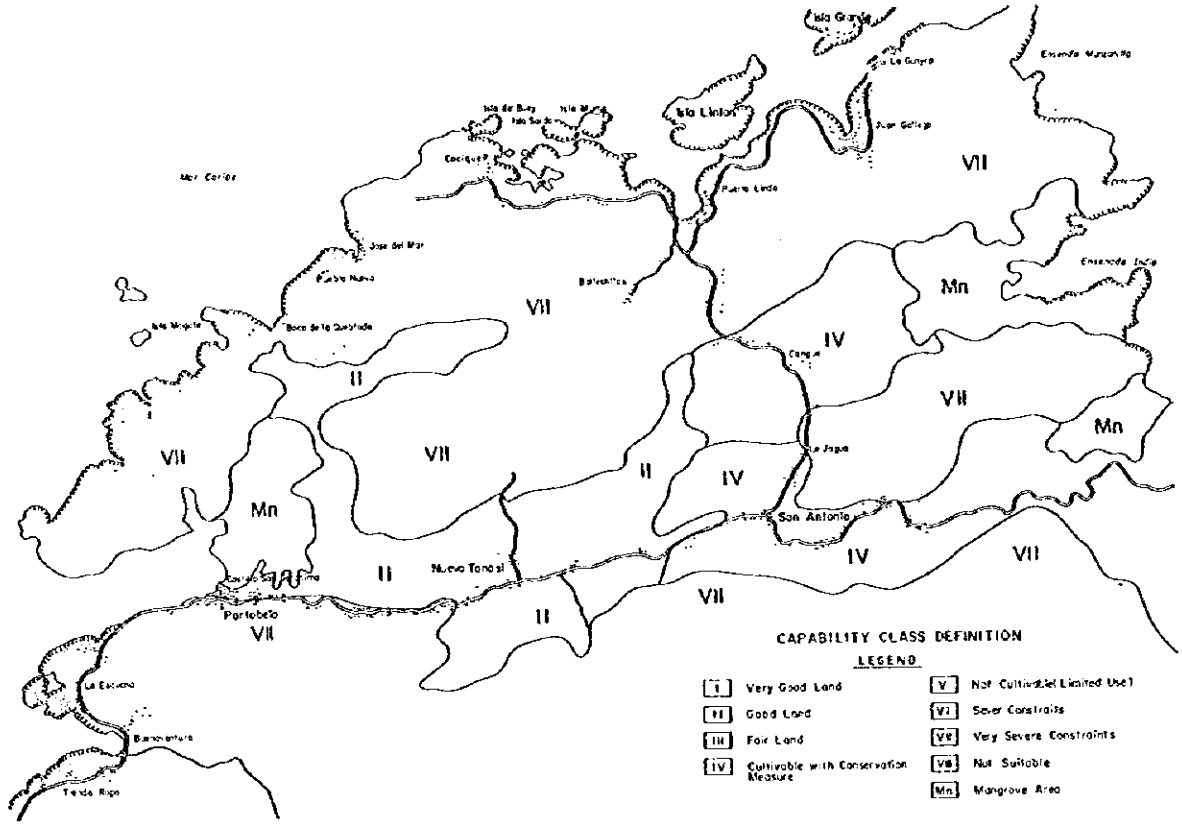


Figure 5.5 Land Capability

3) Improving islands lying only a short distance from the mainland for resort purposes. Among many small islands, Isla Grande is well known for its sandy beach, and diving and fishing are its main attractions for tourists.

4) The coastal belt (7 km) of Portobelo offers a magnificent view of the Caribbean sea, islands and mountain forest.

5.4 Portobelo Area Development Plan

5.4.1 Land use plan

The project area of La Escucha has a total land area of 31 ha., consisting of five components as shown in Figure 5.6. Of the total, 23 ha will be developed as a tourism resort area with accommodation, tourist services, access roads, and improved sandy beaches. The other 8 ha are proposed as conservation and buffer green areas reserved and to be remaning reserved and to be for future development.

For Portobelo town, 5.3 are to be re-developed for tourism, and 0.4 ha are proposed to be mainly used for hotel accommodation. Puerto Lindo and La Guaira are to be developed as tourism resorts within each 7 ha. lot, a majority of which is for hotel accommodation and beach improvement.

5.4.2 Accommodation Development Plan

(1) Room requirement

According to preliminary land use planning, accommodation facilities development should be located in La Escucha, La Guaira, and Puerto Lindo, and further accommodation development should be located in Eastern coastal areas from Nombre de Dios, because of the development regulations for Portobelo National Park.

Table 5.4 shows the aggregate result for Portobelo for the years ending 2000, 2005 and 2010 by hotel classification category.
There are four nominated hotel lots in the development area, three located in three coastal areas and one in the historical town area : 1) on La Escucha, with about 7 ha., 2) Portobelo Historical town district, with 87 rooms, in the town center facing Portobelo Bay, 3) on the beach of La Guaira, with 7 ha. and 4) on the hillside of Puerto Lindo, about 7 ha, and view of the Caribbean sea.

Table 5.4 Accommodation Supply Program

Tourism Zone & Development Area	Total rooms in 2000					Total rooms in 2005					Total rooms in 2010				
	Rounded Rooms			Add. rooms	Total rooms	Rounded Rooms			Add. rooms	Total rooms	Rounded Rooms			Add. rooms	Total rooms
	H	M	E			H	M	E			H	M	E		
Portobelo Total	188	389	74	651	727	248	571	65	884	1611	235	527	128	890	2501
La Escucha	150	0	0	150	150	150	0	0	150	300				0	300
Portobelo town	0	50	0	52	52	0	35	0	35	87				0	87
La Guaira	0	150	0	150	155	0	150	0	150	305				0	305
Puerto Lindo	0	150	0	150	150	0	150	0	150	305				0	300

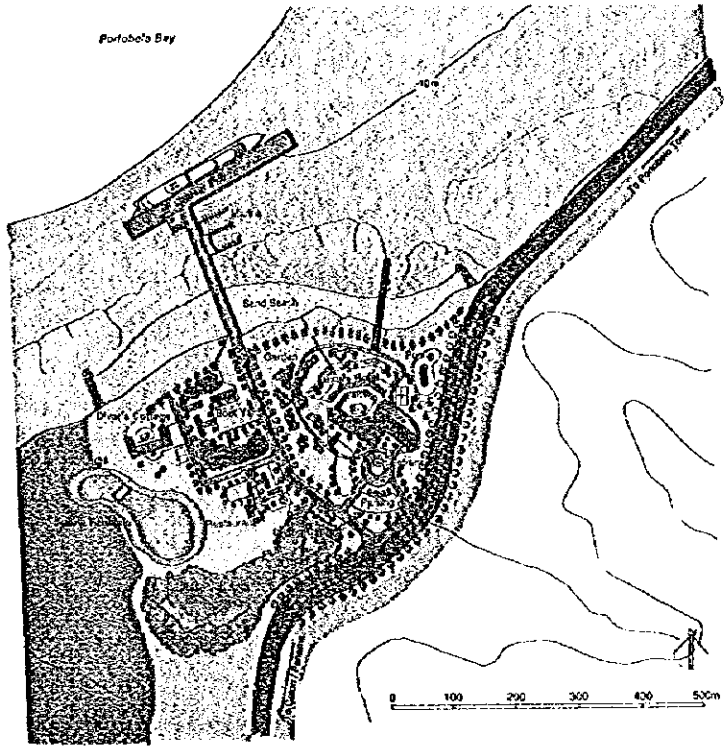


Figure 5.6 Location of Portobelo Town and La Escucha

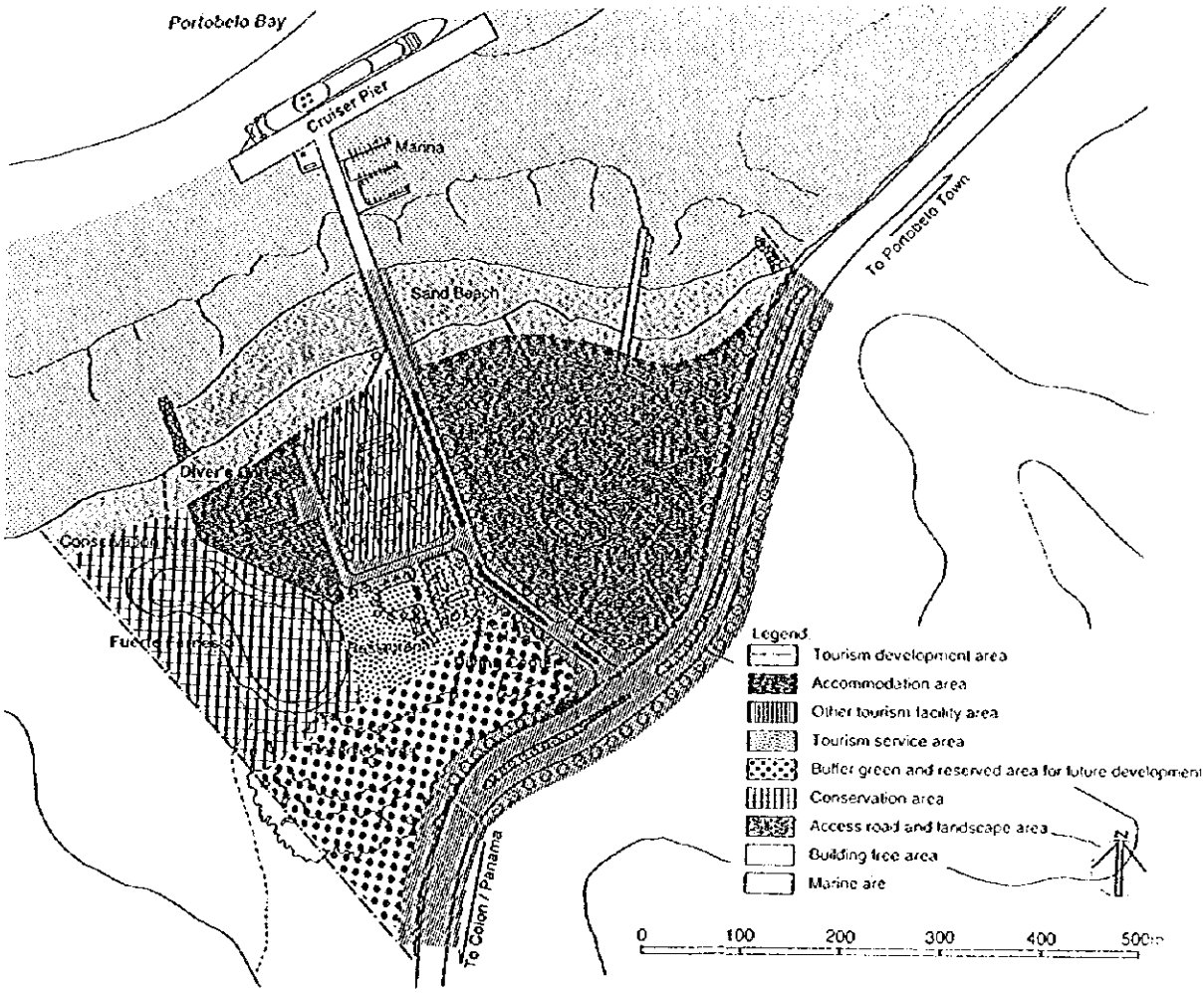


Figure 5.7 Land Use Plan of La Escucha Development Area

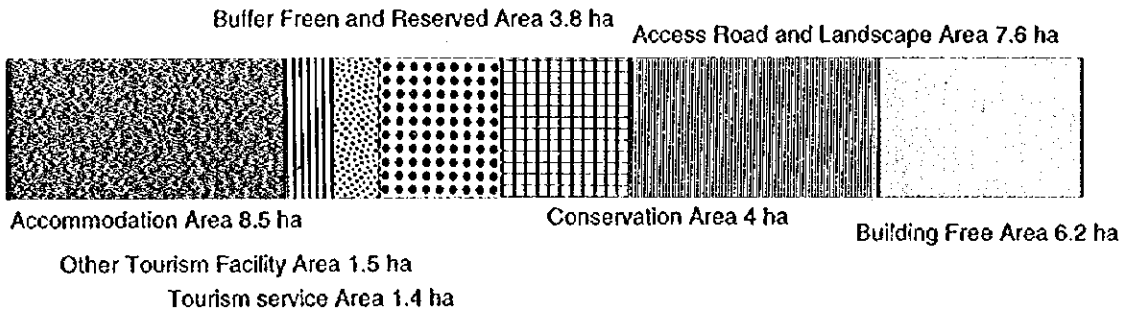


Figure 5.8 Land Use Area in La Escucha

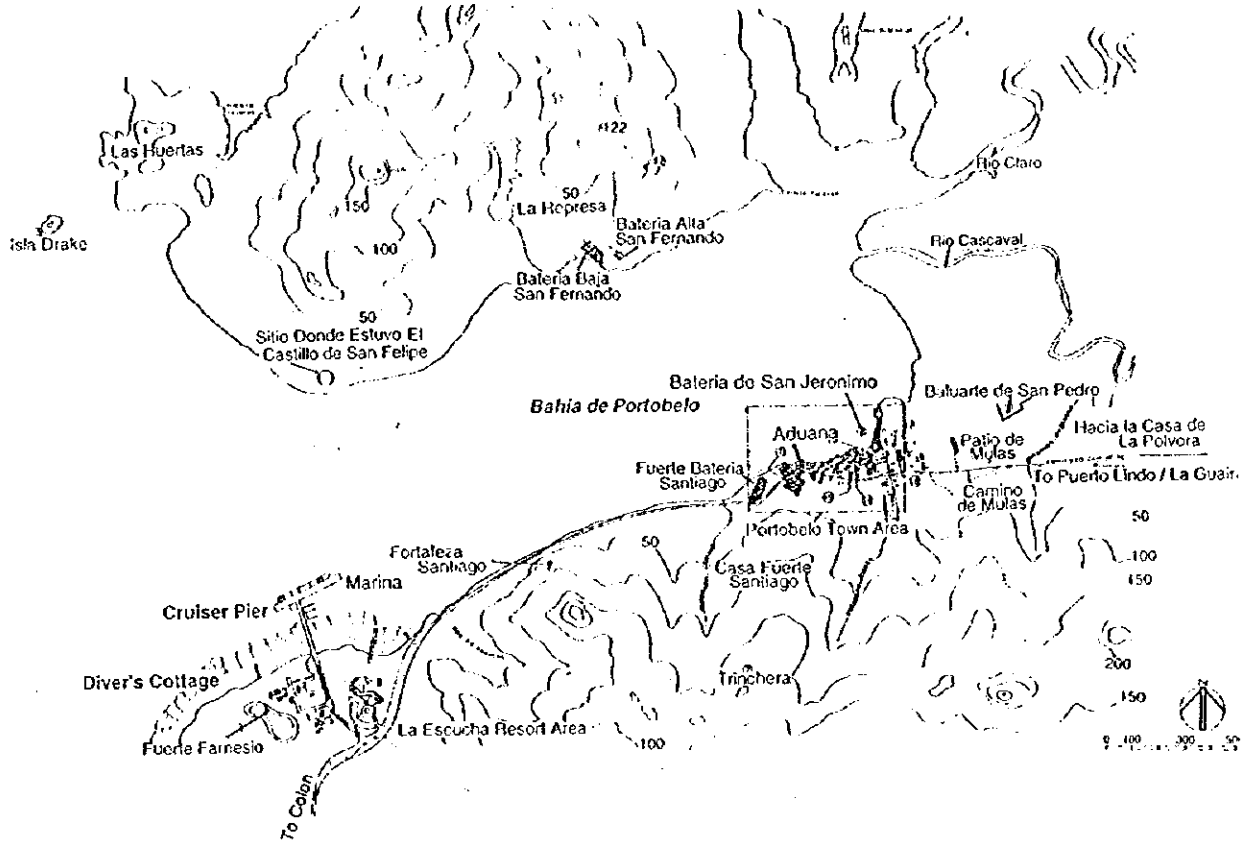


Figure 5.9 Tourism Facilities Development Plan in La Escucha

(2) La Escucha Resort Hotel Development

An historical monument and private resort house are to be located. At the entrance area (La Escucha) to Portobelo, At present, areas for the monument and private resort land have not been clearly defined because there is no public access to the coastal area.

This area should be the site for main accommodation base in Portobelo with tourist pier for cruising. The first hotel is 300 rooms, high standard of should be constructed on lot of 7 ha by the private sector as the pioneer development of Portobelo. Development can be divided into two phases, -150 rooms by 2000 and another 150 rooms by 2005.

(3) Portobelo Town Hotel Development

An historical conservation plan has been proposed in accordance with a study by UNDP/UNESCO, coordinated by INAC in Oct. 1993. In the designated Historical District, it is preferable to limit the use. However, in view of the site conditions, even the historical area should share the commercial activities such as hotels, shops, offices, and it is not advisable to drastically change the use.

It is recommended that hotel buildings be re-constructed in traditional style. The proposed capacity for the first hotel is 50 rooms by the year ending 2000 and an additional 35 rooms by 2005 with related facilities.

This measure is applied to buildings which have no traditional value but still have sound structures. Some measures will be required such as replacement of non- historical elements, re-facing and measures which will ensure historical and aesthetic consistency.

(4) La Guaira Hotel Development

There is only one hotel lot at the Eastern end of La Guaira. The lot has an area of about 7 ha and is recommended for medium standard beach resort hotels. The proposed capacity is 150 rooms in the short term and an additional 150 in the medium term in a minimum of 50 rooms each if it is divided into two lots. Providing as many cottages as possible is recommended and the tower building is recommended for 250 rooms during the short and medium phase.

(5) Puerto Lindo Hotel Development

There is one lot in the hinterland of the hillside, which has a view to the sea. This has an area of 7 ha and is recommended for a medium standard hotel of 150 rooms by the year ending 2000 and an additional 150 rooms by the year ending 2005.
Providing cottages and a low rise building mix is recommended for this development.

(6) Development coordination

Existing accommodation should be made clean and convenient with good service and facilities and financial cooperation from IPAT.

Construction of these hotel developments can be carried out by the private sector, but IPAT must have a share in each hotel. Before construction, every hotel lot should be well maintained by IPAT in order to raise the image of the development area.

5.4.3 Preservation of Historical Portobelo Town

(1) Historical Portobelo Town

Figure 5.10 shows the historical boundary of approximately 800 meters by 150 meters. This was indicated in a previous study by UNDP/UNESCO. An archaeological plan of action for the above areas was undertaken by UNDP/UNESCO Regional Project for Cultural, Urban and Environmental Heritage in October 1993.

This plan is specifically oriented toward the most immediate archaeological needs of the Oficina de Patrimonio Histórico (OPH) cultural resources management in Portobelo and recommended (1) Any archaeological program at Portobelo should concentrate within the historical boundary mentioned above and (2) The Instituto Nacional de Cultura (INAC) should establish a permanent position in the Oficina del Patrimonio Histórico (OPH) for an archaeologist.

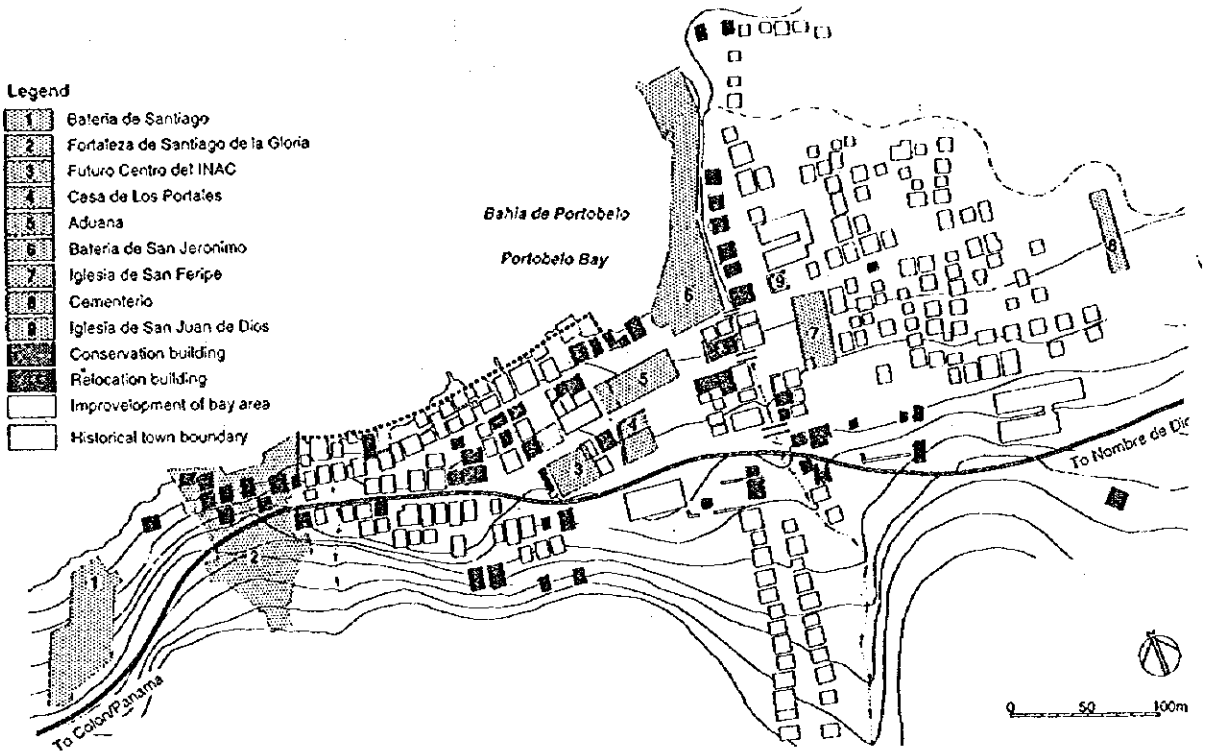


Figure 5.10 Preservation of Historical Portobelo Town

(2) Town center beautification

For buildings, which are the most crucial factor in the beautification of the Historical districts, improvement is to be carried out accordance with the building conservation plan. However, in order to improve the historical town, the following measures are proposed in the Historical Districts.

1) The buildings complex will lead the development in the town. The waterfront area is a part of the tourism development area, and shall provide hotel accommodation of medium standard floor space and commercial space. The waterfront may have a separate tourist pier for boat tours across the bay area.

2) The complex is a town form of historical building design and the ground floor will accommodate commercial facilities such as souvenir shops, restaurants, and the upper floors will be occupied by hotel accommodation, with views of Portobelo Bay.

3) An elongated plaza, continuing from the church, is developed as a part of the amenity space and is paved with cobble stones.

4)An extensive landscaping program is to be initiated in this area of the project on pedestrian malls and communal court yards.

5) An incentive program for individual property owners is to be introduced, to ensure continuity of the historical fabric.

6) All the modern buildings are to be retained, subject to a coherent beautification program.

7) Community facilities, roads and utility network shall be improved and developed in the early stages to encourage the development potential of the private sector.

Table 5.5 Development Components of Town Center Beautification

	Development Components	Required area	Remarks / Capacity
1	Relocation of housing	45 units	Relocate housing from historical monument area
2	Construction infill housing	53 units	New construction housing for relocation and additional
3	Community plaza	1,250 sq.m	Two plazas in the residential area
4	Historical city plaza	2,800 sq.m	Three plazas in the historical area
5	Landscaping	1.6 ha	Within historical area
6	Parking	1,770 sq.m	
7	Toilet	90 sq.m	

5.4.4 Tourism Facilities Development

(1) Information Center Development

The location of the tourist information center should be in the historical town of Portobelo where it will be convenient for international and domestic tourists, easily accessible, and a starting point for travel to other attractions in Portobelo.

Table 5.6 Development Components of Information Center

No.	Development Components	Required area	Remarks / Capacity
1	Center building	100 sq.m	Administration, information
2	Parking	360 sq.m	9 car parking
3	Toilet	90 sq. m	

(2) Handicraft Training Center

Handicraft training center to be located in the Historical District in consideration of historical building revitalization, or infill of the historical town structure. This center is located at the former site of the Aduana, which is a rehabilitation program by INAC inco-poration with USAID. The building will be laid out at the center of the site as a cultural and entertainment activities area. Project implementation includes training for handicraft production, product designs, provision and development of equipment.

Table 5.7 Development components of Handicraft Training Center

No.	Development Components	Required Area	Remarks / Capacity
1	Workshop	100 sq.m	5 rooms
2	Exhibition	50 sq.m	Hall, administration office
3	Toilet	90 sq.m	
4	Parking	400 sq.m	10 car parking space
5	Dormitory	450 sq.m	20 units

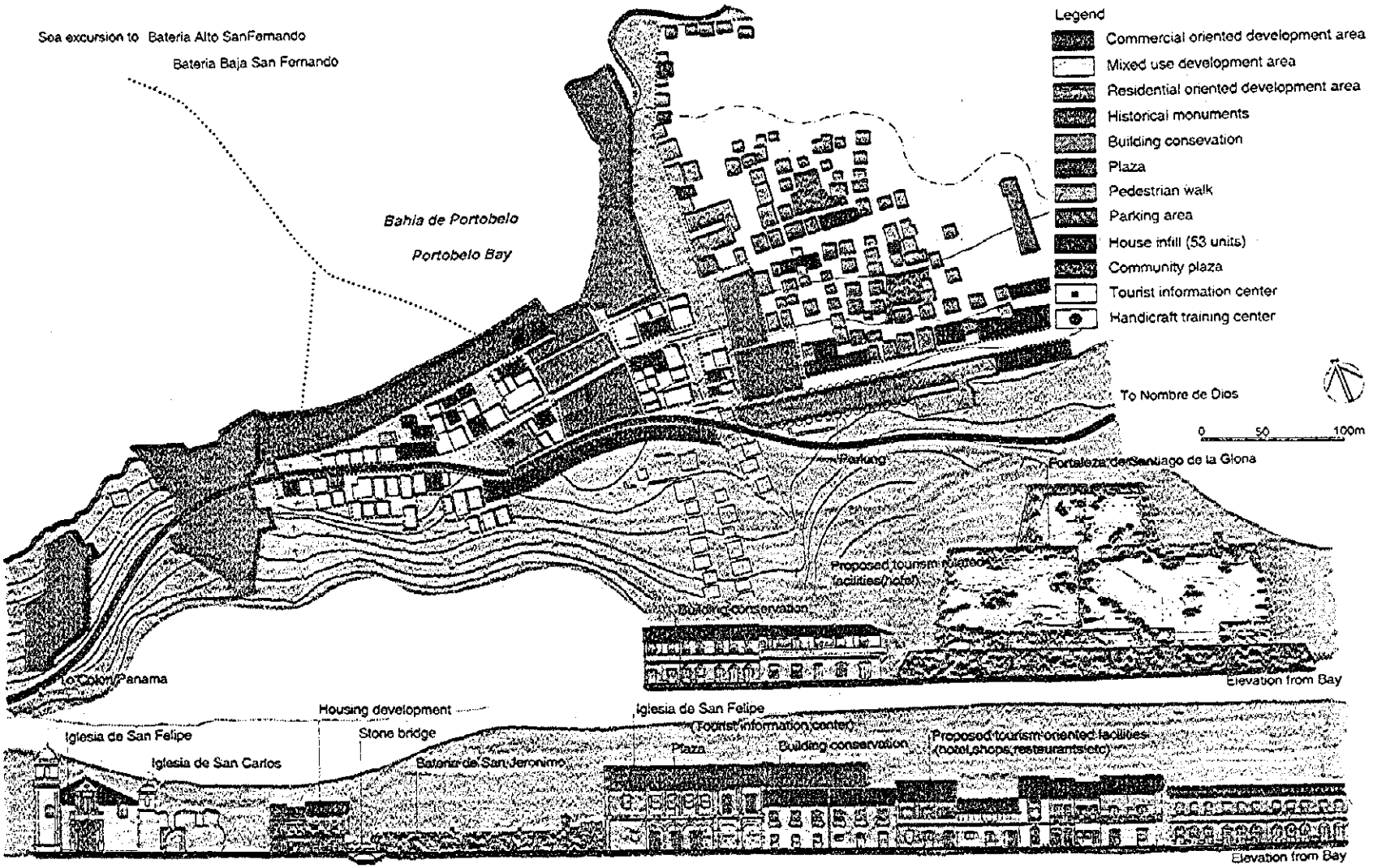


Figure 5.11 Town Center Beautification

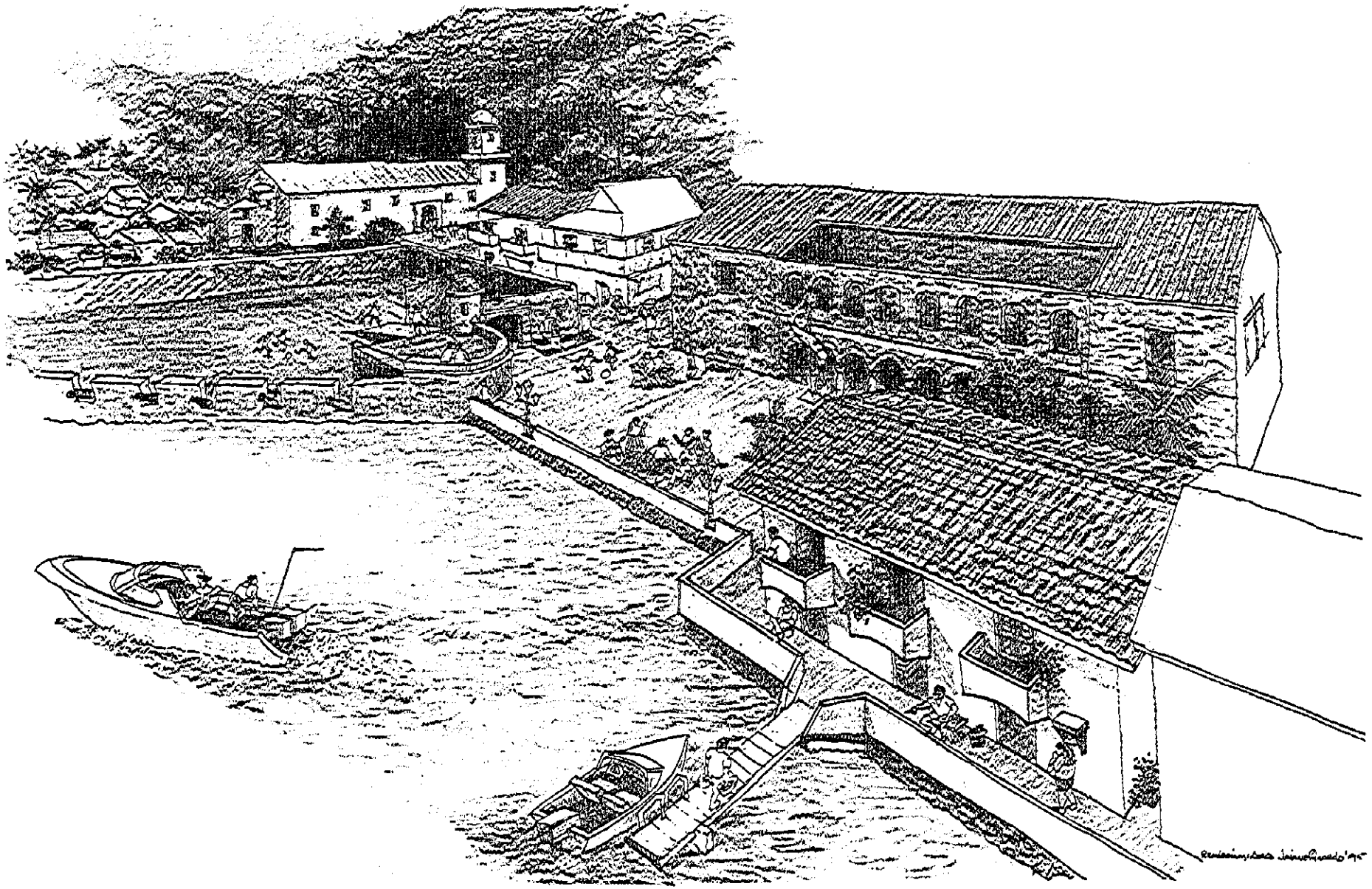


Figure 5.12 Image Sketch of Portobelo Town Center

(3) Beach improvement

The beach area in the Portobelo coastal area should be improved. La Escucha beach has no sandy areas. This condition should be mitigated in order to meet the high standard of a beach resort.
Also, La Guaira and Puerto Lindo need improvement of the beach front.
It is about 1 km long and 50 meters wide or about 5 ha. A layer of white sand 25 cm thick should be placed. It is estimated that about 12,500 cubic meters of white sand should be borrowed from outside. Each area should have parking, toilet and shower facilities for beach activities.

5.4.5 Road development plan

(1) Issues of road development

A road plan must be worked out with consideration given to ensuring movement within the development area and to provide access to the tourist resorts. It is important to take parking facilities into account for people who wish to visit tourist recreation sites such as scenic spots, beaches, rivers and forests, or to take a rest in such places.

(2) Estimated Traffic Volume

Figure 5.13 shows the traffic volume for the year 2010 calculated from the estimated number of visitors to the Portobelo area. The average daily traffic volume will register 4,630 vehicles on the main road between Portobelo and San Antonio, but a much smaller figure of 1,100 vehicles on the branch road leading to Isla Grande.

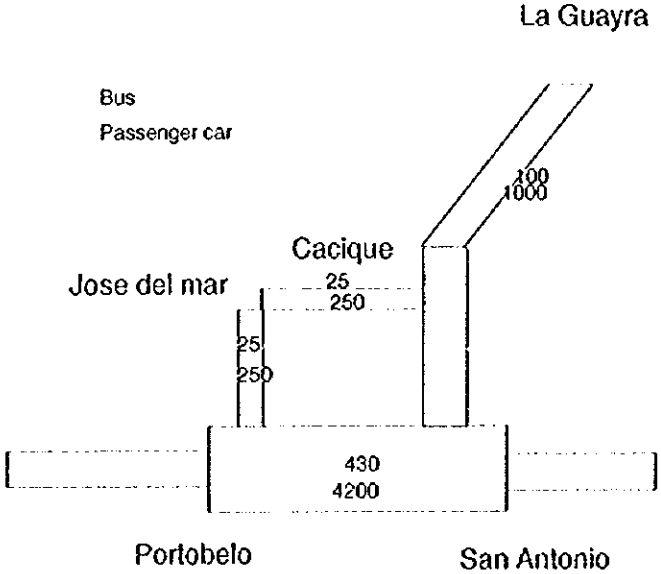


Figure 5.13 Traffic Volume of Study Area in 2010

(3) Road network

Proposed road network development plans are shown in Figure 5.13, and the road plan and cross section of each road are shown in Tables and Figures and described as follows:

Table 5.8 Road Development Classifications

Road Name	Located Name	Length (m)	Right of Way	Width (m)	Project Type
New Portobelo Tourist Road	a) Portobelo-Jose del Mar	8.0	25.0	(6.0)	Shoulders, Drainage, Rio Rfo Cascajal Claro Bridge (60m length)
	b) José del Mar-Puerto Lindo	6.0	25.0	(6.0)	Shoulders, Drainage, Rio Claro Bridge (60m length)
Improvement Isla Grande Access Road	San Antonio-La Guaira	10.5	25.0	(7.0)	Shoulders, Drainage facilities

Table 5.9 Parking with Related Facilities Development

Localization	Area (m^2)	Capacity	Facilities
Jose del Mar	1500	5	Rest Space, Landscape, Sign, Symbols
Cacique	2000	10	Rest Space, Public Toilet, Landscape, Sign, Symbols
La Guayra	3000	50	Rest Space, Landscape, Sign, Symbols, Public Toilet

1) Portobelo Tourist Road

This is the road along the coast leading from Portobelo to Puerto Lindo via José del Mar and Cacique. Improvement of this road will increase convenience of access to the recreation zones at beaches, and will upgrade sightseeing potential in the area. The total road length is 14 km.

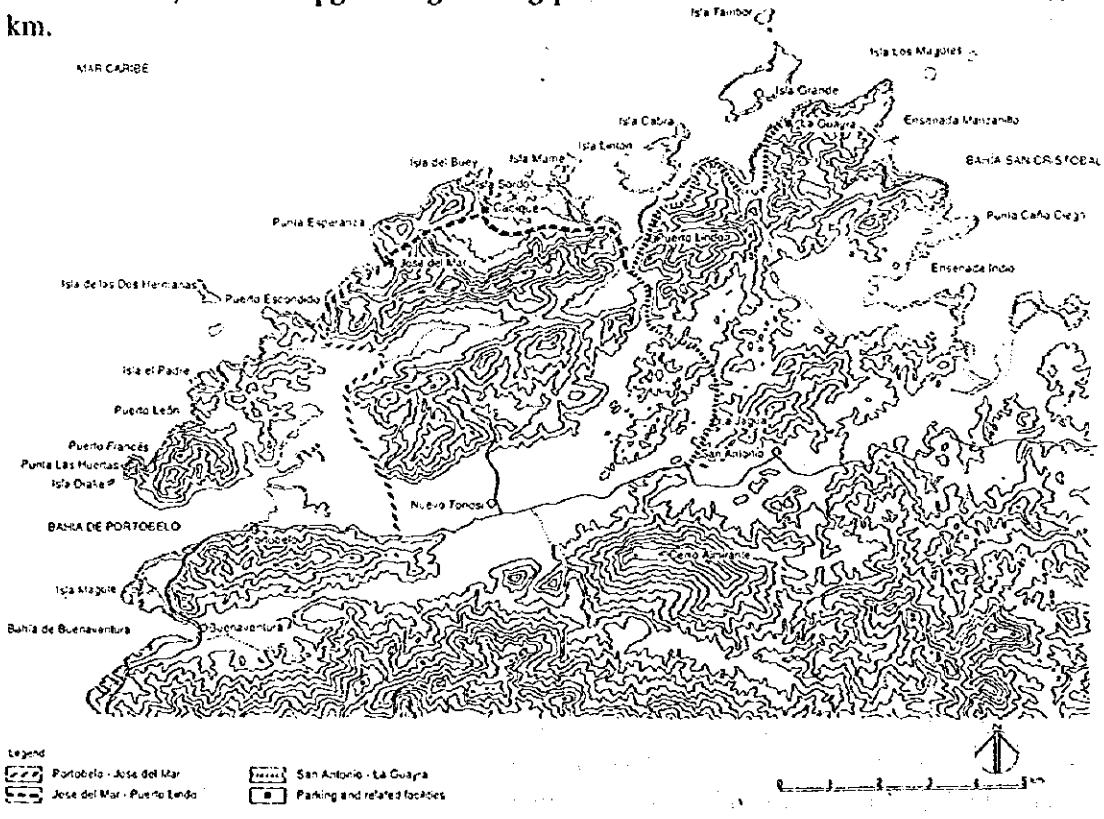


Figure 5.14 Road Network Plan

a. Road between Portobelo and Jose del Mar : 8 kilometers
This section is not included in the current road, so it is necessary to drive from Portobelo to Jose del Mar via San Antonio and Puerto Lindo. To remove this difficulty, a new paved road will be constructed to cover this section. The average daily traffic volume is estimated at 275 vehicles.

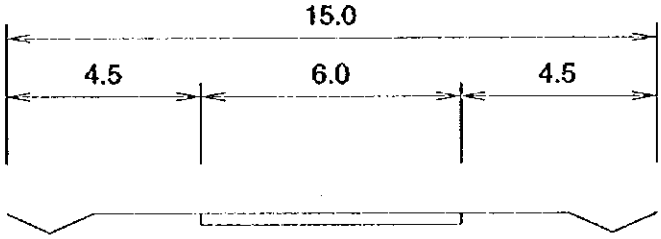


Figure 5.15 Road Section

b. Road between Jose del Mar and Puerto Lindo
The existing earth road will be improved and new pavement with a paved width of 6 m will be built. The average traffic volume is estimated at a small figure of 275 vehicles.

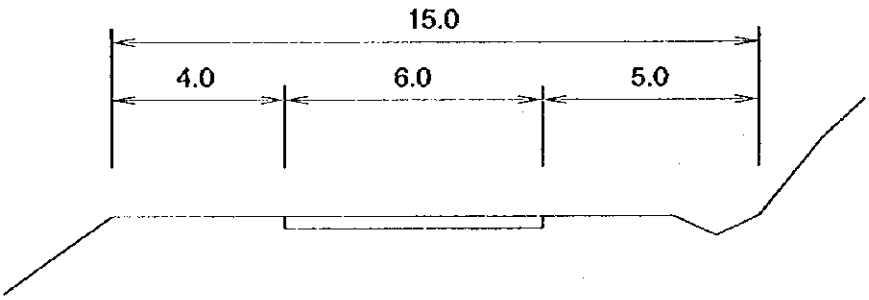


Figure 5.16 Road Section

c. Parking facilities
Parking facilities will be constructed at the following two locations:

- Jose del Mar Parking Site: Observation facilities will be installed on hills commanding beautiful views between Jose del Mar and Cacique.

- Cacique Parking Site: Parking facilities will be built at Cacique because excellent coral reefs and rare water channels are found in the vicinity of Cacique.

2) Isla Grande Access Road

a. Road improvement
The existing road connecting Portobelo and Isla Grand will be improved to increase sightseeing options in the Portobelo area, thereby upgrading the potential of sightseeing in the entire area. The future average daily traffic volume is estimated at a small figure of 1100 vehicles.

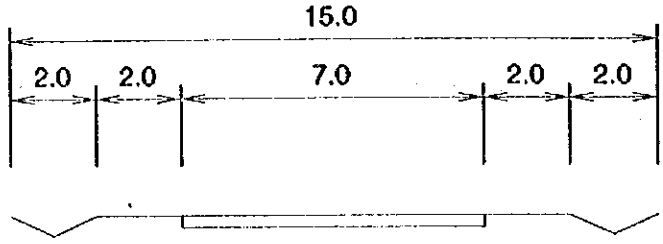


Figure 5.17 Road sectional view

b. La Guaira Parking Site
La Guaira as a terminal of the route serves to connect to Isla Grande. This function will be improved. This site will provide recreation bases for diving and fishing.

5.4.5 Public utilities development

(1) Water Supply

Additional water demand is forecast as shown in Table 5.10 and Figure 5.17.

Table 5.10 Water Supply Demand

Year	Portobelo	La Escucha	Puerto Lindo	La Guaira
2000	1,034	269	150	150
2005	1,173	449	300	300
2010	1,277	449	300	300

The facility plan for water supply is shown below:

Table 5.11 Water Supply Facility Plan

Facility	unit	2000	2005	2010
Well, Pump, (300 m^3 / day) , Reservoir, Chemical treatment, Elevated tank	m^3	5,830	2,480	400
Piping	m	9,000	1,000	1,000

(2) Sewerage

Sewage treatment tank with sedimentation tanks, aeration tanks with fine materials will treat sewage under B.O.D. 30 ppm. It will be required to have the sewage treatment tank prepared at the same time as new building construction is undertaken privately with public technical and financial backup. Table 5.12 and Figure 5.18 shows the sewage treatment demand.

The amount of sewage will be nearly equal to that of the water supply, and the sewage treatment tank will have a capacity of 4 days.
The treated water will be discharged into the combined system under the roads leading to the sea.

Table 5.12 Sewerage Facility Plan

Facility	unit	2000	2005	2010
Sewage treatment tank	m^3	5,830	2,480	400
Piping	m	9,000	1,000	1,000

Sewage Treatment (m^3)

Year	Portobelo	La Escucha	Puerto Lindo	La Guayra
2000	4,137	1,074	600	600
2005	4,693	1,094	1,200	1,200
2010	5,108	1,794	1,200	1,500

(3) Solid Waste

The forecast amount of waste in the project area is as follows:

Table 5.13 Unit Generation Solid Waste

Amount of waste	unit	~2000	~2005	~2010
Average daily amount	ton/day	8	13	15
Accumulation	ton	11,000	30,000	56,000

A 6 ha sanitary landfill site will be prepared for disposal of solid waste up to the year 2010. The solid waste will be collected by tippers with hard covers, disposed of in the landfill site, covered with soil and compacted daily. The leachate (leaching foul water) will be drained and collected to a treatment pond before discharging. The collection trucks will be weighed and recorded for control and management. Access roads will connect the site to the existing road.

Garages for collection trucks and bulldozers, and offices for administration and workers will be prepared. The operation will be done by the local administration and fees should be collected according to discharged waste.

(4) Electric Power Supply

At present, there are existing distribution lines with 13.2kV, 3 phase from Bahía Las Minas Substation to Viento Frio via Portobelo and a 7.6kV, 1 phase from Viento Frio to Santa Isabel via Cuango.

The existing distribution line can not supply the required power because of it's low voltage. Therefore, corresponding to the electric power demand of 8MW for the total F/S development areas by 2010, a new 34.5kV distribution line from the existing Bahía Las Minas Substation to the development area should be developed.

1) Development of Electric Power Supply

Table 5.15 shows the electric power demand for year ending of 2000, 2005 and 2010 in the four development areas.

Table 5.14 Electric Power Demand

Area	2000	2005	2010
Portobelo	1.3	1.8	1.9
La Escucha	1.3	1.8	1.9
Puerto Lindo	1.3	2.1	2.1
La Guaira	1.0	1.7	1.7

Table 5.15 Electric Power Supply Development Plan

Item	La Escucha	Portobelo	Puerto Lindo	La Guayra
Distance of Distribution	30 Km form Bahía Las Minas substation	3 Km from La Escucha substation	17 Km from Portobelo substation	4 Km from Puerto Lindo substation
Distribution Voltage	34.5 Kv	34.5 Kv	34.5 Kv	34.5 Kv
Conductor Size	477 MCM ACSR	477 MCM ACSR	477 MCM ACSR	477 MCM ACSR
Transformer	*A new 12 MVA, 115/34.5 KV, 3 phase in Bahía Las Minas substation is required *One set of MVA, 34.5 kV/208-120V, 3 phase until 2000. *One set of 1.5 MVA, 34.5kV/208-120V, 3 phase until 2005.	*One set of 2 MVA, 34.5 KV/208-120V, 3 phases until 2000. *One set of 1 MVA, 34.5. KV/208-120V, 3 phases until 2005 . *One set of 0.5 MVA, 34.5 KV/208-120V, 3 phases until 2010	*One set of 2 MVA, 34.5 KV/208-120V, 3 phases until 2000 *One set of 1 MVA, 34.5 KV/208-120V, 3 phases until 2005 *One set of 0.5 MVA, 34.5KV/208-120V, 3 phases until 2010	*One set of 1.5 MVA,34.5 KV/208-120V, 3 phases until 2000 *One set 1 MVA,34.5 KV/208-120V, 3 phases until 2005

2) Telecommunications

1) Demand Forecast of Subscribers

Table 5.16 shows the demand forecast at the end of years 2000, 2005 and 2010 in the development areas.

2) Planning of telecommunication Network

A exsiting telephone exchangestation which is located in Portobelo town will connect to subscribeers in each development area.

Table 5.16 Demand Forecast of Subscriber

Area	2000	2005	2010
Portobelo	120.0	160.0	190.0
La Escucha	20.0	40.0	40.0
Puerto Lindo	60.0	100.0	100.0
La Guaira	20.0	40.0	40.0

5.5 Project Cost Estimation

The result of cost estimation by facilities are shown in Table 5.17. The total project cost reaches 131 million balboas of which 78.2 million balboas are for accommodation development, 22.2 million balboas for marine and land transportation development, 16.6 million balboas for public utilities. The remaining 13.1 million is for other tourist facilities composed of information center, handicraft training center, city beautification, beach improvement, and marine center.

Table 5.17 Project Cost of the Portobelo Tourism Development

Units;1,000 Balboas

No.	Project Description	Unit	Amount	Total Cost	Cost Portion			Land & Compensation	
				Financial	Foreing Currency	Local Currency			
4						Financial	Economic	Financial	Economic
4.1	Accommodation			79,270	57,250	20,679	13,604	1,342	1,342
	1) La Escucha (H150/H150/0)	room	300	27,000	21,600	5,400	3,553		
	2) Portobelo Town(M50/M35/0)	room	85	5,950	4,165	1,785	1,174		
	3) La Guayra (M150/M150/0)	room	300	21,000	14,700	6,300	4,145		
	4) Puerto Lindo (M150/M150/0)	room	300	21,000	14,700	6,300	4,145		
	5) Site Preparation(La escucha)	ha	15.9	2,047	1,091	467	308	489	489
	6) Site Preparation(Portobelo Town)	ha	0.4	761	34	14	10	713	713
	7) Site Preparation(La Guayra)	ha	7.0	756	480	206	135	70	70
	8) Site Preparation(Puerto Lindo)	ha	7.0	756	480	206	135	70	70
4.2	Marine Transport Development	ha	9.8	9,570	6,067	3,502	2,734	0	0
	1) Cruiser Pier	m	1	9,570	6,067	3,502	2,734		
	a. Wharf(300m*~25m)	sq.m	7,500	5,464	3,332	2,132	1,730		
	b. Pier fixed(80m*~15m*[100m*~5)	sq.m	1,700	885	540	345	280		
	c. Terminal	sq.m	700	1,733	1,275	457	301		
	d. Parking	sq.m	2,000	151	88	63	47		
	d. Access road	m	600	1,087	680	407	297		
	f. Marina	boat	100	250	152	98	79		
4.3	Land Transport Development			12,511	7,682	4,822	3,478	7	7
	1) Portobelo tourist road			8,171	5,183	2,984	2,147	4	4
	a. Portobelo - Jose del Mar (new road)	m	8,000	5,467	3,630	1,837	1,315		
	b. Jose del Mar - Puerto Lindo (widening)	m	6,000	2,349	1,355	994	718		
	c. Jose del Mar parking	sq.m	1,500	128	73	53	39	2	2
	d. Cacique parking	sq.m	2,000	227	124	101	75	2	2
	2) Isla Grande access road			4,340	2,499	1,838	1,331	3	3
	a. San Antonio -La Guayra	m	10,500	4,073	2,351	1,722	1,245		
	b. La Guayra Parking	sq.m	3,000	268	148	116	87	3	3
4.4	Other Tourist Facilities Development			13,079	8,760	4,222	2,793	98	98
	1) Information center			425	287	138	94		
	a. Center building	sq.m	100	300	221	79	52		
	b. Parking	sq.m	400	48	24	24	17		
	c. Toilet	sq.m	90	77	42	35	25		
	2) Handicraft Training center			1,825	1,317	508	337		
	a. Workshop	sq.m	100	400	294	106	70		
	b. Exhibition	sq.m	50	700	515	185	122		
	c. Toilet	sq.m	90	77	42	35	25		
	d. Parking	sq.m	400	48	24	24	17		
	e. Dormitory	sq.m	400	600	442	158	104		
	3) City center beautification			2,512	1,822	690	469	0	0
	a. Relocation	unit	45	500	368	132	87		
	b. Housing	unit	53	519	401	118	78		
	c. Community plaza	sq.m	1,250	200	147	53	36		
	d. City Plaza	sq.m	2,800	1,000	736	264	179		
	e. Landscaping	ha	1.60	40	29	11	7		
	f. Parking	sq.m	1,770	176	99	77	57		
	g. Toilet	sq.m	90	77	42	35	25		
	4) Beach improvement			450	305	145	100	0	0
	a. Sand layer	ha	5	300	221	79	53		
	b. Parking	sq.m	400	48	24	24	17		
	c. Toilet	sq.m	90	77	42	35	25		
	e. Landscaping	ha	1	25	18	7	5		
	5) Tourist Pier Development			7,868	5,029	2,741	1,793	98	98
	a. Diving Center	sq.m	250	1,000	736	264	174		
	b. Training Pool	sq.m	100	300	221	79	52		
	c. Marine Facilities	sq.m	500	2,000	1,472	528	347		
	d. Marine Museum	sq.m	170	680	500	180	118		
	e. Marine Reserch Center	sq.m	100	400	294	106	69		
	f. Restaurant	sq.m	200	600	442	158	104		
	g. Fuel Station	sq.m	50	200	147	53	35		
	h. Boat Yard	sq.m	1,250	91	67	24	16		
	i. Road Expansion, Landscaping	m	1,400	2,597	1,150	1,349	877	98	98
4.5	Infrastructure Development			16,632	9,360	7,252	5,571	20	20
	1) Water supply	set	1.0	4,249	2,145	2,094	1,533	10	10
	2) Sewerage	set	1.0	5,611	2,842	2,764	2,288	5	5
	3) Solid waste disposal	set	1.0	2,604	1,772	827	574	5	5
	4) Electricity	set	1.0	3,260	2,130	1,130	810		
	5) Telecommunication	set	1.0	908	471	437	366		
	Total			131,063	89,119	40,477	28,180	1,467	1,467

Note: Unit cost of accommodation includes standard hotel amenity facilities

5.6 Implementation Plan

(1) Implementation Schedule

Implementation schedules for each feasibility project are made in consideration of the relation of each to the development plan which can be divided into five components. The access road to Isla Grande where there are existing tourist facilities is planned in the short term. The construction of Rio Mar tour road is in the long term as the number of sightseers increases. The cruiser pier is planned in the short term.

Table 5.18 Implementation Schedule and Term Cost

No.	Project Description	Short Term (US$'000)					Medium Term (US$'000)					Long Term (US$'000)				
4		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
4.1	Accommodation															
	1) La Escucha (H150/H1500)	---	****	****			---	****	****							
	2) Portobelo Town(M50/M350)	---	---	****	****		---	****	****							
	3) La Guayra (M150/M1500)			---	****	****		---	****	****						
	4) Puerto Lindo (M150/M1500)			---	****	****		---	****	****						
	5) Site Preparation(La escucha)	---	****				****									
	6) Site Preparation(Portobelo Town)		---	****			****									
	7) Site Preparation(La Guayra)		---	****				****								
	8) Site Preparation(Puerto Lindo)		---	****				****								
4.2	Marine Transport Development															
	1) Cruiser Pier	---	****	****	****											
4.3	Land Transport Development															
	1) Portobelo tourist road											****	****	****	****	
	2) Isla Grande access road			---	****	****										
4.4	Other Tourist Facilities Development															
	1) Information center	---	****													
	2) Handicraft Training center						---	****	****							
	3) City center beautification	---	****	****	****											
	4) Beach improvement		---	****	****	****										
	5) Tourist Pier Development		---	****	****											
4.5	Infrastructure Development															
	1) Water supply			---	****	****			****	****						
	2) Sewerage			---	****	****			****	****						
	3) Solid waste disposal			---	****	****			****	****						
	4) Electricity			---	****	****			****	****						
	5) Telecommunication			---	****	****			****	****						
	Total Development Cost	4,674	13,885	21,878	20,645	14,228	2,500	10,952	22,028	12,110	235	1,093	1,923	2,460	2,460	0

Note: Unit cost of accommodation includes standard hotel amenity facilities

NOTE: --- Land and engineering period
**** Construction period

(2) Investment Schedule

Investment volumes by sectors and investment time are shown in table 5.18. Total investment is 131.1 million balboas of which the TDC portion is 25.1 million balboas and includes land acquisition and compensation for location. The public investment of 21.8 million balboas is for road improvement, new road construction and cruiser pier construction. The private investment of 82.7 million balboas is for construction of hotel and marine center facilities.

(3) Promotion Plan

Proposed catch phrase for the area is, for example, "Portobelo where Panamanian history is resurrected". Development of the area is characterized by ruins and the Caribbean sea. It is also recommended that travel agencies prepare package tours for one or two days, so that Panamanian and foreign visitors can enjoy the area.

A wide variety of marine activities will attract young people. Notification should be made to the cruise ship company, that the area is going to be developed as a gateway to the San Blas islands. Various kinds of events such as music festivals will induce young people to visit.

5.7 Project Evaluation

5.7.1 Economic Evaluation

(1) Cost

The investment cost, including land and compensation costs, maintenance cost of infrastructure, and the operating cost of the related tourism sectors are calculated in the economic price in Table 5.19.

Table 5.19 Economic Cost of Portobelo Tourism Development Plan

Unit: B/. 1,000

	Investment cost			Total investment cost	Maintenance cost of infrastructure	Operating cost	Total cost
	Land	Public	Private				
Short	1,467	25,389	40,914	67,770	3,583	30,007	101,360
Medium	0	9,785	34,089	43,874	7,832	107,736	159,442
Long	0	7,122	0	7,122	9,932	193,732	210,786
Total	1,467	42,296	75,003	118,766	21,347	331,475	471,588

Note: 1) Operating cost of related private sectors are estimated at 25% of the total tourist revenue for Portobelo Tourism Development Plan (refer to Appendix)

(2) Benefit

The direct and indirect benefit of the Portobelo Tourism Development Plan has been calculated based on revenues from the incremental night stay tourists and day visit tourists as shown in Table 5.20. The portion of revenue estimated as received from foreign tourists is very high, almost 95% of the total benefit as shown in Figure 5.18. The share of accommodation revenue is low compared with 45% estimated for the Chame Resort Development Plan. In the Long Term Development Plan the average share of accommodation expenditure of total tourist expenditures has been estimated at 29% by 2010.

Table 5.20 Benefit of Portobelo Tourism Development Plan

Unit: B/. 1,000

	Tourist revenue		Total tourist revenue	Benefits		Total benefits
	Foreign tourists	Domestic tourists		Direct benefits	Indirect benefits	
Short	77,720	2,944	80,664	49,205	24,603	73,808
Medium	275,961	13,652	289,614	176,664	88,332	264,996
Long	490,366	30,419	520,785	317,679	158,840	476,519
Total	844,047	47,016	891,063	543,549	271,774	815,323

Note: 1) Conversion factor into direct benefit=61% (refer to Appendix)
2) Conversion factor into indirect benefit=31%

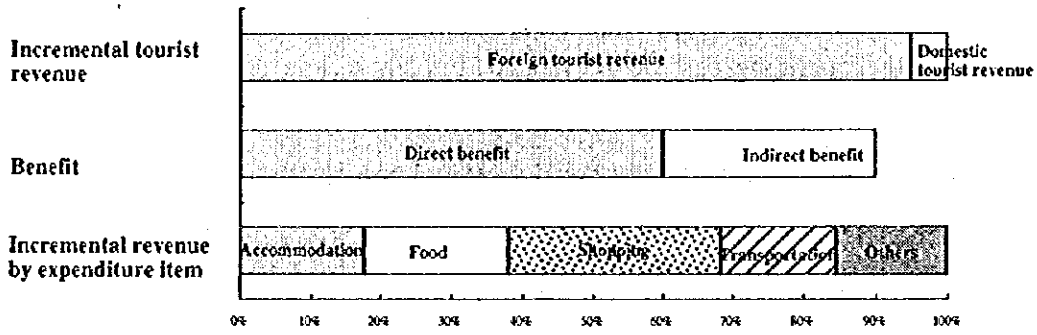
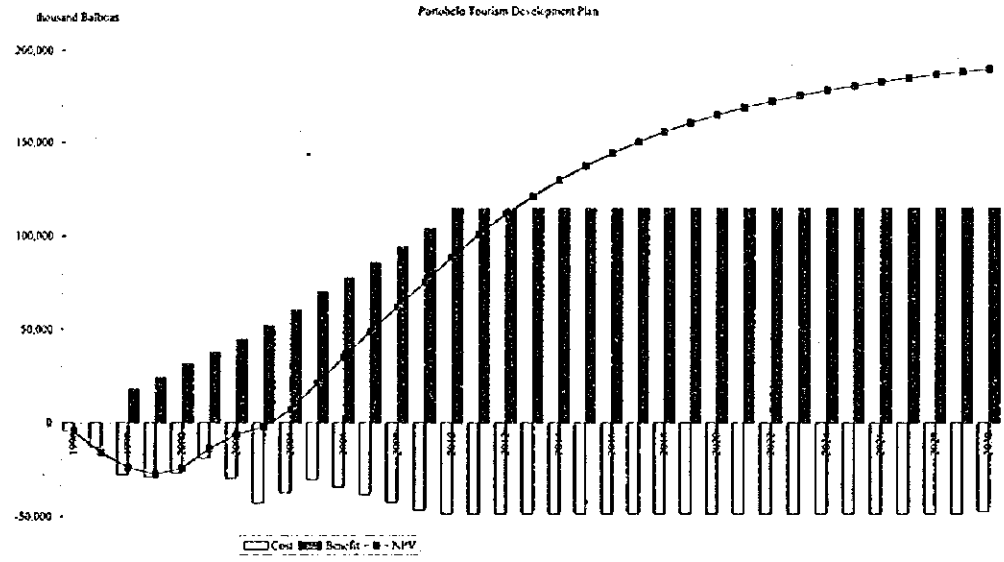


Figure 5.18 Incremental Revenue by Tourist and Expenditure Item, and Benefits (1996-2010): Portobelo Tourism Development Plan

(3) Calculation and evaluation

Figure 5.19 shows the comparison of benefits and costs of the Portobelo Tourism Development Plan. The results of the calculation are shown in the Appendix.



Note: NPV is calculated by using a discount rate of 12%

Figure 5.19 Benefit, Cost and NPV of Portobelo Tourism Development Plan

The Economic Internal Rate of Return (EIRR) and Net Present Value (NPV) have been estimated at 36.9% and 189,788 thousand Balboas respectively which is high enough to justify the Plan. Economic sensitivity has been examined in Table 5.21. The EIRR gives a rate high enough to justify the plan from the economic point of view under the assumption of 20% increase in cost and 20% decrease in benefit.

Table 5.21 Result of Economic Sensitivity Analysis

	EIRR	NPV
Base case	36.9%	189,788 Bl. thousand
Cost increase (20 %)	31.1%	172,497 Bl. thousand
Benefit decrease (20 %)	29.9%	134,545 Bl. thousand
Cost increase (20 %) and Benefit decrease (20 %)	25.2%	117,254 Bl. thousand

5.7.2 Financial Evaluation

The financial viability of TDC has been examined by adopting the general assumptions explained previously.

(1) Cost

Table 5.22 and Figure 5.20 shows the investment cost of the Portobelo Tourism Development Plan. The share of the investment cost for the TDC is estimated at 20% of total cost or 26,529 thousand Balboas including the land cost. The disbursement of the cost is concentrated in the short term period and amounts to 57% of the total cost.

Table 5.22 Investment Cost of Portobelo Tourism Development Plan

Unit: B/. 1,000

Development Body	Short	Middle	Long	Total	%
Land	1,467			1,467	1%
Goverment	13,659	235	7,933	21,827	17%
TDC	14,418	10,644	0	25,062	19%
Private	45,766	36,941	0	82,707	63%
Total	75,310 (57%)	47,820 (36%)	7,933 (6%)	131,063 (100%)	46%

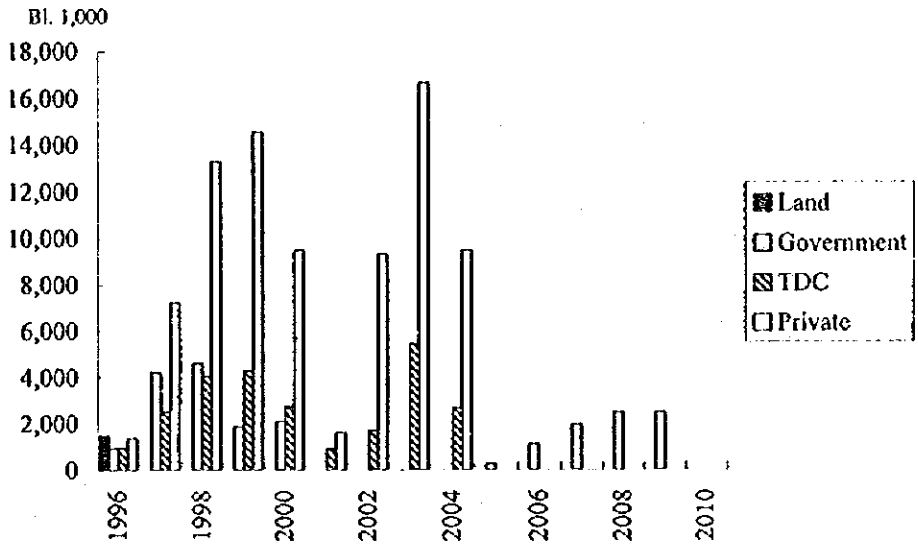


Figure 5.20 Investment Cost by Development Body (1996-2010)

The operation and maintenance cost of TDC and the maintenance cost of the infrastructure and facilities have been calculated and included in the cost of TDC.

(2) Revenue

As shown in Table 5.23 the share of the revenue directly paid to TDC could be very high in Portobelo Tourism Development Plan. In order to create a stable source of revenue, it is necesary to introduce fees for entry into the tourist area such as entrance fee to archeological sites.

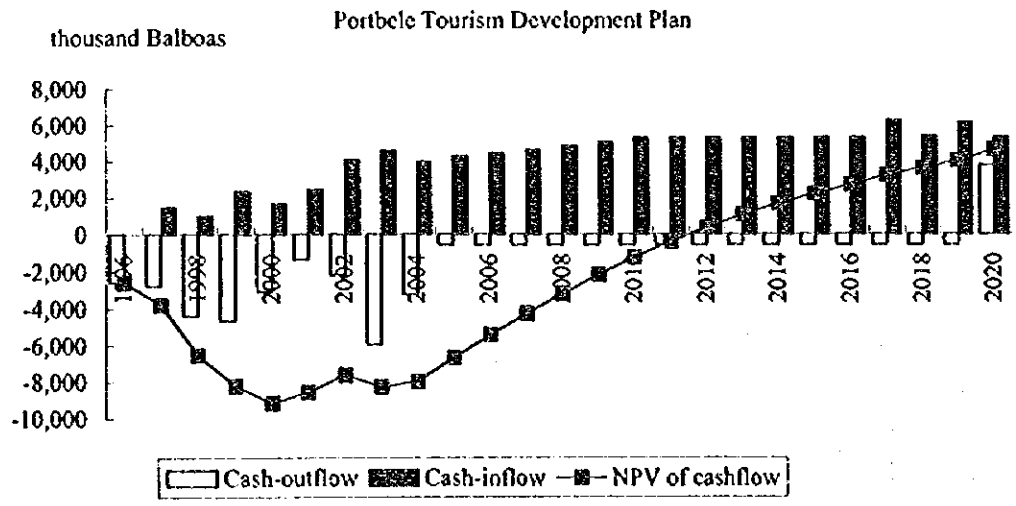
Table 5.23 Estimated Revenue of TDC in 2010 Portobelo Tourism Development Plan

Unit: B/. 1,000

Revenue item	Revenue per year	%
Land lease fee for accommodations	1,818	35%
Land lease fee for other facilities	0	0%
Facility lease fee	16	0%
Revenue from tourists	3,430	65%
Total	5,264	100%

(3) Financial Evaluation

Figure 5.21 shows the cash-inflow and cash-outflow and the Net Present Value of net cash-flow of TDC during the period from 1996 to 2020. The FIRR and NPV are estimated at 15.87% and 4,603 thousand Balboas respectively (refer to Appendix). The Portobelo Tourism Development Plan will be viable from the financial point of view.



Note: NPV is calculated by using a discount rate of 12%

Figure 5.21 Estimated Cash-flow and NPV of TDC (1996-2020), Portobelo Tourism Development Plan

Table 5.24 Results of Financial Evaluation of TDC, Portobelo TourismDevelopment Plan

Unit: B/. 1,000

Term	Investment Cost		Operation & Maitenance Cost	Total Cost	Lease Fee		Total Revenue	Net Profit
	Land	Facility Development			Accommo-dation	Other facility		
Short	1,467	14,418	1,752	17,637	4,602	1,777	6,379	-11,257
Middle	0	10,644	2,769	13,413	9,579	9,681	19,260	5,847
Long	0	0	2,911	2,911	9,090	15,019	24,109	21,197
2011-2020	0	-4,314	5,823	1,508	19,998	34,489	54,487	52,978
Financial Internal Rate of Return (FIRR):					15.87%			
Net Present Value (NPV) discounted by 12%:					4,603	thousand Balboas		

(4) Financing Plan

The cost of the plan is covered by capital from the TDC, possibly a long-term soft loan and incremental revenue derived from the plan. Table 5.25 shows the financing plan assumed. The share of the capital and the long-term loan are estimated at 40% and 36% respectively.

Table 5.25 Financing Plan of Investment Cost Portobelo TourismDevelopment Plan

Unit: B/. 1,000

Total investment cost of TDC		Financing			
		Capital		Long-term loan	Incremental revenue
Land	Infrastructure & facility	Public	Private		
		5,306	5,306		
1,467	25,062	10,612 (40%)		9,654 (36%)	6,263 (24%)
26,529		26,529			

Note: The condition and the schedule of long term loan is shown in Appendix.

5.8 Environmental Impact Study (Portobelo Tourism Development)

5.8.1 Introduction

The Portobelo Tourism Development, is a complex tourism development project which comprises six tourism projects and an infrastructure development formulated in the previous chapter. As a result of preparation of environmental impact study, the following impacts are predicted so that the study will be carried out in accordance with the identified impacts.

Table 5.26 Screening of Project Impacts

	Social Environment									Natural Environment								Pollution					
	Relocation	Economic Activity	Public Facilities	Community Isolation	Cultural Heritages	Water & Other Rights	Health / Sanitary	Wastes	Disaster	Topography and Geology	Erosion	Subterranian Water	River Basin	Coast & Marine Area	Flora and Fauna	Meteorology	Landscape	Air Pollution	Water Quality	Soil Contamination	Noise & Vibration	Ground Substance	Offensive Odors
1) Accommodation Development	B	C	C	D	C	D	D	D	D	C	D	D	C	C	C	D	C	D	C	D	D	D	D
2) Town Center Butification	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
3) Information Center	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
4) Handicraft Training Center	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
5) Beach Improvement	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
6) Infrastructure Development	C	D	D	D	C	D	D	D	D	D	D	D	D	D	C	D	D	D	D	D	D	D	D

Note: A - Large or moderate impact, B - Slight impact, C- Uncertain, D - Nil or Negligible

5.8.2 Present Condition of Project Area

Characteristics of the project area are abundant marine and terrestrial ecology designated as the Portobelo Marine National Park and historical heritages from the colonial era of great historical value.

Noteworthy aspects:

1) A large part of the National Park has been developed for pasture land. As a result deforestation is the main issue in this area. Also associated fauna is decreasing.
2) Rich marine fauna including coral reef are affected by soil erosion and disorderly fishing. However it is still plentiful. Large scale mangrove forests can be found in Puerto Lindo.
3) Housing settlements are part of the colonial heritage in Portobelo

Table 5.27 Present Condition of project Area

Factors	Subject Item	Present Condition /Characteristics
(1) Geography	1) Topography 2) River system 3) Soil 4) Land Use	Mountainous land with coastal plain Secondary forest and pasture land dominate Creeks, small river system
(2) Flora	1) Terrestrial flora 2) Marine flora 3) Vegetation 4) Endangered spacies	Portobelo: The inhabited zone has coused great deterioration to nearby vegetation at the entrance of the town.
(3) Fauna	1) Habitat area of fauna 2) Endangered spices	Portobelo: Several species of birds are observed. The rain forest zone is visited by some birds species near the surroundings of the wooded areas, and some endangered monkey species exist. Marine turtles come to nest and lay eggs.
(4) Landscape	1) Location of view points	The coast of Portobelo is characterized by valleys and alluvial-colluvial plains.
(5)Socioeconomic	1) Chief Industry 2) Inhabitants	Agriculture is the major industry in the Portobelo zone. Fishing activity is only observed on quite specific areas near the town and the Bay of Portobelo. These activities refer to artisan fisheries
(6) Water Quality	1) BOD / COD 2) DO 3) SS	BOD levels are less than 3mg/L, the levels of dissolved oxygen are higher than 6.0 mg/L and levels of fecal coliforms are consistently less than $1x10^3$ /100 ml.
(7) Waste Matters	1) Existing Waste Matters 2)Occurrence points	Solid waste is the principal issue in this zone. This situation is caused by the non-existence of a garbage collection system which cause people to dispose of garbage in rivers, creeks, the sea and on the roads.
(8) Cultural Assets	1) Existing Cultural Assets 2) Scale and volume	There are two racial groups in this zone: Afro-Hispanics, Colonial Negroes of Afromestizos, who descend from the people that came to America during the colonial period. They are called Costeños which is a typical term of this locality. This is the ethnically predominant group. Mulato, which is the result of Spanish-African-Indian intermarriage. This group laborers on the land and destroys tropical forest at an accellerating rate.

5.6.3 Environmental Impact Analysis

The Portobelo Tourism Development comprises the following development projects. The environmental impacts of each development area are analyzed. The characteristics of the environmental impacts are mainly relocations,destryctubg flora and erosion development of accommodation in La Escucha, La Guaira and Puerto Lindo, and town center renovation. The environmental impacts for each project are shown in the following table.

Table .5.28 Environmental Impact Characteristics

Component Projects	Project Type	Project Site/ Scale	Negative Impact Potential
1) Accommodations Development	La Escucha (300 rooms), Portobelo (87 rooms, La Guaira (305 rooms), Puerto Lindo (305 rooms)	Portobelo Town, La Escucha, La Guaira, Puerto Lindo	Flora, Erosion
2) Town Center Beautification	Renovation (98unit), Plaza (4050 Sqm.), Parking (1,770 Sqm.)	Portobelo Town	Relocation
3) Information Center Development	Building (190Sqm), Parking (360 Sqm.)	Portobelo Town	Relocation
4) Handicraft Training Center	Building (1,110 Sqm.)	Portobelo Town	Nil
5) Beach Improvement	L1kmx W50Mts x D250mm (1,250 Cum.)	La Escucha, La Guaira	Nil
6) Road Development	Road Development including bridges W15Mts. x 24.5 KMts.	Portobelo-Jose del Mar, Jose del mar - Puerto Lindo, Puerto Lindo - La Guaira	Flora, Erosion
7) Water Supply, Sewerage and Solid Waste Facilities	1,100 Cu M/day and 4 stations, 400 Cu M Tank and 1kmts piping. 15 ton/day	Portobelo Town, La Escucha, La Guaira, Puerto Lindo	Nil
8) Electricity and Telecommunication	8 MW 380 lines	Portobelo Town, La Escucha, La Guaira, Puerto Lindo	Nil

5.6.4 Environmental Impact Prediction and Evaluation

As a result of the environmental impact Analysis, only one minor or unclear impact is identified. The environmental impacts are processed taking into consideration the construction and operation phase, and scale and type when the projects are carried out. Principle impacts are described while any other small impacts are predicted in this examination on Portobelo town, consequently, no major impact is predicted from relocation caused by this plan.

Table 5.29 Environmental Impact Prediction and Evaluation

Projects	Environment Impact Prediction	Evaluation
1)Accommodation Development	Human activities are already settled in all 4 proposed locations. Relocation is required.	Nil or Negligible impact
2) Town Center Beautification	Relocation is required for residents in subject buildings.	Nil or Negligible impact
3) Information Center Development	The center is established in an existing public building. No impact is predicted.	Nil or Negligible impact
4) Handicraft Training Center	The building is already developed by another organization. No impact is predicted.	Nil or Negligible impact

5) Beach Improvement	There will be some sand extraction near the project area. No major impact is predicted.	Nil or Negligible impact
6) Infrastructure Development	There is existing infrastructure. No major impact is predicted	Nil or Negligible impact

5.6.5 Environmental Countermeasures

To achieve the development with a views to environmental conservation, countermeasures as a result of the series analysis are examined and formulated for avoiding or mitigating environmental impacts.

Environmental factors in this area are deforestation leading to soil erosion which when deposited by rivers on marine fauna, including coral reefs, causes their destruction.

Critical point on this proposed plan is the relocation of residents in the project area especially in Portobelo town, method of compensation is important for this matter. Another critical point is that marine turtles come to lay eggs. Beach monitoring for turtle protection with beach zoning is required.

No other major impact is predicted, although general care for the environmental impacts should be carried out.

6. Caribbean Costa Arriba Road Development Project

6. Caribbean Costa Arriba Road Development

6.1 Planning Condition

6.1.1 General Features of the Area

(1) Study area definition

This feasibility study is for road construction which constitutes the basic infrastructure to make effective use of the sightseeing resources of the Portobelo area and eastward, and to promote local development.

The section of the route to be studied is about 77.6 km long; it leads to Cuango to the East of Sabanita which forms a junction with the Panama Colon road. The route to be studied covers 3 districts in Colon province; Colon province, Portobelo and Santa Isabel.

6.1.2 Tourist attractions around the road to be studied

(1) Conditions of wide-regional area tourist attractions

The road leads toward the east from the Colón Distrito along the Caribbean Sea. Opening of the Panama-Colón expressway will provide a convenient connection to the metropolitan area for the area under study, and will permit future development of the tourist industry.

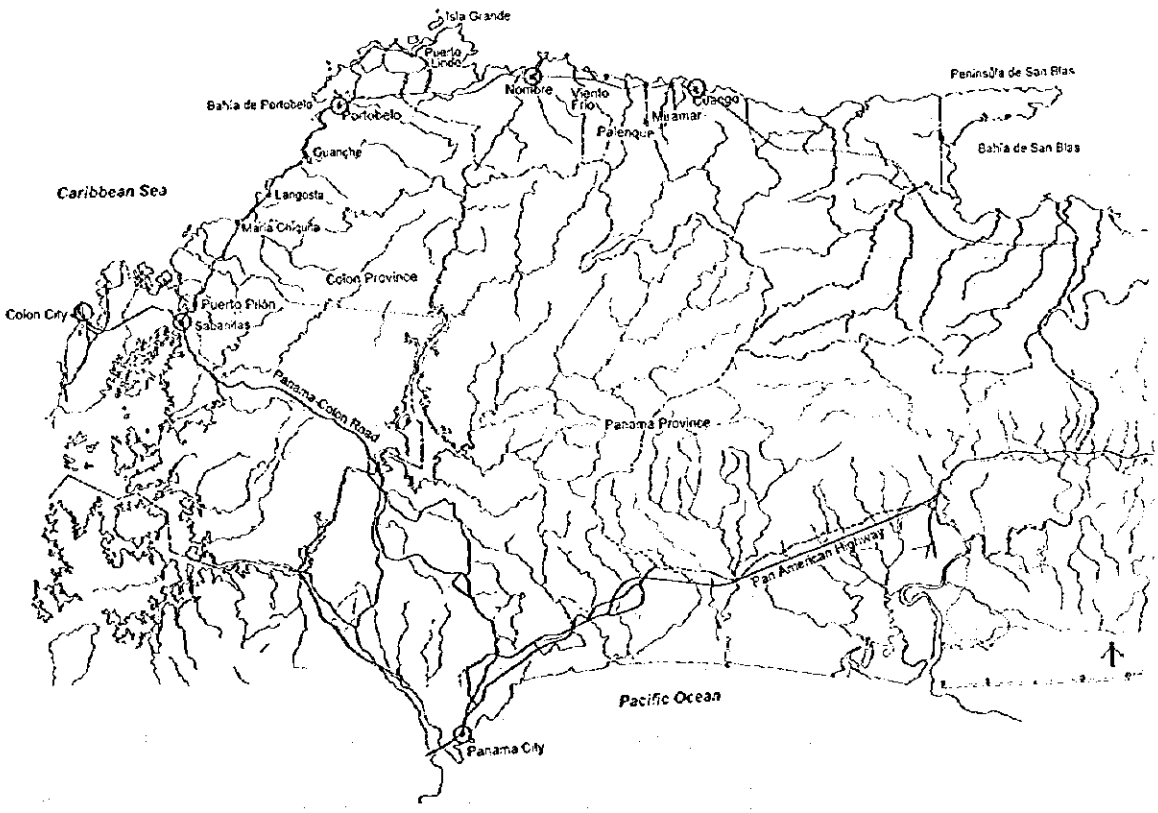


Figure 6.1 Location Map (wide-regional area)

(2) Distribution of tourism resources along the planned road

In addition to coral reefs, beaches and scenic spots along the coast of the Caribbean Sea, tourism resources include Portobelo, relics of the Age of Great Voyages at Nombre de Dios, Portobelo National Park, Rio Chagres National Park, the life and civilization of Indios. These tourism resources are located at the top of the access road leading to the planned road or the planned road. Since there is no other road to access these tourism resources except for this road, improvement of this road is the only way to reduce the time in traveling between tourism facilities.

6.1.3 Characteristics of the Area

(1) Road connecting between Sabanita and Portobelo : 35 kilometers

This road is formed of an asphalt treated pavement which has two lanes and a width of 5 meters, and is relatively improved. However, it is likely to be damaged due to insufficient pavement thickness and drainage treatment, and comfortable driving is possible only for a few months a year. The area along the road between Sabanita and Puerto Pilón has already been developed as a residential area, and traffic congestion is often experienced. In other areas, however, there are few villages; most of the area is occupied by meadows. Almost all the area along the route is located in a coastal region of slightly elevated flat land jutting out toward the Caribbean Sea, and the villages are located along the road.

The coast of the Caribbean Sea along the road is mostly made of coral reefs, with few sandy beaches. Villages are often found in the coastal areas forming sandy beaches.

(2) Road connecting between Portobelo and San Antonio : 9 kilometers

This is a 5-meter wide gravel paved road with two lanes. The bridge across the river close to Portobelo is a temporary bridge, and its width is 3 meters. However, it is poorly maintained and it is dangerous to drive a vehicle of three tons or more over this bridge. The route is located in the valley along Rio Cascajal, and is separated from the sea.

(3) Road connecting between San Antonio and Nombre de Dios : 14 kilometers

The route comes close to the coastline at Nombre de Dios; otherwise it runs in mountainous areas. Most of the developed areas along the road are agricultural and stock raising areas.

For mining and transport of manganese ore, the road to Nombre de Dios has a width of 6 meters and is paved with gravel; it is comparatively improved. Other parts are earthen roads having a width of 5 meters or less. The bridge across Rio Nombre de Dios is a suspension bridge having a width of 3 meters. Its effective bridge span is 5.4 meters. However, the bridge structure is so designed that a vehicle of 5 tons or more cannot run on it.

(4) Road connecting between Nombre de Dios and Cuango : 19.6 kilometers

The road is paved with pit run gravel but is poorly maintained. A minimum road width of 3 meters is ensured, and the section between Nombre de Dios and Viento Frio runs several kilometers inland away from the coastline. Other places are mostly adjacent to the coastline,

except for the portion crossing the river. The river is a natural river with a wide estuary, becoming a flood plain at times of flood. So the bridge across the river is built at a place where the river width on the upstream side is stable, and the route is consequently is located away from the coast. On the other hand, villages are located at the estuary at places directly facing the sea. For these reasons, the villages are separated from the road. Accordingly, each village has an access road connecting it with the road being studied.

6.2 Development Framework

6.2.1 Existing Road

(1) Use of land along the road

The road passes through the center of Sabanita, Puerto Pilón and Portobelo located on the coast of the Caribbean Sea. However, other areas along the road are cultivated as meadows. The section about 4 kilometers long between Sabanita and Rio Llano Sucio in Puerto Pilón is formed by streets to a considerable degree. In the Portobelo area, the road is formed by city streets, and problems occur with traffic control.

(2) Population in the area along the road

Figure 6.2 presents the population distribution according to the administrative unit below the District (Distrito) in the areas along the road. The population is 13,400 persons in Sabanita close to Colon, 10,300 persons in Puerto Pilón, about 3,000 in Portobelo, 1,400 in María Chiquita, and 1,000 in Nombre de Dios. The population is below 1,000 in the Eastern section distant from Colon. Almost all the villages are distributed along this road, and most of the villages in Nombre de Dios and Eastward are located on the coast of the Caribbean Sea.

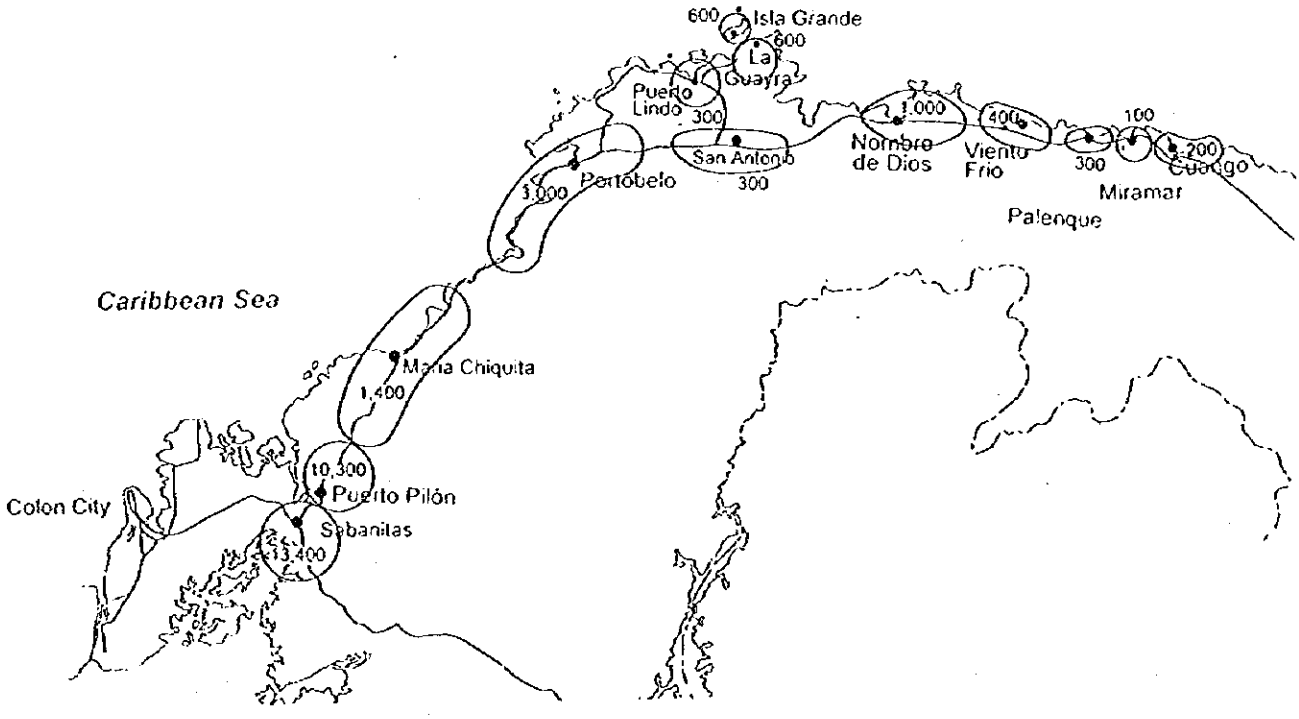


Figure 6.2 Population Distribution in the Study Area

6.2.2 Demand Forecast of the Road

The future traffic volume of the road has been estimated with consideration given to annual number of visitors, traffic characteristics and development size.

The traffic volume between Puerto Pilón and Portobelo has been calculated based on the number of visitors using the road, induced traffic volume resulting from development and traffic due to local activities. The traffic volume in each area of Portobelo and eastward has been calculated with consideration given to the residential traffic and development size. Figure 6.3 shows the result estimated for the year 2010. The induced traffic volume resulting from the sightseeing development is estimated at 40 percent of the number of visitors. As a result, the average daily traffic volume in the Portobelo area by the year 2010 is estimated at 463 vehicles.

Table 6.1 Number of Foreign Tourists

	1992	2000	2010
Foreign Tourist			
Tourists staying overnight	30,000	984,000	295,000
Day tourists	57,000	190,000	535,000
Ships		5,000	30,000
Domestic Tourist			
Tourists staying overnight	36,000	54,000	123,000
Day tourists	118,000	305,000	655,000
Total	164,000	5,119,000	1,210,400

Table 6.2 Traffic Volumes

Traffic Volumes	1992		2000		2100	
Portobelo	Bus	Car	Bus	Car	Bus	Car
Visitor Traffic	25	240	70	650	160	1630
Residential Traffic	5	40	20	180	100	1010
Induced Traffic	0	0	30	330	100	1050
Regional Traffic	10	100	20	200	60	520
Total	40	380	140	1360	420	4210

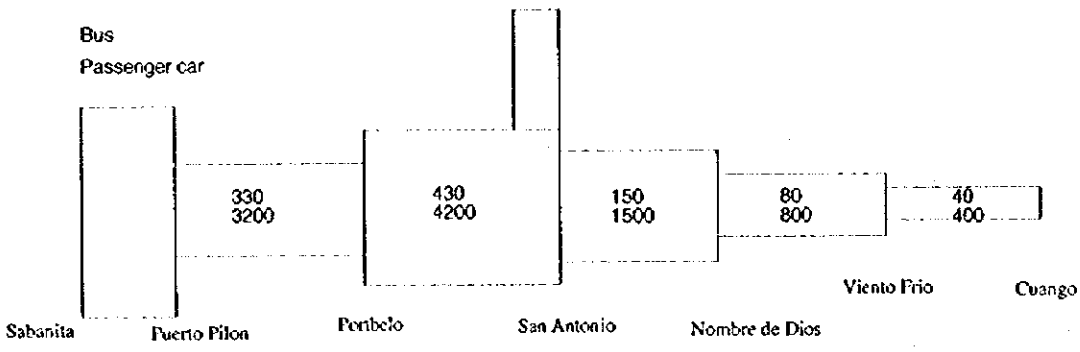


Figure 6.3 Traffic Volume

6.3 Development Plan

6.3.1 Planning Strategy

The road under study is not only facility for the local communities, but also to promote tourism which is the major stimulus for local development. Accordingly, the road must be planned to improve access to the tourist resorts, as well as to facilitate traffic flow, and consideration must be given to the scenic beauty of the road. Furthermore, since this road will be used by tourists, it should provide parking and rest areas at the tourist attractions located along it. Parking areas should provide comfortable rest facilities which allow the road user to take a rest whenever he wishes and enjoy the scenic beauty.

The road should be planned as a place to provide information on the communities through which it passes including the people, culture, scenic beauty and products, so that the charms of the tourist resort will be known to the visitors through communication with nature and local communities. The facilities to fulfill these functions will include parking sites, rest rooms and information centers, as well as restaurants, shops selling, local products, hotel accommodation, history museums and similar facilities of advanced level. However, hotel accommodation and history museums will be excluded from the present road project.

6.3.2 Facilities Component

The basic parking facilities include parking sites, lavatories and information centers. The rest facilities at the tourist resort will include small parks to provide walks on the beach, locker rooms and shower rooms required for bathing, restaurants, trash cans, rest facilities with sun shades, and facilities for boarding buses and cars. The present road assumes appropriate layout of these facilities. These basic facilities are required to ensure security and complete maintenance control in particular.

(1) María Chiquita
Parking facilities
Lavatory
Shower room
Rest bench and guide sign

(2) Langosta
Parking facilities
Lavatory
Shower room
Rest bench and guide sign

(3) Río Grande
Parking facilities
Lavatory
Shower room
Rest bench and guide sign

(4) Portobelo Bay
Parking facilities

(5) Nombre de Dios (for 20 cars)
Parking facilities
Lavatory
Rest facilities and guide sign

(6) Nombre de Dios (for 10 cars)
Access road
Parking facilities
Lavatory
Shower room
Rest facilities and guide sign

(7) Viento Frio (for 10 cars)
Access road
Parking facilities
Lavatory
Shower room
Rest facilities and guide sign

(8) Palenque (for 5 cars)
Parking facilities
Rest facilities and guide sign

(9) Miramar (for 5 cars)
Parking facilities
Rest facilities and guide sign

(10) Cuango (for 10 cars)
Parking facilities
Lavatory
Rest facilities and guide sign

6.3.3 Road Development

(1) Road between Sabanita and Rio Llano Sucio : 4.4 kilometers (STA. Oto STA 4 + 400)

The road along this route is urbanized passing through a suburban area to the city of Colon, and will be improved as a main road in the city. The current traffic volume is already high, and will increase further in future. Since it provides place is an entrance to the Portobelo area, the road must be designed with consideration given to scenic beauty.

Major project items include:

1) Road width to be increased to 4.4 meters. Expansion of two to four lanes
2) Shoulder pavement
3) Construction of new sidewalk and media strip

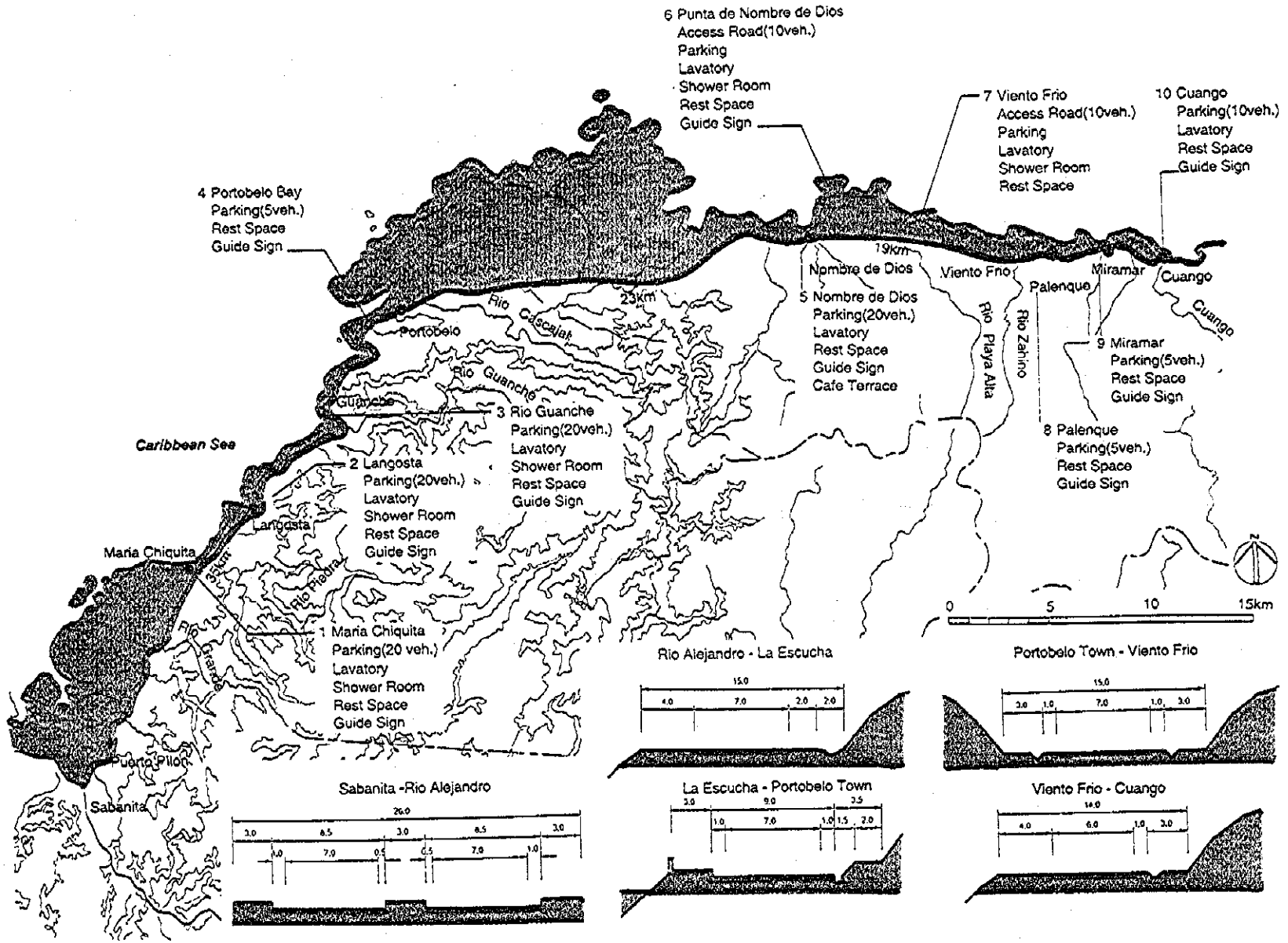


Figure 6.4 Caribbean Costa Arriba Road Development Plan


Río Indio
Río Claro
23km
Caribbean Sea

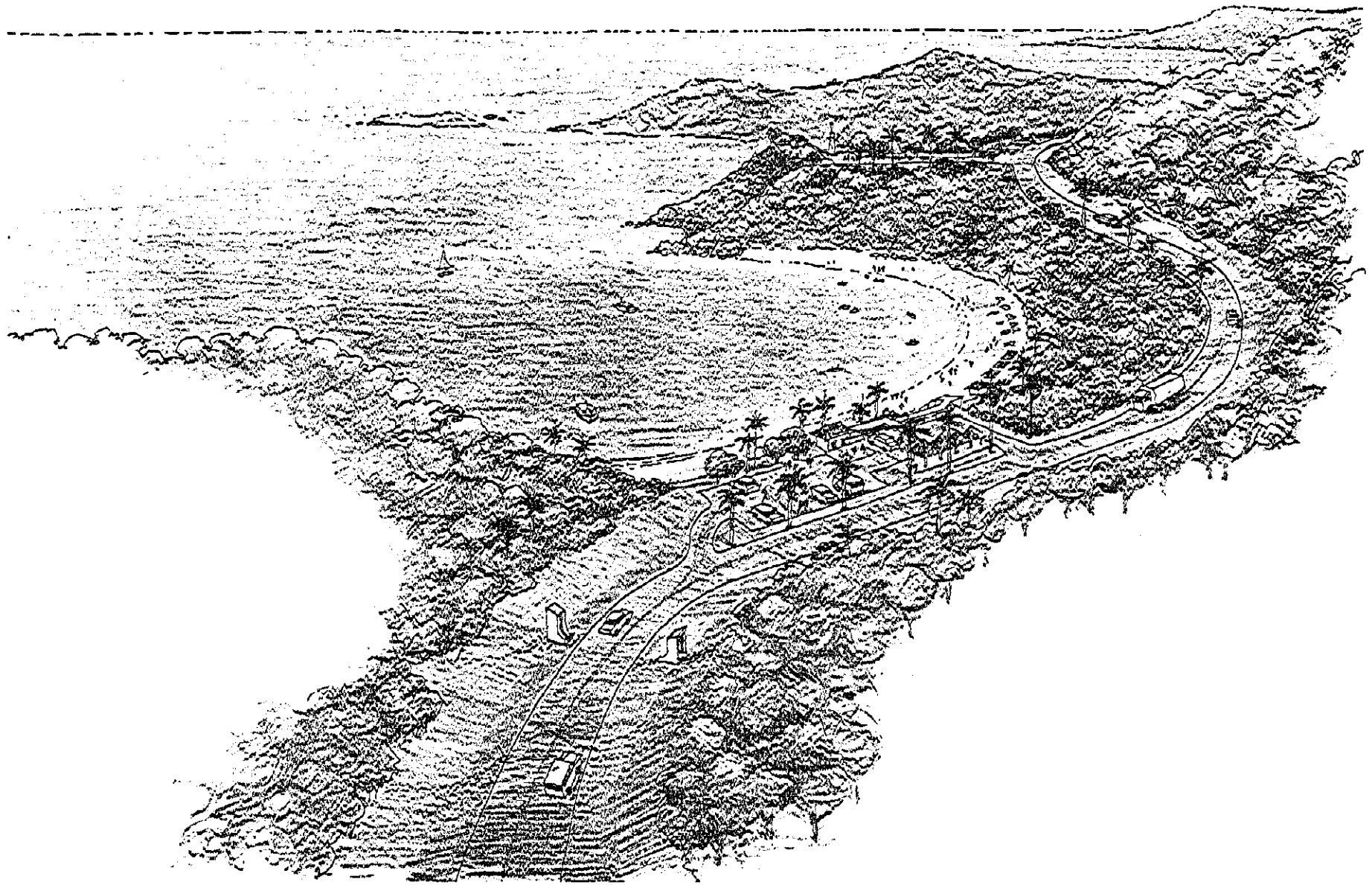


Figure 6.5 Image Sketch of Caribbean Costa Arriba Road Development Plan

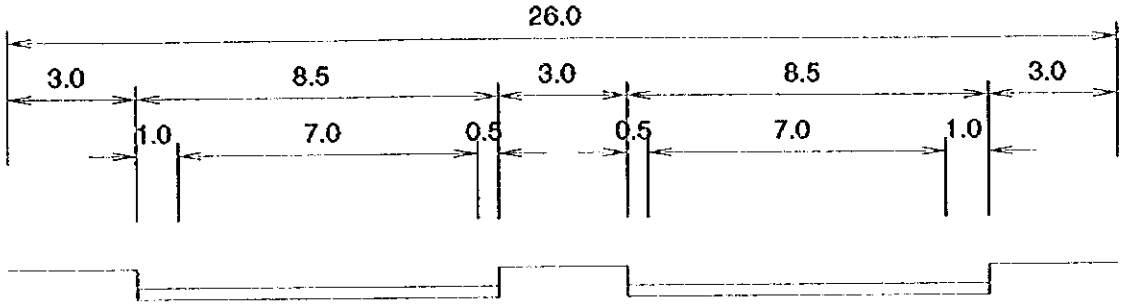


Figure 6.6 Road Section (1)

(2) Road between Rio Llano Sucio and Entrance of Portobelo (STA 4 + 400 - STA 32)

The route between Rio Llano Sucio and María Chiquita (9.4km) is located in an inland area away from the coastline, and the portion from María Chiquita to Portobelo (18 kilometers) is located along the coast. Daily traffic volume in future will be below 4000 vehicles, and a two-lane road will be sufficient to handle it despite a possible increase in the number of tourists during the dry season.

Project items include:
1) Improvement of road pavement for the section 27.8 km long
2) 7.0 meters to be provided for pavement width of one lane is 3.5 meters
3) Improvement of the road landscaping by expanding the shoulder by 1 meter
4) Construction of drainage facilities on the mountain side

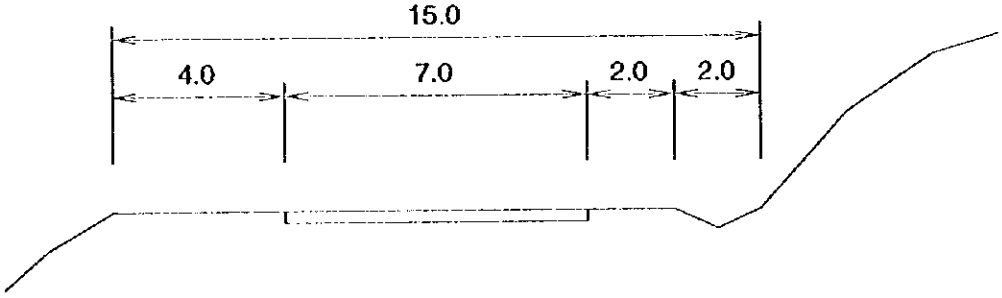


Figure 6.7 Road Section (2)

(3) Road connecting the entrance of Portobelo and Portobelo (STA 32 -- SAT 35)

The route is located along the coast, and serves as the main road of Portobelo town. Since it is a town, it must be suited to pedestrians. The average daily traffic volume shows a comparatively large figure of 4600 vehicles, but two lanes will be sufficient even when concentration of traffic during the dry season is taken into account.

Major project items include:
1) Improvement of the road, 3 kilometers long
2) Improvement of the pavement including the 9 meters wide shoulder, with one lane measuring 3 to 5 meters in width.
3) Construction of a new sidewalk on the sea side
4) Drainage facilities and flower bed using stone masonry to be installed on the mountain side

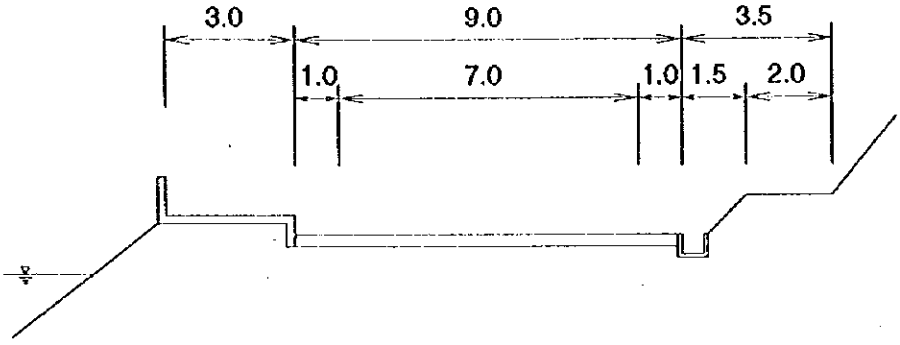


Figure 6.8 Road Section (3)

(4) Road connecting Portobelo and San Antonio (STA 35 -- SAT 44)

This is a common section used to access the tourist resort of Portobelo town, Isla Grande and Nombre de Dios. The route is located in a mountainous district away from the coastline. The average daily traffic volume is estimated at 4600 vehicles, the same as that of adjacent Portobelo town. Two lanes will be sufficient even when traffic concentration during the dry season is taken into account.

Major project items include:
1) Paving of the road, 9 kilometers long
2) New pavement, 7 meters wide
3) Construction of new shoulders and drainage facilities
4) Construction of new Rio Cascajal bridge, 7.0 meters wide, 3 × 20 meters spans 60 meters long

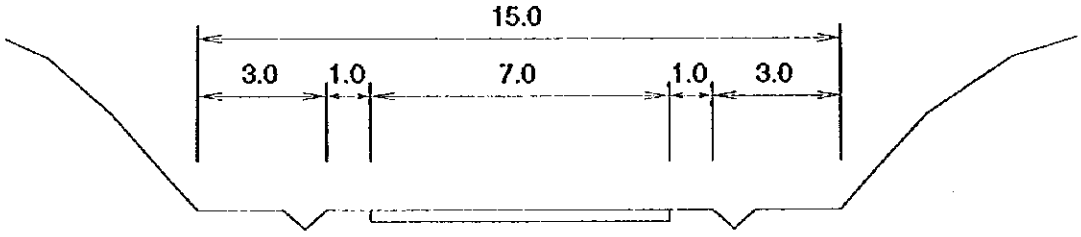


Figure 6.9 Road Section (4)

(5) Road connecting between San Antonio and Nombre de Dios (STA 44 -- 59)

The route is located in a mountainous district away from the coastline, except for Nombre de Dios. The average daily traffic volume on the route registers a small figure of 1650 cars. Two lanes will be sufficient even when the dry season traffic is taken into account.

Major project items include:
1) Paving of the road, 15 kilometers long
2) New pavement, 7 meters wide
3) Construction of new shoulders and drainage facilities Quebrada S/N, Rio Indio, etc., extension of the bridge

4) Width of bridge to be increased from 3.5 meters to 7.0 meters, and length to be increased 10 to 15 m
5) Construction of a new Rio Nombre de Dios Bridge, 3.5 meters wide, 3 × 20 meters spans 60 meters long

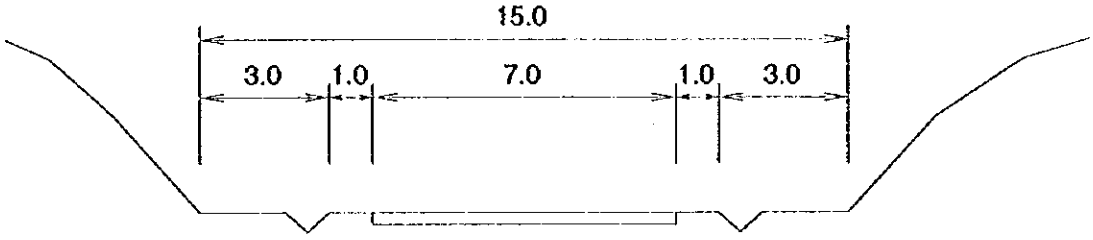


Figure 6.10 Road Section (5)

(6) Road connecting between Nombre de Dios and Viento Frio (STA 63 - STA 63 + 700)

The route is located 2 kilometers or less inland away from the coastline. The average daily traffic volume on the route registers a small figure of 880 cars. Two lanes will be sufficient.

Major project items include:
1) Paving of the road, 4.7 kilometers long
2) New pavement, 7 meters wide
3) Construction of new shoulders and drainage facilities
4) Construction of a new Rio Pato Bridge
5) 3.5 meters wide, 3 × 14.3 meters spans 42.9 meters long
6) Quebrada S/N, extension of two bridges, width to be increased from 3.5 meters to 7.0 meters, and length to be 10 m

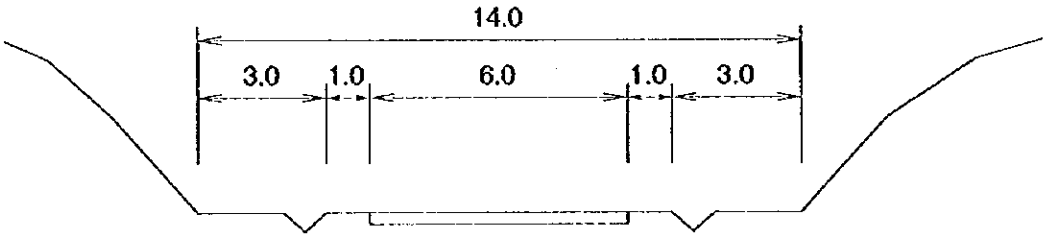


Figure 6.11 Road Section (6)

(7) Road connecting between Viento Frio and Cuango (STA 63+ 700 -- STA 77 + 600)

The route is located basically along the coastline. The average daily traffic volume on the route registers a small figure of 440 vehicles.

Major project items include:

1) Paving of the road, 13.9 kilometers long
2) New pavement, 7 meters wide
3) Construction of new shoulders and drainage facilities

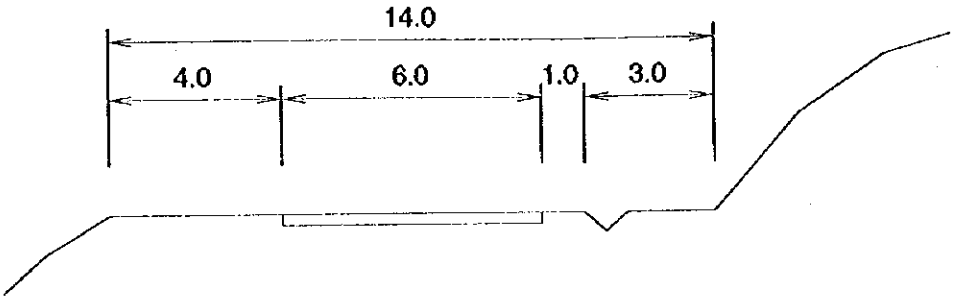


Figure 6.12 Road Section (7)

6.4 Project Cost Estimation

The results of cost estimation by section are shown in Table 6.3. Total project cost reaches 42.6 million balboas of which 8.7 million balboas are for 4 lane road widening project from Sabanitas to Río Alejandrom, 14.4 million balboas are for 2 lane road and pavement project from Alejandro to Portobelo. The remain 19.5 million balboas are for implementation of road project from Portobelo town to Cuango including access road to the Caribbean sea shore, Rio Cascajal bridge and Rio Nombre de Dios bridge.

Table 6.3 Project Cost of Caribbean Costa Arriba Road Development

Units: 1,000 Balboas

Project Description	Unit	Amount	Total Cost	Cost Portion			Land & Compensation	
			Financial	Foreign Currency	Local Currency			
					Financial	Economic	Financial	Economic
1 Sabanita--Rio Alejandro	m	4,400	8,656	4,920	3,737	2,927		
2 Rio Alejandro --La Escucha	ha	0.5	9,136	4,253	4,877	3,176	6	6
1) Road Improvement	m	25,600	8,492	3,896	4,596	2,967		
2) Maria Chiquita Parking	sq.m	2,000	215	119	94	70	2	2
3) Langosta Parking	sq.m	2,000	215	119	94	70	2	2
3) Rio Guanche Parking	sq.m	2,000	215	119	94	70	2	2
3 La Escucha--Portobelo Town			5,388	2,948	2,440	1,861		
1) Road Improvement	m	4,500	5,314	2,904	2,411	1,838		
2) Partobelo Parking	sq.m	1,500	74	44	29	22		
4 Portobelo--San Antonio	m	4,000	2,642	1,593	1,049	756		
5 San Antonio--Nombre de Dios	ha	0.6	7,309	4,293	3,009	2,178	8	8
1) Road Improvement	m	15,000	6,812	4,004	2,808	2,030		
2) Nombre de Dios Parking	sq.m	3,500	287	157	126	95	4	4
3) Small Park	sq.m	4,000	110	62	45	32	4	4
4) Cafeteria	sq.m	120	100	70	30	21		
6 Nombre de Dios --Viento Frio	ha	12.8	4,430	2,521	1,756	1,267	153	153
1) Road Improvement	m	4,700	2,139	1,257	882	637		
2) Access Road(1)	m	2,500	954	526	353	252	75	75
3) Punta Nombre de Dios Parking	sq.m	2,000	201	111	88	66	2	2
4) Access Road (2)	m	2,500	954	526	353	252	75	75
5) Viento Frio Parking	sq.m	1,250	181	100	80	60	1	1
7 Viento Frio--Cuango	ha	0.2	5,245	3,034	2,208	1,596	3	3
1) Road Improvement	m	14,100	4,785	2,782	2,003	1,445		
2) Palenque Parking	sq.m	500	148	81	66	48	1	1
3) Miramar Parking	sq.m	500	148	81	66	48	1	1
4) Cuango Parking	sq.m	700	163	90	73	55	1	1
Total			42,808	23,562	19,076	13,761	170	170

6.5 Implementation Plan

(1) Implementation schedule

This project can be divided into seven sections in consideration of traffic volume and development of tourism plan along the route area. The implementation schedule is fixed by traffic volume and the timing of maintenance work which over-lay and repair of road base course.

(2) Implementation agency

In Panama, the construction of new road and the improvement of existing roads is accomplished under the authority of the Ministry of public works (MOP). Implementation of this project will be done by the ordinary routine work section of MOP.

Table 6.4 Implementation Schedule and Termed Cost

No.	Project Description	Short Term (US$'000)					Medium Term(US$'000)					Long Term (US$'000)				
5		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
5.1	Sabanita--Rio Llano Sucio															
5.2	Llano Socio --La Escucha															
	1) Road Improvement															
	2) Maria Chiquita Parking															
	3) Langosta Parking															
	3) Rio Guanche Parking															
5.3	La Escucha--Portobelo Town															
	1) Road Improvement															
	2) Portobelo Parking															
5.4	Portobelo--San Antonio															
5.5	San Antonio--Nombre de Dios															
	1) Road Improvement															
	2) Nombre de Dios Parking															
	3) Small Park															
	4) Cafeteria															
5.6	Nombre de Dios --Viento Frio															
	1) Road Improvement															
	2) Access Road (1)															
	3) Punta Nombre de Dios Parking															
	4) Access Road (2)															
	5) Viento Frio Parking															
5.7	Viento Frio--Cuango															
	1) Road Improvement															
	2) Palenque Parking															
	3) Miramar Parking															
	4) Cuango Parking															
	Total Development Cost	1,183	10,145	4,474	3,866	2,896	4,782	6,841	6,254	2,359	0	0	0	0	0	0

Note: ---- Land and engineering period
**** Construction period

6.6 Project Evaluation

6.6.1 Economic Evaluation

Economic feasibility of Caribbean Costa Arriba Road Development Plan has been estimated by adopting the following assumptions.

1) Benefits of the plan were estimated based on the cost saving in the maintenance cost and vehicle operation cost (VOC). The maintenance cost for the new improved road was estimated as the maintenance cost in the cost in Table 6.5 and the maintenance cost of the old or existing road was estimated as the cost saving in the benefit in Table 6.5. The VOC saving is included in the benefit as shown in Table 6.5.
2) The project period is 20 years after the completion of the improvement of each section.
3) The residual value of each section is calculated as an inverse cost in the last year of the project period.

4) A discount rate of 12% is used.
5) The maintenance system of the World Bank and the related road improvement studies in Panama are referred to in the estimation.

(1) Cost

The investment cost of Caribbean Costa Arriba Road Development Plan has been converted into economic price according to the components of the cost as shown in Table 6.5. The maintenance cost of the improved roads consists of the over-lay, marking, repair, grass cutting and cleaning of the improved road. It is estimated in economic price according to the maintenance item. The total maintenance cost of the new road is shown in Table 6.5. The total economic investment cost including the land cost and the maintenance cost up to 2010 are estimated at 47.804 thousand Balboas.

Table 6.5 Economic Cost of Caribbean Costa Arriba Road Development Plan

Unit: B/. 1,000

	Investment cost				Maintenance	
	Land	Public	Private	Total	costs of new road	Total
Short	167	19,037	0	19,204	125	19,329
Medium	3	18,116	0	18,119	706	18,825
Long	0	0	0	0	9,654	9,654
Total	170	37,153	0	37,323	10,485	47,808

(2) Benefit

The benefit derived from the improvement of the Caribbean Costa Arriba Road consist of:
-the maintenance cost savings, and
-the vehicle operation cost (VOC) savings

With the implementation of the Caribbean Costa Arriba Road Development Plan, those costs will be saved to the national economy.

The existing level and improvement levels of each road section with the implementation of the Caribbean Costa Arriba Road Development are shown in Table 6.6.

Table 6.6 Existing and Improvement Level of each Road Section of Caribbean Costa Arriba Road Development

Section	Improvement level		
	Gravel road	Asphalt treatment road	Asphalt concrete road
Sabannita - Rio Alejandro		o——▶o	
Rio Alejandro - La Escucha		o——▶o	
La Escucha - Portobelo Town		o——▶o	
Portobelo Town - San Antonio	o——▶o		
San Antonio - Nombre de Dios	o——▶o		
Nombre de Dios-Viento Frio	o——▶o		
Viento Frio-Cuango	o——▶o		

1) Maintenance cost

The maintenance costs saving are usually estimated based on the transport demand and the type of road sub-base. Table 6.7 shows the required maintenance schedule according to type of road subbase. The maintenance cost of the new road and the existing road are calculated based on the maintenance schedule as shown in the table.

Table 6.7 Maintenance Schedule

Description	Existing gravel road	Existing asphalt treatment road	New asphalt concrete road	Frequency
Routing maintenance				
Grass cutting	0	0	0	1 time/year
Ditch and drain cleaning	0	0	0	1 time/year
Periodic maintenance				
Repair	0			2 times/year
Gravel resurfacing	0			1 time/9500 traces*5ton
Existing asphalt resource		0		1 time/74000 traces*5ton
Overlay			0	1 time/10 years
Pavement marking		0	0	1 time/3 years or 74000 traces*5ton

2) Vehicle Operation Cost (VOC)

The VOC of bus and car by type of pavement of the road is shown in Table 6.8. In order to estimate the cost, the maintenance system of the World Bank and the related road improvement studies in Panama have been referred to.

The benefit of the plan or saved cost has been calculated in Table 6.8

Table 6.8 Vehicle Operation Cost per 1,000 km

unit: B/

Pavement	Asphalt concrete		Asphalt treatment		Gravel	
Type of vehicle	Bus	Car	Bus	Car	Bus	Car
Velocity (km/h)	50	55	40	50	30	25
Fuel	29.3	32.5	30.5	30.4	34.0	33.4
Lubricant	2.0	1.7	2.2	2.1	2.4	2.7
Tire	22.0	36.0	26.1	45.0	30.1	72.0
Parts	30.8	11.5	37.9	18.0	46.8	22.5
Meant. Labor	52.1	5.0	68.7	7.5	90.0	11.1
Depreciation	48.4	80.0	58.9	107.3	75.8	107.3
Interest	77.8	65.0	95.3	88.0	122.2	136.5
Crew	348.0	0.0	424.8	0.0	547.2	387.5
Total cost	610.4	231.7	744.4	298.3	948.5	773.1

Table 6.9 Benefit of Caribbean Costa Arriba Road Development Plan

Unit: B/. 1,000

	Cost Saving		
	Maintenance	VOC	Total
Short	2,023	2,791	4,814
Middle	10,580	12,057	22,637
Long	13,588	21,840	35,428
Total	26,191	36,688	62,879

(3) Calculation and evaluation

The EIRR of the total section is estimated at 14.0% which indicates a rate which justifies the project from the economic point of view as shown in Table 6.10. The EIRRs of each section are also shown in the same table. The flow of benefits and costs are illustrated in Figure 6.13.

The economic sensitivity of the plan is shown in Table 6.8 under the following assumptions.

1) Increase of the cost by 20%
2) Decrease of the benefit by 20%
3) Combination of 1) and 2)

Table 6.10 Economic Internal Rate of Return of Caribbean Costa Arriba Road Development Plan

Section	EIRR	NPV (Bl. 1,000)
Sabannita - Rio Alejandro	2.7%	-2,119
Rio Alejandro - La Escucha	15.3%	2,123
La Escucha - Portobelo Town	6.8%	-1,008
Portobelo Town - San Antonio	42.9%	7,012
San Antonio - Nombre de Dios	11.1%	-356
Nombre de Dios-Viento Frio	5.1%	-1,141
Viento Frio-Cuango	5.8%	-788
Total	14.0%	3,723

Note: Detailed calculation is shown in Appendix.

Table 6.11 Sensitivity Analysis of Caribbean Costa Arriba Road Development Plan

	EIRR	NPV
Base case	14.0%	3,723 Bl. million
Cost increase (20%)	11.5%	-977 Bl. million
Benefit decrease (20%	12.1%	114 Bl. million
Cost increase (20%) and Benefit decrease (20%	9.8%	-4,585 Bl. million

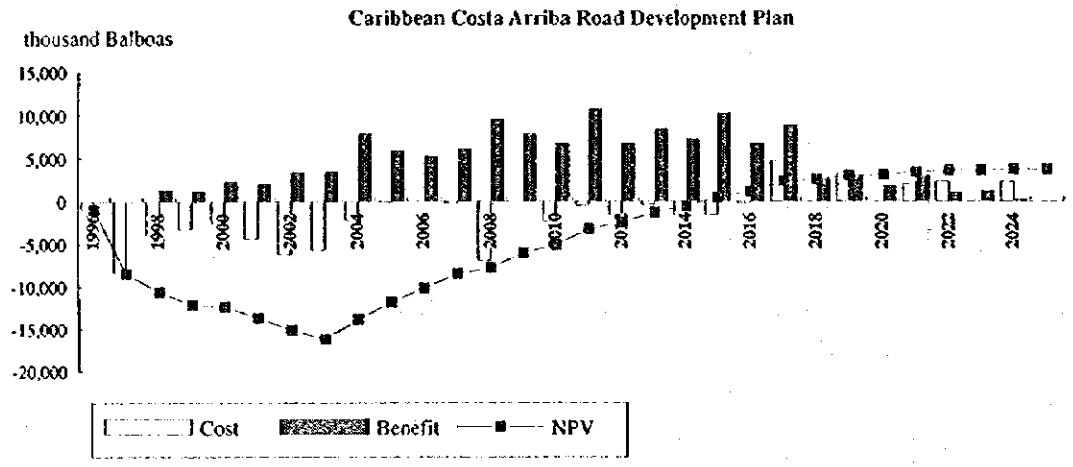


Figure 6.13 Benefit, Cost and Net Present Value Caribbean Costa Arriba Road Development Plan

6.7 Environmental Impact Study

6.7.1 Introduction

This development plan comprises the road development plan and related facilities which connects Sabanita, to Cuango through Portobelo Town on the existing road.

As a result of the preparation of the environmental impact examination, the following impacts are identified. Moreover, detailed screening of each component is examined as described in the following table.

Table 6.12 Screening of Environmental Impacts

	Social Environment									Natural Environment								Pollution					
	Relocation	Economic Activity	Public Facilities	Community Isoration	Cultural Heritages	Water & Other Rights	Health / Sanitary	Wastes	Disaster	Topography and Geology	Erosion	Subterranian Water	River Basin	Coast & Marine Area	Flora and Fauna	Meteorology	Landscape	Air Pollution	Water Quarity	Soil Contamination	Noise & Vibration	Ground Subsance	Offensive Odors
1) Sabanita - Rio Llano Sucio	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D
2) Rio Llano Sucio - Entrance of Portobelo	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D
3) Portobelo Town	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D
4) Portobelo - San Antonio	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D
5) San Antonio - Nomble de dios	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D
6) Nomble de dios - Viento Frio	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D
7) Viento Frio - Cuango	D	D	D	D	D	D	D	D	D	D	C	D	D	D	C	D	D	D	D	D	C	D	D

Note: A - Large or moderate impact, B - Slight impact, C- Uncertain, D - Nil or Negligible

6.7.2 Present Condition of Project Area

The development project consists of a road from Sabanita to Cuango through Portobelo town along the Caribbean Coast. Between the entrance to Portobelo town and La Guaira the alignment passes through Portobelo National Park designated by INRENARE.

Table 6.13 Present Condition of Project Area

Factor	Subject Item	Present Condition
(1) Geography	1) Topography 2) River system 3) Soil 4) Land Use	Elevation range is (3) to Mts. (50) from coastal area to mountain area.
(2) Flora	1) Terrestrial flora 2) Water flora 3) Vegetation 4) Endangered spaces	Secondary forest, pasture land and arable land are dominant in the area. Viento Frio: The vegetation in this zone is composed mainly of palms. Nombre de Dios: Strongly exploited vegetation conserving fruit trees with marked predominance of palms. Thickets, patches of vegetation and trees serve as habitats to certain groups of animals. Palenque: In this area, there is advanced plant deterioration.
(3) Fauna	1) Habitat area 2) Endangered species	Palenque: Two bird species, the blue head parrot and the orange-Chinned parakeets can be found here. Miramar: Certain marine bird species are typical in this area. Cuango: Frequently, flycatcher can be seen and the variable seedeater, another very common species on the roadsides and near thickets is the groove-billed ani. In the farmlands of Cfa Atlántica, examples of animals in this site are the species of endangered monkeys: Capuchin Monkeys, the Geoffroy's Tamarin and the Howler Monkey. Also, some species of endangered rodents are present. In the lagoon the south American Caiman can be found.

(4) Landscape	1) Location of viewing points 2) Contents	Hilly lands access to shore line. Existing road aligns along the Caribbean sea, including various scale of bays.
(5) Economic Activities	1) Chief Industry 2) Inhabitants	Mainly agriculture and fishing with small community
(6) Water Contamination	1) BOD / COD 2) SS 3) DO	No data
(7) Waste Matters	1) Existing Waste Matters 2) Occurrence point	Some garbage was observed nearby inhabited areas.
(8) Cultural / Historical Assets	1) Existing Cultural Assets 2) Scale and volume	From Nombre de Dios to Cuango, in Costa Arriba, twenty-one archaeological sites were registered that dated from the IV Period (.C.- 1520 D.C.) (Drolet 1979, 1980 to and b).

6.7.3 Environmental Impact Analysis

The Caribbean Costa Arriba Road Development comprises the following segments along the Caribbean coast from Sabanita to Cuango. Major environmental factors to be affected by the project implementation are identified.

Table 6.14 Environmental Impact Characteristics

Component Projects	Project Type	Project Site	Major Environmental Factors to be affected
1) Sabanita - Rio Llano Sucio	Road development (4.4 KM.x 26 Mts.)	Sabanita - Rio Llano Sucio	Topography, Flora, Fauna
2) Rio Llano Sucio - Entrance of Portobelo	Road Development (27.8 KM.x15 Mts.)	Rio Llano Sucio - Entrance of Portobelo	Topography, Flora, Fauna
3) Portobelo Town	Road Development (3 KM.x 15.5 Mts.)	Portobelo Town	Topography, Flora, Fauna, Relocation
4) Portobelo - San Antonio	Road Development (9 KM. x 15 Mts.)	Portobelo - San Antonio	Topography, Flora, Fauna
5) San Antonio - Nombre de Dios	Road Development (15 KM. x 15 Mts.)	San Antonio - Nombre de Dios	Topography, Flora, Fauna
6) Nombre de Dios - Viento Frio	Road Development (4.7 KM. x 14 Mts.)	Nombre de Dios - Viento Frio	Topography, Flora, Fauna
7) Viento Frio - Cuango	Road Development (13.9 KM. x 14 Mts.)	Viento Frio - Cuango	Topography, Flora, Fauna

6.7.4 Environmental Impact Prediction and Evaluation

As a result of the environmental impact study, the environmental impacts are predicted in association with project description and present environmental condition and then their evaluation is made.

In this project, no major impact is predicted because the proposed alignment is planned on the existing alignment. However general environmental case will be taken in order to avoid and mitigate any minor and unpredicted impacts.

Table 6.15 Environmental Impact Prediction and Evaluation

Component Projects	Environmental Impact Process	Evaluation
1) Sabanitas - Rio Llano Sucio	Between Maria Chiquita to Portobelo town alignment along the coast. In construction phase, slight impact in soil erosion is predicted. Alignment coincides with the existing on existing road so that no major impact is predicted.	Nil or negligible
2) Rio Llano Sucio - Entrance of Portobelo	Alignment coincides with the existing road so that no major impact is predicted.	Nil or negligible
3) Portobelo Town	Alignment coincides with the existing road so that no major impact is predicted.	Nil or negligible
4) Portobelo - San Antonio	Alignment coincides with the existing road so that no major impact is predicted.	Nil or negligible
5) San Antonio - Nombre de Dios	Alignment coincides with the existing road so that no major impact is predicted.	Nil or negligible
6) Nombre de Dios - Viento Frio	Alignment coincides with the existing road so that no major impact is predicted.	Nil or negligible
7) Viento Frio - Cuango	Alignment coincides with the existing road so that no major impact is predicted.	Nil or negligible

6.7.5 Environmental Countermeasure Examination

To achieve the development in consideration of environmental conservation, countermeasures, as a result of the series analysis, are examined and formulated for avoiding or mitigating environmental impacts.

In this road development plan, the proposed road alignment coincides with the existing road alignment and consequently no major impacts are predicted. However general environmental case will be applied to the plan.

1) Minimizing felling of trees and earth work, including landfill and land excavation, in order to avoid soil erosion. Stripped land should be covered by ground cover plants immediately.

2) Consideration should be given to precipitation in this area, a large amount is recorded annually so the construction season should be planned accordingly.

3) Moreover, design standards should take into account the high level of precipitation throughout the year. For example, the drainage system should have adequate capacity.

7. Maritime Triangle Development Project

7. Maritime Triangle Project

7.1 Planning Condition

(1) Purpose

Las Perlas has enormous potential for marine tourism resources such as clean sea, beautiful beach, fishing etc. with atmosphere for relaxing resort. However there is provided little infrastructure, in particular means of transportation.

The purpose of this proposed project is to meet a future increase in the number of tourists to Las Perlas, 451,000 by 2000 and 1,240,000 by 2010, and to meet rising tourist transportation needs as described below.

1) Of the foreign tourists who enter Panama via the Tocumen Airport, those whose main purpose is to see the Las Perlas Zone.
2) Of the foreign tourists who stay overnight in Las Perlas, those who go on day-trips to mainland Panama to visit the Metropolitan Zone, Farallón Zone and others.
3) Of the foreign tourists who stay overnight in mainland Panama, those who go on a day-trip to Las Perlas.
4) Of the domestic tourists who live on the mainland, those who stay overnight in Las Perlas.
5) Of the domestic tourists who live on the mainland, those who go on a day-trip to Las Perlas.

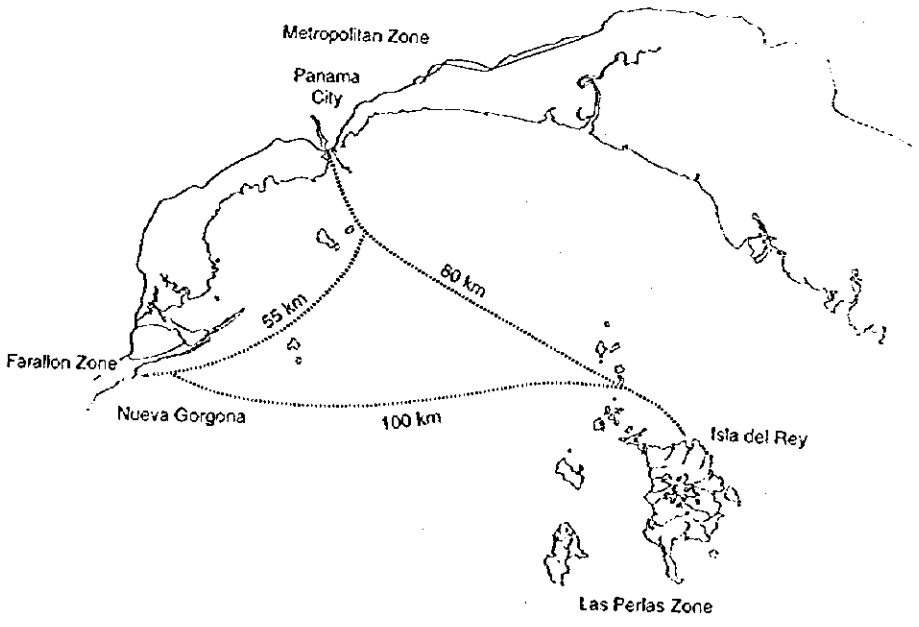


Figure 7.1 Location Map

Currently, there is only a regular air service between mainland Panama and Las Perlas Zone. In order to meet the increase in the number of visitors, it would be necessary to introduce a maritime mass-transportation system.

Also, the air trip between the mainland and Las Perlas Zone takes about 20 minutes one-way; therefore, it is desirable that a high-speed boat that can connect the two places in about an hour is introduced when launching the mainland-Las Perlas Zone boat service.

On the mainland, two access points will be set up: Panama City (Metropolitan Zone), and Nueva Gorgona (Farallón Zone). Currently, there is only one access route between the Metropolitan Zone and Farallón Zone -- that is, Route 1. It would take an hour and a half to two hours to drive one-way between the two; however, a high-speed boat can connect them in about 40 minutes. Thus, maritime transport is thought to have sufficient competitive edge over land transport.

As we have seen, the proposed project is to connect the Metropolitan Zone, Farallón Zone and Las Perlas Zone by a high-speed boat service. The access between mainland Panama and the Las Perlas Zone is expected to drastically improve when the service is launched, benefiting the residents of Las Perlas Zone. It is also expected to contribute to easing the traffic jam between Panama City and Farallón.

(2) Conditions of Proposed Service Areas

1) Population

The population of Panama City (Metropolitan Zone), Nueva Gorgona (Farallón Zone) and San Miguel (Isla del Rey, Las Perlas Zone) is shown below:

Table 7.1 Population of each city (1990)

City	Population
Panama City	413,505
Nueva Gorgona	992
San Miguel	970

Source: Censos Nacionales de Población y Vivienda (Dec.1991)

2) Tourism Resources

a. Metropolitan Zone

Urban-type as well as historical and natural tourism resources are plentiful in this zone, including Panama City, the Panama Canal, the Soberanía National Park and Gatún Lake.

b. Farallón Zone

Farallón has a beach that stretches for a distance of about 70 km, and is an area of second homes, mainly for residents of Panama city. Nearby are highland resorts such as El Valle and the Campana National Park.

c. Las Perlas Zone

This area is rich in island-type tourism resources such beaches, the ocean and aquatic life. However, other than the resort hotel at Isla Contadora, development has not yet been implemented.

Figure 7.2 Location of San Miguel in Isla Del Rey

3) Natural Conditions

At the Gulf of Panama, the range of the tide is about 6 m. This factor must be considered when designing port facilities.

Table 7.2 Tidal level (Pacific Ocean)

	High water level	Low water level	Range of tide
Port of Balboa	5.6 m	-0.6 m	6.2 m
Chame (Bahía de Chame)	5.6 m	-0.6 m	6.2 m
Isla del Rey	5.0 m	-0.7 m	5.7 m

Source: Tidal Table 1994 (U.S. Dep. of Commerce, National Oceanic and Atmospheric Administration National Ocean Service)

Considering wave conditions in the Gulf of Panama, about 93% of the waves are less than 6 feet high and the interval between consecutive waves is less than 9 seconds for about 81% of the waves.

Table 7.3 Annual Wave Statistics (Panama Bay:Percent Frequency of Wave Heights vs. Periods)

Height (feet)	<1	1-2	3-4	5-6	7	8-9	10-11	11<
Period (sec)								
< 6	8.9	24.9	20.2	5.5	1.0	0.3	0.1	
6 - 7	0.3	3.0	6.9	3.1	1.5	0.3	0.1	
8 - 9	0.1	0.8	1.7	1.6		0.3		
10 - 11		0.7	0.6	0.5	0.7	0.1		
12 - 13			0.7	0.3	0.1	0.0		
> 13		0.0		0.1	0.1	0.0		
Indeterm	8.6	2.0	1.5	0.5	0.1	0.1		
Total	17.9	31.3+	31.7+	11.7	3.7	1.1+	0.2	0.2+

0.0 ; Below 0.1 percent of the observations.
Source: Summary of Synoptic Meteorological Observations (SSMO) by the U.S. Navy

7.2 Development Framework

(1) Projected Number of Visitors

1) Projection of Total Number of Visitors

The following is a projection of the number of tourists to Las Perlas Zone.

Table 7.4 Number of Tourists to Las Perlas Zone

(1,000 persons)

Year	Foreign			Domestic			Total
	Inflow	Daytime	Sub-total	Inflow	Daytime	Sub-total	
2000	104	209	313	54	74	128	451
2005	303	464	767	81	124	205	972
2010	217	668	885	123	232	355	1,240

2) Projection for Number of High-speed Boat Passengers

a. Annual number of passengers
The number of passengers in a year is projected as given below based on the projection for the number of tourists to Las Perlas Zone:

• Metropolitan - Las Perlas

(Persons)

		2000	2005	2010
Metropolitan ↓ Las Perlas	Foreign	99,000	160,000	244,800
	Domestic	76,000	114,000	192,000
	Sub-total	175,000	274,000	436,800
Metropolitan ↑ Las Perlas	Foreign	0	0	100,000
	Domestic	0	0	0
	Sub-total	0	0	100,000
Total		175,000	274,000	536,800

• Farallón - Las Perlas

(Persons)

		2000	2005	2010
Farallón ↓ Las Perlas	Foreign	50,000	47,000	122,000
	Domestic	29,000	46,600	85,200
	Sub-total	79,000	93,600	207,200
Farallón ↑ Las Perlas	Foreign	50,000	71,000	92,000
	Domestic	0	0	0
	Sub-total	50,000	71,000	92,000
Total		129,000	164,600	299,200

• Metropolitan - Farallón

(Persons)

		2000	2005	2010
Metropolitan ↓ Farallón	Foreign	0	115,000	150,000
	Domestic	3,600	60,000	110,000
	Sub-total	3,600	175,000	260,000
Metropolitan ↑ Farallón	Foreign	0	140,000	200,000
	Domestic	1,500	25,000	45,000
	Sub-total	1,500	165,000	245,000
Total		5,100	340,000	505,000

b. Daily number of passengers
The number of passengers who would take the high-speed boat is estimated as below:

• **Daily Number of Passengers**

(Persons)

	2000	2005	2010
Metropolitan ↕ Las Perlas	480	750	1,470
Farallón ↕ Las Perlas	360	470	820
Metropolitan ↕ Farallón	0	930	1,380

(2) Type of Boat to be Operated

The main features of different types of candidate boats (hydrofoil, hovercraft and high-speed boat) to be operated are shown below:

Table 7.5 Principal Particulars of High Speed Boats

	Hydrofoil	Hovercraft	High-speed boat
Length	33.2 m	22.1 m	40.9 m
Breadth	12.8 m	10.9 m	10.8 m
Draft	1.70 + 2.80 m	-	1.3 m
Tonnage	302 G/T	51 G/T	275 G/T
Max. speed	40 Knots	50 Knots	30 Knots
Passenger	340 persons	100 persons	280 persons
Max. wave height	3.5 m	1.5 m	3.0 m
Cost (Balboa)	18.0 mill.	7.0 mill.	11.0 mill.
Cost /passenger (Balboa)	53,000	70,000	39,000

The comparison of characteristics of each high-speed boat is as follows.

1) Wave Resistance
As for wave condition in the Gulf of Panama, a hydrofoil or high-speed boat could operate about 98% of the time, and a hovercraft about 81% of the time.

2) Passenger Comfort
Hydrofoils have high stability against wave action because they cruise by lifting their hull above the sea and a high-speed boat has stability against waves because of its shape. Thus these boats are relatively comfortable for passengers.

Hovercrafts are affected by waves and wind, and much noise and high frequency vibration comes from their turbines.

3) Speed
The fastest craft is the hovercraft, the second fastest is the hydrofoil and the third is the high-speed boat.

4) Capacity

The hydrofoil has the highest capacity, the second highest is the high-speed boat and the third is the hovercraft.

5) Price

The most expensive craft is the hydrofoil, the second is the high-speed boat , the third is the hovercraft. But regarding the price per passenger, the most expensive craft is the hovercraft, the second is the hydrofoil and the third is the high-speed boat.

After comparing and considering the various features of different types of boats, we concluded that introduction of a hydrofoil is the most appropriate for the following reasons: high wave resistance, good passenger comfort, large capacity and short transport time.

Table 7.6 Comparison of Characteristics for each High-speed craft (comparative rating out of 5)

	Hydrofoil	Hovercraft	High-speed boat
Wave resistance	5	2	4
Passenger comfort	5	1	3
Speed	4	5	2
Passenger capacity	5	1	3
Boat price	1	5	3
Total	20	14	15

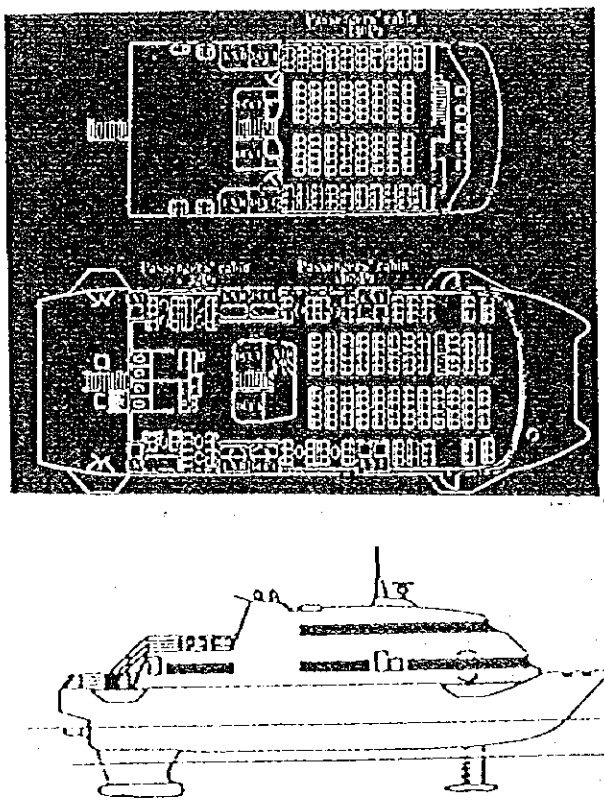


Figure. 7.3 Hydrofoil

7.3 Development Plan

(1) Port Facilities for Each Zone

The pier for a hydrofoil boat should be about 50 m long, the sea bed should be at -4 m or lower. Considerations for the location of the pier are as follows:

- It is better if the flow of passengers is separated from the flow of cargo for the safety of passengers. Therefore the pier should be used only for passengers.
- The facilities should be located near the center of the city for tourist convenience.
- Passenger terminal and car and bus parking areas are required nearby the pier.

1) Metropolitan

In Panama city, there are three options for the location of hydrofoil facilities; Rodman Base, Port of Balboa and Amador (refer Figure 7.4).

It is better to construct a new pier at Amador area according to the following comparison of the locations. Development plan in Amador is in procedure and it will take time to set the development content. Therefor the pier in Metropolitana Zone has been planned in Port of Balboa to meet the short term operation, however relocation to Amador with integration to resort and commercial facilities in future should be considered.

Table 7.7 Comparison of Possible Locations of Facilities for Hydrofoil Boats in Panama city (comparative rating out of 3)

	Returned facility (Rodman Base)	Existing facility (Port of Balboa)	New facility (Amador)
Construction cost	1	2	3
Flexibility	2	1	3
Formation of Complex	1	2	3
Coordination with other institutes	2	1	3
View	2	1	3
Traffic	1	3	2
Soil conditions	2	3	1
Total	11	13	18

2) Farallón

a. Location

In the Farallón Zone, Nueva Gorgona is suggested, because it will be the close to a large development area (Rio Chame area). (refer Figure 7.5)

The length of the pier should be about 300 m to get sufficient water depth (-4 m) .

b. Facility size

– Quay for high-speed boat	fixed pier 250 m x 10 m + flotation pier 50 m x 10 m
– Terminal building	400 m^2 (single-story)
– Parking lot:	Large-sized bus (60 m^2 per unit) x 5 units = 300 m^2
	Passenger cars (30 m^2 per unit) x 50 units = 1,500 m^2
Total	about 2,000 m^2

3) Las Perlas

a. Location

For the Las Perlas Zone, a location in Istela de Eulalio, in front of San Sebastían, about 6 km from San Miguel, is suggested for the pier.(refer Figure7.6)

The length of the pier should be about 100 m to get sufficient water depth (-4 m).

A connecting road is required between Isla del Rey and Istela de Eulalio through Isla Bernardino and Isla Perico.

b. Facility size

Pier for high-speed boat	fixed pier 100 m x 10 m + flotation pier 50 m x 10 m
Terminal building	400 m^2 (single-story)
Parking lot:	Large-sized bus (60 m^2 per unit) x 10 units = 600 m^2
	Passenger cars (30 m^2 per unit) x 20 units = 600 m^2
Total	about 1,200 m^2
Access roads:	2,000 m (Isleta Eulalio - Isla Perico - Isla Bernardino - San Sebastian)
	4,000 m - (San Sebastian - San Miguel)
Total	6,000 m

(2) Boat Operation Plans

The new hydrofoil service will shorten the travel time between Panama City, Isla del Rey and Nueva Gorgona. The time required is as follows.

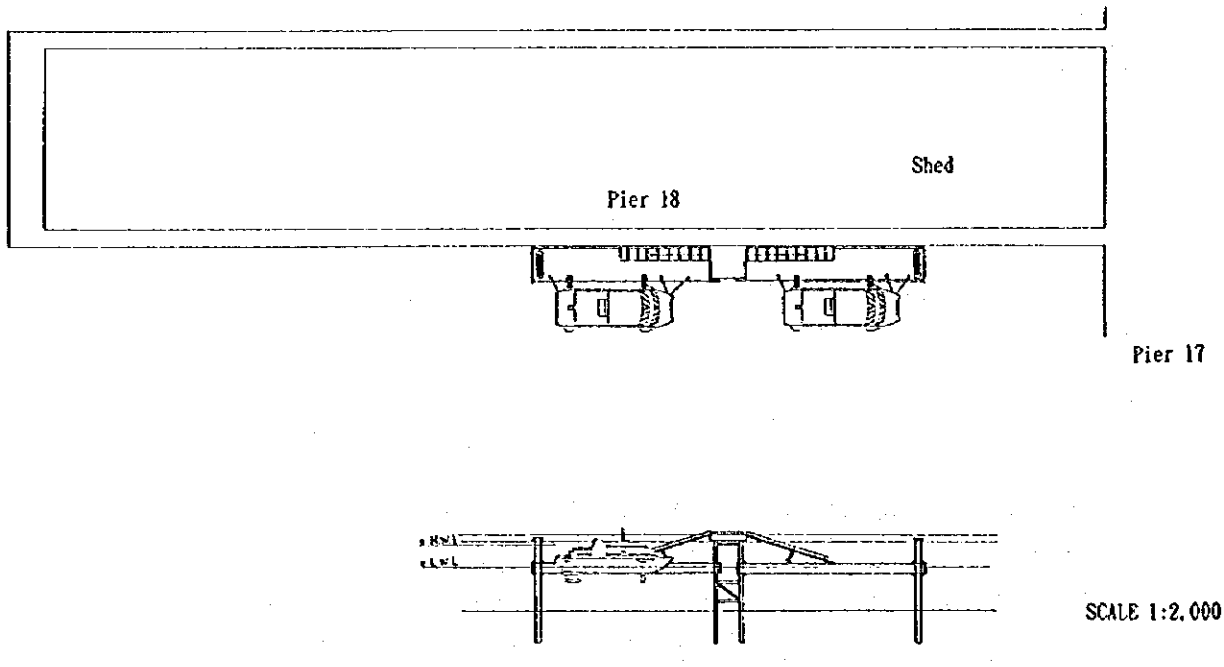


Figure 7.4 Location of port facility for hydrofoil at part of Balboa

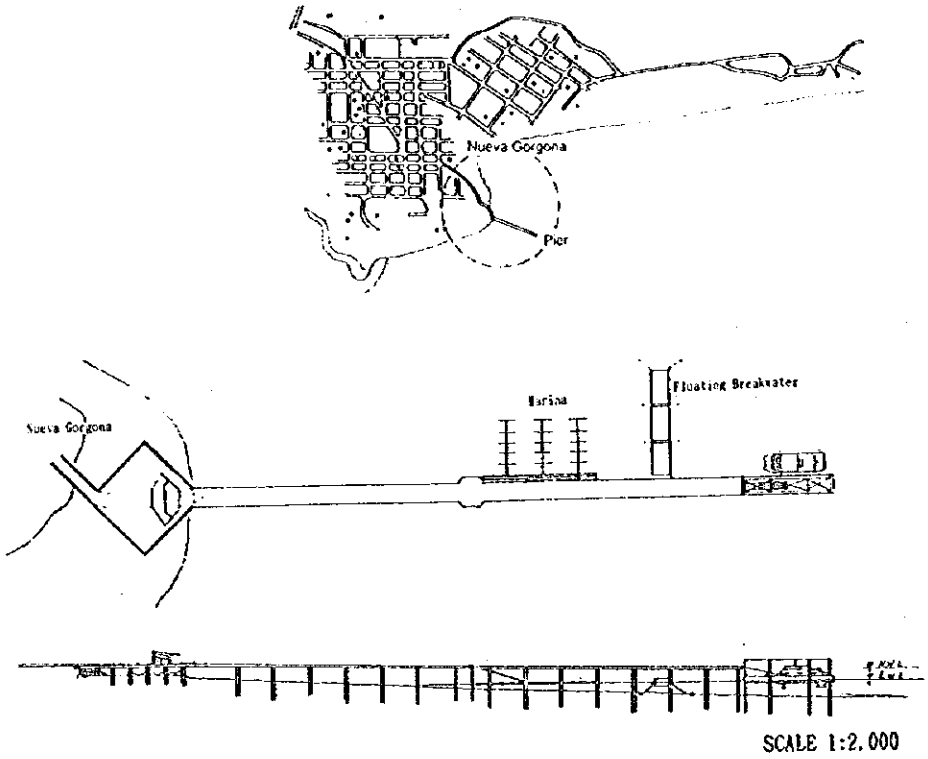


Figure 7.5 Location of port facility for hydrofoil at Nueva Gorgona

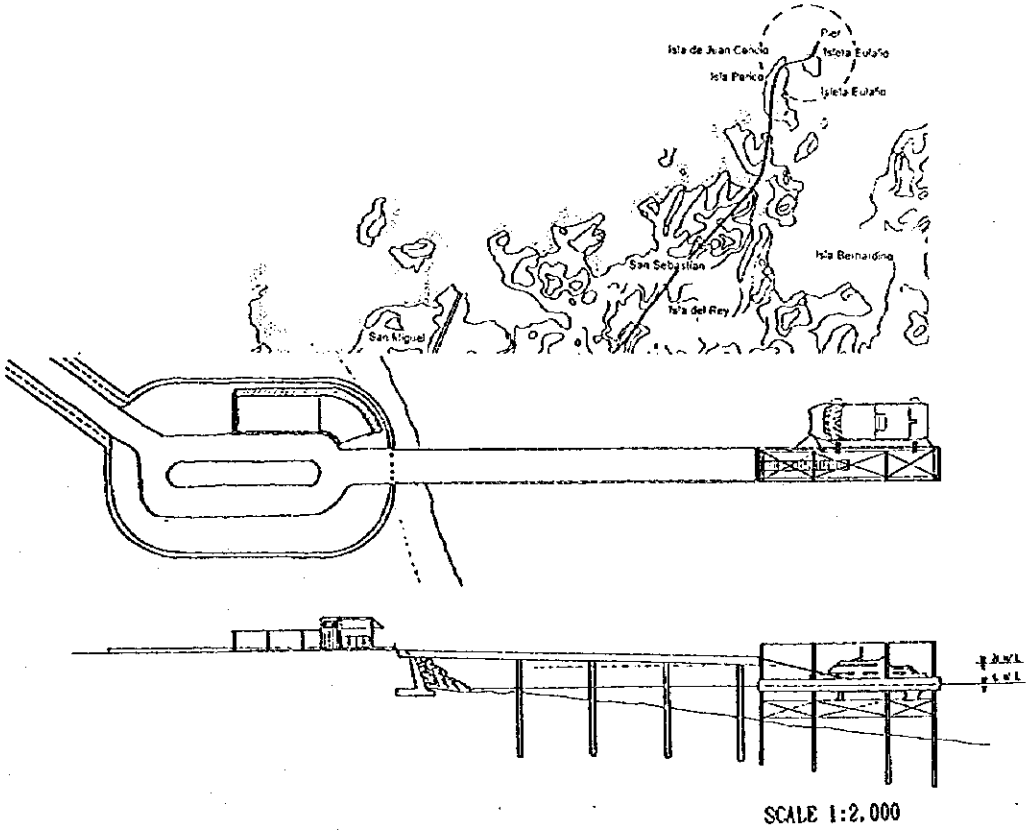


Figure 7.6 Location of port facility for hydrofoil at Isla del Rey

Table 7.8 Distance and Time Required

Cruise	Distance	Time required
Panama (Metropolitan) - Isla del Rey (Las Perlas)	80 km	about 1 hour
Panama (Metropolitan) - Nueva Gorgona (Farallón)	55 km	about 40 minutes
Isla del Rey (Las Perlas) - Nueva Gorgona (Farallón)	100 km	about 1 hour and 15 minutes

The number of passengers using of hydrofoil per day is projected as follows.

Table 7.9 The Number of Passengers using Hydrofoil per day

(Persons)

	2000	2005	2010
Metropolitan - Las Perlas	480	750	1,200
Las Perlas - Metropolitan	0	0	270
Farallón - Las Perlas	220	270	570
Las Perlas - Farallón	140	200	250
Metropolitan - Farallón	0	480	710
Farallón - Metropolitan	0	450	670

Assuming that the capacity of a hydrofoil is about 350 passengers, it is necessary to connect with each zone as follows, however it is assumed that tourists moving between Farallón and Las Perlas will use the Metropolitan - Las Perlas service from 2000 to 2004. In Metropolitan, Port of Balboa will be used temporarily until 2004 when the facility will be completed at Amador. Considering the estimated demand, it is necessary to introduce the first hydrofoil in 2000, the second in 2005, and the third in 2010.

Table 7.10 The Number of Hydrofoil Boat Services per day

(round trips)

	2000	2005	2010
Metropolitan - Las Perlas	3	3	4
Farallón - Las Perlas	-	2	3
Metropolitan - Farallón	-	3	4

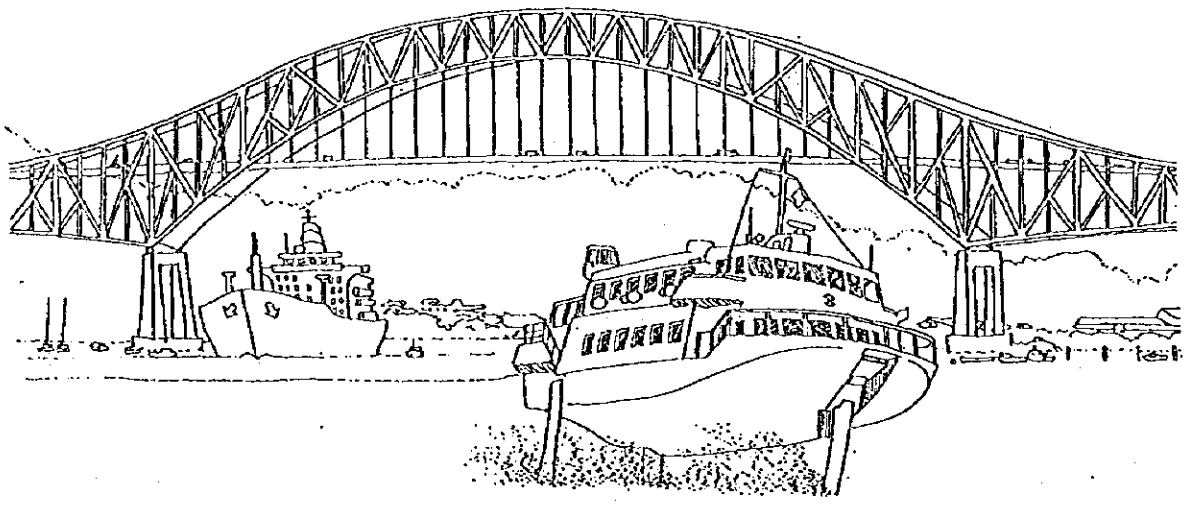


Image Sketch of Hidrofoil Boat

7.4 Cost Estimation

The results of cost estimation by facilities are shown in table 7.11. Total project cost reaches 68.1 million balboas of which 54.0 million balboas are for purchase of hydrofoils, and 2.3 million balboas are for access road to the port in Sam Miguel, parking and terminal. The remaining 2.6 million balboas are for constructing the piers for mooring boats.

7.5 Implementation Plan

(1) Implementation Schedule

This project can be divided into three stages which are preparation of facilities for operation of the service, commencement of operation of the service and adding new boats for the increased number of the passengers. The implementation schedule is planned so that construction of port facilities and access road at San Miguel are in short term and the facilities in Nueva Gorgona are constructed in the medium term.

Table 7.11 Project Cost of Maritime Triangle Project

No. Project Description	Unit	Qty.	Total Cost (B/1,000)	Cost Portion			Land & Compensation
				Foreing Currency	Local Currency		
6					Financial	Economic	
6.1 Pier			2,602	1,587	1,015	824	
1)Nueva Gorgona			1,691	1,031	660	535	
a fixed (250m x 10m)	sq.m	2,500	1,301	793	508	412	
b floating(50m x 10m)	sq.m	500	390	238	152	124	
2)Isleta Eulalio			911	555	355	288	
a fixed(100m x 10m)	sq.m	1,000	520	317	203	165	
b floating(50m x 10m)	sq.m	500	390	238	152	124	
6.2 Terminal			1,984	1,457	523	444	4
1)Nueva Gorgona	sq.m	400	994	729	261	222	4
2)Isleta Eulalio	sq.m	400	990	729	261	222	0
6.3 Parking			274	148	107	80	20
1)Nueva Gorgona	sq.m	2,000	171	88	63	47	20
2)Isleta Eulalio	sq.m	1,200	104	60	43	33	0
6.4 Access road			9,196	5,552	3,628	2,746	15
1)Isleta Eulalio(New)	m	6,000	9,196	5,552	3,628	2,746	15
6.5 Hydrofoil boat	boat	3	54,000	54,000			
Total Development Cost			68,056	62,744	5,273	4,093	39

Table 7.12 Implementation Schedule and Term Development Cost

No. Project Description	Short Term (US$'000)					Medium Term (US$'000)					Long Term (US$'000)				
6.0	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
6.1 Pier															
1) Nueva Gorgona															
a Fixed (250m x 10m)						---	****	****							
b Floating (50m x 10m)								---	****						
2) Isleta Eulalio															
a Fixed (100m x 10m)		---	****	****											
b Floating (50m x 10m)			---	****											
6.2 Terminal															
1) Nueva Gorgona							---	****	****					****	
2) Isleta Eulalio		---	****	****										****	
6.3 Parking															
1) Nueva Gorgona								---	****					****	
2) Isleta Eulalio			---	****					****						
6.4 Access Road															
1) Isleta Eulalio (New)	---	****	****			****	****	****							
6.5 Hydrofoil Boat		****		****			****		****			****		****	
Total Development Cost	933	9,417	2,645	11,729	0	1,507	9,266	2,334	11,563	0	0	7,200	0	11,452	0

Note: --- Land and engineering period
*** Construction Period

(2) Implementation Agency

The operation and maintenance of the Hydrofoil service will be undertaken by a private firm. Relevant port facilities are planned to be provided by the public sector.

(3) Investment Plan

Investment volumes by sectors by investment time are shown in table 711. The total investment is 68.1 million balboas of which 54.0 million balboas are for the private sector. Investment of the public sector is 18.1 million balboas for relevant port facilities.

(4) Promotion plan

1) Panama-Las Perlas

It is necessary to develop Las Perlas as a marine leisure mecca so that this will appeal to special interest markets. The target markets can be decided accordingly. Package tours including comfortable high speed transportation to Las Perlas must be provided to overseas markets. All-inclusive tours are also recommended. The domestic market should also be provided with package tours, mainly for young groups and families on weekends or holidays. Produce many kinds of programs for practicing sea sports. On the other hand, when receiving cruise passengers in Las Perlas, it is possible to interest them in sightseeing tours of the Metropolitan and Farallón areas for a half day or a full day. Therefore, it is necessary to get information about arriving cruise ships from travel agencies that are receiving cruise passengers, or alternatively to approach directly the cruise ship companies for selling tours while their passengers are on shore.

2) Panama-Farallón

It is also necessary to provide foreign visitors with package tours in which high speed transportation between Balboa and Nueva Gorgona is included. Setting up events in Farallón will be effective for inducing urban residents to visit Farallón. Stopping over at Taboga port for weekends and holidays is good for a short stay from Panama City. Prepare Panama City Sightseeing tours for foreign visitors combined with marine transportation from Nueva Gorgona. It is convenient for customers to be met and picked up by tour bus on arrival at Balboa.

3) Las Perlas-Farallón

It is necessary to take notice of the difference in character between Las Perlas and Farallón. Las Perlas, in short, is going to be developed as a resort surrounded by beautiful islands equipped for many kinds of marine leisure activities for long stay vacationers coming from North America and Europe. On the other hand, Farallón will be a coastal resort characterized by amenities on the ground, and will be also for long stay vacationers coming from North America and Europe. It is recommended that travel agencies produce tours which take these characteristics into account and sell them to tourists in each area.

7.6 Project Evaluation

7.6.1 Financial Evaluation

The financial viability of the Maritime Triangle Development Plan has been examined for the period up to 2020 through the following procedure:

1) To estimate the cost of the Maritime Triangle Development Plan including the operation and maintenance cost by financial price
2) To estimate the rates of passenger fees and calculate the revenue based on the passenger demand
3) To formulate a cash-flow and evaluate the financial viability of the Maritime Triangle Development Plan, and
4) To examine the financial viability of the National Port Authority and a private company for boat operation

(1) Cost

Table 7.13 shows the investment cost of the Maritime Triangle Development Plan.

Table 7.13 Investment Cost of Maritime Triangle Development Plan

Unit: B/. 1,000

Development body	Short	Medium	Long	Total	%
Land	39			39	0%
National Port Authority	6,686	6,669	662	14,017	21%
Private	18,000	18,000	18,000	54,000	79%
Total	24,725	24,669	18,662	68,056	100%
	(36%)	(36%)	(27%)	(100%)	

The operation and maintenance costs have been estimated for the following items as shown in Table 7.14:

1) Maintenance cost for infrastructure and facilities which is estimated at 5% of the development costs
2) Operation and maintenance cost for Hydrofoil boat such as fuel, parts and instrument, salary for crews and training cost
3) Operating cost of Panama, Farallón and Las Perlas offices

Table 7.14 Operation and Maintenance Cost of Maritime Triangle Development Plan

Unit; B/. 1,000

	Maintenance cost of iinfrastructure	Maintenance cost of boat					Operating cost				Total cost
		Fuel	Maint. Fee	Crew	Training Fee	Total	Panama	Las Perlas	Farallon	Total	
Short	1,157	792	1,800	156	875	3,623	378	110	0	488	5,268
Middle	2,888	5,149	7,650	936	275	14,010	945	550	110	1,605	18,503
Long	3,405	10,675	16,650	1,716	275	29,316	945	550	550	2,045	34,766
Total	7,450	16,616	26,100	2,808	1,425	46,949	2,268	1,210	660	4,138	58,537

(2) Revenue

A fare of 20.0 Balboas has been estimated to be collected from every passenger boarding a Hydrofoil for each of the three routes. The rate has been estimated considering the relative competitiveness of the Boat to other transport means on the same routes. In the evaluation the occupancy rate has been estimated at 70%. Table 7.15 shows the number of passengers and the revenue from passenger fares.

Table 7.15 Number of Passengers and Revenue of Passenger Fee Maritime Triangle Development Plan

	Number of passengers((oppupancy:70%) (Unit:passengers)				Revenue (Bl. 20.0 /passenger) (Unit:Bl. 1,000)			
	Panama - Las Perlas	Farallon - Las Perlas	Panama - Farallon	Total	Panama - Las Perlas	Farallon - Las Perlas	Panama - Farallon	Total
Short	299	0	0	299	5,984	0	0	5,984
Middle	1,817	230	476	2,524	36,348	4,609	9,520	50,477
Long	2,898	1,721	3,073	7,692	57,957	34,420	61,460	153,838
Total	5,014	1,951	3,549	10,515	100,289	39,029	70,980	210,298

(3) Financial Evaluation

1) Financial Evaluation of the Plan

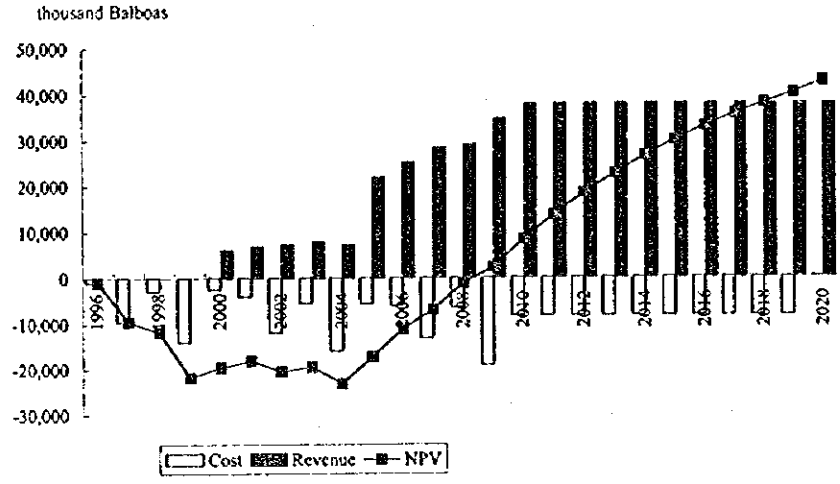
The FIRR and NPV of Maritime Triangle Development Plan have been estimated at 22.2% and 42,479 Balboas by using a discount rate of 12% during the project period from 1996 to 2020 as shown in Table 7.14. The cash flow and the NPV of the Plan are shown in Figure 7.6

Table 7.16 Cash-flow and Results of Financial Evaluation of Maritime Triangle Development Plan Unit: B/. 1,000

Term	Investment Cost				Operating & maintenance cost			Total Passenger revenue	Net profit
	Land	Infrastructure development	Hydrofoil boat	Total	Infra-structure	Boat	Total		
Short	39	6,686	18,000	24,725	1,157	4,111	5,268	5,984	-24,009
Middle	0	6,669	18,000	24,669	2,888	15,615	18,503	50,477	7,304
long	0	662	18,000	18,662	3,405	31,361	34,766	153,838	100,409
2001-2020	0	0	-8,460	-8,460	7,009	76,780	83,789	375,480	300,151
Financial Internal Rate of Return (FIRR)					22.2%				
Net Present Value (NPV) discounted by 12%					42,479 thousand Balboas				

The sensitivity of the project has been examined under the following assumptions:

1) To reduce the rate of passenger fares to 15 Balboas per passenger
2) To reduce the occupancy rate to 65%
3) To increase the investment cost by 10%
4) Combination of 1), 2) and 3)



Note: NPV is calculated by using a discount rate of 12%

Figure 7.7 Estimated Cash-flow and NPV (1996-2020), Maritime Triangle Development Plan

Table 7.17 Results of Sensitivity Analysis, Maritime Triangle Development Plan

	FIRR	NPV
Base case	22.2%	42,479 thousand Balboas
1) Rate of fee' 15 Balboas	16.3%	15,494 thousand Balboas
2) Occupancy rate' 65%	20.7%	34,769 thousand Balboas
3) Cost increase (10%):	20.8%	38,518 thousand Balboas
4) Combination of 1), 2) and 3)	13.6%	5,750 thousand Balboas

2) Financial Evaluation of NPA and Boat Operating Company

The financial condition of the National Port Authority and the private boat operating company is examined under the following assumptions:

1) The NPA will develop the related infrastructure and facilities and maintain them.
2) Private boat operating company uses the facility. Mooring fee is estimated at 400 Balboas per mooring.

Table 7.18 shows number of moorings per day in each port and the annual revenue for the National Port Authority. The revenue is estimated at 876 thousand Balboas, 2,336 thousand Balboas and 3,212 Balboas for the periods 2000 - 2004, 2005 - 2009 and 2010 - 2020, respectively.

Based on the revenue of NPA (and the costs of boat company), the FIRR and NPV of NPA and boat operating company has been estimated as shown in Table 7.19. The sensitivity due to a change in the mooring rate has also been examined for the case of a rate of 500 Balboas per mooring.

Table 7.18 Number Mooring and Mooring Fee

unit: B/. 1,000

Year	Number of moorings/day				Revenue
	Panama - Las Perlas	Farallón - Las Perlas	Panama - Farallón	Total	per year (B/..400/mooring)
2000 - 2004	6			6	876
2005 - 2009	6	4	6	16	2,336
2010 - 2020	8	6	8	22	3,212

Table 7.19 Results of Evaluation, Maritime Triangle Development Plan

Mooring fee	FIRR	
	Base case 400 Balboas	Increase of fee 500 Balboas
National Port Authority	8.4%	11.6%
Boat operating company	26.3%	25.6%

Note: Detailed is shown in Appendix

7.7 Environmental Impact Study (Maritime Triangle Development)

7.7.1 Introduction

The Maritime Triangle Development involves ports and related facilities including access road development projects located in Metropolitana, Farallón and Las Perlas zone.

As a result of the preparation of environmental impact examination, the following impacts are identified. Moreover detail screening of each component is examined as described in the following table.

Table 7.20 Screening of Environmental Impacts

	Social Environment									Natural Environment								Pollution					
	Relocation	Economic Activity	Public Facilities	Community Isolation	Cultural Heritages	Water & Other Rights	Health / Sanitary	Wastes	Disaster	Topography and Geology	Erosion	Subterranian Water	River Basin	Coast & Marine Area	Flora and Fauna	Meteorology	Landscape	Air Pollution	Water Quality	Soil Contamination	Noise & Vibration	Ground Subsidence	Offensive Odors
1) Port Development - Nueva Gorgona	D	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
2) Port Development -San Miguel	D	C	D	D	D	D	D	D	D	D	D	D	D	C	D	D	D	D	D	D	D	D	D
3) Access Road Development - San Miguel	D	C	D	D	D	D	D	D	D	D	D	D	D	C	D	D	D	D	D	D	D	D	D
4) Hydrofoil boad	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	C	D	D	D	D

Note: A - Large or moderate impact, B - Slight impact, C- Uncertain, D - Nil or Negligible

7.7.2 Present Condition of Project Area

The subject project area comprises 3 zones of Metropolitana, Farallón and Las Perlas. Description of the present condition in San Miguel can be found in the Las Perlas Zone of part II and others are described as follows:

Noteworthy aspects:

1) There is a wide tidal range in this area and strong waves in the north and northeastern sectors caused by dominant winds during the dry season in Isla del Rey,
2) The main industry is being carried out in San Miguel which is the location proposed for access road and pier development.
3) Coastal erosion is caused in the proposed pier area of Nueva Gorgona.

Table 7.21 Present Condition of Project Area

Factors	Subject Item	Present Condition
(1) Geography	1) Topography 2) River system 3) Soil 4) Land Use	Wide range tide system in Pacific side and during the dry season. In Isla del Rey, there are strong waves in the north and northeastern sectors caused by the dominant winds in this time. In the northeast of San Miguel there is a group of islands and important geographical features (bays and points). Worth mentioning are Eulalio islet, Perico Island, and the points of Ostión, Mala and Hueca. Maximum depth of the sea between these islets and islands is of, approximately, 6 meters. The bottom is rocky and on the coasts there are small sandy beaches.
(2) Flora	1) Terrestrial flora 2) Water flora 3) Vegetation 4) Endangered spices	.The vegetation in most of these islets and islands is secondary forest and that belonging to the association of shrubs and fallow, predominantly *Guazuma ulmifolia*. The presence of Rhizophora mangle on the coastal borders is typical of the coastal area, abundant examples of *Cecropia peltata*, *Cochlosperum vitifolium*, *Hibiscus sp.*, *Bombacopsis quinata*, *Bursera simaroubq* and cacti vegetation on the rocks and cliffs.
(3) Fauna	1) Habitat area of fauna 2) Endangered species	Abundant bird life with pelicans, frigate birds. A nesting site of marine birds is observed on the small islands.
(4) Landscape	1) Location of view points 2) Landscape	Natural landscape consisting of several islets covered by secondary forest is observed in this area.
(5) Economic Activities	1) Chief Industry 2) Inhabitants	San Miguel: There is no evidence of human settlements or agricultural farms in the study area. Fishing is the chief industry that artisan fisheries have practiced in the subject area and influence zone (snapper, corvina, octopus, two species of conch, oysters, crabs, lobsters, etc.,). The bottoms are rocky and covered by bioclasts and mud.
(6) Water Contamination	1) BOD / COD 2) SS	The discharge of domestic waste water, crude or insufficiently treated, the deposit of solid residuals to open air areas and burning seem to be the main sources of environmental deterioration in the zone.
(7) Waste Matters	1) Waste type 2) Points	At several sites of San Miguel town there are solid residual deposits affecting small bodies of water that cross the town and the mangrove channels, with the deposit of garbage in the coastal zone.
(8) Cultural and Historical Assets	1) Existing Assets 2) Scale and volume	At the mouth of Río Ostión there is reference to pre Hispanic shellmounds (Evaristo Villarreal, pers. comm .)

7.7.3 Environmental Impact Analysis

The maritime triangle Development comprises the following component development projects. From the standpoint of the construction and operational phase, the following impacts have been identified.

Table 7.22 Environment Impact Characteristics

Supporting Projects	Project Type /	Project Site	Negative Impact Potential
1) Port Facility Development-Metropolitana	Nil	Balboa	Nil
2) Port Facility Development-Farallón	Pier (300 x 10 Mts.), terminal (400 Sqm.), Parking (2,000 Sqm)	Nueva Gorgona	Coastal erosion
3) Port facility development - Las Perlas	Pier (150 x 10 Mts.), terminal (400 Sqm.), Parking (1,200 Sqm), access road (6 km.)	San Miguel (Isla Bernardino - Isla San Pablo - Istela de Eulalio)	Erosion, Flora, Fauna
4) Hydrofoil boat	Hydrofoil boat (340 passengers)	Balboa, Nueva Gorgona, San Miguel	Nil

7.7.4 Environmental Impact Prediction and Evaluation

As a result of the environmental impact analysis, identified environmental impacts are processed in consideration of the construction and operating phase, and scale and type when the projects are carried out. Principle impacts are described while any other small impacts are predicted in this examination. Consequently, no major impact is predicted in the three subject areas.

Table 7.23 Environmental Impact Prediction and Evaluation

Component projects	Environment Impact Prediction	Evaluation
1) Port Facility Development-Metropolitana	Existing facilities of Balboa port are utilized for the operation. No major impact is predicted	Nil or Negligible
2) Port Facility Development-Farallón	Proposed pier site is in front of Nueva Gorgona and there is an existing landing point for fishing vessels. Piles are used for pier constructure so that current condition will not be changed. No major impact is predicted.	Nil or Negligible
3) Port facility development - Las Perlas	New pier and access road are proposed in Isla Eulalio close to San Miguel. Access road between islands is reclaimed with rockfill and formed in the same way as the naturual coast. Once in construction phase fauna will be decreased however it will be recovered soon.	No major impact is predicted.
4) Hydrofoil boat	New type of engine: intake water and exhaust the water with high speed of propel. No major impact is predicted	Nil or Negligible.

7.7.5 Environmental Countermeasure

No major impact is predicted, however, general environmental care will be carried out in consideration of avoiding and mitigating unidentified impacts. Moreover the following minor aspects are taken into account at the detail design stage as the plan makes further progress.

1) There is wide range of tide in Isla del Rey and Nueva Gorgona. During the dry season, there are strong waves in the north and northeastern sectors caused by the dominant winds in Isla del Rey. This meteorological condition is to be considered in the detail design phase.

2) Fishing is the chief industry in the San Miguel area and is carried out in the area of the access road and pier development. Temporary compensation of the project should be considered during the construction phase.

3) In Nueva Gorgona, the landing point for fisherman is next to subject area for pier development. Arrangements for joint of the area should be made in advance. Moreover coastal erosion will be caused in this area so that conservation of the coastline should be taken into account in the detail design phase.

8. Conclusion and Recommendation of Project Feasibility Study

8. Conclusion and Recommendations of Project Feasibility Study

Evaluation was made on the six priority projects as the pilot and leading projects for a long-term tourism development and obtained the result that all these projects are feasible.

Therefore, the execution of these six projects is proposed based on this result and particularly the early execution of the following integrated tourism development projects is desirable.

- Chame Resort Development (248 millions Balboas)
- Panama Canal Tourism Development (240 millions Balboas)
- Portobelo Tourism Development (130 millions Balboas)

(1) Early Commencement of Implementation of Six Priority Projects

The Chame resort development, Panama Canal tourism development and Portobelo tourism development are comprehensive tourism development projects and have relatively high economic internal rates of return (19.0%, 16.6% and 36.9%, respectively), so that their implementation is recommended in the sense of the national economy. In the case where a new implementation organization such as the Tourism Development Corporation invests and manages the project, for example by buying raw land, developing necessary infrastructure and facilities and leasing the developed land and facilities to tourism industries, the financial analysis also results in sufficiently high financial internal rates of return (16.6%, 12.9% and 15.9%, respectively).

Within these three projects, the Panama canal tourism development should be given development priority considering the tourism resources of the canal zone, the land ownership and the well developed infrastructure which already exists.

1) Flower and Green City Plan (33 millions Balboas)
The Flower and green city project, has great social benefits, so early implementation by the local government is recommended.

- Beautification of city environment as the main gateway of Panama
- Volunteer citizens will assist in the creation of a city for tourists
- Realization of a clean, attractive and safe city for tourists

2) Caribbean Costa Arriba Road Development (43 million Balboas)
Improvement of the Caribbean Costa Arriba road is recommended for tourism development and local development in the Caribbean coastal region. It has a sufficiently high economic internal rate of return (14%) with road maintenance cost savings and vehicle operating cost savings.

3) Maritime Triangle Development (68 million Balboas)
The maritime circuit development project has a high financial rate return (22.2%), even if operated by private enterprise. However, for realization of the project, coordination is necessary between the initial investment and the development schedule of Las Perlas zone and also the port development schedule.

(2) Next Steps to be Taken

1) Development orientation for rest peripheral areas of six study zones

Within the three survey sites, Coiba has high development potential, however it does not have basic infrastructure especially transport access. Therefore a development and conservation plan should be conducted for determination of future tourism development zones.

Development of Escudo de Veraguas Island is included in Bastimentos zone development. In Horconcitos, beaches and fishing bases will be developed for local residents of the area.

Since San Blas and Darién have unique and precious tourism resources, they should be developed slowly with careful consideration given to environmental conservation.

2) Adjustment and up-dating of the plans

The number of visitors to Panama will be highly affected by economic and other factors in the countries from which the majority of visitors are expected to come, including USA, and European countries.

Therefore, it is important to observe and analyze the conditions and factors in such countries which influence tourist behavior, and frequently adjust and up-date the development plans to make them most effective given the limited budget for capital investment and promotion.

For adjustment and up-dating of the development plans, the necessary information should be systematically collected and analyzed.

3) Further Related Studies

More detailed studies on the priority projects should be conducted to finalize the details for implementation of these projects.

Since institutional and organizational reform was recommended, studies on their strengthening, such as the tourist information center system, should be prepared.

It is recommended that feasibility studies for important projects in areas other than the priority zones, such as Bastimentos and Las Perlas zones, be carried out progressively.

APPENDIX

Appendix 1

Abbreviation

Abbreviation	*Spanish*	*English*
APN	Autoridad Portuaria	National Port Authority
ARI	Autoridad de la Región Interoceánica	Interoceanic Region Authorithy
CONAMA	Comisión Nacional de Medio Ambiente	National Commision of Environment
DAC	Dirección de Aeronáutica Civil	Authority of Civil Aviation
DIMA	Dirección Metropolitana de Aseo	Direction of Metropolitan Cleanliness
IDAAN	Instituto de Acueductos y Alcantarillado Nacional	National Institute of Aqueduct and Drainage
INAC	Instituto Nacional de Cultura	National Institute of Culture
INRENARE	Instituto Nacional de Recursos Naturales Renovables	National Institute of Renewable Natural Resources
INTEL	Instituto Nacional de Telecomunicación	National Institute of Telecommunication
IPAT	Instituto Panameño de Turismo	Panamanian Institute of Tourism
IRHE	Instituto de Recursos Hidráulicos y Electrificación	Institute of Hydraulic and Electrification Resources
JICA	Agencia de Cooperación Internacional del Japón	Japan International Cooperation Agency
MICI	Ministerio de Comercio e Industrias	Ministry of Commerce and Industries
MIDA	Ministerio de Desarrollo Agropecuario	Ministry of Agricultural Development
MINGO	Ministerio de Gobierno	Ministry of Government Adminstration
MIPPE	Ministerio de Planificación y Política Económica	Ministry of Planning and Economic Policy
MIVI	Ministerio de Vivienda	Ministry of Housing
MOP	Ministerio de Obras Públicas	Ministry of Public Works
OEA	Organización de Estados Americanos	American States Organization
PCC	Comisión del Canal de Panamá	Panama Canal Commission
STRI	Instituto Smithsoniano de Investigaciones Tropicales	Smithsonian Tropical Research Institute
USAID	Agencia de Desarrollo Internacional de Estados Unidos.	United States Agency for International Development

Appendix 2 List of Tables and Figures

Sources of data are described below the table and figure while no description of the source is prepared by the JICA Study team.

Part I

Chapter 1

Part II

Chapter I

Chapter 3

Chapter 3

Chapter 6

Chapter 7