STUDY ON
THE ESMERALDAS EXPORT PROCESSING ZONE
DEVELOPMENT PROJECT
IN THE REPUBLIC OF ECUADOR

FINAL REPORT
SUMMARY

December 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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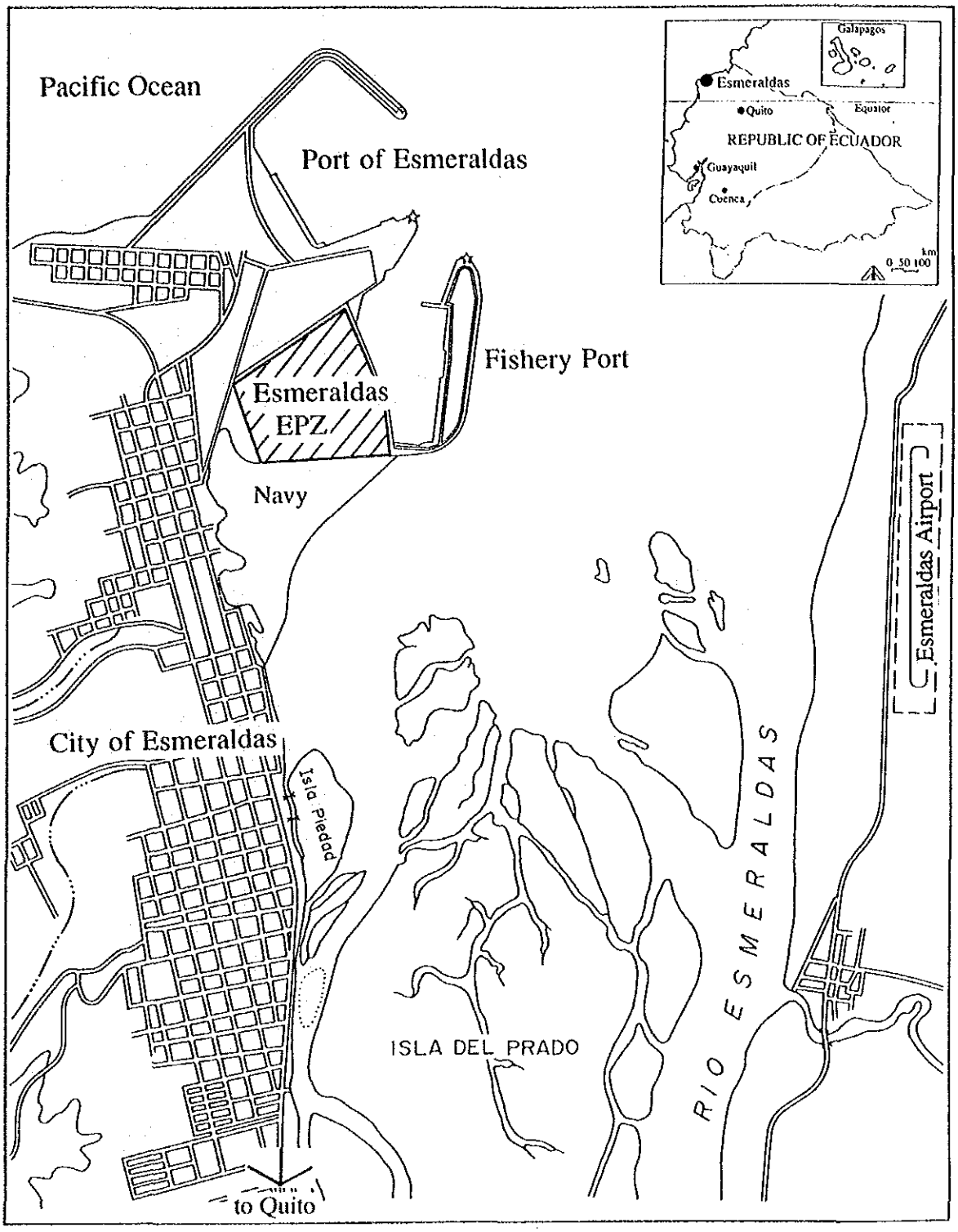

NORTH

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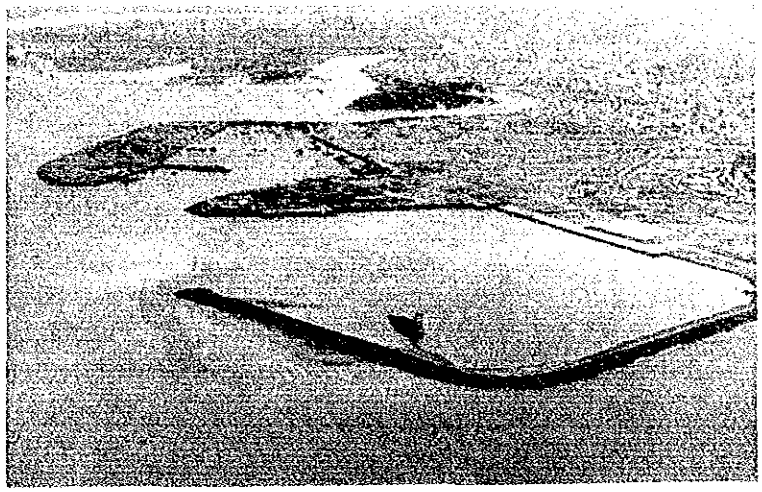
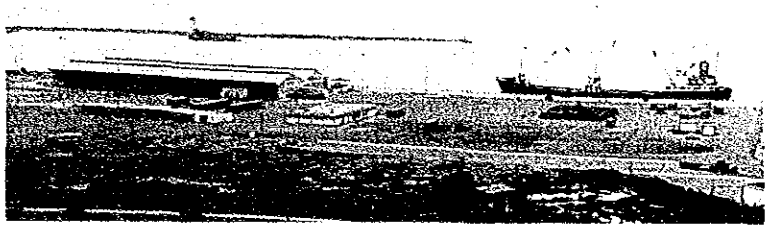
ESMERALDAS EXPORT PROCESSING ZONE DEVELOPMENT PROJECT

Location Map

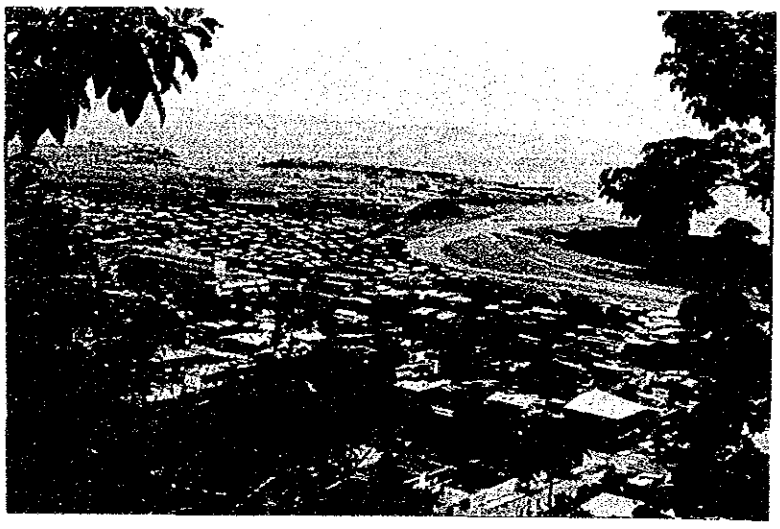
JAPAN INTERNATIONAL COOPERATION AGENCY



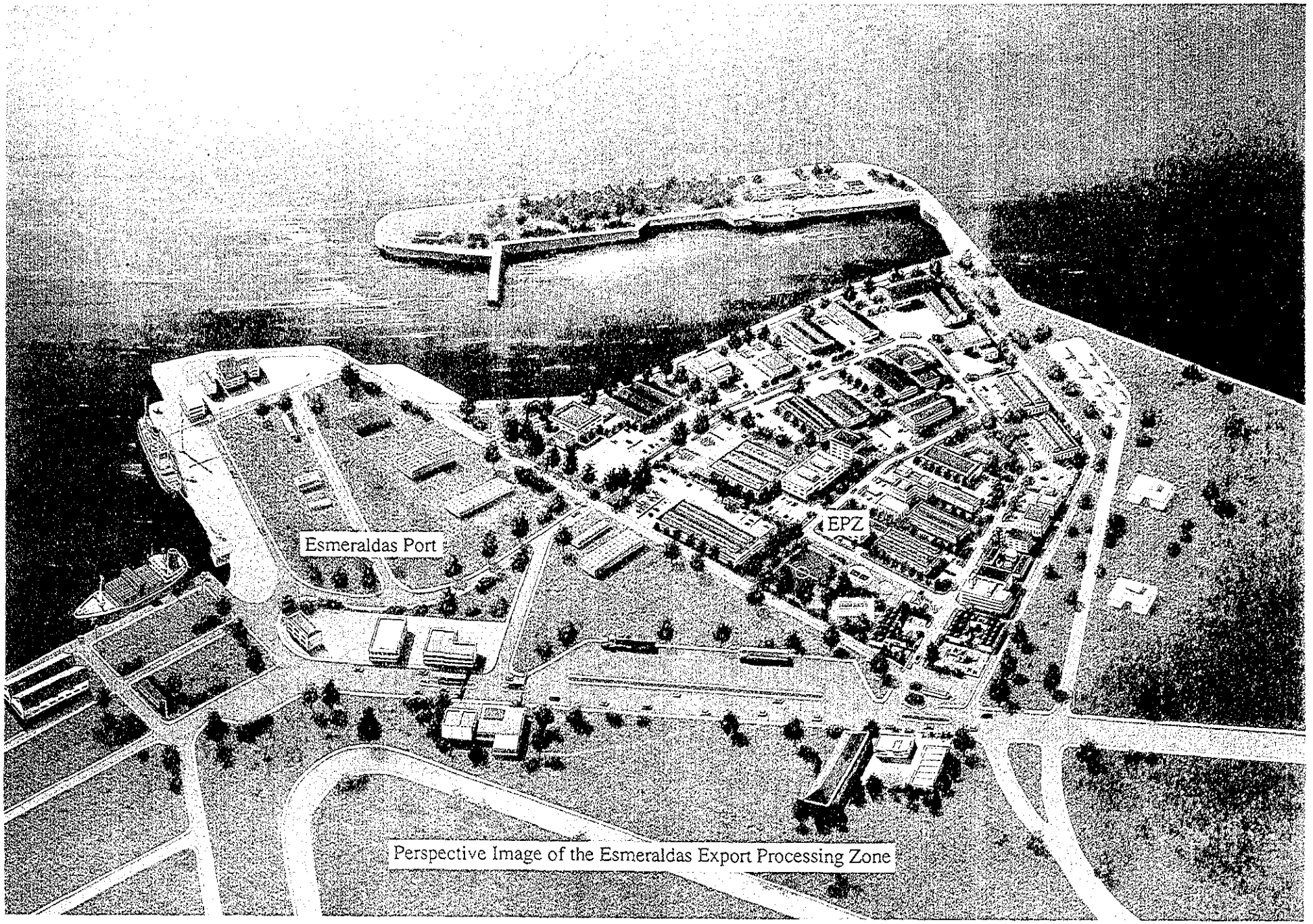
Panoramic View of the Esmeraldas Port and the Esmeraldas EPZ Site



Esmeraldas Port



City of Esmeraldas



Perspective Image of the Esmeraldas Export Processing Zone

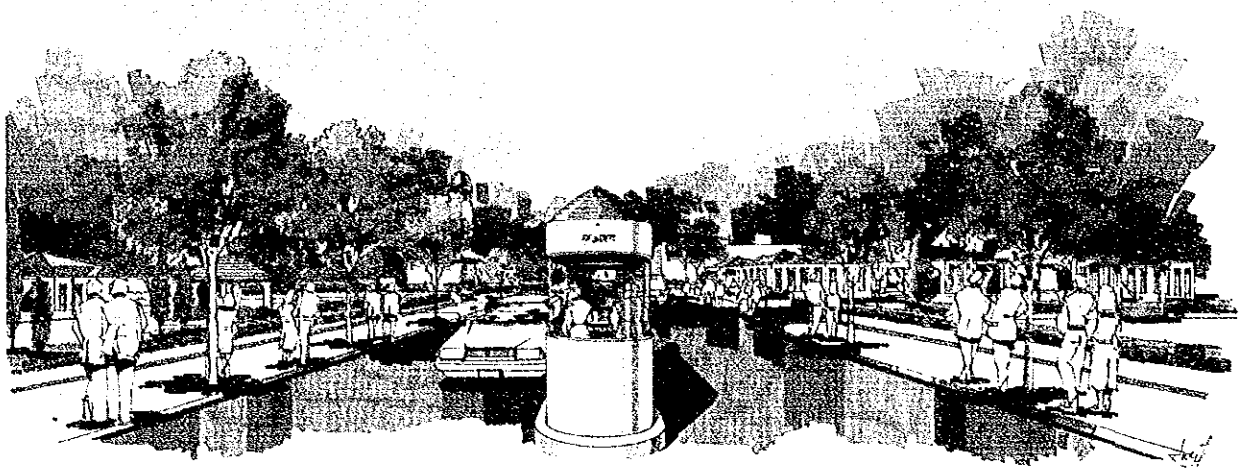


Image of the Esmeraldas EPZ (Front Gate)

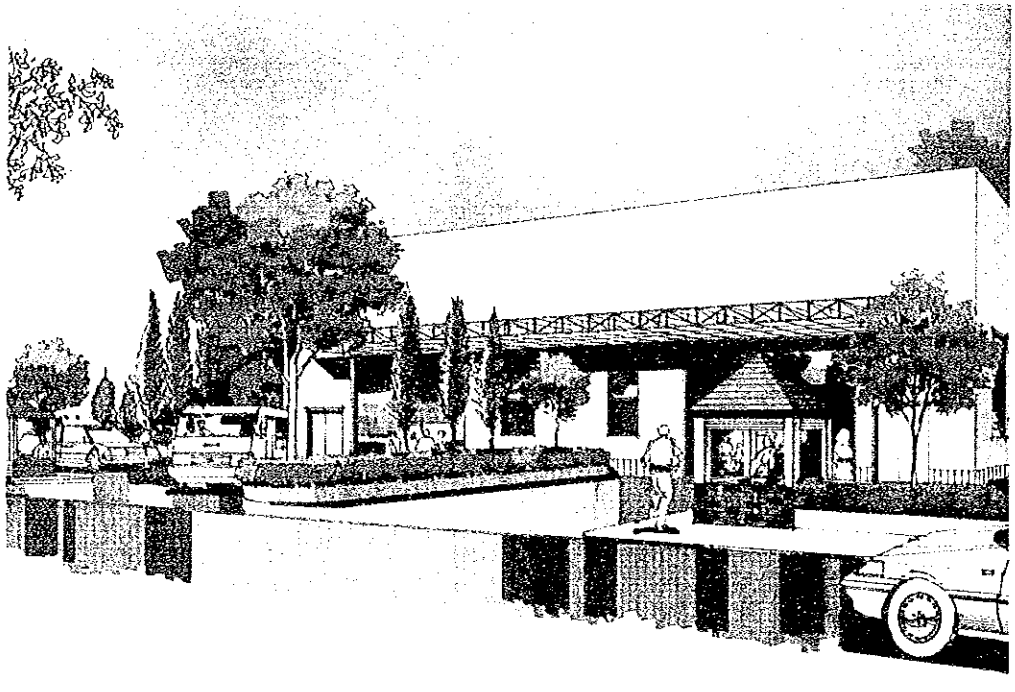


Image of Standard Factory

ESMERALDAS EXPORT PROCESSING ZONE DEVELOPMENT PROJECT

SUMMARY

1. BACKGROUND OF THE STUDY

The industrial sector of Ecuador, which accounted for about 17% of GDP in 1990, remained yet to be developed for the accelerated economic development of the country. The 1989-92 development plan puts an emphasis on the industrial development to meet the requirements of domestic demands and to promote exports for foreign exchange earnings. In compliance with these policies, establishment of Export Processing Zones (EPZs) has been planned by the Government of Ecuador. Esmeraldas, which faces the Pacific Ocean, was selected as the first location of EPZ in Ecuador.

A tract of reclaimed land of about 23 ha adjacent to Esmeraldas port has been allocated for the EPZ development. An administration company, ZOFREE has been set up for the implementation and management of the Project. A study including layout plan was conducted by CENDES and ZOFREE, but detailed study on investment demand, institutional framework and infrastructure development has yet to be made. Under such circumstances, the feasibility level study on the Esmeraldas EPZ has been conducted by JICA Study Team. The study has been executed in Ecuador and Japan during the period from January to March 1991 and from May to December 1991.

2. NATIONAL SOCIO-ECONOMIC BACKGROUND

2.1 Socio-economic Background

During the inter-census period (1982-1990), total population grew at an annual average rate of 2.27% and reached 9.62 million in 1990. Economically active population was 38% of total population. Unemployment rate was estimated to be as high as 14.7%.

GDP growth rate in 1981-1990 was 1.8% in real term. The growth rate was negative in 1983 when non-oil sectors decreased productions and in 1987 when oil pipeline was destructed by earthquakes. Shares of GDP were relatively dispersed among several major

sectors; agriculture (19%), manufacturing (17%), trade and hotels (16%) and petroleum-mining (15%).

Current accounts in the balance of payments were deficit in 1986-90, though compensated by the positive net capital inflow. Exports have exceeded imports, but exports are primarily dependent on crude petroleum and traditional agricultural products.

The national economy, as glanced at before, has been kept stagnant in 1980s and the rate of unemployment and underemployment has been getting higher in recent years. Under the circumstances, the Government of Ecuador is promoting the 1989-1992 development plan to reactivate and accelerate the national economy. One of the major issues in the 1989-1992 development plan is to accelerate industrialization and to promote exports. Since the trades and investments among the member countries of the Cartagena Agreement are liberalized, new foreign investment regulations were enacted in June 1981. The Government expects that the industrialization could be accelerated with the introduction of foreign investments and technologies under the new regulations. The Law of Free Zones, enacted in February 1991, would also be an instrument to accelerate industrialization and to promote exports.

2.2 Sectoral Background

Manufacturing sector in Ecuador principally comprises light-industry, such as food processing, textile-garments, wood and furnitures, etc. Value-added in food products and textile-garments accounted for 56% of the sectoral GDP in 1989. Value-added in other sub-sectors, such as paper-printing, minerals, machinery-equipment, etc. grew steadily in 1981-1989. Export of the manufacturing sector grew at the annual average rate of 1.7% in 1985-1990. Petroleum deviatives had the largest share of export (41%) in 1990, followed by manufactured cacao and coffee (22%) and metal manufacture (4%).

There are about 1,540 enterprises (with more than 10 employees) in Ecuador, employing about 110,000 persons in 1988. Manufacturing enterprises are relatively small in scale, and the average employees per enterprise was about 67 persons and the average production value was about S/.10 million per employee. Geographically, over 80% of manufacturing enterprises are located in three provinces; i.e. Pichincha, Guayas and Azuay provinces.

3. REGIONAL BACKGROUND

3.1 Socio-economic Conditions

In 1990, Esmeraldas Canton had total population of about 173,000, or 1.8% of total population in Ecuador. Urban population was 98,000 (57%) and rural population was 75,000 (43%). The average growth rate of urban population in the Municipality of Esmeraldas was limited to 1.03% per annum, with the implication that the Municipality has no longer enough capacity to absorb increasing population and population, will be expanded more in rural area.

Economically active population was 39%. Although the unemployment rate in Esmeraldas in recent years is unavailable, it is presumed that the rate is much higher than the national average of 14.7% in 1990. Educational level of population in Esmeraldas lagged slightly behind the average in urban area of the country.

Agriculture is the principal activity in Esmeraldas Province. Major products are banana, african palm, coconut, grapefruit, etc. Wood products is also significant, with log and sawn wood accounting for 24% and 29% of national production, respectively. Fishery is another important industry in Esmeraldas.

The manufacturing sector in Esmeraldas Province is less developed, though the Province contributed for 5% of the national production in the sector. The major industry in the Province is oil refinery, which accounted for 97% of manufacturing production of the Province. There are 7 other industrial establishments, of which 2 are food processing and 5 are wood processing.

3.2 Physical Conditions

Topographically, the land prepared for the Esmeraldas EPZ is flat, with elevation ranging from 2 to 4 m above mean sea level. Land filling will not be required for development of the Esmeraldas EPZ.

Climate is complex and full of variety. Annual mean temperature is about 26°C and annual mean rainfall ranges from 432 mm to 924 mm in 1977-1986. Direction of wind are predominantly west, south and southwest, or mainly from the urban area and hilly area behind to the direction of the Esmeraldas EPZ.

Geotechnically, soils in the Esmeraldas EPZ are composed of top soil, sand with gravel, sandy silt, gravel sand, silty sand, silt, etc. Through the core boring and soil laboratory tests conducted in the course of the study, it has been evaluated that substantial settlement and differential settlement will not occur under the condition of ground without fill, if buildings and facilities in the Esmeraldas EPZ are not heavy structures and they are limited to one or two storied buildings.

3.3 Existing Infrastructures

1) Transportation: Esmeraldas is connected by national road No. 25 with Quito and Guayaquil (Esmeraldas-Quito is 310 km). Inner road network in Esmeraldas is formed with well paved roads, but some damages are observed due to poor maintenance. Esmeraldas airport, with a runway length of 2,400 m, is located on the opposite side of Esmeraldas river and commercial airliner is operating between Quito and Esmeraldas six times a week. Port of Esmeraldas was constructed in 1979. It has two berths (350 m of quay wall) enough to accommodate 25,000 DWT ships, as well as ro-ro facility. The port has an expansion plan to construct an additional general cargo berth (175 m) and one container berth (175 m). The port has enough cargo handling spaces and stockyards.

2) Water supply system: Existing water supply system in Esmeraldas, constructed in 1962-65 with a treatment capacity of 800 m^3, is insufficient to feed the city. 6 out of 12 wells are in operation, and 3 additional wells are under construction at present. IEOS is also constructing a new required water supply system and it is scheduled for completion by the end of 1992. When the new system is completed, there will be no problem in water supply in Esmeraldas.

3) Sewerage system: Existing sewerage system in Esmeraldas, constructed in 1965-78, is originally designed for a separate system. Wastewater of more than 50% of the city, however, is presently discharged into Esmeraldas river due to irrational sewer pipe connection to drainage pipes. Wastewater is pumped through a submarine pipe for discharge into the sea at a site about 1.5 km offshore. There is no future improvement plan scheduled for sewerage system in Esmeraldas.

4) Drainage system: Present drainage system is practically operated as a combined system. Drainage pipes are provided for about two thirds of the city area. Many drainage pipes are, however, stuck with sand and they are improperly maintained.

5) Solid waste disposal: Solid waste disposal is operated by the Union. The disposal site is located on the outskirts of the city, and solid waste is dumped and incinerated at the disposal site.

6) Electric power supply: National grid is operated by INECEL, while regional distribution is managed by EMELESA. The national grid has enough power source to feed the grid. Beside, 125 kW thermal plant is available in Esmeraldas as a reserve power source. INECEL's power is received at Santas Vainas substation (138/69 kV) and it is distributed by EMELESA through 13.8 kV distribution lines. EMELESA has a plan to construct a new substation (10 MVA) to cover the demand in the port area, including the Esmeraldas EPZ.

7) Telecommunications: IETEL's switching station in Esmeraldas is limited at present to 6,000 channels and available lines are quite limited. However, IETEL is constructing a second switching station in Esmeraldas with 9,000 digital channels, and it is scheduled for completion towards the end of 1992. When this new station is completed, there will be no problem in telecommunications system. Data communication exchange will also be practicable at that time.

4. FRAMEWORK FOR EPZ DEVELOPMENT

4.1 Expected Role of EPZ

The expected roles of the Esmeraldas EPZ are multi-folds. Among others, principal roles are enumerated as follows:

i) Acceleration of industrialization,
ii) Export promotion,
iii) Foreign exchange earnings, and
iv) Regional development.

The Esmeraldas EPZ is the first EPZ ever implemented in Ecuador, and it is considered to be a pilot project to spearhead other EPZs to be successively developed in Ecuador.

4.2 Legal and Institutional Framework

The Law of Free Zones in Ecuador was enacted in February 1991. Subsequently, the related regulations were issued in September 1991. Under the Law, free zone users may be industrial firms, commercial firms or service firms. National Free Zone Council (CONAZOFRA) has powers to dictate the general policies for EPZ operation and to monitor all matters related to EPZ. Each EPZ is to be managed by the administration company. In the case of the Esmeraldas EPZ, ZOFREE has been established as the administration company.

In relation to the Law of the Free Zones, some new laws and regulations have been recently promulgated. One is the new foreign investment regulations issued in June 1991 to cope with the liberalization among member countries of the Cartagena Agreement. The other is the maquila law and regulations enacted in August - October 1990. Under the maquila law, about 13 enterprises have already been operating or have concrete plans to begin maquila operation in Ecuador.

There are a number of EPZs in central and south American countries. The legal and institutional issues in these EPZs have been reviewed to compare them with the conditions offered by the Ecuadorian Law of Free Zones. As a whole, institutional incentives provided by Ecuador appear to be advantageous to investors and fully comparable to other EPZs in the region.

5. PROSPECTS OF INVESTMENT DEMAND

5.1 Market Survey of Potential Investors

The market survey of potential investors has been executed in Ecuador, USA - Mexico and Japan, with the objectives to i) measure the magnitude of interest in investing in the Esmeraldas EPZ, ii) identify specific categories of industries fit for location in the EPZ, iii) grasp the needs and requirements of investors, and iv) find out the perception of the potential investors in the Esmeraldas EPZ.

Prior to the questionnaire and interview survey in each country, priority categories of industries have been screened, putting emphasis on the labor intensive industries, export-oriented industries and local resources utilization industries. A total of 33 categories have been screened out, and they have been referred to in the selection of samples for questionnaire survey.

5.2 Prospect of Ecuadorian Investment

From the inventory of 1,733 enterprises, a total of 789 companies were selected for short-interview survey. The survey disclosed that 185 companies (23.4%) were interested in EPZs, of which 110 companies preferred to locate in Esmeraldas.

The subsequent long-interview survey with 185 enterprises revealed that 50 companies were interested in the Esmeraldas EPZ with their idea for investment plans, while 10 other companies preferred to locate their factories in EPZs in other locations in Ecuador. These 50 enterprises are considered to be "likely investors" in the Esmeraldas EPZ. Industrial categories of these likely investors are summarized as follows:

ISIC	Category	Number of Likely Investors	(%)
311, 312	Food manufacturing	11	(22.0)
321, 322, 324	Textile, apparel, footwear	11	(22.0)
331, 332	Wood, furniture	3	(6.0)
342	Printing	2	(4.0)
352, 356	Chemical, plastic	11	(22.0)
381, 383, 384	Metal, machinery, equipment	7	(14.0)
	Not declared	5	(10.0)
Total		50	(100.0)

5.3 Prospect of US and Mexican Investment

Selected from 12 published lists of investors, questionnaire was sent to 1,014 companies in net (80% in USA and 16% in Mexico). 28 responses out of 1,014 net mailing were received. The most responsive and positive industry was the apparel industry (6 out of 28 responses).

Subsequently, interview survey was conducted with 41 enterprises, including 10 positive responses to the mail questionnaire survey. As a result, 6 companies expressed reasonable interest in the investment in the Esmeraldas EPZ. They are:

Category	Number of Likely Investor
Apparel	3
Auto parts (wire harnesses)	1
Rattan furniture	1
Developer of industrial construction	1
Total	6

5.4 Prospect of Japanese Investment

Selected from 2 published list of investors, questionnaire was mailed out to 576 enterprises in Japan. Out of the mailed questionnaire, 117 responses were received (response ratio of 20%). Of these responses, 11 enterprises expressed that the investment in the Esmeraldas was worth studying.

ISIC	Category/Products	Number of "Worth Studying"
312	Coffee processing	1
351-352	Chemical product, explosives, Drug and medicine	3
382, 385	Agric. machinery, transport equipment, precision machinery	4
390	Sporting goods	1
-	Engineering, wholesale/trader	2
Total		11

The subsequent interview survey with 11 enterprises, as well as with 9 other enterprises and association of companies, revealed that the investment would not be for the immediate future. Consequently, the interest of Japanese investors has been considered as "long-range interest".

5.5 Overall Investment Demand

50 likely investors in Ecuador and 5 likely investors in USA and Mexico (1 developer of industrial construction was precluded) have been identified through the investment demand survey of this study. If exhaustive survey were made in USA, 4 to 5 times more likely investors would be identified, considering the size of samples selected from the sample source. Out of 55 likely investors identified, 41 companies gave specific figures of factory lot requirement for the Esmeraldas EPZ which totals about 15 to 35 ha. In view of the available

factory land of 17 ha in the Esmeraldas EPZ, it can be considered that sufficient potential demand exists for the Esmeraldas EPZ.

It should be clearly noted, however, that the provision of the competitive and reliable investment environment and the active dissemination of data/information thereof, as well as the consistent promotion activities, are prerequisites for the success in the attraction of investors.

6. BASIC PLAN FOR EPZ DEVELOPMENT

6.1 Proportion of Industries

For the preparation of a basic plan for the Esmeraldas EPZ, 55 likely investors have been further studies. Subsequently, the proportion of industrial categories to be located in Esmeraldas has been reviewed by referring to these in the existing EPZs in other countries, as well as in view of the environmental characteristics. Consequently, a proportion of industrial categories in the Esmeraldas EPZ has been defined for the planning purposes, as summarized hereunder.

ISIC	Category	Assumed Proportion (%)
311, 312	Food processing	15
322	Apparel	40
331, 332	Wood, furniture	15
351, 352	Chemical	15
381, 352	Others (metal, electric device)	15
	Total	100

Further, it is planned to distribute the factory land into 3 categories of lots, with a total of 30 lots in 16.7 ha in the Esmeraldas EPZ.

	Category	Lot Size (ha)	Number of Lots
1.	Large lot	2 ~ 3 1 ~ 2	1 4
2.	Medium lot	0.2 ~ 1	13
3.	Small lot	~ 0.2	12
	Total		30

6.2 Land Use Plan

Two alternative land use plans have been comparatively studied, and the combined type alternative that integrates the EPZ in the port area has been selected.

The efficient land use plan for the EPZ has then been formulated in the light of i) effective road network, ii) provision of adequate sites for utilities and administration, and iii) surrounding by fence and patrol road around the EPZ. The proposed land use configuration is summarized hereunder.

Land Use	Area (ha)	Ratio (%)
Factory lot	16.70	(73.6)
Roads	3.91	(17.2)
Administrative facilities	0.30	(1.3)
Service facilities	0.40	(1.8)
Utilities	0.40	(1.8)
Parks	1.00	(4.3)
Total	22.71	(100.0)

Subsequently, a land use plan has been designed as illustrated in Figure-1 attached.

6.3 Required Facilities

For the successful implementation of the Esmeraldas EPZ, facilities are planned for land preparation, roads, water supply, sewerage, drainage, solid waste disposal, electricity supply, telecommunications, standard factory, administration facilities, service facilities and other relevant facilities.

A layout plan of the buildings and facilities has been worked out as illustrated in Figure-2 attached.

7. PHYSICAL PLAN

On the basis of land use plan, physical plan of each facility have been formulated and designed preliminarily. Major requirements by the Esmeraldas EPZ are summarized as follows:

Item	Requirement
Gross area of EPZ	22.7 ha
Factory lot area	16.7 ha
Number of employees	
Factory employee	2,450
Other employee	130
Total	2,580
Traffic volume	1,100 cars/day
Water demand (by industries)	2,464 m^3/day
Solid waste generation	10 t/day
Electric demand	2,700 kW (3,200 kVA)
Telephones line demand	300 lines

7.1 Road Network

As noted above, the traffic to be generated in the Esmeraldas EPZ is estimated to be 1,100 cars/day, including cargo traffic, commuter traffic and business traffic. Six types of roads have been planned in the EPZ: boulevard of 20 m in width, main road of 16 m in width, sub-road of 12 m in width, patrol road of 4 m in width, access road to fishing port of 16 m in width, and pedestrian deck of 6 m in width. The standard sections of major boulevard, main road and sub-road have been prepared.

7.2 Water Supply, Sewerage and Drainage

1) Water Supply System: Industrial water demand is estimated to be 2,464 m^3/day. Together with water demand for public use, fire extinguishing and other uses, total water demand will be 2,517 m^3/day. A water storage facility of 2,000 m^3 is required for 5-6 hours' retention. The main pipes for distribution will be 150 mm in diameter.

2) Sewerage System: Industrial wastewater is estimated to be 2,217 m^3/day. Together with groundwater, domestic and other wastewater, total wastewater will be

2,467 m^3/day. Pollutant loads are estimated to be 1,365 kg/day in BOD and 767 kg/day of SS. Based on this computation, average BOD and SS concentrations of affluent water are estimated to be about 550 mg/l and 330 mg/l, respectively. Sewage treatment plant by the standard activated sludge method will be installed in the EPZ. The effluent water quality will be set at 55 mg/l for BOD and 70 mg/l for SS.

3) Drainage System: Runoff discharge has been calculated and a network of drainage system has been worked out. In view of the topographic and groundwater conditions, the reinforced concrete pipes (600 - 1,000 mm) are proposed in the downstream sections and box culverts or U-drain with caps are proposed in the upstream sections.

7.3 Electric Power and Telecommunications

1) Power Supply System: Power demand is estimated to be 1,600 kW for industrial use and 1,100 kW for administration and other uses, totalling 2,700 kW (3,200 kVA). Considering some allowances for distribution loss and voltage drop, 5 MVA substation will be required. A new substation will be installed at Las Palmos with its capacity of 10 MVA. A 69 kV transmission line is installed between Santas Vainas substation and Las Palmos substation (5.5 km). A 13.8 kV distribution line will also be installed for 3.5 km.

2) Telecommunications: Demand for exchange capacity is estimated to be 300 lines. After evaluation of two alternative connection systems, a cross connecting cabinet system has been proposed for the Esmeraldas EPZ.

7.4 Solid Waste Disposal

Weight of solid waste disposal in the Esmeraldas EPZ has been estimated to be 4 tons of combustible solid materials and 6 tons of incombustible solid materials per day. After studying two alternative methods of solid waste disposal, the services of disposing to outer area is proposed. A disposal site of about 2 ha is found within a distance of 10 km from the EPZ. Collecting vehicles, semi-trailer and truck and other facilities will be procured under the plan. Further, appropriate treatment comprising primary incinerator and sanitary landfill at the disposal site is proposed.

7.5 Standard Factory

Three types and 10 lots of standard factories are proposed to be built in the Esmeraldas EPZ, as follows:

Type	No. of Lot	Floor per Factory (m^2)	Total Floor (m^2)
Small factory	5	600 ~ 750	3,600
Medium factory	3	2,100	6,300
Large factory	2	4,200	8,400
Total	10		18,300

The standard factories will be scheduled for construction in line with the demand for factories.

7.6 Administration and Service Facilities

The administration building will accommodate ZOFREE office, conference rooms, post office and public spaces, with a total floor area of about 500 m^2. A fire station of 150 m^2 will also be installed. A service building will accommodate lunch service center, kiosk, restaurant, clinic, bank and other public space with a total floor area of about 680 m^2. A gasoline station of about 120 m^2 will also be provided. In addition, park of 4,000 m^2 and sports park of 6,000 m^2 will be proposed as amenity of EPZ.

8. ENVIRONMENTAL ASSESSMENT

8.1 Environmental Assessment

The environmental study has been mainly concentrated on water pollution to be possibly generated by the establishment and operation of the Esmeraldas EPZ. To grasp the prevailing condition of water pollutant load, water quality examination has been conducted at 5 locations in the course of this study. It was found that BOD concentration at these location was relatively small (2 ~ 14 mg/l), while BOD at the chamber of wastewater pumping station was around 510 mg/l.

Pollution of wastewater to be generated in the Esmeraldas EPZ has been assessed to be around 550 mg/l, and wastewater is proposed to be treated by standard activated sludge method. BOD of the treated water is, thus, reduced to 55 mg/l (removal efficiency of about

90%). Discharge of treated water from the EPZ is estimated to be 0.037 m^3/sec, and it is proposed to be led to the existing pumping station where the current discharge is 0.76 m^3/sec. The additional water discharge generated by the EPZ is substantially small with BOD load equivalent to only 0.5% of that currently discharged, and it is evaluated that the diffusion of polluted water originally estimated to be 340 m in diameter under the existing disposal system will not be enlarged substantially. As a result, water contamination to be brought about by the development of the Esmeraldas EPZ is assessed to be negligibly small.

Air pollution may be generated by industrial processing. Judging from the characteristics of selected categories of industries to be located in the Esmeraldas EPZ, SO_2 and NO_2 to be generated in the EPZ will be quite negligible, though they are not quantifiable at this stage. Other environmental aspects will be noise and oscillation, groundwater contamination, solid waste disposal and so forth. Appropriate consideration and measures have been taken in the layout and design of the facilities to prevent and minimize the effects on environment.

8.2 Protection Measures

For protection of water pollution, it is recommended to establish a monitoring system in and around Esmeraldas to assess the situation of water pollution and to work out the solution for it. It is noted that the proposed wastewater treatment in the Esmeraldas EPZ is designed mainly for treatment of organic substances, and the treatment of heavy metals and toxic substances should be executed by each factory if they are to be generated in the processing.

For protection of air pollution, it is also proposed to execute the monitoring and to establish a standard of SO_2, NO_2, SPM, CO, etc.

9. ORGANIZATION AND PROMOTION

9.1 Organization for Implementation

It is proposed that ZOFREE will be organized in the most efficient way with least number of staff. ZOFREE will have 4 departments organized under the board of directors and general manager; i.e. i) Administrative Department, ii) Financial Department, iii) User Service and Promotion Department, and iv) Operation and Maintenance Department. Total number of permanent staff of ZOFREE will be 14.

In addition, it is proposed to establish a Coordination Committee for efficient and successful implementation of the Esmeraldas EPZ. ZOFREE, CENDES and Port Authority of Esmeraldas should be permanent members of the Committee, and other related institutions are asked to join the Committee if and when needed. This Committee is particularly important in the stage of promotion of the Esmeraldas EPZ.

9.2 Institutional and Legal Reinforcement

Since it has been pointed out by potential investors through the interview survey, it appears to be preferable that the Law of Free Zones and Regulations might be reinforced at some points in order that the Esmeraldas EPZ would be more attractive and competitive. These points are i) uniform fee of 2%, ii) 10% higher minimum wages, and iii) profit-sharing with workers. Further, it is desirable that the Law and Regulations will incorporate a grandfather clause to ensure that the incentives and conditions granted under the laws and regulations will not be changed adversely in the future.

9.3 Strategies and Measures for Promotion

CENDES and ZOFREE should cooperate and assist ZOFREE in the promotion of the Esmeraldas EPZ. As the first EPZ in Ecuador, cooperation by MICIP and Ministry of Foreign Affairs is also indispensable for the promotion. When the Fundacion Ecuador is established under sponsorship of USAID, investment promotion can be further coordinated with them.

Promotion activities to be followed by CENDES and ZOFREE have been suggested in the study, including measures for i) direct contact with identified prospective investors, ii) additional direct mail promotion, iii) participation in trade fairs and convention, iv) follow-up work after person-to-person promotion, etc. Some advantageous points to be propagated in the promotion work have also been enumerated through the study.

9.4 Training of Workers

Vocational training facilities at SECAP in Esmeraldas should be utilized to the maximum extent for basic training of workers in the Esmeraldas EPZ. Training courses (8 fields at present) could be amplified and reinforced to meet the requirement of the Esmeraldas

EPZ. Importance of the on-the-job training by EPZ users was also emphasized during interview survey.

10. IMPLEMENTATION SCHEDULE

10.1 Construction Schedule

In view of the minimal scale of construction as an industrial estate, the Esmeraldas EPZ is planned to be constructed in one stage. The construction work is scheduled to start in the middle of 1992. Land leveling, road and utilities will be constructed in 1992-93. Construction of the standard factories will be scheduled for 1993 (2 factories), 1994 (3 factories) and 1995 (5 factories) in line with the demand by investors. The factory operation will be started at the beginning of 1994. All the construction works can be completed by the end of 1995, and full scale operation will be expected in 1996.

10.2 Assumed Progress of Investment

It is expected and planned that the Esmeraldas EPZ will be put into full operation in three years after the commencement of EPZ operation. The cumulative rate of factory operation in the build-up period is presumed to be 20% in 1994, 50% in 1995 and 100% in 1996 in terms of the number of factory lots. It is also assumed that apparel industries will start operation in earlier stages and small lots will be occupied in the initial stage. Foreign investors will be scheduled to start their operation in the later stages.

11. FINANCIAL EVALUATION

11.1 Method of Evaluation and Estimated Cost

Financial evaluation is made to verify financial viability in terms of FIRR. Financial status in operation will also be evaluated by assuming the possible alternative financial plans.

The construction cost of the Esmeraldas EPZ is estimated to be US$6,140,000 in total. This cost involves some facilities to be desirably constructed by other institutions, like Port Authority and IEOS. By extracting these external costs, the internal cost to be borne by ZOFREE is estimated to be US$5,620,000.

(US$1,000)

	Foreign Currency	Local Currency	Total
Internal Cost	1,760	3,860	5,620
External Cost	180	340	520
Total	1,940	4,200	6,140

Annual operation and maintenance cost at full stage of operation is estimated to be US$220,000 (or US$210,000 exclusive of external cost).

11.2 Revenues and FIRR

The unit prices of land lease, standard factory rent and other floor rent have been assumed as follows:

Revenue	Unit Price
• Land lease	US$0.3 ~ 0.5/m^2/month
• Standard factory rent	US$2.5/m^2/month
• Floor rent for commercial services	US$5.0/m^2/month

In line with the lease and rental schedule as noted before, as well as by applying the land lease at US$0.5/m^2/month, the financial benefit and cost streams have been prepared, and FIRR has been calculated as follows:

FIRR (with internal cost)	15.4%
FIRR (with internal and external cost)	13.5%

In view of the opportunity cost of capital in Ecuador (12%), the Project is evaluated to be financially viable.

Through sensitivity analysis, following observation can be noted:

- If ZOFREE bears only the internal cost, the land lease rate could be lowered to US$0.4/m^2 (FIRR=13%). If ZOFREE has to bear the external cost, the land lease rate can in no way be lowered.

- Financial viability is sensitive to the delay in revenues, and one year delay in revenue would make the project marginally feasible (FIRR=12.4%).

11.3 Alternative Financing Plans

Three alternative financing plans have been examined:

Alternative 1: Foreign portion by CFN
Local portion by BEDE
Case-1: Without equity increase
Case-2: With equity increase

Alternative 2: Government grant for infrastructure cost
Case-1: Foreign portion by CFN
Local portion by government grant (for infrastructure cost) and commercial loan
Case-2: Foreign portion by government grant (for infrastructure cost) and CFN
Local portion by government grant (for infrastructure cost) and commercial loan

Alternative 3: Foreign portion by CFN
Local portion by commercial loan

Through analysis on cash flow in each alternative, following observations are presented:

- It is most desirable to seek for the government contribution to the project. In Alternative-2; Case-2, the cumulative surplus is expected in 1999.

- It is desirable to increase equity as much as possible. If the equity is increased by S/. 765 million, (Alternative-1, Case-2), the cumulative surplus is expected in 2003.

- If commercial loan is only available, operation will turn out to be financially difficult. In Alternative-3, the cumulative surplus could not be expected by 2010.

12. ECONOMIC EVALUATION

12.1 Evaluation Method

The economic evaluation has been made by employing the method called "enclave approach", since the evaluation by means of "net incremental production value approach" is impracticable due to lack of data and information. The enclave approach treat the EPZ as an enclave, and the EPZ is viewed as a different territory from economic point of view. The benefits to accrue from the operation by foreign enterprises are quantified as economic benefit for evaluation purpose.

Economic benefits will accrue from i) employment generation, ii) payment of user charges, iii) profit-sharing to workers, iv) transfer of technology, v) payment of uniform fee, vi) balance of the value of domestic inputs, vii) increase in production value in port, and viii) net foreign exchange earning. In the study, i) employment generation and ii) payment of user charges have been calculated as economic benefits, because other benefits are not quantifiable with limitedly available data.

12.2 Estimated Benefit and Cost

Economic benefits to accrue from the operation by foreign enterprises have been calculated for the following three cases; i.e. i) if the foreign investors are limited to 5 enterprises, ii) if the foreign investors will be 10 enterprises (one-third of 30 factory lots), and iii) if the foreign investors will reach 20 enterprises.

In estimating the benefit by employment generation, the opportunity cost of workers at their shadow wage rate has been applied. Since the prices for land lease and standard factory rent are set as competitive with other EPZs in neighboring countries, these prices are considered as economic prices.

Estimated costs, including external costs, have been converted into economic costs by adjusting transfer payments and shadow exchange rate:

12.3 EIRR

EIRR for each case of estimates has been calculated as summarized hereunder.

Case	EIRR (%)
Case 1 (5 foreign enterprises)	6.1
Case 2 (10 foreign enterprises)	18.1
Case 3 (20 foreign enterprises)	33.4

The project can be economically feasible even in the worst case of 5 foreign investors, if the unquantifiable benefits are considered.

13. CONCLUSION AND RECOMMENDATIONS

The feasibility level study on the establishment of the Esmeraldas EPZ will lead to the conclusion and recommendations as summarized hereunder.

1) Establishment of the Esmeraldas EPZ could be financially viable if foreign enterprises and local industries can be successfully invited to locate their factories in the EPZ.

2) Foreign enterprises' interest in the Esmeraldas EPZ is rather weak yet at this study stage, and a determined and sustained effort should be exerted for the promotion activities. Effort for the promotion should be collectively made by ZOFREE, CENDES and other institutions concerned. Without effective promotion, the project feasibility could be marginal.

3) In the promotion, partners for joint ventures should be searched for, because majority of likely investors identified in Ecuador as well as half of US likely investors are looking for partners for joint venture.

4) It is desirable that the associated external cost of the project be financed separately by each cooperating institution under arrangements by the Government.

5) Financially, the Government contribution to cover the local currency portion of the infrastructure cost is preferable. Even if the Government contribution is unrealizable, it is required that the Government will arrange BEDE and CFN loans for the project implementation.

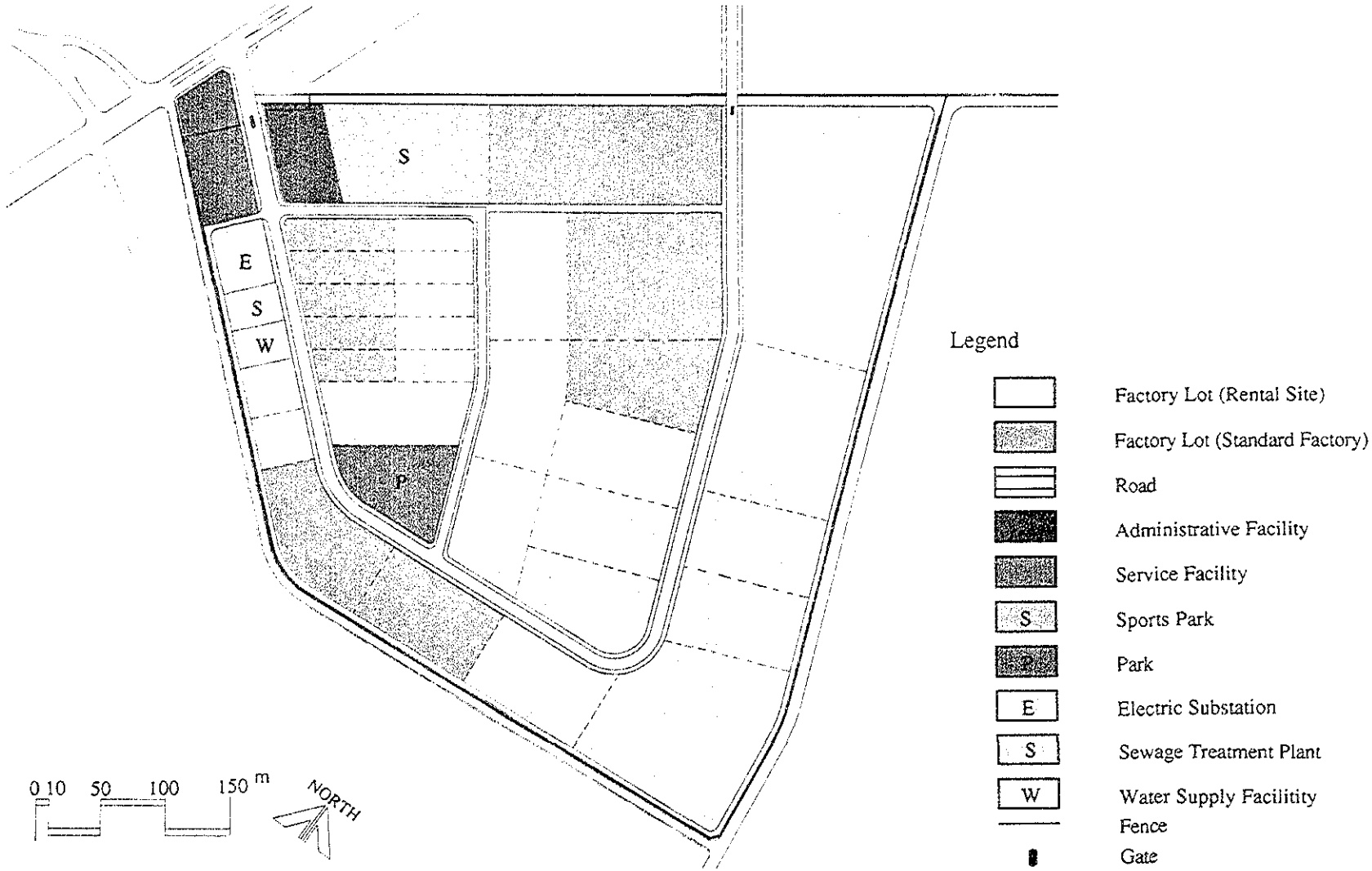
6) It is desirable that MICIP takes note of concerns by the potential investors that the payment of the uniform fee, higher minimum wage and profit-sharing with workers are negative factors in making investment decision.

7) Availability of reliable and trained labor at competitive rates is one of the major issues for foreign investors, and the existing vocational training facilities should be fully utilized for this purpose.

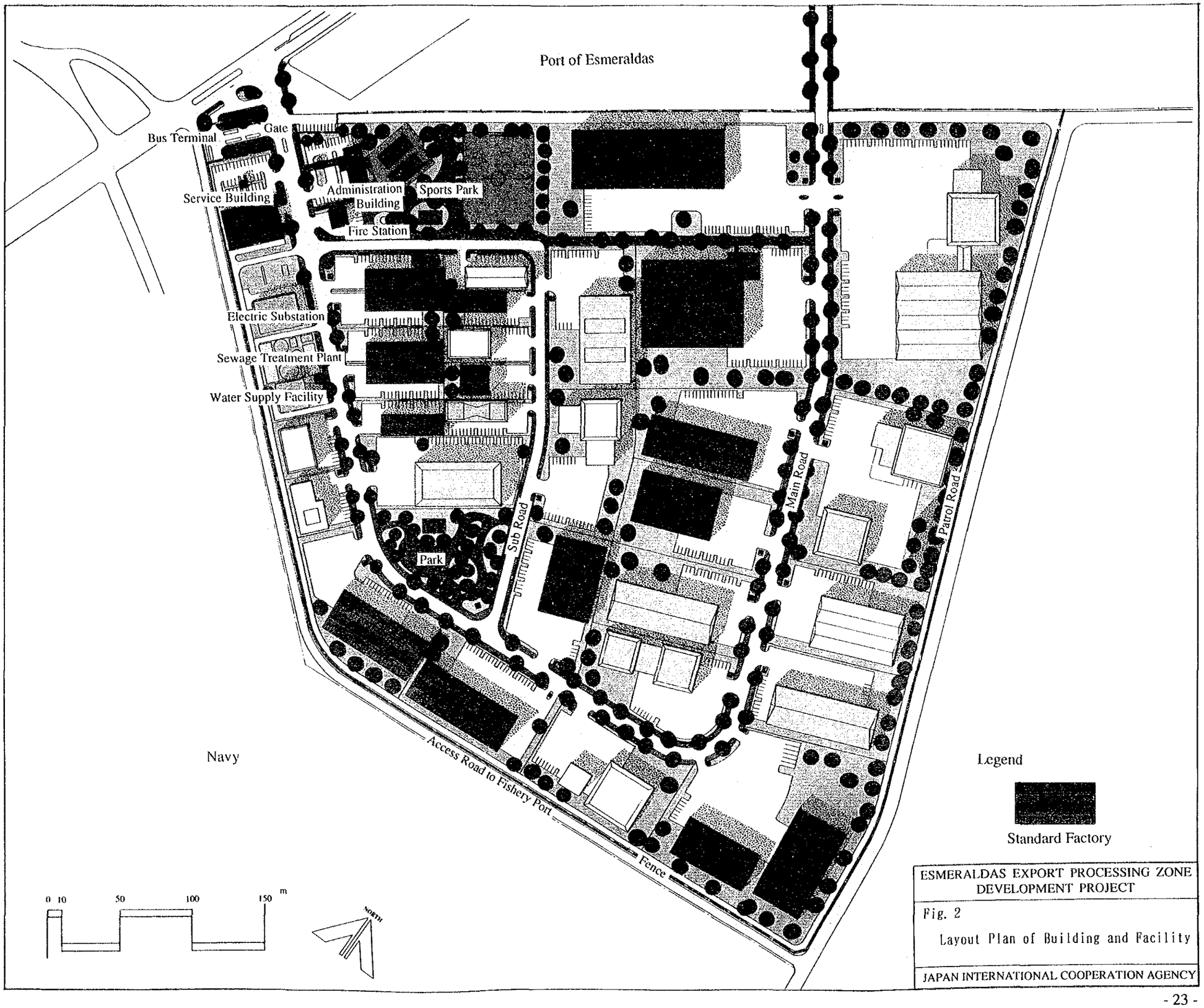
8) Access to shipping with adequate frequency is prerequisite, and appropriate measures should be taken to direct more cargo lines to Esmeraldas port.

9) It is desirable that amenity and social infrastructure in Esmeraldas city be improved in advance of the commencement of the Esmeraldas EPZ for attracting investors.

10) Cooperation and coordination among various institutions are indispensable. Without cooperation among institutions and without able leadership to be taken by the proposed Coordination Committee members, it would not be possible to successfully implement the Esmeraldas EPZ.



JAPAN INTERNATIONAL COOPERATION AGENCY	ESMERALDAS EXPORT PROCESSING ZONE DEVELOPMENT PROJECT	Fig. 1 Land Use Plan



ESMERALDAS EXPORT PROCESSING ZONE DEVELOPMENT PROJECT

Fig. 2

Layout Plan of Building and Facility

JAPAN INTERNATIONAL COOPERATION AGENCY