coordination and assessment control is also provided by the Policy Evaluation Unit. It is difficult to identify any explicit and comprehensive strategy to aid a cross sectoral approach to project identification and investment and to guide overall development of the transport sector.

5.5 **Government Accountability.** The preparation of annual reports from Departments

and Agencies is a requirement of Government. The application of the requirement has been variable, but recently has become a firm commitment. There is, therefore, a procedure in place for parliamentary and public scrutiny of policy and service delivery which is to be translated into practice.

5.6 **Transport Strategy.** Changes to the allocation of functions to Ministries and major changes in Chief Executive Officer appointments, in addition to a fundamental policy initiative by Government to privatize many public sector functions, has made clarification of transport strategy difficult. Priority at present is being given to the review of the organization and responsibilities of Government departments and to the problems of structural adjustment of the national economy.

5.7 **Human Resource Development.** Major constraints have been applied by Government to the manning of departments, including the withdrawal of unfilled staff positions. Moreover, there has been a reduction of technical assistance appointments by not replacing expatriate personnel at the completion of contract periods. External training of staff in specialist technical areas appears to be continuing in those departments which have sought financial appropriation for this purpose. The feasibility of "twinning" arrangements with overseas similar organizations deserves exploration.

5.8 **Aid Environment.** Aid negotiation was suspended in 1989 to enable the Government to prepare new guidelines and to establish clearer priorities for financial and technical assistance. The new guidelines seek bilateral donors to finance 100 percent of project costs and to focus their assistance by province or sector, with the recognition that such a focus may not be appropriate for small donors or national programs. As observed previously, the division of responsibility for bilateral and for multilateral aid does not assist the clear definition of priorities and is likely to make project evaluation and appraisal difficult.

C. General Transport Sector Issues

5.9 **Policies and Practices.** The Government initiative to privatize some public sector functions and to corporatise other functions has, as a component, the introduction of a general policy of cost recovery. The application of cost recovery measures and the way in which privatization of public sector activities might occur is still to be developed in detail, and is being addressed by Government departments. In addition to the issue of privatization, Government is re-examining the devolution of powers to regional Government. Past experience of provincial responsibility for various functions, including transport matters, has not proved satisfactory because of resource limitations and regional institutional capabilities. Nevertheless, the movement of functions from central to provincial Government remains a matter of Government policy.

5.10 Inadequate funding and lack of organizational capability directed to the *maintenance* of transport facilities is identified as a major problem which has led to the condition of the nation's transport assets deteriorating during the course of the 1980s. The problems encompass the maintenance of wharves and jetties in outlying regions, maintenance of provincial airstrips, and the need to rehabilitate neglected roads and bridges. An assessment of all existing transport infrastructure needs to be undertaken to identify warranted assets and establish maintenance priorities and funding requirements.

D. Land Transport Subsector

5.11 **Management Systems.** No road inventory has been prepared for the Solomon Islands. The type, length and location of bridges is unknown as is the condition and

maintenance record of roads throughout the nation. No management and costing system exists which would form the basis for an effective program of road maintenance and rehabilitation. The Rural Transport Program funded under LOME III has as one of its objectives the establishment of an initial inventory of selected roads and bridges, and it has made a valuable contribution in this area. However, there is need to extend the inventory to cover all transport infrastructure.

5.12 **Private Sector Participation.** The involvement of the private sector in the land transport sector is limited to the provision of transport services. Formal public transport services and taxi services are provided within and near to Honiara. Informal public transport services are provided in other areas of the country, usually as an accompaniment to the movement of freight. Freight services are dominated by company owned vehicles although limited freight hire services are available. There is no involvement by the local private sector in the construction or maintenance of roads. The development of a competitive contractor market is an obvious area for privatization of Government functions and an initiative which may assist in the effective devolution of maintenance responsibilities to regional Governments. At this stage, however, the private sector is not equipped to carry out the construction and maintenance functions.

5.13 **Road Investment.** Present Government policy is directed to the rehabilitation of neglected roads and bridges and the development of an effective road maintenance capability. There has been considerable investment in access roads by logging companies on Gaudalcanal. The opportunity should be taken to set construction standards and routes and alignments (in line with existing legislation) as part of logging agreements which later would enable the roads to be more suitably incorporated into the public road system. Future investment in new roads should be coordinated with agricultural development as part of an integrated road/maritime infrastructure program.

E. MARITIME SUBSECTOR

5.14 **Strategy and Policies.** Effective maritime strategies and policies are crucial to the further development of the Solomon Islands economy. While this need has been recognized, no overall action has been taken to prepare a development plan for this sector. The Commodities Export and Marketing Authority (CEMA) has examined domestic logistics, the upgrading of copra centers, and the development of shipping services to meet its specific needs. However, these proposals do not address the provision of services to meet the general passenger and freight transport demand.

5.15 **Wharf and Jetty Facilities.** No inventory exists of wharves and jetties and many appear inadequate or in a poor state of repair. Rehabilitation of selected wharves and jetties is being undertaken through LOME III, but the matter of responsibility for, and adequate maintenance of, regional wharves and jetties needs to be resolved.

5.16 **Inter-island Shipping.** The efficiency and effectiveness of inter-island shipping is a key element in the transport sector. Constraints which have been identified include the high subsidies required to operate the Government fleet, the poor operating performance of those vessels devolved to the provinces, and the lack of appropriate coordination of public and private services.

F. AVIATION SUBSECTOR

5.17 **Strategy and Policies.** The Ministry of Tourism and Aviation is required to consider the corporatization of civil aviation functions in line with the general policy of Government. Indications are that a statutory authority will be proposed responsible for general aviation policy,

air navigation and air safety regulation, and for the operation and management of Henderson Airport and Munda Airport. The Authority would be expected to operate with the objective of full cost recovery for services provided. The feasibility of this should be examined. Operation and maintenance of other airports may be handed to Provincial Governments, a reversion to a situation which has proven unsuccessful previously because of the lack of resources and commitments at the provincial level. The Government is presently seeking donor assistance for the upgrading of Henderson International Airport to improve service standards.

5.18 Airport Maintenance. As in other transport subsectors, maintenance of airports has been a major problem as a result of the lack of any systematic maintenance program and underfunding of basic maintenance needs. The development of an ongoing maintenance program and decision on the responsibility for airport maintenance needs to be resolved.

Endnotes

1. This transport sector survey is based on a mission to Solomon Islands April 8-12, 1991. The mission members were Colin Gannon (Senior Economist and mission leader) and Ian Gordon (consultant). A draft of this report was discussed with the Government of Solomon Islands June 18-19, 1992.

2. See World Bank (1989).

3. The five other South Pacific island countries which were members of the World Bank at the time of this study, were Fiji, Kiribati, Tonga, Vanuatu and Western Samoa.

4. The World Bank country study of the Pacific Island Economies (World Bank, 1991a) presents a more detailed review of the Solomon Islands economy and its development prospects.

5. Concern has been expressed with the warrant for substantial upgrading of the airport road (linking Henderson Airfield and Honiara); one option under consideration (mid 1992) was a BOT scheme financed by an increase in fuel tax. More limited rehabilitation options (such as a sealed overlay) warrant assessment.

BIBLIOGRAPHY

Asian Development Bank (1990), *Privatization and Commercialization Policies and Strategies Project in Solomon Islands*, Ernst and Young.

Asian Development Bank (1981), *Solomon Islands Inter-Island Shipping Problems and Potential Mission Report.*

Australian International Development Assistance Bureau (1991), *Review of the Ministry of Transport Works and Utilities*, SMEC and the Mayo Group.

Australian International Development Assistance Bureau (1991), *Feasibility Study of Provincial Airports Development in the Solomon Islands.* Airplan.

CEMA (1988), *A Proposal for Market Development in the Solomon Islands.*

Government of Solomon Islands (1984), *Economic and Engineering Studies for the Extension and Upgrading of the Lambi-Aola to Marau Sound Roads.*

Roughton and Partners (1988), *Guadalcanal Road Improvement Project, Maintenance Report.* Ministry of Transport, Works and Utilities.

TecnEcon (1988), Solomon Islands Rural Transport Project. Commission of the European Communities.

Tourism Council of the South Pacific (1990), *Solomon Islands Tourism Development Plan 1991-2000*, Ministry of Tourism and Aviation.

Transport and Road Research Laboratory (1982), *The TRRL Road Investment Model for Developing Countries (RTIM2)*, TRRL Laboratory Report 1057.

United Nations Development Program (1989), *Port Development—A Handbook for Planners in Developing Countries*, TD/B/C.4/174.01.

World Bank (1987), *The Highway Design and Maintenance Standards Model.*

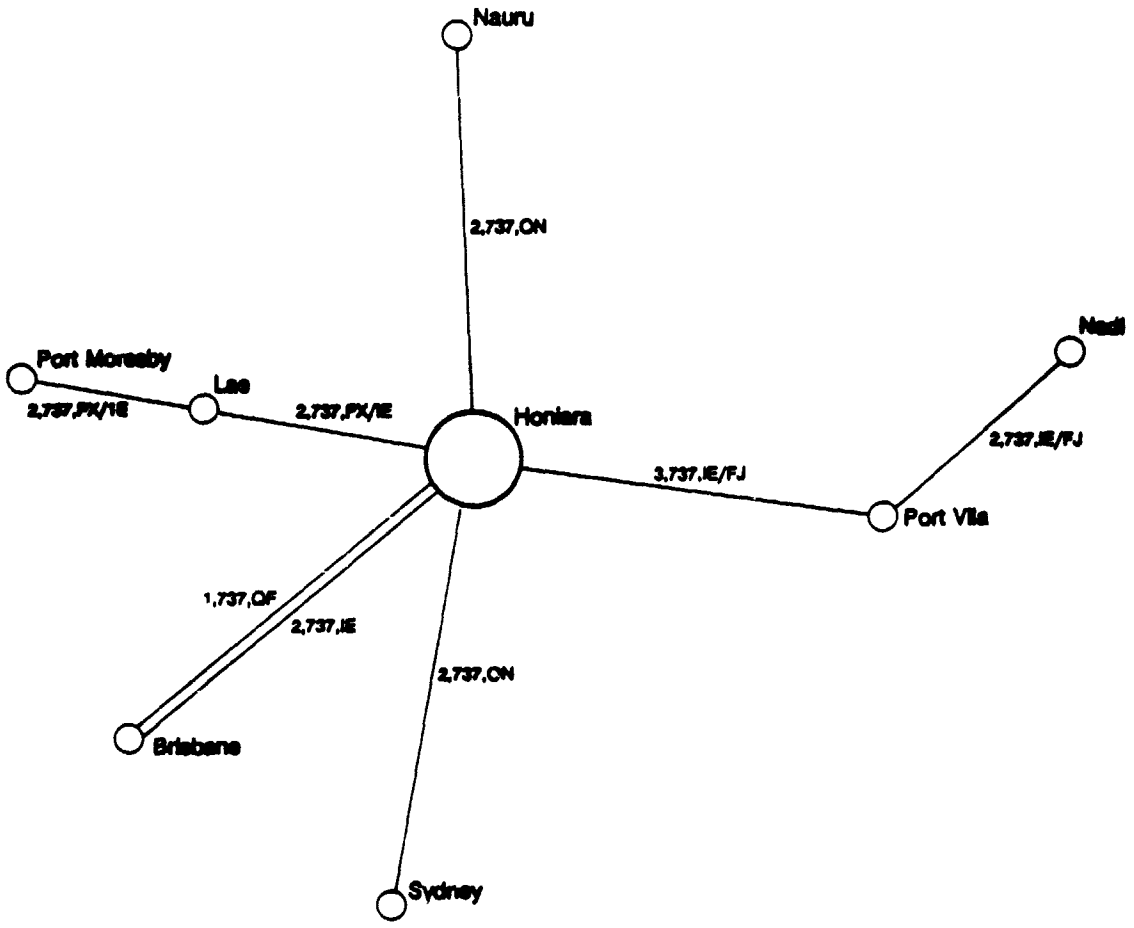
World Bank (1988), *Road Deterioration in Developing Countries—Causes and Remedies*, a World Bank Policy Study, Washington, June.

World Bank (1989), *South Pacific Islands Transport Sector Review.*

World Bank (1990), "Information Systems for Road Management: Draft Guidelines on Systems Design and Data Issues", a World Bank Technical Paper, Washington, September.

World Bank (1991a), *Towards Higher Growth in Pacific Island Economies: Lessons of the 1980s*, Report No. 9059-ASIA, Washington, January 18.

Solomon Islands



ON Air Nauru
PX Air Ningini
FJ Air Pacific
QF Qantas
IE Solomon Island Airways

One-way only

2, 737, IE — Airline
Aircraft type
No. of weekly flights in each direction

INTERNATIONAL AIR SERVICES

SOLOMON ISLANDS

TRANSPORT SECTOR SURVEY

ANNEX 1

CONTENTS

LIST OF TABLES

Table No.

LIST OF BOXES

Box No.

CHAPTER 1
INTRODUCTION

A. CONTEXT

1.1 This annex provides documentation of a survey of the maintenance situation in the Solomon Islands.[1] This survey, along with similar surveys for other PMCs, represents the background for the regional analysis of transport infrastructure maintenance presented in Volume One (Part II) of this report.

1.2 The Solomon Islands Rural Transport Project (CEC, 1988) and the Guadalcanal Road Improvement Project, Maintenance Report (MTWU, 1988) identify the inadequacy of maintenance of transport infrastructure in the Solomon Islands, and maintenance of roads, in particular, as noted in the Country Survey. Maintenance of existing assets is considered to rank higher in importance than improvement works or new construction. At present, government policy does not reflect these concerns. A systematic approach to the assessment of maintenance needs and priorities would provide valuable assistance to recurrent budget planning.

1.3 The Government emphasizes decentralization of responsibility for maintenance of local transport infrastructure to regional government (local roads, airfields, jetties), and privatization of some government services including creation of Government Authorities (Aviation), as a means of developing a commercially oriented management approach and extending financial capacity. These initiatives are important but are not directed to the establishment of an overall maintenance policy.

1.4 While the Country Survey identifies inadequate maintenance of transport infrastructure as a major issue, evidence of this inadequacy is generally circumstantial. At present, there are no asset inventories held by the responsible Departments (with the exception of the Solomon Islands Port Authority), which contain information on asset conditions or historical data. Evidence of insufficient maintenance generally consists of descriptive observations of the present poor condition of infrastructure. Little analysis has been undertaken of the need for cost effective maintenance.

B. MAINTENANCE MANAGEMENT FRAMEWORK

1.5 Tables 1 to 3 indicate the extent of management information available for each transport subsector.[2]

1.6 The tables illustrate the almost complete lack of information available in the road subsector which would assist in the development, operation and maintenance of the road system. In comparison the Solomon Islands Port Authority (SIPA) has a well developed information system for the port facilities under its control. However, there is no inventory information for public wharves and jetties in outlying areas. Information in the

aviation subsector is directed to meeting international air safety requirements. The major deficiencies relate to information useful to the development of adequate maintenance management strategies and systems.

Table 1: SOLOMON ISLANDS—MANAGEMENT INFORMATION INVENTORY ROADS

Functional Level	Purpose	Technical Grouping /a						
		Road Inventory	Pavement	Structures	Traffic	Finance	Activity	Resources
Sectoral	Overall budgetary and statistical information	U	U	U	U	P	P	P
Network	Traffic demand and physical characteristics by link	U	U	U	U	U	U	U
Project	Specific information related to construc-tion, betterment and maintenance	U	U	U	U	U	U	U
Operations	Maintenance of the system to provide effective service	U	U	U	U	U	U	U
Research and Development	Used for specific investigations of development of the system or its opera-tional efficiency	U	U	U	U	U	U	U

/a See para 1.1.7.
A - acceptable basic information available
P - partial basic information available
U - information unavailable

Source: Mission review.

Table 2: SOLOMON ISLANDS—MANAGEMENT INFORMATION INVENTORY PORTS

Functional Level	Purpose	Technical Grouping /a						
		Structures	Civil Works	Buildings	Plant & Equipment	Traffic	Finance	Resources
Sectoral	Overall budgetary and statistical information	A	A	A	A	A	A	A
Network	Traffic demand and physical characteristics by location	A	A	A	A	A	A	A
Project	Specific data	—— Not Applicable ——						
Operations	Maintenance of the system to provide effective service	A	A	A	A	A	A	A
Research and Development	Used for specific investigations	A	A	A	A	A	A	A

/a See para 1.1.7.
A - acceptable basic information available
P - partial basic information available
U - information unavailable.

Source: Mission review.

Table 3: SOLOMON ISLANDS—MANAGEMENT INFORMATION INVENTORY AIRPORTS

Functional Level	Purpose	Technical Grouping /a						
		Civil Works	Buildings	Plant & Equipment	Communi-cations	Traffic	Finance	Resource s
Sectoral	Overall budgetary and statistical information	P	P	P	A	A	P	P
Network	Traffic demand and physical characte-ristics by location	P	U	U	A	A	U	U
Project	Specific data	—— Not Applicable ——						
Operations	Maintenance of the system to provide effective service	U	U	U	A	A	U	U
Research and Development	Used for specific investigations	U	U	U	U	A	U	U

/a See para 1.1.7.
A - acceptable basic information available
P - partial basic information available
U - information unavailable.

Source: Mission review.

CHAPTER 2
NATURE OF THE MAINTENANCE ISSUE

A. Transport Infrastructure Inventory

2.1 Very little data on transport infrastructure are available for the Solomon Islands. Such information which exists is presented below.[3]

2.2 The value of major transport assets in the Solomon Islands has been established using estimates of the replacement cost of identified assets. Where projects have been completed recently, the replacement cost is assumed equal to the construction cost, adjusted to present prices. For older assets the replacement values have been calculated by comparison with the recorded value of similar recent assets.[4] Replacement costs are in turn used as the basis for estimating "best practice" or "assessed" maintenance costs (i.e., least total infrastructure costs).

Road Inventory

2.3 The Ministry of Transport, Works and Utilities does not maintain a road inventory. As set out in Table 1, there are no data which would assist with the strategic planning, work programming, project development or operational control of the road system. There are no accurate figures for the total length of road or of classes of road. The tabulated length is likely to significantly underestimate actual roads in the Solomon Islands. Additional roads have been built since the figures were published but these additional lengths cannot be readily ascertained. There are more roads in plantations and logging areas, many of which are assumed to be public roads, but without formal declaration. No information is available on pavement condition and no inventory exists of bridges and culverts.

2.4 The information that is available on road lengths is set out in Table 4.

2.5 The *replacement cost* of the listed road assets is estimated on the basis of road construction costs derived principally from a report "Economic and Engineering Studies for Extension and Upgrading of the Lambi - Aola to Marau Sound Road (GSI, 1984) adjusted to 1991 values (based upon an average inflation rate of 9.5 percent). These figures have been compared with guideline estimates for construction of roads proposed in the Lome IV National Industrial Program (TecnEcon, 1990) and for two roads constructed recently, one by contract, the other through MTWU resources.

2.6 Average road construction cost estimates by road type are set out in Table 5. The estimates presume that most roads have been built in the coastal regions where the terrain is generally flat. The cost of earth roads is based on estimated costs of clearing, cutting a cross section and spreading imported topping material. Lower costs could be expected if a labor intensive approach was adopted using community labor.

2.7 It is necessary to make assumptions regarding the lengths of unsealed road by width and surface class, as there is very little available

Table 4: SOLOMON ISLANDS—MOTORABLE ROAD BY PROVINCE, 1991

Road Authority	Gravel and Earth Roads	Sealed Roads	Total
MTWU	84	66	150
Honiara	71	35	106
Guadalcanal	265	-	265
(Guadalcanal Island Total)	(420)	(101)	(521)
Malaita	350	-	350
Western	260	-	260
Makira	70	-	70
Temotu	45	-	45
Central	40	-	40
Isabel	15	-	15
TOTAL	1,200	101	1,301

Sources: Solomon Islands Statistical Yearbook 1985/6 (compiled by the Statistics Office), 'Roads and Bridges in Solomon Islands' (internal MTWU paper), and Honiara Town Council Road Register (compiled by Cameron McNamara modified by Roughton & Partners for sealed roads in MTWU authority).

information. Of the 1,200 km of gravel and earth roads, 200 km are assumed to be 6 m wide graveled pavements, 500 km to be 3 m wide graveled pavement and the remaining 500 km to be earth formed roads. Based on the estimated construction costs and road lengths by road classification (see Table 5), the calculated replacement cost of road assets is SI$108.2 million (1991 prices). This estimate does not include bridge or major drainage structures, for which no inventory or estimated value is available. If these assets are assessed as 15 percent of the road costs, the total value of public road assets is some SI$125 million (1991 prices).

Table 5: SOLOMON ISLANDS—ROAD CONSTRUCTION COSTS (SI$ millions, 1991 prices)

Road Type	Weighted Average Construction Cost (km)	Length (km)	Cost
Sealed roads	0.200	101	20.2
Graveled, 6 m pavement	0.140	200	28.0
Graveled, 3 m pavement	0.100	500	50.0
Earth formed	0.020	500	10.0
Total Road Replacement Cost			108.2

Source: Mission Estimates.

Marine Infrastructure Inventory

2.8 The Solomon Islands Port Authority (SIPA) maintains a detailed inventory of assets for the ports under its control—Honiara and Noro, as part of its Port Management Information System (PORTMIS). The other major port at Yandina is privately owned and has not been included.[5] The Authority periodically revalues assets (last carried out in 1987) at replacement cost. Assets are depreciated on the straight line method over the asset (economic) life.[6]

2.9 The estimated replacement costs used in this report have been calculated using the closing value in the register, excluding depreciation, adjusted to 1991 values. The value of construction work in progress (the second ADB Port Development Loan) has been included under Wharves and Jetties. The costs of port development at Noro have been included, although they are not reflected in the asset register as they have not yet been formally vested with the Authority.

2.10 There is no inventory of outer island wharves and jetties and no data on the number, type, dimensions or condition of available facilities. A 1979 inventory investigation financed by AIDAB identified approximately 150 wharves, jetties and anchorages in the Solomon Islands of which around 40 were anchorages. The Commodities Export and Marketing Authority (CEMA) of the Solomon Islands operates five marketing centers in the outer islands for the purchase and transhipment of copra. In addition the Authority operates a further twenty five buying points as intermediate points of sale for primary producers. It is assumed that these facilities constitute the government owned wharves and jetties in the Solomon Islands, for the purpose of estimating the replacement value of government facilities. A private wharf has been constructed recently by contract at a cost of SI$625,000. This is the only available information from which to estimate a replacement value for government assets. The facility consists of a 50 meter granular causeway connecting to a 9 meter piled wharf and is assumed to be representative of facilities which would be normally required. An average replacement value of SI$600,000 has been assumed for each facility.

2.11 It is likely that the resulting value underestimates the replacement costs of outer island wharves and jetties. The estimated replacement cost of all facilities is set out in Table 6 and totals SI$64.7 million (1991 prices).

Aviation Infrastructure Inventory

2.12 The Ministry of Tourism and Aviation does not have an asset inventory in a form which provides for an asset management system. General data are available on the facilities at each airport (e.g. runway lengths, building areas/floor areas). Replacement costs of the existing facilities at Henderson Airport have been based on relevant indicative unit cost estimates prepared as part of "The Study on the Development Project of Henderson International Airport" (JICA, 1991).

2.13 The replacement costs of the 21 Government owned provincial airports are estimated using cost figures for new provincial airports (Feasibility Study of Provincial Airports Development, AIDAB, 1991). An average value of SI$450,000 has been taken for each airport, except for Munda, for which a replacement value of SI$1,700,000 has been adopted. There are a further 10 airports which are privately owned and these have not been included as public assets.

2.14 The total replacement value of government aviation assets is estimated (see Table 7) at SI$35.9 million (1991 prices).

Table 6: SOLOMON ISLANDS—ESTIMATED REPLACEMENT COSTS GOVERNMENT PORT FACILITIES (SI$ million, 1991 prices)

Location	Facility	Replacement Cost
Honiara	Wharves and Jetties	21.6
	Land and Improvements	5.8
	Buildings	10.9
	Ship Working and Mobile Equipment	5.2
	Workboats	0.6
	Other Assets	1.7
Subtotal		45.8
Noro	Wharves and Jetties	5.8
	Buildings	0.8
	Ship Working and Mobile Equipment	1.0
	Workboats	0.5
Subtotal		8.1
Outer Wharves and Jetties	30 facilities @ SI$0.6m	10.8
Total Marine Infrastructure Replacement Cost		64.7

Source: Solomon Island Port Authority and Mission Estimates.

Table 7: SOLOMON ISLANDS—ESTIMATED REPLACEMENT COSTS GOVERNMENT AVIATION FACILITIES (SI$ million, 1991 prices)

Location/Item	Facility Cost
Henderson	
• Runway, taxiway apron	20.4
• Terminal, VIP Building, Control Tower, Administration Building, Firefighting	1.8
• Access road, fencing, landscaping and parking	0.6
• Air Navigation, Facilities (assumed)	2.0
Subtotal	24.8
Regional Airports	
• 21 airfields; representative average cost SI$450,000	9.4
• Munda	1.7
Subtotal	11.1
Total Aviation Infrastructure Replacement Cost	35.9

Source: Mission Estimates.

B. Assessed Maintenance

Roads

2.15 **Average annual road maintenance costs** are developed here based on estimates prepared for the Guadalcanal Road Improvement Project, Maintenance Report (GSI, 1988). These costs were developed using estimated labor, plant and materials inputs to maintain the different classes of road surface on the North Coast Road, Guadalcanal. The original plant costs include only fuel and lubricants (MTWU costing practice). These have been revised using current commercial plant hire rates provided by a private contractor and the costs of labor, adjusted to 1991 prices. The estimates include periodic reseal and regravel maintenance costs, reduced to an average annual equivalent cost. A provisional estimate is included for earth roads. The estimated costs are set out in Table 8.

2.16 **Estimated annual maintenance cost** for the road system of SI$7.6 million is appreciably higher than the cost estimate of SI$4.9 million derived in the Guadalcanal Road Improvement Project, Maintenance Report (GSI, 1988). However, the inclusion of full plant hire rates is appropriate in deriving the real costs of the required maintenance effort.

2.17 The estimated annual maintenance cost assumes that the road system is in good maintainable condition and that maintenance is directed at preserving design standards. Selective field inspection and discussion with various personnel reveals that this is far from the case. However, no pavement or structure inventory exists from which to calculate the backlog of the rehabilitation or reconstruction needs. Evidence from discussions and from reports suggests that much of the road system is in poor condition and in many regions passable only by tractor-trailers. A conservative estimate is that half of the road system is in need of major rehabilitation or reconstruction. This implies a backlog of rehabilitation needs in excess of SI$50 million (1991 prices).

2.18 **Traffic Volume** data are not available, with the exception of the North Coast Road on Guadalcanal. Discussions indicate that much of the network carries less than 10 vehicles per day and the most heavily trafficked roads are unlikely to exceed volumes of 50 vehicles per day. The number of registered vehicles by region is not known. It is estimated that about 95 percent of registered vehicles in the country are used in Honiara or on the north coast of Guadalcanal. Estimates by government officials indicate that there could be some 50 vehicles on Malaita (excluding logging trucks) and that this would be the largest concentration of vehicles

Table 8: Solomon Islands—Average Annual Road Maintenance Costs, 1991

Road Type	Cost/km SI$	Length (km)	Total Cost SI$ million
Sealed roads	12,200	101	1.23
Graveled, 6 m pavement	10,800	200	2.16
Graveled, 3 m pavement	5,800	500	2.90
Earth formed	2,700	500	1.35
TOTAL			7.64

Source: Mission Estimates.

outside of Guadalcanal. Temotu Province, for example, at present, probably has less than 10 vehicles.

2.19 The estimated annual maintenance and rehabilitation requirements presume that all roads in the network should be maintained to a standard commensurate with the needs of normal two-wheel drive vehicles. In view of the very low traffic demands and the use of tractor-trailers to satisfy the transport needs of many communities, consideration needs to be given to the identification of those links in the road system which should be formally maintained to an appropriate standard. The remainder could be left to communities to maintain, if sections of the road system were seen to be of value for local access, or if not, abandoned.

Marine Infrastructure

2.20 Annual average maintenance costs for the marine subsector have been calculated by applying industry wide guideline percentage factors to the estimated replacement values of marine structures and equipment. Because costings of replacement value are aggregated, rather than individually detailed, general percentages have been used (see Table 9). On the basis of these data, the estimated average annual maintenance cost is SI$1.26 million (1991 prices) for facilities at the main ports of Honiara and Noro and SI$0.16 million (1991 prices) for outer island wharves and jetties (see Table 10). This represents a total annual maintenance requirement of SI$1.43 million (1991 prices).

2.21 The port facilities at Honiara under the control of the SIPA appear well maintained. As a result of major capital investments in the port in 1983, and the works recently completed, much of the infrastructure is relatively new. The port facilities at Noro were completed in 1989. Maintenance requirements are reviewed annually and provision is made for identified needs in the SIPA's annual budget.

2.22 The government wharves and jetties in the outer areas are reported to be generally in a state of disrepair. The current (1991) Rural Transport Project being progressed under LOME III funding includes an inventory of selected wharves in outer areas to guide identification of priorities for rehabilitation and replacement works. The funding for the project includes an allowance of SI$3 million for the rehabilitation of *selected wharves and bridges;* the allocation to each type of facility is dependent on the assessed priorities from the inventory surveys. These surveys have not been yet undertaken.

Table 9: SOLOMON ISLANDS—ANNUAL AVERAGE MAINTENANCE COST AS A PERCENTAGE OF REPLACEMENT COST FOR MARINE FACILITIES

Facility	Percent of Capital Cost
• Quay, wharf structures	
- reinforced concrete deck with steel piles	1.0
- hardwood deck and steel or reinforced concrete piles	
- mass concrete	1.5
• Buildings, offices, sheds	0.15
• Mobile equipment and boats	1.5
	10.0

Source: Ports Authority of Fiji and UNDP Port Development Handbook.

The provision of SI$3 million for the rehabilitation works is seen as the first phase of a comprehensive program. It is not intended to meet all rehabilitation needs.

Table 10: SOLOMON ISLANDS—ESTIMATED AVERAGE ANNUAL MAINTENANCE COST GOVERNMENT MARINE FACILITIES, 1991 (SI$, 1991 prices)

Item	Value SI$ million	Factor (percent)	Average Annual Maintenance SI$
Major Ports			
• Wharves & Jetties	27.4	1.0	274,000
• Buildings	11.7	1.5	175,500
• Land & Improvement	5.8	-	-
• Ship Working, Mobile Equipment, Workboats	7.3	10.0	730,000
• Other Assets	1.7	5.0	85,000
Subtotal			1,264,500
Outer Wharves and Jetties	10.8	1.5	162,000
TOTAL			1,426,500

Source: Mission Estimates.

Table 11: SOLOMON ISLANDS—ESTIMATED ANNUAL MAINTENANCE COST GOVERNMENT AVIATION FACILITIES, 1991 (SI$, 1991 prices)

Facility	Value SI$ millions	Factor (percent)	Average Annual Maintenance SI$
Major Facilities: Henderson Airport			
• Terminal and other buildings	1.7	1.0	17,000
• Runway/aprons/taxiways, etc.	21.0	1.5	315,000
• Navigation, radio equipment	2.0	2.0	40,000
• Fire tenders, mobile equipment	0.1	5.0	5,000
Subtotal	24.8		377,000
Regional Airfields			
• Lump sum estimate	11.1	n.a.	210,000
TOTAL			587,000

Source: Mission estimat.

Aviation Infrastructure

2.23 Annual maintenance costs for the aviation subsector also have been calculated by applying percentage figures to the estimated replacement value of facilities. No specific source document has been identified which provides indicative values, as is the case for marine infrastructure. Percentage values have been based on general figures for building maintenance, building plant maintenance and civil works maintenance in the case of major airports. For regional airports the annual costs of maintaining the runway and general cleared area have been estimated as a lump sum amount (1991 prices). These figures include periodic as well as routine maintenance (see Table 11). The estimated average annual maintenance requirement for aviation infrastructure at Henderson Airport, is SI$0.38 million (1991 prices) and for the twenty one regional airstrips SI$0.21 million (1991 prices). The total for all facilities is SI$0.59 million (1991 prices).

2.24 Rehabilitation needs have been identified at the six existing provincial airfields surveyed in the Feasibility Study of Provincial Airports Development (AIDAB, 1991). The average of estimated rehabilitation needs for the five unsealed airstrips is SI$130,000 (1991 prices). For Munda, which has a sealed surface, the estimated rehabilitation cost is SI$750,000 (1991 prices). Application of these values to all twenty one provincial airfields gives an estimated rehabilitation cost of SI$3.41 million. The rehabilitation needs for Henderson Airport are not identified.

C. Maintenance Practices

Roads

2.25 Readily available data pertaining to the MTWU provide separate expenditure budgets for each of its functions. The budget for Roads and Bridges, therefore, is separately identified. The line budgeting procedures of Government separately identify salaries, wages, travel and transport, materials and maintenance of roads and bridges. The line item for maintenance of roads and bridges is understood to cover the external costs (purchases external from government) of road maintenance. This would include payment for contractor services related to road maintenance and rehabilitation. Government plant hire rates are not used in the preparation of budgets or the allocation of costs. Only fuel and lubricant costs (POL) are charged to vehicle and equipment use.

Table 12: Solomon Islands—Recurrent Budget Allocations Roads and Bridges, MTWU; 1991-92 (SI$, current prices)

	1990	1991
Salaries and related costs	430,700	374,100
Wages and related costs	531,960	329,720
Materials	150,000	150,000
Maintenance of Roads and Bridges	250,000	1,350,000
Petrol, Oil, Lubricants (POL)	145,000	145,000
Other	16,400	21,130
TOTAL	1,524,060	2,369,950

Source: Solomon Islands Government Approved Recurrent Estimate 1991.

2.26 The MTWU (Roads and Bridges) budget allocations for 1990 and 1991 are set out in Table 12. The figures indicate a substantial increase (SI$1.1 million) in the allocation of funds to maintenance of roads and bridges in 1991 compared with 1990. It is understood, however, that this increase in funding was directed to the resealing of one project road in Honiara. The Solomon Island Rural Transport Project (CEC, 1989) indicates that the budget allocation for maintenance in 1987 was SI$0.662 million (1987 prices) and SI$0.765 million in 1988 (1988 prices).

2.27 Budget assistance is provided to the seven Provincial Governments by the Central Government. Assistance includes provision for salaries and wages for Provincial Government staff and grants and allowances for specific functions. A Road Maintenance Grant is provided to each of the seven Provincial Governments, for routine road maintenance; it is expected that MTWU would undertake periodic maintenance works. In practice, Provincial Governments are not bound to spend Specific Purpose Grants for their nominated purpose. Some roads are not accepted as provincial and thus maintenance is considered a local community responsibility. The division of responsibility is not clear and in practice it is likely that available funds are expended on all roads independent of responsibility.

2.28 Road Maintenance Grant allocations to the provinces for 1990 and 1991 are set out in Table 13. The figures indicate a 30 percent increase in overall grant allocation. The total MTWU and Provincial allocation for road maintenance for 1990 and 1991 in nominal terms is SI$1,748,060 and SI$2,660,530 respectively, a significant shortfall on the calculated requirement of SI$7.64 million, or SI$4.93 million if full plant costs are not included.

2.29 The present system of budget allocation and cost reporting does not provide information on a program or project cost basis and the actual expenditure attributable to road maintenance cannot be identified. The poorly-defined responsibility for road maintenance, the lack of a road inventory and the ambiguity between public and private roads add to the problems in providing an effective maintenance system.

Ports

2.30 The Solomon Islands Port Authority (SIPA) is responsible for the maintenance of

Table 13: SOLOMON ISLANDS—RECURRENT BUDGET ALLOCATION TO PROVINCES ROAD MAINTENANCE GRANT (SI$, current prices)

Province	1990	1991
Central Islands	12,320	15,400
Isabel	13,440	17,470
Makira	8,960	11,650
Guadalcanal	94,080	122,300
Malaita	34,720	45,140
Western	56,000	72,800
Temotu	4,480	5,820
TOTAL	224,000	290,580

Source: Solomon Islands Government Approved Recurrent Estimate, 1991

ports facilities at Honiara and Noro but there is no clear authority responsible for the maintenance of public wharves and jetties outside of the main ports. The MTWU is responsible for the construction of new public wharves and jetties but takes no responsibility and has no budget allocation for their maintenance. No Specific Purpose Grants are provided to Provincial Governments for wharf and jetty maintenance although funds from Fixed Services Grants could be used.

2.31 SIPA, established by the Solomon Islands Ports Act 1956 is required to operate commercially. In addition, under loan covenants in the Project Agreement for the Second Honiara Port Project, financed largely by the ADB, financial performance targets are:

- an annual return (on revalued net fixed assets) of not less than 5 percent
- a debt service ratio of not less than 1:3.

The Authority has been able to meet all commercial operating costs, including the provision of depreciation reserves and generate a net surplus (see Table 14). In the 1990 financial year it achieved a rate of return on revalued net fixed assets of 5.4 percent.

2.32 The Authority's Chart of Accounts include accounts for repairs and maintenance to fixed assets and to working equipment. Repairs and maintenance costs are allocated to Departments (cost centers) within the Authority as a component of expenses in determining income and expenditure performance. Repair and maintenance costs for 1989 and 1990 are set out in Table 15.

2.33 Actual costs of repairs and maintenance of SIPA's assets were SI$0.55 million in 1989 and SI$0.67 million in 1990. The actual costs of repairs and maintenance of buildings and working equipment are somewhat lower than the estimated values (Table 10). The major difference is the maintenance cost of wharves and jetties. Much of the port infrastructure is relatively new (see para 2.24 above) while major maintenance of facilities is lumpy and generally towards the end of the facility's working life. The accounts of the Authority include a separate provisional account for wharf maintenance, which could be used to accumulate maintenance funding as assets begin to age.

Aviation

2.34 Budget appropriation for airport maintenance, until recently, has been to the MTWU as part of the Roads and Bridges financial allocation. In the current financial year (1991) this budget allocation was transferred to the Ministry of Tourism and Aviation (Civil Aviation Division) which also determines the works priorities. The MTWU is used as the agent to carry out periodic maintenance projects. The Civil Aviation Division of the Ministry is usually the declared aerodrome operator although the Provincial Government is the declared aerodrome operator in some cases. The Civil Aviation Division regards their responsibility as covering periodic maintenance and that routine maintenance is the responsibility of Provincial Governments. Provinces do not receive a specific grant for airfields although they do receive a Fixed Service Grant which could be applied to airfield maintenance. Closures of airports as a result of inadequate routine maintenance occur and the responsibility for maintenance of airfields needs to be clarified.

2.35 Separate line appropriations are provided for airport maintenance at Henderson and provincial airfields. In addition some components of salaries, wages, hire of shipping and other costs would also be attributable to the maintenance functions. The specific provision in the 1991 year of SI$150,000 for maintenance of provincial airfields (see Table 16), if continued, is a significant contribution to meeting the estimated routine and periodic maintenance requirements of SI$0.21 million (para 2.26) provided that the outstanding rehabilitation needs are met. The appropriation for the maintenance

Table 14: SOLOMON ISLANDS—PORT AUTHORITY SUMMARY PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED SEPTEMBER 30, 1990

	1990 $	1989 $
Ship's Dues and Rates	3,651,101	3,259,006
Wharfage, Handling and Storage	1,845,230	1,560,080
Other	214,939	173,822
Total Operating Revenues	5,711,270	4,992,908
Wages, Salaries	1,629,688	1,525,769
Depreciation	1,249,594	1,149,384
Other	1,620,081	1,378,903
Total Operating Expenses	4,499,363	4,054,056
Operating Profit	1,211,907	938,852
Add		
Interest on Investments	314,333	261,543
Gain (loss) on exchange rate variations	3,556	1,067
Gain (loss) on disposal of assets	<1,093>	<2,455>
Lease rents (net)	37,089	49,837
	1,565,792	1,248,844
Less		
Interest on long term debt	566,169	259,307
Extraordinary item	-	367,519
Net Income	999,623	622,018
Balance General Reserve as at 1st October, 1989	6,844,472	6,262,454
Balance General Reserve as at September 30, 1990	7,884,095	6,884,472
Financial Performance Indicators		
Rate of Return on Revalued Net Fixed Assets	5.4%	3.4%
Debt Service Ratio	4.5 times	4.0 times

Source: SIPA Annual Report 1990.

requirements for Henderson Airport is substantially lower than the estimated routine and periodic maintenance needs. Income to the Civil Aviation Division, presented in Table 16 is discussed further in para. 2.62.

Table 15: SOLOMON ISLANDS—REPAIR AND MAINTENANCE COSTS SOLOMON ISLANDS PORT AUTHORITY, 1989-1990 (SI$, current prices)

Repairs and Maintenance	1989			1990			1989 Total	1990 Total
	Admin	Honiara	Noro	Admin	Honiara	Noro		
Buildings	4,491	100,838	7,041	15,215	120,691	12,521	112,370	148,427
Roads	-	26,694	690	-	29,661	3,679	27,384	33,340
Equipment/ Firefighting	9,844	121,697	28,242	8,525	90,315	20,894	159,783	119,734
Forklifts/ Vehicles	-	177,765	4,656	779	275,446	20,080	182,421	296,305
Boats/ Launches	-	39,456	2,256	-	15,244	6,973	41,712	22,217
Wharves/ Jetties	-	22,545	20	-	50,665	1,910	22,565	52,575
TOTAL	14,335	488,995	42,905	24,519	582,022	66,057	546,235	672,598

Source: Solomon Islands Port Authority.

Summary

2.36 The estimated replacement value of transport infrastructure, maintenance overhang, assessed maintenance needs and actual maintenance expenditure are summarized in Table 17. The estimates are derived from a very limited database. The objective of the estimates is to provide an *indicative* quantified perspective of the present situation for the purpose of illustrating the nature and scale of the transport infrastructure maintenance issue. The current replacement value of transport infrastructure has been based on data assembled on the quantity of infrastructure and unit construction costs. The maintenance overhang (i.e. rehabilitation requirements resulting from past inadequate maintenance) is derived from past studies which have identified infrastructure rehabilitation needs; however, none of these is comprehensive or up-to-date, and rehabilitation needs can be expected to be greater than presented in Table 17. The expenditure required to adequately maintain current infrastructure, suitably rehabilitated so that it is maintainable, is estimated on the basis of unit maintenance costs for roads and a proportion of the replacement value of marine and aviation infrastructure. This level of expenditure is used as an approximation of the amount assessed as optimal maintenance (maintenance expenditure which results in a minimum life cycle cost for the asset at a given design standard). *Assessed maintenance does not imply it is warranted. This requires a benefit-cost appraisal of individual assets.* The optimal level of maintenance expenditure cannot be established. Current maintenance expenditure is derived from budget data.

2.37 The replacement value of Government transport infrastructure is estimated at SI$720/capita. The infrastructure has, however, deteriorated considerably, and road rehabilitation

Table 16: SOLOMON ISLANDS—RECURRENT INCOME AND EXPENDITURE FOR MINISTRY OF TOURISM AND CIVIL AVIATION, CIVIL AVIATION DIVISION (SI$, current prices)

	1990	1991
Income:		
• Air Service Licenses and Navigation Fees	7,500	6,500
• Boarding Fees	300,000	300,000
• Landing Charges	200,000	200,000
• Other Fees and Receipts	16,000	21,000
Total	523,500	527,500
Expenditure:		
• Salaries and Associated Costs	506,540	398,530
• Wages and Associated Costs	72,700	76,610
• Utilities	103,000	103,000
• Hire of Shipping	65,000	70,000
• Provision of Systems and Services	52,400	58,700
• Training	22,000	23,000
• Henderson Operation	10,000	10,000
• Henderson Airport Maintenance	10,000	11,800
• Maintenance of Provincial Airfields	-	150,000
• Airport Rescue/Fire Service Maintenance Fee	2,000	2,000
• Equipment Maintenance	63,000	-
• Aircraft Inspection Costs	40,000	40,000
• Other	64,180	66,880
Total	1,010,320	1,010,520

Source: Ministry of Tourism and Civil Aviation.

needs are equal to 40 percent of the total replacement value of the road system. Current maintenance expenditure on transport infrastructure is only 38 percent of that estimated as being required. If there was no accrued maintenance liability for the current infrastructure, an additional SI$6.0 million would be required annually for optimum maintenance of the infrastructure. The current maintenance overhang will require expenditure greater than the assessed maintenance of SI$9.6 million per year if the average condition of infrastructure is to be improved.

2.38 Inadequate maintenance results in more rapid deterioration of infrastructure than need be the case. An estimate of the increase in the equivalent annual cost of infrastructure resulting from poor maintenance is also presented in Table 17 This item is discussed in the next section.

D. IMPLICATIONS OF INADEQUATE MAINTENANCE

2.39 The limited maintenance effort applied to roads in the Solomon Islands has reduced their effective lives to about eight years for sealed roads and much less for unsealed roads. The cost of restoring deteriorated roads has been estimated at three to five times greater than the

Table 17: SOLOMON ISLANDS—SUMMARY OF INFRASTRUCTURE AND MAINTENANCE COSTS, 1991 (SI$ million, 1991 prices)

	Road	Marine	Aviation	Total
Replacement Cost	124.4	64.7	35.9	225.0
Maintenance Overhang /a	50.2	-/b	3.4/c	53.6
Assessed Average Annual Maintenance Requirements /d	7.6	1.4	0.6	9.6
Estimated Current Annual Maintenance Expenditure	2.7	0.7	0.2	3.6
as percentage of assessed requirement	35	50	34	38
Additional Expenditure to Achieve Optimal Maintenance /e	4.9	0.7	0.4	6.0
Additional Annual Capital Expenditure arising from Inadequate Maintenance /f	7.2	2.0/g	1.8	11.1

/a Cost required to rehabilitate infrastructure to a sound standard, i.e. the standard through time which would have been the case with optimal maintenance and for which the assessed annual maintenance expenditure is sufficient to adequately maintain the infrastructure.
/b Excludes outer wharves and jetties for which no information is available.
/c Excludes cost of rehabilitation at Henderson Airport.
/d Expenditure required for optimal maintenance.
/e Difference between current annual expenditure on maintenance and the equivalent annual expenditure assessed as being optimal.
/f Difference between equivalent annual capital cost for replacement of assets with optimal and current maintenance - see Annex 1.
/g SIPA has a provision for wharf and jetty maintenance.

Source: Mission estimates.

cost of timely and effective maintenance (World Bank, 1988). Increased expenditure on timely and effective maintenance can reduce the total life cycle replacement, maintenance and user costs for the continuing service of road infrastructure.[7] The same principle applies to maintenance of infrastructure in the maritime and aviation sectors.

2.40 Reduced expenditure on maintenance is offset by more rapid deterioration of infrastructure than would be the case with optimal maintenance. Indicative estimates of the equivalent annual capital cost of infrastructure with current and optimal maintenance is derived below (Chapter 3). The increase in the cost is summarized in Table 17 The cost to the Government of more rapid deterioration of its transport infrastructure is 80 percent higher than the cost of improved maintenance (i.e., SI$11.1 million compared with SI$6.0 million). This differential is less in the case of roads, reflecting the relatively high cost of maintaining roads in proportion to their low capital cost and a

situation in which traffic volumes are low and the economic life of road is heavily influenced by environmental factors.

2.41 In addition to the higher costs which accrue to the Government from inadequate maintenance, *users of the transport system incur higher costs.* For road users, this includes increased vehicle operating costs; these in turn may result in further decline in economic efficiency through reduced accessibility and increased spoilage of products, and suppressed foregone productive economic activity, if the increased costs make a potential industry unviable. The current poor road conditions increase road user costs by around 14 percent through increased fuel and tire use and additional wear and tear on vehicles (see Box 2.1 on Vehicle Operating Costs). Similarly, increases in port costs which result from inadequately maintained port infrastructure will add to the cost of imported goods and make exports, most of which pass through sea ports less competitive on international markets. For example, inadequate maintenance of wharves and jetties may result in reduced safe working loads for forklifts and vehicles and consequent increases in the costs of handling cargo. Tourism could be severely affected if deficient maintenance results in unreliability and delay of services due to closure of airports - deterioration of the airport terminal could also have an adverse effect on user perception and marketing credibility.

2.42 Passengers pay a considerable premium to travel by air compared with sea, with air fares being between three and five times ship tariffs, e.g. air and sea tariffs are SI$142 and SI$36, respectively, between Honiara and Kirakira and SI$218 and SI$44 between Honiara and Gizo. Both of these trips take about 24 hours by boat and a little over an hour by plane. Airline users thus place an incremental value on the use of the superior potential service of air on these routes at least at SI$140. About two airports are closed each month, commonly because of maintenance problems which can be easily remedied, for example the need to mow grass (at a cost of about SI$600 per month) and, in one case, the need for a new SI$200 airsock. Even if trips are not foregone because of airfield closures, there is a considerable economic cost to users of delays; these avoidable user costs are likely to exceed to a great extent the maximum cost of ensuring improved airfield condition and availability.

2.43 There are opportunities for agricultural development in the Solomon Islands, mostly in copra. The greatest transport constraint to increased smallholder development is reported by a current study to be in accessibility between farms and buying points. The connection between development of such transport links and economic development needs to be better understood to ensure that development is sustainable. Development of local transport links will have a significant effect on the propensity to produce and may increase producer surplus. However, the reduction in the total cost of delivery of agricultural output overseas is likely to be small (unless there are avoidable constraints elsewhere in the transport system), and may not secure significantly greater export sales. Local impact of improved links and more reliable mobility may be greater.

E. MAINTENANCE FUNDING

2.44 There is no hypothecation of revenue to maintenance of road or aviation infrastructure in the Solomon Islands. Nor is there a formal policy on cost-recovery in the road sector where specific fees for use of the road system are not imposed. The SIPA, though, is able to retain its revenue and has a responsibility to maintain its assets.

Roads

2.45 There are no specific charges for use of the road system in the Solomon Islands with the exception of the tax on fuel. Road users contribute to the cost of developing and

Box 2.1: Vehicle Operating Costs

Vehicle operating costs rise rapidly as roads deteriorate, more so on gravel than sealed roads as shown below:

Road Condition	Gravel Road		Sealed Road	
Good	0.736		0.695 1/	
Fair	0.818	(11%) 2/	0.717	(3%)
Poor	0.957	(30%)	0.822	(18%)

There is an almost complete absence of data on traffic volume by road type and condition. Therefore, it is not possible to estimate, with any measure of accuracy, the total cost of operating vehicles over the road network in its current condition and the cost with roads in good condition. However, working assumptions, based on judgment, have been made to provide an indicative estimate of such vehicle operating costs.

Based on say 4,000 registered vehicles travelling an average of 14,000 km per year (say, 50 percent of which is on gravel roads) and with half of the roads in poor condition and a quarter each in fair and good condition, total annual economic vehicle operating costs will be SI$45.7 million. The equivalent cost if roads are in good condition is SI$40.1 million, i.e. current vehicle operating costs are 14 percent higher than would be the case if roads were in good condition. Foreign costs account for 78 percent of these costs. The SI$5.6 million difference between vehicle operating costs on good and poor roads thus represents an incremental import bill of SI$4.4 million per year (equal to 2 percent of estimated current imports).

1/ Average economic vehicle operating costs in SI$/km (see below). Vehicle financial operating costs are 22 percent greater.

2/ Increase compared with the cost on a road in good condition.

maintaining the road system indirectly through: (a) an initial license fee and annual registration charges; (b) driving license fees; (c) import duty and an associated surcharge on vehicles, spare parts and fuel.

2.46 Import duty on new motor vehicles was reduced significantly in July 1991. For example, the duty on cars with engine size of 1 to 1.5 liters was reduced from 75 percent to 23 percent; for cars with engine capacity of more than 2.5 liter, duty was reduced from 155 percent to 47 percent—duty on imported used vehicles is considerably higher, being 155 and 255 percent, respectively for these vehicles. Duty on imported new trucks was also reduced from between 50 and 85 percent to either 15 or 20 percent. Duty on spare parts was increased at the same time as duty on vehicle imports was reduced, for example from 30 percent to 50 percent for tires. A surcharge of 3 percent of CIF value is imposed on all imports. Import duty on petrol and diesel fuel is SI$0.23/liter and SI$0.18/liter respectively (equivalent to rates of about 31 and 24 percent of CIF price).

2.47 While higher rates of duty on equipment and supplies for the road transport sector relative to other imports reflect fiscal/general revenue raising objectives they also may be viewed, in part, as an indirect means for charging users of the road system. Imposing tax "mark-ups" where price elasticities are relatively low ("Ramsey" pricing) might justify higher tariffs for the road transport subsector, with higher tariffs for road transport resources being a fiscal measure, and unrelated to cost-recovery. Alternatively, all income from duties can be considered as contributing to cost-recovery, to the extent that the duties are imposed on road transport users, and revenue from the duties is less than that required for full cost-recovery. (The regional analysis presented in Volume One of this study presents the effect of all identifiable

revenue from duties being treated as cost-recovery.) Detailed data on import duty paid by category has not been processed for some years. Limited available aggregate data does not provide a clear indication of the average level of duty on motor vehicles and fuel compared with all imports as a whole. While duty on transport equipment may be about 8 percent of estimated total duty of SI$47.4 million in 1990, it is likely that there is considerable duty on vehicles in excess of the average rate of duty for all imports which, in part, can be viewed an indirect user charge.

2.48 Revenue from vehicle and driver license fees was estimated at SI$0.50 million in 1990 and SI$0.57 million in 1991. In comparison, the total minimum annual cost of sustaining the road system (i.e. with the road system in maintainable condition and optimum annual maintenance undertaken) is estimated to be SI$20.2 million (1991 prices), comprising:

- Current Maintenance SI$2.7 million
- Incremental Maintenance Needs SI$4.9 million
- Annual Capital Charge SI$12.6 million

Alternative maintenance strategies to that embodied in this funding will result in higher overall costs of sustaining the road infrastructure, and in addition, higher user vehicle operating costs.

2.49 Revenue from vehicle and driver license fees is insufficient to meet current maintenance expenditure. With perhaps only a minor proportion of import duty on vehicles and fuel which might be considered an indirect user charge, it is evident that road users do not currently meet the costs of providing the road system. The present serious deterioration of existing roads represents a substantial contingent and unfunded liability. It is problematic that grant assistance will be available to fund the present maintenance overhang and the increased amount required for the adequate maintenance of the road system. Therefore the Government will need to initiate means to increase its sources of funds, in particular by increasing and rationalizing the charges imposed on road users. Increased road user charges need to be carefully considered as a significant fiscal burden already falls on road users and raises transport costs; general broadening of the taxation system should be introduced (see World Bank, 1991a).

2.50 Two key *equity* issues relate to cost-recovery in the land transport subsector: (a) the geographical distribution of sources of receipts and disbursements of revenue in the subsector; and (b) the apportionment of costs and revenue by vehicle category. Approximately 65 percent of the road assets (by value) are located on Guadalcanal Island. Data on the number of registered vehicles on the island are not available, but it is likely that at least a similar proportion of vehicles (65 percent) are located on Guadalcanal and that a higher proportion of economic activity also occurs on the Island. Accordingly, without any additional information the level of cost-recovery on Guadalcanal is likely to be higher than on other islands; given the greater level of economic activity on Malaita than on the other outer islands, Malaita in turn is likely to have higher cost-recovery than elsewhere. The substantial gap between revenue and expenditure for roads in these other regions, and the limited financial resources on them, reinforces the need to carefully establish that part of the road network which has key economic and social value and to seek the most efficient means for ensuring maintenance of the basic road network - including adoption of appropriate standards. A major proportion of the road network involves low traffic volumes (less than 100 vehicles per day). Such roads, typically gravel and earth formed, provide accessibility as a social service. Fixed costs for maintaining these roads are high—over 75 percent. In such circumstances, a lower share of revenue for cost recovery will derive from specific vehicle-related fees; a higher share will need to be supported by more indirect and general taxes.[8]

2.51 The second equity issue pertains to the attribution of cost and revenue to vehicle types. Trucks cause considerable damage to the road system, disproportionately more than their share of total vehicle kilometers by all road vehicles. Road user charges should be designed to reflect this incremental cost to the system. To the contrary, import duty on trucks is generally less than the import duty on other road vehicles, and it is less likely that the share of revenue from import duty on trucks will contribute adequately to recovery for roads. The present fivefold difference between the annual registration tax for trucks in excess of three tonnes and cars with engine capacity between 1.1 and 1.5 liters (SI$432 and SI$84 per annum) makes only a minor contribution to the difference in damage imposed on the road system by the two types of vehicles. There were 1,499 goods vehicles registered in 1986 (the last year for which data are available) and a further 209 public service vehicles; total registered vehicles was 3,629. While some of these goods vehicles are only small utilities, the large proportion of commercial vehicles indicates potential for a greater rate of road damage, or incremental road construction cost - and hence relatively higher user charges (for example, vehicle registration reflecting axle loads).

Ports

2.52 The replacement cost of port facilities is estimated at SI$65 million, comprising SI$54 million for the main ports and SI$11 million for outer island wharves and jetties. Of these assets, SI$56 million comprises fixed infrastructure and SI$9 million equipment. With optimal maintenance, the equivalent annual cost of the assets is about SI$5.4 million using an opportunity cost of capital of 7 percent (see Annex 1). The equivalent average annual cost of maintenance on an optimal basis is estimated to be SI$1.4 million. The annual cost of sustaining all present port facilities, were they already in good condition is thus SI$6.8 million. Additional expenditure is required to rehabilitate outer island wharves and jetties to this condition.

2.53 The Solomon Islands Port Authority is a soundly based commercial organization with an accumulated asset renewal reserve of SI$4.0 million (1990 Annual Report). In the 1990 financial year it achieved a net surplus of SI$1.0 million after providing SI$1.25 million for depreciation as part of its operating expenses and meeting maintenance requirements for Honiara and Noro. The surplus exceeds the estimated required increase in maintenance expenditure for the two ports for which SIPA is responsible.

2.54 Management of the outer wharves and jetties, however, has been inadequate. There is no clear responsibility for the maintenance of these facilities and no mechanism for the application of fees or charges associated with their use.

Airports

2.55 Income is collected by the Ministry of Tourism and Civil Aviation mostly through boarding charges and landing fees (see Table 16. The revenue is almost entirely attributable to aviation activity at Henderson Airport in Honiara.

2.56 In summary, costs and revenue associated with development, operations and maintenance of the Civil Aviation Division facilities are estimated for 1991 at:

	SI$ Million
Income	0.53
Operating Expenditure	
• With Current Maintenance	1.01
• Incremental Maintenance Needs	0.40
Operating Surplus (Loss)	(0.88)
Less: Annual Capital Charge	3.87
Net Surplus (Loss)	(4.75)

2.57 Revenue would need to be increased ten times from the present SI$0.5 million to generate sufficient revenue to cover the cost of operating the airport facilities and sustaining the infrastructure. As with the other transport

sectors, further revenue is required to fund rehabilitation of infrastructure which has deteriorated from inadequate maintenance in the past. About half of aviation assets and two-thirds of assessed maintenance expenditure relates to Henderson Airport, but most revenue to the Civil Aviation Division is derived from activity at the airport. This required consideration of means for funding the development and maintenance of airfields on outer islands.

F. Situation Summary

2.58 Information currently available to assess asset management needs, even from the most general perspective, is rudimentary, with the exception of the SIPA.

2.59 The replacement value of transport infrastructure (excluding the vehicles, vessels and aircraft which use the system) in the Solomon Islands is estimated to be SI$225 million (US$84 million, 1991 prices). The average equivalent annual assessed maintenance for the transport system is estimated conservatively at SI$9.6 million (US$3.5 million). The annual assessed maintenance is on average equal to some 4.6 percent of the replacement value of the assets; this ranges from 6 percent for roads to 2 percent for the marine and aviation infrastructure.

2.60 The estimated annual assessed outlays for asset maintenance presume that the system has been well maintained in the past and that rehabilitation or reconstruction requirements should only relate to the general ageing of the system. This is not the present situation in the Solomon Islands.

2.61 Much of the infrastructure has been built or reconstructed in the past 10 years and possibly little remains of original investments made more than say 30 years ago, which can be taken as the average life of transport infrastructure. The expected value of one year's replacement of assets would be about SI$7.6 million if the construction of the assets had been spread uniformly over the past 30 years. By comparison, the present estimated rehabilitation and replacement needs are likely to be more than SI$54 million (1991 prices). This estimate is based on very imprecise data but is indicative of the backlog in restoration needs.

2.62 The historic levels of actual maintenance expenditure are difficult to establish and hence to assess. Departmental budget allocations and costing procedures are not designed to provide information on a program/functional basis (for example, maintenance task). The lack of function based financial data is a constraint to understanding and managing maintenance. An apportionment of recurrent Departmental expenditures for all transport modes indicates that some SI$3.6 million was spent on maintenance in 1991, which represents only 38 percent of assessed average annual maintenance requirements.

2.63 At present, virtually all road maintenance is undertaken by the MTWU using force account labor and Government-owned equipment. This approach fails to give sufficient consideration to the separation of management and technical activities, and has resulted in almost exclusive emphasis on the latter. The approach also places heavy demands on the limited number of qualified staff in the Ministry, and fails to take advantage of the greater flexibility available in private companies and the community.

2.64 An indication of cost recovery with assessed maintenance for each transport mode presented in Table 18 indicates substantial under-recovery of costs for road and aviation transport. Use of current maintenance expenditure and the equivalent, higher annual capital charges would result in a lower level of cost recovery.

2.65 Assessment of all existing infrastructure and determination of what assets (and at what standard) warrant (assessed) maintenance is needed. Attention should also be given to identifying maintenance priorities and securing higher cost recovery through direct and indirect user charges.

Table 18: SOLOMON ISLANDS—SUMMARY OF COST RECOVERY (SI$ million, 1991 prices)

	Roads	Marine	Aviation
Income			
• Direct	0.6	5.7	0.5
• Indirect (Loss)	../a	(0.2)	-
Total	0.6	5.5	0.5
Operating Expenditure			
• With Current Maintenance	2.7	3.2/b	1.0
• Incremental Maintenance Needs	4.9	0.6	0.4
Operating Surplus (Loss)	(7.0)	1.7	(0.9)
Less: Annual Capital Charge	12.6	5.4	3.9
Net Surplus (Loss)	(19.6)	(3.7)/c	(4.8)

/a Share of import duty in excess of average rate of duty for all imports; data not available.
/b Excludes allowance for depreciation in annual accounts for SIPA. No revenue or expenditure information available for wharves and jetties outside of SIPA control.
/c Includes all marine facilities.

Source: Mission estimates.

CHAPTER 3
EQUIVALENT ANNUAL VALUE FOR TRANSPORT INFRASTRUCTURE

3.1 **Introduction.** Inadequate maintenance results in more rapid deterioration of transport infrastructure than would be the case with optimum maintenance. This chapter estimates the extent of this effect.

3.2 **Infrastructure Value.** The value of current infrastructure estimated in Section A of Chapter 2 is summarized in Table 19. The cost of this infrastructure comprises two parts; a fixed component and a renewable component. The former includes, for example, clearing and construction of the base for a road. The renewable component of infrastructure is that part which periodically requires reconstruction, for example the surface of a road. The approximate proportion of the total cost of infrastructure which is fixed and renewable is described in Table 19. The estimates are drawn from construction cost estimates for typical construction projects.

3.3 **Economic Life.** With optimum maintenance, the fixed component of infrastructure should have a life of at least 50 years. By definition, all elements of the fixed component of infrastructure should not be affected by the level of maintenance. This is not necessarily the case, however, in practice. For example, poor maintenance of a road may result in inadequate drainage and pot-holing. Water can then penetrate the base structure of the road and result in deterioration of this element of the fixed component. The lives of the fixed components of infrastructure adopted for the current assessment are presented in Table 19. Typical lives of the renewable components of infrastructure with current maintenance and optimum maintenance are also presented in Table 19.

3.4 **Equivalent Capital Cost.** The equivalent annual capital cost of infrastructure with current maintenance patterns and with optimum maintenance are shown in Table 19. An opportunity cost of capital of 7 percent is used. The data illustrate that the current equivalent annual capital cost with current maintenance patterns is about 50 percent greater than would be the case of optimum maintenance was undertaken (i.e. SI$33.0 million compared with SI$21.9 million). The data also shows the importance of adequate maintenance of engineered, unsealed roads, with the incremental capital cost of this item alone accounting for almost 60 percent of the incremental capital cost for all infrastructure.

Table 19: SOLOMON ISLANDS—SUMMARY OF INFRASTRUCTURE VALUE AND MAINTENANCE COSTS (SI$ million)

Item	Roads				Marine				Aviation				TOTAL
	Sealed	Engin -eered	Earth	Total	Wharves & Yards	Bldg	Equip. & Other	Total	Runw ays	Bldgs.	Equip. & Other	Total	
Asset Replacement Value	23.2	89.7	11.5	124.4	44.0	11.7	9.0	64.7	32.1	1.7	2.1	35.9	225.0
Maintenance Overhang /a	..	..	..	50.2	..	..	..	..	..	..	..	3.4	53.6
Assessed Annual Maintenance	1.2	5.1	1.4	7.6	0.3	0.2	0.9	1.4	0.5	0.0	0.0	0.6	9.6
/b	..	..	..	2.7	..	..	..	0.7	..	..	..	0.2	3.6
Current Maintenance Expenditure	..	..	..	35%	..	..	..	53%				34%	38%
% of Assessed Maintenance	..	..	..	4.9	..	.	..	0.7	..	..	..	0.4	6.0
Incremental Maintenance Expenditure	2.0	9.6	1.1	12.6	3.2	0.9	1.3	5.4	3.2	0.2	0.5	3.9	21.9
for Optimal Maintenance /c	2.5	15.7	1.6	19.8	4.0	1.3	2.2	7.5	4.8	0.3	0.6	5.7	33.0
Equivalent Annual Capital Cost:/d	0.5	6.1	0.6	7.2	0.8	0.3	0.9	2.0	1.6	0.1	0.1	1.8	11.1
With Optimum Maintenance													
With Current Maintenance													
Incremental Capital Cost													
Proportion of Capital Cost:													
Fixed Component	65%	80%	100%		20%	100%	0%		20%	100%	0%		
Renewable Component	35%	20%	0%		80%	0%	100%		80%	0%	100%		
Economic Life: (years)													
Fixed Component													
With Optimum	50	50	20		50	30			50	30			
Maintenance	40	30	10		40	15			40	15			
With Current Maintenance													
Renewable Component	15	5	-		50		10		16		10		
With Optimum	8	2.0	-		20		5		8		7		
Maintenance													
With Current Maintenance													

/a Cost required to rehabilitate infrastructure to a sound standard, i.e. the standard through time which would have been the case with optimal maintenance and for which the assessed annual maintenance expenditure is sufficient to adequately maintain the infrastructure.

/b Expenditure required for optimal maintenance.

/c Difference between current annual expenditure on maintenance and the equivalent annual expenditure assessed as being optimal.

/d Based on opportunity cost of capital of 7 percent and parameters described in the lower part of the table.

CHAPTER 4
ROAD VEHICLE OPERATING COSTS

4.1 **Introduction.** Vehicle operating costs have been established using the RTIM2 model,[9] with two exceptions:

(a) The model to determine road roughness (based on, for example, the number of vehicle passes since the last grading on unpaved roads) has not been used as traffic volumes are commonly very low, and the rate of road deterioration will be heavily affected by environmental conditions in addition to traffic activity. Moreover, no systematic data are available on the present condition of roads. For indicative purposes three road conditions have been adopted, as shown in Table 20.

Table 20: SOLOMON ISLANDS—ROAD ROUGHNESS AND CONDITION

Road Condition	Road Roughness (mm/km)	
	Gravel Road	Sealed Road
Good	3,000	2,000
Fair	5,000	3,000
Poor	8,000	5,000

Source: Mission estimates.

(b) Data on the age profile of vehicles in the Solomon Islands and scrappage rates are not available, and the cost of capital and depreciation have been based on the average annual cost over the economic life of vehicles.

4.2 **Vehicle Features .** Representative vehicle types for the most commonly found types of vehicles in use in the Solomon Islands are:

- Car (Mazda 323)
- Light Utility (Isuzu KB Pickup)
- Four Wheel Drive (Toyota Landcruiser)
- Light Truck (Mazda 3 tonne Truck)

Other vehicles will have operating costs similar to these vehicles. Features of these vehicles which influence operating costs are presented in Table 21. The data has been obtained from investigations in the Solomon Islands. The share of each vehicle type is based on the share of registered vehicles and the annual distance travelled by each vehicle category. The number of vehicles registered in 1986 (the last year for which data are available) was:

Motor cars and taxis	1,350
Public service vehicles	209
Goods vehicles	1,499
Motor cycles	253
Other	308
Total	3,619

Some of these vehicles span the four vehicle categories for which operating costs have been derived. Specific data to disaggregate the vehicle types is not available, but it is estimated that 15 percent of cars are 4 WD, half of public service vehicles each have operating

characteristics similar to trucks and 4 WD vehicles respectively, and two-thirds of goods vehicles are similar to pickups and the remainder to trucks. This results in the distribution of vehicles types as shown in Table 21; the distribution is similar to that in other Pacific countries currently being reviewed. Vehicle resource consumption for travel on good sealed roads derived from the RTIM model is also presented in Table 21.

4.3 **Vehicle Operating Costs**. Total vehicle operating costs, in SI$ per kilometer (1991 prices), for travel on sealed roads in good condition are described in Table 22. (Note that economic operating costs are 81 percent of financial costs.) These figures are used as a datum from which vehicle operating costs are estimated for sealed roads in fair and poor condition and unsealed roads (in each of the three conditions) using road roughness as described in Table 20, and relationships in the RTIM model.[10] Traffic volumes are low (see Box 4.1) and representive volumes have been used in estimating total vehicle operating cost savings. The vehicle operating costs are summarized in Box 2.1 in the main text. The principal items with a substantial imported component are fuel, oil, tires, spare parts for maintenance and capital charges. About a quarter of these costs can be attributed to local distribution and retailing; however, there is an import component to these latter costs. This component is estimated as 35 percent, the share of net imports in GDP in the Solomon Islands.[11] Applying this proportion to other components of vehicle operating costs, the foreign cost component of financial vehicle operating costs is estimated to be 77 percent. Average vehicle operating costs on gravel and sealed roads in the three conditions described in Table 21 are presented in Box 2.1.

Box 4.1: Traffic Volumes

The distribution of traffic volumes over the road network is highly skewed. Traffic counts have been made on the north coast road of Guadalcanal since the 1970s, but not elsewhere in the country. Traffic volumes range from 17,800 vehicles per day to 3,600 vehicles per day in Honiara but reduce to 50 vehicles per day within 40 km of the outskirts of the city. Indications are that much of the regional road network carries less than 10 vehicles per day and the most heavily trafficked roads are unlikely to exceed volumes of 50 vehicles per day.

Table 21 SOLOMON ISLANDS—VEHICLE OPERATING PARAMETERS: SEALED ROADS IN GOOD CONDITION, 1991

	Car	Light Utility	4WD	Light Truck
Physical Data				
Free Speed	60	50	60	45
Power-Weight Ratio (BHP/t)	-	-	-	25
Gross Vehicle Weight (t)	1.0	1.0	1.5	3.0
Annual Use:				
Distance (km)	12,500	14,750	12,500	17,000
Time (hours)	500	600	500	680
Effective Life (years)	10	10	10	10
Average Vehicle Age (years)	4	4	5	5
Vehicle Crew:				
Driver	0	1	1	1
Other	0	1	1	1
Traffic Composition	39%	33%	8%	29%
Unit Price Data (1991 prices)				
(i) Financial Prices				
Vehicle	40,000	41,600	83,000	65,000
Tire	211	214	334	266
Fuel	0.98	0.98	0.93	0.93
Oil	12.5	12.50	12.50	12.50
Driver Time (/hr)	1.33	1.33	1.33	1.47
Crew Time (/hr)	0.40	0.40	0.40	0.40
Maintenance Labor (/hr)	1.33	1.33	1.33	1.33
Insurance	700	1,700	2,500	2,500
Annual Registration	135	111	183	231
Real Interest Rate	7%	7%	7%	7%
(ii) Economic Prices /a				
Vehicle	31,200	36,000	59,100	55,200
Tire	150	150	240	190
Fuel	0.75	0.75	0.75	0.75
Oil	10.00	10.00	10.00	10.00
Derived Data /b				
Average Speed (kph)	58	48	59	44
Fuel Consumption (l/'000 km)	72	67	113	134
Oil Consumption (l/'000 km)	1.2	1.8	1.8	4.0
Tires (Consumed/'000 km)	0.139	0.139	0.139	0.331
Spare Parts (%/'000 km)	0.001	0.001	0.001	0.001
Maintenance Labor (hrs/km)	0.001	0.001	0.001	0.001

/a Excludes taxes and duties.
/b Derived from RTIM for sealed roads with roughness of 2,000 mm/km.

Source: Mission estimates.

Table 22: SOLOMON ISLANDS—VEHICLE OPERATING COSTS ON PAVED ROADS IN GOOD CONDITION, 1991 /a
(SI$/km, 1991 Values)

	Car	Light Utility	4WD	Light Truck	Average
Financial Cost					
Fuel	0.070	0.065	0.105	0.125	0.082
Oil	0.015	0.023	0.023	0.050	0.025
Tires	0.029	0.030	0.046	0.088	0.042
Maintenance	0.047	0.058	0.122	0.081	0.064
Interest and Depreciation	0.456	0.402	0.945	0.544	0.497
Licenses and Insurance	0.067	0.123	0.215	0.161	0.116
Driver and Crew	0.000	0.036	0.030	0.042	0.023
Total	0.684	0.736	1.485	1.092	0.849
Economic Cost					
Fuel	0.054	0.050	0.085	0.101	0.064
Oil	0.012	0.018	0.018	0.040	0.020
Tires	0.021	0.021	0.033	0.063	0.030
Maintenance	0.037	0.050	0.087	0.069	0.052
Interest and Depreciation	0.355	0.347	0.673	0.462	0.401
Insurance	0.056	0.115	0.200	0.147	0.105
Driver and Crew	0.000	0.036	0.030	0.042	0.023
Total	0.535	0.638	1.126	0.925	0.695

/a Vehicle operating costs for paved roads in good condition (roughness index 2,000 mm/km) are used as the datum, against which vehicle operating costs for other road types (unsealed and earth) and road conditions (fair and poor) are estimated. The total annual cost of owning and operating vehicles is expressed in SI$/km; variations in operating costs with road condition are tested only for fuel, oil, tires and maintenance.

Source: Mission estimates and RTIM model.

Endnotes

1. The survey of the maintenance situation presented here is based upon a World Bank mission visit to the Solomon Islands September 2-5, 1991.

2. These tables are based on a classification system outlined in Volume One, Part II. The notional classifications used in the marine and aviation subsectors are subject to further refinement.

3. The information is derived from two sources. A questionnaire setting out the data required was circulated prior to the mission visit and used as the reference for discussions with the relevant Ministries and Departments. In addition to the information from the mission, data are drawn from previous sectoral and subsectoral reports on transport in the Solomon Islands.

4. By using a 'replacement' value for the asset, no consideration has been given to the condition of the asset. In most cases the actual value of the asset would be considerably lower than the replacement cost, due to age and lack of maintenance.

5. Transport infrastructure in this report is limited to assets within the public sector. While the overwhelming majority of transport infrastructure (in the Pacific Islands) is publicly owned, the public/private distinction is an arbitrary one from the standpoint of providing transport services.

6. From a depreciation-accounting standpoint straight-line "depreciation" overestimates economic depreciation relative to an equivalent annual cost of "capital recovery" basis. From a resource use standpoint, capital replacement cost plus annual maintenance are the relevant real flows.

7. At the same time th. costs (in addition to maintenance expenditure) of putting in place effective maintenance, such as the administrative and management of personnel, training and information, need to be factored in. Implementation of improved maintenance needs to be cost effective and the costs should be less than the direct savings in infrastructure costs. This issue is addressed in Volume One, Part II of this report.

8. The structure of road user charges and other fees/taxes for road cost recovery is more complex in such situations. This issue of providing reliable access to small, often remote, communities also arises in maritime and aviation with small wharves and airfields.

9. Transport and Road Research Laboratory (1982).

10. The vehicle operating costs are summarized in Box 2.1 in Volume One of this report.

11. Based on data for 1988 when imports, exports and GDP were SI$351 million, SI$225 million and SI$367 million respectively.

SOLOMON ISLANDS TRANSPORT SECTOR STUDY