

1.3 Feasibility Study Method

1.3.1 General Planning Conditions

Infrastructure is a Tourism resource and is a basic requirement for every aspect of development. Its development is mostly provided by the government sector with their standards which will be related to tourism development. For infrastructure development planning, the following methods for water supply, sewerage and solid waste are applied in each study area.

(1) Water Supply

Dams or surface water and wells for underground water are considered for water sources in general. Construction of dams and water purification facilities will entail large costs which could be a burden on the initial investment but will be advantageous for wider regional comprehensive development. For this limited tourism development, wells will be adopted from the view-points of simple filtration facilities, low cost and flexibility to cope with increases in water demand.

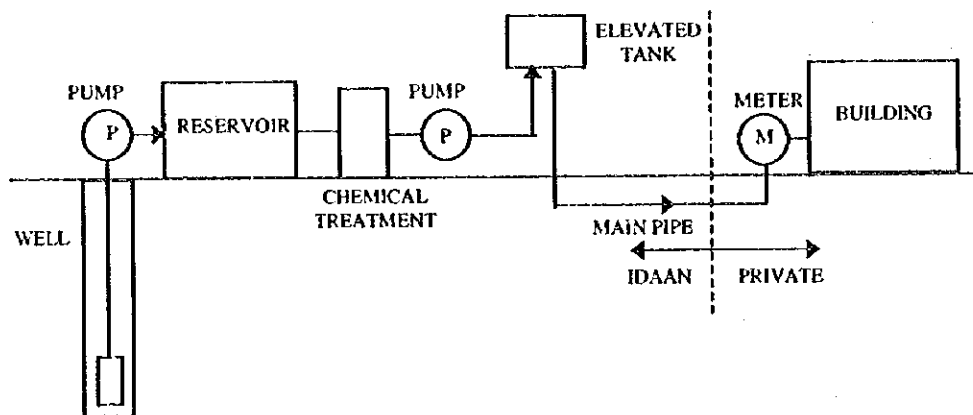


Figure 1.2 Water Supply System

(2) Sewerage

Construction of a sewage collection and treatment system will require a large initial investment. Even Panama city does not yet have a sewage treatment system. However a clean environment is an essential for a resort and sewage must be treated before discharge. Simple septic tanks will not be sufficient for proper treatment but sewage treatment tanks 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 with public technical and financial support. The amount of sewage will nearly equal that of water supply and the sewage treatment tank will be designed to hold a quantity of 4 days supply for treatment. The treated water will be discharged into the combined system under the roads leading to the sea.

(3) Solid Waste

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 road will connect the site to an existing road. Garages for collection trucks and bulldozers, and offices for administration and workers will be provided.

The operation will be done by the local administration and fees will be collected according to discharged waste.

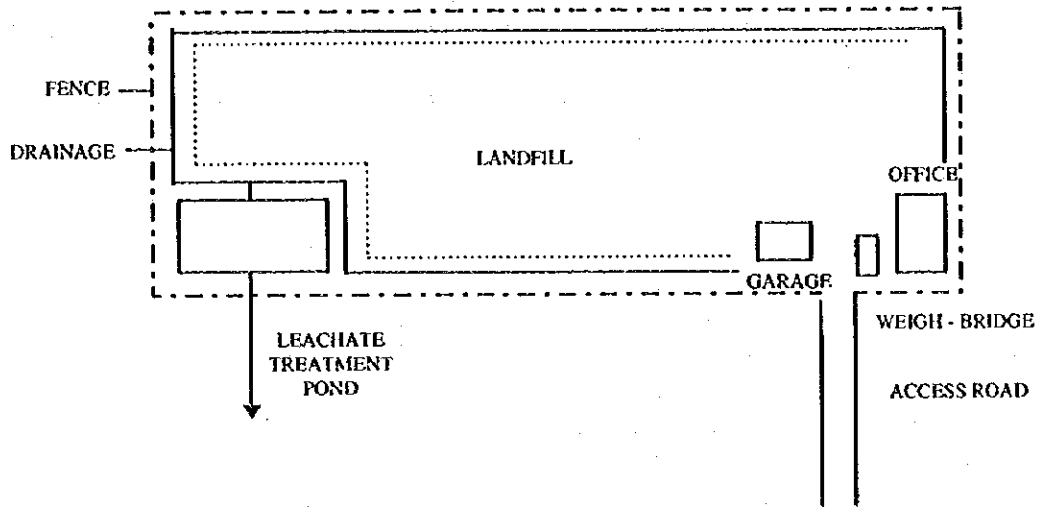


Figure 1.3 Schematic Plan of Sanitary Landfill Site

The treatment flow of the sewage treatment tank is shown below:

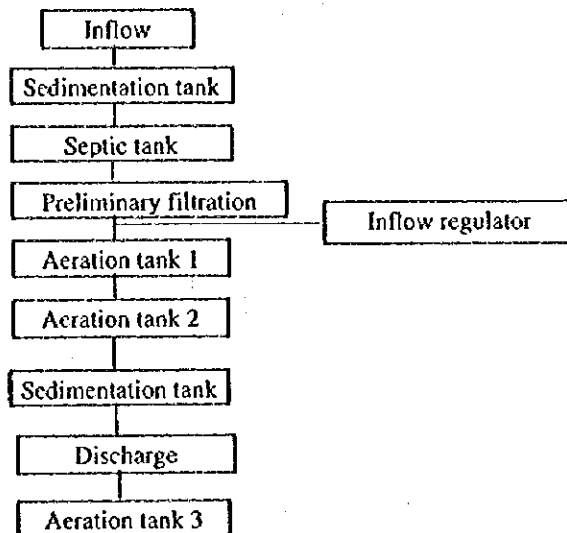


Figure 1.4 Treatment Flow of Sewage Treatment Tank

Sanitary landfill site with necessary facilities and equipment such as office, garage (bulldozers), drainage, leachate treatment pond, access road, fence and gate, vegetation, should be constructed.

1.3.2 Cost Estimation Method

The feasibility study projects consist of development projects such as accommodation, transportation, tourist facilities, public utilities, etc., also facilities such as roads ,parking areas, toilet, pool, yacht harbor, etc.

The construction cost per unit for each of these facilities was calculated as follows. For the construction cost of hotels the applicable costs for high-grade, middle-grade and standard hotels are 100,000, 80,000 and 40,000 Balboas per room respectively. These figures were obtained from private developers and construction firms. The division between the foreign and local portions was established by reference to existing estimates.

Architectural structures such as a cafe terrace are estimated by referring to an existing unit cost. The costs of civil engineering structures or works such as roads, bridges, parking areas, piers, landscaping and site preparation are estimated using representative construction costs following generally used estimation methods. Each construction cost item (e.g. earthwork, pavement, foundation etc.), consisting of materials, machinery, and labor cost components, are calculated as the product of unit price and quantity. The total of these items becomes the direct construction cost. Then added to the direct cost are the indirect costs, consisting of temporary facilities, field office maintenance costs, overheads and engineering services, the each prorated to individual direct cost items. The total development project cost consists of total construction cost and the land acquisition cost (including compensation).

The land acquisition costs are established referring to market prices. The costs, disregarding price escalation and price contingency for each component, were estimated based on February 1995 costs.

1.3.3 Implementation Plan

(1) Implementation Schedule

Based on tourist demand, a schedule for completion of accommodation is established. Prior to hotel construction, land preparation has to be completed. Before the hotel accommodation is opened, public utilities have to be constructed completely. Moreover, relevant tourist facilities must be made ready for use following the increase in the number of tourists.

(2) Implementation Body

After the areas to be developed preferentially have been selected and the planing priorities decided, implementation becomes important.

In order to realize the projects, a principal enterprise responsible for promote the projects is necessary. The Tourism Development Corporation (TDC) was proposed for this work as mentioned previously.

Moreover, the preparation of infrastructure around the project sites should be executed by the respective departments of the ministry or the provincial office according to the nature of the works to be done.

The main activities of the TDC are itemized as follows:

During preparation and construction.

- To acquire land necessary for the project
- To develop and/ or improve infrastructure for access roads and utilities in the area.
- To construct amenity facilities except those profit oriented components.
- To construct public facilities such as museums and symbolic structures such as observation towers and ecological research institutions.
- To initiate activities to induce investment from the private sector according to the development frame work.

After construction

- To lease the land prepared for investors such as hotels, etc. .
- To rent profitable facility buildings to private enterprise.
- To maintain and administer project sites including establishment of public sector projects.

Organization of TDC: a company to be organized as a joint venture between the government and private sectors proposed by JICA Study Team

Funding of TDC: Capital Investment by government and private sectors and loans from local and foreign banking institutions.

Tourism development areas : Areas that include projects proposed by the JICA Study Team. After the areas to be developed preferentially have been selected and the plans to be realized for each priority area decided, the realization becomes important.

(3) Implementation Plan

The responsibilities of the implementation bodies of each development project can be divided into three steps which are land purchase and landscaping for facilities , construction, and operation and maintenance.

The area of the feasibility study is defined at the initial stage of the plan . The designated area for tourism development is controlled by land utilization regulations. The Tourism Development Corporation (TDC) is responsible for development promotion of all feasibility study area except for golf courses. Public utilities are prepared by the TDC in cooperation relevant institutions and operation and maintenance is carried out by each relevant institution.

The construction and maintenance of road and cruiser ship piers is done by MOP or NPA. Golf courses and hotels are carried out from construction to operation by the private sector. All development projects except the above-mentioned facilities in the private and public sectors are instructed by the TDC.

1.3.4 Project evaluation

(1) Economic and financial evaluation

For project evaluation, the economic and financial feasibility of the selected plans has been examined.

The objective of economic analysis is to evaluate the economic feasibility of the plan from the view-point of the national economy. The benefit and cost of the project are distinguished and quantified within the context of the "with" and "without" assumption in market prices and converted from market prices to economic prices in order to eliminate the distortions in the market prices. The economic feasibility of the project is estimated using indices of economic analysis.

The objective of financial analysis is to evaluate and ensure the financial viability of the project for the development body. Namely, the plans, which derive revenues from the implementation of the projects, have been evaluated in accordance with the implementation entity recommended. Whether or not the incremental revenues from the implementation of the project cover the investment costs of the project including operation and maintenance costs, is examined.

For selected area development plans such as the Chame Resort Development Plan, the Panama Canal Tourism Development Plan and the Portobelo Tourism Development Plan, the economic feasibility has been examined. The contribution of tourist expenditure to the GDP of the country has been evaluated as an economic benefit and compared with the incremental costs of the plan. In order to quantify the benefits of the plan the same procedure as in the economic analysis of the Long Term Development Plan has been adopted.

The financial analysis for these three plans has been carried out by assuming the establishment of the TDC, a development corporation consisting of public and private sector companies. The general assumptions for the financial evaluation of TDC are proposed in the Plan as shown on the following page.

In the economic analysis of the Caribbean Costa Arriba Road Development Plan, the cost saving resulting from the road improvement is defined as the benefit of the project, while financial analysis has not been carried out, as user charges have not been provided to MOP.

The Maritime Triangle Development Plan is a project the National Port Authority (NPA) develops the related infrastructure such as landing pier, passenger terminal, etc. and the NPA provides these facilities to private companies. A boat operating company purchases the hydrofoils and operates them. The mooring fees of the boats will be paid to the NPA by the operating company. In the financial analysis, the financial feasibility for the cash-flow of the total plan, the NPA and the boat operating company have been reviewed.

General Assumptions for Financial Analysis of TDC

1. Capital of TDC

- 1) Share: Combination of Public and Private
- 2) Amount 40% of Total Investment
- 3) Year of Payment 1996 and 2000

2. Loan

- 1) Condition of Long Term Loan
 - a Principal 40% of Total Investment
 - b Interest Rate 8%
 - c Repayment Period 20 years including Grace Period
 - d Grace Period 4 years
- 2) Condition of Short-term (year) Loan (in case of shortage of cumulative Cash-flow)
 - a Period year
 - b Interest Rate 14%
- 3) Deposit to Bank (in case of surplus of Cumulated Cash-flow)
 - a Interest Rate 6%

3. Revenue from Leasing Contract

- 1) Rate depends on the condition of land and facilities
average: 1% of the investment cost = monthly rate
- 2) Period 20 years
- 3) Premium An amount equal to 2 years of leasing
will be paid at the beginning of the contract every 20 years
and will not be refunded at the end of the contract

4. Operating and Maintenance Cost of TDC

- 1) Maintenance Cost of Infrastructure and Facilities developed by TDC
5.00% of total investment cost per year
- 2) Operating Cost of TDC
B1.160,000 per year for each development area

Salary & wages	1 person x 15,600	=15,600
	4 person x 10,800	=43,200
	5 person x 7,200	=36,000
		=94,800 (a)
Overhead Expenses	(a) x 30 %	=28,440 (b)
Other Operating Costs	((a)=(b)) x 30%	=36,972
		=160,212

5. Corporation Tax: 30% of net income

6. Evaluation Period: 1996 - 2020

7. Discount Rate for the evaluation: 12%

8. Depreciation:

- 1) The straight line method is adopted.
- 2) Depreciation period: 25 years (estimated by the component of the assets
based on the regulations in Panama)
- 3) The residuals are calculated as an inverse cost in the last year of the evaluation period.

1.3.5 Environmental Impact Study of Project Feasibility Study

(1) Objectives and Contents

The objective of the Environmental Impact Study is to determine whether the project is environmentally acceptable or not in the planning stage as a part of the project evaluation study.

To fulfill this objective, the environmental impacts including magnitude are identified and predicted from the stand-points of the construction and operating stages respectively.

Also the characteristics of the present environmental situation of the project area are analyzed. Then both predicted impacts and existing characteristics are comparatively examined utilizing a reliable method.

Finally the results of the study are compiled as an evaluation and for environmental countermeasures. This statement can be taken into account for project evaluation in the same way as the economic and financial evaluation that was carried out in previous chapter.

(2) Method

There are various kinds of methodologies for environmental studies such as matrix, overlay, network, etc. Among them, the matrix method is considered to be appropriate for this study.

The matrix method has the advantage that environmental impacts are systematically and easily identified over a broad field using a matrix table in the initial stages of the project

The Environmental Impact Study is carried out at the feasibility study stage and comprises study of the present environment and development impact study and evaluation at the end of the study, environmental countermeasures are examined and recommendations made. The study flow is shown in the following Figure.

1) Present Condition Analysis in the Study Area

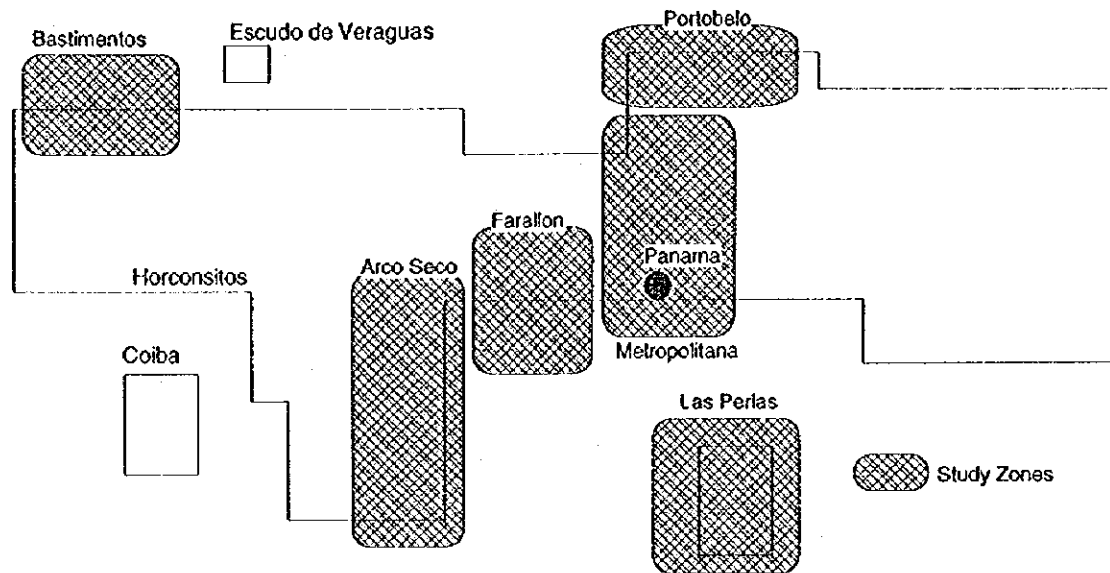
Present environmental factors comprising the social and natural environment are clarified in general and moreover negative factors, such as endangered species and weak ecosystems with their locations are identified in order to avoid adversely affecting them in advance.

2) Development Impact Analysis

This analysis is undertaken to clarify what kind of negative impact is made on the environment when the development project is carried out.

The impact of development, for example, forest felling, excavation, filling land and cut and fill occur in the case of road development. The impact effects on the environment depend on magnitude, type, duration, etc. From this analysis, the impacts are identified utilizing an experimental matrix table.

Environment Analysis of Long Term Development Plan



Environmental Impact Study on Feasibility Study Projects

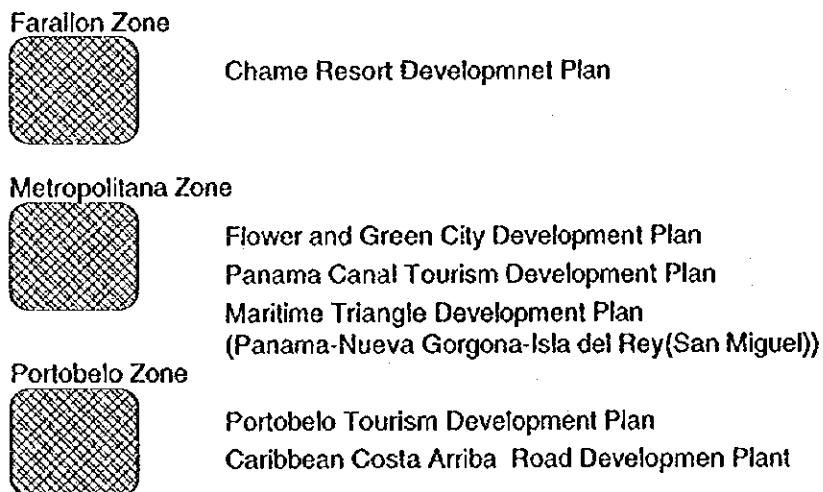


Figure 1.5 Subject Zones and Projects of Environmental Study

3) Impact Process Analysis and Summary Evaluation

The mechanism of the impact process is examined for clarifying focal points of evaluation considering the impact occurrence aspects and type.

Then acceptability of the projects in consideration of effects on the environment based on the results of the development impact study and the process analysis is examined.

4) Environmental Countermeasures

The final step of the environmental impact study is the examination of environmental countermeasures. Avoiding or mitigating the impact countermeasures in accordance with countermeasure level is examined.

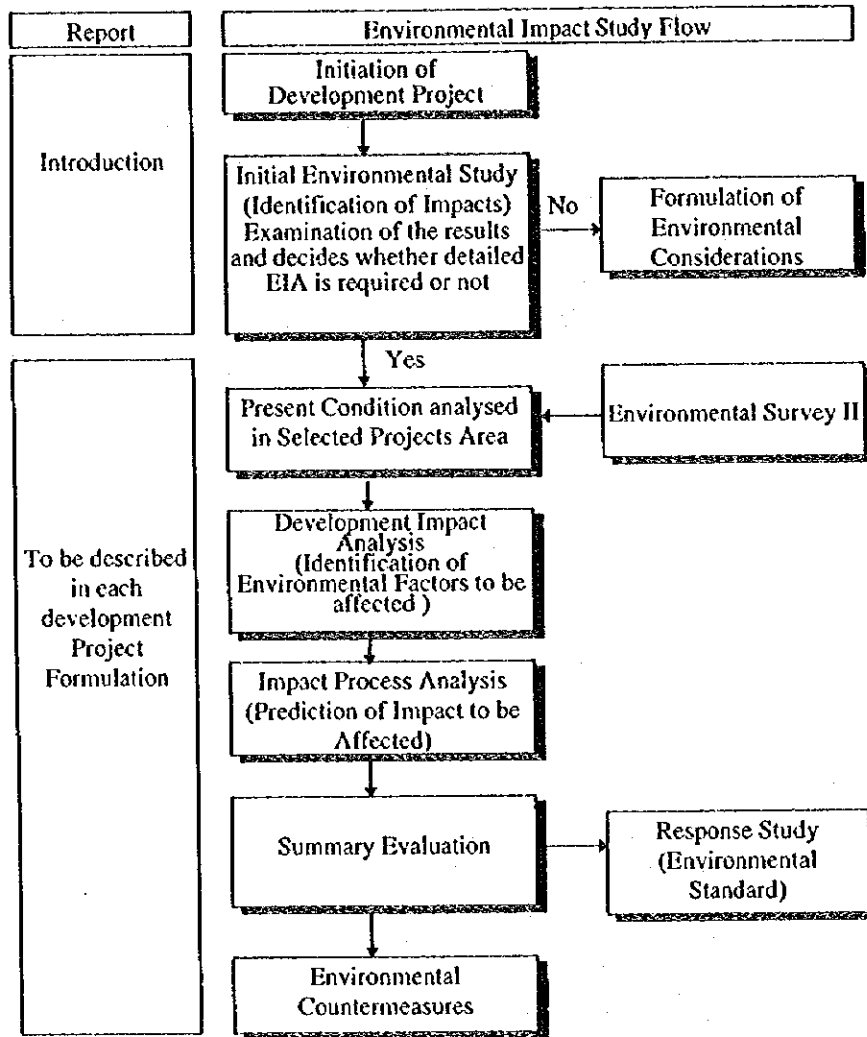


Figure 1.5 Environmental Impact Study Flow

2. Chame Resort Development Project

2. Chame Resort Development Plan

2.1 Chame Area In General

(1) Study area definition

The area for feasibility study is located in the Eastern part of "Farallon Zone" designated in the Long-term Development Plan, and cover both the areas of "Rio Chame" and "Punta Chame".

The area belongs to the Chame Division of Panama Province administratively, with an area of the distance approximately 7,800 ha. and a population of 15,446 from 1990 census data. From Panama city to this area is approximately 100 km and takes an hour and half by car on the Pan-American Highway. The dominant tourism attractions of this area are the long beach facing the Pacific Ocean, and a superb view of the neighboring mountains and islands.

(2) Focal development areas

Focal areas of "Chame Resort Development" are as follows:

- 1) West coast area (from Nueva Gorgona to Rio Chame)
- 2) Cerro Chame area (Mountain site)
- 3) Central coast area (from Rio Chame to La Boca de Chame)
- 4) East coast area (from Boca de Chame to Punta Chame)

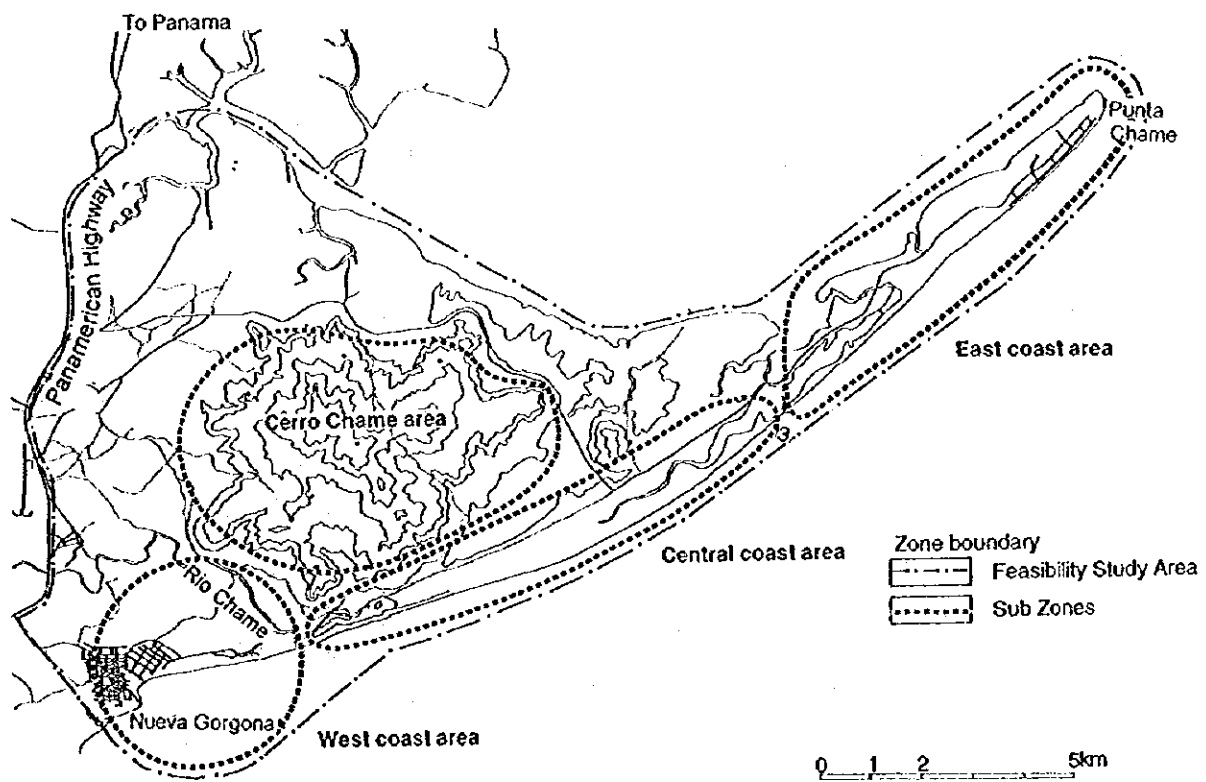


Figure 2.1 Location Map

Table 2.1 Development Components

Project	West Coast area	Cerro Chame area	Central Coast area	East coast area
Hotel accommodation	330 rooms	---	2,050 rooms	260 rooms
Amenity center		Observation Terrace, restaurant	Information center Entrance plaza Cultural plaza International plaza Beach plaza	
Golf community	27 holes pools			
Sports facilities	Horseback riding Tennis courts Marina		Sports ground Tennis courts	
Ecological	Mangrove forest park	Mountain walking path Historical spots	Natural Park Lagoon boat	
Beach Improvement	Parking, toilet/shower beach recreation		Parking, toilet/shower Beach recreation rental equipment	Parking, toilet/shower Beach recreation

2.2 Physical Conditions

(1) Land use

1) Existing Land use

The land on the East and West side adjacent to the sea consists mostly of residential areas for the Punta Chame and Nueva Gorgona communities. There are many large scale resort housing projects, implemented since the 1980's in the East and West coastal areas. These projects take advantage of the beach resort environment and close location to major market areas of Panama city. It is important to integrate tourism development in the study area. Central areas are left unused, because of poor access and limited areas.

As shown in Table 2.2 and Figures 2.2 - 2.3, with some induced development, land use for tourism can be further extended from Nueva Gorgona to Punta Chame along the coastal area. The Cerro Chame hinterland area can also be utilized for tourism without interfering with the existing farm land activity.

Table 2.2 Existing Land Use

Land Use Type	Area (ha)	Ratio (%)
Upland Forest	2,042	25.9%
Pasture /Grassland	267	3.4%
Cattle Ranching	2,467	31.3%
Fish pond	660	8.4%
Bare rock land	534	6.8%
Mangrove forest	957	12.2%
Beach sand	94	1.2%
Lowland forest	179	2.3%
Residential area	440	5.6%
Agricultural land	172	2.2%
Open space	51	0.6%
Water area	13	0.2%
Total	7,876	100.0%

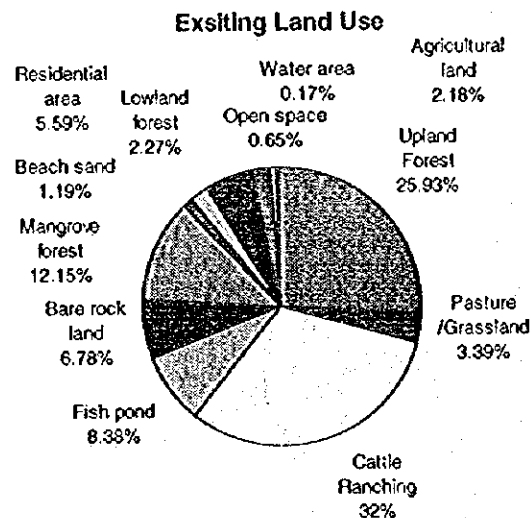


Figure 2.2 Existing Land Use

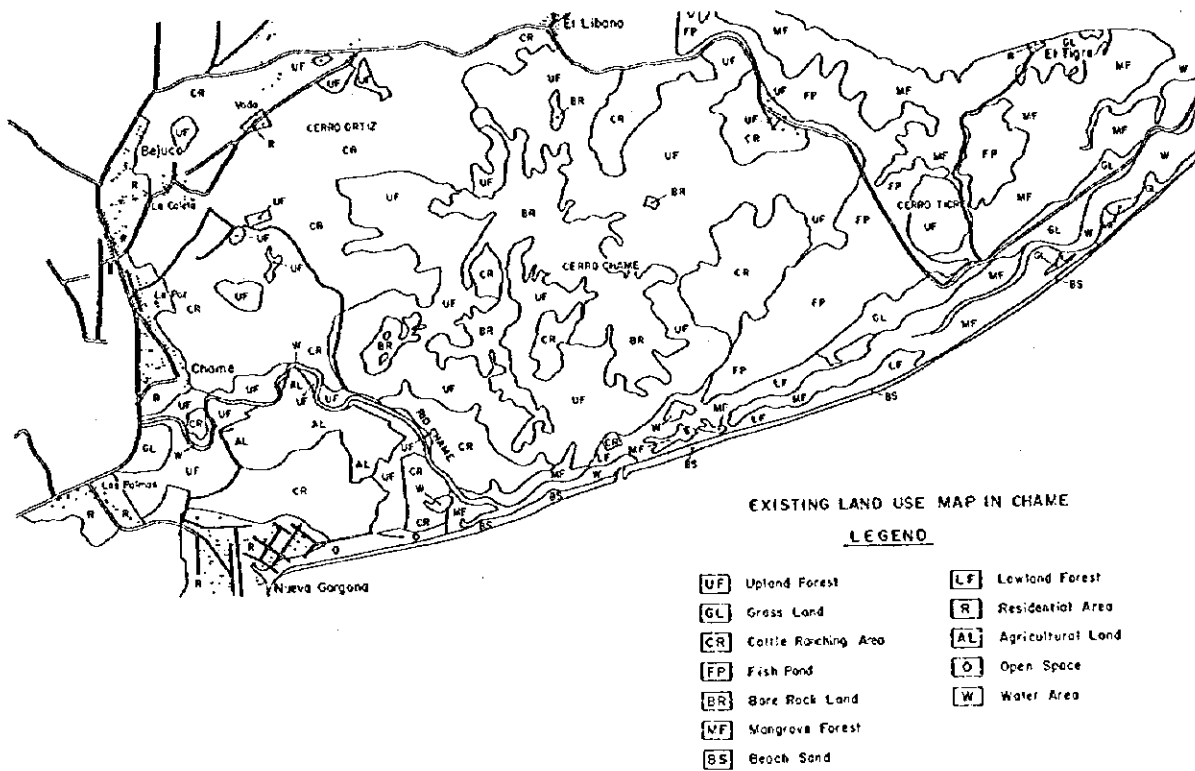


Figure 2.3 Existing Land Use

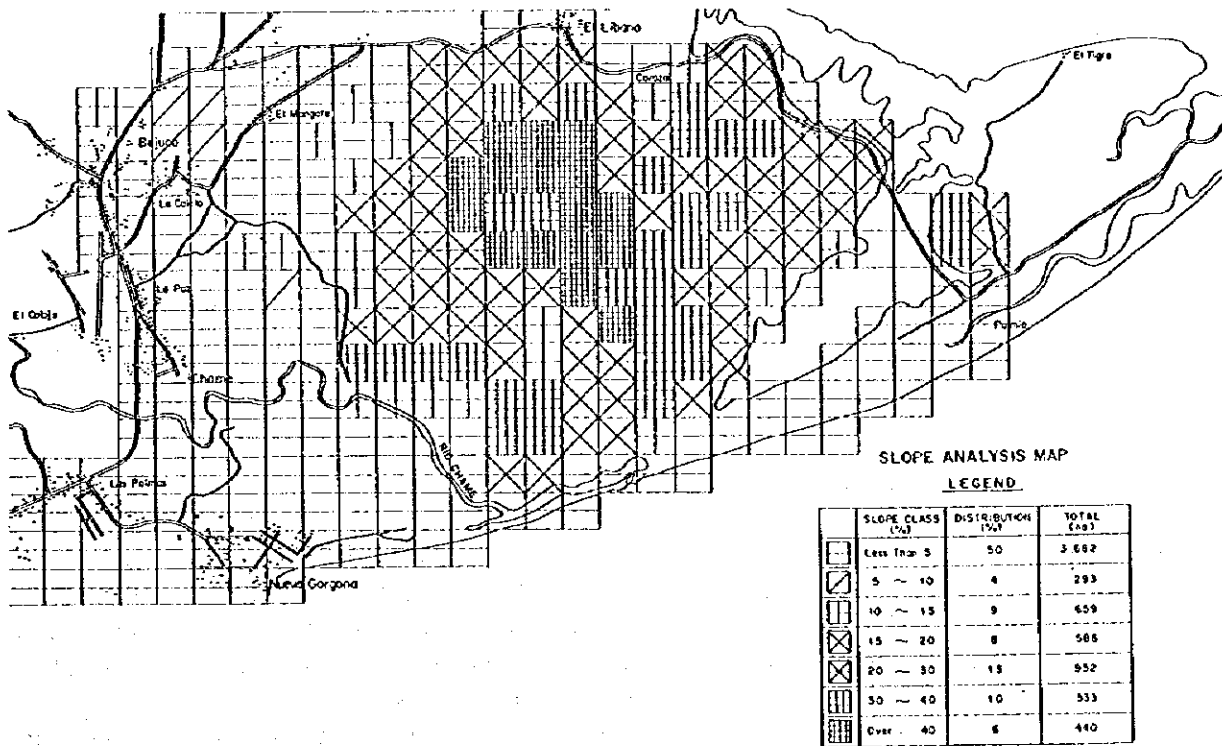


Figure 2.4 Slope Analysis

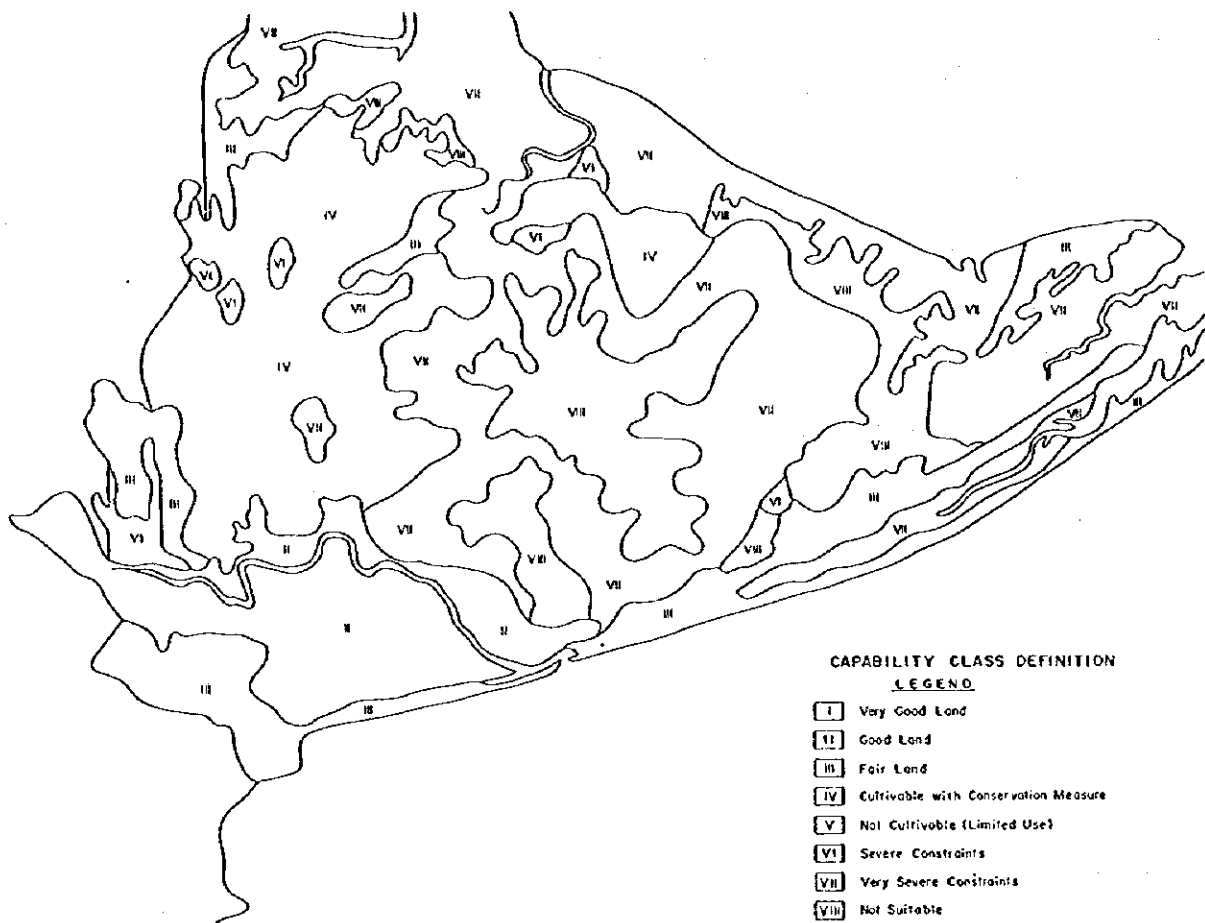


Figure 2.5 Land Capability Analysis

(2) Beach and Sea

The Rio Chame beach area stretches over 5.15 kms. The beach is approximately 50 - 60 meters wide, quite straight, mildly sloped, with white sand having a small portion of iron sands, all of which are acceptable for international tourists. At present, there are very few tourists at Rio Chame because of limited accessibility and facilities. At the tip of the peninsula (Punta Chame), a white sand beach protrudes into the sea.

The sea water quality in this area is acceptable. The waves are normally mild, but become strong during the rainy season. Water quality is within the standard range, free of pollution and is suitable for a tourist attraction. Tide level is about 7m in general. The prevailing climate is characterized by a long dry season.

(3) Natural Features

There are 200 -250m mountains located in the central part of the coastal area, and some plains between mountains and beach front. At the plains bordering the mountains, there is a shrimp culture pond which occupies a large piece of land. The existing trees along the central coastal area, predominantly mangrove and coastal vegetation and coastal plants are located between plains area and the sandy beach area. From the entire length of the beach, Otoque Island can be seen. This area has the potential to offer something different to tourists if accommodation and facilities are designed to be in harmony with the surrounding natural conditions.

(4) Land Ownership

All the hinterland areas are privately owned except for the immediate hinterland along the coastal area. The assistant Mayor of Chame quoted the price of land in this area in the range of B/0.25-1.00 per square meter, however, the actual price is much higher. A private investor is developing areas in the northern part of Punta Chame and Gorgona for building vacation houses. The price of housing lots ranges between B/7.00 to B/30.00 per square meter according to information obtained from the Ministry of Finance (CATASTRO).

It is important to acquire land for each facility needed, because of the outstanding locations selected for development. Some site areas should be acquired for conservation purposes in order to maintain the present natural environment.

(5) Manmade Features

There are no significant traditional buildings in the Chame Area and surrounding region. The basic building structures reflect very little of the Panamanian traditional or cultural features, and are designed more in line with the natural conditions of the areas. Therefore, traditional features shall be reflected in the designs of smaller structures and ornamental elements on the site.

Buildings in this area do not exceed two stories in general, thus, development there of a high hotel building would provide a landmark for the resort development.

Along the Pan American Highway, buildings have been constructed without setback planning, thus, further development there should make the best use out of the limited uniformity in design, height, setback etc..

(6) Infrastructure

There are two ways to reach the coastal area in Chame. The main access to Punta Chame is an approximately 9 kms. long road (Punta Chame-Chame town), branching from the Pan American Highway. This road has an average width of 6 meters or two lanes, and partial improvement of surface and landscaping is required. The other route is a residential road from Nueva Gorgona to Rio Chame which is under construction as a paved road. Therefore, access to the coastal area is very limited.

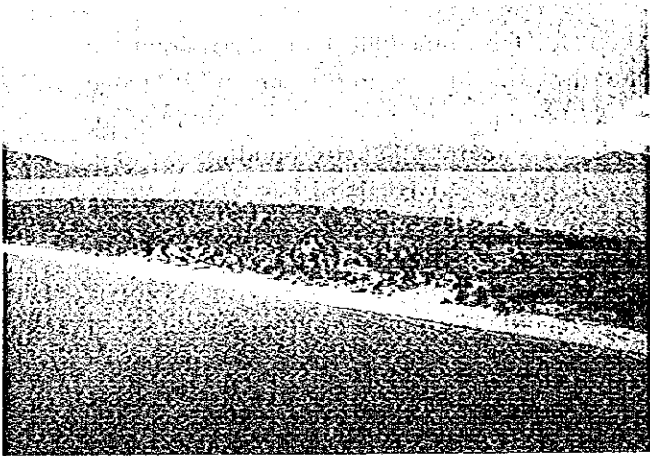
Water supply and sewage is adequate at present, but may not be sufficient if the demand increases. Solid waste management is insufficient and needs to be improved as an urgent project.

Also, power and telecommunications are adequate throughout the area at present, but will require additional expansion to meet the demand resulting from further development.

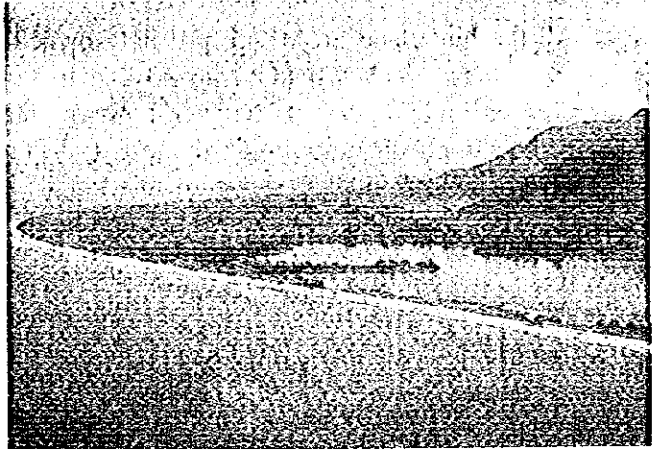
2.3 Development Framework

(1) Target number of Tourists

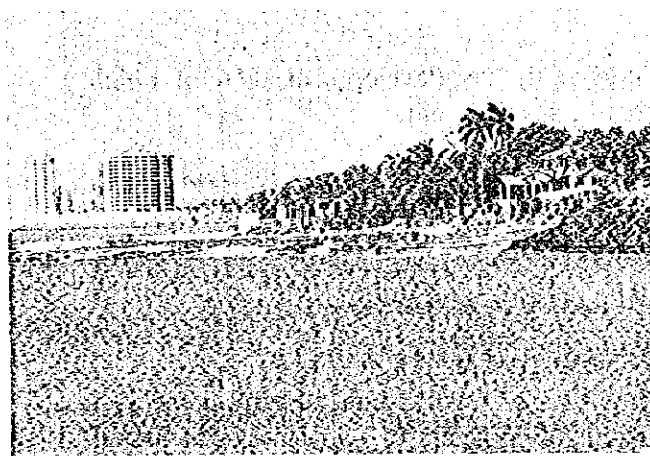
Chame Area needs to be developed to serve tourists in general and residents of the coastal area. The expected numbers of tourists at the end of years 2000, 2005 and 2010 are shown in Table 2.3.



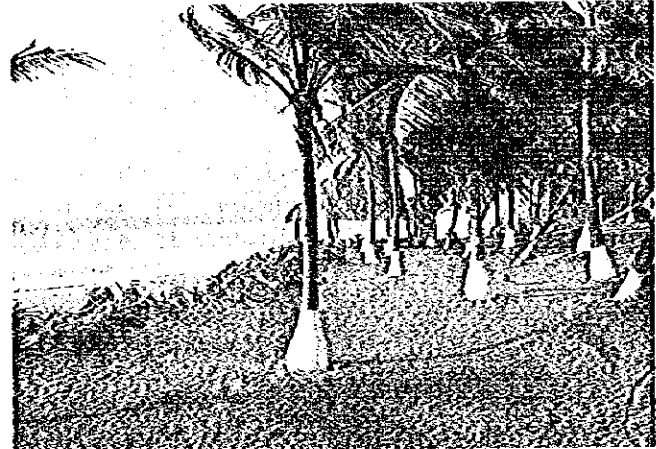
Villa Development in Punta Chame



Mangrove Forest and Shrimp Breeding Farm



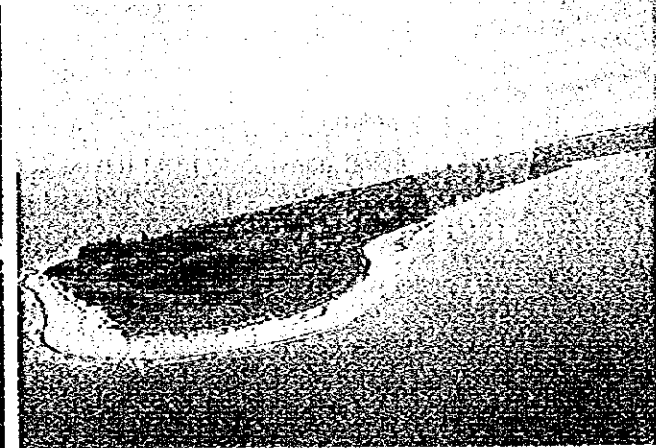
Villas and Condominium in Nueva Gorgana



Punta Chame Coast Area



Farallon Beach



Airport and Villa Development in Punta Chame

Table 2.3 Target Number of Tourists in Chame Area

	Night stay tourists			Daytime tourists		
	2000	2005	2010	2000	2005	2010
Foreign	171,000	600,000	1,380,000	155,000	262,000	313,000
Domestic	48,000	169,000	409,000	200,000	364,000	814,000
Total	219,000	769,000	1,789,000	355,000	626,000	1,127,000

(2) Characteristics of Tourism Development

Chame resort development area is a type of international coastal resort and is characterized as follows:

- 1) Beach oriented international resort
- 2) An active and passive mixed resort mainly for tourists on overnight trips, and also for those on day trips.
- 3) Encourage both resort housing and tourism related projects
- 4) Development of the area can be expected through improvement of the Pan American Highway establishment of a new coastal wad, and air transportation services at Rio Hato.

2.4 Development Plan

2.4.1 Land Use Plan

The land use plan is formulated on the basis of an analysis of the present conditions in the development area including the target number of tourists, zoning and building regulations and infrastructure, and environmental conditions of the area. The development area is approximately 7,876 ha and extended from Punta Chame to the Western part of Rio Chame. The land use area is shown in Figure 2.6 and can be described as follows:

- Accommodation area: located along the coastal area, this area should be developed for its peaceful atmosphere with low to moderate densities for hotel and related facilities.
- Urban and housing area: the urban area should be expanded along the Pan American Highway at the center of Chame district. Housing should be developed area along a second row from the coastline and encourage the existing planned projects.
- Agricultural area: maintain the agricultural land and expand it to the hinterland in coordination with tourism development.
- Nature conservation area: providing services views its environment should be conserved with limited land development.

2.4.2 Tourism facility development plan

(1) Accommodation Development

1) Room Requirement

The table below shows the aggregate results for the 5 years periods ending in the year 2,000, 2,005 and 2,010 by hotel classification category for Chame Area.

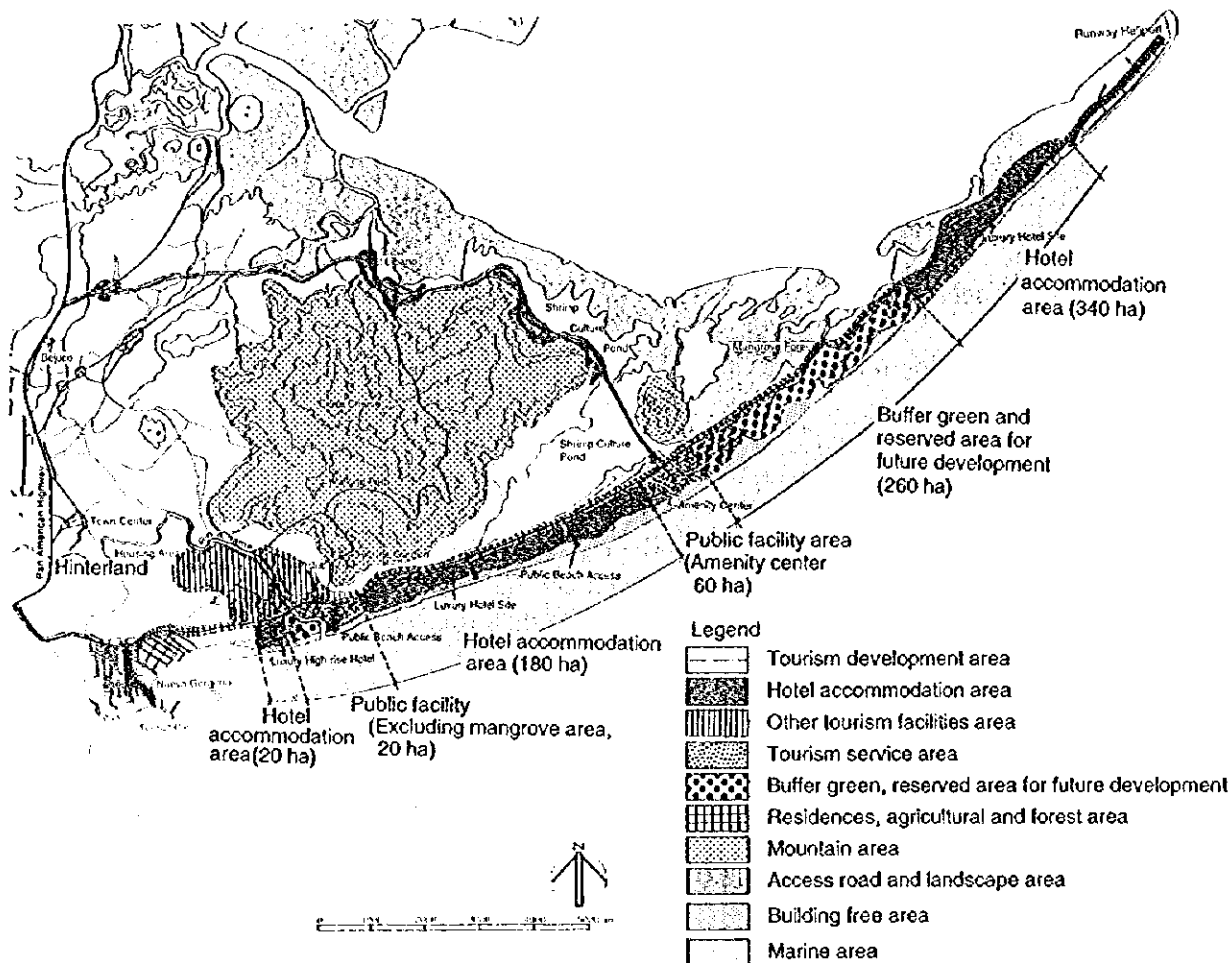


Figure 2.6 Land Use Plan

Table 2.4 Accommodation Development

Tourism Zone & Development Area	Exist Rms.	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		
Chame East	19	0	70	0	70	89	0	90	0	380	469	0	0	100	100	569
Chame Central	0	0	0	0	0	0	180	670	0	750	750	420	780	0	1200	1950
Chame West	67	0	180	0	180	247	150	0	0	380	627	0	150	0	150	777

Note: H=High standard M=Medium standard E=Economy
 Number of additional rooms are rounded from the required number
 (1) Punta Chame, (2) Nueva Gorgona

2) Hotel lot allocation

Hotel lots are primarily located in the East (5 lots at Punta Chame), Central (6 lots) and West (1 lot at Nueva Gorgona). Each area is further subdivided into large areas, between 8 - 77 ha per plot. The land of the Southern part has continuous mangrove forest which should be conserved and utilized as natural gardens, enclosed in hotel plots. Therefore, the plot size for accommodation will require a larger area compared with a conventional resort.

The number of rooms and size of the land required for a hotel depend on the investor, but Figure 2.11 shows an example of the space required between each plot to meet the environmental quality requirements for resort development.

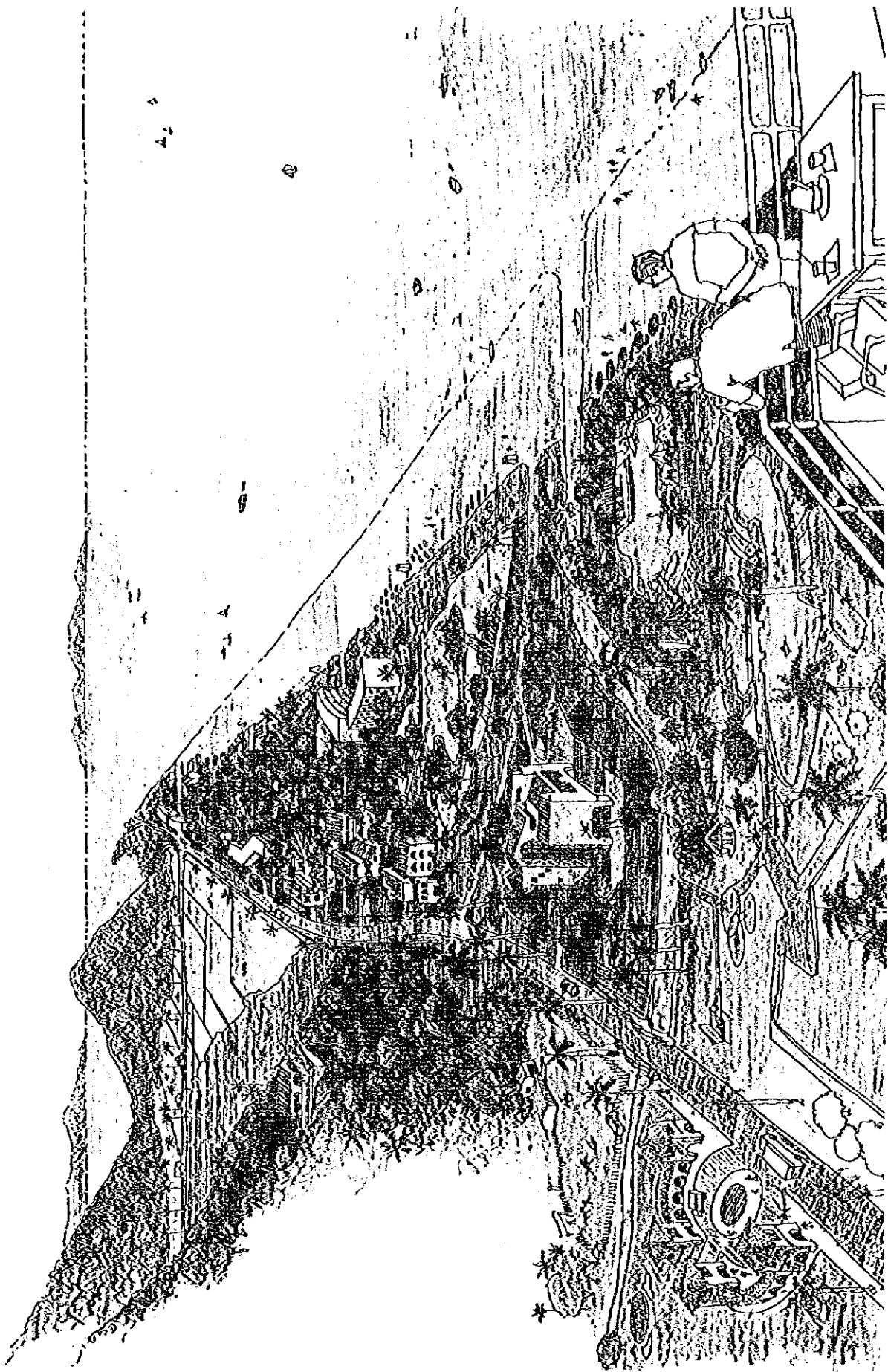


Figure 2.9 Image Sketch of Chame Area

Each hotel building should comply with the following setback regulations.(refer to Figure 2.12)

- Setback: 1st setback line is 15 meters from the lot boundary, and 2nd setback line is 25 meters from the lot boundary.
- No structures should be built in the area between the lot boundary and the setback line.
- Only single story buildings can be built in the area between the 1st setback line and the 2nd setback line.
- Beyond the 2nd setback line, multi-story buildings can be built.

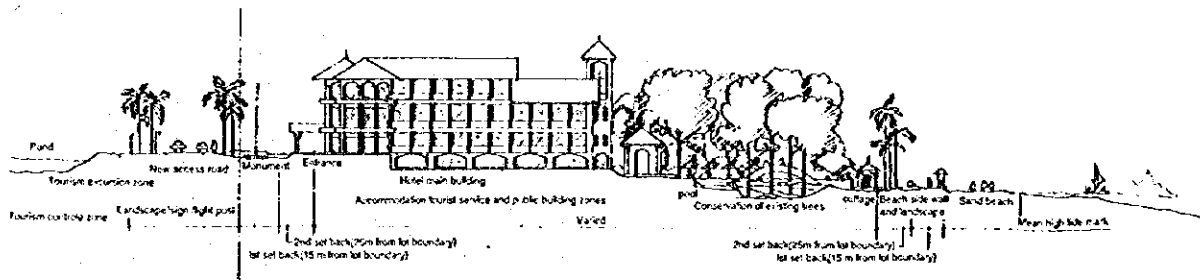


Figure 2.10 Typical Section of Hotel Development in Central Chame

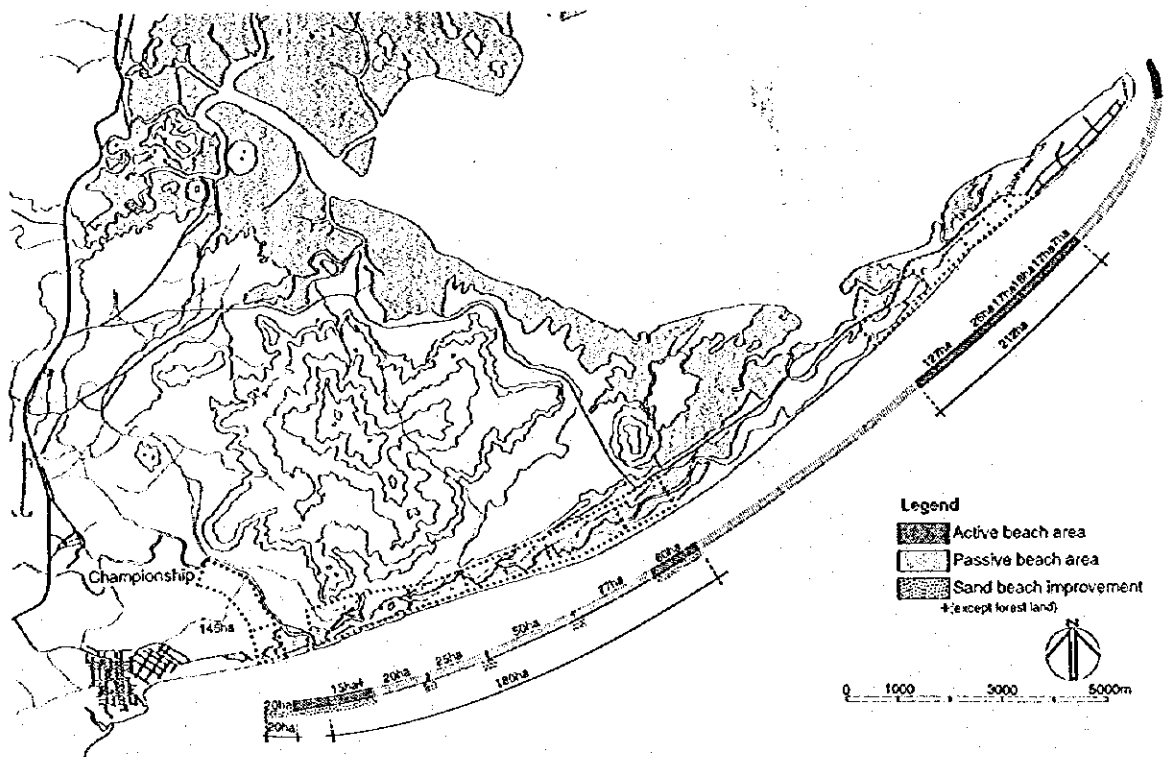


Figure 2.11 Hotel lots Allocation

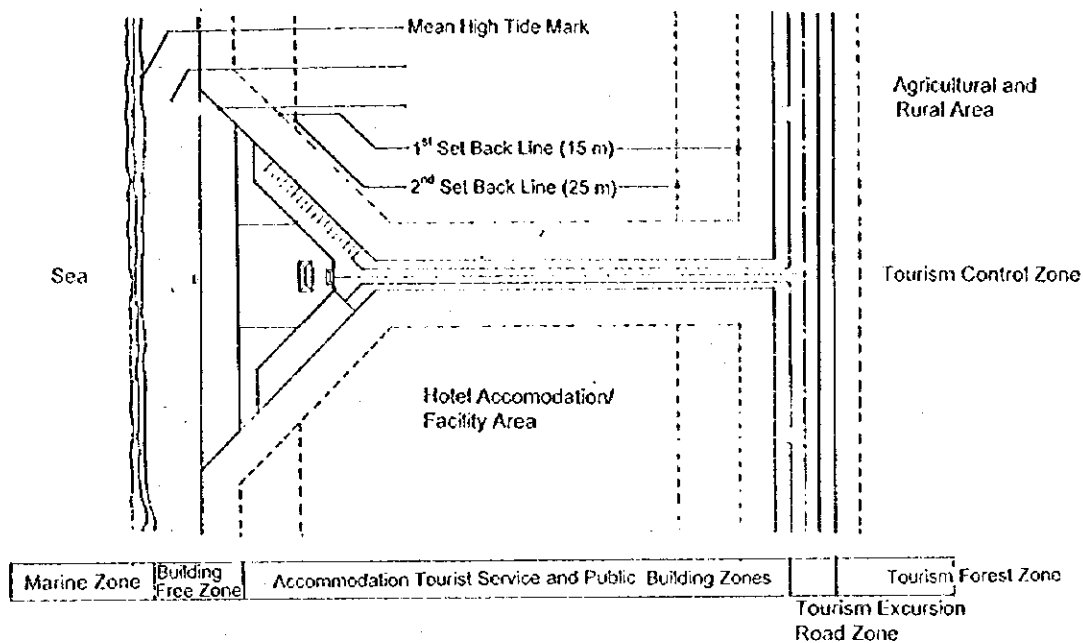


Figure 2.12 Typical Standard of Setback Regulation

(2) Amenity Center Development

The area at the intersection between route 772 and the route leading to Punta Chame coastal road should be developed as an amenity center for pedestrian-related activities. This area should be developed into a large public resort with facilities providing a cheerful atmosphere to establish a typical identity of Chame resort.

As shown in Figure 2.13, the center has a total land area of 60 ha, of which 80% of the land is maintained as it is for conservation purposes. It consists of four theme centers : 1) entrance plaza with parking, information office, commercial area, sports ground, flower garden, cafe/bar 2) cultural plaza with souvenir shops, marine craft center, 3) international plaza with cafeteria, performing arts center, natural park, and 4) Coastal plaza, facing the Pacific Ocean, with service center, cafe/bar.

The service center will support beach activities such as jet skiing, wind-surfing, sunbathing etc. Recreational water sports equipment should be made available in this area as well.

The Natural park shall be open to the public and shall have a variety of additional plants and outdoor furniture for picnics and events.

Table 2.5 Development components of amenity center

No.	Development Components	Required area	Remarks / capacity
1	Commercial	200 sq.m	Market
2	Souvenir shop	100 sq.m	Operation by MOC
3	Information center	100 sq.m	Operation by IPAT
4	Marine craft center	100 sq.m	Operation by MOC
5	Cafe terrace	350 sq.m	100 seats
6	Natural park	20 ha.	Mangrove & other natural habitation / conservation area
7	Service center	50 sq.m	Rental equipment service
8	Parking	2,400 sq.m	60 cars parking
9	View terrace	1,250 sq.m	Event space
10	Landscaping	20 ha.	Sign, symbol, additional plants

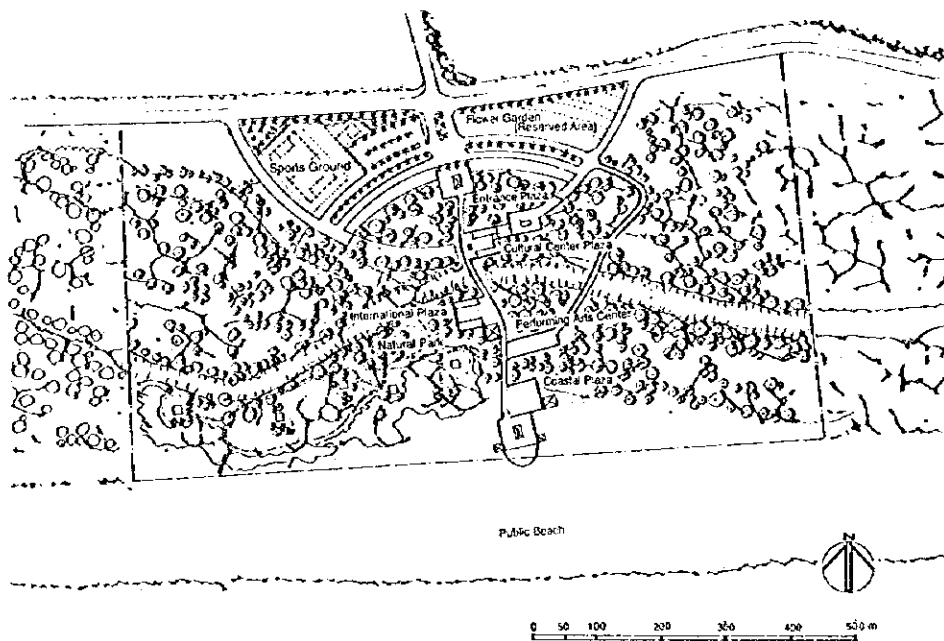


Figure 2.13 Development Image of Amenity Center

(3) Golf Community Development

The 18 hole golf course should be constructed early on in the development together with construction of the first hotel in this area.

The designated area is perceived to contain two different with suitable environment for high quality golf. These areas could each support 18 hole championship standard golf course. In addition to a 18 hole golf course, sports facilities will be developed. Low rise cottages and a resort housing project will also be part of the total community. These will be designed in harmony with the natural surroundings.

The construction of this golf course is not financially feasible, but it would effectively attract tourists to the hotels and raise the image of the area. The golf course can be developed as part of a hotel facility and can be used by visitors from Panama City as well as by local residents.



Figure 2.14 Development Image of Golf Community

(4) Sports facility development

Sports facilities such as multi-purpose playgrounds, shall be located at the amenity center. A tennis center and competitive sports facilities are integrated into the a Golf community development area and located close to the beach.

Table 2.6 Development components of sports facility area

No.	Components	Required area	Remarks/capacity
1	Multi-purpose ground	2 ha	For competitive sports
2	Horseback riding	2.5 km long	Tour with natural trail
3	Tennis center	5 courts	Main stand with 200 visitors
4	Picnic area	10 ha	Rest spots with outdoor furniture
5	Rest room/shower	90 sq m	Located at the center

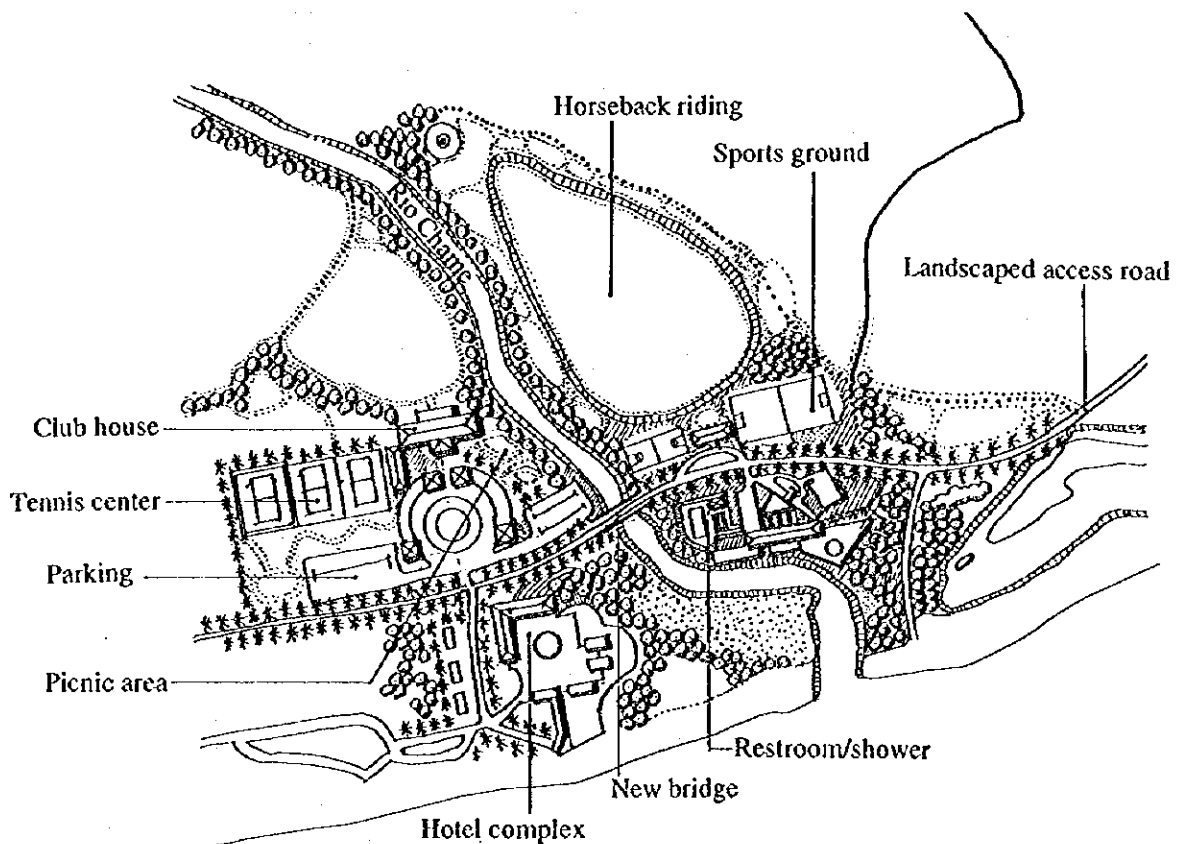


Figure 2.15 Development Image of Sports Facility Area

(5) Ecological tourism facility

Cerro Chame is a suitable place for the establishment of ecological tourism. The highest elevation of the ecological tourism site (500 m.) is the central peak of Cerro Chame which is followed by a 300m high view terrace at the Southern side. On the way to these peaks, there are a few pre-historic caves with flowers and fauna.

The area east of Cerro Chame is the best place to view the whole coastal scene and there are other attractions such as caves with pre-historic paintings and natural plants, which may be considered as ecological tourism elements.

Ecological tourism facilities in Cerro Chame shall be developed as follows:

Table 2.7 Development components of Cerro Chame

No.	Development components	Required area	Remarks / capacity
1	Parking	400	10 cars parking
2	Landscaping	300 sq.m	Parking area and view terrace
3	Toilet	90 sq.m	Located at parking area
4	Walking path	12 km	Natural trail
5	View terrace	300 sq.m	3 spots
6	View terrace restaurant	110 sq.m	20 seats

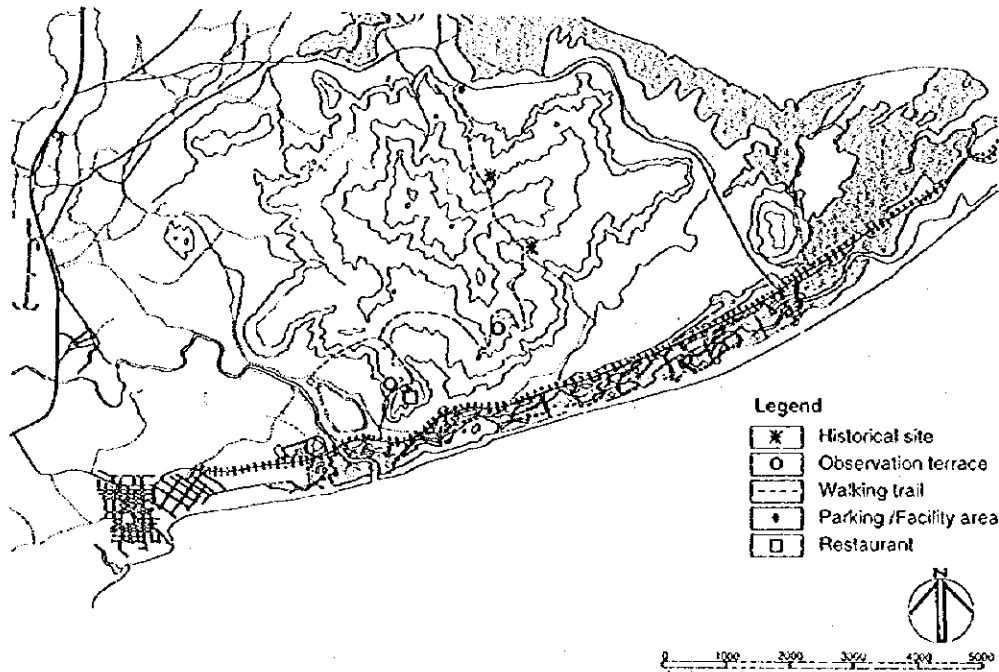


Figure 2.16 Ecological Tourism Development in Cerro Chame

(6) Beach Improvement

1) Beach capacity

The average daily number of tourists using the beach shall be 800 tourists by the year 2000, 1,300 tourists by 2005 and 2,200 tourists in 2010. On peak days, the daily number of tourists will increase by 2.8 times the average number.

The beach zone, approximately 10 kms long and 30-40 meters wide on average, can accommodate 3,000 people at a time under the allowable highest standard density of 10 sq. meters per person.

2) Parking requirement

Adequate parking space should be provided at the rate of 10 tourists for one car. The number of tourists using the parking space is related to the beach use. Therefore, parking space capacity will be for 80 cars by 2000, 130 cars by 2005, and 220 cars by 2010, respectively.

The parking areas are provided in ten sections. One main parking lot shall be located in the amenity center and the other areas shall be at designated places along the beach, as shown in Figure 2.17.

3) Beach road development

Public beach access should be provided between the hotel subdivisions as designated access reservations. The road should be widened to 6 meters. An Area for car turning and resting shelters at the beach entry site should be provided.

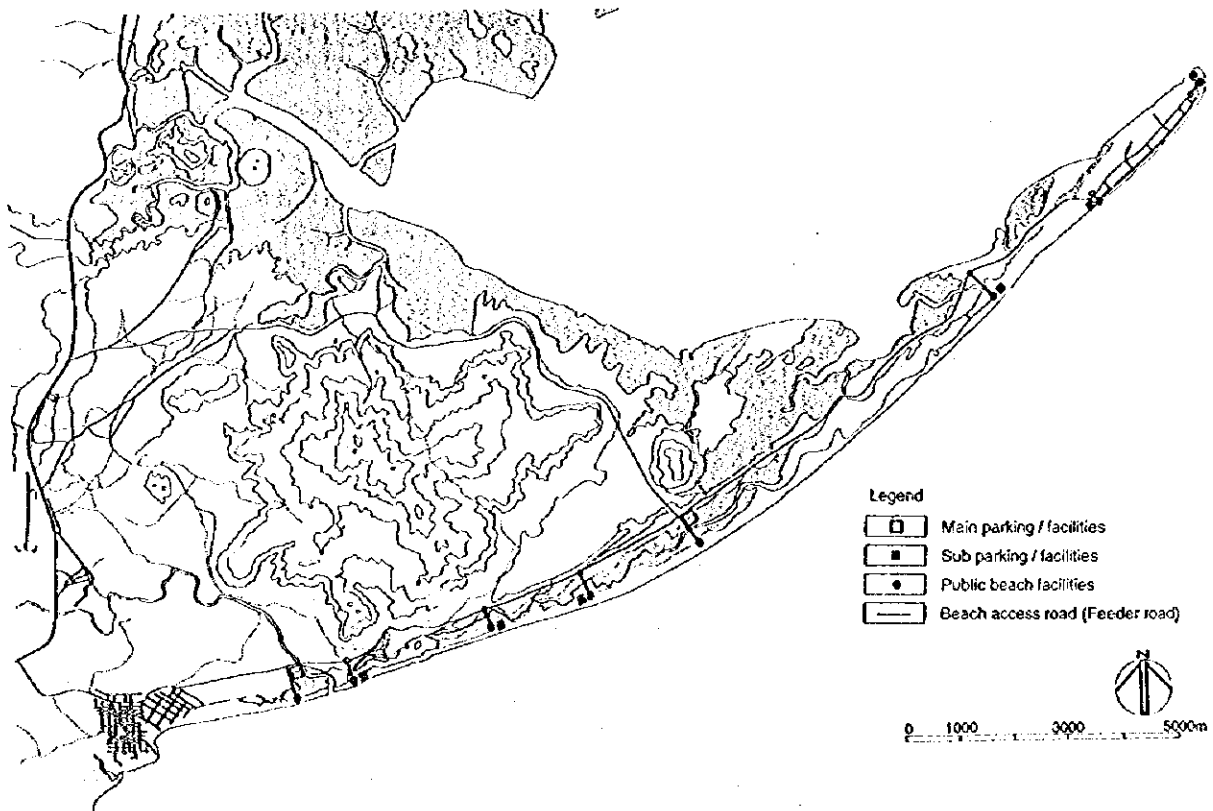


Figure 2.17 Beach Access Road and Facility Development

2.4.3 Road development plan

(1) Issues in road development

The following describes the issues to be solved for the development of Chame Area.

- 1) It is required to improve the Punta Chame access road of the Pan American Highway, and to improve connections with the metropolitan area of Panama and Campana plateau. This will improve convenience of the development area, attracting a greater number of tourists and upgrading the sightseeing potential of the development area.
- 2) Planning a road system to improve connections with the existing adjacent tourist resorts
The existing development areas include Nueva Gorgona on the Western side of the development area and Punta Chame adjacent on the East. It is necessary to improve connections with these regions, thereby increasing the sightseeing potential of the development area.
- 3) Improvement of access roads to nodal points for marine transport
It is essential to ensure connections with the Nueva Gorgona Port and to increase the variations for sightseeing by using the high speed sea route connecting the Las Perlas Islands and Panama. This will upgrade the potential for sightseeing of the development area.
- 4) Improvement of main roads within the development area
It is necessary to construct main roads crossing the development area to provide a framework for the development area. It is also important to provide the space to accommodate urban facilities and to improve the amenities of the development area.
- 5) Improvement of main streets within the development area
The roads and avenues within the development area must be improved to promote orderly development, and roads for access to the sea coast must be constructed.

(2) Estimating the traffic volume

Judging from the number of tourists visiting the Chame Area, the maximum daily spot traffic volume is estimated to register 2,200 vehicles by year 2010. This traffic volume can be handled by two lanes, even if consideration is given to dry seasons when traffic volume is more concentrated.

Table 2.8 Estimated Traffic volume

Purpose	1992		2000		2010	
	Bus	Car	Bus	Car	Bus	Car
Visitor Traffic	20	200	40	370	100	1,040
Residential Traffic	3	30	45	480	105	1,070
Induced Traffic	0	0	33	340	83	840
Regional Traffic	2	20	2	20	2	20
Total	25	250	120	1,210	290	2,970

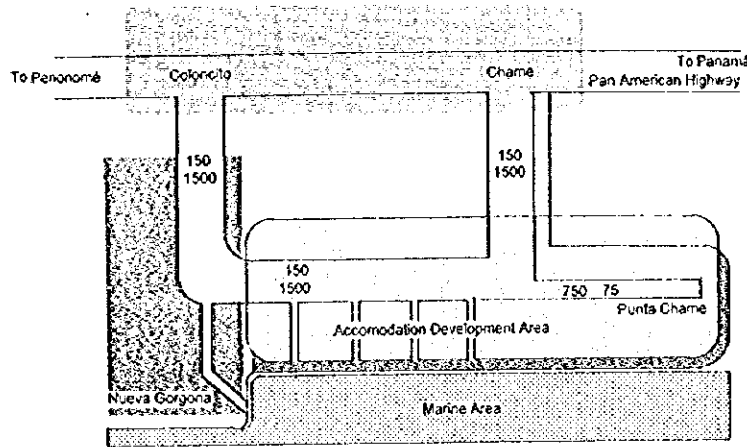


Figure 2.18 Estimated Traffic Volume

(3) Road Network

A proposed road network development plan is shown in figure 2.19. Missing link between East and West along the coastal area is built to allow traffic flow connecting Nueva Gorgona to Punta Chame for beach resort development, including open road-side ditch and landscaping areas.

(4) Road Plan

The road plan and cross section of each road are shown in Figures 2.20-2.23 and described as follows:

1) Improvement of Punta Chame Access Road

The current low cost road pavement (lightly trafficked road pavement) having a width of 5 meters will be improved and modified to asphalt pavement, and new shoulders and drainage facilities on the road-side will be constructed.

Table 2.9 Road Classifications

No	Road Name	Located between	Length (km)	Width (m)	Project type
1	Punta Chame, Access road	Bejuco-Chame center	13.0	7.0	Improvement
2	Nueva Gorgona, Access road	Coloncito-Nueva Gorgona	5.8	7.0	Improvement
3	Nueva Gorgona Port Access Road	Nueva Gorgona-Port	1.2	7.0	New
4	Chame Main Road	Rio Chame-Chame Center	7.2	7.0	New
5	Beach Access Road	Main Road-Beach	2.7	6.0	New

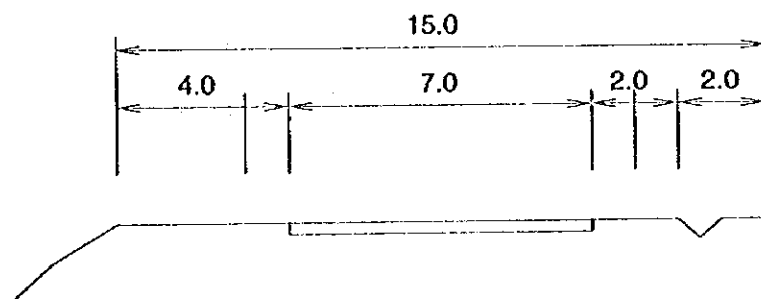


Figure 2.19 Road Section -1 (from Bejuco to Chame Center)

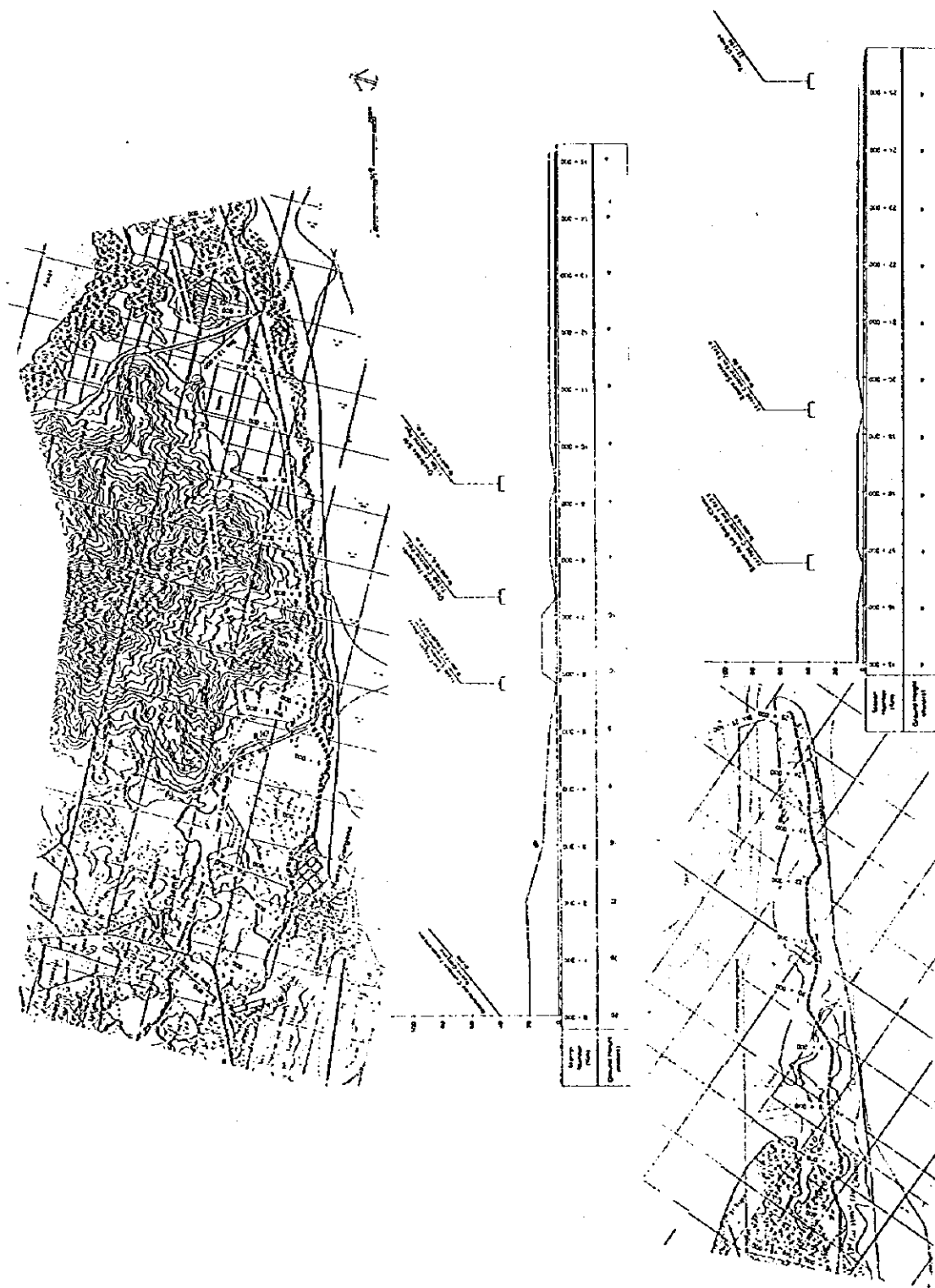


Figure 2.20 Road Network and Landscape Plan

2) Improvement and new construction of roads for connection with Coloncito and Nueva Gorgona

Coloncito and Nueva Gorgona are currently connected with each other by an asphalt paved road having a width of 5 meters. Nueva Gorgona and the development area are connected with each other by a gravel road. This will be improved and modified to an asphalt paved road having a width of 7 meters, and new shoulders and drainage facilities on the road side will be constructed.

3) Access Road to the Nueva Gorgona Port

The current feeder road will be modified to a 7 meter wide asphalt paved road, and new drainage facilities will be constructed on the shoulder.

4) Main roads within the development area

Giving consideration to the direction of drainage flow in the study area which is subject to inundation, a main road from East to West will be constructed adjacent to the shrimp culture ponds. To ensure amenities a shoulder and sidewalk will be provided with sufficient space. This space should be landscaped with plants, and street lighting as well as signs and symbols should be provided to facilitate the movements of tourists.

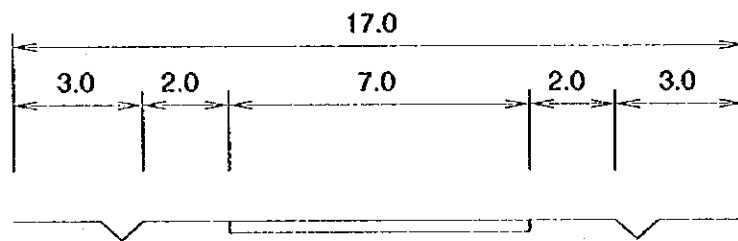


Figure 2.21 Road Section -2 (From Rio Chame to Chame Center)

- Bridge length 80 meters
- Bridge width 9.5 meters

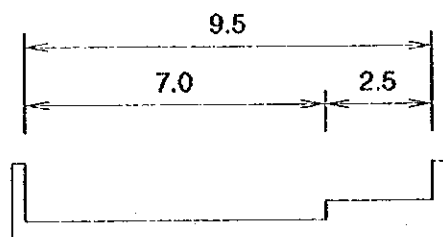


Figure 2.22 Bridge Section

5) Feeder road within development area

New feeder roads having a paved width of 6 meters will be constructed to be used as new access road from the main road to the public beach.

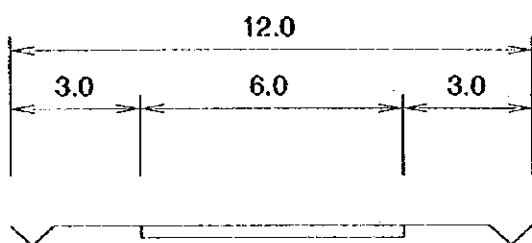


Figure 2.23 Road section-3 (From Chame Main Road to Beach Area)

2.4.5 Public utility development plan

(1) Water Supply

Wells will be adopted from the view-point of simple filtration facilities, low cost and flexibility to cope with increases in water demand. The wells would be located near the Central coast of Chame Resort Area and care should be taken to avoid high saline concentration. The demand of water supply is shown in Table 2.10.

Table 2.10 Water Supply Demand

Year	Chame West	Chame Center	Chame East
2000	530	527	70
2005	770	2,005	160
2010	770	3,950	560

A more detailed plan should be prepared based on the results of a survey of surface and underground hydrology. At this stage, a well, of the diameter 20 cm and depth 50 m, is assumed to produce water at the rate of 300 m³ per day necessary numbers of such a well would be provided to meet the water demand. Related facilities such as pumps, reservoirs, elevated tanks, chemical treatment should also be prepared.

The main distribution pipes should be laid along the coastal road. The facility plan for water supply is shown below:

Table 2.11 Water Supply Facility Plan

Facility	unit	2000	2005	2010
Well, Pump, (300 m ³ / day), Reservoir, Chemical treatment, Elevated tank	unit	4	6	8
Piping	m	20,000	4,000	5,000

Water intake as well as treatment and mains will be managed by IDAAN and the facilities for private sites will be prepared privately.

(2) Sewerage

Treated of sewage water will be discharged to the combined system under the roads leading to the sea. Sewage treatment demand is shown in Table 2.14.

Table 2.12 Sewage Treatment Demand

Year	Chame West	Chame Center	Chame East
2000	880	2,106	280
2005	1,480	8,019	640
2010	1,480	15,480	2,240

The main drainage / sewage pipes will be provided along the coastal road. The facility plan is shown below.

Table 2.13 Sewage Facility Plan

Facility	Sector	unit	2000	2005	2010
Sewage treatment tank	Private	m ³	1,710	5,160	7,640
Piping	Public	m	19,000	5,000	5,000

(3) Solid waste

The amount of solid waste is estimated using the following unit generation:

Table 2.14 Unit Generation of Solid Waste

Facilities	Unit	1995	2000	2005	2010
Hotel	kg / room / day		6.0	7.0	8.0
Restaurant, Cafeteria	kg / m ² / day		0.4	0.4	0.4
Shop, Tourist Center	kg / m ² / day		0.1	0.1	0.1
Domestic	kg / capita / day	1.0	1.1	1.2	1.3

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

Table 2.15 Estimated Amount of Solid Waste

Amount of waste	unit	2000	2005	2010
Average daily amount	ton/day	21	33	54
Accumulation	ton	33,000	83,000	163,000

Sanitary landfill site with necessary facilities and equipment such as office, garage (bulldozers), drainage, leachate treatment pond, access road, fence and gate, vegetation, should be constructed.

Sanitary landfill site of 6 ha will be prepared for disposal of solid waste up to year 2010.

The operation will be done by the local administration and fees should be collected according to discharged waste.

(4) Electric power supply

1) Electric power demand

Table 2.16 show the electric power demand at the end of the years 2000, 2005 and 2010.

Table 2.16 Electric Power Demand (MW)

Year	Chame Center	Chame East
2000	5.00	0.70
2005	12.00	1.20
2010	19.00	3.70

2) Electric Power Supply

The electric power supply plan is summarized in Table 2.17

Table 2.17 Electric Power Supply Plan

Item	Chame *	Chame West and Center	Chame East
Distance of Distribution Line	45 km from Chorrera Substation	15 km from Chame Substation	13 km from Rio Chame
Distribution Voltage	115 kV	34.5 kV	34.5 kV
Conductor Size	477 MCM ACSR	477 MCM ACSR	477 MCM ACSR
Transformer	A new 30 MVA, 110/34.5 kV, 3 phase in new Chame Substation is required	* One set of 6.5 MVA, 34.5 kV/208-120V, 3 phase until 2000 year. * One set of 9 MVA, 34.5 kV/208-120V, 3 phase until 2005. * One set of 9 MVA, 34.5 kV/208-120V, 3 phase until 2010.	* One set of 1 MVA, 34.5 kV/208-120V, 3 phase until 2000 year. * One set of 1 MVA, 34.5 KV/208-120V, 3 phase until 2005. * One set of 3.5 MVA, 34.5 kV/208-120V, 3 phase until 2010.

* New Chame Substation is Required

(5) Telecommunications

1) Demand forecast of subscriber

Table 2.18 shows the demand forecast at the end of years 2000,2005 and 2010 for the two development areas.

Table 2.18 Demand Forecast of Telecommunications Subscribers

Year	Chame Center	Chame East
2000	500.0	30.0
2005	800.0	50.0
2010	1,100.0	110.0

2) Planning of telecommunications network

An existing telephone exchange is located in Chame. This existing telephone exchange will connect subscribers in each focal development area.

2.5 Cost Estimation

The results of cost estimation by facilities are shown in Table 2.19 Total project cost reaches 284.6 million balboas of which 207.2 million balboas are for accommodation development, 16.4 million balboas for land and marine transportation development, 26.6 million balboas for other tourist facilities and the remaining 34.8 million balboas for public utilities such as water supply, sewerage, solid waste disposal, electricity, and telecommunications.

Table 2.19 Project Cost of Chame Resort Development

No.	Project Description	Unit	Amount	Total Cost	Portion		Land & Compensation		
					Financial	Foreign Currency	Local Currency	Economic	Financial
1.1	Accommodation Development			207,185	150,658	52,707	34,688	3,820	3,820
	1) Chame west(M180/M150/0)	room	330	29,700	23,760	5,940	3,908		
	2) Chame center 1 (0/H180,M1570/0)	room	750	56,100	40,890	15,210	10,007		
	3) Chame center 2 (0/0/H220,M600)	room	820	61,800	45,240	16,560	10,895		
	4) Chame center 3 (0/0/H200,M180)	room	380	30,600	23,220	7,380	4,855		
	5) Chame center 4(0/M1000)	room	100	7,000	4,900	2,100	1,382		
	6) Chame east 1 (M70/M90/0)	room	160	11,200	7,840	3,360	2,211		
	7) Chame east 2 (0/0/E100)	room	100	4,000	2,400	1,600	1,053		
	8) Site Preparation(Chame west)	ha	25	483	189	44	30	250	250
	9) Site Preparation(Chame center)	ha	230	4,441	1,739	403	274	2,300	2,300
	10) Site Preparation(Chame east)	ha	127	1,861	480	111	76	1,270	1,270
1.2	Marine Transport Development			500	304	196	158		
	1) Marina(Nueva Gorgona)	boat	100	500	304	196	158		
1.3	Land Transport Development			15,859	8,987	6,672	4,749	200	200
	1) Chame development road	ha	20	10,648	5,928	4,521	3,193	200	200
	a. Nueva Gorgona Access Road	m	5,800	2,624	1,323	1,301	854		
	b. Nueva Gorgona Port Access Road	m	1,200	1,147	578	568	454		
	c. Chame main Road	m	5,800	5,507	3,175	2,132	1,516	200	200
	d. Rio Chame bridge	sq.m	760	1,371	851	519	370		
	2) Punta Chame area access road	m	13,000	5,211	3,059	2,152	1,555		
1.4	Other Tourist Facility			26,606	15,792	7,942	5,506	2,872	2,872
	1) Golf Community	ha	104	11,128	6,639	3,450	2,393	1,040	1,040
	a. Golf course 18 holes	ha	74	7,402	4,063	2,299	1,597	1,040	1,040
	b. Club house	sq.m	2,000	1,050	746	304	200		
	c. Swimming Pool	sq.m	200	577	339	238	183		
	d. Reserved area for golf	ha	30	2,100	1,491	609	412		
	2) Amenity Center	ha	60	6,017	3,654	1,762	1,202	600	600
	a. Access Road	m	1,230	216	129	87	62		
	b. Parking	sq.m	9,800	763	371	292	215	100	100
	c. Entrance Plaza	sq.m		1,888	1,228	560	373	100	100
	Sport Ground	sq.m	12,000	128	88	40	29		
	Commercial	sq.m	600	840	596	244	164		
	Information Office	sq.m	100	350	249	101	69		
	Entrance Plaza/Bar	sq.m	100	100	71	29	20		
	Flower Garden	sq.m	10,000	133	80	53	32		
	Landscaping	sq.m	22,000	337	143	94	59	100	100
	d. Cultural Center Plaza	sq.m		1,416	932	384	260	100	100
	Souvenir Shop	sq.m	300	1,050	748	302	206		
	Marine Craft Center	sq.m	160	224	159	65	44		
	Landscaping	sq.m	3,900	142	25	17	11	100	100
	e. International Plaza	sq.m		1,245	725	320	212	200	200
	Cafeteria	sq.m	320	320	228	92	63		
	Nature Park	sq.m	120,000	131	79	52	32		
	Performing Arts Center	sq.m	400	560	398	162	109		
	Landscaping	sq.m	3,200	235	21	14	9	200	200
	f. Coastal Plaza	sq.m		489	270	119	80	100	100
	Service Center	sq.m	64	224	159	65	44		
	Cafe Shop/Bar	sq.m	100	100	71	29	20		
	Landscaping	sq.m	6,000	165	39	26	16	100	100
	3) Beach Improvement	m		1,180	699	481	354		
	a. Access road	sq.m	2,700	742	427	315	238		
	b. Parking	sq.m	1,600	121	70	51	38		
	c. Toilet/shower	sq.m	140	118	59	59	39		
	d. Beach recreation	sq.m	400	50	36	14	9		
	e. Landscaping	ha	4	150	107	43	29		
	4) Ecological Tourism Facility	ha	4	459	250	167	122	42	42
	a. Parking	sq.m	300	7	4	3	3		
	b. Landscaping	sq.m	300	56	8	6	3	42	42
	c. Toilet	sq.m	90	77	42	35	25		
	d. Walking path	km	12	199	109	90	69		
	e. View terrace /rest spots	sq.m	300	70	50	20	14		
	f. View terrace restaurant	sq.m	110	50	36	14	9		
	5) Sports Facility	ha	119	7,822	4,550	2,082	1,435	1,190	1,190
	a. Multi-purpose ground	ha	2	514	147	67	49	300	300
	b. Horseback riding	km	3	878	354	323	242	200	200
	c. Tennis center	sq.m	4,000	4,700	3,266	1,334	902	100	100
	d. Picnic area	ha	10	1,400	710	290	196	400	400
	e. Toilet /shower	sq.m	140	118	59	59	39		
	f. Parking	sq.m	160	212	14	8	6	190	190
1.5	Infrastructure Development			34,480	19,993	14,464	11,144	23	23
	1) Water supply	set	1	5,802	3,111	2,681	1,899	10	10
	2) Sewerage	set	1	9,427	4,946	4,476	3,680	5	5
	3) Solid waste disposal	set	1	3,136	2,238	890	603	8	8
	4) Electricity	set	1	12,603	7,356	5,247	4,143		
	5) Telecommunication	set	1	3,512	2,342	1,170	819		
Total Development Cost				284,630	195,733	81,982	56,245	6,915	6,915

2.6 Project Implementation

(1) Implementation Schedule

The short term development areas consist of a part of Chame east and Chame west which are adjacent to the existing development area. Chame central and remainder of Chame east are planned for medium and long term development.

Implementation schedules for each feasibility study project are made in consideration of their relation to each development plan which can be divided into five components. Improvement of the existing access road to the project area is planned in the long term.

The construction of the golf community and coastal plaza, entrance plaza to the amenity center are planned as short term. Cultural center in amenity center, beach improvement, ecological tourism facilities, sports facilities and Rio Chame bridge are planned as medium term.

Table 2.20 Implementation Schedule and Term Development Cost

No.	Project Description	Short Term (US\$'000)					Medium Term (US\$'000)					Long Term (US\$'000)				
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1.1	Accommodation Development															
	1) Chame West (M180/M1500)	---	0114	0110			---	0000	0000							
	2) Chame Center 1 (0241/0315700)						---	0000	0000	0000						
	3) Chame Center 2 (0264/0301600)										---	0000	0000	0000		
	4) Chame Center 3 (0264/0301600)										---	0000	0000	0000		
	5) Chame Center 4 (Rio Chame East)(03/M1000)											---	0000	0000		
	6) Chame East 1 (M70/M900)	---	0000				---	0000				---	0000	0000		
	7) Chame East 2 (0604/100)															
	8) Site Preparation (Chame West)	---	0000								---	0000				
	9) Site Preparation (Chame Center)						---	0000			---	0000				
	10) Site Preparation (Chame East)	---	0000				---	0000								
1.2	Marine Transport Development															
	1) Marina (Nueva Guinea)											---	0000	0000		
1.3	Land Transport Development															
	1) Chame Development road						---	0000	0000			---	0000	0000		
	2) Punta Chame Area Access Road												---	0000	0000	
1.4	Other Tourist Facility															
	1) Golf Community	---	0000	0000									---	0000	0000	
	2) Amenity Center						---	0000	0000	0000	0000	0000	0000	0000		
	3) Beach Improvement															
	4) Ecological Tourism Facility															
	5) Sports Facility															
1.5	Public Utilities															
	1) Water Supply	---	0000	0000				---	0000	0000	0000			---	0000	
	2) Sewerage															
	3) Solid Waste Disposal															
	4) Electricity															
	5) Telecommunication															
	Total Development Cost	11,280	19,664	18,068	0	1,054	15,015	45,651	36,263	21,856	419	13,803	43,952	42,297	18,540	0

(2) Investment plan

Investment volumes by sectors by investment time are shown in Table 2.20. The total investment is 284.6 million balboas of which 210.5 million balboas are for hotel, golf course construction by the private sector. The public sector's 15.9 million balboas is for road construction. The remaining 58.2 million balboas are invested for land, marina and other tourist facilities such as amenity center, public beach improvement, ecological tourism facility and sports facility by TDC.

(3) Tourism Promotion plan

The Proposed catch phrase, is for example, "Pacific Coastal Resort for Unusual Days." Chame resort will be developed as a coastal resort next to the Metropolitan area with sea and beach

leisure activities and various amenities on land. Targeted countries are North America and Europe for a short and long stays .

The best season for to visiting Chame will be during the winter time to get away from the cold weather. IPAT and Panamanian travel agencies would approach travel businesses in such countries to create several kinds of tours.

One type would use charter flights from both regions, another would use regular flights mainly from North America. The majority of vacationers long for sunshine, sea and sand. Business and shopping travelers from Central and South America and the Caribbean could be persuaded to enjoy the resort on weekends or holidays. It will be useful for hoteliers to hold various events such as music festivals, food festivals and disco parties on weekends for attracting young people to visit Chame resort from Panama City.

2.7 Project Evaluation

2.7.1 Economic Evaluation

(1) Cost

The investment cost including land and compensation costs are converted into economic price after eliminating the cost of transfer items such as import duty. The maintenance costs for the developed infrastructure and facilities are estimated at 5% of the total development costs. The operating costs of the relevant enterprises in the private sector, which will receive revenue from tourists, have been estimated as shown in Table 2.29.

Table 2.21 Economic Cost of Chame Resort Development Plan

Unit: B/. 1,000

	Investment cost			Total investment cost	Maintenance cost of infrastructure	Operating cost 1)	Total cost
	Land	Public	Private				
Short	6,915	9,269	27,854	44,038	1,560	11,682	57,280
Medium	0	32,449	75,598	108,047	8,170	58,665	174,882
Long	0	17,434	89,374	106,808	13,663	148,237	268,708
Total	6,915	59,152	192,826	258,893	23,393	218,584	500,870

Note: 1) Operating cost of related private sectors are estimated at 21% of the total tourist revenue for Chame Resort Development Plan. The estimation procedure of the coefficient (21%) are referred to "Section 7.1.2, Phase II, "Project cost" and the calculation sheet is attached in Appendix.

(2) Benefit

The benefit of the Chame Resort Development Plan has been calculated based on the expenditure by the incremental number of night stay tourists and day visit tourists for accommodation, food, shopping, transportation and others. The total revenue from tourists have been converted into economic benefit, namely, the direct and indirect contribution to the GDP of Panama in accordance with the procedure, which is explained in section 7.1, Phase II, "Economic and Financial Evaluation of Long term Development Plan". The conversion factor of the tourist revenue to direct and indirect benefit is estimated at 54% and 27% respectively based on the component of tourist expenditure items in Chame Resort Development Plan.

The benefits of the plan are shown in terms of direct and indirect contributions to GDP in Table 2.30. As shown in Figure 2.29 the share of revenue from foreign tourists is estimated to

be very high and the revenue for accommodation will be approximately 45% of the total revenue during the period 1998 to 2010.

Table 2.22 Benefits Chame Resort Development Plan

Unit: B/. 1,000

	Tourist revenue		Total tourist revenue	Benefits		Total benefits
	Foreign tourists	Domestic tourist		Direct 1) benefits	Indirect 2) benefits	
Short	35,303	1,785	37,087	20,027	10,014	30,041
Medium	173,842	12,396	186,238	100,568	50,284	150,853
Long	424,533	46,060	470,593	254,120	127,060	381,180
Total	633,677	60,241	693,918	374,716	187,358	562,073

Note: 1) Conversion factor into direct benefit = 54% (refer to Appendix); Conversion factor into indirect benefit = 27%

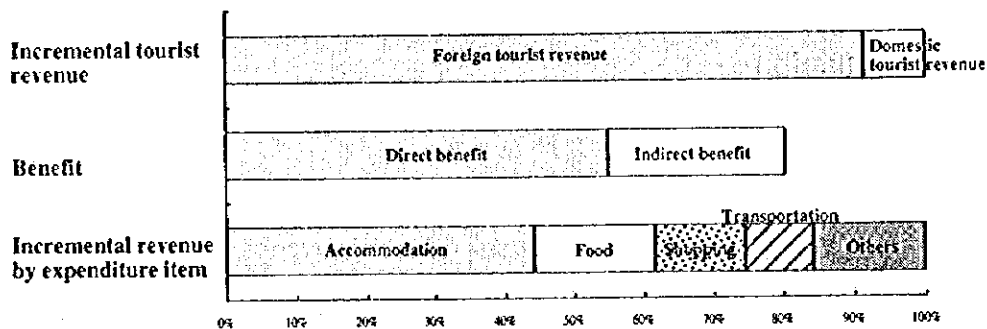
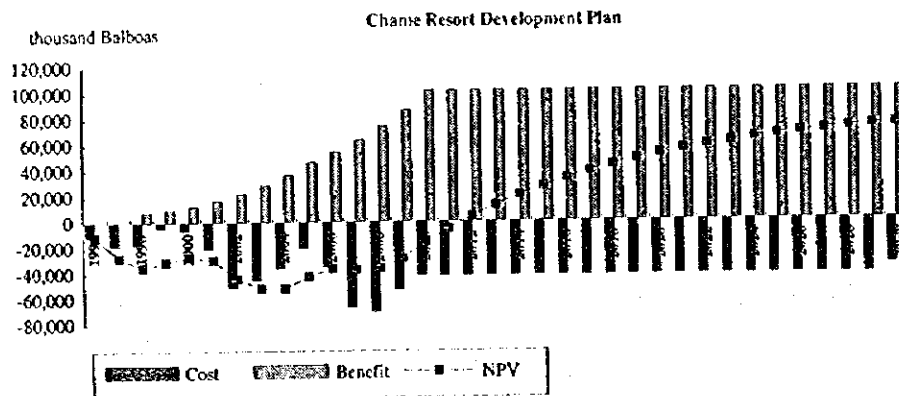


Figure 2.24 Incremental Revenue and Benefits (1996-2010) Chame Resort Development Plan

(3) Calculation and evaluation

Figure 2.30 shows the comparison between benefits, costs and Net Present Value discounted by 12% of the Chame Resort Development Plan from 1996 to 2030.

The Economic Internal Rate of Return (EIRR) and Net Present Value (NPV) have been estimated at 19.0% and 74,138 thousand Balboas respectively. Economic sensitivity has been examined in Table 2.31. The EIRR remains within a level to confirm the economic feasibility of the plan under the assumption of "20% increase in cost and 20% decrease in benefit". The detailed results of calculation are compiled in the Appendix.



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

Figure 2.25 Benefit, Cost and NPV of Chame Resort Development Plan

Table 2.23 Results of Economic Sensitivity Analysis, Chame Resort Development Plan

	EIRR	NPV
Base Case	19.0%	74,138 B/.thousands
Cost increase (20.0%)	15.9%	47,665 B/.thousands
Benefit decrease (20%)	15.3%	32,867 B/.thousands
Cost increase (20.0%) and Benefit decrease (20%)	12.5%	6,395 B/.thousands

2.7.2 Financial Evaluation

The financial viability of the Plan has been examined for the period up to 2020, under the assumption of establishing the TDC, through the following procedure:

- 1) To categorize the development components of the Chame Resort Development Plan to be developed by the TDC in accordance with the development framework (refer to the table in the Appendix)
- 2) To estimate the rates of lease revenues for land and facilities which the TDC may develop and rent to the private sector. In order to estimate the lease rate for each facility, 1% of the total investment cost of the relevant facilities has been estimated to be an average lease fee per month.
- 3) To formulate the cash-flow and the financial plan of the TDC under the general assumptions for the financial evaluation of the TDC, and
- 4) To evaluate the financial viability of the TDC.

The assumptions adopted for the financial evaluation of TDC are explained in the first part of this section (refer to section of 1.3.3).

For the Panama Canal Tourism Development Plan and Portobelo Tourism Development Plan, the financial evaluations have been carried out by adopting the same procedure and assumptions as above.

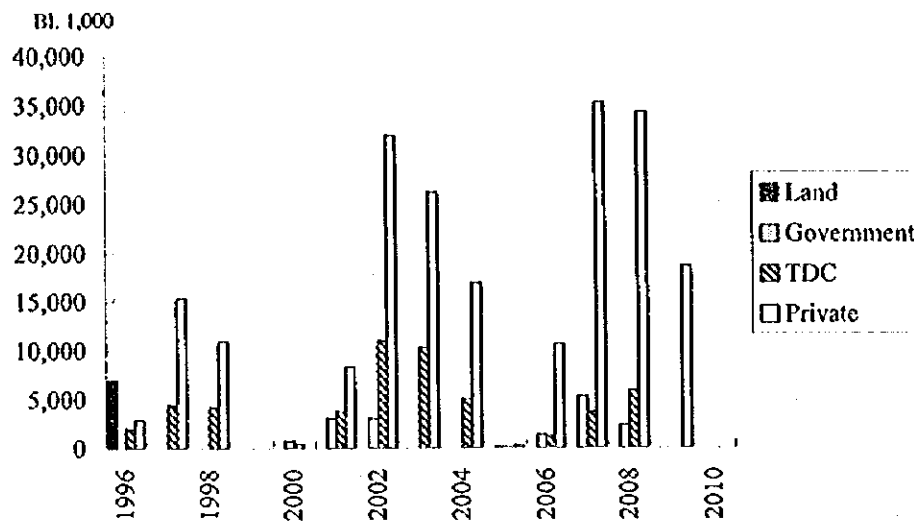
(1) Cost

Table 2.32 shows the investment cost of Chame Resort Development Plan by implementation term and development body and Figure 2.31 illustrates its flow. The share of the investment cost for TDC is estimated at 20% of total cost of the plan or 58,483 thousand Balboas, including the land cost.

As shown in Figure 2.27, the disbursements will increase from the short term to the medium and long terms.

Table 2.24 Investment Cost of Chame Resort Development Plan

Development Body				Unit: B/. 1,000	
	Short	Medium	Long	Total	%
Land	6,915	0	0	6,915	2%
Government	668	6,125	8,866	15,659	6%
TDC	10,917	29,915	10,733	51,565	18%
Private	29,091	83,110	98,290	210,491	74%
Total	47,591 (17%)	119,150 (42%)	117,889 (41%)	284,630 (100%)	100%



**Figure 2.26 Investment Cost by Development Body (1996-2010)
Chame Resort Development Plan**

The operation and maintenance cost of the TDC consists of the following:

- the operating and management cost of the TDC, and
- the maintenance cost of the infrastructure and facilities developed by the TDC.

The maintenance cost is estimated at 5% of the total investment cost. The operating and management cost of the TDC is estimated under the general assumptions made in the previous section.

(2) Revenue

The revenue of the TDC in 2010 is estimated by revenue item as shown in Table 2.33. When estimating the rate of lease fee for land and facilities, 1% of the total development cost is used as a standard monthly leasing rate and simultaneously the market price is taken into consideration. In Chame Resort, the lease revenue of land for accommodation development is estimated to reach almost 75% of the total revenue of the TDC in 2010.

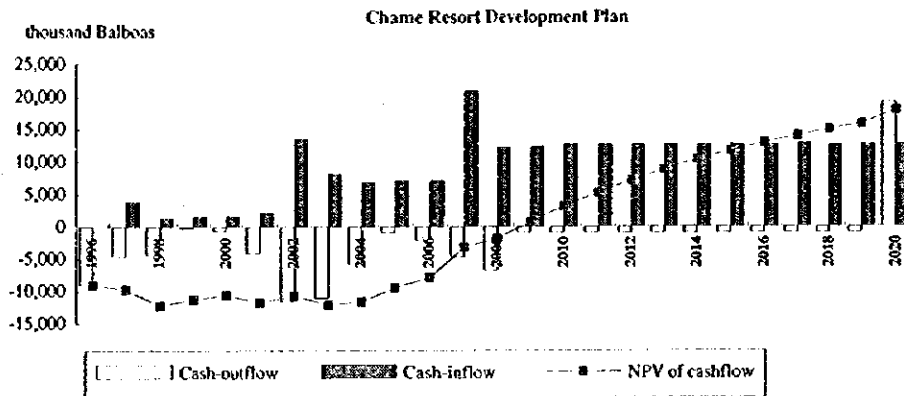
Table 2.25 Estimated Revenue of TDC in 2010, Chame Resort Development Plan

Unit: Bf. 1,000

Revenue Item	Revenue per year	%
Land lease fee for accommodation	9,168	73%
Land lease fee for other facilities	125	1%
Facility lease fee	947	8%
Revenue form tourist	2,374	18%
Total	12,613	100%

(3) Financial Evaluation

Figure 2.32 shows the cash-inflow and cash-outflow of the TDC and net cash-flow presented in NPV between the period from 1996 to 2020, where a discount rate of 12% is used in order to convert net cash-flow into its NPV. The Financial Internal Rate of Return (FIRR) and Net Present Value (NPV) of the TDC before the arrangement of loan is estimated at 19.6% and 17,874 thousand Balboas under the assumptions adopted respectively as shown in Table 2.34. The detailed calculation is shown in the Appendix.



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

Figure 2.27 Estimated Cash-flow and NPV of TDC (1996-2020), Chame Resort Development Plan

Table 2.26 Cash-flow and Results of Financial Evaluation of TDC, Chame Resort Development Plan
Unit: B/. 1,000

Term	Investment Cost		Operation & Mainten. Cost	Total Cost	Lease Fee		Total Revenue	Net Profit
	Land	Facility Devet.			Accomm odation	Other Facilities		
Short	6,915	10,917	1,132	18,964	6,887	1,480	8,368	-10,597
Medium	0	29,915	3,595	33,510	27,439	10,214	37,653	4,143
Long	0	10,733	4,982	15,715	50,244	14,874	65,117	49,400
2011-2020	-6,915	-13,329	10,159	-10,085	91,680	34,703	126,383	136,469
Financial Internal Rate of Return (FIRR):				19.57%				
Net Present Value (NPV) discounted by 12%:				17,874 miles de Balboas				

(4) Financing Plan

The cost of the plan is covered by capital from the TDC, possibly a long-term soft and incremental revenue derived from the plan. Table 2.27 shows the financing plan assumed. The share of the capital and the long-term loan are estimated at 41% and 34% respectively.

Table 2.27 Financing Plan of Investment Cost of TDC, Chame Resort Development Plan
Unit: B/. 1,000

Total Investment Cost of TDC		Financing			
Land	Infrastructure & Facility	Capital		Long-Term Loan	Incremental Revenue
		Public	Private		
		11,913	11,913		
6,915	51,565	23,826 (41%)		20,172 (34%)	14,482 (25%)
58,480		58,480			

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

2.8 Environmental Impact Study (Chame Resort Development)

2.8.1 Introduction

The Chame Resort Development is a complex tourism development project which comprises six tourism projects and an infrastructure development formulated in the previous chapter.

The project area, in consideration of the topography, is divided into three areas consisting of Cerro Chame (mountain), Punta Chame (peninsula) and Rio Chame (river plain) areas.

The Project sites are spatially divided into three areas which are located on the eastern side of Nueva Gorgona, the mouth of the Rio Chame river, the Punta Chame area, and the Cerro Chame area.

The Mineral Resources Department of the Ministry of Industry has designated a reserve area for sand extraction activity along the coast of Punta Chame to Rio Hato within the continental shelf (200 Mts. from the shore line) and a 2 or 3 km. offshore. The project sites are within designated area although it is possible to obtain aggregates nearby.

As a result of the preparation of the environmental impact study, the following impacts are predicted so that the study will be carried out in accordance with the identified impacts.

Table 2.28 Screening of Environment Impacts

	Social Environment									Natural Environment							Pollution						
	Relocation	Economic Activity	Public Facilities	Community Interaction	Cultural Heritages	Water & Other Rights	Health / Sanitary	Wastes	Disaster	Topography and Geology	Erosion	Subterranean Water	River Basin	Coast & Marine Area	Flora and Fauna	Metereology	Landscape	Air Pollution	Water Quality	Soil Contamination	Noise & Vibration	Subsidence	Offensive Odors
1) Hotel Development	D	D	D	D	D	D	C	D	C	C	D	C	C	B	B	B	D	D	D	D	D	D	D
2) Golf Community Development	D	D	D	D	D	D	D	D	C	B	B	B	D	B	D	D	D	C	D	D	D	D	D
3) Amenity Center Development	D	D	D	D	D	D	C	D	D	D	D	D	D	B	D	D	D	D	D	D	D	D	D
4) Beach Improvement	D	D	D	D	D	D	C	D	C	C	D	D	C	C	D	C	D	C	D	D	D	D	D
5) Ecological Tourism Development	D	D	D	D	D	D	C	D	C	C	D	D	D	C	D	D	D	D	D	D	D	D	D
6) Sports facilities Development	D	D	D	D	D	D	C	D	C	C	D	D	D	C	D	D	D	D	D	D	D	D	D
7) Infrastructure Development	D	D	D	D	D	D	D	D	C	C	D	D	D	D	D	D	D	D	D	D	D	D	D

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

2.8.2 Present Condition of Project Area

Characteristics of the project area are mangrove forest with rich fauna along the mouth of the Rio Chame to Punta Chame although mangrove forest has decreased dramatically due to the changing river alignment, development of pasture land, shrimp farming and nearby urbanization. Regarding socioeconomic aspects, the chief industries in this area are the primary industries of fishing and cattle breeding. Sand extraction is being carried out in the surrounding area. Pre-Hispanic ceramics are found in Cerro Chame.

Noteworthy aspects:

- 1) Decreasing mangrove forest due to recent urbanization, development of pasture land and shrimp breeding.
- 2) Eutrophication due to feedstuffs used for shrimp breeding is increasing in the vicinity.
- 3) Marine turtles lay their eggs in the coastal area of Punta Chame to Playa Corona.
- 4) Coastal erosion is caused by the changing river alignment and sand extraction activities in the surrounding area.

Table 2.29 Summary of Present Conditions in Project Area

Factors	Subject Items	Summary of Present Conditions
(1) Geography	1) Topography 2) Meteorology 3) River system 4) Soil 5) Land Use	Cerro Chame: Pre mountain wet forest, 523 Mts. above sea level with volcanic formation. No settlement Rio Chame: Tropical dry forest, Adjacent area of Nueva Gorgona. The mouth of Chame river area. alluvial formation, tropical savanna Punta Chame: Tropical dry forest, Peninsula form, Mangrove forest, Villas development adjacent area
(2) Flora	1) Vegetation distribution 2) Endangered species	Cerro Chame Area: - Patches of natural vegetation, Secondary forest, and grass, Fallow system Rio Chame Area: - Red Mangrove forest along the Rio Chame to Punta Chame Punta Chame - Red Mangrove forest along the Rio Chame to Punta Chame
(3) Fauna	1) Habitat area 2) Endangered species	Cerro Chame Area: - White tail deer, Paca, Cotai, Geoffrey's, Parrots, Rio Chame Area: - Rich fauna in mangrove forest (mangrove Iguana, Crab eating raccoons, Wilson's, swallows), several varieties of marine turtles (Haksbill, loggerhead) breed. Punta Chame - Swallows, marine turtles (Haksbill, loggerhead)
(4) Landscape	1) Location of viewing points 2) Significance of landscape	Cerro Chame Area: - Patches of forest (secondary forest), Rio Chame Area: - Mangrove forest, dune Punta Chame - Mangrove forest, dune
(5) Socioeconomic Activities	1) Chief Industry 2) Inhabitants	Cerro Chame Area: - No settlement in the project area Rio Chame Area: - Sand extraction is being carried out. No settlement Punta Chame - Adjacent area has been developed for a villas. Fishing is chief industry
(6) Water Quality	1) BOD / COD 2) SS	Cerro Chame Area: - No data Rio Chame Area: - No data Punta Chame - No data
(7) Waste Matters	1) Waste Matters 2) Occurrence sites	Rio Chame Area: - Slight garbage accumulation
(8) Cultural / Historical Assets	1) Existing Cultural Assets 2) Scale and volume	Cerro Chame Area: - AD 500 pre-Hispanic assets (ceramics) are identified Rio Chame Area and Punta Chame - Nothing in particular

2.8.3 Environment Impact Analysis

The Chame Resort Development comprises the following development projects. The environmental impacts in each development area are analyzed. The nature of environmental impacts is mainly on flora and fauna through land development in the Rio Chame and Punta Chame Areas. The development impacts for each project are shown in the following table.

Table 2.30 Environmental Impact Characteristics

Supporting Projects	Project Type / Contents	Project Site	Negative Impact Potential
1) Hotel development	Accommodation development (rooms)	Rio Chame, Punta Chame	Flora and fauna Waste matter
2) Golf community development	Golf ground development (18 holes)	Rio Chame South	Water quality
3) Amenity Center Development	Visitor center (building: 900 Sqm., others: 3,650 Sqm. and 20 ha. reserved area) and parking (220 cars)	Punta Chame	Flora and fauna
4) Beach improvement	Parking (220 cars), access road to beach (6 Mts. x 5 sections,)	Nueva Gorgona to Punta Chame	Flora
5) Ecological Tourism facility	Rest facilities and trail development (Buildings: 500 Sqm. parking: 400 Sqm., trail: 12 km.)	Cerro Chame	Topographic aspects
6) Sports Facility Development	Multi-purpose area (2 ha.), tennis court (5 courts), horse riding area (2.5 km.), picnic area (10 ha.) and rest room (90 Sqm.)	Rio Chame	Water quality
7) Infrastructure Development	Road Development (Mts.) Water Supply (2,410 m ³ /day), and Solid Waste Sewerage (54 ton/day), Electricity (22.7 MW) and Telecommunication (1,210 lines)	Cerro Chame, Punta Chame and Rio Chame	Flora and fauna, Landscape, water quality

2.8.4 Environmental Impact Prediction and Evaluation

As a result of the environmental impact Analysis, identified environmental impacts are processed in consideration of construction and operation phase, and scale and type when the projects are carried out. Principal impacts are described while any other small impacts are predicted in this examination.

3. Panama Canal Tourism Development Project

3. Panama Canal Tourism Development Plan

3.1 Study area definition

The Panama Canal consists of three sub-zones: Colon city area, Gatún Lake area, and Isthmus area. The total area of the Canal and its surroundings covers 3,339 sq. kms. Feasibility study is selected for three packaged focal development areas : 1) Gamboa Tourism Development, 2) Summit Tourism Development and 3) Punta Toro Resort Development and 10 focal development spots of the Outdoor Museum Park system are selected, as shown in Figure 3.1.

(2) Focal development areas and spots

- 1) Central Canal area (Summit and Gamboa)
- 2) Northern Canal area (Punta Toro)
- 3) Focal spot areas along the Canal and its vicinities (Amador, American Bridge, Miraflores and Locks, Contractor's Hill, Ruins, Panama Canal Tower area, Panama Canal Museum area, Gatún Locks and Gatún Dam, Punta Toro, San Lorenzo)

Table 3.1 Development Components

Project	Colon City /Punta Toro	Gamboa	Summit
Hotel accommodation	1,105 rms	653 rms in Gamboa	131 rms in Summit
Tourist facilities		Information center Observation tower Canal museum Golf course Tourist pier	Botanical garden Zoological park Golf course Ecological study center Food entertainment
Monument park	Monument park	Monument parks	
Beach improvement	Punta Toro beach		
Infrastructure	Colon marina	Gamboa bridge	Botanical garden road
Transport		Gatun marina	

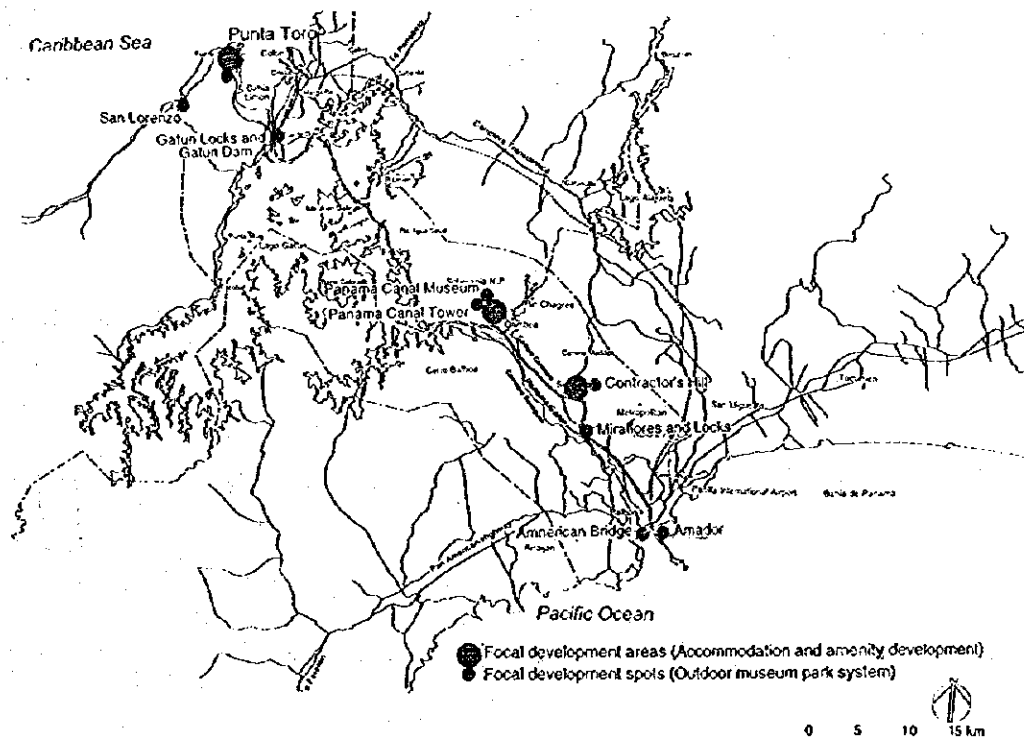
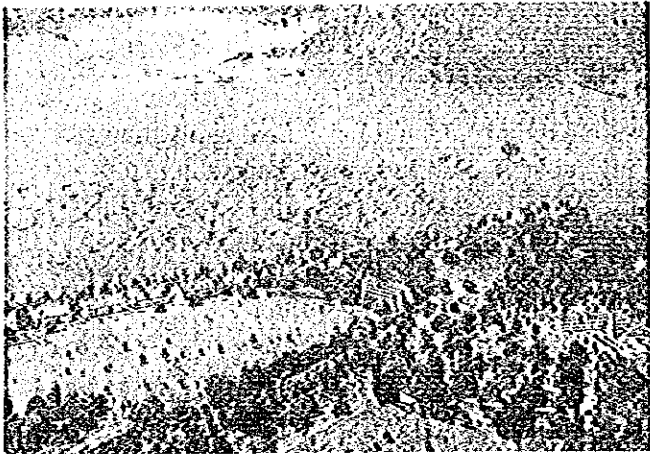
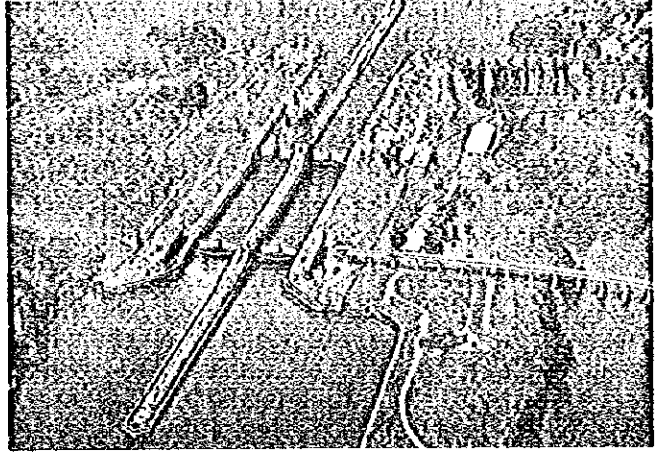


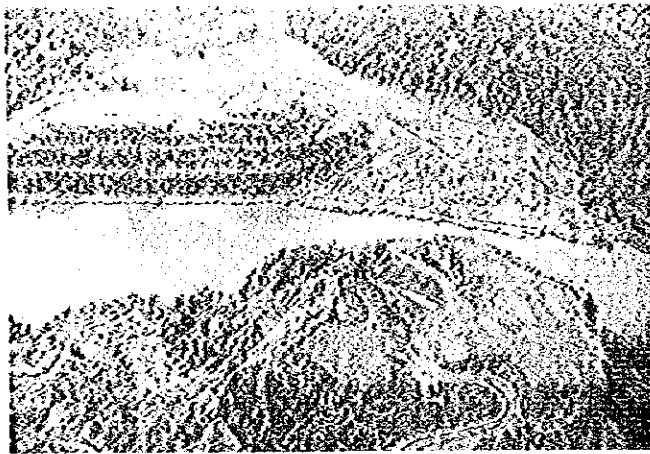
Figure 3.1 Location Map



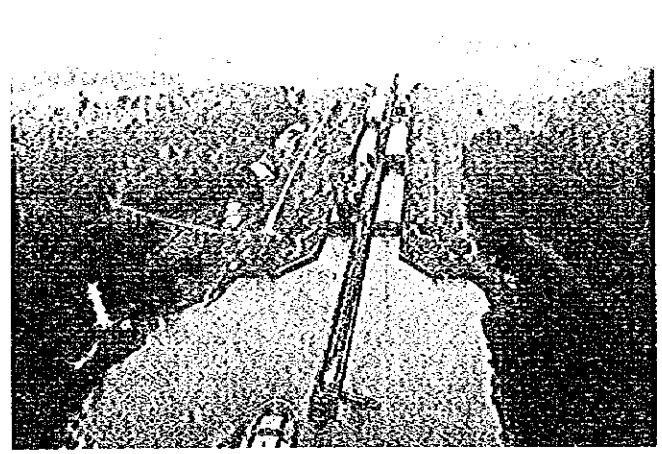
Amador Area: Gateway of the Panama Canal and Yacht Harbor



Miraflores Locks



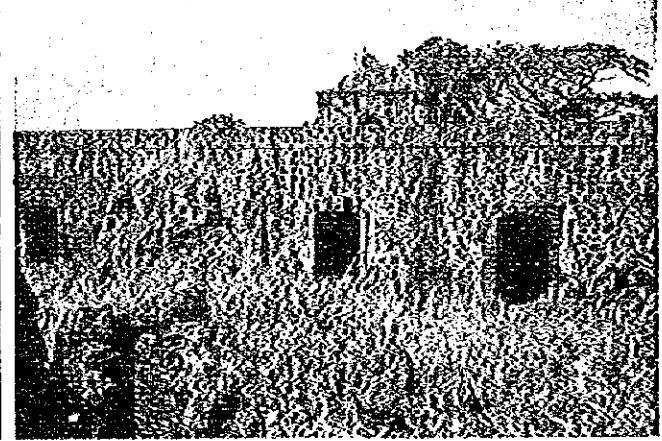
Contractor's Hill (above) and Gaillard cut (below)



Gatun Locks / Gatun Dam



Punta Toro Area



Fort San Lorenzo

3.2 Physical Conditions of Focal Areas

3.2.1 Gamboa Area

(I) Existing land use conditions

As shown in Figure 3.2 - 3.4 land use for tourism can be further improved within the existing compound without deterioration of the existing natural environment. However, new land areas for development are limited as shown in land use and land capability maps, thus, the density of land use should be improved.

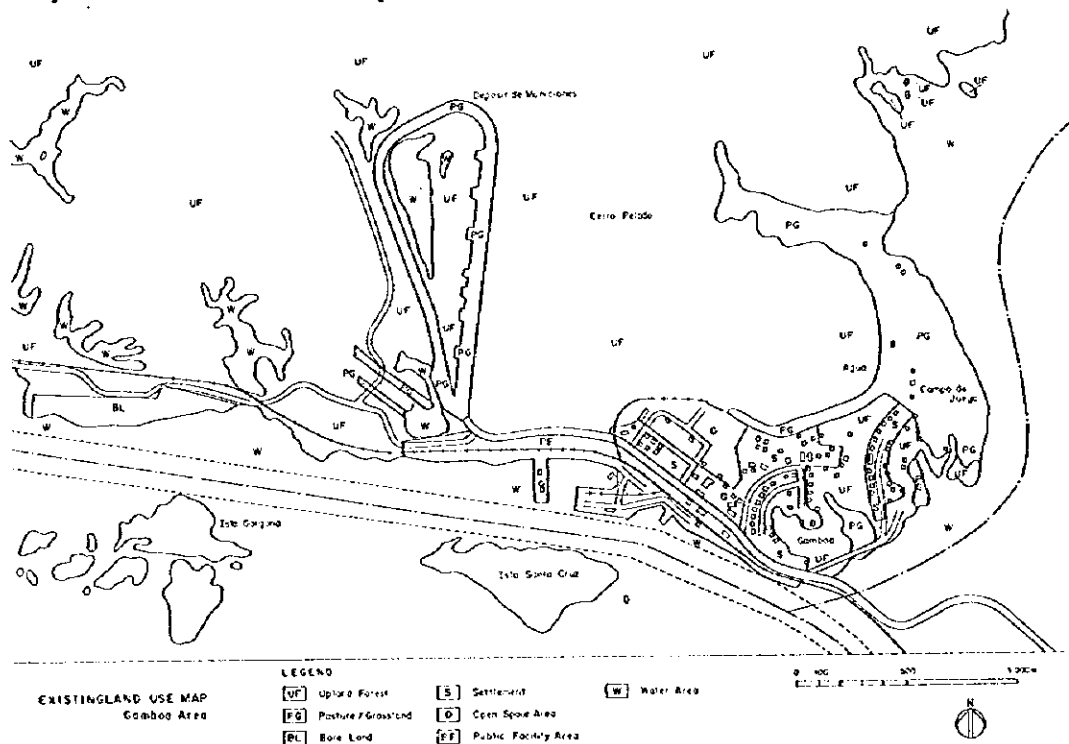


Figure 3.2 Existing Land Use: Gamboa area

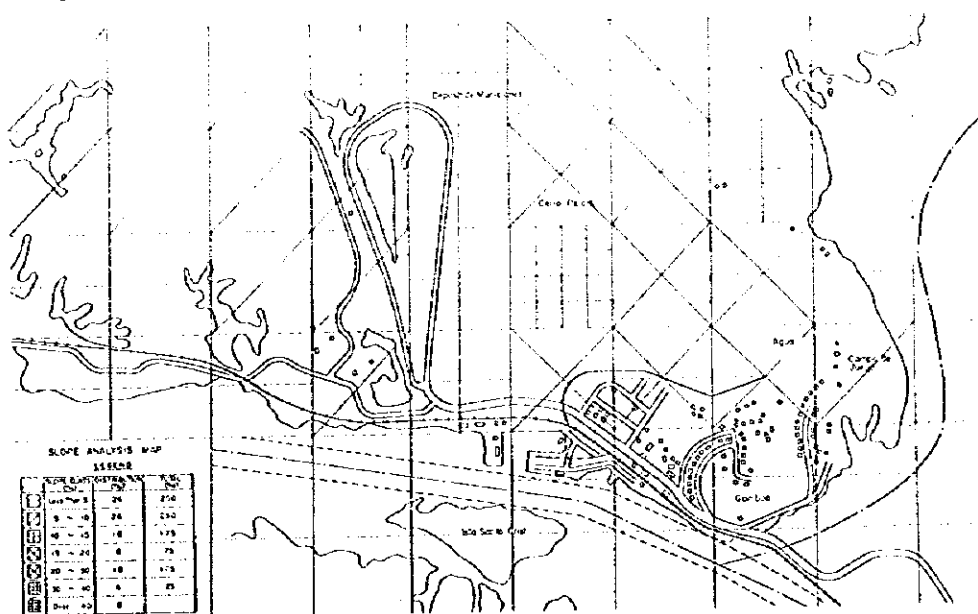


Figure 3.3 Slope Analysis

(2) Natural and Cultural Features

Natural features in this area will impress visitors. It is the buffer zone between intensive use areas and rain forest areas. The intensive use area is composed of many houses of two storey wooded structures for residences of canal officials and workers. Also the area where Churches, schools, sports facilities, and open space are located.

(3) Infrastructure Conditions

The road has an average width of 6 meters or 2 lanes but for the bridge crossing the Rio Chagres, the width is reduced to one lane with combined use by the railway. Construction of a new bridge needs to be developed as an urgent project. Utilities are adequate at present but may not be sufficient if the demand increases.

(4) Potential Tourism Development Areas

Due to the many officials and other people living in the area with facilities, tourism development can be easily improved if facilities and areas with potential are opened to the tourists in Gamboa. Utilization of Cerro Pelado as an observation area, the existing golf course, existing housing for accommodation, and improvement of public facilities for tourists are the most important elements. Existing Gamboa tourist pier, Gamboa railway station, and bridge at the Gamboa gate arts as the main entrance for tours to this attractive place.

The French cemetery area, observation spots at the series of locks and maintenance yards along the canal, are potential areas which merit attention.

3.2.2 Summit Area

(1) Existing land use conditions

Summit area is managed under the Soberania National Park and land use of the area is dominated by forest of the 1,272 ha. of land, there are 895 ha of upland forest and 265 ha of Pasture/grassland. As shown in Figure 3.5 and 3.6, existing land use for tourism can be further improved within the compound of Summit Botanical Garden area.

Table 3.2 Existing Land Use in Summit

Land use type	Area (ha)	Ratio (%)
1 Upland forest	895	70.4%
2 Pasture / Grassland	265	20.8%
3 Bare land	7	0.6%
4 Settlement	10	0.8%
5 Soberania Botanical Garden	40	3.1%
6 Industrial area	21	1.7%
7 Forest cleared area	34	2.7%
Total	1,272	100%

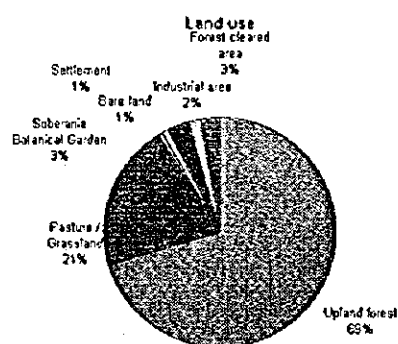


Figure 3.4 Existing Major Land Use in Summit Area

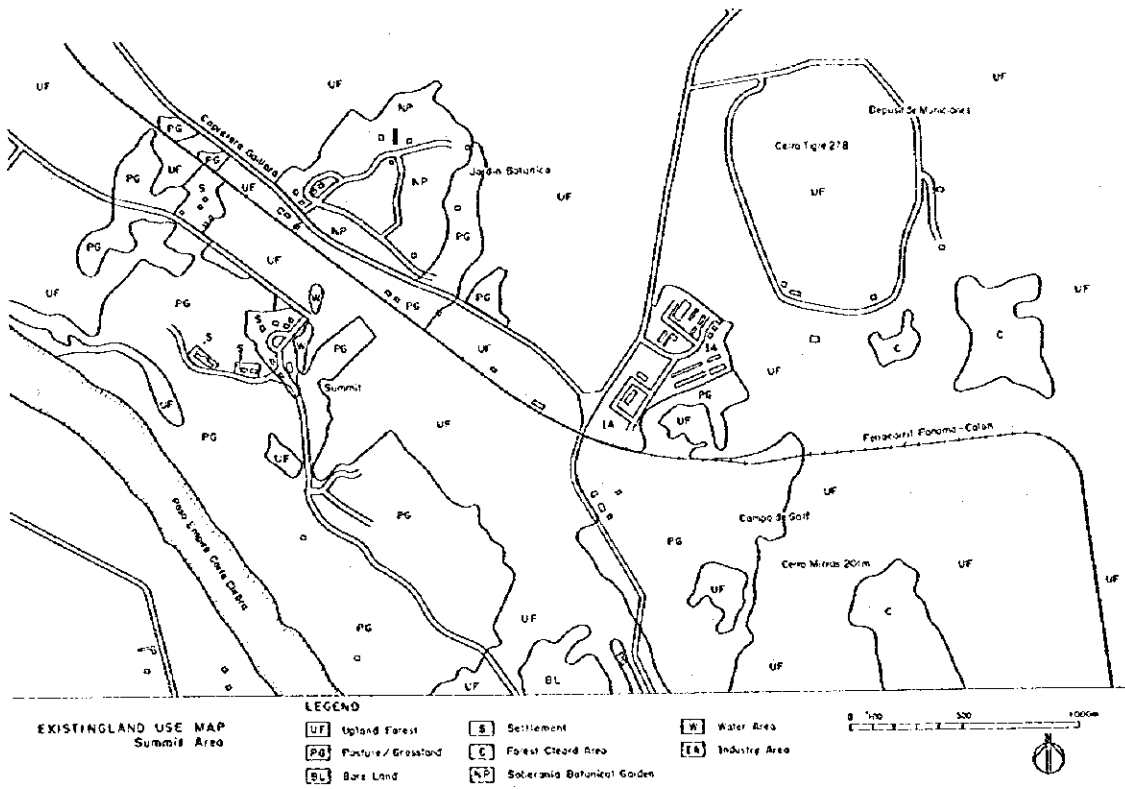


Figure 3.5 Existing Land Use in Summit Area

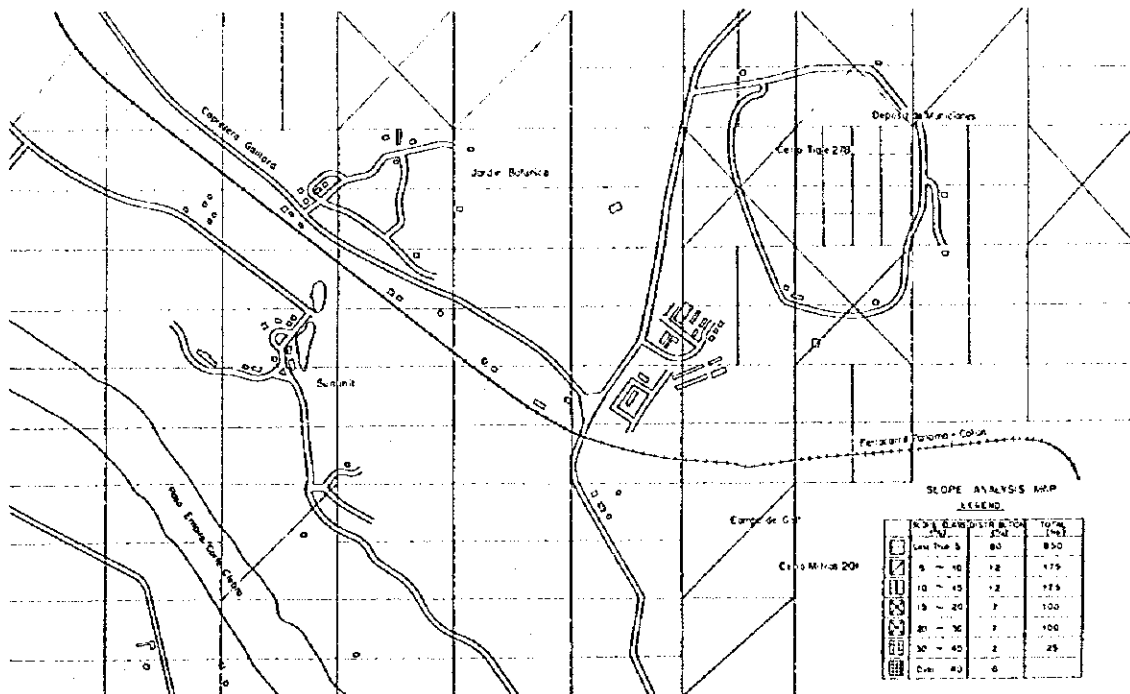


Figure 3.6 Slope Analysis in Summit Area

(2) Natural and Cultural Features

Forest dominated areas have potential for nature loving tourists. Tourism activities depend on the availability of basic resources. It is noteworthy that this area holds the world record for the largest number of birds observed in forests in one day. A part of the natural ecosystem can be seen in the Summit Botanical Garden.

(3) Infrastructure conditions

Basic infrastructure is available, but may not be sufficient if the demand increases due to implementation of the study.

(4) Potential tourism development area

There are many forests, waterways, and rivers which can be developed for tourist potentials. This potential should be utilized as follows:

- 1) To establish an amenity road for Botanical Garden route
- 2) To revitalize the former golf course
- 3) To establish an accommodation and observation area near the waterway
- 4) To establish an ecological study area nearby the Botanical Gardens
- 5) To improve the existing tourist related facilities
- 6) To provide information on the most attractive areas

3.3 Development Framework of Focal Areas

(1) Target number of tourists

The tourist potential of the area should be developed to serve the tourist demand by type of tourists;

Table 3.3 Target Number of Tourists of Panama Canal Area

	Night stay tourists			Daytime tourists		
	2000	2005	2010	2000	2005	2010
Foreign	199,000	715,000	860,000	397,000	536,000	943,000
Domestic	8,000	111,000	221,000	466,000	1,031,000	2,062,000
Total	207,000	826,000	1,081,000	863,000	1,567,000	3,008,000

(2) Accommodation development allocation

Table 3.4 shows the aggregate result for the years ending 2000, 2005 and 2010 by hotel classification category for the Panama Canal Zone. There are four locations in the development area.