

7.1.5 Benefits of the Project

(1) Items of Benefits

The improvement of Betio Port will greatly contribute to the national economy. Considering the "With" and "Without" case, the following items are identified as major benefits of the Improvement Plan of Betio Port from a viewpoint of the national economy.

- 1) Saving in ship staying costs
- 2) Saving in cargo handling costs
- 3) Improvement in efficiency of inter-island transportation of imported cargoes
- 4) Improvement of safety of domestic passenger traffic
- 5) Improvement of safe navigation for entry and departure
- 6) Improvement in environment with providing rubbish disposal area.
- 7) Increase in employment opportunities and incomes.

It is impossible to evaluate all these benefits in monetary terms, out of the above, items 1), 2) and 3) are considered tangible and the monetary benefits of these items are calculated.

The other items are considered intangible and only a qualitative analysis is undertaken.

(2) Calculation of Benefits

In converting the market prices into economic prices, benefits derived from benefit item 1) and 2) are estimated at economic price.

1) Savings in ship staying costs

Present cargo handling with barge operation requires transportation time between ships and the wharf. With implementation of the project, about 91% of cargoes of ships calling at Betio Port will be handled alongside a new wharf. The total cargo handling time at the port will be greatly decreased due to the improvement of cargo handling efficiency. It results in minimizing ship staying time at Betio Port. The reduction of the staying time in the "With" project situation is one of the main benefit of the project.

(i) Ship staying time

Ship staying time at the port comprise the waiting time for berthing and the berthing time for unloading/loading. In Betio Port, waiting time of ship is negligible due to small number of annual ship call of about 60.

With implementation of the project, the improvement of cargo handling rate results in saving of the ship handling time. The cargo handling rate and ship handling time for "Without" and "With" case are shown in Tables 7-1-16 and 7-1-17.

(ii) Share accruing to Kiribati

The benefit derived from the savings of ship staying costs will belong to the shipping companies. Therefore, for foreign ships the benefits accrue to the foreign carriers and for Kiribati ships the benefits accrue to Kiribati. However, it is now standard practice to include some of the benefits accruing to foreign carriers in the appraisal on understanding that in the long run this benefit will filter through to the national economy, for example, through lower freight rates.

Thus, in this study, it is assumed that 50% of the benefits belong to foreign ships will return to Kiribati as well as 100% of benefits for Kiribati ships will accrue to Kiribati's economy giving about 70% of the total benefits to Kiribati.

(iii) Saving of ship staying costs

Benefits derived from savings of ship staying costs due to the implementation of this project are calculated in Table 7-1-18.

Time charterage of dry cargo ships is shown in Table 7-1-19.

Table 7-1-16 Cargo Handling Rate

	Ship Type	1997				1998				1999				2000-2022			
		Cargo Handling Rate		Cargo Handling Rate		Cargo Handling Rate		Cargo Handling Rate		Cargo Handling Rate		Cargo Handling Rate		Cargo Handling Rate			
		Without T/H	With T/H	Without T/H	With T/H	Without T/H	With T/H	Without T/H	With T/H	Without T/H	With T/H	Without T/H	With T/H	Without T/H	With T/H		
Overseas	CNTR Ship	Container	84.2	190.0	75.8	190.0	67.4	190.0	58.9	190.0	190.0	190.0	58.9	190.0			
		G. Cargo	10.0	15.0	9.0	15.0	8.0	15.0	7.0	15.0	15.0	15.0	7.0	15.0			
	PFL	Container	84.2	190.0	75.8	190.0	67.4	190.0	58.9	190.0	190.0	190.0	58.9	190.0			
		G. Cargo	10.0	15.0	9.0	15.0	8.0	15.0	7.0	15.0	15.0	15.0	7.0	15.0			
	BHL	Container	84.2	152.0	75.8	152.0	67.4	152.0	58.9	152.0	152.0	152.0	58.9	152.0			
		G. Cargo	10.0	13.0	9.0	13.0	8.0	13.0	7.0	13.0	13.0	13.0	7.0	13.0			
Domestic	Copra Ship	Copra	17.4	20.0	15.7	20.0	13.9	20.0	12.1	20.0	20.0	20.0	12.1	20.0			
		G. Cargo	7.5	15.0	6.8	15.0	6.0	15.0	5.3	15.0	15.0	15.0	5.3	15.0			
	KSSL Ship	Copra	7.5	15.0	6.8	15.0	6.0	15.0	5.3	15.0	15.0	15.0	5.3	15.0			
		G. Cargo	7.5	15.0	6.8	15.0	6.0	15.0	5.3	15.0	15.0	15.0	5.3	15.0			
	L. Craft	Copra	7.5	15.0	6.8	15.0	6.0	15.0	5.3	15.0	15.0	15.0	5.3	15.0			
		G. Cargo	7.5	15.0	6.8	15.0	6.0	15.0	5.3	15.0	15.0	15.0	5.3	15.0			

(Note) CNTR: Container, CCS: Chief Container Service, PFL: Pacific Forum Line, BHL: Bali HI Line

Table 7-1-17 Ships' Waiting Time

(Unit:Days)

Year	Ship's Waiting Time		
	Without	With	Reduction
1997	267.15	142.65	124.50
1998	304.65	146.73	157.92
1999	355.54	150.94	204.60
2000	415.96	154.96	261.00
↓	↓	↓	↓
2022	415.96	154.96	261.00

Table 7-1-18 Saving of Ship Staying Costs

(Unit:A\$)

Year	Without- With	Saving Cost		
		Feedback Ratio		
		Total	70%	50%
1997	124.50	690,505	483,354	345,253
1998	157.92	849,726	594,808	424,863
1999	204.60	1,062,819	743,973	531,410
2000	261.00	1,329,578	930,705	664,789
↓	↓	↓	↓	↓
2022	261.00	1,329,578	930,705	664,789

Table 7-1-19 Time Charterage of Dry Cargo Ships

(Unit:A\$ per Day)

Ship Type			Without Case		With Case	
			DWT	Charterage	DWT	Charterage
Overseas	CNTR Ship	CCS	10,683	12,600	5,000	5,900
		PFL	3,500	4,900	2,800	4,900
		BHL	15,567	10,800	15,567	10,800
	Copra Ship		2,800	4,900	2,800	4,900
Domestic	KSSL Ship		370-1295	2,800	370-1295	2,800
	KSSL Ship	L. Craft	NRT43-49	470	NRT43-49	470

(Note) CCS: Chief Container Service, PFL: Pacific Forum Line

BHL: Bali Hi Line, CNTR: Container

2) Saving of cargo handling costs

The existing container yard is very tight with about 1,000 m² of limited stacking slots in the yard of 3,000 m² and a sole fixed tower crane on shore is used to unload full FCLs onto the stack. The situation brings containers to be sometimes stacked 6 high in the yard.

With implementation of the project, enough stacking slots will be provided in the yard and 2 or 3 tiers of FCLs will be stacked in the yard, as international standards of FCL stacking.

A mobile crane, forklifts and trailers with chassis will be provided to enhance handling efficiency. The provision will save operation costs of cargo handling.

It is assumed that direct costs in operating costs vary in "Without" and "With" projects while fixed costs are remain constant for every year.

The direct costs consist of personnel costs and other costs such as repair and maintenance, fuel, electrical and water and claims uninsured in terms of service items of shipping, cargo handling and cargo storage.

With implementation of the project, the direct costs become 49% in 1997, 48% in 1998 and 42% in 1999 and 39% in and after 2000 in comparison with "Without" project due to improvement of cargo handling efficiency mentioned above.

(i) Saving of direct labour costs

Direct labour costs of permanent staff and casual labour in "Without" and "With" project are shown in Tables 7-1-20 and 7-1-21.

The shadow prices of the saving of the direct casual labour costs are calculated by multiplying the market prices by the conversion factor of shadow wage rate 0.36 and are estimated to be A\$ 102,261 in 1997, A\$ 129,721 in 1998 and A\$ 168,060 in 1999 and A\$ 214,390 in and after 2000.

(ii) Saving of other direct cost

Direct other costs of repair and maintenance, fuel, electricity and water, and claims uninsured in "Without" and "With" projects are shown in Tables 7-1-22, 7-1-22 (A) and 7-1-23.

The shadow prices of the saving of the other direct costs are calculated by multiplying the market prices by the standard conversion factor of 0.88 at A\$ 242,780 in 1997, A\$ 300,977 in 1988 and A\$ 381,935 in 1999, A\$ 479,549 in and after 2000.

Table 7-1-20 Saving of Direct Labour Costs for Cargo Handling

Year	Cargo Volume Ton	Cargo Handling Time		Unit Cost of Direct Labour per Hour				Direct Labour Costs				Saving D.L. Cost A\$		
		Without		With		Without		With		Total A\$	Total A\$			
		H	AS	H	AS	Parmanent A\$	Casual A\$	Parmanent A\$	Casual A\$					
1997	96,898	6,411.5	3,423.6	49.54	95.07	92.78	95.07	317,642	609,541	927,183	317,642	325,482	643,124	284,059
1998	101,040	7,311.6	3,521.4	50.96	95.07	92.78	95.07	326,715	685,114	1,021,829	326,715	334,779	661,494	360,335
1999	105,394	8,532.9	3,622.5	52.42	95.07	92.78	95.07	336,096	811,223	1,147,319	336,096	344,391	680,487	466,832
2000	109,846	9,983.1	3,719.0	53.82	95.07	92.78	95.07	345,049	949,093	1,294,142	345,049	353,565	698,614	595,528
↓														
2022	109,846	9,983.1	3,719.0	53.82	95.07	92.78	95.07	345,049	949,093	1,294,142	345,049	353,565	698,614	595,528

(Remark)

1993 Labour Cost: Parmanent A\$257,045 Cargo Handling Time: 4089.05H
 Casual 388,765
 Total A\$645,810

Unit Cost of Casual Labour: A\$95.07/H

1997 Labour Cost: Parmanent A\$320,007 (5 Persons A\$62,962 added)
 Unit Cost of Parmanent Labour: A\$92.78/H for With Project, Same Amount of With Case for Without Project
 Unit Cost of Casual Labour: A\$95.07/H for With and Without Project

Table 7-1-21 Shadow Prices of Direct Labour Costs Saving

Year	Saving of Direct Labour Costs Casual (Unskilled Labour)	
	Market Prices A\$	Shadow Prices A\$
1997	284,059	102,261
1998	360,335	129,721
1999	466,832	168,060
2000	595,528	214,390
↓		
2022	595,528	214,390

Table 7-1-22 Saving of Other Direct Costs

(Unit: AS)

Year	Cargo	Cargo Handling Time		Unit Cost of Other Direct Cost										Other Direct Costs				Remark	
		Without	With	Without					With					Total	Claims & Uninsured	Total	Saving		
				Repair & Mainte. etc	Fuel	Electrical & Water	Claims & Uninsured	AS	Repair & Mainte. etc	Fuel	Electrical & Water	Claims & Uninsured	AS						
1997	96,898	6,411.5	3,423.6	51.36	13.87	3.59	10.7	329,295	88,928	23,017	68,603	509,843	175,836	47,485	12,291	3,526	239,138	270,705	AS1.03/H
1998	101,040	7,311.6	3,521.4	51.36	13.87	3.59	10.7	375,524	101,412	26,249	78,234	581,419	180,859	48,842	12,642	3,627	245,970	355,449	
1999	105,394	8,532.9	3,622.5	51.36	13.87	3.59	10.7	438,250	118,351	30,633	91,302	678,536	186,052	50,244	13,005	3,731	253,032	425,504	
2000	109,846	9,983.1	3,719.0	51.36	13.87	3.59	10.7	512,732	138,466	35,839	106,819	793,856	191,008	51,583	13,351	3,831	259,773	534,083	
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2022	109,846	9,983.1	3,719.0	51.36	13.87	3.59	10.7	512,732	138,466	35,839	106,819	793,856	191,008	51,583	13,351	3,731	259,773	534,083	

Table 7-1-22 (A) Other Direct Costs 1989-1993

Cost	Year	Cargo	HNDL Time	Port HQTMS	Warehouse		Marfage		Lighterage		Stevedore		per Cargo		Total	per HNDL T	Remark
					AS	H	AS	H	AS	H	AS	H	AS	H			
Repair & Maintenance	1989	50,865				3,600		38,205		13,236		3,009		58,050		1.14	690
	1993	59,845	4089.05	1,352	0	100		48,244		95,745		355		144,444		2.41	40,223
* Adjust	1993	59,845	4089.05	0	0	0		52,093		209,286		0		261,379			105,748
														210,000		3.51	51.36 Slip: Every 2 Year
Fuel	1989	50,865				1		27,746		8,989		1,553		39,651		0.78	
	1993	59,845	4089.05	0	0	0		47,959		7,470		1,270		56,699		0.95	13.87
Electrical & Water	1989	50,865				0		6,071		920		0		13,059		0.26	
	1993	59,845	4089.05	64	0	13,022		885		0		703		14,674		0.25	3.59
Materials	1989	50,865				1,571		14,160		1,441		17,287		35,512		0.70	
	1993	59,845	4089.05	133	0	177		44,233		464		534		45,541		0.76	11.14
Claims	1989	50,865				-201		1,801		0		1,671		3,586		0.07	
Uninsured	1993	59,845	4089.05	55,760	0	31,666		0		0		41		87,467		1.46	21.39
* Adjust	1993	59,845	4089.05											43,733		0.73	10.70

(Note) HNDL Time: Handling Time. Port HQTMS: Port Headquarters.

Table 7-1-23 Shadow Prices of Other Direct Costs Saving

Year	Saving of Other Direct Costs													
	Repair & Maintenance			Fuel			Electrical & Water			Claims Uninsured			Total	
	Market Prices A\$	Shadow Prices A\$	Conversion Factor Rate	Market Prices A\$	Shadow Prices A\$	Conversion Factor Rate	Market Prices A\$	Shadow Prices A\$	Conversion Factor Rate	Market Prices A\$	Shadow Prices A\$	Conversion Factor Rate	Market Prices A\$	Shadow Prices A\$
1987	153,459	135,044	0.88	41,443	41,029	0.99	10,726	9,439	0.88	65,077	57,268	0.88	270,705	242,780
1988	194,665	171,305	0.88	52,570	52,044	0.99	13,607	11,974	0.88	74,607	65,654	0.88	335,449	300,977
1999	252,198	221,934	0.88	68,107	67,426	0.99	17,628	15,513	0.88	87,571	77,062	0.88	425,504	381,935
2000	321,724	283,117	0.88	86,883	86,014	0.99	22,488	19,789	0.88	102,988	90,629	0.88	534,083	479,549
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2022	321,724	283,117	0.88	86,883	86,014	0.99	22,488	19,789	0.88	102,988	90,629	0.88	534,083	479,549

(3) Intangible Benefits

The following benefits will be generated with implementation of the Project but will not be evaluated in monetary terms. Important benefits listed below are evaluated qualitatively as below:

1) Improvement of transportation efficiency toward outer islands

Betio Port plays a role of not only a trade opening to foreign countries but an entry port to distribute and concentrate domestic cargoes. The latter function is given, due to geographic nature of the country with wide dispersion of islands over vast expansion of the ocean. With implementation of the Project, the function of the Betio Port will be enhanced and efficiency of handling cargoes will be improved to contribute to economic activities in the outer-islands.

2) Improvement of safety and release from inconvenience of passenger traffic

The present inconvenient conditions for passengers getting on and off ships cause unsafe traffic flow around the port area. The said constraints will be eliminated with providing a passenger terminal under the Project.

3) Increase of efficiency of landing cargoes in outer islands with channel dredging.

The outer islands confront constraints of inability to accommodate inter-island ships at their wharves due to siltation in the channels. The Project will provide dredging services to the outer islands for improving cargo handling efficiency.

4) Improvement of safe navigation

The present navigation aids are deteriorated and night navigation are not allowed. The Project will provide appropriate navigation aids for the 24-hours operating port, which will promote saving ship staying costs.

5) Improvement in environment with provision of rubbish disposal area

With implementing the Project, an access road will create an open area connected with East Mole, which will be reclaimed with rubbish, dredged spoil, etc. The area will be a new rubbish disposal area with the existing one at the west end of

Betio Islet and will eliminate contamination of the sea water. The Project will help improvement of the environment of the Atoll.

6) Increase of employment opportunities and incomes

Future management/operation of the Port will require additional employees for new container yard and for KPA.

7.1.6 Calculation of EIRR and Evaluation

(1) Calculation of the EIRR

The EIRR of the Implementation Plan for Betio Port is calculated as 2.74% at shadow price (3.62% at market price). Calculation result of the EIRR is shown in Tables 7-1-24 and 7-1-25.

From view point of national economy, costs/benefits should be discounted by social discount rate which is gradually set up to the rate higher than loan interest.

(2) Sensitivity Analysis

In order to determine whether the project is feasible against changes of calculation conditions, a sensitivity analysis is made for five alternatives.

- Case A : The costs decrease by 10%
- Case B : The costs increase by 10%
- Case C : The benefits decrease by 10%
- Case D : The benefits increase by 10%
- Case E : The benefits increase by 100%
(in the case of double the cargo forecast)

The case E shows that 100% increase of benefit is necessary for target figure of EIRR which is assumed to be about 10%.

The sensitivity analysis for five alternatives is calculated by using the same formula from the base case and the results are shown in Tables 7-1-26 to 7-1-30 and summarized in Table 7-1-31.

Table 7-1-24 Costs/Benefits and EIRR, Shadow Price
(Feedback Ratio of Ship Staying Saving Cost: 70%)

IRR = 2.74% (Unit: ¥)

No.	Year	Costs			Benefits			Net Present Value (Discount Rate= 2.73%)		
		Construction Cost	Operation Cost	Residual Value	Total	Saving Cost Ships' Staying	Saving Cost Cargo Handling		Total	
0	1995	11,749,807	0	0	11,749,807	0	0	0	-11,749,807	1.000000
1	1996	12,288,261	0	0	12,288,261	0	0	0	-11,960,856	0.973340
2	1997	0	215,355	0	215,355	483,354	345,041	828,395	580,789	0.947391
3	1998	0	216,525	0	216,525	594,808	430,698	1,025,506	745,989	0.922134
4	1999	0	217,646	0	217,646	743,973	549,995	1,293,968	966,053	0.897550
5	2000	0	416,607	0	416,607	930,705	693,939	1,624,644	1,055,368	0.873622
6	2001	0	416,607	0	416,607	930,705	693,939	1,624,644	1,027,231	0.850331
7	2002	0	416,607	0	416,607	930,705	693,939	1,624,644	999,845	0.827861
8	2003	0	416,607	0	416,607	930,705	693,939	1,624,644	973,190	0.805596
9	2004	0	416,607	0	416,607	930,705	693,939	1,624,644	947,245	0.784119
10	2005	0	416,607	0	416,607	930,705	693,939	1,624,644	921,992	0.763215
11	2006	0	416,607	0	416,607	930,705	693,939	1,624,644	897,411	0.742857
12	2007	0	416,607	0	416,607	930,705	693,939	1,624,644	873,487	0.723063
13	2008	0	416,607	0	416,607	930,705	693,939	1,624,644	850,200	0.703786
14	2009	0	416,607	0	416,607	930,705	693,939	1,624,644	827,533	0.685023
15	2010	0	416,607	0	416,607	930,705	693,939	1,624,644	805,472	0.666761
16	2011	0	416,607	0	416,607	930,705	693,939	1,624,644	783,998	0.648985
17	2012	0	416,607	0	416,607	930,705	693,939	1,624,644	763,096	0.631683
18	2013	0	416,607	0	416,607	930,705	693,939	1,624,644	742,753	0.614843
19	2014	0	416,607	0	416,607	930,705	693,939	1,624,644	722,951	0.598451
20	2015	0	416,607	0	416,607	930,705	693,939	1,624,644	703,677	0.582496
21	2016	0	416,607	0	416,607	930,705	693,939	1,624,644	684,917	0.566967
22	2017	0	416,607	0	416,607	930,705	693,939	1,624,644	666,658	0.551852
23	2018	0	416,607	0	416,607	930,705	693,939	1,624,644	648,885	0.537140
24	2019	0	416,607	0	416,607	930,705	693,939	1,624,644	631,586	0.522820
25	2020	0	416,607	0	416,607	930,705	693,939	1,624,644	614,747	0.508881
26	2021	0	416,607	0	416,607	930,705	693,939	1,624,644	598,359	0.495315
27	2022	0	416,607	-6,424,308	-6,007,701	930,705	693,939	1,624,644	3,679,630	0.482110
	Total	24,038,068	10,231,487	-6,424,308	27,845,247	23,228,350	17,286,331	40,514,681	2,599	

Table 7-1-25 Costs/Benefits and EIRR, Market Price
(Feedback Ratio of Ship Staying Saving Cost: 70%)

(Unit: \$)

IRR = 3.62%

No.	Year	Costs			Benefits			Net Present Value		
		Construction Cost	Operation Cost	Residual Value	Total	Saving Cost Ships Staying	Saving Cost Cargo Handling	Total	(Discount Rate= 3.61%)	
0	1995	12,315,316	0	0	12,315,316	0	0	0	-12,315,316	1.000000
1	1996	12,879,884	0	0	15,195,000	0	0	0	-14,664,299	0.965074
2	1997	0	241,586	0	241,586	483,354	554,764	1,038,118	741,864	0.931368
3	1998	0	242,768	0	242,768	594,808	695,784	1,290,592	941,825	0.898839
4	1999	0	243,900	0	243,900	743,973	892,396	1,636,369	1,207,840	0.867446
5	2000	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,331,459	0.837149
6	2001	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,284,957	0.807911
7	2002	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,240,078	0.779694
8	2003	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,196,767	0.752462
9	2004	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,154,969	0.726182
10	2005	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,114,630	0.700819
11	2006	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,075,700	0.676342
12	2007	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,038,130	0.652720
13	2008	0	469,848	0	469,848	930,705	1,129,611	2,060,316	1,001,874	0.629924
14	2009	0	469,848	0	469,848	930,705	1,129,611	2,060,316	966,882	0.607923
15	2010	0	469,848	0	469,848	930,705	1,129,611	2,060,316	933,112	0.586690
16	2011	0	469,848	0	469,848	930,705	1,129,611	2,060,316	900,523	0.566200
17	2012	0	469,848	0	469,848	930,705	1,129,611	2,060,316	869,071	0.546425
18	2013	0	469,848	0	469,848	930,705	1,129,611	2,060,316	838,717	0.527340
19	2014	0	469,848	0	469,848	930,705	1,129,611	2,060,316	809,424	0.508922
20	2015	0	469,848	0	469,848	930,705	1,129,611	2,060,316	781,155	0.491148
21	2016	0	469,848	0	469,848	930,705	1,129,611	2,060,316	753,872	0.473994
22	2017	0	469,848	0	469,848	930,705	1,129,611	2,060,316	727,542	0.457489
23	2018	0	469,848	0	469,848	930,705	1,129,611	2,060,316	702,133	0.441463
24	2019	0	469,848	0	469,848	930,705	1,129,611	2,060,316	677,609	0.426044
25	2020	0	469,848	0	469,848	930,705	1,129,611	2,060,316	653,943	0.411164
26	2021	0	469,848	0	469,848	930,705	1,129,611	2,060,316	631,104	0.396804
27	2022	0	469,848	-7,300,350	-6,830,502	930,705	1,129,611	2,060,316	3,404,694	0.382945
	Total	25,195,000	11,634,758	-7,300,350	31,744,724	23,228,350	28,123,937	51,352,287	259	

Table 7-1-31 Results of Economic Analysis, EIRR

Case	EIRR (%)	
	Shadow Price	(Market Price)
Base Case	2.74	(3.62)
Without Passenger Terminal	3.21	(3.90)
Case A (Construction Cost -10%)	3.40	
Case B (-ditto- +10%)	2.18	
Case C (Benefits -10%)	1.91	
Case D (-ditto- +10%)	3.53	
*Case E (-ditto- +100%)	9.50	

* Case E shows that 100% increase of benefit is necessary for target figure of EIRR which is assumed to be about 10%.

(3) Economic Evaluation

Betio Port has long been left without any significant investment for improvement nor maintenance since 1940s. This is due partly to shortage of required income from limited volume of port cargoes and partly to lack of such an adequate organization as "port authority". Modernized cargo handling method of container is a world wide trend and brings benefits of quick cargo handling and quick dispatch of ship. This is true for a large port called by a large number of container ships and this is to claim a trade partner to develop a container handling facilities even in the case where the cargo volume is not large enough to justify the investment. Therefore, in some cases, scaling down of port facilities is employed. Good example is that most of ports in the South Pacific Ocean are not provided with an expensive gantry crane and depend on ship's gear for handling containers to/from ship.

As mentioned previously, the appropriate scope and scale of the improvement plan are to be determined through consideration of results of economic analysis. The following two cases have been examined for their economic feasibility in terms of EIRR and the results are given as below;

Development Option	Construction Cost	EIRR	
		Shadow Price	(Market Price)
i) Development of -9 m Wharf with concrete paved 170m x 120m container yard	A\$ 70.3 mill.	-1.00%	
ii) Development of -6 m Wharf with concrete paved 170mx120m container yard	A\$ 35.6 mill.	1.28%	
Selected Option			
Development of -6 m Wharf with compacted 170m x 100m container yard	A\$ 25.2 mill	2.74%	(3.62%)
(excluding costs for a passenger terminal which benefits are not counted)	A\$ 23.6 mill	3.21%	(3.90%)

As shown in the above EIRR, the improvement plan with -9 m wharf is calculated at about 1% while the plan with -6 m wharf and concrete paved container yard at 1.28%. The -9 m wharf (170m long with 210 x 170 m² turning basin and 25,000 m² of concrete paved container yard) can accommodate all the container carriers of CCS, KSSL and BHL and eliminate a tug and barge operation. However, the construction cost is destructively high and the plan is not economically feasible. Also, the plan with -6 m wharf with paved container yard yields EIRR of 1.28% which is not high enough for economic feasibility. Major reasons for these low economic return are 1) absence of investment to the port facilities over half century requiring large capital investment concentrating on this particular project and 2) small volume of port cargoes to justify provision of full scale container facilities. The selected option delays concrete paving work and gives EIRR of 2.74 % at shadow price and 3.62% at market price which is acceptable when various unfavourable situation and unquantifiable benefits are taken into consideration. In the case that the costs of passenger terminal which assumed to generate no benefits are excluded, EIRR is calculated as 3.21% in

shadow price and 3.90% in market price. Creation of land by channel and basin dredging will have uncountable benefit to Betio City where shortage of land is crucial problem. The reef flat area east to the port is designated as future reclamation area in the land use plan of Betio City. The improvement plan follows the land use plan and at the same time provides an area for rubbish dump which has been increasingly demanded in the community of Tarawa Island.

Table 7-1-26 Costs/Benefits and EIRR, Shadow Price
(Case A -Construction Cost -10%)

IRR = 3.40 %

No.	Year	Costs			Benefits			Net Present Value		
		Construction Cost	Operation Cost	Residual Value	Total	Saving Cost Ships Staying	Saving Cost Cargo Handling	Total	(Discount Rate= 3.398%)	
0	1995	10,574,826	0	0	10,574,826	0	0	0	-10,574,826	1,000000
1	1996	11,059,435	0	0	11,059,435	0	0	0	-10,695,989	0,967137
2	1997	0	215,355	0	215,355	483,354	345,041	828,395	573,409	0,935353
3	1998	0	216,525	0	216,525	594,808	430,698	1,025,506	731,816	0,904615
4	1999	0	217,646	0	217,646	743,973	549,995	1,293,968	941,659	0,874886
5	2000	0	416,607	0	416,607	930,705	693,939	1,624,644	1,022,161	0,846134
6	2001	0	416,607	0	416,607	930,705	693,939	1,624,644	988,571	0,818328
7	2002	0	416,607	0	416,607	930,705	693,939	1,624,644	956,083	0,791435
8	2003	0	416,607	0	416,607	930,705	693,939	1,624,644	924,662	0,765425
9	2004	0	416,607	0	416,607	930,705	693,939	1,624,644	894,275	0,740271
10	2005	0	416,607	0	416,607	930,705	693,939	1,624,644	864,866	0,715943
11	2006	0	416,607	0	416,607	930,705	693,939	1,624,644	836,463	0,692415
12	2007	0	416,607	0	416,607	930,705	693,939	1,624,644	808,974	0,669660
13	2008	0	416,607	0	416,607	930,705	693,939	1,624,644	782,389	0,647653
14	2009	0	416,607	0	416,607	930,705	693,939	1,624,644	756,677	0,626369
15	2010	0	416,607	0	416,607	930,705	693,939	1,624,644	731,809	0,605784
16	2011	0	416,607	0	416,607	930,705	693,939	1,624,644	707,760	0,585876
17	2012	0	416,607	0	416,607	930,705	693,939	1,624,644	684,500	0,566622
18	2013	0	416,607	0	416,607	930,705	693,939	1,624,644	662,005	0,548001
19	2014	0	416,607	0	416,607	930,705	693,939	1,624,644	640,250	0,529992
20	2015	0	416,607	0	416,607	930,705	693,939	1,624,644	619,210	0,512575
21	2016	0	416,607	0	416,607	930,705	693,939	1,624,644	598,860	0,495730
22	2017	0	416,607	0	416,607	930,705	693,939	1,624,644	579,180	0,479439
23	2018	0	416,607	0	416,607	930,705	693,939	1,624,644	560,146	0,463683
24	2019	0	416,607	0	416,607	930,705	693,939	1,624,644	541,737	0,448444
25	2020	0	416,607	0	416,607	930,705	693,939	1,624,644	523,934	0,433707
26	2021	0	416,607	0	416,607	930,705	693,939	1,624,644	506,716	0,419454
27	2022	0	416,607	-5,781,877	-5,365,270	930,705	693,939	1,624,644	2,835,591	0,405669
	Total	21,634,261	10,231,487	-5,781,877	26,083,871	23,228,350	17,286,331	40,514,681	2,908	

Table 7-1-27 Costs/Benefits and EIRR, Shadow Price
(Case B --Construction Cost +10%)

IRR = 2.18 %

No.	Year	Costs			Benefits		Net Present Value		
		Construction Cost	Operation Cost	Residual Value	Saving Cost Ships' Staying	Saving Cost Cargo Handling	Total	(Discount Rate= 2.18%)	
0	1995	12,924,788	0	0	12,924,788	0	0	-12,924,788	1.000000
1	1996	13,517,087	0	0	13,517,087	0	0	-13,228,578	0.978656
2	1997	0	215,355	0	215,355	483,354	345,041	828,395	0.957767
3	1998	0	216,525	0	216,525	594,808	430,698	1,025,506	0.937924
4	1999	0	217,646	0	217,646	743,973	549,995	1,293,968	0.917317
5	2000	0	416,607	0	416,607	930,705	693,939	1,624,644	0.897737
6	2001	0	416,607	0	416,607	930,705	693,939	1,624,644	0.878576
7	2002	0	416,607	0	416,607	930,705	693,939	1,624,644	0.859823
8	2003	0	416,607	0	416,607	930,705	693,939	1,624,644	0.841470
9	2004	0	416,607	0	416,607	930,705	693,939	1,624,644	0.823510
10	2005	0	416,607	0	416,607	930,705	693,939	1,624,644	0.805932
11	2006	0	416,607	0	416,607	930,705	693,939	1,624,644	0.788730
12	2007	0	416,607	0	416,607	930,705	693,939	1,624,644	0.771895
13	2008	0	416,607	0	416,607	930,705	693,939	1,624,644	0.755419
14	2009	0	416,607	0	416,607	930,705	693,939	1,624,644	0.739295
15	2010	0	416,607	0	416,607	930,705	693,939	1,624,644	0.723515
16	2011	0	416,607	0	416,607	930,705	693,939	1,624,644	0.708072
17	2012	0	416,607	0	416,607	930,705	693,939	1,624,644	0.692959
18	2013	0	416,607	0	416,607	930,705	693,939	1,624,644	0.678168
19	2014	0	416,607	0	416,607	930,705	693,939	1,624,644	0.663693
20	2015	0	416,607	0	416,607	930,705	693,939	1,624,644	0.649527
21	2016	0	416,607	0	416,607	930,705	693,939	1,624,644	0.635663
22	2017	0	416,607	0	416,607	930,705	693,939	1,624,644	0.622095
23	2018	0	416,607	0	416,607	930,705	693,939	1,624,644	0.608817
24	2019	0	416,607	0	416,607	930,705	693,939	1,624,644	0.595822
25	2020	0	416,607	0	416,607	930,705	693,939	1,624,644	0.583104
26	2021	0	416,607	0	416,607	930,705	693,939	1,624,644	0.570658
27	2022	0	416,607	-7,066,739	-6,650,132	930,705	693,939	1,624,644	0.558478
	Total	26,441,875	10,231,487	-7,066,739	29,606,623	23,228,350	17,286,331	40,514,681	1.789

Table 7-1-28 Costs/Benefits and EIRR, Shadow Price
(Case C - Benefits - 10%)

IRR = 1.91 %

No.	Year	Costs			Benefits			Net Present Value (Discount Rate= 1.912%)		
		Construction Cost	Operation Cost	Residual Value	Total	Saving Cost Ships' Staying	Saving Cost Cargo Handling		Total	
0	1995	11,749,807	0	0	11,749,807	0	0	0	-11,749,807	1.000000
1	1996	12,288,261	0	0	12,288,261	0	0	0	-12,057,721	0.981239
2	1997	0	215,355	0	215,355	435,019	310,537	745,556	510,493	0.962829
3	1998	0	216,525	0	216,525	535,327	387,628	922,955	667,411	0.944766
4	1999	0	217,646	0	217,646	639,576	494,996	1,164,572	877,838	0.927040
5	2000	0	416,607	0	416,607	837,635	624,545	1,462,180	951,103	0.909648
6	2001	0	416,607	0	416,607	837,635	624,545	1,462,180	933,260	0.892582
7	2002	0	416,607	0	416,607	837,635	624,545	1,462,180	915,750	0.875836
8	2003	0	416,607	0	416,607	837,635	624,545	1,462,180	898,570	0.859404
9	2004	0	416,607	0	416,607	837,635	624,545	1,462,180	881,712	0.843281
10	2005	0	416,607	0	416,607	837,635	624,545	1,462,180	865,170	0.827460
11	2006	0	416,607	0	416,607	837,635	624,545	1,462,180	848,937	0.811935
12	2007	0	416,607	0	416,607	837,635	624,545	1,462,180	833,010	0.796702
13	2008	0	416,607	0	416,607	837,635	624,545	1,462,180	817,382	0.781755
14	2009	0	416,607	0	416,607	837,635	624,545	1,462,180	802,047	0.767088
15	2010	0	416,607	0	416,607	837,635	624,545	1,462,180	787,000	0.752697
16	2011	0	416,607	0	416,607	837,635	624,545	1,462,180	772,234	0.738575
17	2012	0	416,607	0	416,607	837,635	624,545	1,462,180	757,747	0.724719
18	2013	0	416,607	0	416,607	837,635	624,545	1,462,180	743,530	0.711122
19	2014	0	416,607	0	416,607	837,635	624,545	1,462,180	729,581	0.697781
20	2015	0	416,607	0	416,607	837,635	624,545	1,462,180	715,892	0.684689
21	2016	0	416,607	0	416,607	837,635	624,545	1,462,180	702,462	0.671844
22	2017	0	416,607	0	416,607	837,635	624,545	1,462,180	689,282	0.659239
23	2018	0	416,607	0	416,607	837,635	624,545	1,462,180	676,351	0.646871
24	2019	0	416,607	0	416,607	837,635	624,545	1,462,180	663,662	0.634735
25	2020	0	416,607	0	416,607	837,635	624,545	1,462,180	651,210	0.622826
26	2021	0	416,607	0	416,607	837,635	624,545	1,462,180	638,993	0.611141
27	2022	0	416,607	-6,424,308	-6,007,701	837,635	624,545	1,462,180	4,479,501	0.599675
	Total	24,038,068	10,231,487	-6,424,308	27,845,247	20,905,527	15,557,696	36,463,223	2,600	

Table 7-1-29 Costs/Benefits and EIRR, Shadow Price
(Case D - Benefits +10%)

IRR = 3.53 %

No.	Year	Costs			Benefits			Net Present Value	
		Construction Cost	Operation Cost	Residual Value	Total	Saving Cost Ships Staving	Saving Cost Cargo Handling	Total	(Discount Rate= 3.528%)
0	1995	11,749,807	0	0	11,749,807	0	0	0	-11,749,807
1	1996	12,288,261	0	0	12,288,261	0	0	0	-11,869,502
2	1997	0	215,355	0	215,355	531,689	379,545	911,234	649,259
3	1998	0	216,525	0	216,525	654,289	473,768	1,128,057	821,483
4	1999	0	217,646	0	217,646	818,370	604,995	1,423,365	1,049,578
5	2000	0	416,607	0	416,607	1,023,776	763,333	1,787,109	1,152,366
6	2001	0	416,607	0	416,607	1,023,776	763,333	1,787,109	1,113,096
7	2002	0	416,607	0	416,607	1,023,776	763,333	1,787,109	1,075,164
8	2003	0	416,607	0	416,607	1,023,776	763,333	1,787,109	1,038,525
9	2004	0	416,607	0	416,607	1,023,776	763,333	1,787,109	1,003,135
10	2005	0	416,607	0	416,607	1,023,776	763,333	1,787,109	968,950
11	2006	0	416,607	0	416,607	1,023,776	763,333	1,787,109	935,931
12	2007	0	416,607	0	416,607	1,023,776	763,333	1,787,109	904,037
13	2008	0	416,607	0	416,607	1,023,776	763,333	1,787,109	873,229
14	2009	0	416,607	0	416,607	1,023,776	763,333	1,787,109	843,471
15	2010	0	416,607	0	416,607	1,023,776	763,333	1,787,109	814,728
16	2011	0	416,607	0	416,607	1,023,776	763,333	1,787,109	786,963
17	2012	0	416,607	0	416,607	1,023,776	763,333	1,787,109	760,145
18	2013	0	416,607	0	416,607	1,023,776	763,333	1,787,109	734,241
19	2014	0	416,607	0	416,607	1,023,776	763,333	1,787,109	709,220
20	2015	0	416,607	0	416,607	1,023,776	763,333	1,787,109	685,051
21	2016	0	416,607	0	416,607	1,023,776	763,333	1,787,109	661,706
22	2017	0	416,607	0	416,607	1,023,776	763,333	1,787,109	639,157
23	2018	0	416,607	0	416,607	1,023,776	763,333	1,787,109	617,376
24	2019	0	416,607	0	416,607	1,023,776	763,333	1,787,109	596,337
25	2020	0	416,607	0	416,607	1,023,776	763,333	1,787,109	576,015
26	2021	0	416,607	0	416,607	1,023,776	763,333	1,787,109	556,385
27	2022	0	416,607	-6,424,308	-6,007,701	1,023,776	763,333	1,787,109	3,056,641
	Total	24,038,068	10,231,487	-6,424,308	27,845,247	25,551,196	19,014,967	44,566,163	2,880

Table 7-1-30 Costs/Benefits and EIRR, Shadow Price
(Case E - Benefits +100%)

IRR = 9.50%

No.	Year	Costs				Benefits			Net Present Value (Discount Rate= 9.4993%)	
		Construction Cost	Operation Cost	Residual Value	Total	Saving Cost Ships' Staying	Saving Cost Cargo Handling	Total		
0	1995	11,749,807	0	0	11,749,807	0	0	0	-11,749,807	1.000000
1	1996	12,288,261	0	0	12,288,261	0	0	0	-11,222,230	0.913248
2	1997	0	215,355	0	215,355	966,708	680,082	1,656,790	1,202,189	0.834022
3	1998	0	216,525	0	216,525	1,189,616	861,396	2,051,012	1,397,270	0.761668
4	1999	0	217,646	0	217,646	1,487,946	1,099,990	2,587,936	1,648,755	0.695592
5	2000	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,799,455	0.635248
6	2001	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,643,349	0.580139
7	2002	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,500,786	0.529811
8	2003	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,370,587	0.483848
9	2004	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,251,685	0.441873
10	2005	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,143,100	0.403540
11	2006	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	1,043,934	0.368532
12	2007	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	953,370	0.336561
13	2008	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	870,664	0.307364
14	2009	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	795,131	0.280699
15	2010	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	726,152	0.256348
16	2011	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	663,156	0.234109
17	2012	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	605,627	0.213800
18	2013	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	553,087	0.195252
19	2014	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	505,107	0.178314
20	2015	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	461,286	0.162845
21	2016	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	421,266	0.148717
22	2017	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	384,723	0.135816
23	2018	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	351,349	0.124034
24	2019	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	320,866	0.113273
25	2020	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	293,032	0.103447
26	2021	0	416,607	0	416,607	1,861,410	1,387,878	3,249,288	267,609	0.094472
27	2022	0	416,607	-6,424,308	-6,007,701	1,861,410	1,387,878	3,249,288	798,665	0.086277
	Total	24,038,068	10,231,487	-6,424,308	27,845,247	46,456,700	34,572,662	81,029,362	167	

7.2 Financial Analysis

7.2.1 Method of Financial Analysis

In the Economic Analysis of the preceding Chapter, the economic effectiveness of the investment was studied from the point of view of the national economy.

This Financial Analysis is to appraise the financial feasibility of the project comparing without the project by the financial internal rate of return (FIRR) based on a cost-benefit analysis in the same way with economic analysis and to study the financial soundness of KPA management with project by financial statements from the management position of the executing Agency, Kiribati Port Authority to be established.

(1) Discount Cash Flow Analysis

This study aims at analyzing the profitability of the Project itself, seeking the so-called financial internal rate of return (FIRR) by the Discount Cash Flow Method. The FIRR is a discount rate which makes the net present value of the cash flow (income minus cost) equal to zero.

(2) Analysis of Financial Statements

In order to find out whether Betio Port can maintain soundness of financial affairs with the execution of the project, estimated Financial Statements (Income and Expenditure, Source and Application of Funds and Balance Sheet) are prepared for the period from the year 1995, established as the initial year of reckoning when the accounts for the Port were settled, to the year 2022 when the project life is to be completed, to analyze incomes and expenditures, conditions of fund raising and financial status.

7.2.2 Discount Cash Flow Analysis

(1) FIRR

The costs and benefits used for the analysis are evaluated in terms of market prices.

Costs of the project include capital investment, operation and maintenance costs while the benefits are increase in the incomes and decrease in operating costs achieved in

the cases of "with and without" the project.

Tables 7-2-1 to 7-2-3 show the incomes and costs.

Table 7-2-1 Costs for Costs/Benefits (Market Price)

(Unit: A\$)

Year	Total	Construction Cost	Operation Cost	Maintenance Cost	Fuel Cost	Maintenance Dredging	Residual Value
1995	12,315,316	12,315,316	0	0	0	0	0
1996	12,879,684	12,879,684	0	0	0	0	0
1997	241,586	0	210,158	0	25,088	6,340	0
1998	242,768	0	210,158	0	26,270	6,340	0
1999	243,900	0	210,158	0	27,402	6,340	0
2000	469,848	0	210,158	224,790	28,560	6,340	0
↓	↓	↓	↓	↓	↓	↓	↓
2022	-6,830,502	0	210,158	224,790	28,560	6,340	-7,300,350

Table 7-2-2 Benefits for Costs/Benefits (Market Price)

(Unit:A\$)

Year	Total	Saving of Operation Cost	
		Direct	Other
		Labour Cost	Direct Cost
1995	0	0	0
1996	0	0	0
1997	554,764	284,059	270,705
1998	695,784	360,335	335,449
1999	892,336	466,832	425,504
2000	1,129,611	595,528	534,083
↓	↓	↓	↓
2022	1,129,611	595,528	534,083

Table 7-2-3 Incomes for Costs/Benefits (Market Price)

(Unit:A\$)

Year	Incomes		
	With	Without	Balance
1997	2,819,411	2,521,474	297,937
1998	2,950,933	2,635,663	315,270
1999	3,093,284	2,759,447	333,837
2000	3,236,143	2,879,258	356,885
↓	↓	↓	↓
2022	3,236,143	2,879,258	356,885

The FIRR becomes 1.67% as shown in Table 7-2-4. It is considered desirable that FIRR remains at about 1% the same level as the interest of foreign loan.

The above FIRR exceeds this aim, indicating that the Project execution is feasible.

(2) Sensitivity Analysis

Table 7-2-5 shows the result of the sensitivity analysis for fluctuations of the income, expenditures and construction costs.

Table 7-2-5 FIRR by Sensitivity Analysis

Case A	Construction Cost	-10%	FIRR	2.35%
Case B	- ditto-	+10%	FIRR	1.07%
Case C	Incomes	-10%	FIRR	0.90%
Case D	- ditto-	+10%	FIRR	1.71%

Table 7-2-4 Costs/Benefits and FIRR (Market Price)

(Unit: A\$)

FIRR = 1.67%

No.	Year	Costs			Residual Value	Total	Income	Benefits			Total	Present Value (Discount Rate = 1.667%)
		Construction Cost	Operation Cost	0				Saving of Operation Cost	Direct Labour Cost	Other Direct Cost		
0	1995	12,315,316	0	0	12,315,316	0	0	0	0	0	0	-12,315,316
1	1996	12,879,684	0	0	12,879,684	0	0	0	0	0	0	-12,668,496
2	1997	0	241,586	0	241,586	297,937	284,059	270,705	335,449	270,705	852,701	591,239
3	1998	0	242,768	0	242,768	315,270	360,335	466,832	425,504	360,335	1,011,054	731,110
4	1999	0	243,900	0	243,900	333,873	466,832	534,083	534,083	466,832	1,226,209	919,450
5	2000	0	469,848	0	469,848	356,885	595,528	534,083	534,083	534,083	1,486,496	935,988
6	2001	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	921,547
7	2002	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	906,436
8	2003	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	891,575
9	2004	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	876,955
10	2005	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	862,576
11	2006	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	848,432
12	2007	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	834,521
13	2008	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	820,838
14	2009	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	807,380
15	2010	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	794,141
16	2011	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	781,119
17	2012	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	768,312
18	2013	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	755,714
19	2014	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	743,323
20	2015	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	731,134
21	2016	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	719,146
22	2017	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	707,355
23	2018	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	695,757
24	2019	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	684,349
25	2020	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	673,127
26	2021	0	468,848	0	468,848	356,885	595,528	534,083	534,083	534,083	1,486,496	662,091
27	2022	0	468,848	-7,300,350	-7,300,350	356,885	595,528	534,083	534,083	534,083	1,486,496	5,323,028
Total		25,195,000	11,512,756	-7,300,350	29,407,408	9,155,435	14,808,370	13,315,567	13,315,567	37,279,372	2,831	

7.2.3 Analysis of Financial Statement

(1) Premises

- 1) The year 1995 when KPA will be established is reckoned as the initial year, and the estimated financial statements for the period between 1995 and 2022 when the project life is to complete, are to be prepared.
- 2) The port tariff used in the calculation of incomes are present tariff for 1995 to 1996 and revised tariff in and after 1997 as described in the previous section 5.4 Management of KPA.
- 3) Costs are based on those of KSSL and MTCT in 1993.
- 4) Funds for the project investment will be raised by KPA and will consist of foreign and local loans, and will be appropriated in the Financial Statement in accordance with the fund raising method.
- 5) KPA's existing long-term loans related to Betio Port are ignored on the study.
- 6) Existing, additional facilities mentioned above are regarded as fixed assets. Depreciation is by a straight line method.
- 7) The rate of income tax is established as follows:

Income	Rate
A\$ 1 to 50,000 :	25%
A\$ 50,000 and above :	35% on the excess over A\$ 50,000

- 8) The exchange rate is, as a rule, A\$1 = ¥ 75.33.

The summarized financial statements are shown in unit of AS\$ million.

(2) Long-term Loans

All funds are assumed to be raised by loans. Financing conditions of foreign currency are used as reference; interest 1%, repayment 20 years after 10 years grace period.

Local currency is assumed to be 3 cases as follows:

Case 1 : interest 1%, repayment 20 years after 10 years grace period

Case 2 : interest 4%, repayment 20 years after 10 years grace period

Case 3 : interest 8%, repayment 20 years after 5 years grace period

Project fund is shown in Tables 7-2-6(1), 7-2-7(1) and 7-2-7(1A) to 7-2-7(3) and 7-2-7(3A) of Case A, Case B and Case C respectively.

(3) Fixed Assets

Fixed assets related to the existing facilities are based on the details of Fixed Assets for Betio Port in 1995 and the additional investment completed in 1996 are regarded as additional fixed assets.

These fixed assets are shown in Chapter 5.

Depreciation rates are as follows:

Wharfs, breakwaters	2.0 % (50 years)
Buildings	2.8 % (35)
Navigation Aids	5.0 % (20)
Cargo handling equipments	14.2 % (7)
Dredger	5.0 % (20)

Table 7-2-8 shows changes in the fixed assets after 1995.

Table 7-2-6(1) Repayment Schedule of Foreign Loan

1. Conditions of Foreign Loan

Foreign Loan	Interest(%)	Year of Repay	Time of Repay	Grace Periods
18,568,000	1.00	20	20	10

2. Repayment Schedule

(1) Repayment for Grace Periods

(Unit: \$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	9,076,038
1996	90,760	0	90,760	18,568,000
1997	185,680	0	185,680	18,568,000
1998	185,680	0	185,680	18,568,000
1999	185,680	0	185,680	18,568,000
2000	185,680	0	185,680	18,568,000
2001	185,680	0	185,680	18,568,000
2002	185,680	0	185,680	18,568,000
2003	185,680	0	185,680	18,568,000
2004	185,680	0	185,680	18,568,000

(2) Repayment for Repayment Periods

(Unit: \$)

Year	Total Repay	Principal	Interest	Balance
	20,579,020	18,567,997	2,011,023	18,568,000
1 2005	1,028,951	843,271	185,680	17,724,729
2 2006	1,028,951	851,704	177,247	16,873,025
3 2007	1,028,951	860,221	168,730	16,012,804
4 2008	1,028,951	868,823	160,128	15,143,981
5 2009	1,028,951	877,512	151,439	14,266,469
6 2010	1,028,951	886,287	142,664	13,380,182
7 2011	1,028,951	895,150	133,801	12,485,032
8 2012	1,028,951	904,101	124,850	11,580,931
9 2013	1,028,951	913,142	115,809	10,667,789
10 2014	1,028,951	922,274	106,677	9,745,515
11 2015	1,028,951	931,496	97,455	8,814,019
12 2016	1,028,951	940,811	88,140	7,873,208
13 2017	1,028,951	950,219	78,732	6,922,989
14 2018	1,028,951	959,722	69,229	5,963,267
15 2019	1,028,951	969,319	59,632	4,993,948
16 2020	1,028,951	979,012	49,939	4,014,936
17 2021	1,028,951	988,802	40,149	3,026,134
18 2022	1,028,951	998,690	30,261	2,027,444
19 2023	1,028,951	1,008,677	20,274	1,018,767
20 2024	1,028,951	1,018,764	10,187	3

Table 7-2-7(1) Repayment Schedule of Local Loan

1. Conditions of Local Loan

Local Loan	Interest(%)	Year of Repay	Time of Repay	Grace Periods
6,627,000	1.00	20	20	10

2. Repayment Schedule

(1) Repayment for Grace Periods

(Unit:\$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	3,239,278
1996	32,393	0	32,393	6,627,000
1997	66,270	0	66,270	6,627,000
1998	66,270	0	66,270	6,627,000
1999	66,270	0	66,270	6,627,000
2000	66,270	0	66,270	6,627,000
2001	66,270	0	66,270	6,627,000
2002	66,270	0	66,270	6,627,000
2003	66,270	0	66,270	6,627,000
2004	66,270	0	66,270	6,627,000

(2) Repayment for Repayment Periods

(Unit:\$)

Year	Total Repay	Principal	Interest	Balance
	7,344,740	6,627,003	717,737	6,627,000
1 2005	367,237	300,967	66,270	6,326,033
2 2006	367,237	303,977	63,260	6,022,056
3 2007	367,237	307,017	60,220	5,715,039
4 2008	367,237	310,087	57,150	5,404,952
5 2009	367,237	313,188	54,049	5,091,764
6 2010	367,237	316,320	50,917	4,775,444
7 2011	367,237	319,483	47,754	4,455,961
8 2012	367,237	322,678	44,559	4,133,283
9 2013	367,237	325,905	41,332	3,807,378
10 2014	367,237	329,164	38,073	3,478,214
11 2015	367,237	332,455	34,782	3,145,759
12 2016	367,237	335,780	31,457	2,809,979
13 2017	367,237	339,138	28,099	2,470,841
14 2018	367,237	342,529	24,708	2,128,312
15 2019	367,237	345,954	21,283	1,782,358
16 2020	367,237	349,414	17,823	1,432,944
17 2021	367,237	352,908	14,329	1,080,036
18 2022	367,237	356,437	10,800	723,599
19 2023	367,237	360,001	7,236	363,598
20 2024	367,237	363,601	3,636	-3

Table 7-2-7(1A) Total Repayment Schedule of Foreign and Local Loan
(Case A)

(Unit: \$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	12,315,316
1996	123,153	0	123,153	25,195,000
1997	251,950	0	251,950	25,195,000
1998	251,950	0	251,950	25,195,000
1999	251,950	0	251,950	25,195,000
2000	251,950	0	251,950	25,195,000
2001	251,950	0	251,950	25,195,000
2002	251,950	0	251,950	25,195,000
2003	251,950	0	251,950	25,195,000
2004	251,950	0	251,950	25,195,000
2005	1,396,188	1,144,238	251,950	24,050,762
2006	1,396,188	1,155,681	240,507	22,895,081
2007	1,396,188	1,167,238	228,950	21,727,843
2008	1,396,188	1,178,910	217,278	20,548,933
2009	1,396,188	1,190,700	205,488	19,358,233
2010	1,396,188	1,202,607	193,581	18,155,626
2011	1,396,188	1,214,633	181,555	16,940,993
2012	1,396,188	1,226,779	169,409	15,714,214
2013	1,396,188	1,239,047	157,141	14,475,167
2014	1,396,188	1,251,438	144,750	13,223,729
2015	1,396,188	1,263,951	132,237	11,959,778
2016	1,396,188	1,276,591	119,597	10,683,187
2017	1,396,188	1,289,357	106,831	9,393,830
2018	1,396,188	1,302,251	93,937	8,091,579
2019	1,396,188	1,315,273	80,915	6,776,306
2020	1,396,188	1,328,426	67,762	5,447,880
2021	1,396,188	1,341,710	54,478	4,106,170
2022	1,396,188	1,355,127	41,061	2,751,043
2023	1,396,188	1,368,678	27,510	1,382,365
2024	1,396,188	1,382,365	13,823	0

Table 7-2-7(2) Repayment Schedule of Local Loan

1. Conditions of Local Loan

Local Loan	Interest(%)	Year of Repay	Time of Repay	Grace Periods
6,627,000	4.00	20	20	10

2. Repayment Schedule

(1) Repayment for Grace Periods

(Unit:A\$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	3,239,278
1996	129,571	0	129,571	6,627,000
1997	265,080	0	265,080	6,627,000
1998	265,080	0	265,080	6,627,000
1999	265,080	0	265,080	6,627,000
2000	265,080	0	265,080	6,627,000
2001	265,080	0	265,080	6,627,000
2002	265,080	0	265,080	6,627,000
2003	265,080	0	265,080	6,627,000
2004	265,080	0	265,080	6,627,000

(2) Repayment for Repayment Periods

(Unit:A\$)

Year	Total Repay	Principal	Interest	Balance
	9,752,520	6,627,003	3,125,517	6,627,000
1 2005	487,626	222,546	265,080	6,404,454
2 2006	487,626	231,448	256,178	6,173,006
3 2007	487,626	240,706	246,920	5,932,300
4 2008	487,626	250,335	237,291	5,681,965
5 2009	487,626	260,348	227,278	5,421,617
6 2010	487,626	270,762	216,864	5,150,855
7 2011	487,626	281,592	206,034	4,869,263
8 2012	487,626	292,856	194,770	4,576,407
9 2013	487,626	304,570	183,056	4,271,837
10 2014	487,626	316,753	170,873	3,955,084
11 2015	487,626	329,423	158,203	3,625,661
12 2016	487,626	342,600	145,026	3,283,061
13 2017	487,626	356,304	131,322	2,926,757
14 2018	487,626	370,556	117,070	2,556,201
15 2019	487,626	385,378	102,248	2,170,823
16 2020	487,626	400,793	86,833	1,770,030
17 2021	487,626	416,825	70,801	1,353,205
18 2022	487,626	433,498	54,128	919,707
19 2023	487,626	450,838	36,788	468,869
20 2024	487,626	468,872	18,754	-3

Table 7-2-7(2A) Total Repayment Schedule of Foreign and Local Loan
(Case B)

(Unit:A\$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	12,315,316
1996	220,331	0	220,331	25,195,000
1997	450,760	0	450,760	25,195,000
1998	450,760	0	450,760	25,195,000
1999	450,760	0	450,760	25,195,000
2000	450,760	0	450,760	25,195,000
2001	450,760	0	450,760	25,195,000
2002	450,760	0	450,760	25,195,000
2003	450,760	0	450,760	25,195,000
2004	450,760	0	450,760	25,195,000
2005	1,516,577	1,085,817	450,760	24,129,183
2006	1,516,577	1,083,152	433,425	23,046,031
2007	1,516,577	1,100,927	415,650	21,945,104
2008	1,516,577	1,119,158	397,419	20,825,946
2009	1,516,577	1,137,860	378,717	19,688,086
2010	1,516,577	1,157,049	359,528	18,531,037
2011	1,516,577	1,176,742	339,835	17,354,295
2012	1,516,577	1,196,957	319,620	16,157,338
2013	1,516,577	1,217,712	298,865	14,939,626
2014	1,516,577	1,239,027	277,550	13,700,599
2015	1,516,577	1,260,919	255,658	12,439,680
2016	1,516,577	1,283,411	233,166	11,156,269
2017	1,516,577	1,306,523	210,054	9,849,746
2018	1,516,577	1,330,278	186,299	8,519,468
2019	1,516,577	1,354,697	161,880	7,164,771
2020	1,516,577	1,379,805	136,772	5,784,966
2021	1,516,577	1,405,627	110,950	4,379,339
2022	1,516,577	1,432,188	84,389	2,947,151
2023	1,516,577	1,459,515	57,062	1,487,636
2024	1,516,577	1,487,636	28,941	0

Table 7-2-7(3) Repayment Schedule of Local Loan

1. Conditions of Local Loan

Local Loan	Interest(%)	Year of Repay	Time of Repay	Grace Periods
6,627,000	8.00	20	20	5

2. Repayment Schedule

(1) Repayment for Grace Periods

(Unit: \$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	3,239,278
1996	259,142	0	259,142	6,627,000
1997	530,160	0	530,160	6,627,000
1998	530,160	0	530,160	6,627,000
1999	530,160	0	530,160	6,627,000

(2) Repayment for Repayment Periods

(Unit: \$)

Year	Total Repay	Principal	Interest	Balance
	13,499,480	6,626,999	6,872,481	6,627,000
1 2000	674,974	144,814	530,160	6,482,186
2 2001	674,974	156,400	518,574	6,325,786
3 2002	674,974	168,912	506,062	6,156,874
4 2003	674,974	182,425	492,549	5,974,449
5 2004	674,974	197,019	477,955	5,777,430
6 2005	674,974	212,780	462,194	5,564,650
7 2006	674,974	229,802	445,172	5,334,848
8 2007	674,974	248,187	426,787	5,086,661
9 2008	674,974	268,042	406,932	4,818,619
10 2009	674,974	289,485	385,489	4,529,134
11 2010	674,974	312,644	362,330	4,216,490
12 2011	674,974	337,655	337,319	3,878,835
13 2012	674,974	364,668	310,306	3,514,167
14 2013	674,974	393,841	281,133	3,120,326
15 2014	674,974	425,348	249,626	2,694,978
16 2015	674,974	459,376	215,598	2,235,602
17 2016	674,974	496,126	178,848	1,739,476
18 2017	674,974	535,817	139,157	1,203,659
19 2018	674,974	578,682	96,292	624,977
20 2019	674,974	624,976	49,998	1

Table 7-2-7(3A) Total Repayment Schedule of Foreign and Local Loan
(Case C)

(Unit: A\$)

Year	Total Repay	Principal	Interest	Balance
1995	0	0	0	12,315,316
1996	349,902	0	349,902	25,195,000
1997	715,840	0	715,840	25,195,000
1998	715,840	0	715,840	25,195,000
1999	715,840	0	715,840	25,195,000
2000	860,654	144,814	715,840	25,050,186
2001	860,654	156,400	704,254	24,893,786
2002	860,654	168,912	691,742	24,724,874
2003	860,654	182,425	678,229	24,542,449
2004	860,654	197,019	663,635	24,345,430
2005	1,703,925	1,056,051	647,874	23,289,379
2006	1,703,925	1,081,506	622,419	22,207,873
2007	1,703,925	1,108,408	595,517	21,099,465
2008	1,703,925	1,136,865	567,060	19,962,600
2009	1,703,925	1,166,997	536,928	18,795,603
2010	1,703,925	1,198,931	504,994	17,596,672
2011	1,703,925	1,232,805	471,120	16,363,867
2012	1,703,925	1,268,769	435,156	15,095,098
2013	1,703,925	1,306,983	396,942	13,788,115
2014	1,703,925	1,347,622	356,303	12,440,493
2015	1,703,925	1,390,872	313,053	11,049,621
2016	1,703,925	1,436,937	266,988	9,612,684
2017	1,703,925	1,486,036	217,889	8,126,648
2018	1,703,925	1,538,404	165,521	6,588,244
2019	1,703,925	1,594,295	109,630	4,993,949
2020	1,028,951	979,012	49,939	4,014,936
2021	1,028,951	988,802	40,149	3,026,134
2022	1,028,951	998,690	30,261	2,027,444
2023	1,028,951	1,008,677	20,274	1,018,767
2024	1,028,951	1,018,764	10,187	3

Table 7-2-8 Fixed Assets

(Unit: '000\$)

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fixed Assets at beginning Year											
Existing Facilities	801	602	403	204	5						
New Facilities	0	0	18,048	17,268	16,488	15,703	14,928	14,148	13,368	12,588	11,808
Investment	12,315	12,880	0	0	0	0	0	0	0	0	0
Facilities & Equipments											
Depreciation	199	199	199	199	5						
Existing Facilities	0	0	780	780	780	780	780	780	780	780	780
New Facilities											
Fixed Assets at end of Year											
Land	0	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147
Existing Facilities	602	403	204	5	0	0	0	0	0	0	0
New Facilities	0	18,048	17,268	16,488	15,708	14,928	14,148	13,368	12,588	11,808	11,028
Work in Progress	12,315	0	0	0	0	0	0	0	0	0	0
Total	12,917	25,538	24,619	23,640	22,855	22,075	21,285	20,515	19,735	18,955	18,175

Item	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fixed Assets at beginning Year	0								
Facilities and Equipment	11,028	10,248	9,468	8,688	7,908	7,128	6,348	5,568	4,788
Investment	0	0	0	0	0	0	0	0	0
Facilities and Equipment									
Depreciation	780	780	780	780	780	780	780	780	780
New Facilities									
Fixed Assets at end of Year									
Land	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147
New Facilities	10,248	9,468	8,688	7,908	7,128	6,348	5,568	4,788	4,008
Work in Progress	0	0	0	0	0	0	0	0	0
Total	17,395	16,615	15,835	15,055	14,275	13,495	12,715	11,935	11,155

Item	2015	2016	2017	2018	2019	2020	2021	2022
Fixed Assets at beginning Year								
Facilities and Equipment	4,008	3,228	2,448	1,668	888	108	0	0
Investment	0	0	0	0	0	0	0	0
Facilities and Equipment								
Depreciation	780	780	780	780	780	108	0	0
New Facilities								
Fixed Assets at end of Year								
Land	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147
New Facilities	3,228	2,448	1,668	888	108	0	0	0
Work in Progress	0	0	0	0	0	0	0	0
Total	10,375	9,595	8,815	8,035	7,255	7,147	7,147	7,147

(4) Project Life

The project life is calculated as 26 years by calculating the annual depreciation costs based on the depreciation rate newly established for KPA, and dividing the sum of investment and existing residual costs by the depreciation costs.

(5) Calculation of Incomes and Expenditures

Incomes and expenditures are calculated by trading activity at Betio Port such as shipping, cargo handling, cargo storage and other special services.

All cargo (containers, general cargoes, bulk cargoes and bulk fuel) handled through Betio Port are subjects for calculation.

1) Incomes

Incomes are calculated based on the port tariff shown in Chapter 5 in the following manner.

Shipping service:

Total NRT, Total GRT or total GRT Days x port fees

Cargo handling service:

Cargo volume (t or TEU) x port fees

Cargo storage service:

Stored cargo volume (t) days x port fees

Tables 7-2-9 to 7-2-12 show respectively the cargo handling volume, number of ships, total NRT, total GRT and total GRT Days for ships.

2) Expenditures

With the implementation of the Project, the operating expenses are estimated corresponding to changes in the services offered by existing and new facilities. The operating expenses for Betio Port are classified as follows:

Table 7-2-9 Incomes of KPA, 1995-1996, by Present Tariff

Tariff	Rate			1995		1996	
	Item	Unit	Rate	Volume	Amount	Volume	Amount
1. Charges against Ships							
Light Dues	Every Ship	NRT	0.04	164,670	6,587	176,861	7,074
Wharfage	Every Ship	NRT	0.00	164,670	0	176,861	0
Pilotage	Overseas Ship						
	Import	GRT	0.03	208,925	6,268	227,481	6,824
	Export	GRT	0.03	208,925	6,268	227,481	6,824
Pilot Boat	Overseas Ship						
	Import	Boat	27.50	67	1,843	71	1,953
	Export	Boat	27.50	67	1,843	71	1,953
	Sub-Total				16,222		17,554
Trading License	Every Ship	Call	60.00	334	20,040	347	20,820
Stevedoring	Overseas Ship						
	Container	TEU	135.50	2,226	301,623	2,360	319,780
	G. Cargo	T	10.00	9,157	91,570	9,219	92,190
	Copra	T	8.50	7,054	59,959	7,189	61,107
	Domestic Ship						
	In./Outward	T	8.50	30,691	260,874	31,732	269,722
	Sub-Total				714,026		742,799
Fuel, Water and Hires							
	Total				756,875		788,247

Tariff	Rate			1995		1996	
	Item	Unit	Rate	Volume	Amount	Volume	Amount
2. Charges against Consignee/Consignor							
Wharfage	Overseas Ship						
	Imp/Export	T	12.5	58,493	731,163	61,216	765,200
	Domestic Ship						
	In./Outward	T	5.0	30,691	153,455	31,732	158,660
	Sub-Total			89,184	884,618	92,948	923,860
Lighterage	Overseas Ship						
	Imp/Export	T	5.0	58,493	292,465	61,216	306,080
	Domestic Ship						
	In./Outward	T	1.0	25,780	25,780	26,655	26,655
	Sub-Total			84,273	318,245	87,871	332,735
Storage	Imp/Exp Cargo	TxDAY	2.0	89,184	178,368	92,948	185,896
Delivery	Imp Cargo	T	8.50	20,256	172,176	21,598	183,583
	Total				1,553,407		1,626,074
	G. Total				2,310,282		2,414,321

Table 7-2-11 Incomes of KPA, 1997-2022, Without Case (for reference)
by Present Tariff

(Unit: AS)

Tariff	Item	Rate Unit	1997		1998		1999		2000		2001-2022		
			Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount	Volume	Amount	
1. Charges against Ships	Every Ship	NRT	184,001	7,360	191,513	7,661	155,118	7,817	208,432	8,337	208,432	8,337	
			0.04	0	0	0	0	0	0	0	0	0	
	Overseas Ship	NRT	228,840	6,305	247,384	7,422	251,365	7,539	271,306	8,139	271,306	8,139	
			0.03	0	0	0	0	0	0	0	0	0	
	Import	GRT	228,840	6,885	247,384	7,422	251,365	7,539	271,306	8,139	271,306	8,139	
			0.03	0	0	0	0	0	0	0	0	0	
	Overseas Ship	Boat	73	2,008	76	2,090	79	2,173	84	2,310	84	2,310	
			27.50	0	0	0	0	0	0	0	0	0	
	Export	Boat	73	2,008	76	2,090	79	2,173	84	2,310	84	2,310	
			27.50	0	0	0	0	0	0	0	0	0	
	Trading License	Sub-Total	Call	359	21,540	372	22,320	385	23,100	400	24,000	400	24,000
				60.00	0	0	0	0	0	0	0	0	0
	Stowage	Overseas Ship	Container	2,505	339,428	2,658	360,159	2,819	381,975	2,988	404,874	2,988	404,874
				135.50	0	0	0	0	0	0	0	0	0
G. Cargo		T	9,285	92,650	9,295	92,969	9,307	93,070	9,295	92,950	9,295	92,950	
			10.00	0	0	0	0	0	0	0	0	0	
Domestic Ship		T	7,225	81,413	7,311	82,144	7,399	82,892	7,488	83,648	7,488	83,648	
			8.50	0	0	0	0	0	0	0	0	0	
In./Outward	Sub-Total	T	32,819	278,962	33,954	298,609	35,142	298,707	36,270	308,235	36,270	308,235	
			8.50	0	0	0	0	0	0	0	0	0	
Fuel, Water and Bires	Total		772,453	818,979		852,867		885,965		923,002		923,002	
				0		0		0		0		0	
2. Charges against Consignee/Consignor	Overseas Ship	Imp/Export	64,079	800,988	67,068	838,575	70,252	878,150	73,576	918,700	73,576	918,700	
			12.5	0	0	0	0	0	0	0	0	0	
	Domestic Ship	In./Outward	32,819	184,095	33,354	189,770	35,142	175,710	36,270	181,350	36,270	181,350	
			5.0	0	0	0	0	0	0	0	0	0	
	Sub-Total	T	96,898	985,083	101,040	1,008,345	105,394	1,053,860	109,846	1,101,050	109,846	1,101,050	
				0		0		0		0		0	
	Overseas Ship	Imp/Export	64,079	320,395	67,068	335,430	70,252	351,260	73,576	367,880	73,576	367,880	
			5.0	0	0	0	0	0	0	0	0	0	
	Domestic Ship	In./Outward	27,568	27,568	28,521	28,521	29,519	29,519	30,467	30,467	30,467	30,467	
			1.0	0	0	0	0	0	0	0	0	0	
	Sub-Total	T	91,647	347,953	95,607	363,951	99,771	360,779	104,043	398,347	104,043	398,347	
				0		0		0		0		0	
	Storage	Imp/Exp Cargo	T	23,018	185,653	24,520	202,080	25,719	210,788	27,902	219,846	27,902	219,846
				8.50	0	0	0	0	0	0	0	0	0
Delivery	Total	T	1,702,435	1,782,796	1,782,796	1,872,462	1,955,256	2,039,447	2,129,258	2,219,258	2,219,258		
				0		0		0		0		0	

Table 7-2-12 Expenditure of KPA, 1995-2022

Item	(Unit: \$)						
	1995	1996	1997	1998	1999	2000	2001-2022
(Direct Costs)							
Salaries & Wages	890,467	917,585	643,124	661,494	680,487	698,614	698,614
Employee Benefit & etc	0	0	0	0	0	0	0
Sub-Total	890,467	917,585	643,124	661,494	680,487	698,614	698,614
Salaries & Wages (Marine)	50,000	50,000	50,000	52,568	55,063	57,682	57,682
Employee Benefit, etc (Marine)	0	0	0	0	0	0	0
Sub-Total	50,000	50,000	50,000	52,568	55,063	57,682	57,682
Total	940,467	967,585	693,124	714,062	735,550	756,296	756,296
Repair & Slipping (Existing)			175,836	180,859	186,052	191,000	191,000
(New)			6,340	6,340	6,340	231,130	231,130
Sub-Total			182,176	187,199	192,392	422,130	422,130
Fuel and Lubricants (Existing)			47,485	48,842	50,244	51,583	51,583
(New)			25,008	26,270	27,402	28,560	28,560
Sub-Total			72,493	75,112	77,646	80,143	80,143
Electricity and Water (Existing)			12,291	12,642	13,005	13,351	13,351
(New)			0	0	0	0	0
Sub-Total	479,116	494,225	12,291	12,642	13,005	13,351	13,351
Claims Uninsured			3,526	3,627	3,731	3,831	3,831
Other Costs	0	0	0	0	0	0	0
Total	1,419,583	1,461,810	963,610	992,642	1,022,324	1,275,751	1,275,751
(Indirect Costs)							
Salaries & Wages	70,000	70,000	70,000	70,000	70,000	70,000	70,000
Employee Benefit & etc	0	0	0	0	0	0	0
Sub-Total	70,000	70,000	70,000	70,000	70,000	70,000	70,000
Salaries & Wages (Addition)	118,551	118,551	118,551	118,551	118,551	118,551	118,551
Employee Benefit & etc	23,710	23,710	23,710	23,710	23,710	23,710	23,710
Sub-Total	142,261	142,261	142,261	142,261	142,261	142,261	142,261
Total	212,261	212,261	212,261	212,261	212,261	212,261	212,261
Other Costs	0	0	0	0	0	0	0
Total	212,261	212,261	212,261	212,261	212,261	212,261	212,261
G. Total	1,631,844	1,674,071	1,175,871	1,204,903	1,234,585	1,488,012	1,488,012

- i) in terms of business items; shipping, cargo handling (stevedoring, lightering and wharf handling) and cargo storage;
- ii) in terms of expenses items; personnel costs, material costs, repair and maintenance cost and other costs;
- iii) in terms of variable/fixed expenses; direct variable expenses, direct fixed expenses, general administrative expenses (fixed expenses).

The following are assumed as premises in estimating the operation expenses.

- 3) The variable expenses are to vary corresponding to decrease/increase of cargo volume and number of ships , while the fixed expenses are to remain constant for every year irrespective of such changes.

- Shipping service -

The expenses are included in the following cargo handling service.

- Cargo handling service -

Expenses are estimated as follows:

Cargo handling time (h) x unit cost per h (direct variable expenses) + direct fixed expenses + general administrative expenses

- Cargo storage service -

Stored cargo time (h) x unit cost per h (direct variable expenses) + direct fixed expenses + general administration expenses

(6) Financial Statement

The financial soundness of KPA is evaluated by estimated Financial Statement (Income and Expenditure, Source and Application of Funds and Balance Sheet) prepared for the period from the year 1995 to the year 2022.

Based on the calculation of Incomes by both present and revised tariff system and

expenditures, consideration of long term loan conditions and depreciation cost in fixed assets, Case A, Case B and Case C of Financial Statements are studied as shown in Tables 7-2-13(1), 7-2-14(1) and 7-2-15(1) to 7-2-13(3), 7-2-14(3) and 7-2-15(3) respectively.

The improvement plan is evaluated to be financially feasible in Case A and Case B except Case C which is deficit finance due to severe loan conditions.

Lastly, financial ratio analysis concerning the above statements is examined and the result is shown in Table 7-2-16.

Table 7-2-13(1) Statement of Income and Expenditure (Case A)

(Unit: 0004\$)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Income	2,310	2,414	2,319	2,950	3,093	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	2,315	2,066	1,460	1,515	1,552	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812
Interest	0	123	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252	252
Profit before Depreciation	255	225	1,087	1,183	1,289	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172
Depreciation	190	199	919	919	785	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780
Profit after Depreciation	96	26	108	204	504	392	392	392	392	392	392	392	392	392	392	392	392	392	392	392	392	392
Income Tax	23	7	33	67	172	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133
Net Profit after Income Tax	67	19	75	137	332	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Accumulated Net Profit	67	36	161	298	630	889	1,148	1,407	1,666	1,925	2,184	2,443	2,702	2,961	3,220	3,479	3,738	4,000	4,261	4,522	4,783	5,044

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Income	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812
Interest	241	239	217	205	194	182	169	157	145	132	119
Profit before Depreciation	1,183	1,195	1,207	1,219	1,230	1,242	1,255	1,267	1,279	1,292	1,305
Depreciation	780	780	780	780	780	780	780	780	780	780	780
Profit after Depreciation	403	415	427	439	450	462	475	487	499	512	525
Income Tax	137	148	145	149	153	157	162	166	170	175	179
Net Profit after Income Tax	266	267	282	290	297	306	313	321	329	337	346
Accumulated Net Profit	2,450	2,717	2,989	3,269	3,566	3,881	4,204	4,525	4,854	5,191	5,537

	2017	2018	2019	2020	2021	2022
Income	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	1,812	1,812	1,812	1,812	1,812	1,812
Interest	107	94	81	68	54	41
Profit before Depreciation	1,317	1,330	1,343	1,356	1,370	1,383
Depreciation	780	780	780	780	780	780
Profit after Depreciation	537	550	563	576	589	603
Income Tax	183	188	193	198	203	208
Net Profit after Income Tax	354	362	370	378	385	393
Accumulated Net Profit	5,891	6,253	6,623	7,001	7,386	7,779

Table 7-2-14(1) Statement of Source and Application of Funds (Case A)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Source of Funds	12,610	13,105	1,067	1,183	1,289	1,172	1,172	1,172	1,172	1,172	1,172
Profit before Depreciation	295	225	1,067	1,183	1,289	1,172	1,172	1,172	1,172	1,172	1,172
Long-term Loans	12,315	12,880									
Application of Funds	12,344	12,887	33	67	172	133	133	133	133	133	1,277
Acquisition Cost of New Facilities	12,315	12,880									
Replacement	0	0	0	0	0	0	0	0	0	0	1,144
Income Tax	29	7	33	67	172	133	133	133	133	133	133
Increase/Decrease of Net Currents Assets	266	218	1,067	1,116	1,117	1,039	1,039	1,039	1,039	1,039	-165
Current Assets at End of Year	1,266	1,484	2,538	3,654	4,771	5,810	6,349	7,883	8,927	9,566	9,367

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Source of Funds	1,183	1,195	1,207	1,219	1,230	1,242	1,255	1,267	1,279	1,292	1,305
Profit before Depreciation	1,183	1,195	1,207	1,219	1,230	1,242	1,255	1,267	1,279	1,292	1,305
Long-term Loans											
Application of Funds	1,293	1,315	1,324	1,340	1,356	1,371	1,389	1,405	1,421	1,439	1,456
Acquisition Cost of New Facilities	1,156	1,167	1,179	1,191	1,203	1,214	1,227	1,239	1,251	1,264	1,277
Replacement											
Income Tax	137	148	145	149	153	157	162	166	170	175	179
Increase/Decrease of Net Currents Assets	-110	-120	-117	-121	-126	-129	-134	-138	-142	-147	-151
Current Assets at End of Year	9,751	9,631	9,514	9,393	9,267	9,136	9,004	8,866	8,724	8,577	8,426

	2017	2018	2019	2020	2021	2022
Source of Funds	1,317	1,330	1,343	1,356	1,370	1,383
Profit before Depreciation	1,317	1,330	1,343	1,356	1,370	1,383
Long-term Loans						
Application of Funds	1,472	1,490	1,508	1,526	1,544	1,562
Acquisition Cost of New Facilities	1,289	1,302	1,315	1,328	1,342	1,355
Replacement						
Income Tax	183	188	193	198	203	208
Increase/Decrease of Net Currents Assets	-155	-160	-165	-170	-175	-180
Current Assets at End of Year	8,271	8,111	7,946	7,781	7,616	7,451

Table 7-2-15(1) Balance Sheet (Case A)

(Unit: 000A\$)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ASSETS											
Fixed Assets	602	25,598	24,619	23,640	22,855	22,075	21,295	20,515	19,735	18,955	18,175
Work in Progress	12,315										
Net Current Assets	1,266	1,484	2,538	3,654	4,771	5,810	6,849	7,888	8,927	9,966	9,861
Total	14,183	27,082	27,157	27,294	27,626	27,885	28,144	28,403	28,662	28,921	28,036
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-Term Loans	12,315	25,195	25,195	25,195	25,195	25,195	25,195	25,195	25,195	25,195	24,051
Other Reserve and Provision	67	86	161	298	630	889	1,148	1,407	1,666	1,925	2,184
Total	14,183	27,082	27,157	27,294	27,626	27,885	28,144	28,403	28,662	28,921	28,036
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ASSETS											
Fixed Assets	17,395	16,615	15,635	15,055	14,275	13,485	12,715	11,935	11,155	10,375	9,595
Net Current Assets	9,751	9,651	9,514	9,393	9,267	9,138	9,004	8,866	8,724	8,577	8,428
Total	27,146	26,246	25,349	24,448	23,542	22,623	21,719	20,801	19,879	18,952	18,021
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-Term Loans	22,895	21,728	20,549	19,358	18,155	16,941	15,714	14,475	13,224	11,950	10,683
Other Reserve and Provision	2,450	2,717	2,999	3,289	3,586	3,891	4,204	4,525	4,854	5,181	5,537
Total	27,146	26,246	25,349	24,448	23,542	22,623	21,719	20,801	19,879	18,952	18,021
	2017	2018	2019	2020	2021	2022					
ASSETS											
Fixed Assets	8,815	8,035	7,255	7,147	7,147	7,147					
Net Current Assets	8,271	8,111	7,946	7,504	7,057	6,605					
Total	17,086	16,146	15,201	14,651	14,204	13,752					
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801					
Long-Term Loans	9,384	8,082	6,777	5,449	4,107	2,752					
Other Reserve and Provision	5,891	6,253	6,623	7,401	8,236	9,199					
Total	17,086	16,146	15,201	14,651	14,204	13,752					

Table 7-2-13(2) Statement of Income and Expenditure (Case B)

(Unit: '000\$)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Income	2,310	2,414	2,819	2,950	3,093	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	2,015	2,066	1,480	1,515	1,552	1,812	1,812	1,812	1,812	1,812	1,812
Interest	0	220	451	451	451	451	451	451	451	451	451
Profit before Depreciation	295	128	888	984	1,090	973	973	973	973	973	973
Depreciation	199	199	979	979	985	780	780	780	780	780	780
Profit after Depreciation	96	-71	-91	5	305	193	193	193	193	193	193
Income Tax	28	0	0	1	102	63	63	63	63	63	63
Net Profit after Income Tax Accumulated	67	-71	-91	4	203	130	130	130	130	130	130
Net Profit	67	-4	-95	-91	112	242	372	502	632	762	892

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Income	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812
Interest	433	416	397	379	360	340	320	299	276	256	233
Profit before Depreciation	391	1,008	1,027	1,045	1,064	1,084	1,104	1,125	1,146	1,166	1,191
Depreciation	780	780	780	780	780	780	780	780	780	780	780
Profit after Depreciation	211	228	247	265	284	304	324	345	366	388	411
Income Tax	69	75	82	88	95	102	109	116	124	131	139
Net Profit after Income Tax Accumulated	142	153	165	177	189	202	215	229	242	257	272
Net Profit	1,034	1,187	1,352	1,528	1,718	1,920	2,135	2,364	2,606	2,863	3,135

	2017	2018	2019	2020	2021	2022
Income	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	1,812	1,812	1,812	1,812	1,812	1,812
Interest	210	186	162	137	111	84
Profit before Depreciation	1,214	1,238	1,262	1,287	1,313	1,340
Depreciation	780	780	780	780	780	780
Profit after Depreciation	434	458	482	507	533	560
Income Tax	147	156	164	168	173	178
Net Profit after Income Tax Accumulated	287	302	318	339	360	382
Net Profit	3,422	3,724	4,042	4,413	4,871	5,446

Table 7-2-14(2) Statement of Source and Application of Funds (Case B)

(Unit: 000\$)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Source of Funds	12,610	13,008	888	944	1,090	973	973	973	973	973	973
Profit before Depreciation	295	128	888	944	1,090	973	973	973	973	973	973
Long-term Loans	12,315	12,880									
Application of Funds	12,314	12,880	0	102	102	63	63	63	63	63	1,129
Acquisition Cost of New Facilities	12,315	12,880									
Repayment	0	0	0	0	0	0	0	0	0	0	1,668
Income Tax	29	0	0	0	0	0	0	0	0	0	0
Increase/Decrease of Net Currents Assets	266	128	888	944	1,090	910	910	910	910	910	-156
Current Assets at End of Year	1,266	1,394	2,282	3,265	4,253	5,163	6,073	6,983	7,893	8,803	8,647

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Source of Funds	991	1,008	1,027	1,045	1,064	1,084	1,104	1,125	1,146	1,168	1,191
Profit before Depreciation	991	1,008	1,027	1,045	1,064	1,084	1,104	1,125	1,146	1,168	1,191
Long-term Loans											
Application of Funds	1,152	1,176	1,201	1,226	1,252	1,279	1,306	1,334	1,363	1,392	1,422
Acquisition Cost of New Facilities	1,063	1,101	1,119	1,138	1,157	1,177	1,197	1,218	1,239	1,261	1,283
Repayment											
Income Tax	69	75	82	88	95	102	109	116	124	131	139
Increase/Decrease of Net Currents Assets	-161	-168	-174	-181	-188	-195	-202	-209	-217	-224	-231
Current Assets at End of Year	8,486	8,318	8,144	7,963	7,775	7,586	7,378	7,169	6,952	6,728	6,497

	2017	2018	2019	2020	2021	2022
Source of Funds	1,214	1,238	1,262	1,287	1,313	1,340
Profit before Depreciation	1,214	1,238	1,262	1,287	1,313	1,340
Long-term Loans						
Application of Funds	1,454	1,486	1,519	1,553	1,587	1,622
Acquisition Cost of New Facilities	1,307	1,330	1,355	1,380	1,406	1,432
Repayment						
Income Tax	147	156	164	168	171	185
Increase/Decrease of Net Currents Assets	-240	-248	-257	-261	-266	-267
Current Assets at End of Year	6,257	6,009	5,752	5,251	4,703	4,146

Table 7-2-15(2) Balance Sheet (Case B)

(Unit: '000)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
ASSETS											
Fixed Assets	602	25,598	24,819	23,640	22,855	22,076	21,295	20,515	19,735	18,955	18,175
Work in Progress	12,315		2,288	3,265	4,233	5,193	6,073	6,953	7,833	8,703	9,573
Net Current Assets	1,266	1,394	2,288	3,265	4,233	5,193	6,073	6,953	7,833	8,703	9,573
Total	14,183	26,992	26,901	26,905	27,108	27,238	27,368	27,498	27,568	27,658	27,748
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-term Loans	12,315	25,195	25,195	25,195	25,195	25,195	25,195	25,195	25,195	25,195	25,195
Other Reserve and Provision	67	-4	-35	-31	112	242	372	502	632	762	892
Total	14,183	26,992	26,901	26,905	27,108	27,238	27,368	27,498	27,568	27,658	27,748

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ASSETS											
Fixed Assets	17,395	16,615	15,685	15,065	14,275	13,485	12,715	11,935	11,155	10,375	9,595
Net Current Assets	8,486	8,318	8,144	7,963	7,775	7,580	7,378	7,169	6,952	6,728	6,497
Total	25,881	24,933	23,979	23,018	22,050	21,075	20,093	19,104	18,107	17,103	16,092
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-term Loans	23,046	21,945	20,826	19,688	18,531	17,364	16,197	14,939	13,700	12,439	11,156
Other Reserve and Provision	1,034	1,187	1,352	1,529	1,718	1,920	2,135	2,364	2,606	2,863	3,135
Total	25,881	24,933	23,979	23,018	22,050	21,075	20,093	19,104	18,107	17,103	16,092

	2017	2018	2019	2020	2021	2022
ASSETS						
Fixed Assets	8,815	8,035	7,255	7,147	7,147	7,147
Net Current Assets	6,257	6,095	5,752	5,251	4,703	4,146
Total	15,072	14,044	13,007	12,398	11,850	11,293
Capital Employed						
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801
Long-term Loans	9,848	8,519	7,164	5,784	4,378	2,946
Other Reserve and Provision	3,423	3,724	4,042	4,813	5,671	6,546
Total	15,072	14,044	13,007	12,398	11,850	11,293

Table 7-2-13(3) Statement of Income and Expenditure (Case C)

(Unit: '000A\$)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Income	2,310	2,414	2,919	2,990	3,093	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	2,015	2,065	1,480	1,515	1,552	1,812	1,812	1,812	1,812	1,812	1,812
Interest	0	350	716	716	716	716	704	692	678	664	648
Profit before Depreciation	285	-2	623	719	825	708	720	732	746	760	776
Depreciation	199	199	979	979	785	780	780	780	780	780	780
Profit after Depreciation	36	-201	-356	-260	40	-72	-60	-48	-34	-20	-4
Income Tax	29	0	0	0	10	0	0	63	0	0	0
Net Profit after Income Tax Accumulated	67	-201	-356	-260	30	-72	-60	-111	-34	-20	-4
Net Profit	67	-134	-490	-750	-720	-792	-852	-963	-997	-1,017	-1,021

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Income	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812
Interest	622	536	567	537	505	471	435	397	356	313	267
Profit before Depreciation	302	823	857	887	919	953	989	1,027	1,068	1,111	1,157
Depreciation	780	780	780	780	780	780	780	780	780	780	780
Profit after Depreciation	22	48	77	107	139	173	209	247	288	331	377
Income Tax	6	12	22	33	44	56	69	83	96	111	127
Net Profit after Income Tax Accumulated	16	36	55	74	95	117	140	164	192	220	250
Net Profit	-1,005	-969	-914	-840	-745	-628	-488	-324	-132	88	388

	2017	2018	2019	2020	2021	2022
Income	3,236	3,236	3,236	3,236	3,236	3,236
Expenditure	1,812	1,812	1,812	1,812	1,812	1,812
Interest	218	166	110	50	40	30
Profit before Depreciation	1,206	1,258	1,314	1,384	1,384	1,394
Depreciation	780	780	780	780	780	780
Profit after Depreciation	426	478	534	604	604	614
Income Tax	145	165	182	439	480	483
Net Profit after Income Tax Accumulated	281	315	352	827	904	911
Net Profit	819	934	1,286	2,113	3,017	3,928

Table 7-2-14(3) Statement of Source and Application of Funds (Case C)

(Unit: 000A\$)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Source of Funds	12,610	12,878	623	719	823	708	720	732	746	760	776
Profit before Depreciation	295	-2	623	719	823	708	720	732	746	760	776
Long-term Loans	12,315	12,880									
Application of Funds	12,344	12,880	0	0	10	145	156	232	182	197	1,056
Acquisition Cost of New Facilities	12,315	12,880									
Repayment	0	0	0	0	0	145	156	169	182	197	1,056
Income Tax	29	0	0	0	10	0	0	63	0	0	0
Increase/Decrease of Net Currents Assets	266	-2	623	719	815	563	544	500	544	563	-230
Current Assets at End of Year	1,266	1,264	1,887	2,606	3,421	3,984	4,528	5,048	5,612	6,175	5,885

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Source of Funds	802	828	857	887	919	953	989	1,027	1,068	1,111	1,157
Profit before Depreciation	802	828	857	887	919	953	989	1,027	1,068	1,111	1,157
Long-term Loans											
Application of Funds	1,088	1,120	1,159	1,206	1,243	1,289	1,338	1,390	1,444	1,502	1,564
Acquisition Cost of New Facilities	1,082	1,106	1,137	1,167	1,199	1,233	1,269	1,307	1,348	1,391	1,437
Repayment	6	12	22	39	44	56	69	83	96	111	127
Income Tax											
Increase/Decrease of Net Currents Assets	-286	-292	-302	-313	-324	-336	-349	-363	-376	-391	-407
Current Assets at End of Year	5,669	5,317	5,015	4,702	4,378	4,042	3,693	3,330	2,954	2,569	2,156

	2017	2018	2019	2020	2021	2022
Source of Funds	1,206	1,258	1,314	1,374	1,384	1,394
Profit before Depreciation	1,206	1,258	1,314	1,374	1,384	1,394
Long-term Loans						
Application of Funds	1,631	1,701	1,776	1,851	1,869	1,882
Acquisition Cost of New Facilities	1,486	1,538	1,594	1,651	1,669	1,682
Repayment	145	163	182	203	200	200
Income Tax						
Increase/Decrease of Net Currents Assets	-425	-443	-462	-477	-485	-488
Current Assets at End of Year	1,731	1,288	826	349	697	609

Table 7-2-15(3) Balance Sheet (Case C)

(Unit: '000s)

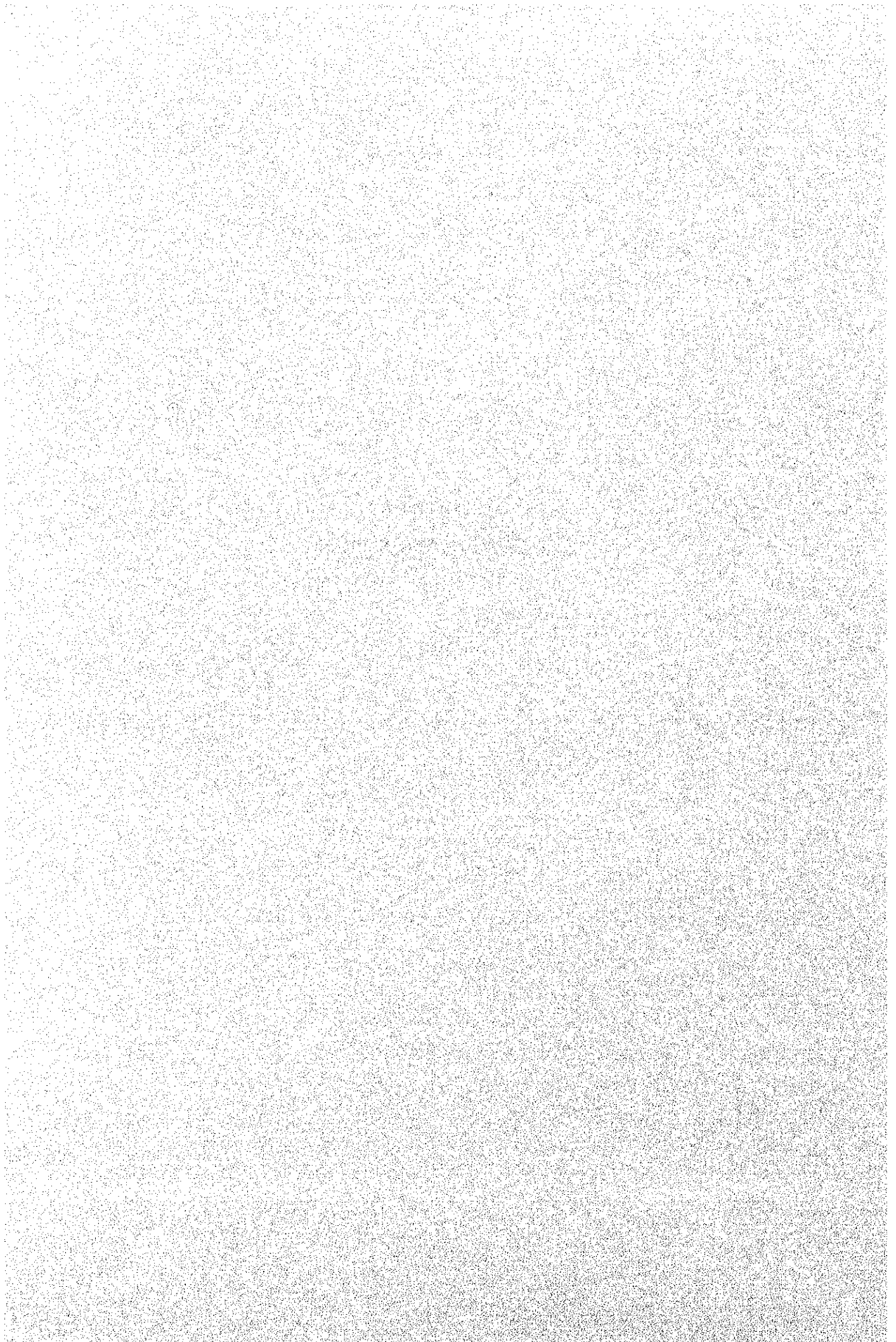
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Assets											
Fixed Assets	602	25,398	24,519	23,640	22,855	22,075	21,295	20,513	19,735	18,955	18,175
Work in Progress	12,315										
Net Current Assets	1,266	1,284	1,887	2,606	3,421	3,984	4,546	5,048	5,612	6,175	5,995
Total	14,183	26,682	26,506	26,246	26,276	26,059	25,843	25,563	25,347	25,130	24,070
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-Term Loans	12,315	25,195	25,195	25,195	25,195	25,050	24,894	24,725	24,543	24,346	23,290
Other Reserve and Provision	67	-134	-490	-750	-720	-792	-852	-963	-997	-1,017	-1,021
Total	14,183	26,662	26,506	26,246	26,276	26,059	25,843	25,563	25,347	25,130	24,070
Assets											
Fixed Assets	17,395	18,615	15,835	15,055	14,275	13,495	12,715	11,935	11,155	10,375	9,595
Net Current Assets	5,609	5,317	5,015	4,702	4,378	4,042	3,693	3,300	2,954	2,563	2,156
Total	23,004	21,932	20,850	19,757	18,653	17,537	16,408	15,265	14,109	12,938	11,751
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-Term Loans	22,208	21,100	19,863	18,786	17,597	16,364	15,095	13,788	12,440	11,049	9,612
Other Reserve and Provision	-1,005	-969	-914	-840	-745	-628	-488	-324	-182	-88	-338
Total	23,004	21,932	20,850	19,757	18,653	17,537	16,408	15,265	14,109	12,938	11,751
Assets											
Fixed Assets	8,615	8,035	7,255	7,147	7,147	7,147	7,147	7,147	7,147	7,147	7,147
Net Current Assets	1,701	1,288	826	782	687	609	609	609	609	609	609
Total	10,546	9,323	8,081	7,929	7,844	7,756	7,756	7,756	7,756	7,756	7,756
Capital Employed											
Capital Fund	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801	1,801
Long-Term Loans	8,126	6,568	4,394	4,015	3,026	2,027	2,027	2,027	2,027	2,027	2,027
Other Reserve and Provision	619	354	1,286	2,113	3,017	3,928	3,928	3,928	3,928	3,928	3,928
Total	10,546	9,323	8,081	7,929	7,844	7,756	7,756	7,756	7,756	7,756	7,756

Table 7-2-16 Financial Ratio

(Unit: %)

Year	Profit Margin (Net Profit/Income)			Return on Total Assets (Profit before Income Tax/Total Assets)			Creditor's Equity to Total Assets (Creditor's Equity/Total Assets)		
	Case A	Case B	Case C	Case A	Case B	Case C	Case A	Case B	Case C
1995	2.9	2.9	2.9	0.7	0.7	0.7	86.8	86.8	86.8
1997	2.7	-3.2	-12.6	0.4	-0.3	-1.3	92.8	93.7	95.1
2000	8.0	4.0	-2.2	1.4	0.7	-0.3	90.4	92.5	96.1
2005	8.0	4.0	-0.1	1.4	0.7	0.0	85.8	90.0	96.8
2010	9.2	5.8	2.9	1.9	1.2	0.7	77.1	84.0	94.3
2015	10.4	7.9	6.8	2.7	2.3	2.6	63.1	72.7	85.4
2022	27.9	27.0	48.0	10.1	11.9	18.0	20.0	26.1	26.1

CHAPTER 8
IMPLEMENTATION PLAN



8. IMPLEMENTATION PLAN

8.1 Implementation Schedule and Required Fund

As shown in Table 8-1-1, the overall implementation of Betio Port Development Plan requires ten years, of which the improvement plan (target year 2000) and the conceptual development plan (target year 2005) require three and five years, respectively.

(1) Improvement Plan

Total project cost of improvement plan with the target year of 2000 is estimated at AUS\$ 25.19 million. The project requires foreign technology, materials and equipment resulting in a large ratio of foreign portion of the project cost of over 70 % and such indirect cost as a transportation cost accounts for about 10 %. The project is planned to be completed in two stages in three year time including the detailed design and tendering.

To make a smooth implementation of the project, the followings should be taken into consideration:

(a) Clearance of unexploded bombs

Betio Port is historically known for a hard-fought field of World War II and such port facilities as Fisheries Jetty built in the recent year had a clearance of unexploded bombs before the commencement of construction. For the implementation of the improvement plan, the said clearance should be conducted in the detailed design stage.

(b) Organization of Kiribati Ports Authority

As mentioned in the chapter 5, the establishment of Kiribati Ports Authority is a key factor for the realization of a sound prosperity of new port facilities in terms of port management and operation. The organization and the foreign instructions of/to personnel should be conducted during the construction.

(2) Conceptual Development Plan

The conceptual development plan includes major works of expansion and pavement of container yard and construction of a cargo shed requiring a project cost of AUS\$

17.76 million. Implementation of the conceptual development plan shall be scheduled to meet increasing demand of port cargo toward opening service in 2005 as shown in Table 8-1-1.

Implementation schedule and yearly investment costs are summarized as follows:

Phase	Main Facilities	Investment (Million A\$)	Implementation Schedule
Improvement Plan			
First Phase	Dredging, Yard, Wharf(40meters)	12.31	1995 to 1996 (two years)
Second Phase	Wharf (40 meters), Shed, Cargo Handling Equipment	12.88	1996 to 1997 (two years)
Conceptual Development Plan			
First Phase	Yard/Road Pavement	8.32	2000 to 2002 (three years)
Second Phase	Yard Expansion, Shed Cargo Handling Equipment	9.44	2003 to 2004 (two years)
Total		42.95	1995 to 2004 (10 years)

8.2 Raising Funds

Improvement plan of Betio Port is financially evaluated rather low at 1.67 % in terms of FIRR. Total required fund, being almost half the government budget, shall be raised from foreign sources of low interest.

Table 8-1-1 OVERALL IMPLEMENTATION SCHEDULE

STAGE	PHASE	ACTIVITY	COST ('000 AS)	YEAR														
				1 1995	2 1996	3 1997	4 1998	5 1999	6 2000	7 2001	8 2002	9 2003	10 2004	11 2005				
Improvement Plan	Phase 1	Detailed Design	323	■														
		Tendering	---	■														
		Construction	11,502	■	■													
		Construction Supervision	485	■	■													
		Total	12,310	■	■													
Improvement Plan	Phase 2	Detailed Design	338	■	■													
		Tendering	---	■														
		Construction	12,030	■	■	■												
		Construction Supervision	508	■	■	■												
		Total	12,876	■	■	■	■											
Conceptual Development Plan	Phase 1	Detailed Design	287							■								
		Tendering	---							■								
		Construction	7,605								■	■						
		Construction Supervision	430								■	■						
		Total	8,322								■	■	■					
Conceptual Development Plan	Phase 2	Detailed Design	430															
		Tendering	---															
		Construction	8,725															
		Construction Supervision	287															
		Total	9,442															

CHAPTER 9
CONCLUSION AND RECOMMENDATION

9. CONCLUSION AND RECOMMENDATION

9.1 Conclusion

The Republic of Kiribati scattering over wide expanse of the Central Pacific Ocean largely depends on sea transport for its economic activities. Kiribati imports most of foods and living necessities while major export commodities are copra and fish. Trade balance has shown a heavy deficit since cessation of phosphate export in 1979.

Due to these peculiar geographical and social conditions, sea transport constitutes lifeline supporting its economic activities while, port facilities are indispensable infrastructure connecting sea and land transport for foreign and domestic cargoes.

However, the major port of the country, Betio and all the other outerisland ports suffer serious deterioration of port function due to long absence of improvement investment to port facilities. Betio Port is a sole gate for foreign trade and a center of domestic sea transport. However, Betio Port confronts problems of inefficient and unsafe port operation due to deterioration of the facilities which are insufficient in capacity. Current situation of the deteriorated port is that the port could not maintain required port functions without urgent rehabilitation and improvement.

Major bottlenecks have been identified as insufficient container yard and costly tug and barge operation. In the present study, the conceptual ports development plan with the target year of 2005 has been worked out and in line with the plan, the improvement plan of Betio Port with the target year of 2000 has been formulated with the major facilities planned as below:

Navigation Aids:	1 L.S.
New Port (6meters deep):	80 meters
Repair to the Existing Wharf:	130 meters
Container Yard, etc.:	29,000 m ²
Shed:	800 m ²
Passenger Terminal:	560 m ²
Cargo Handling Equipment:	1 L.S.
Dredger:	1 L.S.

The present problems of port facilities and benefits from their improvement proposed in the project are summarized as below:

<u>Facility</u>	<u>Existing Condition & Problem</u>	<u>Improvement & Benefit</u>
1. Container Yard	Area is too small and yard operation is extremely inefficient and unsafe.	Provision of a new wide area will allow introduction of heavy cargo handling equipment and significantly improve handling productivity.
2. Wharf	The wharf is 2-3 m deep and the approach channel and basin are too small to accommodate a large container carrier which necessitates a cumbersome and costly double handling by tug and barge.	A 6 m deep wharf with wide approach channel and basin is planned to release the port from a container handling by barge for most of foreign and all the domestic cargoes.
3. Cargo Shed	The existing copra sheds are insufficient in floor area resulting in inefficient operation, while the general cargo sheds are not fully utilized due partly to small and inconvenient container yard.	New shed for short term storage of container cargo is planned in a new container yard and less cargoes will be stored in the existing sheds.
4. Navigation Aids	The existing navigation aids are not provided with lantern and radar reflector and fixing of used anchor chain is inadequate.	For safe and efficient navigation of ship, all the existing navigation aids will be equipped with lanterns and radar reflectors to allow night navigation.

- | | | | |
|----|---------------------------------|---|---|
| 5. | Passenger Terminal | Domestic passenger are forced to bear inconvenience of no waiting room and transfer between wharf and ship by barge. | Inconvenient and unsafe conditions of present passenger traffic will be removed with provision of a new passenger terminal and wharf. |
| 6. | Maintenance
Dredging | An adequate maintenance dredging operation has not been done for many years ruining port function in not only Betio Port but also ports in outer-islands. | A clam shell type dredging equipment mounted on barge will sweep out this problem. |
| 7. | Port Authority | The organization for port administration is non-existent at present and Betio Port is not properly administered nor operated. | A new Kiribati Port Authority is proposed by amalgamating Marine Department of MTCT and Port Section of KSSL. An adequate port management and operation is indispensable for efficient use of the port facilities proposed in the improvement plan. |
| 8. | Environment | An adequate area for dumping rubbish generating from Betio City is not provided and environmental preservation becomes increasing concern recently. | A wide area between a new access and the existing East Mole is to provide an area for rubbish dumping and contribute to preservation of city environment. |

The economic effect accrued by this project is evaluated as 2.74 % in terms of an economic internal rate of return. This is rather low due mainly to small volume of port cargoes and long absence of improvement investment which eventually requires almost an entirely new construction of port.

Uncountable benefits associated with the project include i) improvement of safety and efficiency of passenger transport, ii) improvement of safety and efficiency of navigation in the approach channel, iii) increase in repair capacity and demand of Betio Shipyard Limited through deepened channel and basin, iv) improvement of cargo handling productivity through deeper channel and basin maintained by the planned dredger, v) improvement of environment by provision of waste disposal area, vi) creation of employment opportunity through implementation of the project, etc. In addition, through consideration of important role of sea transport in Kiribati and inefficiency and deterioration of the existing port facilities, urgent implementation of this project is considered to be essential and significant.

9.2 Recommendation

- (1) The improvement plan as proposed in the study is recommended to be urgently implemented for efficient and safe port operation. During the construction work, the proposed monitoring system for possible environmental impact is recommended to be established.
- (2) For efficient and smooth management and operation of Betio Port, the proposed Kiribati Port Authority is recommended to be established in the earliest possible opportunity. All the proposed port facilities and equipment shall be under appropriate control and management of a new Port Authority in order to operate and maintain them efficiently and effectively.
An appropriate training programme of administration staff shall be worked out including recruitment of foreign experts.
- (3) The present port tariff shall be reviewed and revised toward sound financial state of a new Port Authority.
- (4) A shallow reef flat area west of a new access road is planned to be used for rubbish dumping. The procedure and management to eventually create a land area shall be carefully examined by concerned authorities.

(5) A maintenance dredging plan shall be worked out for Betio Port and all the other local port through consideration of dredging schedule based on siltation rate, dredging volume, etc. for efficient domestic sea transport.

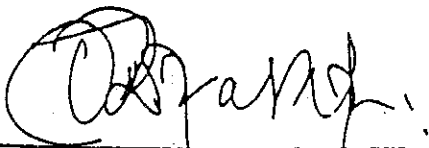
Training programme for planning staff and crew shall be carefully planned for maximizing utilization of the dredging equipment.

APPENDICES

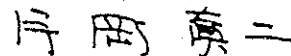
SCOPE OF WORK
FOR
THE STUDY
ON
PORTS DEVELOPMENT
IN
KIRIBATI
AGREED UPON BETWEEN

MINISTRY OF TRANSPORT COMMUNICATIONS AND TOURISM
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

TARAWA, December 3, 1993



Teken C. Tokataake
Secretary
Ministry of Transport
Communications and Tourism



Shinji KATAOKA
Leader,
Preparatory Study Team,
Japan International
Cooperation Agency

1. INTRODUCTION

In response to the request of the Government of the Republic of Kiribati, the Government of Japan has decided to conduct the Study on Ports Development in Kiribati (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Republic of Kiribati.

The present document sets forth the Scope of Work with regard to the Study.

II OBJECTIVES OF THE STUDY

Objectives of the Study are:-

- 2.1. to formulate a conceptual plan for Ports Development in Kiribati, for a period up to the year 2005, and
- 2.2. to conduct a feasibility study on an improvement plan of the port of Betio in Tarawa for a period up to the year 2000.

III STUDY AREA

The Port of Betio in Tarawa and London Wharf in Kiritimati.

IV SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following items:

- 4.1 Review and analysis of existing data and information
 - 1 To collect, review and analyze available data, information, reports, and plans relevant to the Study.
 - 2 To conduct field survey for evaluating the present conditions of the Ports.
 - 3 To identify problems and to define development countermeasures to be taken.

- 4.2 Conceptual Plan for Ports Development
 - 1 To review the present nation-wide socio-economic conditions and forecast the condition in the future.
 - 2 To make traffic demand projection up to the year 2005.
 - 3 To formulate a conceptual plan for Ports Development.
 - 4 To formulate basic layout plans of facilities of the Ports.
 - 5 To conduct Initial Environmental Examination.
 - 6 To prepare maintenance, management, and safety control plans.

- 4.3 Feasibility study on improvement plan for the Port of Betio (Target year 2000)
 - 1 To survey the natural condition.
 - 2 To formulate improvement plan of facilities and other relevant infrastructure.
 - 3 To conduct Environmental Impact Assessment.
 - 4 To prepare a preliminary design.
 - 5 To prepare a construction plan.
 - 6 To make recommendations on port management and operation systems.
 - 7 To prepare cost estimate.
 - 8 To conduct economic and financial analysis.
 - 9 To prepare a project implementation plan.

- 4.4 Conclusion and Recommendation

V. STUDY SCHEDULE

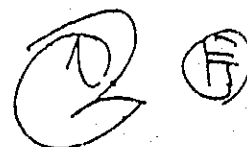
The Study shall be conducted in accordance with the attached tentative schedule.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of the Republic of Kiribati.

1. Inception Report (30 Copies)
At the commencement of the Study.

2. Interim Report (30 Copies)
Interim Report will be submitted within four (4) months after the commencement of the Study.



3. Draft Final Report (30 Copies)
Draft Final Report will be submitted within eight (8) months after the commencement of the Study.

The Government of the Republic of Kiribati shall provide JICA with its comments within one (1) month after the submission of the Draft Final Report.

4. Final Report (50 Copies)
Final Report will be submitted within two (2) months after the receipt of the comments.

VII. UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF KIRIBATI

- 7.1 To facilitate the smooth conduct of the Study, the Government of the Republic of Kiribati shall take the following necessary measures:
 1. To secure the safety of the Japanese Study Team,
 2. To permit the members of the Japanese Study Team to enter, leave, and sojourn in Kiribati for the duration of their assignment therein, and exempt them from foreign registration requirement and consular fees,
 3. To exempt the members of the Japanese Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into Kiribati for the conduct of the Study,
 4. To exempt the members of the Japanese Study Team from income tax and charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study.
 5. To provide the necessary facilities to the Japanese Study Team for remittance as well as utilization of funds introduced into Kiribati from Japan in connection with the implementation of the Study,

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6. To secure permission for entry into private properties or restricted areas for the implementation of the Study,
 7. To secure permission for the Japanese Study Team to take all data and documents (including maps and photographs) related to the Study out of Kiribati to Japan, and
 8. To provide medical services as needed. Its expenses will be chargeable to the members of the Japanese Study Team.
- 7.2 The Government of the Republic of Kiribati shall bear claims, if any arises, against the members of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, exempt when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese Study Team.
- 7.3 Ministry of Transport Communications and Tourism (hereinafter referred to as MTCT) shall act as a counterpart agency to the Japanese Study Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.
- 7.4 MTCT shall, at its own expense provide the Japanese Study Team with the following, in cooperation with other organizations concerned:
- 1) available data and information related to the Study,
 - 2) counterpart personnel,
 - 3) credentials or identification cards.

VIII UNDERTAKING OF JICA

- 8.1 For the implementation of the Study, JICA shall take the following measures:
- 1) to despatch, at its own expense, the Japanese Study Team to Kiribati, and
 - 2) to pursue technology transfer to the Kiribati counterpart personnel in the course of the Study.

IX CONSULTATION

JICA and the Government of the Republic of Kiribati shall consult with each other in respect of any matter that may arise from or in connection with the Study.

A handwritten signature in dark ink, appearing to be 'C. J.', followed by a circled number '17'.

TENTATIVE SCHEDULE

Month	1	2	3	4	5	6	7	8	9	10	11	12	
Work in Kiribati		■	■		■	■		■					
Work in Japan	□	□	□	□		□	□	□			□		
Report presentation	Δ	IC/R		Δ	IT/R			Δ	DF/R			Δ	F/R

IC/R: Inception Report
 IT/R: Interim Report
 DF/R: Draft Final Report
 F/R : Final Report

Minutes of Meeting
on
the Scope of Work
for
the Study
on
Ports Development
in
Kiribati
agreed upon between

Ministry of Transport, Communications and Tourism
and
Japan International Cooperation Agency

Tarawa, December 3, 1993



Teken C. Tokataake
Secretary
Ministry of Transport
Communications and Tourism



Shinji Kataoka
Leader,
Preparatory Study Team
Japan International
Cooperation Agency

The Preparatory Study Team for the Study on Ports Development in Kiribati, headed by Mr. Shinji Kataoka, Director of Planning and Design Standard Division, Port & Harbour Research Institute, Ministry of Transport, has stayed in Kiribati from November 24, 1993 for site visit to several ports in five islands, held meetings with the officials of Ministry of Transport Communications and Tourism and other Ministries concerned with the Study for several times.

In these meetings, both sides agreed on the Scope of Work for the Study, and the minutes of meeting on the Scope of Work are noted as follows:-

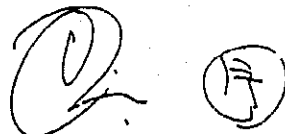
1. Kiribati side and Preparatory Study Team agreed that the feasibility Study on the improvement Plan of Betio Port will be the main component of the Study.
2. Kiribati side pointed out the following two problems to be considered mainly and solution for them should be made in the Study.
 - i) Harbour basin is too shallow even for inter-island vessels to enter, and area of it is insufficient for effective port activities.
 - ii) Cargo handling area is so narrow that the cargo handling is inefficient even for the present cargo handling demand.
3. Both sides agreed that the facilities to be proposed in the Improvement Plan of Port of Betio (Feasibility Study) would be as-follows:
 - i) Vessels between Betio and outer islands will have access to land for loading cargo at least.
 - ii) Expansion of the cargo handling area will be made by land reclamation.
4. Kiribati side requested to conduct environmental study in consideration with the draft environmental guidelines to be presented to the Preparatory Study Team. The Preparatory Study Team agreed to taking it into account in the Study to a reasonable extent.

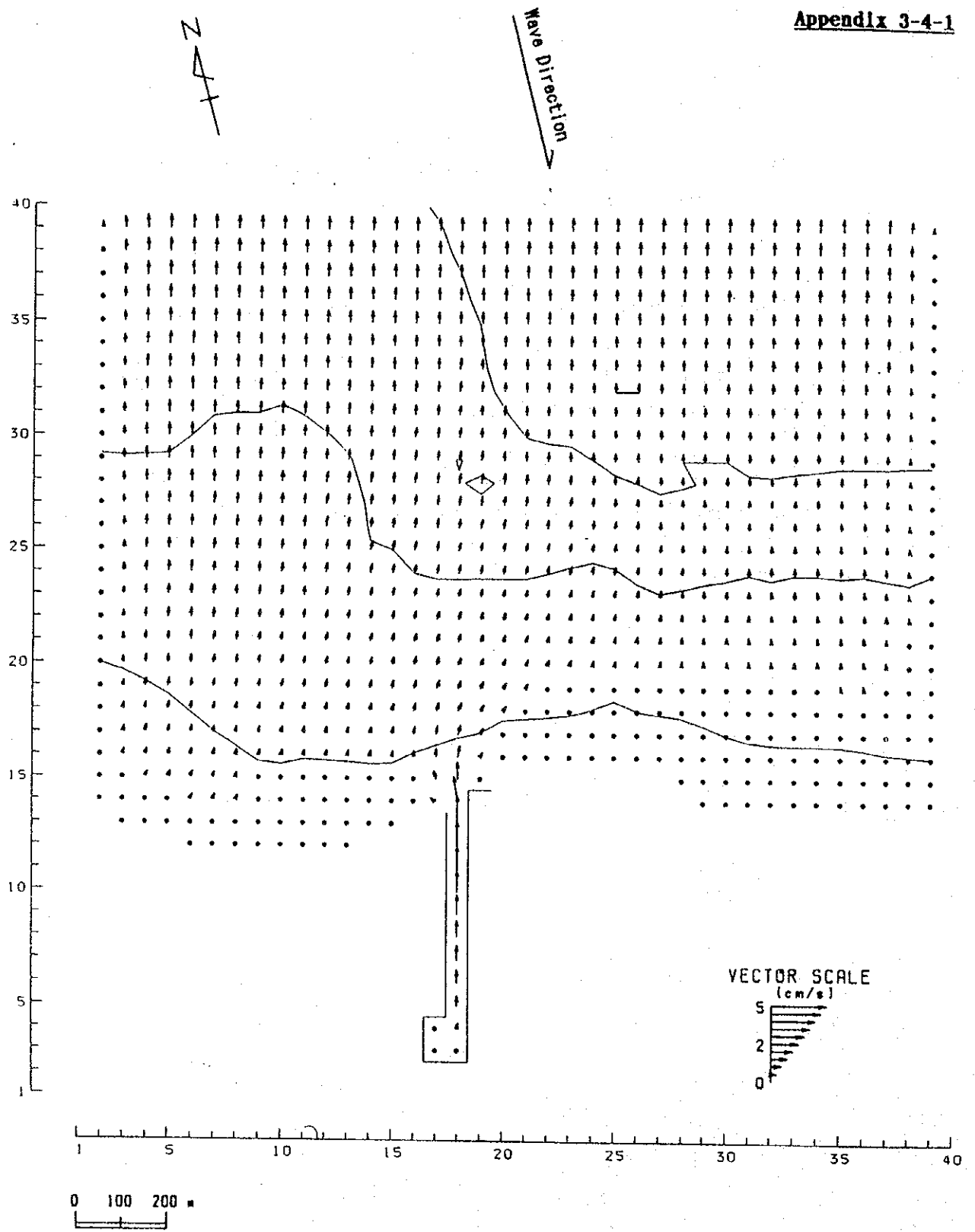
5. Both sides agreed that the Port Authority, which is established under an Act, is very important for maintenance of ports, even though it has not been actually set up.

Therefore, assessment of the Port Authority will be made in the Study.

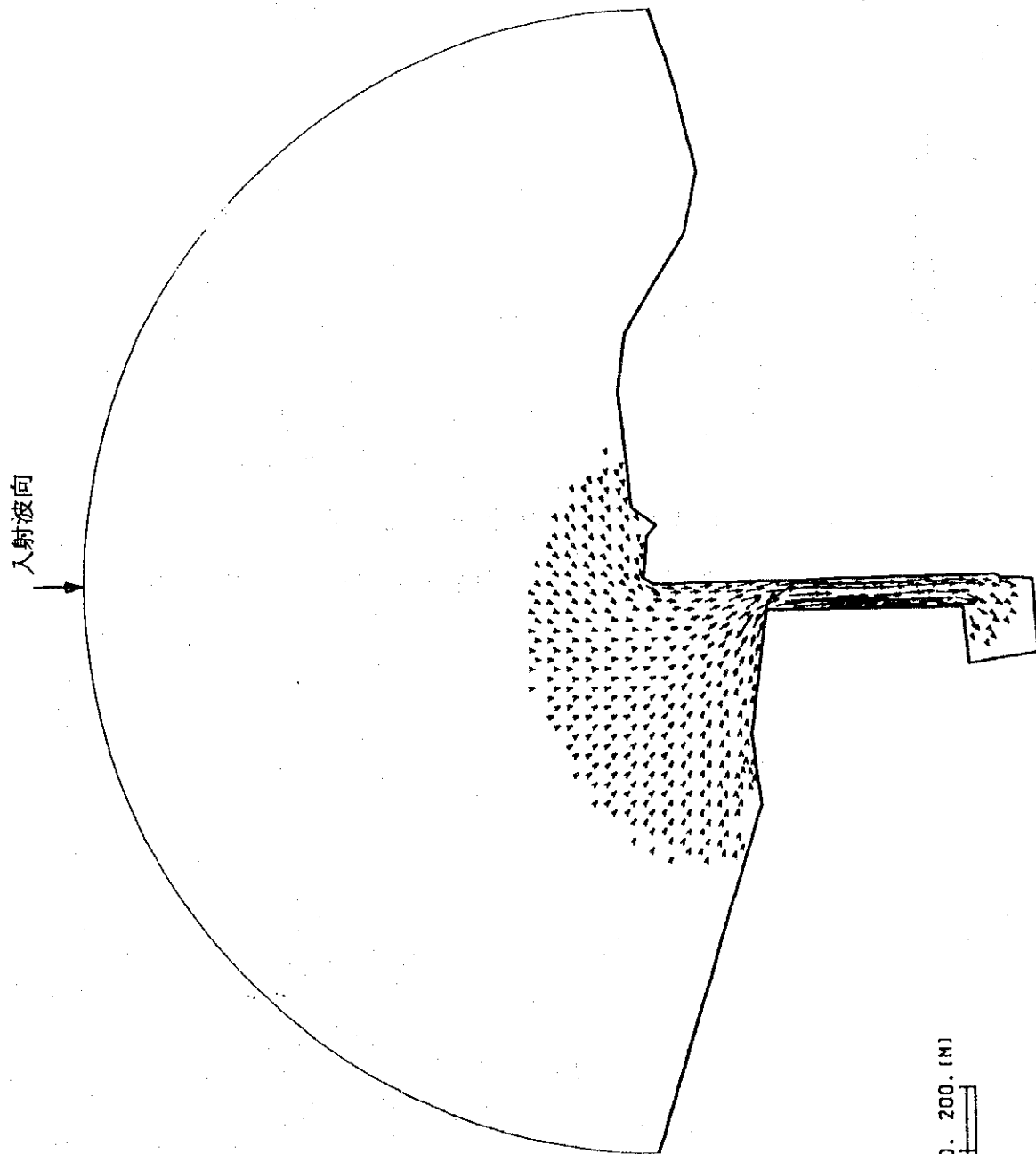
6. The Preparatory Study Team pointed out that problems of unsatisfactory maintenance dredging exist in Betio Port as well as Kiritimati and outer islands.

Therefore, both sides agreed that the Study will include recommendations on maintenance dredging system covering Betio Port, London Wharf, and outer islands.

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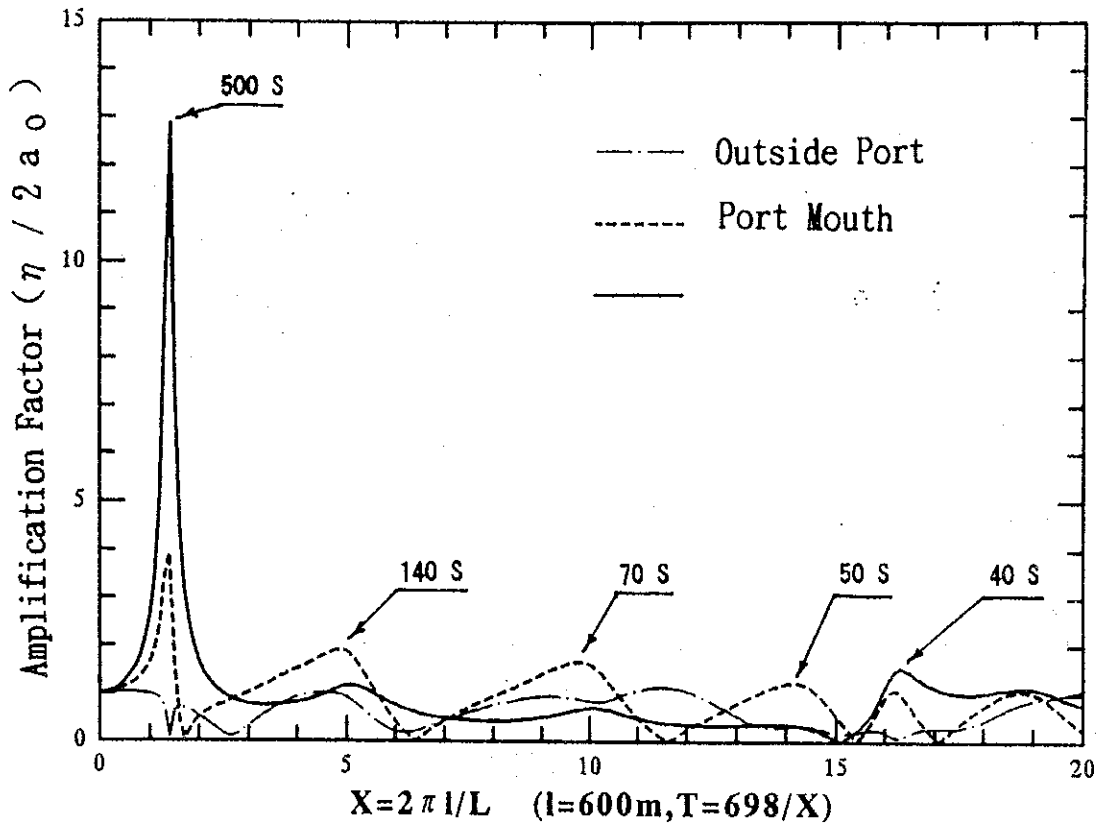


Current Distribution

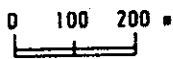
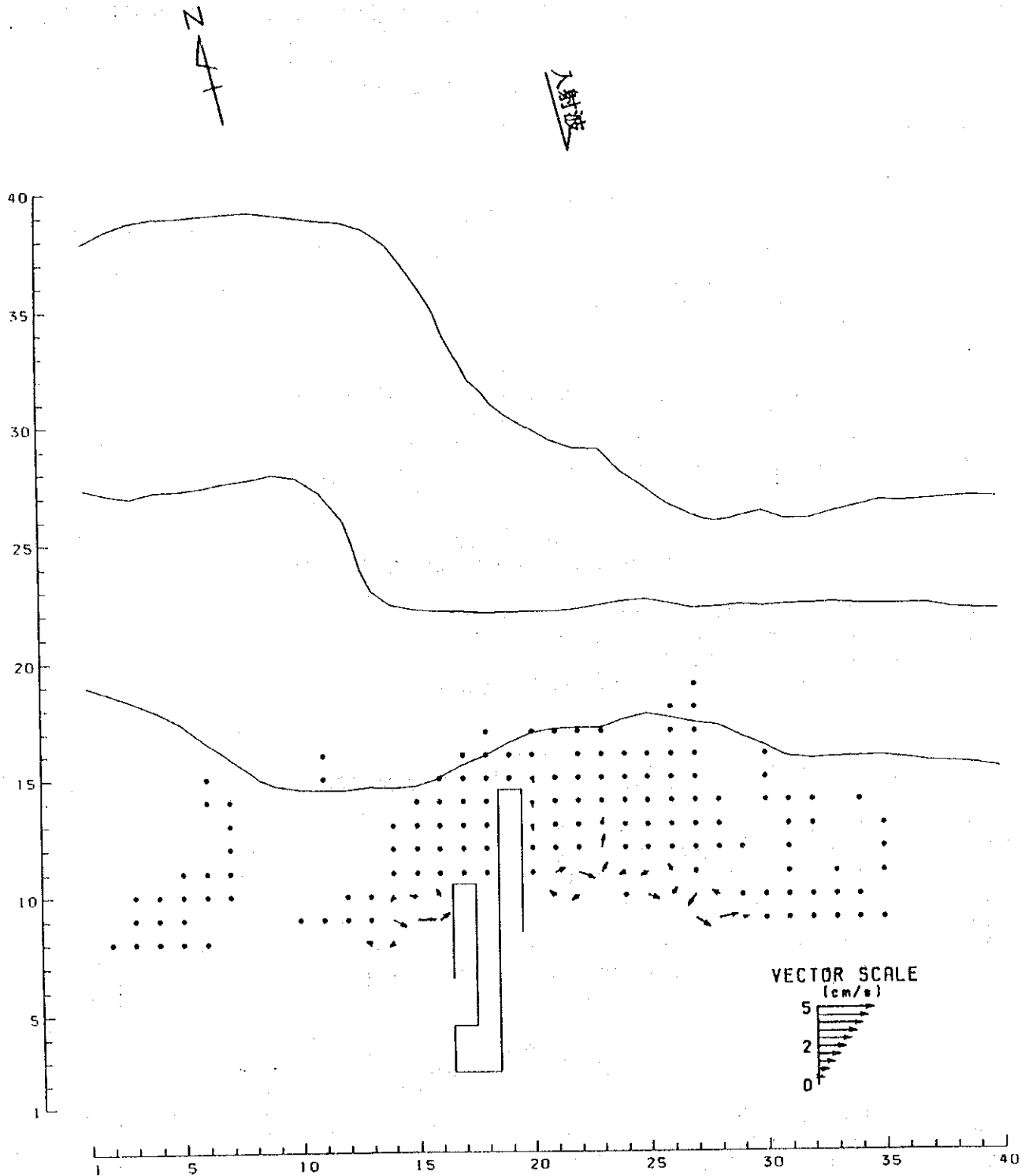


Current Distribution 500.00sec 270°

0. 100. 200. (M)



Calculation Results of Long-Period Oscillation



Wave Direction	N
Wave Height	0.2m
Period	12 sec.
Spreading Parameter	75



Calculation Current Distribution
 (for period of current measurement, 1994)