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Tourism Development Authority (TDA) /Ministry of Tourism / Egypt

The Study on Tourism Development Projects in the Arab Republic of Egypt

Final Report
Volume - **3**
Projects and Programs

July, 2000

Pacific Consultants International
Yachiyo Engineering Co.,Ltd.

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US\$1=LE3.4 (As of November 1999)

Preface

In response to the request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a Study on Tourism Development Projects in the Arab Republic of Egypt and entrusted the Study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Takahide Fujihira of Pacific Consultants International to Egypt, three times between June 1999 and July 2000. In addition, JICA set up an advisory committee headed by Mr. Susumu Takizawa, President, Japan Tourist Association, between June 1999 and July 2000 which examined the study from specialist and technical points of view.

The Study Team held discussions with the officials concerned of the Government of Egypt, and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Egypt for their close cooperation extended to the Study Team.

July, 2000



Kimio Fujita
President
Japan International Cooperation Agency

July 2000

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the Final Report of "The Study on Tourism Development Projects in the Arab Republic of Egypt."

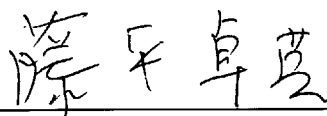
This report compiles the results of the Study which was undertaken in the Arab Republic of Egypt from June 1999 through July 2000 by the Study Team, represented by Pacific Consultants International.

We had been assisted by many people for the accomplishment of the Study, and we would like to express our sincere gratitude and appreciation to all those who extended their kind assistance and cooperation to the Study Team, in particular, the Tourism Development Authority who acted as the counterpart agency.

Also, we acknowledge the effective assistance by all the officials of your Agency and the Embassy of Japan in the Arab Republic of Egypt.

We hope that the report will be able to contribute to formulate appropriate policies and measures for the future development of Egypt.

Very truly yours,



Takahide Fujihira
Team Leader,
The Study Team for the Study on
Tourism Development Projects in the
Arab Republic of Egypt

The Study on Tourism Development Projects in The Arab Republic of Egypt

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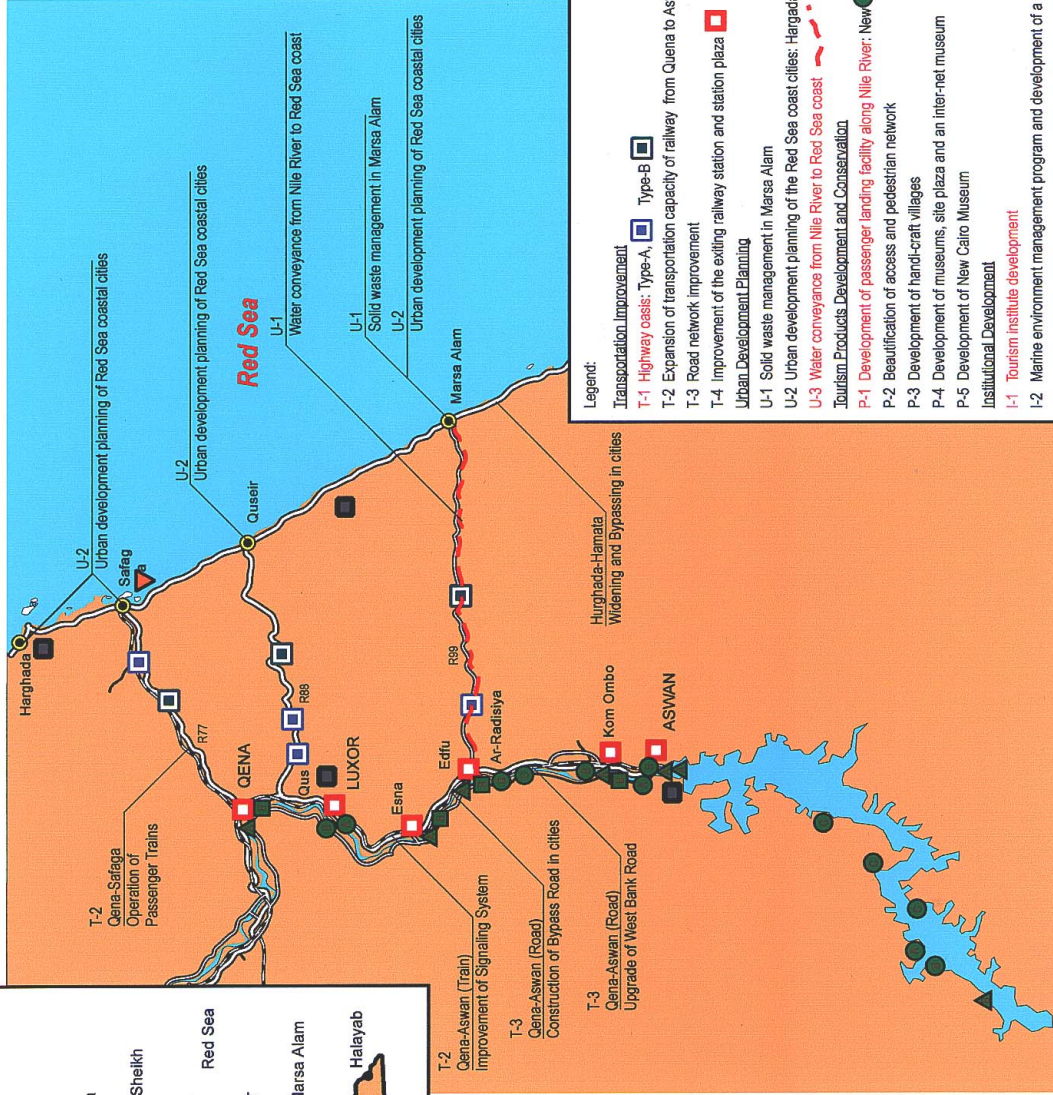
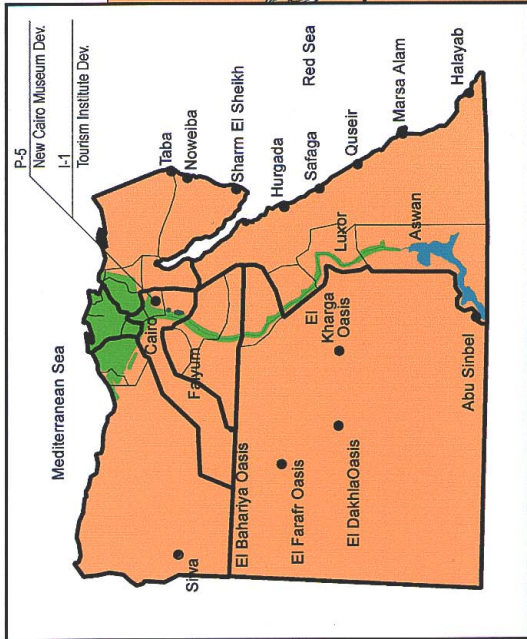
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Abbreviations

ANUC	General Authority for New Urbanization Communities
BOT	Build, Operation and Transfer
CAPMS	Central Agency for Public Mobilization and Statistics
CICC	Cairo International Conference Center
CMPA	Coastal Marine Protected Area
ECA	Egyptian Chefs Association
ECAA	Egyptian Civil Aviation Authority
EEAA	Egyptian Environmental Affairs Authority
EGOTH	Egyptian Organization for Tourism & Hotel
EIA	Environmental Impact Assessment
ENR	Egyptian National Railway
ETA	Egyptian Tourist Authority
FIRR	Financial Internal Rate of Return
GAFI	General Authority for Investment and Free Zones
GAUADP	General Authority for Agrarian Development Projects
GEF	Global Environment Facility
GOE	Government of Egypt
GOIEF	General Organization for International Exhibition & Fairs
GOJ	Government of Japan
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HEPCA	Hurghada Environment Protection and Conservation Association
ICZM	Integrated Coastal Zone Management
IDC	Infrastructure Development Company
IDSC	Information Support and Development Center
IEE	Initial Environmental Examination
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
LB	Landing Berth
MHUUC	Ministry of Housing, Utilities and Urban Communities
MICE	Meeting, Incentive, Conference and Events
MOALR	Ministry of Agriculture and Land Reclamation
MOIMR	Ministry of Industry and Mineral Resources
MOPWWR	Ministry of Public Works and Water Resources
MOT	Ministry of Tourism
MOTR	Ministry of Transport
MSB	Major Station Berth
NCEM	Nile Cruise Environmental Management
NR	National Road
NR	National Road
OB	Other Berth
PCDDs	Polychlorinated Dibenzo Para Dioxins
RBA	Road and Bridge Authority
RR	Regional Road
SA	Service Area
SCA	Supreme Council of Antiquity
SPM	Suspended Particulate Matter
TDA	Tourism Development Authority
TDU	Tourism Development Unit
TIA	Tourism Investors Association
UK	United Kingdom
UNDP	United Nations Development Program
US	United States of America
USAID	United States Agency for International Development
WTO	World Tourism Organization

Study Area and Priority Projects



Legend:

Transportation Improvement

- T-1 Highway oasis: Type-A (Blue square), Type-B (Black square)
- T-2 Expansion of transportation capacity of railway from Qena to Aswan
- T-3 Road network improvement
- T-4 Improvement of the existing railway station and station plaza (Red square)

Urban Development Planning

- U-1 Solid waste management in Marsa Alam
- U-2 Urban development planning of the Red Sea coast cities: Hurgada, Safaga, Quseir and Marsa Alam
- U-3 Water conveyance from Nile River to Red Sea coast

Tourism Products Development and Conservation

- P-1 Development of passenger landing facility along Nile River: New (Green circle), Improvement (Black circle), Expansion (Black square)
- P-2 Beautification of access and pedestrian network
- P-3 Development of hand-craft villages
- P-4 Development of museums, site plaza and an internet museum
- P-5 Development of New Cairo Museum Institutional Development

Other Projects:

- I-1 Tourism Institute development (Red triangle)
- I-2 Marine environment management program and development of a marine environmental center (Black square)
- Plan of Government (Black square)
- GP-1 Construction & Improvement of Airport (Black square)
- GP-2 Improvement of Port (Red triangle)

Red Letter is the most significant projects proposed.

Introduction

Introduction

For the development of Upper Egypt, 11 priority projects and programs have been selected. Further studies have been completed on the 11 projects and programs, as shown in the table below.

In the discussion, 3 project, “P-1 Development of Passenger Landing Facility along the Nile/Nile River Environment,” “I-1 Tourism Institute Development of EGOTH,” and “U-1 Solid Waste Management in Marsa Alam,” were highly prioritized by the steering committee members, and they have to be implemented smoothly.

For the projects and programs selected for pre-feasibility study and implementation program, Initial Environmental Examination (IEE) studies have been carried out.

The results of those studies are presented in this volume.

Further studies completed	No.	Projects & programs
Pre-feasibility Study	P-1	Development of Passenger Landing Facility along the Nile/Nile River Environment
	T-1	Service Area Development along Route 77, 88 and 99
Implementation Program	I-1	Tourism Institute Development of EGOTH
Terms of Reference	U-1	Solid Waste Management in Marsa Alam
	U-2	Urban Development Planning in the Red Sea Coast
Project Profile (Re-evaluation)	U-3	Water Conveyance Project from the Nile River to the Red Sea Coastal Area
Project Profile	P-2	Beautification of Access and Pedestrian Network
	P-3	Development of Handicraft Village
	P-2	Development of Museums, Site Plaza and Internet Museum
Initial Environmental Examination	P-1	Development of Passenger Landing Facility along the Nile/Nile River Environment
	I-1	Tourism Institute Development of EGOTH
	T-1	Service Area Development along Highways 77, 88 and 99
	U-3	Water Conveyance Project from the Nile River to the Red Sea Coastal Area

Source: JICA Study Team

Part I Pre-Feasibility Study

1. Pre-Feasibility Study for Service Area Development along Route 77, 88 and 99

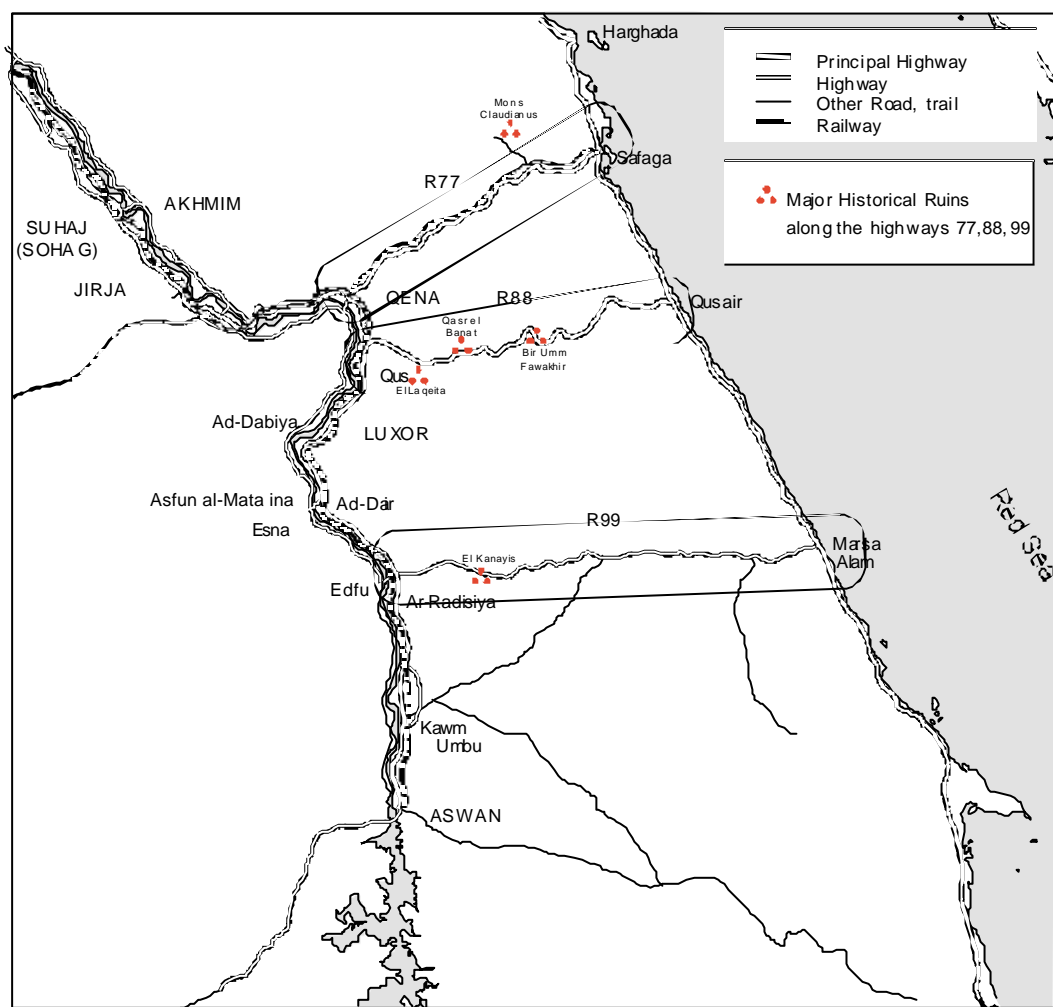
1.1 Introduction

This section shows the pre-feasibility study for Service Area Development Project along Route 77, 88 and 99 aimed at connecting Upper Nile Tourism and the Red Sea Tourism.

1.1.1 Study Area

The study area is the roadside of each road (Route 77, 88 and 99), which collectively serves as the road network to the four governorates of Qena, Luxor, Aswan and Red Sea, as shown in Figure 1.1.

Figure 1.1 Location Map of the Study Area



Source: JICA Study Team

1.1.2 Objectives of the Study

This pre-feasibility study is limited to examining the possibility of Highway Oasis development as service area for travelers between Upper Nile and the Red Sea by car. This study is also based on field studies and some assumptions owing to limits of data information and time frame. It is understood that obviously it will be necessary to amend part of this study in the conduct of further study with detailed engineering.

The objectives of the study are as follows:

- To define a long-term program for circuit development in conjunction with the regional tourism development plan;
- To analyze the possibility of improvement and development of a Highway Oasis in the study area;
- To prepare a Highway Oasis development plan including implementation program and institutional framework.

1.2 Background and Rationale of the Study

Upper Nile Valley has long been a magnet attracting cultural visitors to Egypt; however, leisure tourism has begun to emerge as the highest growth pole of Egyptian tourism in the Red Sea and Sinai resort areas. This phenomenon does not imply that holidaymakers to the Red Sea coast stay only at beach resorts. It has been observed that some tourists staying at beach resorts are apt to take a tour to Upper Nile Valley, which is offered as an optional product by tour agents. Based on the regional tourism development strategy to formulate the corridor to connect both sub-regions of the Red Sea and Upper Nile in the above context, this study has been set out. Following is a general overview of the existing conditions and issues based on field surveys conducted by the JICA Study Team, and the justification of the study.

1.2.1 Overview of Existing Conditions of Each Route

- (1) Conditions of Routes 77, 88 and 99

General condition

The road network connecting both sub-regions of Upper Nile and the Red Sea is formed by a ladder structure of three trunk roads known as Route 77, 88 and 99. Route 77 is a major route connecting the two regions at present. A national power grid, railroad and water conveyance pipes between the Nile and the Red Sea coast run along this road. It is a two-lane road with wide shoulders, and pavement condition is good. At present, there is a roadside rest area between Qena and Safaga.

Table 1.1 indicates general conditions of routes 77, 88 and 99.

Table 1.1 Existing traffic volume of Route 77, 88 and 99

Route	Location	Length of road	Width of Road	Traffic lane	Day traffic volume	Pavement condition
Route 77	Qena City - Safaga	165 km	7.5 - 11.5	2	1,500	Very Good
Route 88	Qift - Quseir	144 km	7.5	2	1,000	Very Good
Route 99	Eduf - Marsa Alam	230 km	6.0	2	500	Good

Note: Unpublished data in 1999

Source: Ministry of Transportation

It should be mentioned that the surface of Route 77 is generally good, but some sections in the mountain area have bad geometric design. Especially, routes 88 and 99 have narrow and steep curves.

Roadside condition

As these routes penetrate the huge desert mountain area, the so-called Eastern Desert, plain deserts and steep mountains dominate the roadside landscape. It has been observed that some Bedouins have settled in the mountain area.

Route 77 and 88 had played an important role as trading routes during the Pharaonic era of ancient Egypt up to modern Islamic era. There are some indistinct historical ruins along these roads. Existing roadside conditions of each route are briefly described as follows:

Table 1.2 Roadside Condition of Each Route

		Route		
		Route 77	Route 88	Route 99
Land use and Landscape		<ul style="list-style-type: none"> - There are some dump sites in the proximity of Qena City - The huge wadi near Qena City brings a monotonous landscape of desert area. - The dynamic landscape of steep mountains near Port Safaga can attract tourists. 	<ul style="list-style-type: none"> - The huge Wadi near Qift City brings a monotonous landscape of desert area. - The dynamic landscape of steep mountains near Al Quseir City can attract tourists. - Al Quseir City as a terminal town is famous for its historical role during in ancient Egyptian era. 	<ul style="list-style-type: none"> - It has a monotonous landscape of desert area, low mountains and plateaus. - Some road sections in the mountainous area have tight curves.
Existing Facilities along road	Tourism Resource	<ul style="list-style-type: none"> - Mons Claudianus, a Roman quarry site - This ruins is found at the branch road of Route 77 (23 km from Route 77) 	<ul style="list-style-type: none"> - Bir Umm Fawakhir historical site, an abandoned quarry site with numerous inscriptions on rocks - Qasr el Banat historical site, a Roman watering station - El Laqeita historical site 	<ul style="list-style-type: none"> - El Knayis historical site, a rock temple of Sethos I in ancient Egypt - Barramiya historical site
	Fuel Station	- One station at Wadi Abu Shih	- One station at Wadi Ambagi	- No facility
	Rest place	- There is a coffee shop at Wadi Abu Shih	- No facility	- No facility
	Security Office	- One office and station at Wadi Abu Shih	- No facility	- No facility (This route is not allowed to be used as a tourist circuit.)
	Ambulance Office	- One office and station at Wadi Abu Shih	- No facility	- No facility

Source: JICA Study Team

(2) Potentials and constraints of Highway Oasis development

These roads should be equipped with some service facilities not only for assurance of safe and comfortable driving on long trips, but also for avoidance of boredom during the long trip and formulation of attractive tour circuits with historical assets along the roads. In this context, the potentials and constraints of Highway Oasis development can be summarized as follows:

Potentials of Highway Oasis development

- Huge number of tourist arrivals to two sub-regions in the future could generate a large demand of road trips by travelers who will enjoy the two sub-regions.
- Long distance or intervals between destinations in Upper Nile and the Red Sea necessitates the development of appropriate rest places for travelers and to provide convenient facilities for drivers to check their vehicles.
- Various historical assets present possibilities for revitalization as attractive tourism product requiring adequate interpreted information, such as a site museum, with emphasis on the importance of their function and role in ancient Egypt.

- Highway Oasis could contribute to the diversification of tourism product and the formulation of various circuits of tour destinations between Upper Nile and the Red Sea.
- Possible participation by desert local people, such as the Bedouins, in this project covering tourism facilities development such as handicraft shop or camel tourism similar to South Sinai desert tourism in the mountain area.

Constraints of Highway Oasis development

- Some sections of the roads, especially on route 99, have bad geometric alignment in the mountain area, and should be improved in order to secure a safe trip.
- Security concerns on those roads give rise to difficulties of tour circulation because of the large number of tourist buses. From the viewpoints of tour comfort and expectation of increasing FIT, this should be addressed in an appropriate manner.
- Since Highway Oasis development has characteristics of being transportation facilities, the responsible authorities or agents should coordinate and cooperate with each other in order to implement the project smoothly.
- This project should also coordinate with and secure the involvement of the Supreme Council of Antiquities when appropriate measures are taken to conserve and utilize historical assets.
- All suitable land for Highway Oases would be plain land area in the wadi. Facilities development should consider natural hazards, such as flash floods, or take appropriate measures to prevent them.

1.2.2 Significance and Justification of the Study

In order to achieve attractive facilities as tourism product between Upper Nile and the Red Sea sub-regions in conjunction with the corridor development, it shall be necessary for the Highway Oasis development that the government support and assume responsibility for the provision of public facilities and infrastructure.

On the other hand, the historical assets along the roads being threatened with environmental destruction should be protected by several measures. Urgent action needs to be taken for the physical protection and improvement of their environment.

The roles of this project are as follows:

- To contribute to the formulation of the Eastern Desert by provision of new tourism products, such as Highway Oases;
- To achieve safe and comfortable travel between Upper Nile and the Red Sea sub-regions; and
- To contribute to the conservation and revitalization of indistinct historical assets along the roads.

In order to meet the requirements for Highway Oasis development, the project should have the following functions:

- To provide adequate transportation service facilities in terms of achieving safe traffic environment of the roads;
- To provide attractive and comfortable visitor service facilities as rest places for travelers of the roads;
- To provide tourism facilities utilizing natural and cultural resources in the desert mountain; and
- To develop site museums in the historic sites in order to conserve and revitalize them.

Table 1.3 Roles and Functions of Highway Oasis Development

Role of development	Function of Highway Oasis			
	Car service station	Rest place	Tourist attraction	Conservation of assets
Assurance of safe traffic for cars			-	-
Provision of convenience for travelers				-
Support of attractive tour circulation				
Revitalization of historical sites along the roads	-			

Note: = the most important factor, = secondary factor, - = no relation

Source: JICA Study Team

1.3 Outline of the Project

1.3.1 Development Framework for Highway Oasis Development

(1) Future passenger demand on each roads

This section examines passenger demand in 2012 based on the tourist flow of the regional development framework and assumptions of other traffic demand estimated by the JICA Study Team.

Future passenger traffic on Routes 77, 88 and 99

Future passenger traffic, shown in Table 1.4, is estimated based on current transportation statistics with related information on future population projections and the target tourist flow proposed by the JICA Study Team. Although major considerations for the target setting are shown below, detailed studies are needed to decide the optimum target.

Table 1.4 Future Road Traffic Demand by Mode

(Unit: thousand passengers per year)

Route	Mode	Existing	2002	2007	2012	Annual average growth rate
Route 77	Tourist traffic	-	400	700	900*	8%
	Other Traffic	-	1,100	1,700	3,000	11%
	Total	(1,110)	1,500	2,400	3,900*	10%
Route 88	Tourist traffic	-	50	200	600	28%
	Other Traffic	-	950	1,400	2,000	8%
	Total	(740)	1,000	1,600	2,600	10%
Route 99	Tourist traffic	-	50	200	800	32%
	Other Traffic	-	450	800	1,300	11%
	Total	(370)	500	1,000	2,100	15%

Note: Passenger traffic indicates two-way traffic volume

Figure with * includes tourist passengers who take train mode in 5% share of total tourist.

Other traffic is estimated by correlation coefficient between future population and assumption of car ownership rate and numbers of traffic in each road.

The number of future population is based on the annual growth rate of Ministry of Planning in Qena, Luxor and Aswan and the proposed figures in Red Sea Governorate.

Source: Sector traffic/Ministry of Transport and Telecommunication 1999 (unpublished)

Future stopover passenger demand who will use the Highway Oases

The number of passengers who will stop and use the Highway Oases is set assuming the correlation of possibilities between tourists and other passengers in terms of necessity of stopping to take a rest or to refuel, among other reasons. Japanese traffic statistics have been used as reference data. This estimation does not include the number of tourist passengers by train assuming that tour by train will begin in medium term (2012), sharing 5% of total tourists between Upper Nile and the Red Sea. The following table illustrates the stopover passenger

demand per day by each target year on each route, taking account of the character of facilities that attract travelers.

Although the next chapter describes a Highway Oasis in detail, the following generally outlines the component of Highway Oases proposed by the JICA Study Team:

Highway Oasis Type A (SA): This type seeks to develop an integrated station for road travelers like a Car Service Area similar to the existing service areas in the new desert road between Alamain and Sadat City. But this facility is proposed to assume a tourism function taking account of historical assets or the desert nature resources and culture along the roads to be utilized.

Highway Oasis Type B (SM): This type focuses on the historical assets between Upper Valley and the Red Sea, covering the Pharaonic era and the Roman caravan routes. The proposed facilities aim at conserving and revitalizing these abandoned historical assets.

Table 1.5 Future Passenger Demand by Type

(Unit: passengers)

Road	Passenger type	Traffic volume per day		
		2002	2007	2012
Route 77	Tourist traffic	1,100	1,900	2,500
	Other traffic	3,000	4,700	8,200
		4,100	6,600	10,700
Route 88	Tourist traffic	100	500	1,600
	Other traffic	2,600	3,800	5,500
		2,700	4,300	7,100
Route 99	Tourist traffic	100	500	2,200
	Other traffic	1,200	2,200	3,600
		1,300	2,700	5,800

Source: JICA Study Team, Tourism in Figures 1997 by MOT

Table 1.6 Future Stopover Passenger Demand by Facility

(Unit: passengers)

Road	Highway Oasis facilities type	Traffic volume per day		
		2002	2007	2012
Route 77	Type A (SA)	1,070	1,780	2,500
	Type B (SM)	110	190	250
Route 88	Type A+B (SA+SM)	460	880	1,720
	Type B (SM) x 2	40	160	490
Route 99	Type A (SA)	410	960	2,540
	Type B (SM)	30	160	660

Note: Refer to Table 1.6 (a) and (b) which are taken from Japanese traffic statistics

Table 1.6 (a) Stopover ratio assumption for Type A

Road	Type	Rest	Repair, gas, etc	Total
Route 77, 88	Tourist traffic	70%	5%	75%
	Other traffic	30%	5%	35%
Route 99	Tourist traffic	90%	5%	95%
	Other traffic	50%	5%	55%

Table 1.6 (b) Stopover ratio assumption for Type B

Road	Type	Rest and sightseeing
Route 77	Tourist traffic	10%
	Other traffic	0%
Route 88, 99	Tourist traffic	30%
	Other traffic	0%

Source: JICA Study Team, Tourism in Figures 1997 by MOT

(2) Highway Oasis facilities development framework

Distribution of Highway Oases in each road

The need for a Highway Oasis usually depends on the interval between gateway cities or tourist towns. The following conditions are considered when proposing the number of facilities:

- Appropriate distance to spend enough time to drive and to rest during a long trip (about 1.0-2.0 hours trip equal to about 60-120 km intervals) so as to secure safe and comfortable driving;
- Intersection points as traffic nodes; and
- Major sites of historical assets along roads to be revitalized by adequate interpretative facilities and access to these assets.

Table 1.7 Selected Highway Oasis Sites

Route	Highway Oasis facilities type	Number	Distance (km)		Reference/Location
			Oena	Safaga	
Route 77	Type A (SA)	1	80	85	Improvement of existing facilities in Wadi Abu Shih
	Type B (SM)	1	144	67	Mons Claudianus in the branch road of route 77
Route 88	Type A (SA)	1	90	54	With Bir Umm Fawakhir historical site
	Type B (SM)-1	1	38	106	El Laqeita historical site
	Type B (SM)-2	1	81	63	Qasr el Banat historical site
Route 99	Type A (SA)	1	110	120	Barramiya historical site
	Type B (SM)	1	60	170	El Knayis historical site

Source: JICA Study Team

Estimation of peak time demand by passengers

According to the passenger demand described above, the peak time for Highway Oasis facilities utilization is calculated as shown in Table 1.8. When the demand is estimated, the following requirements are considered:

- To develop adequate facilities necessary to provide service to the passengers and their vehicles based on the demand in order to facilitate safe and convenient road environment;
- To assume that safety and security of trips will be achieved in the future without any regulated tourist traffic by the combined squadron of tour bus and security cars; and
- To consider the increase of the free independent travelers by small cars such as mini bus or rented cars in the future.

According to the future stopover passenger demand aforementioned, the peak time of passenger traffic for Highway Oasis Type A is estimated on the following premises:

- In the estimation of peak month of tourist passenger traffic, it is assumed that the peak month's share of international tourist arrivals in Egypt is 10% that of total arrivals;
- Assuming that the number of other passenger types will be based on the tourism economic activities in conjunction with the number of tourist arrivals, the same peak share (10%) mentioned above is adopted; and
- As there is no data about peak hour ratio, as similar sample (10%) is taken of a trunk road in a rural area in Japan for estimation of peak hour of tourist passenger traffic.

According to the future stopover passenger demand aforementioned, the peak time of passenger traffic for Highway Oasis Type B is estimated by the same premise, taking account of the following:

- In principle, other types of passenger traffic are omitted from Type B facilities visits; and
- Since it is must to visit several ruins along Route 77, which is considered an important caravan route, and that traveling along Route 99 entails a long trip, there is going to be a great possibility that vehicles will need to stop; thus two Highway Oases are proposed.

Table 1.8 Peak Hour Demand for Type A (SA) Highway Oasis

(Unit: passengers)

Road	Mode	Peak hour traffic volume		
		2002	2007	2012
Route 77	Tourist traffic	70	130	160
	Other Traffic	60	90	140
	Total	130	220	300
Route 88	Tourist traffic	10	40	110
	Other Traffic	50	70	100
	Total	60	110	210
Route 99	Tourist traffic	10	50	200
	Other Traffic	40	70	110
	Total	50	120	310

Note: Passenger traffic indicates two-way traffic peak volume.
Peak month rate = 10%
Peak hour rate = 10%

Source: JICA Study Team, Tourism in Figures 1997 by TDA

Table 1.9 Peak Hour Demand for Type B (SM) Highway Oasis

(Unit: passengers)

Road	Mode	Peak hour traffic volume		
		2002	2007	2012
Route 77	Tourist traffic	10	20	30
	Other Traffic	0	0	0
	Total	10	20	30
Route 88	Tourist traffic	10	20	60
	Other Traffic	0	0	0
	Total	10	20	60
Route 99	Tourist traffic	10	20	80
	Other Traffic	0	0	0
	Total	10	20	80

Note: Passenger traffic indicates two-way traffic peak volume.
Peak month rate = 10%
Peak hour rate = 10%

Source: JICA Study Team, Tourism in Figures 1997/TDA

1.3.2 Project Components

(1) Development of Highway Oasis

Development type

As mentioned in the previous section, two types of roadside facilities development are introduced by level of activities en route to destinations, shown in Table 1.10.

- Type A: Integrated Service Area Development
- Type B: Site Museum Area Development

Table 1.10 Type of Highway Oasis Facilities Required by Level

Type	Role & function	Visitor facilities	Car services	Combined tourism facilities
Type A	<ul style="list-style-type: none"> - To be a service station replete with facilities and to provide tourists and drivers with a place to rest. - To provide convenient services for cars on long trips - To be a small base to stop and access historical and natural tourism sites - To provide visitors with amenity 	<ul style="list-style-type: none"> - Street furniture (lighting, bench, etc) - Telephone booth - Toilet - Kiosk/Information - Souvenir shop - Restaurant coffee/tea shop - Parking 	<ul style="list-style-type: none"> - Fuel supply station - Car repair shop - Road information - Car equipment shop 	<ul style="list-style-type: none"> Archeological site, a combination of: <ul style="list-style-type: none"> - Fossil site museum utilizing antiquities along roads - Tourism information services Wild-life tourism, a combination of: <ul style="list-style-type: none"> - Oasis caravan tourism base - Bedouin handicraft shop or center (Allaqi, Ababda, Bishariin, etc)
Type B	<ul style="list-style-type: none"> - To be a small tourist base with basic facilities and to provide tourists and drivers with a place to rest - To assist visitors and interpret historical information of ruins in the site 	<ul style="list-style-type: none"> - Street furniture (lighting, bench, etc) - Telephone booth - Toilet - Parking 	<ul style="list-style-type: none"> - No car service facilities 	<ul style="list-style-type: none"> - Tourism resource information booth - Site museum for ruins

Source: JICA Study Team

Development degree

According to existing conditions and development framework aforementioned, development degree of a Highway Oasis can be classified into the following types:

- Degree 1: Although this aims at improving existing service road stations to upgrade them in principle, if the existing site is suitable for development, it is proposed that existing facilities be transferred to a new appropriate site to create more attractive facilities and environment.
- Degree 2: New development to be located at a suitable place taking account of a combination with a potential tourism resource to be developed

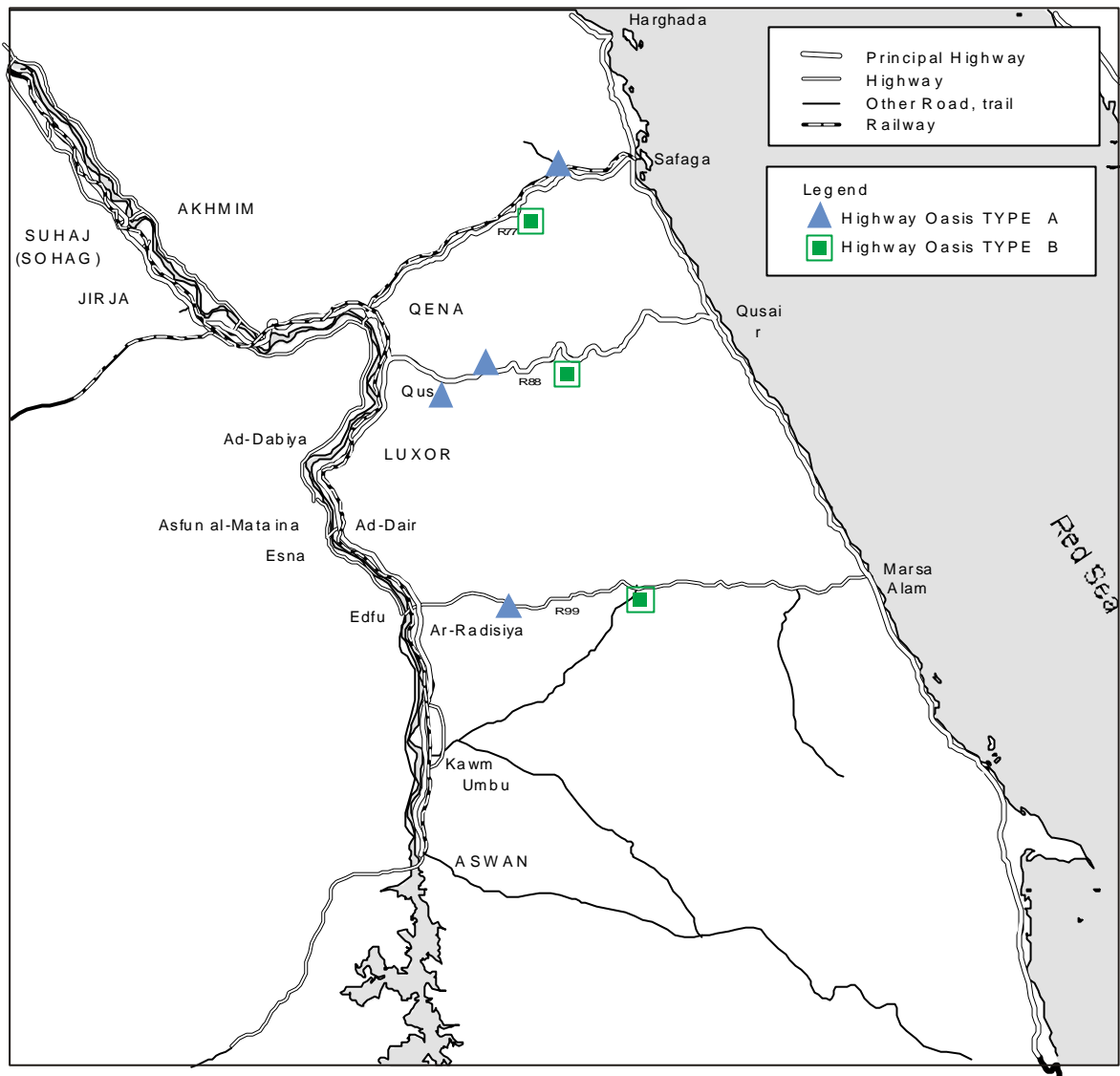
As a result, new Highway Oasis facilities are proposed at each of the candidate sites, even if there are facilities already available.

Table 1.11 Development Component of Highway Oasis by Route

Route	Project code	Facility type	Location	Reference
Route 77	HOD-01	Type A	Wadi Abu Shih site	Upgrading existing facilities
	HOD-02	Type B	Mons Claudianus site	No facilities
Route 88	HOD-03	Type A	Bir Umm Fawakhir site	Upgrading existing facilities
	HOD-04	Type B	El Laqeita site	No facilities
	HOD-05	Type B	Qasr el Banat site	No facilities
Route 99	HOD-06	Type A	Barramiya site	No facilities
	HOD-07	Type B	El Knayis site	No facilities

Source: JICA Study Team

Figure 1.2 Location Map of Highway Oasis Development by Type



Source: JICA Study Team

(2) General planning conditions and improvement guidelines

Facilities requirement

According to the peak hour demand of the facilities, the requirements are as follows.

Parking requirement is estimated on the following premise:

- Large car consists of tourist buses and trucks.
- Small car covers the range from mini buses to small car.
- Each car is given added allowance at peak demand.
- Each car is estimated based on average stay ratio of 0.5 hours per car.
- Composition of large and small car is set by JICA Study Team.

Table 1.12 Parking Facility Requirement

(Unit: Number of cars)

Road	Type of vehicle	Development Type	
		A	B
Route 77	Large car	25	2
	Small car	25	3
	Total	50	5
Route 88	Large car	20	2
	Small car	20	3
	Total	40	5
Route 99	Large car	20	2
	Small car	20	5
	Total	40	7

Note: Each vehicle is given added allowance at peak demand.
Each vehicle is estimated based on the average ratio of stay (0.5 hours)
Refer to Table 1.12 (a) and (b)

Table 1.12 (a) Passengers per car by type

Type	Passengers per car
Large Tour Bus	50.0
Other Car including minibus	5.0
Truck	2.0

Table 1.12 (b) Assumption of share of traffic mode

Road	Traffic mode	Type A Share (%)			Type B Share (%)		
		2002	2002	2007	2012	2007	2012
Route 77	Large tour bus	20	25	30	90	85	75
	Other car	60	55	50	10	15	25
	Truck	20	20	20	0	0	0
	Total	100	100	100	100	100	100
Route 88	Large tour bus	5	10	20	90	85	75
	Other car	75	70	60	10	15	25
	Truck	20	20	20	0	0	0
	Total	100	100	100	100	100	100
Route 99	Large tour bus	10	10	40	90	85	75
	Other car	70	60	40	10	15	25
	Truck	20	20	20	0	0	0
	Total	100	100	100	100	100	100

Source: JICA Study Team

Other facilities consisting of visitor facilities, car service facilities and tourism facilities are estimated based on the design standards for Service Area Facilities of Japan Highway Public Corporation according to traffic volume by type. The following table illustrates proposed facilities standards:

Table 1.13 Standards for Other Facilities

Category	Type of Facilities	Area (m ²)	Type A	Type B
Visitor service facilities	Public toilet	60		
	Restaurant / coffee shop	400		-
	Rest place	140		-
Vehicle service facilities	Fuel service station	500		-
	Car repair and other facilities*	1,000		-
Car parking	Large cars	70		
	Small cars including minibus	25		
Tourism facilities	Site museum	250	*	
	Handicraft shops	150	*	-
	Oasis garden	1,000	*	-

Note: Facilities requirements are based on "Facilities Design Standard of Japan Road Corporation"
Other facilities include security office, etc.
Asterisk (*) means depending on the necessity of each facility, e.g. case of existing historical ruins.

Source: JICA Study Team

Based on the estimation aforementioned, the following facilities requirement is proposed for the Highway Oasis development on Routes 77, 88, and 99. A buffer area should be introduced as margin between a project site and its surroundings from the viewpoint of environmental protection and future expansion.

Table 1.14 Total Facilities Requirement

(Unit: m²)

	Development type	Visitor service facilities	Vehicle service facilities	Parking facilities	Tourism facilities	Buffer area	Total
Route 77	A	600	1,500	1,900	1,150	4,600	10,000
	B	-	-	220	400	680	1,300
Route 88	A+B	600	1,500	1,900	1,400	4,600	10,000
	B	-	-	220	400	680	1,300
Route 99	A	600	1,500	1,800	1,150	3,600	10,000
	B	-	-	270	400	630	1,300

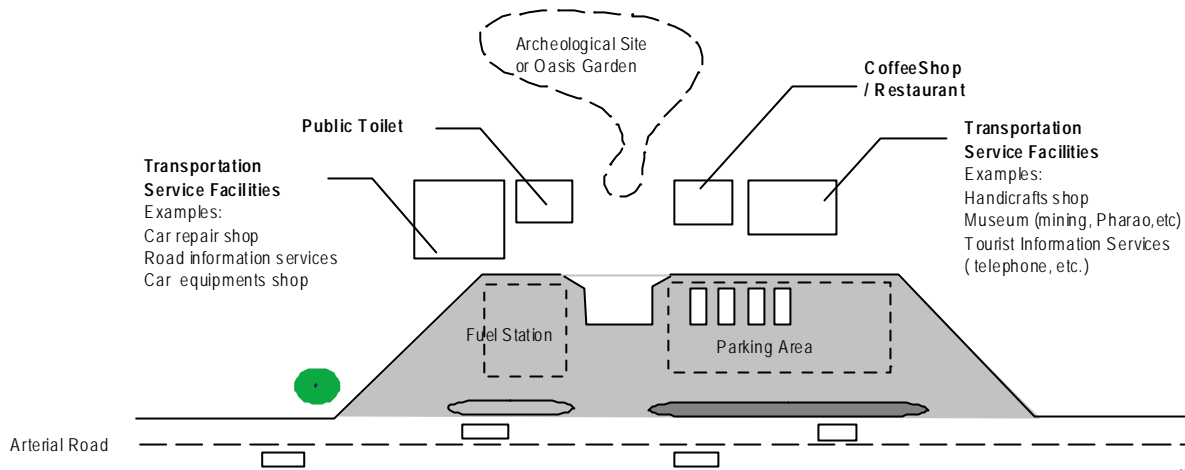
Source: JICA Study Team

Highway Oasis design guidelines

In order to develop an adequate Highway Oasis, the following consideration should be taken.

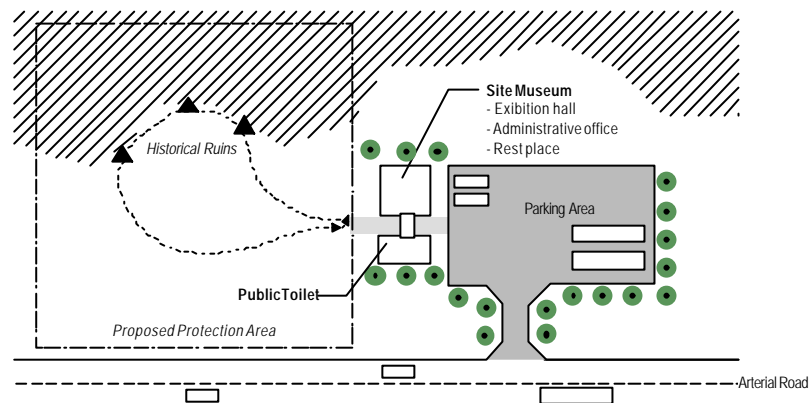
Highway Oases are considered as transportation facilities. As such, safe and efficient traffic flow formulation should be considered in facilities allocation in conformity to the transportation facilities guidelines or regulations. It is also necessary to make visitor flow as smooth and comfortable as possible. Typical plans can be illustrated in Figure 1.3 and Figure 1.4.

Figure 1.3 Typical Development Image Plan of a Highway Oasis: Type A



Source: JICA Study Team

Figure 1.4 Typical Development Image Plan of a Highway Oasis: Type B



Source: JICA Study Team

Environmental considerations are itemized as follows:

- Sample survey and investigation are necessary for historical assets to conserve and utilize them in cooperation with SCA;
- It is necessary to seek possibilities of participation into this project in terms of assurance of local employment in operation and maintenance or tourism facilities; and
- Highway Oases should be developed in carefully selected sites taking account of natural hazard possibilities.

1.4 Project Cost Estimation and Implementation

1.4.1 Project Cost Estimation

(1) Assumptions

The following assumptions have been made for the cost estimates of public investment:

- Project cost is estimated based on market price in November 1999 and inflation is not taken into account for cost and revenue estimates.
- Cost components consist of Direct Construction, Design and Supervision, and Overhead, excluding land acquisition costs and taxes.

- Foreign exchange rate as of the end of November 1999 is used during the whole project life as follows: US\$ 1.00 = LE 3.40, LE 1.00 = Japanese Yen 30.00
- Target year is 2012 and the project is designed to meet the demand in 2012.

(2) Public Investment Cost

The public investment cost includes the development costs for the facilities as shown in Table 15. Project cost amounts to LE 15.0 million, excluding the costs for contingency, land acquisition, all taxes and commercial facilities such as restaurant, coffee shop, fuel station, etc. This total cost is divided according to the time frame for project implementation (urgent action, short term and medium term), considering the scale, effect and other development program, and shown in Table 1.16 hereafter in detail.

- Urgent-action project cost	: 4.0 million LE (27 %)
- Short-term project cost	: 11.0 million LE (73 %)
- Medium-term project cost	: 0.0 million LE
Total projects cost	: 15.0 million LE (100%)

Note: UrgentAction projects are to be implemented within 2 years.
Short-term projects are to be implemented within 3 - 7 years.
Medium-term projects are to be implemented within 8 - 12 years.

Table 1.15 Facilities required for Public Investment

Category	Type of Facilities	Facilities included in public project cost
Visitor service facilities	Road sign/sight and information sign	
	Public toilet and rest place	
	Landscaping	
	Restaurant/coffee shop	
Vehicle service facilities	Fuel service station	
	Car repair and other facilities*	
Car parking	Visitor parking	
	Land preparation	
Tourism facilities	Site museum	
	Souvenir shop	
	Oasis garden	

Source: JICA Study Team

Table 1.16 Public Investment Cost of the Highway Oasis Development Projects

(Unit: LE million)

	Project		Total cost	Urgent		Short Term				
	Code	Description		2001	2002	2003	2004	2005	2006	2007
Route 77	HOD-01	Existing improvement -Wadi el Markh	2.0	0.2	1.8					
	HOD-02	Site improvement - Mons Claudianus	2.0	0.2	1.8					
	Sub-total		4.0	0.4	3.6					
Route 88	HOD-03	New development - Bir Umm Fawakhir	3.0			0.3	1.3	1.4		
	HOD-04	Site improvement - El Laqeita	2.0					0.2	1.8	
	HOD-05	Site improvement - Qasr el Banat	2.0					0.2	1.8	
	Sub-total		7.0	0.0	0.0	0.3	1.3	1.8	3.6	
Route 99	HOD-06	New development - Barramiya	2.0			0.2	0.9	0.9		
	HOD-07	Site improvement - El Kanayis	2.0					0.2	1.8	
	Sub-total		4.0	0.0	0.0	0.2	0.9	1.1	1.8	
Total public investment cost			15.0	0.4	3.6	0.5	2.2	2.9	5.4	

Note: Total project cost of Type A: LE 2.0 million for HOD-01, 06 and LE 3.0 million for HOD-03; Type B: LE 2.0 million for HOD-02, 04, 05 and 07

Source: JICA Study Team

1.4.2 Project Implementation

(1) Implementation Schedule

The implementation schedule of the sub-projects depends on its nature and scale, readiness for implementation, etc. Table 1.17 shows the implementation schedule for the sub-projects.

Table 1.17 Implementation Schedule for the Highway Oasis Development Projects

	Project		Urgent				Short term		
	Code	Description	2001	2002	2003	2004	2005	2006	2007
Route 77	HOD-01	Existing improvement -Wadi el Markh	-----	=====					
	HOD-02	Site improvement - Mons Claudianus	-----	=====					
Route 88	HOD-03	New development - Bir Umm Fawakhir			-----	=====	=====		
	HOD-04	Site improvement - El Laqeita					-----	=====	
	HOD-05	Site improvement - Qasr el Banat					-----	=====	
Route 99	HOD-06	New development - Barramiya			-----	=====	=====		
	HOD-07	Site improvement - El Kanayis					-----	=====	

Note: ----- Preparation stage (study, design, etc.) ===== Construction stage

Source: JICA Study Team

(2) Implementing Agency

Major concerns for the implementation of this project are as follows:

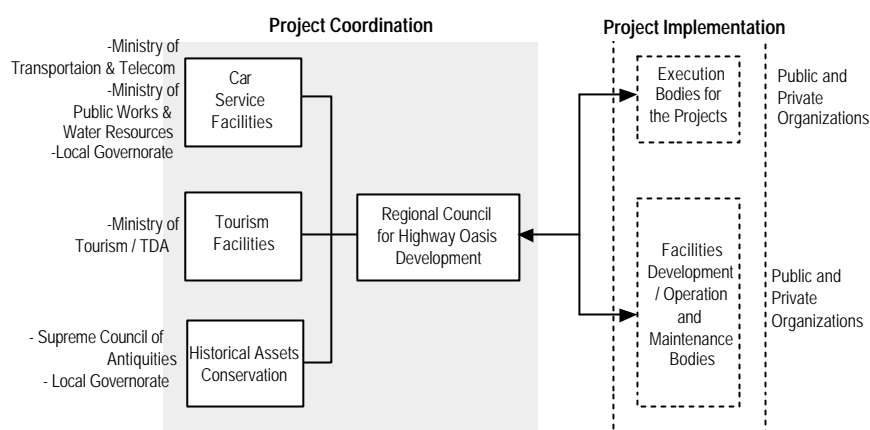
- To coordinate the whole development area (routes 77, 88 and 99) with the four governorates (Qena, Luxor, Aswan and Red Sea);
- To implement the project smoothly by several agencies related to tourism development and roadside development from central governments and agencies to the local level; and
- To take into account the possible participation of the private sector according to its role and function in this project, from project implementation to operation.

Role of government and coordination

In order to implement the project smoothly and efficiently, it is recommended to formulate an organizational system that will take charge of tourism and roadside development management and historical assets conservation.

A suggested system comprising different agencies for Highway Oasis development is shown in Figure 1.5 and the responsibility of each agency is indicated in Table 1.18.

Figure 1.5 Organization of Coordinating Agencies for Highway Oasis Development



Source: JICA Study Team

Table 1.18 Delineation of Responsibility of Coordinating Agencies for Highway Oasis Development

Development activities		Ministry and Agency					
		MOT/TDA	MOTR	MOPWWR	SCA	Local Gov.	
Car service Facilities	Fuel station	-		-	-		
	Car repair station	-		-	-		
	Road information and others			-			
Tourist facilities	Visitor service facilities				-		
	Tourism facilities (handicraft shop, etc)		-				
Historical assets conservation	Antiquities conservation		-	-			
	Interpretation facilities		-	-			
	Design control for improvement		-	-			

Note: = major responsibility, = cooperation with coordination

MOTR means Ministry of Transportation, MOPWWR means Public Works and Water Resources, SCA = Supreme Council of Antiquities

Source: JICA Study Team

Private Sector Participation for Highway Oasis development

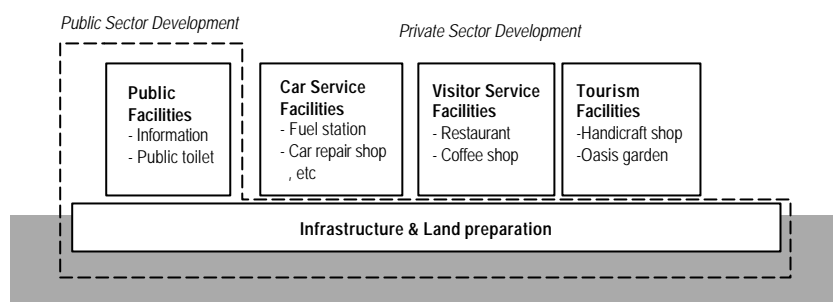
The private sector is considered as adequate implementing bodies for commercial facilities development, not only because of their skills in operation and management but also their capability in and know-how of commercial activities. The improvement project can be classified into two types by each aspect of Highway Oasis development as follows:

Table 1.19 Suggested Implementing Bodies by Development Type

Highway Oasis development type	Site development and construction	Commercial facility development	Maintenance/ Operation	Site Museum/ Conservation
Type A (Service Area)	Public	Private Sector	Private Sector	Public
Type B (Site Museum)	Public		Public	Public

Source: JICA Study Team

Figure 1.6 Conceptual Diagram for Development Component in Case of Type A



Source: JICA Study Team

1.5 Financial and Economic Evaluation

1.5.1 Financial Evaluation

(1) Assumptions

Financial viability of the project for the implementation agency is examined under some assumptions as follows:

Implementing agency

It is assumed that the public sector, such as TDA, will implement the project.

Revenue

It is assumed that the implementing agency of the project will not own and operate any kind of commercial facilities such as restaurant, souvenir shop and vehicle service facilities. On the other hand, site museum, parking, rest place and public toilet will be developed, maintained and/or operated by the agency as shown in Table 1.20. The agency will develop the land and lease it to the private sector for the commercial facilities.

The implementing agency will receive the revenue through following two sources:

- Land rent fee for commercial facilities in Type A (Service Area) Development; and
- Entrance fee of site museum in Type B (Site Museum) Development

Rent for the developed land is assumed at LE 5 per m² per month for the land as shown in Table 1.21. It is assumed that one fourth of the stopover passengers of Type B facility will visit the site museum and the rate of entrance fee is assumed to be LE 10 per visitor. Parking charge of vehicles is assumed to be free.

Table 1.20 Operating Body of Facilities

Category	Type of Facilities	Implementing Agency (public)	Private Company
Visitor service facilities	Public toilet		
	Restaurant/coffee shop		
	Rest place		
Vehicle service facilities	Fuel service station		
	Car repair and other facilities*		
Car parking	Visitor parking		
Tourism facilities	Site museum		
	Handicraft shops		
	Oasis garden		

Source: JICA Study Team

Table 1.21 Rent Area of Developed Land for Commercial Facilities

(Unit: m²)

	Code	Development Type	Visitor service facilities	Vehicle service facilities	Tourism facilities	Total
Route 77	HOD-01	A	600	1,500	1,150	3,250
	HOD-02	B	-	-	-	0
Route 88	HOD-03	A+B	600	1,500	1,400	3,500
	HOD-04	B	-	-	-	0
	HOD-05	B	-	-	-	0
Route 99	HOD-06	A	600	1,500	1,150	3,250
	HOD-07	B	-	-	-	0

Source: JICA Study Team

Operation and maintenance costs

Annual operation and maintenance cost of the project for the implementing agency is estimated at 1% of the initial investment cost. Land rent is assumed to be free.

Table 1.22 Assumptions on Annual Public Operation and Maintenance Costs of Implementing Agency

O & M costs	Rate of expenses
1. Land rent	Free
2. O & M costs	1% of construction cost LE 40 thousand per year (2003 – 2005) LE 90 thousand per year in 2006 LE 150 thousand per year after 2007

Source: JICA Study Team

Evaluation period

Average life period of the facility is assumed to be 25 years. Therefore, financial pre-feasibility is examined over the period until 2032. The demand of stopover passengers, the operation and maintenance cost of facilities and the revenue after 2013 to 2032 is assumed to be the same level in 2012.

(2) Financial evaluation

Table 1.23 shows a cash flow of the implementing agency excluding interest and tax payments. Inflation is not taken into account for cost and revenue estimates.

Under the assumptions mentioned above, the Financial Internal Rate of Return (FIRR) is estimated at 11.1 % over the project period from 2001 to 2032. The FIRR of the project indicates that the profitability of the project is high enough for the public sector to implement the project. The implementing agency will make a profit in annual balance in 2007 and the aggregated balance will turn a surplus in 2014. It is noted that financial sources should be sought to fulfill the shortage for the initial investment cost.

Furthermore, the private sector, such as restaurant and handicraft shop, fuel station, etc, receives revenues through passenger expenditure. If stopover passengers are to spend an average of LE 10 per passenger, total expenditure will be an estimated LE 32 million in 2012. That is more than twice the amount of initial investment cost and 32%, 31% and 37% of the expenditure will be generated along Route.77, 88 and 99 respectively.

Table 1.23 Stopover Passenger and Financial Performance of Implementation Agency

		Urgent		Short Term					Medium Term				
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
I. Daily Demand of Stopover Passenger (passengers per day)													
(1) Initial investment cost													
Route 77	HOD-01	Wadi el Markh	1,070	1,180	1,310	1,450	1,610	1,780	1,910	2,040	2,180	2,330	2,500
	HOD-02	Mons Claudianus	110	120	130	150	170	190	200	210	220	230	250
Route 88	HOD-03	Bir Umm Fawakhir	460	510	570	640	710	800	930	1,080	1,260	1,470	1,720
	HOD-04	El Laqeita	40	50	70	90	120	160	200	250	310	390	490
	HOD-05	Qasr el Banat	40	50	70	90	120	160	200	250	310	390	490
Route 99	HOD-06	Barramiya	410	490	580	690	820	960	1,170	1,420	1,730	2,100	2,540
	HOD-07	El Kanayis	30	40	60	80	110	160	210	280	370	490	660
Total	SA		1,940	2,180	2,460	2,780	3,140	3,540	4,010	4,540	5,170	5,900	6,760
	SM		220	260	330	410	520	670	810	990	1,210	1,500	1,890
II. Financial Performance of Implementation Agency													
1. Cash outflow (LE thousand)													
(1) Initial investment cost													
Route 77	SA	HOD-01	2,000	200	1,800	0	0	0	0				
	SM	HOD-02	2,000	200	1,800	0	0	0	0				
Route 88	SA+SM	HOD-03	2,990	0	0	299	1,346	1,346	0				
	SM	HOD-04	2,000	0	0	0	0	200	1,800				
	SM	HOD-05	2,000	0	0	0	0	200	1,800				
Route 99	SA	HOD-06	2,000	0	0	200	900	900	0				
	SM	HOD-07	2,000	0	0	0	0	200	1,800				
Total			14,990	400	3,600	499	2,246	2,846	5,400				
(2) Operation and maintenance cost													
Route 77		1%				40	40	40	40	40	40	40	40
Route 88		1%						30	70	70	70	70	70
Route 99		1%						20	40	40	40	40	40
Total				0	0	40	40	40	90	150	150	150	150
Total cash outflow				400	3,600	539	2,286	2,886	5,490	150	150	150	150
2. Cash inflow (LE thousand)													
(1) Revenue from land rent													
Route 77	HOD-01	3,250	LE 5			195	195	195	195	195	195	195	195
	HOD-02	620				0	0	0	0	0	0	0	0
Route 88	HOD-03	3,500	LE 5					210	210	210	210	210	210
	HOD-04	620							0	0	0	0	0
	HOD-05	620							0	0	0	0	0
Route 99	HOD-06	3,250	LE 5					195	195	195	195	195	195
	HOD-07	670							0	0	0	0	0
Total				0	0	195	195	195	600	600	600	600	600
(2) Revenue from museum fee													
Route 77	HOD-01	SA	Entrance fee			0	0	0	0	0	0	0	0
	HOD-02	SM	LE 10			110	119	137	155	173	183	192	201
Route 88	HOD-03	SA/M	LE 10					65	73	85	99	115	134
	HOD-04	SM	LE 10						146	183	228	283	356
	HOD-05	SM	LE 10						146	183	228	283	356
Route 99	HOD-06	SA						0	0	0	0	0	0
	HOD-07	SM	LE 10						146	192	256	338	447
Total				0	0	110	119	137	220	684	824	1,002	1,219
Total cash inflow				0	0	305	314	332	820	1,284	1,424	1,602	1,819
3. Net cash flow (LE thousand)													
1. Annual net cash flow			-400	-3,600	-235	-1,972	-2,554	-4,670	1,134	1,274	1,452	1,669	1,953
2. Accumulated net cash flow			-400	-4,000	-4,235	-6,206	-8,760	-13,430	-12,296	-11,021	-9,569	-7,900	-5,947
4. FIRR		11.1%											

Source: JICA Study Team

1.5.2 Economic Evaluation

The economic viability of the project has been examined under the following assumptions:

(1) Benefits

As mentioned in the financial evaluation, there will be additional income for national economy through passenger expenditure in restaurant and handicraft shop, fuel station, etc. That will contribute to the GDP generation of the country.

The contribution of passenger expenditure to GDP is assumed to be the benefits of the project and the benefits are calculated by using the Input and Output Table as shown in Table 1.24. Namely LE 5.54 is estimated to be the direct contribution to GDP of the country, when one stopover passenger consumes LE 10.

Table 1.24 Direct GDP Contribution of Expenditure per Passenger

Expenditure item	Assumed Expenditure per passenger	Coefficient of Value Added *1)	Value added per passenger (Direct contribution to GDP)
Food and beverage expenditure in restaurants & coffee shops	LE 7.0	0.444 *2)	LE 3.11
Expenditure in other shops	LE 3.0	0.810 *3)	LE 2.43
Total	LE 10.0	0.554 (average)	LE 5.54

Source: JICA Study Team

Note: *1) Input/Output Table, 1991/92, Central Agency for Public Mobilization and Statistics, 2) Coefficient of restaurants & hotels sector, 3) Coefficient of whole sale & retailing sector

(2) Economic cost

The cost of the project consists of the followings:

- Public capital investment cost;
- Operation and maintenance cost by public; and
- Private capital investment and O/M costs of commercial facilities

Public Investment and O/M Costs in Economic Prices

The economic cost for the public capital investment and O/M costs are estimated as shown in Table 1.25 and 1.26, respectively. The Standard Conversion Factor is assumed at 0.95 in order to convert the financial cost to the economic cost.

Table 1.25 Public Capital Investment Cost of the Highway Oasis Development Projects in Economic Prices
(Unit: LE million)

	Total cost	Urgent		Short Term				
		2001	2002	2003	2004	2005	2006	2007
Total financial cost	15.0	0.4	3.6	0.5	2.2	2.9	5.4	
Total economic cost	14.25	0.38	3.42	0.47	2.09	2.76	5.13	

Source: JICA Study Team

Table 1.26 Assumptions on Public Operation and Maintenance Costs in Economic Prices

O & M costs	Rate of expenses in financial prices	Rate of expenses in economic prices
1. Land rent	Free	Opportunity cost of land: 0
2. O & M costs for service area	LE 40 thousand per year (2003 – 2005) LE 90 thousand per year in 2006 LE 150 thousand per year after 2007	LE 38 thousand per year (2003 – 2005) LE 85 thousand per year in 2006 LE 142 thousand per year after 2007

Source: JICA Study Team

Private Investment and O/M Costs in Economic Prices

Private investment cost is estimated at LE 33 million at market prices or LE 31.5 million in economic prices for Type A sub-projects as shown in Table 1.27. Type B sub-project will not require any private investments.

Table 1.27 Private Investment Cost (at Financial and Economic Prices)

(Unit: LE million)

	Project		Total cost	Urgent		Short Term				
	Code	Description		2001	2002	2003	2004	2005	2006	2007
Route 77	HOD-01	Existing improvement -Wadi el Markh	11.0		11.0					
Route 88	HOD-03	New development - Bir Umm Fawakhir	11.0				11.0			
Route 99	HOD-06	New development - Barramiya	11.0						11.0	
Total private investment cost (at financial prices)			33.0		11.0		11.0			11.0
Total private investment cost (at economic prices)			31.5		10.5		10.5			10.5

Source: JICA Study Team

Operation costs for commercial facilities per passenger is estimated using the Input and Output Table as shown in Table 1.28. LE 1.15 is estimated as operation costs of private sector when one stopover passenger consumes LE 10.

Table 1.28 Assumptions on Cost for Commercial Facilities

Expenditure item	Expenditure per passenger	Coefficient of direct cost for commercial facilities *1)	Operation cost for commercial facilities per passenger (Direct contribution to GDP)
Food and beverage expenditure in restaurants & coffee shops	LE 7.0	0.118 *2)	LE 0.826
Expenditure in other shops	LE 3.0	0.107 *3)	LE 0.321
Total	LE 10.0	0.115 (average)	LE 1.147

Source: JICA Study Team

Note: *1) Coefficient of direct cost for commercial facilities is calculated based on total coefficient of "Labor income". Intermediate input, indirect tax and subsidies are excluded from the cost. 2) Coefficient of "Labor income" for restaurants & hotels sector, 3) Coefficient of "Labor income" for whole sale & retailing sector

(3) Economic evaluation

Based on the above assumptions, the annual flows of benefits and economic costs are calculated as shown in Table 1.30. The Economic Internal Rate of Return (EIRR) is estimated at 19.7 % which is high enough to identify the economic viability of the project.

Other than the direct contribution of passenger expenditure to GDP, the indirect benefits will be produced through multiplier effects of passenger expenditure within the national economy. If it is assumed that the linkage of the economy will generate the indirect benefits at 30 % of the direct benefits, the EIRR increases to 25.4 %.

The sensitivity of the project is examined for the case that the benefits will decrease by 20 % as shown in Table 1.29. Though the EIRR will decrease to 15.4 % from 19.7 % taking into account of the direct benefits only as shown in Table 1.29, it still confirms the economic viability of the project.

Table 1.29 Sensitivity Analysis

Benefits	EIRR	
	Base case	20 % decrease of benefits *)
Direct GDP contribution to GDP	19.7 %	15.4 %
Direct and indirect contribution to GDP	25.4 %	20.5 %

Note: Average passenger expenditure will decrease by 20 %; or passenger demand will decrease by 20 %
Source: JICA Study Team

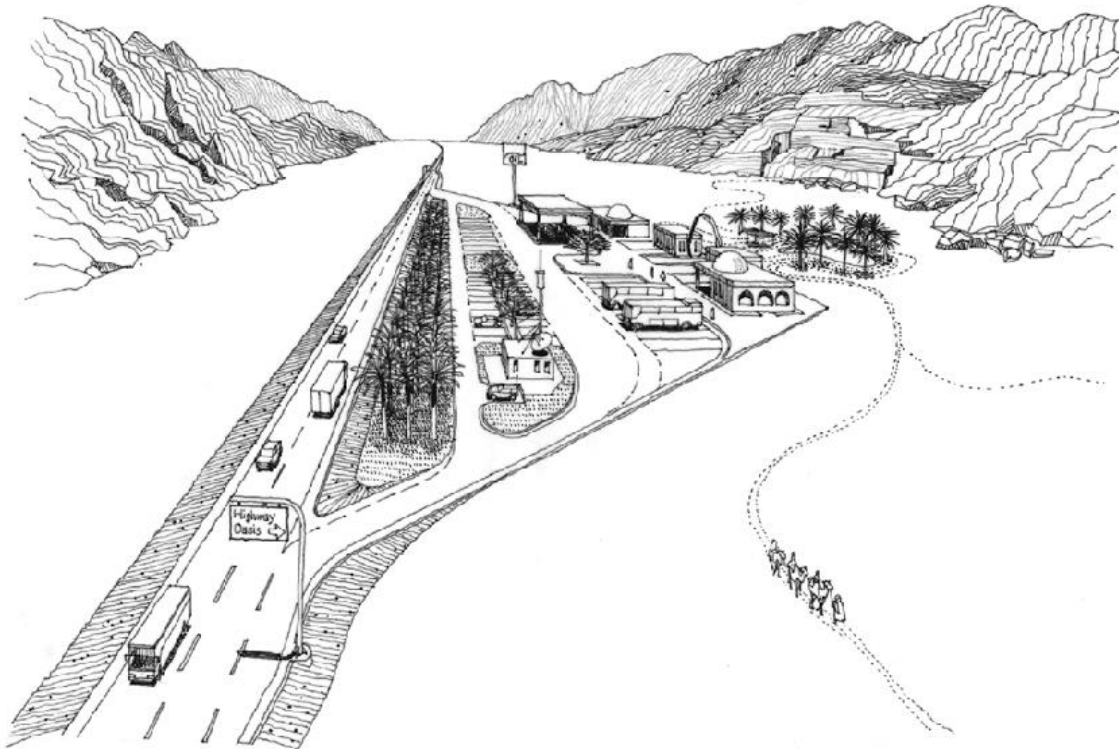
Table 1.30 Economic Benefit and Cost of the Project

	Urgent		Short Term					Medium Term				
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Benefits (LE thousand)												
(1) Expenditure by stopover passengers												
Route 77 /SA HOD-01 LE 10			4,300	4,800	5,300	5,900	6,500	7,000	7,400	8,000	8,500	9,100
/SM HOD-02 LE 10			400	500	500	600	700	700	800	800	800	900
Route 88 /SA+SM HOD-03 LE 10					2,600	2,900		3,400	3,900	4,600	5,400	6,300
/SM HOD-04 LE 10						600		700	900	1,100	1,400	1,800
/SM HOD-05 LE 10						600		700	900	1,100	1,400	1,800
Route 99 /SM HOD-06 LE 10							600	800	1,000	1,400	1,800	2,400
/SA HOD-07 LE 10						3,000	3,500	4,300	5,200	6,300	7,700	9,300
Total	0	0	4,700	5,300	5,800	12,100	15,400	17,600	20,100	23,300	27,000	31,600
(2) Coefficient of Value Added = 0.554 *1)												
(3) Direct Benefits	0	0	2,604	2,936	3,213	6,703	8,532	9,750	11,135	12,908	14,958	17,506
(4) Indirect Benefits			781	881	964	1,579	2,559	2,925	3,341	3,872	4,487	5,252
(5) Total Benefits (Direct + Indirect)	0	0	3,385	3,817	4,177	6,842	11,091	12,676	14,476	16,781	19,445	22,758
2. Economic cost (LE thousand)												
(1) Public Initial investment *2) 14,250	380	3,420	470	2,090	2,760	5,130						
(2) Operation and maintenance (public) *3)			38	38	38	85	142	142	142	142	142	142
(3) Private Initial Investment *4) 31,470	0	10,490	0	10,490	0	10,490						
(4) Operation and maintenance (private)			541	610	667	1,093	1,771	2,024	2,312	2,680	3,105	3,634
Coefficient of operation cost = 0.115 *5)												
Total economic cost	380	13,910	1,049	13,268	3,405	16,798	1,913	2,166	2,454	2,822	3,247	3,776
3. Net Benefits (LE thousand)												
(1) Net Benefits (Direct Benefit)	-380	-13,910	1,555	-10,331	-192	-11,535	6,618	7,584	8,681	10,086	11,711	13,730
(2) Net Benefit (Direct + Indirect Benefits)	-380	-13,910	2,336	-9,450	772	-9,956	9,178	10,509	12,022	13,959	16,198	18,982
4. EIRR												
(1) EIRR (Direct Benefit):	19.7%											
(2) EIRR (Direct + Indirect Benefits):	25.4%											

Source: JICA Study Team

Note: *1) Refer to Table 1.24, *2) Refer to Table 1.25, *3) Refer to Table 1.26, *4) Refer to Table 1.27, *5) Refer to Table 1.28

Figure 1.7 Image Sketch of Service Area (Highway Oasis) Development



Source: JICA Study Team

2. Pre-Feasibility Study for the Development of Passenger Landing Facility along the Nile/Nile River Environment

2.1 Introduction

This section discusses the pre-feasibility study for tourism facilities improvement recommended as one of the projects constituting Upper Nile Tourism development program. In addition, an implementation program for environmental management of Nile cruises is included in this study considering their impact on the Nile environment.

2.1.1 Study Area

The study area focusing on cruise tourism in Upper Nile is the Nile River and Lake Nasser spanning the three governorates of Qena, Luxor, and Aswan, as shown in Figure 2.1.

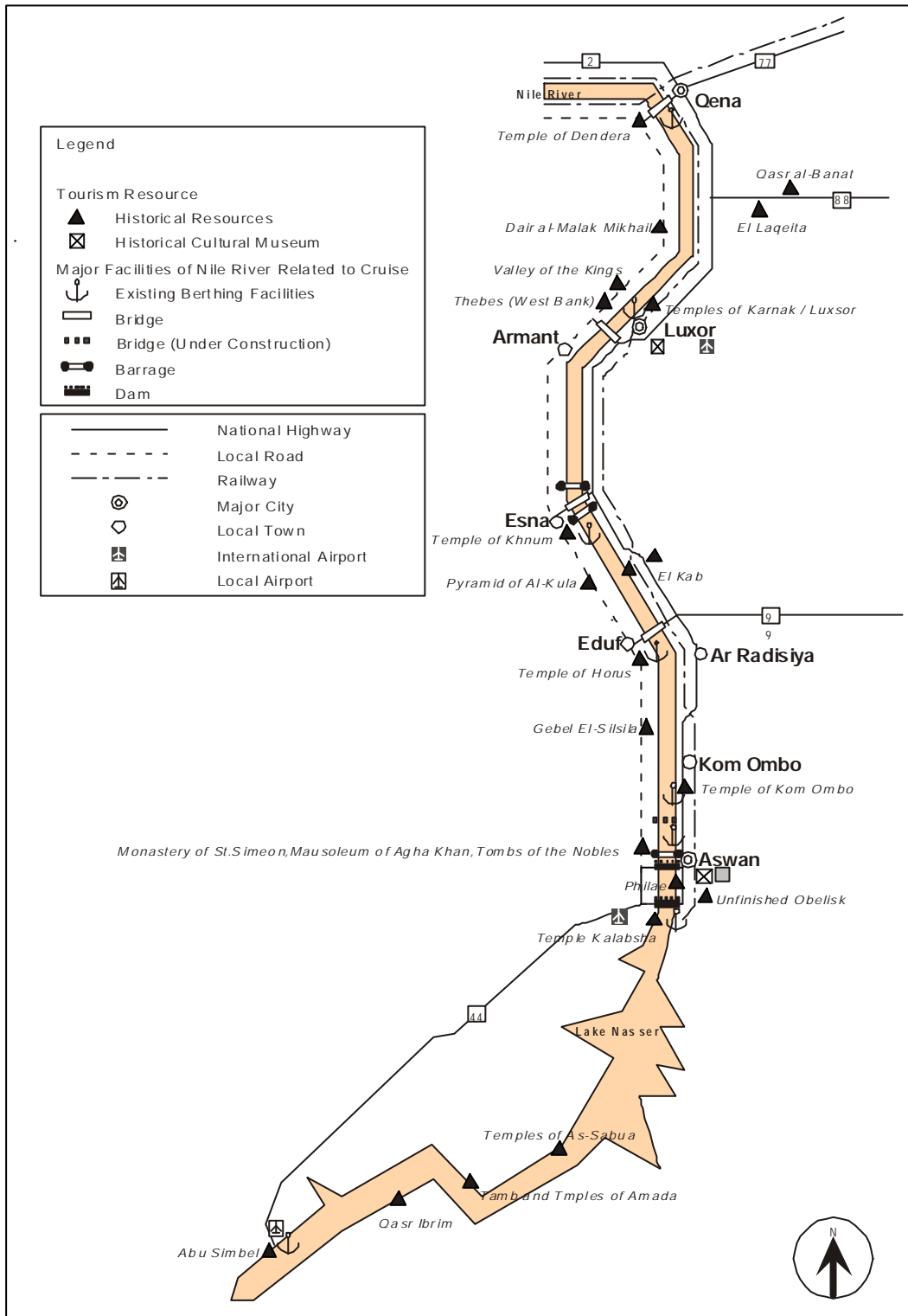
2.1.2 Objectives of the Study

This pre-feasibility study is limited to investigating the possibility of berth facilities improvement and new development for cruise tourism in the Upper Nile sub-region. This study is also based on previous study results and some assumptions owing to limits of data information and time frame. It is understood that obviously it will be necessary to amend a part of this study in the further study with detailed engineering.

The objectives of the study are as follows:

- To define a long-term strategy for the cruise tourism in conjunction with the regional tourism development plan;
- To review previous studies related to cruise tourism in the study area;
- To analyze the possibility of improvement and development of berth facilities for cruise ships in the study area;
- To prepare a berth facilities improvement plan including implementation program and institutional framework; and
- To prepare an implementation program for the Nile cruise environmental management.

Figure 2.1 Location Map of the Study Area



Source: JICA Study Team

2.2 Background and Rationale of the Study

Egyptian tourism is one of the rapidly growing sectors of the Egyptian economy. One of the most attractive tourism products of Upper Nile is cruise tour on the Nile River and part of Lake Nasser. But it has been indicated and discussed also that great numbers of cruising ships in Upper Nile have given rise to problems concerning convenience of tourist services, deterioration of environment and safety of cruise tours. Following is a general overview of the existing conditions and issues based on previous studies and field surveys by the JICA Study Team, and the justification of the study.

2.2.1 Overview of Cruise Tourism in the Upper Nile Sub-region

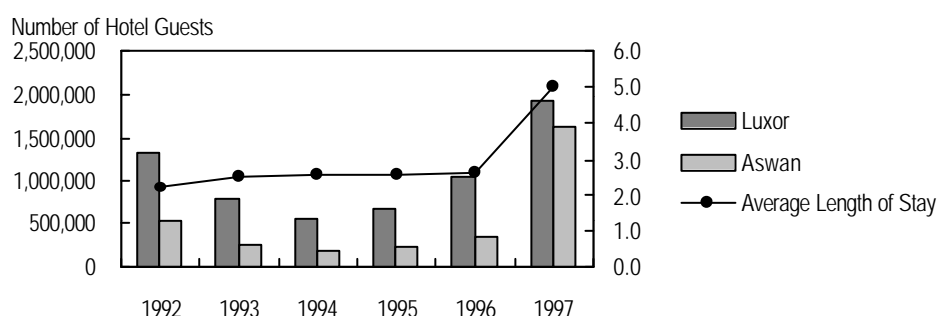
The second largest number of tourists (0.7 million) enjoy classical tourism in the Nile Valley with its famous world heritage sites and cruise tour at the heart of world civilization along the Nile River, although recent government policy has been oriented towards diversifying Egyptian tourism products, such as marine resort product in the Red Sea, which topped the majority of international tourists (0.9 million).

(1) Tourism trend of Upper Nile

The growth of tourists to Upper Nile has been unstable in the last 8 years owing largely to political reasons, such as the Luxor incident in 1997. After this incident, the number of tourist arrivals dropped drastically in 1998, but was revived in 1999 and almost exceeded pre-Luxor tourist numbers. Major trend of Upper Nile tourism is summarized as follows.

- The growth of hotel guests in Upper Nile has re-started at the latter part of 1994, and big annual average growth rate of Aswan (75%) has contributed greatly to the revival of classical tourism in comparison with Luxor (35%);
- Average length of stay in the region is 5.0 days longer than the previous year's 2.6 days;
- Tourists to Upper Nile have not changed their travel pattern, visiting two major destinations either in Luxor City or Aswan City to see temples or travel by air to Abu Simbel, or join the Nile cruise and visit Esna, Eudf, Kom Ombo temples;
- Tourists mainly visit Upper Nile during summer and winter;
- After the Luxor incident, the Nile cruise, which is a popular product of the Nile Valley, once again have begun to draw international tourists, mostly from Europe; and
- In spite of some new tourism investment on cruise ships and inland accommodation development, the scale of new investments lags behind the large hotel investment in the Red Sea.

Figure 2.2 Number of Tourist Arrivals in Upper Nile



Note: Length of stay in Upper Nile is the average number of hotel guests of Luxor and Aswan

Source: Tourism in Figures annual issues by MOT

(2) Nile Cruise tourism

Cruise tourism is not only a major product of the Nile Valley but also a dominant player of regional accommodation capacity. In spite of this, the growth of rooms (cabins) has been quite

slow as indicated by a mere 3.2% annual average growth rate in 8 years. Although basic statistics on the number of Nile cruise tourists has not been established, existing conditions are summarized as follows:

- Nile cruises between Luxor and Aswan is the dominant tour program being offered by major tour agents and operators worldwide. Another cruise tour, the Lake Nasser cruise, has been dealt as optional tour;
- 214 ships on the Nile River including Cairo, Luxor, Aswan, Lake Nasser (3 ships) and the Red Sea area were in operation in 1997, or a share of 60% of total accommodation capacity in the Upper Nile sub-region;
- Cruise ships are mostly classified as 4 to 5-star accommodation, but some international travel agents have indicated several problems about their standard and maintenance, which are below that of a high-rated hotel;
- Each ship has an average of 50 cabins (rooms), operates 3 to 4-day cruises (one-way voyage) or 6- to 7-day cruises (two-way voyage);
- 75% of international tourists staying in ships are Europeans (questionnaire survey in 1991), and are disposed to spending and enjoying the voyage itself most of the time with some visits to antiquities along the Nile River; and
- The three major cruise ship operators are (a) International hotel chain groups (Hilton, Sheraton, Accor group, etc), (b) Tour operators or travel agents (Misr Travel Co, Travaco, etc), and (c) Other companies or individual owners (EGOTH Co., Presidential Co., etc).

Table 2.1 Number of Cruise ships and their Cabins by Year

	1991	1992	1993	1994	1995	1996	1997	1998
Cruise ship	169	181	188	205	206	215	214	216
Cabins	8,584	9,297	9,763	10,339	10,532	11,184	11,322	11,075
Cabins per ship	50.7	51.4	51.9	50.4	51.1	52.0	52.9	51.3
Room share of total region (%)	59.4	59.7	60.3	60.8	60.3	60.9	60.4	61.8

Note: Total number includes areas of Cairo, Luxor, Aswan, Lake Nasser, and the Red Sea
Data in 1998 have not been published.

Source: Tourism in Figures annual issues by MOT

2.2.2 Significance and Justification of the Study

(1) Cruise tourism as an essential product of Upper Nile

Cruise tourism plays the most important role in Upper Nile tourism, from the viewpoint of not only accommodation function (60% of the total capacity of Upper Nile in 1997), but also as the most popular tourism product being offered by a great number of travel agents worldwide. The following are identified as points of product character:

- A traditional tourism product on the Nile River famous for its nostalgic, cultural tourism;
- One of the most attractive transportation modes for sightseeing of antiquities along the Nile River and Lake Nasser and to enjoy the atmosphere of the Nile Valley; and
- Advantageous accommodation facility development in terms of investment efficiency.

(2) Role and function for cruise tourism facilities improvement

In order to cope with the disadvantages of cruise tourism facilities including cruise ships as identified in the preceding section, it shall be necessary that the government support and assume responsibility for the provision of public facilities and infrastructure, even major ones.

On the other hand, the endangered environment of the Nile River and Lake Nasser should be protected by several measures. Urgent action needs to be taken for its physical protection and improvement.

The roles of this project are identified in Table 2.2. In order to meet the requirements for cruise tourism improvement, the project should have the following functions:

- To consolidate the Nile tourism development as a major product of Upper Nile in terms of securing convenient and safe use of cruise accommodation and other water recreational facilities;
- To support adequate management development of water transportation in terms of achieving efficient service and smooth operation of river tourism;
- To formulate attractive and comfortable environment of waterfront area as a base for historical tourism and recreational tourism of the Nile River; and
- To prevent cruise tourism development from deteriorating the environment of the Nile River and Lake Nasser.

Table 2.2 Roles and Functions for Cruise Tourism Facilities Improvement

Role of improvement	Function of Cruise Tourism Product			
	Accommodati on facilities	Water transportation	Visitor facilitation	Environment awareness
Convenient and safe use of facilities				-
Efficient and well-organized service and operation				
Attractive and comfortable environment creation				
Mitigation of natural environmental impacts				

Note: = the most important factor, = secondary factor, — = no relation

Source: JICA Study Team

2.3 Existing Conditions and Issues on Cruise Tourism Facilities Improvement and its Environmental Management in Upper Nile

2.3.1 Existing Conditions of Facilities for Cruise Tourism

(1) Berth facilities

Berth facilities along the Nile River and Lake Nasser can be classified in terms of their function and role, as follows:

Major station berth (MSB)

It is located in front of gateway cities and connected to the international airport, major hotels and cruise ships' utility service systems, such as water and fuel supply, sewerage and solid waste collection.

Landing berth (LB)

It serves as landing place for sightseeing of antiquities or other attractions.

Other berths or piers (OB)

It serves various boats and vessels, such as ferryboats, recreational boats "Felucca" and taxi boats.

Table 2.3 Classification of Existing Berth facilities

Cruise destination	Function		
	MSB	LB	OB
Dendera	-	*	-
Qena	-	**	-
Luxor		-	
Esna	-		-
Eduf	-		-
Kom Ombo	-		-
Aswan		-	
Aswan High Dam	***	-	-
Abu Simbel	-		-

Note: *Dendera berth facilities have been limited to utility service (water and fuel supply).

**Utilities are under construction in Qena new berth facilities.

*** These berth facilities are not identified in detail.

Source: JICA Study Team

According to a recent study by TDA (University of Cairo), berth facilities have been managed and operated by public and private organizations. Public berth facilities are disposed to locate on rural area with historical destinations in front of antiquities, while private facilities concentrate on the major gateway cities of Luxor and Aswan. As it is obvious that the total number of berthing lots, as shown in the following table, indicates a lack of capacity in comparison with the number of ships, it has been observed in the field survey that there are multi-parallel berthing (2-5 lines parallel to the first ship) in many berthing lots.

Table 2.4 Berth facilities in Operation, 1999

Destination	Number of Existing Berths			Ferry berth	Under construction
	Public	Private	Total		
Qena	2	0	2	0	1
Luxor	37	17	54	3	4
Esna	13	1	14	0	0
Eduf	3	1	4	0	0
Kom Ombo	6	0	6	0	0
Aswan	38(4)*	4(38)*	42	2	0
Aswan High Dam	**		-	**	-
Abu Simbel	**		-	-	-
Total	65	57	122	5	5

Note: * This figure indicates a big gap between the study above and a previous study in 1991 and field survey in August, 1999 by JICA Study Team.

** These berth facilities are not identified in detail.

Source: Indicative Plan for the Nile Cruise Berth between Aswan and Cairo by TDA-Cairo University

Table 2.5 Berth facilities Conditions between Qena and Aswan, 1999

Category	Facilities	Qena		Luxor	Qena	Aswan		
		Dendera	Quena	Luxor	Esna	Eduf	Kom Ombo	Aswan
Basic facilities	Embankment (km)	0.1	1.2	3.5	1.3	0.8	0.5	3.0
	Lighting							
	Steps	1	-	4	4	4	3	
	Ferry for local communities	-	-	1	-	-	-	1
	Pier for local ship	-	-	5	-	-	-	-
Utility services	Water Intake	1	-	4	-	2	-	-
	Sewerage Intake	-	-		-	-	-	-
	Waste Disposal System	-	-		-	-	-	-
	Fuel Supply	1	-		-	-	-	-
Security services	Police Station	-	-	1	-	1	-	-
	Police Allocation(person)	-	14	13	8	8	6	
	Fire Hydrant	-	-	6	-	2	-	-
Tourist services facilities	International Telephone	-	-	2	-	-	2	
	Park or Rest Place	-			-	-	-	-
	Public Toilet	-	-	4	-	-	-	-
	Information Center	-	-	-	-	-	-	-
	Souvenir Shops/Kiosk	-	-	9(68)*	-	-	5-6**	
	Coffee Shops/Restaurant	-	-	-	-	-	-	
Transportation	Transportation (Coach)	-	-			-	-	-
	Bus/Taxi Parking site	-	-			-	-	-
	Transport Terminal	-	-	-	-	-	-	-
Plan & project	Berthing Expansion (km)	-	0.5	5.0			-	
	Utility Provision	-					-	
	Development Status	Closed/private	Public	Public/private	Public/private	Public/private	Public	Public/private

Note: * indicates vacant rooms for rent based on the field survey in August, 1999 by JICA Study Team.

** indicates temporary shops based on field survey in August, 1999 by JICA Study Team.

Source: JICA Study Team

(2) Other facilities related to cruise ships

Other facilities along the Nile River and Lake Nasser can be identified in terms of their navigational conditions, as follows:

Table 2.6 Other Facilities related to Cruise Ships

Destination	Surrounding facilities near destination			
	Barrage	Bridge	Dam	Ferry
Dendera	-		-	-
Qena	-		-	-
Luxor	-	-	-	
Esna	(2)		-	-
Eduf	-		-	-
Kom Ombo	-	-	-	-
Aswan	-	*	**	
Aswan High Dam	-	-	**	(port)
Abu Simbel	-	-	-	-

Note: *A new bridge is under construction.

**This dam functions as bridge for vehicles.

Source: JICA Study Team

2.3.2 Existing Plans and Projects for Upper Nile and Cruise Tourism

(1) Existing plans and programs

Several plans and programs have been prepared for Upper Nile in relation with tourism sector development from a region-wide to a town-wide level of development. The following table shows major plans and programs for this region, including those that lack detailed information or have insufficient data.

Table 2.7 Existing Development Plans and Programs in Upper Nile

Governorate	Location	Development related to Cruise Tourism	Reference, data source
Qena	Qena City	-	Development Scheme of South Egypt Plan
	Armant/Esna	-	Development Scheme of South Egypt Plan
	Armant	New Dockyard development	Qena Governorate Plan (Private sector investment)
Luxor	Luxor City	New Berth Development	Luxor City Development Plan by MHUUC-UNDP
	El Toad	-	El Zoraykat Island project
Aswan (Nile River)	Aswan City	-	Under study by MHUCC-UNDP
	Eduf City	New Berth Development	Aswan Governorate has a plan to develop tourist area.
	New Aswan City	New Bridge Construction	Under construction connecting to New Aswan City
New Berth Development		Aswan New City Development Plan by MHUUC	
Aswan (Lake Nasser)	Toshka		Toshka Tourism Development Plan by TDA
	Cruise Ship	Target number(5,000 ships)	Development Scheme of South Egypt Plan
Cruise ship	Cairo/Luxor/Aswan	Current investment plan	Under construction, Hotel Capacity in the Republic of Egypt 1999by TDA

Source: JICA Study Team

(2) Review of previous studies for Nile cruise development

There are three studies for Nile cruise development in past years including a brand new study in 1999. Major topics in the studies can be summarized as follows:

A Priority Action Plan for Infrastructure and Tourism Development in Egypt Phase III 1991: Cruise Ship Tourism by Arthur D. Little and Ministry of Tourism

This feasibility study aims to formulate development plans for berth facilities with terms of reference in order to solve existing problems of Nile cruise tourism (it is not clear whether this plan has been implemented or not). Highlights of the study are as follows:

- Demand analysis projected the number of ships in the range of 506-831 ships and the additional number of berths required in the range of 4-26 berths in 2000;
- Proposed the improvement of visitor capacities of antiquities sites; and
- Proposed the formulation of institutional frameworks for river management programs such as river traffic, cruise ship operation and broad coordination among several agencies; and
- Exclusion of Lake Nasser cruise in the plan.

Private Sector Tourism Infrastructure and Environmental Management Projects: Staff Appraisal Report by World Bank in 1992

This report is for appraisal of the Bank's project loan by the private sector consisting of the Red Sea coastal zone management projects and Nile cruise improvement projects. These projects consist of the following components, but some of them, especially the Nile cruise navigational improvement seems not to have been implemented all:

- Infrastructure development of two integrated development sites (Abu Soma, Sahl

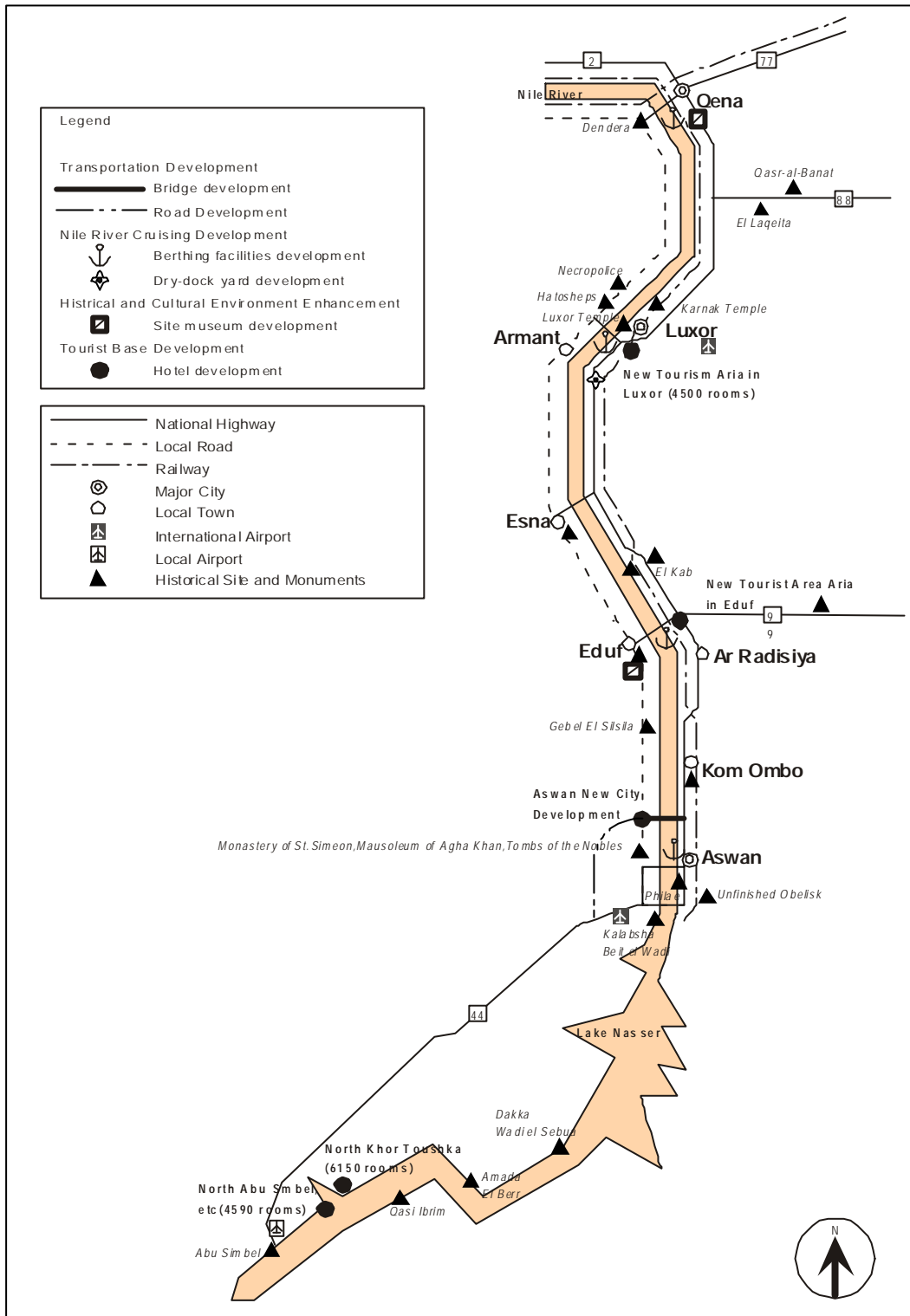
- Hasheesh);
- Provision of utility services by the private sector in the Red Sea coast;
 - Construction of additional berth facilities for the Nile cruise by the private sector;
 - Improvement of traffic and navigational facilities and access to tourist sites; and
 - Development of coastal management plan under the auspices of GEF.

Indicative Plan for the Nile Cruise Berth between Aswan and Cairo by TDA in 1999

This report aims at formulating a master plan for the Nile cruise improvement projects from Cairo to Aswan. The project components presented below are similar to the two development projects mentioned above, and proposed to improve facilities and institutional system for traffic management and others:

- Analysis of berth facilities demand projected the number of possible berths in the range of 230-384 berths;
- Proposed the improvement of visitor capacities of antiquities sites;
- Proposed the formulation of institutional frameworks same as that proposed in the 1991 report; and
- Exclusion of Lake Nasser cruises in the plan.

Figure 2.3 Plans and Projects in Upper Nile



Source: JICA Study Team

2.3.3 Assessment of Berth facilities in Upper Nile

This section describes the constraints and opportunities of the existing berth facilities and the potential sites for future development. A general assessment was conducted based on the following criteria in order to improve and enforce the function and attractiveness of the Nile cruise tourism. Information of existing conditions of berth facilities is based on-site surveys and the report of Indicative Plan for the Nile Cruise Berth between Aswan and Cairo by TDA.

(1) Existing berth facilities

The criteria for assessment of each berth facilities area are itemized below, and the result of assessment by site is shown in Table 2.8.

Potentials

- Magnitude of importance in terms of number of visitors and attraction value added to berth facilities
- Existing and future function of hinterland in conjunction with berth facilities
- Desirable character and role to play in berth facilities (amenity creation, etc)

Berth facilities capacity

- Capacity of berth facilities to meet demand
- Existing facilities conditions and standard
- Facilities and other structures needed (embankment, utilities, visitor facilities)
- Navigational circumstance

Backyard capability

- Existing condition of visitor facilities (parking and traffic conditions)
- Facilities and other structures needed (embankment, utilities, visitor facilities)
- Adequate atmosphere (landscaping, walkway, etc)

Environmental consideration

- Scarcity or importance of natural environment (natural protectorate)
- Possible occurrence of natural hazard (erosion, flash flood, etc)
- Possibility of environmental pollution (inadequate industrial facilities, treatment facilities, etc)
- Landscape condition in terms of harmonization with surrounding environment

(2) Potential site for berth facilities development

On the other hand, several historic sites interspersed along the Nile River have the potential as new historic destinations to become part of the Nile cruise tour. The introduction of new destinations could give the following benefits:

- Contribute to the diversification of historical tourism products;
- Contribute to the extension of length of stay;
- Mitigate problems of concentration at limited historical sites; and
- Increase berthing lots at various places in order to manage the operation of the Nile cruises.

Table 2.8 Assessment of Existing Berth facilities and their Surroundings

		Potential	Berth Capacity	Backyard	Environmental Consideration	Remarks
Qena/ Luxor	Dendera	As temporary stopover for Dendera site	Difficult to expand Bad physical condition for berth	Conflict with local community	Sedimentation problem	Not permitted to use due to security problem
	Qena	As main access area for Dendera with future tourist resort	Possible to expand Necessary to add utility services	Affordable space for visitor services	Sedimentation problem	Qena Governorate plans to provide utility service and tourist facilities and hotels
	Luxor	As major berthing terminal with major gateway city of Luxor	Beyond capacity With full utility facilities	Good condition with attractive promenade	Floating solid waste problem	Municipality plans to develop new berth facilities in El Toad area
	Esna	As sub berthing terminal with tourist town of Esna	Beyond capacity in conflict with two barrages in operation No utility service	Congested urban area Insufficient tourist facilities	Not suitable urban landscape for historical site	Necessary to coordinate urban function and historical environment
Aswan (Nile River)	Eduf	As sub berthing terminal with tourist town of Eduf	Beyond capacity Unsuitable physical condition of river due to small islands No utility service	Tourist traffic congestion Insufficient tourist facilities	Not suitable urban landscape for historical site	Necessary to coordinate urban function and historical environment SCA plans to develop Esna site museum
	Kom Ombo	As sub berthing terminal with future tourist resort of Kom Ombo	Beyond capacity Unsuitable physical condition of river due to small islands No utility service	Conflict with the monument site Not enough area for service	Sedimentation problem Problem of embankment erosion	Necessary to expand berth area and to improve existing berth facilities
	Aswan	As major berthing terminal with major gateway city of Aswan	Beyond capacity Insufficient utility facilities	Problem of monopoly by private sector	Sedimentation problem	Necessary to open private use of the Nile to public use
Aswan (Lake Nasser)	Aswan High Dam port	As terminal only	Congestion with other ships	Unsuitable conditions for tourists	No information	Necessary to coordinate between cruise ships and commercial ships
	Kalabsha/Beit el Wadi	As stopover (the Island) As embarkation point (inland site)	No suitable landing facilities to the island of Kalabsha	Conflict with local fishing boats	Malodor problem from fishery factory	Necessary to develop new embarkation facilities apart from existing one
	Dakkah	As stopover	No suitable landing facilities	No information	Consideration of historical site	Necessary to develop safe berth facilities
	Amada	As stopover	No suitable landing facilities	No information	Consideration of historical site	Necessary to develop safe berth facilities
	Qasr Ibrim	As stopover	No suitable landing facilities	No information	Consideration of historical site	Necessary to develop safe berth facilities
	Abu Simbel	As stopover	Sedimentation problem	No information	Consideration of historical site	Necessary to improve existing berth facilities

Source: Indicative Plan for the Nile Cruise Berth between Aswan and Cairo by TDA and the field survey by JICA Study Team

The criteria for selection of potential site for new berth facilities can be itemized as follows (except engineering and environmental criteria to develop the facilities):

- Magnitude of attractiveness of historical sites for tourists;
- Appropriate distance of location from antiquity sites along the Nile River;
- Accessibility to monument sites in terms of adequate distance from the river bank; and,
- Suitability of environment of historical sites without any artificial obstacles.

Table 2.9 Evaluation of Potential Sites for Berth facilities Development

Candidate of new destination	Potential of site and its conditions				Total evaluation
	Attractiveness	Appropriate Interval	Accessibility	Suitable surroundings	
Naqada ruin	-		-		-
Dier el Marek-Tukh			-		
El Kab (tomb, ruins)					
Gebel el Silsila					

Note: = highest, = secondary, = not good or competitive, - = worst

Source: JICA Study Team

Based on the result of above evaluation, El Kab and Gebel el Silsila are proposed as new destinations and berth facilities can be developed in front of the sites.

2.3.4 Issues for the Cruise Tourism Improvement

The constraints and problems of cruise tourism on the Nile River and Lake Nasser presented in the aforementioned section should be tackled from the broad point of view with multi-sectoral cooperation. The issues are identified as follows:

(1) Issues for facilities improvement

Taking account of compatibility between future demand of cruise tourism and capacity of tourism development, berth facilities should be improved and developed in order to secure safe and comfortable environment for visitors. Major issues are shown below.

Berth facilities for cruise ships and other boats

- Expansion of capacity of berth facilities to normalize its use and meet demand;
- Upgrading of existing facilities standard in conjunction with backyard function, considering that land transportation is expected to grow as substitute measure absorbing future access demand to destinations;
- Introduction of construction measures to mitigate environmental impact;
- Development of new destinations with new berth facilities;
- Creation of attractive atmosphere of water-front area for visitors;
- Necessity of elaborate engineering study for a suitable berth facilities; and
- Adequate system for development and management of facilities among public and private sector taking account of both advantages to serve tourists and ship operation

Environmental impact of cruise ships and other boats

- Minimization of emission of environmental pollutants from ships;
- Installation of necessary system in order to process pollutants from ships; and
- Coordination with stakeholders, such as agricultural or existing communal areas, who are required to utilize berth facilities, and preparation of substitute measures or necessary compensation.

(2) Issues for cruise tourism management

To secure safe and comfortable cruises and other boats, operational management of river transportation is another important pillar that can be added to facilities improvement. The following are other issues in terms of management and operation of the Nile River tourism:

Consolidation of the Nile cruise environmental management

- Cooperation with public services according to their capability;
- Necessity of continuous monitoring and assessment for environmental improvement;
- Consolidation of institutional framework such as regulations and guidelines with necessary expert allocation;

- Promotion of environmental awareness for crews and tourists of water transportation; and
- Necessity of broad cooperation with other sectors, such as urban, agriculture, and industry, to prevent pollution of the Nile River's natural environment, as these sectors could be sources of a far greater magnitude of pollution than those by cruise ships.

The following are not direct issues to be covered by this study; however, they are very important and inevitable for the cruise tourism to tackle constraints in order to achieve a safe and comfortable cruise tour. Major issues including subjects that have already been pointed out in the past, are also indicated below in terms of cruise tourism development in a broad sense.

Improvement of river transportation control management

To improve navigational control and management, the following actions are needed.

- Necessity of proper traffic regulations and traffic control system at berth areas and barrages;
- Necessity of navigational support systems for cruise ship operation, especially counter measures to solve low level water of the Nile River in winter and appropriate communication measures such as voice telecommunication, data transmission and meteorological information;
- Consolidation of sufficient fire safety system and safety regulations in berthing areas;
- Necessity of introducing a zone management system among all water transportation modes, such as cruise ships, ferry boats, river taxis, and recreational boats like Felucca, in the Nile River; and
- Installation of channel navigational aid system, such as lighting beacons and buoys.

And to improve security control and management, the following actions are needed.

- Formulation of security system for passengers to guard against crimes, and emergency system (fire, accidents, etc.) and
- Consolidation of regulatory measures to prohibit inappropriate berthing, such as multi-parallel berthing.

Formulation of Nile Cruise related industry

- Diversification of Nile Cruise Tourism such as introduction of day-cruise, special theme cruise (ecotourism-cruise, casino-cruise, convention cruise, etc),
- Cruise ship service industry such as laundry service and commodity supply,
- Land transportation connecting to destinations or other areas and
- Information and organization for Nile cruise tourism.

Formulation of the Nile River environmental information system

- Provision of inventory for basic information on the natural environment of the Nile River, such as bio-diversity, endemic flora and fauna, etc., through several scientific research between Qena and Luxor and Aswan of the Nile,
- Contribution to nature tourism, such as eco-tourism on the Nile providing information on natural tourism resources and
- Contribution to establishment of environmental management zoning to protect natural resources in terms of utilization of the Nile River tourism.

Institutional arrangement for cruise tourism with integration and coordination

- Formulation of inter-governmental coordination among all related agencies, and
- Specification of responsibilities and authority over river management.

2.4 Outline of the Project

2.4.1 Development Framework for Cruise Tourism Facilities Improvement

(1) Cruise ship development target

This section aims at setting the number of cabins (rooms) of cruise ships required in 2012 based on the regional development framework.

Conditions for target setting

The target number of cabins has been estimated by reviewing current studies (1990 and 1999) and related information on future target numbers of cruise ships mentioned in the previous section. Although major consideration for the target setting is shown below, detailed studies are needed for decision-making of optimum target.

- Necessity of setting the number of ships in relation to development capacity considering (a) gradual and possible improvement or development to solve the problems of existing berthing capacity and its safety and operational efficiency, (b) formulation of environment for cruise ship navigation and operation; and (c) consideration of increase in other river transportation facilities such as day-cruise ships,
- Necessity of strict environmental protection, especially in Lake Nasser, and
- Necessity of substitute development of accommodation facilities requirement in total

Target number of hotel guests, guest-nights and ships

Based on above conditions and several assumptions, the target number of guest nights is calculated, as shown in Table 2.10.

Table 2.10 Target Numbers of Cruise ship Accommodation in Upper Nile

	2002	2007	2012	2017	
Hotel Guest (million)	0.76	0.85	0.94	1.04	
Hotel Guest Nights (million)	3.8	4.2	4.7	5.2	
Share of Total Guest Nights (%)	46%	36%	28%	24%	
Number of ship	Luxor- Aswan	225	250	275	300
	Lake Nasser	5	7	10	15
	Total	230	257	285	315

Note: refer to Table 2.10 (a).

Table 2.10 (a) Correlation coefficient

Occupancy Rate	0.6
Guests per cabin	1.5
Length of stay in all phases	5.0
Cabins per ship in Nile River	50
Cabins per ship in Lake Nasser	60

Source: JICA Study Team

(2) Berth facilities development target volume

Target numbers of berthing slots

According to the estimations described above, the target numbers of berthing slots are calculated as shown in Table 2.11. When the target numbers are estimated, the following conditions are considered:

- To develop and improve single parallel berth facilities with adequate buffer, considering safe navigation and berthing;
- To fill the gap between existing demand and adequate berthing by a temporary measure of parallel berthing in the early phase; and
- To consider the function of berthing as serving not only cruise ships but also other river

transportation modes, such as day cruise ships, in terms of future needs.

Table 2.11 Target Numbers of Berthing Slots

		2002	2007	2012
Number of berthing slots	Cruise ship	230	257	285
	Day cruise ship	3	8	15
	total	233	265	300

Note: Refer to Table 2.11 (a).

Table 2.11 (a) Day-cruise ships per cruising ship

	2002	2007	2012
Day-cruise ships per cruising ship	0.1%	0.3%	0.5%

Source: JICA Study Team

Distribution of target numbers of berthing slots in Upper Nile

According to the estimations described above, the distribution of target numbers of berthing slots is shown in Table 2.12. During estimation, the following conditions are considered.

- To include the numbers or related targets proposed by other development plans in conjunction with berth facilities;
- To disperse berth facilities development pressure to other potential areas thereby preventing concentration on major destinations (Luxor and Aswan), so as to secure safe and comfortable embarkation;
- To secure major suitable berthing slots for night-stay with limited night navigation* ;
- To ensure adequate places to berth and visit tourist sites;
- To introduce the temporary measure of parallel way of berthing in the early stage in order to fill the gap between demand and capacity; and
- To provide adequate development type for berth facilities taking account of environmental conditions and scale of development.

* It is considered that shipson the waterway at night time, in transit to their final destinations because of tour itinerary or other reasons are excluded from the estimation of required facilities, and those ships are equipped with safe navigation system at night.

Table 2.12 Required Numbers of Berthing Slots

Location of Berthing Slots		2002	2007	2012
Nile River	Oena-Dendera	(30)	(30)	20
	Luxor City	(62)	(63)	39
	El Toad/Luxor	(10)	(10)	25
	Esna City	(20)	(20)	20
	El Kab	-	-	5
	Edufu City	(20)	(22)	37
	Gebel el Silsila	-	-	5
	Kom Ombo	(14)	(14)	21
	Aswan New City	-	20	32
	Aswan City	(51)	(52)	54
	sub-total	207	231	258
	Lake Nasser	High Dam Port	(2)	1
Pier to Kalabsha		1*	-	-
Dakkha/Wadi		-	1	1
Amada		-	1	1
Qasir Ibrim		-	1	1
North Kohr Toushka		-	-	1
North Abu Simbel		-	1	3
Abu Simbel		(2)	1	1
Sub-total	4	6	9	
Total	211	237	267	

Note: Figures in parentheses indicates estimation by multiple parallel berthing

* means small boats pier development inland of Kalabsha Island.

Refer to Table 2.12 (a).

Table 2.12 (a) Total numbers exclude ships in-transit on the river and lake

		2002	2007	2012
Ship in-transit to each destination on the Nile River and Lake Nasser	Q/Luxor-Aswan	21	26	30
	Lake Nasser	1	2	3
	Total	22	28	33
(Share to total ships)		9%	10%	10%
Ships needing berth facilities		211	237	267
Grand total		233	265	300

Source: JICA Study Team

2.4.2 Project Components

(1) Development of berth facilities

Hierarchical development role and function

In order to enhance the function and role of berth facilities, three types of facilities development are introduced according by level of tourist activities in the destinations of cruise tours as follows:

Type A: Major station (in gateway city, urban amenity and cruise services are necessary)

Type B: Sub-station (in tourist towns and other accommodation bases with limited service)

Type C: One-stop station (in tourist spots with historical resources without cruise services)

Table 2.13 Development Type and Berth facilities Required by Level

Type	Role & Function	Berth facilities Type	Utilities	Visitor Facilities
Type A	Major station for cruise ships - To be a riverfront-base to dock at a tourists can stay at a tourist town with attractions - To supply basic commodities for cruise ships - To function as traffic terminal between cruise ship and land transportation - To function as a water-oriented recreational activity base - To provide visitors with amenity	Concrete structure & rock-fill embankment - To prepare open space for visitors - To equip with utility service	- Electricity/telecommunication - Water supply - Fuel supply - Sewerage collection - Solid waste collection - Fire hydrant	- Street furniture (Lighting, bench, etc.) - Telephone booth - Toilet - Kiosk/Information booth - Souvenir shop - Coffee shop - Security station - Parking
Type B	Sub station for cruise ships - To be a temporary base to stay and access historical attractions and other facilities - To function as traffic node between ship and land transportation - To provide visitors with basic service facilities - To function as water-oriented recreational activity base	Iron structure pier - To prepare the ship for visitors - To equip with limited utility service - To take account of construction method to mitigate environmental impact	- Electricity/telecommunication - Water supply	- Street furniture (lighting, bench, etc.) - Telephone booth - Toilet - Security station - Parking
Type C	One-stop pier for cruise ships - To be an access point for tourist attractions behind river-front - To prepare a port for one-stop place for cruise ships	Iron structure pier - To prepare the ship for visitors	- Electricity/telecommunication	- Street furniture (lighting, bench, etc.) - Telephone - Security station

Source: JICA Study Team

Development structure type

On the other hand, conforming to the cruise ship's dimensions, a typical berth facility slot is to be designed in scale and structure alongside the manner of berthing, with the following considerations:

- To secure a suitable buffer for the embankment of the Nile River considering the direction of river current and the speed and direction to navigate boats safely and with ease (requirement of length per berthing slot = 1.5 x length of ship);
- To consider physical limits (width and depth of the Nile River) to be able to navigate ships and boats safely;
- To consider mitigation of environmental impact by facilities development;
- To develop the facilities taking account of environmental design and economic measures; and
- To provide various types of facilities depending on the site condition and service function for tourists.

Three structural types of development are as follows:

- Structure 1: Wharf embankment type of berth facilities by concrete structure
- Structure 2: Landing pier type of berth facilities by iron structure
- Structure 3: Floating bridge type of berth facilities by mixed-material structure

Figure 2.4 Wharf Embankment Type of Development / Improvement (Type A)

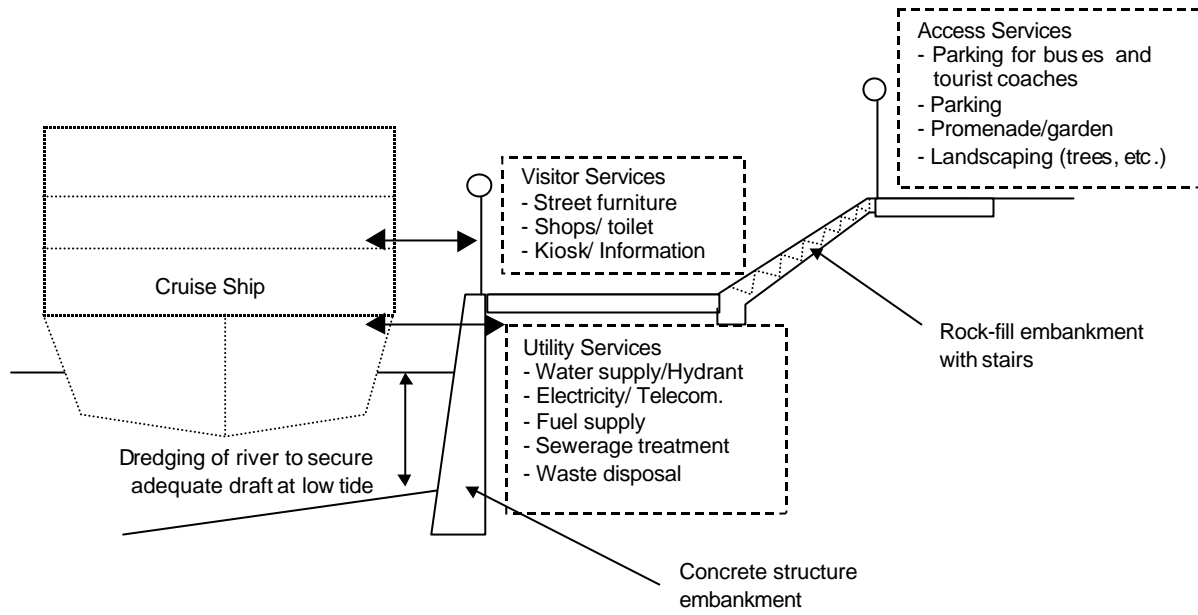
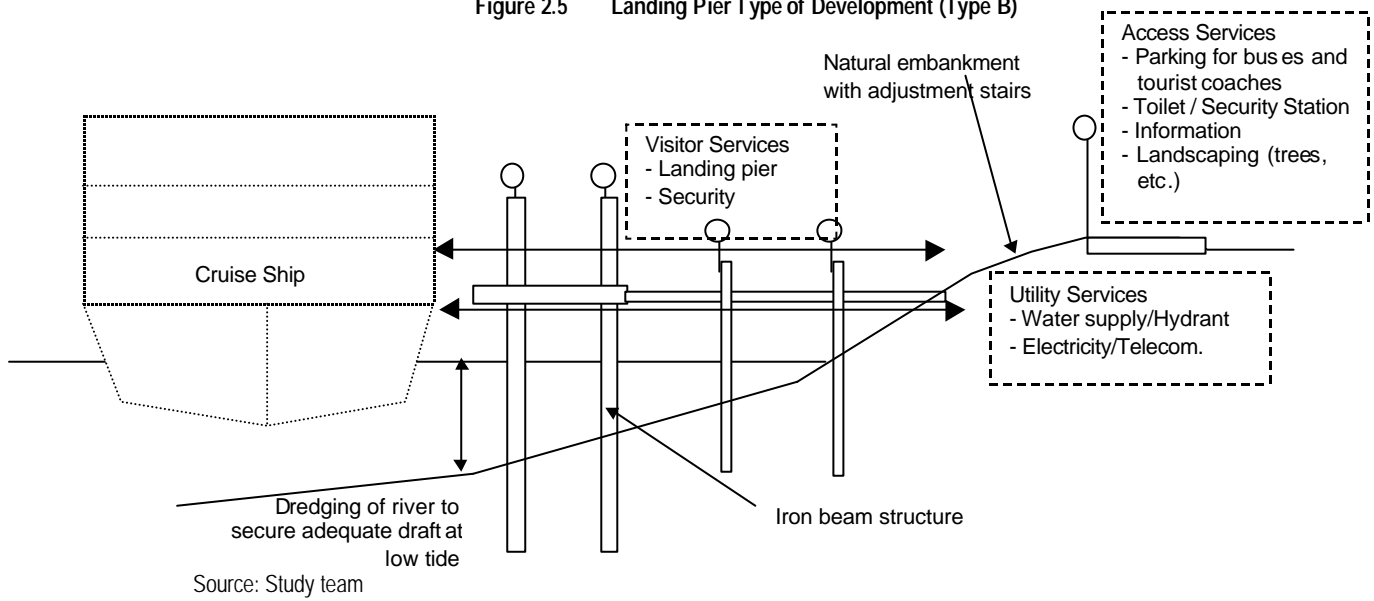
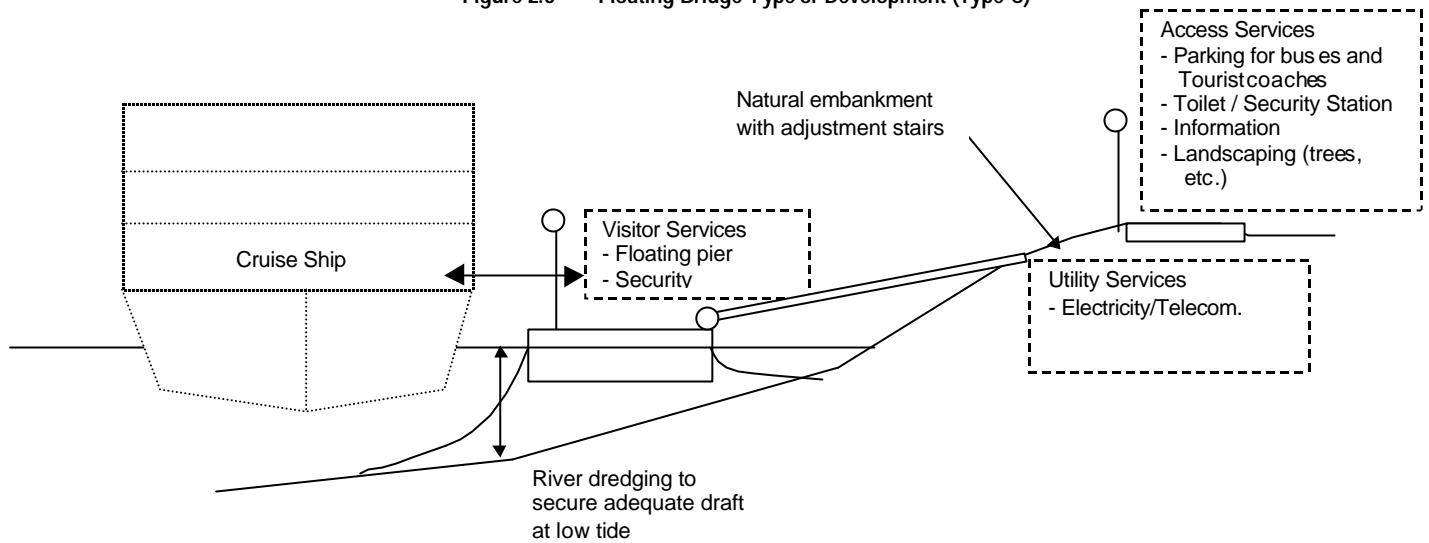


Figure 2.5 Landing Pier Type of Development (Type B)



Source: Study team

Figure 2.6 Floating Bridge Type of Development (Type C)



Source: JICA Study Team

Development degree type

According to the existing conditions and development framework previously mentioned, the development degree of berth facilities can be classified into the following three types:

- Improvement of existing berth facilities to upgrade them;
- Expansion of existing berth facilities to meet demand and improve navigational environment; and
- New development to meet demand taking account of product diversification and prevention of concentration on major destination places.

Development component

According to type of berth facilities, the development components are classified as follows, which are applicable to site conditions at the Nile River and Lake Nasser:

Table 2.14 Development Components for Berth facilities

Type	Major development components	Improvement of berth facilities			Expansion & New Development
TYPE A	Wharf embankment	---	---	---	A4
	Utility services for cruise ships	A1	---	A3	
	Visitor service facilities	---	A2		
TYPE B	Landing pier facilities	---	---	---	B4
	Limited utility service	B1	---	B3	
	Visitor service facilities	---	B2		
TYPE C	Floating bridge	C1	---	C3	C4
	Visitor service facilities	---	C2		

Source: JICA Study Team

(2) Improvement plan for each site

The improvement plan for each site is proposed by type and degree of development applied to each site, including those with and without berth facilities, taking account of existing conditions and desirable future function. For Nile River and Lake Nasser, 17 and 8 projects are proposed respectively, as shown in Table 2.15.

Table 2.15 Proposed Berth facilities Improvement Plan in the Upper Nile Area

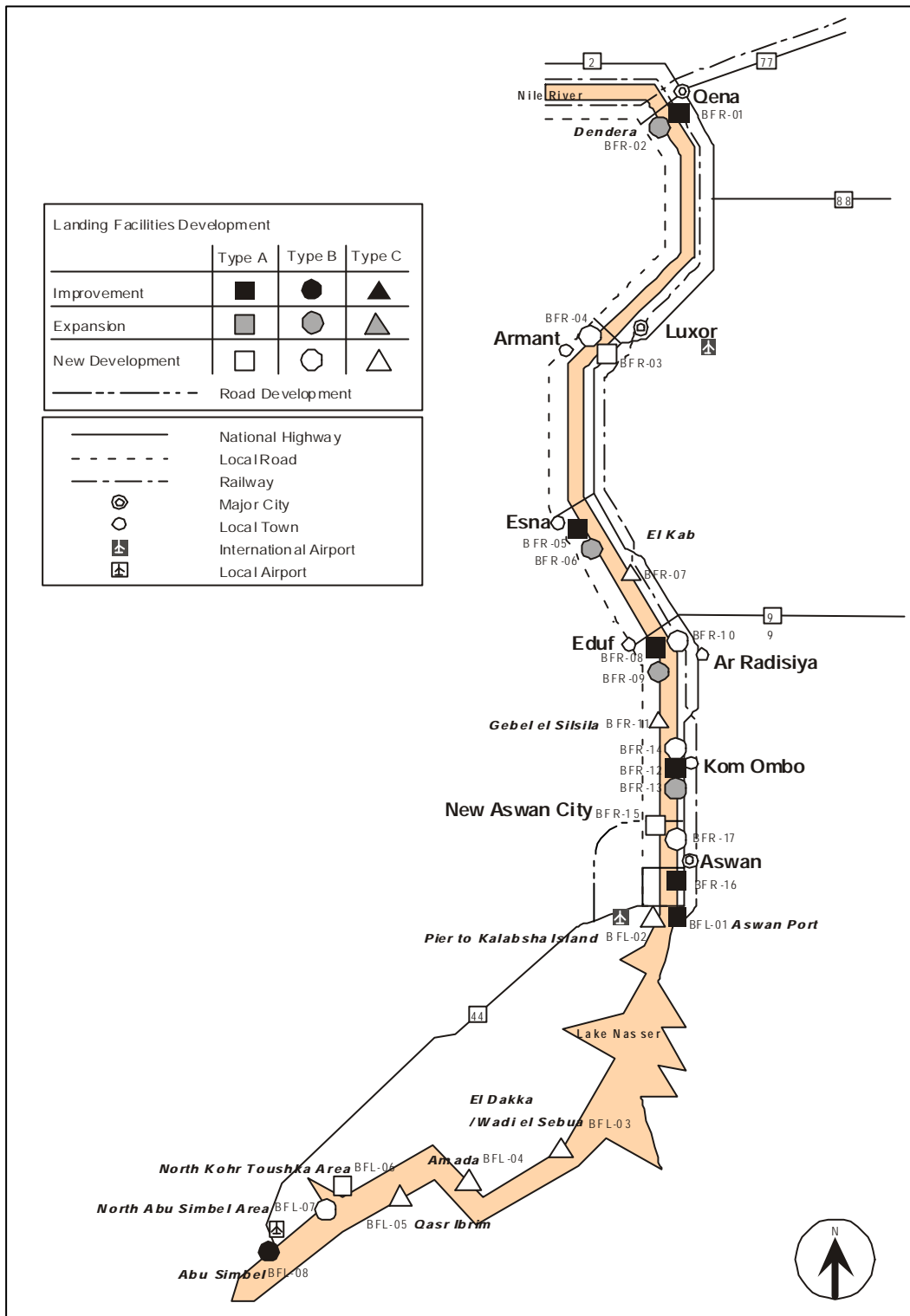
Area	Project code	Location	Existing facility status	Improvement Plan by Type			Reference
				A	B	C	
Qena Governorate	BFR-01	Qena City	Newly developed		-	-	Type A: Berth facilities with utility services and amenities for visitors by wharf embankment type
	BFR-02	Beside of above area	No facilities	-		-	
Luxor City	BFR-03	Luxor west bank/El Toad	No facilities	-		-	Type B: Berth facilities with limited utilities and limited visitor facilities by landing pier type
	BFR-04	Luxor east bank/El Toad	Planned		-	-	
	-	Luxor east bank	Existing Berth	-	-	-	
Qena Governorate	BFR-05	Esna City	Existing Berth		-	-	Type C: Floating bridge type limited utilities
	BFR-06	Beside of above area	No facilities	-		-	
Aswan Governorate (Nile River)	BFR-07	El-Kab area	No facilities	-	-		Type C: Floating bridge type limited utilities
	BFR-08	Eduf City west bank	Existing Berth		-	-	
	BFR-09	Beside of above area	No facilities	-		-	
	BFR-10	Eduf City east bank	No facilities	-		-	
	BFR-11	Gebel el Silsila	No facilities	-	-		
	BFR-12	Kom Ombo east bank	Existing Berth		-	-	
	BFR-13	Beside of above area	No facilities	-		-	
	BFR-14	Kom Ombo east bank	No facilities	-		-	
	BFR-15	Aswan New City	Resort city planned		-	-	
Aswan Governorate (Lake Nasser)	BFR-16	Aswan east bank	Existing Berth		-	-	* Inland pier beside lake **Kalabsha/Beit el Wadi
	BFR-17	Aswan new east bank	No facilities	-		-	
	BFL-01	Aswan High Dam Port	Existing Berth		-	-	
	BFL-02	Landing pier* to the island**	No facilities	-	-		
	BFL-03	Dakka/El Sebua	No facilities	-	-		
	BFL-04	Amada/El Derr Penut	No facilities	-	-		
	BFL-05	Qasr Ibrim	No facilities	-	-		
	BFL-06	North Kohr Tushka	No facilities		-	-	
BFL-07	North Abu Simbel	No facilities		-	-		
BFL-08	Abu Simbel	Existing Berth	-		-		

Note: = New development, = Additional expansion, = facilities improvement, - = not necessary, not existing

Source: JICA Study Team

Table 2.16 shows the required length of berth facilities for each of the 25 projects.

Figure 2.7 Proposed Berth Facilities Improvement Plan in Upper Nile



Source: JICA Study Team

Table 2.16 Length of Berth facilities Required

Development zone	Area	Project code	Location	Classification	Total length (km)
Nile River	Qena Governorate	BFR-01	Qena City	A1	1.7
		BFR-02	Beside of above area	B4	0.7
	Luxor City	BFR-03	Luxor west bank/EI Toad	B4	1.2
		BFR-04	Luxor east bank/EI Toad	A4	3.0
		-	Luxor east bank	-	(3.5)*
	Qena Governorate	BFR-05	Esna City	A3	1.3
		BFR-06	Beside of above area	B4	1.1
	Aswan Governorate	BFR-07	El-Kab area	C3	0.6
		BFR-08	Eduf City west bank	A3	0.8
		BFR-09	Beside of above area	B4	1.2
		BFR-10	Eduf City east bank	B4	1.7
		BFR-11	Gebel el Silsila	C4	0.6
		BFR-12	Kom Ombo east bank	A3	0.5
		BFR-13	beside of above area	B4	0.6
		BFR-14	Kom Ombo east bank	B4	1.0
		BFR-15	Aswan New City	A4	3.9
		BFR-16	Aswan east bank	A3	3.0
BFR-17	Aswan new east bank	B4	3.5		
Sub-total					26.4
Lake Nasser	Aswan Governorate	BFL-01	Aswan High Dam Port	A2	0.7
		BFL-02	Landing pier* to the island**	C4	0.1
		BFL-03	Dakka/EI Sebuia	C3	0.1
		BFL-04	Amada/EI Derr Penut	C3	0.1
		BFL-05	Qasr Ibrim	C3	0.1
		BFL-06	North Kohr Toushka	A4	0.5
		BFL-07	North Abu Simbel	A4	0.4
		BFL-08	Abu Simbel	B2	0.1
Sub-total					2.1
Total					28.5

Note: Classification is referred to Table 2.14

Source: JICA Study Team

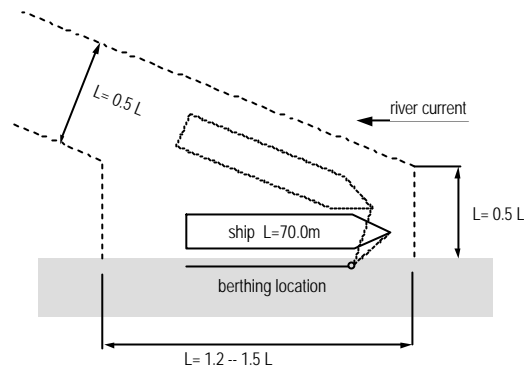
(3) General planning conditions and improvement guidelines

General planning conditions and guidelines for the improvement plan are described hereafter. It is necessary to give careful consideration to the natural and physical conditions of berthing sites, which are composed of several facilities including embankment, utilities and visitor facilities, when they are improved or developed. The following are indicated as planning conditions or guidelines for the improvement plan.

Berthing slots

In order to address traffic congestion of ships and to secure their safety and efficiency, berthing slot should have appropriate length and intervals between ships, taking account of river current and number of slots. The desirable dimension of berthing slot is indicated as follows: for berths with over 4 slots, the length of slot should be 1.5 times the length of ship, with single parallel berthing.

Figure 2.8 Berthing Slot Dimensions for Cruise Ship

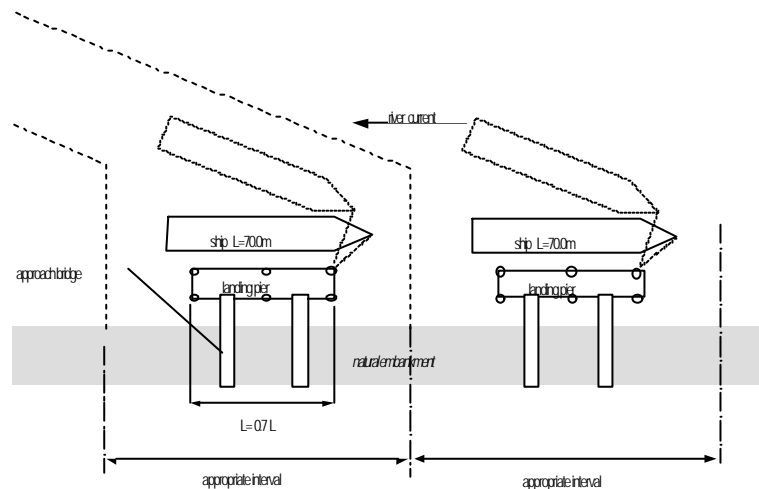


Source: JICA Study Team

Landing pier type berth facilities

Berth facilities of the landing pier type with iron structure has to take into account the mitigation of environmental impact and depth of water required to float a ship (draft). This type can be built at the embankment area in order to sustain a natural landscape. It is difficult to build a hard embankment surface due to the physical condition of the Nile River. The proposed dimensions that should be elaborated in further engineering study can be illustrated as follows.

Figure 2.9 Proposed Dimensions of Landing Pier Type Berth facilities



Source: JICA Study Team

Utilities of berth facilities

Berth facilities should be equipped with utilities such as electricity, water, and fuel, for use of ships and to control emission of pollutants from ships, considering mitigation of environmental pollution to the Nile River. The environmental functions of these utilities are as follows:

- To prevent periodic contamination of drinking water of ships;
- To minimize emission from diesel engines by the ready supply of electricity needed by ships in berth;
- To prevent ships from discharging sewerage and wastewater, such as high concentration detergents, into the Nile River or Lake Nasser;
- To prevent ships from discharging solid waste by providing a disposal system in the berth facilities; and

- To prevent oil and fuel spills by providing a disposal system in the berth facilities.

Within a framework principle that utility services in the berthing site play an intermediary role in management until they are connected to public service, in case of “Development Types A and B,” utilities can have adequate scale and capacity as a relay station according to each site condition.

On the other hand, beyond berth facilities areas, there would be a need to provide a network or system to connect utilities to sites so that waste could be discharged from ships. For utilities out of berth facilities area, three cases would be possible alternatives in consideration of the circumstance in each site. Refer to “Nile Cruise Environmental Management Program”.

Visitor facilities

Visitor facilities aim at serving tourists or visitors who use not only cruise ships but also tour buses or other modes of transportation. These facilities also provide information on attractions, tickets and rest places to visitors enjoying recreational activities such as “Felucca” or recreational boats. In order to meet these needs, the necessary components for visitor facilities can be formulated, and following the basic considerations below:

- To organize and manage various visitor traffic, including those of cruise ships, shuttle transportation to historic sites, excursion buses and others, by separation of each traffic flow or by time control, adequate parking measures, etc.;
- To provide adequate information facilities for visitors in order to guide them in the sites and the surrounding attractions, including ticketing service for other facilities such as recreational boats and coaches;
- To improve refreshment facilities, such as restaurants and tea shops, or provide them in suitable places for visitors, especially land excursion tourists, in consideration of existing condition;
- To provide or improve souvenir shops;
- To establish design codes or guidelines taking into account harmonizing landscape with surroundings, especially antiquity sites;
- To provide tenant spaces for above facilities in which local industries can participate;
- To create a comfortable environment with shade-trees and suitable alcoves to serve as rest places on the Nile River waterfront; and
- To provide security system with tourist police and other emergency aids.

2.5 Project Cost Estimate and Implementation

2.5.1 Project Cost Estimate

(1) Assumptions

The following assumptions have been made for cost estimation:

- Project cost is estimated based on market prices in November 1999 and inflation is not taken into account for cost and revenue estimate.
- Cost components consist of Direct Construction, Design and Supervision, Overheads Profits, excluding land acquisition costs and taxes.
- Foreign exchange rate as of the end of November 1999 is used during the whole project life as follows:
US\$ 1.00 = LE 3.40, LE 1.00 = Japanese Yen 30.00
- Target year is 2012 and the project is designed to meet the demand in 2012.

(2) Project cost

The investment cost of the project includes the development costs for the facilities as shown in Table 2.17. Project cost amounts to LE 1,354 million, excluding the costs for contingency, land

acquisition, all taxes and commercial facilities such as restaurants and souvenir shops. Total cost of the project as a package of sub-projects amounts to LE 1,354 million. This total cost is divided according to the time frame for project implementation (urgent action, short term and medium term), considering the scale, effect and other development program. Table 2.18 hereafter in detail.

- Urgent-action project cost	:	70	million LE (5%)
- Short-term project cost	:	678	million LE (50%)
- Medium-term project cost	:	606	million LE (45%)
Total project cost	:	1,354	million LE (100)

Note: UrgentAction projects are to be implemented within 2 years.
Short-term projects are to be implemented within 3 - 7 years.
Medium-term projects are to be implemented within 8 - 12 years.

Table 2.17 Facilities required for Investment

Category	Type of Facilities	Facilities included in project cost
Tourist facilities	Site sign and information	
	Public toilet and rest place	
	Ticket booth/security booth	
	Restaurant/coffee shop	
	Souvenir shop	
	Visitor parking	
	Pedestrian improvement	
Berthing facilities	Wharf embankment	
	Utility facilities	
	River dredging*	

Source: JICA Study Team

2.5.2 Project Implementation

(1) Implementation Schedule

The implementation schedule of the sub-projects depends on its nature and scale, readiness for implementation, etc. Table 2.19 shows a tentative schedule for the sub-projects.

Table 2.18 Investment Cost of the Berth Facilities Development Projects

Governorate	Project code	Description	Cost	Urgent			Short Term					Medium Term					
				2001	2002	2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
				(Unit: LE million)													
Nile River	BFR-01	Existing improvement - Qena city	27	2.7	11.9	11.9											
	BFR-02	Expansion - Qena city	40			2.0	11.0	18.0	9.0								
	BFR-05	Existing improvement - Esna city	20	2.0	6.1	6.1											
	BFR-06	Expansion - Esna city west bank	63														
		Sub-total	150	4.7	18.0	20.0	17.1	18.0	9.0	3.1	11.2	16.2	16.2	16.2	16.2	16.2	15.4
	BFR-03	New dev't - West bank of El toad	69														
	BFR-04	New development - El Toad	227		11.4	11.4	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1
		Sub-total	296	0.0	11.4	11.4	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1
	BFR-07	New development - El Kab site	18														
	BFR-08	Existing improvement - Eduf city	12	1.2	5.6	5.6											
	BFR-09	Expansion - Eduf city west bank	69			3.4	12.3	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6
	BFR-10	New development - Eduf east bank	97				4.9	4.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9
	BFR-11	New development - El Sisila site	18														
	BFR-12	Existing improvement - Kom Ombo	8	0.8	7.0												
	BFR-13	Expansion - Kom Ombo east bank	34			1.7	9.4	15.4	7.7								
	BFR-14	New development - Kom Ombo East bank	57														
	BFR-15	New development - Aswan New City	296			14.8	14.8	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
BFR-16	Existing improvement - Aswan city	47	4.7	9.4	9.4	9.4	9.4	4.7									
BFR-17	New development - Aswan east bank	200				10.0	10.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
	Sub-total	856	6.7	22.0	34.9	60.7	95.3	120.0	107.6	94.6	111.3	101.5	101.5	101.5	101.5	101.5	
	Total	1,303	11.4	51.4	66.3	111.9	147.5	163.1	144.8	143.3	180.4	148.5	133.1	133.1	133.1	133.1	
Lake Naser	BFL-01	Existing improvement - High Dam Port	7	0.7	2.2	2.2	2.2										
	BFL-02	New development - Pier for Kalabsha	3	0.3	2.7												
	BFL-03	New development - Dakkha/Madi	3			0.3	2.7										
	BFL-04	New development - Amada	3			0.3	2.7										
	BFL-05	New development - Qasir Ibrim	3			0.3	2.7										
	BFL-06	New development - North Kohr Area	0														
	BFL-07	New development - North Abu Simbel	30			1.5	5.4	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	
	BFL-08	Existing improvement - Abu Simbel	1	0.1	1.0												
	Sub-total	51	1.1	5.9	4.6	15.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	
	Aswan Governorate reference total	907	7.9	27.9	39.5	76.4	103.1	127.8	115.4	94.6	111.3	101.5	101.5	101.5	101.5	101.5	
	Total Investment Cost	1,354	12.5	57.3	70.9	127.6	155.3	170.9	152.6	143.3	180.4	148.5	133.1	133.1	133.1	133.1	

Note: Total projects cost excludes contingency, engineering services, land acquisition cost and every taxation.
Source: JICA Study Team

Table 2.19 Implementation Schedule for the Berthing Facilities Development Projects

Governorates	Project		Urgent				Short term				Medium term			
			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	Description	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Qena Governorate	BFR-01	Existing improvement - Qena city	-----	=====	=====									
	BFR-02	Expansion - Qena city			-----	=====								
	BFR-05	Existing improvement - Esna city	-----	=====										
	BFR-06	Expansion - Esna city west bank			-----	=====								
	BFR-03	New dev't - West bank of El toad								-----	=====			
	BFR-04	New development - El Toad			-----	=====								
	BFR-07	New development - El Kab site								-----	=====			
	BFR-08	Existing improvement - Eduf city	-----	=====										
Nile River	BFR-09	Expansion - Eduf city west bank			-----	=====								
	BFR-10	New development - Eduf east bank			-----	=====								
	BFR-11	New development - El Sisiia site												
	BFR-12	Existing improvement - Kom Ombo	-----	=====										
	BFR-13	Expansion - Kom Ombo east bank			-----	=====								
	BFR-14	New development - Kom Ombo East bank												
	BFR-15	New development - Aswan New City			-----	=====								
	BFR-16	Existing improvement - Aswan city	-----	=====										
Aswan Governorate (Nile River)	BFR-17	New development - Aswan east bank			-----	=====								
	BFL-01	Existing improvement - High Dam Port	-----	=====										
	BFL-02	New development - Pier for Kalabsha			-----	=====								
	BFL-03	New development - Dakkha/Wadi			-----	=====								
	BFL-04	New development - Amada			-----	=====								
	BFL-05	New development - Qasir Ibrim												
	BFL-06	North Kohr Area (Long Term)												
	BFL-07	New development - North Abu Simbel			-----	=====								
Lake Nasser Governorate (Nasser Lake)	BFL-08	Existing improvement - Abu Simbel	-----	=====										

Note: ----- Preparation stage (Study, design, etc.), ===== Construction stage
Source: JICA Study Team

(2) Implementation Agency

Major concerns for the implementation of this project are as follows:

- To coordinate the whole development area (Nile River and Lake Nasser) spanning the three governorates of Qena, Luxor City, Aswan;
- To implement the project smoothly by several agencies related to tourism development and water use with environmental consideration, from the central governments and agencies to the local level due to the wide range of character of this project; and
- To take into account the possible participation of the private sector according to its role and function on this project, from project implementation to operation.

Role of government and full integration and co-ordination

In order to implement the project smoothly and efficiently as an integrated cruise tourism facilities improvement in Upper Nile, it is recommended to formulate an organizational system in which several agencies will take charge of management of several activities on the utilization and cruise tourism development of the Nile River and Lake Nasser.

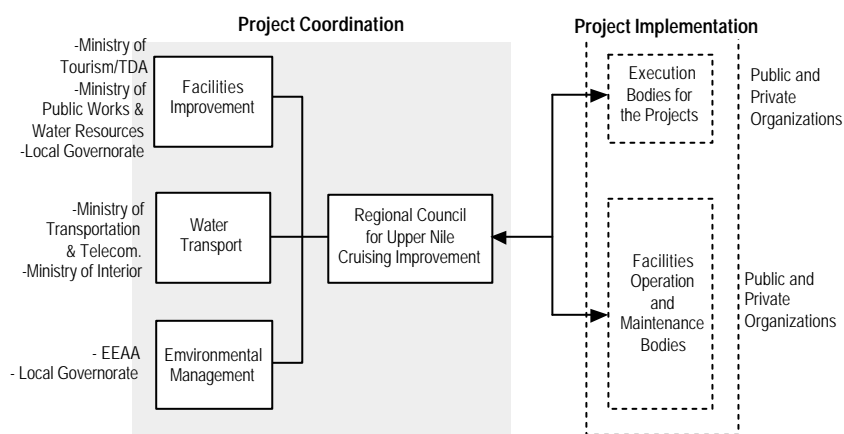
A suggested system comprising different agencies for the integrated cruise tourism facilities improvement is shown in Figure 2.12. Also, major matters to be coordinated by each agency are indicated in Table 2.20.

The projects would require initial investment from the public sector. The main functions of the project unit are summarized as follows:

- Coordinate line agencies and different levels of government involved in implementing the project;
- Monitor its progress; and
- Provide technical and financial assistance.

The proposed organization illustrated above should discuss the different issues of the project concerned and to take necessary actions for effective implementation of the project.

Figure 2.10 Organization of Coordinating Agencies for Integrated Cruise Tourism Facilities Improvement



Source: JICA Study Team

Table 2.20 Delineation of Responsibility of Coordinating Agencies for Integrated Cruise Tourism Facilities Improvement

Improvement activities		Ministry and Agency	MOT/ TDA	MOTR	MOPW WR	MOALR	SCA	MOI	EEAA	Local Gov
Water Transport	Navigational control system		-		-	-	-	-	-	
	River dredging					-	-	-		
	Cruising operation system				-	-	-	-	-	
Improvement of berth facilities	Berthing embankment facilities							-		
	Utilities support system			-		-	-	-	-	
	Tourist service facilities			-	-			-	-	
	Security system (fire and crimes)			-	-	-	-		-	
Facilities environmental management	Environmental equipment for ships				-	-	-	-		-
	Sustainable improvement of river banks			-			-	-		-
	Design control for improvement			-	-	-		-		-

Note: = major responsibility, = cooperation or coordination

MOTR = Ministry of Transportation, MOPWWR = Ministry of Public Works and Water Resources, MOALR = Ministry of Agriculture and Land Reclamation, SCA = Supreme Council of Antiquity, EEAA = Egyptian Environmental Affairs Agency

Source: JICA Study Team

Private-sector participation for Upper Nile cruise improvement

It should be considered that adequate implementation bodies would depend on the character of location to be developed, whether urban, rural or remote area in front of historical areas, and also on the character of project in terms of capability of private or public support. The improvement project can be classified by each type of berth facilities, as follows:

According to the type of berth facilities mentioned previously, development character can be classified as follows:

Type A: This type of large-scale development or improvement with urban amenities and utility services for cruise ships in front of major gateway cities could be suitable for private sector participation or public-private partnership.

Type B: This type of medium-scale development or improvement with utility services, which faces a tourist town or a new resort development area, could have the same possibility mentioned above.

Type C: This small-scale development or improvement of a tourist sightseeing area would be limited to private sector participation.

This project can be divided into the following components, which are suitable for direct implementation.

- Construction: (berth facilities, amenities, utilities)
- Maintenance and operation: (same as above category)
- Utilities (water supply, sewerage and solid waste, waste oil discharge in cooperation with public sector)
- Supplemental service (laundry service, commodities supply, etc. for cruise ships)

In response to above character of the project, suggested implementing bodies of berth facilities development are shown in Table 2.21.

Table 2.21 Suggested Implementing Bodies by Berth facilities Development Type

Berth facilities development type	Development and construction	Maintenance/ operation	Utilities support	Hotel operation support
Type A (Major station)	Private + Public	Private sector	Private sector	Private sector
Type B (Sub-station)	Private + Public	Private sector	Private sector	Private sector
Type C (One-stop pier)	Public sector	Private (consignment)	-	-

Source: JICA Study Team

2.6 Financial and Economic Evaluation

2.6.1 Financial Evaluation

(1) Assumptions

Financial viability of the project is examined under some assumptions as follows:

Project package

Twenty-five proposed projects are grouped into 10 project packages based on the location of berths as shown in Table 2.22. Financial viability is individually examined for the 10 packages. The existing berth of the east bank of Luxor is not included in the packages, because no additional development is proposed in the project.

Table 2.22 Ten Project Packages

Governorate	Project package	Location	Project	
			Code	
Qena Governorate	1	Qena-Dendera	BFR-01	Existing improvement-Qena City
			BFR-02	Expansion-Qena City
Luxor City	2	El Toad/Luxor	BFR-03	New development- west bank/El Toad
			BFR-04	New development- El Toad
Qena Governorate	3	Esna City	BFR-05	Existing improvement-Esna City
			BFR-06	Expansion-Esna City
Aswan Governorate (Nile River)	4	El Kab	BFR-07	New development-El-Kab
			BFR-08	Existing improvement-Eduf City
	5	Eduf City	BFR-09	Expansion-west bank Eduf City
			BFR-10	New development-east bank Eduf City
			BFR-11	New development-Gebel el Silsila
	6	Gebel el Silsila	BFR-12	Existing improvement-Kom Ombo
			BFR-13	Expansion-east bank Kom Ombo
			BFR-14	New development-east bank Kom Ombo
	7	Kom Ombo	BFR-15	New development-Aswan New City
			BFR-16	Existing improvement-Aswan City
8	Aswan New City	BFR-17	New development-east bank Aswan	
		BFR-18	Existing improvement-Aswan City	
Aswan Governorate (Lake Nasser)	10	Lake Nasser	BFL-01	Existing improvement-High Dam Port
			BFL-02	New development-Pier for Kalabsha
			BFL-03	New development-Dakka/Wadi
			BFL-04	New development-Amada
			BFL-05	New development-Qasr Ibrim
			BFL-06	New development-North Kohr Toughka
			BFL-07	New development-North Abu Simbel
			BFL-08	Existing improvement-Abu Simbel

Source: JICA Study Team

Construction cost by project package

Table 2.23 shows the development cost by development term and the share of civil works cost and utility development cost. Total development cost is estimated at LE 1,354 million, of which LE 70 million, LE 678 million and LE 606 million are for urgent action, short-term development and medium-term development, respectively. Cost for civil works shares 89 % of the total development cost.

Table 2.23 Initial Development Cost by Development Term

(Unit: LE million)

Project package	Site area (ha)	Urgent (2001-2002)	Short term (2003-2007)	Medium term (2008-2012)	Total cost	Share in total cost	Development cost share	
							Civil work	Utilities
1 Oena-Dendera	6.3	15	52	0	67	5%	55%	45%
2 El Toad/Luxor	7.8	11	148	137	296	22%	93%	7%
3 Esna City	6.3	8	15	60	83	6%	87%	13%
4 El Kab	1.6	0	0	18	18	1%	100%	
5 Eduf City	11.6	7	128	44	179	13%	90%	10%
6 Gebel el Silsila	1.6	0	0	18	18	1%	100%	
7 Kom Ombo	6.6	8	34	57	99	7%	89%	11%
8 Aswan New City	10.0	0	144	152	296	22%	93%	7%
9 Aswan City	16.9	14	113	120	247	18%	87%	13%
Sub-total	80.6	63	634	606	1,303	96%	89%	11%
10 Lake Nasser	3.0	7	44	0	51	4%	95%	5%
Ground total	83.6	70	678	606	1,354	100%	89%	11%

Source: JICA Study Team

Implementing body

The institutional arrangements for the implementation of the project have variously been proposed in the previous section. In order to identify the financial viability of each project package, however, it is assumed that an Integrated Company will implement each project package in the evaluation. And the financial performances of 10 Companies are examined.

Revenue

Revenue sources of the project for the Company are assumed to consist of (1) berthing charges of cruise ships, (2) utility charges to cruise ships, (3) berth rents of leisure boats, (4) developed land rents for shops and restaurants, and (5) parking charges of vehicles.

Demand (number of night-stay and stopover of cruise ships, number of visitors from river and land, and number of vehicles) is estimated by project package based on the development framework as shown in Table 2.24. After 2012 it is assumed that the demand will be constant for the financial evaluation.

The rates of the charges of revenues are assumed as shown in Table 2.25. It is assumed that the Company will not own and operate shops and restaurants but develop the land and lease it to the private sector. Meanwhile, parking is assumed as operated by the Company.

Table 2.24 Number of Berthing Ships, Visitors and Vehicles per Day in 2012

Project package	No. of berthing ships per day		No. of visitors per day		No. of vehicles per day
	Night stay ¹⁾	Excursion ²⁾	By ship ³⁾	By vehicle ⁴⁾	
1 Qena-Dendera	20 (22)	31	2,970	1,300	120
2 El Toad/Luxor	25 (28)	39	3,780	190	20
3 Esna City	20 (22)	31	3,105	1,300	120
4 El Kab	5 (6)	8	540	930	90
5 Eduf City	37 (41)	57	5,805	1,860	170
6 Gebel el Silsila	5 (6)	8	540	370	30
7 Kom Ombo	21 (23)	32	3,240	1,860	170
8 Aswan New City	32 (36)	50	4,860	190	20
9 Aswan City	54 (60)	84	8,100	1,860	170
10 Lake Nasser	9 (12)	17	1,620	830	80
Total	228 (256)	357	34,560	10,690	990

Note: 1) Figures in parentheses include the number of ships in-transit (refer to Table 2.12)
2) Cruise ship will stop at two berths per day excluding the berth for night stay and operating ratio is estimated at 70%.
3) Cruise ship passenger: Room occupancy rate is 60% and average number of passengers is 1.5 person per room
4) Number of visitors by vehicle is estimated based on the framework of the Upper Egypt Tourism Development
Source: JICA Study Team

Table 2.25 Assumptions on Revenue Sources and Rates of Charge

Revenue source	Rate of charge
1. Berthing charge	LE 700 per ship per night of stay LE 400 per ship per stop for sightseeing excursion ¹⁾
2. Utility service for sewerage and waste disposal	LE 10 per room of cruise ship per day ²⁾
3. Berth rents of leisure boats	LE 20 per ship per day
4. Land rents to shops and restaurants	LE 5 per m ² per month
5. Parking charge of vehicles	LE 5 per vehicle

Source: JICA Study Team

Operation and maintenance costs

Operation and maintenance cost of the project for the Company consists of (a) land rent (b) operation and maintenance cost of utilities and disposal cost of wastes of the utility services and (c) operation and maintenance cost berth and public areas. Based on the available information, expenditure is assumed as shown in Table 2.26.

Table 2.26 Assumptions on Operation and Maintenance Costs

O & M costs	Rate of expenses
1. Land rent	LE 3 per m ² per year
2. O & M costs for facilities including payment for the charges for sewerage and waste disposal	3% of construction cost of facility per year Half of utility services revenue is estimated to be spent as disposal costs of sewerage and waste
3. O & M costs for berth and public areas	1 - 4% of construction costs estimated depend on kind of development type

Source: JICA Study Team

Evaluation period

Average life period of the facility is assumed to be 25 years. Therefore, financial pre-feasibility is examined over the period until 2032. As results of the project implementation, some project packages expect revenue from 2007 during the short-term period and others from 2012 during the medium-term period. The year when the Company will start to receive revenue is assumed as shown in Table 2.27 based on the implementation schedule.

Table 2.27 Year of Starting Operation of Facility

Project package	Revenue				
	Berthing charge for cruise ships	Utility service charge	Berthing charge for leisure boat	Land rents for shops & restaurants	Parking charge for vehicles
1 Qena-Dendera	2007	2007	2007	2007	2007
2 El Toad/Luxor	2007	2007	2012	2012	2007
3 Esna City	2007	2007	2007	2007	2007
4 El Kab	2012	No service	No service	2012	2012
5 Eduf City	2007	2007	2007	2007	2007
6 Gebel el Silsila	2012	No service	No service	2012	2012
7 Kom Ombo	2007	2007	2007	2007	2007
8 Aswan New City	2007	2007	2012	2012	2007
9 Aswan City	2007	2007	2007	2007	2007
10 Lake Nasser	2007	2007	2007	2007	2007

Source: JICA Study Team

(2) Financial Evaluation

Table 2.28 shows the financial viability in the following indicators:

- Net cash flow over the project period from 2000 to 2032
- Net Present Value (discount rate at 8%)
- Financial Internal Rate of Return

Cash flows of each project package are prepared from Table 2.29 to Table 2.38 and the integrated cash flow of the project is also prepared in Table 2.39. Interest payment and inflation are not taken into account in the cash flows.

Table 2.28 FIRR and NPV of the 10 Project Packages

Project package	Net cash flow (LE million)	NPV (r=8%) (LE million)	FIRR	
Nile River	Qena-Dendera	183	23	11.9%
	El Toad/Luxor	-72	-138	-
	Esna City	159	17	11.9%
	El Kab	30	2	9.9%
	Eduf	216	-22	6.2%
	Gebel el Silsila	27	1	9.3%
	Kom Ombo	130	-2	7.6%
	Aswan New City	33	-98	0.8%
	Aswan City	384	19	9.4%
Lake Nasser Corridor	62	-10	5.6%	
Total	1,151	-209	5.2%	

Source: JICA Study Team

Financial viability of total development

As shown in Table 2.23, total development cost of the project is estimated at LE 1,354 million over the period from 2001 to 2011. In 2012, when all the projects are scheduled to be completed, total number of cruising ships will be 256. For 256 ships, 11,520 passengers will be expected per day. In 2012 total revenue of the project is estimated at LE 143 million per year, while total operating and maintenance cost is estimated at LE 40 million. Accordingly, annual net cash flow is calculated at LE 103 million in 2012, though the interest payment, inflation and taxes are not taken into account.

Total development cost, including initial investment cost and operation and maintenance cost, is

estimated at about LE 2,380 million over the project period until 2032. That is an average development cost per cruise ship passenger per day of LE 23.

Net cash flow of the project is estimated to accumulate LE 1,151 million, as shown in Table 2.28. Assuming a discount rate at 8%, the Net Present Value (NPV) is a deficit of LE 209 million. The Financial Internal Rate of Return (FIRR) is estimated at 5.2%, which is low for private sector to invest.

Financial viability of project package

FIRRs of each 10 packages vary from 0.8% to 11.9%. It is noted that the FIRR of 10 packages is not the indicator that shows the order or priority of implementation among them. It indicates the magnitude of requirement for public sector's involvement for financing of the individual project packages. Namely, for the implementation of the project package, which shows low FIRR, financial sources with subsidies from the government should be considered. It is important for the implementation of the project that every project package will be implemented on the proposed schedule when considering the impact of cruise ships on the Nile environment.

In Qena-Dendera, Esna City and Aswan City packages, the facility improvement and expansion plan are included and no new development is proposed. Therefore profitability of those packages are comparatively high. Their FIRRs are 11.9%, 11.9% and 9.4% for Qena-Dendera, Esna City and Aswan City respectively. However they are still low for private sector's profitability to implement the project.

El Kab and Gebel el Silsila are located at rural areas and are new berth developments. Those project packages are proposed as a limited development, namely "floating bridge type development (Type C)". They will not provide utility services and those services need to be provided by other berth facilities. Their development scale is small sharing 1% of total development cost, as shown in Table 2.23. The FIRR is comparatively high at 9.9% and 9.3% in El Kab and Gebel el Silsila respectively. However it is a key factor for the financial performance of these two berths, whether the target number of passenger arrivals will be attained or not. The contribution of the development to local economy will be expected in the area.

El Toad and Aswan New City packages are new developments located in gateway cities. Therefore, they require huge initial investment costs. Each development cost of El Toad and Aswan High City package amounts to 22% of total cost. Their profitability is very low. Luxor City Development Plan and Aswan New City Development Plan are in progress in those cities by UNDP and the Ministry of Housing Utilities and Urban Communities. Under these circumstances, it will be required that the public sector subsidize a considerable part of development cost for these two packages.

External financing

External financial resources such as soft loan with subsidized conditions should also be considered to finance the initial investment cost of the project.

Table 2.29 Cash Flow of Qena-Dendera Passenger Landing Facility Development

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
I. Demand																																				
1) Berthing ship (night stay) per day	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
Berthing ship (utility charge) per day	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
2) No. of Ship	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
No. of room	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
3) Passenger of ship	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	
(No. per room 1.5, occupancy 60%)																																				
4) Visitor from ship per day	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	
Night stay visitor	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	1,485	
Sightseeing visitor	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	
Total visitor	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	4,455	
5) Visitor from land per day	320	424	561	742	982	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	
6) No. of vehicle per day	30	40	52	69	91	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	
II. Development																																				
1) Land (ha)	6.3	ha																																		
2) Rent space (shop & restaurant)	1,300	m ²																																		
3) Berth rent for leisure boat	10																																			
III. Cash outflow (LE million)																																				
1) Development cost	66.6																																			
Share of civil work	55%																																			
2) O & M costs																																				
1) Land rental fee	LE3	per m ²																																		
2) Utility	3%																																			
3) Berth & public space	4%																																			
Total (O & M)	168.4																																			
Total cash outflow	2.7	11.9	13.9	11.0	18.0	9.0																														
IV. Cash inflow (LE million)																																				
1) Revenue																																				
1) Berthing charge (night stay)	LE700	per ship per day																																		
Berthing charge (sightseeing)	LE400	per ship per day																																		
2) Utility Service	LE10	per room																																		
3) Berthing charge of leisure boat	LE20	per ship per day																																		
4) Land rent fee (shop & restaurant)	LE5	per m ² per month																																		
5) Parking charge of vehicle	LE5	per vehicle																																		
Total revenue	350.9																																			
Total cash inflow	350.9																																			
V. Net cash flow (LE million)																																				
1) Annual net cash-flow	182.5																																			
2) Accumulate net cash-flow	-2.8	-12.1	-14.1	-11.2	-18.2	-9.2	13.8	13.9	13.9	14.0	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	
VI. Financial indicator																																				
FIRR	11.9%																																			
NPV (r=8%)	23.0	LE million																																		

Source: Study team

Table 2.30 Cash Flow of El Toad/Luxor City Passenger Landing Facility Development

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033			
I. Demand																																					
1 Berthing ship (night stay) per day			10	10	10	10	10	10	10	10	10	10	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
2 No. of ship			11	11	11	11	11	11	11	11	11	11	11	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
3 Passenger of ship			600	600	600	600	600	600	600	600	600	600	600	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	
4 Visitor from ship per day			540	540	540	540	540	540	540	540	540	540	540	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	
5 Night stay visitor			540	540	540	540	540	540	540	540	540	540	540	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	
6 Sightseeing visitor			1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	2,520	
7 Total visitor			1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	
8 Visitor from land per day			20	31	49	77	121	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
9 No. of vehicle per day			2	3	5	8	13	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
II. Development																																					
1 Land (ha)																																					
2 Rent space (shop & restaurant)																																					
3 Berth rent for leisure boat																																					
4 Development cost			296.1																																		
5 Share of civil work			93%																																		
III. Cash outflow (LE million)																																					
1 Land rental fee			0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
2 Utility			1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
3 Berth & public space			2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
4 Total (O & M)			0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
5 Total cash outflow			0.0	11.6	11.6	34.3	34.3	38.4	41.8	57.3	35.1	19.7	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	
IV. Cash inflow (LE million)																																					
1 Revenue																																					
2 Berthing charge (night stay)			2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	
3 Berthing charge (sightseeing)			2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
4 Utility Service			1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
5 Berthing charge of leisure boat														0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
6 Land rent fee (shop & restaurant)														0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
7 Parking charge of vehicle														0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
8 Total revenue			0	0.0	0.0	0.0	0.0	6.3	6.3	6.3	6.3	6.3	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	
9 Total cash inflow			0	0.0	0.0	0.0	0.0	6.3	6.3	6.3	6.3	6.3	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	
V. Net cash flow (LE million)																																					
1 Annual net cash-flow			0.0	-11.6	-11.6	-34.3	-34.3	-32.1	-35.5	-50.9	-28.8	-13.4	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	
2 Accumulate net cash-flow			0.0	-11.6	-23.2	-57.6	-91.9	-126.3	-168.3	-193.8	-244.7	-278.5	-266.9	-276.7	-266.5	-246.0	-235.8	-225.6	-215.4	-205.2	-184.8	-174.6	-164.3	-154.1	-143.9	-133.7	-123.5	-113.3	-103.1	-92.9	-82.6	-72.4	-62.2	-52.0	-41.8		
VI. Financial indicator																																					
FIRR																																					
NPV (r=8%)																																					

Source: Study team

Table 2.31 Cash Flow of Esna City Passenger Landing Facility Development (2001-2032)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
I. Demand																																				
1 Berthing ship (night stay) per day		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20		
Berthing ship (utility charge) per day		22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
2 No. of Ship		22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
No. of room		22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
3 Passenger of ship		1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100		
4 Visitor from ship per day		990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	
5 Night stay visitor		990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	
6 Signposting visitor		1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	
Total visitor		2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970
7 Visitor from land per day		320	424	561	742	982	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	
8 No. of vehicle per day		30	40	52	69	91	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	
II. Development																																				
1 Land (ha)		6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	
2 Rent space (shop & restaurant)		1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	
3 Berth rent for leisure boat		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
III. Cash outflow (LE million)																																				
1 Development cost		83.22																																		
Share of civil work			2.0	6.1	6.1	6.1	6.1	0.0	0.0	3.2	11.3	16.2	16.2	16.2	0.0																					
2 O & M costs																																				
1) Land rental fee			0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
2) Utility			1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
3) Berth & public space			1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
Total (O & M)			0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Total cash outflow			2.2	6.3	6.3	6.3	6.3	0.2	0.2	6.3	14.4	19.3	19.3	19.3	3.3																					
IV. Cash inflow (LE million)																																				
1 Revenue																																				
1) Berthing charge (night stay)			5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1		
Berthing charge (sightseeing)			4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
LE400 per ship per day			2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
2) Utility Service			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
LE10 per room			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
3) Berthing charge of leisure boat			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
LE20 per ship per day			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
4) Land rent (shop & restaurant)			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
LE5 per m ² per month			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
5) Parking charge of vehicle			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
LE5 per vehicle			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Total revenue			329.1	0	0.0	0.0	0.0	0.0	12.3	12.3	12.3	12.4	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7		
Total cash inflow			329.1	0	0.0	0.0	0.0	0.0	12.3	12.3	12.3	12.4	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7		
V Net cash flow (LE million)																																				
1 Annual net cash-flow			-2.2	-6.3	-6.3	-0.2	-0.2	5.9	-2.2	-7.0	-7.0	-7.0	-36.7	-29.3	-19.9	-10.5	-1.0	8.4	17.8	27.2	36.6	46.0	55.4	64.9	74.3	83.7	93.1	102.5	111.9	121.3	130.7	140.2	149.6	159.0		
2 Accumulate net cash-flow			-2.2	-																																

Table 2.32 Cash Flow of El Kab Passenger Landing Facility Development (2001-2032)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
I. Demand																																				
1) Berthing ship (night stay) per day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Berthing ship (utility charge) per day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2) No. of ship	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
No. of room	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3) Passenger of ship	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
(No. per room 1.5, occupancy 60%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4) Visitor from ship per day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Night stay visitor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sightseeing visitor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total visitor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5) Visitor from land per day	90	144	229	365	583	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	
6) No. of vehicle per day	10	16	24	37	58	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	
II. Development																																				
1) Land (ha)	1.6	ha																																		
2) Rent space (shop & restaurant)	200	m ²																																		
3) Berth rent for leisure boat	0																																			
III. Cash outflow (LE million)																																				
1) Development cost	17.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.1	6.4	6.4	0.0																							
Share of civil work	100%																																			
2) O & M costs																																				
1) Land rental fee	LE3 per m ²	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
2) Utility	3%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3) Berth & public space	2%	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
LE 22 per m ²																																				
Total (O & M)	26.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.2	6.5	6.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.2	6.5	6.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
IV. Cash inflow (LE million)																																				
1) Revenue	56.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1) Berthing charge (night stay)	LE700 per ship per day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Berthing charge (sightseeing)	LE400 per ship per day	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
2) Utility Service	LE10 per room	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3) Berthing charge of leisure boat	LE20 per ship per day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4) Land rent (feetshop & restaurant)	LE5 per m ² per month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5) Parking charge of vehicle	LE5 per vehicle	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total revenue	56.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total cash inflow	56.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V. Net cash flow (LE million)																																				
1) Annual net cash-flow	29.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.9	-4.2	-6.5	-6.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
2) Accumulate net cash-flow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.9	-5.1	-11.6	-18.0	-15.8	-13.5	-11.2	-8.9	-6.7	-4.4	-2.1	0.2	2.4	4.7	7.0	9.3	11.5	13.8	16.1	18.4	20.6	22.9	25.2	27.5	29.7	29.7		
VI. Financial indicator																																				
FIRR	9.9%																																			
NPV (r=8%)	14.5LE million																																			

Source: Study team

Table 2.34 Cash Flow of Gebel el Silsila Passenger Landing Facility Development (2001-2032)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032						
I. Demand																																							
1 Berthing ship (night stay) per day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Berthing ship (daily charge) per day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2 No. of Ship	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
No. of room	50																																						
3 Passenger of ship																																							
(No. per room 1.5, occupancy 60%)																																							
4 Visitor from ship per day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Night stay visitor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Sightseeing visitor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total visitor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5 Visitor from land per day	20	36	64	115	206	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370		
6 No. of vehicle per day	2	3	6	10	17	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30		
II. Development																																							
1 Land (ha)	1.6	ha																																					
2 Rent space (shop & restaurant)	200	m ²																																					
3 Berth rent for leisure boat	0																																						
III. Cash outflow (LE million)																																							
1 Development cost	17.85																																						
Share of own work	100%																																						
2 O & M costs																																							
1) Land rental fee	LE3	per m ²																																					
2) Utility	3%																																						
3) Berth & public space	2%																																						
LE.22	per m ²																																						
Total (O & M)	25.5																																						
Total cash outflow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.2	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5		
IV. Cash inflow (LE million)																																							
1) Revenue																																							
1) Berthing charge (night stay)	LE700	per ship per day																																					
Berthing charge (sightseeing)	LE400	per ship per day																																					
2) Utility Service	LE10	per room																																					
3) Berthing charge of leisure boat	LE20	per ship per day																																					
4) Land rent fee (shop & restaurant)	LE5	per m ² per month																																					
5) Parking charge of vehicle	LE5	per vehicle																																					
Total revenue	54.0																																						
Total cash inflow	54.0																																						
V. Net cash flow (LE million)																																							
1 Annual net cash-flow	27.4																																						
2 Accumulate net cash-flow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.9	-4.2	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5			
VI. Financial indicator																																							
FIRR	9.3%																																						
NPV (r=8%)	1.0	LE million																																					

Source: Study team

2.6.2 Economic Evaluation

The economic viability of the project has been examined under the following assumptions:

(1) Benefits

The project will produce the benefits as follows:

- To provide convenient and safe use of cruising accommodations and other water recreational facilities for the cruising tourists;
- To offer efficient services and smooth operation of river tourism for cruising ship companies;
- To formulate attractive and comfortable environment of waterfront areas for the tourists;
- To improve the living environment for the residents in the areas;
- To contribute the regional economy through incremental tourist expenditure; and
- To prevent Nile River and Nasser Lake with historical assets which are the world heritage from deteriorating its environment by cruising tourism development

Therefore, the beneficiaries of the projects will be the tourists, the residents in the areas and cruising company. Considering the contribution of the project to the preservation of world heritage, all the people in the world as well as the people in the future will be the beneficiaries of the project.

Although the benefits mentioned above should be evaluated in the economic analysis, some are difficult to be measured and some are not the benefits of the country. In the economic analysis, therefore, the followings are estimated as benefits of the project:

Increase of willingness to pay of the cruising ship company

The berthing charges of the proposed berth facilities are assumed to be about 25 % higher than the current charges. For the improved berthing facilities due to the project implementation, the cruising ship owners are willing to pay additional charges and it can be measured as benefits of the project. For the payment from the increased number of cruising ships, total amount of berthing charges could be regarded as benefits.

GDP contribution of visitor expenditure

It is assumed that visitor from ships as well as from land will consume LE 10 per person per visit at the berthing facility in restaurants and shops. Therefore, there will be additional income for national economy through those expenditures. The contribution of the visitor expenditure to GDP is assumed to be the benefits of the project. LE 6.27 is estimated to be the direct contribution to GDP of the country by using Input-Output Table, when one visitor consumes LE 10 as shown in Table 2.40.

Table 2.40 Direct GDP Contribution of Expenditure per Passenger

Expenditure item	Assumed Expenditure per passenger	Coefficient of Value Added ⁽¹⁾	Value added per passenger (Direct contribution to GDP)
Food and beverage expenditure in restaurants & coffee shops	LE 5.0	0.444 ⁽²⁾	LE 2.22
Expenditure in other shops	LE 5.0	0.810 ⁽³⁾	LE 4.05
Total	LE 10.0	0.627 (average)	LE 6.27

Source: JICA Study Team

Note: ⁽¹⁾ Input/Output Table, 1991/92, Central Agency for Public Mobilization and Statistics, ⁽²⁾ Coefficient of restaurants & hotels sector, ⁽³⁾ Coefficient of whole sale & retailing sector

Furthermore, the indirect contribution to GDP, which will be produced through multiplier effects of passenger expenditure within the national economy, could be assumed to be 30 % of

the direct contribution.

Based on the assumptions mentioned above, total benefits of the project are estimated as shown in Table 2.41. The present value of benefits will amount to LE 2,081 million over the project period up to 2032 assuming the discount rate at 8 %. Increased willingness to pay ship company, Direct GDP and Indirect contribution of visitor expenditure account for 38 %, 48 % and 14 % of the total benefits, respectively.

Table 2.41 Benefits of the Project

Benefits	NPV (discount rate = 8%)	%
Increased willingness to pay of cruising ship company	LE 799 million	38 %
Direct GDP contribution by visitor expenditure	LE 986 million	48 %
Indirect GDP contribution by visitor expenditure	LE 296 million	14 %
Total	LE 2,081 million	100 %

Source: JICA Study Team

(2) Economic cost

The cost of the project consists of the followings:

- Capital investment cost of implementing bodies of the project;
- Operation and maintenance cost by implementing bodies of the project; and
- Private capital investment and O/M costs of commercial facilities

Investment and O/M Costs of Implementing Bodies in Economic Prices

The economic costs for the investment and O/M costs of the implementing bodies are estimated as shown in Table 2.42. The Standard Conversion Factor is assumed at 0.95 in order to convert the financial cost to the economic cost.

Table 2.42 Public Investment Cost of the Berthing Facility Development Project

(Unit: LE million)

	Total cost	Urgent action		Short Term					Medium Term			
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Financial cost												
- Investment cost	1,353	12.5	57.3	70.9	127.8	155.3	170.9	152.6	143.4	180.4	148.5	133.1
- O/M cost		1.5	1.8	2.1	2.1	2.1	2.1	35.8	35.9	35.9	35.9	35.9
Economic cost												
- Investment cost	1,285	11.9	54.4	67.4	121.4	147.5	162.3	145.0	136.2	171.4	141.1	126.4
- O/M cost		1.4	1.7	2.0	2.0	2.0	2.0	34.0	34.1	34.1	34.1	34.1

Source: JICA Study Team

Private Investment and O/M Costs in Economic Prices

Private investment cost of commercial facilities such as restaurants and shops is estimated at LE 24.8 million at financial prices or LE 23.6 million in economic prices for Type A Development as shown in Table 2.43. Type B and Type C Development will not include commercial facilities.

Table 2.43 Private Investment Costs of Commercial Facilities

(Unit: LE million)

Project Package	Project code	Description	Cost	Urgent		Short Term				Medium Term								
				2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012			
1	BFR-01	Existing improvement - Qena city	2.8		0.5													
	BFR-02	Expansion - Qena city	0.0			2.3												
	BFR-05	Existing improvement - Esna city	2.1				0.5	1.6										
	BFR-06	Expansion - Esna city west bank	0.0															
		Sub-total		4.9	0.5	2.8	1.6											
		New dev'nt - West bank of El toad		0.0														
2	BFR-04	New development - El Toad	4.9							1.5	3.4							
		Sub-total		4.9	0.0	0.0	0.0	0.0	0.0	1.5	3.4							
Nile River	BFR-07	New development - El Kab site	0.0															
	BFR-08	Existing improvement - Eduf city	1.3			1.3												
	BFR-09	Expansion - Eduf city west bank	0.0															
	BFR-10	New development - Eduf east bank	0.0															
	BFR-11	New development - El Silsila site	0.0															
	BFR-12	Existing improvement - Kom Ombo	0.8		0.8													
	BFR-13	Expansion - Kom Ombo east bank	0.0															
	BFR-14	New development - Kom Ombo East bank	0.0															
8	BFR-15	New development - Aswan New City	6.3										1.0	2.7	2.6			
	BFR-16	Existing improvement - Aswan city	4.9			0.5	2.2	2.2										
	BFR-17	New development - Aswan east bank	0.0															
		Sub-total		13.3	0.0	0.8	1.8	2.2	2.2	0.0	0.0	0.0	1.0	2.7	2.6	0.0		
	Total		23.1	0.0	1.3	4.6	3.8	2.2	1.5	3.4		1.0	2.7	2.6	0.0			
Lake Naser	BFL-01	Existing improvement - High Dam Port	1.1		0.5	0.6												
	BFL-02	New development - Pier for Kalabsha	0.0															
	BFL-03	New development - Dakkha/Wadi	0.0															
	BFL-04	New development - Amada	0.0															
	BFL-05	New development - Qasir Ibrim	0.0															
	BFL-06	New development - North Kohr Area	0.0															
	BFL-07	New development - North Abu Simbel	0.6							0.6								
	BFL-08	Existing improvement - Abu Simbel	0.0															
	Sub-total		1.8	0.0	0.5	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Aswan Governorate reference total		15.1	0.0	1.3	2.4	2.2	2.2	0.6	0.0	0.0	1.0	2.7	2.6	0.0	0.0	0.0	
	Total Private Investment Cost for Commercial Facilities in Financial Prices		24.8	0.0	1.8	5.2	3.8	2.2	2.1	3.4		1.0	2.7	2.6	0.0	0.0	0.0	
	Total Private Investment Cost for Commercial Facilities in Economic Prices		23.6	0.0	1.7	4.9	3.6	2.1	2.0	3.2		1.0	2.6	2.5	0.0	0.0	0.0	

Source: JICA Study Team

Operation costs for commercial facilities per visitor is estimated using the Input and Output Table as shown in Table 2.44.

Table 2.44 Assumptions on Cost for Commercial Facilities

Expenditure item	Expenditure per visitor	Coefficient of direct cost for commercial facilities *1)	Operation cost for commercial facilities per passenger (Direct contribution to GDP)
Food and beverage expenditure in restaurants & coffee shops	LE 5.0	0.118 *2)	LE 0.590
Expenditure in other shops	LE 5.0	0.107 *3)	LE 0.535
Total	LE 10.0	0.113 (average)	LE 1.127

Source: JICA Study Team

Note: *1) Coefficient of direct cost for commercial facilities is calculated based on total coefficient of "Labor income". Intermediate input, indirect tax and subsidies are excluded from the cost. 2) Coefficient of "Labor income" for restaurants & hotels sector, 3) Coefficient of "Labor income" for whole sale & retailing sector

(3) Economic evaluation

Based on the above assumptions, annual benefits and economic costs are calculated as shown in Table 2.46. The Economic Internal Rate of Return (EIRR) is estimated at 10.0 %. Assuming the discount rate at 8 %, the Net Present Value (NPV) is estimated at LE 173.3 million.

The sensitivity of the project is examined for the assumed cases as shown in Table 2.45:

Table 2.45 Sensitivity Analysis

Economic indicator	Base Case	20 % decrease of benefits
EIRR	10.0%	6.6%
NPV discounted by 8%	LE 173.3 million	- LE 110.0 million

Source: JICA Study Team

2.7 Implementation Program for the Nile Cruise Environmental Management (NCEM)

This program for the Nile Cruise Environmental Management (NCEM) focusing on cruise tourism in Upper Nile describes the proposed management measures including options and priorities, for the cruising facilities improvement projects aforementioned in terms of environmental sustainability along the Nile River for short- and medium-term programs.

Cruise tourism might play a leading role in promoting and enhancing environmental management of the Nile River if NCEM should show an adequate environmental management model for other sector industries or other economic activities with huge amount of effluent anticipated into the Nile River. Major roles of NCEM program expected to improve the Nile River environment are indicated below.

- To mitigate the environmental impact from cruise tourism development on the Nile River and Lake Nasser;
- To assure the sustainable cruise tourism of the Nile Valley as a pillar product of Upper Nile;
- To contribute to the qualitative advancement of cruise tourism;
- To involve local industries and communities in environmental improvement; and
- To contribute to the enlightenment of tourists on environmental issues of the Nile's natural environment.

2.7.3 Nile Cruise Environmental Management Program

In order to cope with environmental issues in relation with the cruise tourism summarized in Table 2.47, the NCEM program is proposed in conjunction with the berth facilities improvement project, including infrastructure development for utilities.

Table 2.47 Possible Impacts of Cruise Tourism to the Nile River and Lake Nasser Environments

Matrix	Possible Pollutant and Risks	Environmental Impact
Cruise Ships	<ul style="list-style-type: none"> - Drinking water tank - Waste water, Solid waste, Oil and fuel spills - Drainage from rooms and kitchen, laundry service, etc (detergent, nutrient waste water) - Emission from diesel engine - Refuse by passengers 	<ul style="list-style-type: none"> - Contamination and health problem to passengers - Raw wastes effluent and pollution of the Nile River and Lake Nasser water resource for drinking water and irrigation water - Air pollution, global climate change(CO₂) - Effects on ecological habitats of the Nile River
Berth facilities	<ul style="list-style-type: none"> - Inappropriate construction measures and materials - Inappropriate treatment facilities and management of waste disposal in operation stage - Inappropriate utilities for visitor facilities in operating stage 	<ul style="list-style-type: none"> - Erosion and sediment in construction stage - Noise and vibration in construction stage - Impacts to sensitive river ecosystems - Diffusion of effluvia to surroundings and scavenger problem - Effluent of waste of land facilities to the Nile River - Bad visual impacts and physical alteration to the Nile's natural landscape or historical environment

Source: JICA Study Team

(1) Nile cruise environmental management system

Taking account of the limits in mitigating emission and managing waste from cruise ships by themselves in terms of cost and technology, cruise ships should get involved in and be supported by another environmental management system. On the other hand, berth facilities can also play an important role in providing cruise ships with a well-organized system to treat their emissions and waste.

In case of insufficient facilities and management in the berthing area in Lake Nasser, cruise ships should minimize discharge of pollutants by using high standard equipment of their own. From these points of view, there should be cooperation in every part of environmental management for an integrated management system.

(2) Cruise ship environmental management

Coping with insufficient treatment facilities for waste in both ship and berthing areas in spite of the existence of regulations and some facilities, the environmental management for cruise ships should play a key role until utility services for berth facilities are sufficiently provided to meet future waste demand of ships. In order to minimize the emission and waste of cruise ships, targeting “ zero-emission,” the following components are proposed.

Waste management system formulation

In spite of indications of waste problem from cruise ships, it is not clear where exactly the pollutants are coming from and how they are discharged. It should be investigated and diagnosed by adequate assessment. Appropriate and efficient management system could be formulated through several studies shown below.

- Investigation of existing system and facilities of ships by category and diagnosis of discharge standard and activities quantitatively and qualitatively;
- Carrying out an Environment Assessment commensurate with the degree of potential impacts and any issues of cruise ships; and
- Evaluation of do-able measures to manage waste from ships in both sides of self-treatment system and discharge system to berth facilities in terms of technology and economic assessment.

Hotel operational improvement for environmental management

Effluent from cruise ships as cruise ships is apt to directly affect water environment in comparison with inland hotels owing to their insufficient treatment facilities. In this context, cruise ships should be strictly managed beyond inland hotel environmental management standards.

Mitigation measures

As for equipment standard improvement of cruise ships,

- Primary and secondary treatments are required to satisfactorily process effluents unless they are discharged to berth facilities (even if berth facilities will be provided, pre-treatment is inevitable);
- Water effluent reduction by water recycling should be carried out where feasible such as sewerage system by gray water usage for sanitary equipment; and
- Air emission from diesel engine requires bag-house filters to control particulate matter.

As for waste discharge system to land area,

- Solid and liquid wastes (sewer, wastewater, oil and fuel spills) disposal alternatives should include removal to on-site or off-site managed disposal facilities of berth facilities.

As for hotel operational improvement,

- Outsourcing system of hotel operation of laundry service that require water and detergent consumption, in order to minimize effluent on board; and

- Water conservation by minimizing hotel guests' consumption of water with enlightenment of environmental concerns.

Environmental awareness program for cruise crews and related staff

Crews of ships are important key factors whether NCMP achieve the goal to mitigate environmental impacts or not. In order to enlighten crews and related staff about environmental management, educational programs consisting of "training program" and "awareness workshop" should be introduced.

As for training program,

- Basic operation and management of ship equipment in terms of environmental management
- Emergency training in order to minimize environmental impacts
- Monitoring training of waste and emissions from ship

As for awareness workshop and program,

- Basic instruction and education on environmental management of ships
- Evaluation and assessment of existing activities of crews and related staff by themselves with expert program
- Preparation of educational and instructive materials such as brochures, posters, audio-visual materials, etc.

(3) Berth facilities environment management

The proposed berth facilities development with adequate water supply, solid and liquid waste disposal facilities, and electricity supply reducing the pollution from the cruise ships play key roles in the NCMP. On the other hand, all waste should be disposed finally in the inland area in cooperation with public or private services. This section describes the environmental management within berth facilities only, except inter-relation management with possible services.

Utilities station management alternatives

Beyond berth facilities areas, there would be a need to provide a network or system to connect utilities to sites so that waste could be discharged from ships. For utilities out of berth facilities area, three cases would be possible alternatives in consideration of circumstance in each site:

Case 1: Connection with existing public utility network or service

This is the most favorable case possible to discharge waste to the public utility service; however, the capacity of facilities in city service side should be examined. This case can be applied to the gateway cities and major tourist towns that might have adequate utility service network.

Case 2: Connection with new utility network or service

In case of the berth facilities beside new resort development areas such as El Toad of Luxor or New Aswan City, this connection is economically feasible in order to introduce semi-self-treatment system as common facilities.

Case 3: Introduction of self-treatment system

In case there is no utility service network, it is possible to transfer the waste from ship to final disposal areas that will be managed by related companies from berth facilities by barges in waterway or special road transport. However, it will be necessary to examine whether the project should include the development of a self-treatment system or not.

Mitigation measures during construction of berth facilities

Several measures related to the siting, construction and operation of facilities could be taken to minimize their impact on the Nile's water environment.

EIA is key to ensuring that the impacts of the project are identified and that appropriate mitigation measures are recommended for action. According to this EIA, environmental

standard and guideline and approval process should be required.

- Planning and site selection and evaluation
- Construction measures assessment
- Design guideline and facility standard with appropriate approval process
- Environmental impact assessment

Especially, site selection stage is one of the most important stages in which in-depth engineering study and EIA in terms of compatibility between the assurance of safe navigation against river current and character of natural sediment are conducted. And land availability of berth facilities against existing character such as agricultural land or local community areas, should be considered in the site selection stage.

And in construction stage the following controls are needed.

- There should be erosion and sediment control in the construction area and adequate construction method should be utilized.
- Periodic monitoring should be conducted during project operation.
- There should be materials control in terms of restoration, planting, local materials usage in order to minimize visual impact.
- Introduction of recycling process of construction materials to reduce disposal waste.
- There should be temporary disposal facilities for construction waste.
- Local habitats of the Nile River or Lake Nasser should be considered because of displacement or other threats to the ecosystem.

Mitigation measures during operation of berth facilities

- Pre-treatment facilities for wastes requiring temporary disposal area in the berth facilities site should be equipped with appropriate technologies in order to prevent effluvia and to avoid diseases from wastes.
- Adequate quantity of wastewater storage facilities should be examined by engineering study.
- Electrical power supply to ships whenever it is possible plays an important role in mitigating gas emissions from diesel engines of ships at berth.
- It is necessary to identify all activities that generate waste (qualitative and quantitative waste), including ships and berth facilities, by frequent sampling.
- There should be an evaluation of the character of waste and re-planning of operation and management program in coordination with outside service for wastes, including promotion programs such as low emission awareness.
- Development of environmental awareness and professional skills training of operations staff that handle utilities equipment and wastes from ships are necessary to ensure safe and comfortable facilities environment taking account of the necessity of rigorous management, as in a tourist area.
- Cruise ships' laundry service, which involves water and detergent use, should be sourced out by land service in order to minimize effluent on board.
- Fire in berthing site and ships colliding against each other should be avoided by a well-organized management and navigation control system.
- Natural embankment with endemic flora and fauna should be protected by adequate development measures and monitoring to observe their changes.

(4) Environmental awareness for cruising industries people and tourists

It is required that both tourists and people involved in cruise tourism should participate in an environmental awareness program in order to achieve an effective and expeditious management, as a wide-range of participation is necessary to cope with environmental pollution. Although there have been some descriptions of environmental awareness in previous sections, major programs to be required are summarized below.

Awareness program for cruise crews and berth facilities staff

- Training program for operation of ship equipment, emergency training in order to minimize environmental impacts and monitoring training of waste and emissions from ship
- Awareness workshop and program for basic instruction and education of environmental management of ships, and evaluation and assessment of existing activities
- Preparation of educational and instructive materials, such as brochures, posters, audio-visual materials, etc.

Awareness program for tourists

- Preparation of educational and instructive materials such as brochures, posters, audio-visual materials, etc., on live aboard ships and inland area to minimize their waste.
- Awareness program to protect the historical and natural environments of the Nile, through tour guides who handle historical sightseeing tours and other attractive tours.

(5) River and lake-recreation management

The scenery of "Felucca" yachting on the Nile River, especially in the cities of Aswan and Luxor, is one of the best products that expresses attractive tourism environment in Egypt. On the other hand, the increase of cruise ships and small recreational boats might bring danger in terms of congested navigation conditions. Coping with this situation that is expected to be a big issue, an appropriate management program is required as follows:

Introduction of recreational zoning system

In order to prevent ships and boats from colliding with each other, and to formulate comfortable and safe navigation, a zoning system should be introduced to manage each activity (types of ships and boats, adequate chart and navigation course, time schedule, etc.)

Recreational activities management

It is expected that increase of tourists who enjoy the Nile River and Lake Nasser could generate various water recreational facilities and activities that might include unsuitable activities for a comfortable environment. According to the zoning system for river and lake recreational use, management program and guidelines should be established, which illustrate facility guideline and instructive guidance on usage.

(6) Monitoring and evaluation

The effectiveness of NCEMP in meeting objectives to minimize potentially adverse impacts and enhance the overall quality of the project, is determined during project implementation through monitoring activities. Environmental monitoring should be directed towards measuring and evaluating changes brought about by projects and assessing the effectiveness of proposed mitigation measures. The following is a step-wise process of monitoring this program:

- Frequent sampling of the facilities that temporarily stock effluent or solid waste.
- Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards that any necessary corrective actions can be taken.
- Records of monitoring results should be kept in an acceptable format.
- The work mentioned above should be reported to the responsible authorities and relevant parties, as required

2.7.4 NCEM Implementation Program

For the programs of the NCEM to be implemented, a number of issues should be addressed by the following agencies: MOT/TDA, Ministry of Transport and Telecommunication, EEAA, and others, who have interests in seeing environmental improvements in the Nile River and the Lake Nasser. The three major issues can be described below.

- The status of the NCEM in relation to several other "environmental plans" covering parts of the study area;

- Need for consensus and cooperation on priorities and scheduling; and
- Limited availability of public sector financial sources in this region.

In order to cope with the above issues, effective and rational implementation programs for core mitigation measures should be formulated in cooperation with related agencies and parties with available financial source including governmental funding and international source. This section illustrates briefly necessary measures about institutions and implementation.

(1) Institutional measures

Institutions with environmental responsibilities

The responsibility of environmental affairs related to this NCEM is dispersed to various agencies shown in Table 2.48. It is necessary to have the support of those different agencies from the national down to the local level, and the private sector as well.

Adequate institutional measures for NCEM

As the complexity of this wide-range of responsibilities for NCEM might generate difficulties or obstacles to implement it smoothly, it needs to adopt and apply an adequate organizational system. The following measures are proposed to cope with the above objective.

- Establishment of an inter-institutional management board or council in order to facilitate management planning and activities; and
- Formulation of an organization for internal-external coordination of activities regarding data management/sharing, information availability, monitoring, inspection, and environmental education and community participation.

Table 2.48 Delineation of Responsibility of Coordinating Agencies for Nile Cruises Environmental Management

Ministry and Agency		MOT/ TDA	MOTR	MOPW WR	MOALR	MOI	EEAA	MOIMR	Local Gov
Environmental management activities									
Cruise ship	- Food handling, hygiene, etc.		-	-	-			-	
	- Standard and monitoring of water							-	
	- Safety and environment of workplace			-	-	-		-	
	- Navigation control system				-	-		-	
Berth facilities	- Open-water management							-	
	- Nile River and lakes management							-	
	- Solid and liquid wastes		-	-	-			-	
	- Standard and monitoring of water	-	-					-	
	- ISO 14000 guidelines	-	-	-	-	-			
Supporting local services	- Environment Impact Assessment				-			-	
	- Solid and liquid municipal wastes		-		-			-	
	- Standard and monitoring of water	-	-					-	
	- Safety and environment of workplace	-	-	-	-	-			

Note: = major responsibility, = cooperation or co-ordination, Source: JICA Study Team

MOTR = Ministry of Transportation and Communications, MOPWWR = Ministry of Public Works and Water Resources, MOALR = Ministry of Agriculture and Land Reclamation, MOIMR = Ministry of Industry and Mineral Resources, EEAA = Egyptian Environmental Affairs Agency

Source: JICA Study Team

(2) Potential sources of finance for implementation

As the cost, which consists of initial cost, annual operating cost and provision of original investment for several programs and measures proposed in this NCEM, has not been elaborated by the JICA Study Team, this section therefore shall make some recommendations to secure the NCEM implementation.

Available source and funding

The Egyptian government, the private sector and some NGOs for environmental affairs have been supported by several international funding agencies. The following could therefore be available sources for NCEM financing:

- Environmental Protection and Development Fund (National Fund)
- Major International funding agencies and the World Bank, which have assisted environmental projects in Egypt

Charging mechanism for Nile Cruise Environmental Management

In the context of global environmental awareness movement, people have become interested in contributing to environmental investment. The Nile Cruise is one of the highest tourism products in terms of tour program pricing. Therefore, additional charges could be imposed on those engaged in this type of business and other related endeavors that earn money from the Nile cruise operation as contribution to the environmental protection of the Nile River. The following could be possible charging mechanisms for NCEM financing:

- Added environmental cost to berthing charge or utilities treatment charge
- Tourist contribution, as add-on charge to other facilities use

(3) Implementation program

According to the proposed measures for NCEMP, an implementation program is proposed in Table 2.49. It is understood that this program does not provide an instant solution, and is proposed based on importance, timing and other considerations, as explained in the following criteria :

Criteria for programming

- Early effects on environment
- Possible actions to be able to implement them easily and expect an early effect
- Maturity of the program
- Program to be able to implement them in conjunction with an EIA process and to set an appropriate organization with sufficient capability
- Financial availability
- Low initial cost comparatively or easy to seek possible financing to implement them
- Socio-political acceptance
- Easy and understandable to the public and private sector

Prioritization of Program

Urgent measures

- Environmental awareness program for crews and related staff of cruise ships
- Capability building for environmental management staff of both cruise ships and berth facilities
- Formulation of Environmental Impact Assessment and development guidelines
- Risk management program for navigation in berthing area

Short-term measures

- Continuous program of the urgent action measures
- Program for ship equipment improvement
- Provision of appropriate facilities to transfer waste to other treatment facilities
- Environmental control in construction stage
- Formulation of waste management system in berth facilities area
- Environmental monitoring and its reflection on management
- Formulation of cruise ship operation support
- Riverfront conservation management

Medium-term measures

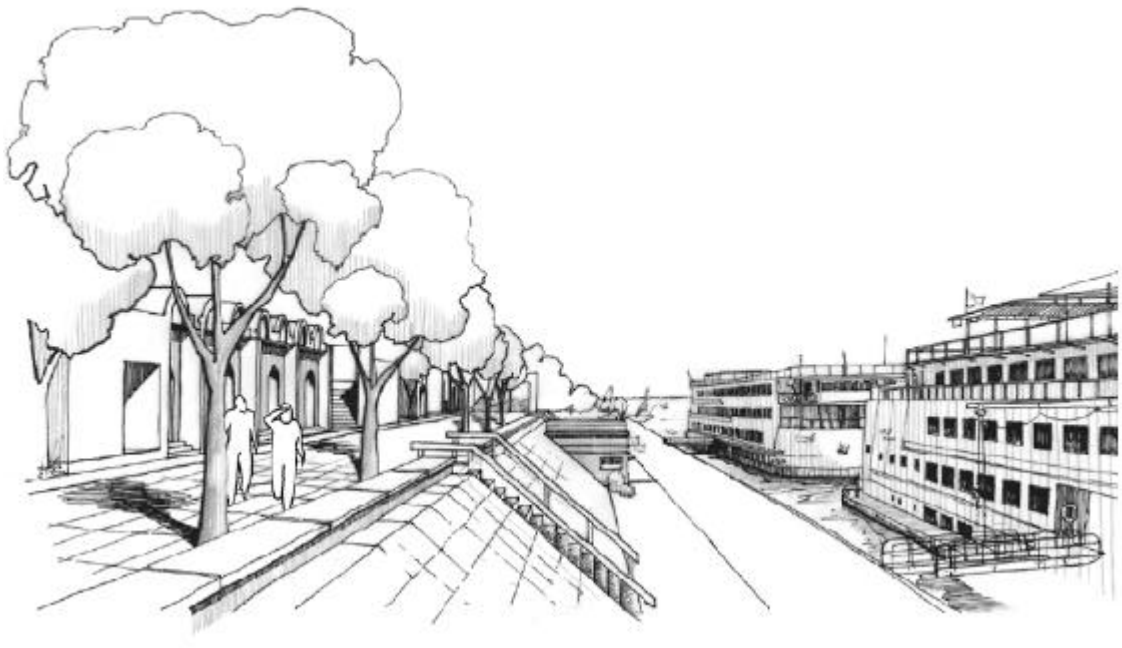
- Continuous program of the urgent action measures
- Continuous program of the short-term measures
- River and lake recreational management

Table 2.49 Implementation Program for Nile Cruises Environmental Management

Implementation Components	Proposed Activities		
	Urgent Action Program (1-2 years)	Short Term Program (3-7 years)	Medium Term (8-12 years)
Cruise Ship Environmental Management	<p><u>Environmental awareness program</u></p> <ul style="list-style-type: none"> • Awareness workshop for basic instruction and education on environmental management • Preparation of educational materials <p><u>Environmental management staff capability building</u></p> <ul style="list-style-type: none"> • Awareness workshop for basic instruction and education on environmental management • Preparation of educational materials 	<p><u>Environmental awareness program</u></p> <ul style="list-style-type: none"> • Training program for ship crews • Awareness workshop for basic instruction and education on environmental management <p><u>Program for ship equipment improvement</u></p> <ul style="list-style-type: none"> • Inspection and improvement for utilities of ships • Additional equipment for utilities 	<p><u>Program for ship equipment improvement</u></p> <ul style="list-style-type: none"> • Inspection and improvement for utilities of ships • Additional equipment for utilities
Berthing Facilities Environmental Management	<p><u>Environmental management staff capability building</u></p> <ul style="list-style-type: none"> • Management workshop for basic instruction and education on environmental management <p><u>Formulation of EIA and development guidelines</u></p> <ul style="list-style-type: none"> • Planning and site selection and evaluation • Construction measures assessment and EIA • Design guideline and facilities standard <p><u>Risk management program</u></p> <ul style="list-style-type: none"> • Appropriate navigation control • Emergency management (fire, collision, etc) 	<p><u>Provision of appropriate facilities to transfer waste</u></p> <ul style="list-style-type: none"> • Establishment waste discharge system to land area <p><u>Environment control for construction of facilities</u></p> <p><u>Formulation of waste management system in berth</u></p> <ul style="list-style-type: none"> • Identification of all activities • Evaluation and re-planning of operation and management <p><u>Environmental monitoring</u></p> <p><u>Riverfront conservation management</u></p> <ul style="list-style-type: none"> • Identification and monitoring of natural environment 	<p><u>Continuous management of berthing utilities</u></p> <ul style="list-style-type: none"> • Operation of waste discharge system • Identification of all activities • Evaluation and re-planning of operation and management <p><u>Environmental monitoring</u></p> <p><u>Riverfront conservation management</u></p> <ul style="list-style-type: none"> • Identification and monitoring of natural environment
River and Lake Recreation Management		<p><u>Formulation of recreational management system</u></p> <ul style="list-style-type: none"> • Introduction of zoning system • Program for use management 	<p><u>Operation of recreational management</u></p> <ul style="list-style-type: none"> • Control and monitoring of recreational activities in the river and lake areas
Supporting Local Services	<ul style="list-style-type: none"> • Programming and formulation of utility services for berthing facilities 	<ul style="list-style-type: none"> • Service operation for berthing utilities • Control and monitoring <p><u>Formulation of floating hotel operation support</u></p> <ul style="list-style-type: none"> • Laundry service and other ancillary service 	<ul style="list-style-type: none"> • Service operation for berthing utilities • Control and monitoring <p><u>Continuous floating hotel operation support</u></p> <ul style="list-style-type: none"> • Laundry service and other ancillary service

Source: JICA Study Team

Figure 2.11 Image Sketch of Passenger Landing Facility



Source: JICA Study Team

Part II Implementation Program

1. Tourism Institute Development of EGOth

1.1 Introduction

Tourism has been a principal economic sector for Egypt for a long time. Employment generation and foreign exchange earnings from the tourism sector are significant for Egyptian economy. The number of total visitors reached 4.0 million in 1997 and the receipts from tourism amounted to 12.4 billion LE (US\$ 3.6 billion) sharing 23% of the total receipts in the balance of payment in 1996/97.

The government of Egypt has set forth a policy in the document “Egypt and the 21st Century” to divert population from the Nile Valley to the remote area and to increase habitable land from the current 5.5% to 25% in 2017. In the context of this policy of population, the government has selected tourism as one of the three sectors (agriculture, housing and tourism) to be promoted and allocated remote lands, such as the Red Sea and Sinai, for the integrated tourism development. Tourist arrivals are targeted at 27 million in 2017 at an average annual growth rate of 10% in the plan. Under the current Fourth Five-Year Plan from 1996/97 to 2001/02 it is also required that the GDP of tourism sector increase with an annual growth rate of 11.1%, which is the highest of all the sectors.

Tourism is a labor-intensive industry and the employment generated by tourism varies widely among the sectors. It creates direct employment in accommodation establishments and indirect employment in the related tourism industries such as restaurants, tour operators, shops and bazaars, tour guides and transportation.

Based on the target of tourism development until 2012, number of tourists including international and domestic tourists, tourist nights and required rooms to accommodate those tourists have been estimated at 18 million tourists, 132 million nights and 400 thousand rooms respectively in 2012. Until 2012, therefore, an estimated 1.1 million new jobs are to be generate in the tourism sector based on the framework.

In line with the economic transition and the tourism boom, the role and function of the private sector has become an important and leading one. However, the bigger responsibility of the public sector is to lead and educate the people working in the tourism industry. It is an urgent requirement for the public sector to provide training programs for the growing demand of employment in the tourism sector.

1.2 Background of the Project

From the viewpoint of tourism service improvement, education and training should be focused on the personnel who provide services directly to the tourists, such as staffs of hotels, restaurants, tour operators and guides. Improvement and expansion of capacity of practical training for accommodation and tourist establishment are significant for future rapid expansion of tourism industry in Egypt. Expanding training capacity at the technical institute is suitable if the facilities and teaching staffs are capable to meet the requirement of tourism and related industries.

Development direction and framework of human development can be summarized as follows:

- More practical and scientific training and education will be introduced in middle and sub-management class of personnel education and training;
- Understanding the tourism business and market for employees for the related industries; and
- Facilities will be provided to support the practical education and training of workers.

Currently, the Egyptian General Company for Tourism and Hotels (EGOTH) is the organization responsible for providing the practical and technical training for tourism and hotel industries in Egypt. There are three hotel institutes in Alexandria, Ismailia and Luxor operated by EGOth.

However, its facilities and programs are not satisfactory to meet the demand of training both in quantity and quality in the future.

Required input to meet the demand and existing capacity is estimated as shown in the table below. Shortage in training capacity for middle level workers such as housekeeping and laundry, and food and beverage is obvious.

Table 1.1 Required Input of Trained Workers and Existing Capacity of Training Institutes per Year in the Long Term

(Unit: persons)

	Required input	Existing capacity
Management & front office	900	1,500
Housekeeping & laundry	1,400	600
Food & beverage	2,900	800
Kitchen	3,100	600

Source: JICA Study Team

1.3 Project

1.3.1 Objectives of project

Training and education of tourism-related personnel is proposed as follows:

- Training capacity of management class and tour guide is sufficient in terms of number of graduates. Improvement of training curriculum and facilities as well as teaching staff is required;
- Training capacity for mid-management level in target type of work (accommodation and tourist establishment) is not enough. Expansion of training capacity in terms of both facilities and qualities of teaching method is necessary with focus on a practical training with scientific method;
- Expansion of education and training capacities other than formal full-time course, such as refresher course, part time course, apprenticeship training with crediting system, is significant. Providing a wide range of training and education opportunity for all levels of personnel is quite effective for skill improvement; and
- Adjustment of the syllabus to meet the actual need and creation of a new certification system.

The new institute will consist of diploma course for manager class and 2-year courses for practical training for housekeeping and laundry, food and beverage, kitchen and front desk operation. Some refresher courses for employees working in hotels and restaurants will also be provided. Capacity of the institute will be approximately 500 students, excluding the refresher courses.

1.3.2 Implementation agencies

The proposed implementation agency is the Egyptian General Company for Tourism & Hotels (EGOTH), under the Ministry of Public Enterprises. Duties of the EGOTH is to develop the tourist area and participate in the management of the historical hotels; and upgrade and develop manpower working in tourism and hotel industries.

There are three hotel institutes in Alexandria, Ismailia and Luxor operated by EGOTH. There are three courses in every institute: Room division, Restaurant and Kitchen. Table 1.2 shows the revenue and expenditure of the three institutes in 1998/99. Each institute receives almost 90% of their revenue from tuition of students, which is LE 3,000 per year per student. On the other hand, the average expenditure per student is estimated at 6,000 – 9,000, which is almost twice as much as the revenue, and 60 to 80% of the expenditure goes to the salary of teachers and staff. EGOTH allocates its own budget to compensate the deficits.

Table 1.2 Revenue and Expenditure of Tourism Institutes of EGOTH

Institute	Annual revenue (LE thousand)	Annual expenditure (LE thousand)	Finance from budget of EGOTH (LE thousand)	Share of EGOTH budget to expenditure
Alexandria	650	1,520	870	57 %
Ismailia	455	845	390	46 %
Luxor	700	1,540	840	55 %

Source: EGOTH

Table 1.3 Annual Revenue and Expenditure per Student

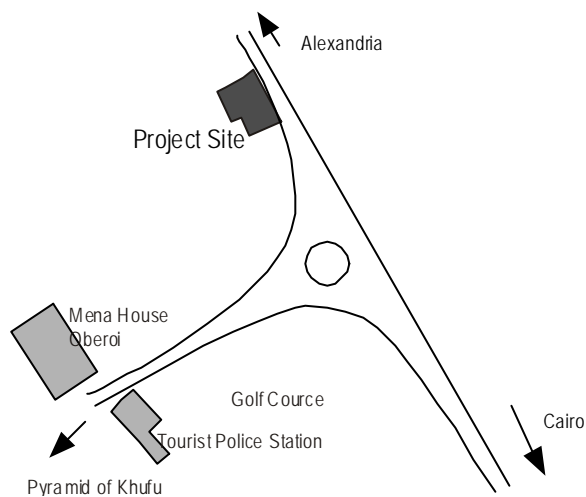
Institute	Number of student	Average revenue per student (LE)	Average expenditure per student (LE)	Average expenditure per student (LE)
Alexandria	170	3,824	8,941	5,117
Ismailia	150	3,033	5,633	2,600
Luxor	233	3,004	6,609	3,605

Source: EGOTH

1.3.3 Project Site

Project site is located near the Giza Pyramids at the beginning of Cairo/Alexandria Desert Road facing such hotels as Movenpick, Mena House, Pyramisa and Sofitel. Total area of the site is 21,000 m². As the land is freely owned by EGOTH, no expropriation of land is required.

Figure 1.1 Project Site



Source: JICA Study Team

1.3.4 Outline of the project

(1) Training courses

- Diploma: hotel management (four years) for 30 students
- Two-year courses (50 students per course) on: (a) housekeeping & laundry, (b) food & beverage, (c) kitchen and (d) front desk operation
- Refresher and temporary courses:

(2) Facilities

- Classrooms (16 rooms)
- Training facilities (kitchen, demonstration restaurants & guest rooms and language laboratory)
- Library, meeting room and conference room
- Administration office
- Dormitory for students (200 students)
- Training equipment

Table 1.4 Training Course and Facilities

		Grade (number of students)				Demonstration facility
Classroom	Course	1	2	3	4	
	Management course	30	30	30	30	
	House keeping & laundry	50	50			Guest room & laundry room
	Food & beverage	50	50			Restaurant
	Kitchen	50	50			Demonstration kitchen & training kitchen
	Front office operation	50	50			Front desk
	Refreshment & temporary					
	Other rooms	Computer laboratory room, language laboratory room, library and meeting room & conference room				
Welfare facilities	Restaurant for students & teachers, small shop for students and health room					
Administration rooms	Chairman's room, teacher's room and rest room					
Operation & maintenance	Room for engineering section and utility room					
Dormitory	For 200 students					

Source: JICA Study Team

1.4 Project Cost Estimate and Implementation Schedule

1.4.1 Assumptions

The following assumptions have been made for cost estimation and evaluation of the project:

- Project cost is estimated based on market prices in November 1999 and inflation is not taken into account for revenue and cost estimates.
- Foreign exchange rate as of the end of November 1999 is used during the whole project life as follows: US\$ 1.00 = LE 3.40, LE 1.00 = Japanese Yen 30.00
- Tuition of student is estimated at LE 3,000 per year for diploma and two-year courses and LE 2,000 per year for the refresher and temporary courses.
- It is assumed that the deficit of operation and maintenance cost will be compensated by EGOH.

1.4.2 Cost Estimate

Area and number of facility of the project are estimated based on the outline of the project as shown in Table 1.5. The total area of facility is 13,380 m² including 11,150 m² of training facility and 2,230 m² of public space for corridor, stairs, toilets, etc.

The initial investment cost of the project is estimated at LE 60.4 million as shown in Table 1.6, including the construction cost, machinery and equipment costs, and engineering and administration fees. Local currency is LE 48.0 million amounting to 80% of the total cost. Average investment cost is LE 4.5 thousand per m². Land cost is not included because the total land area of 21,000 m² is owned by EGOTH.

Table 1.5 Area and Number of Facilities of Tourism Institutes

	Unit area (m ²)	Number	Total area (m ²)	Remarks
1 Training facility				
(1) Classroom				
(a) Classroom for 30 students	100	8	800	
(b) Classroom for 50 students	150	8	1,200	
(2) Laboratory				
(a) Computer laboratory	150	2	300	
(b) Language laboratory	100	2	200	
(3) Meeting room, etc.				
(a) Library	1200	1	1,200	
(b) Meeting room (large)	300	1	300	
(c) Meeting room (small)	100	1	100	
(d) Conference room	900	1	900	
(4) Demonstration room				15 kitchen desks (2 units x 2)
(a) Front office	150	1	150	
(b) Restaurant	300	1	300	
(c) Demonstration kitchen	300	1	300	
(d) Training kitchen	300	1	300	
(d) Guest room	300	1	300	
(e) Laundry room	300	1	300	
(5) Administration				
(a) Chairman's room	100	1	100	
(b) Teacher's room	300	1	300	
(c) Lecturer's room	150	1	150	
(d) Rest room	100	1	100	
(6) Facility for students				
(a) Restaurant & shop	600	1	600	
(b) Health care room	150	1	150	
(7) Engineering				
(a) Engineering room	300	1	300	
(b) Utility room	300	1	300	
Sub-total of training facilities			8,650	
2 Dormitory for 200 students			2,500	
Total (1 + 2)			11,150	
3 Public space	11,150	20%	2,230	Corridor, stair, toilet, etc.
Grand total			13,380	

Source: JICA Study Team

Table 1.6 Initial Investment Cost of the Project

	Local currency (LE million)	Foreign currency (LE million)	Total (LE million)
Construction	40.86	10.62	51.49
Machinery & equipment	5.12	1.22	6.34
Engineering & Administration	2.04	0.53	2.57
Total	48.03	12.37	60.40

Source: JICA Study Team

1.4.3 Implementation Schedule

The proposed implementation schedule is shown in Figure 1.2. Total period of construction is 18 months.

1.5 Financing Plan

1.5.1 Revenue and Expenditure

For the preparation of the financing plan of the Project, revenue and expenditure are estimated under the following assumptions:

(1) Number of students

Numbers of students in each course in each year are estimated in Table 1.7. In 2005, 920 students will be studying and training in the institute, and 200 students will be staying in the dormitory.

Table 1.7 Number of Students

	Capacity	2002	2003	2004	2005 -
Institute					
Category (I)					
-Diploma course:	30 students x 4 years 120	30	60	90	120
-Two-year course:	50 students x 4 courses x 2 years 400	200	400	400	400
Category (II)					
-Refresher & temporary:	400	200	400	400	400
Total		430	860	890	920
Dormitory	200	100	200	200	200

Source: JICA Study Team

(2) Revenue

Tuition of student is estimated at LE 3,000 per year for diploma and two-year courses and LE 2,000 per year for the refresher and temporary courses taking into account the current level of tuition. Dormitory fee is also estimated at LE 2,000 per year per student. Other revenues are not considered. Annual revenue is estimated in Table 1.8.

Table 1.8 Annual Revenues

(Unit: LE million)

		2002	2003	2004	2005 -
Tuition (I)	LE 3,000 per year	0.7	1.4	1.5	1.6
Tuition (II)	LE 2,000 per year	0.4	0.8	0.8	0.8
Dormitory fee	LE 2,000 per year	0.2	0.4	0.4	0.4
Total		1.3	2.6	2.7	2.8

Source: JICA Study Team

(3) Operation and maintenance cost

This consists of salary for teachers and staff, cost for utility and communication, costs for food supplies, etc. Annual cost is estimated based on the average cost per student currently consumed in EGOH institutes in Alexandria, Ismailia and Luxor. Annual operation and maintenance cost per student is estimated at LE 8,000 and LE 2,000 for the students in category I and II courses respectively, and total annual cost is calculated in Table 1.9.

Table 1.9 Annual Operation and Maintenance Cost

		(Unit: LE million)			
		2002	2003	2004	2005 -
Category I	LE 8,000 per year	1.8	3.7	3.9	4.2
Category II	LE 2,000 per year	0.4	0.8	0.8	0.8
Total		2.2	4.5	4.7	5.0

Source: JICA Study Team

1.5.2 Cash-flow

Based on the above assumptions, cash flow of the Project is prepared in Table 1.10 over the period from 2001 to 2012.

Table 1.10 Cash Flow of the Project over the Period from 2001 to 2012

		Total	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of students														
Category (I)														
-Diploma course	30			30	60	90	120	120	120	120	120	120	120	120
-Two-year course	50*4			200	400	400	400	400	400	400	400	400	400	400
Category (II)														
-Refresher & temporary				200	400	400	400	400	400	400	400	400	400	400
Total	520			430	860	890	920	920	920	920	920	920	920	920
Dormitory	200			100	200	200	200	200	200	200	200	200	200	200
Cashflow (LE million)														
Cash outflow														
Initial investment cost	60.3	37.2	23.1											
O & M (I)	8,000	43.0		1.8	3.7	3.9	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
O & M (II)	2,000	8.4		0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Total	111.7	37.2	25.3	4.5	4.7	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Cash inflow														
Tuition (I)	3,000	16.4		0.7	1.4	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Tuition (II)	2,000	8.4		0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Dormitory fee	2,000	4.2		0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total	29.0	1.3	2.6	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Net cash-flow														
Initial investment cost	-60.3	-37.2	-23.1											
Deficit of O & M	-22.4			-0.9	-1.9	-2.0	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2
Total	-82.7	-37.2	-24.0	-1.9	-2.0	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2

Source: JICA Study Team

1.5.3 Financial Sources

It is considered that the initial investment cost and operation and maintenance cost for tourism institutes can be usually financed by the following sources as shown in Table 1.11.

Table 1.11 Sources of Financing for Initial Investment and Operation and Maintenance Cost

Source of finance \ Cost	State government budget	Tuition from Students	Donation	Loan & grant from foreign countries	Equity	Earnings from business
Initial investment cost						
Operation & maintenance						

Source: JICA Study Team

For the initial investment cost of the Project amounting to LE 60.3 million, special subsidies from the State government or external financing sources, such as ODA Loan or Grant should be sought.

Meanwhile, in order to cover the annual deficit of operation and maintenance cost, it is proposed that EGOTH allocate the budget to the project as follows:

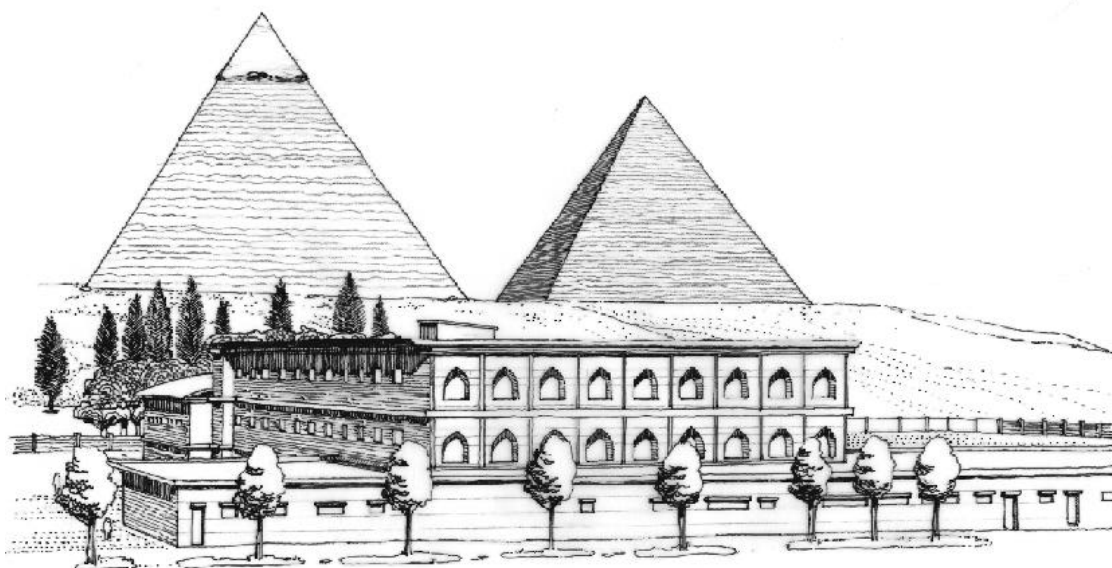
Table 1.12 Annual Allocation of Budget of EGOTH

	2002	2003	2004	2005 -
Annual allocation of EGOTH budget (LE million)	0.9	1.9	2.0	2.2

Source: JICA Study Team

Technical assistance from foreign countries such as dispatching experts or overseas training should be considered.

Figure 1.3 Image Sketch of Tourism Institute of EGOTH



Source: JICA Study Team

Part III Terms of Reference

1. Solid Waste Management in Marsa Alam

1.1 Introduction

Marsa Alam City in the Red Sea will be developed rapidly from now in accordance with the regional tourism development in the Red Sea. This study aims at the preparation of countermeasure to urban environmental problem in the future, and enable the achievement of sustainable tourism development in the Red Sea.

1.2 Background of the Study

Municipal solid waste in the Red Sea is collected and disposed of at an open dumping site by each local governmental entity as one of its official duties. On the other hand, the solid wastes generated from 22 development tourist centers in the Red Sea are collected and disposed daily by the each owner of the tourism facility. Some of them are transported to a compost facility without segregation and separate collection; however, its treatment capacity is not enough. Most of the non-organic solid wastes and other construction wastes are buried in the desert.

In addition to these circumstances, accumulation and open burning of solid waste around the city have been seen often in the Red Sea. Moreover, there are many places where industrial wastes and construction debris are disposed of and dumped in development areas and in the surrounding desert.

Total amounts of solid waste generated in the Red Sea and the TDA Tourist Centers in the Red Sea in 2012 are respectively estimated by the JICA Study Team to be 318.6 tons/day and 207.7 tons/day. Generally, increase of total amount of solid waste generated is expected in accordance with increase of population and economic activity.

However, there is no comprehensive system of solid waste management in the Red Sea area including required technical system, equipment and financing schemes, that can deal with this present critical background. Therefore, a development study in the field of solid waste management is urgently required to prepare a master plan on solid waste management for the Red Sea. After the master plan preparation, implementation of a feasibility study for the implementation of the priority project(s) proposed in the master plan is expected immediately to realize the project(s), and the following concepts shall be considered to comply with the circumstances of the Red Sea area and the tourism development.

- Environmentally sound solid waste management.
- Tourism development-oriented solid waste management.
- Step-by-step plan of solid waste management in accordance with expansion of community and tourism developments.

1.3 Objectives of the Study

1.3.1 Review of Present Condition on the Solid Waste Management

- To review the whole situation concerning solid waste management in the municipalities and tourism facilities of Marsa Alam; and
- To collect and study all available data and information related to the solid waste management and to other fields necessary for preparation of a master plan.

1.3.2 Formulation of a Master Plan

- To prepare a technical system of solid waste management, including collection and transportation, intermediate treatment and disposal of the municipal solid waste and solid waste from tourism facilities in Marsa Alam City until the year 2012;
- To formulate a Master Plan on Solid Waste Management, including solid waste from tourism facilities in Marsa Alam City until year 2012, including institutional and administrative structures, legalities and regulation, financial, manpower training and so on

in addition to the above mentioned technical system;

- To develop an implementation plan for the proposed Master Plan, including a short-term, a medium-term and a long-term solid waste management improvement plan; and
- To select the priority project(s) for Feasibility Study.

1.3.3 Feasibility Study

- To implement a Feasibility Study for the implementation of the priority project(s) proposed in the master plan.

1.4 Study area

The study shall cover the entire area of Marsa Alam City and surrounding TDA Tourist Centers.

1.5 Implementation Agencies

Development body: Ministry of Housing, Utilities and Urban Communities

Operation body: Marsa Alam City

1.6 Scope of Work

1.6.1 Collection of General Data

- Natural Characteristics
- Socioeconomic Characteristics
- Institutional Framework for Solid Waste Management
- Legal and Regulation Aspects for Solid Waste Management
- Present Status of Solid Waste Management
- Basic Data and Information related to Solid Waste Management
- Technical Data and Information related to Solid Waste Management
- Regional and Tourism Development Plans
- Field Reconnaissance Survey

1.6.2 Master Plan Study

- Amount and Generation of Solid Waste
- Preparation of the Master Plan Policies, Objectives and Goals
- Solid Waste Collection
- Transportation
- Intermediate Treatment (including composting and recycling)
- Final Disposal
- Financial Aspects
- Formulation of Alternatives for the Master Plan
- Evaluation of Alternatives and Selection of Optimum Alternative
- Development of the Master Plan
- Legal and Regulation System
- Institution and Organization
- Manpower
- Training and Education
- Community Participation
- Financial Aspects
- Phasing of the Master Plan into Short-, Medium- and Long-term Planning
- Identification of the Priority Project and Scheduling by Urgency

1.6.3 Feasibility Study

- Review of Priority Projects by the Master Plan

- Confirmation of Goal
- Technical Designs
- Cost Estimation
- Management Plan
- Environmental Evaluation
- Project Evaluation
- Implementation Plan

1.7 Estimated Staff Assignment and Mon-month Input

	Required Specialist	Man-months
(1)	Project manager	8
(2)	Solid Waste Planner	7
(3)	Environment Analyst	4
(4)	Organization & Institution/Project Evaluation Analyst	4
(5)	Equipment Designer	3
(6)	Civil Engineer	4
(7)	Cost Estimator	3
	Total	33

1.8 Schedule of the Study

The total study period shall be 12 months from commencement of the study.

2. Urban Development Planning in the Red Sea Coast

2.1 Introduction

Coordinated and harmonious urban development activities are and will be indispensable to support and implement sustainable coastal tourism developments in the Red Sea coast.

2.2 Background of the Study

TDA has principally planned around 1000 km of the Red Sea coast as coastal resort development area for the international tourism market. Around 400 km of shoreline area from Hurghada to Ras Banas are divided between 260 km of TDA Tourist Center development areas and 140 km of urban development areas, which include Hurghada, Safaga, Quseir and Marsa Alam. Major parts of tourism developments consisting of around 22,000 are currently accumulated on Hurghada and its surrounding areas.

Each TDA tourist center should develop small service town functions for their staffs and tourists. However, the designated four existing major cities should take perform tourist town functions to support sustainable coastal tourism development on the Red Sea coast.

Coping with huge development of coastal resort projects along the Red Sea coast, construction and logistics would be essential to support resorts operation, including business/personal service industries, travel agents/operator, staffs for hotels, family housing with community facilities and infrastructure for living environment. According to the above condition, it would be necessary to carefully examine urban development and environmental planning in the Red Sea coastal area.

2.3 Goals and Objectives of the Study

2.3.1 Goals of the Study

- To develop and establish four urban settlements in line with the national policy on population diversion from the Nile Valley to the remote regions;
- Staged urban development of the four cities to coordinate with coastal tourism development trends within their service catchment areas; and
- To create harmonized urban environment for gateway and tourist towns of international coastal resort destinations.

2.3.2 Objectives of the Study

- To assess the urban growth, tourism industrial development and environment of the 4 cities;
- To formulate development framework of population and employment for tourism industry;
- To formulate urban growth control and environmental strategies;
- To formulate Marsa Alam City development master plan with urban growth control measures and environmental management measures; and
- To formulate an action plan for solid waste management.

2.4 Implementation Agencies

Development body: Ministry of Housing, Utilities and Urban Communities

Operation body: Red Sea Governorate and Marsa Alam City

2.5 Study Area

Phase 1: framework study should cover the four cities

Phase 2: master plan study should cover Marsa Alam City

2.6 Scope of the Work

2.6.1 Phase-1: Framework Study

(1) Investigation of Existing Conditions

Present natural and social conditions shall be investigated and compiled within the designated four cities. The results shall be properly incorporated in the subsequent planning process. The main items to be investigated and compiled are as follows:

- Geographic and topographic conditions,
- Record of natural calamities (flooding/eroded shore/etc.),
- Existing land use,
- Existing population communities distribution including Bedouin,
- Historical and traditional heritage,
- Existing transportation and infrastructure facilities,
- Existing public and social service facilities and use, and
- Existing natural environmental resources.

(2) Review of Urban and Tourism Development Plan

The concepts and frameworks of the four cities' development master plans shall be reviewed in terms of their viability and hotel development and job creation program as outlined in the "Tourism Development Projects in The Arab Republic of Egypt 2000". The following are the subjects to be reviewed:

- Tourism development frameworks and phased programs within and outside the city service catchment areas;
- Regional development frameworks including GDP and employment by economic and industrial sectors;
- Future land requirement/framework and distribution for tourism development;
- Future land requirement/framework and distribution for residential and housing development;
- Future land requirement/framework and distribution for urban function development;
- Community module and social service program;
- Future land requirement/framework and distribution for public and social service facilities development;
- Development directions and land use concepts;
- Road and railway network plans;
- Port and airport upgrading and development plans and environmental management measures;
- Service level of urban infrastructure developments;
- Water resources development, supply networks and environmental management measures;
- Electric power generation, supply networks and environmental management measures;
- Sewerage disposal system, network and environmental management measures;
- Solid waste disposal system, facilities and environmental management measures; and
- Environmental management system for marine and terrestrial natural resources.

(3) Identification of Urban Development Issues

Urban development issues of each of the four cities should be identified from the various viewpoints as follows:

- Regional capital function and distribution to create a hierarchical regional structure and tourist gateways/towns;
- Local community participation for coastal resort development (including local industries, manpower, culture, materials and other resources);

- Deterioration of marine/inland natural and social environment and resources;
- Land development and urban growth control to maintain an urban environment;
- Residential development and housing supply to create a matured urban community;
- Transportation network improvement to create good accessibility for international tourists and local communities;
- Public and social services to create a matured urban community;
- Municipal infrastructure supply to create appropriate living environment;
- Financial and budgetary system for urban development; and
- Strategic and prioritized development.

(4) Formulation of Development Framework

Based on the previous study results, the development framework, which coordinates the dimensions and functions of the cities, shall be established as the phased development target for each city. The items to be covered for that purpose are as follows:

- Population;
- Economic and industrial development;
- Land use; and
- Regional, urban and tourism functions.

2.6.2 Phase-2: Master Plan Study for Marsa Alam

(1) Formulation of Development Concept and Direction

The development concept, which shows the outline, features and characteristics, and development directions based on the previous study results of issues and framework, for Marsa Alam City shall be formulated upon confirmation of the master plan study area. The items to be covered for that purpose are as follows:

- Urban growth directions based on the regional tourism development;
- Development direction of tourist gateway functions;
- Development direction of tourism-related industries and city center functions;
- Land use image and planned layout (tourism, residential, commercial/business, infrastructure/utilities, public open space areas, etc.);
- Structure of road and other transportation network (including transportation terminals, airport and seaports); and
- Major infrastructure and utilities network.

(2) Formulation of Development Strategies

Urban development and management strategies shall be formulated and recommended to realize the development concept in consideration of the development targets and issues. The items to be covered for urban growth control and environmental management are as follows:

- Institutional measures to coordinate with tourism development in TDA areas;
- Land use and development control measures to create a good urban and natural environment;
- Investment incentives and systems for major coastal resort development and small scale tourism and related development by local community;
- Residential development and housing supply system with incentives to support and sustain coastal tourism development;
- Public service facilities development system to create matured and stabilized local communities;
- Water resource development and supply system to avoid negative environmental impacts;
- Electric power development and supply system to avoid negative environmental impacts;
- Sewerage disposal system to avoid negative environmental impacts; and
- Solid waste disposal system to avoid negative environmental impacts.

(3) Study of Land Use Framework

For each land use component, land requirement by development phases shall be formulated based on the set of development framework. It shall be estimated under the study of appropriate land use density for each of the land use components.

(4) Formulation of Land Use Plan

Future land use plan by development phases shall be formulated in consideration of previous study results of the development concept and land use framework. On the formulation of future land use plan, the existing geographic condition, flooding record, traditional tribal settlement area shall be properly considered to avoid negative impact to the existing social and marine/inland natural environment. (Land reclamation on the coastal area and large-scale earthworks on the inland area shall be prohibited to avoid negative environmental impacts).

(5) Study of Tourism Development Plan

Coastal resort and tourism development plan by development phases shall be formulated taking into account previous study results and coordination with TDA tourist center developments. Investment incentives, which include taxation, financial and land/infrastructure preparation, and control systems, shall be proposed for major resort investment and small-scale local investment.

(6) Study of Tourism-related Industries and City Center Development Plan

Tourism support and related industrial development plan and city center development plan by development phases shall be formulated in consideration of previous study results. Investment incentives, development guidelines and systems shall be included.

(7) Study of Residential Development and Housing Supply Plan

Residential area development plan and housing supply system by development phase shall be formulated in consideration of previous study results. Investment incentives, development guidelines, supply systems and private/public participation shall be considered and proposed.

(8) Study of Road and Transportation Network and Facilities

Hierarchical road network plan by development phases shall be formulated taking into account future traffic demand, which could be roughly estimated from future land use and density, and the previous development concept.

Transportation terminal, seaport and marina facilities development plans shall also be formulated in consideration of future demand.

(9) Study of Water Resource Development and Supply Plan

Water resource development facilities and supply network plan, which include public and private participation system, shall be formulated by development phase in consideration of the development concept and future water demand. Timing to utilize the Nile River water resources, which will become a substitute to the existing desalination system in the area, shall be assessed from the viewpoint of economic feasibility and global emission gas issue

(10) Study of Electric Power Generation and Supply Plan

Electric power generation facilities and supply network plan, which include public and private participation system, shall be formulated by development phase in consideration of the development concept and future power demand. Timing to connect to the national power grid shall be assessed from the viewpoint of economic feasibility and global emission gas issue.

(11) Study of Sewerage Disposal and Management Plan

Sewerage collection network, disposal facility, recycling system and management plan, which include public and private participation system, shall be formulated by development phase in consideration of the development concept and future volume. Recycling system is indispensable to irrigate fields and open spaces and to avoid the negative impact to seawater quality and ecosystem.

(12) Study of Solid Waste Disposal and Management Plan

Separate garbage collection system and disposal facility plan, which include public and private participation system, shall be formulated by development phase in consideration of the development concept and estimation of future volume. Solid waste disposal and management system is indispensable to avoid negative impact to social and natural environment and to establish a clean gateway for international tourists.

(13) Study of Communication Network Plan

Postal service and telecommunication network plan shall be formulated by development phase in consideration of the estimated future demand. A stable and qualified communication system is indispensable to tourism infrastructure for the establishment of international tourism destinations.

(14) Formulation of Action Plan and Program

Short-term action plans and program shall be formulated from the previous study results. The formulated action plans and program shall be assessed and evaluated from the viewpoints of urgency, importance, etc.

(15) Feasibility Study for Solid Waste Disposal Project

On the bases of the formulated action plan and program of solid waste disposal project, economic and financial evaluations of the project shall be carried out to assess project viability including preliminary environmental impact assessment.

(16) Formulation of Implementation Program for Solid Waste Disposal Project

Implementation program for the solid waste disposal project shall be formulated. It shall include the following items:

- Design and preparation stage for implementation
- Implementation and procurement stage
- Project financing scheme
- Further issues and recommendation

2.7 Estimated Staff Assignment and Mon-Month Input

Required Specialist	Man-months
(1) Project Manager (Urban Planner)	10
(2) Urban Land Use Planner	8
(3) Regional Planner	8
(4) Tourism Planner	8
(5) Institutional Specialist	4
(6) Public and Social Service Planner	6
(7) Architect for Public/Tourism Facilities	4
(8) Housing Planner	6
(9) Transportation Planner	8
(10) Civil Engineer	4
(11) Municipal Engineer	8
(12) Solid Waste Disposal Engineer	5
(13) Sanitary Engineer	4
(14) Electrical Engineer	4
(15) Environmental Assessment	5
(15) Economist	6
(16) Costing Specialist	4
(17) GIS Specialist	8
Total man-months	110m/m

2.8 Work Schedule

It is estimated that completion of the entire master plan study will take 12 months. Implementation of the study should be carried out in the two phases as follows:

- Phase-1: Framework Study 4 months
- Phase-2: Master Plan Study 8 months

Part IV Project Profile

1. Re-evaluation of Water Conveyance Project from the Nile to the Red Sea Coast

1.1 Introduction

The Water Pipeline Project from Qena to Marsa Alam City is proposed as one of the priority projects in the Upper Egypt Tourism Development. On the other hand, “Sahel Hasheesh and Ras Abu Soma Waterworks and Sanitation Program” have recommended desalination plants for the water supply to TDA tourism development.

This chapter will re-evaluate “Water Conveyance from the Nile to the Red Sea Coastal Area” for the potable water supply in Marsa Alam City with special focus on the following:

- Efficient and stable water supply to the urban area and the tourism development area in mid- and long-term perspectives;
- Role of public sector to provide sufficient public utility for the city in which population growth is expected to become extraordinarily high; and
- Coordination of public and private sectors for water supply to the tourism development areas.

In the evaluation, this pipeline project is compared with a desalination plant to indicate the features of two alternatives.

1.2 Background of the Project

1.2.1 Existing Condition of Water Supply in the Red Sea Coast

River water of the Nile and seawater for desalination are the main water sources of potable water supply in cities and tourism development areas in the Red Sea Coast at present.

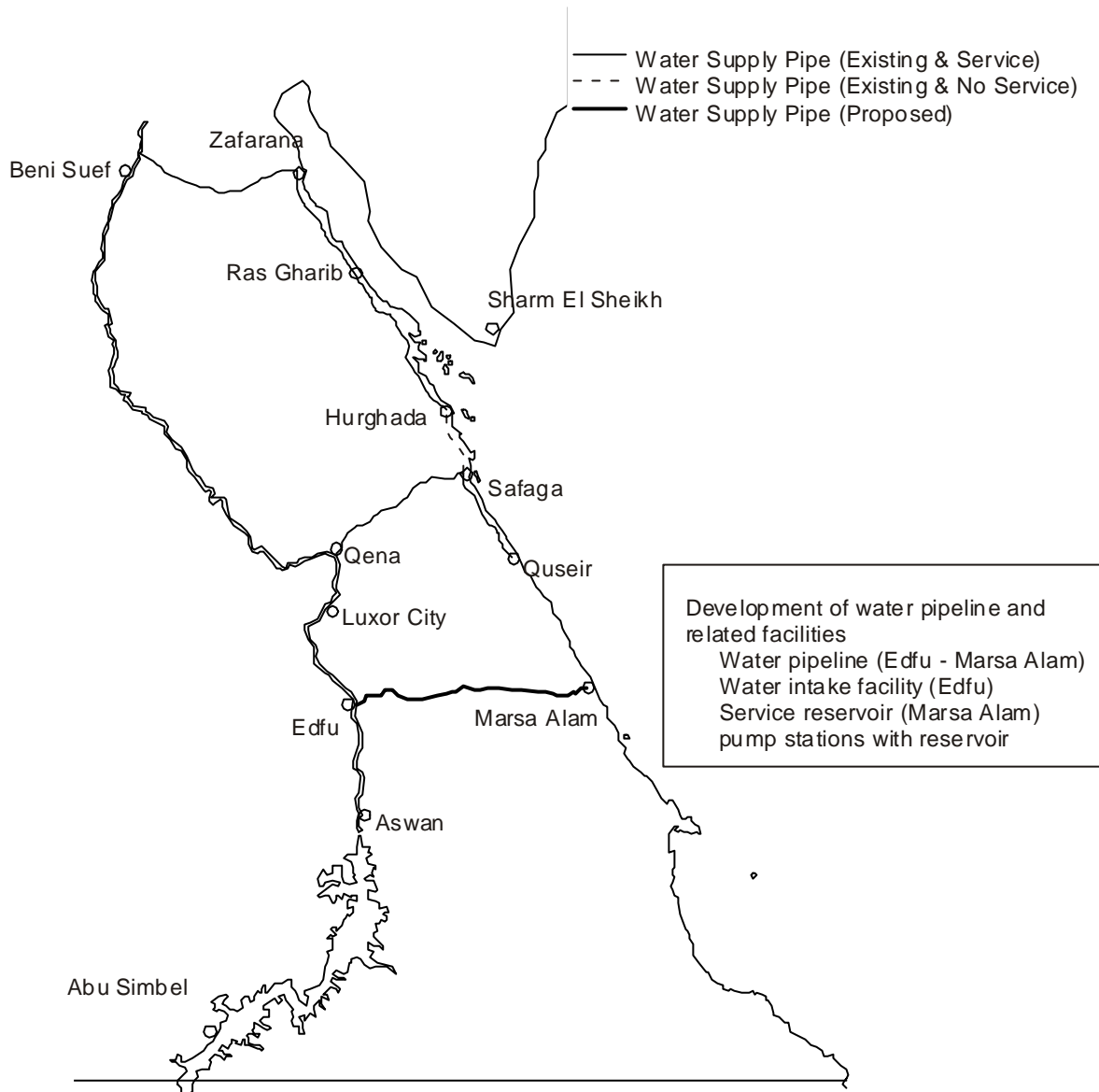
There are water pipelines leading from the Nile to the Red Sea Coast. One is a 1,000-mm pipeline with a maximum conveyance capacity of 65,000 m³/day from Koraymet to Hurghada. In 1999, this line distributed a total of 38,000 m³ of water per day to the following areas: Ras Zafarana (2,000 m³/day), Ras Gharib (12,000 m³/day) and Hurghada (24,000 m³). The other line is 250-mm long that connects from Qena to Safaga and Quseir. It conveyed a total of 17,000 m³ of water per day in 1999, distributed to Safaga (11,630 m³/day) and Quseir (5,650 m³/day).

The cities of Hurghada and Marsa Alam have a desalination plant with a respective capacity of 4,800 m³/day and 600 m³/day that supply the drinking water within the city.

In the TDA tourism development centers, they provide desalination plants to supply water to their guests within their properties per contract with TDA.

Table 1.1 shows the existing condition of water supply in Red Sea Governorate.

Figure 1.1 Existing and Proposed Pipelines from the Nile River to the Red Sea



Source: JICA Study Team

Table 1.1 Existing Condition of Water Supply in the Red Sea

City	Population in 1996	Water Consumption (m ³ /day)	Available Water (m ³ /day)	Source of Water
Hurghada	60,060	10,810	39,000	Nile + Desalination
Safaga	26,703	4,806	11,630	Nile
Quseir	25,596	4,607	5,650	Nile
Marsa Alam	3,377	607	*600	Desalination
Shalatayn	9,947	5,102	300	Desalination
Others	30,012	2,091	17,900	Nile, Desalination
Total	155,695	28,023	75,080	

Note: Nile: Nile Water by Pipeline, Desalination: Sea Water

*: Hearing at Marsa Alam City Council in 1999

Source: Urban Development Planning Report for the Red Sea by Ministry of Housing & New Communities

1.2.2 Tourism Development and Population Increase

TDA is now implementing tourism development of 22 tourist centers in the Red Sea. It is expected that private investors will develop about 130,000 rooms until 2012. Table 1.2 shows the number of accommodation rooms in the Red Sea.

Table 1.2 Number of Accommodation Rooms in the Red Sea Tourism Development Area

TDA development areas and cities	Year				Annual growth rate
	1999	2002	2007	2012	
North Hurghada Sector (TDA)	1,459	3,000	4,000	4,000	8.1%
Hurghada City	14,300	17,000	21,000	21,000	3.0%
Hurghada-Safaga Sector (TDA)	5,649	13,000	21,000	23,000	11.4%
Port Safaqa City/Safaqa-Quseir Sector (TDA)	2,178	3,000	3,000	3,000	2.5%
Al-Quseir City	800	1,000	3,000	8,000	19.4%
Quseir-Marsa Alam Sector (TDA)	987	4,000	14,000	42,000	33.4%
Marsa Alam City	1,300	1,500	3,000	8,000	15.0%
Marsa Alam-Ras Benas Sector (TDA)	102	500	6,000	21,000	50.7%
Total of TDA Development Areas	8,197	20,500	45,000	90,000	20.2%
Total of City Areas	18,578	22,500	30,000	40,000	6.1%
Grand Total	26,775	43,000	75,000	130,000	12.9%

Source: JICA Study Team

New accommodation establishments will create direct employment in those establishments and indirect employment in the related industries. In the Red Sea tourism development area, additional 361 thousand jobs will be generated for the new tourism development until 2012. However, availability of labor force is very limited in the area because of its small population compared with the increasing employment opportunity. As labor force will mostly be supplied from other areas such as the Nile Delta and Valley, there will be a rapid increase of population in the Red Sea due to in-migration.

Thus, the rapid tourism development will cause a great number of population increase amounting to about 621 thousand in 2012 from about 136 thousand in 1999 in the Red Sea. In 2012, out of a population of 621 thousand, about 143 thousand will live in TDA tourism development centers and the remaining 478 thousand will live in and around existing cities and/or towns.

Because of tourism development, a large supply of drinking water will be additionally needed for employees of the tourism sector and accompanying family members, as well as tourists to the Red Sea.

Table 1.3 shows the future population and distribution to cities and TDA development centers from 2002 to 2012.

Table 1.3 Population of Cities and TDA Centers in the Red Sea Coast

	1999	2002	2007	2012
North Hurghada Sector (TDA)	0	2,000	5,000	6,000
Hurghada City	63,000	87,000	126,000	149,000
Hurghada-Safaga Sector (TDA)	0	11,000	27,000	38,000
Safaga City/Safaga-Quseir Sector (TDA)	28,000	40,000	55,000	66,000
Quseir City	27,000	32,000	59,000	125,000
Quseir-Marsa Alam Sector (TDA)	0	5,000	25,000	79,000
Marsa Alam City	4,000	8,000	37,000	119,000
Marsa Alam-Ras Benas Sector (TDA)	0	1,000	5,000	20,000
Shalateen City	12,000	13,000	14,000	16,000
Halaib City	2,000	2,000	2,000	3,000
Total of TDA Development Areas	0	19,000	62,000	143,000
Total of City Areas	136,000	182,000	293,000	478,000
Grand Total	136,000	201,000	355,000	621,000

Source: JICA Study Team

1.3 Water Demand

Future demand of drinking water is estimated as shown in Table 1.4. It is based on population and number of accommodation rooms considering the following assumptions:

- Population and hotel rooms in cities and TDA areas in the Red Sea in year 2002, 2007 and 2012 are estimated based on the framework for the Upper Egypt Region Tourism Development (see Table 1.2 and Table 1.3);
- Unit of water consumption per person is expected to gradually increase from 210 liters/person/day in 2002 to 250 liters/person/day in 2012 due to the improvement of living standard of the people; and
- Water consumption unit per hotel room is expected at 400 liters/room/day.

Necessary volumes of water that each city will have to supply to their respective areas and the TDA centers as well in the future are calculated in Table 1.5.

Table 1.4 Future Water Demand

Town	2002			2007			2012		
	A	Unit	Demand	A	Unit	Demand	A	Unit	Demand
		(l/day)	(m ³ /day)		(l/day)	(m ³ /day)		(l/day)	(m ³ /day)
North Hurghada (TDA)	2,000	210	420	5,000	230	1,150	6,000	250	1,500
	3,000	400	1,200	4,000	400	1,600	4,000	400	1,600
Sub Total (1)			1,620			2,750			3,100
Hurghada	87,000	210	18,270	126,000	230	28,980	149,000	250	37,250
	17,000	400	6,800	21,000	400	8,400	21,000	400	8,400
Sub Total (2)			25,070			37,380			45,650
Hurghada-Safaga (TDA)	11,000	210	2,310	27,000	230	6,210	38,000	250	9,500
	13,000	400	5,200	20,000	400	8,000	24,000	400	9,600
Sub Total (3)			7,510			14,210			19,100
Safaga	40,000	210	8,400	55,000	230	12,650	66,000	250	16,500
	3,000	400	1,200	3,000	400	1,200	3,000	400	1,200
Sub Total (4)			9,600			13,850			17,700
Quseir	32,000	210	6,720	59,000	230	13,570	125,000	250	31,250
	1,000	400	400	4,000	400	1,600	10,000	400	4,000
Sub Total (5)			7,120			15,170			35,250
Quseir-Marsa Alam (TDA)	5,000	210	1,050	25,000	230	5,750	79,000	250	19,750
	4,000	400	1,600	16,000	400	6,400	46,000	400	18,400
Sub Total (6)			2,650			12,150			38,150
Marsa Alam	8,000	210	1,680	37,000	230	8,510	119,000	250	29,750
	1,500	400	600	4,000	400	1,600	10,000	400	4,000
Sub Total (7)			2,280			10,110			33,750
Marsa Alam-Ras Benas (TDA)	1,000	210	210	5,000	230	1,150	20,000	250	5,000
	500	400	200	3,000	400	1,200	12,000	400	4,800
Sub Total (8)			410			2,350			9,800

Note: A = Population, B = Hotel room

Source: JICA Study Team

Table 1.5 Future Water Requirements at Each City

City	Hurghada	Safaga	Quseir	Marsa Alam	Remark
	(1)+(2)+(3)/2	(3)/2+(4)	(5)+(6)/2	(6)/2+(7)+(8)	
Existing capacity (m ³)	39,000	11,630	5,650	600	Year 1999
Future demand (m ³)	47,235	20,955	21,245	18,535	Year 2007
	58,300	27,250	54,325	62,625	Year 2012
Shortage volume in future (m ³)	8,235	9,325	15,595	17,935	Year 2007
	19,300	15,620	48,675	62,025	Year 2012

Source: JICA Study Team

As shown in Table 1.5 there will be a shortage of water supply volume in 2007 and 2012 in each of the four cities under the existing facilities. Core cities such as Hurghada, Safaga, Quseir and Marsa Alam need a large additional volume of water to satisfy future demand. Water supply services of the cities will not be limited within the city areas in the future; it will be required to extend the services to TDA centers to support TDA development. Particularly, in Marsa Alam City, there is an urgent requirement to increase the volume of water supply because the existing capacity is very small.

1.4 Project

In order to meet the demand for potable water in Marsa Alam City in 2012, the Water

Conveyance Project is proposed. In the following section, pre-feasibility of the Water Supply Project in Marsa Alam City is reviewed. In the evaluation, following two options of water resource are considered and compared:

- Water conveyance from the Nile River through pipeline along highway; and
- Desalination Plant of seawater from the Red Sea.

1.4.1 Water Supply System

(1) Pipeline from Qena to Marsa Alam:

- Source of Water: river water of the Nile River
- Intake Facility: Intake pipe (900mm) with pump, Purification plant (capacity of 62,000 m³/day) at Qena city
- Length of Pipeline: 225km
- Size of Pipe: 1000 mm (average velocity of water in pipe is 0.96 m/sec.)

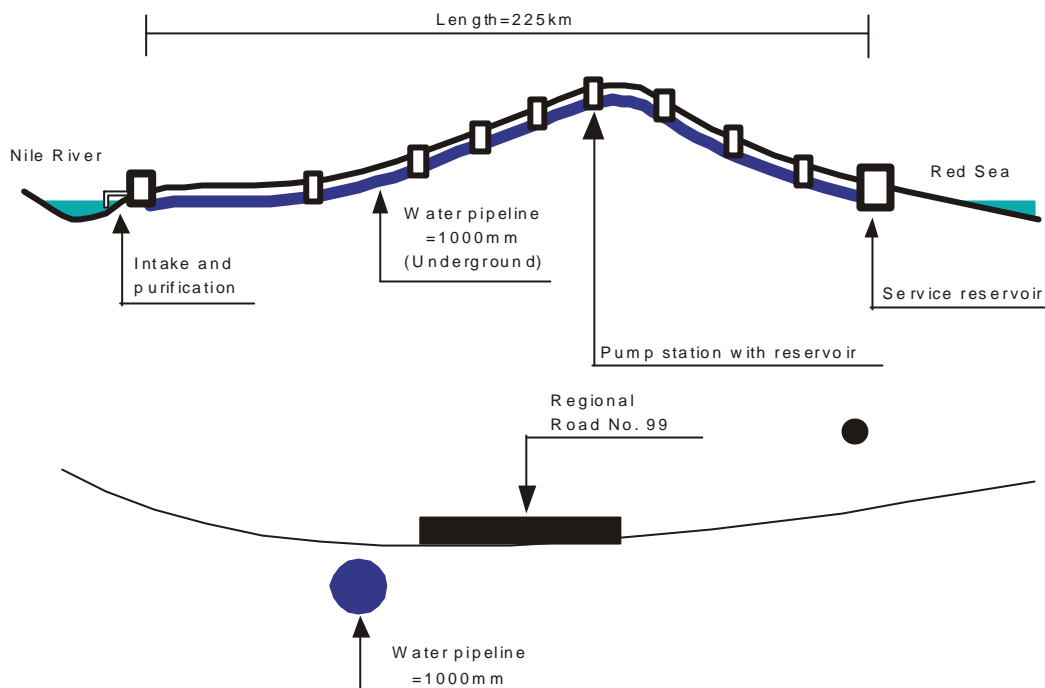
The agreed discharge water volume of Aswan High Dam is around 55 billion m³ per year. It is estimated that the additional water volume to be conveyed per year in 2012 is 22.6 million m³ accounting for 0.4% of the total volume of the Nile River water because of the project. Effect of the project on the distribution of the whole Nile River water is not considered serious. An intake facility will be built near the east bank of the Nile River at Qena City and the treated water will be conveyed by pipeline with pumps constructed along Route 99 to Marsa Alam City. The pipeline will be installed under the ground and a reservoir is to be constructed in Marsa Alam City.

(2) Desalination plants at Marsa Alam:

- Source of water: sea water
- Type of desalination: Reverse Osmosis Membrane Method
- Number of plant: 8 (2 plants x 18,000 m³/day and 6 plants x 5,000 m³/day)

Plural desalination plants are constructed near water consumption places: two plants of 18,000 m³/day in Marsa Alam, four of 5,000 m³/day in Quseir-Marsa Alam, and two of 5,000 m³/day in Marsa Alam-Ras Benas. An abundance of corals exists along the shoreline. In order to minimize the negative impacts on the environment, the pipes for discharging water after desalination are to be extended two to three kilometers away from the shoreline and fixed on the bed in order to prevent any damage to corals.

Figure 1.2 Longitudinal and Cross Sections of Water Pipeline



Source: JICA Study Team

1.4.2 Water volume

Additional volumes of water to meet the demand in Marsa Alam in year 2007 and 2012 are 18,000 m³/day and 62,000 m³/day respectively. Table 1.6 shows the distribution of the volume between domestic use and industrial use of water.

Table 1.6 Additional Water Volume in 2007 and 2012

	2007	2012
Domestic use	12,000 m ³ /day	44,000 m ³ /day
Hotel use	6,000 m ³ /day	18,000 m ³ /day
Total	18,000 m ³ /day	62,000 m ³ /day

Source: JICA Study Team

1.5 Implementation of the Project

1.5.1 Institution

It is a responsibility of the local government to develop and manage the infrastructure of its administrative area, in principle. On the other hand, TDA is proceeding to develop tourist centers as the self-contained type of development. Focusing on mid- and long-term perspectives, roles of public and private sectors for municipal infrastructure development are proposed by development stage in the city area as well as in TDA centers, as shown in Table 1.7, based on the land use as follows:

- Hotel accommodation area in TDA center,
- Service town in TDA area for the settlements to provide services to hotel accommodation center,
- Residential area in the city, and
- Hotel accommodation area in the city.

Table 1.7 Municipal Infrastructure Development by Land Use

		Land use	
		Hotel accommodation	Town/residential
TDA Tourist Center	Short Term (2007)	Private	(Private)
	Mid Term (2012)	Private	Private/Public
	Long Term (2017)	Private/Public	Public
City (urbanized area)	Short Term (2007)	Private	Public
	Mid Term (2012)	Public	Public
	Long Term (2017)	Public	Public

Source: JICA Study Team

In the Red Sea, an indispensable role of the public sector is to improve and upgrade municipal infrastructure services in the existing four major cities. In the service towns of TDA center, it will also be a role of public sector to guide and organize stable settlements of new communities so as to attain sustainable tourism development by avoiding negative impacts on natural and social environments.

(1) Water supply in city area

It is an urgent requirement for the public sector to develop municipal infrastructure to cope with the increasing demand under the pressure of rapid urban expansion. Otherwise, living environment in the existing inhabitant area will deteriorate. Under the current circumstances it is not preferable for the city to choose privatization for the water supply development.

In the tourism area of the city, it will be developed by the private sector in the short term, but it will be more efficient to transfer it to the public sector, along with the municipal management system of the city.

(2) Water supply in TDA area

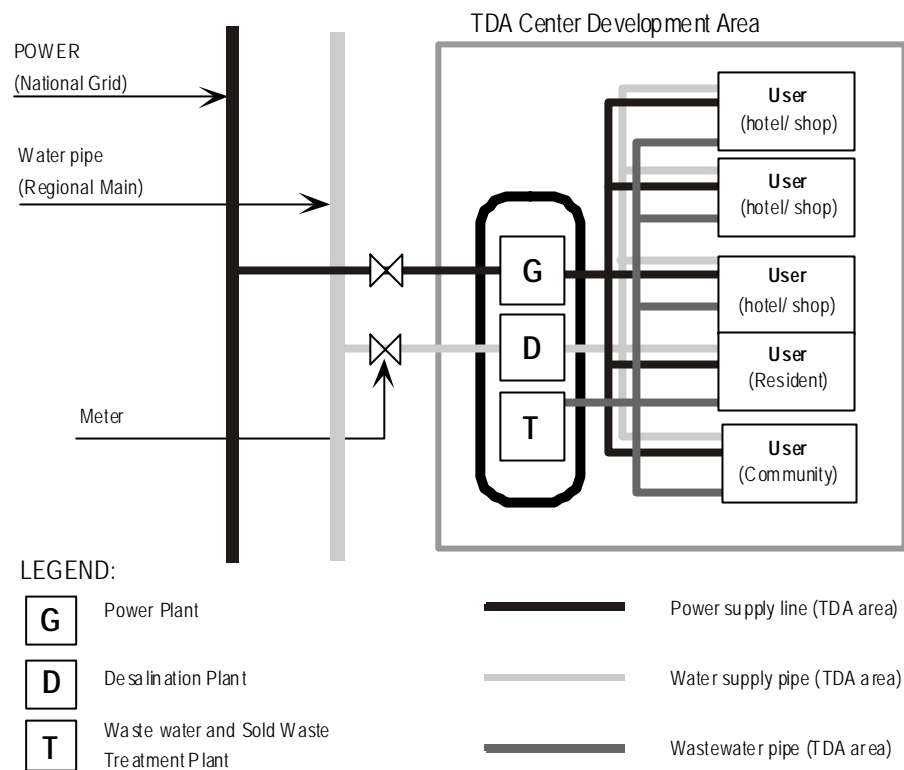
In TDA development area, IDC is currently responsible to provide all necessary utilities in the center and water is provided by desalination plant. There are also many tourism development projects in progress outside of the TDA area. Some utilities are provided by the public sector; others develop it by themselves. In the TDA area, water supply projects can be developed and managed by the private sector (IDC) in the short-term period until 2007. Up to this period, the settlements in the service towns will be small.

In mid term until 2012, considerable number of settlements will grow in the service towns of TDA center. In those service towns, public sector will be involved in developing the water supply, though IDC will still continuously play a role as a utility service company.

In both cases mentioned above, it is proposed that the Ministry of Public Works and Water Resources take responsibility for the supply of necessary volume of water to the front of city area or to the front of TDA development area in mid term. In the city area thereafter the local government can distribute it in the city area. On the other hand, in the TDA center, IDC will manage it.

Figure 1.3 shows an example of private and public coordination of environmental facility utilization on IDC in TDA development area.

Figure 1.3 Environment Facility Utilization and IDC



Source: JICA Study Team

1.5.2 Cost Estimate and Implementation Schedule

(1) Assumptions

The following assumptions have been made for cost estimation and financial evaluation of the project:

- Project cost is estimated based on market prices in November 1999 and inflation is not taken into account for cost and revenue estimate.
- Foreign exchange rate as of the end of November 1999 is used during the whole project life as follows: US\$ 1.00 = LE 3.40, LE 1.00 = Japanese Yen 30.00
- Target year is estimated at 2012 and the project is designed to meet the demand in 2012.
- Life period is assumed to be: 30 years for pipeline; 20 years for desalination plant
- Financial pre-feasibility is examined over the period for 30 years. After the life period of the desalination plant, replacement cost of the plant is estimated. Salvage value of facility is calculated as a negative cost of the last year of evaluation period in 2036.
- Unit of water consumption per person: 210 liters/person/day in 2002, 230 liters/person/day in 2007, 250 liters/person/day in 2012
- Water consumption unit per hotel room: 400 liters/room/day.
- Revenue from water charge is estimated at the following prices for base case considering the current price schedule of water: Domestic use: LE 0.5 per m³, Industrial use: LE 5.0 per m³

(2) Cost estimate for Pipeline Project from Qena to Marsa Alam

Construction cost

Total construction cost of the pipeline from Qena to Marsa Alam with a total length of 225 km is estimated at LE 1,079.8 million, as shown in Table 1.8, including the following.

Pipeline:

- Length of Pipe: 225km
- Size of pipe: 1000mm (average velocity of water in pipe is 0.96m/sec.)
- Unit cost of 1000mm pipe: LE 4.7 million/km including pipes, pumping station with reservoirs and all civil works
- Construction cost of pipeline: LE 4.7 million x 225km = LE 1,057.5 million

Purification Plant:

- Construction cost of purification plant: LE 22 million including 65,000m³/day of the intake facility

Land:

- Land price for purification plant: LE 10/m² x 3ha = LE 0.3 million

Table 1.8 Construction Cost of Pipeline from Qena to Marsa Alam

	Unit cost	Quantity	Total (LE million)
Construction of pipe line	LE 4.7 million/km	225km	1,057.5
Construction of purification plant			22.0
Land	LE 10.0/m ²	3ha	0.3
Total			1079.8

Source: JICA Study Team

Operation and maintenance cost

Annual operation and maintenance cost is estimated at 0.1% of total construction cost amounting LE 1.1 million per year.

Implementation Schedule

Implementation schedule is shown in Table 1.9 including:

- Study: Topographic survey, Geological Survey, and Design (three years)
- Construction: Inlet Facility, Purification Plant, Pipeline, and Water Tower (three years)

Table 1.9 Implementation Schedule of Pipeline from Qena to Marsa Alam

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Qena - Marsa Alam	Study												
	Construction												

Source: JICA Study Team

(3) **Cost estimate for Desalination Plant Project (Reverse Osmosis Membrane Method)**

Construction cost

Total construction cost of the desalination plant is estimated at LE 761.6 million as shown in Table 1.10, including the following:

Desalination plant:

- Number of plants: eight (Two plants x 18,000 m³/day and six plants x 5,000 m³/day)
- Unit cost of plant: LE 8,000/m³ including intake, storage, treatment and discharge facilities and civil works
- Construction cost of plant: LE 8,000 x 62,000 = LE 496 million

Discharging pipe:

- Unit cost of pipe for discharging water to sea: LE 12 million/km (400mm) and LE 7 million/km (200mm)
- Construction cost of discharging pipe: (12 x 4km x 2 pipes) + (7 x 4km x 6 pipes) = LE 264 million

Land:

- Land price for plant: $LE\ 10/m^2 \times 2\ ha/plant \times 8\ Plants = LE\ 1.6\ million$

Table 1.10 Construction Cost of Desalination Plant

	Unit cost	Quantity	Total (LE million)
Construction of desalination plant	LE 8,000/m ³	62,000m ³	496.0
Construction of discharging pipe			264.0
Land	LE 10.0/m ²	16ha	1.6
Total			761.6

Source: JICA Study Team

Operation and maintenance cost

Annual operation and maintenance cost is estimated as follows:

- For the desalination plant, O&M cost is estimated at LE 1.0 million per year, which accounts for 0.2% of construction cost of plant.
- For the discharging pipe, O&M cost is estimated at LE 5.3 million per year, which is 2.0% of construction cost of discharging pipe.
- Change of reverse osmosis membrane: one third of total osmosis membrane will be changed every three years. $LE\ 600/m^3 \times 62,000\ m^3 \times 1/3 = LE12.4\ million$ every three years

Implementation Schedule

It is estimated that the desalination plant will be installed to meet the additional demand yearly until 2012. The construction period of the plant is three years, as shown in Table 1.11.

Table 1.11 Construction Schedule of Desalination Plant

	1 st year	2 nd year	3 rd year
Construction of desalination plant			
Construction of discharging pipe			

Source: JICA Study Team

1.6 Evaluation

1.6.1 Financial Evaluation

Based on the assumptions, cost estimate and implementation schedule discussed above, cash flow of investment cost, operation and maintenance cost and revenue from water charges is calculated as shown in Tables 1.13 and 1.14 for the Pipeline Project and Desalination Plant Project respectively.

(1) Unit water cost of Pipeline and Desalination Plant

Unit cost of water is the average cost to produce one m³ of water. It is estimated considering total cost and total volume of water supply during the project period until 2036. Total cost includes construction cost and operation and maintenance costs, and the salvage value is included as a negative cost in 2036.

Unit water cost is estimated at LE1.76 per m³ for the Pipeline Project. On the other hand, LE 2.13 per m³ is the unit cost for the Desalination Plant Project, which is higher by 20%.

(2) FIRR of the Pipeline Project

The Financial Internal Rate of Return (FIRR) of the Pipeline Project is estimated under two cases of water schedules assumed as shown in Table 1.12.

Table 1.12 Water Tariff Schedule and FIRR of Pipeline Project

	Base case	Alternative case
Water tariff		
Domestic use	LE 0.5 per m ³	LE 1.0 per m ³
Industrial use	LE 5.0 per m ³	LE 10.0 per m ³
FIRR	0.2 %	4.7 %

Source: JICA Study Team

FIRR of the Pipeline Project is estimated at 0.2% for the base case, though the opportunity cost of capital is not considered. It indicates that the cost including construction, operation and maintenance costs except interest cost will be recovered by revenues from water charge in base case. However, it is not financially viable when the interest cost for the initial investment is taken into account. In the alternative case, where the tariff schedule of water is assumed to be double, FIRR increases to 4.7%; however, it is considerably low for development by the private sector only.

Public-private coordination is indispensable for a financially sustainable management of water supply. It is unrealistic that either the private sector or the public sector only will provide all environmental utility services for all the industries and communities in the region.

Table 1.13 Cash Flow of Water Pipeline from Oena to Marsa Alam (Base case of tariff schedule)

Nile Water

Capacity	
Year	2007 2012 -
m3/day	18,000 62,000

Average unit price of water producing cost (LE/m ³):	LE 1.76
FIRR:	0.2%
Assumption: Water charge revenue (LE/m ³)	Domestic: LE 0.50 Industrial: LE 5.00

Year	Investment	O & M	Total cost (LE million)	Capacity (m ³ day)	Domestic consumption	Industrial consumption	Annual total consumption	Total revenue (LE million)	Net revenue (LE million)
		Annual O & M			(m ³ /day)	(m ³ day)	(m ³ year)		
2004	352.8		352.8						-352.8
2005	352.5		352.5						-352.5
2006	374.5		374.5						-374.5
2007		1.0	1.0	18,000	12,000	6,000	6,570,000	13.1	12.1
2008		1.0	1.0	26,800	18,400	8,400	9,782,000	18.7	17.7
2009		1.0	1.0	35,600	24,800	10,800	12,994,000	24.2	23.2
2010		1.0	1.0	44,400	31,200	13,200	16,206,000	29.8	28.8
2011		1.0	1.0	53,200	37,600	15,600	19,418,000	35.3	34.3
2012		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2013		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2014		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2015		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2016		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2017		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2018		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2019		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2020		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2021		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2022		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2023		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2024		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2025		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2026		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2027		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2028		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2029		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2030		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2031		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2032		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2033		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2034		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2035		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
2036		1.0	1.0	62,000	44,000	18,000	22,630,000	40.9	39.9
Total	1,079.8	30.0	1,109.8		1,224,000	504,000	630,720,000	1,143.2	33.4

Source: JICA Study Team

Table 1.14 Cash Flow of Desalination Plant (ROM) in Marsa Alam (Base case of tariff schedule)

Desalination Plant

Capacity

Year	2007	2008	2009	2010	2011	2012 -
m3/day	18,000	26,800	35,600	44,400	53,200	62,000

Average unit price of water producing cost (LE/m3):	2.13
FIRR:	-1.4%
Assumption: Water charge revenue (LE/m3)	Domestic: 0.50 LE Industrial: 5.00 LE

Year	Investment cost							O & M		Total cost (LE million)	Capacity (m3/day)	Domestic consumption (m3/day)	Industrial consumption (m3/day)	Annual total consumption (m3/year)	Total revenue (LE million)	Net revenue (LE million)
							Total	Change of ROM	Annual O & M							
2004	72.5						72.5			72.5						-72.5
2005	110.3	35.4					145.7			145.7						-145.7
2006	38.3	53.9	35.4				127.7			127.7						-127.7
2007		18.7	53.9	35.4			108.1	1.8	109.9	18,000	12,000	6,000	6,570,000	13.1	-96.8	
2008			18.7	53.9	35.4		108.1	2.7	110.8	26,800	18,400	8,400	9,782,000	18.7	-92.1	
2009				18.7	53.9	35.4	108.1	3.6	111.7	35,600	24,800	10,800	12,994,000	24.2	-87.5	
2010					18.7	53.9	72.7	3.6	4.5	80.8	44,400	31,200	13,200	16,206,000	29.8	-51.0
2011						18.7	18.7	1.8	5.4	25.9	53,200	37,600	15,600	19,418,000	35.3	9.4
2012								1.8	6.3	8.1	62,000	44,000	18,000	22,630,000	40.9	32.8
2013								5.4	6.3	11.7	62,000	44,000	18,000	22,630,000	40.9	29.2
2014								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2015								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2016								5.4	6.3	11.7	62,000	44,000	18,000	22,630,000	40.9	29.2
2017								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2018								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2019								5.4	6.3	11.7	62,000	44,000	18,000	22,630,000	40.9	29.2
2020								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2021								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2022								5.4	6.3	11.7	62,000	44,000	18,000	22,630,000	40.9	29.2
2023								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2024	72.5						72.5	3.5	6.3	82.3	62,000	44,000	18,000	22,630,000	40.9	-41.4
2025	110.3	35.4					145.7	5.4	6.3	157.4	62,000	44,000	18,000	22,630,000	40.9	-116.5
2026	38.3	53.9	35.4				127.7	3.5	6.3	137.5	62,000	44,000	18,000	22,630,000	40.9	-96.6
2027		18.7	53.9	35.4			108.1	3.5	6.3	117.9	62,000	44,000	18,000	22,630,000	40.9	-77.0
2028			18.7	53.9	35.4		108.1	5.4	6.3	119.8	62,000	44,000	18,000	22,630,000	40.9	-78.9
2029				18.7	53.9	35.4	108.1	3.5	6.3	117.9	62,000	44,000	18,000	22,630,000	40.9	-77.0
2030					18.7	53.9	72.7	3.5	6.3	82.5	62,000	44,000	18,000	22,630,000	40.9	-41.6
2031						18.7	18.7	5.4	6.3	30.4	62,000	44,000	18,000	22,630,000	40.9	10.5
2032								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2033								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2034								5.4	6.3	11.7	62,000	44,000	18,000	22,630,000	40.9	29.2
2035								3.5	6.3	9.8	62,000	44,000	18,000	22,630,000	40.9	31.1
2036	-110.6	-59.5	-64.9	-70.3	-75.7	-81.1	-461.9	3.5	6.3	-452.1	62,000	44,000	18,000	22,630,000	40.9	492.9
Total	331.7	156.7	151.3	145.9	140.5	135.1	1,061.3	106.3	175.6	1,343.2		1,224,000	504,000	630,720,000	1,143.2	-200.1

Source: Study team

1.6.2 Environmental Evaluation

Based on UNEP information, the advantages and disadvantages of desalination by ROM are briefly summarized as shown in Table 1.15.

Table 1.15 Advantages and Disadvantages of ROM Desalination Plant

	Advantages	Disadvantages
Operation and Maintenance	<ul style="list-style-type: none"> - The processing system is simple; the only complicating factor is finding or producing a clean supply of feed-water to minimize the need for frequent cleaning of the membrane. - Low maintenance, nonmetallic materials are used in construction. 	<ul style="list-style-type: none"> - There may be interruptions of service during stormy weather (which may increase particulate re-suspension and the amount of suspended solids in the feed-water) for plants that use seawater. - Operation of a RO plant requires a high quality standard for materials and equipment. - An extensive spare parts inventory must be maintained, especially if the plants are of foreign manufacture. - RO technologies require a reliable energy source.
Cost and economy	<ul style="list-style-type: none"> - Installation costs are low. - RO plants have a very high space/production capacity ratio, ranging from 25,000 to 60,000 l/day/m². 	<ul style="list-style-type: none"> - There is often a need for foreign assistance to design, construct, and operate plants. - Desalination technologies have a high cost when compared to other methods, such as groundwater extraction or rainwater harvesting.
Technology	<ul style="list-style-type: none"> - Systems may be assembled from prepackaged modules to produce a supply of product water ranging from a few liters per day to 750,000 l/day for brackish water, and to 400,000 l/day for seawater. The modular system allows for high mobility, making RO plants ideal for emergency water supply use. - Energy use to process brackish water ranges from 1 to 3 kWh per 1,000 l of product water. - RO technologies can make use of an almost unlimited and reliable water source, the sea. - RO technologies can be used to remove organic and inorganic contaminants. 	<ul style="list-style-type: none"> - The membranes are sensitive to abuse - The feed-water usually needs to be pretreated to remove particulate (in order to prolong membrane life).
Environment	<ul style="list-style-type: none"> - Aside from the need to dispose of the brine, RO has a negligible environmental impact. - The technology makes minimal use of chemicals. 	<ul style="list-style-type: none"> - Brine must be carefully disposed of to avoid deleterious environmental impacts. - There is a risk of bacterial contamination of the membranes; while bacteria are retained in the brine stream, bacterial growth on the membrane itself can introduce tastes and odors into the product water.

Source: "Newsletter and Technical Publications, Sourcebook of Alternative Technologies for Freshwater Augmentation in Latin America and The Caribbean" by UNEP, <http://www.unep.or.jp/ietc/Publications/TechPublications/TechPub-8c/osmosis.html> (modified by JICA Study Team)

In accordance with the table above, several disadvantages of the RO desalination plant are identified. The RO plant generally discharges foul and scaly matters from feed water and the brine. Therefore, it can be said that the RO plant has potentially negative impacts on the surrounding environment. From viewpoint of environmental protection of the Red Sea and its ecosystems, such foul and scaly matters and brines shall be controlled and disposed of to avoid the negative impacts. Consequently, certain environmental technologies and suitable environmental management systems shall be developed and introduced to the plant for controlling the environmental impacts.

2. Beautification of Access and Pedestrian Network

2.1 Background of the Project

A bad experience pertaining to access could damage a tourist's total impression of a tour. In particular, traveling between destinations is a part of the tour (as excursion tour). In addition to the development and improvement of berth facility and historical sites, the access connecting each place should be upgraded for tourists and citizens' activities.

Generally speaking, the conditions for pedestrians are not pleasant not to say for the handicapped. This project will contribute to form a favorable tourism circuit as well as improvement of pedestrian ways.

2.2 Rationale and Goal of the Project

In order to make a good total impression of the Egyptian tour and to increase tourism attraction, this project is extremely necessary. Even though the historical sites are impressive, if access is bad, the impression of tourists would be spoiled and excursion would be limited.

The goal of the project is to complete the access and network connecting berth facilities and historical sites including pedestrian way in urban areas.

The objective is to establish a pleasant tourism network and to increase capacity of tourism products, thus enhancing the total image.

2.3 Implementation Agencies

It is required that there be close coordination with TDA and governorates. Beautification consists of the usual upgrading of roads, such as paving/marketing/sidewalk, and tourist facilities, such as information board/sign/vegetation/shelter. Tourists and citizens as well will enjoy the overall effects of this project.

In order to improve the total townscape along the access, cooperation of citizens is necessary. In the built-up area, the design and use of buildings along the access should be controlled.

There are largely two types of access: open or non-urbanized access and urbanized (built-up) access, or a combination of these two types. The following are specific facilities required:

- Non-urbanized access: shelter, information board
- Built-up access: control of building and use

The following demarcation is shown just for reference of the characteristics of each facility.

- Governorate: paving, marking, traffic signal, pedestrian network (sidewalk, slope, crossing), lighting, vegetation
- TDA: information board, sign, shelter

2.4 Project Component

The project will consist of the following components:

- Road improvement (paving, marking, traffic sign, lighting, greening of road side);
- Pedestrian network development (sidewalk, pedestrian crossing);
- Tourist information provision (information board, direction sign, kiosk); and
- Regulation of roadside buildings.

2.5 Outline of the Project

Conditions of roads, landscape and parking around and between major historical sites and landing places on the Nile River are not satisfactory. In order to provide a comfortable sightseeing tour of beautiful landscape, the road and parking should be improved with good pavement, clear signs, vegetation and shades where necessary.

- Beautification of access road to historical sites; and
- Provision of pedestrian network with shade, sign and vegetation.

In Luxor (East Bank), the existing project of reconstruction of Sphinx Avenue should be promoted. In West Thebe, this project will support the shuttle system connecting the proposed West Bank Visitor Center and major destination clusters.

2.6 Cost Estimation

The total construction cost is estimated at about LE 9million.

Table 2.1 Beautification of Access and Pedestrian Network

Place	Project	Quantity	Unit	Body	Description	Unit rate	Amount (EP)
Oena-Dendera	Beautification of access between Berth-park development on east bank and Dendera Temple	6	km	T	Paving, vegetation, sign, marking; [Promotion of Existing Riverside Park Development]	300,000	1,800,000
Luxor East bank					[Promotion of Open Museum District Development of CDL]		
Luxor West bank	Beautification of access connecting the historical sites and ferry dock	15	km	T	Paving, vegetation, sign, marking, information board	300,000	4,500,000
Esna	Beautification of access between boat landing place to Esna Temple	0.3	km	T	Paving, information board	300,000	90,000
El Kab	Development of access with pedestrian way between boat landing place and the ruins/tombs	1	km	T	Paving, sidewalk, sign, marking, information board	300,000	300,000
Edfu	Beautification of access between boat landing place and Edfu Temple	1.5	km	T	Paving, vegetation, sign, marking, intersection improvement, information board	300,000	450,000
Gebel El Silsila	Development of access with pedestrian way between boat landing place and the ruin/tombs	1	km	T	Paving, sidewalk, sign, marking, information board	300,000	300,000
Aswan	Beautification of road between the ferry dock and Nubia Museum	1.5	km	G, T	Improvement of pavement, sidewalk, vegetation, sign, marking, intersection, information board	300,000	450,000
Nasser Lake							
El-Sebua	Development of access with pedestrian way between boat landing place and the ruin/tombs	1	ls	P		300,000	300,000
Amada	Development of access with pedestrian way between boat landing place and the ruin/tombs	1	ls	P		300,000	300,000
Qasr Ibrim	Development of access with pedestrian way between boat landing place and the ruin/tombs	1	ls	P		300,000	300,000
Abu Simbel	Development of access with pedestrian way between boat landing place and the ruin/tombs	1	ls	P		300,000	300,000
Total							9,090,000

Note: T:TDA, G:Governorate, P:Private, S:Supreme Committee of Antiquities

Source: JICA Study Team

2.7 Work Schedule

Considering the tourism and public contribution of the project, it should be started as soon as possible from important places such as Luxor and Aswan. It should be completed step by step.

Figure 2.1 Work Schedule in Each Site

	Urgent			Short term				Medium term				Long
Luxor Promenade	■	■	■									
Aswan Promenade			■	■	■							
Oena - Dendera				■	■	■	■					
Luxor Sphinx Avenue				■	■	■	■	■	■	■	■	■
West Thebe				■	■	■	■					
Esna				■	■	■	■					
El Kab								■	■	■	■	
Edfu				■	■	■	■					
Gebel El Silsila								■	■	■	■	
Kom Ombo				■	■	■	■					
Lake Nasser				■	■	■	■					
Abu Simbel				■	■	■						

Source: JICA Study Team

3. Development of Handicraft Village

3.1 Background of the Project

Souvenirs sold in Upper Nile are stereotyped reflecting little local flavor. Souvenir sales would contribute more to the local economy if they were more attractive to tourists. It would also be easier to encourage participation in this industry for local people with a small amount to invest if the products are unique and of good quality. However, many souvenir items are stale and of poor quality, with several fixed patterns. There is much room for promotion of the handicraft industry to the tourism market. In these circumstances, a Handicraft Village is proposed to create promotion bases for the small indigenous industry at strategic locations on roads along the Nile. In a Handicraft Village, many tenants including craftsmen, designers and shopkeepers will be housed. The tourists will observe the actual handicraft making in the workshops and their products will be available at or around the same place. The project will include such activities as promotion of product quality control, creation of new design, training of crafts and facilitation of micro-credit.

On the other hand, there are few service facilities for vehicular travelers, particularly between cities. In spite of the fact that the Nile cruise is popular between Luxor and Aswan, land transport is the quickest and most convenient means of travel between destinations along the Nile. Roadside amenities such as coffee shops, restaurants and car service shops with parking are insufficient on the highway along the Nile. It is necessary to create a center or a base for promotion of the handicraft industry combining with development of roadside amenities along the Nile.

3.2 Rationale and goal of the Project

This project will contribute to upgrading the services for souvenir shopping as well as for land excursion tourists.

The goals of the project are as follows:

- Promotion of small local grassroots industry;
- Provision of service amenity or resting place for drivers and passengers on the road between major cities or destinations along the Nile and creation of new tourist destinations;
- Development of attractive designs and patterns;
- Quality control of products;
- Training and promotion of handicraft work; and
- Promotion of sales of souvenir items.

3.3 Implementation Agencies

The facility construction and activities will be mainly done by the private sector with cooperation and support of TDA and Governorate.

- Mainly private development with support of TDA and Governorate
- Site acquisition or provision: TDA and Governorate
- Construction of facilities: Private investment
- Each shop, workshop, cafe, restaurant: Leased or rented to private tenants
- Design development, quality control, training and promotion: TDA/Governorate

3.4 Project component

The project components are as follows:

- Construction of handicraft village (site, building, utilities);
- Management of handicraft village (arrangement of workshop, administration of training program, operation/maintenance of building);
- Design development, quality control and promotion of handicraft; and

- Implementation of training for handicraft work.

3.5 Outline of the Project

In a Handicraft Village, many tenants including craftsmen, designers and shopkeepers will be housed, showing the process of handicraft work and production in combination with sale of the products. Amenities will include parking, coffee shops, rest space, restaurant, information on the area and handicraft and toilets. The project will include such activities as promotion of product quality control, creation of new designs, training of crafts and facilitation of micro-credit.

There will also be a *suq* (local bazaar) type rest and amenity spot consisting of parking, handicraft shops, workshops, information, cafe with rest space, toilet, vegetation and so on,

Examples of handicraft to be found in the village are woodwork, woodcarving, stonework, metalwork, papyrus painting, lace, etc.

Candidate locations include the following: near Qus (between Dendera and Luxor), near El-Kab (between Esna and Edfu), near Gebel El-Silsila (between Edfu and Kom-Ombo), and West Bank of Aswan (between Aswan and New Aswan City).

3.6 Cost Estimation

Although the scale of the facility should be decided after detailed study, the size of the facility is preliminarily set considering the space for parking, service area and workshop areas. The total construction cost will amount to about EL 25 million, while one site will cost about EL 6 million. In addition, land acquisition cost, maintenance/operation cost for facility, operation cost for design development/quality control/promotion and operation cost for training will be required.

Table 3.1 Development of Handicraft Village

Place	Project	Quantity	Unit	Body	Description	Unit rate	Amount (LE)
Near Qus	Development of Handicraft Village	2,500	m ²	T,G	Parking, building, landscaping, utilities, training equipment (site area: 1.5ha)	2,500	6,250,000
Near El-Kab	Development of Handicraft Village	2,500	m ²	T,G	Parking, building, landscaping, utilities, training equipment (site area: 1.5ha)	2,500	6,250,000
Near Gebel El-Silsila	Development of Handicraft Village	2,500	m ²	T,G	Parking, building, landscaping, utilities, training equipment (site area: 1.5ha)	2,500	6,250,000
Near Aswan New City	Development of Handicraft Village	2,500	m ²	T,G	Parking, building, landscaping, utilities, training equipment (site area: 1.5ha)	2,500	6,250,000
Total							25,000,000

Note: T: TDA, G: Governorate, P: Private, S: Supreme Committee of Antiquities

Source: JICA Study Team

3.7 Work Schedule

It will take time for the effects and results of this project to bear fruit after completion and operation of the facility. The earlier the project starts, the better; in particular one pilot handicraft village should be initiated as soon as the feasibility study finishes.

The period of construction is assumed at about one year on condition that the site is secured and basic infrastructure is available.

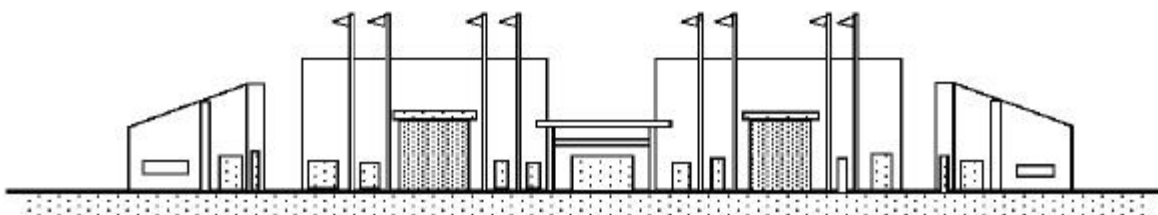
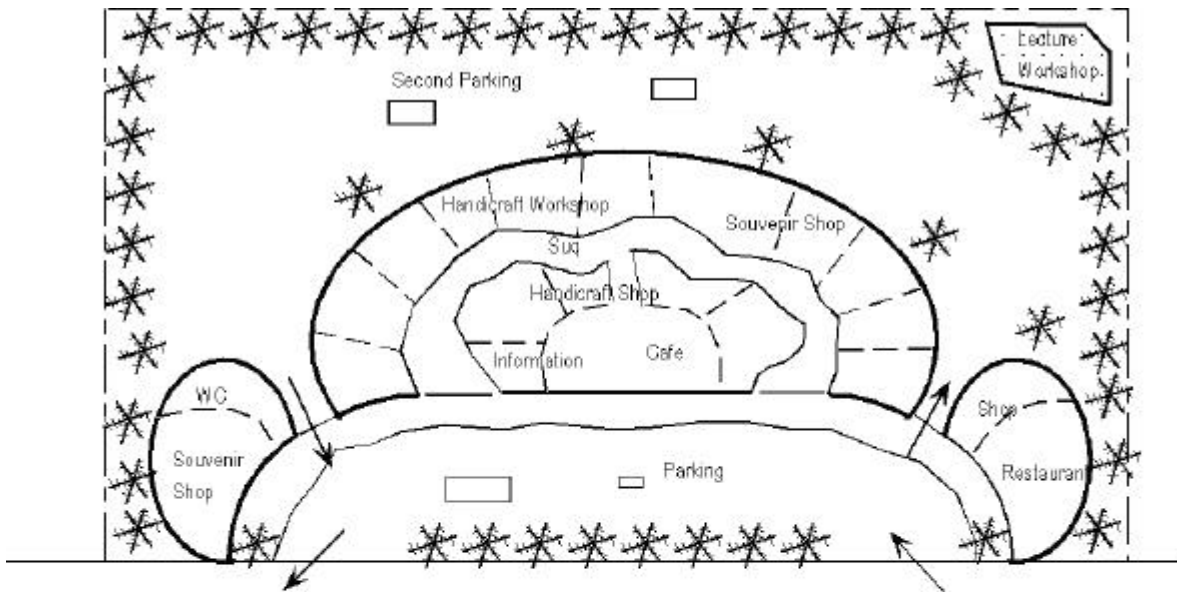
The operation of facilities, programs and training should be continuous.

Figure 3.1 Work Schedule

	Urgent			Short term				Medium term			Long	
Qus Handicraft Village	█	█	█	Training and Promotion/Improvement								
Aswan New City Handicraft Village				█	█	█	Training and Promotion/Improvement					
El Kab Handicraft Village							█	█	█	Training and Promotion/Improvement		
Gebel El Silsila Handicraft Village									█	█	█	Training and Promotion

Source: JICA Study Team

Figure 3.2 Concept of Handicraft Village



Source: JICA Study Team

4. Development of Museums, Site Plazas, and Internet Museums

4.1 Introduction

As discussion and coordination with SCA and other related authorities on this matter was not sufficient to fully develop this project, additional recommendations are given herein due to the importance of this project.

4.2 Background of the Project

Historical sites have been improved gradually since the time of their discovery in the 20th century. As an example, the Karnak temple was excavated from the sand and reconstructed with reinforced columns. However, there are still a number of sites left to be improved, not only new places but also existing destinations, such as Karnak Temple.

Archeological sites should be totally improved and protected from pressures of deterioration by urbanization and damage by visitors. Buffer zones should be secured around the archeological site proper and the gate area (site plaza) should be prepared for service and amenity of visitors.

Generally speaking, parking, ticket box and entrance gate in front of historical sites are not in satisfactory condition. In addition, there is no sufficient information given about them. Even though a site has great historical episodes, it is hard for uninformed visitors to recognize and appreciate them.

On the other hand, the Ministry of Culture has a policy of decentralization of small museums so that each governorate would have its share of cultural pleasures.

4.3 Rationale and Goal of the Project

The project will contribute to conservation of and research on historical heritage sites as well as improvement and expansion of tourism destinations.

Specifically, the goals of the project are as follows:

- Conservation of and research on historical heritage sites;
- Enhancement and expansion of historical tourism products; and
- Improvement of observation condition for visitors.

4.4 Implementation Agencies

The major implementing agency will be the Supreme Committee of Antiquities (SCA) in the light of SCA's administration of archeological assets.

Historical site plaza will be prepared and upgraded mainly by SCA in cooperation with Governorate. SCA will provide and maintain the site museum.

SCA would implement the program of local pilot and information promotion in cooperation with TDA and the local government.

4.5 Project Component

The proposed components of the project are as follows:

- Improvement of site plazas (paving, marking, signage, gate, landscaping, etc.);
- Development of site museums (Dendera, Karnak, El-Kab, Edfu, Gebel El-Silsila, Kom Ombo, Philae, El-Sebua, Amada, Qasr Ibrim, Abu Simbel);
- Promotion of existing plan of site museums for Edfu and Kalasha and improvement of Aswan;
- Development of West Thebe museum;
- Development of Internet Museum, including the development of a comprehensive database; and

- Promotion of local guides (pilot) and information.

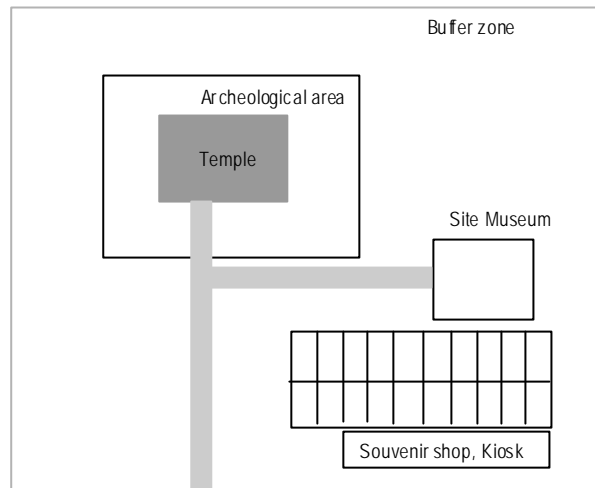
4.6 Outline of the Project

Historical site plaza

Buffer zones around proper archeological compound should be secured.

The plaza in front of each historical site should be prepared in the buffer zone comprising a site museum and parking with landscaping, including paving, fence, and gate.

Figure 4.1 Concept of Historical Site Plaza



Source: JICA Study Team

Site museum

Most tourists usually arrive at historical sites totally unprepared or without much information. There are a number of sites that have sustained damages through the years and are no longer in their original condition (although it is difficult to come up with initial figures on this). Therefore, a site museum is proposed at the entrance of each major site. In this facility, tourists will be able to obtain necessary information about the site and get an image or idea.

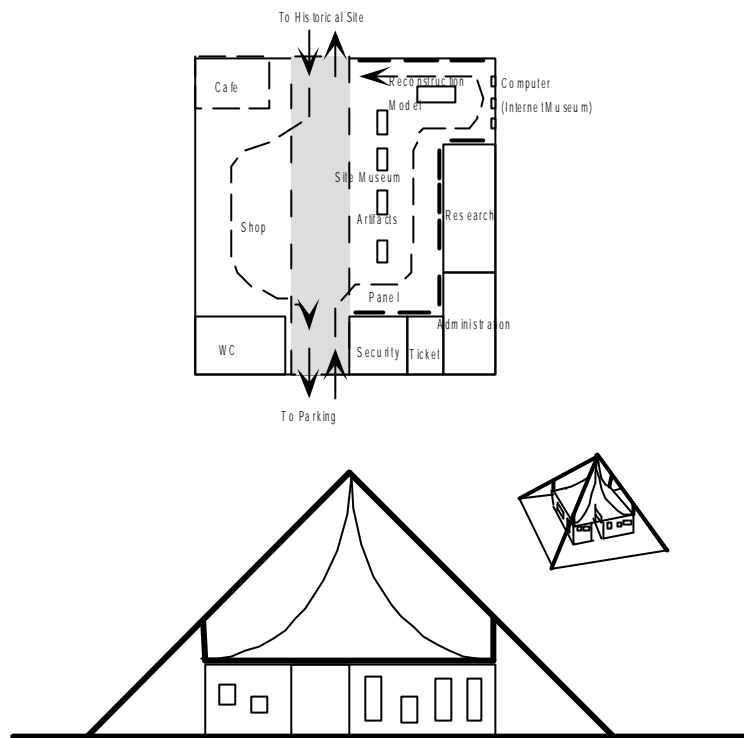
The site museum shall have the following rooms:

- Ticket booth;
- Information hall (Site map panel, history, major points with explanation, reconstruction model, computer to search related information and graphics);
- Exhibition of highlight of artifacts (small museum);
- Administration office;
- Shop, bar, toilet; and
- Researchers' site office.

The function of this museum is provision of information and visitor amenities rather than exhibition of artifacts.

In case the archaeological area extends widely around a temple or tomb site, the structure should not have a deep foundation but rather wooden or steel frames and panels. It should be built after investigation of the site.

Figure 4.2 Visitor Museum



Source: JICA Study Team

West Thebe museum

West Thebe has various assets, including a number of tombs with paintings. Instead of constructing a museum at individual sites, one museum is to provide information on the assets and history of West Thebe as a whole.

Most tourists to Luxor visit the Valley of the Kings as well as Hatshepsut Temple. However, conditions at the tomb sites (small space and large number of tourists) are not good for the preservation of wall paintings. In addition, tourists will not be able to get an image of all the tombs and the whole West Thebe as well. This museum will give tourists the opportunity to obtain information on the tombs of the west bank (Valley of the Kings, Valley of the Queens, Tombs of the Nobles), temples and ruins, with displays of maps, plans, photos, pictures, dioramas (perspective model), accompanied with explanation. It will seem like a real experience of having been at the sites after a visit at the museum.

As the West Thebe Museum would play a role of visitor center at the West Bank, coordination with TDA is important. Effective and efficient distribution and transportation of visitors from this center or hub is expected.

Additionally, as the functions of the proposed West Thebe Museum overlap with those of 'West Bank Visitor Center' suggested in the 'Structure Plan, The Comprehensive Development of the City of Luxor, p5-6 (MHUUC, 1999),' coordination should be established between the two. The West Thebe Museum might be housed in the West Bank Visitor Center. The museum should also be linked with the West Bank Shuttle System since it already has designated stops and parking facilities for transportation (might be solar battery cars). This shuttle system is also necessary to facilitate the circulation and distribution of large number of tourists to various destinations, avoiding large parking and site museums in front of every site.

Internet Museum

In order to search all related information, it is proposed to build an Internet reference system. The number of websites on Egyptology is quite enormous and there are many sites for linkage; however, it is difficult to trace or gather specific items or topics. For example, most information from museums and universities worldwide indicate that the remains of Tutankhamen are displayed in the Egyptian Museum in Cairo, others say that they are in Luxor Museum. A database program and a common format for Egyptian antiquities should be made with network reference system, and this should be published. The system could be developed jointly by the Supreme Council of Antiquities and all related research institutes.

Visitors to historical sites could have total information on specific interest with the network system at every site museum. The project also includes program construction and network equipment. And Internet users in the world should access to the information, so it will act as a market promotion method.

Internet Museum Project consists of systems development (software) for database and networking, and provision of hardware (computers and network devices) to museums and site museums, etc.

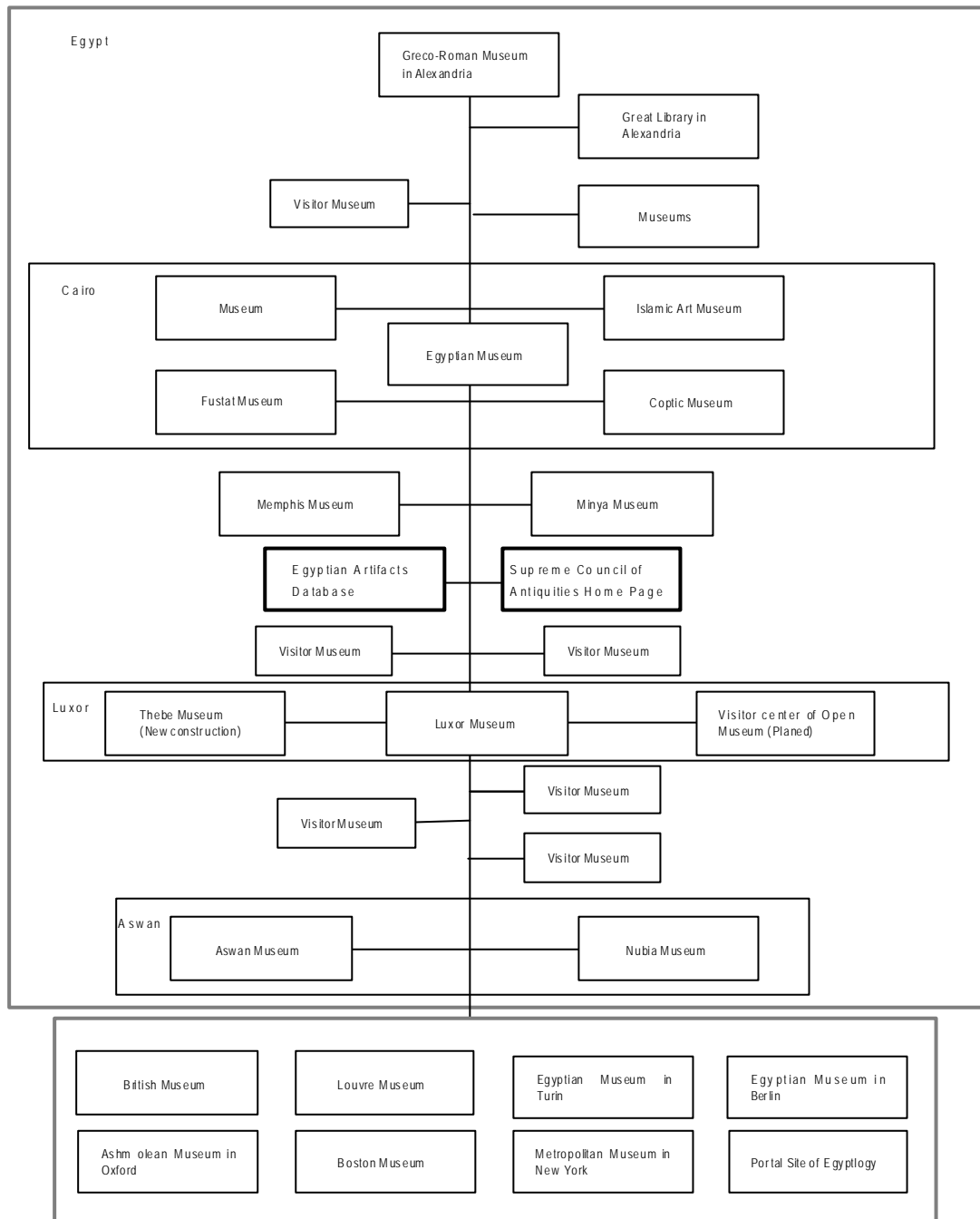
Local Guide and Information Promotion Program

Objectives of this program are as follows:

- To protect and conserve antiquities;
- To offer information to independent tourists (without a guide);
- To control unfavorable activities of tourists in special areas (not prepared area for tourists, e.g. area of color paintings, etc.);
- To guide tourists smoothly and effectively;
- To promote international communication or exchange between tourists and Egyptian people; and
- To promote pride of local people, knowledge of history, importance of antiquities and service-hospitality-communication with tourists.

Using pamphlets printed in several languages (English, French, Spanish, German, Italian, Japanese, Arabic) with maps, local people could provide guidance by taking tourists to the spots or objects and pointing out the corresponding item on the pamphlet after simple training. This service will be included in the entrance admission.

Figure 4.3 Concept of Internet Museums on Egyptian Antiquities



Source: JICA Study Team

4.7 Cost Estimation

The project will cost some EL 30 million.

Table 4.1 Museums, Internet Facilities and Site Plazas (1)

Place	Project	Quantity	Unit	Body	Description	Unit rate	Amount (EL)
-	Internet museum				Construction of data base and internet program, provision of computers and network system		
	Software development (database, internet)	1	ls	S		1,000,000	1,000,000
	Computers	40	unit	S		6,000	240,000
	Network devices	1	ls	S		500,000	500,000
Each site	Site information and guidance pilot program	1	ls	S	Provision of pamphlets printed in several languages and information board; training program and material for site guidance pilots	300,000	300,000
Dendera	Improvement of site plaza at Dendera Temple	0.4	ha	S	Paving, landscaping, information board, kiosk for shops	2,000,000	800,000
Dendera	Preparation of visitor museum	400	m ²	S	Building, utilities, display	3,500	1,400,000

Table 4.2 Museums, Internet Facilities and Site Plazas (2)

Place	Project	Quantity	Unit	Body	Description	Unit rate	Amount (EL)
East bank	Provision of visitor museum at Karnak Temple	600	m ²	S	Building, utilities, display	3,500	2,100,000
West bank	Development of West Thebe Museum	4,000	m ²	S	Building, utilities, display	3,500	14,000,000
El Kab	Improvement of site plaza in front of rock-cut tombs	2,000	m ²	T	Paving, landscaping, information board, kiosk for shops	200	400,000
El Kab	Provision of visitor museum at site plaza	400	m ²	T	Building, utilities, display	3,500	1,400,000
Edfu				S	[Promotion of existing project for development of new entrance, site museum, parking]		
Gebel El Silsila	Development of site plaza	2,000	m ²	T		200	400,000
Gebel El Silsila	Development of visitor museum	400	m ²	T	Building, utilities, display	3,500	1,400,000
Kom Ombo	Improvement of site plaza	2,000	m ²	T	Paving, landscaping, information board, kiosk for shops	200	400,000
Kom Ombo	Development of visitor museum	400	m ²	T	Building, utilities, display	3,500	1,400,000
Aswan	Improvement of Aswan Museum	1	ls	S	Renovation, display	1,000,000	1,000,000
Pilae	Development of visitor museum at the ferry dock (parking)	400	m ²	T	Building, utilities, display (showing original condition and reconstruction work)	3,500	1,400,000
Kalabsha				S	[Promotion of site museum]		
El-Sebua	Development of visitor museum	200	m ²	T	Building, utilities, display	3,500	700,000
Amada	Development of visitor museum	200	m ²	T	Building, utilities, display	3,500	700,000
Qasr Ibrim	Development of visitor museum	200	m ²	T	Building, utilities, display	3,500	700,000
Abu Simbel	Development of visitor museum	200	m ²	T	Building, utilities, display	3,500	700,000
Quseir				S	[Promotion of Quseir Museum Development]		
						Total	30,940,000

Note: T: TDA, G: Governorate, P: Private, S: Supreme Committee of Antiquities

Source: JICA Study Team

4.8 Work Schedule

The traditional work of SCA is important. The project proposes to strengthen and enhance the SCA work putting emphasis on upgrading services for visitors.

The work schedule is to be coordinated with the program of SCA.

Figure 4.4 Study Schedule in Each Site

	Urgent			Short term				Medium term				Long		
Internet Facilities	■	■	■	Expansion and upgrading										
Local pilot promotion				■	■	■	■	■						
Dendera				■	■	■	■	■						
Luxor Sphinx Avenue				■	■	■	■	■	■	■	■	■	■	■
West Thebe Museum				■	■	■	■	■	■	■	■	■	■	
Esna				■	■	■	■	■						
El Kab									■	■	■	■	■	
Edfu				■	■	■	■	■						
Gebel El Silsila									■	■	■	■	■	
Kom Ombo				■	■	■	■	■						
Lake Nasser				■	■	■	■	■						
Abu Simbel				■	■	■								

Source: JICA Study Team

Part V Initial Environmental Examination

1. Initial Environmental Examination

1.1 Objective of IEE

At an early period in the planning stage of the development project, generally, execution of an initial environmental examination (IEE) is required to evaluate environmental impacts that might arise from implementation of a specific project. The primary objective of IEE is to evaluate whether an environmental impact assessment (EIA) is necessary for the project. Accordingly, IEE is conducted based on the following procedure:

- To determine the scope of EIA, if the project is evaluated as requiring an EIA; and
- To examine countermeasures for mitigating effects of the project which require environmental consideration, if the project is evaluated as not requiring an EIA.

1.2 Environmental Items

As a matter of course, environmental fields to be examined in a tourism development project of a national level cover a very wide area including social environment, natural environment and pollution. Therefore, “environmental items” for IEE shall be selected for use in analyzing and summarizing the environmental aspects and issues of specific projects.

In this study, as mentioned above, the environmental items were selected in accordance with the purpose of IEE, the characteristics of the study area, EIA system of Egypt and Law No.4/1994 and JICA Environmental Guideline and so on. The selection was performed after discussions with officials of Environmental Department of TDA and Central Directorate of EIA of the EEAA (Egyptian Environmental Affairs Authority). The selected environmental items include social and natural environments, and pollution as shown in Table 1.1.

Table 1.1 Environmental Items

1. Social Environment	1.1 Resettlement 1.2 Economic Activities 1.3 Traffic and Public Facilities 1.4 Spilt of Community 1.5 Cultural Heritage & Properties	1.6 Water Rights and Rights of Common 1.7 Public Health Condition 1.8 Waste 1.9 Disaster (Risks)
2. Natural Environment	2.1 Topography and Geology 2.2 Soil Erosion 2.3 Groundwater 2.4 Hydrological Situation	2.5 Coastal Zone 2.6 Fauna and Flora 2.7 Meteorology 2.8 Landscape
3. Pollution	3.1 Air Pollution 3.2 Water Pollution 3.3 Soil Contamination	3.4 Noise and Vibration 3.5 Ground Subsidence 3.6 Offensive Odors

Source: JICA Study Team

2. IEE of Proposed Projects and Programs

2.1 Project and Programs

As the results of this master plan study, the JICA Study Team has proposed several projects. The proposed projects consist of four main components, as follows: Transportation, Urban Development Planning, Tourism Products Development and Conservation, and Institutional Development.

2.2 Initial Environmental Examination

In accordance with the environmental items, each proposed project was evaluated from the viewpoint of initial environmental evaluation (IEE) as discussed subsequently.

2.2.1 Evaluation Category

The evaluation can be carried out in accordance with the rating method using four categories as shown in Table 2.1. In this method, every environmental item that is evaluated as category “A” and “B” is considered to require an environmental impact assessment (EIA) at the feasibility study. Items evaluated as category “C” require further studies to clarify the impacts.

Table 2.1 Evaluation Categories

Category	Examination and Evaluation	Remarks
A	Serious impacts will be expected	EIA is required
B	Some impacts will be expected	EIA is required
C	Extent of impact is unknown	Further study will be required
D	No impact will be expected	-

Source: JICA Study Team

2.2.2 Summary of IEE

In accordance with social and environmental conditions in the study area and concept of IEE, each proposed project could be evaluated and summarized as shown in Table 2.2. In the table, four projects written in bold letters with an asterisk mark (*) are identified as priority projects recommended by the JICA Study Team.

Table 2.2 Summary of IEE of Proposed Projects and Programs

Projects	Transportation		Urban Development Planning		Tourism Product Development and Conservation				Institutional Development	
	T-1 Rail Transport T-1-1	T-2 Road Transport T-2-1 T-2-2*	U-1	U-2*	P-1-1*	P-1-2	P-1-3	P-2		
Environmental Items	Resettlement	D	C	B	C	C	C	C	C	C
	Economic Activities	D	C	C	C	B	C	C	D	D
	Traffic and Public Facilities	D	C	C	C	C	B	C	D	D
	Split of Communities	D	D	C	D	D	D	D	D	D
	Cultural Heritage Sites & Properties	D	C	C	C	C	D	C	C	C
	Water Rights and Rights of Common	D	D	C	C	C	D	D	D	D
	Public Health Condition	D	D	C	A	D	D	D	D	D
	Waste	D	D	C	B	C	A	B	C	D
	Hazards (Risk)	D	C	C	C	D	D	D	D	D
	Topography and Geology	D	D	B	D	C	C	D	D	D
Natural Environment	Soil Erosion	D	D	B	D	C	C	D	D	D
	Groundwater	D	C	C	C	C	C	D	D	D
	Hydrological Situation	D	D	D	D	D	C	D	D	D
	Coastal Zone	D	C	D	D	B	D	D	D	D
	Fauna and Flora	D	C	C	C	C	C	D	C	C
	Meteorology	D	D	C	D	D	D	D	D	D
	Landscape	D	C	C	C	C	B	C	C	C
	Air Pollution	D	C	B	B	A	C	C	D	D
	Water Pollution	D	C	C	C	A	C	A	D	C
	Soil Contamination	D	C	C	D	B	D	D	D	D
Pollution	Noise and Vibration	B	B	B	B	C	B	D	D	D
	Ground Subsidence	D	C	D	C	C	D	D	D	D
	Offensive Odors	D	D	D	D	A	D	D	D	D

A: Serious impact will be expected
 B: Some impact will be expected
 C: Extent of impact is unknown (further study will be required)
 D: No impact will be expected

T-1-1 : Expansion of Transport Capacity of Railway from Qena to Aswan
 T-1-2 : Improvement of Existing Railway Stations
 T-2-1 : Road Network Improvement (Upper Nile and the Red Sea Coast)
 T-2-2* : Service Area Development along Highway Routes 77, 88 and 99

U-1 : Solid Waste Management in the Red Sea Coast
 U-2* : Water Conveyance from the Nile River to the Red Sea Coast

P-1-1* : Development of Passenger Landing Facility along the Nile /Nile River Environment
 P-1-2 : Beautification of Access and Pedestrian Network
 P-1-3 : Development of Handicraft Village
 P-2 : Development of Museums, Site Plaza and Internet Museum
 I-1* : Tourism Institute Development
 Note : Asterisk mark (*) stand for priority project

2.3 Primary Prediction of Environmental Impacts of the Priority Projects

It is predicted that the environmental items of each priority project which are evaluated as categories “A” and “B” have several environmental impacts.

Consequently, an environmental impact assessment (EIA) study will be required for these environmental items in accordance with the EIA system of Egypt and Law No.4.

Therefore, the possible environmental impacts of the priority projects are predicted to determine the scope of EIA study as follows:

2.3.1 Development of Passenger Landing Facility along the Nile /Nile River Environment (P-1)

Table 2.3 Possible Impacts and EIA Study Plan of the Priority Project P-1

Environmental Items	Evaluation	Impacts	EIA Study Plan
Economic Activities	B	Depending on the location of the proposed facility, existing commercial activities along the Nile will be affected by the implementation of the project.	Study on the present condition of economic activities along the highways Study on the present and future land use plans
Cultural Heritage Sites & Properties	B	Depending on the location of the proposed facility, cultural heritage sites and properties along the Nile will be affected by the implementation of the project.	Study on location and distribution of cultural heritage sites and properties in the proposed areas Study on the present and future land use plans
Waste	A	- Construction debris, surplus soil or sand will be generated in the construction stage of the landing facility. - Solid waste and liquid waste will be generated in the operation stage of the landing facility.	Study on soil and sandbank Study on solid waste and sewage management system Study on the forecast of total amount of solid waste and sewage at the target year
Landscape	B	The landing facilities will be constructed along the Nile. Therefore, negative impacts on the landscape along the Nile, e.g. unsuitable and artificial design, color and construction, will be predicted	Study on social and local history Study on vegetation in the project area Study on distribution of the cultural properties Study on local construction styles
Water Pollution	A	The Nile River will be polluted in accordance with increase in the total number of cruise ships during construction and operation stages.	Study on management and treatment system of solid waste, waste water and fuel oil from cruise ships Study on the forecast of total amount of solid waste, wastewater and fuel oil from cruise ships at the target year.
Noise and Vibration	B	Noise and vibration will increase in accordance with increase in the total number of cruise ships at the landing facilities during construction and operation stages	Study on the present and future situation of noise and vibration levels

Source: JICA Study Team

2.3.2 Development of Tourism institute (I-1)

Table 2.4 Possible Impacts and EIA Study Plan of the Priority Project I-1

Environmental Items	Evaluation	Impacts	EIA Study Plan
Waste	B	<ul style="list-style-type: none"> - Construction debris, surplus soil or sand will be generated in the construction stage of the facility. - Solid waste and liquid waste will be generated in the operation stage of the facility. 	<ul style="list-style-type: none"> - Study on soil and sandbank - Study on solid waste and sewage management system - Study on the forecast of total amount of solid waste and wastewater at the target year.

Source: JICA Study Team

2.3.3 Service Area Development along Highways 77, 88 and 99 (T-1)

Table 2.5 Possible Impacts and EIA Study Plan of the Priority Project T-1

Environmental Items	Evaluation	Impacts	EIA Study Plan
Waste	B	<ul style="list-style-type: none"> - Construction debris, surplus soil or sand will be generated in the construction stage of the service area. - Solid waste and liquid waste will be generated in the operation stage of the proposed service area. 	<ul style="list-style-type: none"> - Study on soil and sandbank - Study on solid waste and sewage management system - Study on the prediction of the amount of solid waste and sewage in the target year.
Air Pollution	B	Air pollutants will increase in accordance with increase in the total number of vehicles at the proposed service area during construction and operation stages	Study on the present and future situation of air pollutants such as NOx, SOx, COx, SPM and etc.
Noise and Vibration	B	Noise and vibration will increase in accordance with increase in the total number of vehicles at the service area during construction and operation stages	Study on the present and future situation of noise and vibration levels

Source: JICA Study Team

2.3.4 Water Conveyance from the Nile River to the Red Sea Coast (U-3)

Table 2.6 Possible Impacts and EIA Study Plan of the Priority Project U-3

Environmental Items	Evaluation	Impacts	EIA Study Plan
Water Rights and Rights of Common	B	Decrease of irrigation water, aquatic catch, and tourism opportunities due to the change of the Nile River's water flow.	<ul style="list-style-type: none"> - Study on hydrology and meteorology - Study on the present condition of river water use by local population - Study on water use plan - Study on folklore and local history

Source: JICA Study Team

2.4 Study Plans for the Environmental Items Evaluated as “C”

Other environmental items that were evaluated as category “C” require further studies in the target areas of the priority projects. Therefore, brief study plans for the items of category “C” are considered to clarify the impacts of each priority project as follows.

2.4.1 Development of Passenger Landing Facility along the Nile/Nile River Environment (P-1)

Table 2.7 Further Study Plan of the Priority Project P-1

Environmental Items	Further Study Plan
Resettlement	<ul style="list-style-type: none"> - Study on distribution of households, illegal settlements and indigenous settlements around the treatment facilities. - Study on possibility of resettlement - Study on compensation measures - Study on alternative lands for resettlement - Study on past experiences of resettlements in the project area - Study on laws and regulation related to resettlement
Traffic and Public Facilities	<ul style="list-style-type: none"> - Study on present and future local land and the Nile use plans - Study on present and future cruise ship traffic conditions - Study on cruise ship traffic volume demand
Water Rights and Rights of Common	<ul style="list-style-type: none"> - Study on hydrology and meteorology - Study on present condition of river water use by local population - Study on water use plan - Study on folklore and local history
Public Health Condition	<ul style="list-style-type: none"> - Study on present condition of community health - Study on present condition of “vector” animals and insects - Study on natural conditions - Study on waste management facilities and systems
Topography and Geology	<ul style="list-style-type: none"> - Study on Topology and Geology
Soil Erosion	<ul style="list-style-type: none"> - Study on surface soil condition - Study on past record of soil erosion
Hydrological Situation	<ul style="list-style-type: none"> - Study on hydrology, groundwater flow and Wadi
Fauna and Flora	<ul style="list-style-type: none"> - Study on existing fauna and flora - Study on ecosystems - Study on folklore and local utilization of biota - Study on natural protectorate
Air Pollution	<ul style="list-style-type: none"> - Study on present and future situation of air pollutants such as NO_x, SO_x, CO_x, SPM and etc.

Source: JICA Study Team

2.4.2 Development of Tourism Institute (I-1)

Table 2.8 Further Study Plan of the Priority Project I-1

Environmental Items	Further Study Plan
Resettlement	<ul style="list-style-type: none"> - Study on distribution of households, illegal settlements and indigenous settlements around the institute - Study on possibility of resettlement - Study on compensation measures - Study on alternative lands for resettlement - Study on past experiences of resettlements in the project area - Study on laws and regulation related to resettlement
Cultural Heritage Sites & Properties	<ul style="list-style-type: none"> - Study on distribution of cultural heritage and properties - Study on folklore and local histories - Study on laws and regulations related to protection of such heritage sites and properties
Fauna and Flora	<ul style="list-style-type: none"> - Study on existing fauna and flora - Study on ecosystems - Study on folklore and local utilization of biota - Study on natural protectorate
Landscape	<ul style="list-style-type: none"> - Study on social and local history - Study on vegetation in the project area - Study on distribution of the cultural properties - Study on local construction styles
Water Pollution	<ul style="list-style-type: none"> - Study on hydrology, water flow and Wadi - Study on water qualities

Source: JICA Study Team

2.4.3 Pre-feasibility Study on Service Area Development along Highways 77, 88 and 99 (T-1)

Table 2.9 Further Study Plan of the Priority Project T-1

Environmental Items	Further Study Plan
Resettlement	<ul style="list-style-type: none"> - Study on distribution of households, illegal settlements and indigenous settlements. - Study on possibility of resettlement - Study on compensation measures - Study on alternative land for resettlement - Study on past experiences of resettlements in the project area - Study on laws and regulation related to resettlement
Economic Activities	<ul style="list-style-type: none"> - Study on present situations of local economy and local industry - Study on future plans of community promotion and development - Study on laws and regulation related to employment and work
Traffic and Public Facilities	<ul style="list-style-type: none"> - Study on present and future local land use plans - Study on present and future traffic conditions - Study on traffic volume demands
Cultural Heritage Sites & Properties	<ul style="list-style-type: none"> - Study on distribution of cultural heritage sites and properties - Study on folklore and local histories - Study on laws and regulations related to protection of such heritage sites and properties
Water Rights and Rights of Common	<ul style="list-style-type: none"> - Study on hydrology and meteorology - Study on present condition of river water use by local population - Study on water use plan - Study on folklore and local history
Public Health Condition	<ul style="list-style-type: none"> - Study on present condition of community health - Study on present condition of "vector" animals and insects - Study on natural conditions - Study on waste management facilities and systems
Hazards (Risk)	<ul style="list-style-type: none"> - Study on natural conditions - Study on past record on hazards - Study on past record on traffic accidents
Fauna and Flora	<ul style="list-style-type: none"> - Study on existing fauna and flora - Study on ecosystems - Study on folklore and local utilization of biota - Study on natural protectorate
Landscape	<ul style="list-style-type: none"> - Study on social and local history - Study on vegetation in project area - Study on distribution of cultural properties - Study on the local construction styles
Water Pollution	<ul style="list-style-type: none"> - Study on hydrology, groundwater flow and Wadi - Study on groundwater qualities
Ground Subsidence	<ul style="list-style-type: none"> - Study on groundwater - Study on groundwater utilization of local communities and industries

Source: JICA Study Team

2.4.4 Water Conveyance from the Nile River to the Red Sea Coast (U-3)

Table 2.10 Further Study Plan of the Priority Project U-3

Environmental Items	Further Study Plan
Resettlement	<ul style="list-style-type: none"> - Study on distribution of households, illegal settlements and indigenous settlements around treatment facilities. - Study on possibility of resettlement - Study on compensation measures - Study on alternative lands for resettlement - Study on past experiences of resettlements in the project area - Study on laws and regulation related to resettlement
Cultural Heritage & Properties	<ul style="list-style-type: none"> - Study on distribution of cultural heritage and properties - Study on folklore and local histories - Study on laws and regulations related to protection of such heritage sites and properties
Waste	<ul style="list-style-type: none"> - Study on soil and sandbank - Study on solid waste and sewage management system
Topography and Geology	<ul style="list-style-type: none"> - Study on topography and geology
Soil Erosion	<ul style="list-style-type: none"> - Study on surface soil condition - Study on past record of soil erosion
Groundwater	<ul style="list-style-type: none"> - Study on groundwater depth and flow
Hydrological Situation	<ul style="list-style-type: none"> - Study on hydrology, groundwater flow and <i>Wadi</i>
Fauna and Flora	<ul style="list-style-type: none"> - Study on existing fauna and flora - Study on ecosystems - Study on folklore and local utilization of biota - Study on natural protectorate
Landscape	<ul style="list-style-type: none"> - Study on social and local history - Study on vegetation in the project area - Study on distribution of cultural properties - Study on local construction styles
Air Pollution	<ul style="list-style-type: none"> - Study on present and future situation of air pollutants such as NO_x, SO_x, CO_x, SPM and etc.
Water Pollution	<ul style="list-style-type: none"> - Study on hydrology, water flow and <i>Wadi</i> - Study on water qualities
Noise and Vibration	<ul style="list-style-type: none"> - Study on present and future situation of noise and vibration levels
Ground Subsidence	<ul style="list-style-type: none"> - Study on groundwater - Study on groundwater utilization of local communities and industries

Source: JICA Study Team