

Figure 8 Airport Short Term Development Layout Plan

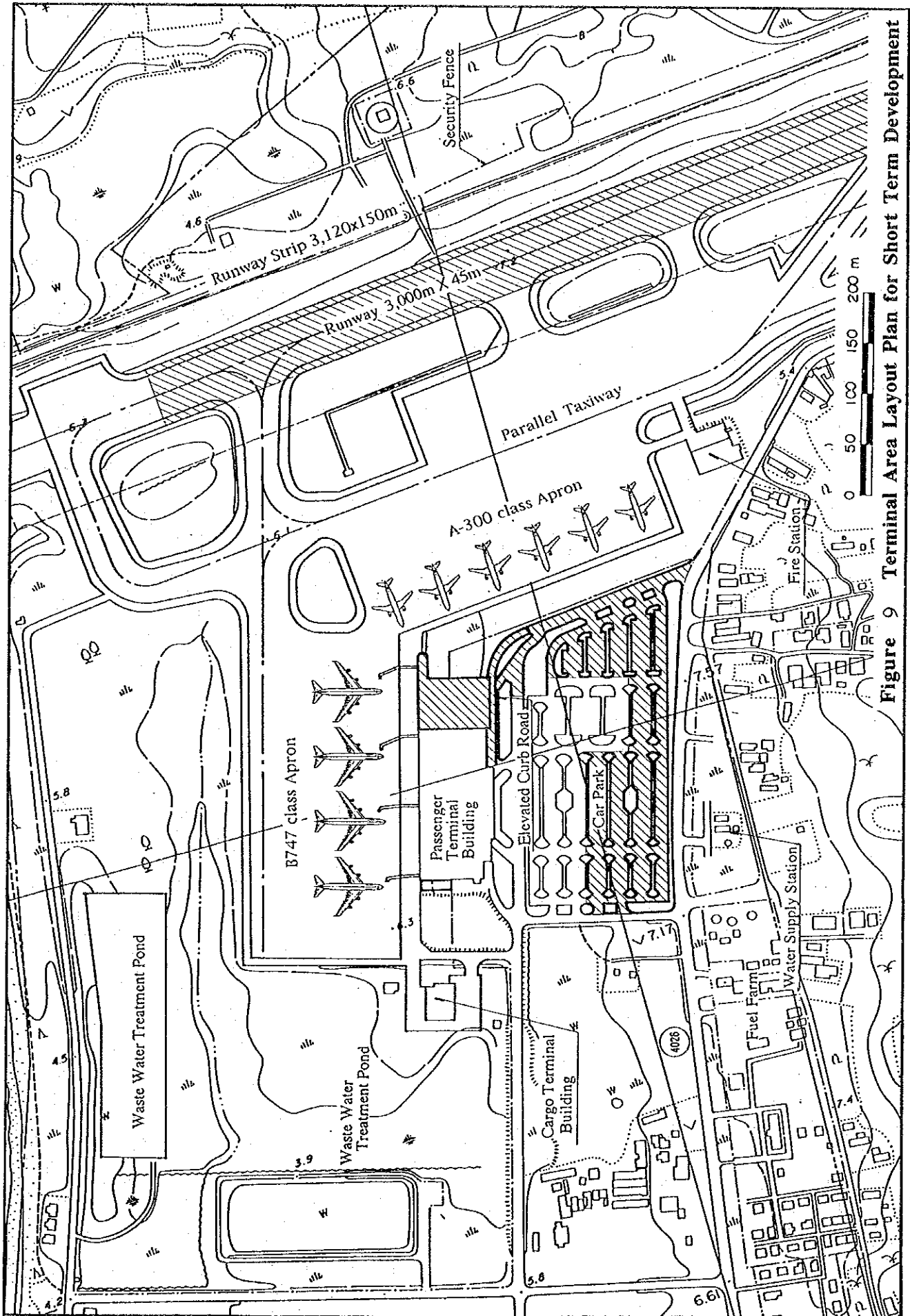


Figure 9 Terminal Area Layout Plan for Short Term Development

4.1.3 Airport Utilities

The existing airport utilities will be developed so as to prepare for the increase of loads in the short-term development as follows.

- **Power Supply System** : Emergency generator with a capacity of 250 KVA will be installed.
- **Water Supply System** : Two deep wells will be constructed. Total daily and hourly production will be 250 tons and 55 tons respectively, together with the existing seven wells.
- **Solid Waste Disposal System** : An incinerator will be installed near the oxidation ponds, and the solid waste collected from the buildings will be treated in the incinerator. Its capacity will be 2,800 kg per day.
- **Telephone Exchange** : Additional electric telephone exchange with a capacity of 200 channels will be installed. ISDN and other latest communication services will also be considered.

4.2 AIRPORT MANAGEMENT STUDY

Generally, Phuket International Airport has been well operated and maintained. There seems no serious problems to be resolved immediately in the present airport management.

However, it should be noted that the number of airport staff in some divisions will be increased in accordance with increase of air traffic volume and expansion of facilities since their work volume will increase.

For example, the staff of Security Division will be increased since the number of security check facilities will be increased. The staff of Airport Service Division for information service will be increased as the number of the passengers will increase. It is also necessary to increase the staff of Maintenance Division who will take the responsibility for the maintenance of the expanded terminal building and car park.

Therefore, it is necessary to increase the total number of airport staff from the present 149 persons to 180 persons in the year 2000 as shown in **Table 8**. However, the annual growth rate of the number of staff has to be kept at not more than 2% in accordance with privatization policy in the AAT Corporate Plan (1994-1996). According to that policy, the total number of AAT staff shall be 171 in the year 2000, and remaining 9 persons shall be hired from subcontractors personnel.

Table 8 Number of AAT Staff at Present and in Year 2000

Section	Present	Year 2000
1. Airport Manager/Deputy Airport Manager	2	2
2. General Administration Division	18	18
3. Airport Service Division	24	36
4. Security Division	52	68
5. Maintenance Division	23	26
6. Rescue and Fire Fighting Division	30	30
Total	149	180
		(AAT staff: 171)

4.3 ENVIRONMENT IMPACT ASSESSMENT AND AIRCRAFT NOISE ANALYSIS

4.3.1 Environmental Evaluation

Short-term development plan does not involve any land acquisition, and the construction scale is relatively small. Therefore, impact to natural environment or pollution will not be expected to be serious. However, countermeasures against water pollution generated during the construction stage and against increasing waste in the operation stage, should be appropriately considered.

The land use surrounding this area is mainly rubber plantations. There is a golf course and resort facilities at the south-east side of the existing airport, and National Park at the south-west side of this airport. The west side of this area may include the Klong Ta Maphrao mangrove reservation forest. Therefore detail reconnaissance will be required.

There will be problems for the non-establishment of land use policies and development plan around the airport. The land use plan around the airport will be established by the authority concerned in the future, viewing after the closing of the existing airport. This could avoid the occurrence of environmental problems, and control the development around the airport vicinity.

4.3.2 Aircraft Noise Analysis

In the year 2000 the contour of WECPNL 70 will be extended approximately 5.7 km long and 1.9 km wide. The contour of WECPNL 70 will cover a part of Ban Lacm Sai Village, east of the Runway 27 threshold. Condominiums in the golf resort south of the airport will be exposed to a noise level WECPNL 70 in 2000. The number of house units within the area with WECPNL more than 70 or 75 will increase a little in the year 2000.

However, serious aircraft noise problem will not occur until the closing of the existing airport.

4.4 PROJECT IMPLEMENTATION SCHEDULE AND COST ESTIMATES

4.4.1 Project Implementation Schedule

Figure 10 shows the overall project implementation schedule for phase I and phase II.

The implementation schedule of the short-term development project is shown in **Figure 11**.

4.4.2 Project Cost

The cost of the short-term development project is shown in **Table 9**. The total cost of the project is estimated to be 497 million Baht (US\$ 20 million)

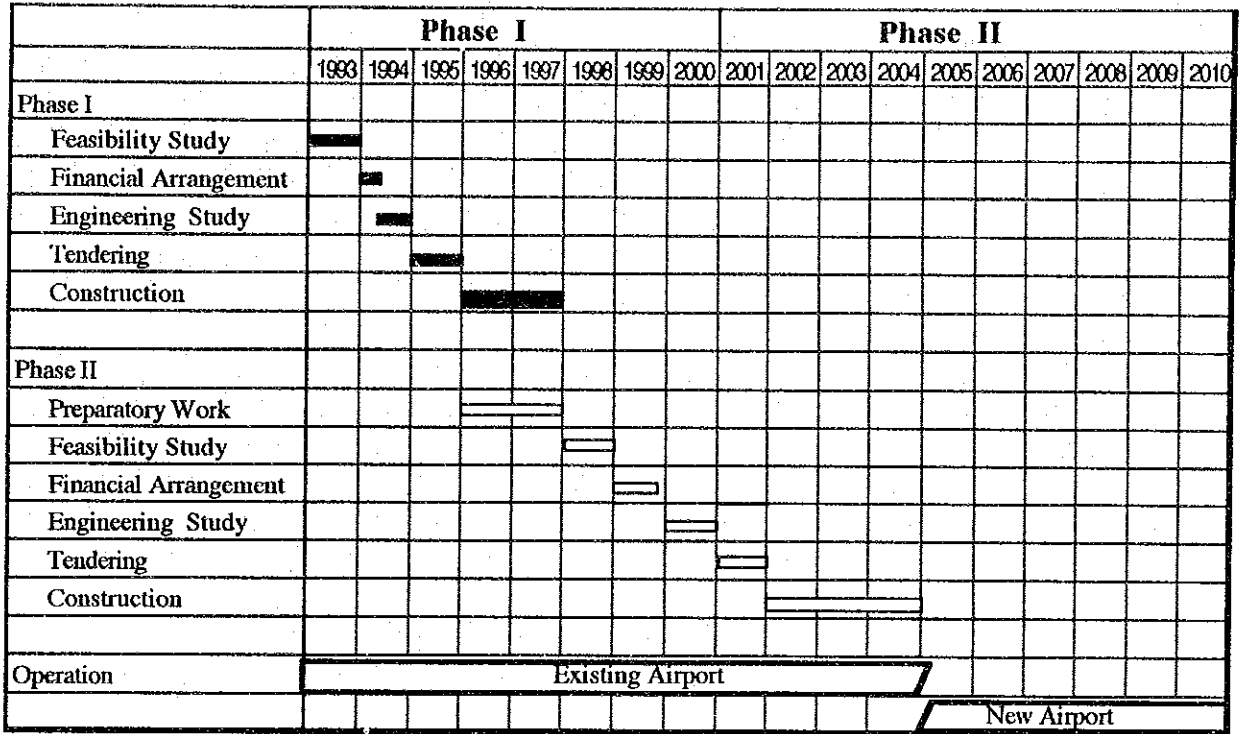


Figure 10 Project Implementation Schedule for Phase I and II

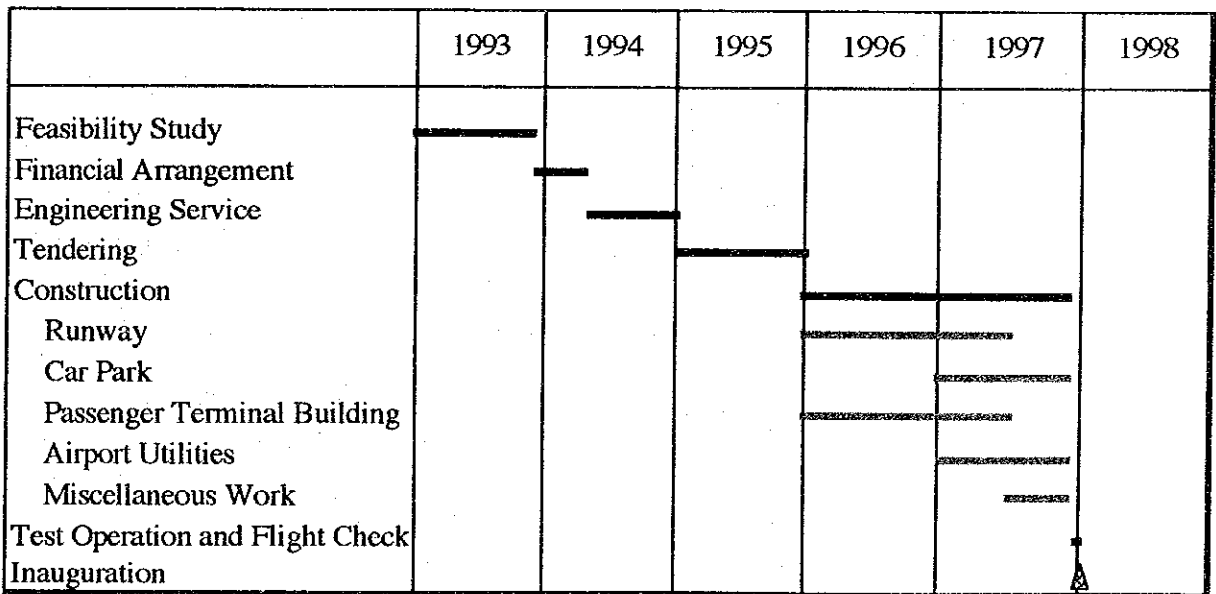


Figure 11 Project Implementation Schedule for short-term development

Table 9 Cost Estimates for the Short-term Development Project

ITEM	Local Portion	Foreign Portion	Total
	Amount (x1,000 Baht)	Amount (x1,000 Baht)	Amount (x1,000 Baht)
A. Construction Cost			
1. CIVIL WORKS			
1.1 Runway Overlay			
1) Pavement Works	28,990	43,500	72,490
2) Pavement Marking	480	1,430	1,910
Sub Total	29,470	44,930	74,400
1.2 Expansion of Car Park			
1) Demolition	30	180	210
2) Earthwork	530	2,820	3,350
3) Pavement Works	11,860	17,800	29,660
4) Drainage	150	250	400
5) Landscaping	2,010	740	2,750
6) Lighting & Signboards	50	290	340
7) Elevated Curb Road	6,000	9,000	15,000
Sub Total	20,630	31,080	51,710
1.3 Miscellaneous Works			
1) Fence and Gate	420	1,270	1,690
-- Gate	20	70	90
Sub Total	420	1,270	1,690
Total of item 1.	<u>50,520</u>	<u>77,280</u>	<u>127,800</u>
2. ARCHITECTURAL WORKS			
2.1 Passenger Terminal Building	70,000	105,000	175,000
2.2 Passenger Boarding Bridge	8,000	12,000	20,000
2.3 Other Special Equipment	3,100	27,900	31,000
Total of item 2.	<u>81,100</u>	<u>144,900</u>	<u>226,000</u>
3. AIRPORT UTILITIES			
3.1 Power Supply System	5,640	13,160	18,800
3.2 Water Supply System	6,370	11,830	18,200
3.3 Incinerator	11,200	2,800	14,000
3.4 Telephone	1,260	5,040	6,300
Total of item 3.	<u>24,470</u>	<u>32,830</u>	<u>57,300</u>
Total of Construction Cost	156,090	255,010	411,100
B. Physical Contingency (10 % of construction cost)	15,609	25,501	41,110
C. Engineering Services (10% of items A.+B.)	4,522	40,699	45,221
Total of Project Cost	176,221	321,210	497,431

Exchange Rate : 1 Baht = 4.4 JPY
1 US\$ = 110 JPY

4.5 FINANCIAL AND ECONOMIC ANALYSIS

The purpose of the economic analysis is to ensure the feasibility of the plan from the view point of national economy, while the financial analysis is to evaluate the financial viability of the Project and clarify the impact of the investment on the financial position of AAT.

Financial and economic analysis have been carried out in the context of "with" and "without assumption". A project life has been assumed up to 2004 because the existing airport is designed to be closed in 2004 and the new airport is expected to open in 2005 as recommended by the Master Plan of Phuket International Airport in 2010.

For the financial and economic analysis of the Project a rate of 12 % has been applied as the discount rate.

4.5.1 Capital Costs and Operating Expenses

The annual disbursement schedule of the capital costs for the short-term development plan is shown in accordance with the implementation schedule of the Project in **Table 10**. Operating expenses of AAT consist of "Personnel expenses", "Operating and maintenance expenses" and "Government land rental expenses" and the incremental operating expenses during the project period are shown in **Table 11**.

Table 10 Capital Costs

Unit: million Baht

	1996			1997			Total		
	Foreign portion	Local portion	Total	Foreign portion	Local portion	Total	Foreign portion	Local portion	Total
Construction Costs	95.70	56.26	151.96	142.63	89.62	232.25	238.33	145.88	384.21
Physical Contingency	9.57	5.63	15.20	14.26	8.96	23.22	23.83	14.59	38.42
Engineering Services	15.27	1.63	16.90	22.76	2.60	25.36	38.03	4.23	42.26
Value Added Tax	8.44	4.45	12.89	12.58	7.07	19.65	21.02	11.52	32.54
Total Project Costs	128.98	67.97	196.95	192.23	108.25	300.48	321.21	176.22	497.43

4.5.2 Financial Analysis

The increase of revenue for AAT by the implementation of the short-term development plan is mainly derived by the incremental capacity of the international passenger terminal building. The revenue of the Project are calculated based on the incremental traffic by using the current rates of charges for the airport use and services regulated by AAT and the incremental revenues from "Passenger service charges", "Landing and parking charges", "Aviation bridge charges", "Rent for offices and real properties" and "Service and concession" are estimated as shown in **Table 11**.

Table 11 shows the comparison of revenues and costs for the Project during the project period. The **FIRR** (Financial Internal Rate of Return) is estimated at **12.03 %** which indicates the minimum rate to justify the Project from the financial point of view. The **NPV** (Net Present Value) has been calculated using the discount rate of 12 % and the result of calculation has been estimated at **0.47 million Baht**.

Table 11 Revenues and Costs of the Project

	Unit: million Baht									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	
REVENUES										
Passenger service			36.68	50.63	65.55	76.81	88.55	100.75	113.43	
Landing & parking			18.56	24.83	31.09	38.67	46.26	53.83	61.41	
Aviation bridge			1.53	2.04	2.55	3.05	3.55	4.05	4.55	
Rent for offices			3.20	5.59	7.99	7.99	7.99	7.99	7.99	
Service & concession			7.34	10.13	13.11	15.36	17.71	20.15	22.69	
TOTAL REVENUES	0.00	0.00	67.31	93.22	120.29	141.88	164.06	186.77	210.07	
COSTS										
CAPITAL COSTS										
Civil Works										
Runway	(69.53)	46.35	23.18							
Terminal RD & Carpark	(48.33)		48.33							
Miscellaneous	(1.58)		1.58							
Architectural Work										
Passenger Terminal Building	(211.22)	105.61	105.61							
Airport Utilities	(53.55)		53.55							
Sub-total	(384.21)	151.96	232.25							
Physical Contingency	(38.42)	15.20	23.22							
Engineering Service	(42.26)	16.90	25.36							
	(464.89)	184.06	280.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VAT	(32.54)	12.89	19.65							
Total Capital Costs	(497.43)	196.95	300.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OPERATING EXPENSES										
Personnel Expenses			2.93	4.05	5.24	6.14	7.08	8.06	9.07	
Operating & Maintenance Expenses			5.98	5.98	5.98	5.98	5.98	5.98	5.98	
Government Land Rental Expenses			1.35	1.86	2.41	2.84	3.28	3.74	4.20	
Total Operating Expenses	0.00	0.00	10.26	11.89	13.63	14.96	16.34	17.78	19.25	
VAT & PROPERTY TAX										
VAT	-12.89	-19.65	4.19	5.73	7.35	8.76	10.21	11.70	13.22	
Property Tax	0.00	0.00	0.40	0.70	1.00	1.00	1.00	1.00	1.00	
Total Payment	-12.89	-19.65	4.59	6.43	8.35	9.76	11.21	12.70	14.22	
TOTAL COSTS	184.06	280.83	14.85	18.32	21.98	24.72	27.55	30.48	33.47	
NET PROFITS										
	-184.06	-280.83	52.46	74.90	98.31	117.16	136.51	156.29	176.60	
FINANCIAL INTERNAL RATE OF RETURN (FIRR):			12.03%							
NET PRESENT VALUE (NPV):			0.47 million Baht							
(DISCOUNT RATE 12 %)										

The financing plans of two cases have been examined in which it is assumed that 80 % of investment costs will be financed by the long-term loan under the condition as shown in Table 12.

Table 12 Condition of Long-term Loans

	Interest rate	Repayment period including grace period	Grace period	ROE
Long-term Loan 1	12 %	8 years	3 years	9.31 %
Long-term Loan 2	8 %	13 years	3 years	30.62 %

For this project the increase in revenues by the project implementation is satisfactory as it covers the capital costs of the Project and the incremental costs for operation and maintenance, if some portion of the capital costs is financed by the loan at subsidized conditions. Therefore, the financing arrangements of the capital costs are the crucial point for the financial feasibility of the Project.

Financial sensitivity has been examined by considering the following conditions.

- 1) 10 % of costs increase including operating costs
- 2) 10 % of revenue decrease
- 3) A combination of 1) and 2)

The FIRR's still maintain a minimum level under the assumption of the three cases.

Table 13 Result of Sensitivity Analysis

	FIRR	NPV
Base Case	12.03 %	0.47 million Baht
1) 10 % of costs increase	9.55 %	-47.76 million Baht
2) 10 % of revenue decrease	9.30 %	-47.77 million Baht
3) A combination of 1) and 2)	6.90 %	-96.00 million Baht

4.5.3 Economic Analysis

Firstly the benefits and costs of the Project have been distinguished and quantified within the context of the "with" and "without assumption". Secondly benefits and costs of the Project have been converted from market prices to economic prices adopting "shadow prices". Thirdly the feasibility of the Project has been estimated using indexes of economic analysis. Finally, the sensitivity of the Project has been examined.

The following **benefits** are quantified for the economic analysis of the Project.

- 1) Benefits from Passenger Service Charges
- 2) Benefits from Landing Charges, Storage Charges and Aviation Charges
- 3) Benefits from Commercial Activities in Passenger Terminal Building

Furthermore, benefits from the related businesses have been assumed and the benefits of the Project including the benefits of those businesses have been estimated for the further analysis.

- 4) Benefits from Foreign Tourist Expenditures (a portion of local transport & tour expenditures)
- 5) Benefits from International Air Fares

Travel time savings are not included in the benefits because the incremental international passenger by the implementation of the Project are foreign passengers and the benefits of their time savings attributed to the benefits of the own countries of the passengers.

The costs of the Project which have been calculated in the financial analysis have been converted into the **economic costs of the Project** by eliminating Transfer Payments and multiplying Standard Conversion Factor of 91 %.

The Economic Internal Rate of Return (**EIRR**) and Net Present Value (**NPV**) have been estimated at **25.96 %** and **295.67 million Baht** respectively, which are high enough to justify the Project (see **Table 14**).

In addition the EIRR and NPV amount to **54.44 %** and **1,177.48 million Baht** respectively, when the benefits from other foreign tourist expenditures and international air fares paid to Thai carriers are included in the benefits of the Project.

Increase in regional incomes through the tourist expenditures by the incremental international passengers will promote the continuous development of tourism sector in Phuket.

Economic sensitivity has been examined to ensure the feasibility of the Project as shown in **Table 15**. The EIRR will remain within a level to reveal the economic feasibility of the Project under the assumption of a combination of 20 % increase in costs and 20 % decrease in benefits.

Table 14 Benefits and Costs of the Project

	Unit: million Baht									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	
BENEFITS										
Passenger Charges			36.68	50.63	65.55	76.81	88.55	100.75	113.43	
Landing & Parking Charges from Foreign Carriers			9.28	12.42	15.55	19.34	23.13	26.91	30.70	
Aviation Bridge Charges from Foreign Carriers			0.77	1.02	1.28	1.53	1.78	2.02	2.27	
Tourist Expenditure in Passenger Terminal Building			51.35	70.88	91.77	107.53	123.97	141.05	158.80	
TOTAL BENEFITS	0.00	0.00	98.08	134.95	174.15	205.21	237.43	270.73	305.20	
COSTS										
CAPITAL COSTS										
Construction Costs (incl. VAT)	(411.51)	162.76	248.75							
Engineering Service(excl. VAT)	(42.26)	16.90	25.36							
VAT for Engineering services	(0.00)	0.00	0.00							
Total Capital Costs	(453.77)	179.66	274.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OPERATING COSTS										
Personnel Expenses			2.93	4.05	5.24	6.14	7.08	8.06	9.07	
Operating & Maintenance Expenses			5.98	5.98	5.98	5.98	5.98	5.98	5.98	
Total Operating Costs	0.00	0.00	8.91	10.03	11.22	12.12	13.06	14.04	15.05	
TOTAL COSTS	179.66	274.11	8.91	10.03	11.22	12.12	13.06	14.04	15.05	
NET BENEFITS	-179.66	-274.11	89.17	124.92	162.93	193.09	224.37	256.69	290.15	
ECONOMIC INTERNAL RATE OF RETURN (EIRR):			25.96%							
NET PRESENT VALUE (NPV):			295.67 million Baht							
(DISCOUNT RATE 12 %)										

Table 15 Result of Economic Sensitivity Analysis

	EIRR	NPV
Base Case	25.96 %	295.67 million Baht
1) 10 % of costs increase	23.03 %	248.50 million Baht
2) 10 % of revenue decrease	22.73 %	218.94 million Baht
3) A combination of 1) and 2)	19.91 %	171.76 million Baht
4) 20 % of costs increase	20.44 %	201.34 million Baht
5) 20 % of revenue decrease	19.26 %	142.20 million Baht
6) A combination of 4) and 5)	14.17 %	47.86 million Baht
Case including the benefits from other tourist expenditures and air fares to Thai Carriers	54.44 %	1,177.48 million Baht

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The conclusions of the Master Plan for Phuket International Airport Development Plan are summarized as follows:

A new airport shall be developed for long-term development plan of the target year 2010, and the existing airport will be developed on a minimum scale only to meet the demand of the target year 2000 until completion of the new airport as the short-term development.

It should be noted that the new airport site determined in this Study was selected from the possible sites mainly in Phuket Island and they are not fully in compliance with international standards of ICAO in respect of obstacle limitation surfaces. Therefore, a separate detailed study for site selection is required for a new airport construction in Phuket Island including construction in the sea or on the adjacent mainland.

The conclusions of the Feasibility Study are summarized as follows:

- (1) The Short-Term Development Plan is feasible from the technical, environmental, economic and financial aspects.
- (2) The FIRR of this Project is estimated at 12.03 % which indicates the minimum rate to justify the project from the financial point of view.

The EIRR and NPV are estimated at 25.96 % and 295.67 million Baht respectively, for the national economy of Thailand. Furthermore, the EIRRs will remain within a level to reveal the economic feasibility of the project under the assumption of combination of 20 % increase in costs and 20 % decrease in benefits.

- (3) The environmental impact assessment for the short-term development indicates that there will not be so much influence expected as a whole.
- (4) Consequently, the existing airport will be expanded for the target year 2000 in order to cope with increasing demand along the implementation schedule established in this Study.

5.2 RECOMMENDATIONS

In order to implement the project as scheduled in this Study, the following measures are recommended.

- (1) National and regional consensus for the project implementation should be obtained.
- (2) The preparatory and coordination works are advisable to be undertaken as soon as possible.
- (3) Financial arrangement for project implementation should be prepared.

(4) A separate study should be carried out for selection of a new airport site fully in compliance with ICAO standards in Phuket Island including in the sea or on the adjacent mainland. Especially in case of a new site in the sea, the following items should be studied in detail:

- Meteorological conditions such as wind direction and velocity
- Marine conditions such as tidal current, wave height, etc.
- Environmental conditions in the reclamation area

