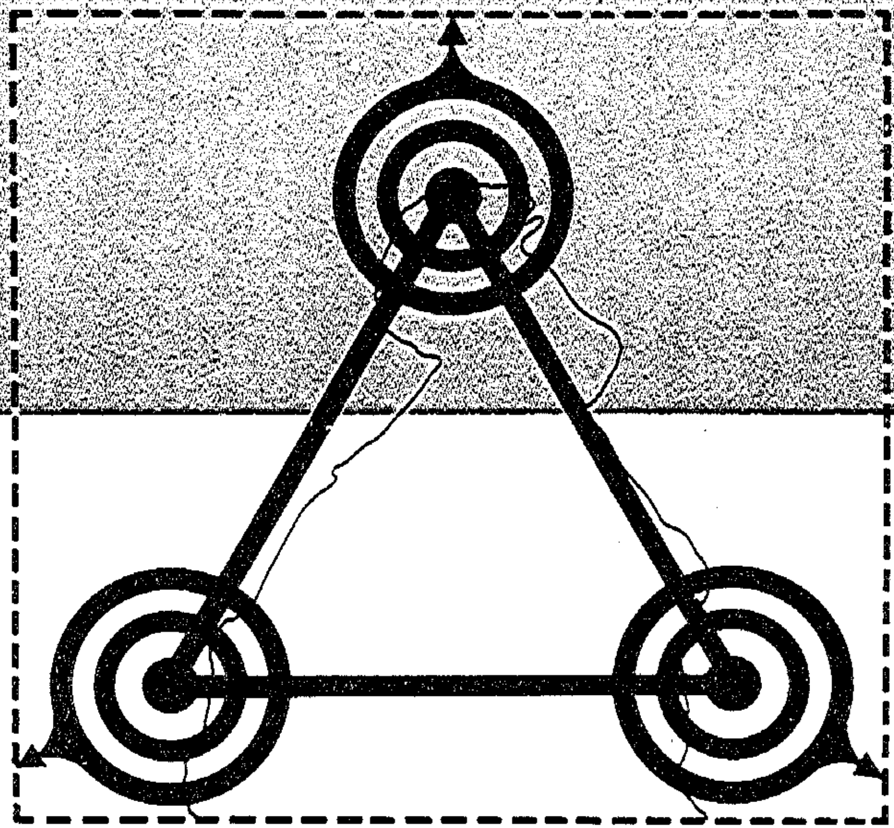
No. 7

STUDY ON THE DEVELOPMENT PLAN OF SUEZ BAY COASTAL AREA

IN THE ARAB REPUBLIC OF EGYPT



社会開発協力部報告書

FINAL REPORT

STUDY ON
THE DEVELOPMENT PLAN OF
SUEZ BAY COASTAL AREA
IN THE ARAB REPUBLIC OF EGYPT

JULY 1986

VOL. III SHORT-TERM PLAN

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1. Short-term Development Plan

1.1 Development Schedule

The target year of the short-term development is set as 1995 in the agreement between the Egyptian Committee and the Study Team. The port and industrial activities will begin to operate stage by stage and are expected to achieve the development target in 1995.

The stage construction plan is set as shown in Table 1.1.1, and the plan is outlined below:

PORT AREA:
- o The fishing port will be completed to accomodate the fishing boats which presently moor along the coast in areas which are to be used for port facilities before the construction of these facilities begins.
- o The urgently needed grain terminal and bulk cargo berths in Ataqa are implemented first. Bulk berths will start operations in 1990 and the grain terminal will start operations in 1991.
- o The coal terminal will start operations in 1992.
- o The multi-purpose berths will start operations in 1993.

IE, IFZ:
- o In order to make the investment as even as possible, the construction works of the IE and IFZ are divided into 3 stages and 2 stages, respectively.
- o Development stages are in accordance with the development of the port facilities.
- o The IE and IFZ are constructed in such a way that those industries which are more likely to locate can locate earlier.

URBAN AREA:
- o The urban area is developed to accommodate workers with residences and utilities to meet their growing demand along with the operation of additional industries in each stage.

UTILITIES:
- o Utilities are developed to meet the projected demand of the port, industries and residents in each stage.

Table 1.1.1 Phasing of the Short-term Plan

Items	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96
Investigation/Tendering	=======	===								
PORT AREA										
Dredging & Reclamation		===	=======	=======						
Fishery Port			=======	****S						
Bulk Cargo Terminal			=======	======***	S					
Grain Terminal		===	=======	********	++++++	S				
Coal Terminal					=======	***++++	S			
Multi-purpose Berth							======*	S		
INDUSTRIAL ESTATE										
Stage 1: Food, Cement, etc.			=======	=======	)))))))))	S				
Stage 2: Food					=======	=======	)))))))))	S		
Stage 3: Chemicals, Ceramics, etc.							=======	=======	)))))))))	S
INDUSTRIAL FREE ZONE										
Stage 1: Machinery			=======	=======	)))))))))	S				
Stage 2: Machinery, etc.					=======	=======	)))))))))	S		
URBAN DEVELOPMENT										
District A							=======	=======	++++++	S
District B			=======	=======	++++++	S				
OTHER INFRASTRUCTURES										
Railways					=======	=======				
Trunk Roads			=======	=======	=======	=======				
Water Supply			=======	=======	=======	=======	=======	=======		
Sewerage			=======	=======	=======	=======	=======	=======		
Electricity			=======	=======	=======					

Legend:
- ======= Fundamental Facilities
- ******* Buildings
- +++++++ Equipment
-))))))))) Factories
- S Starting Time of Operation

1.2 Sectoral Plan of the Development

1.2.1 Industrial Development in Ataqa

(1) General Conditions of the Area

The site is located about 12 km south from Suez City along the Suez-Ain Sukhna Road. A railroad runs parallel to the road on the shore side and connects the area with Cairo via Suez. Utility lines such as water mains, sewerage and gas and oil lines also run in between the road and the railroad. There are several large industrial facilities i.e., a power plant, a fertilizer plant, a textile mill and a glass bottle plant, about 2 km north from the northern edge of the proposed industrial estate. In addition, the Red Sea Fishery Resource Research Center sponsored by FAO was built recently. The Ataqa Fishery Port is located just south of the planned grain terminal. On the west side, high voltage transmission lines run from north to south about 400 to 600 meters apart from the road.

(2) Planning Policies

The followings are the major planning policies.

- o Creation of attractive physical facilities to encourage industrial investment by the private sector including foreign investors.
- o Avoiding unnecessarily expensive development costs of industrial infrastructures from scattered and random industrial development.
- o Functional linkage with the development of Suez City.
- o Removal of existing facilities to be kept to a minimum.
- o Future expansion to be linked with the short-term development.

Based on the above policies, it is proposed to develop an industrial estate with the following scale and types of industry.

Types of industry	: Food, Textiles, Apparel, Non-metallic Minerals, Metal Products
Employment	: Around 14,000
Land	: Around 310 ha (net), 400 ha (gross)

(3) Proposed Strategic Project

Among the industrial estate industries, the food processing complex is especially promising considering the possible location of a grain terminal at Ataqa. The potential food processing complex is illustrated in Fig. 1.2.1.

A model plan of the food processing complex based on the information given by the MOSHT is shown in Fig. 1.2.2. The estimation of factory area was made on the assumption that the flour mill and macaroni factory will operate 24 hours a day and the feed mill will operate 8 hours a day.

(4) Layout Plan of the Industrial Estate

The industrial estate is layed out considering the type of cargoes transported to and from factories, pollutants from factories, and lot size.

General Idea of Layout by Type of Industry: Basic metal industries which use large trucks for cargo transportation should be located along the major roads in the estate. Basic metal industries which might cause pollution like noise should be separated from other enterprises.

The labour-intensive consumer-related industries should locate near the center facility of the estate to provide convenient access to public transportation. The food processing industries proposed by MOSHT should be located in the area adjacent to the silos to allow functional linkage between the two facilities. The area behind the coal terminal is appropriate for the location of building materials industries which are less influenced by the dust from the coal terminal.

General Layout by Size of Factory Lot: The required size of factory lots depends on the type of industry and scale of production. Therefore, it is necessary to provide investors with lots that are flexible enough to comply with various size requirements.

Based on the types of industries selected, the required size of lot per establishment was analyzed, and it seems that about 35% of all the establishments require lots between 1 ha and 2 ha and about 80% of the firms require lots between 0.5 ha and 5 ha. (See Fig. 1.2.4)

To meet the size requirements, it is necessary to set a standard lot size which is highly flexible. The standard size is set as 200 m x 150 m of frontage along the secondary roads within the estate. The area of the standard lot is 3 ha which can be subdivided into 2 lots by dividing the frontage or the depth, and further subdivided into smaller lots if necessary. (See Fig. 1.2.5)

To meet the requirement for larger size lots, some districts will be planned for large factories.

Location of industry by size of lot is shown in Fig. 1.2.6.

Fig. 1.2.1 Food Processing Complex

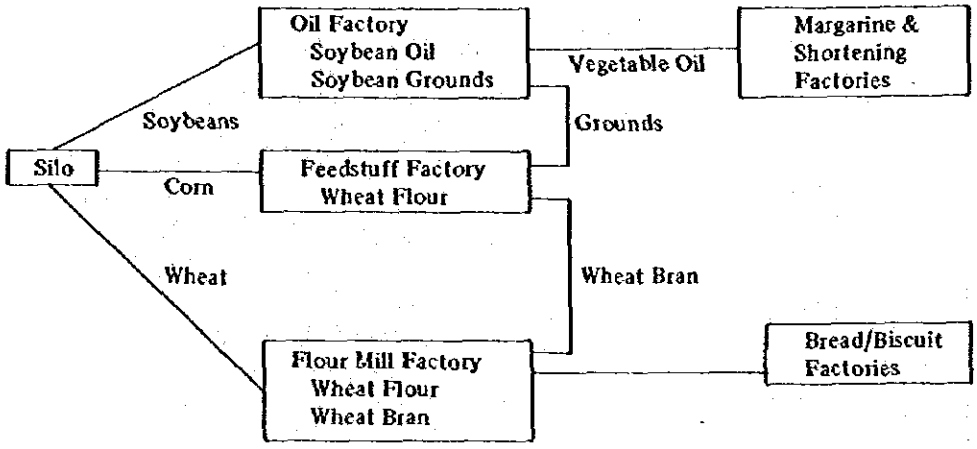


Fig. 1.2.2 General Layout Plan of the Food Processing Complex

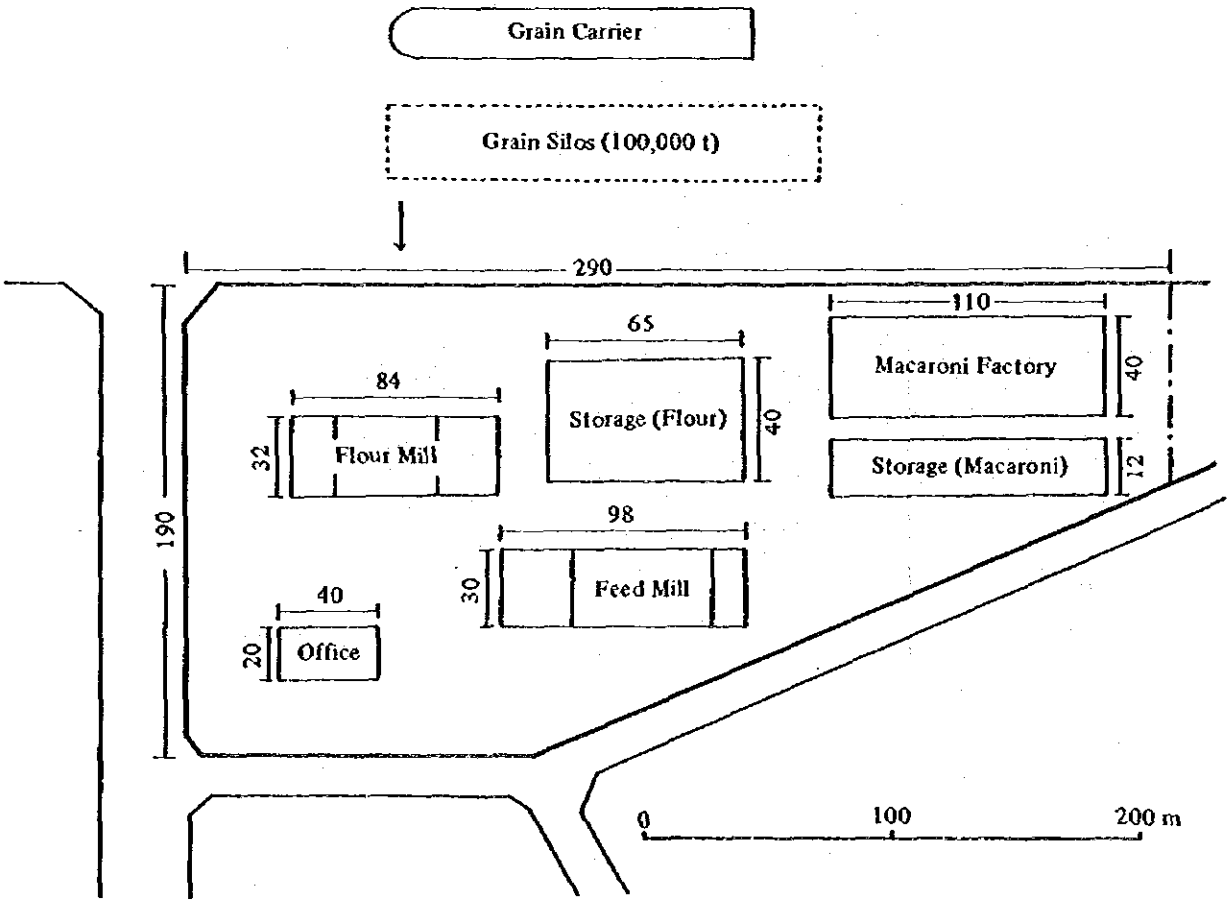


Fig. 1.2.3 General Layout in Ataqa Industrial Estate

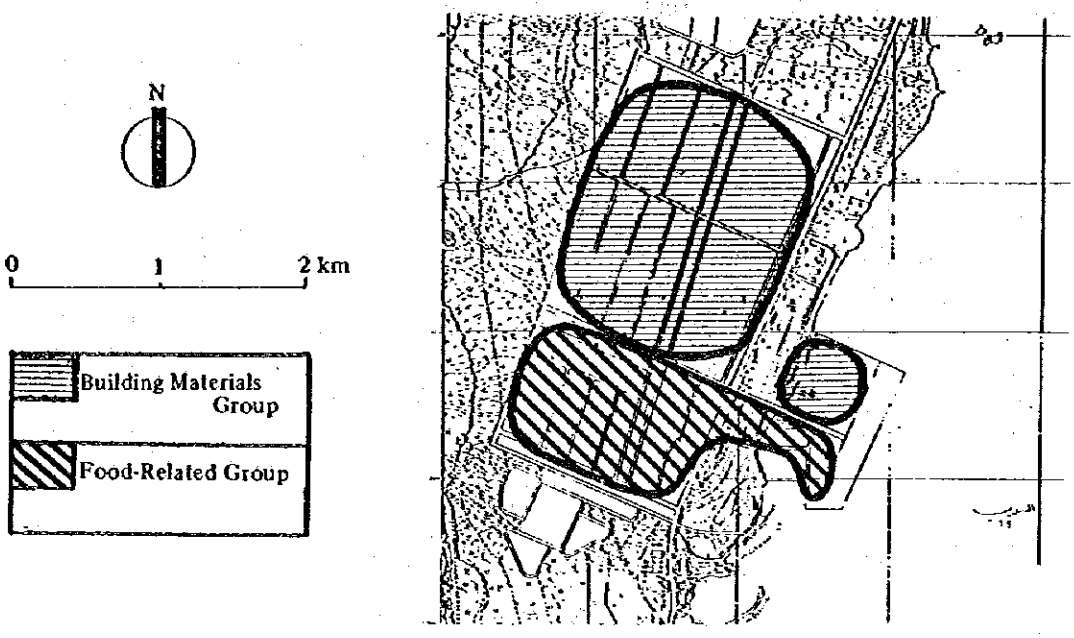


Fig. 1.2.4 Distribution of the Lot Size of Factories in Ataqa Industrial Estate

Factory Size	% of Total Number of Factories
Less than 0.5	5.70
0.5 ~ 1.0	19.00
1.0 ~ 2.0	35.20
2.0 ~ 5.0	27.00
5.0 ~ 10.0	7.00
10.0 ~ 20.0	0.90
20.0 ~ 50.0	3.80
50.0 and Over	1.30

Fig. 1.2.5 Standard Factory Lot

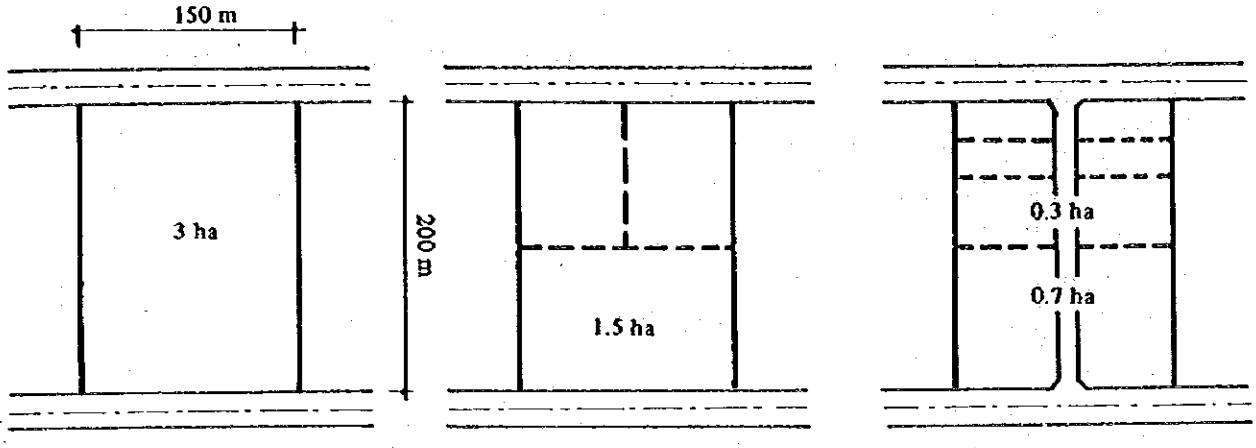
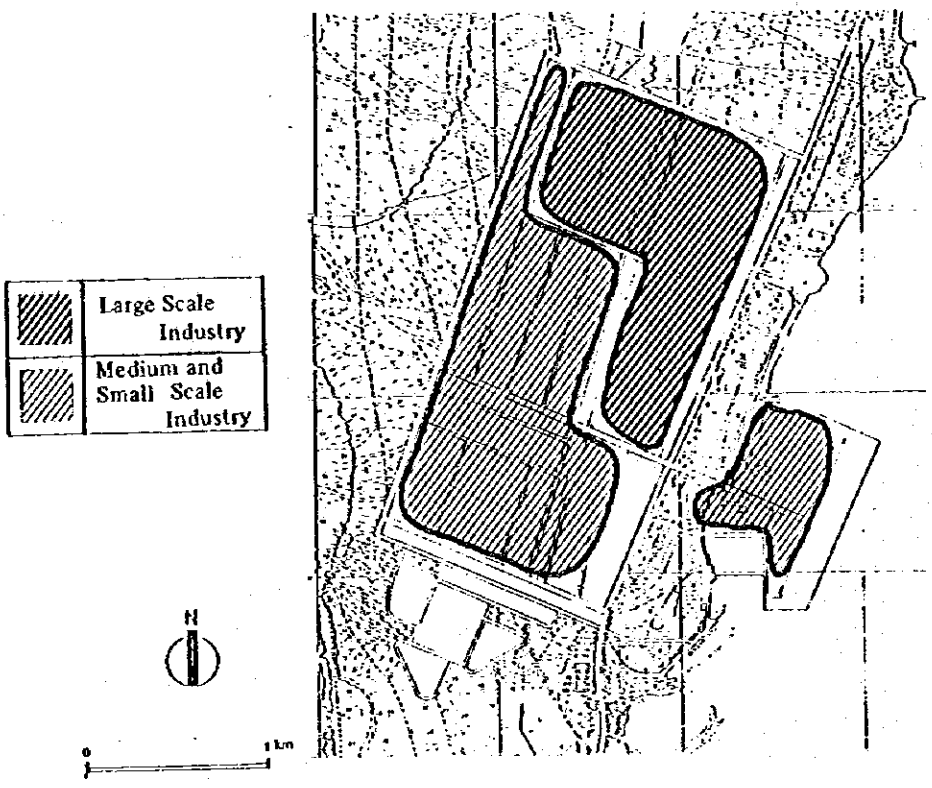


Fig. 1.2.6 General Layout by Size of Factory Lot in Ataqa Industrial Estate



Common Facilities and Their Layout: Common facilities are designed to support various activities which take place in industrial estates, and the type and level of the facilities largely influence the attractiveness of the industrial estate from the business point of view. Common facilities can be classified into the following types by function.

- o Administrative service facilities
  Estate management office, site office of other governmental agencies including police and fire stations
- o Business service facilities
  Commercial space for offices (banks, insurance, shipping and forwarding companies, etc.), shops, restaurants, warehouses
- o Utility service facilities
  Power ubstation, water treatment plant, sewerage treatment facilities, post and telecommunications center, gas station, etc.
- o Transportation facilities
  Bus terminal, bus stops, parking lots, car maintenance shops
- o Workers' welfare facilities
  Clinics, catering facilities, mosque, church, sport gardens, greens and parks
- o Training facilities
  Training room, meeting room, library, etc.

For the short-term plan, two center facilities are planned. Center facilities comprise a central building, police and fire station, religious facilities and parks and greens. The central building offers the administrative services of the industrial estate and provides office space for traders, banks, insurance companies, etc., commercial space for restaurants, cafeterias and shops, and welfare space for a clinic, a library and meeting rooms. One is located on the mountain side along the arterial road connecting the area with Ataqa Port and its planned total floor area is estimated at 4,400 m^2 which includes the central building, police and fire stations and religious facilities.

Another one is located on the shore side behind the coal terminal, and its total floor space is estimated at 2,750 m^2.

The area required for the sewerage treatment plant and power substation is estimated at 20 ha.

Fig. 1.2.7 General Layout by Type of Industry in Ataqa Industrial Estate

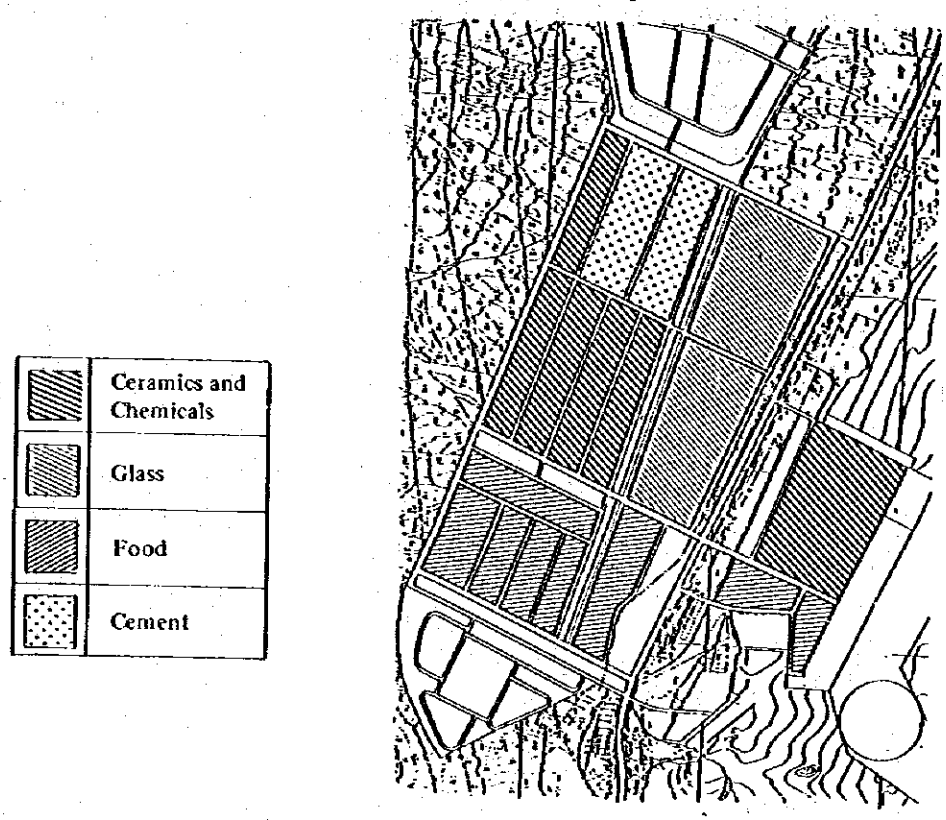
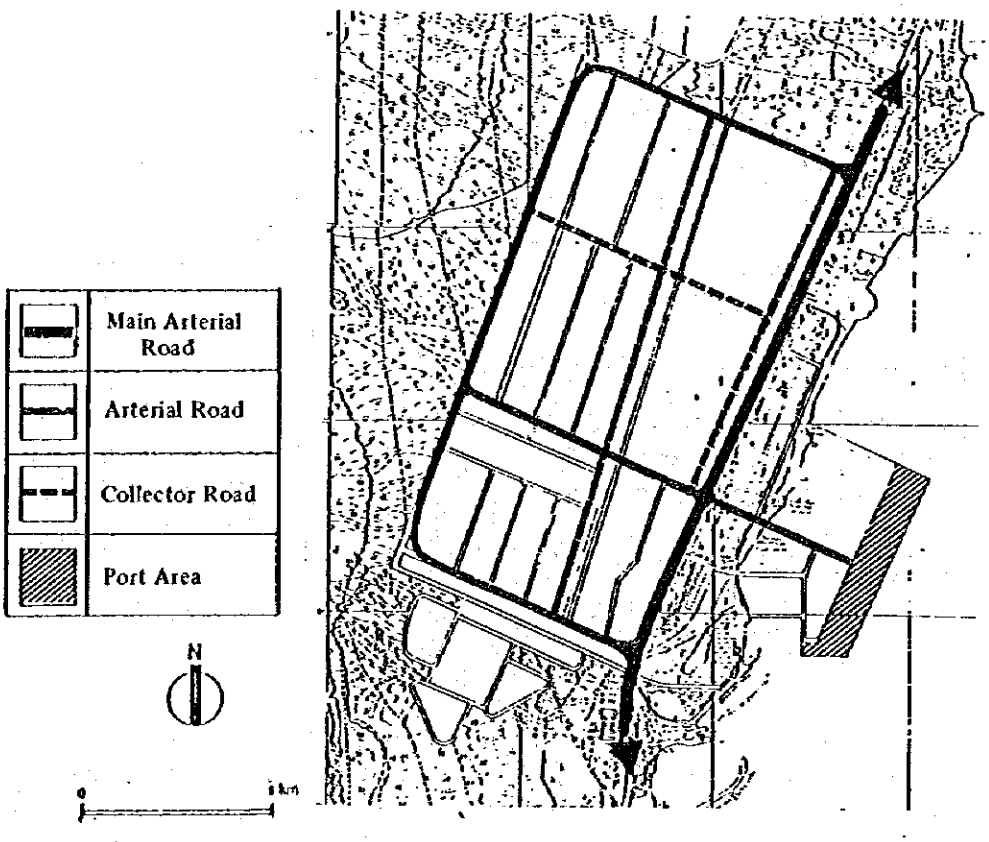


Fig. 1.2.8 Road Network in Ataqa



Road Network in and around the Estate: The only existing road in the Ataqa district is the Suez-Ain Sukhna Road with two lanes of carriageway. The road divides the estate into two parts, namely the shore side and the mountain side.

The road connecting these two parts across the Suez-Ain Sukhna Road is the main arterial road of this estate.

Fig. 1.2.8 shows the road network composed of arterial, collector and feeder roads. The arterial road is 35 meters wide which includes wide pedestrian ways and a landscaped center island. The collector roads are 25 and 21 meters in width and the feeder roads are 18 meters in width.

(5) Land Use Plan and Outline of the Short-term Development of the Ataqa Industrial Estate

Fig. 1.2.9 shows the land use plan of the Ataqa industrial estate in 1995. The total developed area is approximately 400 ha which includes 310 ha of net factory lots. Housing for the workers is proposed separately, but the scale of development covers a part of the requirement. Accordingly, the majority of workers are planned to commute from Suez City. Table 1.2.1 shows an outline of the target industrial development in Ataqa in 1995.

Table 1.2.1 Outline of the Targeted Industrial Development in Ataqa, 1995

Types of Industries	Consumer-Related and Basic Materials Groups
Number of Factories	About 70 Factories Expected
Net Area for Factories	About 310 ha
Expected Employment	About 14,000
Expected Output	About 203 million LE
Water Consumption	About 40,300 tons per day (Avg. day)
Cargo Input and Output	Input : About 4,400,000 tons per year Output: About 4,600,000 tons per year

(6) Staging Plan

Fig. 1.2.10 shows the development of the estate; the first stage comprises the coastal and central part of the estate including food processing complex and construction related industries, the second stage comprises the southern part of it including food related industries, and the third stage comprises the northern part of it including the construction related industries, also.

Fig. 1.2.9 Land Use Plan of Ataqa Industrial Estate

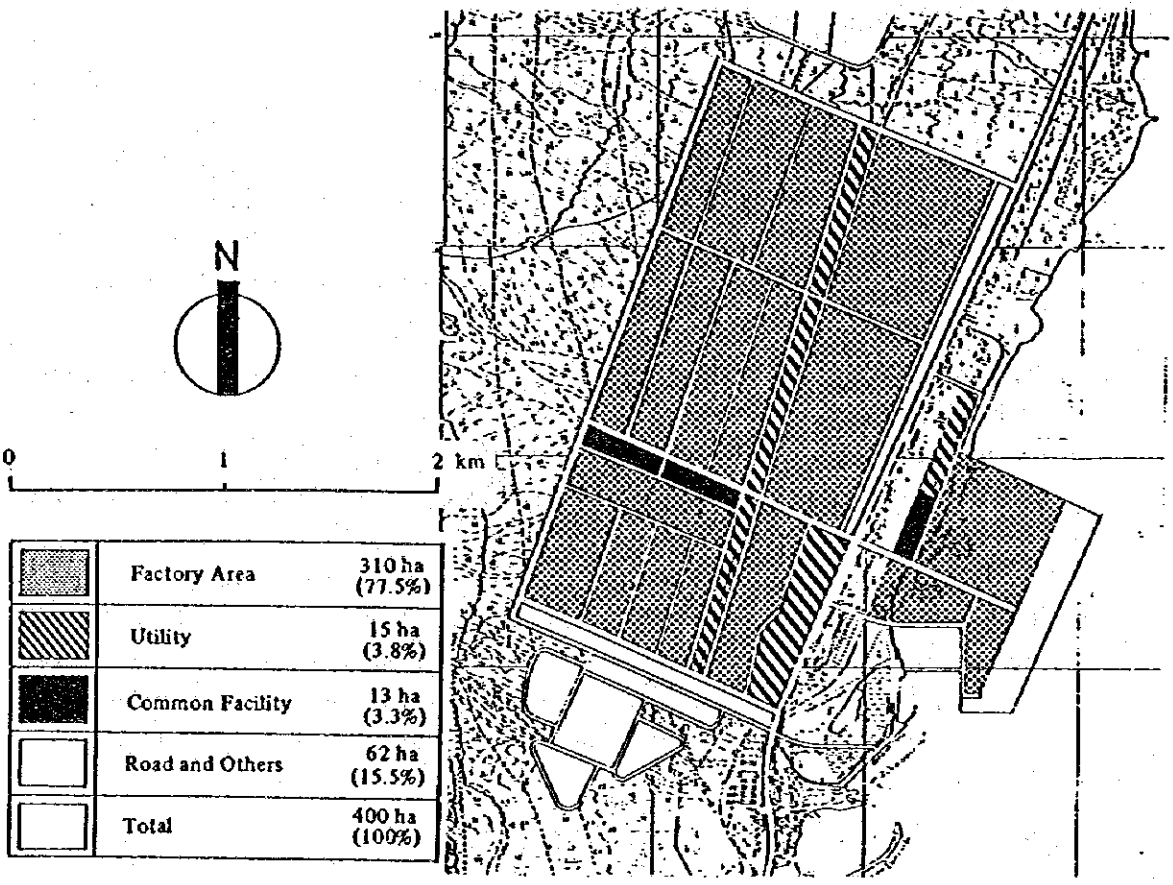
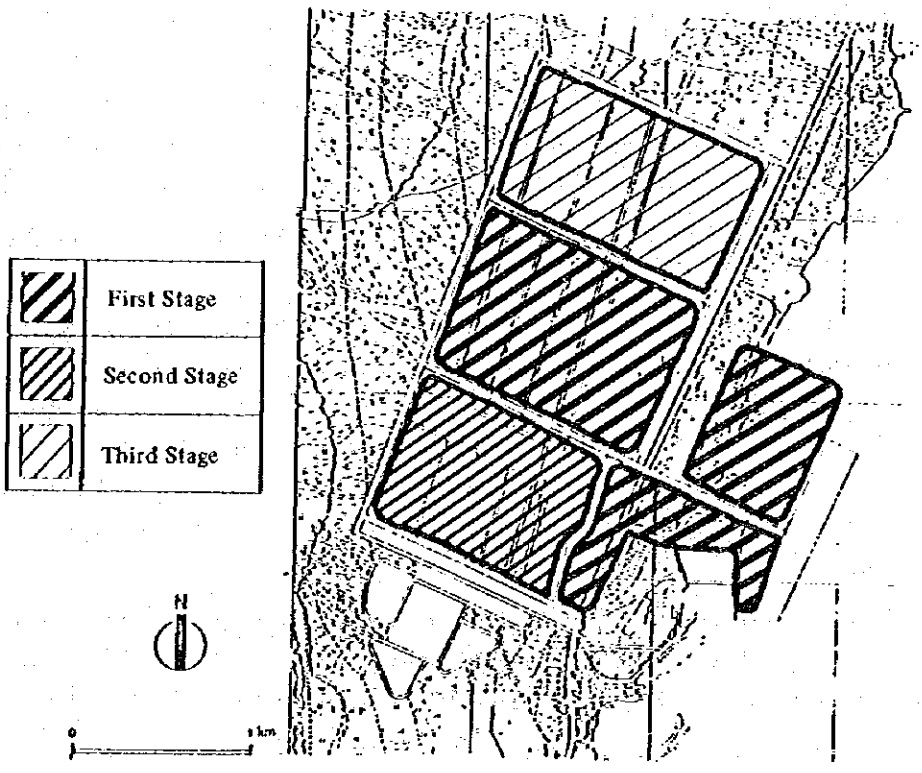


Fig. 1.2.10 Staging Plan of Ataqa Industrial Estate



1.2.2 Industrial Free Zone Development in Adabiya

(1) General Condition of the Area

Adabiya is located a few kilometers south of Ataqa and has two berthing facilities, one for cement and the other for various cargoes of which main commodity is wheat. In an area just behind the port, there are several quarries mining limestone and dolomite at the foot of Gebel Ataqa, about 1.5 kilometers from the shoreline. The rising terrain is steep and limits development towards the mountain. Thus the development can only practically take place within about one kilometer from the shoreline. (See Fig. 1.2.11)

The area has only one road leading to Suez to the north and to Ain Sukhna to the south. The road is important not only for traffic but also for utilities such as water mains, oil and gas pipelines and power transmission lines which are installed along the road. These utility lines are considered as a development constraint in terms of land use.

However, the area is recognized to have a higher potential for port development than Port Ibrahim considering locational and oceanographical conditions. Accordingly, it is proposed under this study to expand and modernize the existing facilities so that Adabiya may become the main gateway of the country on the Red Sea for liner cargo. This expansion and modernization plan is the basic condition for the industrial free zone planning.

(2) Planning Policies

The industrial free zone (IFZ) in Adabiya mainly aims to promote manufactured export to earn needed foreign exchange and to create job opportunities to meet the rapid growth of the labour force. Industries expected to locate in the IFZ are labour-intensive and export-oriented ones which produce such products as clothing, footware, leather and rubber products and some types of electrical machinery. As these industries depend on international liner shipping services for their imports of raw materials and exports of finished products, it is required to locate the IFZ within the customs zone of the international commercial port.

In this sense, Adabiya is the most suitable location for IFZ development in the Study Area.

The IFZ in Adabiya must be functionally, economically and physically attractive to foreign multinational companies which are expected to be major investors in the zone. Functional attraction requires regular shipping service connecting with the major markets of products and the sources of materials supply, and minimal administrative formalities such as foreign trade declaration and foreign exchange allocation for the activities within the zone. It also requires a reasonable level of common services.

Economic attraction requires a package of incentives such as exemptions of customs duties and tax holidays, abundant and low cost labour supply, low cost infrastructures and utilities and low cost and efficient cargo handling at the port.

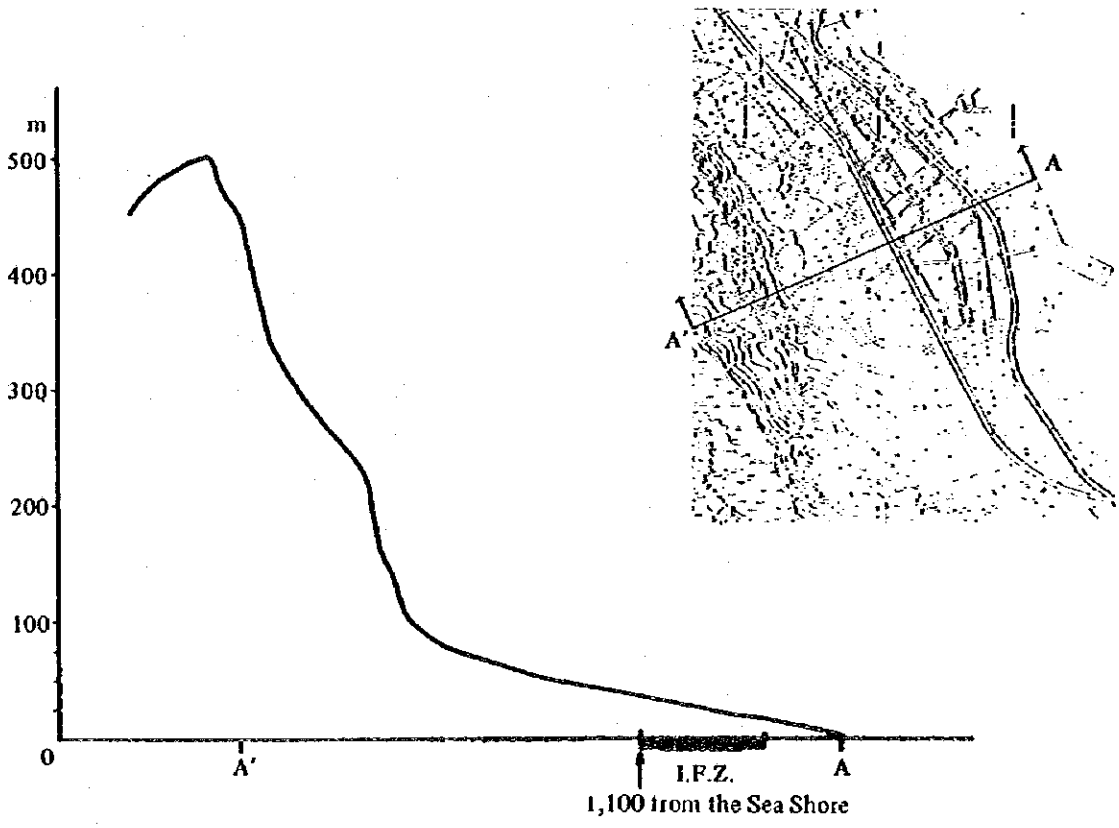
Major planning policies are itemized below.

- o Ease of customs and security control by physical configuration.
- o Creation of attractive physical facilities.
- o Functional linkage with port development and operation.
- o Minimization of expensive development costs.
- o Removal of the existing facilities to be kept at a minimum.
- o Common services shall be provided at one central location.

Based on the above policies, it is proposed to develop an industrial free zone in Adabiya with the following scale and types of industry.

Types of industry:		Labour-intensive, export-oriented
Employment	:	About 6,600
Land area	:	About 52 ha (net), 82 ha (gross)

Fig. 1.2.11 Topography of Adabiya



(3) Layout Plan of the Industrial Free Zone

The Adabiya Industrial Free Zone is to be located within the customs zone for the convenience of export-oriented industries. As the topographical conditions of the site limit the future expansion in contiguous areas, the Phase II development will be located on Cape Adabiya.

General Layout by Type of Industry: According to the characteristics of the the Ataqa Industrial Estate. However, a custom office and related facilities will road of the zone for the convenience of large trucks. Some of these establishments which cause pollution like noise must be grouped together and separated from the others.

As the apparel industry is labour intensive, such firms should be located in areas with easy access to public transportation service. As for the machinery industry which requires a high level of accuracy in processing, remote location away from sources of vibrations is needed. Considering these operational characteristics, the apparel industry will be located near the trunk road connecting the zone and the port, the metal industry will be in the northern part and the machinery industry will be in the southern part of the zone.

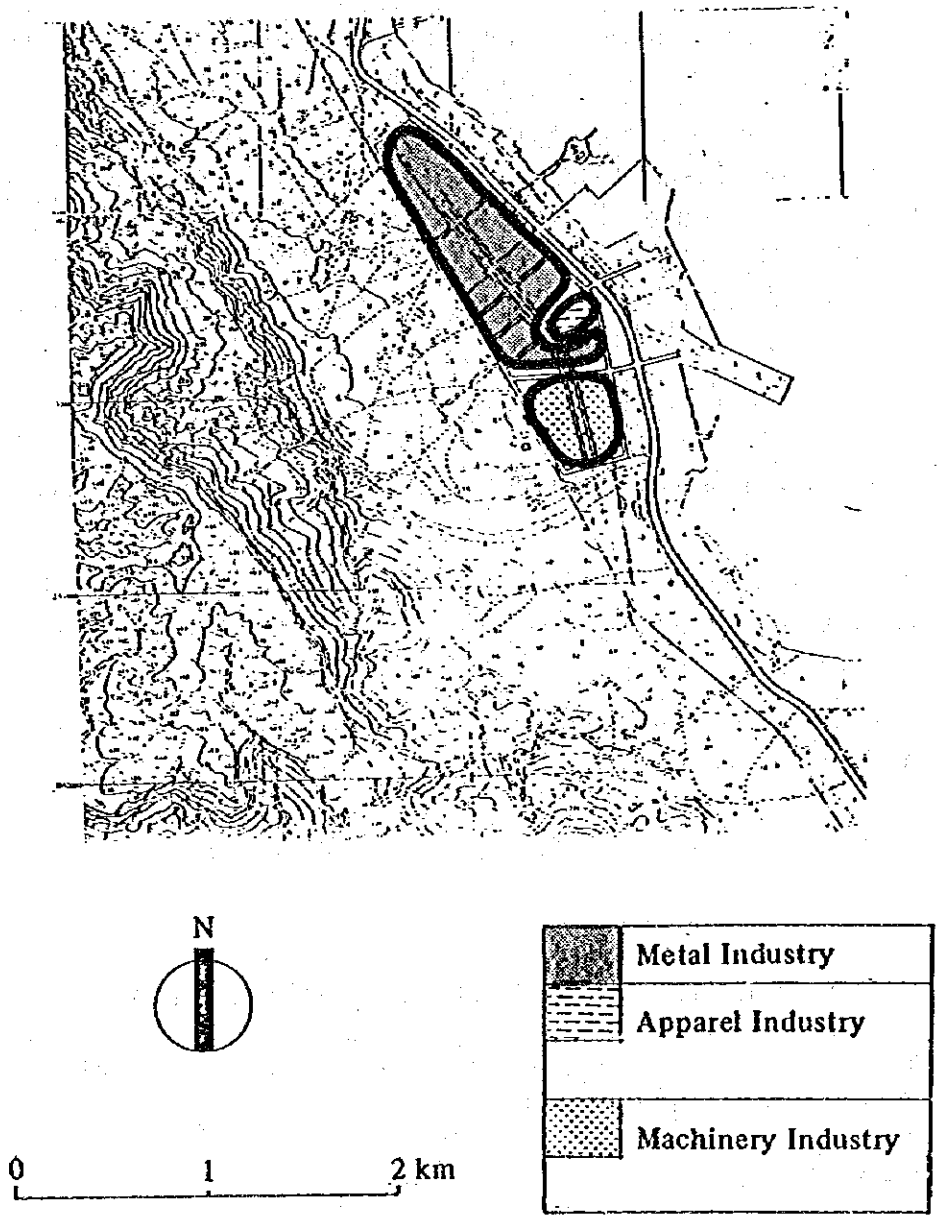
General Layout by Size of Factory Lot: As the maximum size of factory in Adabiya IFZ is about 3 ha, a planning system based on 3 ha lots is applicable. Consequently, the entire zone is designated for small and medium scale establishments.

Common Facilities: In order to support ordinary activities in the industrial free zone, the required common facilities in the zone are similar to those required at the Ataqa Industrial Estate. However, a customs office and related facilities will also be necessary.

To complete all the foreign trade procedures within the zone, an official customs office branch and tally and weighing offices should be located in the zone. For the customs and security control of the zone, a guard office will be set at the gate.

The central building offers the necessary administrative services and provides space for various business activities.

Fig. 1.2.12 Location of Industry by Type in Adabiya Free Zone



The planned total floor area of the central building is estimated at about 4,550 m^2.

The center is located just after the main gate facing Adabiya Port and is surrounded by the park and greens.

The area required for sewerage treatment and utilities is estimated at about 1 ha, and will be located at the northern end of the zone.

Road Network in and around the Zone: The only inter-regional road in this area is the Suez-Ain Sukhna Road. The arterial road will be set to connect the zone with the port and the inter-regional road. Collector roads run along the boundary of the site. The widths of the right of way of the roads are as follows:

Inter-regional road:	35 meters
Arterial road:	21 meters
Collector roads:	18 meters

(4) Land Use and Outline of the Short-term Development of the Adabiya Industrial Free Zone

Fig. 1.2.14 shows the land use plan of the Adabiya Free Zone in 1995.

The developed area is approximately 82 ha which includes about 52 ha of net factory lots.

Table 1.2.2 shows an outline of the target of industrial free zone development in Adabiya in 1995.

Fig. 1.2.15 shows the stage development of the zone; the first stage comprises the southern part of the zone and the second stage the Northern Part.

Table 1.2.2 Outline of the Targeted Industrial Development in Adabiya, 1995

Types of Industries	Consumer-related and Processing and Assembly Groups
Number of Factories	About 40 Factories Expected
Net Area for Factories	About 52 ha
Expected Employment	About 6,600
Expected Output	About 76 million LE
Water Consumption	About 2,500 tons per day (Avg. day)
Cargo Input and Output	Input : About 255,000 tons per year Output: About 236,000 tons per year

Fig. 1.2.13 Road Network in Adabiya

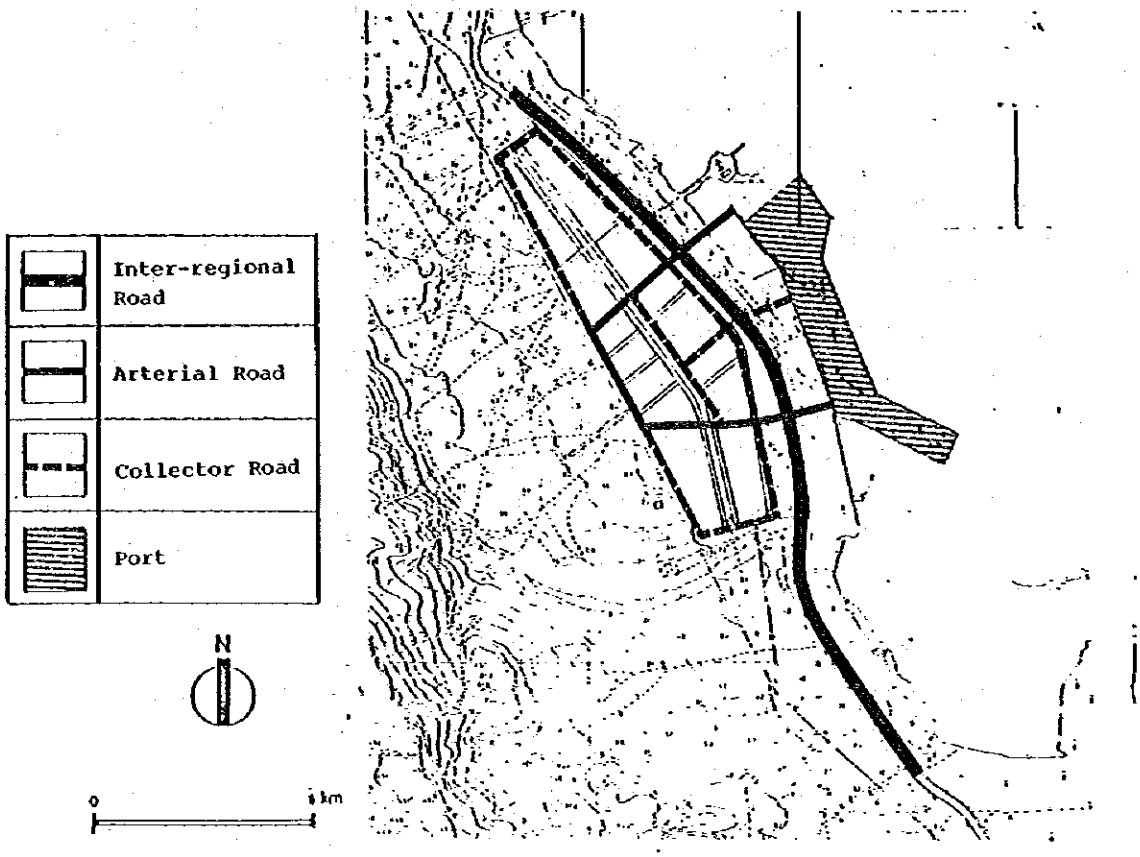
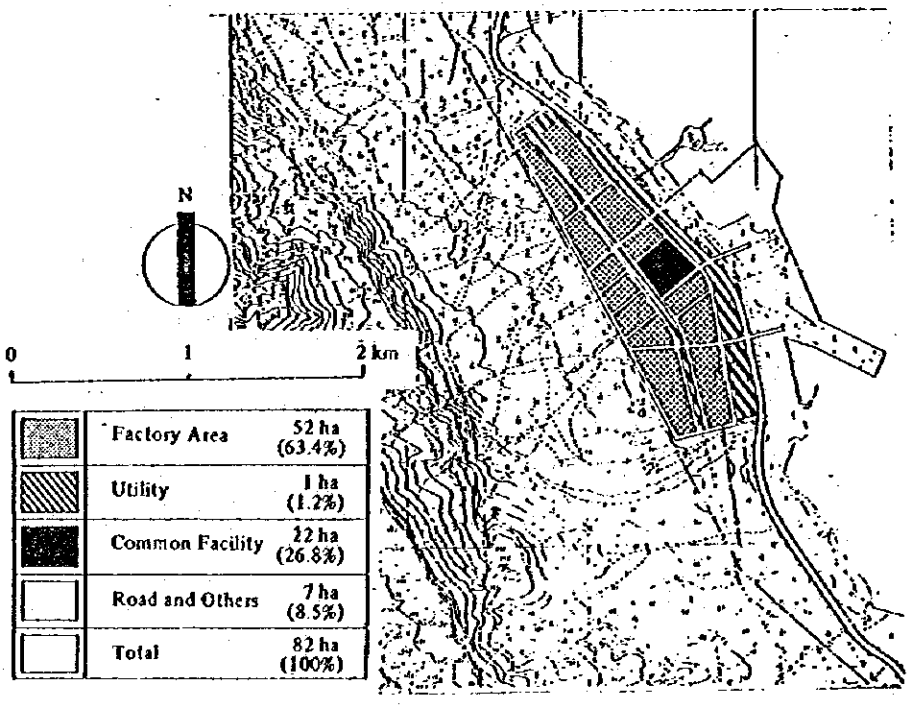


Fig. 1.2.14 Land Use Plan of Industrial Free Zone in Adabiya

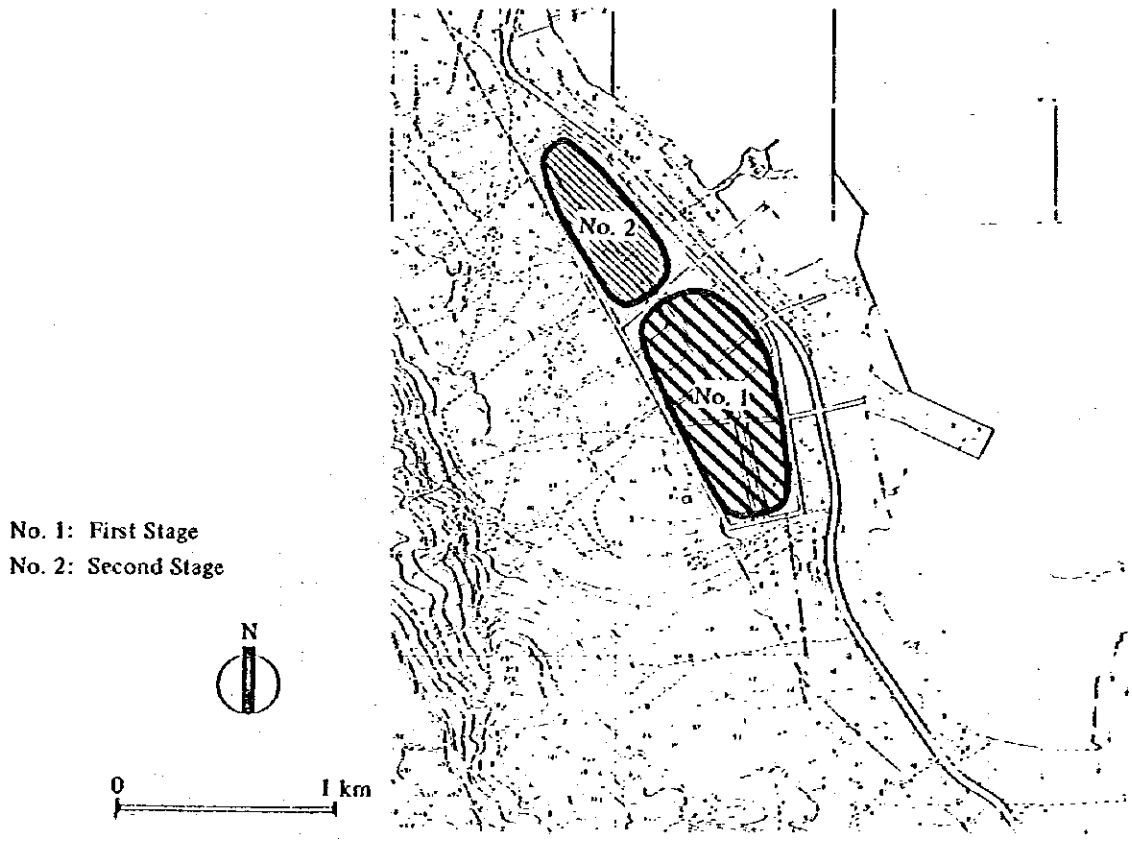


(5) For Realization of the Adabiya IFZ

For successful realization of the Adabiya IFZ, special considerations are needed on the following points.

- o Promoting the Port of Adabiya to major liner shipping companies as a regular port of call in Egypt.
- o Promotion of the Adabiya IFZ to the foreign businessmen's associations in Cairo and Alexandria, and to the various economic organizations in Europe, the USA and the Far East.
- o Monitoring of the development of competing IFZs and EPZs (export processing zones) in the region such as Jebel Ali in UAE, Larnaca in Cyprus, and Mersin and Antalya in Turkey, and adjustment of investment incentives and relevant institutional systems when needed to compete with them.
- o Study on so called standard factory buildings (ready made factory buildings) for easier occupancy by small scale industries.

Fig. 1.2.15 Staging Plan of Adabiya Industrial Free Zone Development



1.2.3 Transport Development

(1) Ports

Short-term development will be concentrated on Ataqa-Adabiya. Ibrahim Port will be rehabilitated as a passenger port based on the development plan of the Red Sea Port Authority by the year 1987. The 7 general cargo berths which are currently under restoration will be completed by the year 1987. In Adabiya, the berths which will be newly constructed in phase I are 2 multi-purpose berths which will mainly serve container ships using their own gear after 1993. One berth among the restored general cargo berths will serve special cargo carriers in phase I and will serve general cargo carriers after 1995.

In Ataqa, 1 grain berth with 70,000 tons of silos, 1 coal berth and 2 bulk cargo berths will be constructed by 1992, and the fishery port will also be completed by 1990.

In order to balance the volume of dredged soil and reclaimed soil, reclamation behind the second coal berth which is planned to be constructed in phase II will be completed in phase I.

Basins and channels at Adabiya will be dredged at −11.5 m depth corresponding to the maximum ship size of 20,000 DWT in phase I. Some of those at Ataqa will be dredged at −15 m depth corresponding to 80,000 DWT grain carriers and the rest will be dredged at −13 m depth corresponding to 50,000 DWT coal carriers.

The width of channels is set at 1.5 times the overall length of the maximum ship size of objective vessels since the channels are relatively short and ships will pass by each other frequently.

Circular areas with a radius of 1.5 times the overall length of the maximum ship size are planned at both sides of the mooring basin and working basin.

The grain silo (capable of stocking 70,000 tons) is located at the center of the grain terminal and consists of a big machinery tower, 40 silo bins and an area for 16 additional silo bins for future expansion by 2005. On the quay side of the silo, six bagging and truck-loading systems are planned and the wagon loading system will be located on the opposite side.

The projected throughput at the ports is listed in Table 1.2.3, and the layout plans are shown in Fig. 1.2.16 -- 1.2.22.

Table 1.2.3 Projected Throughput in 1995

('000 t)

Berth	Commodity	Export	Import
General Cargo	General Cargo	128	674
Special Cargo	Timber		90
	Iron & Steel Products	7	191
	Heavy Equipment & Cars		21
Multi-purpose	Containers	35	178
Grain Terminal	Wheat		1,462
Bulk Cargo	Iron & Ore		501
	Salt/Sulphur		15
	Cotton	12	
	Rice		21
	Sugar		155
	Paper/Pulp		63
Coal	Coal/Coke		1,248

Fig. 1.2.16 General Layout of Ataqa-Adabiya Port

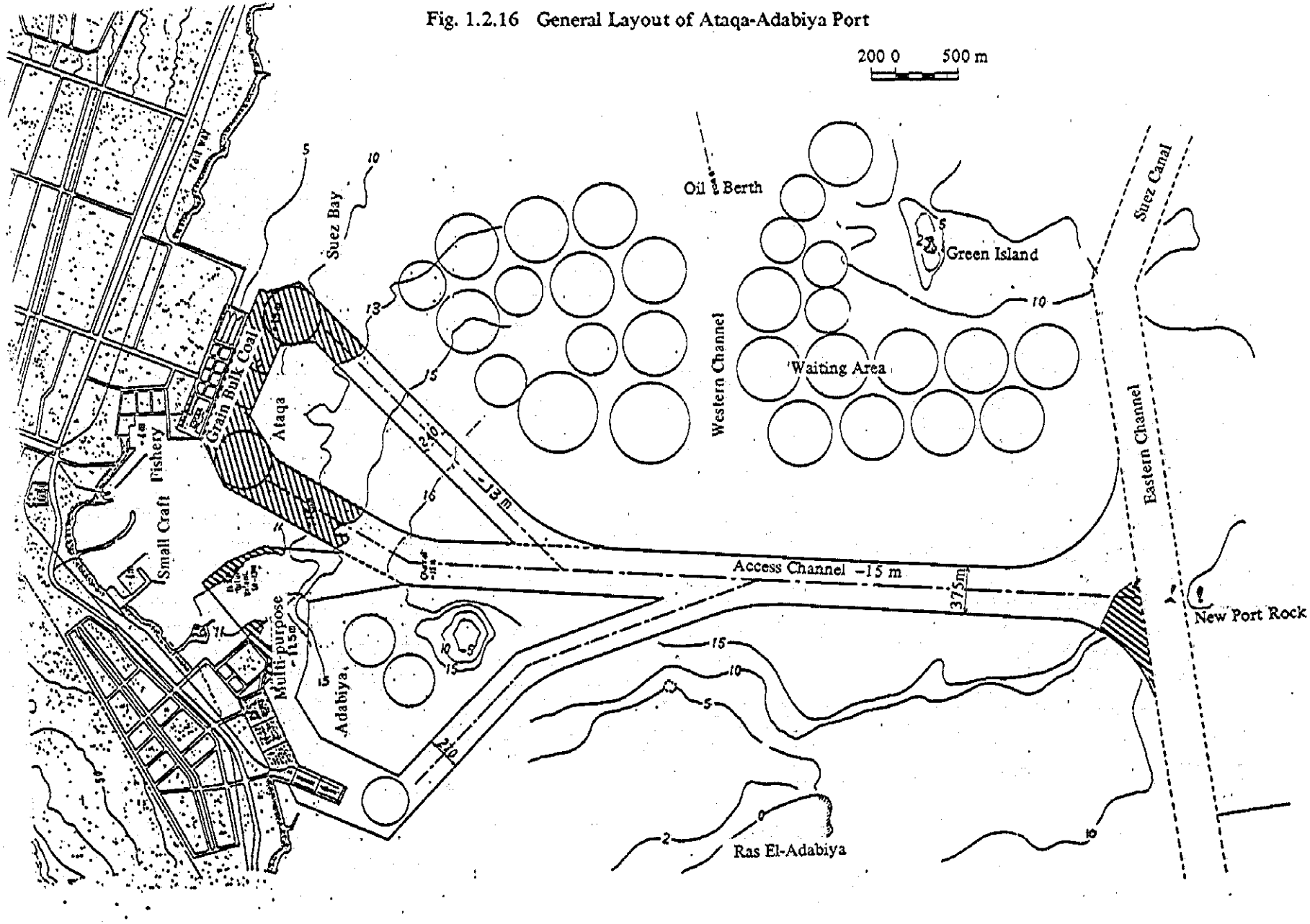
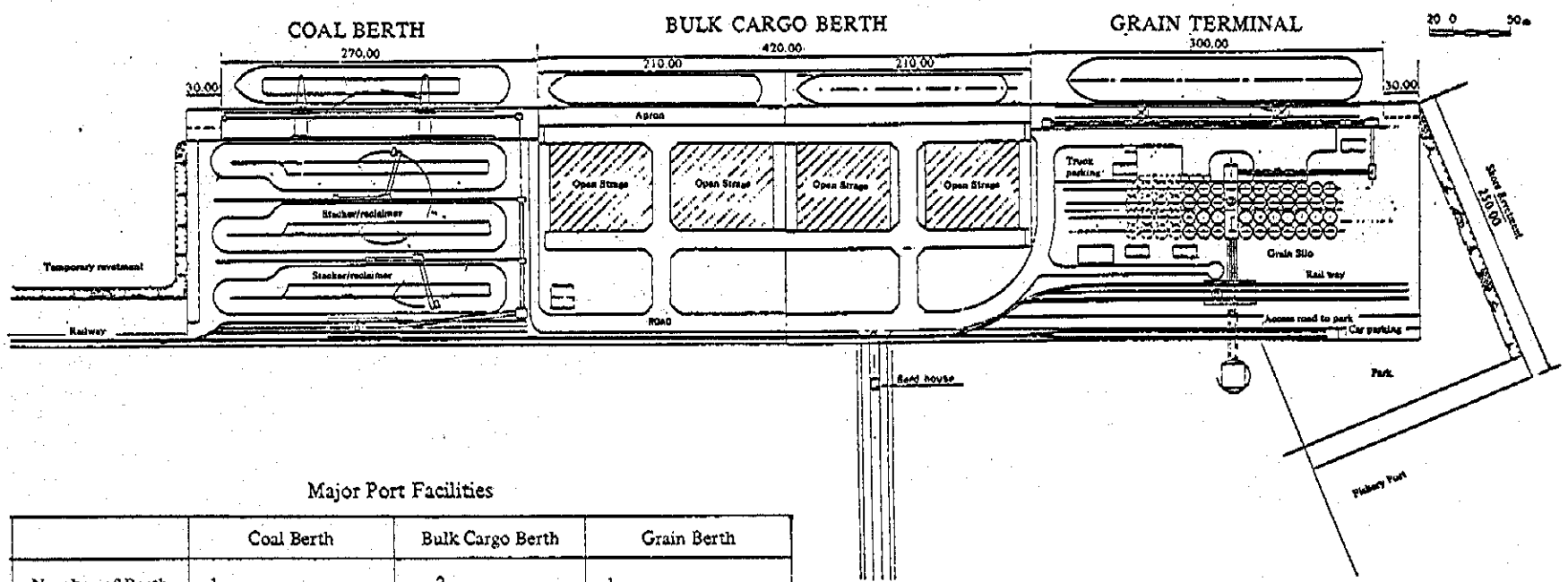


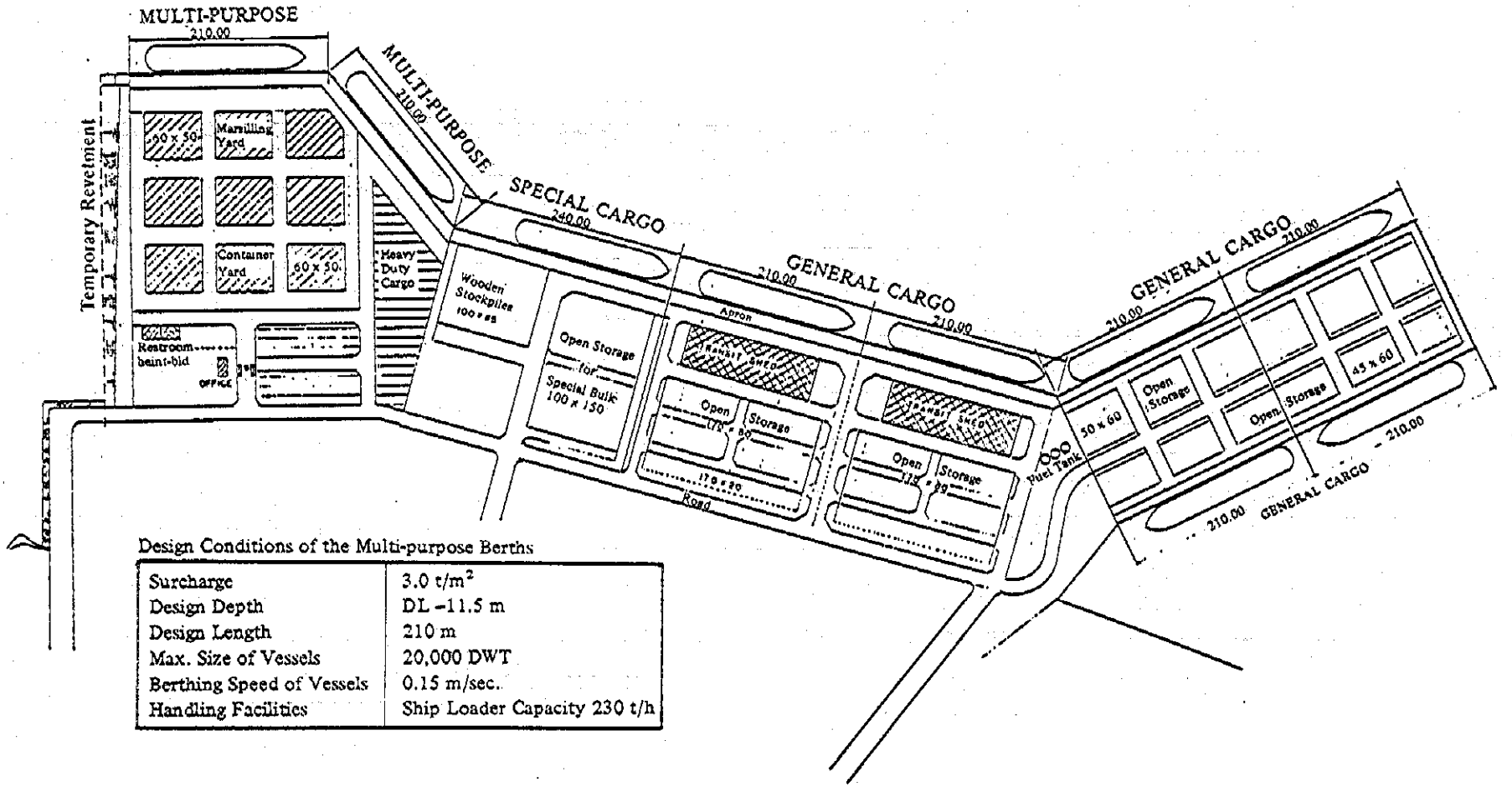
Fig. 1.2.17 Layout of Ataqa Port, 1995



Major Port Facilities

	Coal Berth	Bulk Cargo Berth	Grain Berth
Number of Berths	1	2	1
Length of Berths	270 m	210 m x 2	300 m
Water Depth	CDL –13.0 m	CDL –11.5 m	CDL –15.0 m
Objective Ship	50,000 DWT	20,000 DWT	80,000 DWT
Handling System	600 t/h x Unloader Stacker/Reclaimer Belt Conveyor Wagon Loading	Ship Loader	600 t/h x 2 Pneumatic Unloader Conveyor Bagging and Truck Loading Wagon Loading
Others	Coal Storage 27,000 m²	Open Storage 24,000 m²	Grain Silo 70,000 t

Fig. 1.2.18 Layout of Adabiya Port, 1995



Design Conditions of the Multi-purpose Berths

Surcharge	3.0 t/m^2
Design Depth	DL –11.5 m
Design Length	210 m
Max. Size of Vessels	20,000 DWT
Berthing Speed of Vessels	0.15 m/sec.
Handling Facilities	Ship Loader Capacity 230 t/h

Fig. 1.2.19 Layout of Grain Terminal

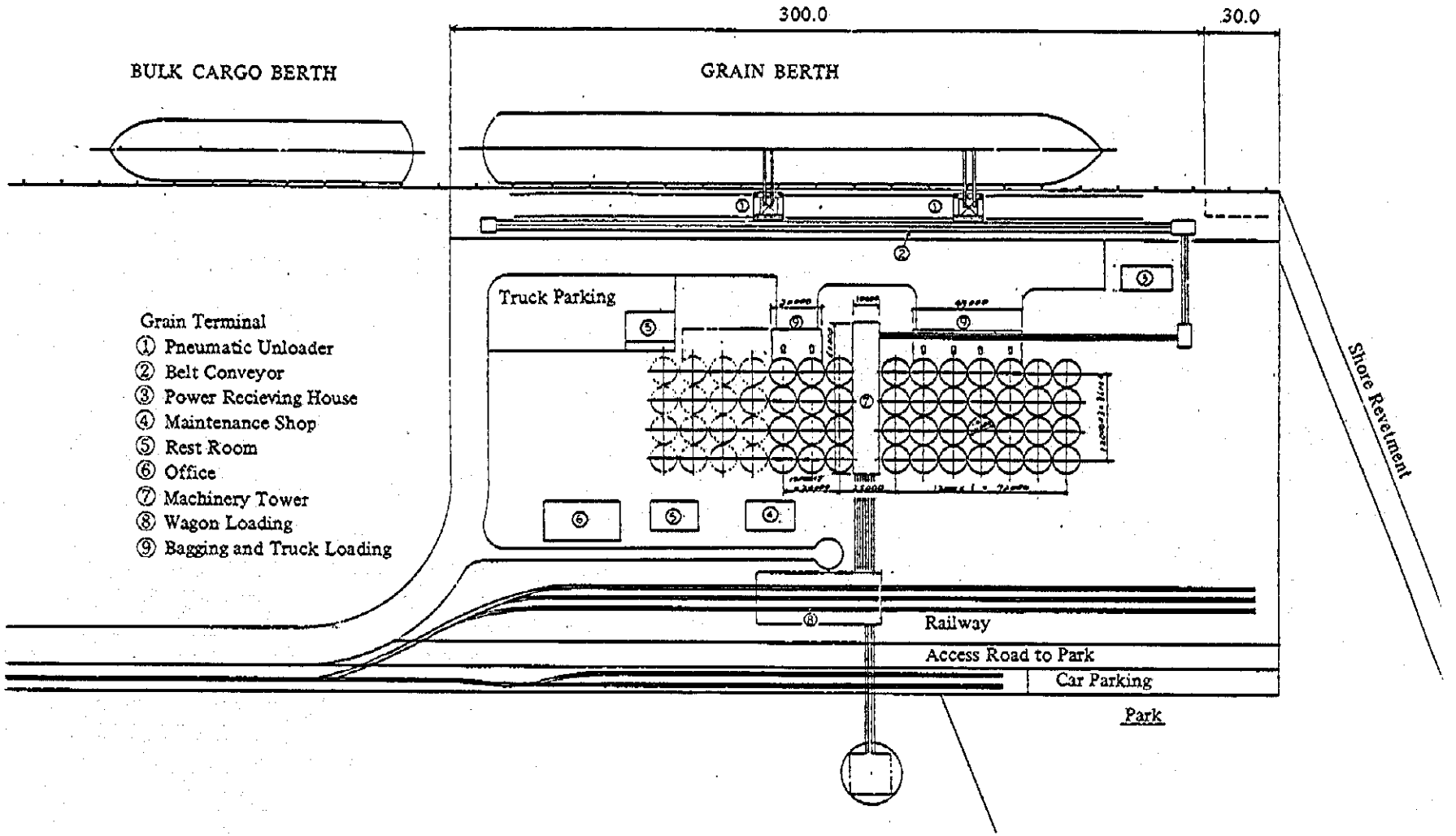
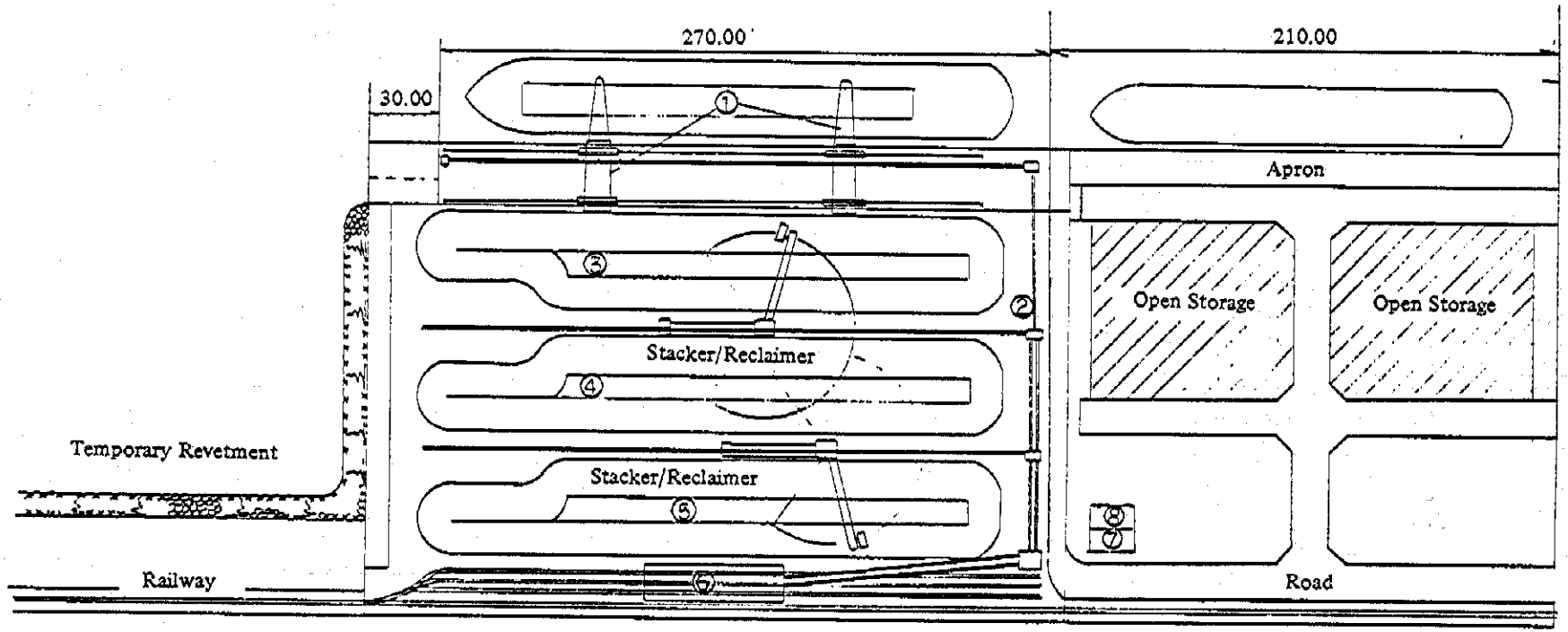


Fig. 1.2.20 Layout of Coal and Bulk Cargo Berths



① Unloader
② Belt Conveyor
③~⑤ Coal Storage
⑥ Wagon Loading
⑦ Office & Maintenance Shop
⑧ Rest Room

Fig. 1.2.21 Layout of Fishery Port

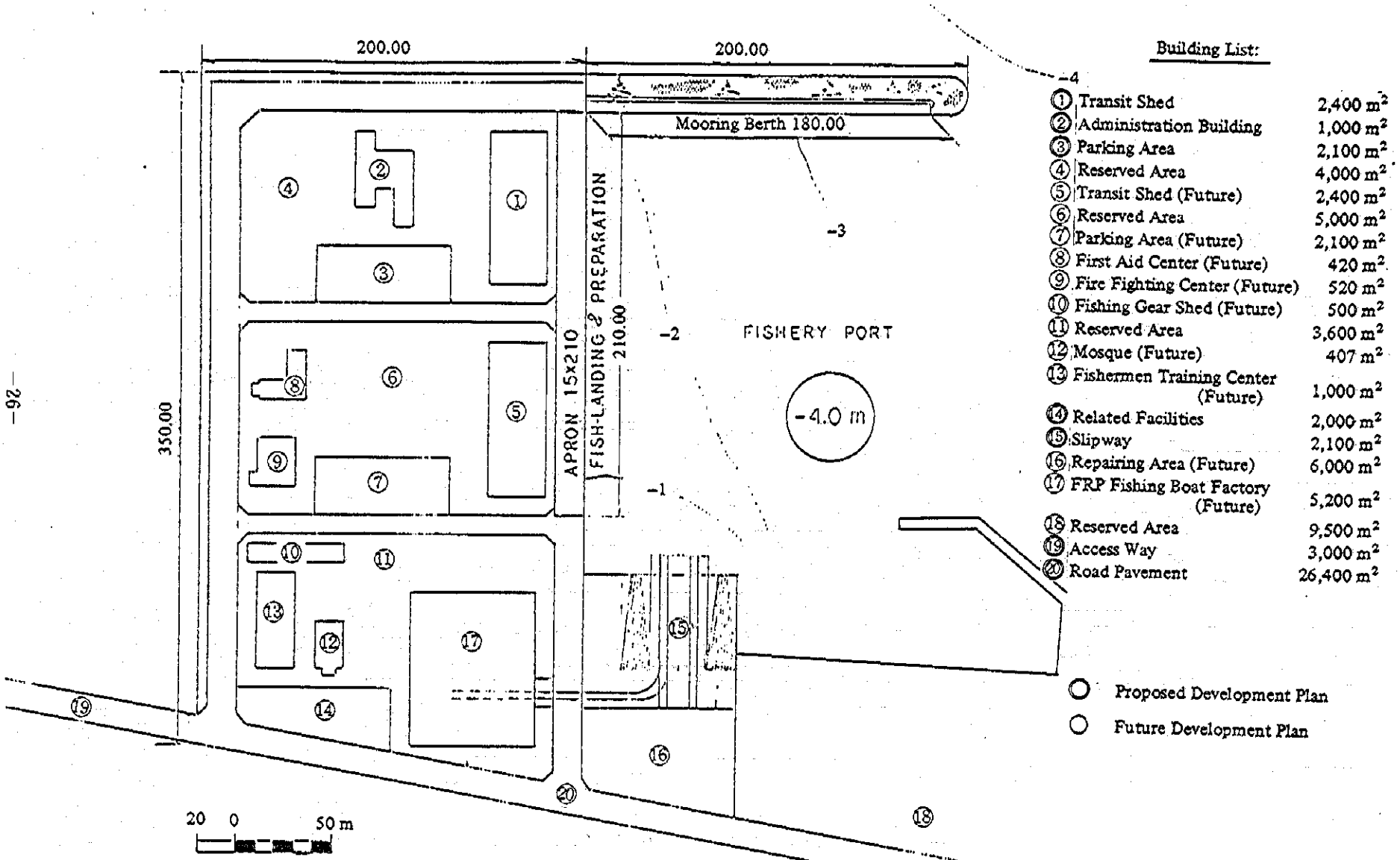
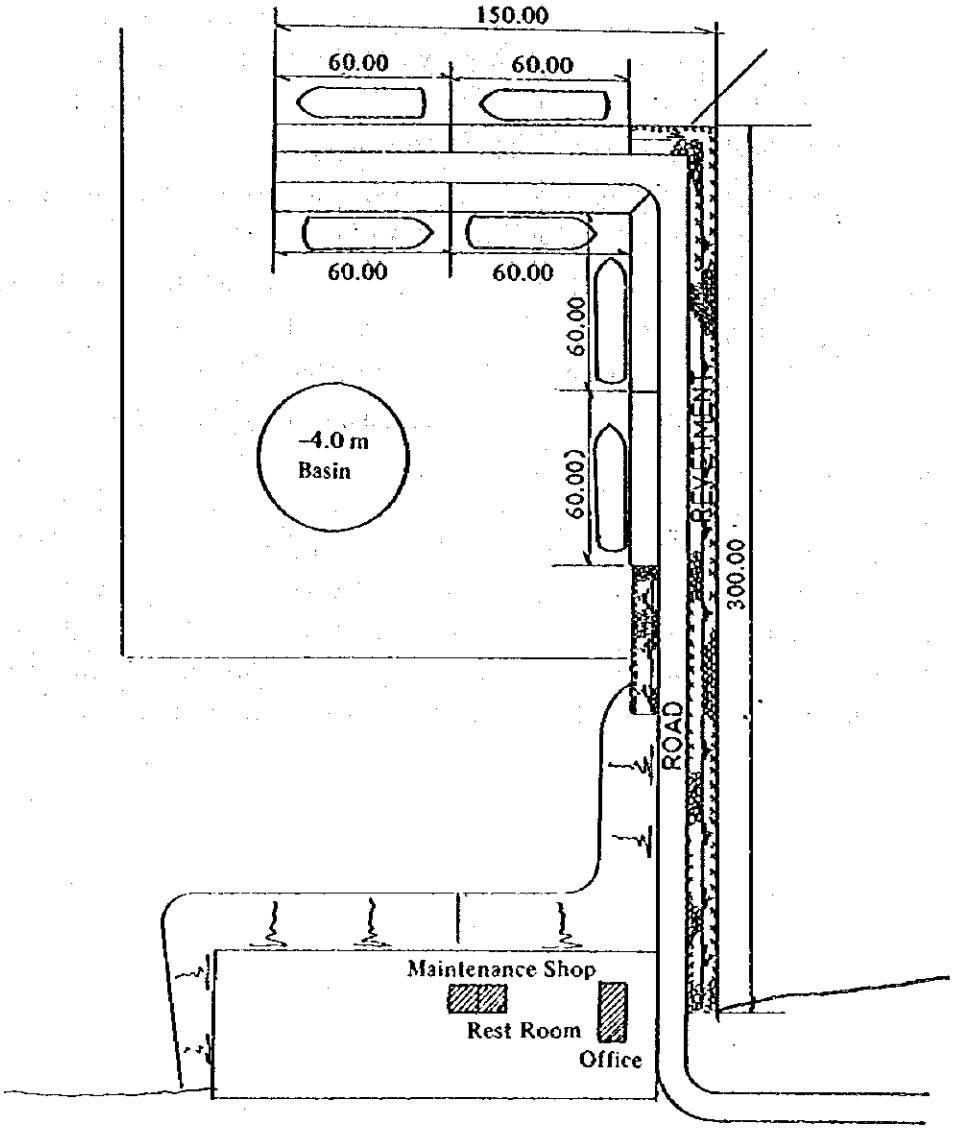


Fig. 1.2.22 Layout of Small Craft Berth



(2) Roads

The road development of the short-term plan, which is illustrated in Fig. 1.2.23, consists of:

1) Addition of a 7.5 m wide carriageway of 10.3 km in length in the section between Suez and Adabiya Port. With this development, the coastal road between Suez and Adabiya will become a dual carriageway road and serve as a trunk road for the industrial and port development.

2) Provision of 2-lane roads of 8.9 km in length as trunk roads in the industrial estate in Ataqa and also as access roads to Ataqa Port.

3) Provision of 2-lane roads of 2.2 km in length as trunk roads in the industrial free zone in Adabiya and in Adabiya port. The roads will function as the linkage between the industrial free zone and the port area.

4) Other secondary and access roads within industrial and residential areas.

Maximum traffic flow occurs in the section of the coastal road between Suez and Ataqa as shown in Fig. 1.2.24. The traffic volume becomes 25,404 P.C.U./day and 2,477 P.C.U./peak hour and peak direction. The volume capacity ratio of this section are 33% and 71% for P.C.U./day and P.C.U./peak hour and peak direction respectively for the dual carriageway road. Provision of a 2-lane road is sufficient for the 1995 traffic in Ataqa-Adabiya industrial and port areas. In the Ataqa area, however, the road must be widened to a 4-lane road to meet demand in 2005.

Fig. 1.2.23 Road Development, 1995

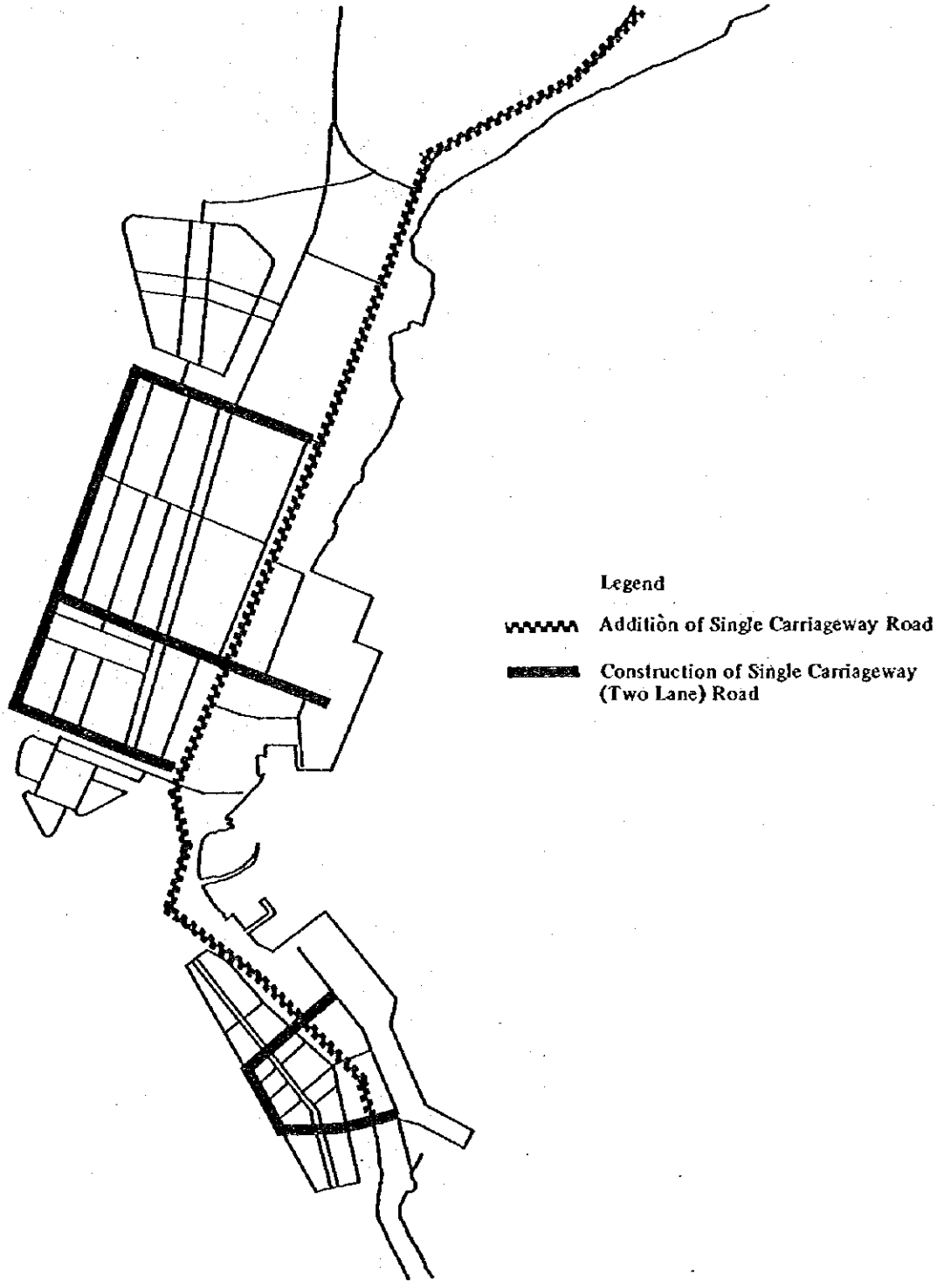
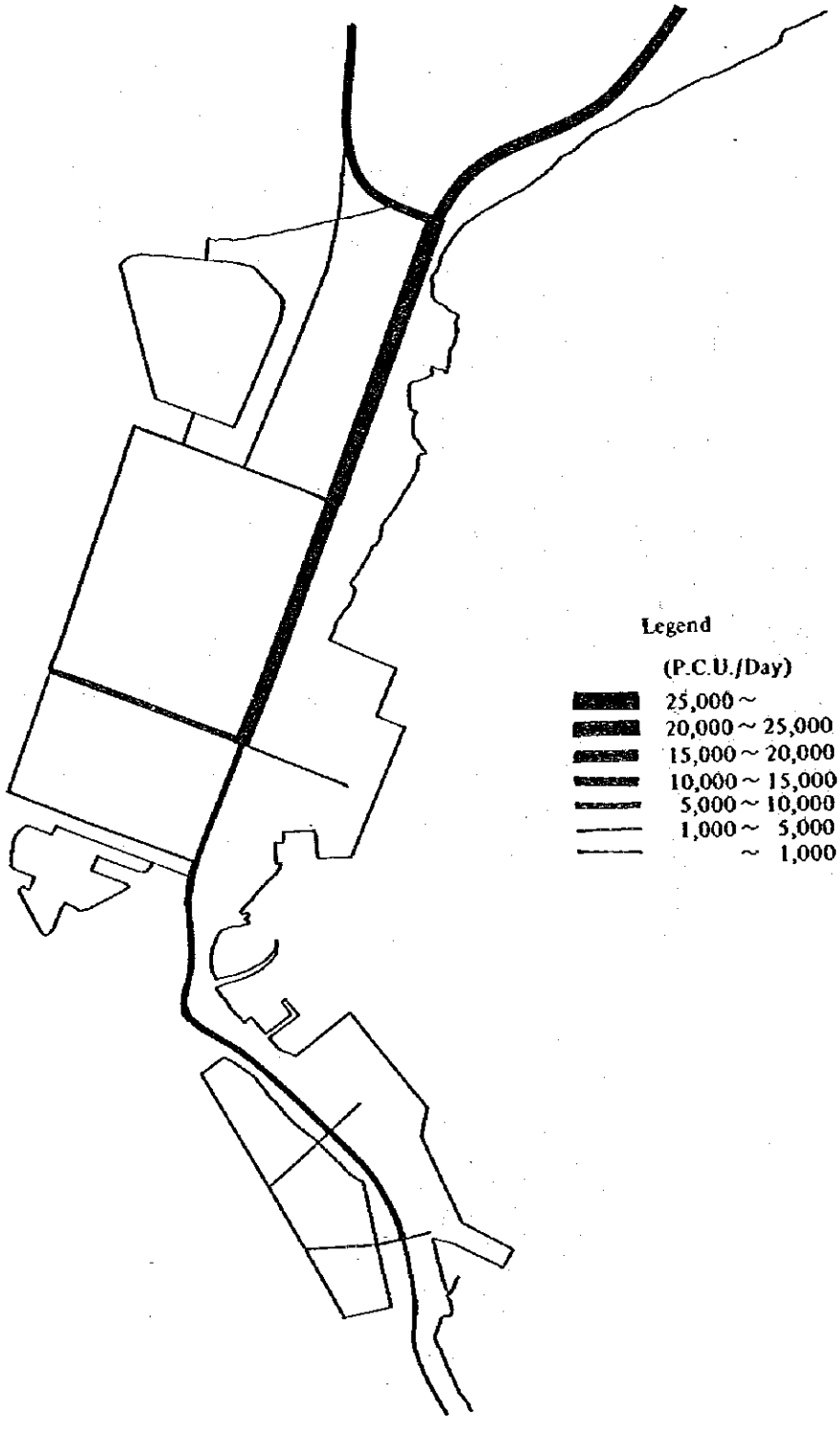


Fig. 1.2.24 Traffic Volume in 1995 (P.C.U./Day)



(3) Railways

Rail development of the short-term plan, which is illustrated in Fig. 1.2.25, is as follows:

1) Restoration of the 8.5 km long track between Suez and Ataqa Port

2) Provision of a signal control system in the above section

3) Ataqa port rail system development, which includes:

   - o Branch line to Ataqa Port
   - o Shunting yards for train composition
   - o Loading yards for grain and coal/coke in Ataqa Port

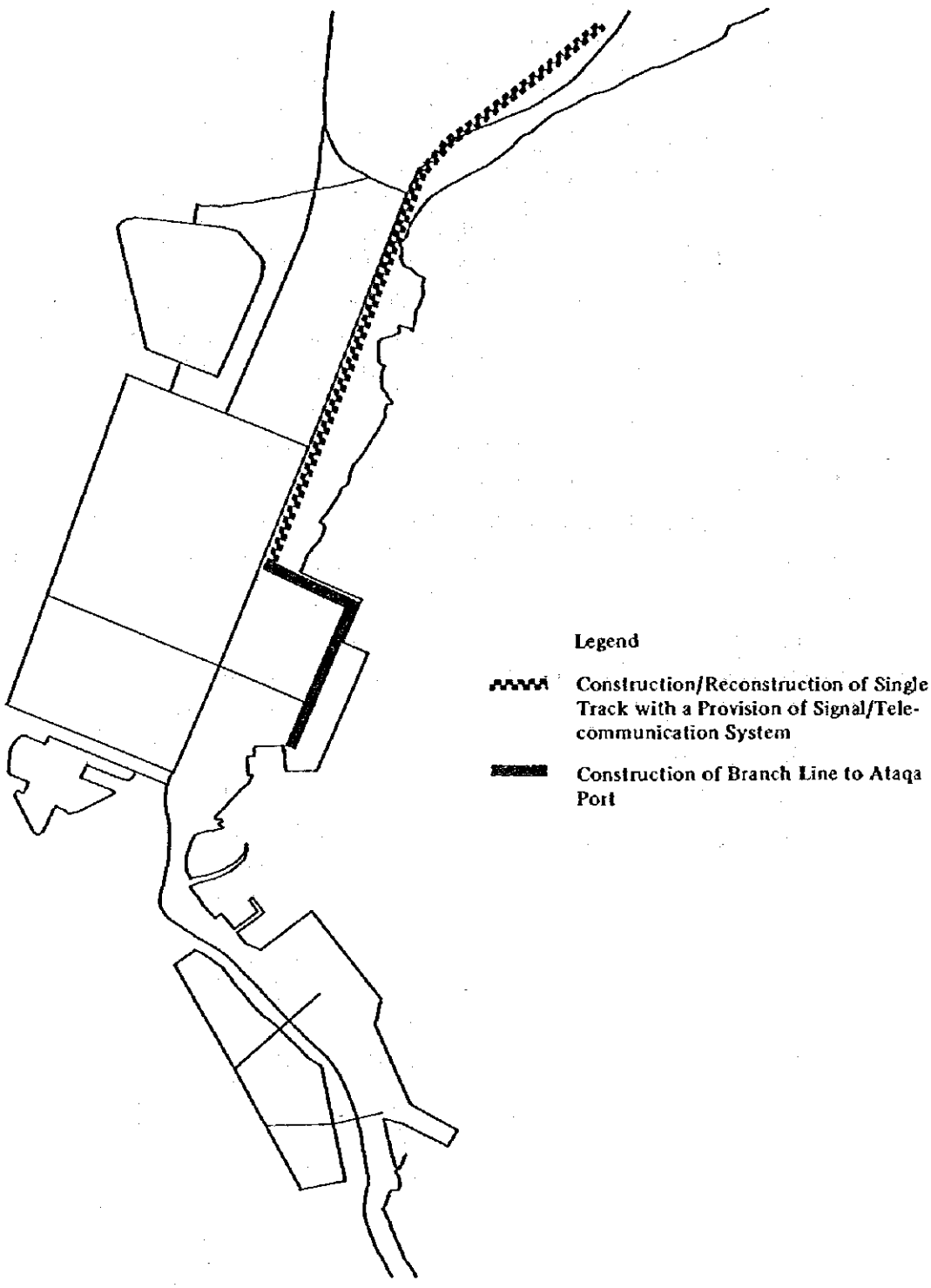
Transport of coal/coke and wheat requires four and two trains per day, respectively. The total traffic per day in the section between Suez and Ataqa becomes 26 trains per day in 1995. Since the current transport capacity in this section is about 20 trains per day because of old and poor system, some system renewal is required. Considering the increase in demand by 2005, track rehabilitation and introduction of a new signal control system is recommended.

In Ataqa Port, three branches each will be provided for coal/coke and wheat loading. In addition, a shunting yard with four 400 m fingers is required for train composition.

Assuming the cycle time (the time required for a train to go from Ataqa Port to its inland destination and come back) is one day and two days for coal/coke and wheat respectively, the required rolling stock is computed as follows:

Diesel Locomotives	:	11 units
Special Hopper Cars for Wheat	:	132 units
Wagons for Coal/Coke	:	141 units

Fig. 1.2.25 Rail Development, 1995



1.2.4 Tourism Development

Some ongoing development projects of tourist facilities are included in the development areas that are proposed in Vol. II.

Ras Sudr : A hotel, villas, bungalows and other tourist facilities are being operated by Misr Sinai Travel Co., Ltd.

Ain Sukhna (Sandy Beach) : A hotel, beach cabins and other tourist facilities are scattered along the coast and operated by private companies, governorate bodies and so on.

South Ain Sukhna : The Ain Sukhna hotel is now under construction by the Ministry of Tourism.

Suez City : A lot of hotels are in service in downtown Suez City.

For the short-term development focused on 1995, concentrated development might be introduced at the existing tourist spots listed above, and the following basic direction of tourism development is proposed:

- o Half of tourist demand in 2005 is proposed for Ras Sudr and Ain Sukhna (Sandy Beach) development.
- o The other half of the demand is proposed for South Ain Sukhna and Suez City.
- o A few day trippers are expected in Masala and Ayun Musa.

The number of accommodations proposed for the short-term development are shown in Table 1.2.4.

Land use plans in Ras Sudr and Ain Surhna (Sandy Beach) are proposed as shown in Fig. 1.2.26 and Fig. 1.2.27 in consideration of the effective utilization of existing tourist facilities such as hotels, villas and related infrastructures.

Table 1.2.4 Number of Units of Accommodation Proposed for the Short-term Development by Area in 1995

Area	International Class Hotel (rooms)	Second Class Hotel (rooms)	Apartment, Bungalow and Villa (units)	Beach Cabin (units)
Ras Sudr	160	620	1,060	100
Ain Sukhna (Sandy Beach)	–	140	1,370	1,500
Masala, Ayun Musa	–	–	–	800
South Ain Sukhna	–	120	–	–
Suez City	–	300	–	–
Total	160	1,180	2,430	2,400

Fig. 1.2.26 Land Use Plan of Ras Sudr Resort in 1995

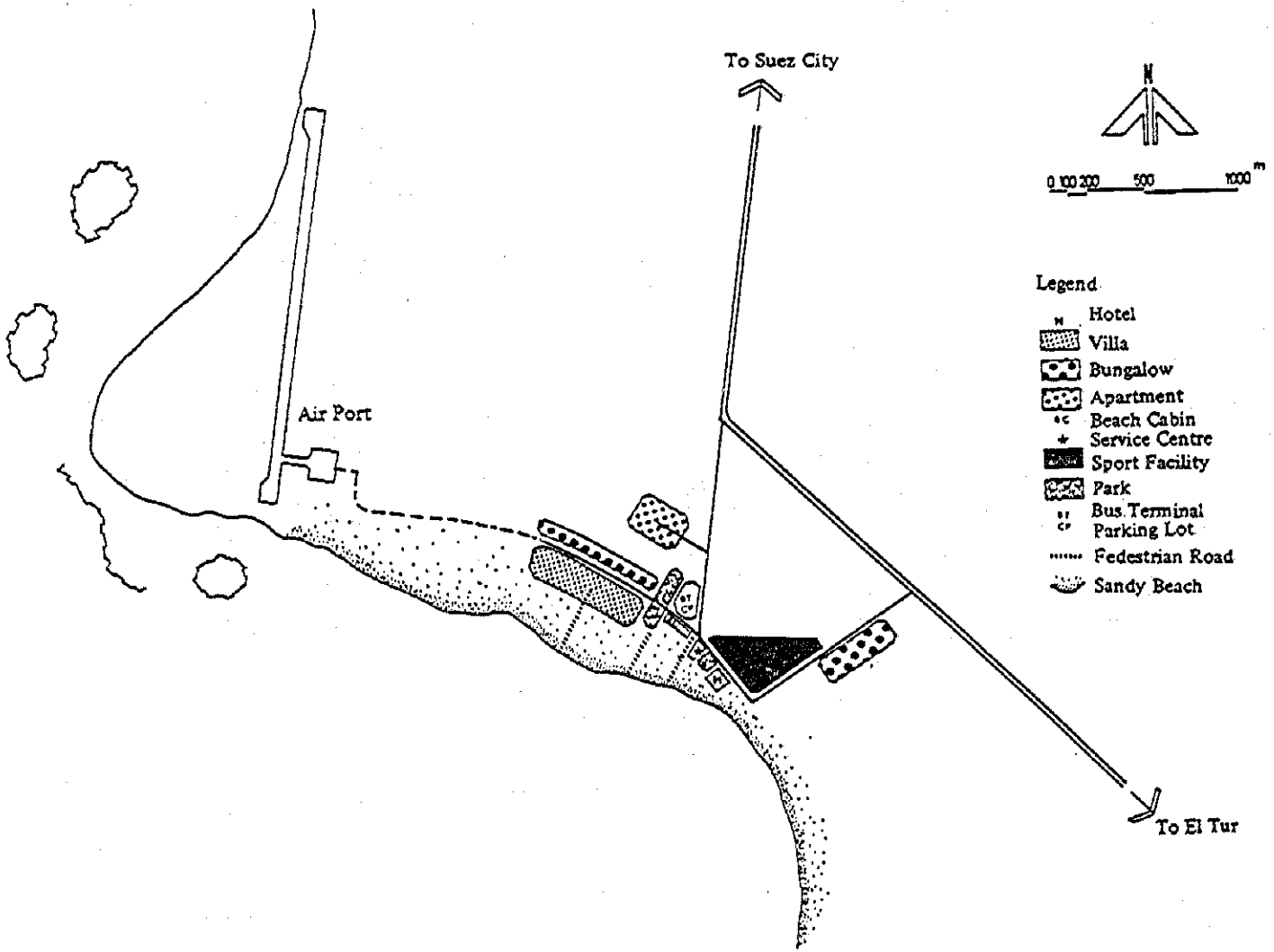
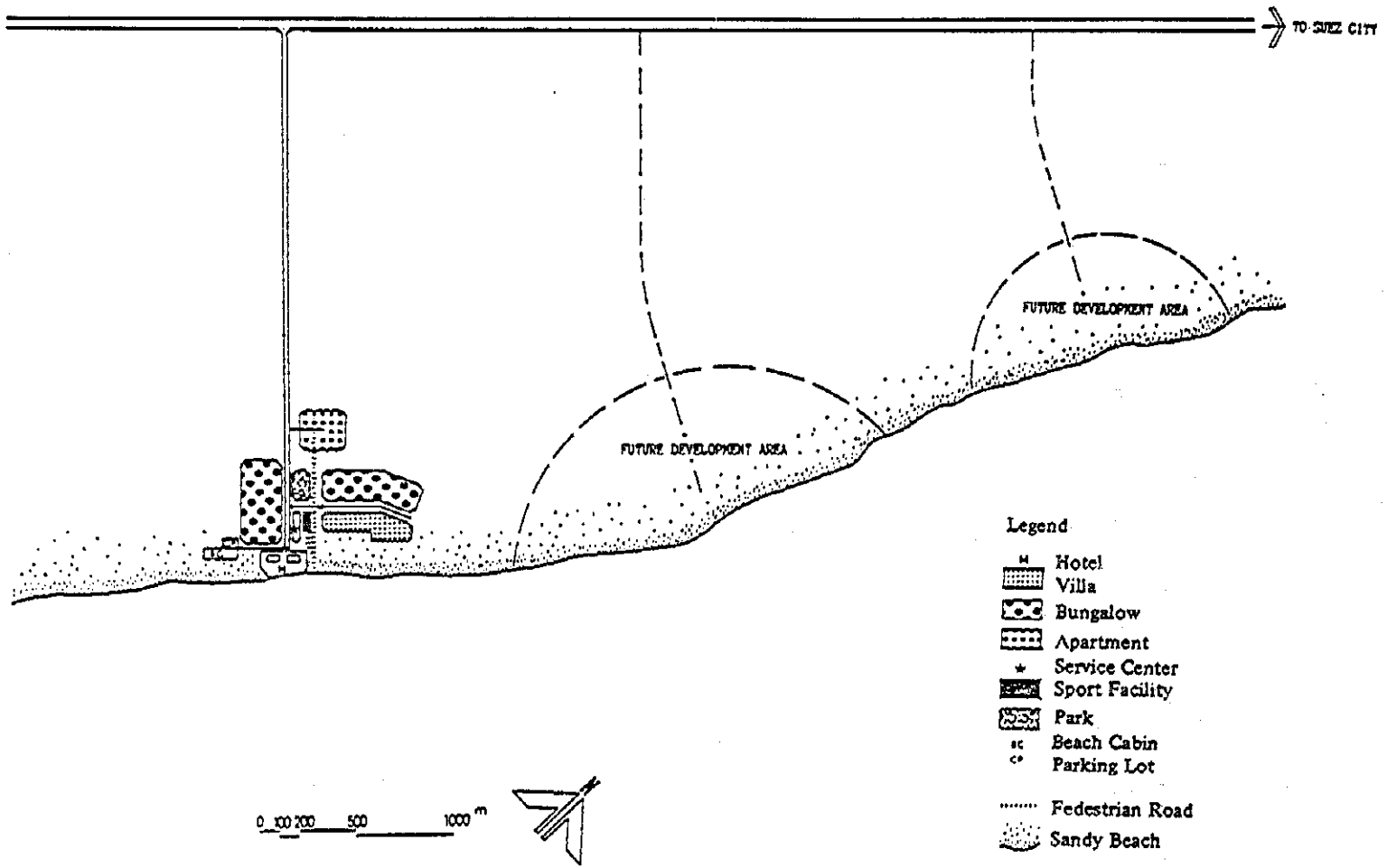


Fig. 1.2.27 Land Use Plan of Ain Sukhna (Sandy Beach) Resort in 1995

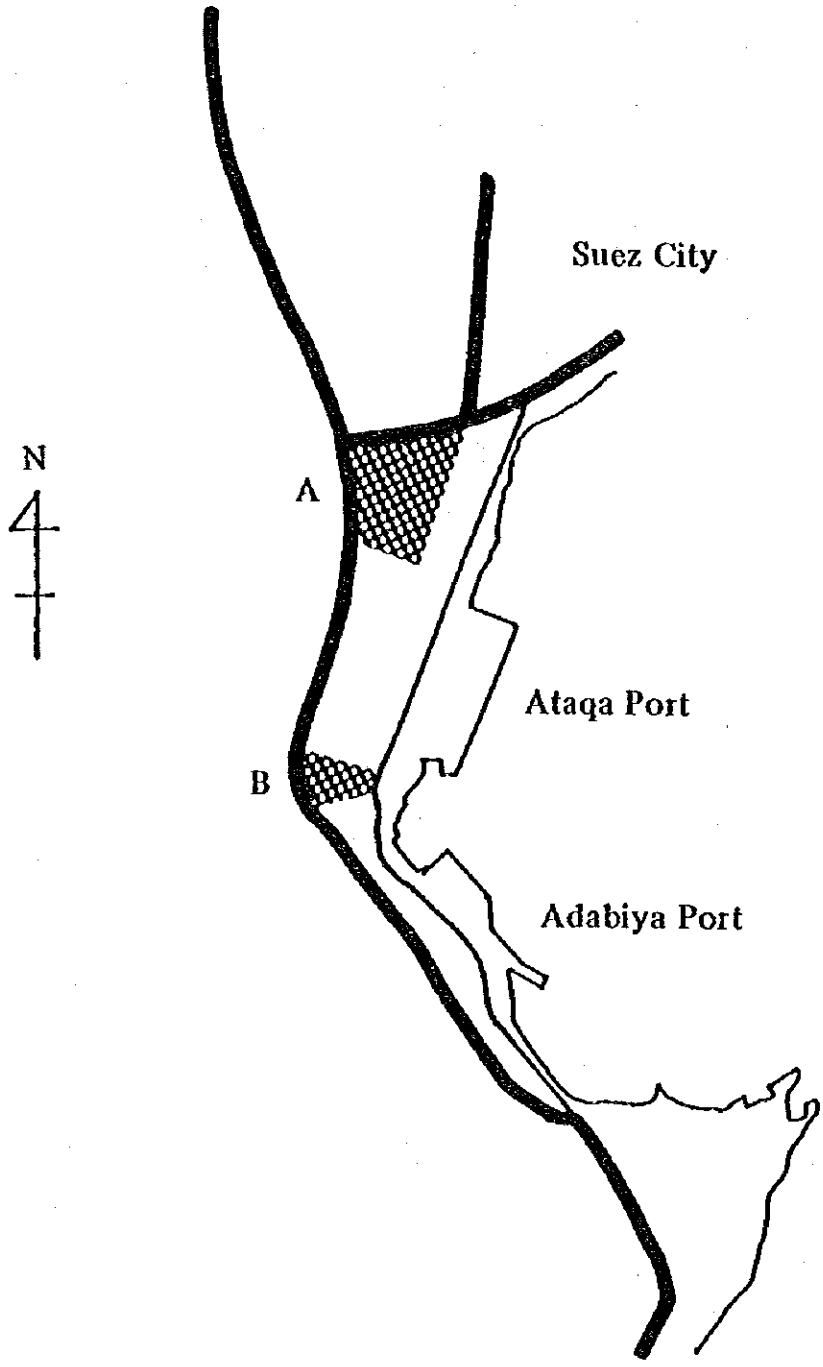


1.2.5 Urban Development

Areas for short-term urban development are subdivided into two districts as indicated in Fig. 1.2.28. Each district will serve workers with residences in Ataqa-Adabiya. The target population for the short-term development is 30 thousand, which will increase to 35 thousand by year 2005.

Residential areas together with areas for urban facilities will be developed as shown in Figs. 1.2.29 and 1.2.30. Given these patterns of land use, each district will increase the intensity of development, maintaining a certain balance of land use, so as to accommodate the planned population by year 2005.

Fig. 1.2.28 Location of the Short-term Development Urban Areas



(1) District A

Access: The district has access to roads to the north, south, and east. An inner circular road is provided to serve as a main road.

Housing: Residential areas of higher density are located along the central spine, and moderate density areas are located on both sides of the high density area. The district is composed of four neighborhood units.

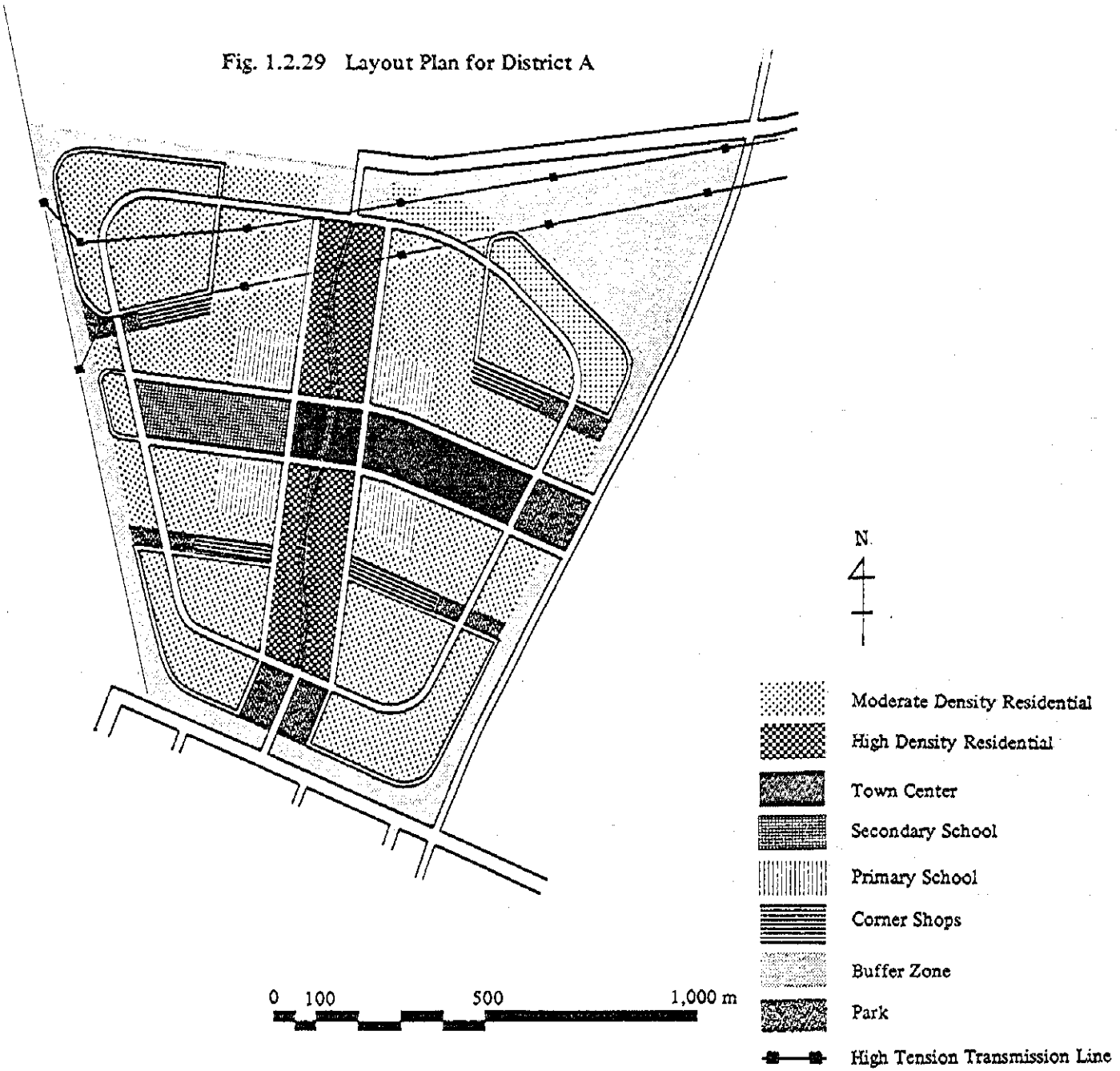
Center: The town center is located in the middle of the district. Some shopping, social and cultural facilities are provided at the ground level of the high density housing.

Green Network: A buffer zone surrounds the district, and some square-shaped parks are located in each neighborhood as well as a linear park along the central spine. Open access to the shore along the buffer zone is also considered.

Land Area: The size of each land use area (200 ha in total) and of areas for various urban facilities are as follows:

- o High Density Residential : 22 ha, 1700 d.u.
- o Moderate Density Residential : 91 ha, 5500 d.u.
- o Town Center : 6 ha
- o Schools : 11 ha
- o Corner Syops : 3 ha
- o Parks : 7 ha
- o Buffer: : 60 ha

Fig. 1.2.29 Layout Plan for District A



(2) District B

Access: The district has access to the northern main road of the district. There are four loops which serve the residential area.

Housing: High density residential areas are located in the northern section, and moderate density areas are located around the town center. The district is made up of one neighborhood unit which is to serve primarily as a community for fishermen and industrial workers.

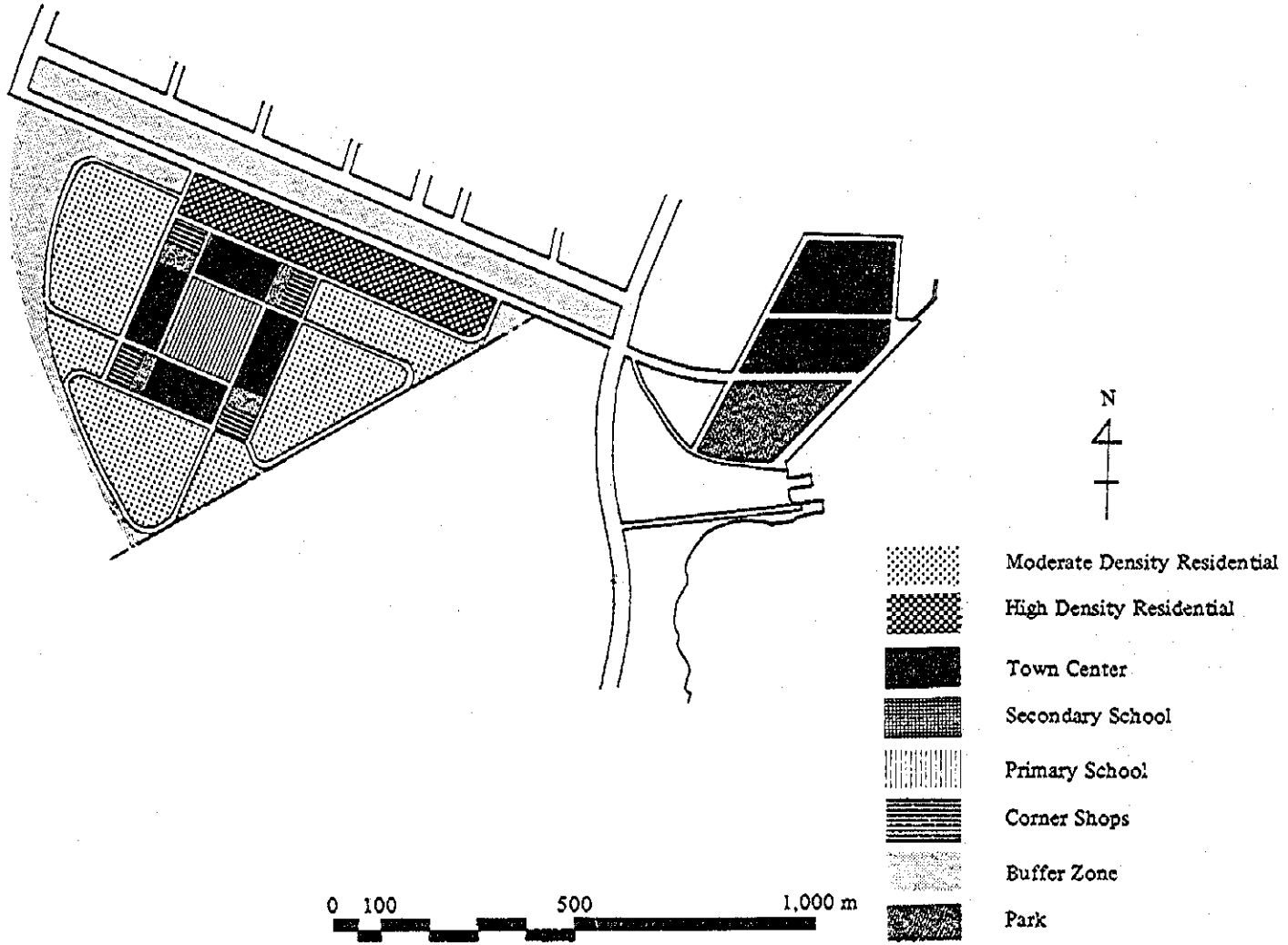
Center: A relatively small town center is located in the middle of the district, and a larger town center, which is to comprise waterfront restaurants and shops is located close to the Ataqa Port.

Green Network: A buffer zone surrounds the district, and small square-shaped parks are located in each neighborhood. There is a pedestrian way between the waterfront and the town center along the northern main road of the district.

Land Area: The size of each land use area (72 ha in total) and of areas for various urban facilities are as follows:

- o High Density Residential : 6 ha, 400 d.u.
- o Moderate Density Residential : 30 ha, 1400 d.u.
- o Town Center : 10 ha
- o School : 2 ha
- o Corner Shops : 2 ha
- o Parks : 5 ha
- o Buffer : 17 ha

Fig. 1.2.30 Layout Plan for District B



1.2.6 Utilities Plan

(1) General

For the feasibility study, utilities should be planned to serve the Ataqa Industrial Estate, Adabiya Industrial Free Zone and Ataqa-Adabiya Port area. Utilities plans are, however, prepared taking into account the requirements of other parts of the Study Area including Ain Sukhna and Ras Sudr whenever it is more realistic, with the following assumptions:

1) In the case of water supply, some project elements are planned so that they can serve for common use considering scale economy. Namely, a treatment plan is proposed to serve the whole Study Area including the Ain Sukhna and Ras Sudr areas besides the Ataqa-Adabiya area.

   The water transmission main to be laid between the treatment plant and the Ataqa-Adabiya area is proposed to have a flow capacity which is big enough to supply treated water to Ain Sukhna in addition to the Ataqa-Adabiya area.

2) Residential areas neighbouring the Ataqa Industrial Estate are not included in the scope of the feasibility study and, therefore, neither water and electricity distribution systems nor a sewerage system are planned within these areas. Major project elements including the following items, however, are planned so that they can meet the requirements of these areas.

   - o Water treatment plants
   - o Water transmission mains
   - o Water distribution basins
   - o Sewage treatment plant
   - o Electricity transmission lines
   - o Primary substation

3) For the facilities proposed for common use, allocation of construction cost is made for the served areas. The allocated cost for the Ataqa-Adabiya area and the cost of facilities for the exclusive use of the area are given in Section 3.2 of this volume.

(2) Water Supply

The water supply plan is prepared based on the projected water demand for Ataqa-Adabiya area as given in Tables 1.2.5 -- 1.2.8.

Methodologies for demand projection are as explained in Section 4.7.1 of Part I in Vol. II. In formulating the plan, the following assumptions are made:

1) Based on the SCA water supply record and the data for advanced and developing countries, unaccounted for water use including leakage and fire-fighting water is assumed as 15% of water treatment plant output for 1995. Treatment plant use is 5% of the output.

Table 1.2.5 Projected Domestic Water Demand in the Ataqa-Adabiya Area, 1995

('000 m³/day)

Area	Residential Use			Commercial & Public Use			Green Area Irrigation			Total		
	A.D.	M.D.	P.H.	A.D.	M.D.	P.H.	A.D.	M.D.	P.H.	A.D.	M.D.	P.H.
Urban Area												
District A	5.2	6.8	10.4	0.5	0.7	1.0	0.7	0.7	0.7	6.4	8.2	12.1
District B	0.2	0.3	0.4	0.6	0.8	1.2	0.5	0.5	0.5	1.3	1.6	2.1
Industrial Estate												
Center	–	–	–	0.1	0.1	0.2	0.6	0.6	0.6	0.7	0.7	0.8
Industrial Free Zone												
Center	–	–	–	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.5
Total	5.4	7.1	10.8	1.3	2.1	2.6	2.1	2.1	2.1	8.8	10.9	15.5

Note: A.D.: Average day demand in terms of accumulated demand at intake point
M.D.: Max. day demand
P.H.: Peak hour demand
Seasonal and hourly demand fluctuation are not taken into account for green area irrigation.

Table 1.2.6 Projected Industrial Water Demand in the Ataqa-Adabiya Area, 1995

('000 m³/day)

Area	Avg. Day	Max. Day
Industrial Estate	40.3	52.4
Industrial Free Zone	2.5	3.3
Total	42.8	55.7

Note: Avg. Day: Average day demand in terms of accumulated demand at intake point
Max. Day: Maximum day demand

2) The seasonal and hourly demand fluctuation is assumed as follows:

- o Seasonal fluctuation for all uses
  Maximum day demand = 1.3 x Average day demand
  Design Cop. of Treatment Plant = 1.5* x Average day demand
  * Considering maintenance and overhaul of the water treatment plant.
- o Hourly fluctuation for domestic and tourism uses
  Peak hour demand = 2.0 x Average hour demand

No hourly fluctuation is assumed for industrial and ship supply uses.

3) The ongoing Southwest Transmission Project is assumed to be completed by early 1986. The capacity of the Southwest Transmission Project is 20,000 m^3/day in terms of treatment plant output.

4) Water supply facilities including intakes, treatment plants, raw and treated water mains and distribution ponds are planned to meet the additional demand which can not be satisfied by the existing and ongoing water supply schemes.

5) The incremental water demand expected during the 1986 – 1995 period should be fully met by public water supply development projects.

6) Raw water should be withdrawn from the Suez Sweetwater Canal, considering the scarcity and degraded quality of the groundwater resources in and around the Ataqa-Adabiya area and the relative cost of alternative water supply schemes.
   The layout plan for the water distribution system for the Ataqa-Adabiya area is shown in Fig. 1.2.31.

Water Treatment Plant: The water treatment plant is planned to meet the maximum day demand. To meet the water demand increase expected in the Ataqa-Adabiya area during the 1986 – 1995 period, a new treatment plant with a capacity of 79,900 m^3/day is proposed to be constructed by 1995 along the Suez Sweetwater Canal about 3.0 km north of the existing plant, to take advantage of the proximity to the raw source, while the capacity of the existing Suez Treatment Plant is proposed to be expanded by 21,100 m^3/day.

Considering the quality of the raw water which is to be withdrawn from the Suez Sweetwater Canal, the following treatment process is to be adopted:

1) Chlorination and neutralization
2) Flocculation
3) Sedimentation
4) Filtration (rapid sand)

The quality of the treated water should meet WHO standards.

A flow sheet showing the treatment process of the proposed new water treatment plant is given in Fig. 1.2.32.

Table 1.2.7 Projected Port Water Demand in the Ataqa-Adabiya Area, 1995

(m^3/day)

Port	Avg. Day	Max. Day
Ataqa Port	1,580	2,054
Adabiya Port	680	884
Fishery Port	6	8
Total	2,266	2,946

Note: Avg. Day: Average day demand in terms of accumulated demand at intake point
Max. Day: Max. day demand

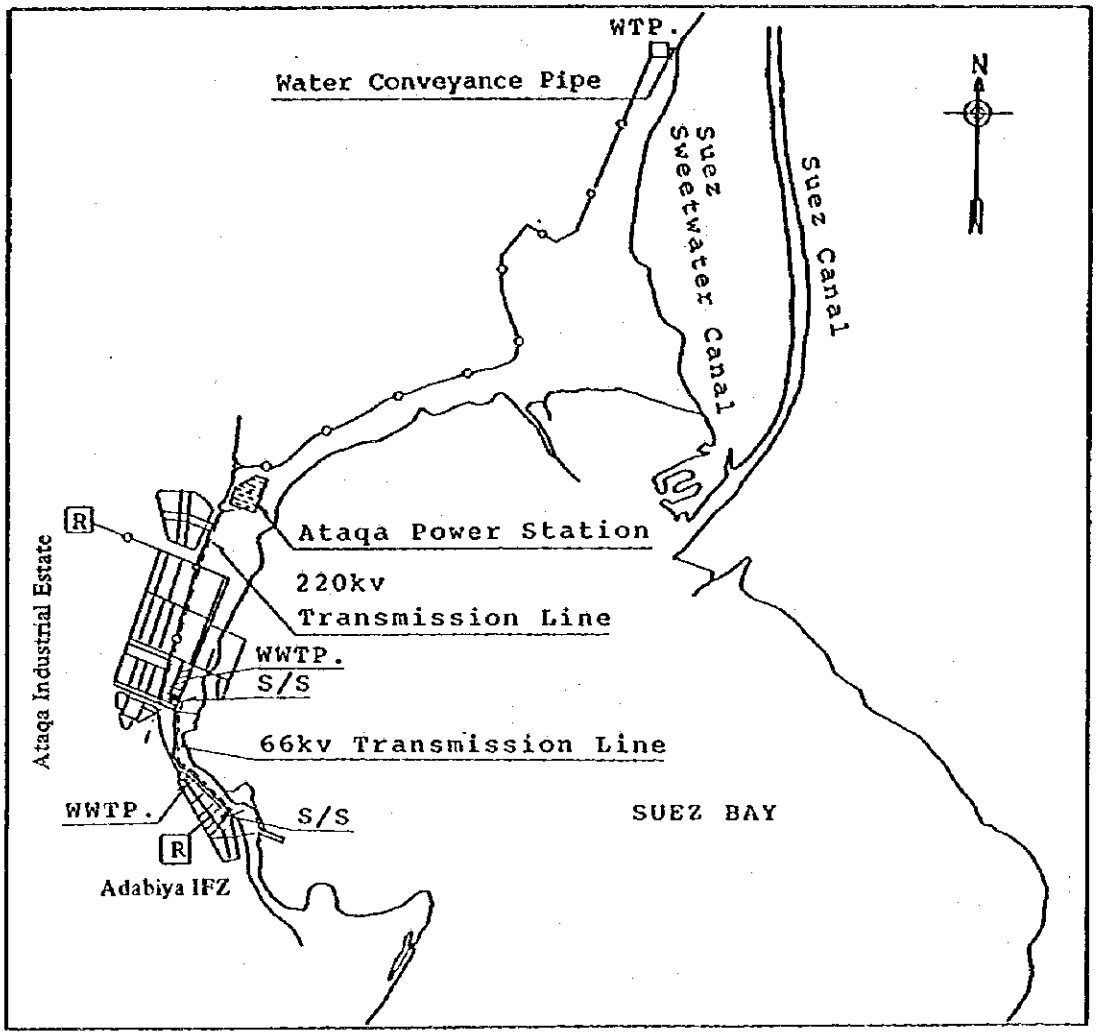
Table 1.2.8 Projected Total Water Demand in the Ataqa-Adabiya Area, 1995 (Avg. Day Base)

('000 m^3/day)

Category / Area	Domestic	Industrial	Port	Total
Urban Areas	7.7	–	–	7.7
Industrial Estate	0.7	40.3	–	41.0
Industrial Free Zone	0.4	2.5	–	2.9
Port	–	–	2.3	2.3
Total	8.8	42.8	2.3	53.9

Note: Figure are demand at the intake point.

Fig. 1.2.31 Utilities Network Plan



LEGEND

—o— Trank Water Main

- - - - Transmission Line

□WTP. Water Treatment Plant

[R] Distribution Basin

Ataqa Power Station

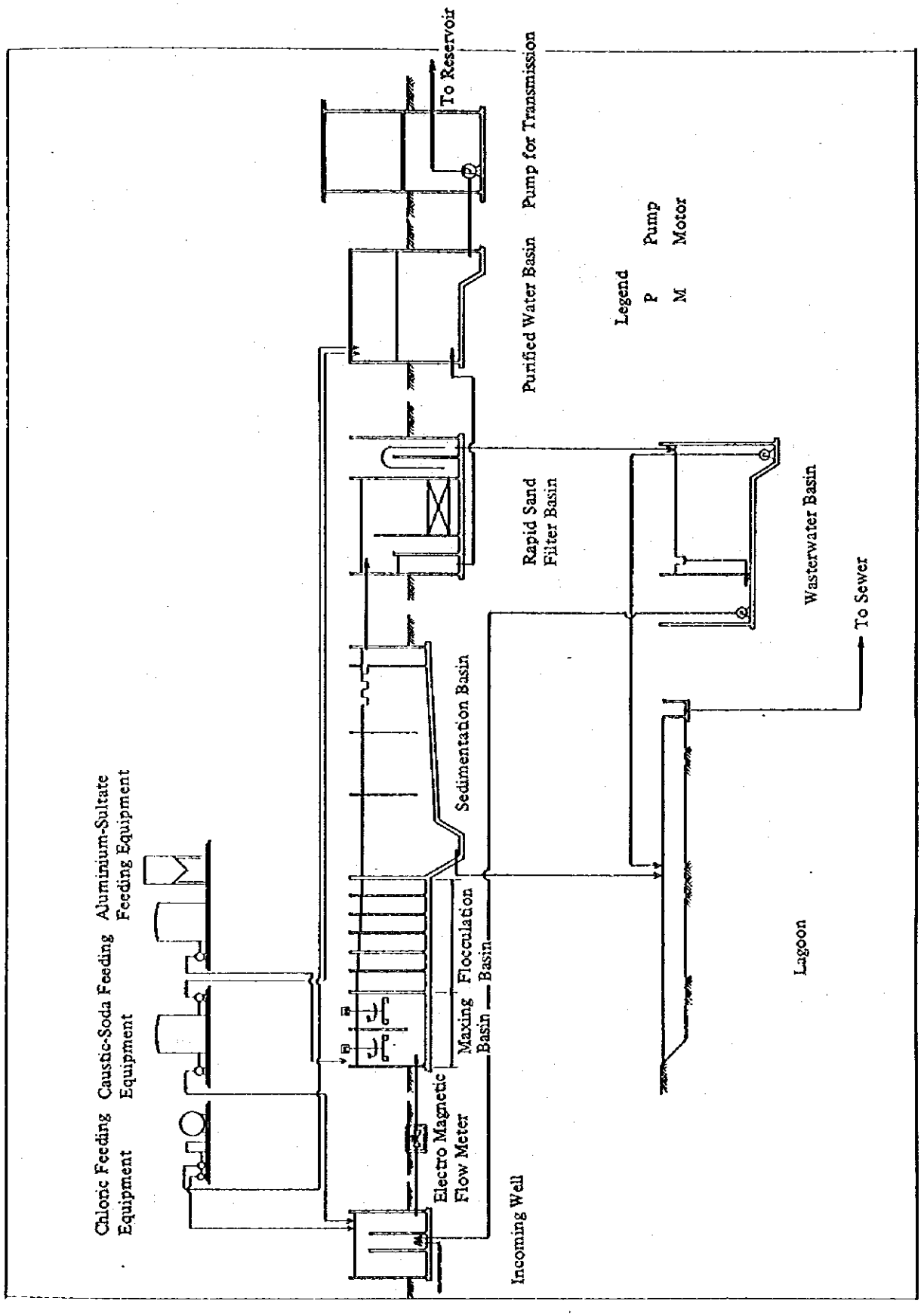
S/S Substation

WWTP. Waste Water Treatment Plant

Scale

0 1 2 3 4 5 km

Fig. 1.2.32 Proposed New Water Treatment Plant



Water Transmission Mains: To convey treated water to the distribution system for the Ataqa-Adabiya area, water transmission mains are to be constructed. Water mains are designed so that the maximum day demand plus fire fighting requirements should be supplied, assuming that the hourly demand fluctuation should be absorbed by the distribution basins to be constructed as part of the distribution systems. The mains should be made of either mortal-lined ductile iron or steel depending on their diameters. In determining the diameters, flow velocity is assumed at 1.2 m/s. A total length of 23.1 km of mains should be laid to convey treated water to the Ataqa-Adabiya area. The principal features of the mains are shown in Table 1.2.9.

Water Distribution System: The treated water will be supplied to the distribution basins. The capacity of the basins is set equal to 20% of the maximum day demand to adjust for the hourly fluctuation of the water demand. Two distribution basins are proposed to be constructed for the Ataqa-Adabiya area as shown in Fig. 1.2.31. The principal features of the distribution basins are given in Table 1.2.10.

Table 1.2.9 Principal Features of the Proposed Water Transmission Mains for the Ataqa-Adabiya Area to be laid by 1995

Location (From → To)	Diameter (mm)	Flow Capacity (ℓ/s)	Length (m)
New Suez Water Treatment Plant → Ataqa	900	864.6	14,500
Transmission Main → Distribution Basin in Ataqa	900	816.0	2,400
Ataqa → Adabiya	450	202.5	5,500
Transmission Main → Distribution Basin in Adabiya	250	54.4	650

Table 1.2.10 Principal Features of the Distribution Basins for the Ataqa-Adabiya Area to be constructed by 1995

Area	Land Area (m^2)	Capacity (m^3)
Ataqa	13,400	14,100
Adabiya	6,400	940
Total	19,800	15,040

(3) Sewage Disposal

Based on the projected volume of sewage and industrial wastewater for the Ataqa-Adabiya area as given in Tables 1.2.11 to 1.2.14, a wastewater disposal plan is prepared. Methodologies for estimation are explained in Section 4.7.2 of Part I in Vol. II. In formulating the plan, the following assumptions are made:

1) Seasonal and hourly fluctuations of sewage discharge are assumed to be the same as those of water demand.

2) No historical record of the characteristics of the water quality of the domestic and commercial sewage is available in and around the Ataqa-Adabiya area including Suez City. With regard to the industrial wastewater, only limited data are at hand. The quality of the sewage and industrial wastewater of the Ataqa-Adabiya area in 1995 is assumed, therefore, based on those of Japan in the early 1980's.

3) Pretreatment of industrial wastewater including neutralization and removal of toxic materials should be carried out by the factories prior to discharging into the central sewage system.

4) The quality of treated sewage to be discharged to local receiving waters including canals and the sea should comply with the standards stipulated in Law No. 48 in 1982 "Regarding the Protection of the River Nile and Waterways from Pollution", as follows:

PH	:	6 to 9
BOD	:	less than 60 ppm
SS	:	less than 60 ppm
Total Coliforms	:	5,000 MPN/100 ml

5) The incremental sewage and industrial wastewater after 1985 should all be disposed of by the central sewage system.

Sewers: To convey the discharged sewage and industrial wastewater to the sewage treatment plant, sewers are to be constructed. Sewers are designed so that the hourly peak discharge plus the infiltration of groundwater can be conveyed.

The cross-section of the sewers is determined so that the discharge capacity of the sewers is twice as big as the estimated flow rate in the case of 500 mm diameter pipes or less and one and half times as big as the flow rate for bigger pipes. The gradient of the sewers is set in the range of 1.0/1,000 to 2.5/1,000 so that the flow velocity is kept at 1.0 to 1.2 m/s. Annual average rainfall in the Study Area is around 30 mm or less, and no allowance is made for the rain storm water. The layout plan for the sewerage system for the Ataqa-Adabiya area is shown in Fig. 1.2.31.

Table 1.2.11 Projected Domestic Sewage Discharge in the Ataqa-Adabiya Area, 1995

('000 m³/day)

Area	Residential			Commerical & Public			Total		
	Avg. Day	Max. Day	Peak Hour	Avg. Day	Max. Day	Peak Hour	Avg. Day	Max. Day	Peak Hour
Urban Areas									
District A	3.3	4.3	6.6	0.4	0.6	0.8	3.7	4.8	7.4
District B	0.1	0.1	0.2	0.4	0.5	0.8	0.5	0.7	1.0
Industrial Estate									
Center	–	–	–	0.1	0.1	0.2	0.1	0.1	0.2
Industrial Free Zone									
Center	–	–	–	0.1	0.1	0.2	0.1	0.1	0.2
Sub Total	3.4	4.4	6.8	1.0	1.2	2.0	4.4	5.7	8.8
Infiltration of Groundwater	0.3	0.3	0.3	0.1	0.1	0.1	0.4	0.4	0.4
Total	3.7	4.7	7.1	1.1	1.3	2.1	4.8	6.1	9.2

Table 1.2.12 Projected Industrial Wastewater Discharge in Ataqa-Adabiya, 1995

('000 m³/day)

Area	Avg. Day	Max. Day
Industrial Estate	26.0	34.0
Industrial Free Zone	1.6	2.1
Sub Total	27.6	36.1
Infiltration of Groundwater	2.8	2.8
Total	30.4	38.9

Table 1.2.13 Projected Port Sewage Discharge in the Ataqa-Adabiya Area, 1995

('000 m^3/day)

Port	Avg. Day	Max. Day
Ataqa Port	1,020	1,326
Adabiya Port	440	572
Fishery Port	4	5
Sub Total	1,464	1,903
Infiltration of Groundwater	146	146
Total	1,610	2,049

Table 1.2.14 Projected Total Sewage and Wastewater Discharge in the Ataqa-Adabiya Area, 1995 (Avg. Day Base)

('000 m^3/day)

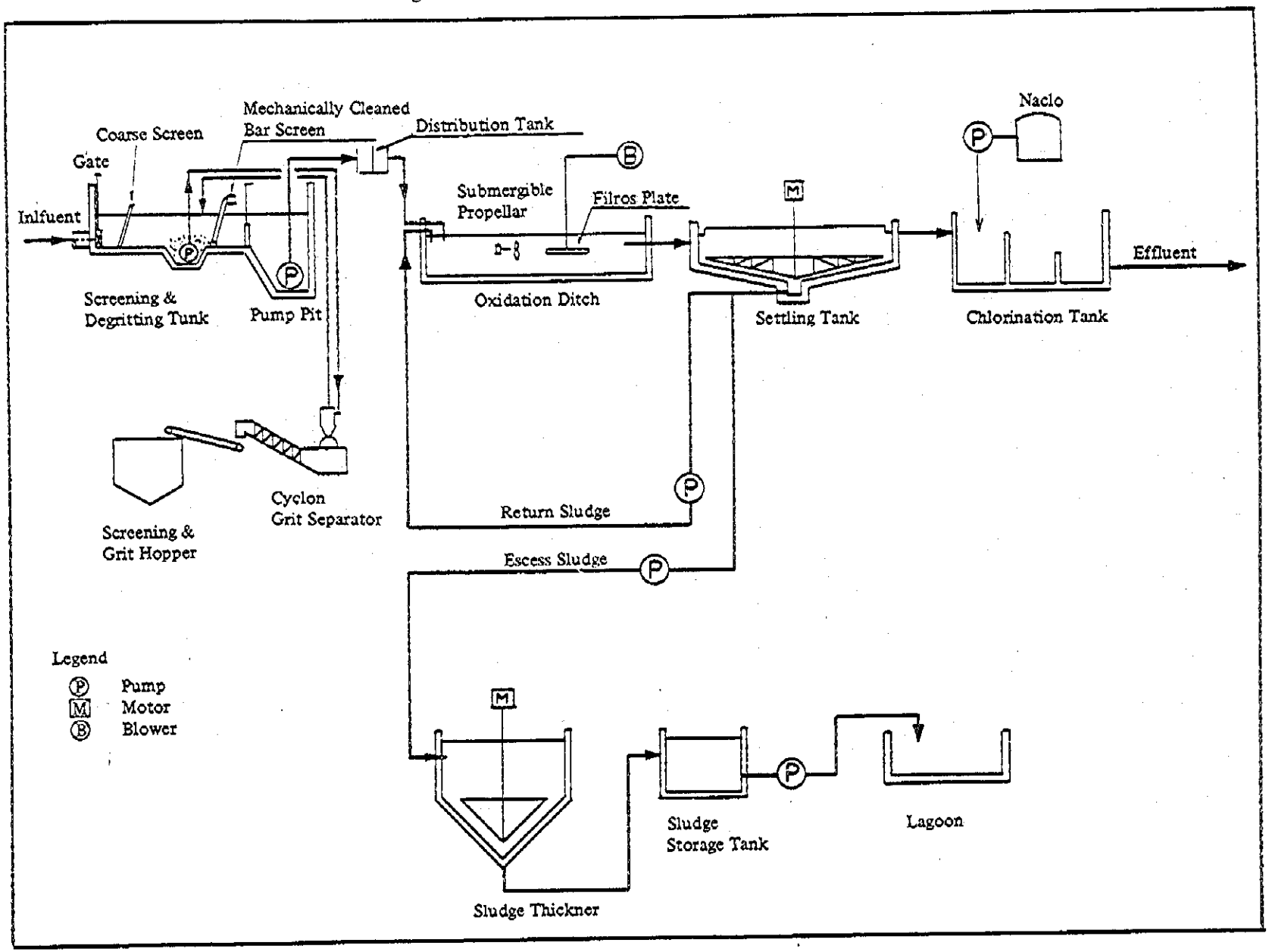
Category / Area	Domestic	Industrial	Port	Total
Urban Areas	0.2	--	--	4.2
Industrial Estate	0.1	26.0	--	26.1
IFZ	0.1	1.6	--	1.7
Port	--	--	1.6	1.6
Sub Total	4.4	27.6	1.6	33.6
Infiltration of Groundwater	0.4	2.8	0.1	3.3
Total	4.8	30.4	1.7	36.9

Sewage Treatment Plant: The sewage treatment plant is planned so that the maximum day discharge can be treated. Treatment alternatives considered for sewage disposal include oxidation ditch, aerated lagoon and standard activated sludge, and oxidation ditch is adopted based on the following factors, also taking into account the impact of the treated sewage on the receiving waters.

- o Operation and maintenance of the facilities is relatively easy.
- o Operation and maintenance cost is relatively inexpensive.
- o Though the oxidation ditch method requires a relatively huge tract of land, adequate land space is available for constructing the treatment plants.

The treatment plant sites are selected to minimize the potential of the sewage getting septic, and to maximize the use of gravity collectors to save pumping cost. The proposed sites for sewage treatment plants are shown in Fig. 1.2.31. The flow of the oxidation ditch process is shown in Fig. 1.2.33. The total capacity of the proposed treatment plants amounts to 43,000 m^3/day for Ataqa and 2,600 m^3/day for Adabiya.

Fig. 1.2.33 The Flow of the Oxidation Ditch Process



(4) Power Supply

The power supply plan is prepared based on the projected power demand of the Ataqa-Adabiya area and its load characteristics as given in Tables 1.2.15 – 1.2.18. Methodologies for demand projection are explained in Section 4.7.3 of Part I in Vol. II. In formulating the plan, the following assumptions are made:

1) The Ayun Musa Thermal Power Station proposed by JICA in 1983 should be constructed. Phase I with 600 MW of installed capacity should be commissioned by 1995 and Phase II with another 600 MW should be commissioned by 2005. The transmission lines to be extended from the power station should be interconnected with the existing transmission lines between Suez City and Cairo which form a part of the national unified power grid via a new substation to be constructed northwest of the Ataqa Power Station.

2) The installed capacity of the Ataqa Power Station will be reinforced to 600 MW. The planned 300 MW unit 4 which is now at the tendering stage should be commissioned by 1995.

3) The planned generating capacity of the Ayun Musa and Ataqa Power Stations is well over the projected power demand for the Study Area in 1995 including the Ataqa-Adabiya area. No other power generating stations, therefore, are proposed to be constructed in the Study Area. It is also proposed in this study that the power network for the Study Area should be interconnected with the national grid at Ataqa as well as at El Sukhna.

   The planned Ataqa Industrial Estate, Adabiya Industrial Free Zone and Ataqa-Adabiya Port are located in close proximity to the existing Ataqa Power Station, the installed capacity of which is scheduled to reach 900 MW by 1995, and it is proposed that power will be supplied by the Ataqa Station through the transmission lines.

   The existing transmission lines pass aslant the planned Ataqa Industrial Estate for about 5 km. This portion of the transmission lines, therefore, should be realigned so that it will not obstruct the proposed land use in the area. Two primary substations are proposed to be constructed with two 220/66 KV transformers with a capacity of 70 MVA each and three 66/11 KV transformers with the total capacity of 81 MVA. The layout plan for the power distribution system for the Ataqa-Adabiya area and a skeleton connection diagram for the primary substations are shown in Fig. 1.2.31 and 1.2.34. The principal features for the primary substations are given in Tables 1.2.19 and 1.2.20.

Table 1.2.15 Domestic Power Demand in the Ataqa-Adabiya Area, 1995

Area	Residential		Commercial & Public		Total	
	GWH/year	MW	GWH/year	MW	GWH/year	MW
Urban Areas						
District A	10.8	1.9	0.3	0.1	11.1	2.0
District B	0.4	0.1	0.3	0.1	0.7	0.2
Industrial Estate						
Center	–	–	0.1	0.0	0.1	0.0
Industrial Free Zone						
Center	–	–	0.0	0.0	0.0	0.0
Total	11.2	2.0	0.7	0.2	11.9	2.2

Table 1.2.16 Industrial Power Demand in the Ataqa-Adabiya Area, 1995

Area	GWH/year	MW
Industrial Estate	396.3	106.7
Industrial Free Zone	53.4	15.2
Total	449.7	121.9

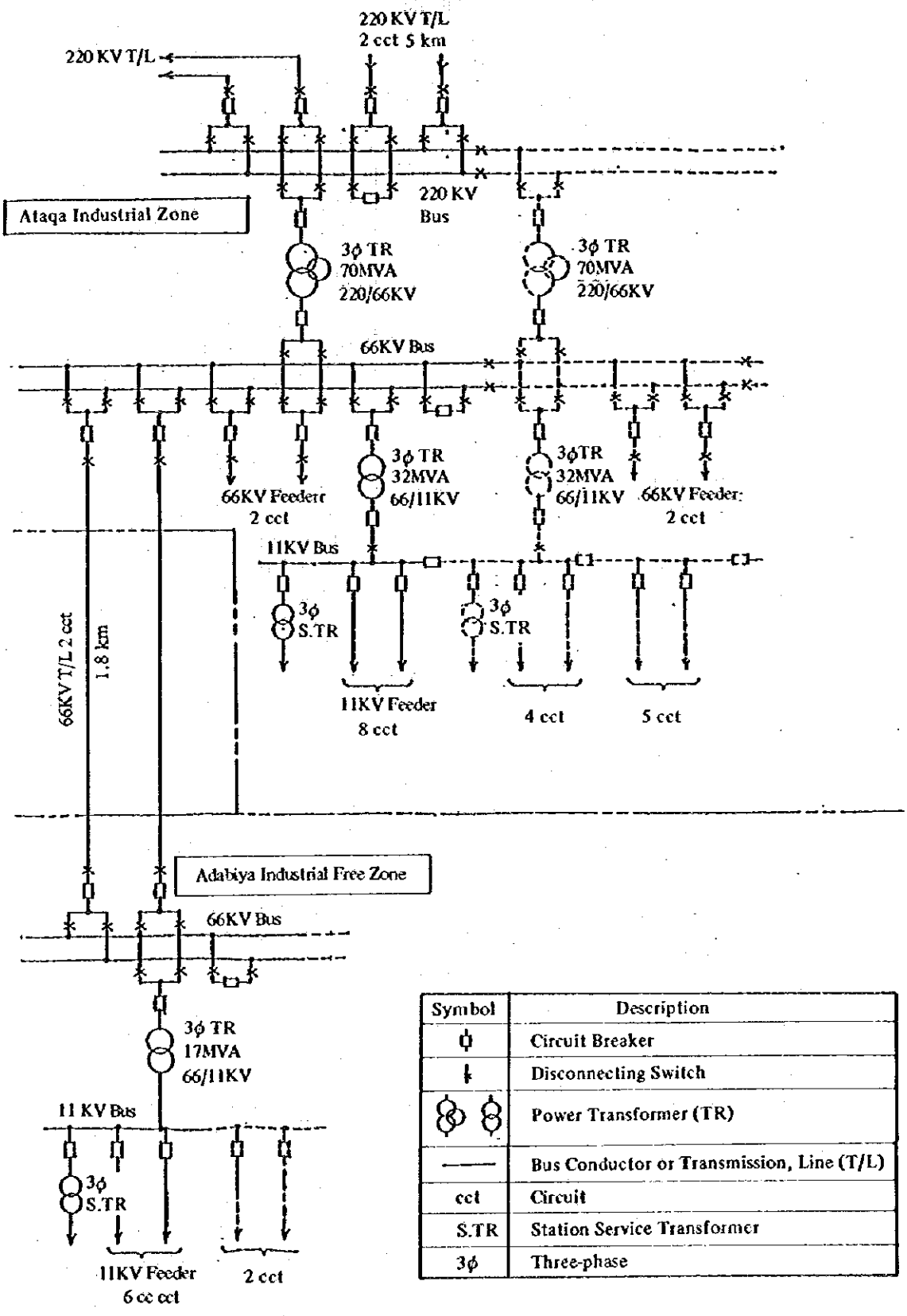
Table 1.2.17 Port Power Demand in the Ataqa-Adabiya Area, 1995

Port	Gwh/year	Mw
Ataqa Port	52.7	9.4
Adabiya Port	10.1	1.8
Fishery Port	0.6	0.1
Total	63.4	11.3

Table 1.2.18 Total Power Demand in the Ataqa-Adabiya Area, 1995

Category / Area	Domestic		Industrial		Port		Total	
	GWH/ year	MW	GWH/ year	MW	GWH/ year	MW	GWH/ year	MW
Urban Areas	11.8	2.2	–	–	–	–	11.8	2.2
Industrial Estate	0.1	0.0	396.3	106.7	–	–	396.4	106.7
Industrial Free Zone	0.0	0.0	53.4	15.2	–	–	53.4	15.2
Port	–	–	–	–	63.4	11.3	63.4	11.3
Total	11.9	2.2	449.7	121.9	63.4	11.3	525.0	135.4

Fig. 1.2.34 Skeleton Connection Diagram for the Primary Substations



Symbol	Description
ϕ	Circuit Breaker
ϕ	Disconnecting Switch
⊗ ⊗	Power Transformer (TR)
——	Bus Conductor or Transmission, Line (T/L)
cct	Circuit
S.TR	Station Service Transformer
3ϕ	Three-phase

Table 1.2.19 Principal Features for the Primary Substation for Ataqa to be constructed by 1995

Facilities	Sets Requires	Notes
1. Transformer		
M. TR 3φ 220/66KV 70 MVA	2	Main Transformer
TR. 3φ 66/11KV 32MVA	2	Transformer
S. TR 3φ11KV/400--230V 500KVA	2	Station Service Transformer
2. Switchgear		
220KV GCB W/CT @27	7	Gas Circuit Breaker
220KV DS W/E 3φ @2.8	4	Disconnecting Switch/with Earthing Switch
220KV DS W/D 3φ @3.3	16	Disconnecting Switch/without Earthing Switch
220KV PD 1φ @2.8	6	Potential Device
220KV L.A. 1φ @2.6	27	Lighting Anester
66KV GCB @7	11	Gas Circuit Breaker
CT 1φ 1φ @1	33	Current Transformer
DS W/E @1	4	Disconnecting Switch/with Earthing Switch
DS W/D @0.9	26	Disconnecting Switch/without Earthing Switch
PD 1φ 1φ @1	12	Potential Device
L.A. 1φ 1φ @0.5	18	Lightning Anester
11KV Cubicle @6	26	
Low ten ACB @2	3	Low Tension Air Circuit Breaker
NFB Su AC @2	2	No Fuse Breaker Sub AC Board
NFB Su DC @2	1	No Fuse Breaker Sub DC Board
Charger @3	1	
Control Boards		
220KV TL @4	2	220KV Transmission Line
220KV TR @5	2	220KV Transformer
66KV TR @5	2	66KV Transformer
66KV T/L @4	2	66KV Transmission Line
11KV Feeder @5	5	
3. Aux. Equipment		
Battery	1	
Oil Pur. Equip.	1	Oil Purifying Equipment
Tools & Meters	1	

Table 1.2.20 Principal Features for the Primary Substation for Adabiya to be constructed by 1995

Facilities			Sets Requires	Notes
1. Transformer				
TR. 3φ 66/11KV 17MVA			1	Transformer
S. TR 3φ 11KV/400–230V 100KVA			1	Station Service Transformer
2. Switchgear				
66KV GCB		@7	4	Gas Circuit Breaker
CT	1φ	@1	12	Current Transformer
DS W/E		@1	2	Disconnecting Switch/with Earthing Switch
DS W/D		@0.9	8	Disconnecting Switch/without Earthing Switch
PD	1φ	@1	6	Potential Device
L.A.	1φ	@0.5	9	Lightning Anester
11KV Cubicle		@5	10	
Low ten ACB	@2	@2	1	Low Tension Switchgear
NFB Su AC		@2	1	No Fuse Breaker Sub AC Board
NFB Su DC		@2	1	No Fuse Breaker Sub DC Board
Charger		@3	1	
Control Boards				
66KV TR		@5	1	66KV Transformer
66KV T/L		@4	1	66KV Transmission Line
11KV Feeder		@5	3	
3. Aux. Equipment				
Battery			1	
Tools & Meters			1	

1.3 Land Use Plan for 1995

The short-term development plan concentrates on the Ataqa-Adabiya area, where major industrial development including an export processing zone and port development will take place as a propulsive development for the region, based on the development scenario explained in Chapter 6 of Part I in Volume II.

In Adabiya, around 80 ha of free zone (export processing zone) is planned for the expected consumer-related, processing and assembly group industries. The free zone is connected by three roads to Adabiya Port, 7 berths of which will start their full operations by 1987/88 after the current rehabilitation and construction works are completed. Two additional berths for multi-purpose use for containerized cargo and special cargo are planned to expand port capacity.

In Ataqa, around 400 ha of industrial estate is planned for the expected non-metallic minerals, mineral products, food, textile and apparel industries. The fishery port and grain terminal are layed out close to the industrial estate for the food processing industry to minimize transportation cost. Residential areas are layed out on both sides of the industrial estate to minimize the commuting distance of the workers.

The reclaimed land behind the coal and bulk cargo terminal is planned for building materials industries ahead of the construction of the coal terminal in the second phase in order to balance the volume of dredged and reclaimed soil.

Port facilities in Ataqa include a highly mechanized grain terminal with 70,000 tons of silos in Phase I, 2 bulk cargo berths and 1 coal berth with a branch railway line. The grain terminal is designed to be able to distribute bagged wheat by trucks and bulk wheat by rail wagons and by conveyor belt to the nearby flour mill.

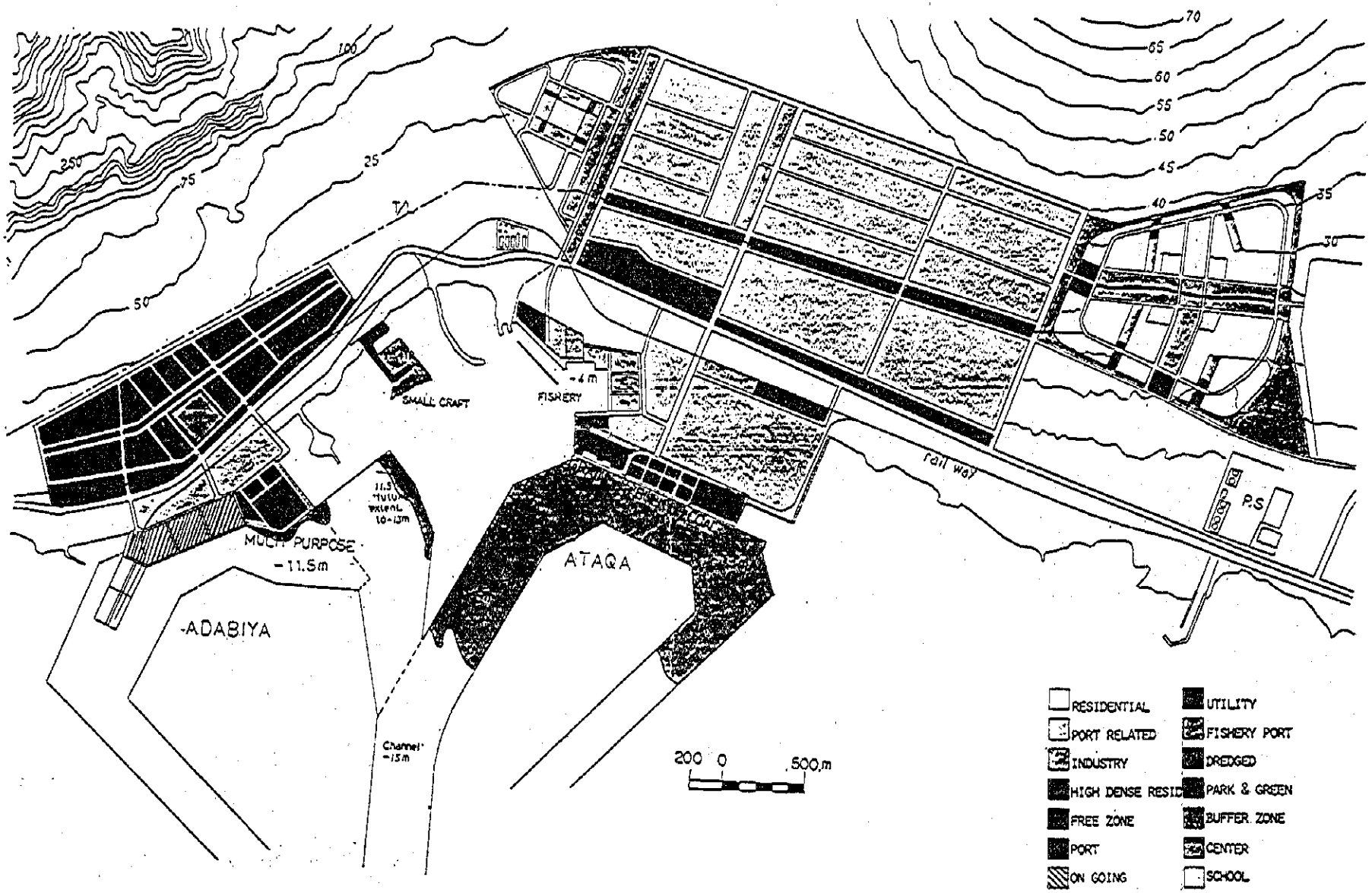
An additional 7.5 m wide carriageway coastal road connecting Adabiya with Suez is planned to meet the industrial and port development in this area.

In the industrial estate and industrial free zone, 2-lane roads are planned as the trunk roads, and necessary roads within industrial and residential areas are also planned. As for railways, an Ataqa port rail system including a branch line to Ataqa Port, shunting yards for train composition and loading yards for grain and coal in Ataqa Port are planned under the short-term development.

Tourism development in the short-term is principally concentrated on ongoing and existing tourism spots in Ras Sudr and Ain Sukhna.

The land use plan for 1995 is shown in Fig. 1.3.1.

Fig. 1.3.1 Short-term Development Plan



1.4 Identified Projects

The short-term plan requires the immediate start of new projects and the completion of existing ones. Although certain projects are already defined, other parts of the first phase of the plan need further analysis. For instance, as to the introduction of new industries, feasible factories and plant size must be defined through another detailed study if they are to be implemented by the public sector. However, most of the factories are expected to locate privately after provision of necessary infrastructures such as industrial estates, utilities and transportation facilities.

In order to attract necessary private investment, the public sector has to prepare necessary infrastructures ahead of private investment.

This volume is prepared to provide necessary information to decide on the implementation of the projects, and includes preliminary designs and cost estimations together with a general discussion of the financial and economic aspects of necessary propulsive projects, so that budgets can be approved and construction can start as quickly as possible.

As is stated in the development dynamics section in Volume II, the projected urban development is planned to be achieved through industrial development mainly by the private sector. The urgent and necessary public sector projects to induce new development in the Study Area are as follows:

Project 1 Port Development at Ataqa-Adabiya

To provide necessary facilities for the export of products and import of raw materials with lower cost to attract export-oriented industries.

To provide necessary facilities for the import and storage of wheat to attract the food complex based on the flour mill.

To provide necessary facilities to promote fisheries and food processing industries related to fisheries.

Project 2 Industrial Estate Development at Ataqa

To provide the necessary estate and facilities to attract the expected industries.

Project 3 Export Processing Zone Development at Adabiya

To provide the necessary industrial estate and facilities to attract export-oriented industries.

Project 4 Related Utilities Development in Ataqa-Adabiya

To provide the necessary water, electricity, and sewerage treatment system to attract the expected industries and to support port and urban activities.

2. Implementation

2.1 Implementation Schedule for the Identified Projects

The implementation schedule for the identified projects is set as shown in Table 2.1.2 to maximize the net benefits from the projects subject to the technical capacity of execution and possible annual disbursements.

In order to avoid the risks arising from excessively early implementation of the industrial estate and free zone, the implementation schedule for these infrastructures is divided into three and two stages respectively as shown in Table 2.1.1.

Table 2.1.1 Staging Plan for the Industrial Sector Development

Industrial Estate			Industrial Free Zone	
1987/88~90/91	89/90 ~ 92/93	91/92 ~ 94/95	1988/89~90/91	89/90 ~ 92/93
Foods & Cement Industries	Foods Industries	Chemicals & Ceramics Industries	Machinery Industries	Machinery Industries

Note: Execution periods includes those for factory construction.

Table 2.1.2 Detailed Construction Schedule

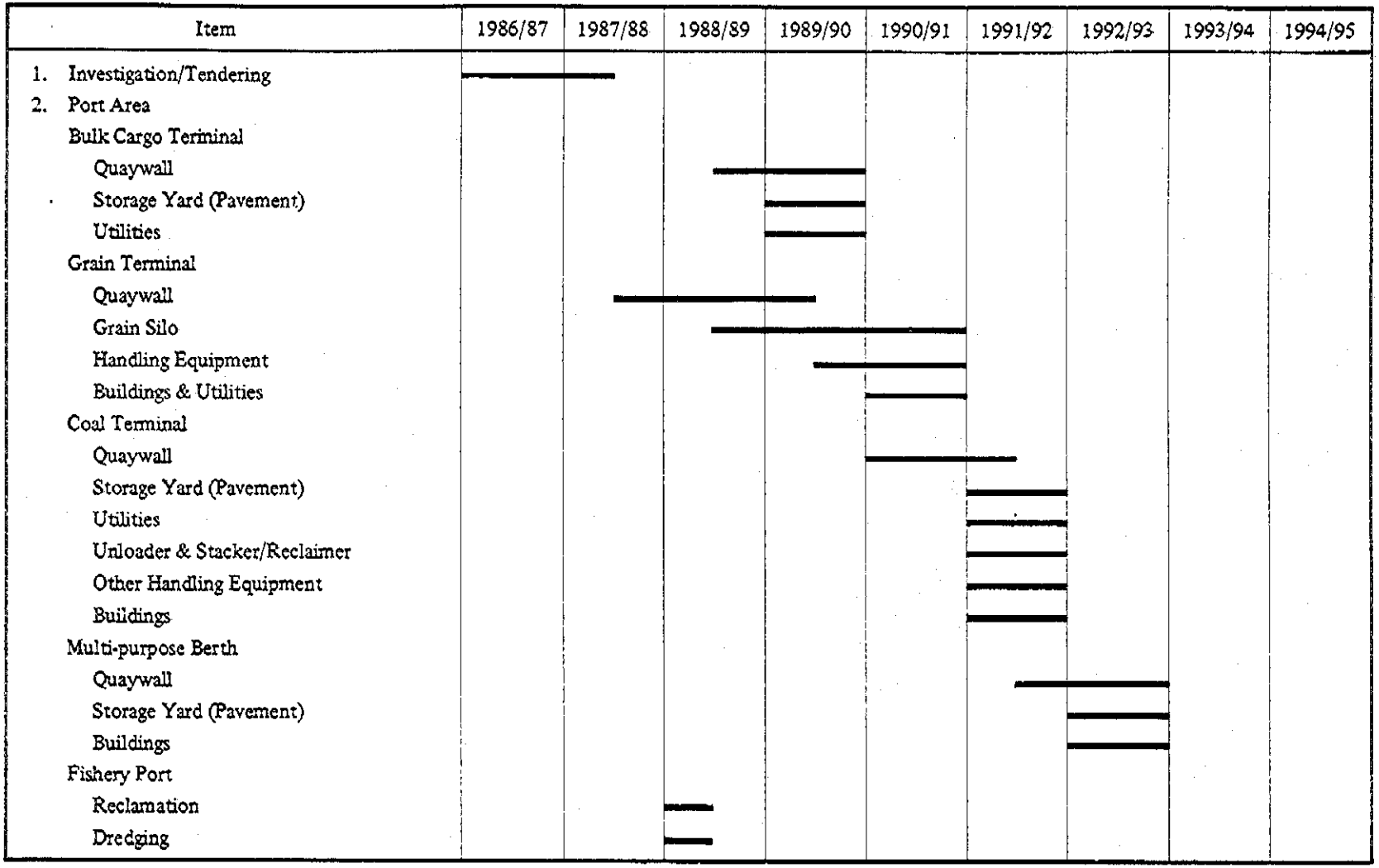


Table 2.1.2 (Continued)

Item	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Quaywall									
Pavement									
Transit Shed									
Related Buildings									
Water Supply									
Small Craft Berth									
Reclamation									
Dredging									
Quaywall									
Road									
Related Buildings									
General Works									
Reclamation									
Dredging									
Revetment									
Site Preparation									
Navigation Aids									
Road									
Implementation Supervision									
3. Industrial Estate									
Stage 1									
Center Building									
Drainage									
Sewerage									
Road									
Street Lighting									

Table 2.1.2 (Continued)

Item	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Water Supply									
Electricity									
Site Preparation									
Stage 2									
Center Building									
Drainage									
Sewerage									
Road									
Street Lighting									
Water Supply									
Electricity									
Site Preparation									
Stage 3									
Drainage									
Sewerage									
Road									
Street Lighting									
Water Supply									
Electricity									
Site Preparation									
Implementation Supervision									
4. Industrial Free Zone									
Stage 1									
Center Building									
Drainage									
Sewerage									

Table 2.1.2 (Continued)

Item	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Road									
Street Lighting									
Water Supply									
Electricity									
Site Preparation									
Stage 2									
Drainage									
Sewerage									
Road									
Street Lighting									
Water Supply									
Electricity									
Site Preparation									
Implementation Supervision									
5. Related Infrastructures									
Railways									
Trunk Roads									
Water Supply Mains									
Water Treatment Plants									
Sewerage Plants									
Electricity									
Implementation Supervision									

2.2 Management and Operation of the Projects

2.2.1 General

The Suez Bay Coastal Area Development will be one of the leading projects to achieve the dispersion of population and industry from the two major metropolitan areas, which is the most important object of the Egyptian national development policy. However, it is not too much to say that what holds the key to the success of this big project is the short-term development plan, because it is the first stage of the entire project, and its success or failure will directly affect the following development.

To lead this short-term project to success, the users of the new port and the tenants of the new industrial estate and free zone should be attracted on schedule, and this deeply depends on the effort of the Egyptian government.

For this purpose, the government must establish an appropriate institutional framework and realize effective and efficient management and operations. The management body will have to make timely decisions and conduct harmonious implementation through close cooperation with and smooth coordination among the various sectors concerned. Efficient management is necessary to overcome the abuses of the bureaucracy which are often pointed out as one of the main factors which hinder industrial activities. The following is the result of the study on the suitable institutional framework and some essential points for the effective and efficient management and operation of the port, the industrial estate and the industrial free zone.

2.2.2 Institutional Framework

(1) Appraisal of the Existing Institutional Framework

Bases for the Appraisal:

1) Types of Institutional Framework

The types of institutional framework to implement the overall development of a region such as this project are generally classified as shown in Table 2.2.1.

Table 2.2.1 Types of Institutional Framework

Classification		Explanation
One-Agency Type		One agency takes responsibility for the whole implementation.
Multi-Agency Type	without a Coordination Organ	Each agency concerned takes responsibility for the implementation only in its sector.
	with a Coordination Organ	One organ takes responsibility for coordination among the agencies concerned.

2) Functions of the Institutional Framework

The institutional framework for the implementation of this kind of project is required to fulfill the following functions.

- o To make timely decisions
- o To maintain close cooperation with and smooth coordination among the various sectors concerned during the whole implementation period: the planning, construction, and management and operation stages.
- o To deal flexibly with necessary modifications of the plan

Appraisal: Out of the existing organs, the Suez Governorate and the Ministry of Development, New Communities and Land Reclamation have the possibility to serve under a one-agency type framework, which is preferable to the multi-agency type in that it simplifies the decision making process facilitating timely decisions and modifications of the plan.

1) Suez Governorate

In the case of regional development, a local government is commonly the most suitable implementation body of the project. However, this is not true in Egypt because the local government has little power for the overall regional development.

2) Ministry of Development, New Communities and Land Reclamation

On the contrary, this ministry is considered to be the most appropriate agency to oversee the implementation of this project because Presidential Decree No. 72 in 1972 gives it substantial power to make development plans and to construct the necessary infrastructures in five regions in Egypt: Cairo City, the Suez Canal, the Sinai Peninsula, the Western Desert and the Red Sea.

But coordination with other concerned agencies seems to be required both in the planning and the implementation stages. Furthermore, the Ministry's power doesn't cover all the works required in this project; for example port facilities are managed and operated by the Port Authorities at present.

3) Various Agencies

The multi-agency type framework is usually not efficient, because it cannot effect timely decisions and modification of the plan due to the necessity of consultation among different agencies. To improve this type of institutional framework, the following measures will be required;

- o A permanent coordination organ like a steering committee consisting of high officials from all the relevant organs must be created.
- o The leading agency which has comparatively large power must be nominated to support the coordination organ and to smooth the implementation.

The purpose of all these measures is to make the decision and implementation process smoother.

(2) Proposed Institutional Framework

As a result of the appraisal of the existing institutional framework, we propose a new one as illustrated in Fig. 2.2.1.

This proposal depends on the following considerations.

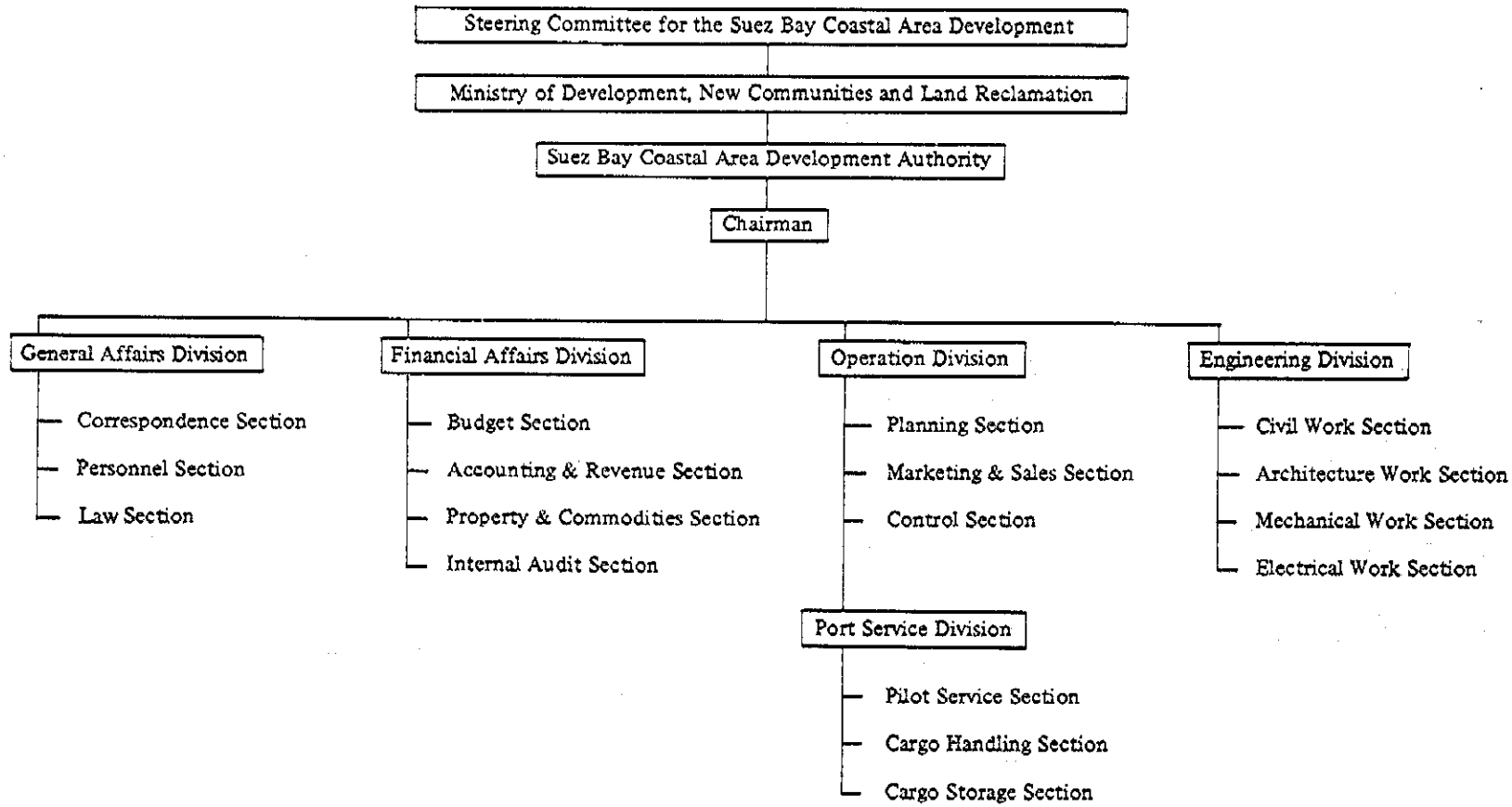
- o It is most efficient that one agency takes full responsibility for all the necessary works of this project. Consequently, we propose that a new agency should be set up and we call it tentatively the Suez Bay Coastal Area Development Authority (hereinafter referred to as "SBDA").
- o But coordination with the relevant organs will be required even for this new authority in all the stages of the project: the planning, construction and operation stages.

  For smooth decision making on the plan, a steering committee consisting of high officials from all the relevant organs, which we tentatively name the Steering Committee for the Suez Bay Coastal Area Development, must be organized.

  And at the same time, the leading agency which will support the Steering Committee should be nominated to smooth its activities. We propose that the Ministry of Development, New Communities and Land Reclamation is to be appointed as this leading agency, considering the present power balance among the organs concerned.
- o Accordingly, it is effective for SBDA to belong to the Ministry of Development, New Communities and Land Reclamation.
- o And it is also preferable that SBDA be organized with specialists of each sector transferred from the relevant organs.

Through the concentration and accumulation of experience and know-how, SBDA will greatly contribute to the development projects.

Fig. 2.2.1 Proposed Institutional Framework for the Implementation of the Project



2.2.3 Steering Committee for the Suez Bay Coastal Area Development

(1) Members of the Steering Committee

The following agencies, at least, are expected to join the Steering Committee for the Suez Bay Coastal Area Development:

- o Ministry of Development, New Communities and Land Reclamation
- o Ministry of Planning
- o Ministry of Finance
- o Ministry of Investment and International Economic Cooperation
- o Ministry of Economy and Foreign Trade
- o Ministry of Industry and Mineral Wealth
- o Suez Canal Authority
- o Ministry of Transport and Communications
- o Ministry of Maritime Transport
- o Ministry of Supply and Home Trade
- o Ministry of Irrigation
- o Ministry of Electricity and Energy
- o Suez Governorate

(2) Powers of the Steering Committee

The powers which must be given to this Steering Committee are as follows:

- o Coordination among the agencies concerned
- o Decision of the implementation plan of the project
- o Supervision of the implementation

2.2.4 Suez Bay Coastal Area Development Authority (SBDA)

(1) Powers of SBDA

The powers which SBDA must have are as follows:

- o Fund raising
- o Land acquisition
- o Decision of the construction schedule
- o Research, planning and sales activities for the promotion of the port, industrial estate and industrial free zone
- o Management and operation of the facilities
- o Port services sales
- o Maintenance and repairs of the facilities and equipment

(2) Organization of SBDA

Fig. 2.2.1 illustrates an example of the organization of SBDA.

(3) Division of Duties

Table 2.2.2 shows an idea of the division of duties in SBDA.

(4) Number of Employees

The estimated number of employees of SBDA in 1995/96 is shown in Table 2.2.3. This number will increase or decrease according to the SBDA's business scale which we will consider in Chapter 5 of this volume.

Table 2.2.2 An Idea of the Division of Duties in SBDA

Division/Section	Port Sector	Industrial Sector		Urban Sector	Related Infrastructures Sector
		Industrial Estate	Industrial Free Zone		
General Affairs Division					
Correspondence Section	1. Office management 2. Management of official documents 3. Arrangement of the Steering Committee				
Personnel Section	1. Personnel affairs 2. Payment of salaries				
Law Section	1. Enactment of regulations 2. Transaction of regal problems				
Financial Affairs Division					
Budget Section	1. Budget-making 2. Fund raising 3. Contract-making 4. Settlement of accounts				
Accounting and Revenue Section	1. Survey on tariffs 2. Collection of charges 3. Receipts and disbursements of cash				
Property and Commodities Section	1. Land acquisition 2. Property management 3. Receipts and disbursements of commodities				
Internal Audit Section	1. Internal audit				

Table 2.2.2 (Continued)

Division/Section	Port Sector	Industrial Sector		Urban Sector	Related Infrastructures Sector
		Industrial Estate	Industrial Free Zone		
Operation Division					
Planning Section	1. Control of the land use in the development area 2. Research for the project promotion 3. Preparation of statistics 4. Decision of the progress plan of work				
Marketing and Sales Section	1. Collection and analysis of the necessary information 2. Promotion and sales activities of the port, industrial estate and industrial free zone 3. Publicity activities				
Control Section	1. Permission for the use of port facilities 2. Restriction on the use of port facilities 3. Connection with the Port Service Division	1. Selection of tenants 2. Control of the activities in the industrial estate 3. Connection with tenants	1. Selection of tenants 2. Control of the activities in the industrial free zone 3. Connection with tenants	1. Guidance and assistance of the private housing construction 2. Permission of the use of common facilities 3. Connection with residents	
Port Service Division					
Pilot Service Section	1. Pilot service				
Cargo Handling Section	1. Stevedoring and longshoring				
Cargo Storage Section	1. Cargo storage				
Engineering Division					
Civil Work Section	1. Design 2. Supervision of the implementation 3. Maintenance and repairs			of the civil engineering work	

Table 2.2.2 (Continued)

Division/Section	Port Sector	Industrial Sector		Urban Sector	Related Infrastructures Sector
		Industrial Estate	Industrial Free Zone		
Architecture Work Section	1. Design 2. Supervision of the implementation 3. Maintenance and repairs — of the architecture engineering work				
Mechanical Work Section	1. Design 2. Supervision of the implementation 3. Maintenance and repairs — of the mechanical engineering work				
Electrical Work Section	1. Design 2. Supervision of the implementation 3. Maintenance and repairs — of the electrical engineering work				
(Remarks) Scope of Business of each Sector	1. Dredging 2. Reclamation 3. Site Preparation 4. Design, supervision of the implementation, and maintenance and repairs of the navigation aids, port facilities on land and related infrastructures in the port area	1. Site Preparation 2. Design, supervision of the implementation, and maintenance and repairs of the public facilities in the industrial estate	1. Site Preparation 2. Design, supervision of the implementation, and maintenance and repairs of the public facilities in the industrial free zone	1. Site Preparation 2. Design, supervision of the implementation, and maintenance and repairs of the community facilities and related infrastructures in the urban area.	1. Design and supervision of the implementation of: 1) Water supply facilities 2) Drainage and sewerage facilities 3) Power supply facilities 4) Road 5) Railway wich locate outside of the port, industrial estate, industrial free zone and urban areas

Note: 1. Although it is desirable for SBDA to take the full responsibility for all the businesses required in this project, only the followings should be excluded because they are considered to be more suitable to be done by each responsible agency as a part of its nation-wide businesses.
1) Supervision of the industrial free zone as a position of the Customs
2) Water supply service
3) Sewage treatment service
4) Power supply service
5) Railway operation service
6) Maintenance and repairs of all the railway facilities and the water supply facilities, drainage and sewerage facilities, power supply facilities and road all of which locate outside of the port, industrial estate, industrial free zone and urban areas.

2. On the contrary, 7 Adabiya berths which are rehabilitated and constructed according to the Port of Suez Phase 2 Plan should be transferred from the Red Sea Port Authority to SBDA for their efficient management and operations.

Table 2.2.3 Estimated Number of Employees of SBDA in 1995/96

Division/Section	Port Sector	Industrial Sector		Urban Sector	Total
		Industrial Estate	Industrial Free Zone		
Chairman	1				1
General Affairs Division	Chief : 1				1 + 50 = 51
Correspondence Section	5	5	3	4	17
Personnel Section	13	5	3	4	25
Law Section	2	2	2	2	8
Financial Affairs Division	Chief : 1				1 + 63 = 64
Budget Section	9	4	3	5	21
Accounting and Revenue Section	10	3	2	6	21
Property and Commodities Section	5	5	3	4	17
Internal Audit Section	1	1	1	1	4
Operation Division	Chief : 1				1 + 58 = 59
Planning Section	7	5	4	4	20
Marketing and Sales Section	4	5	4		13
Control Section	14	2	2	7	25
Port Serviec Division	Chief : 1				1 + 1,087 = 1,088
Pilot Service Section	17				17
Cargo Handling Section	930				920
Cargo Storage Section	140				140
Engineering Division	Chief : 1				1 + 88 = 89
Civil Work Section	13	8	4	7	32
Architecture Work Section	2	1	1	8	32
Mechanical Work Section	4	1	1	8	14
Electrical Work Section	8	7	3	12	30
Total	1,184	54	36	72	6 + 1,346 = 1,352

Note: Number of employees in the related infrastructures sector is not estimated because they will be engaged only in their construction stage works.

2.2.5 Issues in Management and Operations

Here, we study the issues in SBDA's management and operation activities and propose some recommendations. But this study and these recommendations are limited only to the port and industrial sectors which are the most important for SBDA.

(1) Port

Promotion of Mechanization: There are two types of use of port facilities: exclusive use by a specific shipping company or a consignee and common use by various users. The former gives such merits to SBDA as construction and administrative cost reduction. But in this project, port facilities are planned to be constructed and operated as common use facilities on the basis of the demand projection. Accordingly, operation of the port efficiently with minimum cost and a minimum number of employees becomes the important issue.

To cope with this problem, mechanization of the cargo handling will be the key point. Fortunately in the proposed grain and coal berths, cargo handling will be fully mechanized. The promotion of mechanization in the other berths will also be required through the introduction of advanced equipment.

This mechanization, at the same time, enables the cost reduction of the users. For instance, shipping companies can save the plying cost through the cut down of their ships' stay at the port. This will be a good sales point and SBDA should advertize this advantage to attract users as scheduled or, if possible, more rapidly to this port.

Putting the Port Service Activities under Private Management: In this study, we propose that SBDA should take full responsibility for almost all activities including the planning, construction, management and operation of the port facilities and the supply of port services like pilotage, cargo handling and storage.

It is appropriate in this stage of the development to realize efficient management and operation through the unification of the relevant sections. However, we think that the port service supply activities should be put under private management at some future time to improve the service level. However, monopolistic national companies like the existing cargo handling and storage companies are not at all appropriate, because the improvement of the service level can be achieved only through competition among many companies.

(2) Industrial Estate and Industrial Free Zone

Disposition of Land: There are two alternatives for the disposition of land in the industrial estate and the industrial free zone: sales and rent.

For SBDA, the advantages of land sales outweigh those of renting, because SBDA will be able to collect the invested money in the early years and to reduce the administrative cost and the number of employees engaged in management activities. Land lease, on the other hand, would only give SBDA a little more power to control the activities of the factories.

Consequently, we recommend that SBDA should sell land in the industrial estate and industrial free zone.

However, the advantages for SBDA mean disadvantages for tenants, that is the enterprises need a lot of funds beyond the factory construction cost in the early years and so on. Then, payment conditions of the land purchase, which are proposed in Section 5.4.2 of this volume, must be carefully considered.

Government Funds: Attraction of industries to industrial estates and industrial free zones seems to be very difficult in every country. The attraction of foreign enterprises is especially difficult. To conduct this work successfully, the government and SBDA will have to expend great efforts.

To conduct market research, provide the necessary land and infrastructures at a reasonable cost, provide laborers with excellent skills, reduce the bureaucratic controls and give reasonable incentives for the tenants are all necessary conditions to overcome the competition in attracting industries.

For the government to provide land and necessary infrastructures at as cheap a price as possible, it must invest its own funds. As there will be no interest burden on those funds, they will contribute greatly to the price reduction of the land and infrastructures.

Incentives: As incentives for the tenants, especially for the foreign tenants, the following must be employed to make the estate and zone more attractive.

1) Both in the industrial estate and the industrial free zone:
   - o Alleviation of exchange controls which are the most serious problem for foreign enterprises at present
   - o Exemption or reduction of corporate income tax, fixed property tax and the individual income tax of the foreign employees at least for the first several years until the tenants' businesses are firmly established
   - o Establishment of a system to provide highly skilled Egyptian laborers, or otherwise subsidizing the enterprises for their cost for training Egyptian employees
   - o Establishment of a sales promotion system under the close cooperation between SBDA and the tenants
2) Especially in the industrial free zone:
   - o Relaxation of restrictions on trade
   - o Exemption or reduction of customs duties for all or part of the exported and imported goods
   - o Exemption from as many customs procedures as possible
   - o To permit the tenants to sell their products not only in foreign markets but also in the local market to a certain extent so that domestic industrial activities will not stagnate

3. Investment Cost Estimation

3.1 Preliminary Design of Facilities

3.1.1 Port

In designing port facilities in this study, Japanese design codes and standards (Technical Standards for Port and Harbour Facilities in Japan, etc.) are used for the design features and standards.

The structural type of berths is decided considering the economy, reliability of execution, period of construction, and the use of domestic materials and labour.

From the results of the natural conditions survey, soil foundation at the proposed sites are quite good and estimated wave heights are fairly small. Therefore no special attention is required in designing berths.

(1) Design Conditions

Tidal level: Design tidal level is set as shown in Fig. 3.1.1 based on the results of the natural conditions survey presented in Chapter 5 of Part I in Volume II. The relationship between datum level (DL) and elevation level (EL) which is based on the Mean Sea Level at Alexandria is as follows:

$$EL = DL + 1.137 \text{ m}$$

Earthquakes: The acceleration of 0.05 g is applied for the design of quaywalls considering the least acceleration applied in Japan for the design of port facilities, since there is no available record of earthquakes in Egypt.

Soil Conditions: Soil conditions at the quaywalls and the yards are set as shown in Fig. 3.1.2 based on the boring data from the Study Team and the data from past studies.

Wave Height: The design wave height is set as H 1/3 = 0.8 m based on the estimation explained in Chapter 5 of Part I in Volume II.

Depth and Crown Height of Quaywalls: The design water depth and crown height of structures are determined as shown in Table 3.1.1.

The design water depth is equal to the planned water depth which was determined in Chapter 5 of Part II in Volume II. The crown height of quaywalls was determined based on the "Technical Standards for Port and Harbour Facilities in Japan" which presents the following guideline.

$$\text{Crown Height} = \text{H.W.L.} + 1.0 - 2.0 \text{ m}$$

Fig. 3.1.1 Design Tidal Level

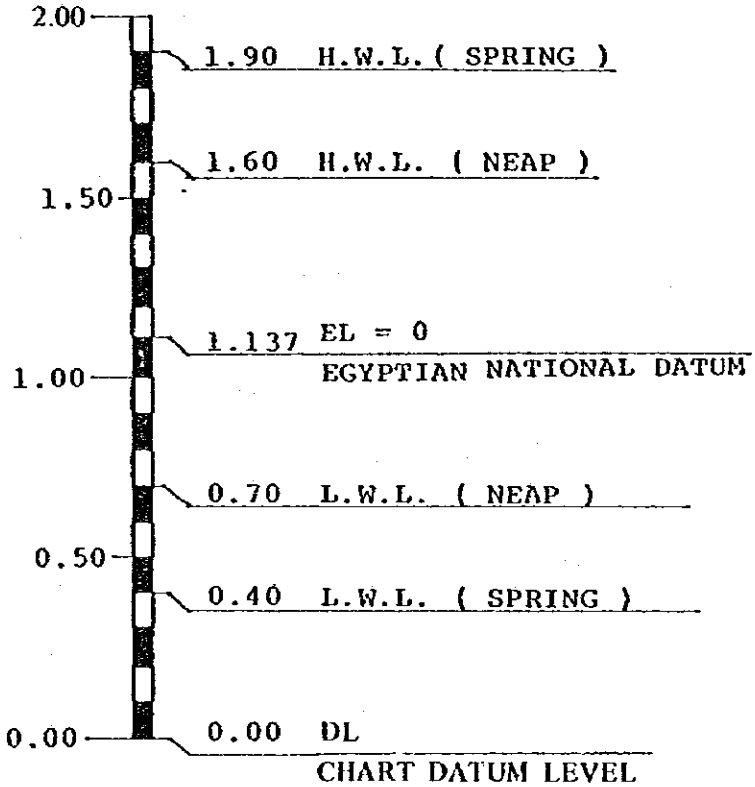


Fig. 3.1.2 Soil Conditions

FOR QUAYWALLS

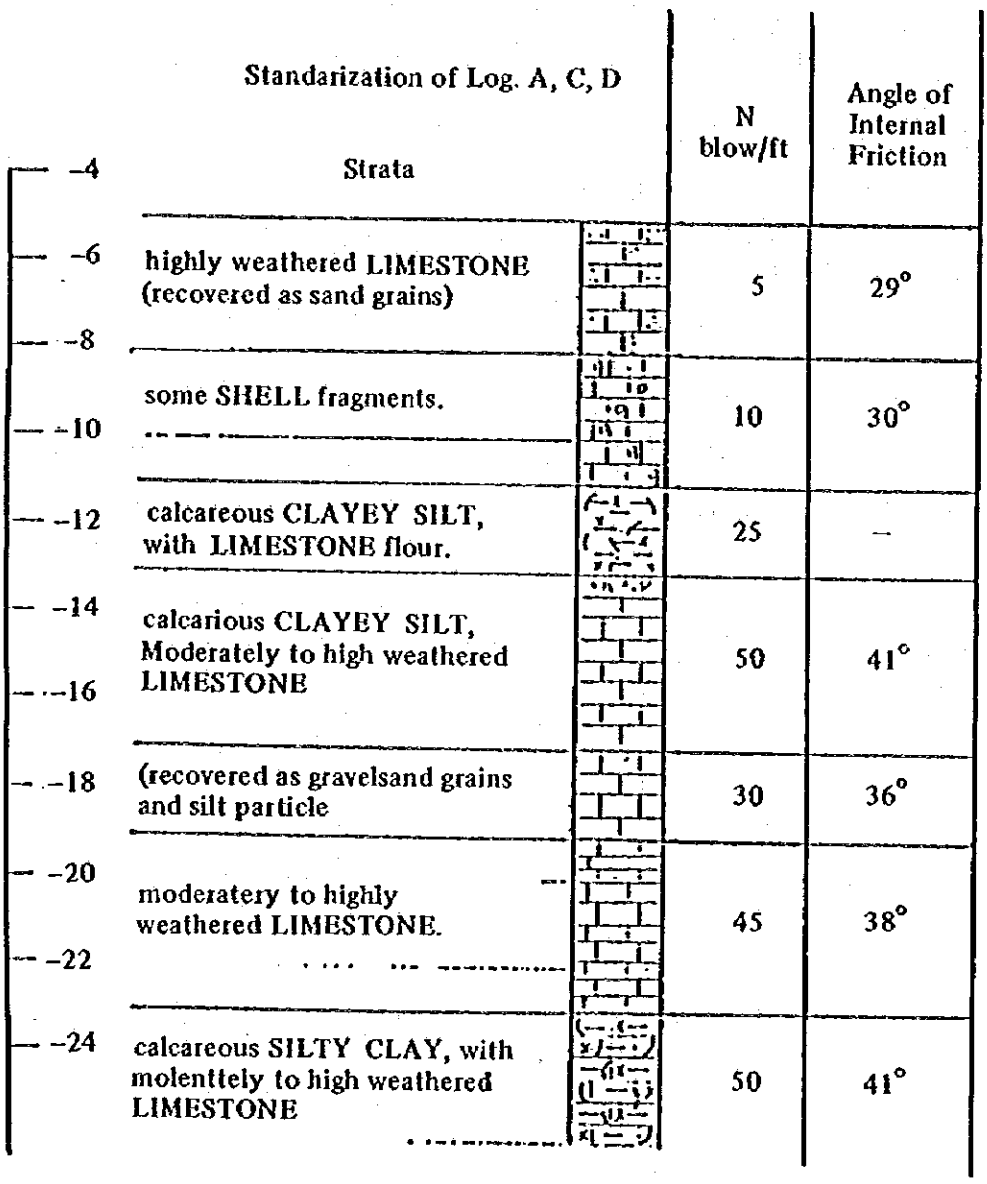


Fig. 3.1.2 (Continued)

FOR STRUCTURES ON YARD

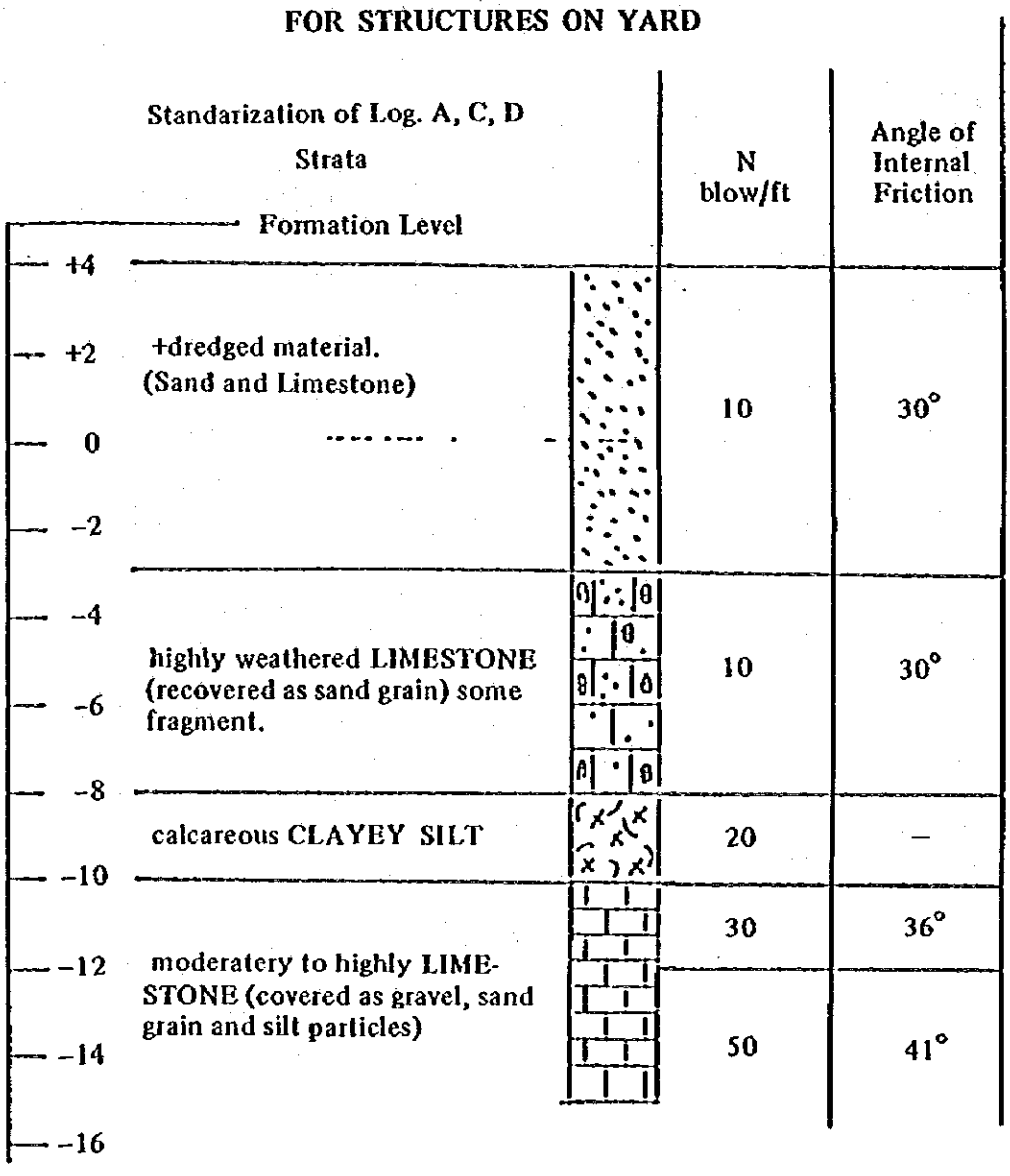


Table 3.1.1 Design Conditions of Berths

Name of Berth		Grain	Coal	Bulk Cargo
Plase		Ataqa	Ataqa	Ataqa
Design Conditions				
Surcharge	t/m²	1.0	1.0	1.0
Crown Height	m	DL +3.6	DL +3.6	DL +3.6
Design Depth	m	DL -15.0	DL -13.0	DL -11.5
Design Length	m	300	270	210
Max. Size of Vessels	DWT	80,000	50,000	20,000
Berthing Speed of Vessels	m/sec	0.10	0.15	0.15
Handling Facilities				
Type		Pneumatic Unloader	Unloader	Ship Loader
Capacity	t/h	1,200	1,000	120

Name of Berth		Multi-purpose	Small Craft	Fish Landing
Place		Adabiya	Adabiya	Ataqa
Design Conditions				
Surcharge	t/m²	3.0		
Crown Height	m	DL +3.6	DL +3.0	DL +3.0
Design Depth	m	DL -11.5	DL -4.0	DL -4.0
Design Length	m	210	60	210
Size of Vessels	DWT	20,000	GT 500	GT 250
Berthing Speed of Vessels	m/sec	0.15	0.20	0.20
Handling Facilities				
Type		Ship Loader	–	–
Capacity	t/h	230	–	–

(2) Structural Types for Preliminary Design

The structural types of quaywalls are determined by considering the characteristics of various structural types and examining the following factors:

- o Natural Conditions
- o Conditions of Use
- o Conditions of execution
- o Construction period
- o Construction cost
- o Availability of local resources including construction machines and labour

The concrete caisson type is the most recommendable for the following reasons:

1) Hard soil material at the foundation of the caisson minimizes predredging and replacement of stone.
2) The foundation for pneumatic unloaders on the grain terminal can be easily provided on the caissons.
3) A caisson production yard is available at Dars near Port Tawfik, also launching and towing facilities are available.
4) As caisson production has taken place at Dars since 1983, skilled laborers are available.
5) The caisson type is economical, capable of relatively quick construction, and experienced labourers are available for its construction in Suez.

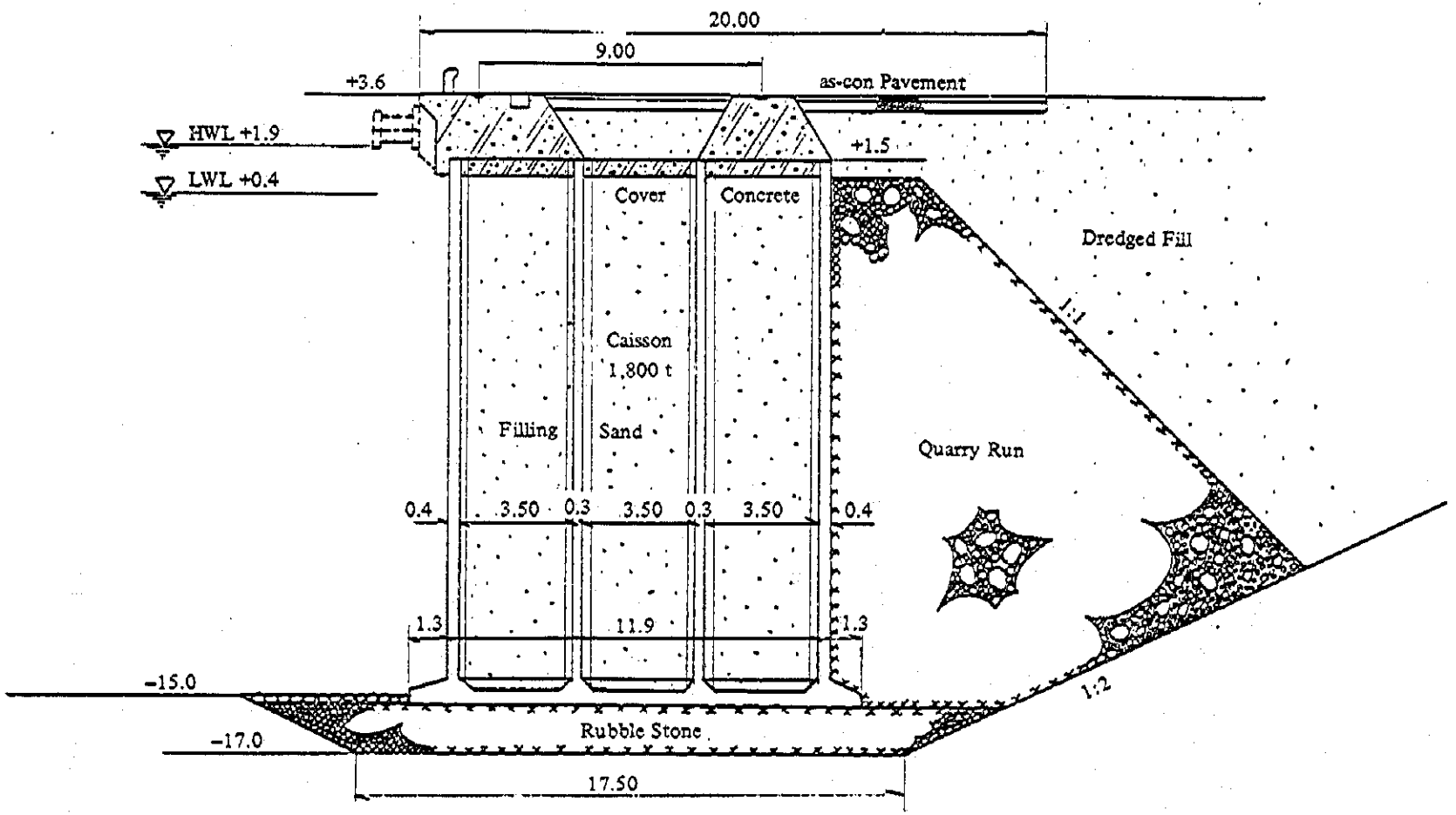
Steel type quaywalls such as open type wharves with steel piles, cellular type steel sheet pile wharves and regular steel sheet pile wharves are not recommendable for Suez Bay because of high salinity, pile driving problems on the soil foundation which consists of limestone, and 1.3 – 1.5 times higher cost with a higher percentage foreign currency required compared with the concrete types.

As to the concrete type quaywalls, concrete block quaywalls including concrete cellular block types are generally applicable in the Gulf of Suez, where there is a suitable soil foundation. However, as the break even point for the structural types between caisson type and concrete block type is at –10 – –12 m in depth, for the grain berth and coal berth, the caisson type is recommended.

Considering the possible decrease in cost by mass production of caissons, berths other than the grain and coal berths are also recommended to apply caisson construction. Though the modification of the Dars shipbuilding yard to construct a suitable caisson yard is necessary, the production cost per caisson can be reduced if a large number of caissons are produced.

The standard cross-sections of each berth are shown in Figs. 3.1.3 – 3.1.10.

Fig. 3.1.3 Cross Section of Grain Berth



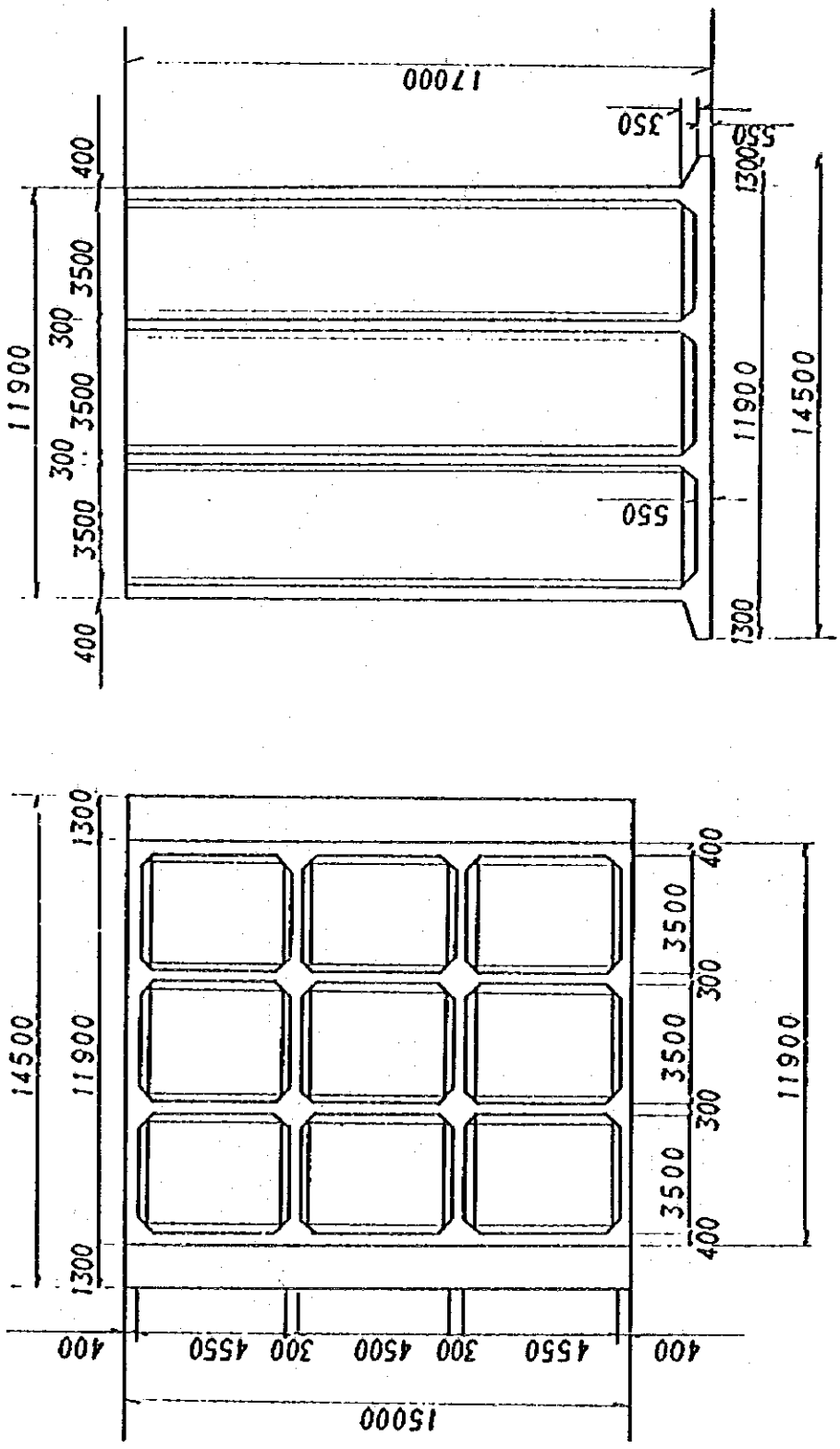


Fig. 3.1.4 Section of Concrete Caisson for Grain Berth

Fig. 3.1.5 Cross Section of Bulk Cargo Berths

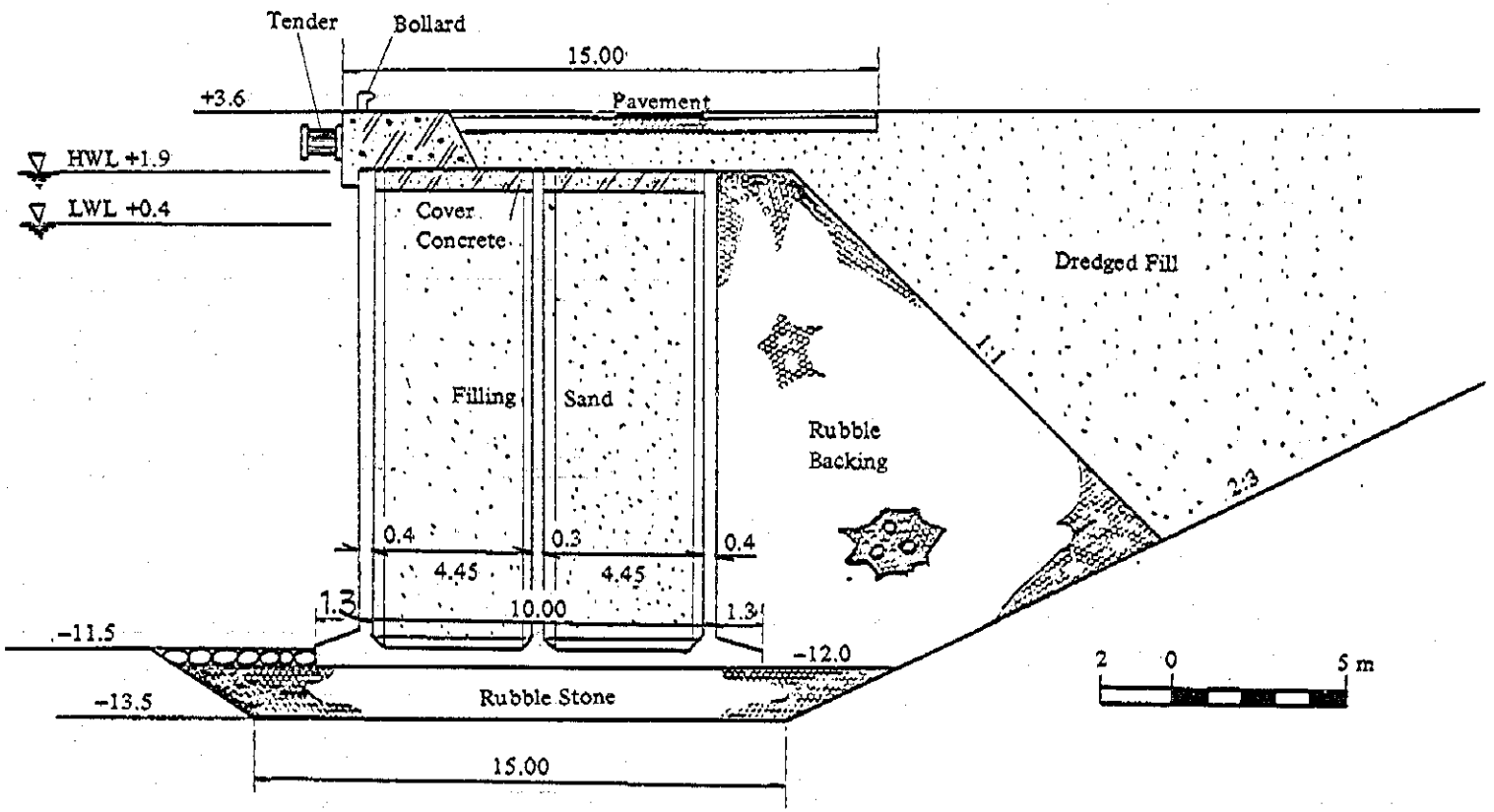


Fig. 3.1.6 Cross Section of Coal Berth

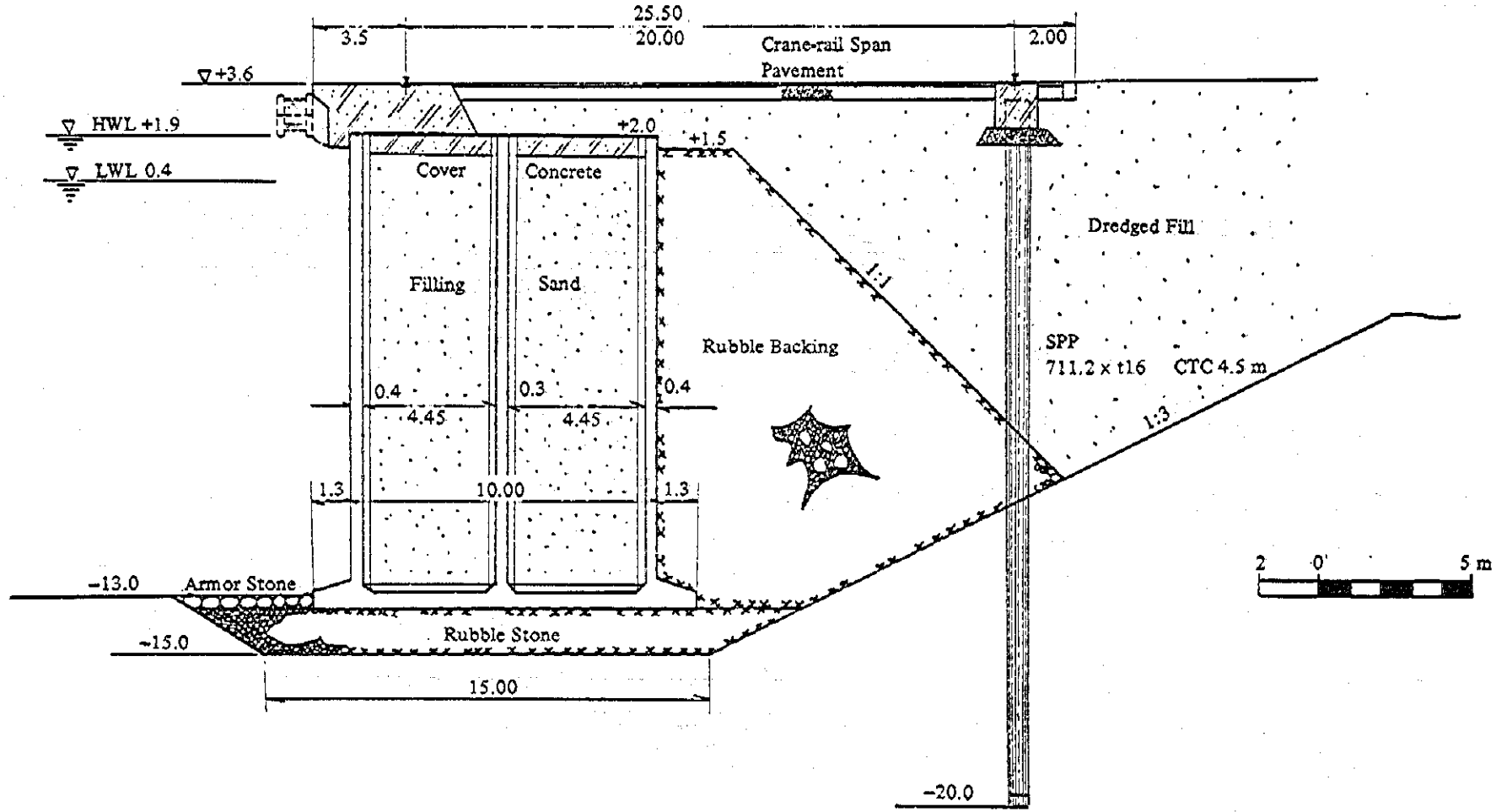


Fig. 3.1.7 Cross Section of Multi-purpose Berths

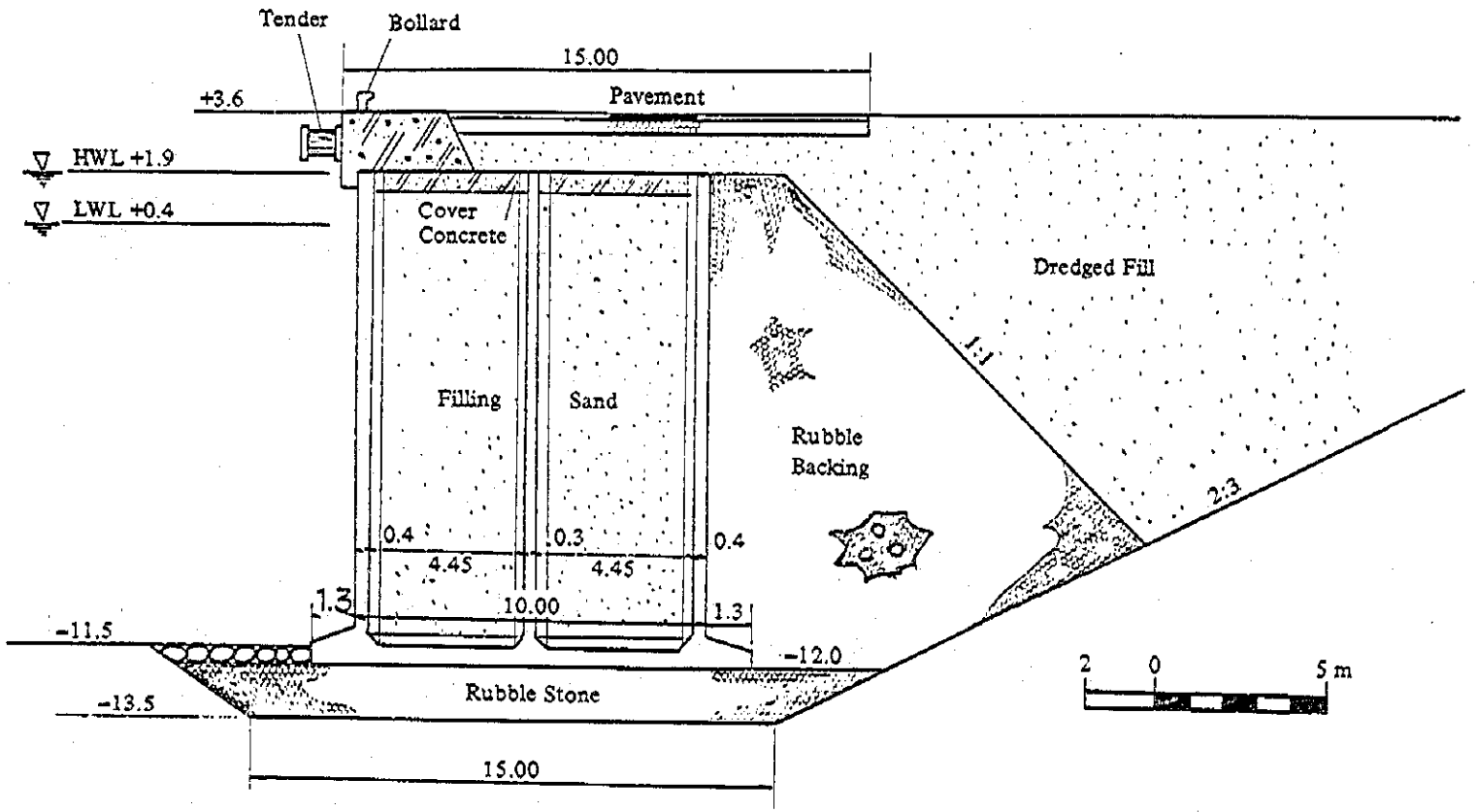


Fig. 3.1.8 Section of Concrete Caisson for Bulk Cargo, Coal and Multi-purpose Berths

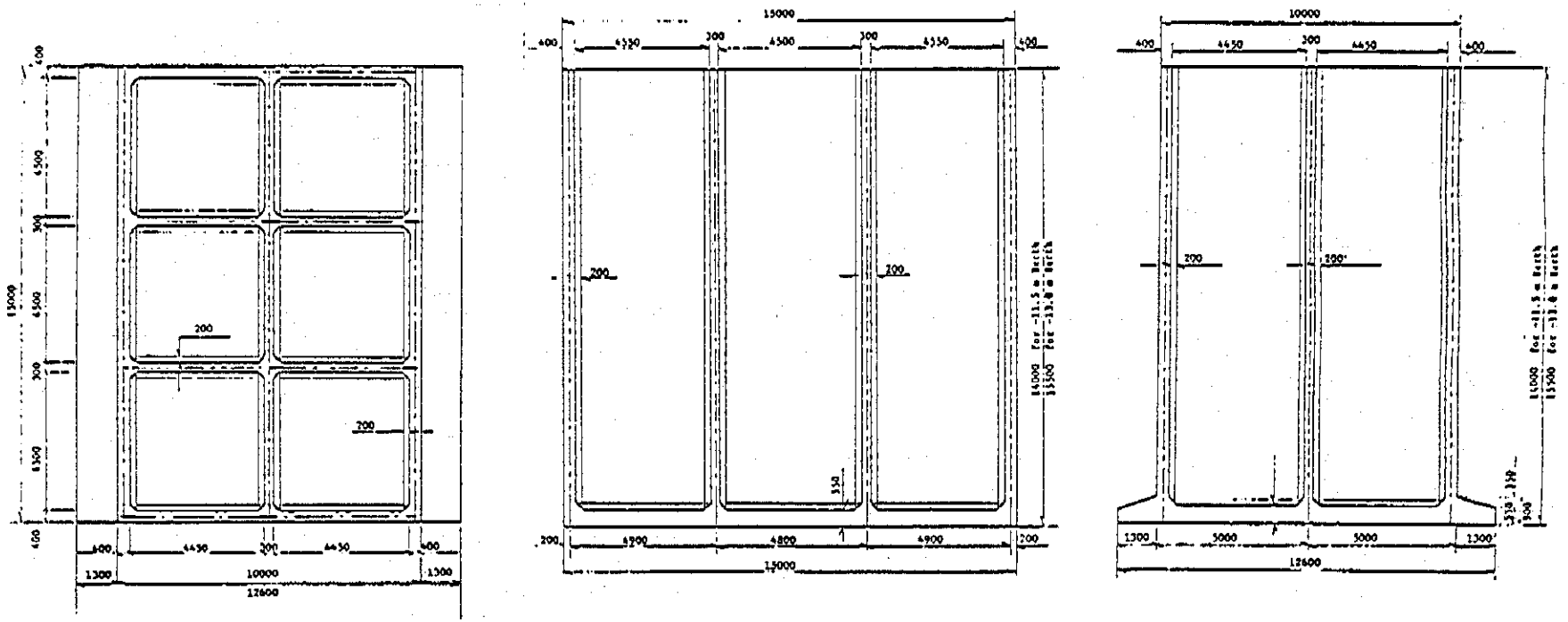


Fig. 3.1.9 Cross Section of Fish-landing Berth

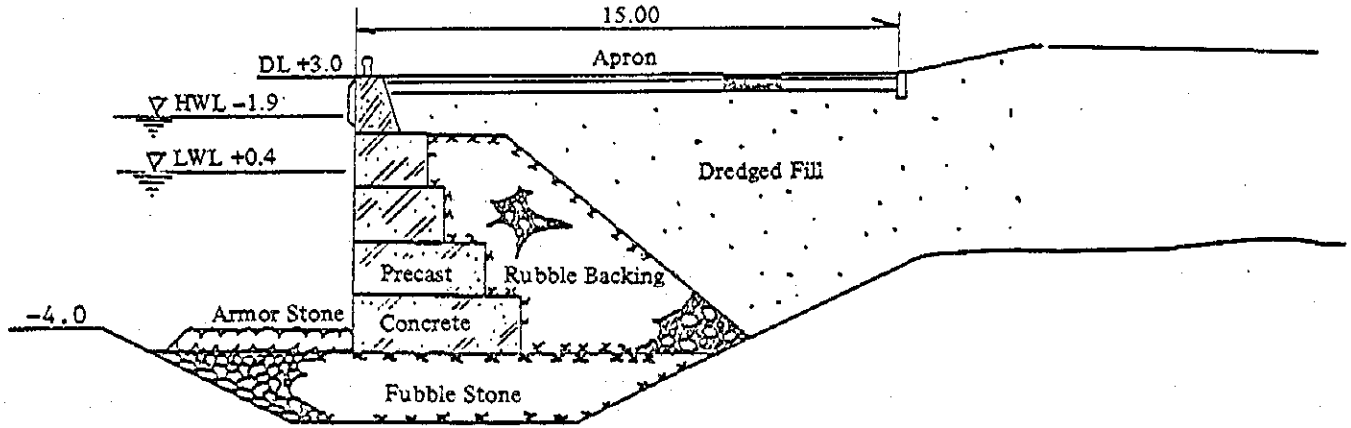
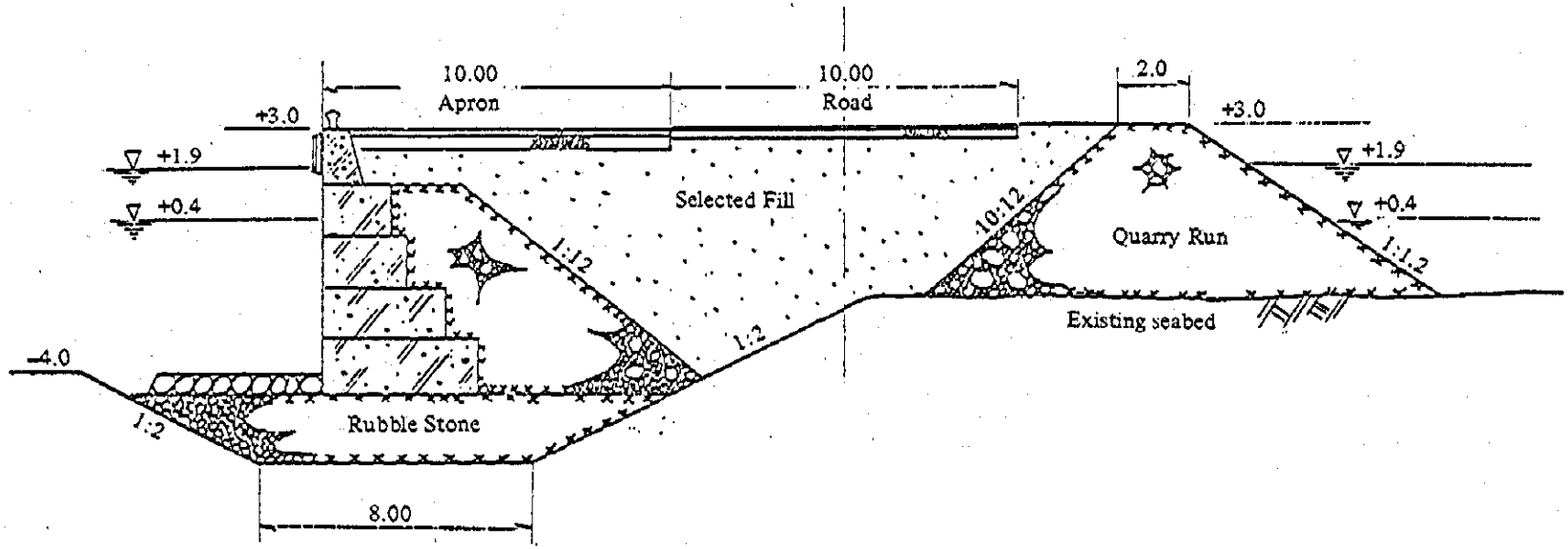


Fig. 3.1.10 Cross Section of Small Craft Jetty



(3) Channels and Basins

The grade for side slopes of channels and basins is set at one by three (1:3) considering the current channels of the Suez Canal in Suez Bay.

(4) Grain Terminal

The facilities of the silo include fumigation, cleaning, aeration and temperature detection systems. The measurement control center and the office together with the laboratory for wheat sample analysis are located in a machinery tower and a concrete building respectively within the grain terminal.

1) Unloading

- o Pneumatic unloader — 600 t/h — 2 units
- o Belt conveyor on berth — 660 t/h — 2 units
  length 270 m x 2 lanes = 540 meters with a stopper and an angle tower
- o Belt conveyor to the silo — 660 t/h — 2 units
  length 170 m x 2 lanes = 340 meters with an angle tower
- o Dust collection facilities

2) Grain Storage

- o Silo bins
  - · No. of units : 40 units
  - · Total capacity : 70,000 tons
  - · Diameter : 11.0 m
  - · Height : 36.1 m
  - · Original design : Cylindrical reinforced concrete type
  - · Alternative design : Steel structure

Based on a comparison of the two types of silo bins, the reinforced concrete type may be recommendable in this area considering natural conditions, construction cost, the use of local materials, construction conditions and so on.

However, soil investigations at the site of the silo bins must be carried out to confirm the bearing capacity of the soil foundations. If the bearing capacity is low, the steel type may be preferable to the reinforced concrete type.

The construction cost of silo bins is estimated based on the original design including slab rooves and fumigation, cleaning and aeration systems.

- o Design conditions of silo bins are as follows:
  - · Unit weight of grain : 0.75 t/m^3
  - · Angle of repose : 28°
  - · Available storage capacity : 1,870 tons

- Materials
  - Cylindrical wall : Reinforced concrete
    concrete b_{28} = 240 kg/cm²
    steel bar SD 30
  - Hopper : Steel SS 41
  - Foundation : Steel pipe pile foundation

o Machinery

• Machinery tower	: Steel structure	10 m x 60 m
• Chain conveyor	: 240 t/h	6 units
• Hopper scale	:	2 units
• Magnetic separator	:	2 units
• Net screen separator	:	2 units
• Auto-sampler	:	2 units

- Hoppers, tanks, chutes, slide gates, cutting edges and riggings and supports for related equipment

3) Distribution

o Wagon loading

• Wagon loading house	: 20 m x 50 m =	1000 m²
• Gates for outlet of air tight silos	:	40 units
• Chain conveyor	: 240 t/h	12 units
• Take-out bucket elevator	: 240 t/h	4 units
• Hopper scale and supports for related equipment	:	4 units

- Surge tank
- Silo gates, cutting edges, chutes and riggings and supports for their related equipment

o Bagging and truck loading

• Building	: 63 m x 12 m =	756 m²
• Chain conveyor	: 25 t/h	6 units
• Take-out bucket elevator	: 25 t/h	6 units
• Bagging storage tank	:	6 units
• Packer scale	:	6 units
• Sewing machine and belt conveyor	:	6 units
• Bag chute for truck loading	:	6 units

- Riggings and supports for related equipment

o Distribution facility to the flour mills

- Chain conveyor : 240 t/h 70 m x 2 lanes, 2 units

More detailed design descriptions and features are shown in Appendix IV.

(5) Coal Terminal

The rough sketches of handling equipment are shown in Fig. 3.1.11 and 3.1.12.

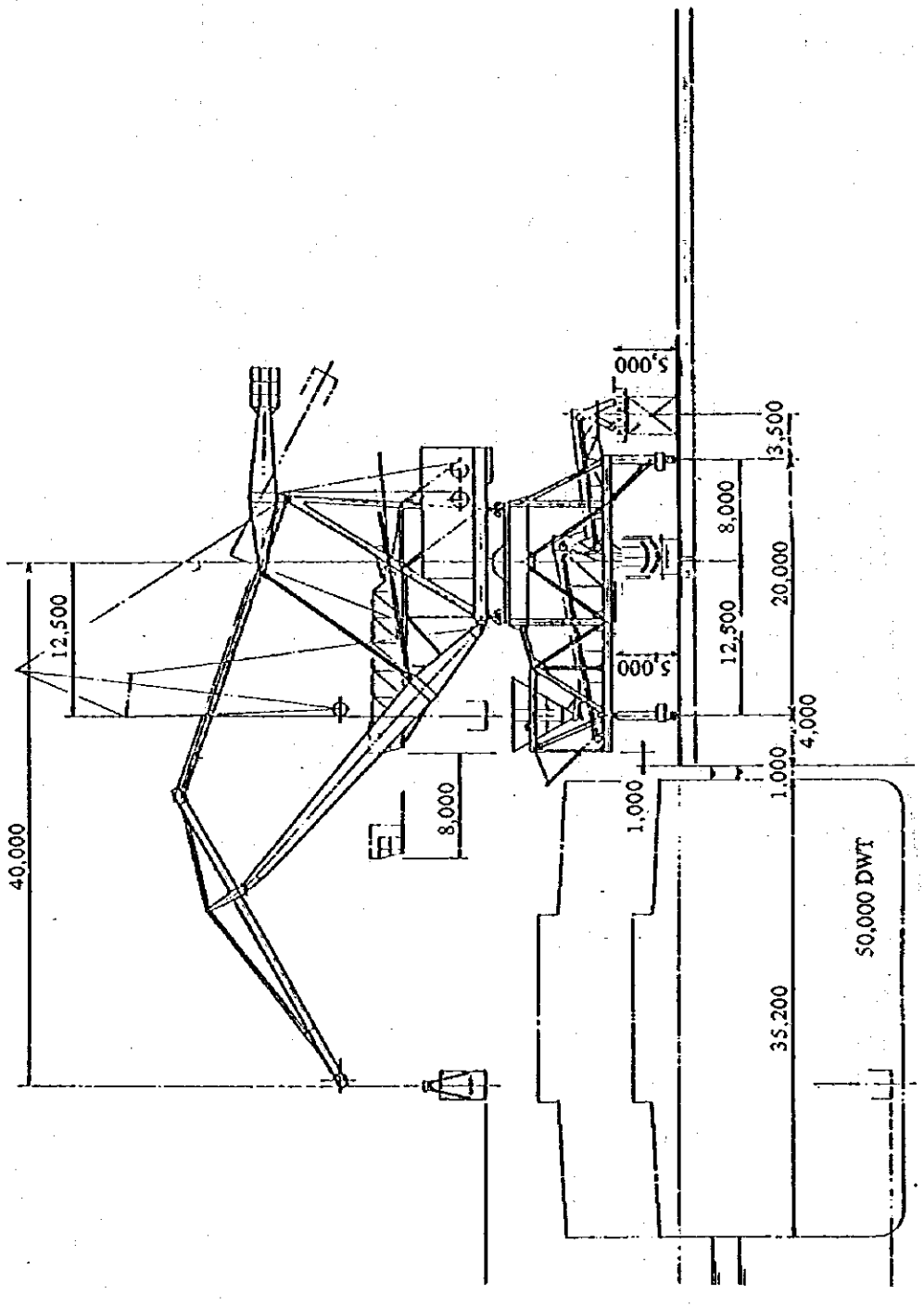
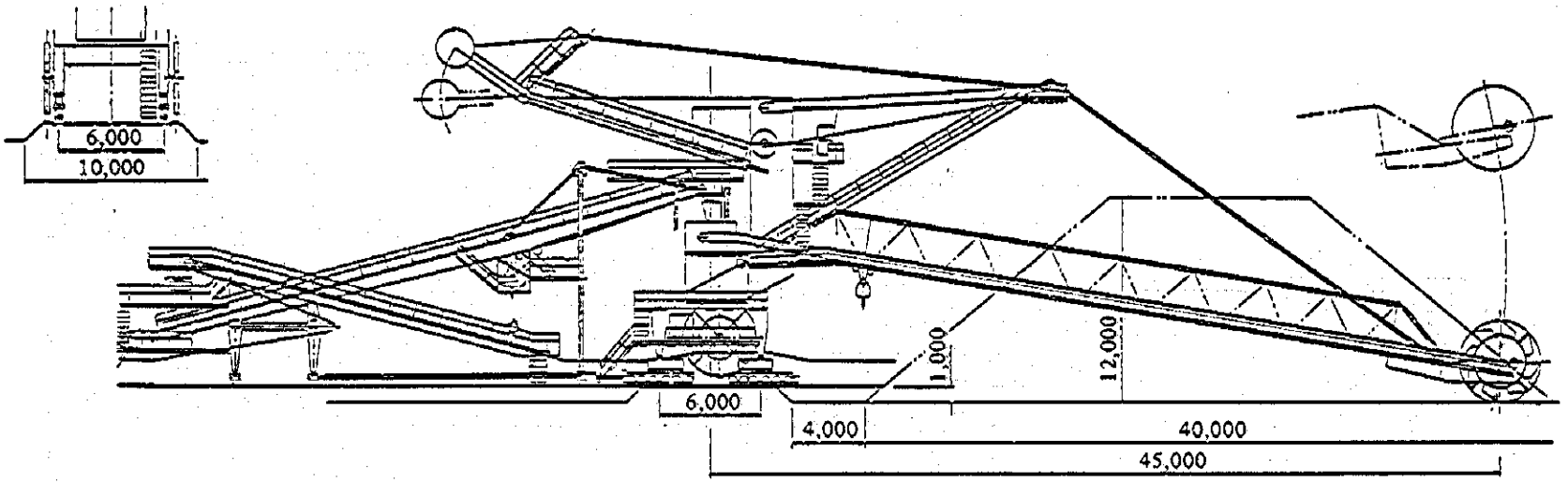
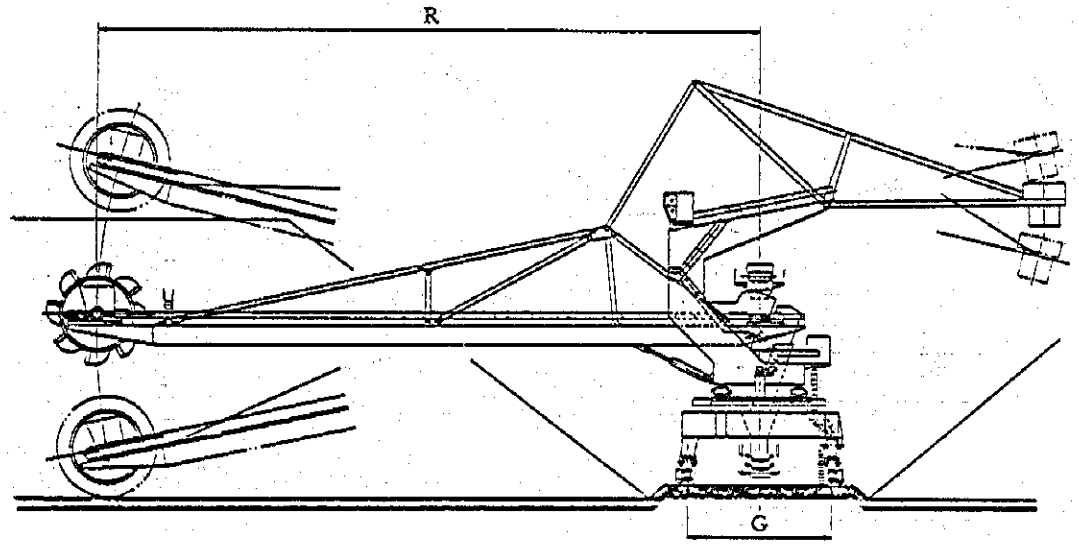


Fig. 3.1.11 500 t/h Coal Unloader

Fig. 3.1.12 1,200/1,100 t/h Coal Stacker-reclaimer





Main Dimensions (m)	R	35.5	40	45	50	56
	G	7	8	8	10	10
	W	7	8	8	10	10
Speed	Traveling (m/min)	30/15	30/15	30/15	30/15	30/15
	Slewing (rpm)	0.2	0.2	0.2	0.15	0.15
	Derricking (m/min)	5	5	4	4	4

3.1.2 Roads

Roads will be constructed on rather flat desert terrain and on the areas developed for the industrial zone.

For this reason, the amount of earth work will be minimal. The typical cross section of each road is shown in Figs. 3.1.13 and 3.1.14.

Some road sections in the industrial estate in Ataqa reserve land for future widenning.

The typical pavement structure is shown in Fig. 3.1.15 which is designed refering to the typical Egyptian desert road.

Fig. 3.1.13 Road Section Identification

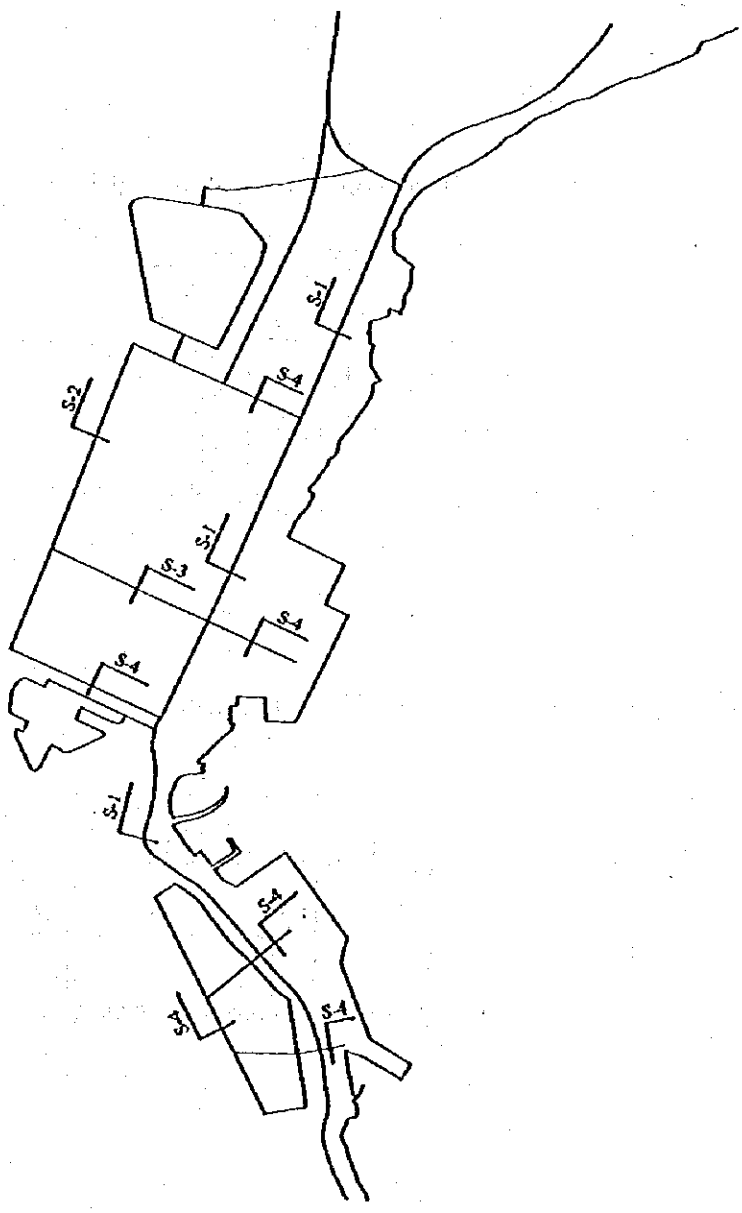
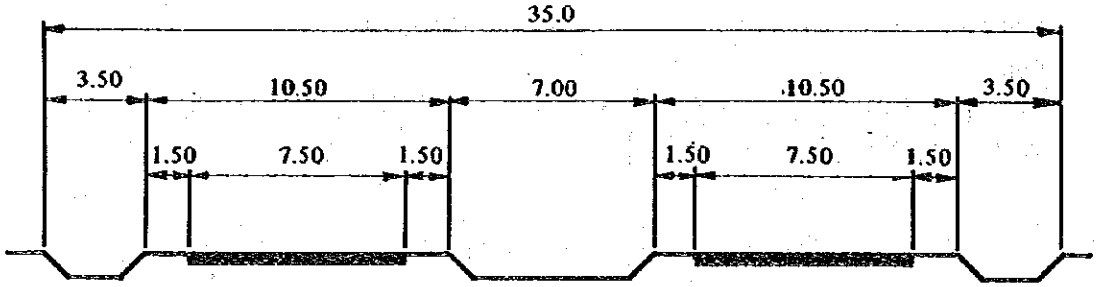
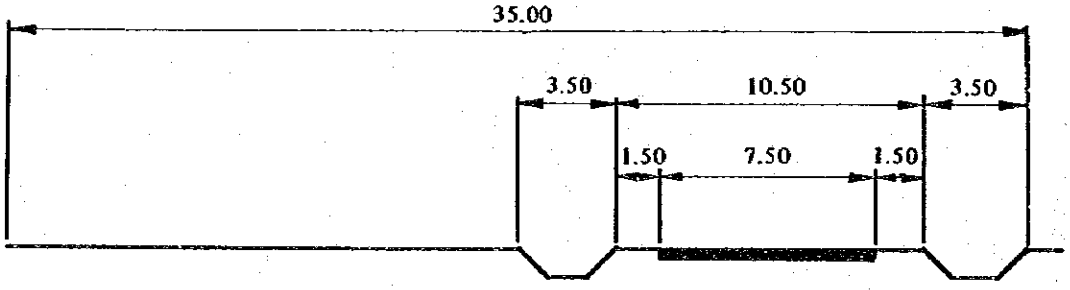


Fig. 3.1.14 Road Cross Section

S-1 Dual Carriageway Road



S-2 Single Carriageway Road (with Reserve Space for Future Expansion)



S-3 Primary Road (with Reserve Space for Future Expansion)

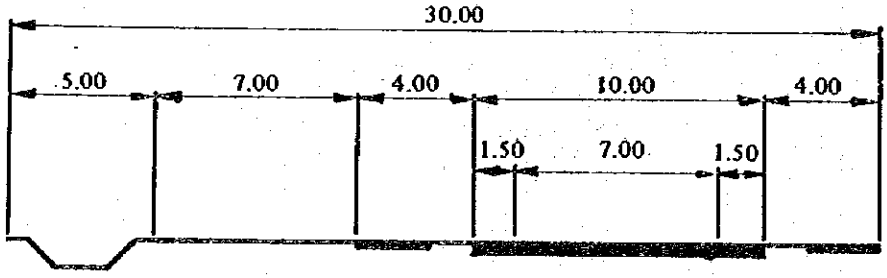
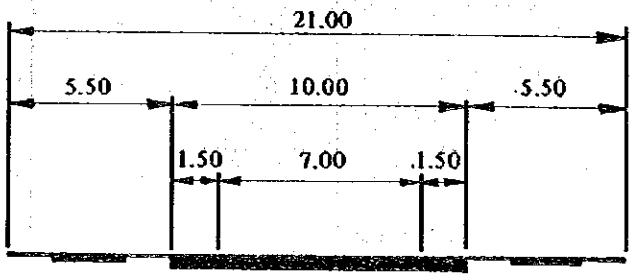


Fig. 3.1.14 (Continued)

S-4 Secondary Road



Access Road