

ブラジル連邦共和国

スアッペ臨海工業開発計画

資料No. 1

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MASTER PLAN

RESUME

MASTER PLAN - RESUME

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3.0

PHYSICAL PLAN FOR THE FIRST STAGE

3.1

ECONOMIC CONDITIONINGS

3.1.1

Outstanding Results of the Policy for Developing the Region

Due to the large extent of its territory and the noteworthy differences along the historic process of territorial occupation, it seemed inevitable that Brazil presented retarded areas and some economic blanks. Nevertheless, this is not the case concerning the Northeast. This region presents the peculiar circumstance of being not only the oldest colonization zone but also the most progressive one. From the 20's on, when the country tried the first steps towards the development of industrial activities, according to the standards of North America and the leading nations of Europe, the country losses the upswing and enters the so-called relative retard cycle.

For a long time, the general idea was to make to believe it was a phenomenon due to impropitious climatic conditions as presented by a lot of its parcels.

However, the long discussion this subject raised, after World War II, has enabled to formulate an overall strategy, successfully proved, and only requiring some final touches on some parts, one of which is, precisely, the leitmotiv of this study.

The essential elements of such policy were based upon the creation of a substructure for transportation and

power supply - with more evident relative intensity levels than those concerning the Country, on the whole - and a compulsory mechanism for resources transfer, as well as the building up of federal agencies encharged to discipline the investments (SUDENE-BNB system).

The paved routeway network in the Northeast has expanded, from 2,102 km, in 1960, to 9,416 km in 1970, and 14,541 km in 1972. The distribution among the sub-regions was also improved durint this period, as shown through the next tables:

(kilometers)

	1960	1970	1972
<u>Upper Northeast</u>	<u>1.371</u>	<u>3.674</u>	<u>4.467</u>
Alagoas	235	441	714
Pernambuco	738	1.879	2.145
Paraiba	266	700	731
Rio Grande do Norte	132	654	877
<u>Upper Northwest</u>	<u>442</u>	<u>2.763</u>	<u>5.425</u>
Ceará	265	1.840	2.972
Piauí	128	291	1.402
Maranhão	49	632	1.051
<u>South Northeast</u>	<u>289</u>	<u>2.979</u>	<u>4.649</u>
Bahia	282	2.696	4.274
Sergipe	7	283	375
<u>Total</u>	<u>2.102</u>	<u>9.416</u>	<u>14.541</u>
<u>Brazil</u>	<u>13.357</u>	<u>38.626</u>	<u>59.849</u>

SOURCE: IBGE.

Comparing the expansion rates of the paved network, we have the following result:

	(annual increment - %)	
	1960/1970	1970/1972
Upper Northeast	2.7	1.2
Upper Northwest	6.3	2.0
South Northeast	10.3	1.6
<u>Northeast</u>	<u>4.5</u>	<u>1.5</u>
<u>Brazil</u>	<u>2.9</u>	<u>1.5</u>

The non-paved routeway network, between 1960 and 1972, increased more than twice and a half, passing from 113,000 km to 293,000 km. This expansion is presented on the next table.

	(kilometers)	
	1960	1972
<u>Upper Northeast</u>	<u>39.070</u>	<u>86.721</u>
Alagoas	4.890	10.459
Pernambuco	15.342	26.443
Paraíba	10.302	31.636
Rio Grande do Norte	8.536	18.183
<u>Upper Northwest</u>	<u>39.071</u>	<u>126.581</u>
Ceará	12.582	53.796
Piauí	20.515	34.760
Maranhão	5.974	38.025
<u>South Northeast</u>	<u>35.039</u>	<u>79.361</u>
Bahia	31.313	71.402
Sergipe	3.726	7.959
<u>Total</u>	<u>113.180</u>	<u>292.663</u>

SOURCE: IBGE.

The installed capacity of the power generating plants has practically triplicated through the ten last years, passing from 530,000 KV, in 1963, to about 1.5 million KV, in 1973.

The enlargement of the railway network has caused the expansion of the single national market, actually limited to the center-south region, while the increase on generating power has permitted that the resources compulsorily directed to the area were preferably assigned to industrial development.

During a little more than ten years (1962/1973), SUDENE has approved about 1,500 projects, two thirds of which connected to industry, involving investments around four billion dollars. Nearly 500 new or updated industrial undertakings came into operation, while a similar number is being implanted or designed.

The investments assigned to the regional development have reaching, in 1973, an annual average equivalent to 2 billion dollars, taking Northeast, the Amazon and center-south regions on the whole, and 1 billion dollars, considering only the Northeast. In order to have a reference point to compare the magnitude of this process, it is enough to mention the overall financial aid to the underdeveloped world, through such international agencies as BID and BIRD, summing up US\$ 1,4 billion, in 1971.

Recently, the Federal Government has definitely discussed the contents of the policy on regional development, entailed to the Program for National Integration.

Actually, the objective is the complete formation of a single national market, where the various integrant parts might find their real tendencies. Besides, the so-called project 'PROTERRA' was released, actually directed to the needs to render modern the agricultural procedures, which concern should be one of the most important of such policy, now being started.

Therefore, in a relatively short term, this policy has succeeded in introducing essential changes to the development perspectives for the Northeast.

3.1.2 Regional Role in the Brazilian Development Pattern

The regular accomplishment both of massive federal investments and the transfer of resources from the private sector has caused the dynamization of the northeastern economy. Registering the fact, the ENB emphasizes: "we may notice that, actually, within a relatively short term, Northeast has left a long period of stagnation, starting the march towards its integration in the regional development. And this thanks to the implantation, from the second half of the 50's on, of a new governmental policy toward this Region, to replace the traditional procedures on simple strive against the drought. The result is that the regional growth rate, only 3% in the period between 1947/1953, raised to 6.8% between 1954/1962, reaching around 8% in 1965/1969. In the current decade it is expected a probable rate around 10.0% (*)".

The reached objective, however, corresponds to a simple stage of the process, since it aims to get and maintain a self-supported development, that is, releasing the permanent backing of aid programs.

Such growth, as referred to by BNB, produced the creation of industries to replace the acquisitions from the Center-South region, dimensioning them to supply this region with exceeding items. Such units have improved the existing dramatic unemployment conditions, and have contributed to start rendering modern the services sector, on which is incumbent, at long term, to replace the classic "feudal tertiary". Thus, they have produced the desired impact, concerning the break of stagnation cycle.

Nevertheless, the conquering of self-supported development requires a much more gigantic endeavor, which master lines are just being outlined, but now taking the country on the whole and not considering isolated regions. The fundamental objective is to reach the harmonious arrangement of the whole set, based upon the results accumulated in a recent past, as mentioned further on.

The self-supported development requires the existence of a market able to absorb the increasing supply of goods and services, i.e., the significant raise on the income standards. On this concern, the recent performance of the national economy has released the fact that the exportations may constitute a privileged link of this chain. In other words: the increase of the internal

market, as a first stage, is faced as a result of the performance in the dynamic sector, which growth is supported by the sales on the foreign market.

(*) "Perspectives on Development of Northeast up to 1980", Fortaleza, Banco do Nordeste do Brasil, 1971, Vol. I, Synthesis, Page 6.

The internal market, at a long term, should be raised as a supporting basis of the economy, presenting its recent increase really significant indicators.

Another element being mobilized, thanks to the policy commenced ten years later, is concerned to the capacity of the Brazilian agriculture to react to price inducements, not existing the rigidity of supply as supposed until recently.

This experience had been taken into account by the Federal Government on establishing the regional functions within the strategy for the Brazilian development, being already outlined the following procedures:

a) to transform the axis São Paulo-Guanabara-the State of Rio and Espírito Santo into a main center for mining, siderurgy and mechanic-metallurgy of international scope, also provided with a modern agriculture and urban services for large masses;

b) specialization of Far-South (Paraná, Santa Catarina, Rio Grande do Sul) and a part of Center-West region (South of Mato Grosso) as exporter of large bulks of agricultural products, with concurrent availability of industrial substructure and services;

c) implantation in South Northeast (Bahia and Sergipe) of gigantic main centers for petrochemical and chemical industries and, at the same time, to transform 'Reconcavo da Bahia' into a touristic center, according to world standards, without prejudice of full use of its potential and trends on agriculture;

d) creation of a center assigned to industrialize on large scale the mineral resources, directed to the international market, alongside Maranhão-Pará, which might lead, on the whole or partly, the Upper Northeast (including, besides Maranhão, the States of Ceara and Piauí) as well as a significant part of Amazon region.

Concerning both the Center-West and the West Amazon regions, or the upper Northeast (Alagoas, Pernambuco, Paraíba and Rio Grande do Norte), the definite trends have been not yet established.

As to the last one, the next topic includes an hypothesis of development adequate to the scope of national integration.

3.1.3 Hypothesis on the Development of Upper-Northeast

This report considers the hypothesis of building up a dynamic sector in upper Northeast, formed by the exporter economy of industrialized primary products. The involved activities should have the function to exploit adequately the regional trends, on such a way fully integrated to the national economy as a whole, i.e., performing them within the required levels of productivi-

ty. Therefore, the initiatives taken into consideration should mark the inclusion of that Brazilian region into the scale economy, established in accordance with international parameters, in order to be assured the self-supported growth and the rising to the developed part of the world, simultaneously to the other regions of the country.

The model into consideration is assumed on already mobilized possibilities, but it tries to amplify them significantly, as further on evidenced.

The direct Brazilian policy on exportation has assured to the country to reach a highly outstanding position in the sugar world market, equivalent to 12% on the total amount of importation. This is a really expanding market, being expected the acquisitions from the main buyers to reach 25 million tons in 1975 and about 40 million tons, in 1985. This phenomenon is followed by the complete recovery on the prices of the product, nullifying the existing differences between the free world market and the preferential North-American market. The new condition has enabled a progressive updating of sugar agriculture and industry in the Northeast, improving the agricultural procedures, using fertilizers, and putting an end to the plantations on those areas which topography is not adequate, as well as consolidating sugar mills in order to establish large capacity units. It is imperative to take this process to the last consequences, since it depends mainly on our own capacity to get as much as 20% of the world importations, which should mean 8 million tons in 1985. From that

amount, the upper Northeast should be entitled to at least 5 million tons (around 60%). The accomplishment of such goal would require to triplicate the current supply, passing from the present 2 million tons/year to 6 million tons/year.

The cotton should be the second great agricultural possibility to be duly exploited, taking as basis the integrated projects, aiming the production of yarns, textiles and ready-made items, to export on different levels of industrial production, thus conquering a steady position in the market. This program requires a large-scale updating on the cotton economy of upper Northeast, in order to be completely and fully discussed the noteworthy advantages of long fiber cotton, being cultivated in the area.

The contribution of the agriculture to the new dynamic should be not limited to sugar and cotton. Other perspectives may arise, concerning the citric fruits and oleaginous seeds.

Concerning the mineral resources, the calcareous rocks are assigned to provide an important contribution to the project now on preparation. Taking into consideration the international market readily available for cement, the industrialization of the product should be supported in large capacity units, using as fuel the abundant natural gas existing close to the deposits of calcareous rocks, to reach final competitive prices. Other possibilities should be analyzed, namely the salt, which can be used as raw material for the production of kelp for the external market, which is able to absorb large quantities of this good.

The exportation of industrialized primary products, as aforementioned, could provide an annual revenue around US\$ 2.5 billion, at the end of the next ten years.

Those results would assure growth rates never less than 9% per year, enabling the upper Northeast to reach 1985 with an Internal Income around US\$ 10 billion and an income per capita between US\$ 700 and US\$ 800.

The adoption of such a model for the development of such part of the Northeast involves the assumption on the implantation of harbour installations on a compatible scale to meet the capacity of the listed initiatives, as it is the case of the harbour conception for Suape. This undertaking, on its turn, should provide the implantation of other industrial units, to be considered on this study.

3.2 INDUSTRIAL AND HARBOUR ACTIVITIES FOR THE 1st. STAGE

The identification of the loads liable to handling in Suape - as well as the industrial activities to be thereon located - was a result from the very function assigned to it, that is, to make feasible a development model which driving element was the exportation of industrialized primary products. Besides, there were taken into consideration the purposes - sufficiently substantiated - of business groups to be settled in Suape and/or to operate through its installations. Considering such subject, an option was made toward the grouping of activities, according to the kind of required harbour support, that is, whether collective installations whether private terminals..

3.2.1 Activities Requiring Multiple-Service Port Installations

A SUGAR

The world sugar market has handled, in 1972, 76 million tons, commercialized by an overall amount of US\$ 15 billion. The main factors to be registered are a decrease on the significance of the preferential north-american market - where a price allowance was customary - and the succeeding raising prices on the free market.

The comparison is quite expressive:

YEARS	FREE MARKET		AMERICAN MARKET	
	US\$/T	RATE	US\$/T	RATE
1966/1970	53.1	100	129.3	100
1971	91.5	172	161.1	125
1972	157.0	296	178.4	138
1973	201.3	379	203.8	158

SOURCE: IAA

Therefore, the quotations in the international free market were raised four times within three years, reaching the prices paid by the north-american.

Yet more surprising is the performance of the market during the current year of 1974. The medium quotations reached by the brazilian exportations are equivalent to US\$ 800/ton. It means: they quadrupled once more, but this time it took only a year.

From the second half of the past decade, Brazil has developed a significant effort toward conquering a place amidst the largest world producers and, concurrently, a representative share of the market. Thus, the harvest corresponding to 1972/1973 provided to Brazil the condition of second world producer, with 6 million tons (USSR, 8.5 million and Cuba, 5.5 million).

For the harvest corresponding to 1977/78, the brazilian supply should exceed 10 million tons, thus assuring a first position.

Concerning the exportations, we went from 800 thousand tons in 1964 to an average a little more than one million tons between 1966/1971, and soon reaching 2.6 million

tons in 1972 and 3 million in 1973. Considering only the importer market, the Brazilian sales in 1973 corresponded to 12%, against only 5% in 1970. The world importations are expected to evolve from 26 million tons, in 1975, to 32 million tons, in 1980, and 40 million, in 1985, when Brazil should attain to 20% of such demand, that is, 6 million tons in 1980 and 8 million in 1985.

The Brazilian exportations are due only to the States of Pernambuco, Alagoas and São Paulo. In 1971, São Paulo has exported 25% of the whole amount. Considering the unusual increase on the Brazilian sales, the contribution from the south region was raised to 45%, in 1972, and 60%, in 1973. However, the policy of the Sugar and Alcohol Institute, centralizing the international trade of the product, is directed toward stimulating the expansion of the northeaster supply, concerning the foreign market, assigning to it a share around 60%, equivalent to about 3.6 million tons, in 1980, and 4.8 million tons, in 1985.

Once available such parameters and the evaluation on the possible performance of the regional agriculture, we have got these figures concerning the exportable surplus in upper Northeast, and centralized, respectively, in Alagoas and Pernambuco (local supply and from the States of Paraíba and Rio Grande do Norte):

(Thousand tons)			
YEARS	ALAGOAS	PERNAMBUCO	TOTAL
1980	1,035	2,500	3,535
1985	1,075	3,280	4,985
1995	2,115	4,490	6,605
2005	2,130	4,585	6,715

The exportations of sugar through Recife port are liable to a specific terminal, which operational capacity is estimated as 1,850 thousand tons/year, considering the maximum performances on those cycles when the fundamental parcels of shipment take place. In Maceio is being implanted another terminal, to outset the operation expectedly on the second semester of 1977. Its design capacity is evaluated as 3 million tons/year, to attain in principle to the anticipated flowing for that state of the Union.

The continuity of this program should require, therefore, a third terminal, to be localized in Suape, to attain the following volume of exportation, on charge of Pernambuco:

YEARS	THOUSAND TONS
1980	650
1985	1.430
1995	2.640
2005	2.735

B WHEAT

In order to obtain the benefits of the scale economy, on handling wheat, which benefits the new harbour installations are able to provide, Suape should centralize the imports of this cereal as required, in principle, by upper Northeast. A similar objective copes with the government purposes to use the official monopoly in force, to commercialize the product, to assure the full rationalizing of its transport.

The flour mills operate according to quotas, receiving the wheat in natura directly from the hands of the

Government. This one is incumbent on importing and acquire the brazilian harvests.

In Pernambuco, three flour mill units are operating, being two localized in Recife Harbour, with capacity to process 215 thousand tons/year. The third one is installed in Olinda (capacity 55 thousand tons). As long as the state consumption increases, the mill units should go inwards the region, to be implanted in the urban centers of Agrests.

The supply to Alagoas, Paraiba and Rio Grande do Norte is performed through the existing ports, respectively Maceio, Cabedelo and Natal.

In Pernambuco, the expected evolution of consumption is the following one:

YEARS	THOUSAND TONS
1980	312
1985	386
1995	566
2005	647

To attain such a demand, the mill units should be allocated as follows:

(THOUSAND TONS)				
YEARS	RECIFE	OLINDA	OTHERS	TOTAL
1980	215	55	42	312
1985	215	55	116	386
1995	215	55	296	566
2005	215	55	377	647

The redistribution of the product, from Suape on, should be processed by road transportation, except when concerned to the currently existing units in the Capital city, located near the harbour and which could receive

the cereal by sea.

Concerning the trends of consumption on further States, the estimation is:

(THOUSAND TONS)

<u>STATES</u>	<u>1980</u>	<u>1985</u>	<u>1995</u>	<u>2005</u>
Alagoas	103	128	173	198
Paraiba	109	147	264	301
Rio Grande do Norte	88	114	173	199
TOTAL	<u>300</u>	<u>389</u>	<u>610</u>	<u>698</u>

In short, the importations of wheat, centralized by Sua-pe, should reach these levels:

(THOUSAND TONS)

YEARS	PERNAMBUCO	OTHER STATES	TOTAL
1980	312	300	613
1985	386	389	775
1995	566	610	1.176
2005	647	698	1.345

C. LIQUID CARGO

1. Molasses

The expectancy is on the formation of the following surplus concerning the whole sugar production in upper

Northeast:

YEARS	THOUSAND TONS
1980	1,029
1985	1,370
1995	1,762
2005	1,845

The joint capacity of Maceio and Recife ports is up to 720 thousand tons/year, thus presenting the following figures for exportation through Suape:

YEARS	THOUSAND TONS
1980	109
1985	450
1995	842
2005	925

II Alcohol

Only in Pernambuco are generated exportable surplus of alcohol, which might be completely through Suape, due to the availability of adequate installations. The surplus is expected on the figures below set forth:

YEARS	THOUSAND TONS
1980	113
1985	151
1995	181
2005	181

III Castor oil

The significant increase on the number of castor oil planting and the preparation of such oil, in Pernambuco, depend at least on the possibility to market the product through tank-ships with the required load capacity. On that concern, the increments of production should be absorbed by Suape, being such increase expected as follows:

YEARS	THOUSAND TONS
1980	30
1985	60
1995	70
2005	80

3.2.2 Activities Requiring Private Terminals

A FERTILIZERS

The manufacture of fertilizers in Suape should be on charge of 'EMBRAFERTIL - Empresa Brasileira de Fertilizantes S/A', headed by 'União de Empresas Brasileiras' (group Moreira de Souza), including the participation of the Japanese firms 'Sumitomo Chemical' and 'Ataka', and still backed by the financial support of 'DIPER - Cia. de Desenvolvimento Industrial de Pernambuco', effected through share holding, due to the significance of such undertaking, concerning the applied know-how to the agriculture and, consequently, the accomplishment of development model for the upper Northeast.

EMBRAFERTIL is proposed to perform the following production program:

	(THOUSAND TONS)		
FINAL PRODUCTS	1980	1984	1987
NPK (15-15-15)	170	170	170
NPK (18-18-18)	-	230	506
NP (8-30-0)	45	45	45
TSP (0-42-0)	-	70	280

Regarding the accomplishment of such goals, the enterprise shall dispose of the following components of its production complex:

- sulphuric acid unit;
- phosphoric acid unit;
- MAP unit;
- granulation unit;

The project being submitted to SUDENE by EMBRAFERTIL, explains with more details the production program aforementioned. However, concerning the purposes of the current analysis, it is enough to refer to the expected cargo handling.

The sulphuric acid unit is dimensioned to produce 39.3 thousand tons, in 1980; 168.8 thousand tons, in 1984; and 642.9 thousand tons, in 1987. It requires the importation of the following amounts of sulphur:

YEARS	TONS
1980	13.021
1984	55.871
1987	212.780

The sulphuric acid unit should effect different concentration levels of phosphate, requiring the following amounts of phosphatic rock:

YEARS	TONS
1984	196.800
1987	784.780

On the first stage (1980), in order to attain the production program 38 thousand tons of phosphatic rock should be imported.

As the MAP unit should operate only on the third stage (1987), during the initial cycles should be imported 52.6 thousand tons (1980) and 92.5 thousand tons (1984) of mono-ammonium phosphate.

At last, to deliver the final products following the indicate NPK formulas, EMBRAFERTIL should import potassium chloride, ammonia and urea.

In short, this project should promote the importation of the following raw materials:

(TONS)

PRODUCT	1st. STAGE	2nd. STAGE	3rd. STAGE
Phosphatic Rock	37,707	196,800	784,780
Sulphur	13,021	55,871	212,780
Potassium Chloride	42,500	111,132	193,491
MAP	52,580	92,462	-
Ammonia (*)	6,990	16,673	48,780
Urea (*)	37,570	102,936	181,375

(*) To be obtained in Camaçari (PETROQUISA).

The unit previously specified was dimensioned to attain integrally the Upper Northeast and partly the demand of Upper Northwest (Ceará, Piauí and Maranhão), where a large-scale agricultural development is expected, both by including vacant lands and irrigation.

Thus, the initial supply from EMBRATEL should be directed towards:

(THOUSAND TONS)

PRODUCTS AND YEARS	UPPER NORTHEAST	UPPER NORTHWEST	TOTAL
<u>1980</u>	<u>215</u>	<u>-</u>	<u>215</u>
NPK	170	-	170
NP	45	-	45
<u>1984</u>	<u>415</u>	<u>100</u>	<u>515</u>
NPK	300	100	400
NP	45	-	45
TSP	70	-	70
<u>1987</u>	<u>555</u>	<u>446</u>	<u>1001</u>
NPK	370	306	676
NP	45	-	45
TSP	140	140	280

B ALUMINUM INGOTS .

The disbursements corresponding to the importation of nonferrous metals, in 1973, have reached the considerable amount of US\$ 250 million.

The dimensions concerning these expenses together with the slowness to implement the initiatives already mentioned and concerning this sector, led the government to adopt a series of active measures.

Among these are outstanding:

- 1) intensifying of mining projects;
- 2) preference to the importation of semi-manufactured goods, concerning those items which prospectings have not yet reached conclusive results;
- 3) governmental participation to make feasible the undertakings;

In order to assure the accomplishment of the last decision, FIBASA - a subsidiary holding of BNDE - was settled, to include nonferrous metals among the sectors to be developed on a priority schedule.

Concerning the aluminum, the accomplishment of Project Trombetas (large capacity unit to mine bauxite and produce alumina) was accelerated and a new undertaking was designed, a large aluminum plant to be installed in Belem. Both the projects are aimed to promote the exportations and, at the same time, to obtain raw materials for the Brazilian industry, to adequate prices. Therefore, there were considered large capacity undertakings, able to take all the advantages from the scale economy.

The apparent consumption of aluminum, in the country, has reached as much as 160 thousand tons, in 1963, being expected to exceed 200 thousand tons, in 1975.

The installed capacity of the Brazilian plants reaches up to 115 thousand tons, allotted among the "Cia. Brasileira de Alumínio - CBA", of Votorantim Group, installed in Mayrink, State of São Paulo; ALCAN, with two units, the first one in Saramenha, Minas Gerais, and the second in Salvador, receiving this one alumina from the first unit; and ALCOA, operating in Poços de Caldas, Minas Gerais. Assuming they are supplied through their own mining facilities, the three groups should supply 340 thousand tons/year, on the first half of the next decade.

The units on consideration supply metallic aluminum ingots, the raw material used by the rolling mills operating on most of the consumption centers. According to the 'Associação Brasileira de Alumínio - ABAL', the supply from the rolling mills is diversified as follows:

<u>PRODUCTS</u>	<u>(%)</u>
Plates	31
Extruded	17
Sheets	6
Cables	34
Cast	12
	<hr/>
TOTAL	100

The cables are used for the manufacture of wires and other items as required by power supply industry. As to the plates, they mainly requested by the transportation sector, namely for the manufacture of railway cars.

The other products, at last, are absorbed by civil engineering, consumption goods, packages, etc.

The activity of rolling mill in Pernambuco is performed by ASA, located in the Metropolitan Area of Recife, progressively mounted and working out 30 thousand tons/year of aluminum, and it is liable to double such production until the end of the decade.

The evolution of the Brazilian consumption (aluminum ingots) is estimated as follows:

YEARS	THOUSAND TONS
1975	205
1980	387
1985	730
1995	1.756
2005	2.860

Considering the total recovery of the metal (the so called "secondary production, estimated as 10% of the consumption) and only for the supply of the existing units, as aforementioned, we should have deficits, estimating round figures on 300 thousand tons, in 1985, 1.2 million tons in 1995 and 1.6 million tons in 2005.

The Aluminum Plant, in Belem (Cia. Vale do Rio Doce), associated to the Japanese group IMSA, is designed to produce 640 thousand tons/year of aluminum ingots, at the beginning of the next decade, and oriented toward the foreign market. However, at the end of the decade, the Brazilian market should be able to absorb its supply.

Nevertheless, it is most improbable that the manufacture of metallic aluminum, for internal consumption, is concentrated in Upper North.

It should be also considered as a remote possibility that Brazil, once having conquered a steady position in the world market for that metal, with the Project Belem, is likely to renounce to that position, especially when the reserves of bauxite, localized in recent years, give us an appreciable situation on this subject.

Concerning the attainment of the internal market, it is expected for the sector the following future configuration:

- I) mining of bauxite and production of alumina being concentrated in the far North;
- II) manufacture of metallic aluminium in units strategically located, considering the consumer market; and,
- III) large decentralization of rolling mill activity.

Considering the aforementioned scheme, the opportunity for integration of such activity in Pernambuco stands out, implanting a unit to produce aluminum ingots. The only plausible obstacle to this integration was the virtual impossibility to promote the harbour handling of raw material, which problem is solved once Suape is implanted.

The dimensions of such rolling mill are given by the scale economy of the sector and, thus, it should have an initial capacity to supply 100 thousand tons/year. Considering the period being required for its operation it would be functioning around 1980, when the local demand should raise to 55/60 thousand tons. The surplus

of ingots on such level (40/45 thousand tons) should be easily supplied to the internal market. Being unchanged the capacity of the rolling mill, the surplus should disappear in 1985. Considering the current rates of regional development, the market should admit a capacity addition around 50 thousand tons/year, through each succeeding decade. In that case, the upper North-east should represent, in 1995 and 2005, nearly 10% of the national market.

Thus, we would have the following evolution, on the production capacity of aluminum ingots, in Suape Complex:

YEARS	THOUSAND TONS
1980	100
1985	100
1995	150
2005	200

Such a production schedule requires the importation of these inputs.

I N P U T S	1.000 ton			
	1980	1985	1995	2005
Alumina	200	200	300	400
Coke	70	70	105	140
Coal	4	4	6	8
Tar	30	30	45	60
Cryolite	2	2	3	5
Aluminum fluoride	3	3	5	6

Such raw materials should come from:

INPUTS	ORIGIN
Alumina	Brazil (Pará)
Coke	Imported (USA/Europe)
Coal	Brazil (Santa Catarina)
Tar	Brazil (São Paulo/Minas)
Cryolite	Imported (USA/Europe/Japan)
Aluminum fluoride	Brazil (São Paulo)

C PETROLEUM REFINERY

The policy being accomplished by the National Council for Petroleum and Petrobrás, concerning the internal supply of petroleum by-products, is based upon the successive decentralization of the refining industrial park. Thus, the refineries once concentrated in Rio de Janeiro and São Paulo were decentralized, first to Minas Gerais, then to Rio Grande do Sul and, currently, a unit is being implanted in Paraná.

A similar policy should be extended to the Northeast, as long as the expansion of consumption thus justifies. Presently, it is processed the enlargement of Matapipe Refinery, to be finished in 1977 and to be absorbed by Petrochemical main center, being implanted in that State. Thus, this unit should present a surplus, around 34 thousand barrels/day, in 1980, when the demand of upper Northeast, upper Northwest and Pará would reach 146 thousand barrels/day. So, it is configurated a deficit a little less than 120 thousand barrels/day, requiring the importation of a new refinery unit.

This demand is allocated as follows, among the various sub-regions:

DESIGNATION	1975		1980		1985	
	Qty.(1)	(%)	Qty(1)	(%)	Qty(1)	(%)
Upper Northeast	46	56.1	81	55.7	141	55.4
Upper Northwest	21	25.4	39	26.5	70	27.7
Para	15	18.5	26	17.8	43	16.9
TOTAL	82	100.0	146	100.0	254	100.0

(1) One thousand barrels a day.

The regional consumption is thus concentrated in the Upper Northeast, where the excellent position of the Metropolitan Area of Recife is outstanding. From that point of view, it appears as the privileged location.

Being, undoubtedly, the most adequate technical solution - without ignoring the politic imperative reasons which the Petrobras would consider on a final option - it is possible to anticipate the dimensions to be assumed, as an indication.

Considering the period after 1985, the regional demand should evolve as follows:

DESIGNATION	THOUSAND BARRELS/DAY	
	1995	2005
Upper Northeast	316	767
Upper Northwest	140	366
Para	93	200
TOTAL	549	1.355

From the preceding data it is assumed that, from the late 80's on, the dimensions of the Upper Northwestern and Para markets should admit a refinery, within the

same premises to reach the handling of by-products always at shorter distances, once respected the scale economy of producing units.

Thus, Suape Refinery should have a production capacity as below set forth, including the surplus also estimated, after attaining the demand of Upper-Northeast.

THOUSAND BARRELS/DAY			
YEARS	SUPPLY FROM SUAPE REFINERY	DEMAND OF UPPER NORTHEAST	BALANCE
1980	150	81	69
1985	250	141	109
1995	320	316	4
2005	750	767	- 17

Suape Refinery, thus dimensioned, should attain to the highest parcel of demand in upper Northwest, until 1987. From that time on, the supplies to that region should be merely complementary ones, completely ceasing in 1991. Along that period, until circa 1995, there should be accomplished exportations to Para.

The surplus from the production of Suape Refinery, after supplying the upper Northeast, should be directed to the following basis:

	(thousand barrels/day)							
Place	1980	1981	1982	1983	1984	1985	1986	1987
Fortaleza(1)	32	36	40	44	49	55	59	48
São Luiz	11	12	3	15	17	19	20	18
Belém	26	9	2	24	5	55	16	15
<u>TOTAL</u>	<u>69</u>	<u>57</u>	<u>45</u>	<u>83</u>	<u>71</u>	<u>109</u>	<u>95</u>	<u>81</u>

(1) Demand in Ceará and Piauí.

On the cycle after 1987, should be ceased the supplies to Fortaleza base. Suape Refinery should supply a surplus for the consumption of aforementioned regions, on the following figures:

		(thousand barrels/day)							
Places	1988	1989	1990	1991	1992	1993	1994	1995	
São Luiz	23	23	27	15	-	-	-	-	
Belem	44	30	62	53	47	26	5	4	
Total	67	53	89	68	47	26	5	4	

Thus, from 1995 on, Suape Refinery should have its effective range limited to the Upper Northeast: the eventual deficits perhaps configurated are, on the previous hypothesis, only indicators, due to the character of expanded term. The basic idea is that the unit should be dimensioned and operated according to utilization levels of capacity being compatible both with the required rates of probatibility and to maintain fully supplied its very own market.

At last, the exportations through cabotage to the surrounding ports (Cabedelo, Natal and Maceio) should occur only when the consumption levels exceed 20,000 barrels/day.

Trying to establish the operational requirements that petroleum by-products should carry to Suape port, the next table shows the expertation flows, through cabotage, on the cycles previously characterized:

Destination	thousand tons/month							
	1980	1981	1982	1983	1984	1985	1986	1987
Fortaleza (1)	40	45	50	55	61	69	74	60
São Luiz	14	15	4	19	21	24	25	23
Belem	33	11	3	30	6	44	20	19
Total	87	71	57	104	88	137	119	102

(1) Including the demand in Ceará and Piauí.

The next cycle shows:

Destination	thousand tons/month							
	1988	1989	1990	1991	1992	1993	1994	1995
São Luiz	29	29	34	19	-	-	-	-
Belem	55	38	78	66	59	33	6	5
Cabedelo	29	31	34	36	40	41	46	51
Natal	-	26	29	31	34	36	39	43
Total	113	124	175	152	133	110	91	99

During the next period, completing the actual study, the activity concerning the cabotage, from Suape on, should be restricted to Upper Northeast, showing the following figures:

Destination	Thousand tons/month									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cabedelo	55	60	66	71	79	85	94	101	112	120
Natal	46	50	55	60	65	71	78	84	91	100
Maceio	-	49	54	59	64	70	76	84	93	101
Total	101	159	175	190	208	226	248	269	296	321

Taking annual cycles, the results are as follows:

Destination	thousand tons/year							
	1980	1981	1982	1983	1984	1985	1986	1987
Fortaleza (1)	480	540	600	660	732	828	888	720
São Luiz	168	180	48	228	252	288	300	276
Belem	396	132	36	360	72	528	240	228
Total	1044	852	684	1248	1056	1644	1428	1224

(1) Including the demand in Ceará and Piauí.

Destination	thousand tons/year							
	1988	1989	1990	1991	1992	1993	1994	1995
São Luiz	348	348	408	229	-	-	-	-
Belém	660	456	936	792	708	396	72	60
Cabedelo	348	372	408	432	480	492	552	612
Natal	-	312	348	372	408	432	468	516
Total	1356	1488	2100	1825	1596	1320	1092	1188

Destination	thousand tons/year									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cabedelo	660	720	792	852	948	1020	1128	1212	1344	1440
Natal	552	600	660	720	780	852	936	1008	1092	1200
Maceió	-	588	648	708	768	840	912	1008	1116	1212
Total	1212	1908	2100	2280	2496	2712	2976	3228	3552	3852

Taking the supply of the analysed refinery, in accordance with the nominal refining capacity as previously set forth, the following figures on the importation of crude oil are obtained:

YEAR	THOUSAND TONS/ MONTH	THOUSAND TONS/YEAR
1980	202	2.424
1981	202	2.424
1982	202	2.424
1983	270	3.240
1984	270	3.240
1985	337	4.044
1986	337	4.044
1987	337	4.044
1988	337	4.044
1989	337	4.044
1990	405	4.860
1991	405	4.860
1992	405	4.860
1993	405	4.860
1994	405	4.860
1995	432	5.184
1996	432	5.184
1997	472	5.664
1998	540	6.480
1999	540	6.480
2000	675	8.100
2001	675	8.100
2002	809	9.708
2003	944	11.328
2004	944	11.328
2005	1.012	12.144

D CEMENT

The Brazilian government is interested to promote and stimulate cement exportations to the international market, taking into consideration, for one side, the dynamism of such importer market and, on the other hand, the development of the brazilian industry. In principle, it could be admitted that it would be possible to have

25% of the market formed by the large-scale importers, representing about 16 million tons, in 1990, providing an income around US\$ 650 million, based upon the quotations of the late period.

Considering as essential requirements, from an internal point of view, to make effective such a program, the adoption of adequate scales by industrial plants (3 thousand tons/day; equivalent to 1 million tons/year) and the availability of specific harbour installations.

Representative groups of the northeastern cement industry have expressed their interest for such a program.

Taking into consideration that the schemes for harbour flowing, due to the present study, are more developed in the Northeast than in Center-South, the Region should be entitled to perform forty percent of such program, that is, to export 6 million tons, in 1990, providing an income nearly US\$ 250 million.

In order to operate within competitive costs, having a security limit, due to eventual floatings on international quotations, the industrial plants should dispose of a minimum scale of 1 million tons/year.

Besides, they would be directed to the external market, since the local market should admit units with such a load capacity only in the 90's.

The schemes to be adopted would be based on the production of clinker next to the deposits, not only due to the economy of transport caused by the losses of calcareous compound on that production cycle, but also to the emission of polluted particles on the same phase (1).

The product to be removed to Suape should be the clinker, as it is easily handled and transported - liable to be performed in barges - as well as stocked, though it would be not compulsorily exported that way.

(1) The emission of particles is around 70% and 90%, during the production of clinker, following the usual procedures, that is, through dry or wet process.

Next to the terminals and areas for formation of stocks there should be available a mill installation, able to add gypsum to the clinker and, thus, to obtain cement as final product, whenever required to make effective shipments that way. There should be also installation for packing of cement, considering that not every importer market acquires the product by heaps.

At last, it is admitted that the accomplishment of exportation goals, as aforementioned, should be reached gradually, being expected to grow moderately from the 90's on (around 3% per year).

In short, this should be the schedule for cement and/or clinker exportations, through the harbour installations of Suape:

YEARS	THOUSAND TONS
1980	2,000
1985	4,000
1990	6,000
1995	7,000
2005	9,000

3.2.3 Other Activities Liable to Short-Term Occurrence

Besides the activities being mentioned on prior items, other initiatives are highly feasible to occur yet during the first stage of implantation of the Industrial Complex, due to the harbour facilities liable to be supplied by Suape, or even to single eventual factors.

A REPAIR SHIPYARD

The maintenance and repair works are classified according to skilled labour demand, equipments and other resources to their accomplishment, gradually and in accordance with the difficulty involving the attainment of services.

1st. STEP SERVICES

These are performed by the very crew, with the resources available aboard, and referred to checks and inspections and maintenance, except 'quickworks'.

These services are performed when the ship is navigating or loading or unloading at the port.

2nd. STEP SERVICES

Generally designated as 'Cruise Repairs', they are usually performed by repair shops with better resources than those existing aboard, although not requiring great requirements on skilled labour or tools.

These are small services usually performed when the ship is staying at the port.

3rd. STEP SERVICES

These are considered the services requiring equipments and labour able to accomplish technical works of higher responsibility, on one or more specific fields, thus requiring the aid of repair shops ashore, which should be specific ones for such service. These services are usually performed when the ship is staying at the port.

4th. STEP SERVICES

These are the works predominantly performed on quick-works or others requiring that the ship is docked or put into a shipway.

These services are accomplished by shipyards, which might have or not a large number of specialized workshops but, generally, the investments on equipments are such as to enable to accomplish most of the works aboard, even performing the upper works, taking advantage of the dockage period.

These services are usually programmed, being the programming adjusted as much as possible to the schedules of the ships.

Consequently, the demand of maintenance and repair services afloat, on a preventive or corrective way, present a correlation between the requests to the workshops ashore and the frequency of ships at the port.

Now, the demand of dockage services presents different characteristics when considering medium load capacity ships and when it is the case of large load capacity ships, assigned to ore bulk transport.

In the first case, the demand is processed preferably at the ends of the route, where the ships are unloaded. In case of large capacity ships, however, the dockage resources are attracted next to the harbours, strategically located concerning the routes, taking into consideration the period of time necessarily spent by tankers on cleaning and eliminating the gas from the tanks and still, namely the ore bulk carriers, the time lost on deviating from their normal routes.

The Suape harbour supply, characterized as tending to assume a significant position as a transfer port, and, still, due to the availability of countless possible private terminals, should classify it as a port presenting a large frequency of ships, whether completely empty, coming to load, whether totally unloaded, on its installations.

This fact is the strategic situation of Suape concerning the route Middle East - West Coast and Gulf, in the United States, and its middle position, as referred to, from the far ends of Brazilian longshore, as well as from Buenos Aires and Caracas, are liable to establish an area, in the Harbour Industrial Complex for Suape, for installation of a shipyard which load capacity should be compatible with those of the ships to be received therein.

The feasibility on the implantation of a shipyard, still during the first stage, might be not backed by the frequency of ships operating during such phase, but should

find such backing on a confined market available to the private undertakings expressing their interests, as already noticed, through the National Bulk Carrier group, owner of one of the most significant fleets including VLCC's and ULCC's.

Anyway, the frequency of ships being expected in the 1st. stage, shows the need on the availability of a backland area and mooring for ships, to attain repairs afloat, namely 'cruise repairs'.

B . FISHING

It is generally known that every species has its geographic habitat conditioned by the ecology, as well as the boat on its pursuance and her methods of capture, are determined by the habits of the species. Having always in mind those true facts, there were studied the methods of capture being considered as feasible ones, from a little fishing base, in Recife, taking into consideration, besides those actually in practice, the ones presenting good perspectives, due to the available reserves in the influential area of the new port.

The result, on the contrary to a first thought, was not gratifying. From every studied species, occurring on northeastern epicontinental sea and nearby area, the only presenting capability to support a more intense exploitation were the tuna and the likes.

Thus, based upon a work performed by Melquiades Pinto Paiva, from the Laboratory for the Study of the Sea, from the University of Ceará, it was projected the capture of such tuna species, to its optimum level.

At the same time, it should be remembered that being a permanent concern of the Government to establish an economic balance through various Brazilian regions, namely the Center-South and the Northeast, it is licit to look for conditions to establish such balance as soon as possible. On that concern, the creation of a tuna fishing base in Recife, since it is the only type of fish the Northeast could exchange with the South, as it is less expensive; and being produced on relatively large quantities, it would be always a necessity to him, as a source of animal protein, also contributing to the policy of national economy.

At the moment, and considering the fishing interchange, the Brazilian Northeast imports from the Center-South and abroad (specially codfish) and exports to abroad (namely lobster).

In case a political-economic option comes to develop tuna fishing, from the proposed base in Recife, another option should be imposed: to create a compulsory requirement to export at least a part of the fish to be produced, to the South, preventing the whole production to be allocated to external markets, primarily prepared as a whole frozen, and due to the attraction of high prices on the international market. Better profits, considering the economy as a whole, should be obtained when entailing the exportation to canned goods or to more sophisticated ways of industrialization.

From a regional point of view, we should remember that if the State of Ceará is requiring the establishment of

a fishing port, with main characteristics directed toward the lobster, the State of Pernambuco might be prepared for tuna fishing. The State of Pernambuco might take this attitude, successfully, since exploiting tuna fishing. And, besides, it would create conditions to receive all the northeastern tuna fishing boats, to unload on its port, virtually emptying all the available stocks, as well as the foreign fishing fleets, stimulated by the creation of a small industrial park to be installed and liable to absorb the product of that external fishing activity, probably entering the country under drawback system.

In short, it would be also justified the implantation of a tuna fishing base, in Suape, similarly to the rest of Brazil: the sardine fishing fleet, concentrated in Rio de Janeiro, Santos and Santa Catarina; the line, performed in Abrolhos, is already being noticed in Vitoria and tends to search another base, closer to the south of Bahia; and the net fishing, originally based in Guanabara bay, is now being concentrated in Rio Grande. Thus, the industrial fleet always looks for the nearness of the fishing grounds.

Then, if the shoals of tuna and the like are in the Brazilian Northeast, the natural and logic tendency is to develop their capture from the ports in this region. Only this reason should be enough to justify the implantation, with assured success, of a tuna fishing base in the Harbour Complex for Suape.

Besides this dimension on the expansion of industrial fishing and though the possibilities to expand the workmanship fleet are quite limited, aid programs concerning such workmanship - as recently developed by SUDEPE, jointly with INCRA - might change, though on a small scale, the structure of workmanship fishing, providing to it a higher capture potencial. In this case, connected to the incipient fishing activity existing in Suape, new workmanship powered boats should be received on pioneer installations, forming a small fishing trade center, cold-storage facilities, icemaking installation and further support substructures, based upon a cooperative activity.

Such approach, being adopted for the workmanship fishing, involves the general idea that it should be the basic for industrial fishing, as it happens all over the world. And so, considering the existence of an incipient activity already noticed in Suape, it is reasonable to anticipate the allocation of an area to make easier the development of this activity, to discipline it, in order to harmonize the fishing activities with the maritime navigation demanding the Port, in Suape.

C. ROLL-ON/ROLL-OFF AND LASH

The roll-on/roll-off system, due to its significant advantages concerning the transportation of unitized cargo, especially when the sudden raise on the price of fuels caused a realignment on the operational system of transports, concerning their economy, should request

adequate installation, even on 1st. stage.

This need is due to a recent resolution of SUNAMAM authorizing brazilian firms to initiate their operations with the system, namely on transportation of automobiles from the Center-South to the North and Northeast.

On the other hand, the transport system using LASH is already implanted along the brazilian and platine shoreline, operated by Delta Line, though on a restricted way, since the units are not enabled to operate with more than 9.5 m of draft, or otherwise they should be not able to operate on the ports of Belem, Mucuripe, Paranaguá, Rio Grande and Buenos Aires.

On these last ones the restrictions should be not so heavy, as they are end-of-route ports and the ships come to them with enough cleared draft. However, Belem and Mucuripe, which are called at the beginning of the route, are only reachable by a maximum draft of 9.5 m. Under these conditions, the ships should carry only about 17,000 tons of cargo, producing an average utilization of 59%.

The favourable conditions to be supplied by Suape, already enabling during the 1st. stage larger drafts than the maximum of Lash type ships, should also cause the realignment of transportation system, attracting such ships to this port, right on the beginning of this stage.

Such fact gives the opportunity to other facilities, of operational character, enabling already during the first stage to receive cargo from the barges of Lash ships.

D OTHER ACTIVITIES

To the activities being anticipated for the 1st. stage of implantation of the Industrial Complex, might be added other ones, as a consequent demand answer to the arising harbour supply, as well as to the promotional dynamic started by 'DIPER - Companhia de Desenvolvimento Industrial de Pernambuco'.

On this concern, studies on various industrial profiles are still in progress, such as on mechanic-metallurgical sector, electric and electronic materials and other ones, trying to stimulate private interests to the Complex area.

As a consequence, it is expected that, once activated by the industrial promotion and the offer of pioneer substructures, still during 1st. stage, other industrial activities are implemented, accelerating the development process of the area, providing a large flexibility to adjust the substructure to the elasticity of demand.

3.2.4 Charge of Flow-Chart

To consolidate the results on the economic studies, next are set forth the flow-chart charges for the 1st. stage, as basic elements for dimensioning the harbour installations and route-railway accesses.

Table 3.1 shows the overall projection of charge traffic through harbour installations, while Tables 3.II, 3.III and 3.IV indicate the charge flows to the primary and secondary hinterland of Suape, according to the different types of transport - cabotage, railway and road - indicating origin and destination.

TABLE 3.1

PROJECTIONS ON THE OVERALL MOVEMENT OF CARGO IN THE PORT (1,000 tons)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	
COLLECTIVE PORT																											
Importation	1816	2003	2298	2582	3329	3555	3632	3623	3072	4031	4249	4490	4721	4976	5244	5518	5809	5609	5640	5691	5736	5780	5798	5820	5836	5854	
- Wheat	617	642	673	705	739	775	808	842	870	915	954	995	1037	1082	1128	1176	1207	1240	1272	1240	1257	1274	1292	1309	1327	1345	
Exportation	2222	1481	1625	1872	2152	2480	2781	2781	2841	2116	2225	2405	2684	3084	4116	4343	4392	4392	4421	4451	4472	4505	4531	4561	4591	4619	
- Wheat	206	316	311	321	362	389	425	445	445	466	487	510	533	558	584	610	627	635	644	652	661	670	679	687	698	708	
- Sugar	615	741	821	1019	1222	1430	1570	1570	1729	1829	1944	2068	2195	2335	2487	2649	2659	2659	2660	2677	2692	2708	2725	2742	2759	2775	
- Fertilizers	109	176	235	305	376	450	485	521	558	595	634	673	714	756	798	842	850	858	867	875	883	892	900	908	917	925	
- Alcohol	113	130	137	134	142	151	154	156	159	162	165	168	171	174	178	181	182	181	181	181	181	181	181	181	181	181	
- Vegetable oils	30	34	40	46	52	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	
PRIVATE TERMINALS																											
Importation	15701	15515	15429	15315	15311	15255	15265	15250	15200	15282	15322	15422	15568	15810	15931	15977	15987	15987	15950	15922	15927	15935	15950	15955	15960	15965	
- Phosphatic rock	12455	10550	10601	10581	10755	11205	11450	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500
- Sulphur	38	78	117	157	197	237	277	317	357	397	437	477	517	557	597	637	677	717	757	797	837	877	917	957	997	1037	
- Potassium chloride	43	55	67	80	92	104	116	128	140	152	164	176	188	200	212	224	236	248	260	272	284	296	308	320	332	344	
- Unrefined oil	32	44	56	68	80	92	104	116	128	140	152	164	176	188	200	212	224	236	248	260	272	284	296	308	320	332	
- Crystallite	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
- Chlorine	72	76	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	
- Coal-tar	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
- Chloride	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
- Chloride (*)	2600	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	
Exportation	5245	5212	4852	4634	4546	2252	2015	2082	2500	2562	2023	2442	2922	2870	2431	2032	10562	10562	10840	11080	11272	11460	11648	11836	12024	12212	
- Bitumen	2020	2020	2000	2000	2000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	
- Fertilizers (*)	3245	3017	2807	2624	2476	2352	2234	2116	2000	1984	1968	1952	1936	1920	1904	1888	1872	1856	1840	1824	1808	1792	1776	1760	1744	1728	
TOTAL IMPORTATION	11066	11170	11274	11386	11504	11779	11405	11442	11370	11615	11644	11695	11757	11822	11892	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	
TOTAL EXPORTATION	6447	6458	6494	6521	6705	7232	7642	7861	8044	8078	8218	8297	8393	8561	8747	8967	9207	9467	9747	10027	10307	10587	10867	11147	11427	11707	
TOTAL MOVEMENT	17515	17628	17766	17907	18209	18511	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	18300	

(*) By cabotage.

TABLE 3.1

PROJECTIONS ON THE OVERALL MOVEMENT OF CARGO IN THE PORT (1,000 tons)

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	2000	2001	2002	2003	2004	2005
COLLECTIVE PORT	1214	2643	2798	2582	2830	2355	2434	2623	2822	4031	4749	4460	4731	4976	5244	5519	5540	5604	5648	5691	5734	5780	5799	5799	5799	5964
- Importation	512	542	573	705	729	775	800	842	870	915	934	925	1037	1082	1128	1176	1191	1207	1224	1240	1252	1274	1282	1282	1282	1343
- Wheat	612	643	673	705	739	775	800	842	870	915	934	925	1037	1082	1128	1176	1191	1207	1224	1240	1252	1274	1282	1282	1282	1343
- Exportation	1202	1401	1625	1877	2102	2480	2626	2781	2844	3116	3295	3409	3644	3691	4116	4341	4389	4393	4424	4451	4477	4506	4531	4531	4531	4619
- Wheat	309	316	323	351	369	406	406	425	445	466	487	510	533	558	584	610	618	627	635	644	652	661	670	679	683	698
- Sugar	615	741	891	1044	1222	1320	1617	1817	2112	1039	1844	2068	2192	2239	2487	2640	2689	2689	2689	2689	2689	2689	2689	2689	2689	2735
- GrASSES	182	170	235	302	374	430	485	521	538	575	621	673	714	750	798	842	850	858	867	875	883	892	900	908	917	923
- Alcohol	113	176	127	134	142	151	154	156	157	162	165	162	171	174	178	182	181	181	181	181	181	181	181	181	181	181
- Vegetable oils	30	34	40	46	52	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
PRIVATE TERMINALS	15202	15212	15170	15215	15211	20254	20265	20380	21030	20742	24521	24942	25405	25170	25931	27972	29287	29222	29564	29731	31977	32115	32203	32510	32821	41259
- Importation	10455	10523	10603	12281	10765	13252	13250	13500	13500	13500	15500	15500	15702	15500	15200	17653	18655	18355	18655	18655	20655	20655	20655	20655	20655	26910
- Phosphatic rock	38	78	117	157	197	323	327	705	785	785	785	785	785	785	785	785	785	785	785	785	785	785	785	785	785	785
- Sulphur	11	20	34	45	56	106	161	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213
- Potassium chloride	43	53	69	88	111	133	161	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193
- Unrefined oil	57	67	77	82	92	61	30	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
- Ammonia	250	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
- Coal	72	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
- Coke	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
- Fly-ash	2000	2000	2000	2000	2000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
- Clinker (*)	2245	2012	2462	4124	4544	2252	2014	2052	2550	2282	2522	2442	2292	2670	2421	19332	10332	10367	10840	11034	11272	11460	11648	11831	12150	14428
- Exportation	2603	2025	2005	2005	2000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
- Cement	3243	3057	2829	2034	2446	2152	2916	2634	3020	2873	2507	5011	3482	3747	3011	2917	2717	3152	3434	3669	3857	4045	4233	4404	4731	5033
- Fertilizers (*)	-	-	-	-	100	100	100	446	442	439	436	431	427	423	420	415	415	415	415	415	415	415	415	415	415	415
TOTAL IMPORTATION	11060	11170	11274	11386	11504	13772	14050	14342	14370	16415	16454	16495	16537	16582	16628	18031	19846	19862	19975	19995	21912	21939	21947	21964	21982	29186
TOTAL EXPORTATION	6447	6428	6494	6513	6705	9732	9642	9861	10414	10378	12318	12237	13593	13564	13547	14675	14701	14964	15273	15535	15749	15966	16181	16444	16727	23267
TOTAL MOVEMENT	17515	17628	17768	17697	18209	23511	23700	24203	24822	24793	28772	29422	30130	30146	30175	33506	34547	34626	35152	35430	37651	37895	38128	38405	39739	47222

(*) By cabotage.

TABLE 3.II
PROJECTION ON THE LOADS TO BE TRANSPORTED BY CABOTAGE

A - Origin Suape

Product/Destination	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
WHEAT	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
Ports in the upper-Northeast	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
TOTAL	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215

B - Destination Suape

Product/Origin	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CLINKER	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
Perambuco (Northeast Longshore and other States)	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
TOTAL	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

TABLE 3.III.
PROJECTION OF RAILWAY TRANSPORTATION
A - Origin Suape

Product/Destination	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1955	1957	1958	1959	2000	2001	2002	2003	2004	2005
FERTILIZERS	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	250	250	250	250	250	250	250	250	250	250
- Pernambuco inland	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	225	225	225	225	225	225	225	225	225	225
- Alagoas	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	25	25	25	25	25	25	25	25	25	25
PETROLEUM BY-PRODUCTS (*)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	250	250	250	250	250	250	250	250	250	250
- Pernambuco inland	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	250	250	250	250	250	250	250	250	250	250
TOTAL	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	500	500	500	500	500	500	500	500	500	500

B - Destination Suape

Product/Origin	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1955	1957	1958	1959	2000	2001	2002	2003	2004	2005
SUGAR	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	250	250	250	250	250	250	250	250	250	250
- Pernambuco, Paraiba and R.G.Norte inland	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	225	225	225	225	225	225	225	225	225	225
AMMONIA	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	25	25	25	25	25	25	25	25	25	25
- Gramaçari	25	25	25	25	25	100	100	100	100	100	100	100	100	100	100	100	25	25	25	25	25	25	25	25	25	25
UREA	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	25	25	25	25	25	25	25	25	25	25
- Gramaçari	25	25	25	25	25	100	100	100	100	100	100	100	100	100	100	100	25	25	25	25	25	25	25	25	25	25
TOTAL	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	500	500	500	500	500	500	500	500	500	500

(*) Expected providing base in Salgueiro and/or Petrolina, to supply Pernambuco inland.

TABLE 3. IV

PROJECTION OF ROUTEWAY TRANSPORTATION

A - Origin Suape

Product/Destination	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
WHEAT	111	125	132	142	152	162	172	182	192	202	212	222	232	242	252	262
- Olinda	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
- Pernambuco inland	56	70	77	87	97	107	117	127	137	147	157	167	177	187	197	207
FERTILIZERS	112	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
- Pernambuco inland	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
- Alagoas inland	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
- Paraiba and R.G. Norte	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
PETROLEUM BY-PROD.	2,423	2,502	2,616	2,755	2,924	3,124	3,356	3,620	3,916	4,244	4,604	4,996	5,420	5,876	6,364	6,886
- Pernambuco	2,115	2,132	2,260	2,421	2,603	2,819	3,066	3,344	3,654	4,004	4,396	4,828	5,300	5,812	6,364	6,956
- Alagoas	376	423	470	517	564	612	659	706	754	801	848	895	942	989	1,036	1,083
- R.G. Norte	470	517	564	612	659	706	754	801	848	895	942	989	1,036	1,083	1,130	1,177
- Paraiba	470	517	564	612	659	706	754	801	848	895	942	989	1,036	1,083	1,130	1,177
VALUABLE INGOTS	102	102	100	100	100	100	100	100	100	100	100	100	100	100	100	100
- Rolling mills of Pacific	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
- Fortaleza	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
- Others in Northeast	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
TOTAL	3,741	3,820	4,010	4,233	4,472	4,736	5,026	5,342	5,684	6,054	6,454	6,884	7,344	7,834	8,354	8,914

For the pioneering activities for the implantation of Suape, selected as they were, it has been tried to define their location in compliance with the CI guidelines for area development as defined on 2.5.9, also in conformance with the recommendable strategy for its initial implantation.

The port activities to be developed in the first stage are subdivided according to three aspects :

- Activities characteristic of the common port
- Activities characteristic of private terminals
- Other activities with possibility to occur at short terms.

As far as the activities in the common port are concerned, the ones which were selected for the economical studies comprise two basic characteristics : Export of Sugar, Vegetable oils, molasses and alcohol, and transshipment of wheat, with turnover regulating stock at Suape, for serving the Region, with a view to provide savings on freight expenses.

The enumerated port activities would classify according to standards appearing on 2.5.1, i.e. : the areas of immediate back-land to the berths would be allocated to the exporters of sugar and liquids and to the party charged with wheat distribution in the region, the quay being destined for bading and unloading, according to the need ships may demand.

The topographic back-land conditions nearing the entrance to the North Canal (Massanga) are largely favorable to the implantation of facilities for sugar, cited liquids and accomodate themselves adequately with the guidelines for development of CI area in the port zone (ZP) recommended on 2.5.9.

In this way, it was tried to launch in the Tancagem area, at

the hill sides existing there , installations for wheat storage , whose characteristics are based on vertical silos , with great load concentration , close to the bases of such elevations , and the sugar installations existing in the plains near the entrance to the North Canal , at the left shore , as the characteristics for stocking are based on horizontal silos , with well spread load . It was also taking into consideration the necessity for a warehouse for stocking bags , in view of the demand aspects of the foreign market , also with characteristics for distributed load .

As the wheat neared the hill side and the liquids being located at their feet , there will be free areas in the Uplands , immediate to the back of the quay , which may be utilized for other loads of lower density , with the consequent use of extensive areas and with lower ship turn over , as for equipments and general cargo , destined to the CI itself .

Bearing in mind the possibility for short term implantation of the roll on/roll off lines in great demand for Recife and seen that said port is not provided with installations for receiving such ships , a ramp construction is suggested for same at Suape .

The foreseen ideal location for roll on/roll off installation for maximum occupation , is integrated with that of containers installations , at the up basin of the North Canal (Massangana) . The first stage , for the development of CI with no allowance made for drainage , and the implementation of the common port areas , besides the commence of the canal , would make a condition for either a intensive drag for servicing the roll on/roll off , or the utilization of temporary area for it , until complementation of the drag to the mentioned basin .

The inflexion of the Massangana River being considered , a little to the up-river foreseen for the first stage , which is a foreseen site to be earthed in the maximum occupation , and considering the small draft demand by roll on/ roll off ships , it is suggested that a temporary installation in that place for such type of ships as indicated on figure 3.1 , which would then require small investments and would take advantage of the infra - structure launch for the area .

As far as the operations with lash are concerned , if said should occur at the first stage , the loading /un - loading of vessels could be effected in the foreport foreseen at the Suape basin , the barges being then discharged or loaded in the common quay , by taking advantage of the interregno of the operations of wheat carrying or sugar vessels and /or liquids .

Close to the common quay , making up , with the closing quay intended for the operations with sugar bag loading at the entrance of the North Canal , an area for fishing installations has been foreseen , in the beginning loading the crafts based at Suape , eventually being capable of acting as warehouse and industrial processing facility , still in the first stage .

In the same way , an area sufficiently ample was earmarked in the Area I , at the entrance basin , across canal , for the installation of a shiprepairing yard , which may eventually be reduced , as the need may arise for the amplification of the entrance basin , as a consequence of studies made on smaller models . It should be stressed , however , that , even in this way , the resulting area for the implantation of the yard will be sufficiently ample .

Relatively to the port characteristic activities of private terminals in the first stage , or , those connected with the pioneering industries , the following was located :

a) The Petroleum Distillery , in the area intended for the energetic center , between the PE 60 and the highway distributing yield , receiving petroleum through pipelines from the berths installed at the entrance basin in the - Area I - and/or offshore terminal , exporting the derivative via baths which were launched near those for the importation of petroleum ;

b) The clinker milling layout for cement exports , also located in the Area I , at the entrance basin , having in mind the large industrial scale turned to the exportations , requiring the biggest ships foreseen for Suape .

c) The fertilizer plant in the Area II , close to the North Canal (Massangana) , with possibilities to receive ships up to 125.000 TDW for importing phosphatic rock , or in long terms , out of the horizon of the project , exports of fertilizers , and taking advantage of the scenery at the mouth of the Tatuoca River , with berths that could be put into use for handling all loads, and others , requiring smaller size vessels for , as per example , Ammonia , Potassium , Chloride , etc .

d) The Aluminum Layout , intended to fabricating aluminum in the form of ingots from the Alumina , was located between the fertilizer plant and the area intended for an eventual shiyard , with loading/unloading operations being effected in the previous indicated .

The petroleum distillery tankage area was scheduled to be installed in the vicinities of the Cupe point , close to the port access highway V , in strategic position , capable of receiving petroleum from both the berths located at the entrance basins to the port and from possible offshore terminals , which could from there be pumped via pipelines parallel to the said access and to the roadway distributing yield, to the distillery.

The tankage area for petroleum derivatives may be launched close to the loading berths , at the entrance basin to the port , close to the existing reefs lining .

It is thought that the concentration of activities around the entrance basin , which was planned for the port and the beginning of the North Canal (Massangana) , close to the Suape Basin , would avoid the dispersion of resources at the CI area , and will allow the development of same in a harmonic and righteous way , with a zoning plan foreseen for the Complex .

Figure 3.II indicates the location of the pioneering activities of the first stage , in a schematic way .

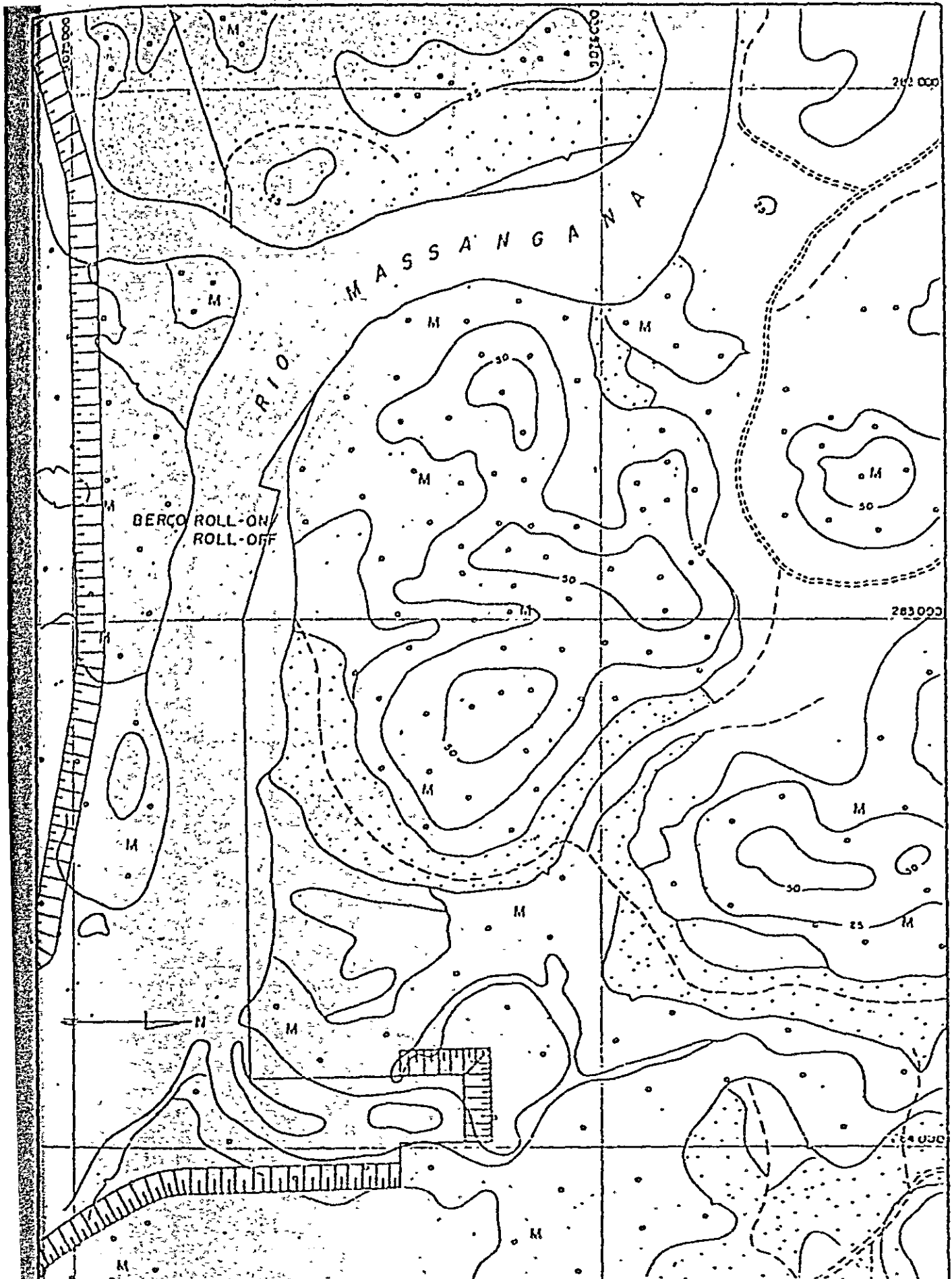


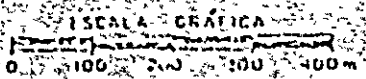
FIGURA - 31

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GOVERNO DO ESTADO DE PERNAMBUCO - PRAC
 COMISSARIA DE SAO CARLOS RIBEIRO INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SAO PE

SCHEME ON THE LOCATION OF
 ROLL-ON/ROLL-OFF INSTALLAT.



TRANSCON SA

Projeto	data	escala	assinha no	folha

- a) Refinery
- b) Harbour channel
- c) Oil
- d) Cement
- e) Shipyard
- f) Aluminum
- g) Fertilizers
- h) Harbour channel
- i) Collective port area
- j) Wheat
- k) Vegetable oils
- l) Sugar

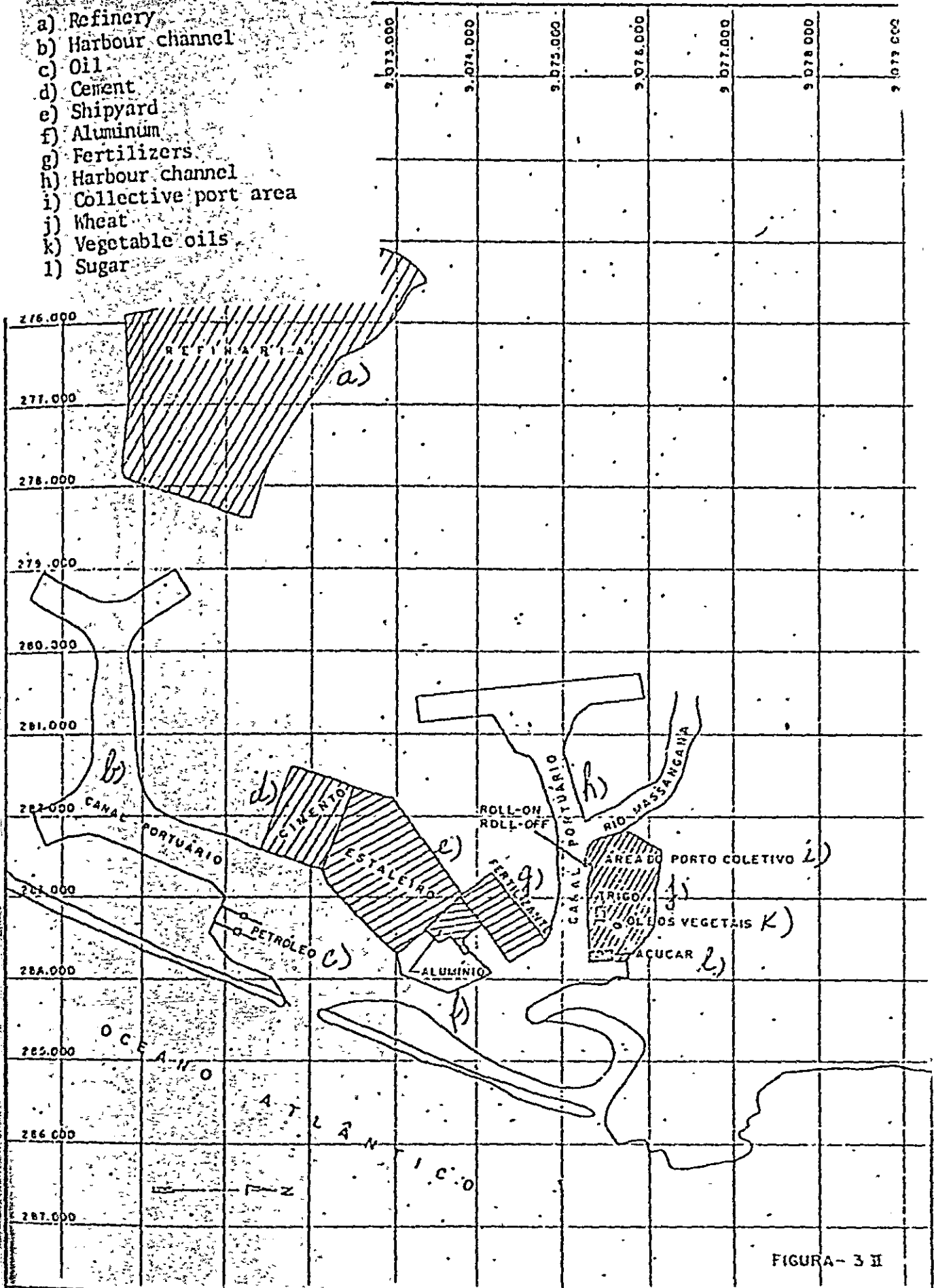


FIGURA - 3 II

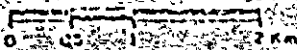
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GOVERNO DO ESTADO DE PERNAMBUCO - PRAC
 COMPLEXO DE DESENVOLVIMENTO INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SUAPE

SCHEME ON THE LOCATION OF
 PIONEER ACTIVITIES AT
 1st. STAGE

ESCALA GRAFICA



TRANSCON SA

Scale: 1:50,000 Date: 1973 Elevation: 100m Case no: 1000

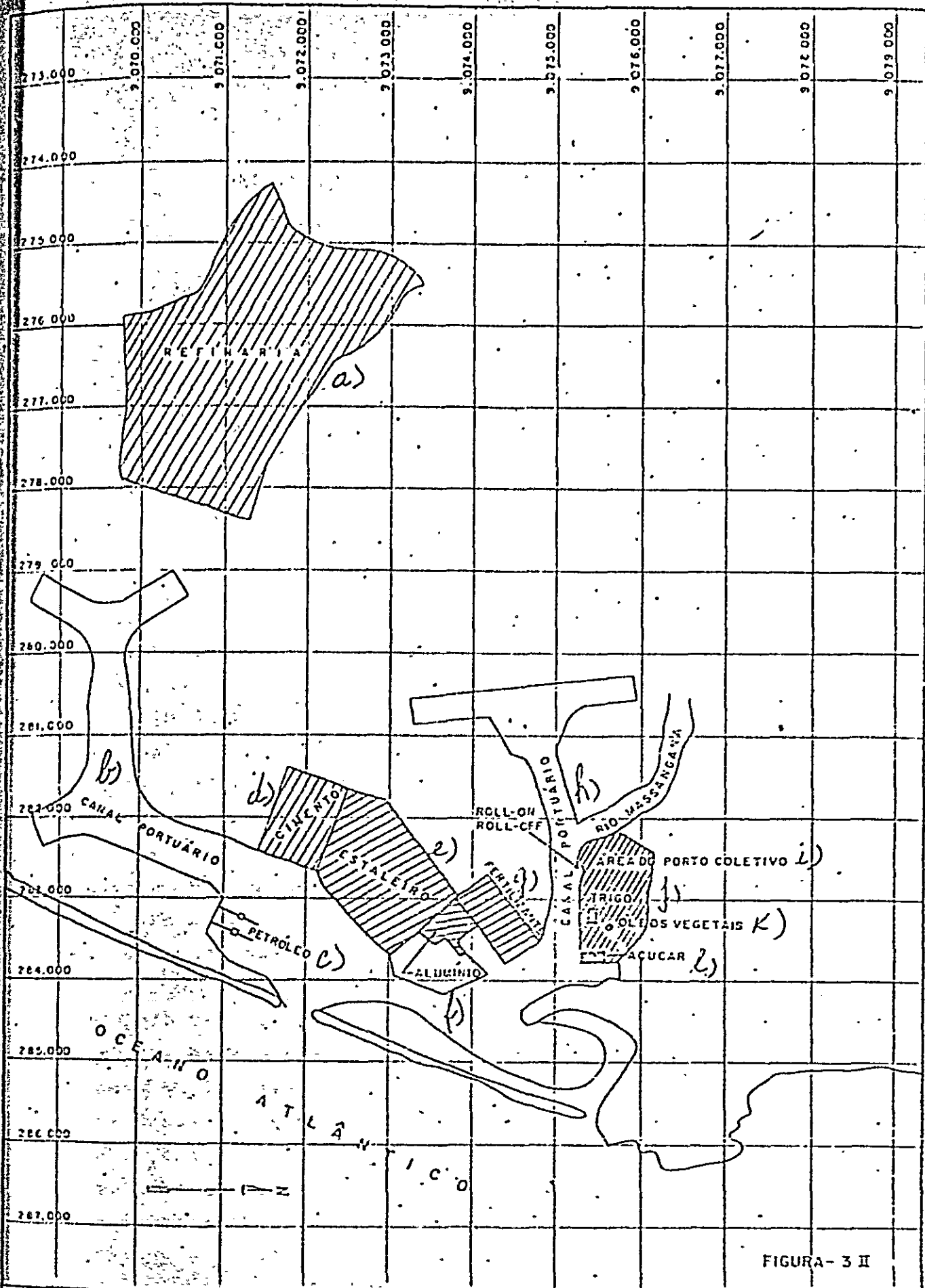


FIGURA- 3 II

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GOVERNO DO ESTADO DE PERNAMBUCO - DNAC
 COMISSÃO DE DESENVOLVIMENTO INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SUAPE

SCHEME ON THE LOCATION OF
 PIONEER ACTIVITIES AT
 ISL. STAGE.

ESCALA GRAFICA

TRANSCON-SA

Desenho nº 1/10/11

3.4 ALLOCATION OF THE INFRASTRUCTURE NECESSARY IN THE FIRST STAGE

3.4.1 PORT SYSTEM

A Generalities

Among the various sectors constituting the study of the Suape Industrial Complex , no doubt that one assuming the greatest importance in the scheme is the one referring to the port and sea , for the basic idea in which the project is founded envisages to ensure direct maritime access to the different industries to be installed there .

These characteristics are of special interest for the economical aspect of the undertaking , since the different increment and manufactured products necessary or being produced in such industries will not be operated in the common port installations , as they will become private terminals , situated immediately close to these industries .

Two advantages can be seen to arise immediately from the adopted procedure : the first is the elimination of a serie of administrative formalities which would naturally be imposed on the loadings / unloadings operations at a common port installation , where the industries cannot , naturally , have a direct management , apart from having the goods suffer repeated transshipments and travelling long terrestrial ways to go , through internal traffic routes in the Industrial Complex . The second advantage - and this can strongly contribute to cheaping the product - is that the transport of such increment will be effected by specially chartered vessels , and , through the usual chartering letters the importer may speed up the loading/unloading operations of a ship , and , there

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fore be benefited with the ' Dispatch Money ' advantage, which will be effectively lead to a reduction of the cost of transportation . Such savings, which are to be though of , can not be obtained by the users , if the installations of the common quay be utilized .

On the other hand , by using private installations , the industries will have bigger interests and facilities to schedule the arrivals of the vessels which will carry their merchandises , thereby avoiding the port to be congested and getting to better use of the installations available ,

With the project for the assembly of the Industrial Complex , thereby constituting the General Master Plan , the respective execution of which was planned in consequent stages , with basis on the results of economical studies carried out , so as to ensure the necessary infra-structure that could allow the commencement of the implantation of industries , access to port installations that will constitute the basic nucleus of the said Industrial Complex .

Of course , the final word on the outlining of the elaborated port project will be incumbent upon the Hydraulics Laboratory , whose studies in reduced models are under way , which will examine the Hydraulic behaviour of the internal projected channels , so as to ensure that they may attain the depths and calmness foreseen for them , indicating the adjustments that may eventually be found necessary .

Within the permissible technical knowledge for judgement with basis on the studies and observations effected in the field , the elaborated port project is entirely feasible , and the stages to be developed as the parts there of were foreseen .

B- Description of the first stage system

The implantation of the Suape port installation making up the first stage was developed according to two criteria; the execution of protection and access works that could ensure facilities to the navigation of crafts of up to 135.000 TDW and the limitation of the internal channels in the maritime shore , which develops at the entrance , from the area foreseen for the cement yard until the one intended for the fertilizer yard , including the areas facing it , which are intended , respectively for the terminal of petroleum derivatives and for a first stretch of the common quay .

Apart the fact that these industries are foreseen to be implanted , nearer the entrance to the port , in the elaborated Master Plan; these are the ones that for the time being can offer greater possibilities of immediate installation .

The construction of the projected collective quay , despite the philosophy that prevailed in the elaboration of the Suape project , is highly advantageous for meeting the exports of determined products of the Northeastern economy , which by its own nature , would not justify the construction of private terminals and actuate as a transshipment port for wheat , attaining economy in the freight scale , as well as permitting the industries that will come to the industrial complex to take advantage of it and support its production.

At the first phase of implanting the Suape Industrial Complex , the amounts of increment imports and exports of manufactured products will not attain economical conditions to resort to using vessels larger than those of 135.000 TDW , which simply coincides with a set of ships that are now being constructed in the country.

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In a parallel to this reduction of depth allowed for the first stage, it was foreseen the opening of a channel in the south side, with small depth, of course and with reduced width, for allowing the flow of the waters of the rivers Ipojuca and Merepe, since that the place near the lines of reefs where their water flow, will be earthed for the construction of a plateau in the back of the berths where the oil carriers are foreseen to operate. In front and across the port entrance, at the area, intended for the installations and ship repairing, the area to be dragged was greatly reduced, the front basin being limited by a straight line connecting the cement factory to the so-called "Ponta dos Franceses". Still making part of the first stage, a reduction to the channel width is foreseen, near the "Ponta dos Franceses", as well as the dimensions of the foreport area, located in front of the present Suape beach.

With reference to the depths, only the port entrance basin will be kept, in the 19.372 meters elevation, in relation to the CNG zero, whereas the open canal for allowing the flow of the Ipojuca river will be dragged for 3.72 meters. In the internal channel toward the Massangana river, the deepening will be carried out for the first phase of the first stage, until the elevation of 14.872 meters. And in the second phase of this same stage, for the elevation of 17.872 meters, except for the final part of the canal, following the collective quay, and in the darcena located close to the area intended for the fertilizers Plant, where the depths will be placed at 11.372 meters and 13.372 meters. At the beginning, at the fishing quay area, the depths will be placed at 7.372 meters, it being that in the port entrance there will be a transition zone for the canal depths, along the Massangana river to the basins of the port.

Such reductions, both in depth and in dragged area, had for objective the adequacy of the port to the navigable conditions in this first stage, the necessary volume of sand to be dragged being used for earthing the priority areas, to the definite

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elevation of + 2.628 meters in relation to the CNC level, and the remaining volume to be utilized for earthing the stretches where the port axis 3 and 4 will be implanted, while the earthwork, to have an elevation of + 1.50 meters, to cover almost the whole of the area in the projected Industrial Complex.

There will be, therefore, a perfect balancing between the dragged volume for the opening of the Canals for the first stage, and the recovering of the lands that constitute the Suape Industrial Complex, the implantation cost being greatly minimized, and offering from the beginning the conditions for these priority industries to be installed and function as incentivating poles for other industries.

C - Opening of the Port Entrance

As a consequence of the studies carried out, it was foreseen that the port entrance be located at the break water axis existing now, which was not considered on account of such fact, but rather because this region is directly reached by an open access canal in the SE direction, which coincides with that of the winds and of most frequent waves.

In the implantation of this external access canal, it also contemplated the situation of the rock bedding, which was evidenced by the geophysical tests, so as to ensure its deepening, even in the definite stage, allowing access to vessels larger than the foreseen ones - this stage will be entirely independent on the de-rooking.

The situation of the reef, constituted by a layer of arenite of about 3 meters thick, which develops under a layer of rough sand somewhat compacted, makes the problem of entering the port in such condition and also seeing the depths to be attained, a point that should be given all care. In this con-

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In connection various studies were carried out , with a conclusion that the best would be the opening of a "window" of trapezoidal base , similar to the transversal section of the external canal , with 20.00 meters in depth and 320.00 meters large , each shore presenting a ramp of 1,3 protected with a 2.00 meters thick rocking .

The carrying out of task should be done by creating in the front and in the opening a sand dike made up of material taken from the dragging of the external access canal , complemented with material taken from the dragging of the internal canals . Once this dike has been completed , on its had will be opened the foreseen window, as well as the dragging of the foundation base for the pier 26.372 meters deep , all in accordance with the project for these works so that the deepening of the access canal may be effected eventually in the foreseen depth , as well as in the port entrance , which should allow the transet of ships up to 260.000TDW, or even 370.000 TDW , in case a shipyard should exist for this size , but in such case , such ships should cross the port with low tonnage .

This phase being accomplished the works for rockering for protection of the opening ramps will be commenced , at the reef line , as well as the launching of the rockering for constructing the protection piers , all in accordance with the elaborated projects .

Such protective works being carried out and the opening of the window made , and the dragging of the entrance basin being completed , in the internal area of the reef line , there will commence the removal of the sand dike referred above , by diminishing its width in the internal side through the aids of dragging to the limits of safety conditions offered by the suction drag , and inward pressure work . The conclusion of the works in the front area at the port entrance will be made with the hopper drag , employed in dragging the external canal , it being that a volume of sand placed at the left side of the south

pier, whereas the volume placed at the right side of the North protection pier, will be integrated as apart of the beach foreseen to be launched there .

Consequently, although at this first phase the access canal be dredged to 21.372 m, the protection works and port entrance are already prepared for their future depth conditions that will go down as deep as - 26.372 m.

D PORT PROTECTION

At the present situation the reef line, that offers a natural protection to the port area, has its peak at + 0.0m so it is necessary to raise it up in such a way as to avoid the ripples and ravaging waves and the appearance of uneasiness condition at the port basin.

That is what was verified at Recife Port where a similar protection had to be altered in order to guarantee the port basin tranquility. There, the elevation works consisted of a wall block, which is now being improved with the rock-filling both externally and on its upper part.

Studies made for the elaboration of the port project, show the convenience of keeping a single opening at the reef line, the need of elevating it and of building side protection piers.

Although the hydraulics laboratory as a part of studies which will be held in a reduced model, will examine in ripple canal and ripple tanks the definite cross sections of different protection works foreseen as necessary right at the beginning the respective projects were elaborated, with the application of theoretical knowledge which Maritime Hydraulics puts at our service.

So, both for the piers project and for the reef elevation, the weight of the blocks which line up its most exposed part was calculated by the application of Hudson formula, the Engineers Corps of the America Army, and a towering elevation of + 3.82 m was estimated, and an external embankment, from the lowest tide upward, of 1.2 and the existence of

2.5 m high ripples (amplitude). With these elements, the utilization of 3 ton stone blocks was predicted to build the lining of the outer and upper part of the piers and studied the distribution of different types of stones for the construction of the cross section of work.

In case of the field studies that will be made as a part of the measurement campaign which is also incumbent on the Hydraulics Laboratory, showed the existence of higher ripples (greater amplitude); the study of protection breakers cross section may be reformulated without hampering the study of the undertaking feasibility study.

Recife port projection reinforcement and elevation project foresees peak elevation identical to the one adopted for Suape reducing the outer embankment in 1:15 but varying the weight of the blocks from 3 to 5 tons. We have indication about how the weight of these blocks have been calculated, but we know that the work has been keeping a safety level, which constitutes a guarantee for the solution adopted for Suape Port.

Referring to reef elevation, the problem was divided into two parts. At the South of the port entrance, an elevation work with the use of rocks was adopted as the solution, the cornerstone point being located more near to the internal reef line in such a way that the wave splashing starts its way at the pier basis.

The calculation of the stone blocks weight was also made by applying Hudson, formula which furnishes a result identical to the one attained for the pier project.

The typical cross section of this stretch of the work is presented at the drawing in the enclosed figure.

For the north of the port entrance the solution of the problem was examined according to two criteria: either keeping an elevating work identical to the south entrance or creating there an artificial beach made up with the product of the dredging of the internal canal. This solution, as the ripple splashing occurs on the beach, does not need having so high a peak and the basing of the sand beach will be performed by a rocking bed of a relatively low volume.

Should the creation of the artificial beach materialize, the extension of reef line may be made with economical conditions much more advantageous, which made this solution for the making of the beach to be selected.

So that the material dredged for the opening of the external access canal could be used, it became necessary to foresee the use of 2000 m³ Hopper dredge in order that, when the tide is at high ebb, it may move nearer to the reef lines and discharge the tanks by the rear door. The estimate of the increase of the cost of cubic meter of dredged material with the utilization of 2000 m³ dredge instead of 9000 m³ which would be possible, if the launching of the construction of the beach were not forecast, is relatively insignificant that is around Cr\$0.36. This does not alter the advantageous situation resulting from the decrease of the rock filling volume.

The solution projected for the construction of beach at the north of the port entrance must be object of a study in reduced model. This is to examine the longevity of the work, which, however, in view of the economical advantage offered, does not prevent anyone from adopt this solution a right at the start.

The development of the respective project foresees the beach sustaining, on one side by the north great water at the port entrance and, on the other side, by rooted great water at the Santo Agostinho lape. In this case, it is not necessary that its foundation be situated below six or seven meters since sand is not carried by the ripple action at this site. Still, as a safety measure, 150 m wooden stacks, of the "Xase" type may be built every 200 meters, in such a way as to separate the sand between them.

These spikes will be built with wood planks, measuring 30 m approximately, emerging with the beach grading.

In view of the fact that this is a work, the definitive project of which depends on laboratory study, in order to estimate the beach grading we adopted the enclosed graph, appearing in W.N. Bascon's work, was published at the Transactions of the American Geophysical Union (1971), which establishes a relationship between the sand grit sizes with the beach grading, as they may be found naturally unsheltered, partially-sheltered or sheltered. So a stable beach is one having an unsheltered or exposed area, with sand grits measuring .4 in diameter, which are the conditions verified at the location, and the sand grading will be 1.20 as adopted in the project.

The construction of such a beach makes it possible to forecast a saving of approximately Cr\$10,000,000.00 in carrying out the works .

DREDGING SERVICES

The dredging services for the opening of inside and outside access canals deserved , in the whole project , a very accurate study , having in mind a greater saving in the enterprise and the equilibrium in the dredging and earth filling services , in such a manner as to reduce to the minimum the need for deeping the canals and for throwing away the respective volumes .

For dredging the outside access the solution adopted was the only compatible with the carrying out of on the large services , that is , utilizing Hopper dredge . A special solution was adopted in the carrying out of inside access canal services , envisaging the employ of suction drags and dismountable pressure dredge , which may be transported to the different work sites and there put into operation .

The dredging planning details are consubstantiated at Tome IV , where each area services peculiarities are studied in detail , with an indication of the most recommendable equipments , a justification of the adopted variables , services difficulties and probable operational cost .

The dredging plan studied may be summarised in this way :

- Services in the port access canal ;
- Services in the inside canals , basins and fore-port;
- Supporting services to the port entrance opening.

The port access canal is expected to be dredged to -21.372 meters , in relation to CNG zero , the geophysical studies made having shown that the whole bottom consists of sand in such a manner that part of this material will be utilized to give support to the port entrance opening services and part thereof will be employed in the

building of the artificial beach to be created between the port entrance and Santo Agostinho Cape .

The remainder of the material dragged in the outside canal shall be thrown away one mile north off the canal gravity center .

The cross section dragged with have a trapeze form with 1.5 side ramps , in view of margin stability even considering the vessel's speed . It is possible , with a better granulometry knowledge of the sand to be dragged , the ramps may be reduced to 1.3 resulting a substancial services cost saving due to the smaller volume .

In view of the disturbance conditions at the location , the equipment to be utilized at it has already been told shall be a Hopper drag with a 9000 m^3 tank capacity . However , as the utilization of part of the dredged material to the building of the artificial beach has been accounted for , the matter has been reformulated and the employ of a dredge of the same type but with a 2000 m^3 capacity has been studied . This equipment will be provided with draught reading 5.70 m , allowing to throw the dredged material , by the back door opening , as low as 7.70 meters into the sea .

At the first phase of the first stage , the inside canals dredging is scheduled to be made in areas I , II , III , IV and IX as well as in part of area VI , to give outflow to Ipojuca River waters exactly at this phase 90% of the volumes necessary to the conclusion of the first stage .

Area II , at the second phase of the first stage , the inside canals dredging is enlarged , both in extension as in deepness , its bottom reaching - 17.872 meters in relation to CNG zero .

Most of the material dredged will consist of sand , clay and aronite occuring in some stretches . This materials will be pressed for the filling of different areas of the port levelled ground , which are of a more immediate interest , for the installation of the industries of access routes .

In any event , the dredging was planned in such a way as to always provide the better combination between the floating piping length and the land piping length . Such a combination was based on the greater costs and load floating piping loss , and in the minimization of the utilization of Boosters .

With the purpose of selecting the dragging equipment, the joint utilization of self-transporting and suction and pressure dredges was the first consideration . Finally , however it was decided that only suction and pressure dredges would be employed , to utilize the material dredged for earth filling . Based on comparative studies about operational costs of a number of dredges , 26-inch Dredges , portable type was selected as the equipment to be utilized . The portable type dredges offer the advantage of having lower operational cost , lower draught and of being easily transported to their work site . This last factor acquires a special importance in Suape case , since the present shore-line near Santo Agostinho cape , does not always provide safe condtions at the entrance .

The breaking of the reef line and the consequent port entrance opening , required the building of ground dike , outside the reefs , which will be made with dredged sand , part of the access canal by self -transporting dredge and part of the inside area , by the suction and pressure dredge .

This dike will dredged in the outside and inside areas as soon as the port entrance is opened and the break waters are built . A great deal of sand volume obtained this way , will be pressed to form the artificial beach foressen for the North port entrance .

The hydraulic earthfilling to form the Industrial Complex plateau will be made in such a manner as to level different areas to the project elevation value (+2.628) which is below to the earthfilling foreseen in the Plan of maximum filling. On the other hand, however, it is higher than volume of earth filling available at the first stage.

So, the elaboration of an earth filling policy became a necessity for this stage, it was oriented according to the three following basic principles:

- 1) To guarantee a total utilization of the volume of earth filling available at the first stage.
- 2) To define priority areas, essential to the operation of the Industrial Complex which will be earthed up to the project elevation.
- 3) To define the distribution of earthfilling volume still available at the remaining plateau areas.

The following decisions resulted from the foregoing:

To earth T_1 , T'_3 , T'_4 and T_{10} areas considered priority
 To earth T_0 , T_2 , T'_3 , T'''_3 , T'_4 , T_5 , T_8 and T_9 areas at sanitation elevation, that is, that which locates immediately above maximum tidal level;

No earthing at the 1st. stage and a greater reasonability to the earth filling complementation.

To create the artificial beach foreseen for the North port entrance it was studied the utilization of part of the sand originated from the dredging of the outside canal and of part of the dredging of inside canals, the same orientation already followed for earth filling services of the port leveling off being adopted in this case.

Creation of the Fore-Port

Although the characteristics of private terminals consist, basically in providing berths in quantities and with a productivity large enough to eliminate the vessels waiting it is not lawful to consider necessarily the creation of a fore-port where, for various reasons, the ships have to berth before receiving authority to moor.

It is a fact that with the private terminal system adopted for Suape port, many facilities for the clearance of ships before they may moor and start operating will be granted but, even so, it can not be overlooked that most ships which demand the port make long path traffic and should be cleared by Customs, Police and Port Health Authorities.

Not being convenient to agree as fore-port area, the one right at the port entrance, since the ships going into and out of the port will have their marching obstructed by those stalled, it was selected for fore-port the basin located in front of Suape beach. The area provides very favorable conditions for the purpose in view, since it is exactly located beside the inside canals and also offers a very ample area, easily dredgeable.

Initially the available area will allow that, when the number of ships foreseen to stall in small, they may be moored to fixed buoys, fastened to heavy weights, describing a circle under the tydal effect. If, with the development of the port, the number of ships that should stay at the fore-port may be increased, the anchorage system may be changed and they may be moored to bouys by the fore and by the aft with the utilization of a much smaller area.

G

COLECTIVE PORT

The area earmarked to the collective port at the first stage covers leveled areas on the left margin of Mas-sangana River elevations as high as 60 meters. There has been an attempt launch : a tank area for liquids (vegetable oils , molasses and alcohol) for export in elevated platforms ; the wheat silo located at the vicinity of the embankment , off the quay on a ground fit for foundations ; facilities , for teh exports of sugar near the quay , on the area where the longer depths prevail .

So 4 berths have been forecast , one of which to be a component of the quay closing at the North canal (Massangana) . The end use of the four berths will be the following : the 1st. for bagged sugar export ; the 2nd. for bulk sugar export and with a structure to moore 125000 DWT vessels ; the 3rd. with a 80000 DWT which will be earmarked to permit the sugar facilities expansion and at this stage being utilized for inter-state trade ; the 4th earmarked for wheat export, is forecast to permit the mooring of 60000 DWT vessels .

The rossing of piping installations for exports of liquids has been forecasted .

The arrangement of these liquid bulks on the vessel ramps will allow the loading of vessel by gravity action in any of the four berths , an exception being made for molasses, the viscosity characteristics of which puts an difficulty i.e. , it requires pumping equipment. For the liquids which will be transported to the port by truck , an access utilizing a valley located at the rear of the elevation on demand of the elevation , so as to permit the tanks loading by gravity .

II

WHEAT FACILITIES PRATICABILITY

IMPORT AND EXPORTS

The wheat receival will be effected through the unloader mounter on a movable grant with an initial capacity of 400 t/h (after 1985 there will be a new 400 t/h unloader) and carried to the silo conveyer belts . The silo , with a 50000-ton capacity , will have a weighing equipment large enough to attend the 800 t/h both for receival and forwarding . The forwarding will be either by route or maritime (coasting navigation) .

I

SUGAR FACILITIES PRACTICABILITY

RECEIVAL

By means of trucks or wagons in warehouse store-rooms, at the reate of 500 t/h and transported to the two horizon- tal silos , with a total stocking capacity of 200 thousand tons or to the bagging building .

FORWARDING

Recovering sugar from the stacks by two rotating scoops, for 500 t/h each , transported by belts to weighing equip ment and from there to movable loader grant with a capaci- ty of 1000 t/h .

BAGGING

The sugar which is received there in bulk , directly from the warehouse store - rooms or from the horizontal silos or directly from the mills through trucks or wagons. Sugar will be bagged at the rate of 4000 sacks/hours and con- veyed by belts to the warehouse for sacking (which has a capacity of 25 thousand tons) or shipped directly to the vessels , through the movable grant equipped with a teles- cope to reach the ship hold .

J

LIQUID BULK FACILITIES PRACTICABILITY

MOLASSES

The receipt will be effected from tank trucks by gutters by gravity action and carried to the twelve tanks with 10300 ton capacity. The forwarding will be performed in two stages: 1) by gravity action to the pump room and 2) to the quay end extremity by utilizing pumps with a capacity up to 900 t/h.

ALCOHOL

Alcohol, which has low viscosity will be pumped from trucks up to the tanks with 4700 t capacity, in a total of 5 tanks. At the time of forwarding, the liquid will descend by gravity allowing a 300 ton capacity.

VEGETABLE OILS

Also received by gravity from truck tanks through gutters and conveyed by piping to 3 tanks of 2700 ton capacity each. The vegetable oil will be conveyed to the quay by gravity action, at the rate of 400 t/h.

K COLLECTIVE PORT OPERATION SUPPORTING FACILITIES (ADMINISTRATION AND MAINTENANCE)

The area forecast for the administration will have pioneer collective facilities at Suape providing the minimum required support to lodge the administrative services of the Port Authorities of Recife on place. It will have a private parking lot, vesting room and sanitary fixture canteen, port police, Customs services and related services.

L OTHER PORT-RELATED FACILITIES

Considering the possibility of the existence of other port related activities still at the first stage, a harmony bet-

ween the Plan layout of the port with the areas earmarked for this purpose , which are : fishing facilities , roll-on and roll -off mooring facilities ; reservation of an area for repairing ship yard.

So near the end of the collective port lay-out drawing a suggestion for fishing facilities and roll-on and roll-off ships is also presented .

The fishing port was considered of high interest for the region , both under the economical and social aspect. At Suape region , a fishing installation is currently going built. It has an artisan aspect but can and shall be developed , which will also contribute as an economical and health feeding source for the community which will be concentrated as the Industrial Complex work force .

The reasonable and overall utilization of local labor force and the stretch of sea located near Massangana River and adjoining to collective port beginning .

Besides the stretch of the quay which permits mooring , with a depth of 4.620 meters , or in other words , six meters in minimal water , the port study foresees, right at the entrance , the existence of two mooring points for maintenance and repairs in fishing boats , besides a running preferably type " syncro-lift " for hull service and cleaning . Near the moorable quay near and behind its alignment , is located the warehouse for receipt and selection of the fish , which is then transported for the refrigerating facilities , which lay along side the quay or to fish marketplace area , situated in a building right beside the warehouse in such a way that the fish purchaser does not need walk in the industrial areas .

The fishing industrial areas , located a little far off the quay , shall be developed by private entities contemplate the areas earmarked for the fishing workmanships .

At skirt of the elevation down in the interior an area intended for the fisher dwelling place while the bordering area and at the bottom of where the fishing port is located was earmarked for net rocks and possible port enlargements .

The details of these installations is only in the form of a draft as a suggestion for future development. The area situated between the site earmarked for the sugar terminal and the wheat silo battery will be utilized. The area toward which that terminal will develop , offers an immediate possibility for the installation of the containers temporary park , the respective quay also rendering possible the loading and unloading operation from lash and other barges .

Such a technological resources at still at a start of utilization in Brazil , however in view of the numberless advantages of its employ in the maritime transportation , it has been considered that they should be programmed or at least , they should be forecast with a shorter term , specially to attend the Industrial Complex as envisaged for Suape .

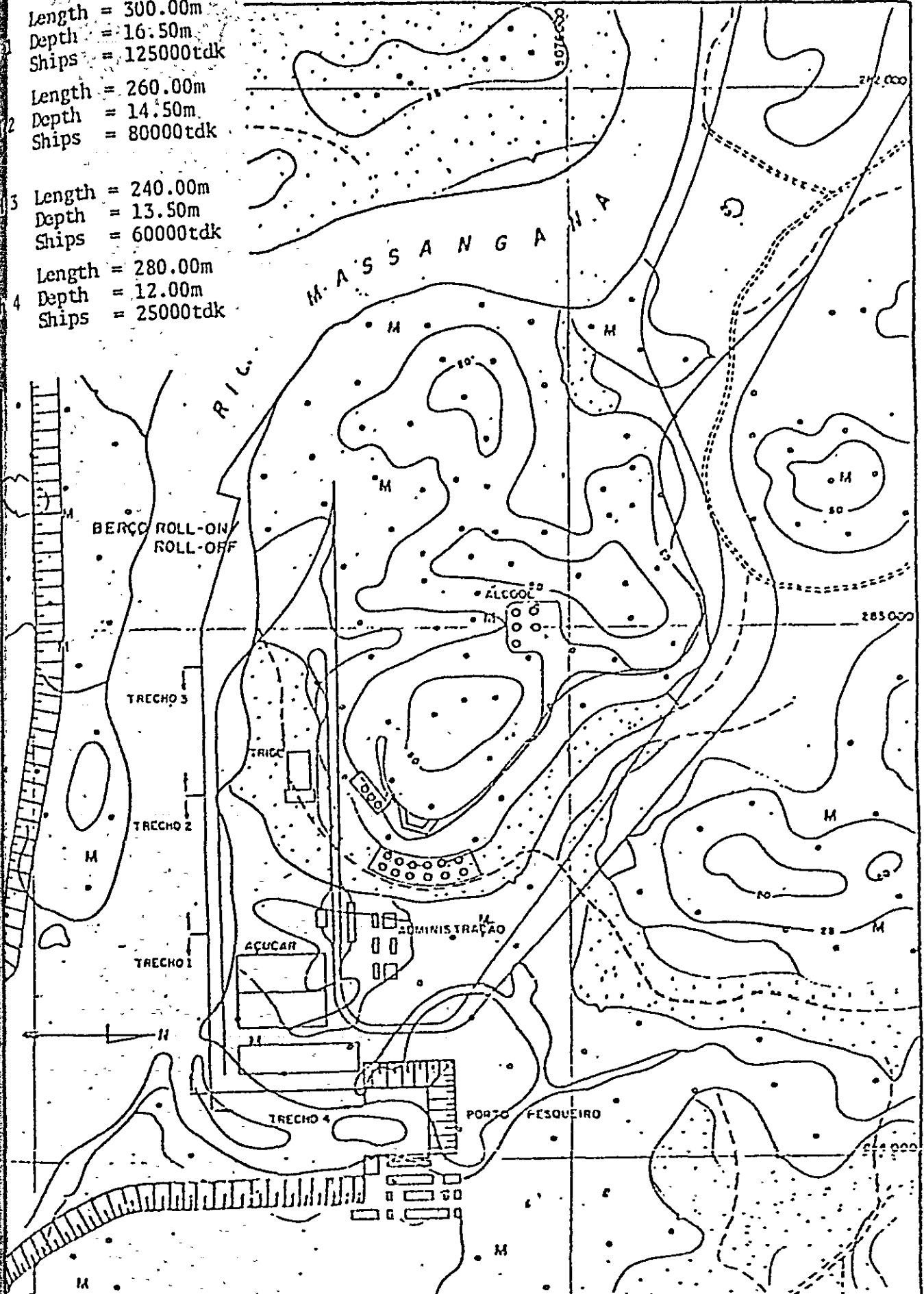
II NAVIGATION SUPPORT

Such a support is aimed at defining the outside access canal axis , well ahead of its start , for the correct locating of the vessel , as well as the axes inside canal limits and maneuver areas , apart from providing meteorological and hydrographic information to the vessels and aid them in their maneuvers for entering the port , locomotion along the inside , mooring and demoorning canals .

With these objects in view , the following equipments have been listed :

- I Lighted and blind traffic signals for orienting the vessels on the largo and in the port area obeying the international code and in accordance with the provisions issued by the Diretoria de Hidrografia e Navegação of the Brazilian Navy Ministry.
- II Decca radio-location for a better orientation of vessels.
- III Central Radar Station for providing at each moment a picture of the port traffic , in such a manner as to aid the maneuvers of the vessels (already computed in the telecommunication study) .
- IV Meteorological hydrographic and tide-recording station for collecting permanent data on visibility and maritime conditions , winds , currents , waves , tide , and so forth ; for transmitting this information to vessels and for forecast studies .
- V VHF radio-telephone station , for communication between port and vessel , and between different areas of the port .
- VI Two 1500 HP towboats , for vessels maneuvers .
- VII Auxiliary crafts , such as launches , water and oil boats and so forth for rendering services to the vessels .

- Length = 300.00m
- Depth = 16.50m
- Ships = 125000tdk
- Length = 260.00m
- Depth = 14.50m
- Ships = 80000tdk
- Length = 240.00m
- Depth = 13.50m
- Ships = 60000tdk
- Length = 280.00m
- Depth = 12.00m
- Ships = 25000tdk



TRECHO 1	COMP. Pto. = 300,00m PROF. = 16,50m NAVIOS = 125.000tdk
TRECHO 2	COMP. Pto. = 260,00m PROF. = 14,50m NAVIOS = 80.000tdk
TRECHO 3	COMP. Pto. = 240,00m PROF. = 13,50m NAVIOS = 60.000tdk
TRECHO 4	COMP. Pto. = 280,00m PROF. = 12,00m NAVIOS = 25.000tdk

FIGURA - 3.4.1

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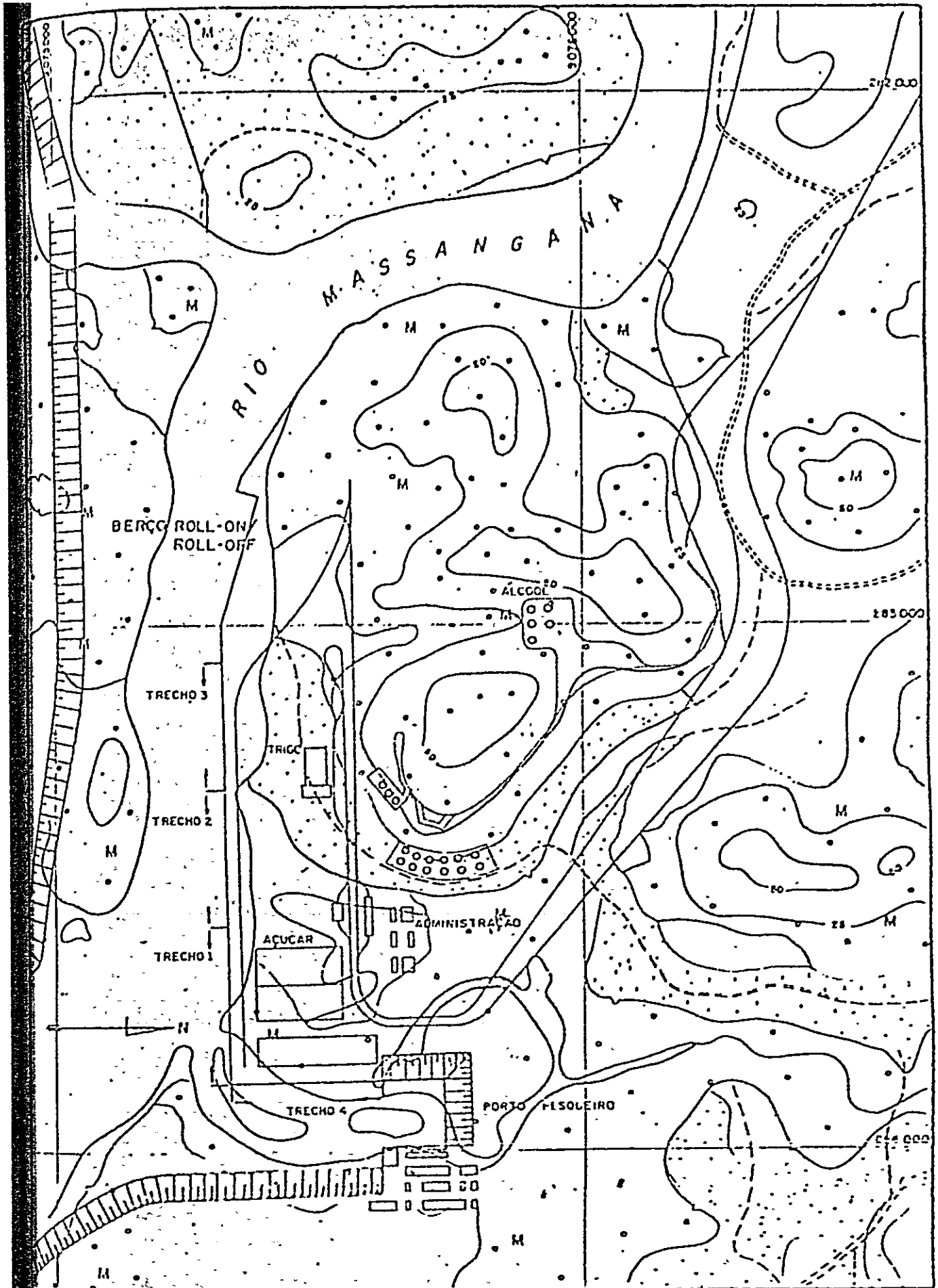
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GOVERNO DO ESTADO DE PERNAMBUCO - PRAC
 COMISSÃO DE ESTUDOS VEM NTE INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SUAPE
 SCHEME ON THE LOCATION OF
 COLLECTIVE PORT INSTALLATIONS

Autores:	Data:	Estado:	Assinatura:	Título:



TRECHO 1	COMPLO: 300,00m PROF.: 16,50m NAVIOS: 125,000t/d
TRECHO 2	COMPLO: 260,00m PROF.: 14,50m NAVIOS: 180,000t/d
TRECHO 3	COMPLO: 240,00m PROF.: 13,50m NAVIOS: 160,000t/d
TRECHO 4	COMPLO: 280,00m PROF.: 12,00m NAVIOS: 175,000t/d

FIGURA - 3.4.1

ESCALA: GRÁFICA
0 100 200 300 metros

dlpor

TRANSCON S.A.

GOVERNO DO ESTADO DE PERNAMBUCO - EPAC
TERMINAL DE INTERCOMUNICACÃO INDUSTRIAL
DE PERNAMBUCO

COMPLEXO INDUSTRIAL DE GUAPE

SCHEME ON THE LOCATION OF
COLLECTIVE PORT INSTALLATIONS

Projeto	Coleção	Escala	Assento nº	Índice
22/7/51	1960			

3.4.2. ROADWAY SYSTEM

Suape port Industrial Complex roadway system was planned in such a way as to attend the various port residential and industrial requirements to be created and to interconnect perfectly to the already existing region road network, as well. Obeying the indicated objectives for the different road lines, a ranking qualification according to the importance of the road in the overall ensemble in of the Complex. Primary or secondary axes have been creation in function of their importance in terms of intensity and flow direction.

The program for the 1st. stage comprises :

Main access to the complex connected directly to PE-60, which at the stretch from BR-101 to the same, it is recommended that it is added to the federal road network, constituting a BH-40x to be created based on the "Corridors for Exporting".

Distributing trunks which will permit to integrate the internal system according to the different traffic options, right from the start of the Industries Complex.

Port Axis I which interconnect the collective port directly to the Main Access and in the Distributing Trunk;

Port Axis III which, starting from the Distributing Trunk will permit the connection thereof to the areas intended for cement, fertilizers and aluminum plant through part of Port Axis IV;

Port Axis V will be implemented only at its beginning. This will be performed in such a way as to permit access to the residential area of the locality called Nossa Senhora do O (ZH-1) and to the area intended for oil tanker berths;

Residential Access I interconnecting the Distributing trunk.

The establishment of this primary axis in its more significant stretches is considered as the means to provide the basis for the overall internal road way system of Industrial Complex, which will permit its expansion in a flexible manner.

Apart from these primary axes, at the 1st. stage the secondary axes will be established. These will comprise the access areas to the bulk collective port, to the fertilizers and aluminum plants, to the cement plant and the orientation in the industrial zones.

The access to the oil tanker berths area near the port entrance in view of the insignificant traffic, shall be processed at this stage through the present CUPE road (PE -38) and from there to the berths site by the service road that shall be implanted to attend the works for elevating the reef at the south stretch and launching of the pipelines.

The remaining accesses foreseen in the first stage, being all secondary ones, and refer to the connection of the habitational areas of N.S. do O (ZR - 1) and Boasica (ZR-2) to the primary axis integrating the Port Exis V and habitational access as indicated above.

The attached figure indicates the internal routway system and points out the stretches which are expected to be implanted at this stage.

From the traffic studies which were made on the foreseen roadway turnover, and on the distribution to various sectors, the vehicle type LT - 7638 has been chosen. The Suape traffic will have typically urban characteristics, this due to the existence of a large of a large number of trunks, at invariable peak hours and due to the flux of passenger. Based on this and with the characterization of the flux of and - service levels, a one-way platform with shoulders was foreseen, apart from the strip for bicycles for the whole way, until 1955, when duplication of the way will occur.

The pre-dimensioning of the pavement, which involved keen studies on

sub-bed and material searching , have determined a flexible paving for the highways , and it was made according to the method on flexible paving projects of the engineer Murillo de Souza , where the lining method by the stages was adopted .

In function of the future traffic expectations , a first asphalt pavement was envisaged , to be laid down the effective sub-base and the base for the first stage .

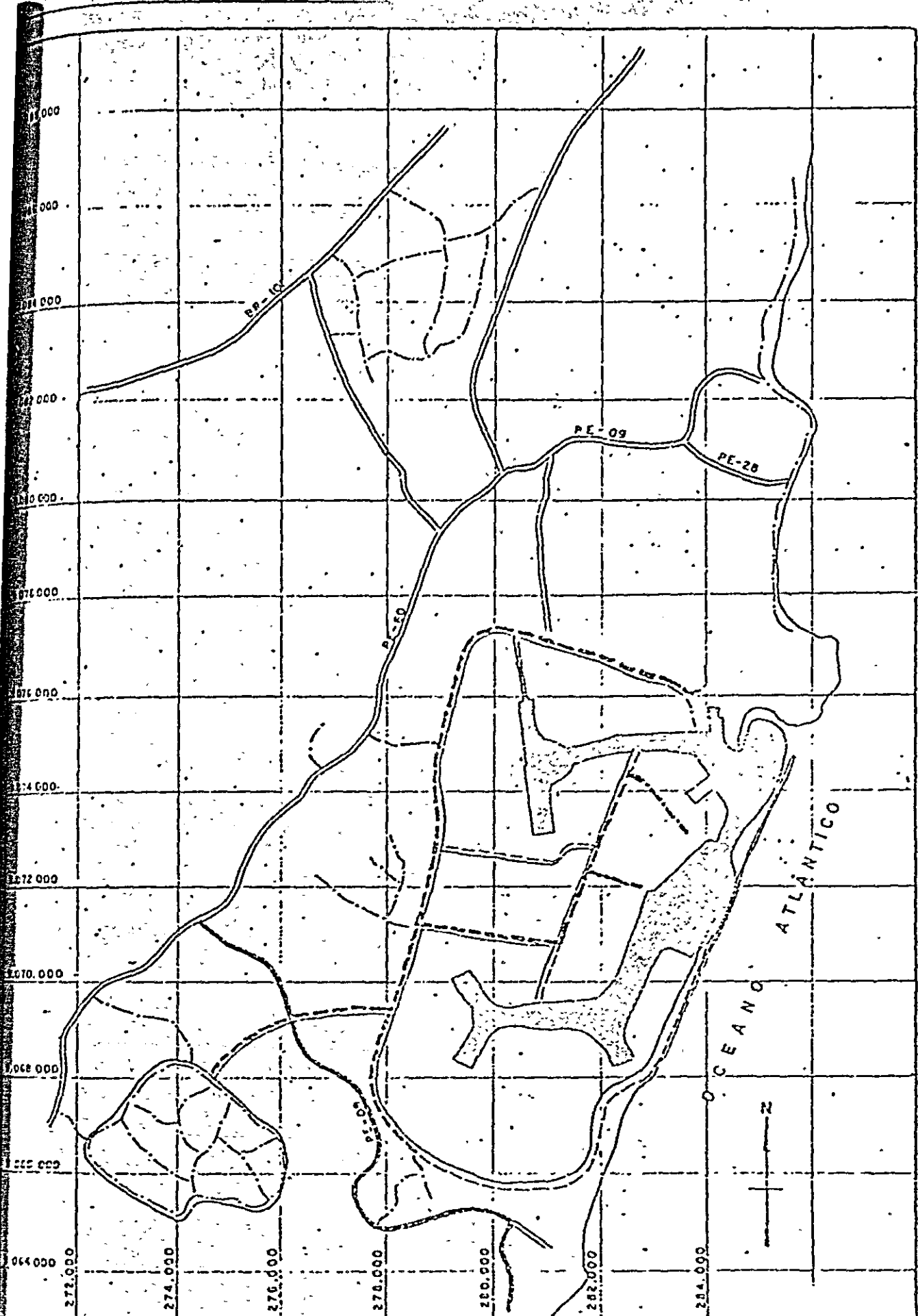
The sizing of the runway was made by taking into consideration the necessity of free and continuous traffic , and given the topographic conditions , a class U highway was established for the principal access and for the distributing trunk , and class I for the remaining ones .

The unbalance between volumes of cuttings and earthfill is expected to be overcome through the volume dredged out of the port canals for the hydraulic earthfillings .

Three usual options are presented in relation to the solution to problems concerning removal of the mud from the mangrove : ramp , sand drains and use of dynamite , whereas the recommendations as to the specifications for materials to be employed as final solution to the problems concerning the earthfilling of the mangrove , and a particular study for each region on the mangrove in given , and the whole road drainage system was studied and quantified , with basis on the general drainage system prepared for the region . The calculations of the bridges were given on allowance for the future needs for enlarging in view of the maximum occupation and also viewing the protecting shoulders for pedestrians and bicycle drivers .

The roadway and railway crossings and accesses will be at level , and they have been chosen in function of the turnover during the first stage; and as a solution for 90° entrances turnaway rollers were built for heavy traffic, and side routes were provided with acceleration and slow down strips. Special attention was given to Suape entrances, through the Pe-60, where a levelled access was built, since there could be no reasons for elevated overpasses clovers in the flow, in order to absorb both the heavy traffic to

the complex, which is considered of priority, and the normal traffic of the Pe-60



Federal and State routeways
 Bicycles
 Primary Access
 Secondary Access

ESCALA GRÁFICA
 0 0.5 1 2 3 km

dipar

TRANSCON S.A.

GOVERNO DO ESTADO DE PERNAMBUCO - PNEC
 COMISSÃO DE DESENVOLVIMENTO INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SUAPE
 SCHEME ON THE RAILWAY SYSTEM
 AT THE I.C.

Project	date	sheet	total sheets

3.4.3

RAILWAY
ROADWAY SYSTEM

The existence of a Port Industrial Complex entails , as it may be expected , an excellent railway condition with the already existing system , principally in regards to the characteristics of the Industries and of the Port , which will be installed or constructed .

In conceiving the physical plan , the guidelines thus established was based on the location of the port and of the incipient industries , which already counted on the existing railway traffic.

With basis on the plannings for the railway traffic a starting or ending at Suape for the first stage , the estimated traffic was defined for the internal area of the Industrial Complex in respect of 4 horizons in the project , i.e. 1980,1985,1995, and 2000 .

The following are the origins and destinations selected : Bulk cargo Port , fertilizer Plant and Petroleum Distillery .

On the other hand , the number of wagons to be handled each day permitted that the principal railway stretches in the main yard be established , the necessity or which originated by force of such turnover .

The determination of the number of trains to be handled each day was not only a function of the number of wagons to each origin/destination , but was also dependent on the technical conditions established for the main trunk , for the distributor , trunk and for the other port lines .

Therefore , the number of trains was fixed after the profiles of the respective fences had been sketched .

The resistances of the wagons and locomotives were calculated according to the Davis formula .

The locomotives choice was based on the principal characteristics of the

models currently utilized by the divisions of the Superintendência Regional do Nordeste of the RFFSA.

Once the numbers of trains is fixed, all future operational scheme may be prepared, with the time - table graphs on line, and schedules comprising the trains to be under way to a given destination.

The yard lay-out was then definitely elaborated, with basis on parameters obtained on the operational schemes which, also allowed in its turn that the yard had its turnover well destined.

The ensemble of operations of the yard, for the trunk distributor and port branches provided the necessary elements for establishing the levels of communication. The licencing and signalling, sufficient for meeting the requirements of the cited operations.

The yard has been conceived with four lines for receiving and sending incoming or outgoing trains to and from the "Linha da Rede Ferroviária Federal S/A", being three lines for the classification of the wagons for the three destinations of the Complex, other three lines for receiving wagons coming from these places and one for general maneuvering control.

The yard must be provided with complete installations for maintenance of the wagons, feeding and maintenance of locomotives, some facilities for handling of containers, apart from the paved roads connecting to the existing road. It will occupy an area of about 200.000 m², and there will be enough free space left for doubling its size in case of a need. The total extent of the lines will reach 13.7Km.

It is estimated in about Cr\$30.000.000,00 (thirty million cruzeiros) the infrastructure absorbing Cr\$5.000.000,00 the superstructure getting Cr\$8.000.000,00 and the remaining for the installations, inside lanes and other sundries.

The main branch , the distributing trunk and the port branches are all laid out on an almost plain terrain where earthworks prevail as the longer course runs on long shores and sandy regions .

The maximum grade is 0.5% and the minimum radius curve in the sub-branches is 245 meters.

The total extension of the main branch , distributing trunk and port branches is about 26 Km .

The implantation of the main switch yard may be carried out in parts as the need may show , according to the development of the complex , foreseen to culminate in 1985 .

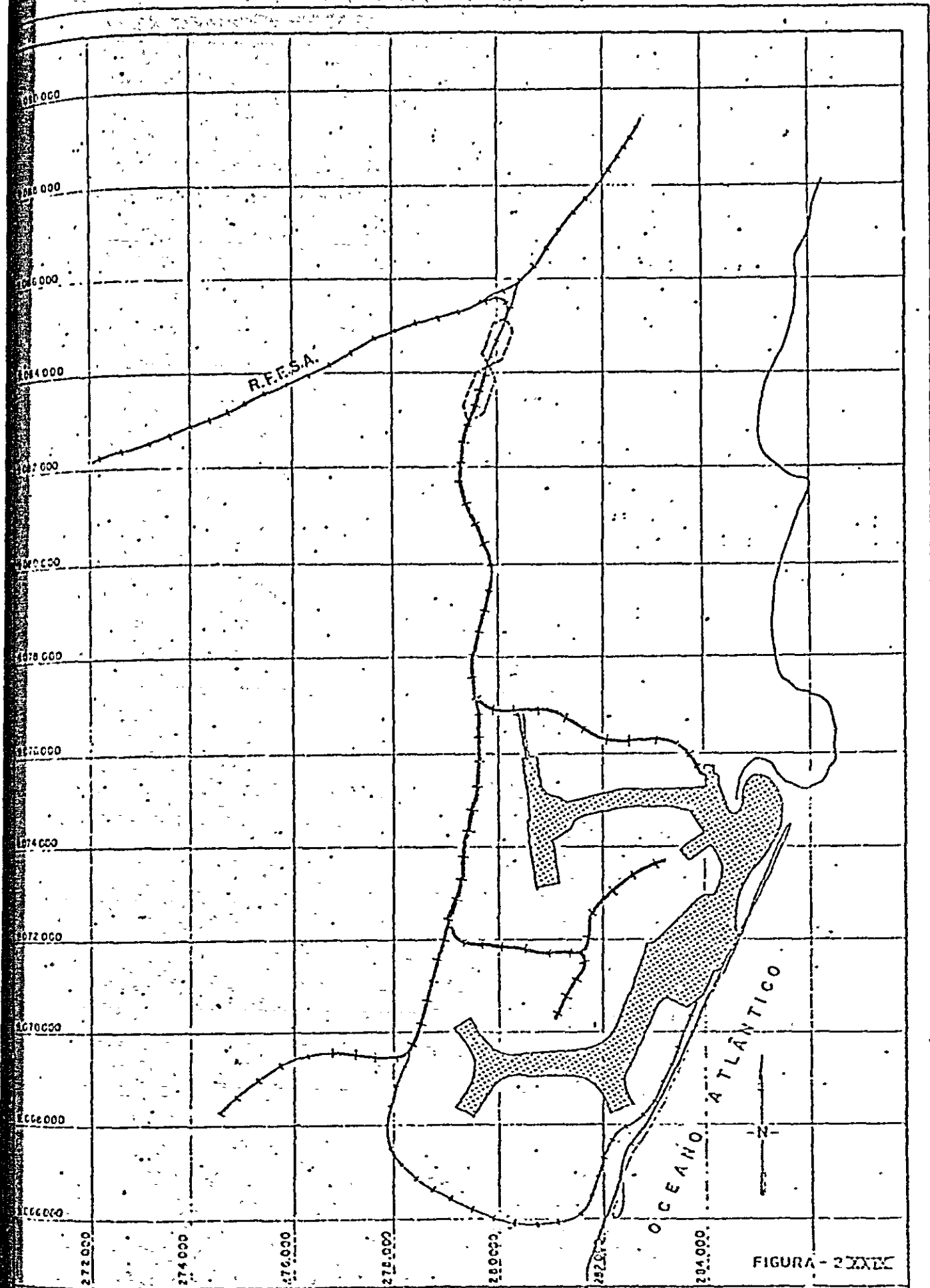
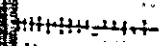
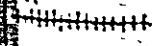


FIGURA - 2XXEC

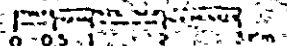
 Railway (Master plan)
 1st. Stage

diper



GOVERNO DO ESTADO DE PERNAMBUCO - P.M.A.
 COMISSÃO DESENVOLVIMENTO INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SUAPE

SCHEME OF RAILWAY
 SYSTEM

ESCALA GRÁFICA

 0 0.5 1 2 3 km

TRANSCON S.A.

Assessor	Coleta	Estudo	Desenho nº	Scale

3.4.4 ELECTRICITY SYSTEM

The first stage of the implantation of the Suape Area comprises the consumers as indicated on 3.3, which today may be predicted to settle in that area at very short terms.

- Petroleum Distillery
- Clinker mill
- Fertilizers Complex
- Aluminum Plant
- Port Installations
- Urban Areas

With basis on the indicators utilized in the basic economical studies for projecting the growth of the Industrial production, was defined the evolution of the electric power consumer market. Such evolution has been detailed accordingly on the enclosed table.

In a general way, the power feeding scheme will be made through three levels of tension, that is, 230KV, 69KV, and 13.8KV, compatible with the charges of the consumers.

Of this supply, will take part the Pirapama (230/69/13,8KV) substation and Cabo substation (69/13,8KV), already existing in the surroundings of the area earmarked for the Complex, and a new one (230/69/13,8KV) to be implanted the closest possible to the charge center foreseen for Suape, in a terrain measuring approximately 223X 125 m, its location being planned to be close to the Distributor Road trunk.

Both this new substation in the area of the Industrial Complex and that of Pirapama will be fed directly from Recife II, and will be connected through a "tie" of 230KV which will allow that the resources be reciprocal between them.

Studies of technico-economical nature have indicated the feeding of the Suape substation by two 230 KV circuits , of twin ACSR conductors , (2X636 MCM), with capacity to attend the evolution of the demand foreseen to occur in the period 1980-1985 .

Given the conditions of developing with the future charges , the reliability of supply to the Cabo substation also may be improved , by means of its interconnection with the 69 kv bus-bar at Suape substation .

From this substation , five 230 KV feeders will follow four of which being intended for the Aluminum plant and one intended for the petroleum Distillery . To the 69KV bus-bar the clinquer mill and the fertilizers complex will be independently connected . From the 13.8 KV bars will follow the feeders for the collective point installations and also for the urban areas .

The Pirapama and Cabo substations may be utilized as auxiliary for servicing the charges for any installations that may develop in their neighbourhood .

The 230 KV circuits will be in ACSR 6.36 MCM cables , fixed to structures pattern CHESP , metallic or concrete made , in the way the conductors are arranged , either on vertical or horizontal .

The 69 KV feeders of the clinquer mill or of the fertilizer Complex will be in ACSR conductors , gange 4/0 and 1/0 respectively , fixed in concrete structure , CELPE PATTERN .

Identically in concrete poste , CELPE PATTERNS, should be fixed the 4/0 AA conductors of the 13.8 KV primary feeders.

EVOLUTION OF POWER CONSUMER MARKET

	1980		1985	
	Annual Consumption (MWh)	Maximum Demand (MW)	Annual Consumption (MWh)	Maximum Demand (MW)
Oil Refinery	160,000	360.00	250,000	60.00
Clinker Mill	94,000	12.00	188,000	24.00
Fertilizer Complex	13,400	2.50	28,300	5.40
Aluminum Plant	3,600,000	514.00	5,600,000	800.00
Harbour Installations				
Collective Port	900	0.40	1,600	0.70
Oil Terminal	5,300	1.38	5,240	1.36
Urban Area	3,600	0.80	7,200	1.50
Others	11,200	2.10	17,900	5.30
TOTAL:	3,888,400	-	6,108,240	-

3.4.5 TELECOMMUNICATION SYSTEM

The planning for the Suape port industrial complex allowed for the implantation on the 1st. stage , for the sake of developing the area thereto related , of Industrial activities , port , residential , service , administrative . activities and those of aiding , all according to the frequency of vessels at the Port facilities.

As it has been planned in line with the latest methods of area inter-relationship , with graduation on industrial levels , residential patterns and other infrastructural activities , or high degree of interest is foreseen from all persons involved , such as those living in the industrial complex area, or in the Suape neighbourhood , with a great in-flow workers.

The existence of the city of Cabo in the Complex area and the elevated degree of inter-relationship with Recife , brings bright expectations of a high degree of interest by Suape toward those two cities .

Such facts lead to a sizing of a telecommunication system with a large portion of telephone traffic to Recife , Cabo and other cities in the national telecommunication system.

As per the guidelines supplied by " " Telebras " , SUAPE is completely prepared to enter the National Telecommunication System - DDD , all depending solely on the planning by "Enbratel " , who should prepare a route in this connection. Alternatively Suape may be introduced as a satellite of any of "TELPE " stations , also depending on the planning on the part of the Pernambuco concessionaire .

The automatic long distance calls at Suape are extremely necessary , above all due to the in-flow of everyone who will come to the Industrial Complex for conducting business.

A transmission tower shall be then installed close to the area of administrative services , taking advantage of an existing elevation which is about 400 meters high.

An automatic telephone station will be installed in the building belonging to the area of the Administrative Center .

In the residential areas , fiberglass telephone booths will be available for use of these having no residential telephones blocked to the direct dialing system(DDD) .

Apart from the public and residential telephones , there will be installed apparatus for all types of commercial concerns and telephone stations will be provided so that those persons having no residential telephones may avail themselves of the long distance calls by paying a toll in the moment the call is made .

In the industrial and administrative areas , and at the common port , for each group comprising over 1000 employees the installations will allow for the use of PABX panels , whereas for the others , the PBX or PABX will be employed.

The automatic telephone station foreseen for the 1st. stage will be of the usual type , for 1000 terminals, operating with registry signaling , type MFC , ZC scheme for the national system .

The billing of the calls tolls will follow the concessionaire norms , with the long distance calls being automatically ticketed at the class I transit station of Embratel at Recife .

At short terms , the " Suape Port Industrial Complex" will take up the installation of a telegraphic multiplex equipment with capacity for 24 (twenty four) terminals , it being that there will be no need for a telegraphic station to be implanted .

3.4.6 WATER SUPPLY SYSTEM

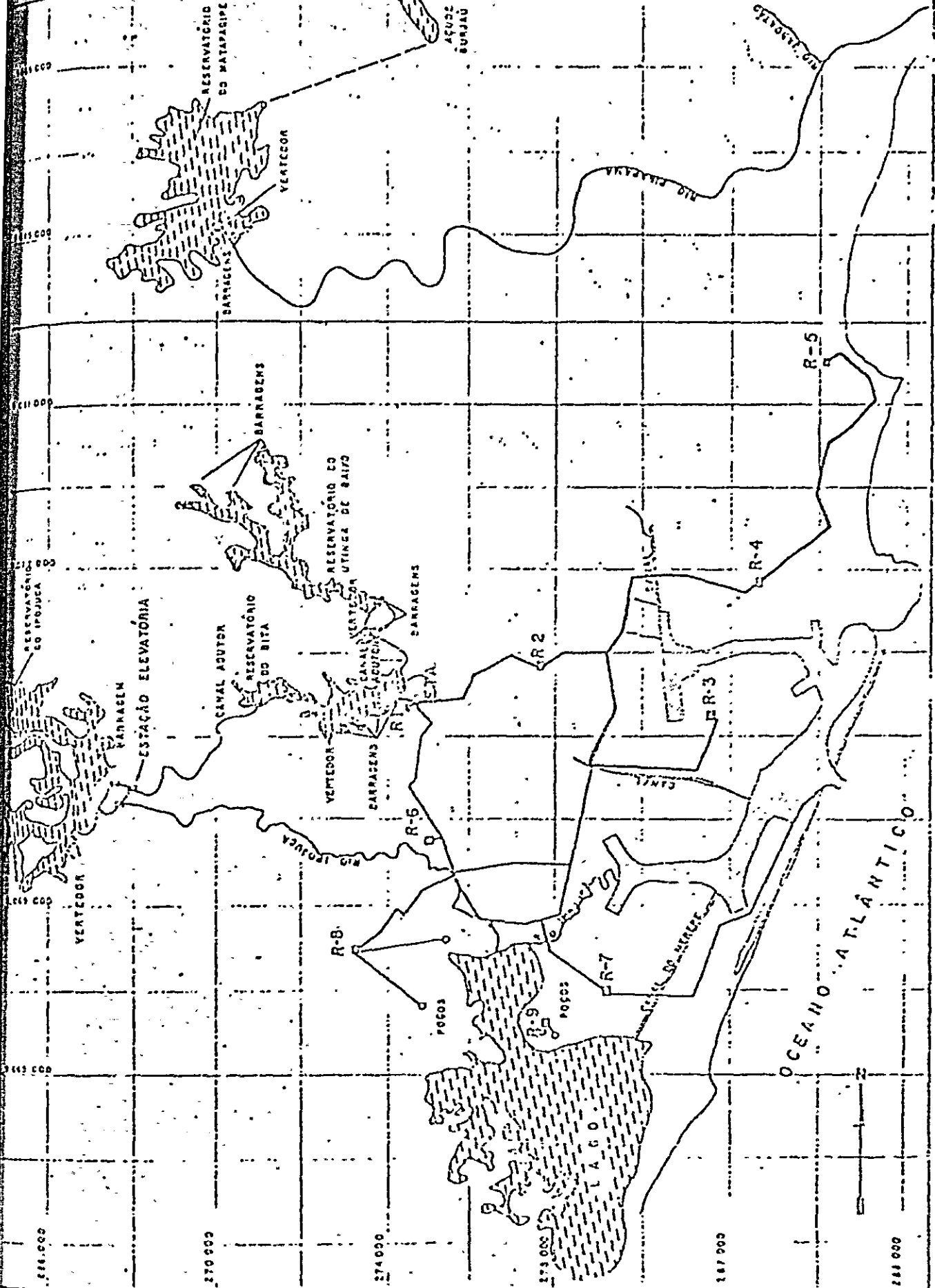
The Industrial Complex water supply , during its first stage , will be fed by underground waters, for the residential zones of Nossa Senhora do Ó and Boaxica, and by surface waters for the remaining area .

The surface water sources are the Bitá and Itutinga de Baixo reservoirs (Massangana basin) and the Crauas-
su Engenho (Ipojuca Basin) this latter making part in the floods lamination system.

As it has been described in the overall conception , the water is channelled from the Bitá water-taking reservoir through a closed canal , to ETA . At this stage , is pre-dimensioned to meet a demand of 75.000 m³ per day , which has englobed the absorption of the regulating capacity of the Bitá reservoirs (36.300 m³ per day) and will require a pumping force and the channelling of about 7.000 m³/per day in the Ipojuca reservoir .

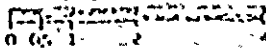
The distillery requires a supply for its demand foreseen , at about 43.200 m³ per day .

The remainder of the water , after treatment , will be channelled to the R-2 reservoir , for attendance to the foreseen industries , as well as the camping , the Administration zone , the system being thus put into equilibrium with the R-3 and R -4 reservoirs.



— MASTER PLAN
 - - - 1st. Stage

ESCALA GRÁFICA



dipor



EMANSON SA

COMPLEXO INDUSTRIAL DE SUAPE
 SCHEME OF WATER SUPPLYING SYSTEM

PROJETO DE 1971

3.4.7 FLOOD CONTROL SYSTEM

Among the hydrographic basins constituting the Industrial Complex area, the Ipojuca should be mentioned for its long extension - which is over 3.500 Km² in area and occupies one fifth of zones of high rain ratios and locates in coastal and forest-rich zones.

Ranking second in importance, is the 900 Km² Merepe basin and other that are called small systems, comprising the basins of Massangana, Jasmin, Algodois and Prego.

As it has been seen in the concept for water supplying, a large extent of the Massangana basin will be controlled by using dams, whose reservoirs will flow to the Ipojuca basin. The present job, done in line with general usage for works on flood control, is rather concentrated in the Ipojuca River, even though the small systems have been deeply studied with a view to acquiring a knowledge of their capacity for providing water supply.

A IPOJUCA SYSTEM

The analyzed alternatives included studies of control dams, basin-transposing canals, improvements of natural gutters, dikes, tributary rivers and sluices. Apart from the floods lamination, providing limits and controlling the discharge running towards the gutters at the Industrial Complex area, the works also aimed at retaining the drifted deposits, mainly at time of the floods. Illustration 3 shows the alternatives that were given more detailed studies, as the evaluation of quantities and costs, accumulation capacity and laminating function.

CHARACTERISTICS OF THE FLOODS OF THE PROJECT

Considering the topographic characteristics and the morphology of the basin, the studies on the works were concentrated upriver, near the city of Escala, by taking the place called Engenho Maranhão, which is the mean point of the Escala - Industrial Complex stretch, where since a short

time , pluviometric data are available with reference to hydrographic elements .

At this point the basin has the following characteristics:

AREA	3.450 Km ²
bottom lengths	283 Km
elevation of the river bed	55
upper elevation of the river	870
level difference	815 m
average declivity	0,28%

The rains , in the project , were calculated with the utilization of the Grumbel method , and by considering the multiplicity of climates along the basins , three sub-basins were taken , and the stations of Arcoverde , Caruarú , and Escada were chosen to represent each of the basins and recurrences were ascertained , respectively for 100 and 1000 years : Arcoverde 15,5 and 23,1 cm , Caruaru 12,5 and 18,7cm Escada 22,5 and 33,6 . These maximum , taken into account for the whole basin, yielded the following values : 16.33 and 22.9 cm , the last figures being deducted 20% (small Dams) yielding at the end the figures : 13.5 and 18.3 cm as being the values to be considered in the maximum daily rains , for 100 and 1000 years of recurrence .

The rain distribution was made according to the methodology applied by the Engineer Jayme Taborga (Hydrological Practices) (1974) for 6-to 6 hours intervals , after which the unit hidrograph elements were determined . The flood hydrograms for the periods of 100 and 1000 years are found in the illustrating tables .

TOPOGRAPHIC AND MAPPING CONDITIONS

The mapping method utilized was that of SUDENE , with res-titutions effected by VASP in the scale of 1:25.000 and the elevation grades spaced 10 m .

The populated areas in the city of Escala , and the grading of the road BR-101 and that of the railway network put a limit to the water margin in the reservoirs .

For the areas closer to the Industrial Complex (upwards the PE-60) photographs in the scale of 1:50.000 and charts in the scale of 1:10.000 supplied by the subcontractor aerodata (1974) have been utilized .

Studied Alternative

Four alternatives were studied in greater details, which alternatives were referred to as A, A1 , B and B1: The A and A1 alternatives had their commencement at a small sized dam , at Engenho Maranhão , and through the successive use of transposition of basins and breakers the flood excess were diverted to the Serinhagem Basin, which has a large gutter , with possibilities for an eventual lamination , and whose areas , easy to be irrigated are now rated down in relation to the area of the Industrial Complex. A1 is constituted as a variable to A, so that its cost may be eliminated , this attempt having proved not to be worthwhile . The B alternative has proven highly favorable to the implantation area , as a solution to the flood problems. Its cost, allied to the forecasting of handling big volumes of water in the Industrial Complex , caused that a consideration be given to the alternative B1 , without a regulating function , and allowing the discharge of some importance upriver , which is controlled by another reservoir , in the form of a buffer lake , before penetrating the Industrial Complex. This alternative , as it makes the desired functions and having a relatively low cost and allowing that the discharge be controlled by means of a sluice , and by elevating the dam's height , any future lamination requirement may be met with , then the general conception was given .

The following table provides a comparision between the studied alternatives and the values of water accumulated in the reservoir, at the maximum elevations .

Alternative	accumulated volume m ³	cost Cr\$
A	135.000.000	36.692.300
A1	200.000.000	41.618.700
B	350.000.000.	64.160.000
B1	120.000.000	21.532.500

SELECTED ALTERNATIVE

As it has been said previously , the selected alternative was the one denominated B1 , consisting of an earth Dam , with free discharge by means of a concrete pipe 6 m in diameter , lined externally with iron plates , with tapering entrance where the control of the discharge was considered to operate .

The illustration give an idea of the dam and its elements on a horizontal view , profile and sections . The reservoir occupies an area of 785 ha and the cost of the works was estimated as follows :

Excavations	Cr\$7.368,500
beaten earthfill,rip-rap and drains	9,236,500
Discharge	3,750,000
Expropriation	1,117,500
	<hr/>
	Cr\$21,532,500

The flood condition in the reservoir: , for the period of 100 years , indicate the elements above illustrated .

B MEREPE SYSTEM

The low lagoon-like waters of the Merepe river served to function as a basin for accumulating the normal yearly floods, and at time of the excessive floods the water levels increase in such areas, adding to the waters of the Merepe itself, and to the discharges of the Ipojuca river, which, when a certain value is reached, the limits of the gutters is overcome. These lagoon waters are extended southwards, and will trespass, under high water levels, the Merepe-Maracaípe divider, at the locality of Porto de Galinhas, rendering continuous the Barra do Ipojuca - Barra do Merepe - Barra do Maracaípe connections. In an attempt to bring this natural phenomenon into discipline, so as to ensure a safe occupation of the Industrial Complex, access traffic PE-60-Cupe, cupe - port. de Galinhas and Porto de Galinhas - PE -60, and other way to the Industrial Complex, and finally, putting into discipline the out-flow and the use of buffer lake, where the study will totally comprehend the flood control for the Merepe System, as far as the Industrial Complex interests are concerned.

C BUFFER LAKE

The buffer lake is resulted from the utilization of lagoon-like low areas, which provide during the floods, a continuity to the rivers Ipojuca, Merepe, and Maracaípe, for the control of the incoming and flowing out-flow. The lake will also make possible other uses such as recreation and fishing, and will make a beautiful touristic set the dunes, the bushes, the palms and beaches. The lake formation results in the construction of a judicious dike-road (future PI -9) with control in three ways: existing gutter in the Ipojuca river, existing gutter in the Merepe river and the canal in the divider Merepe - Maracaípe (Porto de Galinhas PI road). All such way outs would be provided with sills in the 1,50 m elevation (over high ebb) and would be controlled by sluices, maintaining a constant level on the elevation 3. The grade of the road-dike would be fixed at the elevation 4, at least, and when paved over, the elevation would be 4.50. Thereby the lower part of the beams would be superior to 4.

AFFLUENT DISCHARGES

The sizing of the outflow control in the lake, with a view to keep the water level in a constant elevation 3, will be effected by taking into consideration the peak discharges of the centuries-old Ipojuca and Merepe rivers. As to the Ipojuca river, it will be considered the laminating effect of the B-1 reservoir, which results in a discharge of $555\text{m}^3/\text{s}$. The peak discharge in the Merepe river was calculated in $384\text{m}^3/\text{s}$, according to the hydrogram presented hereon. The thousand years old flood would be considered, allowing the elevation of the water level until +3,80 and the grade of a stretch at the start of the Porto de Galinhas-PE-60, road would be lowered so as to allow the discharges of the Ipojuca and Merepe river to flow completely, which were then estimated in $1,780\text{m}^3/\text{s}$ and $621\text{m}^3/\text{s}$, respectively.

The simultaneous century-old floods of the Ipojuca-Merepe with the Utinga de Baixo-Bita, were not considered, as they will flow to the Ipojuca system, after construction of the dam, this making null their flow propability. The simultaneousness of floods, when considered in separate, in the Mata zone and in the Coast zone, yielded lower values than those under consideration.

The figures show the composition of the century-old flood hydrogram and the thousand year-old, affluent to the lake.

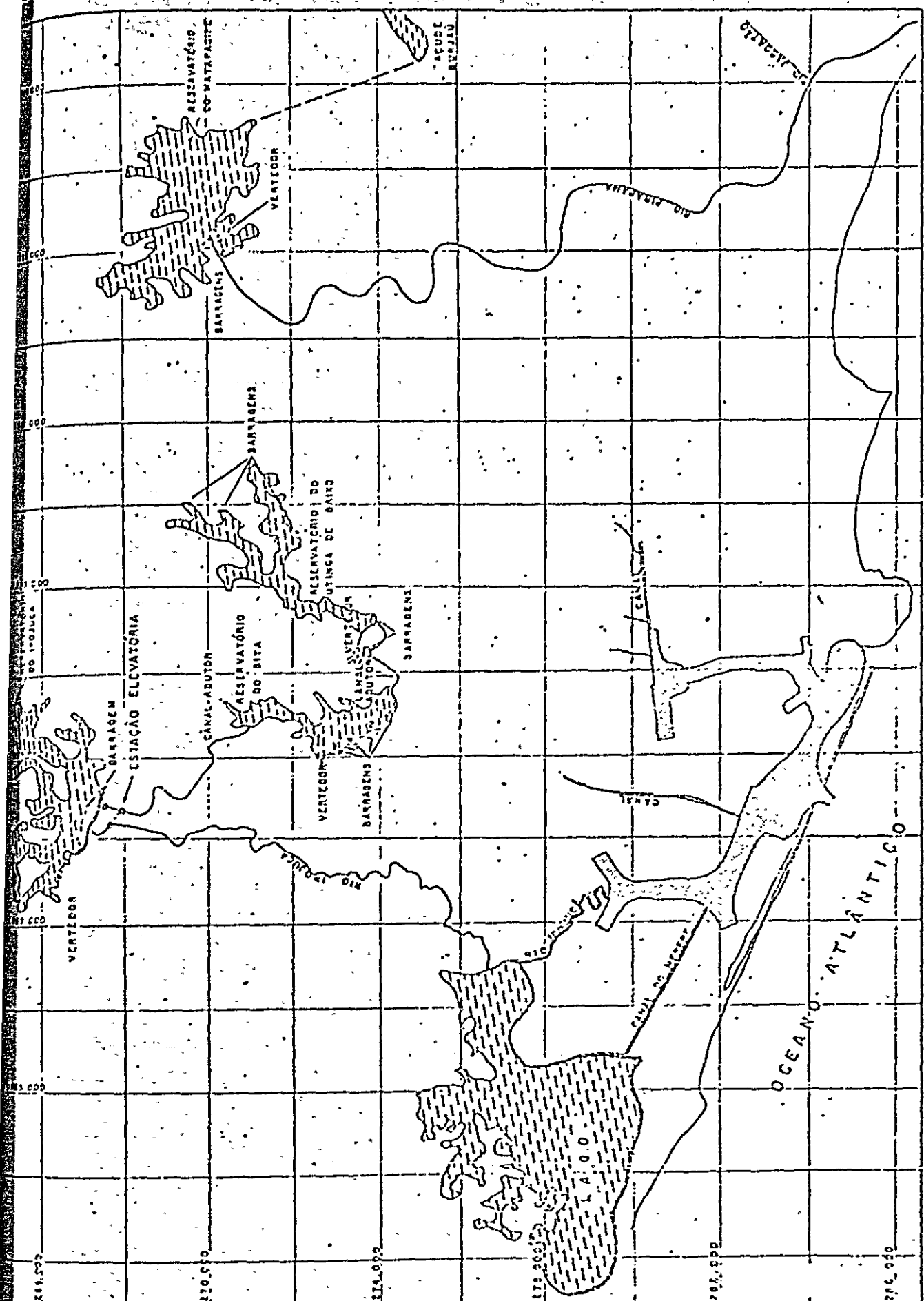
AFFLUENT DISCHARGES

The lake level control will be effected through 3 vents, by utilizing the existing gutters of the Ipojuca and Merepe rivers, and also utilizing an existing ring in the Merepe-Maracaibe divider.

The maximum discharges to be evacuated were estimated in $555\text{m}^3/\text{s}$ (100 years) and $1,780\text{m}^3/\text{s}$ (1000 years), by duly considering the lamination of the B1 dam.

The total length of the spillway was calculated in 290m, so distributed: Ipojuca gutter: 110.90m; Merepe gutter 76.20m; and divider canal 103.9m.

The Porto de Galinha:- PE-60 highway will have its grade lowered,
to an extension of 900m, in order to prevent the works against
the thousand-year floods.



ESCALA GRAFICA
 0 0,1 2 4 km

diper

TRANSCOH SA

GOVERNO DO ESTADO DE PARANÁ - I.R.A.C.
 GOVERNADOR DE PARANÁ VILMÃO INDUSTRIAL
 DE PERMANENTE
 COMPLEXO INDUSTRIAL DE SUAPE

OVERALL CONCEPTION FOR
 FLOOD CONTROL AT THE I.C.

1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
------	------	------	------	------	------	------	------	------	------	------	------	------

3.4.8 SEWAGE DISPOSAL SYSTEM

The domestic sewage disposal system and the industrial waste for the first stage, part of option 'c' being discussed on the general conception for maximum occupancy, otherwise the only real economically feasible and liable to evolve in the future for another option.

Thus, the industrial waste should pass through a conditioning stage before being thrown into the public network, the single one for such waste and domestic sewage disposal.

A ring-shaped collector (north collector in the general conception) shall come from the junction of the Distributor Trunk and the Harbour Center Line III to connect the zones assigned to fertilizers, alumina and cement, towards north.

Following the zone of collective and fishing ports, it should reach the Treatment Station (ETE), next to Cabo Santo Agostinho. From ETE, the affluents shall be pumped by an oceanic emitter.

This collector should receive the waste from all the industrial zones, from the Administrative Center and Camp to the Collective Port, the Fishing Port and Gaibu residential zone. Residential zones in Nossa Senhora do Ó and Boasica should be served by their own systems, with stabilization lagoons in this first stage.

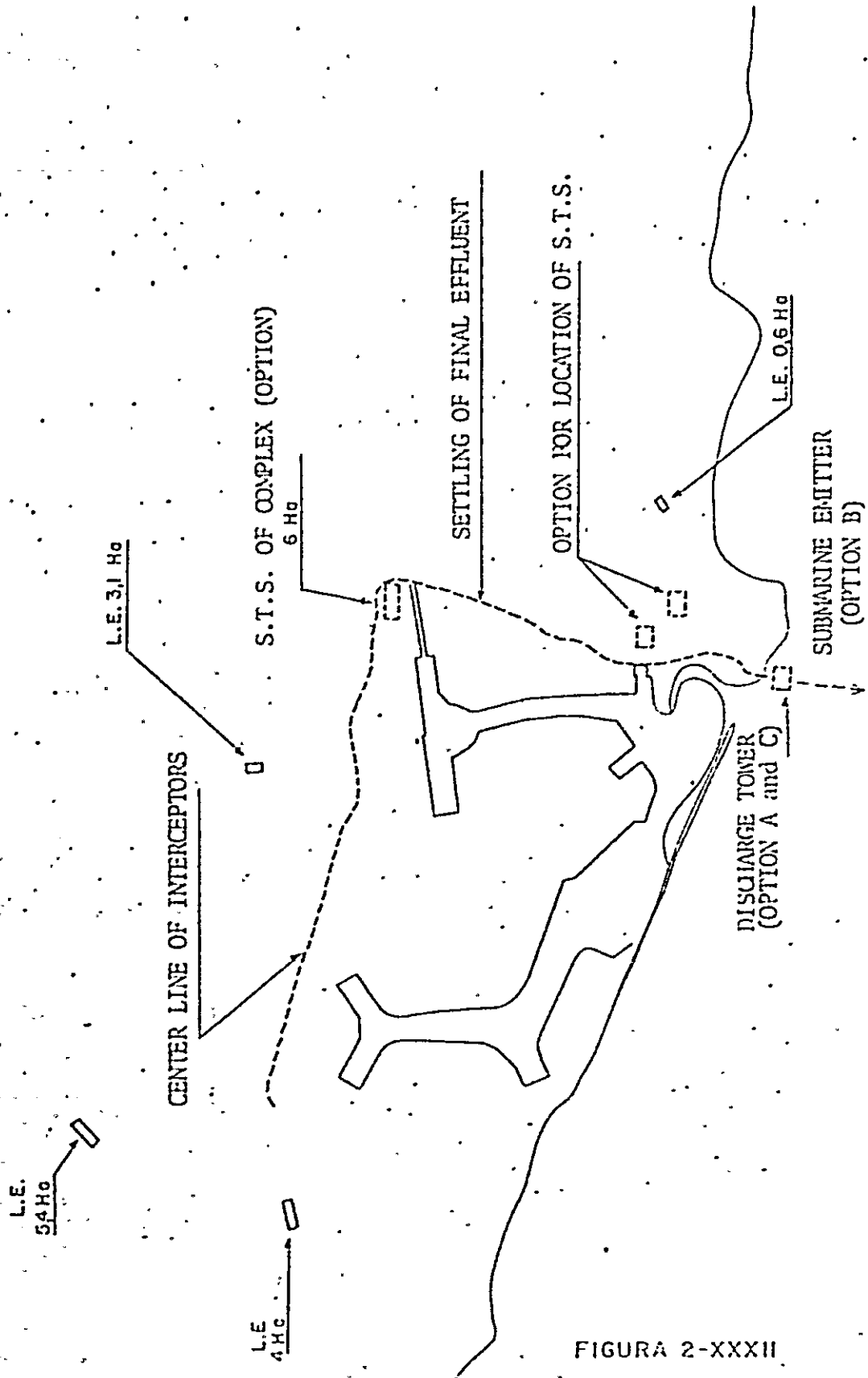


FIGURA 2-XXXII

E. - Stabilizing Lagoon

diper



TRANSCON SA

GOVERNO DO ESTADO DE PERNAMBUCO - PEAC
 COMISSÃO DE DESENVOLVIMENTO INDUSTRIAL
 DE PERNAMBUCO

COMPLEXO INDUSTRIAL DE SUAPE

SEWAGE DISPOSAL SYSTEM - 1st
 Stage - SANITARY AND INDUST.
 SEWAGE AT THE COMPLEX

Proj. 2-101/001 (1/20/60) desenho nº 11/10/60
 11/10/60

3.4.9 HABITATIONAL SYSTEM

During the first stage, on the implantation of the I.C., three sites were assigned to allocate the habitational activities.

The first one is a camp planned in the area next to the administrative zone and PEGO which should be used as temporary lodging for the single personnel, integrating ZRP.

The camps should offer three options: type A₁, which should be formed by camps with full sanitary installations. Types A₂ and A₃, formed by rooms for 2 and 4 people, respectively, with jointly dressing rooms and sanitary installations.

In this area it should be not allowed the construction of complete houses or residential units, since these should be located in the expansion area of Nossa Senhora do Ó - ZR-1 or the new agglomerate of Boasica - ZR-2. The implantation system of ZRP should be oriented as to assign it to the very contractors involved in the construction of the I.C.

As to the Zones ZR-1 and ZR-2 it was established a residential program based upon a principle on the starting of basic habitational modules served by an agglomerate of minimum services, which should be enlarged through the aggregation of the same ones, demanding more com-

plete service modules until reaching a concentration of nearly 50,000 inhabitants, when it should reach a level of complete services to fulfill the needs of a medium size town.

To define the three types and number of dwellings to be built in Suape, there were analyzed the types of residential units more adaptable to the preferences of the dwellers of the region and the Metropolitan Area of Recife.

We must conclude that the individual units should be preferable to the collective familiar units due to the high number of persons usually forming a family (5.3 inhabitants/family).

The objectives of such programming was to anticipate a diversification on the dwelling types to enable not only an option to choice but also a visual movement to the project.

The collective dwellings were limited to the maximum of four floors, thus preventing the use of elevators.

The following types of dwellings were adopted:

- isolated individual house, germinate individual, on line houses and apartment buildings.

From this habitational program on, it was dimensioned the habitational basic module designated as module 'A'.

It is proportionated to 1,100 inhabitants, requiring 207 habitational units allocated on the following percentage: 5% of isolated houses, 50% of on line houses,

20% of germinative houses and 25% of apartments.

The distribution is not a rigid one and it should change according to the physiographic conditions of the place or the preferences of the population to be therein installed.

This residential 'A' module requires a minimum social substructure, to be attained by a module 'A' of services formed by: Commerce (grocery store, greengrocery and bakery), kindergarten, small workmanship shops, areas for recreation (playgrounds).

The summing up of the three habitational 'A' level modules require to be attained by a service level 'B' module, formed by commerce, small workshops, bars and restaurants, health services, church, elementary school, and areas for the practice of sportive games.

The habitational 'C' module is proportionated to 9,900 inhabitants, that is, 3 'B' modules. This concentration of population requires a more complete social substructure, therefore being implanted a level 'C' service module, formed by general commerce, supermarket, free market, an area assigned to circus performances, diversions park, offices, banks, bars and restaurants, sportive fields, health centers, high school, etc.

Reaching a population of 49,500 inhabitants there shall be formed an habitational agglomerate 'D', supported by a level 'D' service agglomerate formed by offices,

Commercial center, Market, Hospital, Hotel, Cinemas, bus terminal, railway terminal, post offices, Police Station, Cultural Center, etc.

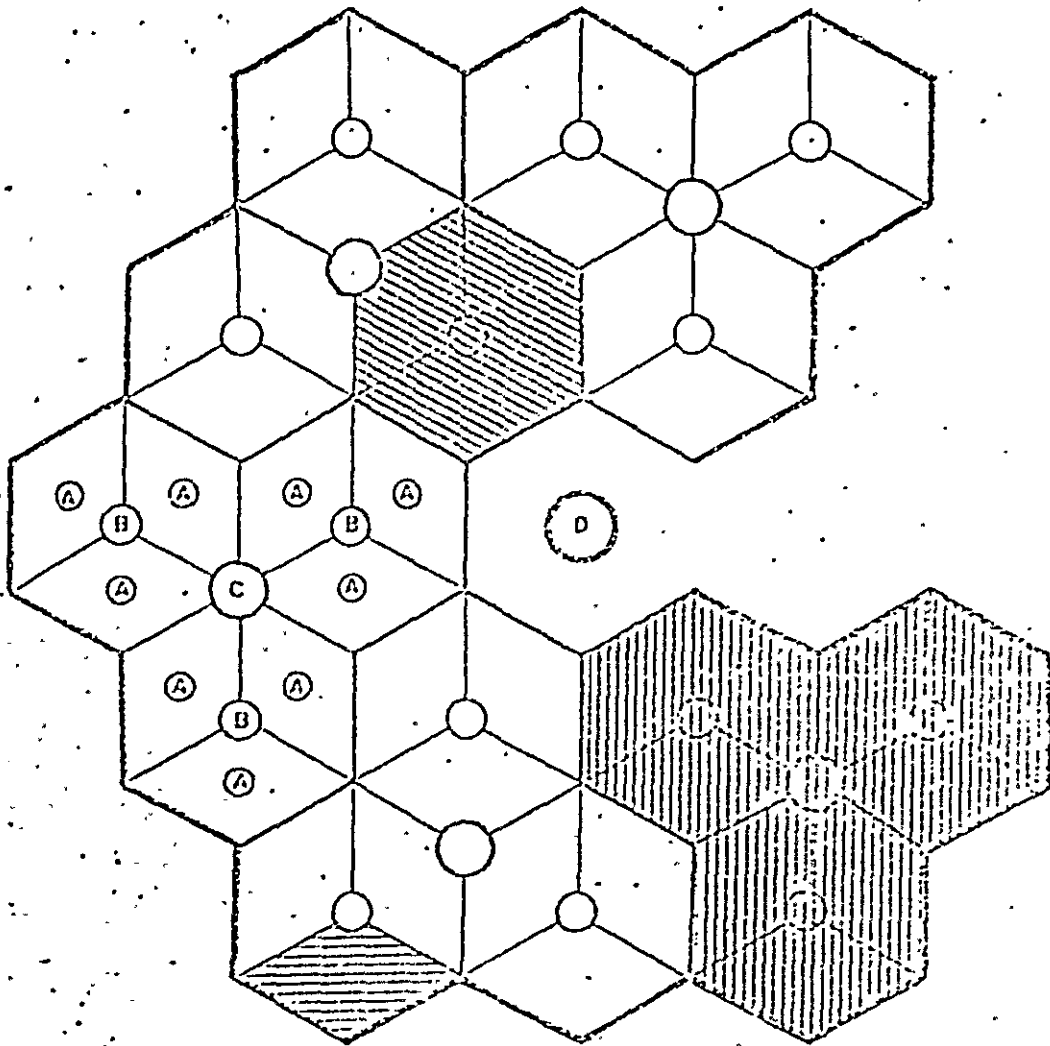
Summing up, the proposed scheme presents two well defined systems:

the habitational modules are repetitive ones, while the service modules, beside being repeated through the different levels are also complementary units, that is, they complement the substructure of communitary equipments, as long as these are being required due to the evolution of the agglomerates which are being created.

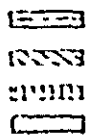
Fig. ... shows the proposed theoretical model.

The anticipated implantation program is based upon the provisions on the increase of the population and the allocation of the same area, as shown on the drawing included in this page.

The service modules should follow the implantation of residential modules, though being anticipated for Boasica-ZR-2 the beginning of the implantation of a 'D' level service module, trying with this to characterize this area as a center for rendering of services for Suape Micro-area (I.C.).



CENTER A • 1.100 HAB.
 CENTER B • 32 • 3.360 HAB.
 CENTER C • 30 • 9.900 HAB.
 CENTER D • 1 • 49.500 HAB.



diper



GOBIERNO DE ESTADO DE PUEBLA
 COMISIÓN GENERAL DE FOMENTO INDUSTRIAL
 DE PUEBLA
 COMITÉ INDUSTRIAL DE FOMENTO

THEORETICAL MODEL FOR
 RESIDENTIAL PROGRAMING

TRANSCON S.A.

1972/73

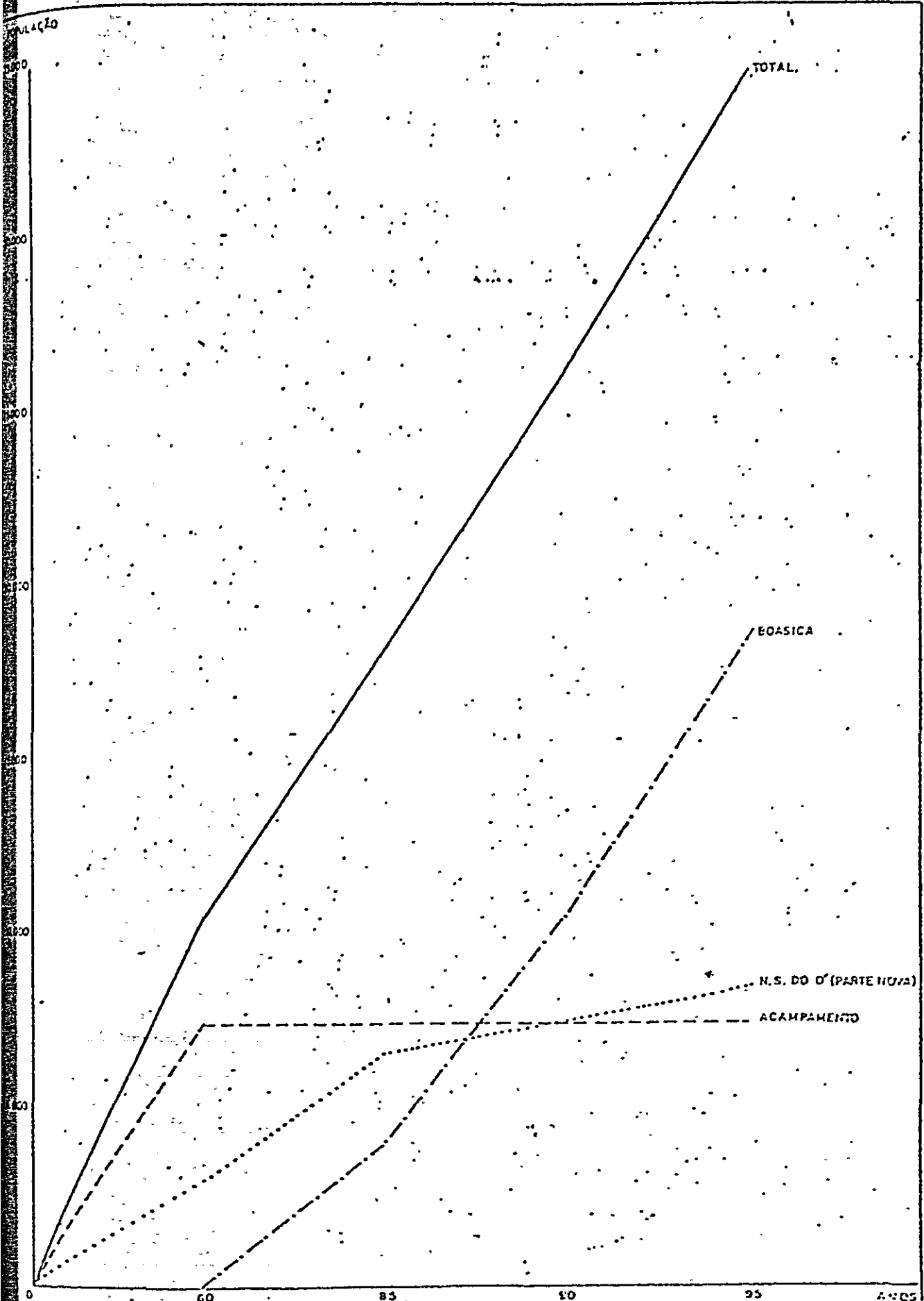


Diagram on the evolution of Population, each five years:
1st. Stage



GOVERNO DO ESTADO DE PERNAMBUCO - PRAC
COMISSÃO DE DESENVOLVIMENTO INDUSTRIAL
DE PERNAMBUCO
COMPLEXO INDUSTRIAL DE SUAPE

TRANSCON SA	INSCRIÇÃO	DATA	ANOS	DESENVOLVIMENTO	INDIC

3.4.10 URBANIZATION SYSTEM FOR THE ADMINISTRATIVE AREA

Once established the location of the Administrative Center based upon the physiographic interpretation and circulation studies, it was attempted the least irregular part of that ground and the one which required the least displacement of earth for the implantation of the agglomerates, for the first stage.

From the analysis of the initial arbitrary plan we must conclude that it would be possible its adjustment to a geometric drawing with hexagonal modulation to harmonize volumes and spaces, and allowing repetitions for future expansion of the whole assembly.

The center triangle includes all the buildings assigned to the central Administration of the I.C., cultural activities and conventions or commerce and service functions.

The arrangement of these buildings starts from a monumental square around which ~~which~~ the main public buildings are laid out.

At the external area to the central triangle there were located the complementary functions of the Administrative Center.

To the north was the communitary support agglomerate, including health center, first aid clinic, services for selection and training of personnel, besides the police station and the fire brigade.

To the south, in a lower plan with easy access to the Distributor Trunk, were localized the maintenance services, gas stations and the heliport.

The valley to the southeast was assigned to the hotel, the restaurant and radio communications tower.

At last, east of ZCA-1, was the large passageway establishing the connection between the aforesaid triangle and the road-railway station.

Concerning the functional programs, during the first stage on implantation, it is anticipated the construction of the following units of ZCA-1:

Administrative building

Commerce and Services

Selection and Training

Medical Center

First Aid Clinic

Police Station

Public Surveillance

Fire Brigade

Only the program concerning the buildings of the Central Administration was dimensioned in detail, based upon the requirements of personnel for the various functions.

On this first stage, it should be built a module of the building assigned to the administration, representing nearly 20% of the whole area.

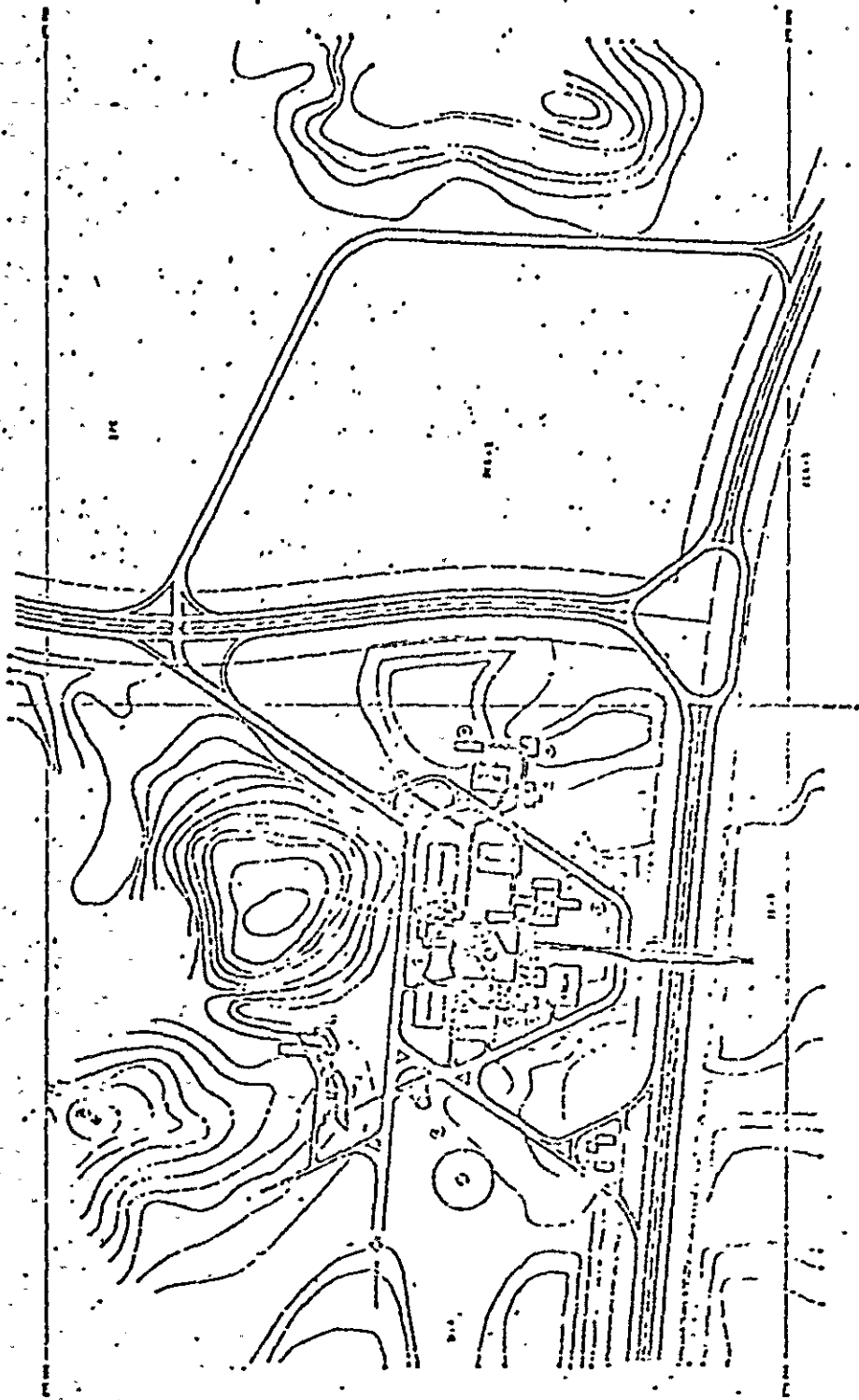
This module, a complete one concerning the equipments, shall have a single floor with 2,500 m² which might be reproduced by the side, to enlarge the assembly. However, as soon as the substructure of Suape area has reached higher standards, it is recommended that the remaining modules are developed toward a vertical direction, to give a more monumental aspect to the assembly. The buildings assigned to the commercial activities shall have two floors, being utilized the 2nd. floor for the offices.

These modules should be very flexible, enabling the private enterprise to have them enlarged according to the needs.

The buildings assigned to the communitary services should have, ever since, their definite dimensions, except the Center for Selection and Training of Personnel, which might be enlarged further on.

To serve ZCA-1 agglomerate, there were anticipated two parking areas compatible with the dimensions of the planned modules.

The next figure exemplifies the aforementioned scheme.



dipor



GOBIERNO DEL ESTADO DE PERNAMBUCO - D.P.I.C.
 EMPRESA DE PROMOCIÓN INDUSTRIAL
 DE PERNAMBUCO
 COMPLEXO INDUSTRIAL DE SIAPE

ADMINISTRATIVE CENTER

TRANSOR S.A.

escala	data	autor	desenho nº	lote

3.4.11 TOURISTIC INTEGRATION SYSTEM

The implantation of a touristic industry within the Suape Complex, considering that the physiographic conditions of the area favour a natural division between the industrial concern and the areas assigned to preservation and leisure, constitutes a significant contribution to the economic support being expected, particularly to the State of Pernambuco, and generally to the Northeastern region, with the organized development of this area.

The main touristic attraction of Suape is undoubtedly its beaches.

To achieve a rational exploitation of them, their qualities have been analyzed: natural beauty, extension, width, etc., areas, potencial occupation and density, as well as their capacity concerning the theoretical number of beds.

Besides the attractions of the environments there were also considered the historic attractions and the folklore centers.

From the analysis of the trends concerning the existing areas, there were defined five available zones for implantation of touristic projects. Each of them might include a new agglomerate. The agglomerates are always limited by natural obstacles such as elevations, rivers and the sea, or historic and/or ecologic preservation sites.

Once accepted these natural limits, it is possible to prevent a monotonous and uniform development along the beach. Another structural factor, besides the natural limits, are the functional ones. The required size to support a district center and a secondary school, is calculated around 3,000 inhabitants, which coincides with the population of the assigned areas.

There were created five agglomerates for touristic exploitation, integrated within the local landscape. They were localized along the beach, in Pontal de Cupe, Gai-bu, Pedras Pretas, Itapuama and Paiva.

The proposed areas allocation concerning each one of these areas is based upon the idea that the areas next to the beach should have a predominant touristic use and the more distant ones a mixed use. The density, established through the occupation rate and the total usable area, increases as long as the distance from the beach augments. The buildings should not interfere with the natural scenery. The maximum height pattern is established as two floors. The pedestrians and the haunTERS of the beach dominate the longshore zone, since the main access runs parallel to the beach, to a distance of 500 to 600 m.

Each area presents 4 different uses: touristic undertak-ings, sports and recreation on open air or inside the clubs, residential area for the population with a higher income and district centers where the communitary equip-

ments were situated serving as support for the operation of the area.

Gaibu area was considered as the most indicated to start a urbanization plan.

The touristic module to be implanted in the area, should have a capacity for 3,400 beds, corresponding to a neighborhood unit, presenting the following composition:

Beach hotel

- 100 rooms - 1 floor of high quality with extensive recreation areas.
- 200 isolated houses for rent, of different architectural types and high quality.
- A social and sportive club with large installations.
- 500 lots with areas around 1,000 and 1.500 m² for luxury houses.
- commercial areas, strictly controlled.
- green areas, communitary equipment, marina, etc.

The access to the areas should be made through PE-9 and PE-28, which extension should reach the grounds of the marina, in the Yacht Club.

Proposed club for Galheta beach. The access of the beach zone should be made through secondary routes, perpendicular to the beach with a broken line plan to limit the external spaces and provide better integration to the accesses in the topography of the ground, leaving free spaces for green areas.

To complete the natural attraction there were provided:

- a swimming pool between the reefs and the beach, laterally

closed by an artificial reef with a water level equal to the high water.

- a marina that could be operated as a Yacht Club.
- an hippic club to provide horse riding.
- golf club with 18 holes, in a valley.
- restoration of historic areas.
- installations for different types of sportive games, such as, volleyball, tennis, swimming, beach soccer, etc., along the shoreline.

The next table shows the details of the assembly and its adaptation to the environments.

To develop this system, the following possibilities have been considered:

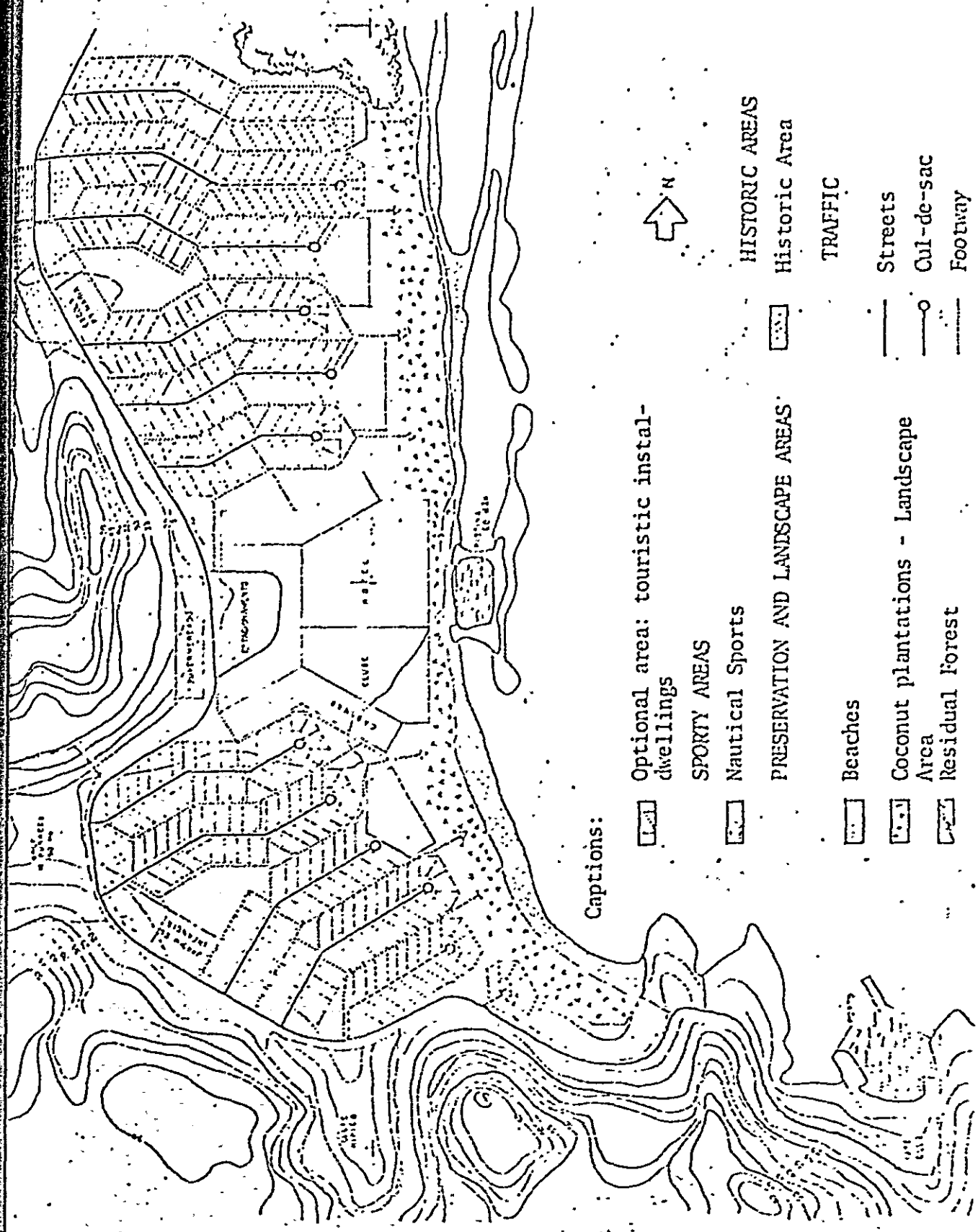
- The construction of the hotel should be financed through the sale of lots, to initiate the development plan.
- The clubs, providing night lodgement should start the development, followed by the sale of adjacent lots, the construction of the hotel set and facilities for recreation.
- The sale of lots and construction of luxury houses should attract to the place high income people, being involved in the schedule of implantation of the I.C.

The substructure of public services should be restricted to the agglomerate, during the initial stage, being spread















all over the area, as long as the urbanization proceeds.

The development of Gaibu area should be performed by the private initiative, being limited the governmental participation to fiscal incentives and financing.

Considering this project as one of the most adequate to the conditions of the northeastern contractor, since it requires only a reduced initial capital, with high return at short term, it is expected that Gaibu area is completely urbanized within five years.



Captions:

-  Optional area: touristic install-dwellings
-  SPORTY AREAS
-  Nautical Sports
-  PRESERVATION AND LANDSCAPE AREAS
-  HISTORIC AREAS
-  Historic Area
-  TRAFFIC
-  Streets
-  Beaches
-  Coconut plantations - Landscape Area
-  Residual Forest
-  Historic Area
-  Cul-de-sac
-  Footway

1st. Center: Gaibu Beach



TRANSON, S.A.

GOBIERNO PROTECTOR DE DEPARTAMENTO DE LAS
 COMARCAS DE LA PENINSULA IBERICA
 DE FERROVIARIO
 COMITEN INDUSTRIAL DE LAS ISLAS
 PRELIMINARY SKETCH ON THE
 ALLOCATION OF TOURISTIC AREAS
 1st. Center

1962

3.4.12 OVERALL BUDGETARY ESTIMATE FOR THE 1st. STAGE

(Cr\$ 1,000)

A	WATER DELIVERY	
	Impounding of surface water	Cr\$ 5,766
	Impounding of underground waters	3,416
	Treatment Station	6,739
	Delivery and Reservoirs	19,520
	Distribution	11,074
B	URBANIZATION	
	Administrative area	8,259
	Camp area	29,625
	Nossa Senhora do Ó	80,552
	Boasica	415,531
C	FLOOD CONTROL AND CHANNELS	44,833
D	SANITARY SEWAGE DISPOSAL AND INDUSTRIAL WASTE	
	Treatment/Nossa Senhora do Ó	1,605
	Treatment/Boasica	1,661
	Treatment/Camp and Administrative Area	1,076
	Treatment/Gaibu	1,273
	Collector network	33,086
	General treatment station	13,086
	Oceanic emitter	26,352

E	TELECOMMUNICATIONS	13,706
F	POWER SUPPLY	107,696
G	RAILWAYS	
	Branch lines	31,534
	Yard	32,770
	Bridges	2,391
H	ROADS	
	Earthworks	21,329
	Drainage	6,395
	Paving	35,623
	Bridges	4,799
I	HARBOUR	
	Dredging and embankments	508,457
	Protection works	96,250
	Opening of harbour inlet	18,700
	Pier	163,456
	Wheat facilities	81,125
	Sugar facilities	123,277
	Liquid facilities	36,168
	Complementary works	10,885
	Navigation aids	27,500
J	EXPROPRIATION	5,000

RESUME

A	Water supply	CR\$ 46,515
B	Urbanization	533,967
C	Flood control and channels	44,833
D	Sewage disposal and industrial waste	78,615
E	Telecommunications	13,706
F	Power supply	107,696
G	Railways	66,695
H	Roads	68,146
I	Harbour	1,065,818
J	Expropriation	5,000

Physical Chronogram for Implantation of 1st. Stage

	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
1	PRELIMINARES GERAIS																				
1.1	LIMPEZA DE PAVIMENTO DE CONCRETO																				
1.2	LIMPEZA DE PAVIMENTO DE CIMENTO																				
1.3	LIMPEZA DE PAVIMENTO DE ALVENARIA																				
1.4	LIMPEZA DE PAVIMENTO DE MADEIRA																				
1.5	LIMPEZA DE PAVIMENTO DE OUTROS MATERIAIS																				
2	RECEBIMENTO DE MATERIAIS																				
3	MONTAGEM DE FORMAS																				
3.1	MONTAGEM DE FORMAS DE CONCRETO																				
3.2	MONTAGEM DE FORMAS DE CIMENTO																				
3.3	MONTAGEM DE FORMAS DE ALVENARIA																				
3.4	MONTAGEM DE FORMAS DE MADEIRA																				
3.5	MONTAGEM DE FORMAS DE OUTROS MATERIAIS																				
4	LUBRIFICACAO																				
5	DESENVOLVIMENTO DE CIMENTOS E CIMENTOS																				
6	ESTRUTURAS																				
6.1	ESTRUTURAS DE CONCRETO																				
6.2	ESTRUTURAS DE CIMENTO																				
6.3	ESTRUTURAS DE ALVENARIA																				
6.4	ESTRUTURAS DE MADEIRA																				
6.5	ESTRUTURAS DE OUTROS MATERIAIS																				
7	REVESTIMENTOS																				
7.1	REVESTIMENTOS DE CONCRETO																				
7.2	REVESTIMENTOS DE CIMENTO																				
7.3	REVESTIMENTOS DE ALVENARIA																				
8	REVESTIMENTOS DE MADEIRA																				
8.1	REVESTIMENTOS DE MADEIRA DE CONCRETO																				
8.2	REVESTIMENTOS DE MADEIRA DE CIMENTO																				
8.3	REVESTIMENTOS DE MADEIRA DE ALVENARIA																				
8.4	REVESTIMENTOS DE MADEIRA DE MADEIRA																				
9	REVESTIMENTOS DE OUTROS MATERIAIS																				
9.1	REVESTIMENTOS DE OUTROS MATERIAIS DE CONCRETO																				
9.2	REVESTIMENTOS DE OUTROS MATERIAIS DE CIMENTO																				
9.3	REVESTIMENTOS DE OUTROS MATERIAIS DE ALVENARIA																				
9.4	REVESTIMENTOS DE OUTROS MATERIAIS DE MADEIRA																				
9.5	REVESTIMENTOS DE OUTROS MATERIAIS DE OUTROS MATERIAIS																				
10	REVESTIMENTOS DE MADEIRA																				

3.4.13 - Physical Chronogram for Implantation of 1st. Stage

1. Water Supply
 - 1.1 Surface water impounding
 - 1.2 Underground water impounding
 - 1.3 Treatment
 - 1.4 Delivery and Reservoirs
 - 1.5 Distribution
2. Telecommunications
3. Urbanization
 - 3.1 Administration area
 - 3.2 Camp
 - 3.3 N.S. do Ó
4. Electrical Power
5. Flood and channels control
6. Sewage disposal
 - 6.1 N.S. do Ó
 - 6.2 Boasica
 - 6.3 Camp and management
 - 6.4 Gaibu
 - 6.5 Treatment station
 - 6.6 Sewage disposal network
 - 6.7 Oceanic emission
7. Railways
 - 7.1 Branch lines
 - 7.2 Railway yard
 - 7.3 Bridges
8. Routeways
 - 8.1 Embankment
 - 8.2 Dredging
 - 8.3 Paving
 - 8.4 Bridges
9. Harbour
 - 9.1 Dredging and embankment
 - 9.2 Protection works
 - 9.3 Port inlet

- 9.4.1 Pier
- 9.4.2 Installations for wheat
- 9.4.3 Installations for sugar
- 9.4.4 Installations for liquids
- 9.4.5 Complementary works
- 9.5 Navigation aids
- 10. Expropriations

3.4.14 Chronogram on the Application of Investments For Substructure

1. Water supply
 - 1.1 Surface water impounding
 - 1.2 Underground water impounding
 - 1.3 Treatment
 - 1.4 Delivery and Reservoirs
 - 1.5 Distribution
2. Telecommunications
3. Urbanization
 - 3.1 Administration area
 - 3.2 Camp
 - 3.3 N.S. do Ó
4. Electrical Power
5. Flood and channels control
6. Sewage disposal
 - 6.1 N.S. do Ó
 - 6.2 Boasica
 - 6.3 Camp and management
 - 6.4 Gaibu
 - 6.5 Treatment station
 - 6.6 Sewage disposal network
 - 6.7 Oceanic emission
7. Railways
 - 7.1 Branch lines
 - 7.2 Railway yard
 - 7.3 Bridges
8. Routeways
 - 8.1 Embankment
 - 8.2 Dredging
 - 8.3 Paving
 - 8.4 Bridges
9. Harbour
 - 9.1 Dredging and embankment
 - 9.2 Protection works
 - 9.3 Port inlet
 - 9.4.1 Installations for wheat
 - 9.4.2 Installations for sugar
 - 9.4.4 Installations for liquids
 - 9.4.5 Complementary works
- 9.5 Navigation aids
10. Expropriations

MASTER PLAN

4.0 ECONOMICAL ESTIMATE

4.0 ECONOMICAL ESTIMATE

4.1 METHODOLOGY

4.1.1 OVERALL CONCEPT

The economical estimate which follows is mainly intended to obtain parameters for establishing the degrees of priority in the venture under consideration . Such results are arrived at by finding the relations between benefits(B) and costs (C) , which can be of two types : Ratio (B/C) and difference (B-C) .

The benefits/costs relation gives hint to the feasibility of the venture being carried out , which could not occur otherwise if benefits were smaller than the costs, a stress being placed to the position of the latter vis-a-vis the public interests . For this reason , the benefits are ascertained having in mind the economy of the upper northeast and never considering the venture in separate .

Accordingly , all advantages to the economy in the region depending strictly on Suape implantation will be considered as benefits .

As it has been indicated , the new port facilities are intended to visualize a pattern of development comprising the states located within the upper Northeast (Alagoas , Pernambuco , Paraiba and Rio Grande do Norte). The purpose of such policy is to try the adequate exploitation of the economic trend which has been growing without a haze of doubt , which is translated by the Exportation of manufactured primary products . The efforts are being made , in short , in order to provide a better view of the new shape of the northeastern economy in a compatible way, in which case the sugar exports occupy an outstanding position , which exports should then be complemented with

cement, and vegetable oils exports , Other concerns of identical importance will be envisaged at a further date .

However , only the merchandises already referred to , given the potentiality of the region and the perspectives in the international market , will eventually require such port facility in the size of Suape .

It is equivalent to saying that the undertakings would never attain the position from where they could change into a privileged point in the development of the region , had they not been provided with the new anchorage . Without Suape , no need could be envisaged for a third sugar terminal to exist , in short or medium terms, nor could its location be sited in the state of Pernambuco . If Suape did not exist , no big cement factories aimed at the international market could be thought of .

The foregoing gives a ready explanation as to what must be understood as Economical benefits which Suape may provide , that is , the advantages attained by the economy of the region as a consequence of its being put into practice .

In this connection , the port facilities in themselves could well attract other undertakings or , at least , have an influence in the increase of the turnover . Such is the case of the fertilizers plant , which could not exist without Suape . The petroleum distillery in its turn would be provided with a smaller capacity , and so forth .

The evaluation , according to the methodology now under consideration requires that , for both the benefits and the costs , the values be taken according to their economical meanings and never in relation to their monetary meanings .

4

The changing of the financial budgets into economical budgets requires basically these procedures :

- 1st) Elimination of indirect taxes present in the costs
- 2nd) Ascertainment of the cost of labour opportunity and of the capital and exchanges .

In short , the correction of the financial data was made with the re-evaluation of the values involved in the remuneration to the factors of production and in the acquisition of assets and services , apart the deletion of the budgetary items corresponding to the transfers . Having in mind the type of project , there were also provided the correction of the debts brought about by the exports and /or substitution to the imports .

Information concerning the corrective indexes and the criteria that helped the determination is given in the subsequent sections .

4.1.2' SOCIAL COST OF THE CURRENCIES

The analysis of the projects aiming at the exports or substitution to the imports calls for the introduction of the concept for " social " exchange rate - the one that could put the exchange market to a balance , once the Import and tax-assessing restrictions are eliminated . To the effect of the up-to-date calculation and the "social" exchange rate , the process suggested by Bacha and Modenesi in the Magazine " Pesquisa " (1) was utilized , which was made for IPEA . From the model referred to we have :

$$r_s = r_x (1+l)^a (1+s_1)^{b_1} (1+s_2)^{b_2} ; \text{ where } a+b_1+b_2 = 1$$

where : r_s - social cost of the currencies (Cr\$/US\$)

r_x - exchange rate for exports (Cr\$/US\$)

(1) - Government analysis on Investment project in Brazil: Procedures and Recommendations , by Edmar Bacha - IPEA-1972.

t- average tariff on imports :

$$a = \frac{M e_m}{X e_x + M e_m}$$

, where X is the value (US\$) of the

exports and capital goods ; e_x 0. the elasticity-price of the offer and e_m the absolute value of the elasticity - price for the demand of imports of capital goods whose dollar value is given by M :

- s_1 - incentive rate for non-industrial exports ;
- s_2 - is the incentive rate for industrial exports ;
- b_1 - participation of non-industrial exports on the sum of exports and imports ; and ,
- b_2 - participation of industrial exports on the sum of the exports and imports .

Given that

$a + b_1 + b_2 = 1$, we have $e_m = e_x$; thus

$a = \frac{M}{X + M}$, simplified form to be utilized in the present work . Furthermore the coffee will not be included , supposing that the exchange rates for coffee will not present any changes and these said rates represent maximization of income in the country as far as this product market is concerned ; the coffee price being a function of the Brazilian Exports , same presenting a demand curve with low elasticity-price .

The evaluation of the tariff levels in the Brazilian economy was carried out by (1) Bergsman and Malan for April 1967 , resulting in an average indicator equivalent to 37 % . Bacha's analysis (2) as far as the consistency of this index is concerned , suggests its utilization in the present work .

(1) J. Bergsman and P. Malan , " The Industry Protecting Structure in Brazil " , the Brazilian Magazine on Economy ; April/June , p.97 - 144

(2) Op. cit .

The fiscal stimulus viewing the exports in the form of exemption to the payment of income tax and of credit to the internal sales, equivalent to twice the IPI (tax on manufactured products) value, which will vary according to the price of the product to export represent an average remuneration increase of about 4.7 to 19.3% on both the non-manufactured exports (exception made for coffee) and the manufactured ones, respectively, these being the values assumed by the parameters s_1 and s_2 of the currencies social cost equation.

In order to provide the analysis on how $(r_s r_x^{-1})$, will behave in function of the recent oscilation in the commercial scale, calculations were made (fig.4.1) on the parameters a , b_1 and b_2 for the 1970-1974 period.

The utilization of the values in the basic formula provides :

<u>YEAR</u>	<u>r_s / r_x</u>
1970	1,251
1971	1,261
1972	1,255
1973	1,246
1974	1,272

Source : fig. 4.2

A variation of $\pm 1,5\%$ is found between the ratio calculated for 1974 and the average ratio ascertained from 1970 to 1973 .

As the present analysis is aimed at establishing the value for r_s/r_x which will be used in the social evaluation for the Suape Port Industrial Complex , it is found that the expectations for this parameter . indicates growing tendencies , at least until the end of the decade . Thus , as far as the project under consideration is concerned , the value of r_s/r_x estimated for 1974 is a rather pessimistic parameter ; however , given the distortions which are likely to have happened due to the precariousness of the statistics used in the country , it is suggested that the ratio $r_s / r_x = 1,27$ be used as a safety factor (which was estimated for 1974) and as a representative for the period of analysis of the project .

4.1.3 SOCIAL COST OF LABOUR

This part shows an approximate measure that allows the re-evaluation of the factor " Work " at the cost it is found in the region . This measure is the Social Cost of Labour (or simply labour) .

Existing studies on this subject (1) have shown that for the Northeast , the Social Cost of Labour would range between 50% and 63% of the private cost all in accordance with

(1)ref. the Brazilian Magazin on Economy - Vol.27, n94-Oct/Dec. 1973

the hypothesis adopted for studying the economy's behavior .

The quantifying methodology has plenty of details and fully acceptable through it the author attained the functional relationship of three major variables(2):

C = consumption rate of the urban worker, measured according to social costs .

M = marginal working productivity in agriculture.

S₀ = present value of an investment unit , in terms of Consumption .

The formulation shows that the social cost of labour is demonstrated by the volume of savings which was lost through consumption less the increase of the welfare relative to the social value of the investment .

Taking the appropriate indicators as a base , it will be admitted , at the present , the coefficient of 0.6 , that is the hypothesis that the social cost of labour be equal to 60% of the financial cost of the factor work .

4.1.4 ASSETS AND SERVICES ,

This part is restricted to the elimination of the indirect taxes and insurances on materials and services which have been purchased .

From the study of the activities involved the following hypothesis may be admitted for the composition of the intervening elements :

- 15% refer to Services and 85% to materials;
- of the materials 10% would be ascribable to fuel oils and 10% to lubricating ones ;

$$(2) \text{ CST} = C - \frac{C - M}{S_0}$$

- of the remaining material , only 15% would have been originated in the region .

The ICM (Tax on Circulation of Merchandises) in force is 15% on the sales within the state and 13,5% for the interstate transactions . The ISS (tax on Services) is equal to 5% the sole tax on lubricatings and edibles both liquids and gaseous ones is 18.5% on the lubricating oils(1) and the fuel oils are exempted (2) . As to the IPI (tax on Industrialized Products) an average tax of 8% was admitted for the various goods which may be concerned .

In this way , it was possible to form an equation to the problem , as follows :

$$P = 0.15C + 0.1C + 0.1C + 0.15C + 0.50C + 0.05(0.15C) + \\ + 1.85C(0.1C) + 0.08(0.15C) + 0.08(0.50C) + 0.15C . \\ .(0.08(0.15C)) + 0.135(0.08(0.50C)) .$$

$P = 1.26C$, where :

P = price of the products acquired in the market

C = cost of the goods less the indirect taxes

The coefficient found (1,26) will be , therefore , used in the conversion of financial to economical ones , the values related to goods and services .

4.1.5 CAPITAL

It was considered the remuneration for the factor capital as being equal to the cost of opportunity in the national economy . In this case , a rate of 10% per annum was adopted , which is the usual for feasibility studies carried out in Brazil , thus being accepted by all international credit agencies .

4.1.6 USE EXPECTANCY AND CURRENCY OF THE PROJECT

In respect of the period of life expectancy of the project, an interval of 30 years has been fixed (1975/2005) (3) ...

TABLE 4.1
ESTIMATE OF PARAMETERS ON THE COMMERCIAL BALANCE

YEAR	VALUE IN CURRENT US\$ 10 ⁶ (1)				PARAMETERS (3)			
	EXPORTS (2)				Imports	a	b ₁	b ₂
	T o t a l	Industrial	Non-Industrial					
1970	1.732	622	1.110	2.507	0,591	0,262	0,147	
1971	1.988	772	1.216	3.247	0,620	0,232	0,148	
1972	2.859	1.154	1.735	4.232	0,594	0,244	0,152	
1973	4.654	1.842	2.852	6.075	0,564	0,265	0,171	
1974 (4)	7.500	4.047	3.426	12.500	0,625	0,171	0,204	

(1) Source: Central Bank of Brazil - Report from August, 1974

(2) Excluding coffee

(3) Estimated as explained in the text

(4) Estimate

TABLE 4.2

ESTIMATE ON THE SOCIAL COST OF THE CURRENCY

Year	Parameters (1)		Duties and incentives (2)			R_g/R_x (3)	
	a	b ₁	b ₂	t	s ₁		s ₂
1970	0,591	0,262	0,147	0,370	0,047	0,193	1,251
1971	0,620	0,232	0,148	0,370	0,047	0,193	1,261
1972	0,594	0,244	0,162	0,370	0,047	0,193	1,255
1973	0,564	0,265	0,171	0,370	0,047	0,193	1,246
1974	0,625	0,171	0,204	0,370	0,047	0,193	1,272

(1) Source: Table 1.

(2) The values concerned with the analyzed period have been considered as constant ones.

(3) According to the formula, as presented in the text.

as the depreciating focus will be under observation .

- (1) average between the ones packed in Brazil and the already packed when imported .
- (2) Decree-Law n0. 1340 of 22.08.1974.
- (3) the autonomous projects will be considered as being implanted in 1980 .

4.2 CALCULATION OF THE CURRENT BENEFITS

4.2.1 ADOPTED PROCEDURES

With a view to calculate the benefits to be attributed, it was decided that only the principal ones from among the concerns which could be distinguished , as follows:

- Cement
- Aluminium
- Fertilizers
- Oil Distillery
- Sugar
- Molasses
- Alcohol
- Vegetable Oils

The other concerns were not taken into consideration , due to their small significance , as in the case of wheat, which , even if industrially processed , would add very little to the benefits under study .

As for these items included in the evaluation , the parts that would be able to operate without the Suape Port facilities were disconsidered , Thus , the calculation of the benefits accounted for only those parts whose operation would be dependent on the construction of the new anchorage .

Once the quantities under consideration are calculated , and with basis on the characteristics shown on item 3.2, studies have been made to show the Gross Additional Value, in each case .

As it's known , the Additional value (payment to factors plus indirect taxes) relative to a given economical activity is given by the difference between the value of the production and the intermediate consumption through the calculation is not as plain and as simple for the parts of each enterprise ; for many a part of the items thereof are originated from the upper Northeast itself , and the and the economical unit responsible for its production would have its activities increased .

It is seen therefore that , theoretically , the identification of the overall additional value to the V.S.O. account calls for a survey of the strokes brought about by all economical activities located in the geographical space encircled by the region . In the present case , such a procedure would not justify itself , given the required limits for accuracy . Therefore , the degree of dependability of the calculations becomes penalized as the magnitude of the values under study diminishes .

It was necessary , thus , to divide the intermediate consumption into regional and extra-regional one . In the latter case , the domestic and foreign charges were ascertained , that is , those requiring use of exchange and therefore requiring a special calculation ,

The undertakings being characterized , then the results relative to each of the afore mentioned items may be presented.

4.2.2 CEMENT

The increases in the production schedule being characterized , as shown on item 3.2 afore mentioned , the evolution

of the intermediary consumption was evaluated :

INTERMEDIATE CONSUMPTION (US\$ MILLIONS/YEAR)

Period	Regional	Extra - Regional	
		Internal	External
1980/1984	6,0	6,9	6,9
1985/1989	12,0	13,8	13,8
1990/1994	24,0	27,6	27,6
1995/2004	27,0	31,0	31,0
2005/....	33,0	37,9	37,9

The value of the calculated Production, supposing the enterprise to be under full operation , has been so made with basis on the price of US\$40/t (FOB) effective in the state for which the evaluation was made .

Thereby , the following table may be presented:

Period	Yearly production values
	(US\$ million)
1980/1980	80
1985/1989	160
1990/1994	240
1995/2004	280
2005/....	360

In the case of cement exports , and in conformance with the procederus referred to in item 4.2.1- hereof , the benefits are equivalent to the values of production less the extra-regional intermediate consumption .

Therefore , the following evolution can be obtained in the end , for these values :

Period	Yearly Benefits	
	US\$ MILLION	Cr\$ MILLION
1980/1984	64,3	450,1

...,...

1985/1989	128,8	900,9
1990/1994	177,4	1.241,8
1995/2004	209,6	1.467,2
2005/....	274,0	1.918,0

For deducting the expenses stemming from the attendance of the intermediate consumption imported from abroad , the conversion of these values was carried out to outline the social cost of the currency (item 4.1.2)

4.2.3 ALUMINUM

In conformance with the item 3.2 , the production of aluminum in the form of slugs brings about the imports of raw material from other areas in the country in a similar way to imports from abroad . The pole played by the consumption of electrical power is clearly distinguishable as is it has to cross the longways of the upper Northeast despite being generated in the Northeast .

The evaluation of the intermediate consumption with the pertaining desaggregation is effected as follows:

Aluminum Intermediate Consumption-US\$million/Year

<u>Periodo</u>	<u>Extra- Regional</u>		
	<u>Regional</u>	<u>Internal</u>	<u>External</u>
1980/1994	4,2	29,0	4,2
1995/2004	6,2	43,6	6,2
2005/....	8,2	58,2	8,2

The changes which are found in the periods are brought about by the scale elevation as indicated on item 3.2 afore mentioned :

The worldwide cotation for Aluminum , as ascertain ed by CACEX for the 1st. half of 1974 , reached US\$0.45/pound weight , or (US\$900/t) , Though the trends follow the general increase of the price for the non-ferrous , such values have been adopted for the sake of the consistency in the evaluation . Thus, by using US\$900/ton, the enterprise under consideration would have the following revenue :

Period	Yearly value of production
	US\$ million
1980/1994	90
1995/2004	135
2005/....	180

According to the established system , the benefits are equivalent to the values of production less the extra regional intermediate consumption , after deducting the foreign expenditures , in compliance with the social cost of the currencies . These are then the results arriv ed at :

Period	Aluminum -yearly-Benefits	
	US\$ million	Cr\$ million
1980/1994	56	392
1995/2004	84	588
2005/;...	111	777

4.2.4 FERTILIZERS

The benefits whose quantification. is made hereon are originated from the production activity to be undertaken by Embrafertil the corresponding implantation project of which has been previously described .

Nevertheless , should the implantation of Suape port facilities not take place , there would be no conditions for producing fertilizers , the plans for that producing unit becoming thus impaired and the area would only count on the existence of the maxing activities . In this case,

the fertilizers importation would be increased from the present 150 thousand tons to 260 thousand tons per year in 1995 . These imports , if compared with the year during which the various stages of the project are implanted , would present the following aspect . :

<u>STAGES</u>	<u>IMPORT</u> (<u>thousands of tons</u>)
1980	173
1984	193
1987	210

The benefits will be the result of the difference between the estimated imports and Embrafertil's production, which is expected to turn out as follows:

<u>STAGES</u>	<u>OUT PUT</u> (<u>thbusand of tons</u>)
1980	215
1984	515
1987	995

The intermediate consumption relative to the output differential share presents the following configuration as far as the remuneration to the factors is concerned , during the intervening years of the project .

Intermediate Consumption(Cr\$million/year)

Stages	Regional	Extra - Regional	
		Internal	External
1980	20.0	32.0	28.0
1984	90.0	144.0	126.0
1987	150.0	240.0	210.0

The preceding evaluation is the output of ponderation between the various elements intervening in the production process adopted by the industrial unit under consideration .

As regards the calculation of the output values , the figures were taken from the prices prevailing in the internal market making part of the said project , up - to - dated for August , 1974 , all in accordance with Index 2 of Conjuntura Economica , which yields the following results :

<u>STAGES</u>	<u>Yearly value of production(1)</u>	
	<u>Cr\$ million</u>	
1980	71.0	
1984	495.0	
1987	1.029,0	

(1) relative to the differential previously characterized.

In view of these elements , and in conformance with the adopted structure , the following was ascertained :

<u>Year</u>	<u>Yearly Benefits</u>	
	<u>US\$million</u>	<u>Cr\$ million</u>
1980/1983	0.5	3.4
1984/1986	27.3	191.0
1987/2005	74.6	522.3

4.2.5 OIL REFINING

The carrying out of failure to carry out the Suape Complex will have an influence in the size of the Distillery , as it would certainly be able to serve other states located outside the upper Northeast . Therefore , the benefits produced by this activity , and ascribable to the analyzed venture , will all have provenience from the production surplus to be exported , through Suape , to the upper North

west and Parā (see item.3.2) . Such exports , having a fixed limit for the year 1995 , present the following quantifying elements :

<u>YEAR</u>	<u>1.000 m³</u>	<u>YEAR</u>	<u>1.000 m³</u>
1980	3.863	1988	2.800
1981	3.639	1989	2.464
1982	3.416	1990	2.127
1983	3.136	1991	1.736
1984	2.912	1992	1.344
1985	3.752	1993	896
1986	3.471	1994	448
1987	3.136	1995	224

The operational unit costs are presented hereunder , taking as basis a unit with a refining capacity of 175,000 BPDO .

<u>Discrimination</u>	<u>Cr\$ /m³</u>
Variable costs :	540
- Raw Materials	530
- Utilities , Materials , "Royalties "	10
Fixed Costs :	22
- Personnel	15
- Materials	1
- Sundries	3
- Depreciation and amortization	13
Total cost :	562

Although the Distillery shows variations in the capacity (150 to 200 thousand BPDO) running the years under study , it is admitted that , from the average production scale adopted , the savings and the expenditures liable to occur would have unexpressive meaning and would compensate themselves . In this way the total cost relative to the afore mentioned exportable balance was determined , the values of which are presented on table 4.3 hereafter .

It is then demonstrated the proportion on which these costs remunerate the producing factors, with basis on the elements intervening in the production process:

<u>Discrimination</u>	<u>Z</u>
Regional Factors	7
<u>Extra-regional factors</u>	<u>93</u>
- Internal	3
- External	90

These indexes permit to calculate the destination of the Distillery batch of intermediate consumption, which is focused as follows :

Intermediate Consumption (in Cr\$ million)

YEAR	REGIONAL	EXTRA- REGIONAL	
		INTERNAL	EXTERNAL
1980	152	65	1.954
1981	143	61	1.842
1982	134	58	1.728
1983	123	53	1.586
1984	115	49	1.473
1985	148	63	1.898
1986	137	59	1.755
1987	123	53	1.586
1988	110	47	1.417
1989	97	42	1.246
1990	84	36	1.075
1991	68	29	879
1992	53	23	679
1993	35	15	454
1994	18	8	226
1995	9	4	113

The total revenue expected in the Commercialization of the exportable surpluses is the following :

<u>YEAR</u>	<u>Cr\$million</u>	<u>YEAR</u>	<u>Cr\$million</u>
1980	3.245	1988	2.352
1981	3.057	1989	2.070
1982	2.869	1990	1.787
1983	2.634	1991	1.458
1984	2.446	1992	1.129
1985	3.152	1993	753
1986	2.916	1994	376
1987	2.634	1995	188

These results were based on the price of Cr\$840/m³, where a mean tax has been accounted for, arrived at by ponderation among the various products derived from the refining of petroleum, according to the participation prescribed by the current legislation(1).

From the values so far presented these results are reached :

PETROLEUM REFINING - BENEFITS

<u>Year</u>	<u>US\$ million</u>	<u>Cr\$ million</u>	<u>Year</u>	<u>US\$ million</u>	<u>Cr\$Million</u>
1980	100	698	1988	72	505
1981	94	657	1989	64	446
1982	88	616	1990	55	386
1983	81	567	1991	45	313
1984	75	526	1992	35	244
1985	97	679	1993	23	161
1986	90	628	1994	12	81
1987	81	567	1995	6	40

As it has been illustrated in previous cases, the social cost of the currency was taken into account when deducting the intermediate consumption in foreign exchange.

(1) Decree- Law no. 1340, of 22.08.74.

TABLE 4.3 - PETROLEUM REFINERY IN SUAPE - OVERALL COSTS OF OPERATION

(Cr\$ million)

DESCRIPTION	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
<u>Variable Costs</u>	2.086	1.956	1.945	1.693	1.572	2.076	1.875	1.693	1.512	1.331	1.146	537	725	464	242	171
Raw Materials	2.047	1.930	1.611	1.662	1.543	1.985	1.840	1.662	1.464	1.306	1.127	920	712	475	238	119
Utilities, materials, royalties	39	36	34	31	29	38	35	31	28	25	21	17	13	9	4	2
<u>Fixed Costs</u>	85	80	75	69	65	87	76	59	62	54	47	39	30	20	10	5
Labor	19	18	18	16	15	15	17	15	14	12	11	9	7	4	2	1
Materials	4	4	3	3	3	4	3	3	3	2	2	2	1	1	1	-
Various charges	12	11	10	9	9	11	10	9	8	7	6	5	4	3	1	1
Depreciation and amortization	50	47	44	41	38	49	46	41	37	33	28	23	18	12	6	3
<u>OVERALL COST</u>	2.171	2.046	1.920	1.762	1.637	2.109	1.951	1.762	1.574	1.385	1.195	976	755	504	252	126

4.2.6

BENEFITS OF REPERCUSSION

These topics deal with the benefits generated by the increment of the production of the agricultural industry, which will originate from the optimization of the conditions which the Suape Port will make available.

A treatment will be given to the Sugar and its correlatives such as molasses and Alcohol, and also to the vegetable oils.

A given "static" capacity in the port turnover with a limit was assumed, for the Ports of Recife and Macei , which, once they are exhausted, would be necessary the creation of another terminal in order to absorb the exportable surplus for each product.

Therefore, the aggregate values included in the revenue stemming from the exportation of these products through Suape will be characterized, all of which will be re-evaluated as per the concept of the cost of the currencies opportunities.

a) Sugar

The price of the product in the International Market has attained big figures, and it is expected to reach the figure of US\$1.000/t until the end of the year. However, this trend to climb higher is ascribable to various structural factors, causing the market off-balance. It can be illustrated with the Cuba crop, which will not attain the levels foreseen previously, and also the possibilities that the floods which now barrage Hungary and Czechoslovakia would also hit the Ucrania, barring the production of beet sugar, which is the main product of the region within the Soviet Union.

The salary requirements by Argentine workers in this field and the anticipation that the European Common Market may purchase 200 thousand tons of the product, also constitute elements that should be taken into consideration.

The consultant feels, therefore, that the basis for sustaining these prices is not thoroughly reliable, and it was determined that these elements be eliminated so that the intended analysis may offer a greater solidity.

Thus, the price of US\$400/t (FOB) was adopted, which would possibly be the one effective in case of absence of the said variables.

With basis on this price, and according to the quantity foreseen to be handled by Suape, the benefits arising from the exports of Raw Sugar would be discriminated as follows:

SUGAR - BENEFITS

YEAR	US\$ Million	Cr\$ million	YEAR	US\$ million	Cr\$ million
1980	297	2.079	1993	1.069	7.483
1981	348	2.436	1994	1.137	7.959
1982	407	2.849	1995	1.207	8.449
1983	477	3.339	1996	1.211	8.477
1984	559	3.913	1997	1.216	8.512
1985	654	4.578	1998	1.220	8.540
1986	695	4.865	1999	1.224	8.568
1987	739	5.173	2000	1.228	8.96
1988	786	5.502	2001	1.233	8.631
1989	836	5.852	2002	1.237	8.659
1990	889	6.223	2003	1.241	8.687
1991	945	6.615	2004	1.246	8.722
1992	1.005	7.035	2005	1.250	8.750

These results allow for quantities taken away for remunerating extra-regional factors, which, in this case, is admitted to be almost restrictedly destined to the acquisition

tion of fertilizers and other implements for the cane farming and machinery and parts for the plant .

b) Molasses and Alcohol

The price of these two residual products resulting from the sugar industry has kept a certain relationship in regards to the sugar . Such being the case , these products will be referred to a price different from that found for the present exports ,(1) , as the taxes are made in connection with the factors having a direct influence in the present sugar trade .

The benefits thus generated by the exports of such products will therefore be characterized in the following way :

(1) US\$75/t for the Molasses and US\$32/lb for Alcohol.
as per Cacex' figures .

MOLASSES AND ALCOHOL - BENEFITS

YEAR	Molasses		Alcohol	
	US\$ millions	Cr\$ millions	US\$ millions	Cr\$ millions
1980	7	49	26	182
1981	12	84	27	189
1982	16	112	29	203
1983	21	147	31	217
1984	26	182	32	224
1985	31	217	35	245
1986	33	231	35	245
1987	36	252	36	252
1988	38	266	36	252
1989	41	287	37	259
1990	43	301	38	266
1991	46	322	38	266
1992	49	343	39	273
1993	52	364	40	280
1994	55	385	41	287
1995	58	406	41	287
1996	58	406	41	287
1997	59	413	41	287
1998	59	413	41	287
1999	60	420	41	287
2000	61	427	41	287
2001	61	427	41	287
2002	62	434	41	287
2003	62	434	41	287
2004	63	441	41	287
2005	63	441	41	287

Of the above discriminated aggregated values , which have been calculated with base on prices of US\$ 60/t and US\$200/t for Molasses and Alcohol , respectively , the quantities admitted as the remuneration to extra-regional factors were deducted .

c) Vegetable Oils

The benefits generated by the commercialization abroad of the castorseed oil production handled through the Suape Port is now quantified according to a criterium already described . These figures will present , during the intervening years of the Project , the following :

VEGETABLE OILS- BENEFITS

YEAR	US\$ million	Cr\$ million	YEAR	US\$ million	Cr\$ million
1980	16	112	1993	37	259
1981	18	126	1994	37	259
1982	22	154	1995	38	266
1983	25	175	1996	38	266
1984	28	196	1997	39	273
1985	32	224	1998	39	273
1986	33	231	1999	40	280
1987	33	231	2000	41	287
1988	34	238	2001	41	287
1989	35	245	2002	42	294
1990	35	245	2003	42	294
1991	36	252	2004	43	301
1992	36	252	2005	43	301

The price adopted for calculating these values is US\$600/t , according to information supplied by CACEX .

Out of the total revenue obtained , was deducted the quantities pertaining to the evaluation of the remuneration to the

extra- regional factors intervening in the intermedia-
ry consumption of this production , from the farm to the
plant where the seed undergoes the treatment .

4.2.7 TOTALITY OF THE CURRENT BENEFITS

The preceding findings are totalled on table 4.4 (figu-
res in Cruzeiros) and 4.5 (in US\$) as inserted here-
after .

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4.3 ESTIMATE ON THE CURRENT COSTS

The investment parcels referred to herein are those necessary to the implantation of the so-called 1st. stage .

These costs are reproduced in a distinctive way , according to the discrimination hereafter :

- Industrial Investments
- Port and correlated investments

The first type comprehends the investments necessary to the implantation of the various producing units in the industrial area of the complex , and those deemed necessary to the attainment of the goals discriminated on topic 3.2 .

4.3.1 Industrial Investments

For this case , it was admitted that , given the characteristics similar to those of the investments , three years anticipation would be necessary for the maturity of each of the undertakings . Such a promise is applied both for the implantation and for the investments necessary to the increase of the production scale .

It was also admitted that these investments would be distributed , for those years , in portions of equal amounts.

These hypothesis were supported by the average occurencies in projects approved by BNDE .

Were also considered the investments listed on tome III , studies on Economy , according to each case , excepting the cases mentioned hereunder :

a) As far as the Petroleum Distillery and the Fertilizers Plant are concerned , the values received by each of these

units were applied to the differentials attributable to Suape, evidenced in the previous ascertainment of the benefits, and,

b) the additional production of Sugar was considered in the total, along with its respective by-products and the vegetable oils.

In order to change the aforementioned investments into Economy Cost, in compliance with the methodology requirements, presented on item 4.1, it was disaggregated into labour, materials (subdivided into domestic and foreign ones), and profits, amounts calculated in accordance with the values furnished at that opportunity. Similar disaggregation is presented on table 4.6.

The following results were arrived at :

ECONOMIC VALUES OF PRODUCTIVE INVESTMENTS
(Cr\$ millions)

YEAR	CEMENT	ALUMINUM	FERTI- LIZERS	PETROLEUM REFINERY	RURAL INDUSTRIES	TOTAL
1978	158,9	224,4	110,4	172,4	59,0	725,1
1979	158,9	224,4	110,4	172,4	59,0	725,1
1980	158,9	224,4	110,4	172,4	59,0	725,1
1981	-	-	-	207,4	-	207,4
1982	-	-	14,7	207,4	-	222,1
1983	158,9	224,4	14,7	479,9	59,0	936,9
1984	158,9	224,4	14,7	272,3	59,0	729,3
1985	158,9	224,4	17,2	272,3	59,0	732,3
1986	-	-	17,2	-	-	17,2
1987	-	-	17,2	-	-	17,2
1988	158,9	-	-	222,4	59,0	440,3
1989	158,9	-	-	222,4	59,0	440,3
1990	158,9	-	-	222,4	59,0	440,3
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	79,4	112,2	-	-	59,0	250,6
1994	79,4	112,2	-	-	59,0	250,6
1995	79,4	112,2	-	-	59,0	250,6
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	158,9	112,2	-	-	-	271,1
2004	158,9	112,2	-	-	-	271,1
2005	158,9	112,2	-	-	-	271,1

4.3.2 PORT INVESTMENTS AND THE LIKE

As it was exemplified by the investments required by the producing activities, it became indispensable that the budgets called for on topic 3.4 be decomposed into the same elements already referred to, viz: labour, materials and profit. In order that such a decomposition be effected the consultant have called forward their own experience and availed themselves of similar situations that have arisen from other studies.

The financial values being dealt with (which appear on table 4.8.) have been reduced to economic values, in compliance with the methodology previously characterized, the corresponding details of which are provided on tables 4.9 to 4.9i.

The totals ascertained in respect of the economical costs of the investments in the port and the like are listed on table 4.10.

4.4 Calculation of the feasibility Indicators

The costs and benefits , for the so-called 1st. stage, as they were estimated year-to-year on the preceeding items, have been up-to-date on table 4.11 for 1975 , on basis of the rate of 10% per annum .

The following results were found :

C = costs	- Cr\$3.946 million
B = benefits	- Cr\$48601 million

The following values are therefore ascertained for the feasibility indicators :

B - C	= Cr\$44,655 million
B / C	" 12.3

The project is thus a highly recommendable one , even when considering the values taken for basis for calculating these indicators to admit deviation in the range of 20% to 30% .

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

Current Benefits (Cr\$ millions)

YEAR	CEMENT	ALUMINUM	FERTI-LIZERS	PETROLEUM BY-PRODUCTS	SUGAR	MOLASSES	ALCOHOL	VEGETABLE OILS	TOTAL
1980	450,1	392	3,4	698	2.079	49	182	112	3.955,5
1981	450,1	392	3,4	657	2.436	24	189	126	4.337,5
1982	450,1	392	3,4	616	2.649	112	203	154	4.779,5
1983	450,1	392	3,4	567	3.369	147	217	175	5.290,5
1984	450,1	392	191,0	526	3.913	182	224	196	6.074,1
1985	900,9	392	191,0	679	4.578	217	245	224	7.426,9
1986	900,9	392	191,0	628	4.865	231	245	231	7.653,9
1987	900,9	392	522,3	567	5.173	252	252	231	8.290,2
1988	900,9	392	522,3	505	5.502	266	252	238	8.576,2
1989	900,9	392	522,3	446	5.852	287	259	245	8.904,2
1990	1.241,0	392	522,3	386	6.223	301	266	245	9.577,1
1991	1.241,0	392	522,3	313	6.615	322	266	252	9.924,1
1992	1.241,6	392	522,3	244	7.025	343	273	252	10.303,1
1993	1.241,0	392	522,3	161	7.483	364	280	259	10.703,1
1994	1.241,0	392	522,3	81	7.959	365	287	259	11.127,1
1995	1.467,2	588	522,3	40	8.449	406	287	266	12.025,5
1996	1.467,2	588	522,3	-	8.477	406	287	266	12.013,5
1997	1.467,2	588	522,3	-	8.512	413	287	273	12.062,5
1998	1.467,2	588	522,3	-	8.540	413	287	273	12.090,5
1999	1.467,2	588	522,3	-	8.568	420	287	280	12.132,5
2000	1.467,2	588	522,3	-	8.596	427	287	287	12.174,5
2001	1.467,2	588	522,3	-	8.631	427	287	287	12.209,5
2002	1.467,2	588	522,3	-	8.659	434	287	294	12.251,5
2003	1.467,2	588	522,3	-	8.687	434	287	294	12.279,5
2004	1.467,2	588	522,3	-	8.722	441	287	301	12.325,5
2005	1.910,0	777	522,3	-	8.750	441	287	301	12.996,3

TABLE 4.5

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

Current Benefits (US\$ millions)

YEAR	CEMENT	ALUMINIUM	FERTI- LIZERS	PETROLEUM BY-PRODUC	SUGAR	MOLASSES	ALCOHOL	VEGETABLE OILS	TOTAL
1980	64,3	56	0,5	100	297	7	26	16	556,2
1981	64,3	56	0,5	94	348	12	27	18	613,8
1982	64,3	56	0,5	88	407	16	29	22	652,8
1983	64,3	56	0,5	81	477	21	31	25	755,8
1984	64,3	56	27,3	75	553	26	32	28	867,6
1985	128,7	56	27,3	97	634	31	35	32	1.062,0
1986	128,7	56	27,3	50	695	33	35	33	1.098,0
1987	128,7	56	74,6	81	739	36	36	33	1.184,3
1988	128,7	56	74,6	72	786	38	36	34	1.225,3
1989	128,7	56	74,6	64	836	41	37	35	1.272,3
1990	177,4	56	74,6	55	889	43	36	35	1.366,0
1991	177,4	56	74,6	45	945	46	38	36	1.416,0
1992	177,4	56	74,6	35	1.005	49	39	36	1.472,0
1993	177,4	56	74,6	23	1.069	52	40	37	1.529,0
1994	177,4	56	74,6	12	1.137	55	41	37	1.590,0
1995	209,6	84	74,6	6	1.207	58	41	38	1.718,2
1996	209,6	84	74,6	-	1.211	58	41	38	1.716,2
1997	209,6	84	74,6	-	1.216	59	41	39	1.723,2
1998	209,6	84	74,6	-	1.220	59	41	39	1.727,2
1999	209,6	84	74,6	-	1.224	60	41	40	1.733,2
2000	209,6	84	74,6	-	1.226	61	41	41	1.739,2
2001	209,6	84	74,6	-	1.233	61	41	41	1.744,2
2002	209,6	84	74,6	-	1.237	62	41	42	1.750,2
2003	209,6	84	74,6	-	1.241	62	41	42	1.754,2
2004	209,6	84	74,6	-	1.246	63	41	43	1.761,2
2005	274,0	111	74,6	-	1.250	63	41	43	1.856,6

TABLE 4.6 - SUAPE - ANALYSIS ON THE INVESTMENTS AS REQUIRED FOR PRODUCTIVE ACTIVITIES

(Cr\$ thousand)

YEAR	LABOR	M A T E R I A L			PROFIT	OVERALL TOTAL	
		FOREIGN	BRAZILIAN	TOTAL			
C E M E N T							
1978	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1979	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1980	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1981							
1982							
1983	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1984	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1985	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1986							
1987							
1988	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1989	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1990	15.400	61.600	78.200	107.800	186.000	20.500	221.900
1991							
1992							
1993	7.700	30.800	39.100	53.900	93.000	10.300	111.000
1994	7.700	30.800	39.100	53.900	93.000	10.300	111.000
1995	7.700	30.800	39.100	53.900	93.000	10.300	111.000
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003	15.400	61.600	78.200	107.800	186.000	20.500	221.900
2004	15.400	61.600	78.200	107.800	186.000	20.500	221.900
2005	15.400	61.600	78.200	107.800	186.000	20.500	221.900

TABLE 4.6 - SUAPE - ANALYSIS ON THE INVESTMENTS AS REQUIRED FOR PRODUCTIVE ACTIVITIES

(Cr\$ thousand)

YEAR	LABOR	M A T E R I A L			PROFIT	OVERALL TOTAL	
		FOREIGN	BRAZILIAN	TOTAL			
ALUMINUM							
1977							
1978	12.600	112.000	142.200	127.400	269.600	28.000	310.200
1979	12.600	112.000	142.200	127.400	269.600	28.000	310.200
1980	12.600	112.000	142.200	127.400	269.600	28.000	310.200
1981							
1982							
1983	12.600	112.000	142.200	127.400	269.600	28.000	310.200
1984	12.600	112.000	142.200	127.400	269.600	28.000	310.200
1985	12.600	112.000	142,200	127.400	269.600	28.000	310.200
1986							
1987							
1988							
1989							
1990							
1991							
1992							
1993	6.300	56.000	71.100	63.700	134.800	14.000	155.100
1994	6.300	56.000	71.100	63.700	134.800	14.000	155.100
1995	6.300	56.000	71.100	63.700	134.800	14.000	155.100
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003	6.300	56.000	71.100	63.700	134.800	14.000	155.100
2004	6.300	56.000	71.100	63.700	134.800	14.000	155.100
2005	6.300	56.000	71.100	63.700	134.800	14.000	155.100

TABLE 4.6 - SUAPE - ANALYSIS ON THE INVESTMENTS AS REQUIRED FOR PRODUCTIVE ACTIVITIES

(Cr\$ thousand)

YEAR	LABOR	MATERIAL			PROFIT	OVERALL TOTAL	
		FOREIGN	BRAZILIAN	TOTAL			
FERTILIZERS							
1977							
1978	13.600	15.100	19.200	107.700	126.900	15.200	155.700
1979	13.600	15.100	19.200	107.700	126.900	15.200	155.700
1980	13.600	15.100	19.200	107.700	126.900	15.200	155.700
1981							
1982	1.600	1.800	2.300	12.700	15.000	1.800	18.400
1983	1.600	1.800	2.300	12.700	15.000	1.800	18.400
1984	1.600	1.800	2.300	12.700	15.000	1.800	18.400
1985	1.900	2.100	2.700	14.700	17.600	2.100	21.600
1986	1.900	2.100	2.700	14.900	17.600	2.100	21.600
1987	1.900	2.100	2.700	14.900	17.600	2.100	21.600
PETROLEUM REFINERY							
1977							
1978	20.700	46.000	58.400	140.300	196.700	23.000	242.400
1979	20.700	46.000	58.400	140.300	198.700	23.000	242.400
1980	20.700	46.000	58.400	140.300	198.700	23.000	242.400
1981	24.900	55.300	70.200	168.800	239.000	27.700	291.600
1982	24.900	55.300	70.200	168.800	239.000	27.700	291.600
1983	57.600	128.000	162.500	390.400	552.900	64.000	674.500
1984	32.700	72.700	92.300	221.600	313.900	36.300	382.900
1985	32.700	72.700	92.300	221.600	313.900	36.300	382.900
1986							
1987							
1988	26.700	59.300	75.300	181.000	256.300	29.700	312.700
1989	26.700	59.300	75.300	181.000	256.300	29.700	312.700
1990	26.700	59.300	75.300	181.000	256.300	29.700	312.700

TABLE 4.6 - SUAPE - ANALYSIS ON THE INVESTMENTS AS REQUIRED FOR PRODUCTIVE ACTIVITIES
(Cr\$ thousand)

YEAR	LABOR	M A T E R I A L			PROFIT	OVERALL TOTAL	
		FOREIGN	BRAZILIAN	TOTAL			
RURAL INDUSTRY							
1978	6.700	-	-	68.300	68.300	8.300	83.300
1979	6.700	-	-	68.300	68.300	8.300	83.300
1980	6.700	-	-	68.300	68.300	8.300	83.300
1981							
1982							
1983	6.700	-	-	68.300	68.300	8.300	83.300
1984	6.700	-	-	68.300	68.300	8.300	83.300
1985	6.700	-	-	68.300	68.300	8.300	83.300
1986							
1987							
1988	6.700	-	-	68.300	68.300	8.300	83.300
1989	6.700	-	-	68.300	68.300	8.300	83.300
1990	6.700	-	-	68.300	68.300	8.300	83.300
1991							
1992							
1993	6.700	-	-	68.300	68.300	8.300	83.300
1994	6.700	-	-	68.300	68.300	8.300	83.300
1995	6.700	-	-	68.300	68.300	8.300	83.300

TABLE 4.7

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE
ECONOMIC COSTS DUE TO THE PRODUCTIVE ACTIVITIES

CEMENT

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1978	9,2	147,6	2,1	158,9
1979	9,2	147,6	2,1	158,9
1980	9,2	147,6	2,1	158,9
1981				
1982				
1983	9,2	147,6	2,1	158,9
1984	9,2	147,6	2,1	158,9
1985	9,2	147,6	2,1	158,9
1986				
1987				
1988	9,2	147,6	2,1	158,9
1989	9,2	147,6	2,1	158,9
1990	9,2	147,6	2,1	158,9
1991				
1992				
1993	4,6	73,8	1,0	79,4
1994	4,6	73,8	1,0	79,4
1995	4,6	73,8	1,0	79,4
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003	9,2	147,6	2,1	158,9
2004	9,2	147,6	2,1	158,9
2005	9,2	147,6	2,1	158,9

TABLE 4.7

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE
ECONOMIC COSTS DUE TO THE PRODUCTIVE ACTIVITIES

ALUMINUM

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1978	7,6	214,0	2,8	224,4
1979	7,6	214,0	2,8	224,4
1980	7,6	214,0	2,8	224,4
1981				
1982				
1983	7,6	214,0	2,8	224,4
1984	7,6	214,0	2,8	224,4
1985	7,6	214,0	2,8	224,4
1986				
1987				
1988				
1989				
1990				
1991				
1992				
1993	3,8	107,0	1,4	112,2
1994	3,8	107,0	1,4	112,2
1995	3,8	107,0	1,4	112,2
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003	3,8	107,0	1,4	112,2
2004	3,8	107,0	1,4	112,2
2005	3,8	107,0	1,4	112,2

TABLE 4.7

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE
ECONOMIC COSTS DUE TO THE PRODUCTIVE ACTIVITIES

FERTILIZERS

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1978	8,2	100,7	1,5	110,4
1979	8,2	100,7	1,5	110,4
1980	8,2	100,7	1,5	110,4
1981				
1982	1,0	11,9	1,8	14,7
1983	1,0	11,9	1,8	14,7
1984	1,0	11,9	1,8	14,7
1985	1,1	14,0	2,1	17,2
1986	1,1	14,0	2,1	17,2
1987	1,1	14,0	2,1	17,2

PETROLEUM REFINERY

1978	12,4	157,7	2,3	172,4
1979	12,4	157,7	2,3	172,4
1980	12,4	157,7	2,3	172,4
1981	14,9	189,7	2,8	207,4
1982	14,9	189,7	2,8	207,4
1983	34,6	438,9	6,4	479,9
1984	19,6	249,1	3,6	272,3
1985	19,6	249,1	3,6	272,3
1986				
1987				
1988	16,0	203,4	3,0	222,4
1989	16,0	203,4	3,0	222,4
1990	16,0	203,4	3,0	222,4

TABLE 4.7

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE
ECONOMIC COSTS DUE TO THE PRODUCTIVE ACTIVITIES

RURAL INDUSTRY

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1978	4,0	54,2	0,8	59,0
1979	4,0	54,2	0,8	59,0
1980	4,0	54,2	0,8	59,0
1981				
1982				
1983	4,0	54,2	0,8	59,0
1984	4,0	54,2	0,8	59,0
1985	4,0	54,2	0,8	59,0
1986				
1987				
1988	4,0	54,2	0,8	59,0
1989	4,0	54,2	0,8	59,0
1990	4,0	54,2	0,8	59,0
1991				
1992				
1993	4,0	54,2	0,8	59,0
1994	4,0	54,2	0,8	59,0
1995	4,0	54,2	0,8	59,0

TABLE 4.0
**HARBOUR INDUSTRIAL COMPLEX FOR SUAPE
 HARBOUR INVESTMENTS AND THE LIKE
 FINANCIAL VALUES**

(Crs 106)

YEAR	EXPID- PRIATION	WATER SUPPLYING	TELEUN- MNICAT.	URBANI- ZATION	ELECTRIC POWER	FLOOD AND CHANNELS CONTROL	SEWAGE DISPOSAL	RAILWAYS	ROADS	HAREOUR	TOTAL
1975	5,0	9,1	-	15,0	0,7	-	1,2	10,6	39,4	32,0	113,0
1976	-	14,1	2,0	22,6	10,7	4,8	0,5	8,8	20,7	20,5	104,7
1977	-	6,9	0,6	8,0	10,7	10,0	0,5	8,7	-	109,7	155,1
1978	-	7,5	0,6	8,0	10,7	10,0	17,5	8,7	-	223,7	286,7
1979	-	2,2	0,6	8,3	10,7	10,0	17,5	8,3	-	266,7	326,3
1980	-	1,0	0,6	6,0	10,7	10,0	18,3	4,5	2,0	124,6	177,7
1981	-	1,0	0,6	7,0	10,7	-	21,3	4,5	2,0	110,9	158,0
1982	-	0,5	0,6	39,0	10,7	-	0,1	4,5	-	94,4	149,8
1983	-	0,5	0,6	39,0	10,7	-	0,1	4,5	-	26,9	82,3
1984	-	1,9	0,6	39,2	10,7	-	0,1	3,6	-	26,9	83,0
1985	-	1,9	2,2	35,8	10,7	-	0,1	-	2,0	29,4	81,0
1986	-	-	0,6	30,0	-	-	0,1	-	2,0	-	32,7
1987	-	-	0,6	30,0	-	-	0,1	-	-	-	30,7
1988	-	-	0,6	29,0	-	-	0,1	-	-	-	29,7
1989	-	-	0,6	29,2	-	-	0,1	-	-	-	29,9
1990	-	-	0,6	38,1	-	-	0,1	-	-	-	38,8
1991	-	-	0,6	37,6	-	-	0,1	-	-	-	38,3
1992	-	-	0,6	37,1	-	-	0,1	-	-	-	37,8
1993	-	-	0,6	37,1	-	-	0,1	-	-	-	37,8
1994	-	-	0,6	37,1	-	-	0,1	-	-	-	37,8
1995	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-	-	-	-
2005	-	-	-	-	-	-	-	-	-	-	-

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9a - SCHEDULE FOR INVESTMENTS

Harbour		Economic Values			(Cr\$ 103)
YEAR	LABOR	MATERIAL	PROFIT	TOTAL	
1975	8.465	6.403	1.001	15.869	
1976	5.408	4.081	647	10.136	
1977	29.077	21.993	3.420	54.490	
1978	59.303	44.849	6.964	111.116	
1979	71.228	53.866	8.363	133.457	
1980	33.026	24.983	3.884	61.893	
1981	29.377	22.225	3.457	55.059	
1982	25.019	18.925	2.944	46.888	
1983	7.106	5.380	843	13.329	
1984	7.106	5.380	843	13.329	
1985	7.230	5.475	858	13.563	
1986					
1987					
1988					
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HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9b - SCHEDULE FOR INVESTMENTS

Railways

ECONOMIC VALUES

-(Cr\$ 10³)

YEAR	LABOR	MATERIAL	PROFIT	T O T A L
1975	3.306	2.725	168	6.199
1976	2.758	2.271	141	5.170
1977	2.724	2.249	138	5.111
1978	2.724	2.129	138	5.111
1979	2.584	2.249	132	4.845
1980	1.396	1.154	71	2.621
1981	1.396	1.154	71	2.621
1982	1.396	1.154	71	2.621
1983	1.396	1.154	71	2.621
1984	1.141	939	57	2.137
1985				
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2005				

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9c - SCHEDULE FOR INVESTMENTS
ECONOMIC VALUES

Roads

(Cr\$ 10⁶)

YEAR	LABOR	MATERIAL	PROFIT	T O T A L
1975	11.474	7.718	1.059.	20.251
1976	6.011	4.044	555	10.610
1977				
1978				
1979				
1980	585	393	54	1.032
1981	585	393	54	1.032
1982				
1983				
1984				
1985	586	393	54	1.033
1986	586	393	54	1.033
1987				
1988				
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2005				

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9d - SCHEDULE FOR INVESTMENTS - ECONOMIC VALUES

Electric Power

(Cr\$ 10³)

YEAR:	LABOR	MATERIAL	PROFIT	TOTAL
1975	140	324	6	470
1976	2.238	4.911	86	7.235
1977	2.238	4.911	86	7.235
1978	2.238	4.911	86	7.235
1979	2.238	4.911	86	7.235
1980	2.238	4.911	86	7.235
1981	2.238	4.911	86	7.235
1982	2.238	4.911	86	7.235
1983	2.238	4.911	86	7.235
1984	2.238	4.911	86	7.235
1985	2.238	4.911	86	7.235
1986	-	-	-	-
1987	-	-	-	-
1988	-	-	-	-
1989	-	-	-	-
1990	-	-	-	-
1991	-	-	-	-
1992	-	-	-	-
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	-	-	-	-
1997	-	-	-	-
1998	-	-	-	-
1999	-	-	-	-
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9c - SCHEDULE FOR INVESTMENTS - ECONOMIC VALUES

Telecommunications

(Cr\$ 10³)

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1975	-	-	-	-
1976	621	642	21	1.284
1977	175	183	6	364
1978	175	183	6	364
1979	175	183	6	364
1980	175	183	6	364
1981	175	183	6	364
1982	175	183	6	364
1983	175	183	6	364
1984	175	183	6	364
1985	646	671	22	1.339
1986	175	183	6	364
1987	175	183	6	364
1988	175	183	6	364
1989	175	183	6	364
1990	175	183	6	364
1991	175	183	6	364
1992	175	183	6	364
1993	175	183	6	364
1994	175	182	6	364
1995				
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2005				

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9f - SCHEDULE FOR INVESTMENTS - ECONOMIC VALUES.

Urbanization

(Cr^s 10³)

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1975	5.288	3.747	49	9.084
1976	7.976	5.652	221	13.849
1977	2.821	1.998	78	4.897
1978	2.821	1.998	78	4.897
1979	2.912	2.063	81	5.056
1980	2.116	1.498	59	3.673
1981	2.468	1.748	68	4.284
1982	13.750	9.742	381	23.873
1983	13.750	9.742	381	23.873
1984	13.807	9.782	382	23.971
1985	12.979	9.195	359	22.533
1986	10.577	7.493	293	18.363
1987	10.577	7.493	293	18.363
1988	10.224	7.244	283	17.751
1989	10.309	7.305	286	17.900
1990	13.420	9.508	372	23.300
1991	13.262	9.397	367	23.026
1992	13.067	9.259	362	22.688
1993	13.067	9.259	362	22.688
1994	13.067	9.259	362	22.688
1995				
1996				
1997				
1998				
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2000				
2001				
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2003				
2004				
2005				

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9g - SCHEDULE FOR INVESTMENTS - ECONOMIC VALUES

Water Supplying

(Cr\$ 10³)

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1975	2.779	2.781	82	5.642
1976	4.324	4.327	128	8.779
1977	2.098	2.101	62	4.261
1978	2.302	2.305	68	4.675
1979	685	687	20	1.392
1980	307	306	9	622
1981	307	306	9	622
1982	153	153	5	311
1983	153	153	5	311
1984	568	568	17	1.153
1985	568	568	17	1.153
1986				
1987				
1988				
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2005				

HARBOUR INDUSTRIAL COMPLEX FOR SNAPE

TABLE 4.9h - SCHEDULE FOR INVESTMENTS - ECONOMIC VALUES

Sewage Disposal		(Cr\$ 10 ³)		
YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1975	330	252	35	617
1976	141	108	115	264
1977	140	106	15	261
1978	4.765	3.633	501	8.898
1979	4.766	3.633	502	8.901
1980	4.978	3.797	524	9.299
1981	5.974	4.416	610	1.100
1982	35	26	36	97
1983	35	26	36	97
1984	35	26	36	97
1985	35	26	36	97
1986	35	26	36	97
1987	35	26	36	97
1988	35	26	36	97
1989	35	26	36	97
1990	35	26	36	97
1991	35	26	36	97
1992	35	26	36	97
1993	35	26	36	97
1994	35	26	36	97
1995				
1996				
1997				
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2001				
2002				
2003				
2004				
2005				

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE

TABLE 4.9i - SCHEDULE FOR INVESTMENTS - ECONOMIC VALUES

Flood and Channels Control

(Cr\$ 10³)

YEAR	LABOR	MATERIAL	PROFIT	TOTAL
1975	-	-	-	-
1976	1.247	889	144	2.280
1977	4.260	1.849	300	6.409
1978	4.260	1.849	300	6.409
1979	4.260	1.849	300	6.409
1980	4.260	1.849	300	6.409
1981	-	-	-	-
1982	-	-	-	-
1983	-	-	-	-
1984	-	-	-	-
1985	-	-	-	-
1986	-	-	-	-
1987	-	-	-	-
1988	-	-	-	-
1989	-	-	-	-
1990	-	-	-	-
1991	-	-	-	-
1992	-	-	-	-
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	-	-	-	-
1997	-	-	-	-
1998	-	-	-	-
1999	-	-	-	-
2000	-	-	-	-
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-

HARBOUR INDUSTRIAL COMPLEX FOR SLAPE

TABLE 4.10 - HARBOUR INVESTMENTS AND THE LIKE - ECONOMIC VALUES

(Cr\$ '106)

YEAR	WATER SUPPLYING	TELE-COMMUNICATIONS	URBANIZATION	ELECTRIC POWER	FLOOD AND CHAN-NELS CONT	SEWAGE DISPOSAL	RAILWAYS	ROADS	HARBOUR	HARBOUR TOTAL
1975	5,6	-	9,1	0,5	-	0,6	6,2	20,3	15,9	58,2
1976	8,8	1,3	13,8	7,2	2,3	0,3	5,2	10,6	10,1	59,6
1977	4,3	0,4	4,9	7,2	6,4	0,3	5,1	-	54,5	83,1
1978	4,7	0,4	4,9	7,2	6,4	8,9	5,1	-	111,1	148,7
1979	1,4	0,4	5,1	7,2	6,4	8,9	4,8	-	133,5	167,7
1980	0,6	0,4	3,7	7,2	6,4	9,3	2,6	1,0	61,9	93,1
1981	0,6	0,4	4,3	7,2	-	11,0	2,6	1,0	55,1	82,2
1982	0,3	0,4	23,9	7,2	-	0,1	2,6	-	46,9	81,4
1983	0,3	0,4	23,9	7,2	-	0,1	2,6	-	13,3	47,8
1984	1,2	0,4	24,0	7,2	-	0,1	2,1	-	13,3	48,3
1985	1,2	1,3	22,5	7,2	-	0,1	-	1,0	13,6	46,9
1986	-	0,4	18,4	-	-	0,1	-	1,0	-	19,9
1987	-	0,4	16,4	-	-	0,1	-	-	-	18,9
1988	-	0,4	17,8	-	-	0,1	-	-	-	18,3
1989	-	0,4	17,9	-	-	0,1	-	-	-	18,4
1990	-	0,4	23,3	-	-	0,1	-	-	-	23,8
1991	-	0,4	23,0	-	-	0,1	-	-	-	23,5
1992	-	0,4	22,7	-	-	0,1	-	-	-	23,2
1993	-	0,4	22,7	-	-	0,1	-	-	-	23,2
1994	-	0,4	22,7	-	-	0,1	-	-	-	23,2
1995	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-	-	-
2005	-	-	-	-	-	-	-	-	-	-

TABLE 4.11

HARBOUR INDUSTRIAL COMPLEX FOR SUAPE
COMPARISON BETWEEN COSTS AND BENEFITS

(Cr\$ 106)

YEAR	No.	UPDATING FACTOR	COSTS			BENEFITS	
			Industrial Investments	Harbour Investments and the like	Total	Current	Updated (1)
1975	0	1,000000	-	50,2	50,2	-	-
1976	1	0,922091	-	59,6	59,6	-	-
1977	2	0,826446	-	83,1	83,1	-	-
1978	3	0,751315	-	140,7	873,8	-	-
1979	4	0,683014	725,1	167,7	656,5	-	-
1980	5	0,620921	725,1	93,1	609,8	-	-
1981	6	0,564474	207,4	82,2	508,0	3 965,5	2 462,3
1982	7	0,513158	222,1	61,4	163,5	4 337,5	2 448,4
1983	8	0,466508	936,9	47,8	155,7	4 773,5	2 452,6
1984	9	0,424098	729,3	48,3	459,4	5 290,5	2 466,2
1985	10	0,385543	732,3	46,9	303,5	6 074,1	2 576,0
1986	11	0,350394	17,2	19,8	279,2	7 426,9	2 863,4
1987	12	0,316631	17,2	16,9	37,1	8 290,2	2 693,2
1988	13	0,280665	440,3	18,3	132,8	9 577,1	2 484,8
1989	14	0,263331	440,3	16,4	120,6	8 924,2	2 344,8
1990	15	0,239392	440,3	23,8	111,1	9 577,1	2 292,7
1991	16	0,217829	-	23,5	5,1	9 924,1	2 159,8
1992	17	0,197845	-	23,5	4,6	10 303,1	2 038,4
1993	18	0,179859	250,6	23,2	23,2	10 703,1	1 925,0
1994	19	0,163508	250,6	23,2	273,8	11 127,1	1 819,4
1995	20	0,148644	250,6	23,2	273,8	12 025,5	1 787,5
1996	21	0,135131	-	-	250,6	12 013,5	1 623,4
1997	22	0,122846	-	-	-	12 062,5	1 481,8
1998	23	0,111678	-	-	-	12 090,5	1 350,2
1999	24	0,101526	-	-	-	12 132,5	1 231,8
2000	25	0,092296	-	-	-	12 174,5	1 123,7
2001	26	0,083906	-	-	-	12 209,5	1 024,5
2002	27	0,076278	-	-	-	12 251,5	934,5
2003	28	0,069343	271,1	-	271,1	12 279,5	851,5
2004	29	0,063039	271,1	-	271,1	12 328,5	777,2
2005	30	0,057309	271,1	-	271,1	12 996,3	744,8
TOTAL			-	-	3 945,8	-	48 601,3

(1) Considering a 10% p.a. rate.

5.0 INSTITUTIONAL ASPECTS

5.0 INSTITUTIONAL ASPECTS

5.1 INSTITUTIONAL CONCEPTS

An analysis of the alternatives on the most adequate ju
ridical form of the organism which will implement and ad
ministrare the Suape Port Industrial Complex led to the
conclusion that a public state enterprise would be the
most indicated to start its activities . This enterprise
may afterwards be transformed into a joint venture corpo
ration , the State of Pernambuco being the biggest stock-
holder and the industries being implanted there becoming
the other share-holders .

To avoid that this corporation be subject to more than
one legal status , and to two different legislations and
require a double pole structure , two different organisms
have to be instituted : one to administrate the port sys-
tem by means of the Federal Government concession and an-
other to manage the Industrial Center .

As the Government of the state of Pernambuco holds the
concession to operate the Recife Port and since the natio
nal port policy foresees the exploitation of the ports by
a sole organism in each state , the adequate solution is
the re-ratification of the Recife Port concession contract
so that it includes Suape area . So , a new port organism
will not be considered . Suape will be a supplement to the
existing Recife port installations , both under the legal
and institutional aspect .

At the occasion of creating the enterprise that will admi
nistrare the Industrial Complex , the state of Pernambuco
is expected to promote an agreement with the Federal Govern
ment to the re-ratification of the Port of Recife concession
contract , so that the area which will hold the collective

port installations projected to Suape will also cover the concession in question, by means of its inclusion in the Recife port administration area.

The state-Industry reciprocal rights and duties will be defined in a Plot of Land Cession Commitment to the industries which will be installed around the Complex.

5.1.1 STATE-UNION RELATIONSHIP

The port and industrial complex intended will be 40 Km south of Recife port, in its jurisdictional area. Recife Port is administrated by the state of Pernambuco, under the Federal Government authority, through the DNPVN (National Department of Ports and Navigable Routes).

The basic factors which generated this Industrial Complex are:

- a) facilities resulting from the Suape's physical conditions, in contraposition with the port of Recife expansion difficulties;
- b) port facilities for the industries that are being implanted there;
- c) these port facilities will consist mainly of private terminals.

As a consequence of these factors Suape Complex is considered as the sum of the private terminals and a port area for public use, complementing Recife Port, when Suape becomes more convenient than the expensive alterations in the installations of Recife Port.

The specialized private terminals will be destined to the turn over of increment or products from the industries installed at the local and the collective quay, to the servicing to the users, the size and nature of which do not justify the im-

plantation and operation of the private terminal .

COINCIDENCE OF DIPER / PORT OF RECIFE INTERESTS

The carrying of Suape is promoted by DIPER - Cia de Desenvolvimento Industrial de Pernambuco (DIPER- Pernambuco Industrial Development Co.) which is also an organism of the state of Pernambuco Government .

The fact that DIPER belongs to the port of Recife concessionaire dismisses interests conflicts , making it possible the coexistence of the Port of Recife and Suape . This coexistence will give to the state of Pernambuco port alternatives and will permit a rational exploitation of both ports, with better results .

ALTERNATIVES TO INSTITUTIONALIZATION

Three alternatives to institutionalization have been studied.

ALTERNATIVE 1

Suape installations would be an extension to the Recife Administrative Area .

This solution was dismissed because it would comprehend without port distinction , which by itself is a contradiction to the law's spirits .

ALTERNATIVE 2

To institute a port administration dissociated of the Recife Port .

This hypothesis has not been adopted either , once it is contrary to the Port policy , which recommends the exploitation of the ports, terminals and navigable routes by multiple-concern companies corporations , only one for each state..

ALTERNATIVE 3

ALTERNATIVE 3

Re- ractify the Port of Recife concession contract , so that it includes Suape area .

This is the solution recommended to the establishment of the port administration , because it allows for a large number of advantages . As the state of Pernambuco holds the Port of Recife concession and is the promotor of Suape enterprise , the conflict of interests is avoided. The establishment of two entities at the same state to exploit the ports becomes unnecessary . Not taking into account a new port organism Suape will be a legal and institutional supplement to the existing installations of Recife Port , which will be agreed upon under the terms of the rectified and ratified contract .

The situation will be similar to that of the state which held two or more ports which are incorporated into a single multiple-concern corporation . There will be only one port administration , however the services will be processed at two or more places . This alternative will allow the Government , when it is deemed it convenient , to establish the Companhia Docas de Pernambuco (Pernambuco Docks Company) , a multiple-concern corporation , having both the Union and the state of Pernambuco as shareholders , through the managing organism of the Industrial Complex of Suape , which , by its turn , will also be able to become a multiple-concern corporation , the industries installed there being its shareholders .

5.1.2 STATE - INDUSTRY RELATIONSHIP

Participation of the state of Pernambuco

It will be incumbent upon the state of Pernambuco to build, at the port Complex , to ensure the operation at the port installations : canals , and evolution basins , protection and shelter works , road and railway access , other infrastructure works , as power , water supply , sewage system,

etc .

The state of Pernambuco will cede to the industries which implant at the Complex , the areas and stretches of the wet perimeter necessary to the implantation of the respective private terminals .

Participation of the Users

The following will be incumbent upon the industries implanting at Suape :

- to make arrangements , by means of the managing organism of the Industrial Complex , in order to obtain approval for the project of the private terminal;
- to obtain from the Transport Ministry the authorization to operate the private terminal;
- to build the private terminal .

The enterprise will build its manufacturing installations and the private terminal , in accordance with the Directing Plan approved by the state of Pernambuco to Suape .

Cession of Plots of Land

The state of Pernambuco will cede for use and for profits the stretches of land earmarked to the implantation of the industry , fixing a time limit for the construction thereof to initiate .

By means of the managing organism of the Industrial Complex , the state of Pernambuco will receive in compensation the port facilities and the infra-structure provided the payment of the just value of the plots of lands in shares of the industries . So , the state will have a substantial capital represented by : shares of the enterprises that install there ; investments and infra-structure .

Responsibility of the state as the entrepreneur

The state of Pernambuco will constitute a public enterprise to implement the works of the Industrial Complex. This public enterprise can be turned into a multiple - concern company , the state of Pernambuco becoming the major shareholder , the industries which will be implanted at Suape acquiring the remaining shares . .

So the state of Pernambuco will be the big entrepreneur with the following responsibilities :

- a) to obtain from the Federal Government the grant to take the necessary steps to the implantation of the Complex .
- b) to arrange local and external resources at the appropriate time , to guarantee the evolution of the enterprise .
- c) to coordinate all arrangements so that they are throughly finished .

5.1.3 FULFILLMENT OF NATIONAL POLICIES

The national port policy foresees the constitution of the Companhia Docas de Pernambuco , as the only organism to manage the port activities in the state . The legal form of administrating the Suape port installations .

Which was proposed will permit the Federal Government to institute this enterprise , when deem it convenient .

The Companhia Docas de Pernambuco can be a joint venture corporation with share partnership of the Union and the state of Pernambuco , by means of the managing organism of the Industrial Complex . This , for its turn , is expected at this time to be constituted as a joint venture , with the participation of the industries implanted at Suape .

In this way, the port installations of Recife and Suape will unite in compliance with national policies .

The authorization for the private terminal to be instituted is government by the decree-law nº 5 , of 4th April , 1966 , the sole purpose of which was to provide a reduction to the costs so as to facilitate the exported merchandises and to put them in a position to be internationally competitive .

The institutional concept of Industrial Port Complex at Suape corresponds to the Federal Government firm belief, expressed by the Decree-Law 83/66 , that the organized port will in the future handle exclusively general cargo merchandises , as a consequence of the construction exploitation of private terminal and embarking bases earmarked to handle solid and liquid bulk cargoes .

5.2 MANAGING ORGANISM TO THE INDUSTRIAL COMPLEX

5.2.1 CHARACTERISTICS OF THE ENTERPRISE

The Suape complex comprises basically a Port making an articulation with an Industrial Center .

The Industrial Center comprises :

- a) an urban organization with a market industrial purpose ;
- b) appropriate administration ;
- c) typical structure ;
- d) specific management .

The port and the Industrial Complex complement each other . One justifies and requires the other . So neither has a reason of existing separated . That is the reason for the convened name Port - Industry Complex . The two works complement themselves physically , in the idea and in their economical end-use .

A legal distinction , however , occurs because there are two activities governed by different legislations .

There exists a de facto situation created by Decree-2845 of the Government of the state of Pernambuco, which who referred to as a public welfare , for disappropriation purposes : lands , improvements , public services and possible reights over the area . This decree gives birth to the first . over the area . This decree gives birth to the first figures , entertains rights and obligations and gives way to the first rules .

The nature of the works will be distinguished as follows :

a) area earmarked to the port enterprise is the shoreline (beaches and plots of lands owned by the Navy) increased by occasional alodial terrain (real state free of dispute , pensions and onuses)

b) area earmarked to the Industrial Complex - it is the remaining area , which is the most extensive and is of private ownership .

FEDERAL PARTICIPATION

The use of beaches (assets of general use) and the Navy's plot of lands (Union's assets & ownership) implies the Federal Government's ownership . These plots of lands cannot be expropriated by the Government , as far as the direct ownership is concerned . That is , they cannot be expropriated by the Government as to the direct ownership (nude ownership) but can be expropriated for useful ownership (use , ownership) . It is necessary the federal consent to the utilization of these plots of lands .

PLOTS OF LANDS AND ASSETS OF THE ORGANISM

No matter what is the legal model for the state organism which comes to manage the Complex of Suape enterprise , the organism will never be the ground owner , for these reasons :

a) that ground is not subject to acquisition under the usual basis ;

b) the donation to the state , by federal law , would be to pattern , under condition ;

c) it would be a re-salvable ownership , committed to the port activity .

d) it would be integral part of the port system , sub-
jected to the concession legal regime .

e) as the concession finishes , this ownership reverts
to the Union ;

f) the organism this way cannot be owner , being only
user of the plots of land strictly earmarked to the port
system ;

g) Union assets & Ownership will therefore also be the
additions , the reclaimed lands and other areas taken
out of the sea , even when these are aggregated to the
port installations ;

i) the additions cannot be part integrating of the state
property , either .

Every and any investment in port works , according to
the concession regime , will be incorporated to the system,
and becomes property of the Union .

NEED FOR TWO ORGANISMS

So , it is necessary to institute two distinct organisms
to manage the port system by means of the Government
concession and to manage the Industrial Center .

With the creation of two organisms , hypertrophy will be
avoided , and greater flexibility will be attained whereas
the property under the state together with their autonomy
will be exempted from reverting the port system assets to
the Union , such flexibility will thus compensate the ef-
fectiveness of the performance intended with the juridi-
cal unit .

It would be possible for a single organism to exert owner-
ship to the future services in the port and concurrently
take over the management of the Industrial Complex , but
it would face the following inconveniences :

It would need the federal Government authorization ,
would become subjected to a number of Juridical si-
tuation and to two different legislations and would
have to constitute a bi-polo formation .

5.2.2 LEGAL DEFINITION OF THE ORGANISM

According to the nature of the activity , the Complex comprises :

- a) construction , installation and exploitation of port facilities ;
- b) construction and administration of an Industrial Center.

As to political jurisdiction , the Industrial Center will occupy a ground belonging to Igarapé and Ipojuca Municipies .

The matter covers interests in the local (Municipies) , regional (state of Pernambuco) and national (Union) .

The installation and operation of the Industrial Complex will imply in ground territory planning and the issuance of urbanism norms . The constitutional system dividesthe power on urbanism among three nuclei : Union , State , and Municipie .

URBANISM COMPETENCE

The creating of the Industrial Complex implies in a physical and territorial planning of the ground . Urbanism has an ample meaning and coprises a social and physical planning of the territory . The competence to dispose on urbanism comprises :

- a) Union
 - Elaboration of the Urbanism National Plan
 - General Urbanism Rules
- b) State
 - State Urban Plan
 - Regional Urbanism Norms , which complete the general norms .
- c) Municipio
 - Norms on the territorial ordination , contained in the Master Plan .

COMPETENCE TO INSTITUTE

The state of Pernambuco is empowered , according to institutional precepts , to institute and administer the complex .

The only infra- state organisms with competence originally gained , through the Federal Constitution , are the Union , the state and the municipe . For not having power , originally gained , the Complex has no autonomous expression with juridical and political personality with specific attributions . Therefore , it has no self - determination on the juridical plan .

As a consequence , it will have the juridical form and the assignment , which the instituting organisms gives to is . The instituting organism , the state of Pernambuco is the one that originally has power to administer the Industrial Complex .

5.2.3 COMPLEX ADMINISTRATION AND URBANISM

The administration of the Complex involves the matter urbanism . Its object will be public services and not only economical activity . It will require the planning of the ground occupation . Norms on the construction in general and norms on the arrangement of the urban duster will be performed there , as the water supply , sewage system , urban cleaning, and environement protection and so on .

The Complex will hed major installations at Recife Metropolitan Region . The common services in the Metropolitan Region Area may be granted to metropolitan enterprise or to other state organism that is established by agreement . The common services in the Metropolitan Region , subject to unification according to legislation are the following : integrated plan-

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ning of economical and social development ; basic sanitation ; notably water supply ; sewage system and public service care ; use of the metropolitan ground ; transportation and route system ; production and distribution of flammable gas piped ; hybrid resources utilization and environment pollution control ; other services included in the area under the responsibility of the Deliberating Council of the Metropolitan Region by Federal law ,

URBANIZATION PROCESS AND POWER TO ZONING

The state of Pernambuco will adopt a given strategy as to the juridical aspect related to urbanization process and power to zoning .

The initial measure will be the limiting in the area of the urban sector , comprising industrial , commercial , port and residential areas as well as the rural sector .

To start the urbanization process , a patch in the ground will be earmarked to be the urban nucleus of the enterprise. So , the patch in the ground in question will be kept for urban purposes . All the neighboring areas will automatically be converted into an " expansion urban area " .

As a consequence , the urban requirements will have an influence over the area . In this way , the owner's adhesion to the Master Plan , regarding the urban growth . The state of Pernambuco gains power to zoning . If the owner does not adhere to the Master Plan , the state of Pernambuco may appropriate to expand the urban sector .

This policy overcomes the problem of the Union having sole power to rural zoning .

In creating the organism that will administer the Industrial Complex , the state of Pernambuco will:

- a) grant to this organism the performance of services which may be carried out directly by this or through other organisms , by means of convention , contracts agreements ;
- b) harmonize through the Deliberating Council of Recife Metropolitan Region , the Master Plan of the Industrial Complex , the norms on general construction and the lay out of the urban to be formed .

5.2.4. REASON FOR A PUBLIC ENTERPRISE

The state of Pernambuco will enact a law , instituting Suape Industrial Complex , wherein :

- a) objectives will be fixed ;
- b) zoning will be established ;
- c) powers are stated ;
- d) assignments are distributed .

At the same law a public state enterprise will be created with the purpose of implanting and administering the Industrial Complex .

The presence of the state in the public activity does not make it necessarily of public interest . At the same time, the consideration as to public service should not be disregarded when exerted by a private concern .

The juridical regime clarifies the public nature of the service. The public concern is gifted with power, sovereignty prerogatives and is not subject to any acts originating from either party.

The Industrial Complex activity holds objectives which are not covered by a juridical regime on private right. So, a juridical regime contemplating the public objectives intended will be considered.

The patterns of indirect administration in Brazil are :

Government enterprise, multiple concern, public enterprise and foundation.

Of these, the public enterprise is conceived to exploit economical activity-which the state is led to exert on the force of contingency or administrative convenience -conferring to it an undeniably public purpose.

The public enterprise is given a public service which not be typical in Public Administration and which results from of the state faculty of being converted in entrepreneur to better attain its objective. In the multiple-concern, the state acts as a private party, which does not harmonize with the Public Rights instruments.

The state of Pernambuco may choose among any of indirect administration forms to administer Suape Industrial Complex. The public enterprise or the multiple concern would be the most proper forms. However, at the instituting phase there will be no sizeable private capital participating in the undertaking, the public enterprise being recommended for this occasion. In the future, the public enterprise may be converted into a multiple concern, if indispensable to absorb private investments.

5.2.5

ORGANIZATION MODEL

Legal and institutional reasons determine the existence of two organisms :

- a) organism directing the Industrial Complex ;
- b) organism administering the port installations ;

At the implanting phase it will be incumbent upon the organism directing the Industrial Complex the responsibility for the carrying out of strictly port related projects, to be delivered later on to the responsibility of the port authority .

In the organization plan , in order that the enterprise may obtain the necessary flexibility , it will adopt the administration by projects technique , in a headoffice - wise structure, giving way to the continuous re-handling of human , material and financial means , as well the fast creation and extinction of hired man-power .

The organization model is conditional upon the methodology selected to the project development. Each phase of the implantation and of the bringing into operation will be characterized by specific emphasis on a different objective .

PROJECT MODALITY OF PROJECT AND CONSEQUENCES IN THE ORGANIZATION OF THE ORGANISM

The port is the polarizing element of the development to occur. So , the sizeability of the port and the implantation program may be revised as :

- a) the enterprises will commit themselves with the implantation of the industrial units in the area .

- b) the port base be implanted ;
- c) that the overall infra- structure of the Complex be implanted .

This will become a back-feeding device .

The modulated solutions will be given the preference in respect of the Port and the physical and territorial planning of the Complex .

As a consequence of this modulation in the project , it is not immediately foreseeable the existence of a definitive and stable organizing architecture . At the same time , it is not possible to demand for a preliminar definition of the pattern of organization . The implantation of the Complex and of the Port is required at short terms . The task calls for a nuclear structural device provided with strong executing capacity .

The organism in charge of the Complex will thus have an administering structure capable of , gradually , relocating its gravity center into :

- a) Implanting the Port and the infra-structure;
- b) Processing the occupation of the area by the industries, auxiliary services and urban installations ;
- c) Activities for maintenance of the Complex .

These three stages are not to be separated . The demands for the three stages over the organizing scheme will vary in amounts and in the way they are dealt with .

The required flexibility is not easy to find in the traditional models of administration dealing with maintaining consolidated undertakings .

The recommended model of administering through a head-office structure is intended to meet the conditions required for constituting the organism which will be in charge of the Complex . The basic end for such structure is the project , it being that there may be as many projects as they are required , with no inflationary risks to the permanent structure , solely constituted of operating organisms and macro-units , corresponding to the first stage and to homogeneous grouping ; and in the second stage , to groups of maintenance units . These macro-units will keep their ample operational flexibility internally , without the roughening of hard structure or the formation of long chains of raking authority.

The organization , through projects , proposed for the activities charged with the operation , comprises a set of transitory structural devices for attaining the specific purposes . During the carrying out of the project the Manager will avail himself of all means placed at his disposal by the functional Department (personnel ; equipments , installations , financial resources , etc.). Upon completion of the works , the structure will be undone , the remnants thereof being put to other uses . Large undertakings will be avoided as well as the social charges , thus the utilization of temporary labour , leasing of machines and equipment and contracted jobs will be put into practise.

The transitory units will coexist , in the future , as permanent units , which will be created for administering those services which will characterize themselves by the need in which they are presented .

b) Privately occupied

- b.1 - In case of use of a state Property by a given party , the state may expropriate such rights (possession and improvements) .
- b.2 - When such occupation is duly legalized at the SPU , the state may indemnify such improvements.
- b.3 - The occupation being unlawful (with no registry at SPU) eviction may apply .

DOMINIAL LANDS

A dominial land is that over which domain is applicable fully , e.g.: when all rights by consequence of or originated in the ownership are found together in a single person . The state-member cannot expropriate the dominial rights from the Union from federal organisms , multiple-concern companies , etc. However, there may be agreements aiming at exchanging , buying , passing or adherence to the Plants of the state of Pernambuco .

As for the state dominial lands , the Government of Pernambuco may stipulate whatever use as it may deem fit .

The municipal dominial lands existing in the area may be expropriated by the state of Pernambuco . The state may also provide that the municipality will adhere to the undertaking of the Complex , through the allotment as to the use of the metropolitan ground , which is incumbent upon the Conselho Deliberativo da Região Metropolitana .

PRIVATELY - OWNED ESTATES

About two thirds of the area where the Complex will locate are private property , where the " plantation " is outstanding with its four sugar plants .

There are the mortgaged estates and bound to other onuses .

but the law provides the title to ownership as long as the creditors apply their credit with the sum deposited by the state as an indemnity to the expropriation .

The expropriations may be gradual , and made according to the requirements shown by the Complex .

Some of the lands will only be provided with services (pipe lines , passageways) etc, with no expropriation being needed , and with no indemnities , the improvements may be obstructed sometimes .

POWER FOR EXPROPRIATING

The law 4.132/62 defines seven cases of expropriation for the sake of common benefits , and not just as an exclusive device for land reform . The state Decree on utility declaration and public necessity for expropriating does not collide with the declaratory federal decree of the priority zone intended for land reform .

The Presidential decree is not a preliminary act of expropriation . It is a warning that the rural property may be eventually expropriated if a form of exploitation socially beneficial is not given to it .

The state member may expropriate rural realstate with basis on the public interest for carrying out a service or work comprised within its jurisdictional area . The state member may not expropriate the rural realstate for land reform purposes .

The state member will not alter the economical destination of the property for land reform purposes . It will simply expropriate the rural realstate for carrying out the service or work of public interest , within its jurisdictional area .

It is not important to define whether the expropriation is of public utility, public necessity or social interests. The important is to determine, as it has been done by the state decree, that the state of Pernambuco has envisaged the public interests for effecting the expropriations. The expropriations may be effected with basis on Decree-Law no. 3365/41, the article 5th of which contemplates an ample range of "cases of public utility" which makes ends meet with the necessity of Suape Project.

RESALE OF LANDS

The party from whom the property is expropriated is not concerned with the fate given to the land by the Public power. The basis should be that the realstate be expropriated for the sake of public interests, and that, after completion of the works, as a consequence of which the property may have increased its value, the realstate be still kept for the purpose of said public interest.

Save this relationship, it will be possible to place the area integrating the Complex to resale.

The expropriation may extend to the lands adjoining that one in which the works will be carried out:

- a) when deemed necessary to the development of the work (expropriation of contiguous area);
- b) when the execution of the job entails an extraordinary valuation of the adjacent lands (expropriation of extraordinarily valued zones).

The expropriation of the adjacent lands may be intended both for the integral and satisfactory execution of the plans of public works and for facilitating the amortization of the large amounts spent by the state, through the re-sale of the lands so acquired.

5.3 ACCESS TO THE LAND

The state of Pernambuco possesses legal means for the access to the land intended for the Suape Port Industrial Complex .

The current legislation allows the state to obtain the grant for using the lands owned by the Union , dispose of the lands owned by the state in whatever manner , maintain a discipline through the Administration of the Metropolitan Area as regards the use of lands owned by the country or take them away through special laws and expropriate and place for resale the privately-owned lands .

JURIDICAL SITUATION OF THE NAVY LANDS

Within the area intended for the implantation of the Suape Complex there are beaches (public asset for common use) and lands belonging to the Navy (public assets owned by the Union) .

These lands can not be expropriated as far as the ownership and title are concerned . Their utilizability , use and possession may be expropriated by the state . All improvements are also to be under this liability , and the assets to the Union and their organism are not for expropriating utilizable domain and improvements made , the state of Pernambuco needs the concession of the Serviço de Patrimônio da União:

The state of Pernambuco may request that the Union bestows the Navy's lands , it being indispensable to indicate the end use being envisaged .

The Navy lands may be occupied by the state , through different solutions for each juridical situation :

- a) occupied by a Federal Public Service
- through agreements between the Governments ;

