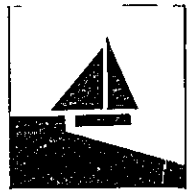
CHAPTER 6 PORT FACILITIES



6.1 Introduction

At present, the sea area around Pattaya has a wide range of shipping, such as commercial sightseeing boats, personal boats for recreational purposes, fishing boats with their home port at Pattaya, etc. They total about 500 in number, including small size scooters and yachts, most of them centering along the 4-km-long Pattaya beach with a rather high rate of congestion.

If the future increase of tourists is to accompany a proportional increase of such boats and ships for recreational and sightseeing purposes, the waters will have an enormous number recreational boats.

Regulatory measures together with proper guidance should be provided to promote an orderly utilization of the sea area and its coastline.

The present situation of the utilization of the area poses several problems, as listed below:

- Unlawful occupation of the beach and illegal buildings
- Confusion in utilization of the water surface
- Lack of safe embarkation and disembarkation facilities
- Lack of rescue systems
- Lag in marine environment conservation measures

An important point to be noted with regard to this plan is how to bring about systematic order in the operation of sightseeing and recreation-purpose shipping for providing tourists with safer and more comfortable services, as against the current situation where all kinds of crafts are randomly using the sea and the beach areas.

The study points out that an area in which people are allowed to enjoy safe and pleasant swimming should be secured first of all, while bringing together those sightseeing boats that are usually scattered along the beach at random, by furnishing them with safe embarkation and disembarkation facilities as well as with anchoring berths.

The on-site detailed investigation conducted recently revealed a need for modification of the master plan for completion of the north and main port within Phase I (1986). Re-examination of various factors, such as coastline utilization, port management, mooring methods and berthing areas, construction costs, etc., led to the conclusion that the construction of the north port should be delayed until necessary, while the main port should be completed within Phase I, i.e. by 1986.

The need for the north port will be discussed after the data on utilization of the port operations of the future main port becomes available.

Furthermore, the master plan maintained that Pattaya-based fishing boats might continue their present operations. More detailed study revealed that they are operated seasonally, and that most of the people are leading a "round-the-clock, on-board existence"; making it rather difficult to control the water area utilization and consequent contamination. The feasibility study here suggests that efforts should be directed to

gradually moving them out to neighboring fishing ports and organizing the fishing ports.

Detailed studies were made of the wind, wave, sea bottom and soil conditions, as well as surveys of the number of boats, large and small, their activities and the condition of boating facilities, as well as sea area utilization, including excursion and fishing boats. We also estimated the future demand for excursion boats.

Key factors for designing the port are briefly summarized in the following tables and figures:

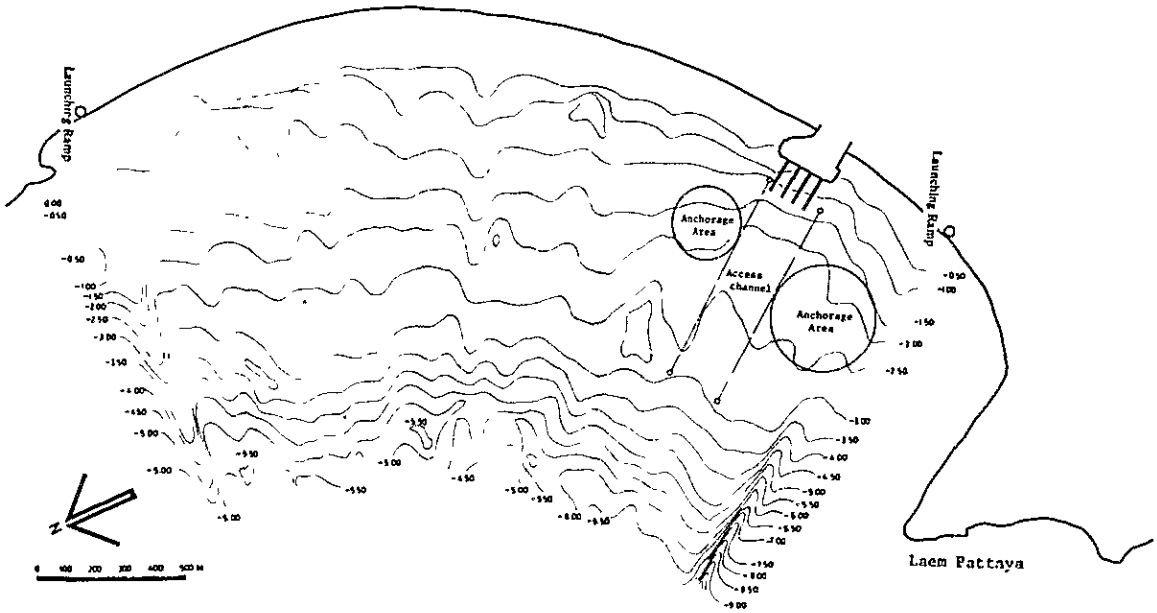


Fig. 6.1 Navigational Channel and Anchorage

Table 6.1 Number of Passengers in Peak Hours

Year	Number of Passengers	Passengers on Peakday	Hourly Concentration			Number of Passengers in Privately Operated Boats			
			1 hour	2 hours	3 hours	Number of Passenger	1 hour	2 hours	3 hours
1978	1,108	443	776	942	1,108	443 (50)	776 (87)	942 (105)	
1981	1,403	561	982	1,193	1,403	561 (63)	982 (110)	1,193 (133)	
1982	1,553	621	1,087	1,320	1,398	559 (63)	977 (109)	1,188 (132)	
1984	1,928	771	1,350	1,639	1,542	617 (69)	1,074 (120)	1,311 (147)	
1986	2,438	975	1,707	2,072	1,950	780 (87)	1,365 (152)	1,658 (184)	

Note: Ratio of concentration ( ) shows number of boats

1 hour : 40%
2 hours: 70%
3 hours: 85%

Table 6.2 Minimum Number of Berths

Year	Number of Boats (2 hours)	ΔT=20 mins.	ΔT=30 mins.
1978	87 boats	14.5 berths	21.8 berths
1981	110	18.3	27.5
1982	109	18.2	27.3
1984	120	20.0	30.0
1986	152	25.3	38.0

Total Project Cost is shown on page 20, Table 1.1.

6.2 Layout for Port

(a) Main Port

The planned site for the port facilities is the same as where the existing piers are located. The site was selected because of its ideal natural conditions and also because it will be integrated in the redevelopment project for the downtown area. In order to smoothly carry out the construction of the port facilities, it is desirable that the redevelopment project for the downtown area be reviewed. The amenity core will be the point where the main access routes to the piers coincides.

Fig. 6.2 shows the general port plan and the navigational channel respectively.

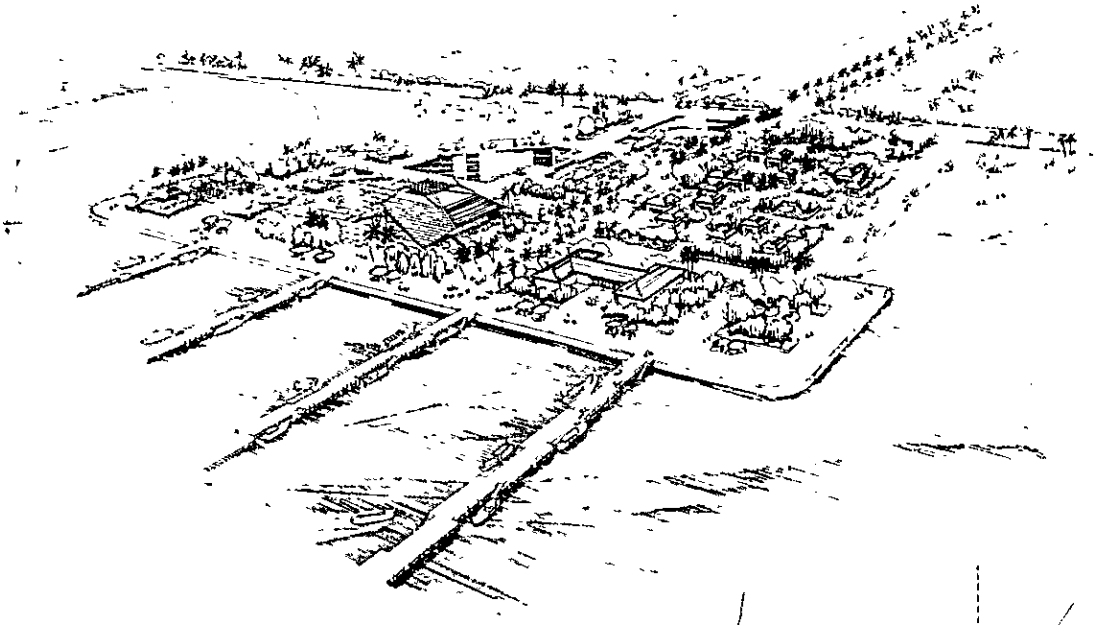
(b) Launching Ramp Plan

At present there are one public and three private launching ramps at Pattaya. The private launching ramps are used mainly by motor boats. If boating activities were to expand proportionate to the increase in the number of tourists, the coastal line and the sea around the launching ramps would soon be occupied by these boats.

Therefore, it is proposed that two private launching ramps at the center of Pattaya beach be discontinued in the future. The time of discontinuation would naturally depend on agreement with the owners, but it is hoped that the time will coincide with the completion of port facilities and launching ramps to be newly built (1981).

(c) Piers for Ko Lan Island

As for the landing facility plan based on the Ko Lan utilization plan and island traffic network plan, piers for excursion boats are provided at two places, i.e., Ta Van beach and Tien beach, and, moreover, an additional pier is to be provided for material transportation (including construction materials for other infrastructure facilities) and water supply on the east side of Ko Lan, where there is a fishing village at present.



Perspective of Proposed Main Port

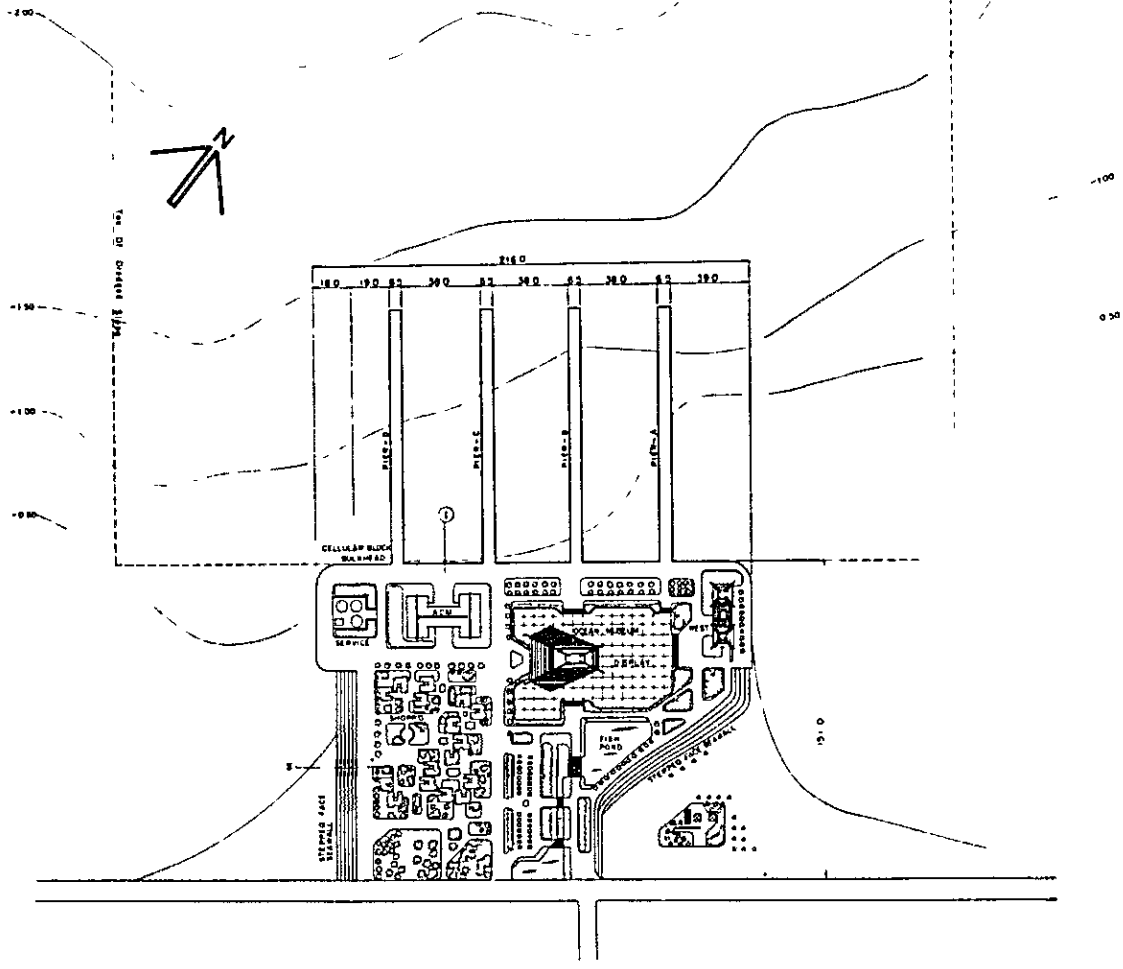


Fig. 6.2 General Plan of Main Port

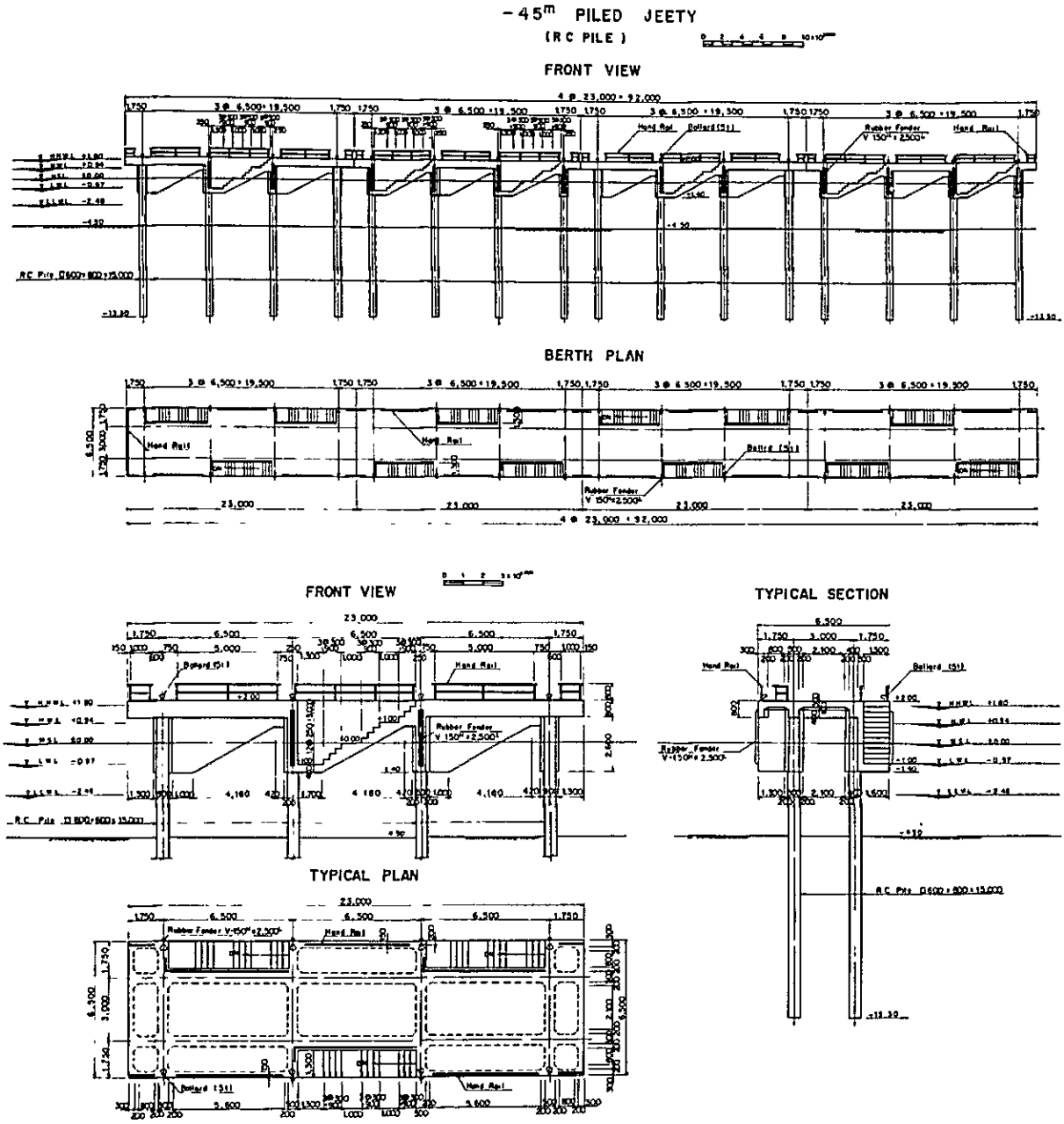


Fig. 6.3 Pier Plan and Sections at Main Port

6.3 Port Management

After the completion of the port construction, the harbour management office will be established for the management of the port and for the maintenance and repair of facilities.

(a) Facilities Subject to the Control of the Harbour Management Office

Sea area facilities

1) Piers
2) Access channel and anchorage area
3) Navigation aids

Protection facilities

1) Revetment

Land facilities

1) Management office
2) Parks and roads (within port site)
3) Other relevant facilities (utilities and sewage facilities)

(b) Facilities on Commission

1) Refueling facilities
2) Restaurants, souvenir shops and other stores shall be owned by traders, provided that the land is leased as a rule.

(c) Management of Piers

After completion of pier construction, the piers shall be managed under the following preconditions.

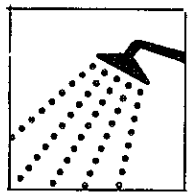
1) If one berth is occupied by one boat, a vast sea area is required and the user's share of expenses will increase. Therefore, one berth shall be shared by several boats as a rule. It will make pier management easy as compared to common use by an unspecified number of boats.

2) Occupancy permission for each berth shall be based on an application system, provided that the pier charge is paid.

3) Applications for occupancy permission shall be submitted jointly by several boats which will share one berth.

4) The rent of a pier shall be collected from the occupants of the pier and it will be determined so as to meet repayment and interest, maintenance cost and operational expenses.

CHAPTER 7 WATER SUPPLY SYSTEM



7.1 Purpose of the Study

This has been studied despite the fact that the Thai Government already has separate plans for the water supply system, because of its importance in the evaluation of the whole project and because of the need for estimations of the rough costs for construction maintenance and operations.

The estimates were based on the following informations:

(1) The expected number of tourists, namely, foreign, Domestic and day tripper

(2) Required size and scale of public and private facilities, amenity cores, hotels and restaurants

(3) Proposed landuse plan

(4) Population increase and controls

(5) Planning of the island for tourism development

7.2 Relationship to Other Parts of the Infrastructure

The water supply system will be important to other parts of the infrastructure in the planning, construction and operation stages. It is vital that this system be brought into operation in concert with the other systems.

(1) Planning Stage

The most feasible and economic plans and designs should be drawn up in accordance with the basic figures, such as forecasted demand and the landuse plan. The water system should be coordinated with the sewerage system in every possible way.

(2) Construction Stage

The water supply system should be implemented together with the road and street system to avoid double excavations for pipe laying.

(3) Operation

The system could start operating after completion or even partial completion. The required charges could then be collected from the users.

Water supply charges should be collected together with sewage charges. It would be difficult to collect these charges separately.

7.3 Amount of Water to be Supplied

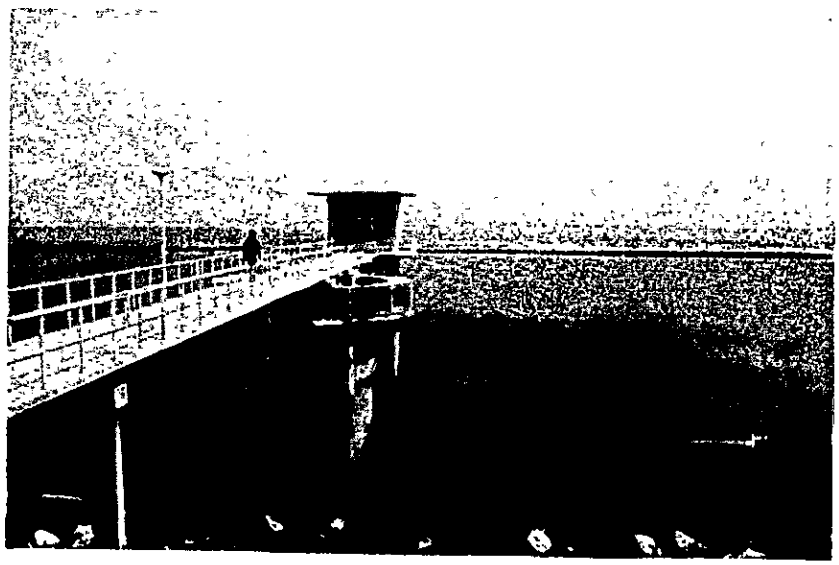
The annual volume of water required have been estimated as follows:

Table 7.4.1 Total Annual Volume of Water

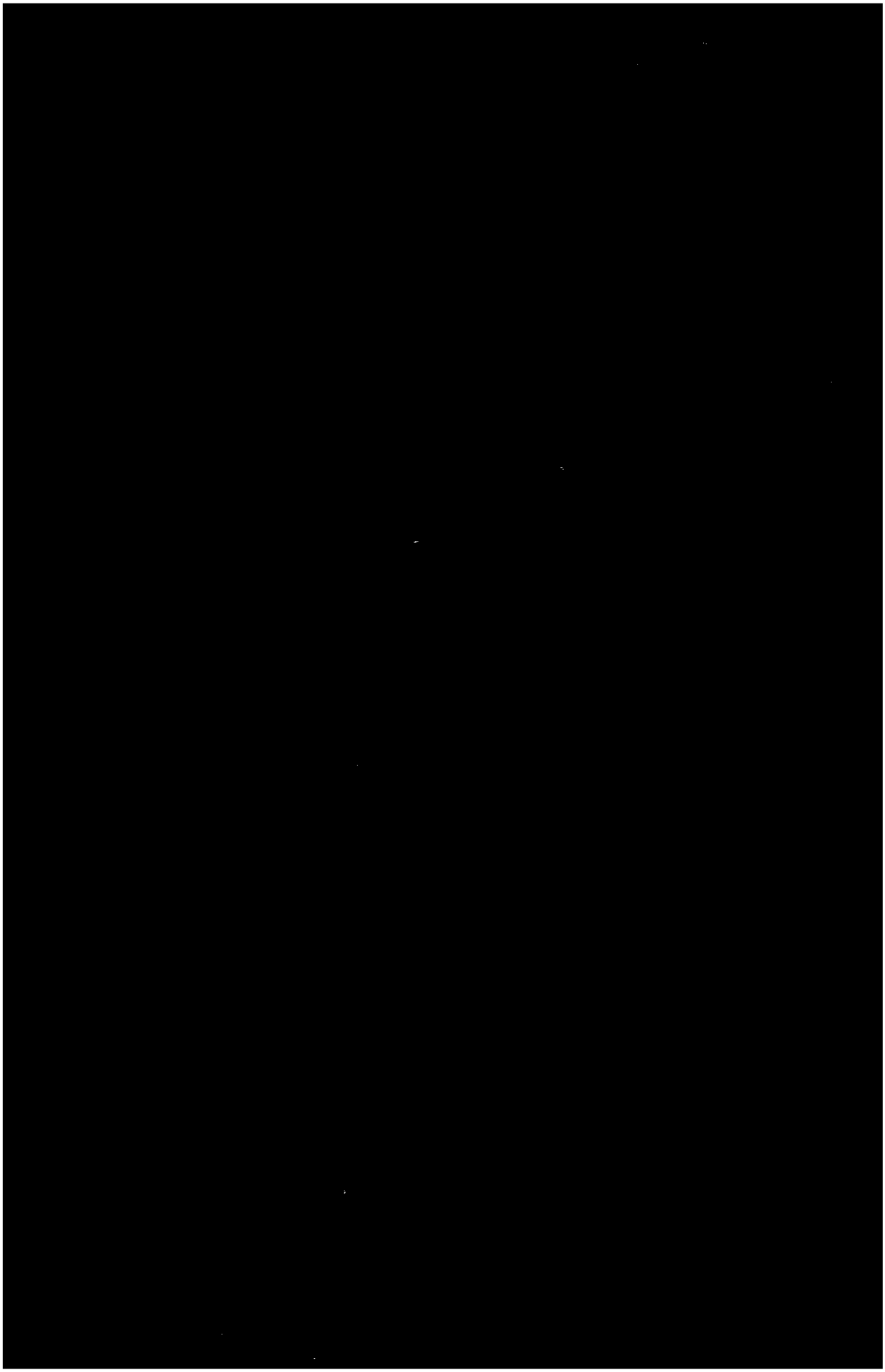
Year	Tourism	Residential	Total
1981	414	2,926	3,340
1986	1,546	4,568	6,114
1991	1,561	5,080	6,641
1996	1,561	5,573	7,144

The water for tourism includes that for users on Ko Lan island.
Unit: thousand cubicmeter.
Total Project Cost is shown on page 20, Table 1.1.

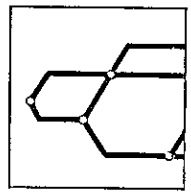
Construction of mabprachan Reservoir



Bang Phra Reservoir



CHAPTER 1 IMPLEMENTATION OF THE PROJECT



1.1 The Phasing of Development

The implementation schedule described here is for Phase 1 of the project, which is planned to cater for tourist demand and population increases in the area up to 1986. The basic schedule of Phase 1 of the project is shown on the Implementation Schedule, Table 1.1.
Total Project Cost is shown on page 20, Table 1.1.

1.2 Stage–1, Preparation Work

Major preparation work before construction should be undertaken immediately following the basic policies and plans established in the master plan and the feasibility study. This will include the establishment of an administrative organization and the negotiation of financial matters including internal and/or external loans. The final design will also be carried out, together with the preparation of tender documents for local and/or international bidding, if necessary.

(a) Establishment of Project Unit

As described in Chapter 2 - Organization and Management, an authorized organization (PTOC) will be established at the beginning of Stage-1. Role of this organization will start from the preparation work prior to execution of the project, such as:

(1) Acting as representative for the project

(2) Negotiating financial and technical aid

(3) Supervision of final design by a qualified international consulting firm

(4) Control of bidding and construction

(5) Construction supervision to ensure conformity to project requirements and specifications

(b) Negotiation of Financial Matters

The following will be performed by the organization through the supervisory agencies and/or assistance of the consultants if required.

(1) Cost estimation of the project

(2) Forecasting balance of payments, estimation of public rates for miscellaneous charges

(3) Study of the profit and loss statement

(4) Study of financial sources

(c) Preparation of Final Design

The following activities will be carried out by the organization before bidding for construction contracts starts:

(1) Establishment of implementation schedule

(2) Preparation of terms of reference

(3) Requesting on technical aid from the government agencies

(4) Selection of consultants

(5) Detailed topography and subsoil survey

(6) Final design

(7) Preparation of tender documents

1.3 Stage–2, Bidding and Construction

Bidding will be conducted using the tender documents prepared in Stage-1. Construction of the project will be started based on the contracted drawings and technical specifications.

The project should be divided into several contracts in such a way as to get maximum efficiency. Invitations for bids for the first construction works should be advertised during the first quarter of 1980.

(a) Bidding and Construction

(1) The project should be divided into several contract groups considering the character and size of the construction.

(2) Prequalification of contractors should be conducted during the first quarter of 1980.

(3) Tendering for the contracts should start during the first quarter of 1980 with assistance from the consultants.

(4) Construction should start by the beginning of the calendar year 1980, the remaining work by the beginning of 1981.

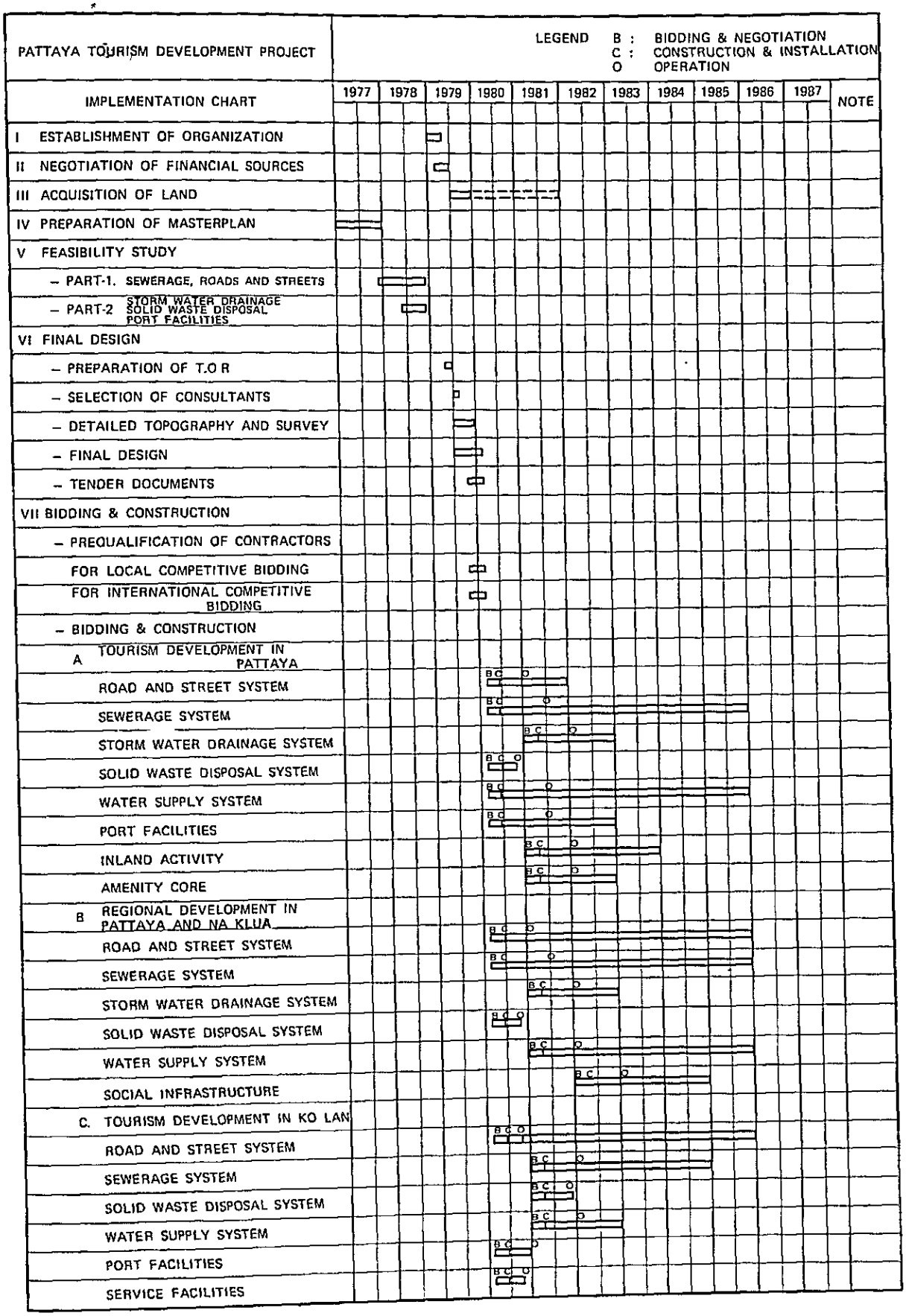
(5) Urgent construction works should be defined and dealt with.

(6) Construction supervision should be done by the organization with the assistance of the consultants.

(7) Operations could start after the completion of initial bidding; however, some could be in partial operation before completion of all the preparation work.

A schedule of implementation is shown in Table 1.1.

Table 1.1 SCHEDULE OF IMPLEMENTATION



CHAPTER 2 ORGANIZATION AND MANAGEMENT

2.1 Necessity

The organization of a body for the implementation of the project will be indispensable from the standpoint of project execution on one hand and the facilitation of securing foreign loans on the other hand.

(a) An Organization for Centralized Administration and Management

An organization is most important for the systematic execution of the project. It should be organized in such a manner, as to appropriately position the water supply system, sewerage system, roads and streets, storm water drainage system, solid waste disposal system, port facilities and amenity cores in an integrated tourism complex, so that the overall development effects will be accomplished.

(b) An Organization Capable of Handling Development Funds

The magnitude of such investments can be clearly understood if the total 1978 budget of the T.O.T. of 63 million baht, and the estimated total revenue of Pattaya Township of 68 million baht are compared. Furthermore, from 15 to 20% of the said public investments will be in foreign currency, which may not be easily generated from sources within Thailand but will have to be secured from overseas financial institutions. Such institutions ordinarily require the recipient of the funds to possess loan of tourism development funds. Total Project Cost is shown on page 20, Table 1.1.

2.2 Overall Organizational Structure

Under the recommended structure, the T.O.T. and other central government agencies, Pattaya Township, and private tourism industries (or their associations) will be able to participate and promote tourism development without organizational overlaps, but in such a manner that they will function complementarily to each other, and all of the funcitons necessary for tourism development projects will be satisfied.

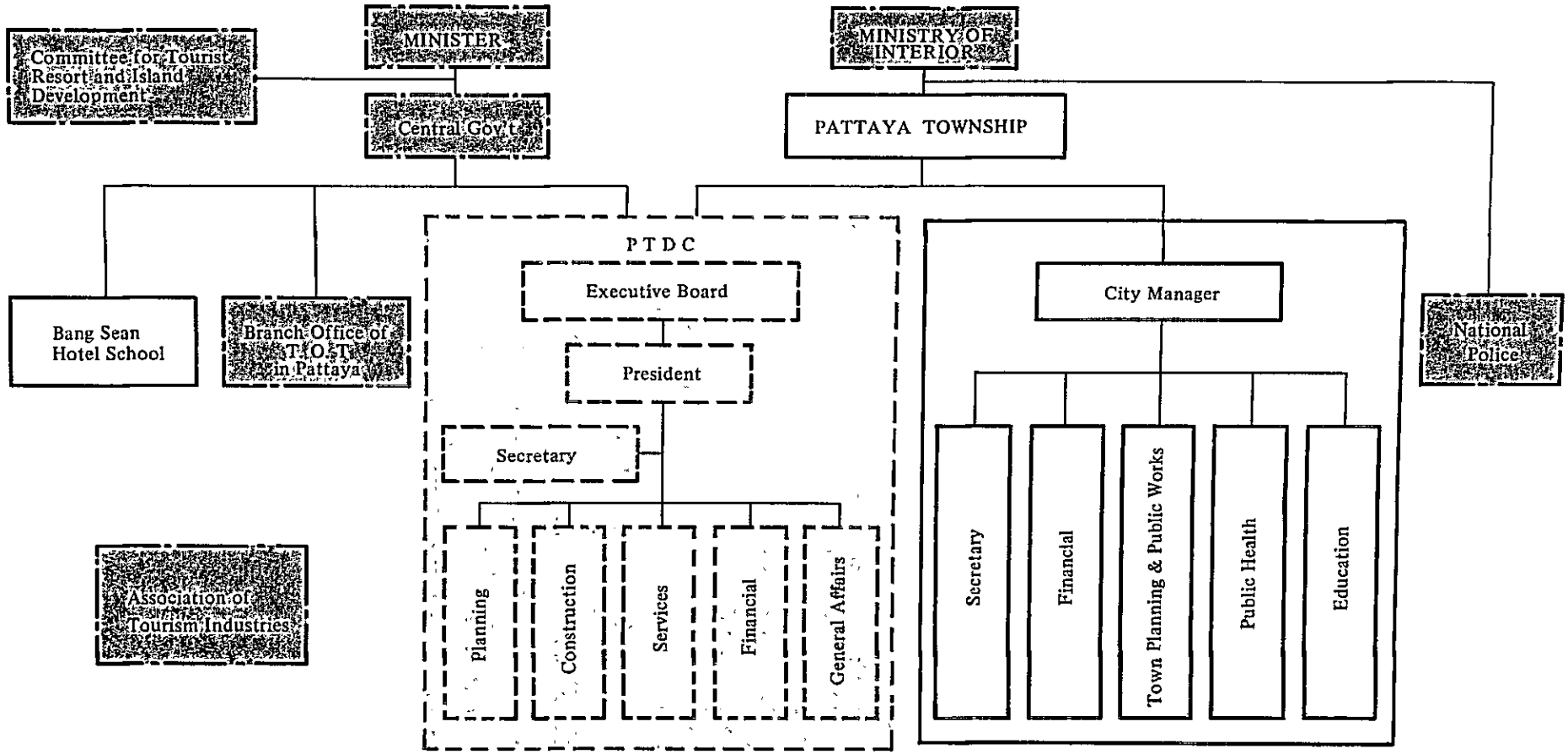
2.3 Pattaya Tourism Development Corporation : P.T.D.C.

(a) Alternatives

As the first step in formulating recommendations for the project execution organization, possible alternatives under the existing legal and administrative frameworks should be identified and evaluated. The following three alternatives are possible under current laws and summary of the alternatives is shown in table 2.1.

Alternative I	Direct execution by the Pattaya Township
Alternative II	A company to be established by joint investment by the township and private capital.
Alternative III	A public corporation to be established by joint investment by the Central Government and the Pattaya Township.

Fig. 2.1 Organization for Project Execution & Operation



Legend : Existing : Planned : Proposed

Note: PTDC would be established under the management of the Pattaya Township and Central Government following Article 73 of the Pattaya Township Act as well as relating law.

Table 2.1 Summary of Evaluations for Fig. 2.1

Alternatives	Establishment.	Personnel.	Funds.	Overall Rating.	
Alternative I	G	F	F	F	G: Good
Alternative II	P	G	G	P	F: Fair
Alternative III	G	G	G	G	P: Poor

Basing on above evaluation, Alternative III is adopted. This organization is called "The Pattaya Tourism Development Corporation".

(b) Organizational Structure of Pattaya Tourism Development Corporation (PTDC)

The PTDC organization would consist of an executive board, a president, and a secretary, as well as planning, construction, services, finance and general affairs departments.

(c) Authority

To facilitate the effective accomplishment of the assigned duties, the PTDC will be equipped with appropriate areas of authority within the specified area.

a. The authority to coordinate with other government agencies, Pattaya Township and private capital with regard to the execution of projects,

b. The authority to construct and operate each project,

c. The authority to obtain bank loans and to issue bonds,

d. The authority to set rates for charges on tourism as well as public facilities subject to the approval of the Central Government,

e. The authority to establish special charges subject to the approval of the Central Government,

f. The authority to plan and promote the establishment of cooperatives,

g. The authority to control and manage tourism industries.

(d) Manpower Planning

The staff needed for the execution and operation of the first phase of the Pattaya project will be 188 personnel for the operation of infrastructure, 91 personnel for the operation of the amenity cores and inland activities, and 61 personnel for the execution and management of the head office, giving a total of 340.

(e) Cost of Operation and Administration

Overhead cost must be estimated in addition to the above direct personnel expenses. Assuming that the same management system as that of Pattaya Township will be adopted for the PTDC office, general administration expenses are estimated roughly as 1 million baht.

(f) Financial Soundness

Inasmuch as the PTDC chiefly provides for the construction and operation of projects which are generally of low profitability, it seems that the PTDC will be in a fairly difficult financial condition during the initial

decade. Efforts should be made to secure the financial soundness of the PTDC through the following measures:

a. Procurement of low cost funds
b. Increasing revenue
c. Other measures

If the financial soundness of the PTDC cannot be realized through the measures in a. and b. above, the PTDC may accept a part of the Township's financial resources as the PTDC's current revenue, in view of the fact that some of the benefits deriving from the projects to be executed by the PTDC would be earned by the Township as incremental tax revenue.

2.4 Establishment of Committee for Project Execution Study

As mentioned earlier, the PTDC will be the main organization in the execution of the Pattaya Project, but further consideration is needed for the detail of the organizational set-up. Job allocation between Pattaya Township and PTDC concerning this project should be determined through discussion by the Pattaya Township, TOT, and other government agencies. Preparation for the establishment of the PTDC is an urgent job, also. Taking these things into consideration, it is highly recommended that inauguration of the PTDC be organized. The range of duties should be examined in detail and decided by this committee. This committee for project execution study will consist of representatives from the TOT, Pattaya Township, and government agencies concerned.

The chairman and the coordinator should be most appropriately assigned from the representatives of the TOT. Under this committee, subcommittees will be organized for the preparation of execution of each construction works, establishment of the PTDC, and raising of funds for the construction work.

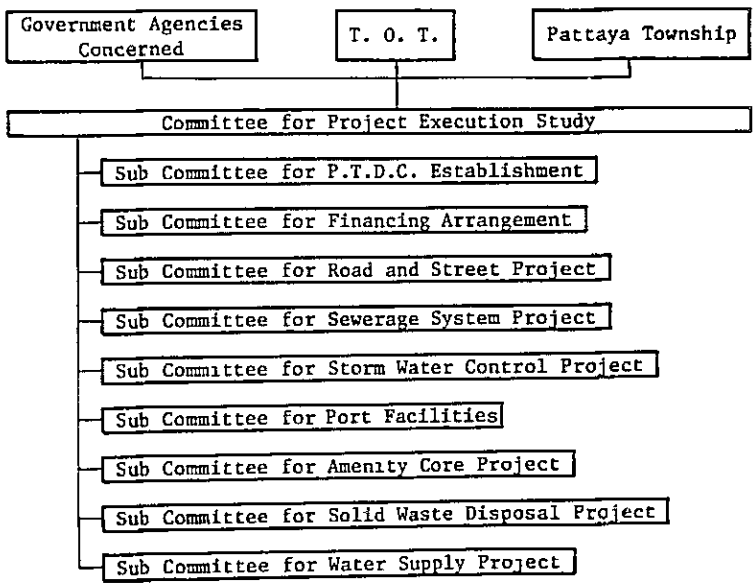


Fig. 2.2 Structure of Committee for Project Execution Study

2.5 Other Organizations Related to the P.T.D.C.

(a) Tourist Organization of Thailand

When a national organization for tourism is not equipped with an authority for implementing tourism development projects, as is the case of the present TOT, the execution of systematic development is generally hindered. Reorganization of the TOT into an authority would be an effective way of overcoming this difficulty. In October, 1978, the said reorganization plan was approved by the Cabinet in principle, and it is now in the process of preparation before being submitted to the Parliament. The authority should play an important role in the implementation of the Pattaya Project.

(b) The Pattaya Township

a. Objectives of establishment

The concept of the establishment of the Pattaya Township is based on three main objectives:

- To modify the system by introducing a city manager into the local administration,

- To enhance the local administrative power sufficiently to meet the security, environment, housing, and sanitary requirements which tourism calls for, and

- To increase local government revenues.

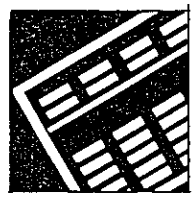
b. Personnel plan

Necessary Pattaya Township staff will be secured through the appointment of the current forty-two Na Klua Sanitary District personnel and some of the current personnel of Amphoe Bang Lamung to the Township; and also through the dispatch of other necessary staff and personnel from the Central Government agencies and other municipalities by the order of the Ministry of Interior. According to the Pattaya Township Establishment Preparatory Committee's estimation, the number of the Township staff and personnel, including the City Manager and the Assistant City Managers, will be 121 in total. Proportionally, the 121 personnel are estimated to be only 0.3% of the total population of the Pattaya area and this seems to be insufficient for handling the necessary administrative services for the inhabitants as well as the tourist facilities.

c. Budget plan

The township taxes and other revenue are estimated to total about 38 million baht (27 million baht from the house/land tax, 0.4 million baht from the motor vehicle tax, and 5 million baht from alcoholic, slaughter, and amusement taxes, etc.). It is expected that a subsidy of 30 million baht will be granted by the Central Government each year. The total Township revenue of 68 million baht from taxes and subsidies is a fairly large one.

CHAPTER 3 FINANCIAL ANALYSIS



3.1 Introduction

To evaluate this project, it is necessary to study the financial feasibility of the executive organization in charge of its execution; namely, the Pattaya Tourism Development Corporation (hereinafter referred to as the PTDC), as described in Chapter 2, Organization and Management.

The major works to be executed by the PTDC will be public infrastructures; namely, (a) the road and street system, (b) the sewerage system, (c) the storm water drainage system, (d) the solid waste disposal system, (e) the port facilities, and (f) the water supply system. These works will be provided in the study area including Ko Lan Island.

3.2 Cost Estimation

- Criteria for Estimation

The prices in 1976 have been adopted as the base for cost estimations. International market prices in 1976 were also adopted for the cost estimation for imported goods. As the average charge for freight and insurance costs from foreign countries to Thailand, 9% of the F.O.B. price was adopted, with US$ being converted into Thai Baht at the exchange rate of US$1 = 20 Baht.

- Initial Investment Costs for Phase 1, up to 1986

  - Construction Costs have been divided into two kinds of currencies, namely, local and foreign. Unskilled labor costs and the tax portion have been separately calculated for each item.

  - Consulting services, in this analysis, have been divided into design and supervision categories.

  - Price contingencies have been estimated at 8% and physical contingencies at 7% against the construction costs and total consulting service during the construction period up to 1986.

  - Land acquisition prices at the end of 1977 were adopted for land unit prices in the current market. No contingency was taken into consideration in land prices.

Total initial investment costs with contingency for the infrastructures (category A) are estimated at 1,109.9 million Baht (US$55.5 million) of which land cost is 221.8 million Baht, civil works and equipment, 813.0 million Baht and consulting services, 75.1 million Baht. On the other hand, the costs for other facilities (category B) are estimated at 1,849.9 million Baht (US$92.5 million) of which land cost is 633.7 million Baht and civil works and equipment, 1,105.7 million Baht, and consulting services, 110.5 million Baht.

Table 3.1 Total Project Cost of Infrastructure by Major Project Components Category-A
Phase 1, up to 1986

Unit: million Baht

Major Project Components	Land Acquisition	Civil Works and Equipment	Consulting Services	Total Physical Facilities	Project Administration	Total Project Cost	Total Project Cost US$ million
Road and Street System	182.5	129.1	11.5	323.1 (29%)	26.0	349.1	17.4
Sewerage System	18.1	159.3	14.7	192.1 (17%)	19.9	212.0	10.6
Storm Water Drainage System	18.4	22.9	2.4	43.7 (4%)	5.6	49.3	2.5
Solid Waste Disposal System	0.6	19.7	1.8	22.1 (2%)	13.1	35.2	1.8
Port Facilities	-	53.6	5.4	59.0 (6%)	6.2	65.2	3.2
Water Supply System *1	2.2	322.3	29.5	354.0 (32%)	27.4	381.4	19.1
Base Line Cost	221.8	706.9	65.3	994.0	98.2	1,092.2	54.6
Physical Increase	-	49.5	4.6	54.1 (5%)	-	54.1	2.7
Price Increase	-	56.6	5.2	61.8 (5%)	-	61.8	3.1
Contingencies Sub-Total	-	106.1	9.8	115.9	-	115.9	5.8
Total Project Cost	221.8 (20%)	813.0 (73%)	75.1 (7%)	1,109.9 (100%)	98.2	1,208.1	60.4

Note *1 Cost on Water Supply System was estimated tentatively based on the study output by the Masterplan.

Table 3.2 Total Revenue, Residential and Tourism Area, by Type of Works

unit: x 10^3 Baht

No.	Year	Road and Street R AC	Road and Street T*1 AC&SC	Road and Street ST	Sewerage R*2 SC	Sewerage T*3 AC&SC	Sewerage ST	Storm Water Drainage R AC	Storm Water Drainage T AC	Storm Water Drainage ST	Solid Waste Disposal R SC	Solid Waste Disposal T*3 AC&SC	Solid Waste Disposal ST	Port Facilities T&ST AC&SC	Total	Water Supply R*2 SC	Water Supply T*3 AC&SC	Water Supply ST	Grand Total
4	1980	-	-	-	-	-	-	-	-	-	1,092	2,568	3,620	-	3,620	-	-	-	3,620
5	1	-	2,300	2,300	3,387	1,088	4,475	-	-	-	1,141	3,112	4,253	2,312	13,340	10,190	3,135	13,325	26,665
6	2	-	2,800	2,800	3,692	5,942	9,634	-	-	-	1,249	4,598	5,847	5,604	23,88	10,800	11,268	23,068	45,953
7	3	-	3,300	3,300	4,085	7,745	11,830	-	-	-	1,361	7,344	8,705	6,501	30,336	11,869	14,373	26,242	56,578
8	4	4,416	6,520	10,936	4,355	8,141	12,496	552	1,250	1,802	1,481	8,213	9,694	6,621	41,549	12,843	15,044	27,887	69,436
9	5	7,056	10,270	17,326	4,471	8,159	12,630	941	1,883	2,824	1,603	9,211	10,814	6,621	50,215	13,503	15,073	28,576	78,791
10	6	9,984	18,676	28,660	4,620	9,773	14,393	1,248	4,557	5,805	1,731	10,036	11,767	7,137	67,762	14,302	17,749	32,051	99,813
11	7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
12	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
13	9	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
14	90	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
15	1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
16	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
17	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
18	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
19	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
20	6	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
21	7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
22	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
23	9	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
24	2000	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
25	1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
26	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
27	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
28	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
29	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
30	6	9,984	18,676	28,660	4,620	9,773	14,393	1,248	4,557	5,805	1,731	10,036	11,767	7,137	67,762	14,302	17,749	32,051	99,813
Total		221,136	417,386	638,522	117,010	236,308	353,318	27,701	98,830	126,531	44,238	245,802	290,040	177,536	1,585,947	359,547	431,622	791,169	2,377,116

Notes: R : for Residents T : for Tourism industies
S.T.: Sub total A.C.: Annual charge S.C.: Service Charge

*1: including revenue from parking and concession on Baht-Bus.
*2: including revenue from other industries such as Tapioca factories.
*3: including revenue from residents in Kolam island.

- Maintenance and Operation Cost (hereinafter referred as M & O cost)

The required number of manpower for full operation of all infrastructures was estimated about 300. The total cost is 349.7 million Baht for 27 years up to 2006 and is about 32% of the total initial investiment costs. As civil works and equipment cost for the infrastructure, 706.9 million Baht is needed. The total M & O cost is about 50% of the previous cost. In other words, annual M & O cost is almost 2% of the initial construction cost (excluding land cost).

- Administration Costs

Administration costs allocated into seven work items of six infrastructure systems and amenity core administration. The total cost up to 2006 is 129 million Baht (7.1 million Baht a year during the execution of the project and 3.9 million Baht a year after completion of the implementation). These costs cover the salaries and over-head expenses needed for project management in the headquater of the PTDC.

- Depreciation Costs

The average life duration of civil structures and equipments have been estimated respectively, and then the Sum of Year's Digits (SDY) Method has been applied with a 5% book value in order to calculate the annual amount of depreciation.

3.3 Profit and Loss Statement for Infrastructure

Revenues from charges are divided into two kinds of categories; namely, "service charge" and "annual charge".

- "Service charge" has been established by harmonizing to current service charges such as for the water supply system in Pattaya and other areas in Tahiland. A basic concept for "service charge" is to cover enough operating cost and administration cost of the each component of infrastructure. "Service charge" will be levied on the utilized quantities.
- "Annual charge" is a special charge for the utilization of public facilities to cover the initial investment in the project where "service charge" cannot be collected or where "service charge" revenue is expected to be more effective in covering the initial investment cost if combined with "annual charge". The annual charges are fixed charges, such as the basic charges for telephone services, and are levied on per room of hotels and per household of residents, etc..

According to the profit and loss statement, the net operating profit after the completion of facilities in tourist and residential areas will be both positive and incomes from these areas exceed running costs including depreciation cost. The gross operating profit (G.O.P.) of tourism area will be 2.7 times that of the residential area after the completion of the facilities. From this, it is easily understood that the main income source is from the tourism area rather than the residential area in spite of the fact that the amount of initial investments are greater in the residential area (58%) than in the tourism area (42%).

The estimations of consumption are obtained by multiplying the design capacity specified in the technical studies with the efficiency factor for revenue generating for each system.

Total revenue will be about 2.4 billion Baht up to 2006; that means, about 1.4 times of the total cost of six infrastructure components including the initial investment, maintenance and operating cost, administration cost and contingencies.

Table 3.3 Profit and Loss Statement (1)

Unit: million Baht

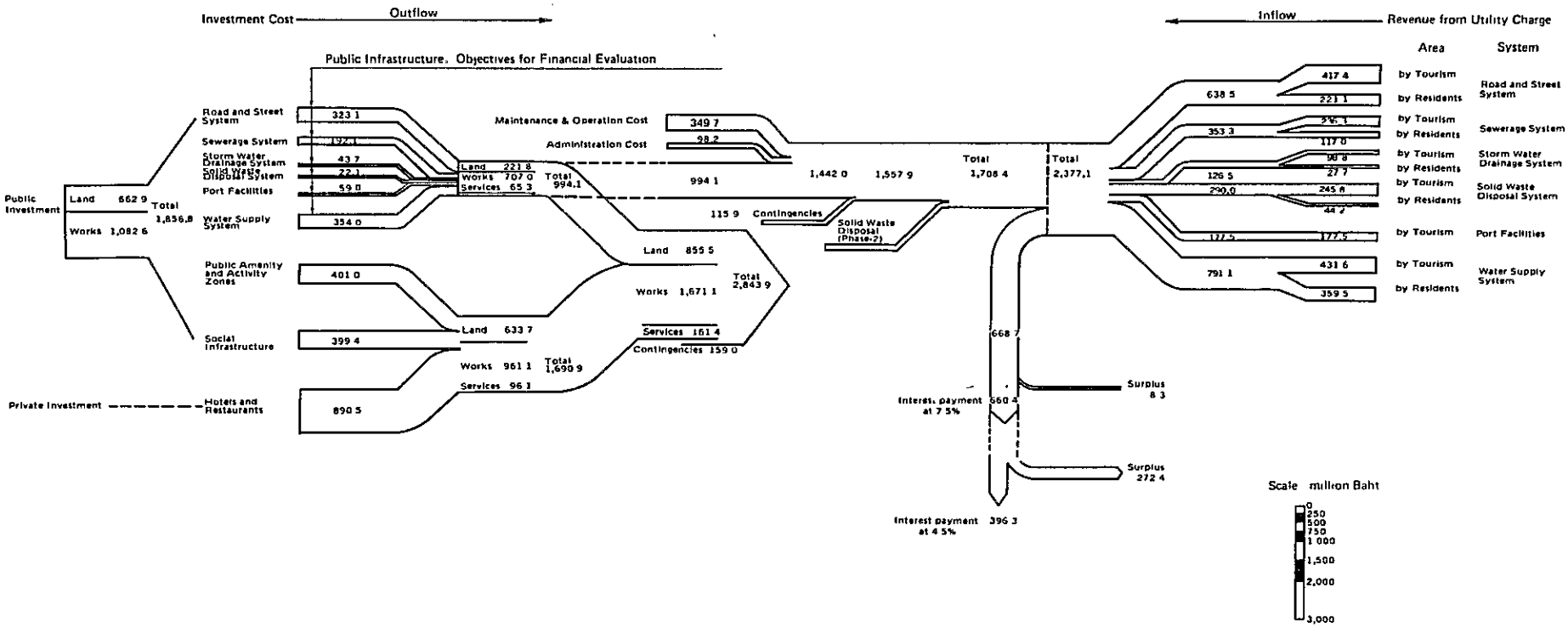
Area	Revenue	Expenditure			Gross Operating Profit
		M & O Cost	Administration Cost	Total Cost	
Tourism and Residential Area	2,376.9 (1,585.8)	349.7 (225.6)	98.2 (70.8)	447.9 (296.4)	1,929.0 (1,289.4)
Residential Area	769.5 (410.0)	201.0 (121.2)	49.4 (28.9)	250.5 (150.1)	519.0 (259.9)
Tourism Area	1,607.4 (1,175.8)	148.6 (104.4)	48.8 (41.9)	197.4 (146.3)	1,410.0 (1,029.5)

Table 3.4 Profit and Loss Statement (2)

Unit: million Baht

No.	Year	Revenue			Expenditure			Gross Operating Profit (A) - (B)
		Service Charge	Annual Charge	Total (A)	M.&O. Cost	Administration Cost	Total (B)	
1	1977	-	-	-	-	-	-	-
2	1978	-	-	-	-	-	-	-
3	1979	-	-	-	-	3.0	3.0	-3.0
4	1980	2.2	1.4	3.6	1.7	3.8	5.5	-1.9
5	1981	24.2	2.4	26.6	8.6	4.9	13.5	13.1
6	1982	36.1	9.8	45.9	9.6	5.3	14.9	31.0
7	1983	38.5	18.1	56.6	10.2	↓	15.5	41.1
8	1984	41.4	28.1	69.5	10.4		15.7	53.8
9	1985	43.7	35.1	78.8	11.0		16.3	62.5
10	1986	48.6	51.3	99.9	11.8	5.3	17.1	82.8
11	1987	↓	↓	↓	13.1	3.0	16.1	83.8
12	1988				13.3	↓	16.3	83.6
13	1989				13.4		16.4	83.5
14	1990				13.5		16.5	83.4
15	1991				13.6		16.6	83.3
16	1992				13.7		16.7	83.2
17	1993				↓		↓	↓
18	1994							
19	1995							
20	1996				13.7		16.7	83.2
21	1997				15.1		18.1	81.8
22	1998				↓		↓	↓
23	1999							
24	2000							
25	2001							
26	2002							
27	2003							
28	2004							
29	2005							
30	2006	48.6	51.3	99.9	15.1	3.0	18.1	81.8
Total		1,206.7	1,172.2	2,378.9	349.7	98.2	447.9	1,931.0

Fig. 3.1 Project Inflow and Outflow on Pattaya Tourism Development Project: Phase 1. (1986)



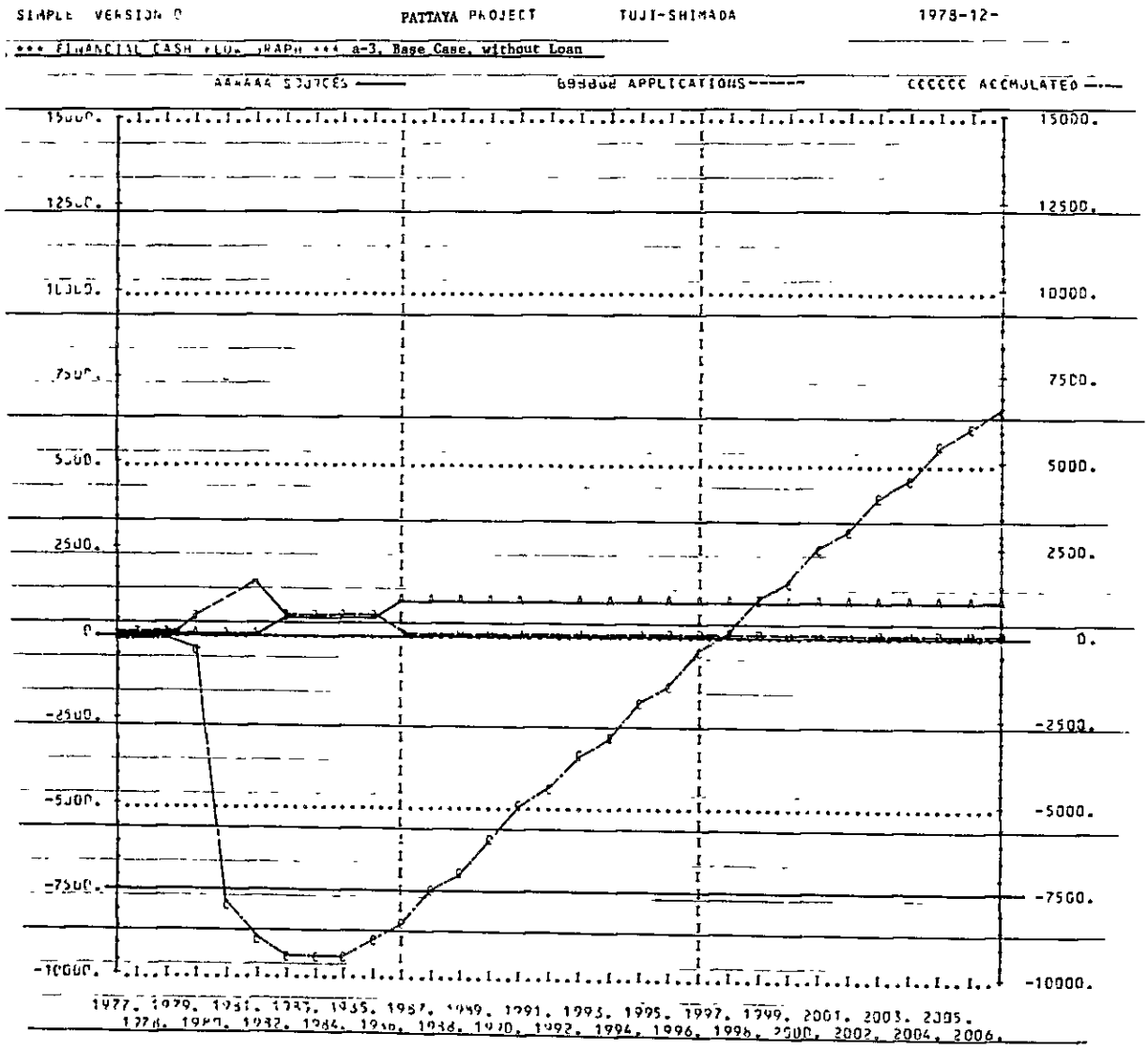
3.4 Cash Flow

(a) Cash Flow of the Project: for 30 years by 2006

The accumulated cash balance for the project of the tourism area is 885 million Baht in the surplus, but that of the residential area is 218 million Baht in the deficit. The total accumulated cash balance of both areas is thus 667 million Baht in the surplus. In short, the income generated by the project for the residential area covers all of the running cost of the infrastructures and 75% of the initial investment cost for the residential area. Consequently the tourism industry is anticipated financially to supplement the deficit of the outflow generated from the works provided in the residential area.

Undertaking of the burden on the tourism industry, namely as of about 25% of initial investment for the residential area, may be justified on the ground that the industry will be able to carry on their profitable business on the expenditure by tourists who will enjoy the days staying in the beach resort of good environment in the tourism area and the residential area as well.

Fig. 3.2 Financial Cash Flow (Graph),
Unit: hundred thousand Baht.



(b) Cash Flow in Considering Foreign Loans

The cash flow has been studied taking into account of financing from overseas for the whole public infrastructure. The amount of foreign loans has been assumed to be 50% of the initial investment. The rest of the initial investment has been assumed to be financed by the fiscal budget of the Government of Thailand. Domestic private loand will not be applicable because this project may be regarded as the relatively low profitability due to the public infrastructure.

- Loan Amount; 50% of the initial investment, namely a sum of construction costs, consulting services, contingencies for these two items and land costs,

- Interest Rate; deferred payment at 7.5%, and when the Government subsidizes the amount of money equal to the sum of the interest,

- Disbursement; for 6 - 7 years during the construction period for the first phase,

- Repayment Period; a grace period of maximum 7 years, and equal repayment to be paid back by installments over 20 years from 1987 to 2006.

3.5 Financial Internal Rate of Return

Separate rates of return are calculated for each project areas, namely the tourism area and the residential area. To prevent any arbitrary estimation, rational policies were taken into account for the necessary allocation of cost and planning of a possible utility charge.
In addition the combined rates of return are also calculated as well to obtain the overall true picture of the project.

(a) Profitability of the Project Itself

The rate for the total investment cost obtained indicates the profitability of the project.

Table 3.5 Financial Internal Rate of Return

Area	Base Case	Alternative
Tourism	9.5%	9.0%
Residential	negative	negative
Combined	3.8%	4.0%

Base Case ; for the six components of the infrastructure
Alternative; for the five components of the infrastructure excluding the Water Supply System

Obtained rate of return for combined is 3.8%. This figure must be justified as the project involves public infrastructures not only for the establishment of and improvement to the sophisticated infrastructure in the beach resort but also for the features of a rural development of the neighbouring area, namely the residential area.

(b) Profitability of PTDC's Equity

The rate of return with the foreign loans in the cash flow is shown below.

Table 3.6 Financial Rate of Return for PTDC's Equity

Area	Base Case	Alternative
Tourism	10.9%	9.9%
Residential	negative	negative
Combined	0.2%	0.6%

Base Case ; for the six components of the infrastructure,
Alternative; for the five components of the infrastructure excluding the water supply system

In case that loaned money is used, it should be noted that the profitability of the project will be recognized if the profitability is in excess of the real term interest rate and that the reversed conditions worsens the profitability.

The profitability of the investment for the tourism area is higher than the real term interest rate and, thus, introduction of the loan to the tourism area projects pushes the profitability slightly upward. On the other hand, loaned money greatly worsens the profitability of the investment for the residential area. The overall profitability of the entire projects becomes worse if loaned money is used.

An overall combined rate of return in use of foreign loans falls down to 0.2% and therefore the rate might become a negative figure in case that there should be generated unfavorable changes in estimated income and operating costs, etc.

(c) Subsidy from the Government

If a subsidy from the central or local government is taken into acount as much as the equal amount of the interest payment for foreign loaned money, the return will rise considerably at high level as 7.5%. The total amount of subsidy is estimated about 700 million Baht, that is 35 million Baht a year.

According to the study, total amount of the incremented business tax and corporated income tax generated from the tourism industry will reach respectively more than 1,500 million Bahts and 800 million Baht in total by 2006.

As the total amount of subsidy of 700 million Baht or 35 million Baht a year is equivalent with about 30% of the incremental amount of tax, thus the government may be able to subsidize an amount for the interest payment on foreign loaned money.

According to the government draft on the Pattaya Township Revenue Plan shown in Chapter 2, the revenue is estimated 38 million Baht a year by tax on house and land, etc., also 30 million Baht a year as a special subsidies from the Central Government of Thailand is appropriated in 1979.

Some portion of these amount of 68 million Baht a year may be applied for the interest payment.

The rate in case of Subsidies from Governments will be as follows.

Base Case : for the six components of the infrastructure,
The rate of return = 7.5%

Alternative: for the five components of the infrastructure excluding the water supply system. The rate of return = 7.7%

3.6 Ability to Pay Utility Charges

No matter how useful the systems and facilities may be, if the charges are beyond the paying ability of the users, no-one can expect them to use the facilities.

(a) By Residents

The ability to pay charges has been found in the recent records of the Thai National Census (Statistical Yearbook Number 31, 1974-1975), and the study team uses the figures in this analysis. The census covers the 5 main regions of Thailand during 1971 to 1973.

In the Pattaya region, expenditure in the 1973 statistics was 1,800 Baht/month for one household each month. As the consumer price index has risen approximately to 6.5%, average expenditure by a household in the Pattaya Area estimated to be about 2,300 Baht as of 1977.

The limit of the new charges (service charges and annual charges) for a household should be kept in the range of allowable for them. After taking an evaluation on the available data, an allowable rate has been judged to be less than 7.5% of household expenditure.

The annual increase in expenditure and estimated charges is shown below:

Table 3.7 Annual Increase in Expenditure and Estimated Charges

Year	(A) Monthly Expenditure *1	(B) Charges Upper limit *2	B/A	(C) Charges Estimated	C/A	C/B
1977	2,300	170	7.5%	-	-	-
78	2,420	180	7.5%	-	-	-
79	2,540	190	7.5%	-	-	-
80	2,660	200	7.5%	12	0.5%	6%
81	2,800	210	7.5%	75	2.7%	36%
82	2,940	220	7.5%	76	2.6%	34%
83	3,080	230	7.5%	82	2.7%	35%
84	3,240	240	7.5%	133	4.1%	55%
85	3,400	260	7.5%	161	4.7%	63%
86	3,570	270	7.5%	189	5.3%	71%

*1 Monthly expenditure after 1977 is assumed to increase at a rate of 5% a year.

*2 Charges here do not include charges for existing facilities (infrastructure i.e. solid waste disposal, water supply etc.)

Most of the infrastructures will start operating after 1980.

Percentage of the amount of charges to the monthly expenditure will increase year after year, however the public charge expenditure in 1986, when it is the peak, will be 189 Baht/month, which is equivalent to 5.3% of the total expenditure (3,570 Baht/month). This rate being lower than the estimated maximum allowable percentage of 7.5%, it is expected for the residents to accept the infrastructure with the proposed utility charges.

(b) By the Tourism Industries

At the end of phase 1, 1986, new utility charge will become 23 thousand Baht/room year and the gross operating profit will 47.7 thousand Baht/room year. On the other hand, the current low gross operating profit as 10 thousands Baht/room year in deficit will continue if the project will not be implemented.

Therefore incremental profit by the project is estimated 57.4 thousands Baht/room year as a differential amount of both cases.

In other words, the hotel industry will gain the incremental profit of about 2.5 times of an amount of the utility charge.

For the other tourism related industries utility charges are proposed as basically same rate of charge for the hotel industry. It will be levied to the other industry such as shops, restaurants and etc..

The rate of net profits before tax will be 18.7% and 3.4% in 1986 for the hotel industry and for the other tourism industries respectively. Without the project the rate of net profits for the hotel industry will be at lower level some of minus 30%.

From the fact mentioned above, it can be concluded that the tourism industries are able to afford to pay utility charges.

Table 3.8 Incremental Utility Charges: Hotel Industry

unit: thousand Baht/room/year

Year	Room Occupancy Rate (R)	Annual Fixed Charges	Service Variable Charges	Total Charges (A)	Total Sales * 253.1R (B)	% in Charges in Sales (C)=A/B	Current Utility Cost in Sales (D)	Incremental Utility Cost in Sales (E)= A-D
1977	31.2%	-	-	-	79.0	-	5.2	-
1978	34.0	-	-	-	86.1	-	5.4	-
1979	40.0	-	-	-	101.2	-	5.6	-
1980	45.4	0.7	0.3	1.0	114.9	0.9%	5.8	-
1981	50.3	1.8	5.5	7.3	127.3	5.7	6.0	1.3
1982	55.3	4.5	6.1	10.6	140.0	7.6	6.2	4.4
1983	58.3	7.6	6.4	14.0	147.6	9.5	6.3	7.7
1984	65.7	9.4	7.2	16.6	166.3	10.0	6.6	10.0
1985	72.6	10.9	8.0	18.9	183.8	10.3	6.9	12.0
1986	80.0	14.2	8.8	23.0	202.5	11.4	7.2	15.8

Note: Annual sales per room per year, when full occupancy.
= Average expenditure per guest per night x double Occupancy Rate x 365 nights
= 433 Baht per guest per night x 1.6 guests per room x 365 nights
= 253.1 thousand Baht per room per year.

3.7 Sensitivity Analysis and Its Evaluation

On the basis of the described assumptions and with an estimated economic life of 30 years, the financial internal rate of return of the investments in the project area, both areas of the tourism and residential, would be 3.8% in the basic case and 0.2% in the return on equity with a foreign loan.

Key variable items for the sensitivity analysis are the construction costs, the revenue from utility charges and the interest rate. The results are shown in Table 3.9.

Table 3.9 Sensitivity Tests (in %)

		Basic *1 Case	Return on *2 Equity
Bast Estimate		3.8	0.2
Change			
Construction Costs	+10%	2.9	negative
	-10%	4.7	2.3
Prices (revenues)	+10%	4.8	2.5
	-10%	2.6	negative
Interest Rate *3	+ 1%	-	negative
	- 1%	-	1.1

Notes 1) Basic case shows a profitability of the project as a whole.
2) Return on Equity shows a profitability of the PTDC.
3) Interese Rate 7.5 ±1%

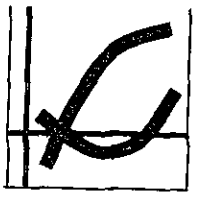
The rate of return would be particularly sensitive to changes in the revenue from utility charges. However, the risk of the revenue decreasing more than 10% is considered small. Because of the unit price of utility charges are under the chargeable level, namely within the ability of users to pay. And also efficiency on revenue gaining was taken consideration for estimating the chargeable consumption by each type of users.

The rate in the case when the water supply system is excluded from the project will become in similar to the results for the project including the system.

The rate in the sensitivity test in the basic case are all positive. A rate of 3.8% would be considered sufficient level for the return considering the nature of the project. It can be concluded that this project is financially feasible.

The rate on the equity by the PTDC with use of foreign loan would be 0.2% in the best estimate. It is considered very low so that the rate would be declined to the negative level by 10% increase of the construction cost or by 10% decrease of the revenue from the utility charges. However, if a subsidy from the government for the amount of interest payment is secured, the rate of return would rise up to 7.5%.

CHAPTER 4 ECONOMIC ANALYSIS



4.1 Introduction

A decision about the viability of a project must be made from the standpoint of national economy as well as from financial feasibility evaluation of the project entity. This project, in particular, has quite a public nature, involving improvement of infrastructures. Therefore, economic evaluation must be given due consideration.

The net benefits to the economy will consist of expenditures made by visitors in the Pattaya - Na Klua area and in Ko Lan Island, less the operating costs of all the facilities to be provided.

For Pattaya to grow as an international tourist resort, it is essentially needed to invest the capital necessary for the infrastructure to improve the current situation into the controlled environmental condition. Therefore, the relatively high investment required here to preserve previously mentioned environment might be warranted in comparison to the case of the non-tourism area.

The economic benefits of each element of the public infrastructure can be defined theretically, but is difficult to express separately in monetary value in this project. Although it amounts to a considerable sum, it is not included in the economic benefits for calculations of the rate of return.

The key benefits from this project can be summarized as an integrated one which combine various effects of these facilities and attract more tourists for producing additional benefits to the tourism industries rather than the individual economic benefits earned in individual facilities. More benefit to the industry will produce other economic benefits such as increase of the net foreign exchange earnings to the national economy and generating new employment demands directly or indirectly in the project area and its surroundings.

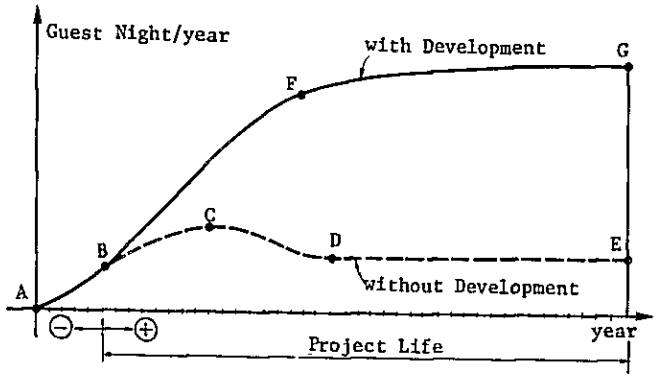
Tourist arrivals in Pattaya are estimated to increase till 1996, including the areas being developed at present and in Sourthern Pattaya area to be developed in phase-2. In this report, the economic analysis is made basing on the tourist arrivals to be accommodated in the phase-1 area.

The number of hotel rooms in the phase-1 development area will be 4,300, adding new 700 rooms to existing 3,600 rooms at the end of phase-1. Possible guest nights estimated in phase-1 will reach a saturation point after 1986.

As shown in Fig. 4.3, guest nights a year in 1976 is 604,000. person-nights, 1,980,000. person-nights in 1986, and this level will be kept constant after 1986.

The economic benefit includes only the incremental gross operating profit of the tourism industry. The mode of this incremental benefit is illustrated in Fig. 4.1.

Fig. 4.1 Effect of Development in a Model Figure



Notes:

Stage A ∿ B	:	Arrivals increasing spontaneously,
Stage B ∿ C	:	Arrivals still increasing but a low growth rate,
Point C	:	Peak Arrivals with a deterioration of environment
Stage C ∿ D	:	Arrivals decreasing
Point D	:	Arrivals going down to a bottom
Stage D ∿ E	:	Arrivals keeping on a bottom.
Stage B ∿ F	:	Arrivals increasing further by an improved environment
Point F	:	Arrivals growth rate going to a lower rate
Stage F ∿ G	:	Arrivals keeping on a same level by a competitive sales to the international and/or domestic tourism demand.

Incremental Arrivals by development: Area of BEG.

Table 4.1 Total Project Cost by Infrastructure and Other Facilities
Phase 1, up to 1986.

Unit: million Baht

Category	Land Acquisition *3	Civil Works and Equipment	Consulting Services	Total Physical Facilities	Project Administration	Total Project Cost	US$ million
A: Infrastructure *1	221.8	706.9	65.3	994.0 (34%)	98.2	1,092.2	54.6
B: Other Facilities *2	633.7	961.1	96.1	1,690.9 (57%)	30.8	1,721.7	86.1
Base Line Cost	855.5	1,668.0	161.4	2,684.9	129.0	2,813.9	140.7
Physical Increase	-	117.0	11.3	128.3 (4%)	-	128.3	
Price Increase	-	133.7	12.9	146.6 (5%)	-	146.6	
Contingencies Sub-Total	-	250.7	24.2	274.9	-	274.9	13.8
Total Project Cost	855.5 (29%)	1,918.7 (65%)	185.6 (6%)	2,959.8 (100%)	129.0	3,088.8	154.5

Notes: *1 : Public Infrastucture such as Road and Street System, Sewerage System, Storm Water Drainage System, Solid Waste Collection and Disposal, Port Facilities and Water Supply System. for Financial and Economic Analysis.

*2 : Other Facilities in Public Sector -- Tourism — Amenity Core, Inland Activity Facilities. -- Residential -- School, Hospital and Open space.

Other Facilities in Private Sector -- Tourism -- Hotels and Restaurants for Economic Analysis.

*3 : No contingecies put on the land Acquisition.

4.2 Scope of Economic Analysis

Works to be evaluated in the economic analysis include incremental public and private investments as below.

(a) Public Sector

Following works will be provided in the residential area and the tourism area.

1) road and street, 2) sewerage system, 3) storm water drainage system,
4) solid waste disposal system, 5) port facilities, and 6) water supply system.
7) Amenity core, inland activity zones and beach facilities.
8) Social infrastructures such as:

- School: Schoolhouse and related facilities
- Community facilities: Communication Center, Police Boxes, Fire Department and Hospital, etc.
- Open Space: City Park, Children Park and Promenade

(b) Private Sector

9) Hotels
10) Restaurants, etc.

Total project cost with contingencies is 2,959.8 million Baht or US$148 million which includes a land cost of 855.5 million Baht, a construction cost of 1,918.7 million Baht and a consulting service of 185.6 million Baht. These costs include social infrastructure costs for hospital, school, community center and city parks, although it is assumed that their benefits equal their costs.

For defining the investment cost and evaluation of the project, these 10 item facilities were grouped into two categories; namely, item 1) ∿ item 6) as "category - A" and the other items as "category - B". Economic evaluation concerns all the items, however, financial analysis for the proposed infrastructure works concern only "category A".

Investment costs are calculated separatly into two zones, namely, the tourism area and the residential area. However, the cost of the integrated facilities which are utilized by both zones for economic reasons was separated arithmetically based on the demand (i.e. sewege treatment facilities in the sewerage system) generated within the zones.

4.3 Economic Costs and Benefits

The project is a on a large scale, including infrastructures, amenity cores, private hotels and restaurants. Some of the facilities to be provided would be served and paid directly by the tourists, while others would be compensated indirectly. Accordingly, the cost and the benefits have been carefully analyzed so as to avoid any double counting.

Economic costs must be converted from the financial cost, taking into account discrepancy between market prices and true economic costs. To analyse the economic aspect of project the following considerations have been taken.

(a) Economic Costs

First, capitals invested to this project in the public sector and in the privated sector are comduted. Next, maintenance and operation costs in the public sector 1) ∿ 6) are calculated. Administration costs in the public sector 1) ∿ 7) are added, too. Then, taxes and tariffs included in respective costs are subtracted from the total of all above mentioned 1) ∿ 10) in order to adjust the costs into the real economic costs.

Economic costs after adjusting transfer items up to 2006 are shown in Tables 4.2.

Table 4.2 Economic Costs for Economic Life, up to 2006,

unit: million Baht

No	Year	Investment Costs (A)					Total	(B)	(C)	(D)	Tax in Investment Cost (E)			Economic Cost
		Category "A" Infra-structure	Social Infra	Category "B" Amenity Core	Category "B" Private Invest	Sub-total		Maintenance Operation Cost	Administration Cost	Sub-Total (A+B+C)	Category "A"	Category "B"	Total	(D) – (E)
1	1977	-	-	-	22.3	22.3	22.3	-	-	22.3	-	0.1	0.1	22.2
2		-	-	-	22.5	22.5	22.5	-	-	22.5	-	0.1	0.1	22.4
3		33.1	3.5	2.3	30.5	36.3	69.4	-	3.9	73.3	-	0.1	0.1	73.2
4		740.9	180.8	26.3	214.2	421.3	1,162.2	1.7	5.1	1,169.0	42.7	19.7	62.4	1,106.6
5		154.3	136.6	30.4	190.4	357.4	511.7	8.6	6.5	526.8	4.2	21.0	25.2	501.6
6		70.8	40.8	78.3	276.2	395.3	466.1	9.6	7.1	482.8	2.1	19.5	21.6	461.2
7		30.1	23.3	72.7	73.2	169.2	199.3	10.2	7.1	216.6	0.8	5.1	5.9	210.7
8		38.3	13.1	70.4	72.2	155.7	194.0	10.4	7.1	211.5	0.9	4.2	5.1	206.4
9		38.5	13.7	71.4	72.4	157.5	196.0	11.0	7.1	214.1	1.8	4.1	5.9	208.2
10	1986	5.0	13.7	70.6	27.6	111.9	116.9	11.8	7.1	135.8	0.9	0.9	1.8	134.0
11		7.8	-	-	-	-	7.8	13.1	3.9	24.8	0.8	-	0.8	24.0
12		6.4	-	-	-	-	6.4	13.3	3.9	23.6	0.8	-	0.8	22.8
13		6.4	-	-	-	-	6.4	13.4	3.9	23.7	0.8	-	0.8	22.9
14		6.4	-	-	-	-	6.4	13.5	3.9	23.8	0.8	-	0.8	23.0
15		6.4	-	-	-	-	6.4	13.6	3.9	23.9	0.8	-	0.8	23.1
16		6.4	-	-	-	-	6.4	13.7	3.9	24.0	0.8	-	0.8	23.2
17		6.4	-	-	-	-	6.4	13.7	3.9	24.0	0.8	-	0.8	23.2
18		6.4	-	-	-	-	6.4	13.7	3.9	24.0	0.8	-	0.8	23.2
19		6.4	-	-	-	-	6.4	13.7	3.9	24.0	0.8	-	0.8	23.2
20	1996	6.4	-	-	-	-	6.4	13.7	3.9	24.0	0.8	-	0.8	23.2
21		10.3	-	-	-	-	10.3	15.1	3.9	29.3	1.1	-	1.1	28.2
22		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
23		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
24		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
25		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
26		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
27		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
28		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
29		8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
30	2006	8.3	-	-	-	-	8.3	15.1	3.9	27.3	1.1	-	1.1	26.2
Total		1,261.4	425.5	422.4	1,001.5	1,849.4	3,110.8	349.7	129.0	3,589.5	72.4	74.8	147.2	3,442.3

(b) Economic Benefits

Pattaya is an established beach resort in the international tourism market having an accommodation capacity of more than 3,600 hotel rooms and a spontaneously developed tourism center.

According to the result of tourist demand analysis, the additional hotel rooms estimated in the phase 1 is 700 rooms, that is to say about 20% increase of the current accommodation level. In the economic benefits it is excluded the tourism industry's revenue generating on the current arrivals by the existing accommodation levels. Here economic benefits include only the incremental gross operating profit of the tourism industry. Sales costs, personnel costs, administration costs, and new public charges created by this project are subtracted to obtain the gross operational profit from the total sales of the hotel industry and other tourism industries. Tax portion included in these operating costs are added into economic benefits for adjusting the transfer items like in the case of economic costs calculation.

Business tax that tourists pay are also added to obtain the economic benefits. These calculations on the economic Benefits were made for "with case" of the development and "without case" of the development.

Table 4.3 Incremental Amount of Economic Benefits

Unit: million Baht

No.	Year	Economic Benefits*1	Foreign Costs*2	Corporate Income Tax*3
1	1977	18.2	3.1	0.1
2	1978	42.1	5.7	0.3
3	1979	89.8	10.0	0.6
4	1980	134.9	15.7	1.4
5	1981	177.1	22.9	6.6
6	1982	214.1	31.0	10.3
7	1983	253.4	40.1	13.9
8	1984	323.3	48.5	24.3
9	1985	391.2	57.0	34.4
10	1986	457.4	67.0	43.2
11	1987	442.1	64.9	41.1
12	1988	442.3	64.6	41.2
13	1989	438.0	63.5	40.9
14	1990	433.4	62.4	40.4
15	1991	432.9	62.1	40.5
16	1992	427.9	61.0	40.0
17	1993	428.4	61.0	40.1
18	1994	428.7	61.0	40.1
19	1995	428.0	60.6	40.1
20	1996	423.0	59.6	39.6
〃	〃	↓	↓	↓
30	2006	423.0	59.6	39.6
	Total	10,656.2	1,517.7	935.1

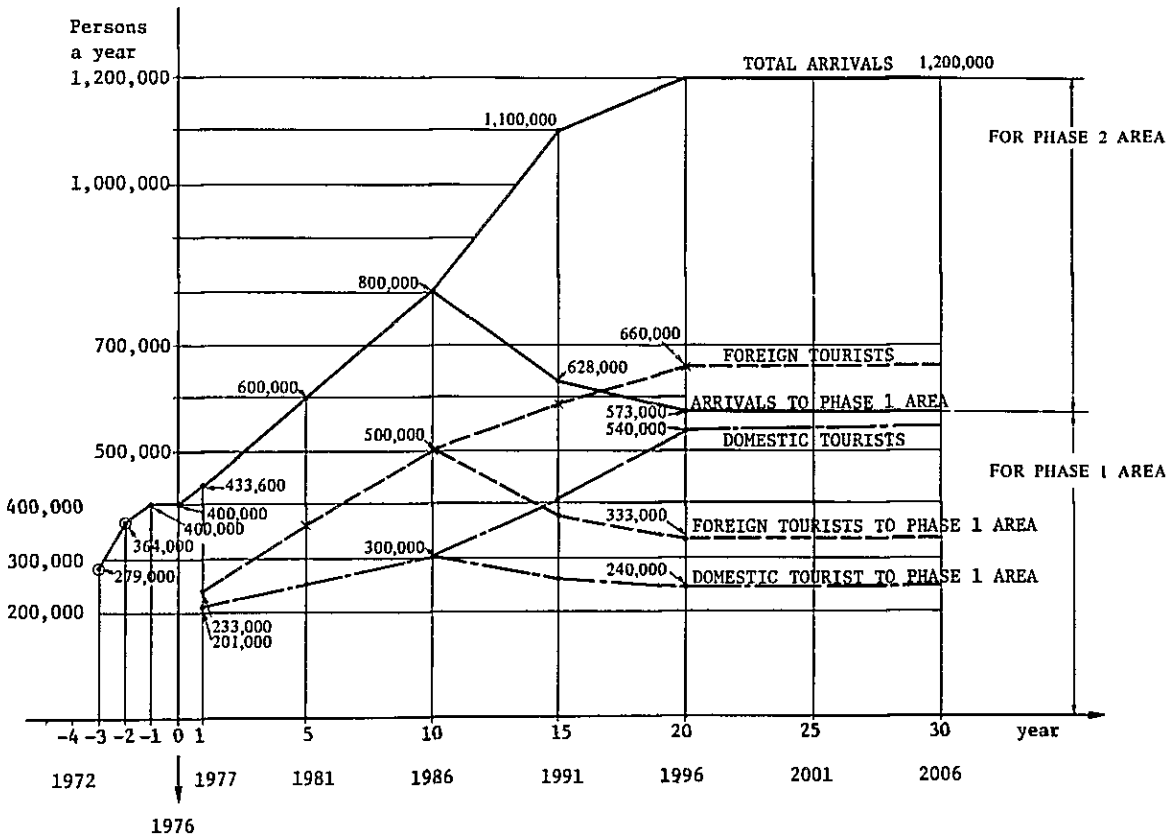
Notes: 1) These benefits consist of those hotel industry produces and those other tourism industries make.
2) Foreign Costs in the operating costs.
3) Corporate Income Tax to be reviwed to the tourism industries.

(c) Gross Operating Profit of Tourism Industry

Tourism industries are divided into two categories as hotel industry and other related tourism industries. Operating costs of these industies consist basically of the fixed costs which are not affected by change of sale amount and contrary the variable costs which are changed with the sales. A fixed cost on hotels business is assumed almost the same amount as a variable cost when room occupancy rate is about 70%. Below this occupancy levels, a fixed cost will be predominately higher than a variable cost. When room occupancy rate is about 35%, a fixed cost will become about 70% of the total cost. Therefore, the variable cost cannot act for representing the cost of hotel operation.

On the other hand, other tourism related facilities such as restaurants, shops and other relatively smaller enterprises than the hotel industry normally, have a lower fixed cost and a higher variable cost than those of the hotel industry. Therefore, the variable cost must be acted for the ruling cost to this industry.

Fig. 4.2 Visitors (Persons) Arrivals to Phase 1 Area



(d) Hotel Industry

As shown in Table 4.3, guest nights a year in 1977 must be 657,000 person nights, 1,980,000 person-nights in 1986, and this level will be kept constant after 1986.

Average length of stay of tourists will be expected to be longer along with the improvement of infrastructure, amenity core, and beach facilities after implementation of the project. Average length of stay will increase from 1.5 days in 1977 to 2.5 days in 1986, and further to 3.4 days in 1996. Thus, as possible guest nights a year in phase-1 area will be constant after 1986, guest arrivals a year will decrease. At this stage phase-2 area will be developed and incremental guest arrivals will be accomodated there as shown in Fig. 4.2.

Fig. 4.3 Guest Nights and Room Occupancy Rate: Phase 1

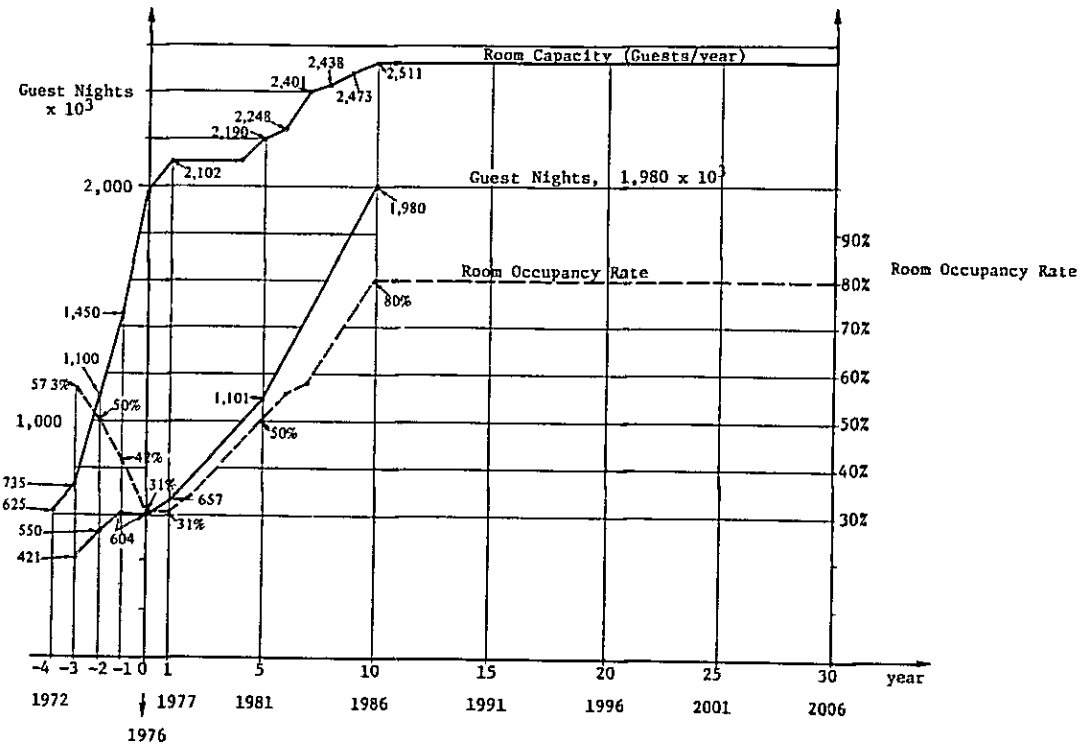


Table 4.4 Average Expenditure per Guest per Day

Unit: U.S. Dollar

Days stayed (night)	Total	Hotel Industry	Other Tourism Industries
2	43.2 (100.0%)	25.5 (59.0%)	17.7 (41.0%)
5	37.6 (100.0%)	24.0 (63.8%)	13.6 (36.2%)
8	35.3 (190.0%)	23.2 (65.7%)	12.1 (34.3%)

From the above analysis, tourists' expenditure in the hotels is expected to decrease slightly in the future, provided that the annual accommodation capacity of the hotels is constant and tourists' average length of stay increases.

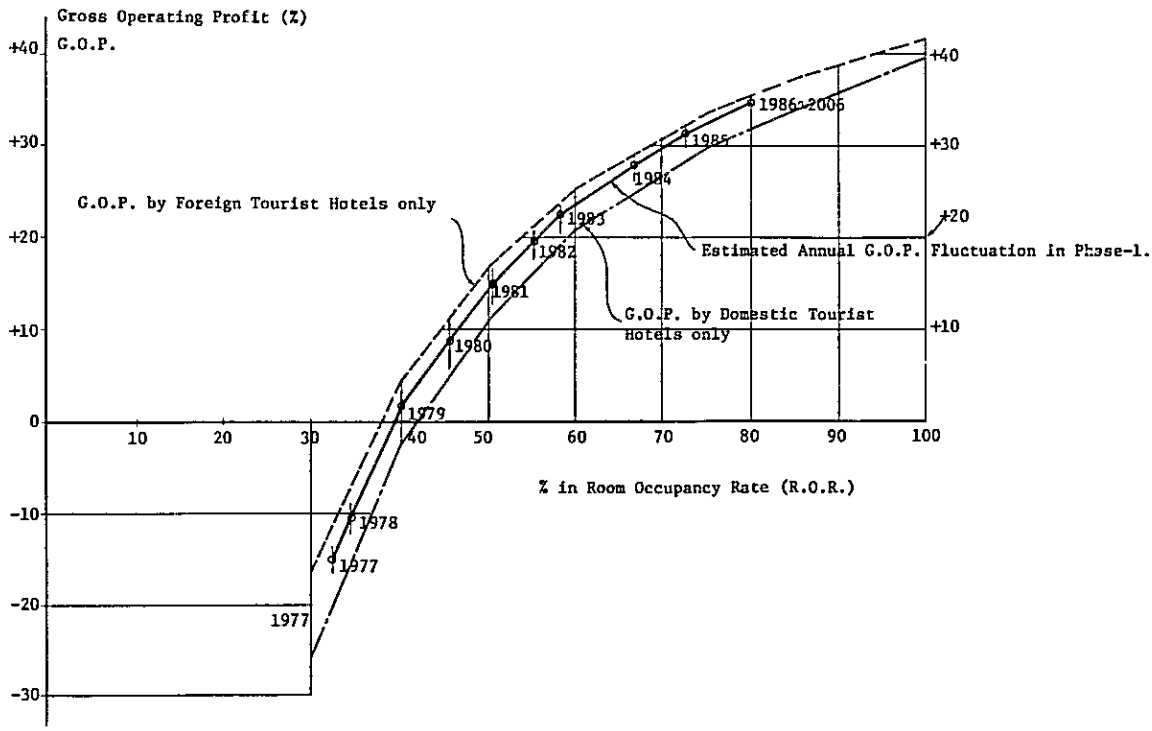
Table 4.5 Cost and Expenses in Hotel Industry

Unit: x 10^3 Baht/room/year

Class	Foreign Tourist		Domestic Tourist		Average *2	
Cost Group	Fixed Cost	Variable Cost	Fixed Cost	Variable Cost	Fixed Cost	Variable Cost
A	-	54.7R *1	-	38.5R	-	51.3R
B	36.4	+ 27.5R	28.9	+ 19.3R	34.3	+ 25.4R
C *3	31.5	+ 9.6R	24.0	+ 6.9R	29.3	+ 8.9R
TOTAL	67.9	+ 91.9R	52.9	+ 64.7R	63.6	+ 85.6R

Notes: 1. R means Room Occupancy Rate (%)
2. Average ratio of Foreign Tourist (guest-nights) to Domestic Tourist (guest-nights) is 2.85 for 30 years by 2006.
3. Group C, operating cost includes the current utility charges.
4. Utility charges newly created by the implementation are excluded in this table.

Fig. 4.4 Gross Operating Profit (G.O.P.) for Hotel Industry



Notes: 1) Existing hotel rooms ..... 3,600 rooms
2) Additional hotel rooms for phase 1 area. (from masterplan)

Year	1981	1982	1983	1984	1985	1986
Additional	150 rooms	100	262	62	60	66
Accumulated	150 rooms	250	512	574	634	700

An average spending per guest per day is analyzed separately by room charges, meals, touring, shopping, and others considering the nature of conditions Pattaya faces to.

Average expenditure per guest per day is considered to vary in accordance with length of stay. Generally speaking, expenditure for room and meals will be constant, while expenditure for touring, shopping, and others will become smaller, as the days stayed increase.

Room rates in Pattaya was analyzed based on current informations by the T.O.T. Pattaya Office and defined the room rates for the first class and economy class. Average room rate is US$18/day or 360 Baht/day considering group and off-season discounts. The room rate after tax and service charge is US$21.3/day or 426 Baht/day. According to the data of the T.O.T. and analysis by the study team, the following was revealed.

Profit and Loss Statement of the hotel industry is analyzed in consideration of operating expenses of two hotel classes: First class hotels for foreign tourists and economy class hotels for domestic tourists.

Operating expenses are classified into three subdivided groups: namely,

- Group A; sales costs for foods, beverages, and others
- Group B; payroll and other departmental expenses,
- Group C; other undistributed expenses such as administration, management, promotion, utilities and maintenance.

Addition, the operating expenses are estimated in accordance with hotel classes and room-occupancy rates as shown in table 4.5.

According to the findings by the study team, the hotel occupancy rate of the Pattaya area is low, as a whole; consequently, the Gross Operating Profit of the hotel industry is presently negative. Analysis shows the average gross operating profit will be changed to the positive value from the negative one within few years after the implementation of the project. Fig. 4.4 shows the inclination of the business of the hotel industry in the future. In this estimate, an increase of the number of hotel rooms is also taken into account as shown in the foot notes.

(e) Other Tourism Industries

In the other tourism industries, all of the costs are assumed as variable costs. As to incomes, though the expenditure per day tripper is kept constant, daily expenditure by night staying visitors will be reduced as the length of stay increases. Therefore, incomes will gradually decrease as in the case of the hotel industry. The gross operating profit rate on sales is kept constant, about 14%, and the total amount of the gross operating profit for 30 years grows 2.5 times than the profit without development.

(f) Seasonal Fluctuation of Arrivals

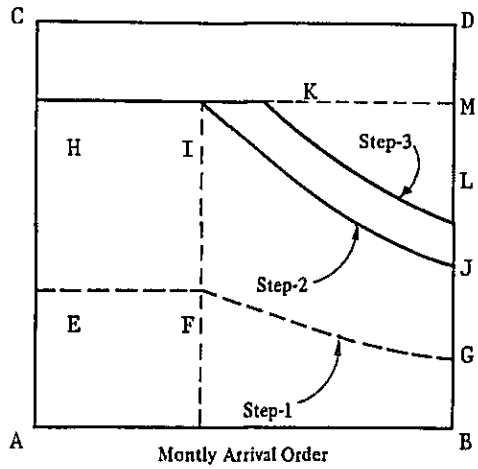
As infrastructures are being implemented further, promotion becomes necessary to attract more tourists to Pattaya. The reason for intensive promotional efforts is to make less the seasonal fluctuations of tourist arrivals. Tourist arrivals during the peak months of November through April significantly differ from that of the off-season months. The results of analysis on the seasonal fluctuation is shown in Fig. 4.5 providing necessary steps Pattaya to approach.

The next objective is to extend the peak months to include May and October so that the duration of the peak season becomes seven months instead of the current five months.

It will be very difficult to raise the annual room occupancy rate up to 80% under current seasonal pattern of tourist arrivals, if neglecting the efforts to increase the number of peak months. It is strongly recommended for the related public or private organization to promote next two conditions.

1) To keep room occupancy rate in the peak months more than 90%
2) To increase duration of the peak months from 5 to 7.

Fig. 4.5 Model for Room Occupancy Rate Increase



Annual Room Occupancy Rate

☐ ABCD : Number of rooms ..... (100)

☐ ABEFG : Number of rooms used at present, Step-1 ..... (30 ∿ 50)

☐ ABHIJ : Number of rooms used in present pattern of distribution when R.O.R. in peak months is assumed to be 90%. Then AH/AC = 90%, Step-2 ..... (70)

☐ ABHKL : Largest possible number of rooms used, Step-3 by increment of peak months ..... (80)

when $\frac{KLM}{IJM} \leq 50\%$.

Here, IJKL is the portion where more number of tourists should be invited than the present seasonal pattern, by the promotional effort on the part of tourist resorts.

4.4 Economic Internal Rate of Return

Economic life has been defined as for 30 years, an average economic life for hotels and other private investments, namely from 25 years to 35 years and of 25 years for the proposed public investments such as infrastructure (road, sewerage etc.), social infrastructures (school and hospital) and amenity cores. Economic analysis has been made on the streams from 1977 to 2006 (30 years). Based on the economic cost and revenue streams and an estimated economic life of 30 years, the internal economic rate of return is calculated as 15.3%.

Table 4.6 Economic Internal Rate of Return

Case	Rate of Return	Note
Case A	15.3%	Without Foreign Loans
Case B	17.9%	With Foreign Loans

The rate of return of 15.3% indicates the high profitability of this project from the point of national economy. As the profitability exceeds the effective interest rate of the loan, the rate with loans is 2.6% higher. Thus, foreign loans, under assumed conditions, are more favorable for the project than without loans.

The above analysis has not considered the direct benefits from the investment for the residential areas. It is realistic to assume, however, that over one half of the investment (58%) for infrastructure of the project area would benefit the local population rather than the tourism industries.

Paying consideration of above concept, the economic rate of return on the tourism program as a whole would increase to more than 20%.

Table 4.7 Economic Resource Flow, Case A without Loan

** ECONOMIC-RESOURCE-FLOW ** 3-a-1. Sensitivity Test, Without Loan, Base Case (100,000 BAHT)

YEAR	ECONOMIC BENEFIT (E)	LOANS (N)	RESOURCE INFLOW (X=E + N)	ECONOMIC COST (F)	DEBT SERVICE (W)	RESOURCE OUTFLOW (Y=F + W)	ANNUAL BALANCE (Z=X - Y)	ACCUMULATED	NET PRESENT VALUE 10.00 %	15.00 %	20.00 %
1977	182.	0.	182.	222.	0.	222.	-40.	-40.	-36.	-35.	-33.
1978	421.	0.	421.	224.	0.	224.	197.	157.	163.	149.	137.
1979	898.	0.	898.	732.	0.	732.	166.	323.	125.	109.	96.
1980	1349.	0.	1349.	11066.	0.	11066.	-9717.	-9394.	-6637.	-5556.	-4686.
1981	1771.	0.	1771.	5016.	0.	5016.	-3245.	-12639.	-2015.	-1613.	-1304.
1982	2141.	0.	2141.	4612.	0.	4612.	-2471.	-15110.	-1395.	-1068.	-828.
1983	2534.	0.	2534.	2107.	0.	2107.	427.	-14683.	219.	161.	119.
1984	3233.	0.	3233.	2064.	0.	2064.	1169.	-13514.	545.	382.	272.
1985	3912.	0.	3912.	2082.	0.	2082.	1830.	-11684.	776.	520.	355.
1986	4574.	0.	4574.	1340.	0.	1340.	3234.	-8450.	1247.	799.	522.
1987	4421.	0.	4421.	240.	0.	240.	4181.	-4269.	1465.	899.	563.
1988	4423.	0.	4423.	228.	0.	228.	4195.	-76.	1337.	784.	470.
1989	4380.	0.	4380.	229.	0.	229.	4151.	4077.	1202.	675.	388.
1990	4334.	0.	4334.	230.	0.	230.	4104.	8181.	1081.	580.	320.
1991	4329.	0.	4329.	231.	0.	231.	4098.	12279.	981.	504.	266.
1992	4279.	0.	4279.	232.	0.	232.	4047.	16326.	881.	432.	219.
1993	4284.	0.	4284.	232.	0.	232.	4052.	20378.	802.	377.	183.
1994	4287.	0.	4287.	232.	0.	232.	4055.	24433.	729.	328.	152.
1995	4280.	0.	4280.	232.	0.	232.	4048.	28481.	662.	284.	127.
1996	4230.	0.	4230.	232.	0.	232.	3998.	32479.	594.	244.	104.
1997	4230.	0.	4230.	282.	0.	282.	3948.	36427.	533.	210.	86.
1998	4230.	0.	4230.	262.	0.	262.	3968.	40395.	487.	183.	72.
1999	4230.	0.	4230.	262.	0.	262.	3968.	44363.	443.	159.	60.
2000	4230.	0.	4230.	262.	0.	262.	3968.	48331.	403.	139.	50.
2001	4230.	0.	4230.	262.	0.	262.	3968.	52299.	366.	121.	42.
2002	4230.	0.	4230.	262.	0.	262.	3968.	56267.	333.	105.	35.
2003	4230.	0.	4230.	262.	0.	262.	3968.	60235.	303.	91.	29.
2004	4230.	0.	4230.	262.	0.	262.	3968.	64203.	275.	79.	24.
2005	4230.	0.	4230.	262.	0.	262.	3968.	68171.	250.	69.	20.
2006	4230.	0.	4230.	262.	0.	262.	3968.	72139.	227.	60.	17.
	106562.	0.	106562.	34423.	0.	34423.	72139.	600087.	9358.	170.	-2125.

4.5 Sensitivity Analysis and Its Evaluation

On the basis of the described assumption and with an estimated economic life of 30 years, the economic internal rate of return on the investments in the project areas-both the tourism area and residential area, would be 15.3% for the basic case and 17.9% with foreign loans included. Key variables of the sensitivity analysis are the shadow wages, the room occupancy rate, the investment costs and the interest rate of foreign loans. The results are shown on Table 4.8.

Table 4.8 Sensitivity Tests (in %)

	Percentage of Variations	Case A	Case B
Best Estimate		15.3%	17.9%
Variations of Factors			
Application of the shadow wages *1		15.3%	17.9%
Occupancy level of the hotel industry *2	-4%	14.8%	17.2%
" "	-9%	13.6%	15.6%
Investment cost *3	+10%	13.5%	15.2%
"	-10%	17.6%	21.1%
Interest rate *4	+1%	-	17.5%
"	-1%	-	18.3%

Case A: Basic Case as Economic Feasibility of the Project.
Case B: Considering Foreign Loans

*1 Unskilled labor cost is estimated at 70% of the amount actually paid in the current market wage rates.

*2 Best estimate takes the occupancy level at 78.8% after 1987 on the assumption that the current 5 peak months will change to 7 months. In this sensitivity analysis, variations of the rates of return are analysed in two case: 1) with 6 peak months (occupancy level after 1987 is 74.8%) and 2) with 5 peak months as at present (occupancy level after 1987 is 69.8%)

*3 Maintenance and operation costs in respective infrastructure works also fluctuate with the change of the investment costs.

*4 Rates vary only when the foreign loans are considered. 7.5 ± 1%

As the ratio of the unskilled labor in the economic cost of this project is small, the rate of return remains almost the same even if the shadow price of the unskilled labor is applied. The rate of return drops sharply when the room occupancy rate goes down. For instance, when the room occupancy level is lowered by 9%, however, the rate of return drops by 13.6%.

The rate of return is most affected by the variation in the amount of investment. The change in the interest rate does not give much impact.

The rate of return in the sensitivity test on the basic case are higher than 13% in all cases. The rate, 13%, would be sufficient enough level of the return considering the nature of the project.

The rate of return with foreign loans keeps still higher value of 15%, that is naturally more favorable for the project.

It can be concluded that this project is feasible not only financially but also economically.

4.6 Other Economic Benefits

(a) Foreign Exchange Earnings

At present foreign exchange earnings contribute greatly to Thailand for its economic developments. For the national economic, the foreign exchange earnings can be recognized as a benefit. Therefore, the amount of the net foreign exchange earnings becomes one of the important factors for evaluating the project.

This project is expected to increase the gross foreign exchange earnings by US$1,031.5 million, nominally in 30 years and the net foreign exchange earnings, deducting the foreign cost portion from the gross foreign exchange earnings, is calculated as US$933.3 million. The foreign exchange reserves at the end of 1977 in Thailand were US$1,323 million. Against this, the gross foreign exchange earnings and the net foreign exchange earnings correspond to 78% and 70.5%, respectively. And the annual gross foreign exchange earnings are expected to reach US$44.1 million in 1987, which corresponds to 51% of US$87 million, the gross foreign exchange earnings earned by the tourism sector in 1976.

(b) Employment Effect

In the project area, there were about 42,500 people in 1976, and the population was distributed over 3 districts as below.

Table 4.9 Current Population

District	Population
Bang Lamung	6,481
Na Klua	20,842
Nong Pleu	15,208
Total	42,531 persons

According to the survey done by Bang Lamung Amphoe Office in 1977, the average number of members per household is about six persons.
The ratio of the employed population to the total population was 40% in 1976. According to the 1976 survey of age group distribution in the study area, 60.5% of the total population belongs to the age group of "15-59" years. This project can provide employment opportunities for the local people, it will contribute greatly to the stabilization of mobile population. The employment structure is summarized as 11.2% for Agriculture and fishery, 1.7% for Production process and 87.1% for Service. The estimation process of the hotel related service population is based on the frame work flow chart in the master plan.

When in full operation, it is estimated that the project will provide direct and indirect employment for a minimum of 9,100 persons, which will be equal to 53.5% of the employed population in 1976.