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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANISATION

G/F INDUSTRIAL AREA OF THESSALONIKI

C/F GREECE

VOLUME 1

p. 123

containing

REPORT AND CHAPTER I - MASTER PLAN

for

HELLENIC INDUSTRIAL DEVELOPMENT BANK

MAY 1972

Gibb-Ewbank Industrial Consultants,
24 Queen Anne's Gate,
London S.W.1

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United Nations Industrial Development Organisation,
Lerchenfelderstrasse 1,
Vienna, AUSTRIA.

For the attention of Mr. Gold

May, 1972

Dear Sirs,

HELLENIC INDUSTRIAL DEVELOPMENT BANK
INDUSTRIAL AREA OF THESSALONIKI

We have pleasure in submitting our report on the Industrial Area of Thessaloniki. Our contract for this work with you is dated August 1971 and it was revised in November, 1971. For convenience the Terms of Reference for the Report have been extracted from this Contract and form Appendix No. 1 to this Volume.

The work in the field was carried out in Greece during spring and summer 1971 after which a preliminary report was submitted to you clarifying the requirements and making outline proposals for fulfilling them.

This report was discussed with you and the Hellenic Industrial Development Bank in Athens in August 1971, and it formed the basis of a draft Final Report which was submitted to you in November 1971. This was discussed with you and HIDB in Athens in February 1972. The various modifications introduced to our proposals at both these stages are all included in the Final Report now enclosed.

The Report is submitted in the form of a Summary which follows this letter and in 4 chapters, corresponding to the form of our Contract with you. Chapter I - Master Plan - is included in this volume. Chapter II - Services Centre and Chapter III - Industrial Estate, are included in the second volume and Chapter IV - Free-Customs Zone forms the final volume.

Each volume contains reduced scale copies of Figures and Plates to illustrate the text. The full-size drawings which our Contract calls upon us to submit are in separate volumes pertaining to each chapter of the Report.

Continued......

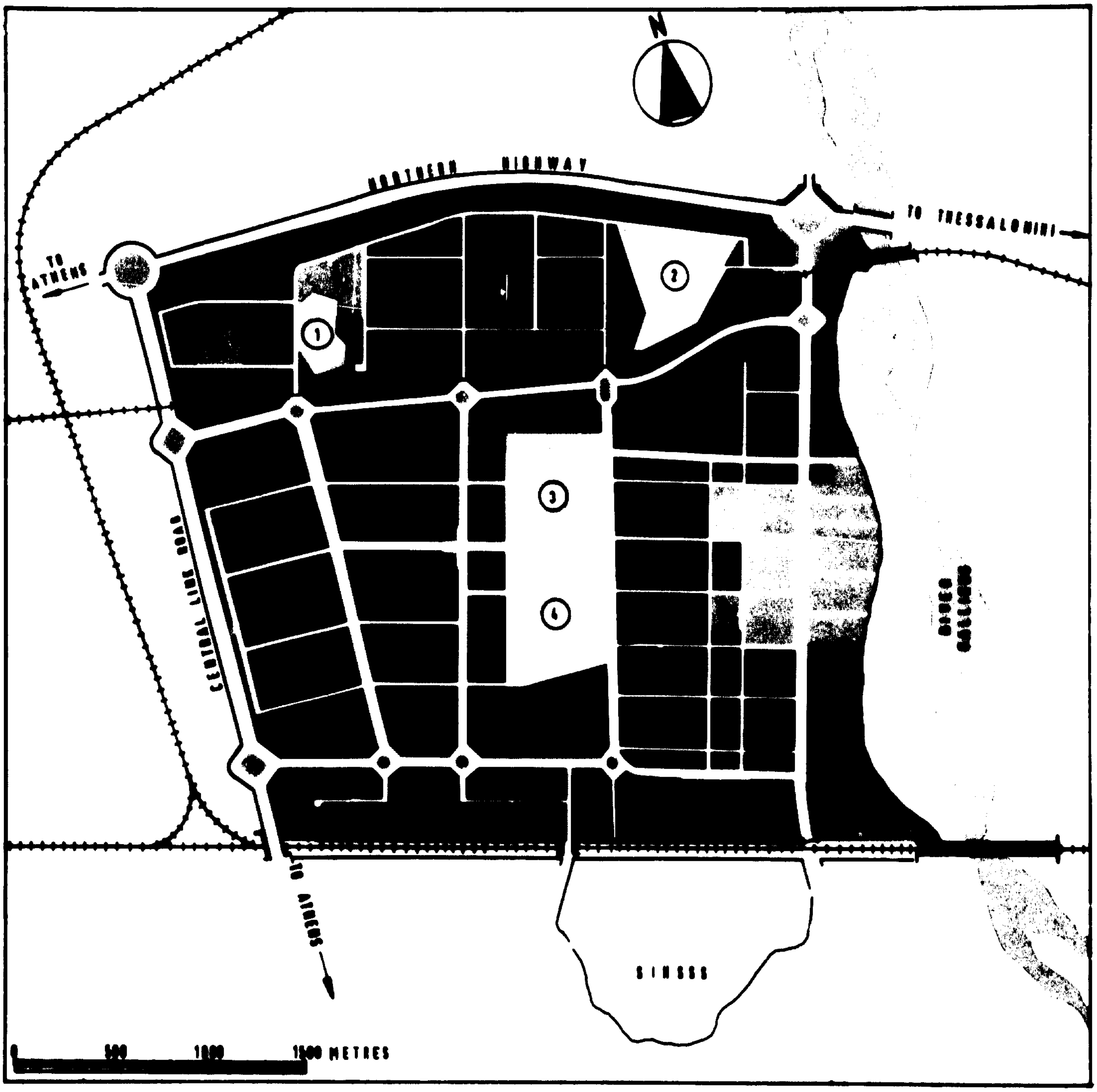
Our team for this work, drawn from the staff of Gibb-Ewbank Industrial Consultants, Sir Alexander Gibb & Partners, Gibb, Petermuller & Partners, and assisted by Sir Sadler Forster have found the work of great interest and also wish to record the valuable assistance given to them by your Project Manager in Greece, Mr. Poling and by Mr. Michos and other officials of the H.I.D.B., without which the work could not have been done.

It is our hope that this report will be of assistance in promoting the industrial development of Greece.

Yours faithfully,

For GIBB-EWBANK INDUSTRIAL CONSULTANTS

Richard Bailey



KEY

NATO	1
MILITARY BARRACKS	2
LAND RECLAMATION STATION	3
COTTON RESEARCH INSTITUTE	4

COLOUR LEGEND

- GENERAL INDUSTRY
- INDUSTRIAL ESTATE
- FREE CUSTOMS ZONE
- SERVICES CENTRES
- RECREATION
- EXISTING INSTALLATIONS

INDUSTRIAL AREA OF THESSALONIKI

SUMMARY REPORT

GENERAL

In the following pages, the proposals and recommendations contained in Chapters I - IV of this Report are summarised and their order of cost is stated. The summary contains the principal recommendations for the Hellenic Industrial Development Bank organisation necessary to implement the proposals, and the actions that must be taken by other organisations in the Thessaloniki region if the Master Plan is to be successfully completed.

The eastern part of the Industrial Area now being developed is referred to below as Area 1, and the western part, into which it is now proposed to extend, is referred to as Area 2.

1. MASTER PLAN - CHAPTER I

1.1 General

Area 2 is approximately twice the size of Area 1; it lies to the west of it and is about 5 m lower in elevation, being only 5 m above sea level at its lowest point. The bearing capacity of the ground is, if anything, slightly less and it is suitable for light factories. These two factors make Area 2 more expensive to develop than Area 1. However, with suitable planning the Central Services, and the communications and utility systems, can be combined for both areas. It is therefore considered that the extension of industrial development into Area 2 can be justified economically.

1.2 Planning of Area 2

The development of the Master Plan for Area 2 has been influenced by the existence of Area 1, and certain installations in Area 2, particularly the Cotton Research Institute and Land Reclamation Stations of the Ministry of Agriculture, the northern railway and the Military installations to the north of it. These installations, which sever and fragment the Area, are required to continue in operation for some time, However, the large part of Area 2 immediately to the west of the Agricultural Stations is free of other installations, and it will effectively form the initial extension of Area 1. It includes the geographical centre of the whole Area and it is logical to site the Services Centre here rather than in Area 1, to which it can be connected by a direct route between the two Agriculture Stations, to form a green area and nucleus for the general landscaping of the Area.

The northern part of Area 2 between the two Military installations will be developed subsequently. It is most desirable that the northern railway be re-routed clear of the Area by this time, and that the Public Power Corporation re-site their stores.

Finally, the west side of Area 2 will be developed. This is the least attractive economically, as it must be raised by at least 1 m to enable it to be drained.

The Industrial Estate, the Free-Customs Zone and the Rail Freight Depot, all being required at an early stage, are located within Area 1, where sites and utilities are now available.

1.3 Industrial Plots

Area 2 will provide a total area of 465 hectares for Industrial Plots, compared with 259 in Area 1, after allowing for the infrastructure of roads, services and utilities, and the Government and NATO installations which will remain on the Area.

The road system of Area 2 provides blocks slightly larger than those of Area 1, for division into factory plots with the maximum flexibility. The larger plots have been associated with the primary roads and the smaller plots with secondary roads.

Factories will generally have to be raised 0.5 m above existing ground level to avoid flooding.

Zoning of the Area for different types of industry is not recommended; it is preferable that the development shall be kept as compact as possible so that the investment in the infrastructure of each successive stage of development gives the greatest overall benefit. Neither foundation conditions, prevailing winds or other factors are sufficiently predominant to justify the reservation of any part of the Area for specific industries.

Approximately 74 hectares at the south side of Areas 1 and 2 can be provided economically with rail access, without level crossings of the Area road system. It is recommended however that Rail Freight should be handled centrally in a Depot with container loading facilities, in preference to sidings to the factories.

1.4 Road System

Three main connections to the external roads are planned to ensure good access to and from the Industrial Area. The first is an extension of the primary road on the east side of Area 1 to the Northern Highway. Early completion of the widening of the Highway is also necessary to prevent traffic congestion. Construction of the proposed Central Link Road between the Northern Highway and the new Southern Highway from Thessaloniki to Athens, will be required to provide a satisfactory outlet to the south as well as providing a second connection to the north. It must be sited to the west of the Area, not through it as proposed at present.

The system of primary and secondary internal roads already built in Area 1 will be extended. These are correctly proportioned for the ultimate traffic but economies can be made in the first stage of Area 2 by building one carriageway only on the primary roads.

1.5 Utilities

Piped drainage systems with gravity flow will not be possible on Area 2 for either storm water or sewage, as it lies too low.

The storm water will be removed in a system of open channels alongside the roads to a new outfall channel on the west side. Sewage will be collected at a number of stations and pumped to a gravity sewer in the higher ground alongside Area 1.

Appropriate distribution networks for water, electricity and telephones have been designed. Power supplies should be adequate but a second 150 kV sub-station and the diversion of the 150 kV overhead line will be required. The present water supply must be supplemented by the proposed Aravissos pipeline.

2. SERVICES CENTRE AND SUB-CENTRE - CHAPTER II

The Services Sub-Centre for Area 1 should be built as soon as practicable. It will contain the Technical Training and Advisory Centre, Satellite Works Services Depot & Satellite Health Centre, a Cafeteria, a Petrol Service Station and a Bus Station. Space is allocated for shops, banks and offices. At a later date a Church and Creche may be built. The construction of the Services Sub-Centre will improve the attractiveness of the present site for further industries, particularly on the Industrial Estate.

The main Services Centre has been sited deliberately in the centre of the whole Industrial Area to serve its long-term needs, and the benefit of this siting will be obtained from 1975 onwards when factories are expected to be constructed on Area 2. Selected Service buildings should be constructed in 1974, starting with the Administration and Works Services Depot and followed by the Health Centre and Restaurant. The Police and Fire Stations, the Telephone Exchange and Post Office should be built in agreement with the authority concerned. A Computer building will be added if a need is demonstrated for this service.

Sites have been reserved for commercial buildings and appropriate landscaping is included in the scheme to form an attractive Centre for the area.

3. INDUSTRIAL ESTATE - CHAPTER III

The Industrial Estate is sited in Area 1, where blocks of land of convenient size and utilities are available so that a start can be made to this most desirable feature of the Area.

Primary designs and layouts of the Industrial Estate are included in Chapter III. Five standard types of factory have been designed, with attractive appearance but low cost, so that resulting rents can encourage firms to establish themselves on the Estate rather than add to the ribbon development along main roads in the Thessaloniki Region.

The factories will be constructed of Greek materials and will use basically the same system of precast concrete modular framing which will combine flexibility with cheapness. It is recommended that 22 factories of the four smaller types shall be constructed as early as possible, so that prospective tenants can inspect them and decide which type will best suit their needs. Further factories should be built as soon as the demand is established.

4. FREE-CUSTOMS ZONE - CHAPTER IV

The establishment of a Bonded Warehouse Compound is recommended as the most appropriate initial form of development. It will be sited in Area 1 and it can therefore be initiated in the near future.

An area of 7.5 hectares has been allocated and it is proposed that an initial Warehouse Area of 2,000 m² be provided with capacity for expansion to 14,000 m².

A Free-Customs Zone with manufacturing facilities would require amendment to the existing tax system and should not be pursued at this stage.

Forecast of Growth

A long-term rate of growth of 10% per annum is predicted for the Free-Customs Zone. Alternative forms of investment incentive have been recommended to enable this growth to be achieved.

The Bonded Warehouse Compound will encourage manufacturers to export their products and give scope to medium and small scale industry to co-operate.

5. PROGRAMME FOR DEVELOPMENT

A forecast is made in the Report of the rate at which development should be undertaken in order to achieve the overall objective of the Industrial Area and provide industrial employment to all who can benefit from it in the Thessaloniki Region. The following stages of development are recommended to achieve this growth rate with the most economical use of capital for the construction of roads, earthworks and utilities and for the provision of services.

5.1 Area 1 Works (1972 - 1974)

The Services Sub-Centre will be constructed in Area 1 and the Administration will be established in temporary premises near it.

Road No. 1 will be extended northwards to form the entrance to the Area with industrial plots on either side. The Industrial Estate, the Free-Customs Zone and the Rail Freight Depot will be initiated.

Essential utility works, such as the water storage reservoir, sewage treatment plant and electricity distribution will be completed.

5.2 Area 2 Stage 1 (1974 - 1976)

The infrastructure of roads, drainage and utilities will be constructed on the centre and south eastern part of Area 2, ready for allocation of plots for factories to commence in 1975. This stage will include 152 hectares of industrial plots.

The initial buildings of the Services Centre, with its connecting central road to Area 1, will be constructed.

The utility distribution networks on Area 2 will be supplied with water and electricity from Area 1.

5.3 Area 2 - Stage 2 (1979 - 1981 approximately)

The infrastructure works will be extended northwards to the Area boundary and 168 hectares of industrial plots will be created. A Services Sub-Centre and some small plots will be included, to supplement those on the Industrial Estate.

Further buildings will be provided for the Services Centre and the Industrial Estate.

The road system will be connected to the Central Link Road, which must be completed by this time.

The utility networks will be extended. The power supply must be augmented from a second 150 kV sub-station, and the 150 kV power line must be diverted. The completion of the Aravissos water supply pipeline will be required, and the reservoir must be enlarged. A second main outfall sewer will be required.

5.4 Area 2 - Stage 3 (1984 - 1986 approximately)

This stage will complete the development of the Industrial Area up to the western boundary, and create a further 145 hectares of factory plots. If the Military and Ministry of Agriculture installations have been removed by this time, additional industrial land can be provided at low cost.

6. ADMINISTRATION

6.1 Promotion of the Industrial Area

The stages by which the Industrial Area may be developed, based on a forecast of economic factors, are described above. The realisation of these planning stages requires the adoption by the HIDB of an active policy for promotion at home and abroad, to ensure the full utilisation of the facilities to be provided.

6.2 Formation of the Industrial Area Company

An organisation to administer the Industrial Area must be established appropriate to its objectives. Recommendations are made in the Report for the establishment of the Industrial Area Company and for its management and staff. In operation it should be autonomous in all matters regarding the day-to-day administration. The HIDB would remain responsible for all major policy decisions.

HIDB should arrange that the legal responsibilities for the Free-Customs Zone operation be vested with the Industrial Area Company by Decree. It should then decide the division of responsibility between itself, the Industrial Area Company and the Customs Authorities.

The Company should be organised with a number of Divisions to carry out certain of its functions. These would include divisions for the Industrial Estate and Free-Customs Zone management.

6.3 Recommendations for Operation

Agreement on the handling of the following matters must be reached as a first priority, and the HIDB should then delegate to the Industrial Area Company the responsibility for their implementation:-

(i) A policy of plot allocation should be adopted in order to give effective control over the orderly development of land, roads and utilities, and the subsequent factory building and extension.

(ii) A policy for the standards of construction and conditions of use should be formulated both for factories on freehold plots, and factories for letting on the Industrial Estate.

(iii) The aims and objectives of the Free-Customs Zone should be established, and admission policies and the system of operation should be settled.

7. ORDER OF COST

Each Chapter of the Report states the order of cost of the proposals contained in it. These are summarised below, with the periods during which the works are likely to be required. The exact dates will be subject to continuous review

INDUSTRIAL AREA OF THESSALONIKI

ORDER OF COST

All figures in millions Drachmae

	1973-76 approx.	1977-82 approx.	1983-90 approx.
AREA 1			
Services Sub-Centre No. 1	12		
Initial factories on Industrial Estate	16	(Total for all factories, 246)	
Free-Customs Zone, initial warehouses	18	12	—
Rail Freight Depot	22	10	—
Infrastructure Development	53		
AREA 2			
Services Centre	22	19	9
Services Sub-Centres		12	12
Infrastructure Development	229	343	178

Note: Figures are not stated for additional roads and utilities on Area 1, which is outside the Terms of Reference of the Report.

Sewage treatment plant for Area 2 is not included; this will form part of Chapter V of this Report.

A similar allowance has been made for the provision of Services Sub-Centres in Area 2 as for the Services Sub-Centres to be built initially in Area 1.

CHAPTER I - MASTER PLAN

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PART V - COSTS

FIGURES

APPENDICES

PLATES

DRAWINGS (in separate folder)

HELLENIC INDUSTRIAL DEVELOPMENT BANK

REPORT ON
INDUSTRIAL AREA OF THESSALONIKI

CHAPTER I - MASTER PLAN

1. INTRODUCTION

1.1 TERMS OF REFERENCE

These are given in Appendix No. 1; they may be stated briefly as follows:-

"To prepare a Master Plan and Development Programme for Area 2 of the Thessaloniki Industrial Area, which forms an extension to the existing Area 1 which is to be incorporated into the Plan."

1.2 PURPOSE OF INDUSTRIAL AREA

The purpose is to enable new industries to be set up to provide jobs for those unemployed, or underemployed, particularly due to the rundown of the agricultural industry. The Area should attract capital and labour from Athens and stimulate foreign investment in Thessaloniki. It should also provide employment for people wishing to return from other European countries, and generally encourage the industrial development of the economy.

It has been assumed throughout that inducements will be offered by Hellenic Industrial Development Bank to potential industries to come to the Area, in order that these ends can be achieved.

1.3 DEFINITIONS

In order to avoid confusion between the terminology of this Report and other Reports dealing with planning around Thessaloniki, the following descriptions are used throughout:

"Industrial Zone"

This refers to the land round Thessaloniki, shown allocated for industrial use on the Master Plan included in the Regional Study for Thessaloniki.

"Thessaloniki Industrial Area", or "Industrial Area"

This refers specifically to the land purchased by HIDB and defined in Section 3.1. below.

"Area 1" - the land already developed on the east side of the Industrial Area.

"**Area 2**" - the land recently purchased on the west side of the Industrial Area and not yet developed.

"**Industrial Estate**" The part of the Industrial Area set aside for the construction of small factories for rental.

1.4 SITE INFORMATION

To assist the preparation of the Master Plan, all available information about the Industrial Area site, the existing installations on it and its environment, have been collected, and a new survey made of it. The Regional Study for Thessaloniki by Prof. Triantafillidis and various other reports and proposals for development have been examined, and where appropriate, translated into English. A very large amount of background information has consequently been accumulated. It is considered desirable to set down a summary of these findings in Part I of this Chapter of the Report.

1.5 AREA 1 DEVELOPMENT

Part II summarises the events that have occurred since the development of Area 1 commenced in 1968, and outlines the present position of this Area. It includes detailed particulars of the factories built or about to be built in July 1971. It also gives a brief description of the utilities that have been and are being provided.

1.6 FUTURE INDUSTRIAL DEVELOPMENT

In order that the plan will correctly provide for development of Area 2 in stages appropriate to the needs of future industries a study has been made of the future industrial development in Thessaloniki. Predictions are made of the rate of growth that should occur in the Industrial Area if its purpose, as outlined above, is to be achieved. This study is contained in Part III of the Report.

1.7 MASTER PLAN

Part IV of the Report describes the proposals for the future development of the site, and the stages of development, including the provision of Industrial Plots, the Services Centre and Sub-Centres, the Free-Customs Zone and the Industrial Estate.

Descriptions are given of the utilities to serve Area 2.

1.8 ORDER OF COST

An estimate of the order of cost of development of Area 2 is contained in Part V.

1.9 APPENDICES AND DRAWINGS

There are 9 Appendices containing technical matters, which support some of the main points of the Plan. A list of these, together with the drawings submitted in the separate folder is given in the Index. Some drawings are reproduced as Plates at the end of the chapter:

Plate No. 1 - Present Position

Plate No. 2 - Master Plan

Plate No. 3 - Land Expropriation

Plate No. 4 - Industrial Estate Layout

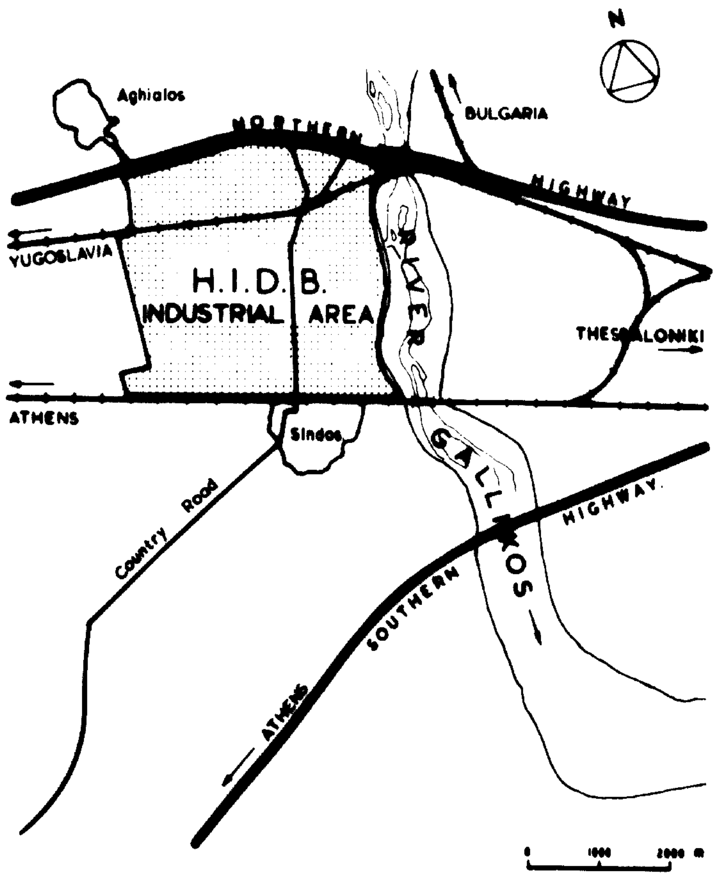
PART I - SITE INFORMATION

2. THE SITE

2.1 LOCATION AND SITE BOUNDARIES

The site of the Industrial Area is shown on Figure No. 1, and it is 14 km west of Thessaloniki. The eastern boundary is the western bank of the River Gallikos. The Area extends from the Thessaloniki to Athens Highway on the north to the railway passing through Sindos on the south. The western boundary follows no distinguishable feature. (It is later recommended that it shall be the proposed Central Link Road).

The boundaries were defined in the Ministerial Decree dated 8th December, 1965 and are shown on the Hellenic Industrial Development Bank's Plan No. 1177 dated 15th September 1965. The Ministerial Decree is included in Appendix No. 2 of this Report. The boundaries are shown on Plate No. 1 and in detail on Drawing No. 1/2.



SITE LOCATION

FIGURE 1

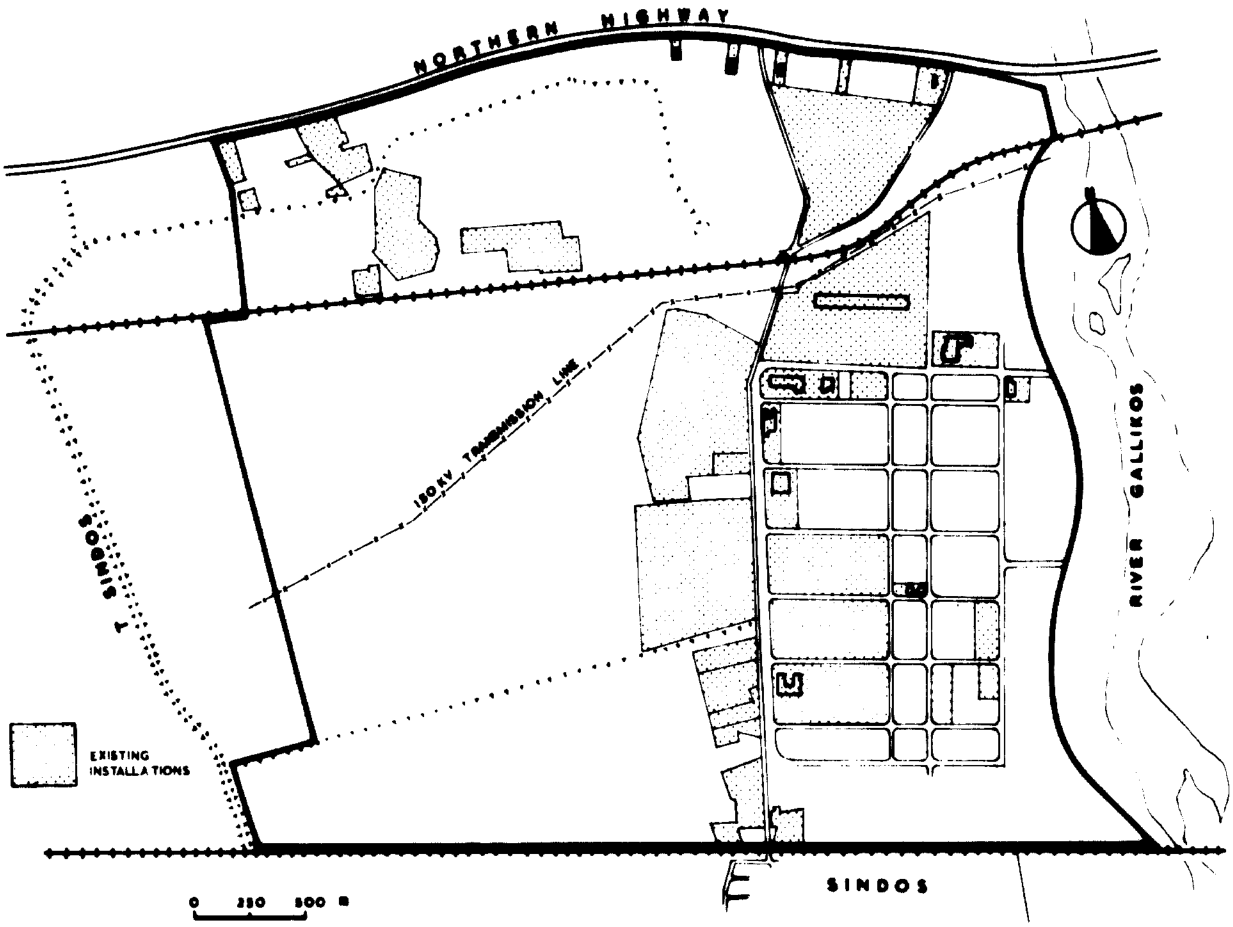
2.2 DESCRIPTION

The site of the Industrial Area is low lying and virtually flat, the level varying from 15 m above sea level on the east side to only 5 m on the west. It is part of the delta of the Gallikos and Axios Rivers and is formed from alluvial deposits. The material consists of clay, silts, sand and gravels in many heterogeneous layers. The two rivers now have flood banks in which the flow is contained, which should prevent further deposition of alluvium.

2.3 EXISTING INSTALLATIONS AND SITE LIMITATIONS

Within the site boundaries some plots have already been developed, others are under development, and there are a number of existing installations and features which create site restrictions.

All of which are shown in detail on Plate No. 1 and Drawing 1/2 and are reproduced pictorially on Figure No. 2.



PRESENT POSITION

FIGURE 2

2.3.1 **Railways**

The Area is divided by the railway from Yugoslavia to Thessaloniki. Its retention in this location imposes considerable planning restrictions, and its eventual relocation is essential to the proper final development of the Area.

2.3.2 **Buildings, etc.**

Area 1 - Newly constructed factories

Area 2 - Cotton Research Institute of the Ministry of Agriculture
Land Reclamation Station of the Ministry of Agriculture
N.A.T.O. Base
Military Barracks
Storage Compounds
Established factories
Small houses (near Sindos)

A list of existing installations (except the houses) known to be on the site in 1971 has been compiled as accurately as possible, and included as Appendix No. 3; the plot numbers are those of the HIDB Land Plan.

It was agreed at the Meeting with UNIDO and HIDB in Athens in August, 1971 that the plan should allow for all these installation (except the houses) to remain on the site, at least for the immediate future. The Plan should however deal with the possibility of their eventual removal.

2.3.3 **Transmission Line**

A 150 kV overhead transmission line crosses Area 2, severely restricting its development and recommendations are made for it to be diverted.

2.3.4 **Clay Pits**

There are several pits, some of considerable depth, from which clay or other sub-soils have been extracted. Until these are suitably filled, they will cause restrictions to development.

2.4 EXTENT OF SITE

The site was originally divided into Phases I, II and III.

The area of these were stated by HIDB to be:

Phase		Area ha
I		310
II		280
III		392
	Total	982

It was confirmed at the meeting in Athens in August 1971 that the boundary between Phases II and III had no planning significance and they were amalgamated, although they are later sub-divided to accord with the programme for stage development.

It is simpler to refer to Phase I as Area 1 and Phases II and II as Area 2; this notation is in accordance with the Contract.

The new survey, to a scale of 1/2,000, gives the following gross areas:

				Gross Area ha
AREA 1				334
AREA 2				638
	Sindos Road	4		
	Yugoslav Railway	8		
	NATO Base	9		
	Military Barracks	25		
	Storage Compounds	8		
	Cotton Research Institute)			
	Land Reclamation Station)	59		
	Established Factories	25		
		138	(say)	140
	Gross Site Area			1,112

The above table closely approximates the areas assumed by HIDB if allowance is made for the existing installations.

3. PREVIOUS SITE SURVEYS AND SOILS INVESTIGATIONS

3.1 TOPOGRAPHIC SURVEYS

Plans of the site were produced by the Ministry of Works on 33 sheets to a scale of 1:1,000, from a survey at a scale of 1:5,000. The date of this survey is unknown, but it is probably some years old as few buildings are shown. There were a number of serious discrepancies between it and the HIDB's Land Plan and it was considered essential for a new survey to be made of the whole Industrial Area. Particulars of the new survey are given in Section 4 of this Chapter. It demonstrates that the earlier survey was substantially correct, apart from its omission of recent development.

3.2 PREVIOUS SOILS INVESTIGATIONS

Data has been obtained from 14 boreholes, sunk for various reasons in the past, but no comprehensive soils investigations have been carried out. Details of this data is given in Appendix No. 4 and the position and logs of the boreholes are shown on Drawing No. 1/9.

3.3 FOUNDATION CONDITIONS

The results of these investigations are neither conclusive nor adequate to form a definite opinion of the ground which varies considerably, but they indicate that the surface has a foundation capacity of 0.5 Kg/cm^2 (½ ton/sq.ft.) after removal of top soil. At the north and east sides of the site, bearing capacities of 1.0 Kg/cm^2 may be possible. These foundation loads are appropriate for light buildings of 1 or 2 storeys. Significant settlement may be expected in some areas, owing to the presence below the surface of very soft layers. Several boreholes indicated these to be 5 - 10m thick.

The use of end-bearing piles to support heavier loads without settlement is likely to be limited to localities where layers of dense sand exist at relatively shallow depths. A borehole shows that one such layer occurs at the centre of Area 1.

Friction piles are not likely to be of value unless of considerable length.

Ground water was found at varying depths below the surface, and it seems reasonable to assume it will probably not be more than 3 m below Area 2 and may be higher in winter. Due to the water and the soft ground deep excavation is likely to be difficult and should be avoided whenever possible.

4. NEW SURVEYS AND SOILS INVESTIGATIONS

4.1 NEW SURVEYS

During June and July 1971, the whole Area was surveyed and plotted to a scale of 1:2,000 and further information was obtained in October and November 1971. The survey is used as the basis for the Master Plan 1/2,000 sheets.

The new survey has been related to the grid used for the previous survey. The triangulation was based on stations on the roof of the restaurant at Sindos and on the railway west of the Sindos road. A third station was found on the flood bank of the River Gallikos. New triangulation stations consist of pipes set in concrete.

Levels are based on the existing benchmark No. R.23 located near the Cotton Research Institute which has a value of 10.647m.

4.2 AERIAL PHOTOGRAPHS

Arrangements were made with the Ministry of Works for aerial photographs to be taken of the Industrial Area, and for a strip 1 km wide around it.

The information disclosed by the aerial photographs confirms that the survey was comprehensive and provides valuable information about the environs of the Area.

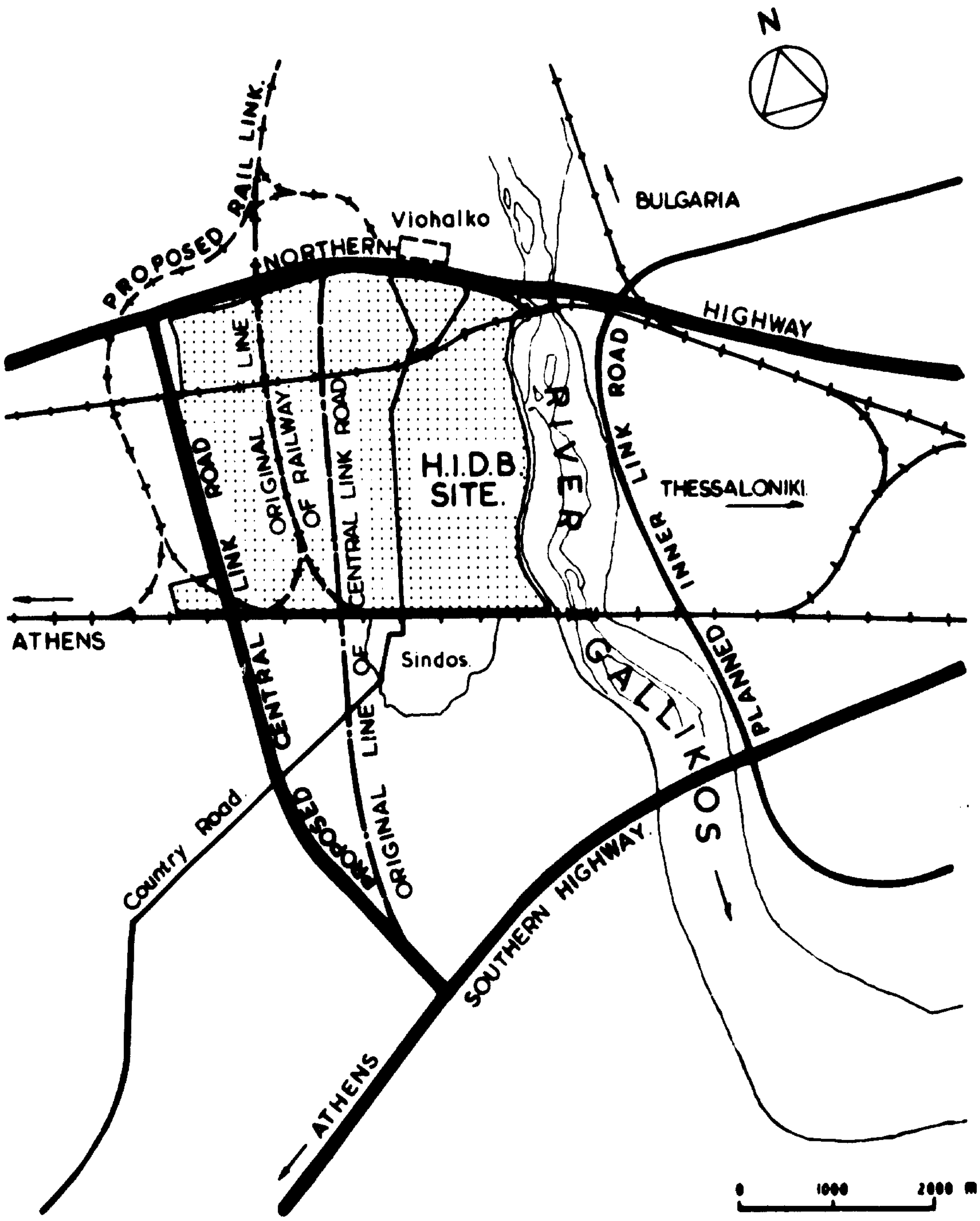
4.3 NEW SOILS INVESTIGATIONS

The Hellenic Industrial Development Bank has advised UNIDO that they wish to proceed with a further soils investigation. It is recommended that this should consist of a pattern of boreholes at about 300 m centres and 25 m deep which will enable the bearing capacity of the surface layers to be determined more precisely, for the design of the foundations of light factories. It should indicate where stronger layers exist, where industries involving medium loads may best be sited. For any major developments, this investigation must be supplemented later by detailed investigations of the sites selected.

The position of the proposed boreholes is shown on Drawing No. 1/10 and the requirements for soils investigation insitu and laboratory testing is given in Appendix No. 5.

5. ROADS AND RAILWAYS

The external communications, both existing and future, are shown on Figure No. 3



ROAD AND RAIL COMMUNICATIONS

FIGURE 3

5.1 NORTHERN HIGHWAY

The present access to the Industrial Area is from the Athens-Thessaloniki highway north of the site (described henceforth as the Northern Highway). This is a heavily trafficked single two-lane carriageway road generally less than 15 m wide. It serves light industry on both sides of the road, and traffic pulling off the road reduces its effective capacity.

For a short distance to the west of the bridge over R. Gallikos, this road forms the flood embankment protecting the Industrial Area.

There is a plan that the road shall be up-graded to a dual two-lane carriageway where possible, and the work is expected to be completed by 1973/4. It is anticipated that endeavours will be made to limit access connections to this road.

The only available statistics from traffic counts on this road made in 1970, are included in Appendix No. 9.

The Master Plan for Thessaloniki Region proposes that there should eventually be a new highway to the west from Thessaloniki, several kilometres to the north of the Northern Highway. This is considered a wise provision and it would enable the Northern Highway to be used primarily for access to the Industrial Zone and the Industrial Area, and through traffic would be removed from it.

5.2 NATIONAL ROAD

A National Road, subsequently called the Southern Highway, from the outskirts of Thessaloniki to Athens (575 kms) is being built about 3 km south of the Industrial Area. It is understood that this road will ultimately have dual two-lane carriageways with grade separation, but initially only one carriageway is being constructed. This road will shorten the distance from Thessaloniki to Athens by 40km.

5.3 LINK ROADS

Between these two main roads radiating from Thessaloniki, three link roads have been planned. An inner link road is proposed on the east bank of the River Gallikos and an outer link road (and part of the highway to Yugoslavia) is under construction on the east bank of the River Axios 8 kms west of the Industrial Area. A central link road has been proposed on a line across the Industrial Area, on the western side of the Cotton Research Institute.

If this alignment of the Central Link Road is maintained a heavy volume of additional traffic would be channelled through the Industrial Area, causing both congestion and disruption between the two halves. It is recommended in the Master Plan that this road should be moved to the western boundary of the Industrial Area.

5.4 COUNTRY ROAD TO SINDOS

The existing 'country' road connects Sindos and other villages to the south-west to the Northern Highway. The Master Plan includes proposals for its absorption into the Area road system, but it will remain the link with Sindos and its environs during the initial stages of development.

5.5 RAILWAYS

The two-track railway from Athens to Thessaloniki forms the southern boundary of the Industrial Area. This line gives good communication both to the Port of Thessaloniki and to the south of Greece and it was agreed at the meetings in August 1971, in Athens that it should be used as the main rail connection to the site. There is a small passenger and goods station at Sindos, where there is also a level crossing of the country road.

The single-track line from Thessaloniki to Yugoslavia crosses the northern part of the site. It is understood that this line may eventually be abandoned and all traffic past the site will go by the southern line, with a junction west of Sindos. This proposal is strongly supported in the Master Plan.

Another proposal was made (by Efpalino) for a rail link from the Athens to Thessaloniki southern line, to pass through the Industrial Area west of the Cotton Research Institute to connect with the railway line to Bulgaria. For the reason given for the link road, it is recommended that this railway should not be constructed through the Area. It should be located beyond the western boundary.

These recommendations are indicated on Figure No. 3 and provision is also shown for the spur to the Viohalko factory north of the Industrial Area, which is understood to be under negotiation with the Railway Authorities.

6. UTILITIES

During the site survey and investigations, enquiries were made to the relevant authorities about the utility networks in the vicinity of the Industrial Area and plans for their development.

Separate enquiries about particular utilities installed on Area 1 are included in Section 9.

6.1 ELECTRICITY (Public Power Corporation, DEH)

The bulk supplies that will feed the Industrial Area are centred on a switching station 5 kms towards Thessaloniki, north of the heavy Industrial Zone. Power is fed to this station from Thessaloniki, from the north-west and from the south-west of Greece. In the latter case, the connection is the 150 kV transmission line across the Industrial Area. It is this line that DEH propose to use to supply the Area, and they state there will no difficulty in providing the power required (300 MVA approx.).

At present a medium voltage line (15 MV) runs from the switching station along the country road to Sindos, to which the factories on Area 1 are connected temporarily.

6.2 WATER SUPPLY

The Water Authority of Thessaloniki - OYO obtains a substantial part of its water from wells in the alluvium in the vicinity of the Industrial Area. Some wells are at Kalahorion east of the Gallikos River and others are south of Sindos. A branch has been laid from the main to the south-east corner of the Industrial Area, where booster pumps are installed to deliver water to the Area. It is understood that 15,000 m^3/day are available and the quality of the supply will be suitable for general industrial use.

OYΘ plan to provide additional supplies to the Industrial Zones west of Thessaloniki from springs at Aravissos 48 kms to the west, in a pipeline of 1.650 m dia., which will cross the Industrial Area and join up with the pipeline from the wells to Thessaloniki. The new pipeline is planned for a capacity of 200,000 m^3/day. It is not known when it is planned to construct it.

There are no other supplies to the Industrial Area and to Sindos, except local wells.

6.3 TELEPHONES

There is an exchange at Sindos, to which most factories in Area 1 are connected. This is very overloaded, not able to provide more connections, and its service involves delays.

The Telephone Authority (OTE) are extending their network with a new Exchange to the north-west of the Industrial Area near Nea Aghialos. Foundation work has begun. Trunk route connections to Thessaionikí will be increased to 300. OTE intend to provide subscriber connections for the Industrial Area from this new Exchange.

6.4 SEWAGE TREATMENT

The Ministry of Public Works is considering proposals for a sewage pipeline from Thessaloniki to a treatment plant near the mouth of the River Axios. It is not known when this work may be undertaken, nor the actual sites that may be chosen for the pipeline and the treatment works.

No other proposals for sewage disposal exist in the region of the Industrial Area.

6.5 ROUTES

The routes of the existing and future utilities, where known, have been indicated on Drawing No. 1/1, included in the separate folder.

7. METEOROLOGICAL AND SEISMIC RECORDS

The Industrial Area of Thessaloniki is fortunate in containing a Meteorological Station at the Cotton Research Institute. Meteorological records have been kept for some considerable time; in some cases records go back to 1935.

Appendix No. 6 summarises the records.

Earthquakes are known to occur in the Thessaloniki Region, and the Terms of Reference require that structures shall be designed with a factor of 0.12 to give the horizontal loadings.

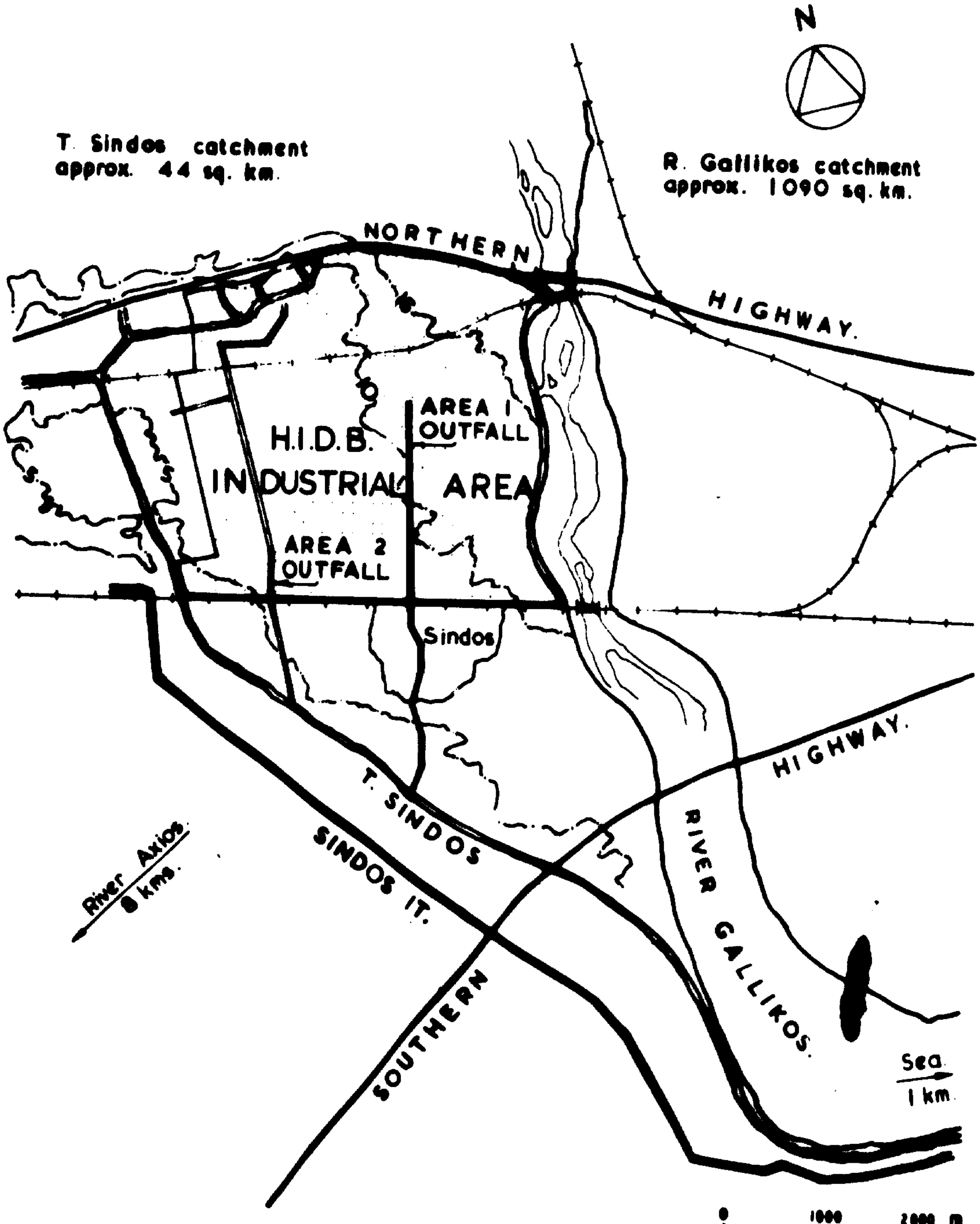
No detailed investigation has been made of the frequency and severity of the shocks that have occurred.

8. FLOODING AND DRAINAGE

The majority of the Industrial Area lies between 5 and 15 m above sea level as indicated on Figure No. 4 and could be subjected to flooding from four possible separate sources, as follows:

8.1 RIVER GALLIKOS

The most serious risk of flooding is from the River Gallikos. This river has a catchment of approximately 1,090 km² and its catchment is typical of a very flashy run-off. The River Gallikos has flood banks which vary from 20.5 m above sea level at the north of the Industrial



FLOOD CHANNELS

FIGURE 4

Area to 13.0 m at the south. It is understood from the Ministry of Works, Hydraulic Works Services, that the flood banks were designed for a discharge of 700 m^3/sec.

Approximate calculations indicate that a flood of this magnitude might occur once in 100 years but a thousand year flood from this catchment could be of the order of 2,000 m^3/sec. There is thus a definite and significant risk that the flood banks along the River Gallikos, built in 1928, will be overtopped or breached by a large flood, although this had not yet happened. It is significant to note that the railway bridge at the north-east corner of the Industrial Area was originally constructed with the underside of the girders 1.12 m above the crest of the weir underneath. A flood in 1935 rose 0.4 m above the underside of the girders. This flood was computed to be 635 m^3/sec and the Railway Authorities considered it prudent to raise the underside of the bridge by 1.58 m, which was calculated to permit a discharge of about 910 m^3/sec before reaching the girders. This work was done in 1948.

The flood banks are rodent-infested and could fail before the water level reaches the top. It is also a fact that the bed of a river carrying a heavy load of alluvium can be raised significantly after each large flood, which reduces the effectiveness of the flood bank.

The later proposals of this Report include recommendations that the flood bank on the west side of the River Gallikos should therefore be raised to protect the Industrial Area of Thessaloniki. The extent of the raising is outside the scope of this Report.

8.2 RIVER AXIOS

In about 1925 the River Axios was diverted westwards to prevent siltation near the Port of Thessaloniki. Flood banks were constructed and they were raised in 1936. It is understood that the flood banks have never been overtopped.

It is unlikely anyway that flooding would reach the Industrial Area owing to the new Outer Link road embankment and to the original channel which both lie between the new course and the Area. The risk of flooding from the Axios is small.

8.3 MAIN DITCH - T. SINDOS

A main drainage ditch, T. Sindos or the "Sindos Channel" crosses the N.W. corner of the Area and then passes to the west of it. It drains an area of about 40 sq.kms. north of the Northern Highway to the sea between raised banks. Its bed is generally about 2 m below the surrounding ground. At times the water level in the ditch could be above the surrounding ground, which it is intended to protect, and it is possible that it could flood the western part of the Industrial Area, which lies very low. No statistics are available of the flood flows in this channel nor the levels reached and conflicting opinions have been given in answer to local questioning. A survey has been made of its channel between the Northern Highway and the sea, as it is the only available outfall for storm water from the Industrial Area. The bed is covered with vegetation. It is understood that this is cleared away periodically.

8.4 LOCAL DRAINS

There are four main east-west ditches and one north-south ditch on Area 2 between the two railways which discharge into the Sindos Channel at the south-west corner of the Area. They are 1.0 - 1.5 m deep and their slope is the same as the ground, 1 in 550 to the west.

8.5 LOCAL FLOODING

During the heavy rain in July 1970, houses in Sindos north of the railway line were flooded to a depth of 60 cms for 2 or 3 days. This may have been caused by water being locally retained by the railway embankment and the country road. In the south-west corner generally, it has been said that the ground is liable to occasional flooding to a depth of 5 - 10 cms. It is not known whether more frequent and more serious floods occur at the western edge of the Area, which is the lowest part of all.

PART II - THE EXISTING INDUSTRIAL AREA (AREA 1)

9. HISTORY OF DEVELOPMENT

The founding of the Hellenic Industrial Development Bank in 1964 created the central State Agency in Greece for Industrial Development.

To achieve its objectives, the HIDB was empowered to purchase land for industrial development and to grant loans for the establishment of enterprises.

The Industrial Area of Thessaloniki is one of the sites chosen and its present extent has been defined in Section 2. Part of the Area has already been bought and the remainder will be purchased during 1972.

A memorandum on the Development of the eastern part, or Area 1 was written by P.E. Consulting Group in 1967 and a copy of this has been studied. A Master Plan Report, containing specific proposals for the development of Area 1 was made in 1968. This report was in Greek, and the Chapters considered to be most relevant, Nos. 1, 8 and 9 have been translated into English. These have been studied.

Development commenced in 1968 with the construction of the Goodyear factory which started production in 1969 with 250 employees. A start was made with the infra-structure works in 1969. The roads, sewers and water mains in Area 1 are now substantially complete.

A number of the industrial plots in Area 1 have been sold to private industries, particularly those facing the western boundary road. In some cases, options to purchase extra land have been granted and most of the land along this road has been taken up.

By July 1971, 13 factories had been established. They occupied sites of 25.5 ha and had options over a further 1.2 ha. They employed 618 workers.

At the same date, 6 factories were under construction on total site areas of 5.1 ha, with options on 2.9 ha. These factories expect to employ 395 workers. Completion of the factories is anticipated during 1972-1973.

Development of a further 6 factories, to employ 428 workers, was also at that time under active discussion with the Hellenic Industrial Development Bank. The proposed site areas were 10.9 ha with 12.0 ha of options. The intention is for these factories to be in operation in 1973-1974.

Interviews have been held with the management of the factories in production, and they have kindly given details of their processes, and their service and utility requirements. Similar information has been obtained from other factories operating on Area 2, and about those factories which are being constructed on Area 1 or are under discussion. These particulars are given in Appendix No. 7. They have been of assistance in estimating the extent of services and utilities required on the whole Area. The factory sites are shown on Plate 1 and Drawing No. 1/2.

Thus, by 1974 the situation is likely to be:-

TABLE 9.1

FACTORIES IN AREA 1

Year	Factory	No. of Factories	Plot Area (ha)	Option (ha)	Employment (workers)	Persons/ Hectare
1969	Goodyear	1	28	-	250	9
July '71	Factories in Operation	13	25.5	1.2	618	24
July '71	Factories under Construction (ready 1972-73)	6	5.10	2.9	395	78
July '71	Factories under Discussion (ready 1973-74)	6	10.9	12.0	428	39
		26	69.5	16.1	1691	24

9.1 INDUSTRIAL PLOTS

The road system of Area 1 is approximately parallel and square to the Railway through Sindos. Four main north-south roads create blocks approximately 500, 140 and 280 m wide, and the east.west roads settle their depth at 250 m, except at the north and south ends where there are smaller blocks. Additional blocks are available for development to the east and south of the road system, but not to the north or west sides, which are bounded by Goodyear, and the Cotton and Land Reclamation Institutes.

As stated above, 70 ha has been allocated or was under consideration for development in July 1971 leaving 219 hectares available out of the net area of 289 ha, after deducting the area of the Road system, etc. Development has not been sufficiently regulated and this will make it difficult to promote the best use of the infrastructure facilities in future. There is little uniformity in the orientation and frontage of the initial developments and the final appearance and usage will inevitably reflect this lack of planning control. Some of the factories front on to the main roads, instead of the secondary roads, which will impede the traffic flow.

The block sizes appear generally to be small in relation to the plot allocation, and full use of the roads and sewers is not made. The plots often face up to two and in some cases three roads. The areas of the factories are often small in relation to the plot sizes.

9.2 ROADWAYS AND RAILWAYS

The perimeter roads of Area 1 have been built with dual two-lane carriageways, and the intervening roads have single two-lane carriageways. Details of the construction are shown on Figure No. 5, which also shows the general siting of the utility network. The western perimeter road is adjacent to, but separate from, the Sindos country road.

No railway lines have been laid in Area 1.

9.3 ADMINISTRATION, SERVICES, AMENITIES

No provision has yet been made for these facilities; it is understood that the narrower central blocks were intended as a site for them.

UTILITIES

9.4 WATER SUPPLY

Originally all factories were supplied from local wells. The permanent supply by the Water Authority of Thessaloniki (OYΘ) is now in partial operation. Water is supplied to two storage tanks (6,000 m^3) located at ground level in the centre of Area 1.

It is understood that the distribution mains already laid alongside each road will be pressurised by pumping. It was originally intended to have a 52 m high water storage tower, but it is understood that this is not now to be built.

The supply available to Area 1 is understood to be 15,000 m^3/day. This rate of supply could increase in future to 20,000 m^3/day by the provision of additional booster pumps.

9.5 SEWAGE DISPOSAL

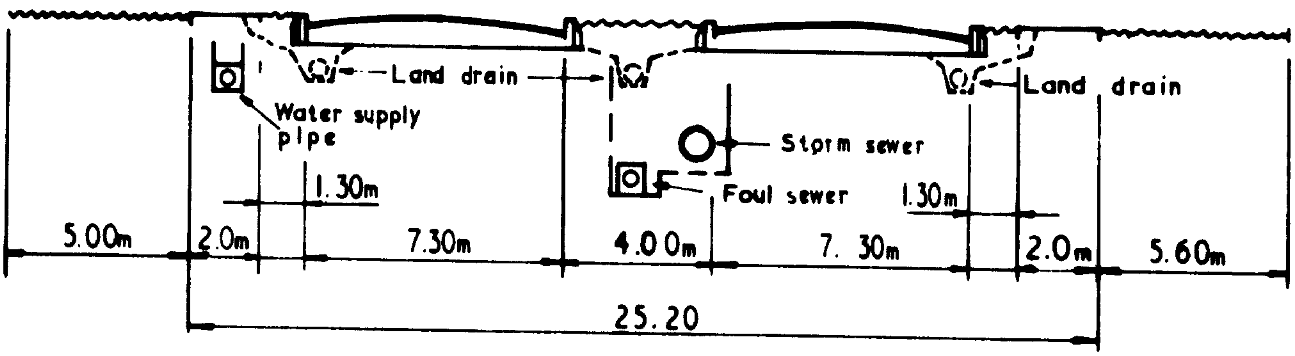
The sewage disposal from the Area is the responsibility of HIDB. The 1968 Master Plan Report proposed that sewage should be pumped from Area 1 to avoid deep sewers with small gradients. This scheme has evidently been abandoned, and a gravity system has been constructed. Sewage is collected by pipes laid along the east-west roads system into a main sewer along Road No. 4. This sewer continues in a south-westerly direction beyond the Sindos Channel, and terminates about 100 m from the channel known as IT Sindos.

It was proposed to construct a treatment plant at the termination. Excavation was commenced but the work was suspended after difficulties due to water infiltration.

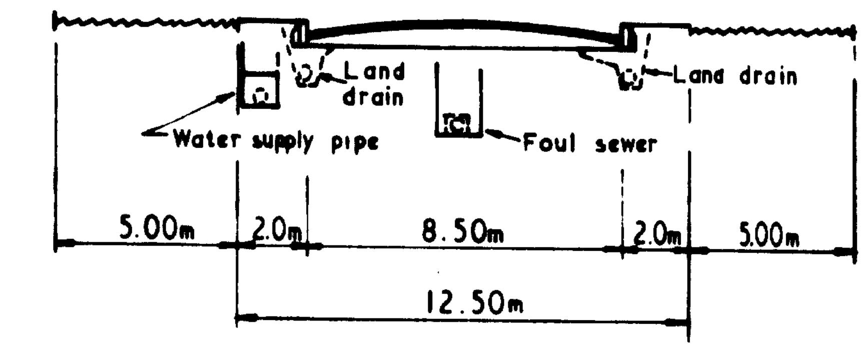
Objections were raised by the Ministry of Agriculture tc the treatment plant site, as it will further pollute an already polluted ditch and raise the ground water level of the surrounding area. It is also understood that they require the treated effluents to be pumped either to the River Gallikos or to the sea.

The Ministry of Agriculture advise that the discharge should alternatively be made to the Sindos Channel. This is normally dry and it would mean that effluents will need to be treated to a higher standard.

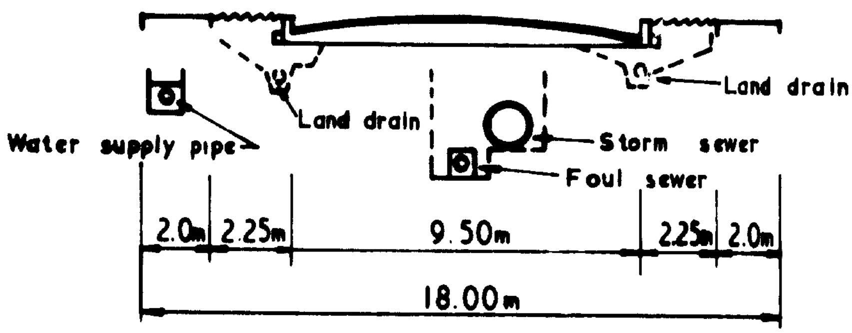
It is understood that a temporary treatment plant is now being installed, with its outfall into the Sindos Channel.



CLASS I



CLASS II



CLASS III

EXISTING ROADS AREA 1

FIGURE 5

9.6 SURFACE WATER

The 1968 Report proposed that surface water should be collected in a system of open channels in the middle of the roads. This scheme has evidently been abandoned.

A piped network, leading into a culvert on the western side of Road No. 4 has been constructed. From the south-west corner of Area 1 an outfall is laid in a south-westerly direction to the Sindos Channel, as shown on Figure No. 4. (Section 8).

9.7 ELECTRICITY SUPPLY

At present, temporary connections have been made to the factories from the D.E.H. 15 kV overhead line along the country road to Sindos. D.E.H. intend to build a new 150 kV sub-station, connected to the transmission line across the Area, from which the permanent supply to Area 1 will be provided.

Agreement has been reached with D.E.H. on the location for the sub-station, together with appropriate steel lattice tower locations. It is to be west of Road No. 1 and the plot size required by D.E.H. involves a small realignment of the northern railway. The capacity to be installed in this sub-station is 100 MVA. It is understood that the estimated demand for Area 1 is 90 MVA by 1980.

The medium voltage distribution designed by D.E.H. is a comprehensive 20 kV radial system around Area 1 with cross links.

9.8 TELEPHONES

The present telephone communications in Area 1 are routed through the Sindos Exchange to Thessaloniki and are the cause of serious concern for connections not only to Thessaloniki are delayed, but also to Athens and the national and hence, international, networks.

The present connections, with the exception of Goodyear with 15 exchange lines, appear to be one each to most factories.

9.9 GAS

There is no gas supply to the Industrial Area.

PART III - THE FUTURE INDUSTRIAL AREA - (AREA 2)

10. FUTURE INDUSTRIAL DEVELOPMENT

In order that the Master Plan may provide for the needs of future industries, it has been necessary to forecast the type of industries that may come to the Area, and the rate at which the infrastructure development should be done.

The study extends the research originally proposed in the P.E. Consulting Group's memorandum and continued in the 1968 Report which led to the development of Area 1. Statistics from the HIDB Master Plan Report of 1968 have been used for some of the forecasting.

The 1968 Master Plan Report anticipated that the plots in Area 1 would be mainly allocated by 1975 and that the full development of the plots would be reached by 1985. The population employed was anticipated to be about 10,000 in 1975 and 20,000 in 1985. The 1968 Report anticipated the progressive development of the infrastructure of Area 1 with completion in 1975 including a Services Centre.

Events since 1968, particularly the decision to increase the size of the Area, have made it necessary to make a fresh forecast. The new forecast has been based on the assumption that HIDB will continue to offer inducements to industries, both Greek and foreign, to set up factories and provide employment, to satisfy the fundamental purpose of the Area, stated in Section 1.

10.1 EXPANDING INDUSTRIES IN THESSALONIKI

The following forecast of the types of industries likely to come to the Area commenced with a study of the available Greek statistics of imports and exports of industrial goods, and of various publications and surveys of the prospects of specific industries within Greece.

Manufacturers established in the Area were interviewed, to ascertain the possibilities of expanding their capacity. Manufacturers in the timber, domestic appliance and electrical industries in Thessaloniki Region were also visited and interviewed.

It may be assumed that the industrial development drive will be primarily in the field of import substitution. This will apply particularly where the value of the imported goods is high and where the quantity is large. It will also apply when the labour element is large.

The major expansion will occur in industries using the products of new basic industries, and the effect on the Industrial Area of the proximity of Hellenic Steel and Esso-Pappas is important. These belong to the metal and chemical sectors of industry highlighted as having the main growth in Greece at present. In addition, there will also be growth related to such other basic products as paper and wood, food, textiles and non-metallic minerals. Tobacco has shown a good growth rate in recent years but has declining prospects for the future.

Expansion may also take place in export industries, which have been studied in detail in Chapter IV - Free-Customs Zone. This is a special case.

10.2 INDUSTRIES NOT SUITABLE FOR THE INDUSTRIAL AREA

It is considered that the heavy basic industries should not be established on the Industrial Area for the following reasons:

i. The ground, as reported in Section 3.3 is not generally suitable for the support of heavy loads which are inevitably involved.

ii. Heavy industries create difficulties in the disposal of solid, liquid and aerial wastes which would be likely to affect seriously the labour-intensive light industries already established on the Area and more suited to it.

iii. Heavy basic industries must be large in order to be efficient, and need big sites with generous reservations for future expansion. It would be difficult to provide economically for these needs in the infrastructure of the Industrial Area.

10.3 INDUSTRIES SUITABLE FOR THE INDUSTRIAL AREA

A list has been compiled of those industries most likely to expand in the immediate future, and which are suitable for sites in the Area. It should be revised in the light of experience by HIDB from time to time.

This list is given as Appendix No. 8.

10.4 RATE OF DEVELOPMENT OF THE INDUSTRIAL AREA

This is considered to be largely dependent on the population growth in Thessaloniki and the growth of that section of the population available for Industrial employment which can be absorbed, either in the Area or in other industries in the Thessaloniki Region.

10.5 POPULATION OF THESSALONIKI REGION

Predictions were made in the HIDB Master Plan Report for Area 1 of the total population of the Thessaloniki Region and the proportion of it that may be available for employment in manufacturing industries.

Table 10.1 assumes the growth of population from 1973 to 1987 to be 2.8 per cent per year. This is lower than between 1961 and 1969 when it was 3.3 per cent. The table may therefore under-estimate the present trend, since urbanisation is currently very high. The rate may, however, drop to 2.8 per cent at a later stage, as the migration of agricultural labour slows down.

A growth rate of 3.3 per cent would take better account of the desire to attract people back from Europe to work in Thessaloniki and this percentage has been used in this forecast.

TABLE 10.1

POPULATION PROJECTIONS FOR THESSALONIKI REGION

Year	Total Population	Active Population	Employees in Processing (Mftg) Industries	Percentage	
(1)	(2)	(3)	(4)	(4:2)	(4:3)
1951	301,000	120,000	31,600	10.5	26.4
1958	355,000	128,000	34,000	9.6	26
1961	378,000	132,000	39,000	10.3	28.2
1963	420,000	153,000	42,300	10.1	27.7
1967	505,000	184,000	58,000	11.5	31.5
1973	675,000	246,000	80,000	11.8	32.5
1987	1,000,000	350,000	150,000	15.0	43.0

10.6 ACTIVELY EMPLOYED POPULATION

In 1969 the population of working age in Thessaloniki as a percentage of the total population was over 68 per cent (31.5 per cent male and 36.8 per cent female). Table 10.1 indicates that the proportion that will be "actively" employed was estimated to be about 35 per cent of the total in both 1973 and 1987. It is again considered that this is likely to be an under-estimate; the proportion is probably higher at present, since the inflow into Thessaloniki consists mainly of people of working age. In addition, women are also being employed in large numbers. It is proposed to assume that the actively employed population, as a percentage of the total, will be 40 per cent for 1973-1980 and 45 per cent for 1980-1985.

10.7 EMPLOYMENT IN MANUFACTURING INDUSTRY

The ratio of those employed in manufacturing industry to the actively employed population, projected in Table 10.1 to vary from 32.5% in 1973 to 43% in 1987, appears to be reasonable in the light of the experience in other countries in a similar stage of industrialisation.

10.8 EMPLOYMENT IN THE INDUSTRIAL AREA

The proportion of the available labour force that will be employed in the Industrial Area will depend to a large extent on the type of industries likely to be established there. It has been forecast that these will all be in the light to medium sector.

A study of the Statistical Year Book of Greece 1970 shows that, for the period 1963-1969, this sector accounted for the larger proportion of all manufacturing industry in Greece.

TABLE 10.2

PERCENTAGE OF LIGHT AND MEDIUM TO TOTAL MANUFACTURING INDUSTRY

	1963	1969
No. of Factories	70%	65%
Average annual employment	65%	64%
Output of manufacturing industry	70%	62%

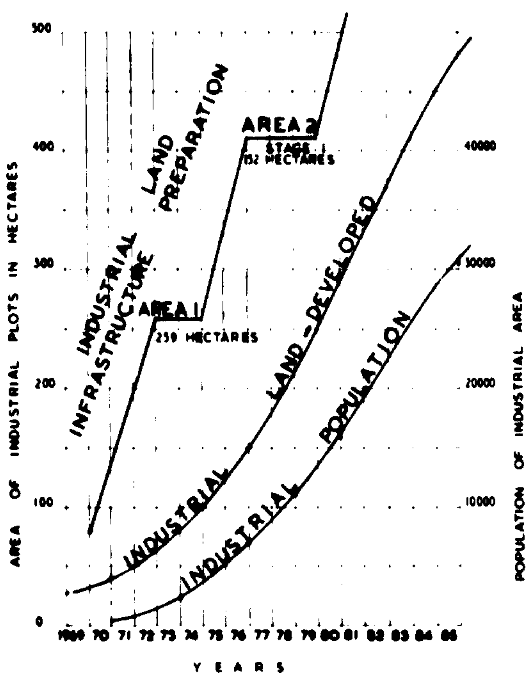
Taking future trends into account it may be expected that an average figure of 60% of new employment will occur in medium and light industries.

Some of this expansion of industry will take place in other parts of the Thessaloniki Region. However, it is assumed that the main development will take place in the Industrial Area as it is here that the main inducements can be provided.

In the early years it is assumed that these inducements will attract 40% of new employment in manufacturing industry, i.e. two-thirds of the 60% given above. Later it is assumed that the proportion will reduce to one-third, i.e. 20% by 1990.

The result of the above assumptions on the projected labour force of the Industrial Area has been re-calculated and is given in Tables 10.3 and 10.4 below and Figure No.6.

These also show the expected employment in 1973 if the developments under construction and consideration in July 1971 are in operation by then.



GROWTH FORECAST

FIGURE 6

TABLE 10.3

POPULATION PROJECTIONS FOR THESSALONIKI AND RATIOS USED

Year	A Total Population	%	B Active Population	%	C Population in Manufacturing
1973	675,000	40	270,000	32.5	87,750
1978	794,000	40	317,000	35.7	113,450
1980	839,000	40	335,000	37.1	124,300
1985	963,000	45	433,000	41.1	180,000
1990	1,106,000	45	500,000	43.0	215,000

TABLE 10.4

FORECAST OF WORKING POPULATION IN THE INDUSTRIAL AREA

Year	Increase in Population in Manufacturing (from Table 10.3)	%	Industrial Area Population Increase (To nearest 500)	Total Industrial Area Population
1973	-	-	(1,700)	1,700
1974-1978	25,700	40	10,500	12,200
1979-1980	10.850	40	4,500	16,700
1981-1985	55,700	25	14,000	30,700
1986-1990	35,000	20	7,000	37,700

TRAINING OF SKILLED LABOUR

The above projections of potential employment take no account of the numbers of skilled labour that will be required to maintain the rate of development. Inevitably shortages will arise which may retard this, however much financial inducement may be offered.

10.9 LAND REQUIREMENTS

The population density on the land currently being developed in the Industrial Area is about 20 employees per hectare of plot area. When options have been exercised and immediate expansion plans have been put in hand this may become 30 per hectare. Consideration of the likely employment in factories under discussion indicates that the density may increase to approximately 35 per hectare by 1974. The future plot allocation policy (dealt with in Section 29) should ensure that in future a more economical use is made of land and by 1978 50 employees per hectare may generally be achieved on the larger plots. On the smaller plots, and in the Industrial Estate, densities up to 120 may be expected.

Based on the forecast of industrial population in Table 10.3 it is possible to predict the amount of land required. For the period 1974-1978 the average density is assumed to be 65 persons per hectare and after 1978 it is assumed to be 75. These figures are still low compared with those achieved in the United Kingdom. The resultant prediction of land development is shown in Figure No. 6. This indicates that Area 1 (259 hectares, after deducting infrastructure, etc. see Table 15.1) would be fully used by 1979. It would not of course be possible to attain such an objective as part of the Area will be held for expansion of established factories and the remaining plots will not always be suitable for new factories. Therefore, the first stage of Area 2 will have to be developed concurrently.

The estimated population of 38,000 in 1990 will, according to the forecast, require approximately 550 hectares of Industrial Plots, and the complete development of the 750 hectares available for industry will not occur until after 1990.

10.10 GENERAL

The above forecast cannot be precise, and the growth will inevitably vary, as the future is dependent on many extraneous and unpredictable factors. However, the forecast should form a suitable basis for the early planning and construction of the next stage of infrastructure, services and utilities where the lead time is 3 -4 years before factories can be built.

Stages of development are dealt with in Section 28.

PART IV - THE MASTER PLAN

11. MASTER PLAN

11.1 GENERAL

In preparing the Master Plan all the factors stated in the Terms of Reference, and the decisions reached at the meetings in Athens in August 1971 and February 1972 have been taken into account. The Plan is outlined in this Section and described in detail in the Sections that follow. It is shown on the separate Drawing No. 1/2 which is to the convenient scale of 1/5,000 and on 6 sheets Drawings Nos. 1/3-8 to the scale of 1/2,000 required by the Contract. Its validity has been checked by the growth forecast made in the preceding section.

The aim has been to provide a logical extension of the infrastructure already built to enable the maximum use to be made of it, and to ensure that the Plan can be implemented in stages, obtaining the maximum benefit at each stage from the further capital invested in the infrastructure.

It has also been the aim to ensure that the Plan is efficient at each stage, the road and block layouts are sufficiently flexible to provide plots of the size required and the service and utility installations are in the best position to serve the needs of the factories.

These two aims are at times conflicting and the Plan shows how they can best be resolved during the whole period of growth.

11.2 NATURE OF SITE

Area 2 has a small slope of 1 in 550 from east to west, and a much slighter general slope from north to south. Its low-lying nature will result in difficulty of storm water disposal; the very low areas will have to be raised, and the drainage and flood protection works that will be necessary are outlined in Section 19. The drainage works will commence at the south of Area 2 and there will be some cost benefit if plot development also starts here.

With regard to foundations, the limited soil investigations done hitherto indicate that light industrial development can be done anywhere on the site, but it has not been possible to deduce whether there are specific areas where heavier industries can be sited.

Further site investigations are proposed, in order to verify the overall suitability and determine generally whether stronger sub-soil layers exist to support heavier loads on piles. This matter is referred to in Section 15.6 - Zoning.

11.3 PRINCIPLES OF PLANNING

In addition to the existence of Area 1 in the eastern part of the site, several other fundamental factors have dictated the new Plan. These are:

(a) The Land Reclamation Station and the Cotton Research Institute will continue to exist at the centre of the site for the foreseeable future.

(b) The southern railway will provide the main rail connection. The northern railway will continue in existence for an unknown period, and will divide the site.

(c) The N.A.T.O. and Military Establishments to the north will also continue for some time, and further fragment the part of Area 2 north of the railway.

(d) The main external road communication will be the Northern Highway, and this should be supplemented in future by the Central Link Road, which should be sited on the west side of the Area. Together, these roads will give good outlets from all parts of Area 2.

These factors indicate that the first stage of development of Area 2 should include its centre and south-east part, adjacent to Area 1. In this way, the Services Centre and other utility installations can be built in the near future on sites correct for both long-term and short-term needs. The maximum efficiency and economy will also result from the integration of the new road and utility systems with those of Area 1. Use can also be made of the railway through Sindos for freight traffic.

Later, development of the northern part of Area 2 will be done, and finally the low-lying part to the west, as the cost of development will be highest there.

11.4 BASIC LAYOUT

The main features of the Master Plan are shown on Figure No. 7 and in more detail on Plate No. 2 at the back of this Volume. The six drawings at 1/2,000, Nos 1/3-8, show the full details.

The stages of its growth are given separately in Section 28.

Internal Roads

The north-south road on the east side of Area 1 (Road No.1) is extended northwards to form the new entrance to the site from the Northern Highway.

The new system of primary and secondary roadways in Area 2 has a spacing suitable for plot allocation and development which is based on experience on similar projects elsewhere in the world, and on experience to date in Area 1. The orientation follows that of Area 1.

Industrial Plots

The blocks will be sub-divided, with the larger plots along the primary roads, in order to limit the number of entrances from them. Smaller plots are along the secondary roads. This arrangement will promote good traffic circulation and a more imposing appearance. Still smaller plots are planned adjacent to the services sub-centres, where the roads are spaced more closely, and a system of pedestrian ways is introduced.

Rail System

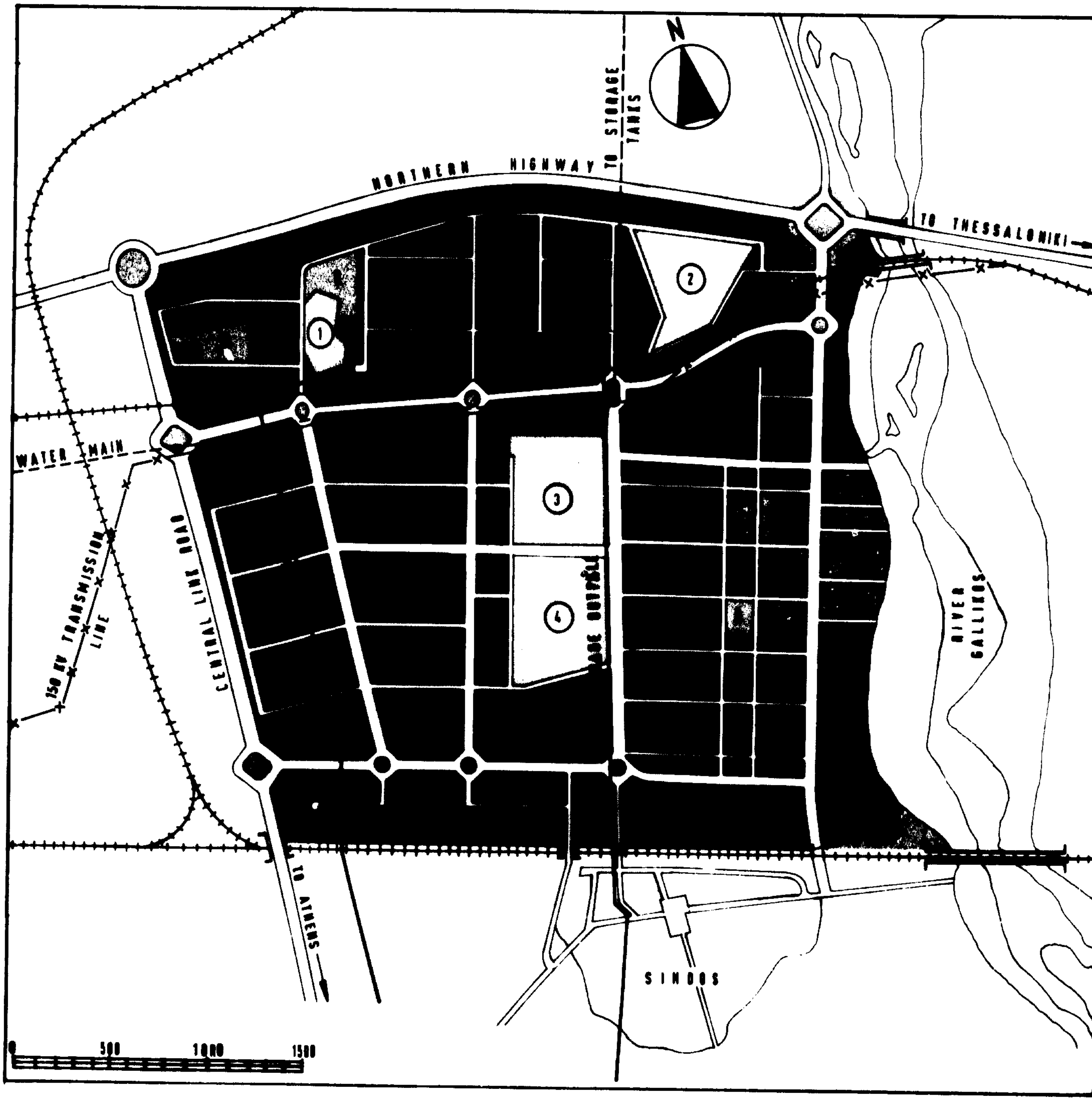
Plots with rail access are at the south end of both Area 1 and Area 2, so that no tracks need cross the general road system. The sidings originate from Sindos Station, and a Rail Freight Depot is sited adjacent to this.

Services Centres

The Services Centre has an attractive, as well as efficient, site in Area 2 near the "Green Area" of the Land Reclamation and Cotton Research Stations. This is considered a good feature and should be retained, in part, if the Stations eventually leave the Area.

The Services Centre is connected to Area 1 by a direct route. This road and the main north-south avenue, west of the Services Centre, will form the centre feature of the Area, and will be landscaped appropriately. The necessary adjustments to the boundaries of the Land Reclamation Station are dealt with in Section 26.

Services Sub-Centres are sited in Areas 1 and 2, adjacent to the Industrial Estate and the smaller plots, to give maximum benefit to the parts of the Area with the highest population.



KEY		COLOUR LEGEND
NATO	1	GENERAL INDUSTRY
MILITARY BARRACKS	2	INDUSTRIAL ESTATE
LAND RECLAMATION STATION	3	FREE CUSTOMS ZONE
COTTON RESEARCH INSTITUTE	4	SERVICES CENTRES
ELECTRICITY SUB-STATION	E	RECREATION
WATER SUPPLY PUMPHOUSE	P	EXISTING INSTALLATIONS

MASTER PLAN

FIGURE 7

Industrial Estate

The Industrial Estate is sited within Area 1 as construction can start immediately here and utilities are available. The blocks available are of a suitable size. If they are eventually fully developed, the Estate could expand into Area 2, near one of the Services Sub-Centres where there are other blocks of a suitable size.

Free-Customs Zone

This consists of a fenced compound of bonded warehouses sited on the south side of Area 1, so that the Zone can be initiated without waiting for the development of Area 2. It is convenient to the Rail Freight Depot, which may handle much of its traffic.

Amenities

The main amenities, in the form of open spaces, catering establishments, shops and playing fields, will be grouped around the Services Centre and Sub-Centres, and on areas least suitable for industrial plots. Landscaping and tree planting is proposed principally along the primary roads and particularly on those crossing at the Services Centre. Car parks are provided mainly near the Services Centres and Sub-Centres; some are distributed over the Area.

Utilities

Utility networks follow the lines of all roads and space is provided for distribution centres in appropriate central locations.

12. SERVICES CENTRES

The Terms of Reference require that a site be chosen and layout plans prepared for a Services Centre, housing the Administration Offices of HIDB and common services for the Industrial Area.

Some facilities are required for operation by Public Authorities and others by private enterprise, in addition to those to be operated by HIDB.

Planning has been assisted by discussion with these Authorities, but no commitment has been made to or by them as to the financing or methods of operation. The proposals contained in Chapter II of this Report, and summarised below, are recommended as being suitable for the Area's needs and its anticipated rate of growth. The planning requirements were outlined in the Preliminary Report, and the scheme was outlined in the Draft Final Report. Both were discussed with HIDB and their comments have been incorporated in the final scheme.

During the progress of planning it became apparent that certain services would best be decentralised throughout the Area and this need has been taken into account.

12.1 CENTRAL SERVICES

Many of the services will be centrally operated for the whole Area, and buildings for these have been designed within the Services Centre complex, as follows:-

(a) Centre (Administration) Building, for HIDB

(b) Security Services - Police Station
Fire Station

(c) Industrial Health Centre

(d) Main Telephone Exchange and Post Office

(e) Works Services Depot

(f) Restaurant for Centre staff and visitors

(g) Computer Centre
(Conditional on the result of further study of the need for it)

(h) Commercial, such as banks, offices, shops, central bus station and petrol filling station. (These will not be built by HIDB and designs have not been prepared)

12.2 SERVICES CENTRE LAYOUT

The location and layout of the Services Centre are shown on Figures Nos. 8(a) and 8(b) overleaf. These indicate the positions of the buildings which will be provided initially and those which may follow and show provision for expansion where this is desirable. The buildings are described in detail in Chapter II of this Report.

12.3 SERVICES SUB-CENTRES

Three Services Sub-Centres have been included in the Master Plan, distributed about the Area in such a way that all factories, and particularly the smaller ones, will be within easy reach of the Services they provide. It is planned that one is built at each stage of construction, the first being in Area 1; the services for the first stage of Area 2 will be provided from the Main Services Centre.

12.4 SERVICES SUB-CENTRE - AREA 1

A Services Sub-Centre will be required in Area 1 during the next two years (1973-1974) to serve all the needs of Area 1 and the Industrial Estate until the Main Services Centre can be constructed and to continue to give local services thereafter.

The essential item in it is a temporary Administrative Centre.

For reasons of expediency, it has been considered appropriate to site the Technical Advisory and Training Centre in the Services Sub-Centre so as to be adjacent to the Industrial Estate and serve the most likely source of trainees.

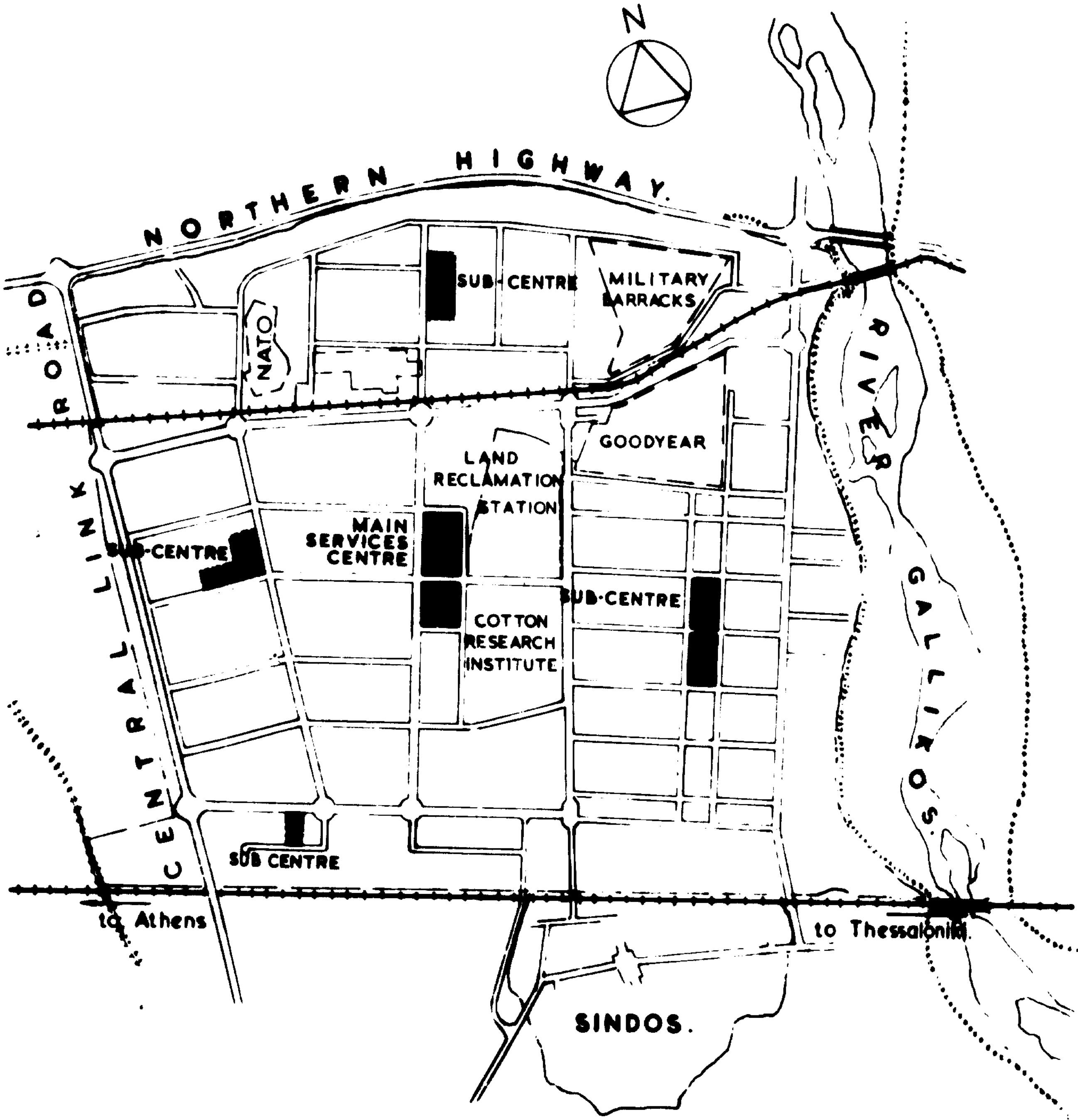
The following other buildings are proposed:-

Satellite Medical Centre

Satellite Works Services Depot

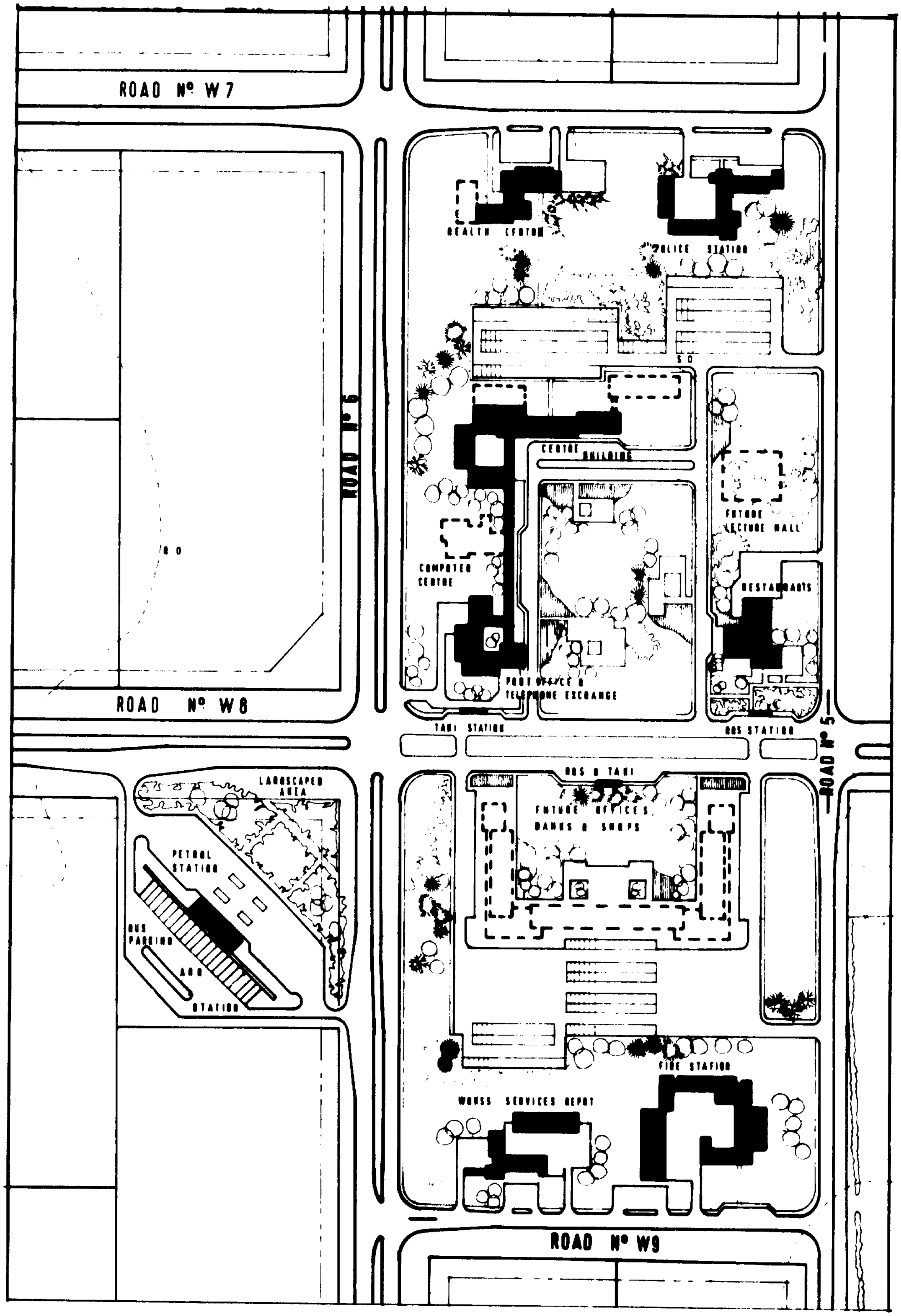
Cafeteria

The Master Plan also shows a Bus Park, Recreation Area, and Petrol-filling Station.



LOCATION OF SERVICES CENTRES

FIGURE 8(a)



LAYOUT OF SERVICES CENTRE FIGURE 8(b)

13. INDUSTRIAL ESTATE

The site for the Industrial Estate is on Area 1, where the infrastructure works are substantially complete, and it will be possible to start the development of an Industrial Estate with very little delay. This is considered essential for the promotion of the growth of the Area generally. It is recommended that the Estate should be located on HIDB's Plots 13, 18, 19, 20, 25 and part of Plot 26, as shown in Plates Nos. 1 & 2. The total area will be 54 hectares with a new usable area of 51.4 hectares after deduction of existing and proposed main roads. The part of the Estate west of Road No. 1 will be developed first.

A series of standard factories has been designed and the total potential covered factory area available will finally be about 150,000 m². It is recommended that 5,600 m² of factories of the smaller type shall be constructed at an early date, in advance of firm tenancies being arranged, in order to stimulate demand for them.

A more detailed description of the Industrial Estate and the factories is contained in Chapter III of this Report.

14. FREE-CUSTOMS ZONE

A site of 7.5 hectares has been allocated for the Free-Customs Zone in Area 1, south of Road E10 and adjacent to the Rail Freight Depot. The reason for the reduction in area from the Terms of Reference is explained in Chapter IV.

This site will be fenced to form a compound, in which Warehouses will be built, starting with one only and extending it as necessary to meet the demand. Offices and a control point will be built at the entrance to check the arrival of customs-free imports, to check their issue to and return as finished goods from factories on the Area and finally to control their shipment in bonded containers, if and when this system is in operation. A rail siding is included in the scheme to facilitate direct traffic of sealed rail vans but it is anticipated that much of the inward and outward traffic will be containers which will be handled on to rail wagons in the Rail Freight Depot.

Siting the Zone in Area 1 means that it can be initiated in the near future, as the infrastructure facilities are available there, and the Warehouse can be built sooner than if it was sited in Area 2.

Designs of the buildings are not included in the Terms of Reference.

15. INDUSTRIAL PLOTS

15.1 AVAILABLE AREA

The Industrial Area occupies 1,112 hectares as shown in Section 2.4 plus a further 10 hectares which it is recommended, in Section 26, shall be purchased to complete the site up to the proposed Central Link Road on the north-west corner. 723.5 hectares are allocated for industrial plots, as shown on Table 15.1 below, which summarises the main features of the Master Plan. 464.5 hectares are on Area 2, compared with 259 on Area 1. A further 64 hectares could become available in Area 2 after inclusion of the land at present occupied by N.A.T.O., the Military Barracks and the Ministry of Agriculture Institutes.

TABLE 15.1

ALLOCATION OF AREAS IN HECTARES

	AREA 1	AREA 2 Stage 1	AREA 2 Stage 2	AREA 2 Stage 3	TOTAL
Industrial Plots					
Available - large	87	140	99	96.5	422.5
- large with rail access	35	6	20	13	74
- small			47	18	65
- allocated (or on option)	86	6	2	17	111
Industrial Estate	51				51
TOTAL Industrial Plots	259	152	168	144.5	723.5
Free Customs Zone	7.5				7.5
Rail Freight Depot	14				14
Infrastructure	56	64.5	80	50.5	251
Existing Installations					
NATO				9	
Military Barracks				25	
Ministry of Agriculture				59	93
Public Roadways					
Northern Highway			3	3.5	6.5
Central Link Road				26.5	26.5
	336.5	216.5	251	318	1122

NOTE 1: The size of Area 1 is based on

Area within HIDB original boundary	334	hectares
Add Area adjacent to North end of Road No. 1	12	hectares
	346	hectares
Deduct Area adjacent to Road W6	9.5	hectares
(to be developed as part of Area 2) Total	336.5	hectares

NOTE 2: The total area of the Project Site includes the 1112 hectares within the HIDB boundary plus 10 hectares proposed for purchase in the north-west corner. (see Section 26)

NOTE 3: Infrastructure includes Roads, Services, Utilities, Car Parks and amenities.

15.2 SIZES OF PLOTS - AREA 2

Area 2 is divided by the new road system into blocks of an average size of 18 hectares. These will give good flexibility for the allocation of plots of suitable size for the type of industry expected, and will give the best use of the roads and utilities alongside them. Generally, the blocks are of sufficient size that both sides of the roads will be used for development. The secondary road system, on to which factories will mainly front, has an average spacing of 300 m and half of this distance will be a suitable depth for most factory plots. The blocks can be divided into plots of various widths to meet the demand as it arises.

The Master Plan shows them sub-divided into plots mainly from 1 to 3 hectares and these sizes are considered to be the most likely ones required. Factories of 5,000 to 15,000 sq.m can be built on them. Some larger plots are shown from 3 to 20 hectares. Larger plots still could be provided if required, by the amalgamation of two blocks, which should preferably be done on the perimeter of the Area to avoid traffic dislocation.

The larger plots mainly front on to the primary roads, and in many cases can have their entrances from the secondary roads which will be fronted by the smaller plots. This will cause the least overall traffic congestion.

Approximately one-fifth of Area 2 is allocated for plots for the smallest industries, all less than one hectare each. There will be two such areas grouped around the Services Sub-Centres. They are planned to give maximum flexibility of development according to demand, and can be allocated in the same way as the larger plots or used for standard factories as an expansion of the Industrial Estate.

The plan for the north part of Area 2 allows for the continued presence of NATO and the Military Barracks, and if necessary the Stores and the Northern Railway. It also enables the land alongside the Northern Highway, and the existing factories there, to be served from the new road system. It also shows how the plots adjacent to the railway will be developed when it is removed, and the Area calculations of Table 15.1 are based on the assumption that both the Railway and the Stores will have gone.

15.3 PLOTS WITH RAIL ACCESS

Consideration has been given to the advisability of including a sidings system that will give rail access to every plot. This study is included in Section 18.

It has been concluded that plots on the south side of the Area only should be reserved for factories requiring sidings, as they can be built economically and will not need to cross the general road system and dislocate traffic. Plots with an area of approximately 35 hectares can be provided in Area 1 and another 39 hectares on the south side of Area 2. The location of these plots is shown on the Master Plan. If the road connection to the Central Link Road at this corner has to be elevated, then it will be possible to extend the Area siding system under it and along the west boundary to serve additional plots. The need for this is unlikely; it is considered that the number of factories for which rail access can be economically justified will be small, and much less than 74 hectares described above, which is 10% of the Industrial Land on the Area. It is not recommended that the Northern Railway be retained to give rail access to plots.

15.4 PLOT LEVELS

On Area 2 it will not generally be possible to build factories with the floors at ground level; the ground is flatter and lower than Area 1. The drainage system proposed in Section 19 will require that all the roads and all the factories shall be raised ½ m above ground level. Bulk filling will be required on the western side of the site where the ground level must be raised by about 1 m to bring it clear of possible flooding.

The clay pits must also be filled. Initially, it is recommended they are used as Car Parks, while the filling settles.

15.5 PLANNING OF INDUSTRIAL PLOTS

It is proposed that a more rigidly planning standard should be imposed on private developers than in Area 1, in order to obtain more efficient use of land and utilities, to promote good traffic circulation and to give orderly appearance to the Area. This is important if efficient industries are to be attracted. Comments on the existing regulations and recommendations for their improvement are dealt with in Section 29.

15.6 ZONING

It is considered more important to maintain a compact development of the area at each stage rather than to apportion separate zones for specific industries. This will be economical in expenditure on the infrastructure, and will promote a higher degree of amenity with the avoidance as far as possible of large plots covered with weeds between developments.

Nearly all the industries listed in Appendix 8 can be sited anywhere within the area without affecting their neighbours. However, certain industries may present problems with aerial effluent, smells or other nuisances. These include paint, tanning and bleaching and certain plastics industries. These cases should be dealt with as they arise, and kept as far away from susceptible existing factories as it is possible.

The prevailing wind is from the north-west and north, and this makes it very difficult to isolate any new factory, as they will all be up-wind of either the existing Area 1 or the village of Sindos.

Therefore, industries with particular offensive aerial, solid or liquid effluents, should be kept off the Area altogether.

Industries involving high water consumption and large liquid effluents should be grouped near each other and near the main utility runs, if possible. These are on the east side of Area 2.

The proposed new soils investigation may reveal that some parts of the Area are capable of supporting heavier loads. If so, they can be added to the Master Plan and reserved for heavier industries.

Briefly, it is felt that no specific zoning policy can be imposed. The HIDB will need to consider all special cases as they arise. Suggestions for their policy on admission of industries are given in Section 29.

15.7 BLOCK AND PLOT NUMBERING

It is proposed that Blocks shall be identified in future by referring to the road numbers at the east and north side, for instance 7W9, to accord with the road numbering system outlined in the next Section. This prefixes the secondary roads with E or W, depending on their location in Area 1 or 2 and will enable a block to be easily found.

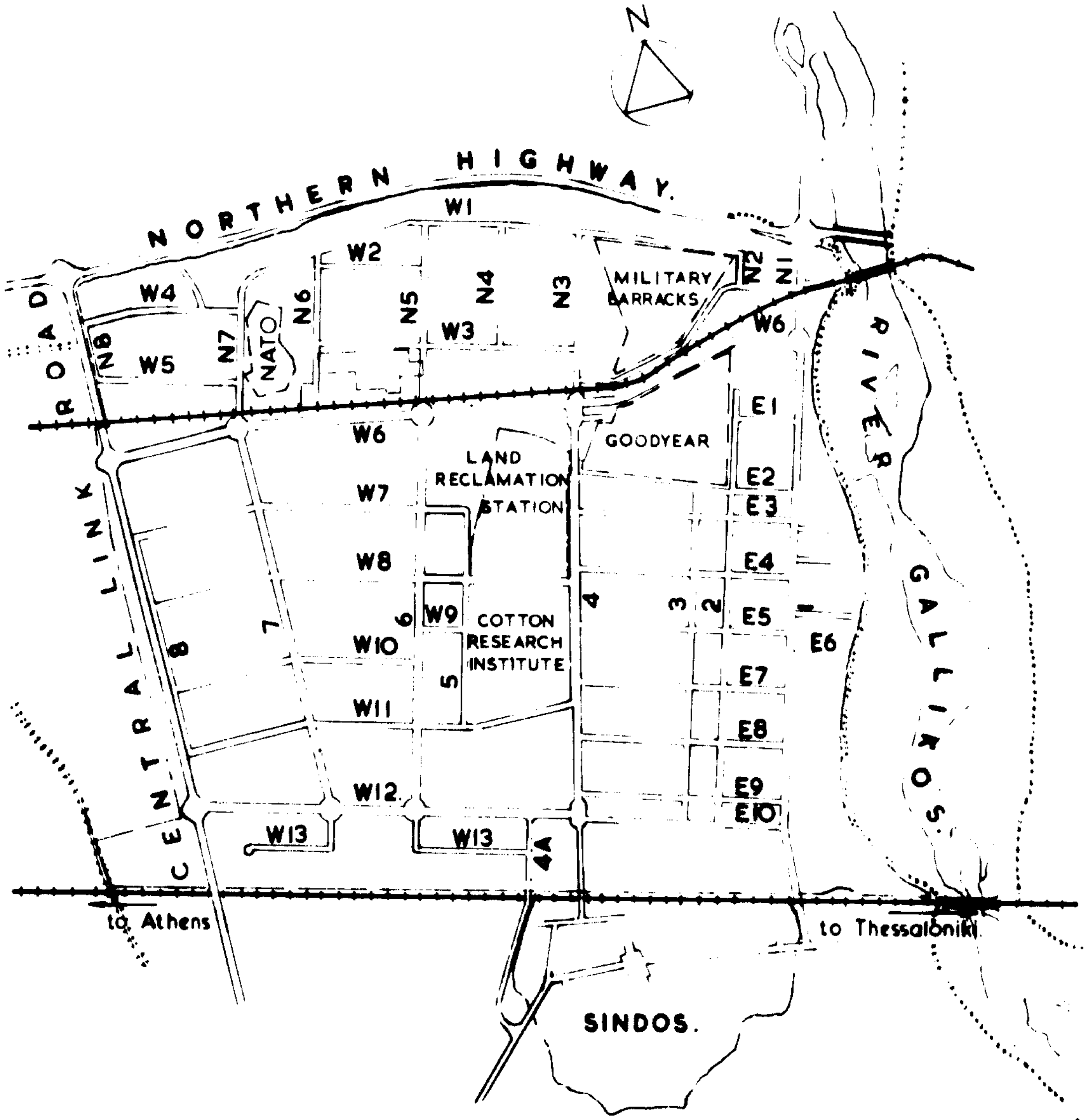
16. ROADS

16.1 INTERNAL ROAD SYSTEM

The overall road system is shown on Figure No. 9, with the numbering system proposed for internal roads, which retains as far as practical the existing numbers in Area 1.

The system in Area 2 generally follows the pattern set in Area 1 to which it is connected by Roads W8, W11 and W12.

The roads within Area 2 will be parallel to or at right angles to the line of the railway through Sindos, except where the route is dictated by existing facilities or the site boundaries. The network chosen has been designed to give ease of traffic flow, and blocks of a size suitable for industrial plots.



ROAD NUMBERING SYSTEM

FIGURE 9

Primary Roads

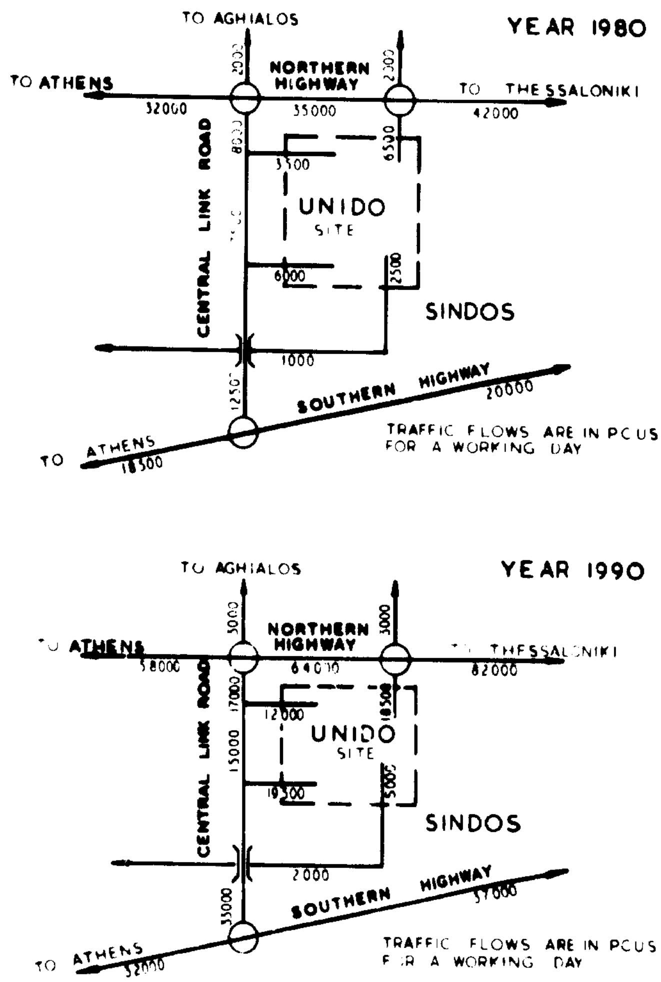
Road No. 1 (of Area 1) will be extended northwards to form the main entrance to the site from the Northern Highway. When the Industrial Area is fully developed the traffic will mainly disperse along Road W6, which follows the diverted power line and northern railway.

The major collection and dispersion road to the south will ba Road W12 which leads via the Central Link Road to the National Road system.

Running north-south between these two roads are Roads Nos. 1, 4, 6 and 7 to complete a basic network of primary roads.

These main routes have been the subject of the traffic study, which forms Appendix No. 9, to ensure their correct design and that of the junctions where they intersect with each other and the external road system.

The forecast of traffic intensities repeated on Figure No. 10 (below) indicates that by 1990 the flow at the north end of Road No.1 will be 18,500 passenger car units or pcus per day and the peak flow will be 2,500 pcus per hour, which is approaching the maximum



PRELIMINARY FORECAST OF TRAFFIC FLOWS IN THE VICINITY OF THE INDUSTRIAL AREA OF THESSALONIKI

FIGURE 10

capacity of a dual-lane carriageway with no frontage access, no standing vehicles and high capacity junctions. The forecast for Road W12 is 19,500 pcus per day and a peak of 2,630 pcus per hour, and thus a similar dual two-lane carriageway road is required. The western end of Road W6 is calculated to have a peak flow in 1990 of 1,620 pcus per hour, and this road also needs to have dual two-lane carriageways.

It is assumed that the peak flow on Roads Nos. 4, 6 and 7 will be half that on Road W12, i.e. 1,300 pcus per hour. As there will be some access to plots and heavy cross traffic at secondary road junctions, the traffic flow warrants a dual two-lane carriageway road.

Initially, access to Area 1 and the first stage of Area 2 will be via Road No. 1, E2, 4 and dispersal. Road W6 need not be built at this stage. Roads Nos. 6, 7 and W12 need only be built with one carriageway until the second stage of Area 2 is developed as they do not yet form primary roads.

Secondary Road System

The closer network of secondary roads will all be of single two-lane carriageways which have adequate capacity for the traffic and conditions.

It is hoped that the northern railway will have been relocated by the time the part of Area 2 to the north of it is developed. If not there is sufficient space between Road W6 and the railway for traffic to wait at level crossings. The traffic flow does not warrant the cost of bridges, and the railway has only a limited life.

Road W1 has been sited so that new plots on the northern side can be developed without needing access to and therefore reducing the capacity of the Northern Highway.

16.2 JUNCTION DESIGN

Roads W6 and W12, and the north end of Road No. 1, will eventually carry the largest volume of internal traffic and require high capacity junctions. Roundabouts have been chosen as they allow free flow of traffic in preference to channelised junctions with traffic lights. These roundabouts occupy substantial areas of land but this is felt to be acceptable in view of the large site.

The roundabouts, with a width of 10 m and a weaving length of 45 m, will take 3,000 pcus/hour. This will be adequate to take the predicted traffic of about 2,500 pcus/hour of each primary road, together with an allowance of 500 pcus joining from another road. A typical roundabout is shown on Figure No. 11.

The spacing between roundabouts on Roads W6 and W12 is 400 m approximately.

Modifications will have to be made in Area 1, at the intersection of Road No. 4 with Road Nos. E2 and E10 to construct these roundabouts.

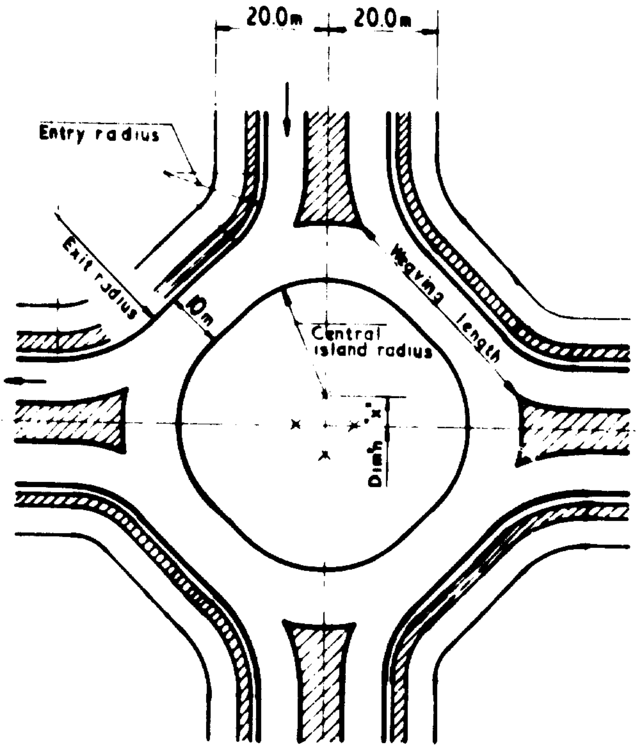
In the first stage of Area 2 development, when only single carriageways are built on primary roads, simple 'T' or 'X' junctions only will be used. However, utility crossings will be arranged so that roundabouts can be built later without difficulty and land must be reserved for them.

All junctions on Roads Nos. 6 and 7 will have channelising islands. The space between junctions is 300 metres approximately.

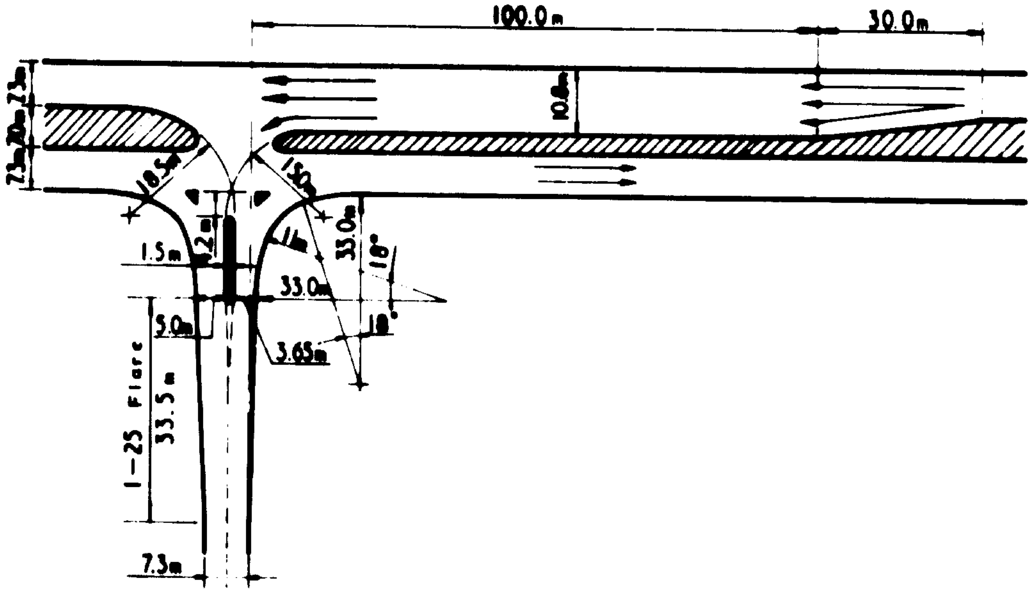
Junctions where secondary roads only are involved will be simple 'T' or 'X' junctions with radiused kerbs preferably 100m apart to prevent traffic congestion.

With the network and the junction designs proposed it is considered that it will not be necessary to have traffic lights at any of the intersections and that the whole road system will be able to provide efficiently for the traffic within the Area, including the use of cars for commuting, when it is fully developed.

Typical details of junctions are shown on Figure No. 11.



	Roundabout on internal roads	Roundabout on external roads
Entry radius	17.0m	20.0m
Exit radius	25.0m	30.0m
Central island rad	20.0m	25.0m
Dimension "x"	5.0m	20.0m
Weaving length	45.0m	70.0m



TYPICAL ROUNDABOUT AND ROAD JUNCTIONS

FIGURE 11

16.3 FACTORY ACCESSES

Generally, access to individual plots will be from the secondary roads. In some cases along Roads Nos. 6 and 7 there will be access to larger plots direct from the road. If these are kept away from intersections it is considered that the traffic interference will be acceptable. Major plots sited alongside Roads W6 and W12 will, as far as possible, have access to them from the secondary road system but where accesses cannot be avoided, they will be collected into a "feeder road".

16.4 TYPES AND WIDTHS AND CONSTRUCTION

The dual-carriageway primary roads have a wide centre reserve of 7 m so that at cross-roads vehicles from secondary roads can cross one carriageway at a time with ample width in the centre to wait. The carriageways remain the same width, 7.3 m as Class I road on Area 1, and the footpaths of 2m and the small verges of 1.30 m for lighting standards and road signs are also repeated. Being similar to the Class I roads of Area 1 they are designated as Class IA roads.

There is a verge at each side for various services and landscaping. The extent of the primary road reserve is 40 m wide except where it is increased to include open drainage channels alongside.

The central Road W8 which will connect Area 1 to Area 2 will, although classed as a secondary road, have dual-carriageways, with a special central reserve of 10 m between Roads Nos. 4 and 6, and special landscape treatment to provide a dominant access to the Services Centre from Area 1. Special landscape treatment is also proposed for Road No. 6 the main central avenue of the Area past the Services Centre which it is proposed should be reserved for the most important industries.

The secondary roads (Class IIA) have single 7.3 m wide carriageways. Because of the higher number of pedestrians and the absence of the 1.30 m intermediate verges the footpaths are 3 m wide. Outside the footpath on each side is a small verge and then the drainage channels and then another verge for services to give an overall road reserve 40 m wide.

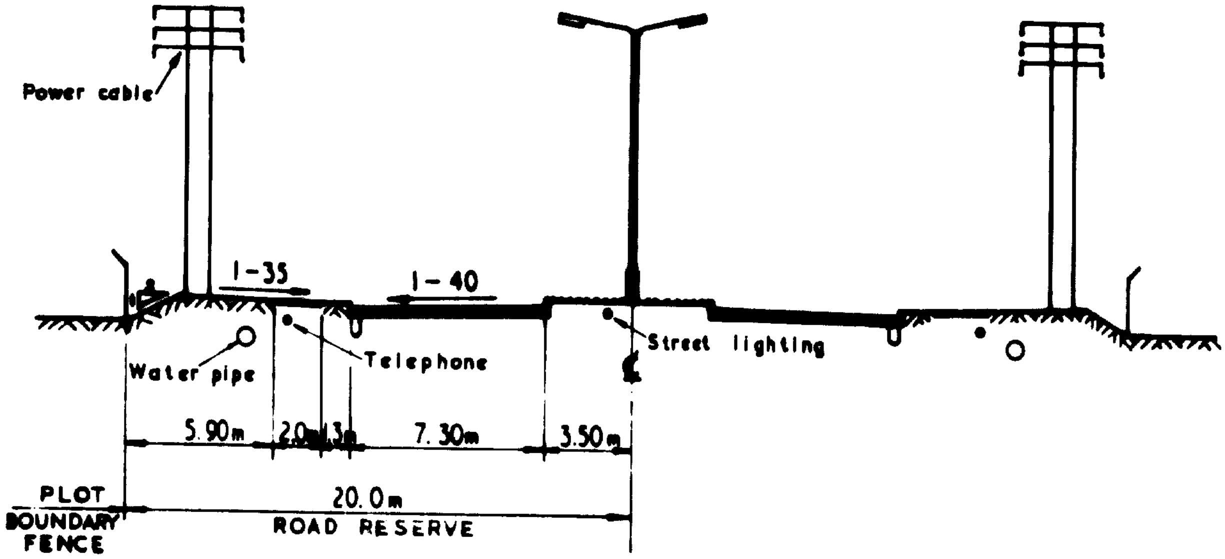
Class IIIA roads for local service roads to individual plots will have 5m wide carriageways, 2 m footpaths to give a total reserve of 12 m.

Cambers, gradients, curvature, etc., are generally in accordance with modern practice for local distributor and access roads, with design speeds of 50 km per hour. In order to control drainage run-off, and because the footpaths and lighting standards are close to the road, kerbs will be used on all roads. Carriageways will consist of a wearing course on a flexible base. This is suitable for the alluvial soil where settlement will occur. The provision of footpaths of flexible construction together with the unsurfaced outer verges facilitates the layout of all underground services. The electric power cables are carried overhead on poles at the outer edge of the road reserve to ensure sufficient clearance against shorting. Soil pipes and water supply pipes and telephone cables will be placed under the outer verges closer to the plots they serve.

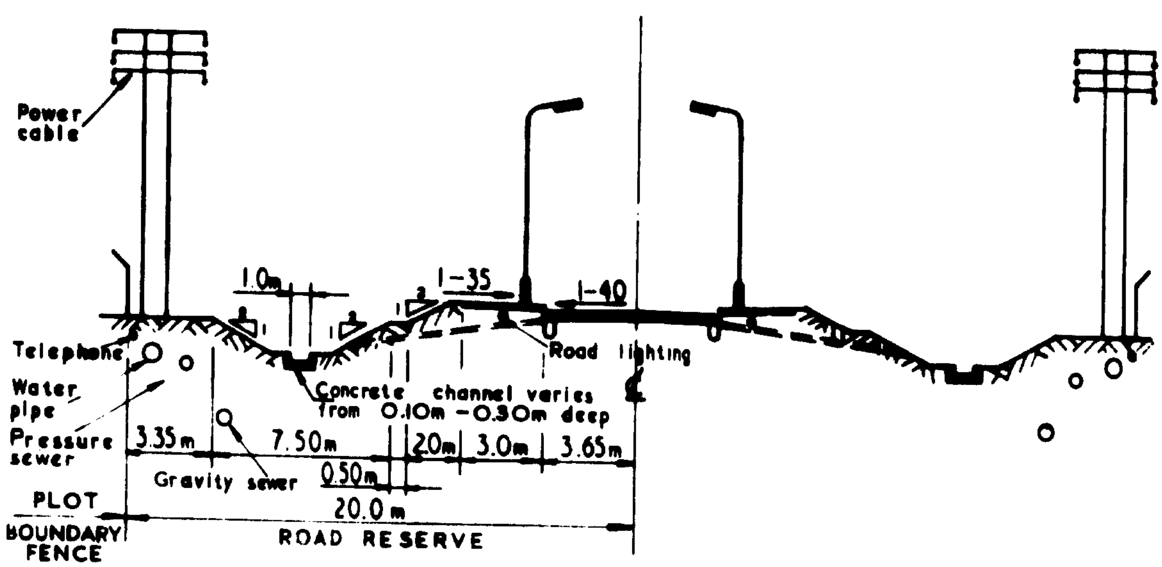
Typical cross sections of the roads are shown on Figure No. 12 opposite.

16.5 EXTERNAL TRAFFIC

The traffic forecast in Appendix No. 9 gives the predicted flow at the important junctions where the primary road system of the Area joins the external roads, and these are shown on Figure Nos. 10a and 10b.



CLASS IA PRIMARY ROAD



CLASS IIA SECONDARY ROAD

PROPOSED STANDARD ROADS IN AREA 2 OF INDUSTRIAL AREA

FIGURE 12

It has been assumed that the Central Link Road will be completed before 1980. Indeed this matter must be given serious attention by HIDB, as its deferment would seriously overtax the only other entrance to the site and cause serious congestion and delay.

Junction of Road No. 1 and the Northern Highway

The traffic forecast shows that the traffic on the Northern Highway at the site entrance will, by 1990, be larger than is generally accepted as the maximum for a dual two-lane carriageway to which standard it is understood that the Highway is now being improved. It has been assumed that, in due course, a new route further north will be provided for through-traffic, as shown on the Master Plan for Thessaloniki Region.

The junction of Road No. 1 with the Northern Highway is designed as a surface roundabout with a capacity sufficient for the future dual two-lane carriageway standard of the two roads. It is designed for 3,200 pcus per hour with 80% weaving traffic and with a width of 10 m has a weaving length of 70 m. A grade-separated junction was rejected on the assumption above that the Highway through-traffic will be relieved and the extra cost is unwarranted. It would be difficult to build, owing to the proximity of the Gallikos River Bridge and other installations.

The northern side of the roundabout forms a part of the flood banks of the River Gallikos. The raising of these is recommended in Section 19 and this must be taken into account when the roundabout is built.

Connections to the Central Link Road

The forecast of traffic is such that similar roundabouts to that at the junction of Road No. 1 with the Northern Highway will be adequate. However, the Link Road design may be such that grade-separation is required and the roundabouts will be elevated. As there is no other road connection within 300 m of the roundabouts the necessary ramps and slip roads can be constructed. The decision on grade separation would have to be made before the surrounding plots are developed so that the land can be made available.

16.6 COUNTRY ROAD

When the new site entrance via Road No. 1 is built, the existing country road connection to the Northern Highway should no longer be used for any traffic from Sindos or the Industrial Area.

The village of Sindos may develop to provide some of the labour force required for the Area and good access, both vehicular and pedestrian is therefore needed. It is recommended that Road No. 1 should be extended southwards to by-pass the eastern outskirts of Sindos and join the main east-west road through the village. A single two-lane carriageway should be adequate with a level crossing over the railway.

The predicted traffic flow for 1990 on the southern end of the 'country' road, which will remain as the main connection to Sindos and the villages beyond, indicates that a single two-lane carriageway road is adequate. The volume may then be sufficient to warrant a bridge and this requires the road to be diverted further west and to by-pass the village rejoining the old road further south. Until traffic demand warrants the construction of the bridge, the existing section of the road and the level crossing connection to Sindos can be maintained.

The use of the country road through the Area will otherwise be discontinued, except as an access road to the Land Reclamation Station, Cotton Research Institute and a few factories.

17. PERSONNEL TRANSPORTATION AND PARKING

17.1 GENERAL

The methods of transporting the labour force to work affect the Master Plan in several ways. The main impact will be on the road system which has been designed to accommodate employees' transport as well as commercial traffic at peak hours.

Certain assumptions regarding the origin and methods of this transport have had to be made. These are outlined below, and are followed by the provisions required in the Master Plan to deal with car parking and transportation generally.

17.2 HOUSING LOCATIONS

The Terms of Reference of this Report do not include housing. No study has therefore been made to determine where the labour force will live. (This is an important part of any industrialisation policy). The number employed in the Area is forecast to rise to 38,000 by 1990. It is possible than some of the work force will live in the Sindos Area, as is proposed on the Master Plan for the Thessaloniki Region. However, major housing developments, of a size comparable to the Industrial Area itself, would be difficult to undertake near Sindos, owing to the possibility of flooding, and it is assumed that much of the labour force will continue to come from Thessaloniki and the surrounding villages as it does at present.

17.3 PRIVATE BUSES

Most factories now make their own arrangements for private bus transport for their employees. This is likely to continue, but in a decreasing proportion to the total traffic. To prevent obstruction to the Area roads, it will be necessary in future, to ensure that each factory provides its own parking space for buses within its plot.

17.4 PUBLIC BUSES AND BUS ROUTES

As the Industrial Area develops, it will become practical for many of the employees to be brought in by public transport. Most of this transport will be concentrated at the peak hours when work normally starts and stops, but bus services to and through the Area throughout the day will be desirable also.

On Figure No. 13 a suggested routing for bus transport around Area 1 and the first stage of Area 2 is indicated.

The routes ensure that no-one will have to walk more than 250 m from the bus stop to their place of work.

It has been assumed that at peak hours the 13,000 employees who may eventually work on Area 1, including 6,000 on the Industrial Estate, will require 25 buses, stopping at the Bus Stations, and at Bus Stops throughout Area 1. The same will apply to each stage of Area 2.

Since the Services Centre and Sub-Centres are the most practical positions for the Bus Stations, these have been designed to allow at least 20 buses (each seating 40-50 persons) to park as a special peak hour requirement. This provision assumes that other buses will be circulating to take up or let down the employees who are too far from the Bus Station.

Five Bus Stations are shown on the Master Plan, one close to each Sub-Centre, one opposite the main Services Centre and one at Sindos railway station. It should not be necessary to provide shelter at these stations.

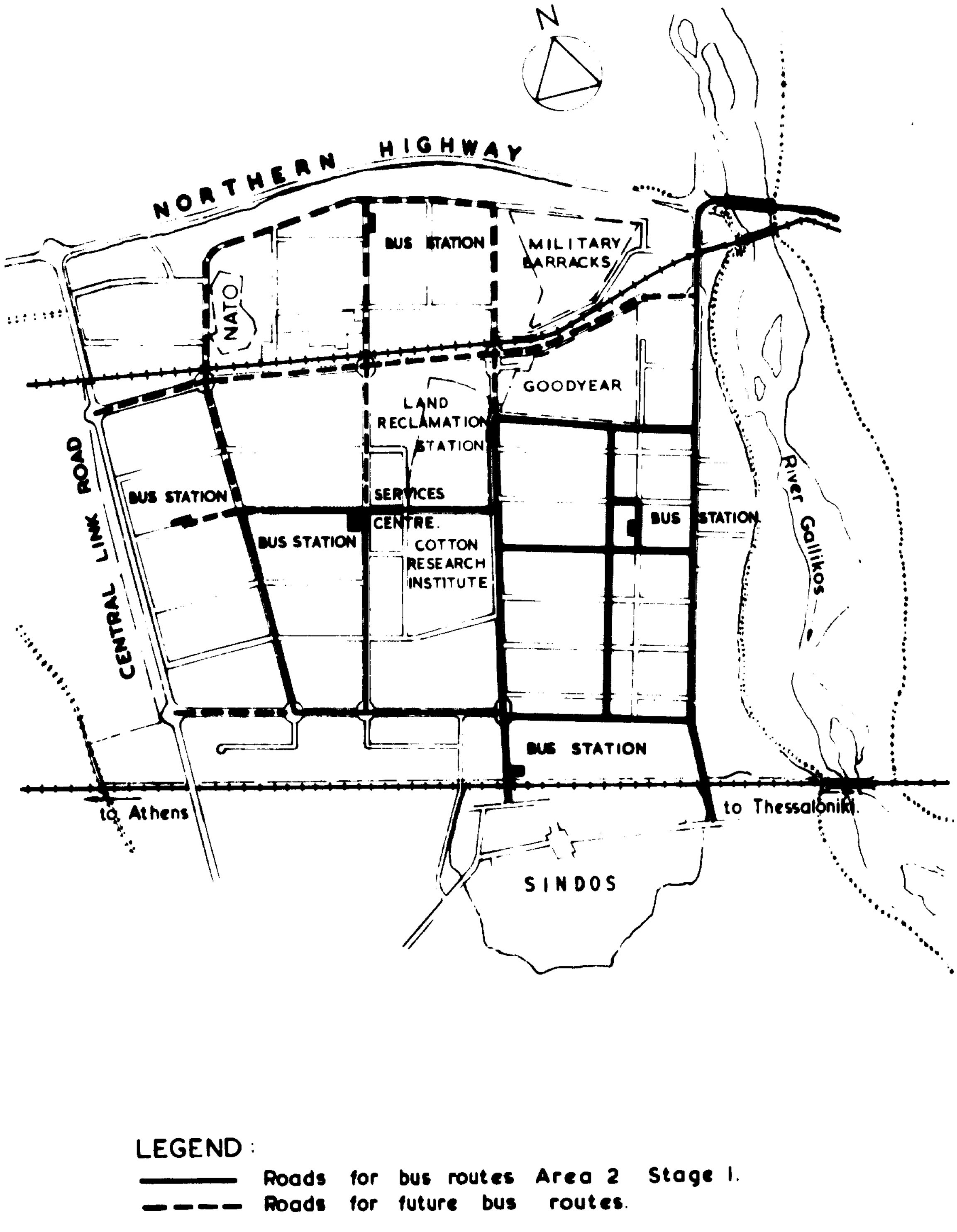


FIGURE 13 BUS ROUTES

17.5 PRIVATE CARS AND CAR PARKING

The number of employees who use their own cars (or travel in the cars of others) is constantly increasing in Greece and throughout the world, and so is the provision necessary for their parking. The time will shortly be reached on the Industrial Area when parking on Area roads must be stopped, as their use by vehicles for which they are intended, will be impeded.

Generally, factories within the Industrial Area, should be expected to provide car parks on their own sites for their employees, visitors and commercial vehicles. It is recommended in Section 29 that the regulations shall require developers to provide at least one parking space for every 4 workers.

The growth of car ownership is quick and this forecast could be outdated by 1980, and it is certainly likely to be exceeded by 1990.

Provision should therefore be made for amending the regulations if experience shows this desirable.

17.6 PUBLIC CAR PARKS

The Master Plan shows a number of public car parks for general purposes, and some for the small factories, both on the Industrial Estate and in Area 2, which will not have adequate area for car parking within their ownsites.

In assessing the number of cars on the Industrial Estate and on the small plots in Area 2, the ratio of one car to four employees has been exceeded as it will be prudent to have the space available and change its use later if it is not all necessary.

The locations of car parks is shown on the Master Plan, which includes a total area of parks in Area 2 of 15 hectares. In addition, parking is suggested as a temporary use for the clay pits, as soon as they are filled. Later they will be used for industry when the filling has settled.

17.7 SERVICE STATIONS

On the Master Plan, petrol service stations have been shown within each Services Sub-Centre and one west of the main Services Centre, on Road No. 6.

17.8 PEDESTRIAN WAYS

The pedestrian ways, shown mainly around the Industrial Estate and the corresponding small-plot developments of Area 2, will lead from the car parks to the factories and the amenities of the Sub-Centres. The surface water channel west of Road No. 7 has been utilised largely as pedestrian ways assuming that it will be covered ultimately.

17.9 RAIL TRAVEL

It is recommended that HIDB consider with the Railway Authorities the possibility of increasing the frequency, reliability and comfort of the railway service to Sindos, particularly for people commuting from Thessaloniki. This could well assist in preventing congestion on the Northern Highway when the Area is more fully developed.

18. RAIL NETWORK

18.1 RAIL SIDINGS

The Master Plan includes industrial plots with rail access, with an approximate area of 74 ha and the sidings to serve these plots, and holding sidings at Sindos.

The importance which the Greek Railway Authorities attach to the provision of rail access to a larger proportion of plots is clearly understood and their proposals for Area 1 have been examined. From a railway point of view the proposals are admirable but from a planning aspect they have the following objections:-

(a) Several crossings of the primary Road No. 1 are involved, with consequent danger and disruption to road traffic.

(b) The tracks are located on land reserved for the Industrial Estate and the Services Sub-Centre, and on land already purchased or under option for industrial development, where railways are not in any case required.

(c) Much land is sterilised by curves, sidings, loading bays, etc.

(d) Enquiries at site in 1971 showed that only 1 out of 26 factories required a siding.

No reasonable justification can be found for accepting the larger rail siding network. Generally, industries throughout the world are tending to dispense with sidings. Unless all the plots subscribe to their upkeep the capital cost cannot be justified, nor can the numerous level crossings. More and more industries are adopting road transport, and use rail only where an efficient central freight depot and container loading facilities are available.

18.2 RAIL FREIGHT

An investigation into the quantity of materials currently being imported into Area 1 and finished goods despatched from it, by road and rail, was made during 1971 by enquiries at 18 factories in the Area. The findings are shown on Table 18.1.

The current trend for an increasing proportion of goods to be handled by road will continue, especially in view of the construction of the National roads in Greece. This may be partially offset by railway modernisation, including the greater use of containers, and it is understood that container handling facilities are to be developed at the Port of Thessaloniki. These will be particularly useful for shipment of finished goods to overseas countries, especially those from the Free-Customs Zone.

Generally, it has been assumed that rail traffic in 1980 will be four times higher than in 1971, and in 1990 it will be three times higher than in 1980. This prediction of future rail traffic is shown on Table 18.1 with an approximate prediction of the amount of port traffic that may go by rail instead of road when facilities are available in the Area to deal with it.

Table 18.1 forecasts that in 1980, the materials arriving by rail will increase to 140,000 tons, of which it is assumed that half will arrive in containers, i.e. 70,000 tons.

The finished goods despatched by rail in 1980 are forecast to be 420,000 tons, of which most will be in containers, say 350,000 tons.

The total rail traffic in 1980 is thus estimated at 560,000 tons, with 420,000 tons in containers.

In 1990, the forecast total rail traffic is 1,680,000 tons of which, perhaps, 1,200 000 tons will be in containers.

TABLE 18.1

PREDICTION OF MOVEMENT OF GOODS BY RAIL (in tons)

RAW MATERIALS IN:								
Data	Working Population	Total Imported	Truck from Greece	Truck from Europe	Through Thessaloniki Port		Rail from Greece	Rail from Europe
					Road	Rail		
1971	1,000	220,000	130,000	very small	70,000	none	5,000	15,000
1980	16,000					60,000	20,000	60,000
1990	38,000					180,000	60,000	180,000
FINISHED GOODS OUT:								
Data	Working Population	Total Exported	Truck to Greece	Truck to Europe	Through Thessaloniki Port		Rail to Greece	Rail to Europe
					Road	Rail		
1971	1,000	220,000	120,000	7,000	40,000	none	15,000	38,000
1980	16,000					200,000	60,000	160,000
1990	38,000					600,000	180,000	480,000

18.3 RAIL FREIGHT DEPOT

The Master Plan allocates a space for a Rail Freight Depot close to Sindos Station, and indicates an arrangement of sidings, handling facilities and storage buildings for the traffic forecast in 1980 and capable of expansion to serve the traffic forecast for 1990. It is not intended to be the final arrangement as it is understood that the Railway Authorities will be responsible for this.

The 1980 traffic of about ½ million tons indicates that three reception sidings will be required initially, expanded later to four.

Wagon traffic will either be handled direct to the sidings of any factory that requires them, or in the Depot where a loading bank and a freight shed are proposed.

Container traffic which is estimated to reach 150 per day in 1980, will be handled by two gantry cranes, mastering 3 tracks, with a container park alongside, of sufficient capacity to handle 300 per day by 1990.

18.4 NORTHERN RAILWAY

As previously mentioned, the single track northern railway bisects the site and the possibility of its abandonment is strongly supported. The Master Plan does however make allowance for its retention for a short period after commencement of development to the north.

Road W6 has been positioned sufficiently far south of the railway to allow traffic to wait at the level crossings on the secondary roads without interfering with the flow of traffic on the roundabouts. Level crossings have been shown as they are more economic than bridges especially as the future of the railway is limited.

The length of the railway between Roads Nos. 1 and 4 is at present too close to the boundary of the Goodyear Tyre Factory, to allow both the transmission line and Road W6 to keep south of the railway. Being the main entrance road to the site, Road W6 should not make several crossings of the railway and therefore it will be necessary to divert the line further north between Roads 1 and 4. This diversion will also assist in providing the full size of the Area 1 sub-station as required by D.E.H. (see Section 9.7).

19. SURFACE WATER DRAINAGE AND FLOOD PROTECTION

Area 2 is low-lying and must be protected from flooding by the adjacent River Gallikos and the Sindos Channel. The drainage system must be capable of removing the run-off of storm water from the Area and this will increase considerably in quantity as the development proceeds.

Figure No. 14 shows how Area 1 has been drained into the Sindos Channel at a point where its maximum flood level, although possibly above the adjacent ground, is still about 4 m below the lowest (SW) part of Area 1. The design of the system of pipes and culverts installed has not been studied in this Report, but it should be capable of removing storm water with this fall. It appears to have a capacity of approximately 10 m^3/sec.

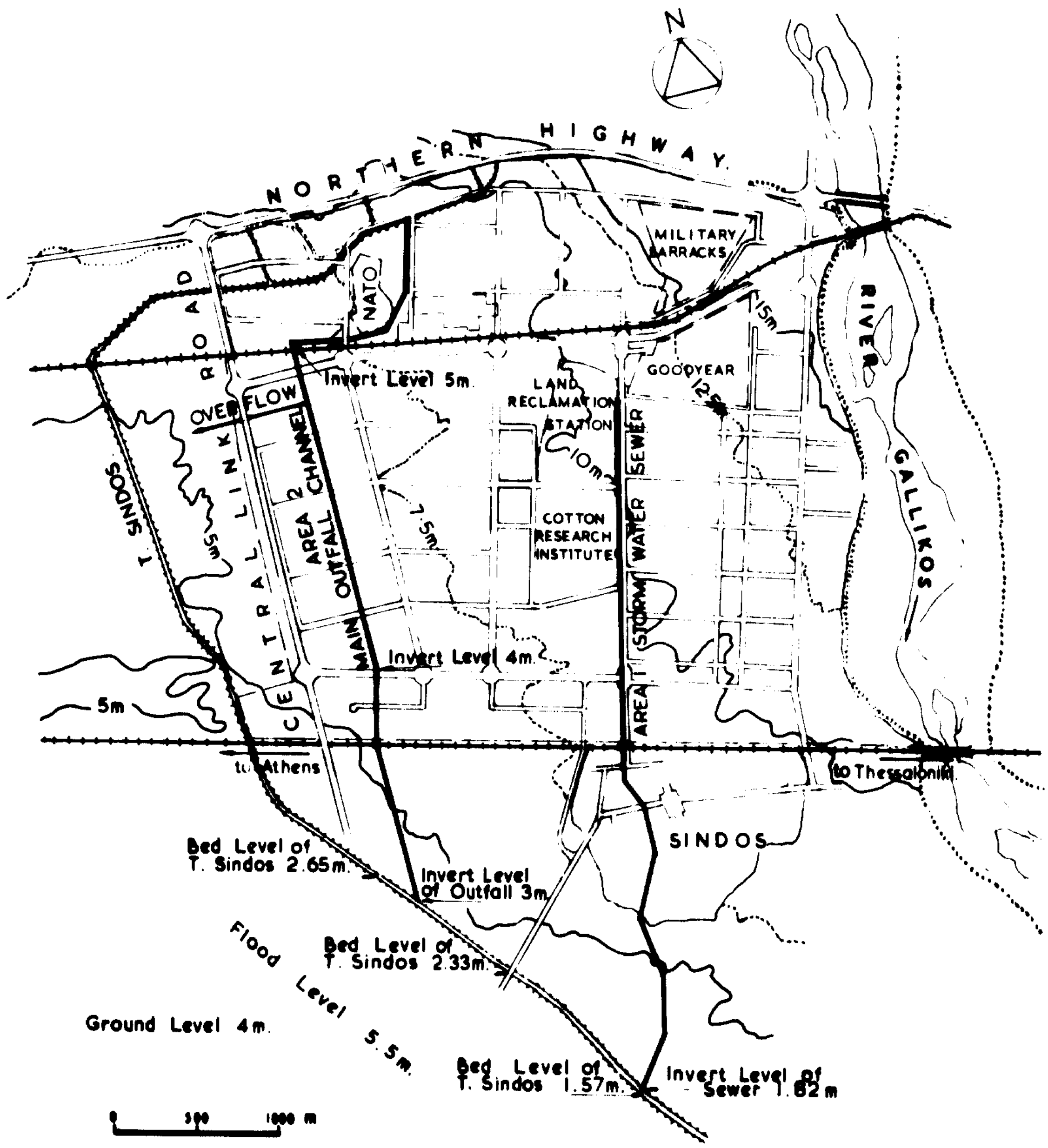
The ground of Area 2 is about 5 m lower than Area 1 and its lowest part is probably below the flood level in the Sindos Channel. The ground water level under Area 2, may only be about 3 m below the ground in summer and will be higher in winter. The ground slope is much flatter in Area 2, compared with Area 1.

The drainage system must deal with all these difficulties.

19.1 ESTIMATE OF RUN-OFF

19.1.1 Rainfall

Rainfall records have been kept at the Cotton Research Institute since 1934. The average rainfall over the last 36 years was 457 mm per year, the majority of which occurs in the autumn and winter. The monthly average figures are shown in Appendix No. 6. The average rainfall for the wettest month (November) was 67 mm, which fell in an average of 7.8 days. The winter rainfall is not heavy and provides no special problems of drainage. In the summer, however, intense storms of short duration occur. Daily records have been obtained over a four year period (1967-1970) and in that period four storms have occurred in which over 30 mm of rain have fallen in a short period. The most intense storm recorded showed a precipitation of 63 mm in 40 minutes.



STORM WATER DRAINAGE

FIGURE 14

It is notable that two intense storms occurred within two days of each other in one year followed by a two year interval before the other two storms fell in quick succession. In such cases the run-off from unpaved areas is likely to be increased due to saturation of the ground by the first storm.

19.1.2 Basis of Design

The surface water drainage system has been designed so that it can carry normally the run-off from the worst intensity of rainfall that is likely to occur every two years. For storms of greater intensity, it is possible that the water level will rise temporarily over the undeveloped areas of each plot; this is the reason why all buildings and roads are to be raised 0.5 m above the ground level, which should be adequate to prevent them being flooded.

Drains large enough for any possible storm would have to be very wide, and this would result in an uneconomic use of land.

19.1.3 Run-Off

The total run-off from an area on which rain is falling is only a proportion of the total rainfall, depending on the impermeability factor, which will vary in proportion to the paved areas, and the porosity and slope of the surface.

For individual fully developed plots, the factor of 0.6 has been assumed. For Area 2 generally the factor will be approximately 0.4 when development is complete. This factor is based on a realistic assessment of the extent to which development of the plots will be carried, and takes into account the proportion of open spaces that will be provided generally.

On this basis the ultimate run-off from Area 2 will be approximately 50 m^3/sec.

Initially the run-off will be much less, and the proposals which follow take this into account.

19.2 ESTIMATES OF WATER LEVEL AT OUTFALL

At the nearest practical outfall point which is south west of Sindos, the Sindos Channel has a bed level of 2.5 m, 1.5 m below the ground level (4.0 m), and a flood bank level of 5.5 m. Its calculated capacity when full is 110 m^3/sec, assuming that the bed is not allowed to become too dense in undergrowth. From local enquiries it appears that the level rarely rises above the ground level and this indicates a flow of about 70 m^3/sec, which would be reasonable for its catchment north of the Northern Highway, as it is now. When the catchment, which is zoned for industry, becomes more developed, the flow can be expected to increase. With the run-off from the Industrial Area, it appears that future flood levels will be higher and there is a real risk that the present banks of the Sindos Channel may be overtopped. No doubt action will be taken in due course to prevent this, and the consequent serious flooding of the Sindos Area

It is considered prudent to design the Area drainage system for an outfall level of 5.5 m. This is considered to be the level to which the floods may rise at the outfall point when full development of the catchment has occurred.

19.3 MAIN DRAINAGE CHANNEL AREA 2

Most of Area 2 lies between levels of 6.5 and 10 m. The north-east corner and the N.A.T.O. base are higher, and a substantial part, about 600 m wide all along the western boundary is between 5.0 and 6.5 m.

The distance from the outfall to the north of the Industrial Area is 4 kms. It is essential to construct a new and large main channel along this length of sufficient capacity to remove the run-off without its level rising above ground level.

It is proposed to site this channel on the west side of the first stage development of Area 2, as shown on Figure No. 14.

The flat slope will require a large cross-section. It will be practical for this channel to be unlined, except the invert, during the initial stage of Area 2 development. It will be generally 2.5 m deep with an invert width varying from 13.5 m at the outfall down to 4.5 m at the northern end. During later stages the channel can be lined (and covered) to increase its capacity and to reduce the interference with development.

An overflow channel will be provided as part of the second stage of development, leading to the Sindos Channel west of the site, to lead off any temporary surcharge.

19.4 PIPED DRAINAGE SYSTEM

Consideration has been given to a piped drainage system, similar to Area 1, to take the run-off from each block and road to the main channel. The pipes would generally follow the east-west secondary roads.

The fall of the ground in this direction is generally 1/550 and pipes of up to about 1.5 m diameter were found necessary. They would have ½ m of cover under the roadways and none elsewhere, and would obstruct other utilities.

During a storm with the pipes running full, the water level in them would be nearly at ground level throughout the whole of Area 2, and the proper design of a secondary pipe system to drain individual plots into them would be impossible.

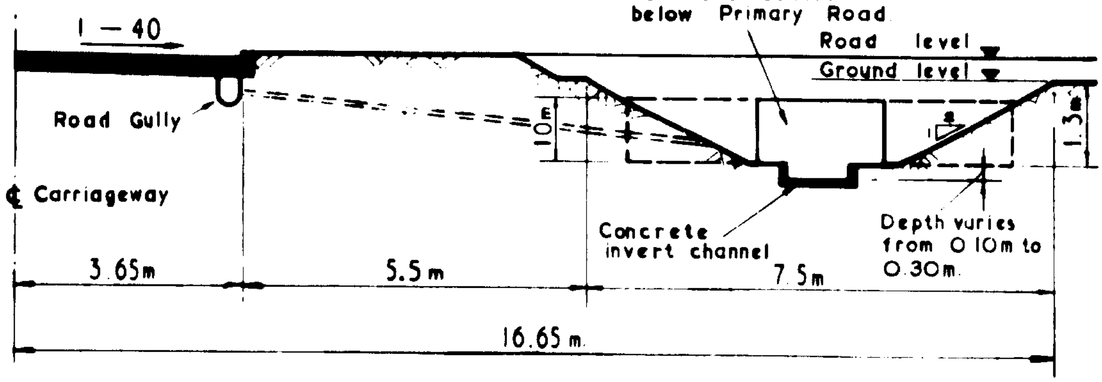
It has been concluded that a piped drainage system could only operate successfully throughout Area 2 if its level is raised by at least 1 m over a large part of it. This is believed to be uneconomic, and therefore the piped drainage system will be limited to the north-east corner of Area 2 where the ground is highest, and open drains used elsewhere.

19.5 OPEN DRAINAGE SYSTEM

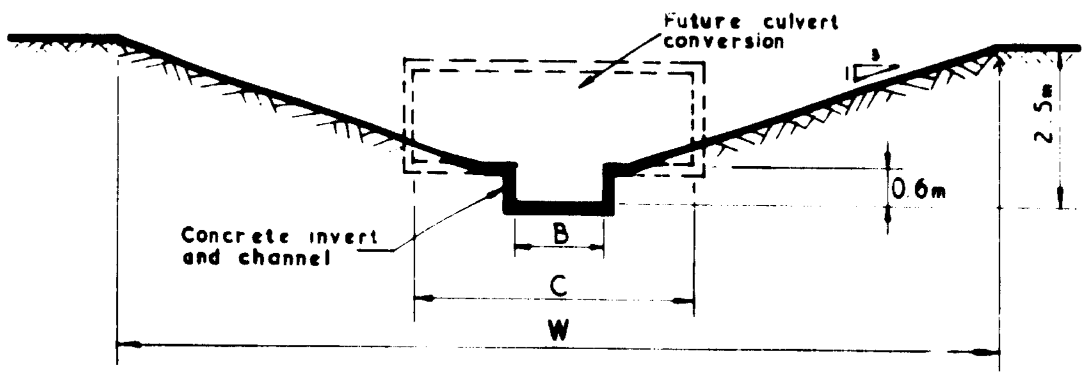
This will be based on open channels each side of all east-west roads, 7.5 m wide at the top and 1.5 m deep below ground level discharging into the new main drainage channel. With the prevailing fall of 1/550, these will have sufficient capacity to take all run-off from the two-year storm without overtopping, when every plot is fully developed. The chance of any flood overtopping the channels is therefore small, and such water would only temporarily cover the building verges and yards, but not the floors and roads which will be built ½ m above ground level generally throughout Area 2.

A concrete invert to each channel will be provided to take the run-off from normal rainfall. There will be rectangular concrete culverts under the road crossings with aprons downstream to prevent scour. Similar culverts will be used in the Services Centre Area.

Figure No. 15 shows the cross-section of a typical east-west secondary road, and the adjacent open channel. The complete drainage system is shown on Drawing No. 1/11.

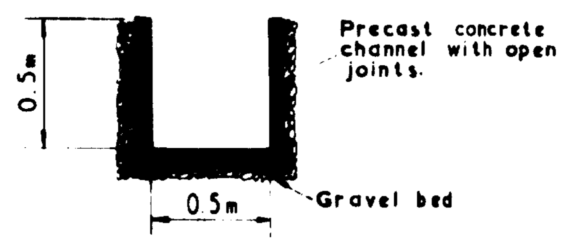


SECTION OF SECONDARY ROAD AND DRAIN



	B	C	W
At north railway	1.5m	4.5m	14.5m
At south railway	4.5m	13.5m	22.0m

SECTION OF MAIN DRAINAGE CHANNEL



SECTION OF PLOT DRAINAGE CHANNEL

SECTIONS OF STORM DRAINS

FIGURE 15

19.6 PLOT DRAINAGE

It will be the responsibility of each developer to plan his layout so that run-off will flow to the open channels. With the deeper plots (200 m deep) it will be necessary for them to extend the channel system towards the back of the plots, so that rainwater can be removed with the small available fall (approx. ½m). A cross-section of a suitable channel is shown on Figure No. 15. Precast construction would be economic, and the open joints with the gravel layer beneath will prevent stagnant water being left in the channel after rainfall.

Smaller plots can be developed with pipe systems leading to the lined concrete inverts of the main channels.

The inclusion of soakaways for run-off from the more remote parts of a plot development should be an adequate method and this will help to relieve pressure on the main system during heavy storms.

19.7 SERVICES CENTRE DRAINAGE

It is considered desirable that the Services Centre site shall have attractive surroundings and that the surface water drainage shall be a piped system. To provide the necessary outfalls for this system, the culverts under the main north-south Road No. 6 have been extended eastwards past the Services Centre Block.

19.8 ROAD DRAINAGE

The roads have raised kerbs to control the run-off and gullies to collect it. Piped drains will lead to the open channels directly alongside secondary roads, as shown on Figure No. 11.

19.9 MAINTENANCE OF OPEN CHANNELS AND CLOSED CULVERTS

It will be the responsibility of the Industrial Area Company and each plot owner, to see the channels are kept clear.

19.10 LAND DRAINS

During the initial stages of Area 2 development, the existing land drains in the undeveloped areas will continue to flow either into the Sindos Channel as at present or into the new system of open channels. This should maintain satisfactory conditions at the Ministry of Agriculture Stations and elsewhere. Eventually they will be all absorbed into the new system.

19.11 FLOOD PROTECTION

It has been stated in Section 8 that the Gallikos flood banks may not be high enough to prevent a very large flood from the river overtopping them and covering the Industrial Area. The damage that would result would be very serious. It is recommended that a full engineering study is made, to decide whether the banks should be raised. The Northern Highway forms the flood bank at the north-east corner of the Area and it may also need to be raised.

The Sindos Channel crosses the north-west corner of the site and its capacity will have to be increased adequately to prevent it discharging on to the Area when in flood, particularly when development north of the Northern Highway increases the run-off. No part of the Industrial Area drainage system south of the Sindos Channel has been connected into it, in order not to aggravate the problem.

No part of the Industrial Area should be developed unless its surface is at least 1.0 m abc 'c the projected flood level in the Sindos Channel where it crosses the flat land to the west of the Area. This means that the ground within 600 m of the western boundary will have to be raised by an average of 1 m, so that the land is nowhere lower than 6.5 m.

20. WATER SUPPLY

The Terms of Reference require that the Master Plan includes a scheme for water reticulation throughout Area 2 and one was submitted with the Draft Final Report. Subsequently HIDB have decided to purchase additional land north of the Area for a water storage reservoir common to both Areas 1 and 2. A new scheme for Area 2 has had to be prepared which now includes the supply to Area 1 from this reservoir.

20.1 WATER REQUIREMENTS - AREA 2

It is recommended that an average annual allowance be made throughout the Area of 36 m^3 per day per hectare of factory plots, and that this be increased to 360 m^3 per hectare for industries which may require large water supplies. It is assumed that these would be grouped at the east side of Area 2 near the main reticulation of water and sewage. This quantity is based on general experience of other Industrial Estates, and should include for water for irrigation of the factory frontage where it is expected that gardens and landscaping will be done. Appropriate allowances are made for infrastructure plots for varying purposes.

The total quantity required for Area 2 is assessed as shown in Table 20.1.

TABLE 20.1

AREA 2 - WATER REQUIREMENTS

	Area ha	Average Rate $m^3/d/ha$	Daily Quantity m^3/d Average	Peak Flow m^3/hr
Industrial Plots - normal	435	36	15,600	1,300
- heavy (including proportion of of existing installations (see Table 15.1)	90	360	32,400	2,700
Services Centre, Sub-Centres, Garden & Amenity Areas	50	20	1,000	300
			49,000	4,300

In Table 20.1, it is assumed in the case of Industrial Plots that the peak hourly rate of flow is twice the average rate of flow.

For infrastructure plots, a smaller average rate is assumed, as no process water is required, but the maximum rate allows for water to irrigate the landscaped areas during the summer.

20.2 TOTAL WATER REQUIREMENTS FOR INDUSTRIAL AREA

The following estimate is based on quantities for Area 1 notified by HIDB:-

Area 1	15,000
Goodyear	10,000
Area 2	49,000
Total	74,000 m³ per day

20.3 FIRE HYDRANTS

In addition to the demands estimated above, an allowance has been made for flow from fire hydrants spaced at 200 m intervals. The design of the reticulation system allows for a group of four hydrants to discharge 15 litres/sec. from each hydrant and maintain average flows to all consumers at the guaranteed minimum pressure.

20.4 WATER STORAGE

The Draft Final Report included proposals for the water for Area 2 to be stored at ground level on a site south of the Services Centre and a pressure pumping system for distribution from this point. This was recommended instead of a water tower in view of the foundation problem and the high seismic loading which would have made the tower very costly.

HIDB now propose to acquire a site 2 kms north of the Area with an elevation of +71 m and require that this be used for a reservoir with 1 day's capacity for Areas 1 and 2, constructed in stages to suit the Area development.

The reticulation system for Area 2 has been re-designed, and now includes a pipeline from the reservoir which will also be used as a supply line to it, and a supply to Area 1.

It has been assumed that the lowest draw-down level of the reservoir will be +69 m, which is 60 m above Area 2, and that the reservoir will be 6 m deep.

20.5 WATER PRESSURE

Under peak flow conditions and maximum draw-down in the supply reservoir, water can be delivered to all plots at a minimum pressure of 30 m. Pressures in the vicinity of the main supply pipe will be in the order of 40 - 45 m.

20.6 DISTRIBUTION NETWORK

Because of the likelihood of ground settlement the use of flexibly jointed pipes is a requirement. For the smaller diameters, asbestos cement pipes with flexible joints are proposed. For the larger diameters, steel pipes with flexible couplings should be utilised.

The analysis of the network for Area 2 has been carried out with the aid of the Hydring computer programme. The network will consist of a ring of pipes from 150 mm to 1,000 mm in dia. generally following the line of the main and secondary roads, so that the system will be appropriate to stage development. It is shown on Drawing No. 1/12.

20.7 SOURCES

The water available from the sources at Kalohorion is understood to be 15,000 m^3/day and this is also the estimated requirement for Area 1. It is understood that the quantity could be increased to 20,000 m^3/day by additional pumping. This water is at present pumped to two storage reservoirs situated at ground level in Plot No. 11 of Area 1 and part of the reticulation system has already been pressurised by pressure pumps. Goodyear have a well, capable of supplying their requirement of 10,000 m^3/day, and it is understood that this will be included into the Area supply system.

When the new elevated storage reservoir and the main to it has been constructed, the system will be pressurised from this reservoir and the existing pumps used to supply the reservoir. There will thus be a surplus initially for supply to Area 2, but this will need to be supplemented as soon as major development of Area 2 is undertaken.

The proposed future source of supply to the Industrial Area will be from the Aravissos pipeline which is planned by the Thessaloniki Water Supply Authority. This, it is understood, will have a potential discharge of 214,000 m^3/day. It is not known what other demands exist but it is believed that the source will be adequate to supply all the requirements of the Industrial Area. It would appear that this extra supply will be required by 1978 and HIDB should press for its early implementation. The possible route of the pipeline is shown on Drawings Nos. 1/1 and 1/12.

It is recommended that a minor diversion of the planned pipeline is made to enable a branch to be connected to the supply pipe to the storage reservoir. From information received from the Water Authority it is evident that the head available will be in the order of 12 m. Thus a Pumping Station will be a requirement to raise the water to a sufficient pressure to enable the connection to be made. This will be sited in Area 2, north of the Land Reclamation Station.

In view of the uncertainty of the quality of the water, allowance should be made for the installation of a chlorination plant from the outset at the Pump Station.

20.8 MAINTENANCE AND OPERATION

It is understood that the water reticulation system for Area 2, when each stage is complete, will be handed over to the Thessaloniki Water Authority, OYΘ, to operate the service, maintain the system, and make their charges direct to the plot owners. No allowances for maintenance, personnel or equipment has therefore been made in the proposals for the staff to administer the Area, nor in the estimates.

21. SEWAGE

21.1 GENERAL REQUIREMENTS

The sewage system has been designed to deal with 45,000 m^3/day which is 90% of the average water supply demand for Area 2 of of approximately 50,000 m^3/day. The balance of 10% is the assessment of the loss through leakage and overflow to the storm drains, irrigation, evaporation, etc.

The water supply to normal industrial plots has been estimated as 36 m^3/hectare/day. This is composed of "domestic" water for toilets, etc. and "industrial" water for manufacturing processes, etc. The "domestic" water is taken as 50 litres per person per day for an average intensity of 75 people per hectare and discharged to waste over several short periods (start and finish of morning and afternoon working, breaks, etc.) totalling five hours. The peak flow is taken as four times the average. The "industrial" water is taken as being discharged as effluent over a 12 hour working period with a peak flow of three times the average.

The peak flow of sewage from plots with normal water supply is 0.2 m^3/minute/hectare. Certain plots on the east side of Area 2 are allocated to industries with high water consumption. The flow from these plots may be as much as 1.5 m^3/minute/hectare.

21.2 DESIGN OF SEWAGE SYSTEM - AREA 2

The sewerage system has been designed on the basis of gravity sewers discharging the sewage into collecting chambers, from which it is pumped to a large main gravity sewer leading to the treatment works.

A gravity system throughout Area 2 would be impractical as the sewers would become so deep that their construction, far below the water table, would be extremely expensive in the soft and difficult ground conditions. At the termination the outfall sewer would of course be far below the treatment plant and pumping here would be necessary anyway.

A velocity of 0.9 m/sec is proposed when peak flows are discharged. This should clear any solids not flowing during the slower velocities at times of non-peak flow. A minimum velocity of 0.5 m/sec has been used for flows of 10% of the peak discharge.

Appropriate gradients of the sewers to achieve the required velocities and discharges have been allowed.

A minimum diameter of 150 mm is recommended for all sewers below ground level.

Area 2 slopes in a westerly direction at about 1 in 550 with the water table not far below ground level. The falls of the sewers are far greater than that of the ground and only short runs can be provided before excavations are troubled by ground water. The best design of the sewerage system is to have generally one pump station to every block of approximately 20 hectares, i.e. an area bounded by four connecting roads. Where there are industries with large water consumption, additional pump stations will be necessary.

The sewers from each plot will lead into main sewers on each side of each east/west road, at the outer edge of the road reserve. The main on the north side will cross the road to a pump station on the south side in a recess within the general plot boundary line.

Although falls have been kept to a minimum, the sewers at the pump stations will be about 5.5 m below ground level. This will be below the water table and the excavation will have to be within sheet piling or a dewatering system. The alternatives would be to increase the number of pump stations or to design the system for much slower velocities with the costly provision of automatic flushing. Neither of these alternatives are recommended.

Approximately 21 pump stations will be required for Area 2; 8 stations will be required in the Stage I development.

The routes of the rising mains depend on the site chosen for the treatment plant, which is dealt with in Section 21.4 below. It is assumed that they will discharge initially into the Area 1 sewer alongside Road No. 4, and space has been allocated for the mains to lead to this sewer along the verges of the east-west roads. Depending again on the site chosen for the treatment plant, it will probably be necessary to construct a new and larger main sewer parallel to the existing one to take the full flow from Area 2.

21.3 EXISTING SEWERAGE SYSTEM OF AREA 1

At present, all factories in Area 1 have temporary local sewage disposal arrangements on their own sites.

The permanent sewerage system of Area 1 consists of gravity sewers leading into an egg-shaped main sewer running alongside the existing country road and continuing to a site on the north bank of the Sindos Channel about 1.5 km south of Sindos, where it is understood that a temporary treatment plant will be installed in 1972 to act until a permanent plant for the whole Area is built. The capacity of this main sewer appears to be about 50 m^3/minute. This compares with the final estimated water consumption of 25,000 m^3/day (including Goodyear) which is 17 m^3/minute average over 24 hours. It appears that there will be spare capacity for Area 2 sewage in the early stages of development.

21.4 SEWAGE TREATMENT PLANT

The permanent treatment plant for the Industrial Area is to be dealt with in Chapter V of this Report. This will take into account various other factors in addition to the existing Area 1 system and the sewage from Area 2. Such factors are:

Ground conditions at alternative sites (as far as these are now known).

Outfall arrangements for treated effluent.

The future construction of a main sewage plant for Thessaloniki.

When this Report is completed, it will include proposals for the sewage outfall from Area 2.

21.5 CONSTRUCTION

The pumping stations will consist of two chambers, the pump chamber and a storage tank. The motors will be housed in a room directly above the pump chamber.

Each pumping station will contain two pumps, each of 2.5 m^3/minute capacity, connecting into a rising main.

A minimum cover of 1 m has been adopted for the gravity sewer and 1.5 m for the pressure mains.

Differential settlement of the pipes is likely to occur in the soft ground and therefore flexibly jointed glazed ware or concrete pipes will be used.

Manholes of precast concrete segments are proposed at a maximum of 100 m spacing.

The general arrangement of the sewerage system is shown on Drawing No. 1/13.

21.6 OPERATION AND MAINTENANCE

The sewage system will be the responsibility of HIDB. A major item will be the treatment plant and recommendations for the staff and equipment necessary for its operation and maintenance will be made in Chapter V. It is assumed that such arrangements will also include for the maintenance of the sewage system on the Industrial Area, and no allowance for this has been made in the Works Services Depot in the Services Centre. This site would be inappropriate anyway.

It is estimated that the pumps in one station could consume about 1100 KWhr of electricity per month. At a rate of 0.70 drachma/KWhr the cost of electricity would be 770 drachma/month/pumping station.

It is considered that the cost of the multiple pump stations, their maintenance and the cost of electricity for their operation will be considerably less than the comparable cost of a single gravity sewage system over the whole of Area 2 leading to a single pumphouse.

22. SOLID WASTE DISPOSAL

Permanent arrangements for solid waste disposal from Area 1 have not yet been made. At present, it is the responsibility of each site owner to arrange with private hauliers.

Some doubts exist as to whether the Industrial Area of Thessaloniki will be considered as an extension of the Municipality collection area for solid waste. Local enquiries indicated that it may not be easy to arrange such an extension and it appears necessary for HIDB to be prepared to organise a disposal service themselves. This is preferable to any large extension of private arrangements, which will be unlikely to preserve the amenity of the Area.

The content, type, density and quantity of industrial waste can vary so widely that it is not possible to make an accurate estimate of the quantity to be collected. It may be expected that a maximum of about 3 tonnes per day could be collected from each factory, but the average may be about 100 kg. The density will vary but can be taken as approximately 120 - 150 kg/m^3.

It will be necessary to provide a number of vehicles each about 10 m^3 capacity of the high compaction type similar to those used by the Municipality. It is recommended that six vehicles be purchased to deal with Area 1, and a further 6 to deal with Area 2 Stage I. Further demountable skips, and other specialised vehicles might have to be purchased to meet exceptional demands by certain industries, unless contract arrangements can be made for waste collection.

The choice of method of solid industrial waste disposal lies between tipping and incineration. The preponderance of metallic or non-organic materials in industrial waste makes it unsuitable for composting. Consideration has been given to filling the disused clay pits in the Area. As considerable control would be necessary to avoid unpleasant environmental conditions it is not ecommended that waste materials be used for this. The existing tip at Kalohorion is available to private users and a round trip would be approximately 20 km. The Municipality are considering the installation of an incinerator and it is not recommended that one should be provided within the Industrial Area, since the discounted cost is higher than tipping.

It is recommended that HIDB arrange a disposal service, operating from the Municipal tip, where a small depot should be established as a base for the personnel and vehicles involved.

23. ELECTRICITY SUPPLY AND DISTRIBUTION

The Terms of Reference require an estimate to be made of the demand for power from Area 2, and that proposals are made for the main sub-station and distribution system. It is understood that these will actually be installed by the Public Power Corporation (DEH) and the general design has therefore followed their normal practice and the system they propose to install on Area 1.

23.1 LOADS

The loading estimates for Area 2 have been based generally on experience in similar Industrial Areas elsewhere, which have been compared with the loads from the factories on Area 1 and the estimates made by DEH, and there is reasonable agreement between them.

The estimate of loading requirements in Area 2 for each of the stages of development is given in Table 23.1.

TABLE 23.1

ESTIMATES OF ELECTRICITY DEMAND IN AREA 2

Stage	Year	Approximate Area (ha)	Approximate Demand (MVA)
1	1974-76	160	60
2	1979-81	170	70
3	1984-86	150	70
	Total	480 hectares	200 MVA

The load for Area 1 has been estimated by DEH as 90 MVA, when it is fully developed. They have stated that the capacity of the 150 kV line is adequate for the total load of approximately 300 MVA for the whole Area.

23.2 DISTRIBUTION VOLTAGE

In this Report 20,000 volts is referred to as medium voltage. The medium voltage in the Thessaloniki Area will shortly be uprated from 15 kV to 20 kV and all medium voltages are taken to be at this voltage.

23.3 DISTRIBUTION TO AREA 1

The distribution system that DEH propose to use for Area 1, described in Section 9, originates from a new sub-station in the north-east corner of the Area, west of Road No. 1 and south of the railway, with a capacity of 100 MVA. The sub-station is on the route of the 150 kV transmission line and convenient for the distribution network to Area 1. The land it occupies is not particularly suitable for industrial development.

It is considered, from the forecast of growth of the Area, that there will be an adequate capacity to supply the whole Area, including Area 2, from this sub-station until 1978.

23.4 DISTRIBUTION TO AREA 2

Between 1976, when power in Area 2 is first required, and 1978 a medium voltage line will connect along a line south of Road W6 from Area 1 (north-east) sub-station to the site of the main sub-station on Area 2, sited west of Road No. 6.

This is on the diverted alignment of the 150 kV line, which will be connected to the main Area 2 sub-station in 1978. This sub-station will include four 70 MVA transformers; two initially, with the others installed as the load increases. Equipment will be required to avoid a fault level in excess of equipment ratings on the medium voltage system.

The medium voltage feeders from the Area 2 sub-station will be taken underground within the 150 kV line reserve to convenient points to avoid overcrowding in the sub-station area and to be clear of future development. From these points the system will be radial, but with cross-connections throughout to enable alternative supplies to be made for maintenance and during repairs.

The conductors will be carried in vertical formation on wood H-poles where double circuit routes are required, but single pole and horizontal conductor formation will be used for single circuit lines. Around the Services Centre, distribution will be underground to conform with the other amenities.

The majority of plots in Area 2 are expected to have a direct medium-voltage supply to their own sub-station. Where the individual demands are small, and where low voltage supply is required for sewage pump houses and street lighting, there will be a supply from a ground mounted transformer.

A local overhead voltage distribution system will be erected in the rear access or service roads of the small plot areas. Generally, low voltage underground cables will be laid in the services reserves as there is no provision for overhead low voltage lines along the roads.

The proposed distribution system is shown on Drawing No. 1/14.

23.5 MAINTENANCE AND OPERATION

It is understood that the actual installation of the electricity distribution system will be done by DEH, and that they will maintain it, and make charges to the plot occupants direct.

HIDB will only be responsible for maintenance of local supplies to their own installations, such as sewage pumps, street lighting, etc.

24. STREET LIGHTING

There is no street lighting at present on the Industrial Area, and it is understood that no definite plans have yet been made for Area 1 which need be taken into account.

The type of street lighting proposed for main and secondary roads of Area 2 is low pressure sodium lamps of the monochromatic 'yellow' type. The installation at the Services Centre will have colour-corrected mercury lamps giving a high colour rendering. The standard of lighting will be higher there than for the adjacent roads.

On dual carriageways, the lanterns will be carried on 10 m high double-outreach steel columns in the central reservation. The standard of lighting will accord with British Standard Code of Practice BSCP 1004, Part 2 for Group A2 roads. On single carriageways the standard of lighting will be to Group A3 with the lanterns carried on 8 m steel poles with single outreaches. Each major interchange will have individual treatment, with high mast contrasting colour or special fittings, as appropriate.

All lighting will be supplied from convenient sub-stations, switched and metered in ground-mounted feeder pillars, and thence to the underground cable system. An allocation has been made within the main road reserves for street lighting columns and underground cables. To accord with the different types of road, the lanterns will be time-switched and relay-contactor operated from a central control or by photo electric cells mounted in each individual lantern. These systems of control will provide reduced illumination in areas of low traffic density during quiet hours.

24.1 OPERATION AND MAINTENANCE

It is understood that HIDB will be responsible for the operation and maintenance of the street lighting system. For this, a hydraulic truck will be required to give access to the lamps.

25. TELEPHONES

Within the Industrial Area generally it is expected that the number of exchange lines required will increase from an average of 1 per plot up to 5 per plot. Related to population this represents a figure of one line for about every 10 people, and an eventual requirement of 5,000 exchange lines approximately.

The forecast of population growth suggests that there will be 15,000 on Areas 1 and 2 in 1980 and this may represent a requirement of about 1,500 lines.

It is assumed that these will be connected initially to the new exchange being built at Nea Aghialos. This is understood to provide 3,000 lines, some of which will be required for other customers than those on the Industrial Area.

Discussions with the Telephone Authority OTE have shown that their intention would be to install in the future another exchange on the Industrial Area.

Provision is being made for this in the combined Post Office and Telephone Exchange building in the Services Centre. This will have rooms and areas for the future installation of a 5,000 line Exchange complete with apparatus, racks and batteries.

Teleprint facilities (telex) will not be so extensive and it is expected that only 1 in 10 telephone subscribers will use the telex service.

It is intended that the whole of the telephone distribution system will be by underground multi-pair cables, pulled into ducts laid in the verges, with road crossings at suitable places. Ground mounted junction boxes will be sited to collate individual subscriber connections into multi-pair cables for routing to the Exchange. No provision is made for overhead wiring.

The general proposals for the telephone communications are shown on Drawing No. 1/15.

26. LAND EXPROPRIATION

While every endeavour has been made to respect existing boundaries, it has become clear that some adjustments will be essential and others desirable.

Under the first category, it is imperative to provide a direct road between Area 1 and the main Services Centre. For this, it will be necessary to expropriate some of the southern part of the Ministry of Agriculture's Land Reclamation Station.

In the second category, it is recommended that adjustments should be made to the other boundaries of the Land Reclamation Station to permit a more rational road pattern to be adopted. These are not so urgent, and could be deferred till later stages of the development of Area 2, by which time it will be clear whether the Station is to remain on the Industrial Area.

The land presently occupied by the Cotton Research Institute would remain unaffected.

Between the north-west corner of the site boundary and the proposed alignment of the Central Link Road there are 10 hectares of land which would form a logical part of the Industrial Area and should be purchased and the site boundaries adjusted accordingly.

To avoid the alignment of Road W1 passing through Lot No. 573, and indeed through the factory buildings on it, it would be preferable to adopt the alignment shown on the Master Plan which, it will be seen, cuts the north-west corner of the Military Barracks site. Action on this matter is not urgent, but the road should be built in the second stage development of Area 2 to give access to the plots to the north, which need not then have access to the Northern Highway.

Road No. 6 passes through three buildings on Lot No. 17b, which would require to be purchased and demolished when development starts north of the Northern Railway.

Attention is drawn to the proposal that the Central Link Road should largely be constructed just within the western boundary of the Industrial Area. The land here is very low lying and less suitable than anywhere else on the Area for factories. Its use for the Link Road would be beneficial to the Area's external communications. The extreme south-west corner of the Area lies beyond the site proposed for the Link Road and no purpose can be seen to justify its development as part of the Area.

The proposed adjustments to the Area boundaries are shown on Plate No. 3 at the end of this volume.

27. LANDSCAPING AND AMENITY

Under this heading the general amenities to be provided for the enjoyment of personnel, which are additional to the communal facilities in the main Services Centre and Sub-Centre, are outlined.

27.1 LANDSCAPING OF AREA 2

Almost the whole of Area 2 which is not already developed, is agricultural land under cultivation and there is little doubt that it is land capable of supporting good crops, given a reasonable supply of water. Additional evidence of its quality is the successful planting of trees, carried out by the HIDB throughout the length of the eastern boundary of Area 1. Here, there is a flourishing tree screen, which will make a considerable contribution to the appearance of the site. Within Area 1 there are various groups of trees which should be retained in the forthcoming development. Area 2 is flat and featureless with only a few groups of trees.

The landscaping scheme envisages avenue planting down the primary roads and planting in clumps along some of the smaller roads in order to provide contrast with the regulated factory buildings. The roundabouts would have special treatment with flowering shrubs.

Wherever possible, plots of land which, by their size or shape, are uneconomic for factory development are proposed to be landscaped as feature gardens and planted with trees. This particularly applies to the north-west corner of the area, which is fragmented by existing factories, pits, N.A.T.O., etc.

Grass verges are planned along the primary avenues and large grassed areas are proposed around the Services Centre. Allowance is made in the water distribution proposals for sprinkler supplies to these areas and the gardens mentioned above. The amenities provided by these public open spaces should encourage factories to make similar improvements to their frontages.

It is also proposed that tree planting should take place around and within Car Parks, partly to reduce the hard appearance of these necessary features and partly to provide shade, where possible. This landscaping is shown on the Master Plan.

The general planning endeavours to segregate pedestrian routes from traffic routes, where this is possible. These pedestrian routes should be planted with decorative and shade trees. It is expected that they, and the open spaces to which they will connect, will be used for lunch-time walks by personnel from the nearby factories.

27.2 LANDSCAPING OF ENTRANCE FROM NORTHERN HIGHWAY

For some time the only entrance to the Area will be from the proposed new roundabout on the Northern Highway. At this junction, and along Road No. 1, special landscape treatment should be provided.

Along each side of the road there will be clumps of trees of tall varieties so that glimpses of the factory buildings can be gained as the area is approached. Interspaced with these trees will be groups of flowering shrubs. In addition there will be an attractive directional sign on each side of the entrance, readily visible from the Northern Highway. The extent of the landscaping proposed is shown on the Master Plan.

At a later stage the access points on the Central Link Road will also be given special control to ensure attractive landscape treatment.

27.3 RECREATION

Areas of recreation are included near the Services Sub-Centres. Two proposals for recreation grounds are also shown on land unsuitable for industry in the north-east corner of Area 2. Some of these will provide a venue for organised games, such as football and, as the area develops, it is anticipated that through communal effort, or at the insistence of some of the factory enterprises, pavilions, changing rooms and other facilities may ultimately be provided. Smaller open spaces could also be used during leisure periods, for kicking footballs about, for netball practice and other pastimes.

It is anticipated that small traders will be prepared to service kiosks, for the sale of papers, tobaccos and confectionery in the Recreation areas.

27.4 GENERAL APPEARANCE

It is proposed to introduce screening of all areas which might be untidy. For example, within the Industrial Estate, screen walls, or a reasonably opaque form of fencing would be placed around the factory yards.

27.5 IMPLEMENTATION

It is recommended that land shouldbe allocated for a nursery in which various species of trees, shrubs and plants could be propagated for use in the landscape scheme. A site in the south-east corner of Area 1 is suggested. It is also recommended that factory owners should be able to purchase trees and shrubs from this nursery, to encourage them to carry out landscape schemes within their own sites. It has been noticed that Goodyear have already planted trees on their site and their example might well be followed by others, if they have a ready supply.

27.6 ROAD SIGNS AND ADVERTISEMENTS

It is recommended that HIDB should set a standard in the design of all signs and notices by providing a series of properly designed road signs. The normal traffic signs must follow the International Code and will be consistent throughout the area. There are, however, many other signs required; directional signs and name boards outside the official buildings and instructional and warning signs, and a consistent design of notice and lettering should be adopted.

With this standard for Area signs, HIDB will have more influence in controlling the standard of signs erected by the plot developers. Well designed hoardings, properly grouped, can add colour and interest to some undeveloped corners and, if these are well placed for visibility, developers could be encouraged to use them in preference to cluttering their own sites.

28. PROGRAMME FOR STAGE DEVELOPMENT

28.1 GENERAL

To achieve the greatest economic benefit from capital expenditure, the Area should be developed in stages such that building development should not only follow closely after the laying of roads and utilities, but should also proceed in a continuous orderly manner so that there are no gaps in development, leaving lengths of roads and utilities idle.

Clearly this ideal cannot be achieved entirely. Plate No. 1 shows how Area 1 has already been allocated, either for factory construction or by the granting of options for future development. The total area under option or available for extension of factories is much larger than that required for the actual factories; this illustrates the uneconomic provision of roads and services. It has been assumed that on Area 2 it will be possible to control more rigidly the order of plot allocation, and the density of buildings on the plots.

The forecast of growth of employment, and land required for factories has been illustrated on Figure No. 6. This indicates that the whole net area of 259 ha of Area 1, available for Industrial Plots could be developed to contain factories in production by 1979.

Towards the later part of Area 1 development, the remaining plots will not always be of a size suitable for new industries and some may still be retained by present occupants for future expansion of their factories. It is considered that the infrastructure on part of Area 2 should be available, so that plot allocation can commence during 1975; this should allow enough time to complete the building cycle, and ensure that the overall development of the Area can continue unchecked.

The size of each stage of infrastructure development is a compromise between the economics of scale in Civil Engineering work which favours large stages, and the maintenance cost and the return on capital, mentioned above, which favours small stages. In the circumstances, as envisaged at present, it is considered that each stage should cater for the anticipated needs of 4 - 5 years.

28.2 STAGE 1 DEVELOPMENT - AREA 2

Stage 1 will include 152 hectares of Industrial Plots, based on the assumption (from Figure No. 6) that land development will be proceeding at a rate of approximately 40 hectares/year. (This area is larger than that proposed in the Draft Report, and it is felt to be a more realistic anticipation of future needs.) As recommended in Section 11, Stage 1 will be the centre and south-eastern parts of Area 2. Stage 1 will include the Services Centre, and the initial buildings should be ready also by 1975. No Services Sub-Centre will be included in Stage 1; the services will come from the Centre.

Roads will be built with one carriageway only, and no roundabouts.

Stage 1 will include utility distribution networks but the supplies of water and electricity will come from Area 1, the supply to which will not be fully used during the stage. Similarly, sewage will be pumped to the Stage 1 main sewer. The new storm water outfall channel will be constructed.

The suggested Stage 1 of Area 2 is shown opposite on Figure No. 16. The overall area is 216 hectares.

28.3 FURTHER DEVELOPMENT OF AREA 1

Figure No. 16 also shows the items that should be done in Area 1, prior to and concurrently with Stage 1 of Area 2. These consist of the Services Sub-Centre, the first factories on the Industrial Estate, and the initiation of the Rail Freight Depot and Free-Customs Bonded Warehouse Compound, as proposed in Chapters II, III and IV of this Report. Other works on Area 1 are the new Entrance Roadway at the north end of Road No.1. together with the infrastructure for the plots immediately on each side of it. One of these is required for the main electricity sub-station from which the permanent distribution network to Area 1 will originate.

The water storage reservoir, large enough for supplies required up to 1980, should be built together with the main connecting it with Area 1. The sewage treatment plant must be constructed.

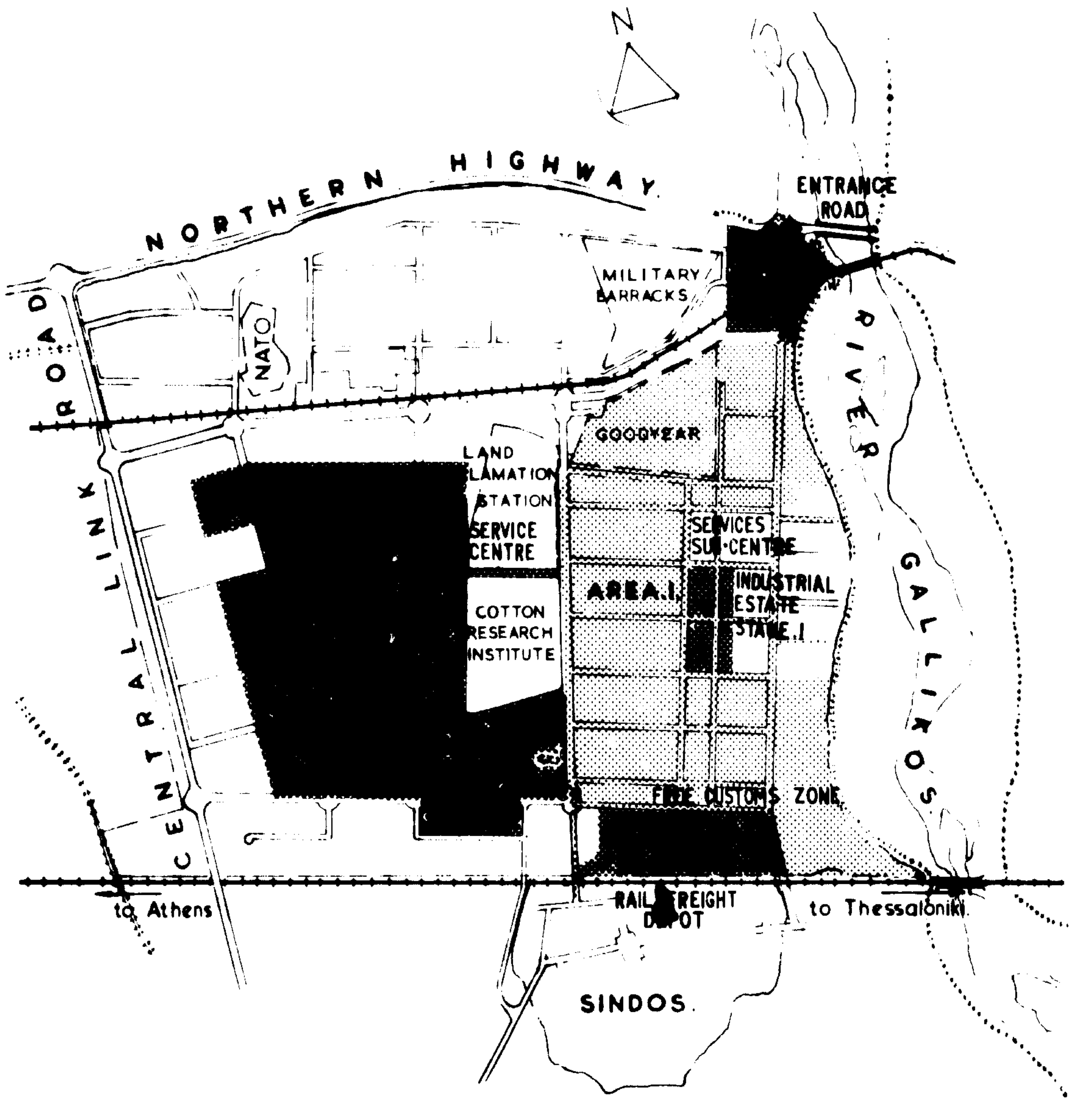
28.4 STAGE 2 DEVELOPMENT - AREA 2

This stage should be planned in detail when the growth of demand for land can be more closely forecast. Figure No. 17 indicates the proposed Stage 2, based on the same rate of growth as Stage 1. It has 168 hectares of industrial plots. It includes the northern part of the Area, which is more economic to develop than the western one basically because it is higher and easier to drain. It is also nearer to the main utilities. It provides alternative access to the strip alongside the Northern Highway, from which access will presumably be limited in future. Also included is the strip alongside the southern railway and sidings can be laid to plots in the strip if required.

A Services Sub-Centre is included and plots of many varying sizes are shown on the Master Plan.

The primary road system of Stages 1 and 2 will be made complete with dual carriageways and roundabouts.

Every effort should be made by HIDB to have the Northern Railway and the Stores to the north of it removed before this stage is used for factories. If the railway is to remain then



AREA 2 DEVELOPMENT - STAGE 1

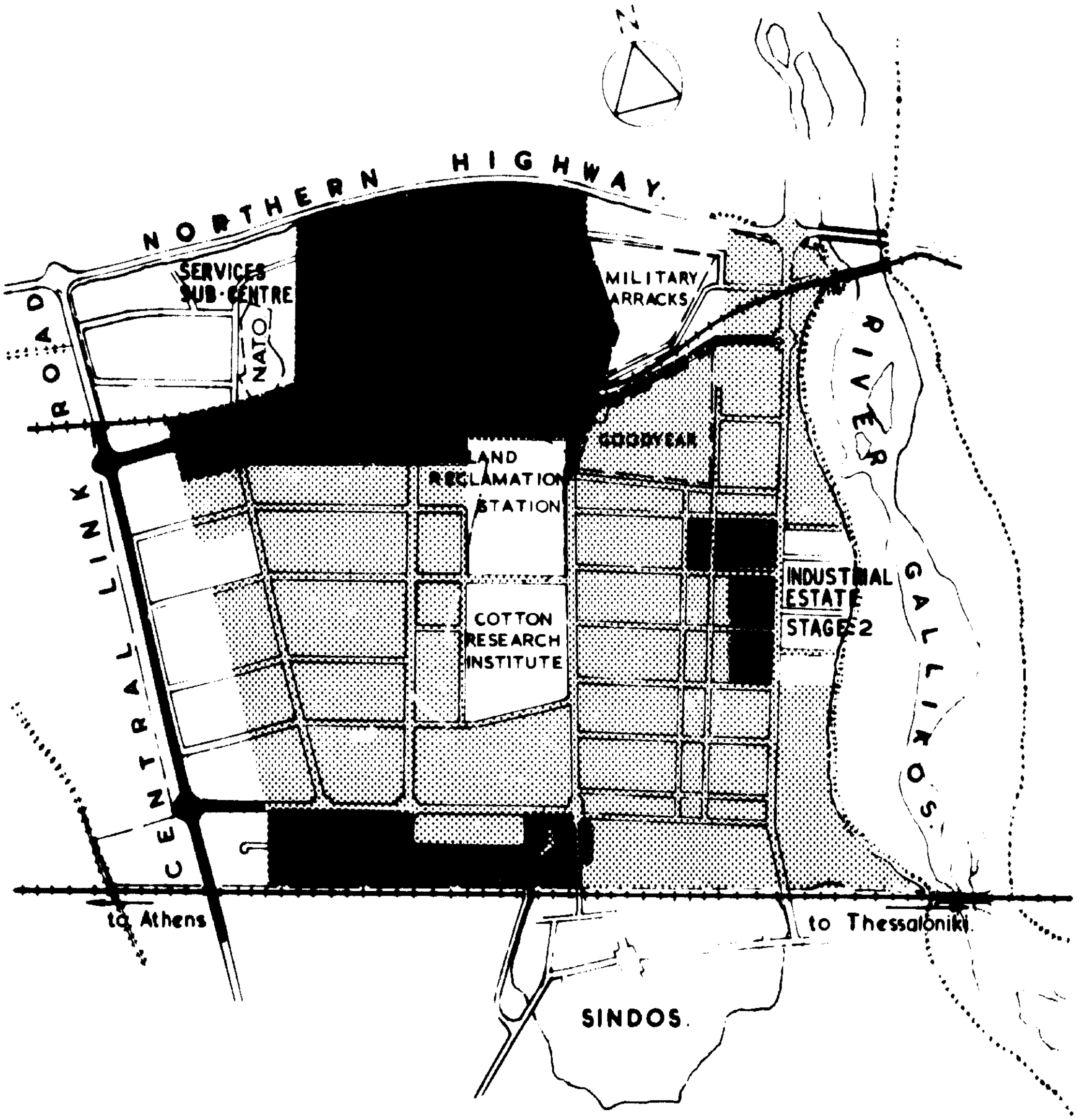
FIGURE 16

a short length at the eastern end will have to be diverted as outlined in Section 18.4. HIDB should also ensure that the Central Link Road is built in time to be incorporated with the internal road system before this stage is undertaken.

The n~~w main sub-station on Area 2 will be required, together with additional water supply and an extension to the storage reservoir, and the new sewer outfall from Area 2 will be built.

The forecast on Figure No. 6 indicates that the infrastructure work should be done 1979-1981, so that plot allocation can start before all the land on Stage 1 has been taken up.

Stage 2 of Area 2 has a total area of 251 hectares, of which it is assumed that the widening of the Northern Highway will occupy 3 ha.



AREA 2 DEVELOPMENT - STAGE 2

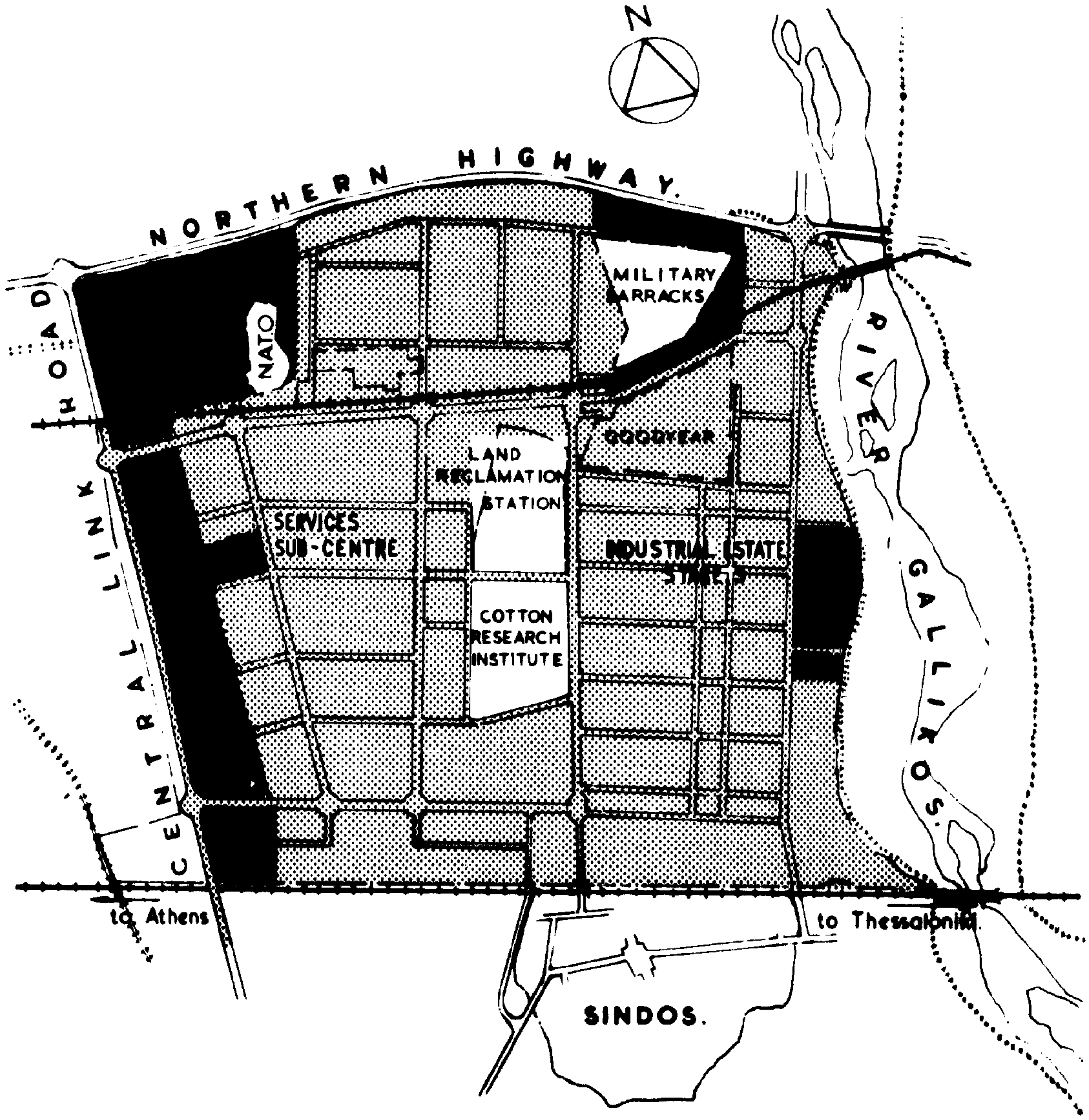
FIGURE 17

28.5 STAGE 3 DEVELOPMENT

The final development of the western part of the Area will require that it is raised above flood level and fill material will have to be imported for this. Alternatively, if it is possible concurrently to develop the Military Barracks and NATO site, the fill material can be taken from them with consequent benefit; both are at present too steep for efficient industrial use.

The Ministry of Agriculture Stations near the Services Centre are assumed to remain, but their areas could be added to this stage of development if they have been relocated.

Stage 3 includes a Services Sub-Centre and the Master Plan shows a flexible system of plot allocation. Stage 3 is shown on Figure No. 18. The growth forecast suggests that it may be necessary to construct this stage in 1984-86. Its area is 195 hectares, of which a further 3.5 ha may be occupied by the widening of the Northern Highway and 26.5 ha will be occupied by the Central Link Road and the area beyond it.



AREA 2 DEVELOPMENT - STAGE 3

FIGURE 18

Should the Military Barracks, NATO, and the Ministry of Agriculture Stations be relocated, the Area of Stage 3 will increase by 93 hectares, most of which could be used for Industry. This would increase the initial plot area of 145 hectares to about 200.

28.6 PROGRAMME OF WORK TO BE PUT IN HAND

		Start	**Finish**
Preliminaries			
(a)	Study reports and decide works to be put in hand	1972	1973
(b)	Arrange for financing	,,	,,
(c)	Complete acquisition of land	,,	,,
(d)	Arrange with Statutory Authorities for supply of water, electricity, etc.	,,	,,
(e)	Complete soils investigations	,,	,,
(f)	Prepare Contract documents for Building and Civil Engineering Work	,,	,,
(g)	Draw up new Regulations for planning and construction of factories.	,,	,,
Area 1 Works			
(a)	Services Sub-Centre	1972	1973
(b)	Industrial Estate (1st Stage)	1973	1974
(c)	Rail Frieght Depot	1973	1974
(d)	Free-Customs Warehouse	1973	1974
Area 2 Works (Stage 1)			
(a)	Services Centre (1st Stage)	1974	1975
(b)	Services Centre (2nd Stage)	1975	1977
(c)	Infrastructure Works, Stage 1	1974	1976
Roadworks			
(a)	Connection of Road No. 1 to Athens - Thessaloniki Northern Highway	1973	1974
(b)	Connection of Road W12 to Central Link Road	1979	1980
Utility Works			
(a)	Installation of new Sub-Station in Area 1	1972	1973
(b)	Diversion of 150 kV Power Line across Area 2	1979	1980
(c)	Construction of Sewage Treatment Works		

29. ADMINISTRATION

The Terms of Reference require that the Report outlines the Administrative organisation required, and the arrangements it should make for the correct implementation of the Plan.

29.1 ESTABLISHMENT OF INDUSTRIAL AREA COMPANY

1. The establishment of Industrial Areas* is governed by Law 4458 of 1965 and responsibility for their organisation and operation has been assigned to the HIDB.

2. Section 6 of Article 1 of Law 4458 states that the Industrial Area shall be organised and operate under the supervision of the Minister of Industry. The Bank is, therefore, responsible to the Minister for the execution of Government policy in this field.

3. Acting through the Ministers of Co-ordination and Industry, the Government is encouraging the establishment of several Industrial Areas in Greece. They will add considerably to the work of the Bank. The problem of the day-to-day administration of these Areas, particularly such a large one as that at Thessaloniki, is therefore of considerable importance. What is done at Thessaloniki may well become the pattern for application elsewhere.

4. The HIDB has, inter alia, in this context four functions, viz:

   (a) as a Development Bank - financing industry;

   (b) channelling Bank and State funds to all Industrial Area development, such as that at Thessaloniki;

   (c) assisting in administrating direct and, through responsible Government Departments, the financial Incentives to Economic Development; and

   (d) the physical development and day-to-day administration of Industrial Areas.

   As regards (a). (b) and (c) these are obviously matters for the Bank's Head Office and Branches. The last item - (d) - is of a very different character and could best be dealt with by the delegation of powers and responsibilities to a local organisation.

5. It would appear that Article 5 of the Royal Decree No. 750, January, 1969 has this in mind when it states "the Industrial Area shall be managed by an Office under HIDB".

   However, Section 3 of Article 1 of Law No. 4458 provides for the formation of a "legal entity" which may carry out work for HIDB. This alternative does not appear to conflict with the expression "an Office". Such "legal entity" would be fully under the control of the Governor and directors of the Bank.

6. It is essential that management should be given proper authority and standing from the outset. The Thessaloniki Industrial Area will become an important centre of industry employing tens of thousands of workpeople and cannot be administered from a distance. Many matters will require immediate attention and the local organisation must be such that it can act quickly and with authority.

   The major problem to be resolved is, therefore, that of the type of local unit to be made responsible to HIDB for the development and management of the Area. Everything depends on this. A decision must be made before staff are engaged,

* Law 4458/65 does not differentiate between an Industrial Area or an Industrial Estate and gives the term "Viomilaniki Perithi" such flexibility that it can include either.

because the nature of the unit's responsibilities will have a fundamental bearing on the type of people required. The following recommendations are, therefore, submitted for consideration.

7. A separate "legal entity" should be formed by HIDB. This should take the form of a company with a small and purely nominal capital structure just sufficient to satisfy the requirements of Greek Company legislation. This company will not require capital in the ordinary course of business because it will be controlled and financed by HIDB as set out below (vide 9).

   It is referred to hereafter as the "Company", and a suitable name needs to be chosen for it.

8. The constitution, powers and responsibilities of the Company will be based on its relationship with HIDB. It only exists to carry out the HIDB policy, but for convenience of administration the aim should be to make it as nearly an autonomous body as possible, working within clearly expressed conditions and policy directives given by the Bank.

   The Company would be responsible for the development of the Area, not only attracting industries by modern promotional methods, but entering into contracts for the infrastructure, and for the building of factories, warehouses, shops, offices and other premises. As a "legal entity" it would do this in its own name, covered by authority given, and finance provided, by HIDB (vide 9 (a) below).

9. As a necessary method of control HIDB would retain the ownership of the freehold. The Company would be granted a Head Lease in which would be set out the conditions of tenure. In this way the general policy of the Bank would be stated; directives later might be needed specifically or generally.

   Capital and Revenue expenditure would be controlled by the Bank as follows, viz:

   (a) **Capital**

   The Company would submit to HIDB a cost estimate of each proposed capital project. On receiving approval from HIDB it would enter into the necessary contracts, and draw funds against a financial authority to meet its liabilities to the Contractor.

   (b) **Revenue**

   For some years the Company will not have sufficient Income to meet its Revenue expenditure. The Company will, therefore, submit to HIDB an estimate of annual outgoings (mainly salaries and wages) and HIDB will make a subvention to cover such outgoings. This will be increased as the Company's organisation grows, and decreased as income from rents and services accrues.

   (c) **Financial Accounts**

   Annual accounts will be prepared in accordance with Greek Company Law, and the Company will provide such other financial information as HIDB may require.

29.2 ADMINISTRATIVE ORGANISATION

29.2.1 Board of Directors

The Company's affairs should be supervised by a small Board of experienced persons appointed by the Governor of HIDB holding office at his pleasure.

Article 7 of the Royal Decree No. 750 states that:-

"A Committee shall be formed to act as an adviser to the Office of the Area."

It is recommended that this Committee will not be required when the Board of Directors is appointed. There is no need for two bodies covering much the same ground.

29.2.2 General Manager

This is a "key" appointment and should be subject to approval by the Governor of HIDB.

Documents covering the formation of the Company should clearly state that the General Manager is responsible to the Board of Directors for the administrative work of the Company. He should be consulted about the organisation of the Company, and particularly on the appointments (listed below) to be made by the Directors of the Company.

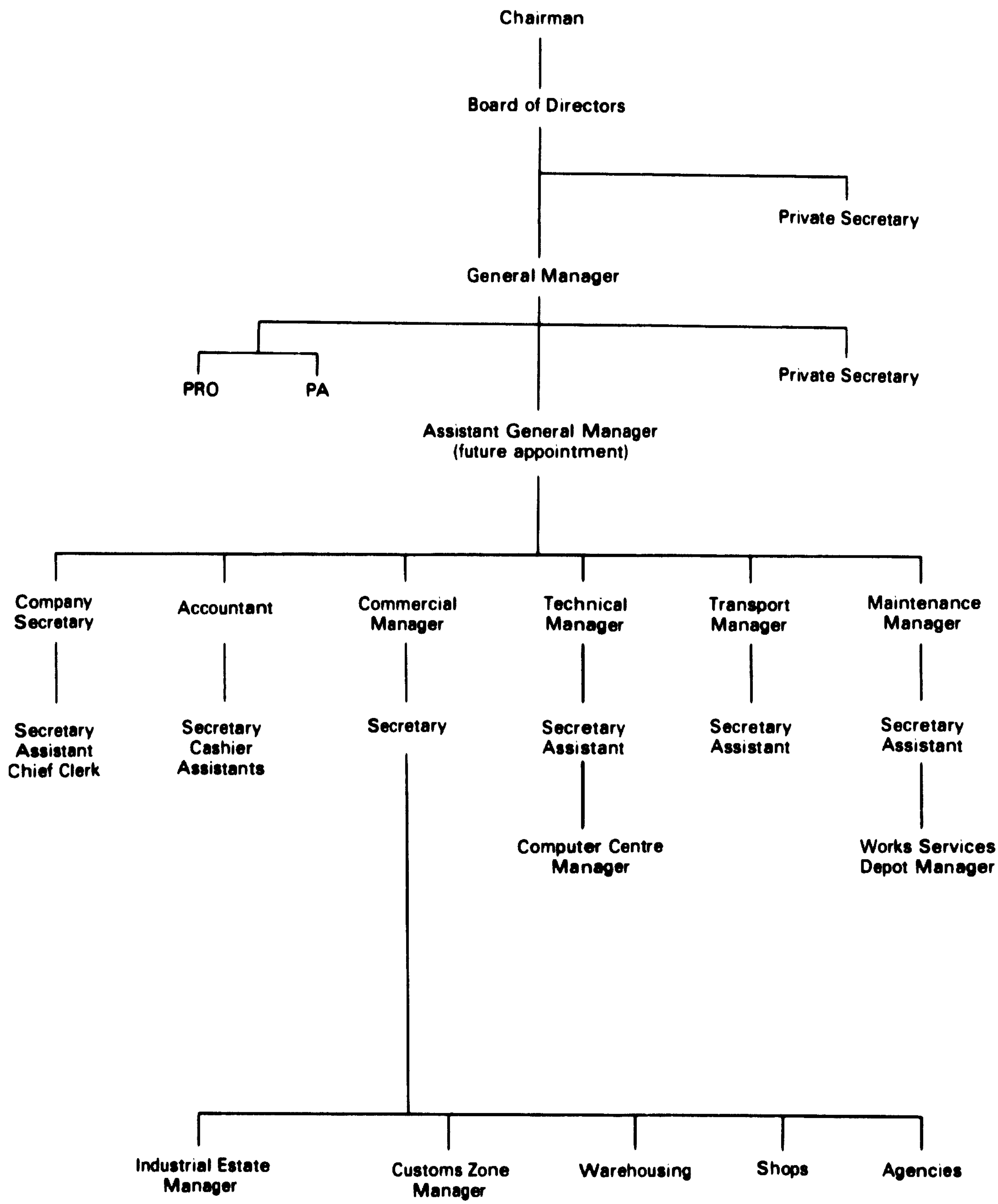
29.2.3 Other Senior Appointments

Bearing in mind the foregoing, the following posts are recommended. Care must be taken that the Company does not rush into appointing staff before it is needed. In each case a "job specification" should be prepared, and the Company's organisation laid out in a practical and flexible form in order that additions may be made smoothly as and when required.

(a)	Secretary	- preferably a commercial lawyer
(b)	Accountant	- fully qualified and experienced
(c)	Commercial Manager	- with marketing and publicity experience and accustomed to high level negotiations
(d)	Head of Technical Division	- a very important post. Highly qualified Engineer/Architect/Planner
(e)	Head of Maintenance Division	- a Specialist with a knowledge of mechanical equipment
(f)	Head of Transport Division	- with considerable knowledge of transportation - road, rail, sea and air.

Initially not more than 30 persons should be engaged comprising - General Manager and the six above-named senior appointments, plus appropriate private secretaries, typists, clerks and general assistants.

The proposed management structure is shown in Figure No. 19.



PROPOSED MANAGEMENT STRUCTURE

FIGURE 19

29.3 INFRASTRUCTURE AND ESTATE DEVELOPMENT

The organisation recommended above is one that can supervise the development of the infrastructure of the Area and the Industrial Estate, for which it would enter into appropriate Contracts. The key appointment here is the Head of the Technical Division, who must be experienced in the execution of large scale Civil Engineering and Building Works.

He must also be experienced in the planning of Utility Services and he will be the co-ordinator who ensures that the outside Authorities implement their plans, in a manner compatible with each other and with the Master Plan of the Area.

It is not recommended that staff of the Industrial Area Company should be responsible for the detailed design and supervision of the Infrastructure Works and the Industrial Estate. This is not a continuing function, except on a small scale, once the main works have been executed. The policy of engaging specialists in this work should be continued, but it is emphasised that there should be one organisation employed to co-ordinate the detailed planning of all technical matters. Otherwise bottlenecks will occur in the development, where lack of one particular service or utility will obstruct the whole development.

The main items of infrastructure and Industrial Estate development have been outlined in Section 28, with the periods during which they should be implemented.

29.4 PROMOTION

The realisation of the purpose of the Industrial Area, and its development in accordance with the stages proposed, will only be achieved by the adoption by HIDB of an active policy of promotion. This must supplement the inducements, mainly financial, to Industries considering whether or not to set up on the Area. It is not part of the Terms of Reference of this Report to advise on these matters.

29.5 ADMISSION

Comments have been requested on the policies to be adopted in admitting applicants. The proposals which follow refer to matters affecting the proper execution of the Master Plan, and do not deal with the financial standing of the applicants.

Types of Industries

The industries suitable for the Area have been outlined in Section 10 and Appendix 8. This is not intended to be comprehensive, but to indicate generally the processes which will require factories that can reasonably be built on the Area without causing special infrastructure requirements or causing a nuisance to their neighbours. They should also be proportionally large employers of labour, to make use of the personnel service facilities to be provided. The list should be revised continuously by the Industrial Area Company.

Generally, however, industries with offensive effluents, and heavy industries, should not be admitted to the site.

Zoning

This has been discussed in detail in Section 11. Briefly no fixed policy of zoning by industries in separate locations can be enforced. The Industrial Area Company must formulate their own policy and implement it flexibly as each application arises, in accordance with the principles set down in Section 11.

Plot Allocation

The subsidising of developed land, when sold to Industries, can result in its uneconomic use unless proper steps are taken to control its development.

Generally the developer should be required to take only sufficient land to permit 100% expansion of his initial building. If greater expansion is envisaged, as is possible with certain growth industries, options for adjacent plots can be sold, but this must be for a short period only and subject thereafter to renewal with the agreement of the Industrial Area Company at continuously increasing cost. Industries should generally be encouraged to take new and larger plots at a later date if expansion beyond 100% becomes necessary.

Only in this way can the sterilisation of a large part of the infrastructure, and an untidy site, be avoided.

29.6 PLANNING AND CONSTRUCTION OF FACTORIES

It is understood that the present policy of selling sites to private developers will continue throughout Area 1 and Area 2, with the exception of the Industrial Estate, where factories will be built for letting.

In accordance with the Terms of Reference a review has been made of the existing regulations under which sites on the Industrial Area are developed and factories erected. This review is given below, and is followed by recommendations for the improvement of the regulations, so that the best possible planning and satisfactory construction can both be achieved.

29.7 BUILDING REGULATIONS

Legislation about the administration of the Industrial Area commences with the assignment of responsibility to HIDB by Law No. 4458 of 1965. Regulations concerning the operation of the Industrial Area by HIDB were issued and approved under Royal Decree No. 750.

These regulations include some of the relevant clauses of the Greek Building Regulations, in particular those referring to site area, site coverage, building lines and height of buildings.

To make a full study of the Greek General Building Regulations is a task far beyond the scope of this Reoort but limited investigations have been made into those sections contained in Article 3 which apply. It would seem that the most relevant clauses have already been covered by adaptation within Royal Decree No. 750.

Site Area and Coverage

Article 3, Clause 2 of Decree No. 750, stipulates a minimum of 2 stremmata (0.2 ha) with a minimum frontage of 20 m and a minimum depth of 50 m. Clause 4 stipulates that Buildings are to be erected under the all-side-free system except on sites under 3 stremmata (0.3 ha) where a mixed building system is permitted. This is defined in Clause 6 of the Building Regulations as referring to a building with one side at a distance from the boundary and the other adjoining the next building. Site coverage is dealt with in Clause 5. Briefly this stipulates that the general maximum built space shall not exceed 40% of the plot area but if substantial reasons are given HIDB can increase this to 60% in respect of plots up to 3000 m^2 or 50% in respect of plots over 3000 m^2.

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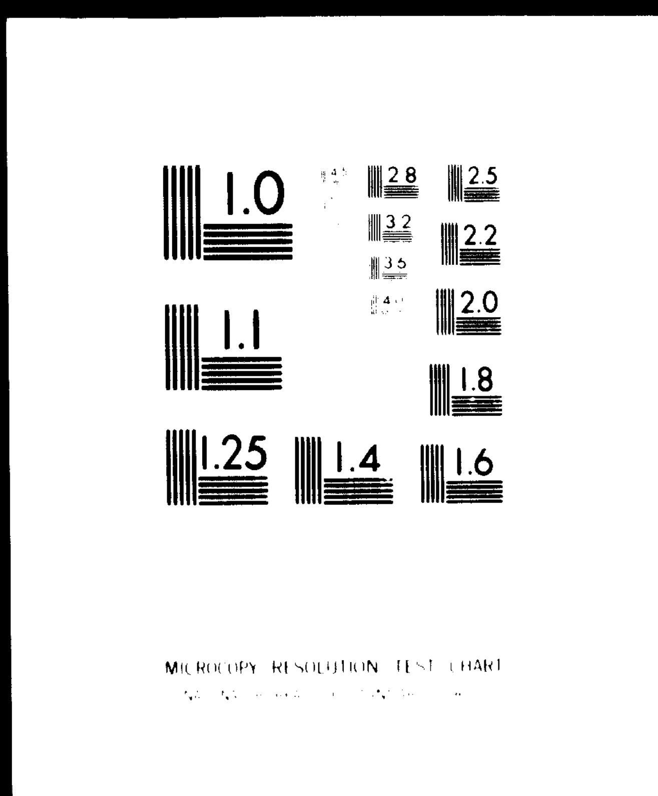

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The three Regulations above appear to be reasonable in their general application to the Industrial Area but depend to some extent on the interpretation of plot area when applied to the Industrial Estate. Site coverage ratios on the Industrial Area could in certain cases be slightly increased to allow greater plot coverage when adjacent open spaces are taken into account.

There is no doubt as to the need to provide small workshop units and small factories in the Industrial Estate and it must also be possible to build these in an economic form to ensure attractive rental terms. It is considered desirable that the existing legislation should be adjusted to enable HIDB to modify the Greek Building Regulations in their application to the Industrial Estate.

Recommendations on the extent of the changes are made in Chapter III - Industrial Estate.

Building Lines

Article 3, Clause 5, does not make it entirely clear whether the minimum distance of 7 m is from the building to the plot boundary or the space between buildings. The Greek Building Regulations indicate that the latter is intended. This is satisfactory provided that no permanent obstructions are permitted in the space between the building and the boundary such as would prevent the use of the space for access by a fire engine or other emergency vehicle.

Clause 6 imposes a minimum building line of 10 m from the Plot boundary and this is quite reasonable. It should apply to both street frontages of a corner plot; there must be no relaxation on "side street" frontages.

Heights of Building

The above Clause 5 has a direct effect upon Clause 8 which limits the height of buildings by prescribing a maximum ratio of 2:1 between building height and the distance between buildings. This provides suitable protection to the rights of light and amenity which an adjoining owner expects. If a developer wishes to construct a higher building he must site the building appropriately further from his plot boundary.

It is recommended that this Clause should be worded to enable HIDB to grant permission for a particularly tall building, provided the rights of adjoining owners are suitably safeguarded.

The remaining Clauses in Article 3 are all suitable and essential control which do not call for comment.

29.8 SUGGESTED IMPROVEMENTS TO THE REGULATIONS

The following suggestions have been made in various Sections of the Report for improved planning of Industrial Plots, and should be the subject of the Regulations.

Frontage & Access

Frontages should be mainly to secondary roads.

Some larger plots will have frontages on to Roads 6 and 7. In this case the number of accesses should be limited, and they should be remote from road junctions.

Access to plots facing Roads W6 and W12 should be from service roads.

Fencing

The responsibility for fencing each plot will rest with the developer, and it will be reasonable to insist that it is completely done, to prevent nuisances on unfenced areas.

However, it is also reasonable to insist that proposals for fencing frontages on to roads are submitted for approval. Wherever possible developers should be encouraged to maintain their security along the front line of the building and landscape their land between it and the road, and so increase the general amenity.

Car and Bus Parking

It is recommended that additions to the regulations should include provision for parking on each plot at a ratio of 1 car to 4 employees. This regulation can be modified for very small plots, but these will be mostly on the Industrial Estate.

They should also control the loading and unloading of buses and goods at factory sites to ensure that such activities take place within the plot and not on the adjoining roads. This would not apply where service roads are provided.

Ground Conditions

The regulations should state the height above ground level required for floors and roads, and the foundation pressures allowable.

Planning Generally

The regulation which permits buildings for living purposes within an industrial plot is a matter for concern if it will be construed to the extent of combining industrial building with housing. This can no doubt be controlled by HIDB under the powers conferred on it but it does raise the question of the lack of Regional Planning legislation generally.

29.9 REGIONAL PLANNING CONTROL

It is understood that, by Common Law in Greece, a landowner may use his land for any purpose, provided the Regulations appropriate to that purpose are followed. In other words there is no legislation to control land use or which can designate areas for specific purposes. The Master Plan proposals for Thessaloniki can therefore have little or no effect. The point is stressed because the success of the Industrial Area can be seriously jeopardised if other potential developers can choose to build wherever land is available.

29.10 DEVELOPMENT CONTROL

In order to maintain a high standard of amenity, as reflected in health and working conditions, it is recommended that development control is applied not only to site coverage and building lines, but also to the visual quality of building design and materials. These are also important to the status of the Industrial Area and should be controlled.

Building Design

The dominant design feature of industrial buildings is the repetitive nature of the structural frame. It is particularly important that where monotony might occur, a relieving feature is introduced to give interest to the elevation. Such a feature may comprise of a well designed entrance, advertising feature, landscaping, etc.

Building Materials

The control of materials used is important to the appearance of the area and should be defined at an early date so that developers are made aware of standards likely to be approved. The consideration of these standards should include the effect of the quality of materials on the maintenance of buildings.

Development control is best understood by example and, through the promotion of the Industrial Estate, an opportunity will be given to HIDB to have practical illustrations of design, materials, layouts etc., of a range of sizes of industrial buildings to show and specify as applicable to an acceptable standard of general industrial development.

30. ORDER OF COST

Estimates have been made of the order of cost of constructing the works which are needed to develop the infrastructure of Area 2. The cost has been allocated to the three stages outlined in Section 28 in which the development may take place, and, where applicable, to Area 1. The estimates do not include the cost of actual plot development, which is assumed to be borne wholly by the developer.

The estimates are based on the current cost of Civil Engineering works in Greece at the date of the Report. No allowance is made for later escalation of costs. The cost of detailed design and supervision of construction of the works is not included.

Utilities

A provisional amount is included for the Reservoir and the main connecting it to the site which must be most approximate, as the site was chosen by HIDB after completion of the Draft Final Report and it has not been examined.

No figure can be given for sewage treatment plant, as the location and type of the plant has not yet been decided.

The estimates include for the cost of the electricity distribution network, although it is understood that this work may be done by the Public Power Corporation (DEH). The figure includes the 150 kV sub-station and the sub-stations on each major factory plot.

The cost of telephone exchanges and connections are not included.

Rail System

The cost of the Rail Freight Depot and the Sidings, which may be borne by the Railway Authorities, are shown separately. It has been assumed that the main utilities supplying the Depot (and the Industrial Estate and Free Customs Zone) will be from Area 1 networks.

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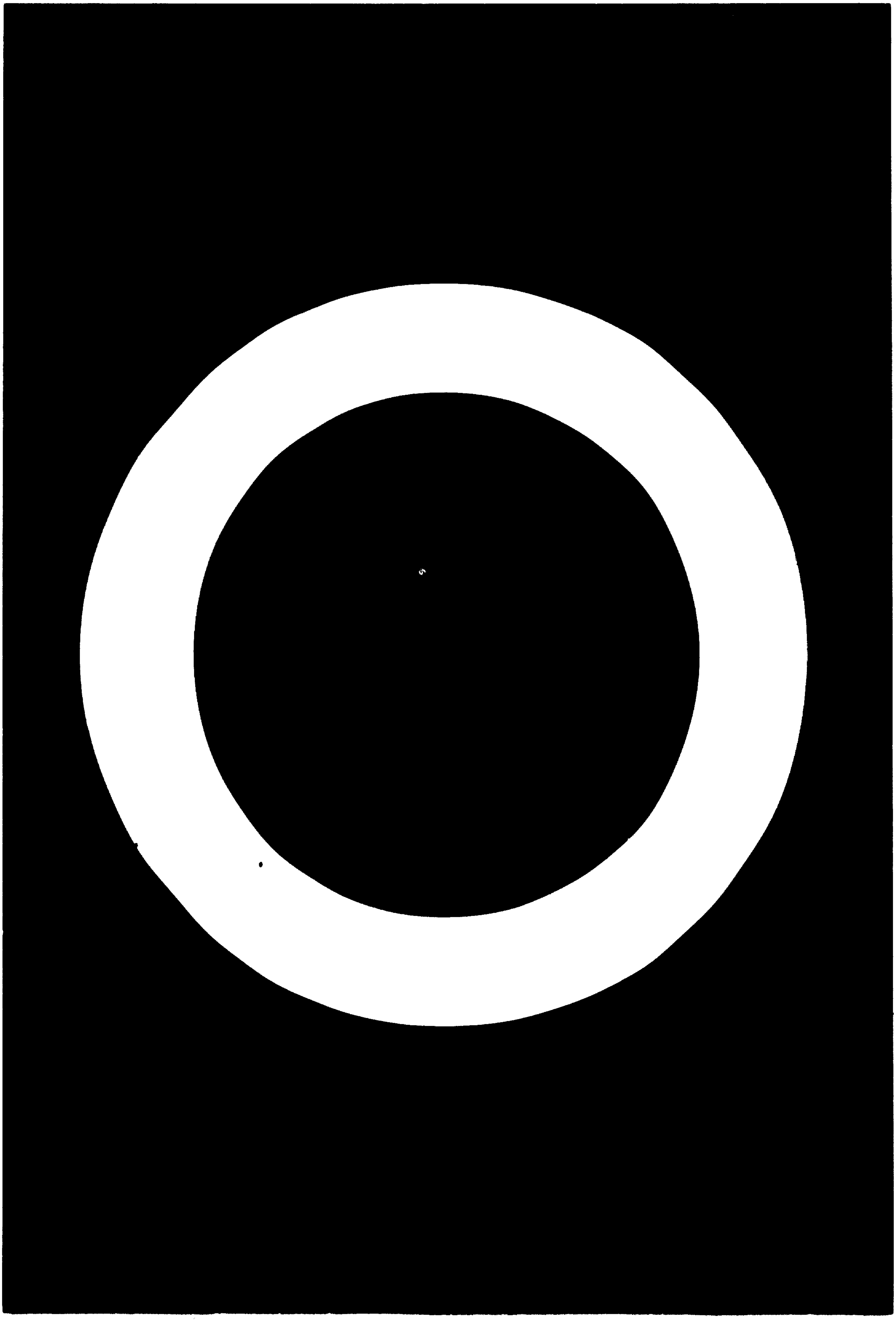
TABLE 30.1

INFRASTRUCTURE COSTS - AREA 2
(with additional works in Area 1)

	Area 1	Area 2			
		Stage 1	Stage 2	Stage 3	Total
Area, gross (ha.)	337 (incl. NE corner)	216	248	195	
Area, net industrial plots (ha.)	259	152	168	145	
Approximate period	**1973-4**	**1974-6**	**1979-81**	**1984-6**	
	Drs. Million	Drs. Million	Drs. Million	Drs. Million	Drs. Million
New Roads, earthworks including surface water drainage		87	107	82	276
Roundabouts and road widening			29		29
Surface water outfall channel		9	2		11
Water Storage and distribution	23	26	30	22	78
Sewage system		26	22	26	74
Main outfall sewer			36		36
Sewage treatment		not included			
Solid Waste Disposal	4	4	4	4	12
Street lighting		4	5	4	13
Landscaping		4	10	6	20
Rail Freight Depot and Sidings	22		10		10
Electricity Distribution		69	75	34	178
Realignment 150kV line	4		13		13
TOTAL		229	343	178	750

The cost of the Services Centre (including landscaping), the Industrial Estate and the Free-Customs Zone are given separately in Chapters II, III, and IV of this Report.



APPENDIX 1

TERMS OF REFERENCE

The Terms of Reference for Chapters I, II, III and IV, are contained in the Contract between UNIDO and Gibb-Ewbank Industrial Consultants dated August 1971 which were revised by Amendment No. 1 dated November, 1971. The relevant extract relating to the responsibilities of the Contractor (as revised) are quoted below for ease of reference.

2.00 RESPONSIBILITIES OF THE CONTRACTOR

2.01 Statement of Work

The Contractor shall render on the terms hereinafter set forth the necessary services and facilities to accomplish this project as follows:

(a) **MASTER PLAN - FUNCTION I**

1. The Contractor shall draw up a Master Plan and Development Programme for an industrial area of a size up to 982 hectares which the Hellenic Industrial Development Bank intends to establish in the extension of the existing industrial area.

2. The following factors and conditions shall be considered in the formulation of the Master Plan and Development Programme.

   (a) The infrastructure work, existing factories and factories in process of establishment on the existing site of 310 ha.

   (b) The topography of the new site.

   (c) Basic communications and utilities available.

   (d) Type and size of plots likely to be required, initially and subsequently.

   (e) The best zoning for different industries, including, but not limited to, open spaces and common services.

   (f) Development in stages, to obtain the best return on invested capital.

   (g) The Hellenic Industrial Development Bank maintains the exclusive right to regulate the direction of traffic of the vehicles and pedestrians in the streets of the industrial area and settle all matters relevant to traffic following approval by the component police authorities.

   (h) The fencing of the sites, which is compulsory, and layout of planted spaces for aesthetic reasons.

   (i) Allocation of space in the area as suitable locations for:-
   1. Petrol Stations
   2. Creche
   3. Cafeterias and Kiosks

4. Chapel
5. Sports Ground
6. Warehouse
7. Car Parking

3. The Master Plan and Development Programme shall cover:

(a) the use of the land;

(b) the size of the industrial squares;

(c) the Services Centre;

(d) the road network;

(e) the general layout of the infrastructure works including the water supply and fire extinguishing networks, the waste disposal and drainage networks, with suggestions as to the construction methods;

(f) the railway network;

(g) the required power together with the distribution network and sub-station;

(h) the required telecommunications equipment, the distribution network and telecommunications centre;

(i) the illumination network for spaces of public use;

(j) the combined arrangement of the following particular work and functions in the overall layout.
1) road network;
2) railway network;
3) water supply network;
4) drainage and sewage networks - industrial waste processing;
5) power supply network sub-station;
6) illumination network for spaces of public use;
7) telecommunication networks.

(k) The successive phases of the construction of the above works.

(l) The connection of the industrial area with the national road and railway networks.

4. The building conditions shall be in accordance with applicable Government Building Bye-Laws and Regulations including those which are listed below:

(a) The minimum surface of a site is determined at two stremmata (or 0.2 hectares) with a minimum front of 20 m and minimum depth of 50 m.

(b) The building system shall be the all-side free system, with the exception of the sites having a total area of up to 3 str. (or 0.3 hectares) in which case the mixed building system may be applied.

(c) The maximum built space for each site is specified, in principle, at 40% of the total area. This maximum percentage may be increased to 60% for sites covering an area up to 3 str. (or 0.3 hectares) and to 50% for sites covering an area greater than 3 str., provided that substantial reasons dictate this extension and the Hellenic Industrial Development Bank, through the UNIDO Project Manager, grants its consent.

(d) The minimum distance between the master plan street tracing line and the construction line (length) is determined at 10 m irrespective of the width of the street.

(e) Free spaces left on the sides and on the rear of a building must be at least 7 m wide.

(f) No limit shall, in principle, be imposed to the height of any kind of buildings within the industrial area, provided that the maximum ratio between the height of the building and the distance from the boundary of the nearest part, suitable for building in the adjoining sites, is 2:1. Special constructions necessary for the operation of the industrial unit, such as but not limited to, chimney and cooling towers, are not subject to the above limitation, provided approval is granted by the Hellenic Industrial Development Bank, through the UNIDO Project Manager.

5. **Requirements Report**

The Contractor shall determine the essential requirements for the development of the Master Plan through the gathering of all available information and data about the site and the requirements, initiate surveys to augment the information with all the detail necessary to form a sound basis for the plan and conduct discussions with the UNIDO Project Manager and designated UNIDO and Government personnel. A report of those essential requirements shall be furnished in accordance with paragraph 2.09 b) below

6. **Draft Final Report and Draft Final Master Plan**

Based upon the essential requirements developed under paragraph 5 above, the Contractor shall prepare a draft final report and draft final master plan under scale 1/2000 in accordance with paragraph 2 09 e) below, which shall include:

(a) Layout plan of the industrial area

(b) Master plan

(c) Circulation network (road and railway)

(d) Water supply and fire extinguishing network

(e) Waste disposal and drainage network

(f) Power distribution network, illumination for spaces of public use and telecommunications

(g) Schedule for the successive phases of development of the area

(h) Charts under suitable scale (ground plan, section) for items under paragraph 3 j) and 3 k) of this Section

(i) Outline of administrative organisation and arrangements necessary for the correct implementation of the Plan.

7. **Final Report and Final Detailed Master Plan**

Based on the approved draft final report and draft final master plan referred to in para. 6 above, the Contractor shall submit a Final Report in accordance with para. 2.09 f) below, together with a final detailed Master Plan drawn on scale of 1/2000. The Master Plan shall show the stages recommended for its progressive implementation and estimates of costs of these stages shall also be provided.

(b) THE SERVICE CENTRE - FUNCTION II

The Contractor shall perform the following tasks with respect to the establishment of a Service Centre.

1. Layout Plan

The Contractor shall prepare a layout plan for the Service Centre indicating the location of various facilities, prepare designs of buildings and draw up detailed specifications of machinery and equipment for common service facilities. Workshops and laboratories, warehouses, fire station, exhibition halls shall be matched to the type and number of industries existing and to be established and initial provision and allowance for later expansion of such facilities shall be suited to the anticipated rate of growth of these industries. The provision of such facilities as social, catering and welfare amenities, car parks and bus service terminals shall be suited to the needs of the planned worker population and the expansion of these facilities, if required, shall be suited to the anticipated growth in population. Particular care shall be taken when considering these social and catering amenities to suit them in type and style to the needs and custom of the local workers and to ensure that they will provide the services which the workers will want and will use. The Centre shall be capable of future expansion as required either at the initial site or at other sites within the Industrial Area. The layout plan shall include the following:

(a) Centre Building, including
   (1) Office of Industrial Area Division of Hellenic Industrial Development Bank
   (2) Library
   (3) Conference Room and Exhibition Halls
   (4) Commercial Service Office and Shops

(b) Security Services Building including
   (1) Police Station
   (2) Fire Station

(c) Health Centre

(d) Post Office

(e) Restaurant

(f) Computer Centre

(g) For the above buildings exterior and interior arrangements shall be furnished.

(h) Designate areas in the Services Centre for:
   (1) Future extension to buildings listed under paras (a) through (f) above
   (2) Commercial Banks

(3) Car Parking
(4) Taxi Stands
(5) Exhibition Building
(6) Lecture Theatre/Auditorium for 200 to 300 persons
(7) Gardens, tree planting and green space

2. The Contractor shall also submit recommendations for the following:

(a) Stages of development of the Services Centre in order that it can supply services to the factories.

(b) Construction materials which should be of a Greek origin and tested or standardised in accordance with applicable Government Specifications.

(c) The decoration of the Service Centre and surroundings according to aesthetic conceptions.

3. The building conditions to be considered shall be the same as those stated under paragraph 2.01(a) 4 above (see Chapter 1).

4. Machinery and Equipment List

(a) A general list of machinery and equipment to be installed in the central workshop (Toolroom and Mechanical Shop, Heat Treatment Shop, Chemical Laboratory, Effluent Treatment, Testing Laboratory) will be made available to the Contractor The list shall be examined by the Contractor who shall submit any recommended changes to the UNIDO Project Manager for approval.

(b) When the above list is approved the Contractor shall prepare detailed technical specifications with full performance characteristics in a neutral form suitable for international competitive bidding and shall also prepare a list of recommended manufacturers on a global basis, taking into account standardisation with existing equipment if applicable and servicing any spare parts facilities in the Salonika area and/or elsewhere in Greece.

5. Requirements Report

The Contractor shall determine the essential requirements for the Service Centre and the most satisfactory site for it taking into account the master planning of the site and the planning of the Industrial Estate. A report of those essential requirements shall be furnished in accordance with paragraph 2.09(b) below.

6. Draft Final Report and Draft Final Layout Plans

Based on the essential requirements developed under paragraph 5 above, the Contractor shall submit in accordance with para 2.09(e) below a draft final report and draft final layout plans of the Service Centre including sketch drawings of the buildings, stages of expansion and preliminary estimates which shall indicate the choice of main materials and methods of construction.

7. Final Report and Final Layout Plans

Based on the approved draft final report and draft final layout plans referred to in paragraph 6 above, the Contractor shall submit a final report and final plans in accordance with para 2.09(f) below which shall include:

(a) A general topographical chart 1:500 of the total area of the Service Centre,

(b) A final topographical chart 1:500 of the building complex in which the successive stages of construction and development are pointed out;

(c) Architectural plan for every building (including but not limited to ground plan elevation and section) 1:50, including stages of development;

(d) Architectural plan with details for every building under suitable scale, including stages of development;

(e) Plans of open space development and arrangement such as, but not limited to, parks, parking, playgrounds and autobus station, including stages of development;

(f) Layout plans for equipment and utility requirements;

(g) Required specification for materials, bearing in mind that the seismic coefficient is 0.12 in Salonika.

(h) Full indication shall be made of the stages of development and future expansion. The plans shall be accompanied by detailed estimates of construction costs.

(c) **INDUSTRIAL ESTATE - FUNCTION III**

It is proposed to establish an Industrial Estate on a tract of land of 50 hectares near the Service Centre, Function II.

1. The Contractor shall perform the following tasks with respect to the establishment of the Industrial Estate:

(a) Prepare the layout plan of the estate and a phased programme of development;

(b) Recommend four to five different types or sizes of standard factory buildings and provide the designs for these buildings. The types of factory buildings to be suggested shall provide for possible extension, usually to the extent of a second similar building. Materials to be used in the construction of the framework and roofs of the aforementioned factory buildings shall be of Greek origin, bearing in mind that the seismic coefficient is 0.12 in Salonika. Recommend other construction materials which should be of Greek origin and tested or standardized in accordance with applicable Government specifications.

(c) Examine the possibility of pre-fabrication of the whole buildings or parts of them, provided pre-fabricated components can be manufactured in Greece.

(d) Survey the advantages, disadvantages and special uses of each recommended type of factory building.

(e) Prepare a complete set of plans of factory buildings (including ground plan, elevation and section) 1:50.

(f) Prepare detailed plans under suitable scale.

(g) Prepare specifications of constituent materials.

(h) Recommendations shall be made on the administrative structure necessary for the management of the Estate together with applicable basic regulations.

(i) Prepare a layout plan for a Technical Advisory and Training Centre including the exterior and interior design and the interior arrangements of the Centre.

2. The building conditions to be considered shall be the same as those stated under paragraph 2.01 a. 4 above.

3. The Contractor shall determine the essential requirements for the Estate including the most satisfactory site for it and the likely size and type of industries that may be attracted to the estate and their complementary services. A report of the essential requirements shall be furnished in accordance with paragraph 2.09 b) below.

4. **Draft Final Report and Draft Final Designs**

Based on the essential requirements developed under paragraph 3 above, the Contractor shall submit in accordance with paragraph 2.09 e) below a draft final report and a draft final design of the Estate based on information available including a plan at scale 1/1000 showing the road and plot layout and sketch drawings of the types of standard factories proposed. The distribution of basic utilities shall be outlined at 1/1000 scale.

5. **Final Report and Final Design**

Based upon the approved draft final report and draft final design referenced in para. 4 above, the Contractor shall submit a final design in accordance with para. 2.09 f) below together with a) a final layout plan of the estate, based upon a physical check of the existing road plots and roads, b) drawings of the several types of standard factories proposed, at scale of 1/1000 with details at 1/25, together with a survey of the alternatives considered, c) specifications of the building materials and layout drawings at 1/1000 of the utilities, and d) an estimate of the cost of the development of the Estate with details of cost estimates for each standard factory.

(d) FREE CUSTOMS ZONE - FUNCTION IV

The Contractor shall perform the following functions with respect of the establishment of a Free-Customs Zone:

1. **Feasibility Study**

(a) The Contractor shall undertake a feasibility study for the establishment and operation of a free-customs zone in an area of 40 ha. The study shall provide answers to the following questions:

1) whether it is feasible and desirable to establish the zone;

2) what will be the most suitable site and how much land should be earmarked;
3) what type of industries and, if need be, commercial activities will be attached to the free zone;
4) what types of facilities are required;
5) whether and to what extent it is necessary to provide such things as improved plots of land, standard factory buildings built in advance of demand, warehousing facilities and a commercial area.

(b) In determining the feasibility of the zone, the following factors which shall be examined and considered shall include, but not necessarily be limited to the following:

1) **Advantages and disadvantages of Salonika as a location**
   (a) Suitability and geological location of the site.
   (b) Local industrial development and other economic factors.
   (c) National economic development and its relevance to Salonika.
   (d) Availability of plans for infrastructure and utilities in Salonika.
   (e) Raw materials availability.
   (f) Manpower availability.
   (g) Transport and communication comparative costings.
   (h) Scope for development of local and foreign industry.

2) **Potential industries and activities**
   (a) Export industries.
   (b) Industries for processing hitherto exported raw or semi-processed materials.
   (c) Industries assembling imported components.
   (d) Introduction of appropriate service industries.
   (e) Entrepot activities.

3) **Relevant experience of other Free-Customs Zones**

4) **Local planning**
   (a) Types and sizes of industries suitable for location in the zone.
   (b) Selection of site for Free-Customs Zone in relation to the Master Plan for Industrial Area.

5) **The National Legal and Fiscal Framework**
   (a) Existing fiscal and financial incentives
      i) National
      ii) Regional
   (b) Administrative framework
   (c) Legal Aspects
   (d) Other operational factors

(c) The Contractor shall submit the feasibility study in accordance with paragraph 2.09d).

2. **Plan for Establishment and Operation of the Free-Customs Zone**

(a) Based upon the conclusions and recommendations contained in the feasibility study conducted under paragraph 1 above, the Contractor shall prepare a plan for the establishment of a free-customs zone, which shall include the following

1) **Layout and Location**

(a) Precise location of the Free-Customs Zone.

(b) Incorporation of the Zone into the Industrial Area.

(c) Facilities and utilities to be provided including warehousing and administrative offices.

(d) Detailed layout plan of the zone, including size of proposed plots and factories.

2) **Constructional Aspects**

(a) Policy regarding plot improvement.

(b) Consideration of types of factories required.

(c) Design of standard factories.

(d) Provision and design of facilities.

3) **Financial Aspects**

(a) Financial organisation.

(b) Capital cost estimates.

(c) Profitability criteria for the operation of the Zone.

(d) Expected return on investment.

4) **Administrative Aspects**

(a) Constitution of administration

(b) Organisation chart for construction, operation and management of the zone.

(c) Rules and regulations for the operation of the Zone.

5) **Incentives for the Development of the Free-Customs Zone**

Incentives which shall be considered and on which recommendations shall include the following:

(a) **Fiscal Incentives**

i) Exemption from import duties.

ii) Selective export subsidies.

iii) Corporation and business tax reductions.

iv) Income Tax reduction/exemptions for expatriates.

v) Tax Holidays.

vi) Tax exemptions for specific capital e.g. capital for re-investment and formation of services.

(b) **Economic Incentives**

i) Repatriation of capital

ii) Depreciation allowance

iii) 'Soft' loans and easy access to credit

iv) Policies for selling/leasing sites, plots, and factories.

v) Reduced charges for infrastructure usages including but not limited to cheap rates for energy supply

vi) Provision of training of workers.

(b) **Draft Final Report**

The Contractor shall submit a draft final report containing the abov ,plans and recommendations and proposals for the establishment and phased development of the Zone in accordance with paragraph 2.09e).

(c) **Final Report**

Based upon the approved draft final report mentioned in paragraph (b) above, the Contractor shall submit a final report with final recommendations in accordance with paragraph 2.09f).

APPENDIX 2

MINISTERIAL DECREE

Concerning boundaries of the Industrial Estate in the Administrative District of the Eparchy of Thessaloniki

THE MINISTERS OF CO-ORDINATION AND INDUSTRY

Having regard to:

1. The provisions of Law 4458/65 "concerning the Industrial Estates",

2. Opinions No. 16/17.3.65, 23/16.6.65 and 34/20.10.65 of the Board of Directors of the Hellenic Industrial Development Bank concerning determination of the Thessaloniki Industrial Estate;

3. Introduction Report dated December 7, 1965 concerning determination of Thessaloniki Industrial Estate as issued by the Committee set up, under joint Decree No. 34403/5954/24.4.65 of the Ministers of Co-ordination and Industry, to assess proposals submitted by the Hellenic Industrial Development Bank;

4. Topographic Map No. 1177 15.9.65 of Thessaloniki Industrial Estate, submitted by the Hellenic Industrial Development Bank;

DO HEREBY DECREE as follows:

The Industrial Estate in the administrative District of the Eparchy of Thessaloniki shall be bounded:

a. On the east and from north to south by lots Nos. 704 and 703 of N. Magnesia cadastral plan on a length of about 170 m with zone occupying the west embankment of the Gallicos river on a length of about 3,160 m.

b. on the south by the north trench of the Athens-Thessaloniki railway line on a length of about 3,900 m.

c. On the west and from south to north by the zone occupying main drainage ditch on a length of about 335 m, by lots Nos. 35, 44, 67, 66, 65, 64, 63, 62, 59, 58, 57, 56, 55, 53, 52 and 51 of Sindos cadastral plan, on a total length of about 1,790 m, by a farm road crossing field No. 24 of Sindos cadastral plan on a length of about 440 m, and then by the south boundary of the zone occupying the ditch and the railway line on a length of about 180 m, and then, crossing the Thessaloniki - Jugoslavia railway line; by lots Nos. 1595, 1574 and 1554 of N. Agohialos cadastral plan on a total length of about 320 m, on a line crossing uncultivated fields nos. 1548 and 1394 of N. Agohialos cadastral plan and also by ditch No. 1393 on a total length of about 340 m and finally by lot No. 1442 of N. Agohialos cadastral plan.

d. On the north by the Thessaloniki - Athens highway on a length of about 3,400 m and by lot No. 640 of N. Magnesia cadastral plan on a length of about 330 m.

As shown in the certified topographic map filed with Service II, General Direction of Technical Services of the Ministry of Industry.

This Decree is to be published in the Government Gazette.

Athens, 8th December 1965

The Ministers

APPENDIX 3
EXISTING INSTALLATIONS

PHASE I

1. Factories in Operation

Factory	Activity	Plot No.
Goodyear	Rubber Tyres	-
Hellas Cans	Tin Cans	1
Varhart Limited	Cardboard Boxes	1
Ilios Ten Cate	Cotton Spinning	3
St. Regis Hellas	Cardboard Boxes	22

2. Factories Under Construction

Apostolidis & Co.	Diesel Engines	2
A.P.K.O.	Plastics	4
Vepsy	Synthetic Material	6
Viofit	Insecticides	25

3. Factories Under Discussion

N. Krallis	Pharmaceuticals	1
E. Tompoulidis	Fans	1
Tsentellis	Textiles	5
I. Boutaris	Wines and Spirits	16
Flocas Ltd.	Confectionery	16
Ganoulis	Plastics	- *
Xanthopoulos Lazaridis	Leather Tanning	- *
P. Kontellis Limited	Rigid P.V.C. Pipe	- *
Kesselwerke		4

N.B. * Site not yet determined

PHASE II

1. Cotton Research Institute

2. Land Reclamation Station

3. Military Barracks

4. N.A.T.O. Base - Fuel Storage Depot.

5. **Factories and Storage Depots in Operation**

Factory or Depot	Activity	Plot No.
Olympos Aeria	Industrial Gases	521 and 522
Zoumbouridis	Cement	526
D.E.H. (Electricity Authority)	Storage Depot	16-19
Victor A.E.	Turpentine and Glue	17a
Doukaki	Porcelain Santitary Ware	1471
O.T.E. (Telephone Authority)	Storage Depot	1467 1468 1469 1459
Karagiorgiou Brothers	Cotton Gin factory	1478-1480
"The Two Brothers"	Clay Block factory	1542 1543 1544
Toule Brothers	Clay Drainage Pipes	603
Atlas	Clay Block factory	617 618
T.E.M.E. Limited	Steel Tanks	1463 1464

6. **Factories Under Construction**

Esthimiadis	Plastics	528
Agrotiki	Agricultural Machinery	

APPENDIX 4

PREVIOUS SOILS INVESTIGATIONS

Several independent soils investigations have been carried out in the Industrial Area. The results of these investigations are shown on Drawing No. 1/9. The conclusions can be summarised as follows:-

1. **General Report** (May 1970)

(a) Location — -Area I Water Tower site - 2 boreholes

Conclusions — -Foundations to be carried on piles 15 m long driven to stiff sand.

(b) Location — -Sewage Pumphouse site - 1 borehole

Conclusions — -Raft foundation for loads less than 0.5 Kg/cm^2 or use friction piles.

2. **Professor Lorzos Report** (1967)

Five boreholes were drilled disclosing the following information:

Borehole No.	Location	Conclusions
L1	North of Area I	Light - medium buildings. Heavy buildings on 15 m piles. This borehole not typical of whole area.
L2	South of Area I	Light buildings only. Ground between 7 and 12 m has virtually zero strength. No deep strata suitable for piles.
L3	South-west Area 2	Light buildings only. Medium buildings can possibly be founded on 9 m piles. Between 16 m and 26 m ground has virtually zero strength.
L4	Centre Area 2	Similar to L2 but deeper and suitable for medium weight buildings on raft foundations at approximately 3.0 m.
L5	Centre Area 2	At depth of 0.8 m suitable for light buildings on spread footings. Between 3 m and 9 m soil is of very low bearing capacity. It may be possible to found heavy structures on piles if penetration exceeds 15 m.

3. Goodyear - Foundation Report

Six boreholes were drilled at the site of the Goodyear factory. The report suggests settlement of loose sand by vibration or the removal of sand (about 1 m deep) and foundations taken on clay where a safe bearing capacity of 1.1 Kg/cm^2 exists. It is not known which alternative has been adopted.

4. Water Authority Trial Bores - July 1970

Four shallow drillings were undertaken. Soil description and water level were the only facts disclosed.

Conclusions

The general conclusions are as follows:-

1. that the ground is extremely variable and if loads in excess of 0.5 Kg/cm^2 are required, specific investigations of the particular area will be required.
2. Water levels vary between +1.0 m above datum to -3.70 m below datum.
3. Some strata are described as having "virtually no strength".
4. Clays are normally loaded. Consolidation due to applied loads is likely to be large. This situation is likely to exist over the entire site.

APPENDIX 5

REQUIREMENTS FOR SOILS INVESTIGATIONS AND LABORATCRY TESTING

1. Introduction

Boreholes insitu and laboratory tests are required to provide information on the soil conditions for foundation design in the Industrial Area of Thessaloniki.

2. Site Investigations

Boreholes are required to be sunk by shell and auger methods at the positions shown on Drawing No. 1/10. Boreholes shall be taken to at least 15 m below ground level and the description of the soils encountered and comments on ground water level are required to be given in the borehole records.

Disturbed and undisturbed samples shall be taken at every 2 m of depth and despatched to a testing laboratory for examination and testing.

Dynamic cone penetration tests shall be made in gravels to test their relative density and the value of the penetration resistance shall be stated in the borehole record.

3. Laboratory Testing

The natural moisture content, natural wet density and shear strength of 100 mm diameter samples using several lateral pressures with a modified test procedure.

Mohrs circle of stress at failure shall be provided.

Chemical analysis shall be made on ground water samples to determine their soluble sulphate content and pH value.

APPENDIX 6

METEOROLOGICAL RECORDS

The Ministry of Agriculture, Institute for Cotton Research, situated approximately 2 Km north of Sindos (latitude 40° 40′ N, longitude 22° 49′) central to the Area 1 and 2 areas has extensive meteorological records going back to 1935 in some cases. The principal information is summarised below:

TEMPERATURE RECORDS

	Average Monthly Mean Air Temperature (1946-1966) °C	**Average Monthly Mean Min. Air Temperature (1945-1966) °C**	**Average Monthly Mean Max. Air Temperature (1945-1966) °C**	**Average Monthly Lowest Air Temperature (1942-1946) °C**	**Average Monthly Highest Air Temperature (1942-1946) °C**
January	4.6	0.5	9.0	- 6.3	15.9
February	6.1	1.2	11.5	- 5.0	18.2
March	9.1	3.5	14.5	- 2.6	22.7
April	14.3	6.6	20.4	1.0	26.5
May	19.0	11.4	25.9	6.0	32.0
June	24.3	15.5	30.1	11.1	36.0
July	27.1	18.3	32.7	14.4	37.2
August	26.3	18.1	33.0	14.0	38.1
September	21.9	14.5	28.2	9.5	34.1
October	15.7	9.9	22.0	4.0	28.3
November	11.4	6.7	16.2	- 0.7	21.9
December	6.8	2.4	11.2	- 4.0	18.1
Year	15.5	9.1	21.3	- 8.1	38.8

RAINFALL RECORDS

	Monthly Rainfall (1935-1966) in mm	No. of Rain days/month (1935-1966)
January	39.8	5.8
February	27.7	3.6
March	35.8	5.8
April	34.8	5.5
May	40.8	5.7
June	34.7	5.1
July	14.6	2.3
August	13.0	2.0
September	33.4	3.0
October	51.8	5.4
November	67.1	7.8
December	63.3	7.2
Total for Year	456.7	59.3

(1935-1966)	
Spring	114.7
Summer	61.8
Autumn	148.0
Winter	129.3
Year	453.8

WIND RECORDS

Percentage Frequency of Wind Direction (1957-1966)

Month	Direction							
	N	NE	NW	S	SE	SW	E	W
January	24.4	12.3	40.0	2.2	2.2	3.3	11.2	4.5
February	22.2	10.6	37.2	5.3	3.7	4.3	13.8	3.0
March	18.9	11.5	24.3	11.1	6.2	5.5	19.3	3.4
April	14.8	11.6	22.1	19.0	8.1	6.3	14.9	3.3
May	11.1	10.9	23.9	17.6	12.0	7.5	13.8	3.7
June	8.5	8.1	26.6	22.1	10.8	11.5	9.5	2.7
July	8.6	10.5	25.3	22.7	8.4	16.2	5.2	3.2
August	6.2	9.0	25.9	20.0	11.2	16.2	7.0	4.0
September	12.6	11.9	18.7	18.4	13.5	15.6	4.7	4.8
October	13.4	12.8	21.3	15.6	9.2	9.8	13.2	4.3
November	19.8	12.0	25.8	8.6	7.6	7.2	15.7	3.7
December	25.6	11.2	36.0	4.5	5.9	3.2	9.3	4.7
Year	15.5	11.0	27.3	13.9	8.2	8.8	11.4	3.8

WIND RECORDS

	Days of Strong (Force 6) and Very Strong (Force 7) Winds Beaufort Scale (1954-1966)
January	6.5
February	6.6
March	5.2
April	5.9
May	5.0
June	6.5
July	6.6
August	6.0
September	4.3
October	3.8
November	4.5
December	5.8
Year	66.7

Unido Industrial Site Salonika

Particulars of factories in Operation

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Particulars	Phase 1 a Goodyear Hellas	Phase 1 b Hellas Cans	Phase 1 c Vanhart Ltd	Phase 1 d Ilios Ten Cate	Phase 1 e St Regis Hellas	Phase 2 a Olympos Aeria	Phase 2 b Zoumbourdis	Phase 3 a Victor AE	Phase 3	Total
Initial plot area (Ha) + location	28	3 3	1	3	3 5	2 5 Plot 52 + 522	1 4 Plot 526	0 5 Plot 179		
Area of option (Ha)			0 5							
Product	Tyres	Cans	Cardboard boxes	Cotton thread	Paper boxes	Compressed air	Cement products	Resin Glue + Turpentine		
Present production	811 per day	36 million/year	150 tons/month	4½ tons/24 hours	4000 tons/year	Oxygen 650 cu m/hr Air 40kg/hr Acetylene 1990kg/8 hrs		28 tons/8hrs		
Planned increase in production	2-3x increase 5-10 years	Total 50m on/year	10% per year		2-3000 tons/year					
Future total output	7700 per day	100 m on/year		9 tons/24 hours	10,000 tons/year			12500 tons/year		
Dispatch	Trucked Greece	Road + rail Exported	Northern Greece + Exported	Exported Road + rail	Trucked Greece	Trucked Greece + Islands		Road + rail Greece + Europe		
Present raw materials	Petroleum	4000 tons/year sheet metal	14% more than production	5 tons/day cotton	5000 tons/year Paper	100 tons/month Calcium carbide		5560 tons/year		
Future raw materials	Petroleum	Increase due to output	14% more than production	Increase due to output	15% more than production			Little increase		
Transport of raw materials to factory	Shipped to Salonika trucked to factory	Trucked from Hellenic Steel	Shipped America Finland Greece	Trucked Northern Greece	Shipped America + Finland	Trucked from Yugoslavia		Greece Germany Israel Italy Ship + road		
Present number employed	250	140 to 180	31	6 8	60	34		10		
Male/female ratio	242 8	2 1	18 13	1 2	9 1	27 7		All male		
Shifts worked	3	1 to 3	1	3	1	1 to 3		1		
Future numbers and male/female ratio	387	Double present	180 male/female ratio similar	Increase proportional to production	Ratio 4 1	Little increase		30		
Employees by co-	Less than 10%	7	1	1	7	2				
Employees transport by other means from where	Public transport Salonika Sindos	Sindos Public transport Salonika Company bus	Bus Salonika and Sindos	Company transport Sindos Pyrg. + Salonika	Bus Sindos + Salonika	Company bus Sindos + Salonika		Train Salonika		
Present water consumption	Average 100 gpm Peak 550 gpm			20 cu m/day				Average 30 cu m/hr Peak 60 cu m/hr		
Total consumption of water per 24 hours		Very small	6 cu m/day	20 cu m/day				250 cu m/day		
Proportion of water used for a Domestic water b Process water c Air conditioning d Other purposes	20 gpm Remainder	Machine cooling + Domestic purpose	6 cu m/day	Domestic + Air conditioning only	Domestic + Air conditioning only	Mostly process water		b 70% d 30%		
Present source	Well 800 gpm	Well	Well	Well	Drinking Sindos Remainder well	2 Wells		Well		
Quality before treatment	Hard	Hard	Hard	Hard	Hard	Good quality		V Hard		
Fire-fighting requirements and how water supplied pressure	Sprinklers Well pump 1300 gpm	Equipment Installed		Pressure Tank	Equipment Installed	Equipment Installed		Chemicals		
Increase in present consumption				Total 40 cu m/day				Double		
Supply voltage	15 Kv	15 Kv	220v	17 Kv	15 Kv			220 + 380v		
Present power requirements total average peak	average 1300 Kw peak 900 Kw total 678000 Kwh	Transformer 320v Machine Power 496 HP	Transformer 220-380 volts Machine Power 100 HP	Transformer 1360 HP 380v	Consumption 40-45 000 Kwh	Machine Power 500 Consumption 220,000 Kwh/month		Average 180 Kw No peak		
Power requirements (future)	60% production increase	Machine Power 846 HP						50% increase		
Quantities per day of a Domestic sewage b Industrial waste water c Special effluent	As for water supply							b 30 cu m/hr		
Treatment given to each and where discharged	a Chlorinated b — Discharged into River Galicos	a Septic tank b Burnt or sold	a Septic tank		a Septic tank b Burnt or sold	b Septic tank c Sold or removed by truck		Discharged into ditch No treatment		
Facilities if installed in the proposed Service Centre would be of particular interest	Trash disposal 200 kg/day	First Aid	Any	Any	Banking social security services customs offices + railway access	Banks customs + telecommunications	Testing laboratory	Chemical laboratory banks restaurant + customs		

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<u>Unido Industrial Site Salonika</u>

<u>Particulars of Factories in Operation</u>

Particulars	c Dockakis	e Karagiorgou Bros	f The Two Brothers	g Toule Bros	h Aitos	j TEME Ltd				Total
	Phase 3									
Initial plot area (Ha) e location	1 8 Plot 1871-1879 1883-1884	2 Plot 1970 1978-1980	3 Plot 1903 + 1904	0 8 Plot 603	2 Plot 617 + 618	0 7 Plot 1871 + 1872				
Area of option (Ha)				0 7 Plot 602						
Product	Sanitary Fittings Porcelain products	Cotton Gin	Clay Bricks	Glazed + unglazed pipes	Clay Bricks	Steam boilers Polishing discs				
Present production	3300 units/24 hrs	130 tons/24 hrs	3000 000/year	1300 m/day	7000 000/year	1 million units/year				
Planned increase in production	40%	25%								
Future total output						3 million units/year				
Despatch	Trucked to Cyprus + Greece	Exported rail or sea Greece road	Truck Salonika + neighbourhood	Northern Greece Truck	Truck Salonika + neighbourhood	Truck to Salonika				
Present raw materials	1000 tons/year	140 tons/24 hrs Raw cotton	Coal + Clay	12 tons/day clay 2 tons/day wood	Clay	450 tons/year				
Future raw materials	40% increase	As production				1200 tons/year				
Transport of raw materials to factory	30% Greece 70% outside train	Northern Greece Road	N Greece + immediate area by road	Truck from Sindos	Local	Company truck				
Present number employed	48	70-80	8	17	27	74				
Male/female ratio	1 1	All male	6 2	15 2	22 5	65 9				
Shifts worked	1 to 3	3	1	1	[illegible]	2 to 3				
Future numbers and male/female ratio	10% increase	5% increase				Increase of 36 men 18 women				
Employees by car										
Employees transport by other means from where	Company bus Salonika + villages	Public transport Surrounding villages	Public transport Surrounding villages	Public bus Salonika + neighbourhood	Public bus Surrounding villages	Company bus				
Present water consumption	50 cu m/day		4-6 cu m/day	5 cu m/day	8-10 cu m/day	24 cu m/8 hrs				
Total consumption of water per 24 hours	50 cu m/day		4-6 cu m/day							
Proportion of water used for a Domestic water b Process water c Air conditioning d Other purposes	Process + domestic water from Army Barracks	b	Brick making + domestic water only			Process water only Domestic by tanker				
Present source	Well	Well	Well	Process trucked from Salonika Domestic from Vrachaino	Well	Well				
Quality before treatment	Sea-Salty		Quite good		Quite good	V Hard				
Fire-fighting requirements and how water supplied pressure	Chemicals	Water tanks and pumps installed				Chemicals				
Increase in present consumption						72 cu m/8 hrs				
Supply voltage	220 + 380v	220v	15000 to 380v	15000 to 380v		380v				
Present power requirements Total (average peak)	Machine Power 350 HP	Machine Power 600 HP	Machine Power 180 HP	Machine Power 115 HP	Machine Power 150 HP Consumption 15-20.000 Kwh	Machine Power 130 HP				
Power requirements (future)	Consumption 50 kw	10-20% increase								
Quantities per day of a Domestic sewage b Industrial waste water c Special effluent			Very small	c Very small	Domestic water only					
Treatment given to each and where discharged	a b Septic tank 20-25 cu m/day			a Septic tank	a Septic tank	b Untreated				
Facilities if installed in the proposed Service Centre would be of particular interest	Telephone + customs offices	Restaurant + Banks If closed to factory			Customs for export to Yugoslavia	Chemical laboratory				

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Unido Industrial Site Salonika

Particular of Factories Under Construction

Particulars	Phase 1				Phase 2	Phase 3					Total
	a Apostolidis + Co	b A P K O	c Vepsy Ltd	d Viofit	e Efthimiadis	e Agrolik					
Initial plot area (Ha) & location	2 Plot 2	0 25 Plot 9	0 5 Plot 6	0 6 Plot 25	1 5 Plot 327	0 25					
Area of option (Ha)	Plot 2	0 25 Plot 9	0 4 Plot 6	0 5	0 5 Plot 326	0·25					
Product	Diesel engines	Plastic Container	Synthetic Curtains	Drugs + fertilizer	Expanded plastics Polythene sheeting	Agricultural machinery					
Present production	2000 units/year	900 tons/year	20 million sqm/year	72 tons/shift	200 kg/min 250 tons/month	85 units/day					
Planned increase in production		300 tons/year	40 million sqm/year								
Future total output		3600 tons/year		3 times present production							
Dispatch	Trucked to Greece	Thessalonika N Greece Trucked	Trucked to EEC countries	Trucked to Greece Shipped to Islands	Greece						
Present raw materials	Cast iron 300 Iron Steel 100 tons/year	Same as output	Polyester yarn quantity varies	7000 tons/year	+ 5% more than production 100 tons/month	Sheet metal discs and tanks					
Future raw materials		Same as output	Polyester yarn quantity varies			Sheet metal discs and tanks					
Transport of raw materials to factory	Europe Rail or Ship	Athens Germany Italy UK Trucked	West Germany Belgium Holland + Italy Trucked	Trucked Greece train Switzerland	Europe + USA by ship	Greece truck Germany train Italy sea					
Present number employed	80	70	100	15	60 – 70	50 - 60					
Male/female ratio	80 2	1 1	1 1	1 1	4 1	60 2					
Shifts worked	1	3	3 and 1½	1	3	1					
Future numbers and male/female ratio		200 ratio 1:1	160 ratio 40 60	30 increase in women	30 – 40	120					
Employees by car	5	8 to 20	2 or 3								
Employees transport by other means from where	Company bus Salonika	Bus from Thessalonika	Company transport Salonika + Sindos	Company bus Salonika							
Present water consumption	1000 cu m/2 months	20 to 25 cu m/day	48 to 72 cu m/day								
Total consumption of water per 24 hours		20 to 25 cu m/day	48 to 72 cu m/day	5 cu m/hour	5 cu m/day						
Proportion of water used for: a Domestic water b Process water c Air conditioning d Other purposes	a 50% b 50% c — d —	a Remainder b 5 cu m/day c 5 cu m/day d 5 cu m/day		a 5% b 95%	Domestic and machine cooling	Machine cooling					
Present source	Well	Main supply	Well	Well	Well	Well					
Quality before treatment	Good	Hard		Good	Satisfactory						
Fire-fighting requirements and how water supplied pressure	Extinguishers	Cos or powder type extinguisher	Sprinklers + fire extinguishers	Extinguishers	Extinguishers						
Increase in present consumption		10 cu m/day		Initial doubled							
Supply voltage	15 kv	15 or 20 kv									
Present power requirements Total (average peak)	Transformer 220v Machine Power 500 kw	Transformer 220/380v Total power 1600 KVA	2 Transformers 630 KVA 220v	Small substation owned by DEH	Voltage 380v Machine Power 500 HP						
Power requirements (future)					Machine Power 544 HP						
Quantities per day of: a Domestic sewage b Industrial waste water c Special effluent		As for domestic water supply	a 2500 gpd -4000 gpd	b Neutralised							
Treatment given to each and where discharged		a Discharged into main sewers c Removed in barrels or soakaway	b No treatment discharged into main sewers		Septic tank	No special treatment					
Facilities if installed in the proposed Service Centre would be of particular interest	Banking	Telephone exchange telex shopping centre first aid ambulances + training centre	Customs Creche and Training Centre	Banking and commercial facilities	Any	Customs					
Start production		1972	September 1971	July 1971	August 1971	By 1974					

Unido Industrial Site Salonika

Particulars of Factories Under Discussion

Appendix No 7
Sheet 4 of 4

Phase

Particulars	a	b	c	d		g	h	j	Total
	[illegible]	E Tompoulidis	A Tsenteris	I Boutaris	E Ganoulis	P Xanthopoulos-Lazaridis	P [illegible] Ltd Chemicon S A	Kesselwerke	
Initial plot area (Ha) location	0 4 Plot	0 9 Plot 1	4 Plot 5	1 Plot 10	0 3 Plot 3	1 Plot 2	1 Plot 6	4 Plot 4	
Area of option (Ha)		0·5	6	1			1 Plot 6	3·5 Plot 4	
Product	Pharmaceutical goods	[illegible] and electric motor	Cotton thread Cotton oil & Cotton cake	Wine bottling & ouzo production	Industrial Plastics	Primary curing of lamb – skins	PVC Pipes	Water heaters	
Present production		25000 and 5000 units/year	30 - 35000 tons per year	8000 bottles/day		1 million skins per year	2500 tons/year	25 tons day	
Planned increase in production		10 15% per year	4 - 5000 tons per year	15000 bottles/day			5500 tons, year		
Future total output		Double present production		Plus 600 tons/year vegetables			8000 tons/year		
Dispatch			50% Greece rest exported	50% exported by ship			60-65% Home market Trucked	Rail EEC and Yugoslavia	
Present raw materials	Alcohol in small quantities	100 tons/year metal	50.000 tons per year	150 tons/year alcohol			100 tons/week PVC Powder	25 tons, day sheet metal	
Future raw materials				Alcohol			Increase due to output		
Transport of raw materials to factory	50% Greece rest imported	50% Germany rest Greece by truck	Greece Middle East & Pakistan	Trucked from Greece			Salonika & Holland	Rail West Germany & Salonika	
Present number employed	20	35	16 workers/17 tons per shift	30			45	250	
Male/female ratio	[illegible] 5	34 1	Men only	22 8			62 5	9 1	
Shifts worked	1	1	Basically 3					1	
Future numbers and male/female ratio	Little increase	50% increase ratio 4:1					67 Ratio 62 5	600 Ratio 9 1	
Employees by car							4 5		
Employees transport by other means from where	Salonika and Sindos	60% Salonika 40% Sindos					Bus		
Present water consumption							1500 gph	10 cu m, day	
Total consumption of water per 24 hours	25 cu m/month		100 cu m/day	30 cu m/day		40 cu m day	36 000 gals/day		
Proportion of water used for a Domestic water b Process water c Air conditioning d Other purposes		a 25 cu m/month b	a %	Domestic & process water only	Domestic only		a 1000 gpd b 360000 gpd	Greatest need pressure testing	
Present source			H.I.D.B supply	H.I.D.B supply			Main supply	Main supply	
Quality before treatment									
Fire fighting requirements and how water supplied pressure	Extinguishers						Co₂ extinguishers	Sprinklers & extinguishers	
Increase in present consumption							1 5 5000 gpd		
Supply voltage							15 to 22 kv		
Present power requirements Total average peak	Voltage 220 & 380v Machine Power 5 HP	Voltage 220 & 380v Machine Power 47 HP		Machine Power 60 HP	Machine Power 40 HP		380 220 v Power 350 HP	40 000 kwh month 250 kvA Total power at 380.220 v	
Power requirements future	Machine Power 90 HP	Machine Power 90 HP					Power 700 HP		
Quantities per day of a Domestic sewage b Industrial waste water c Special effluent		c 50 tons, year					[illegible] 000 gpd	As for water supply	
Treatment given to each and where discharged		c Removed by truck [illegible]		Septic tank		[illegible]	[illegible] Main sewer	[illegible] sewer	
Facilities installed in the proposed Service Centre would be of particular interest	Customs & free [illegible]	Banks customs [illegible]	Customs [illegible]	Customs banking [illegible]	[illegible]		[illegible]	[illegible]	

APPENDIX 8

INDUSTRIES MOST LIKELY TO EXPAND IN THE IMMEDIATE FUTURE AND SUITABLE FOR SITING ON THE INDUSTRIAL AREA

Textiles and Footwear

Cotton ginning

Ready-made Clothing

Yarn and thread

Shoes

Acrylic and man-made fibres

Metal Products and Light Engineering Porducts

Agricultural machinery (hay pickers, balers, etc.)

Tanks and containers

Canning

Ventilators

Hand Tools

Compressors

Car components (light weight)

Truck chassis

Engines

Hoists, lifting machines

Business machines (assembly)

Electromotors

Pumps

Cycles

Electrical Products

Air conditioners

Lamps

Washing machines (assembly)

Electric batteries

Starters

Accumulators

Television Sets

Radio components

Portable electric space heaters

Electric wire

Plastic insulating tubing

Construction Products

Porcelain products

Cement

Pipes

Wood Products

Matches

Parquet

Furniture

Others (toys, frames, etc.)

Chemicals, Plastics and Related Products

Pharmaceuticals

Agricultural and veterinary pharmaceuticals

Soap and detergents

Paint

Tanning and bleaching

Polythene/PVC products

Plastic containers

Industrial plastics

Cosmetics

Food Products

Processing and freezing

Canning fruit and vegetables

Bottling fruit and vegetables

Confectionery

Soft drinks

Alcoholic drinks

Paper and Packaging

Printing and Publishing

Glass Products

Bottles and containers

Sheet and plate glass

APPENDIX 9

TRAFFIC FORECASTS

1. INTRODUCTION

A preliminary forecast has been made of the traffic which will be generated by the Industrial Area. An approximate projection has also been made of the traffic on the external roads and the two together provide a forecast of the future volume on the roads in the neighbourhood of the Industrial Area.

There are serious deficiencies in the traffic data available as a base from which to make the external traffic projections, and the future traffic volumes calculated must be regarded, therefore, as approximations.

2. FORECAST OF TRAFFIC GENERATED INTERNALLY BY THE INDUSTRIAL AREA

2.1 Vehicle Ownership

Traffic forecasting in the U.K. has for many years been based on the theory that provided roads are of adequate capacity traffic growth is directly related to the growth in vehicle ownership. This has been confirmed by information from several transportation studies in British towns which have shown that a linear relationship exists between trip generation and vehicle ownership similar to that shown on Figure 9.1. If a good forecast of vehicle ownership can be made, trip generation rates can be related to it and a forecast of future trip generation produced.

It has been suggested by J.C. Tanner[1] that the increase in vehicle ownership can be represented mathematically by a logistic growth curve which is known to fit sociological and biological data. Tanner postulated that forecasts of vehicles per head should be on a logistic growth curve when plotted against the year. The slope of the curve at the present day (i.e. the present growth rate) should be determined from vehicle registration data over the past few years and initially the curve would rise at this rate. The curve flattens out as saturation level is approached - the level of ownership at which there will be no further increase in the number of vehicles per head of population.

This method has been adopted in the forecast of future traffic in the Industrial Area.

Logistic growth curves have been prepared for cars and lorries in the Thessaloniki region. The three parameters necessary to fit the curves are the current ownership levels in Thessaloniki, the recent growth rate (1961-68) (both obtained from Professor Triantafillidis) and a saturation level chosen from the Consultant's experience of traffic forecasting.

These curves, indicating the characteristics to be expected in the future growth of vehicle ownership in the Thessaloniki area, are plotted to a natural scale in Figure 9.2. Between 1975 and 1985 a very rapid increase in car ownership is shown, followed by a lesser growth as saturation level is approached at the turn of the century.

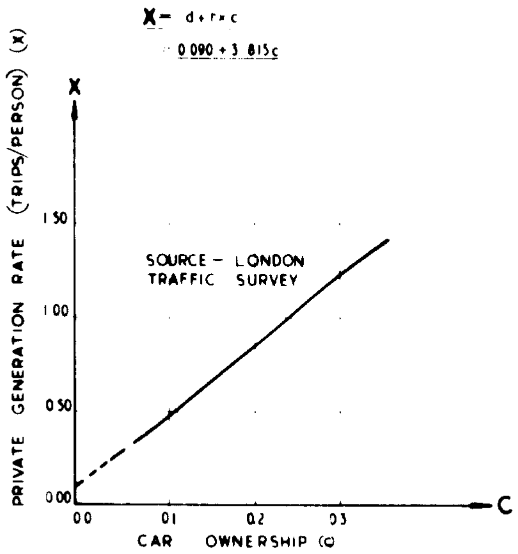
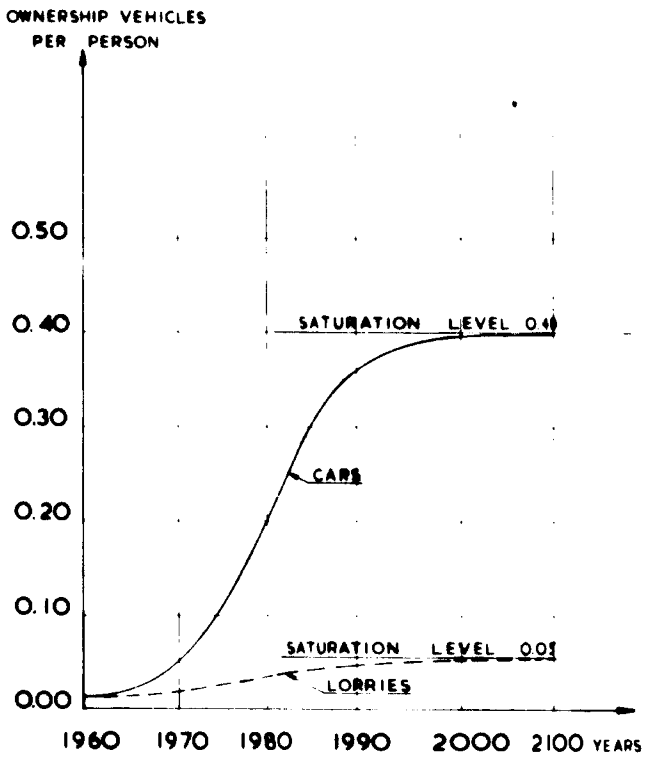


FIGURE 9·1 RELATIONSHIP BETWEEN TRIP GENERATION AND CAR OWNERSHIP



LOGISTIC GROWTH CURVES FITTED TO –
I PRESENT OWNERSHIP LEVELS 1968
II GROWTH RATE 1961 TO 1968
III SATURATION LEVELS SHOWN
SOURCE – PROF TRIANTAFILLIDIS

FIGURE 9·2 VEHICLE OWNERSHIP GROWTH CURVES FOR THE THESSALONIKI AREA

The use of the logistic curve in this context can be supported by plotting on a semi-logistic scale the vehicle ownership per person for the three years in which figures are available for the Thessaloniki area. This is shown in Figure 9.3 for all vehicles. A true logistic curve plotted to this scale gives a straight line and it can be seen that the three available points do lie on a straight line.

2.2 Trip Generation

In order to calculate the traffic volume of the Industrial Area, trip rates within industrial regions are required for the vehicle ownership levels predicted for 1980 and 1990. These are determined on the hypothesis that for given levels of vehicle ownership the trip rates per employee in an industrial area are similar in all countries.

The trip rates given in Table 9.1 are the rates at which trips will be generated by industrial areas at the future dates chosen for design purposes. The rates for individual journey purposes and travel modes are added together to provide overall trip generation rates. In order to forecast the number of journeys (in p.c.u.'s) finishing and starting in the Industrial Area, the trip rate for the appropriate year is multiplied by the number of employees.

TABLE 9.1

ONE-WAY TRIP RATES, PER EMPLOYEE, FOR LAND OF INDUSTRIAL USE

	Year		
Mode/Purpose	**1971**	**1980**	**1990**
Car driver to/from work	0.139	0.483	0.845
Other Private Transport to/from work	0.058	0.055	0.050
Bus to/from work	0.071	0.056	0.037
Business visit by car	0.120	0.150	0.180
Commercial vehicle movement	0.139	0.227	0.292
TOTAL:	0.527	0.971	1.404

2.3 Validation from Athens Basin Study

The trip rates are derived mainly from information collected in the West Midlands Transport Study,[2] which covered the Birmingham and Wolverhampton Conurbation in the United Kingdom. To ensure that these rates could be applied in Greece, they have been validated by comparison with data from the Athens Basin Transportation Survey and Study[3]. The Athens Study has several limitations which make it unsuitable for derivation of basic rates for the design of the Industrial Area. These are:-

(i) The car ownership level in Athens at the time of the Survey (1962) was approximately 0.026 cars per head of population. This is too low to provide a reliable base for forecasting.

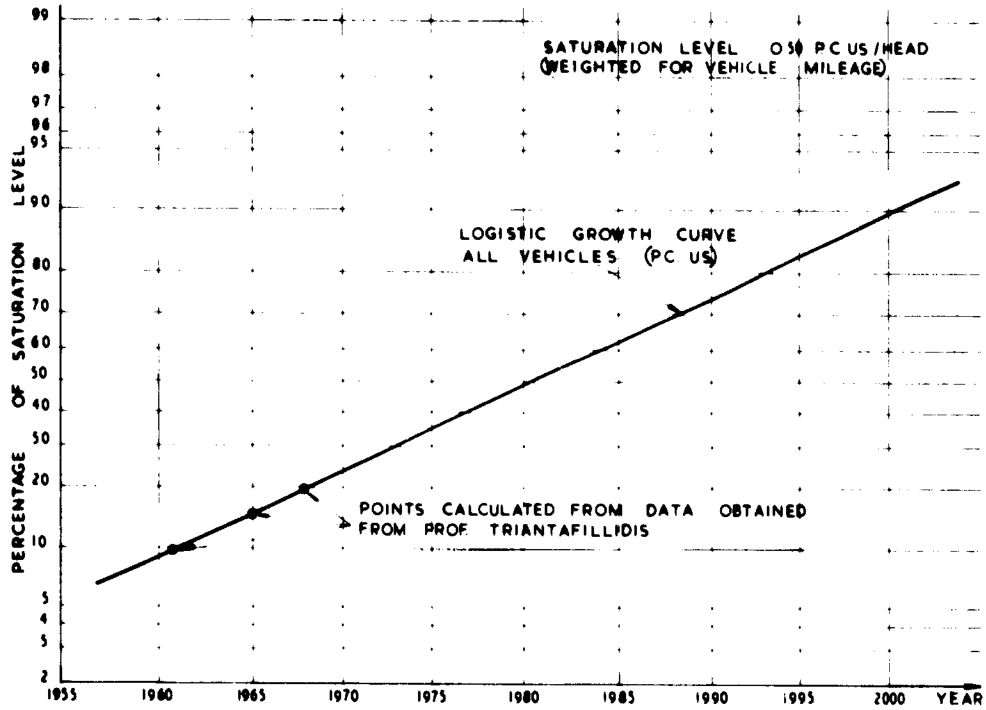


FIGURE 9·3 VEHICLE GROWTH CURVE FOR THESSALONIKI AREA

(ii) The forecast of traffic to work relied on growth factors rather than trip rates.

(iii) No trip rates were published for commercial vehicles.

Despite these limitations three checks on the trip rates in Table 9.1 were possible:

(1) The car-driver trip rates to and from work have been tested historically by a reverse forecast to the car ownership level (0.026) in Athens at the time of the Study (1962). This was compared with the trip rate actually observed in the Athens Survey:-

Calculated Trip Rate = 0.063

Observed Trip Rate = 0.059

(one-way car-driver trips per employee)

There is a 6% difference between the observed and calculated figures. In view of the limitations in the Athens Study, this is a very close comparison and provides confidence in the trip rates used in the forecast for the Industrial Area.

(2) The Athens car driver trip rate to work was used as a base from which to calculate the 1980 trip rate for the Industrial Area. This provided a forecast of 0.477 compared with 0.483 in Table 9.1, and again the comparison is very satisfactory.

(3) The business trip rate by car was calculated for 1980 from the Athens base. This gave a rate of 0.154 p.c.u. trips per employee compared with the 0.150 used in Table 9.1.

The three comparisons with the Athens Survey data suggest that the trip rates given in Table 9.1 are a satisfactory basis for forecasting future trips generated by the Industrial Area.

2.4 Validation of Journey to Work

A further method of validating the trip rates is by using the 1971 rate to estimate the current trips to work by car in the Industrial Area. Some details of the present journey to work were obtained from the Consultant's survey of factories in the Industrial Area[4]. Ten firms provided information about the number of employees travelling to work by car. These firms employed 918 persons of which approximately 66 came by car. Applying the 1971 car driver trip rate (from Table 9.1) gave an estimate of 918 x 0.139 = 127.6 trips to and from work. This represents 63.8 persons driving cars to work compared with 66 in the survey. Thus the synthesised use of the car to travel to work compares closely with that surveyed and this produces confidence in the forecasting technique.

2.5 Validation of Commercial Vehicle Trip Rates

The commercial vehicle trip rate in Table 9.1 has been checked by an independent calculation of the number of p.c.u.'s required to transport the annual tonnage of raw materials and products predicted for the Industrial Area. The figures and comparisons are given in Table 9.2. The commercial vehicle trip rate from Table 9.1 was first sub-divided into trips for service and distribution. This was done by reference to the W. Midland data from which the rates were derived. The trip rates for the distribution of products and materials should provide an estimate of commercial traffic comparable with the number of vehicles required to transport the tonnages forecast. Average vehicle loading factors, including running empty, were calculated from a Survey of Road Goods Transport in the U.K. in 1962.[5] The current trends in the composition of vehicle fleets and in the maximum gross weight of vehicles were considered and it was assumed that the maximum vehicle weight in 1980 would be the 42 metric tons proposed in the latest E.E.C. draft directive. By 1990 this is expected to increase to 48 metric tons if current trends continue. The corresponding average loading ratios are 0.376 and 0.293 p.c.u.'s per ton of payload as shown in Table 9.2.

It has been assumed that there are 250 working days in the year and the loading ratios were used to calculate the daily commercial vehicle traffic for distribution in p.c.u.'s. Finally the traffic has been divided by the number of employees to give trip rates to be compared with those calculated from the W. Midlands data. For 1980 the comparison is very close, the figures being 0.148 and 0.143 respectively. For 1990 the trip rate of 0.184 commercial vehicle p.c.u.'s per employee is higher than the 0.162 calculated from the assumed tonnage transported. However, the two figures are still close enough to give confidence in the predictions.

3. INTERNAL FLOW PATTERN - TRIP DISTRIBUTION

The calculations described in the previous section produced forecasts of the road traffic in p.c.u.'s which will be generated by (i.e. attracted to) the Industrial Area. In order to design the entrance roadways of the Area it was necessary to predict the opposite end of all trips starting or finishing in the Industrial Area. For commuting to work the gravity model principle has been used. This explains the trip distribution pattern in terms of the disposition of residential population in the Thessaloniki Region and the distances between the various towns and cities, and the Industrial Area. A single run of a very simple model was made using the population data from the 1971 census and the measured distances to the towns in the Region.

TABLE 9.2

ALTERNATIVE PREDICTIONS OF COMMERCIAL VEHICLE TRIP RATES FOR THE INDUSTRIAL AREA

		Year 1980	Year 1990
COMMERCIAL VEHICLE TRIP RATES (P.C.U.'s PER EMPLOYEE)	Distribution	0.143	0.184
	Service	0.084	0.108
(From Table 9.1)	TOTAL:	0.227	0.292
Maximum Vehicle Weight (gross) (metric tons)		42	45
% of heavy vehicles		35%	45%
Average Loading Ratio (p.c.u.'s per ton payload)		0.376	0.293
Annual Tonnage of Products and Raw Materials to and from the Industrial Area		1,600,000	5,200,000
Daily Commercial Vehicle Traffic for Distribution (p.c.u.'s per day)		2,465	6,114
Number of Employees		16,700	37,700
Commercial Vehicle Trip Rate for Distribution (p.c.u.'s per employee)		0.148	0.162

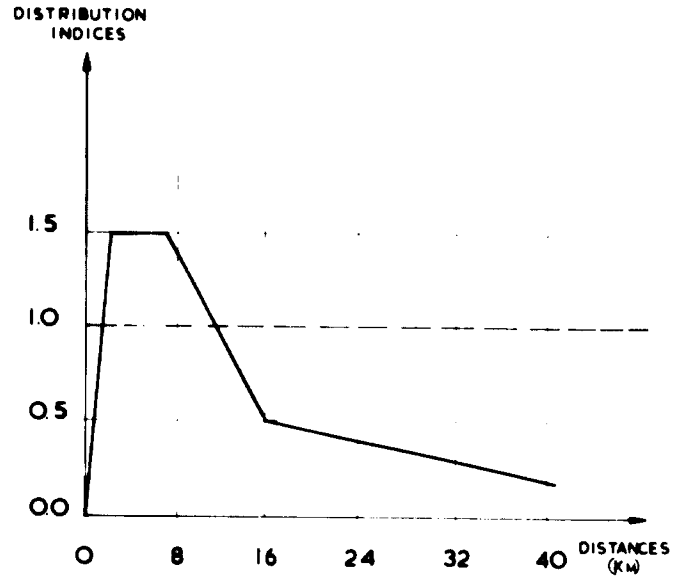


FIGURE 9·4 INDICES USED IN THE TRIP DISTRIBUTION PROCESS — THESSALONIKI

The generalised distribution function is shown on Figure 9.4.

The commercial traffic was distributed in accordance with the population pattern for the whole of Greece and with the transport pattern expected from the trading forecasts. The distribution of commercial trips is shown on Figure 9.5.

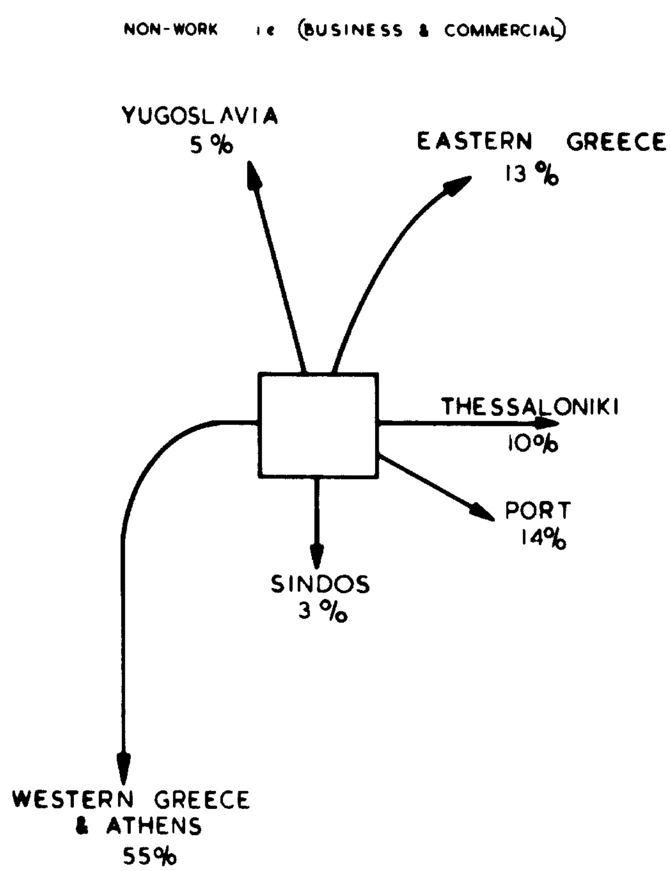


FIGURE 9·5 EXTERNAL DISTRIBUTION OF NON-WORK TRAFFIC GENERATED BY THE INDUSTRIAL AREA

The commercial and commuting distribution patterns were then assigned separately to the approach routes to the Industrial Area on the basis of the shortest route to the destination. The two assignments were finally combined in order to provide the overall distribution patterns shown in Table 9.3. This gives the volume of traffic generated by the Area and using the five routes leading to the Area.

TABLE 9.3

FUTURE TRAFFIC DISTRIBUTION FROM THE UNIDO SITE

Year	**1980**	**1990**
Working Population (Employees)	16,700	37,700
Traffic Distribution Route	**Urban p.c.u.'s per day**	
Country Road through Sindos	883	2,994
Thessaloniki via Southern Highway	4,407	14,798
Athens via Southern Highway	3,346	9,600
Athens via Northern Highway	1,126	3,536
Thessaloniki via Northern Highway	6,454	22,003
TOTAL TRAFFIC GENERATION OF THE UNIDO SITE:	16,216	52,931

4. FLOW PATTERNS - EXTERNAL

In order to recommend junctions to the external road system, the base flow patterns were required for these external roads. These were established by projecting traffic flows on the Northern Highway to the years 1980 and 1990. Growth was based on the curve in Figure 9.3 and it was assumed that it would be concentrated within Greater Thessaloniki and that there would be little increase in population in the small towns to the west of Sindos. Furthermore, the population growth in the first 25 years of Professor Triantafillidis' Master Plan[6] would be in the area east of the River Gallikos. The traffic generated by this development of Greater Thessaloniki would not therefore affect the roads near the Industrial Area beyond the growth caused by the increase in vehicle ownership or generated by the Area itself.

To account for the increased traffic due to the great improvement of accessibility planned on the Athens-Thessaloniki axis, larger growth rates have been used, beyond the growth due to vehicle ownership. The growth rate was increased by 40% on the Northern Highway, and by 30% on the Southern Highway. These values have been chosen to account also for the population increase in the whole of Greece.

The basis for the forecast of external traffic is a count at Nea Magnesia in 1970 which gave 17000 pcu/day (total both ways). By Hagios Adanasios this had fallen to 11000 pcu/day.

Traffic generated by the Industrial Area was added to the predicted external traffic and the resulting flow patterns are shown in Figures 9.6 and 9.7. In both cases the traffic volumes on the Northern Highway are about twice the level on the Southern Highway. This is because the northern road serves numerous small towns between Thessaloniki and Alexandria. The lower volumes on the Southern Highway are, however, compatible with its function as the main long distance road between Athens and Thessaloniki.

The volumes into the Industrial Area in Figures 9.6 and 9.7 do not exactly balance with the total traffic generation of Table 9.3. This is because of some slight penetration of the Area by traffic with a destination in Sindos, and similar minor traffic movements.

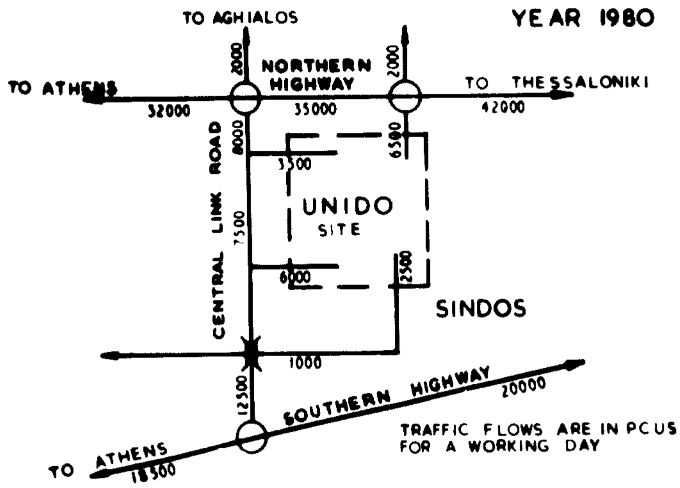


FIGURE 9·6 PRELIMINARY FORECAST OF TRAFFIC FLOWS IN THE VICINITY OF THE INDUSTRIAL AREA OF THESSALONIKI – 1980

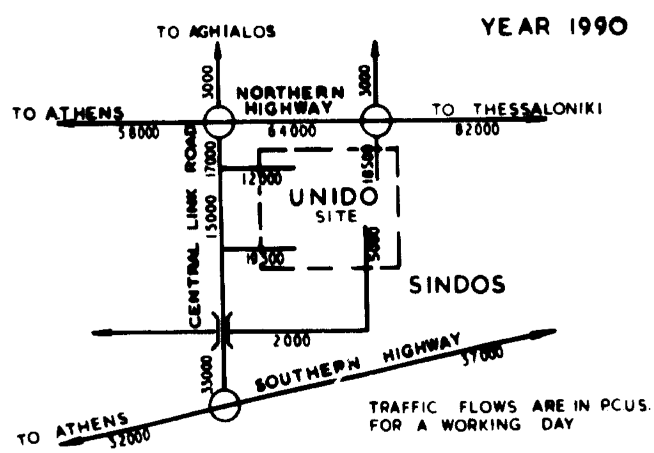


FIGURE 9·7 PRELIMINARY FORECAST OF TRAFFIC FLOWS IN THE VICINITY OF THE INDUSTRIAL AREA OF THESSALONIKI — 1990

5. TRAFFIC DESIGN FACTORS

5.1 Peak Flow Factors

The forecasts described above are all in traffic volumes (in p.c.u.'s) during the 24 hour day. However, to interpret the results in terms of road requirements, and in order to apply highway capacity standards, it is necessary to consider the highest volume in a single hour of the day. In order to determine a peak hour factor, data from the West Midlands Transport Study was examined. The peak hour percentages were obtained for each of the modes or purposes used for the trip rates in Table 9.1. These investigations showed that the morning peak in the year 1990 would be the most pronounced. Table 9.4 indicates a peak hour percentage of 14.0

TABLE 9.4

CALCULATION OF PEAK HOUR AND DIRECTIONAL FACTORS

Mode/Purpose	24 Hour Trip Rate	Peak Hour Factor %	Peak Hour Trip Rate	% in Major Direction	Trip Rate for Major Direction
Car driver to/from work	0.845	17.3	0.146	95	0.139
Other Private Transport to/from Work	0.050	15.9	0.008	85	0.007
Bus to/from Work	0.037	17.5	0.006	75	0.005
Business Journeys	0.180	2.2	0.004	40	0.002
Commercial Vehicle Movements	0.292	11.0	0.032	45	0.014
TOTAL:	1.404	14.0	0.196	85.2	0.167

Directional factors were determined for the morning peak hour. These were obtained partly from evidence in the West Midlands Study and partly from the logic of journey purpose. The factors, expressed as the percentage in the major direction, are given in Table 9.4, and an overall directional factor of 85.2% was calculated.

It was felt desirable to allow a small margin of safety on the factors calculated above. It was decided therefore to use peak hour and directional factors of 15% and 90% respectively for roads within the Industrial Area. For external roads the usual design criteria of 10% in the peak and 2/3 in the major direction would be appropriate.

6. ROAD DESIGN

The predicted traffic flows, as shown in Figures 9.6 and 9.7 and the traffic design factors given above have been used in the calculations for required carriageway capacity as given in Section 16 of Chapter 1.

6.1 Carriageway Capacity

The capacity of roads in built up areas is based on peak hour demands. The following figures[7] have been taken as the practical capacities:

Type of Road	Capacity in p.c.u.'s per hour for one direction
Single two lane carriageway all purpose street where waiting vehicles and junctions with heavy cross traffic and access to plots severely limit capacity..	400 to 500
Single two lane carriageways all purpose street with junctions with heavy cross traffic, bus stops and some access to plots	800
Dual two lane carriageway all purpose street with junctions with heavy cross traffic, bus stops and some access to plots	1200
Dual two lane carriageway all purpose road with no frontage access, no standing vehicles and no junctions other than roundabouts	2400

7. DEFINITION

Passenger Car Units

The passenger car unit or p.c.u. takes into account the different amount of road space required by vehicles of different types. The basic unit is the car. Taxis, light vans and three wheeler vehicles also count as one unit. Different types of vehicles affect the capacity of rural roads, urban roads, roundabouts and traffic lights in varying degrees and therefore the weighting has to be varied. The following values have been adopted:

Class of Vehicle	Urban Road	Roundabout
Private car, taxi, motor cycle combination, light goods vehicle	1.00	1.00
Motor cycle (solo) motor scooter	0.75	0.75
Medium or heavy goods vehicle, horse-drawn vehicle	2.00 (increasing to 3.00 in 1990 as size of heavy vehicles increase)	2.80
Bus, coach	3.00	2.80
Pedal cycle	0.33	0.50

8. REFERENCES

1 J.C. Tanner: Forecasts of Vehicle Ownership in Great Britain: Roads and Road Construction - *43*, p.p. 341-347 and 371-376, November and December, 1965.

2 West Midlands Transport Study: Freeman Fox, Wilbur Smith and Associates: City of Birmingham, 1968.

3 Athens Basin Transportation Survey and Study: Wilbur Smith and Associates: Ministry of Public Works, Athens, 1963.

4 Appendix 7 of Chapter I of Final Report on Industrial Area of Thessaloniki. Gibb-Ewbank Industrial Consultants, May 1972.

5 Ministry of Transport: Survey of Road Goods Transport 1962 Final Results Part I: H.M.S.O. London, 1964 (M.O.T Statistical Paper No, 2).

6 Master Plan of Thessaloniki: Prof. I. D. Triantafillidis: General Report 66: Ministry of Public Works, 1968.

7 Roads in Urban Areas - Ministry of Transport, Scottish Development Department, The Welsh Office, H.M.S.O., 1966.

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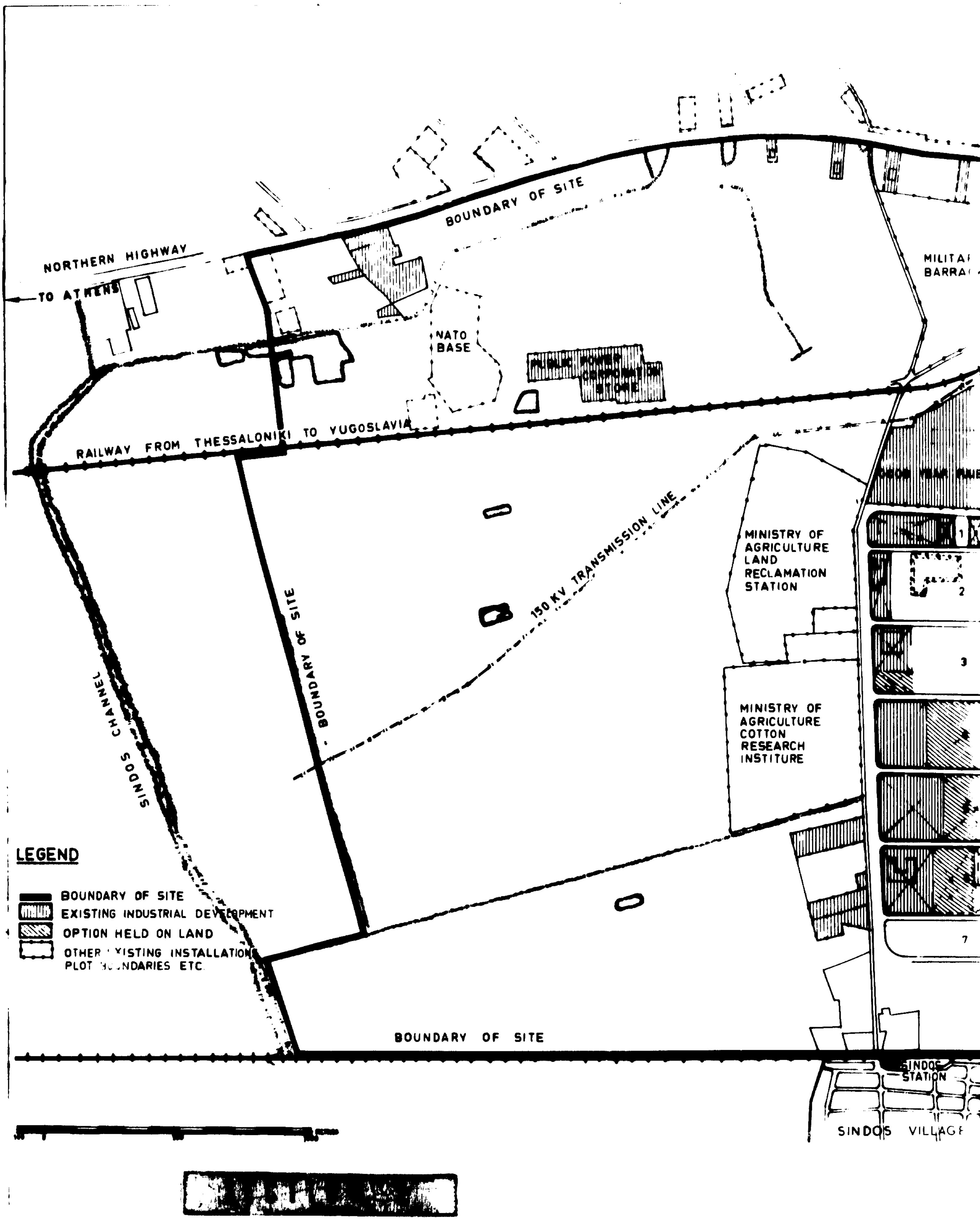
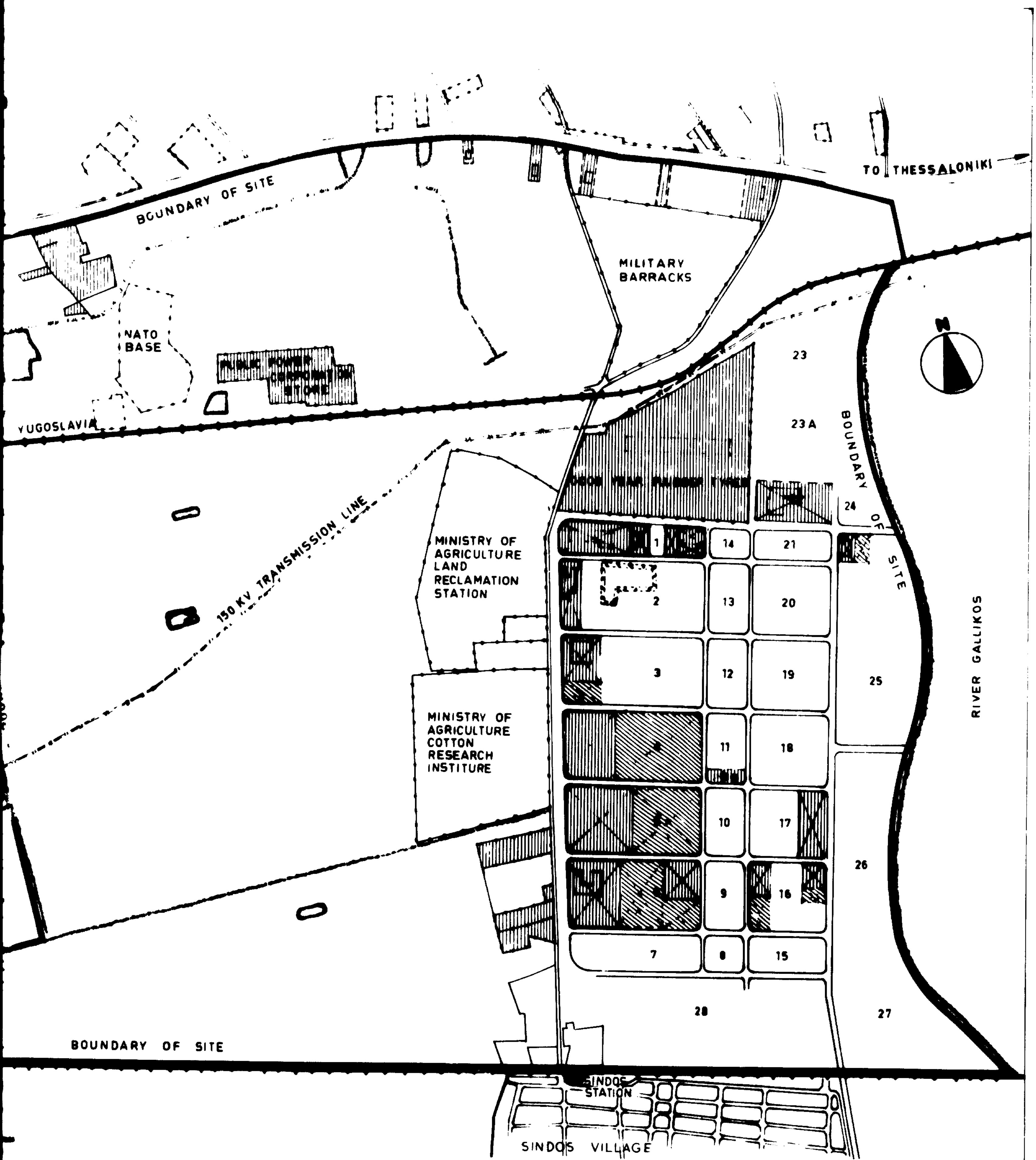
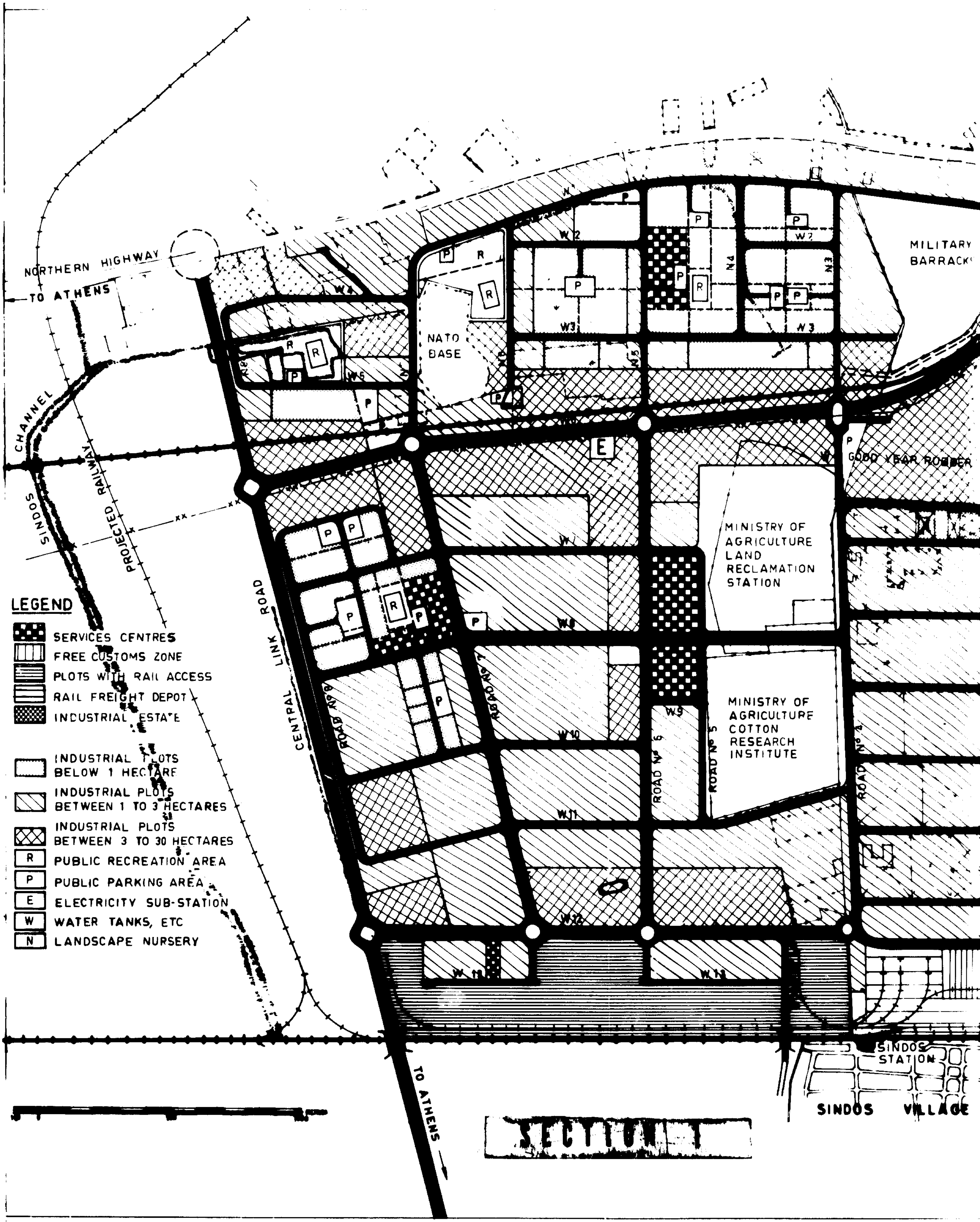


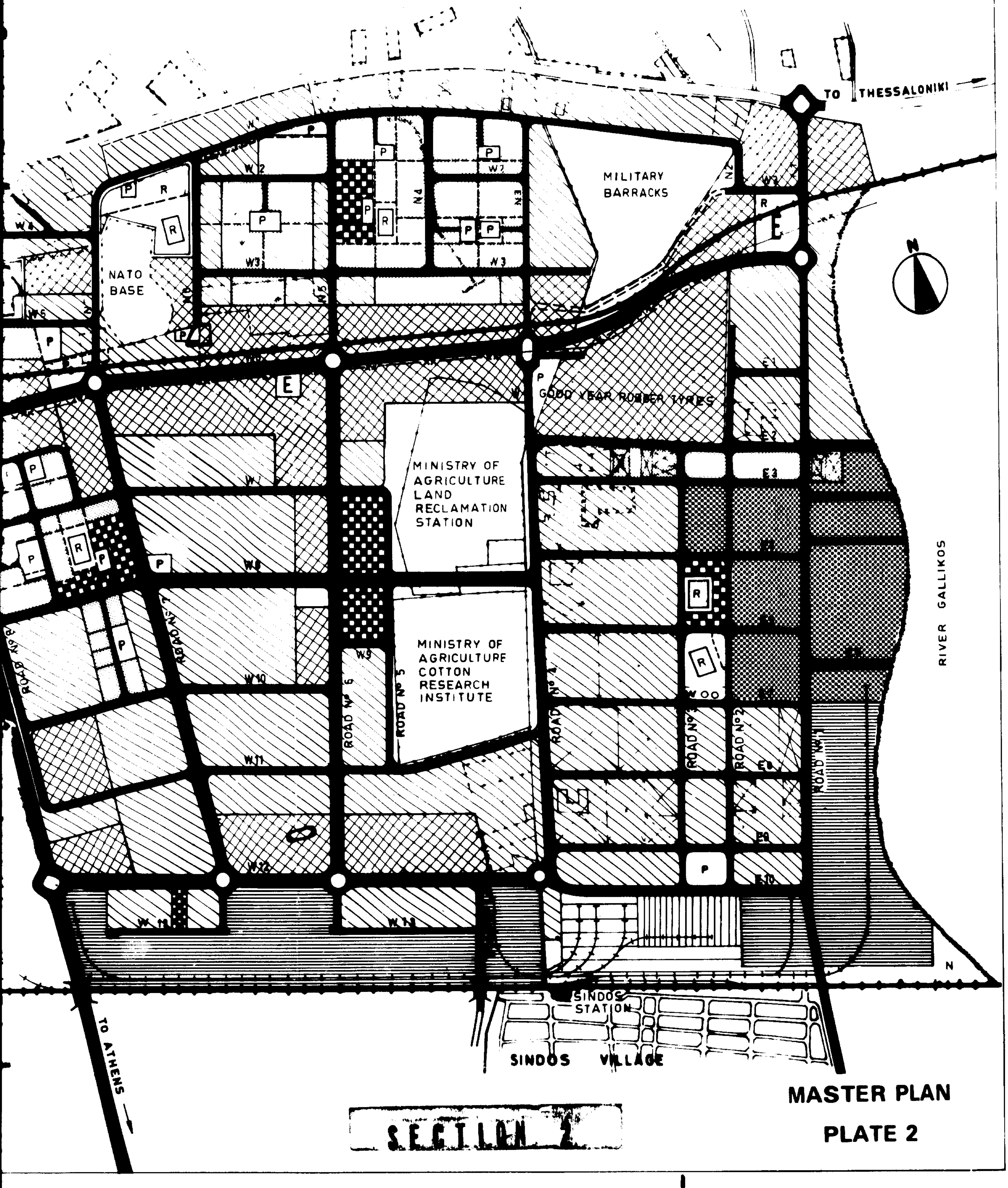
NORTHERN HIGHWAY
TO ATHENS
BOUNDARY OF SITE
NATO BASE
MILITA
BARRA
RAILWAY FROM THESSALONIKI TO YUGOSLAVIA
150 KV TRANSMISSION LINE
MINISTRY OF AGRICULTURE LAND RECLAMATION STATION
MINISTRY OF AGRICULTURE COTTON RESEARCH INSTITURE
SINDOS CHANNEL
BOUNDARY OF SITE
BOUNDARY OF SITE
SINDOS STATION
SINDOS VILLAGE
LEGEND
BOUNDARY OF SITE
EXISTING INDUSTRIAL DEVELOPMENT
OPTION HELD ON LAND
OTHER EXISTING INSTALLATIONS PLOT BOUNDARIES ETC.



PRESENT POSITION

PLATE 1

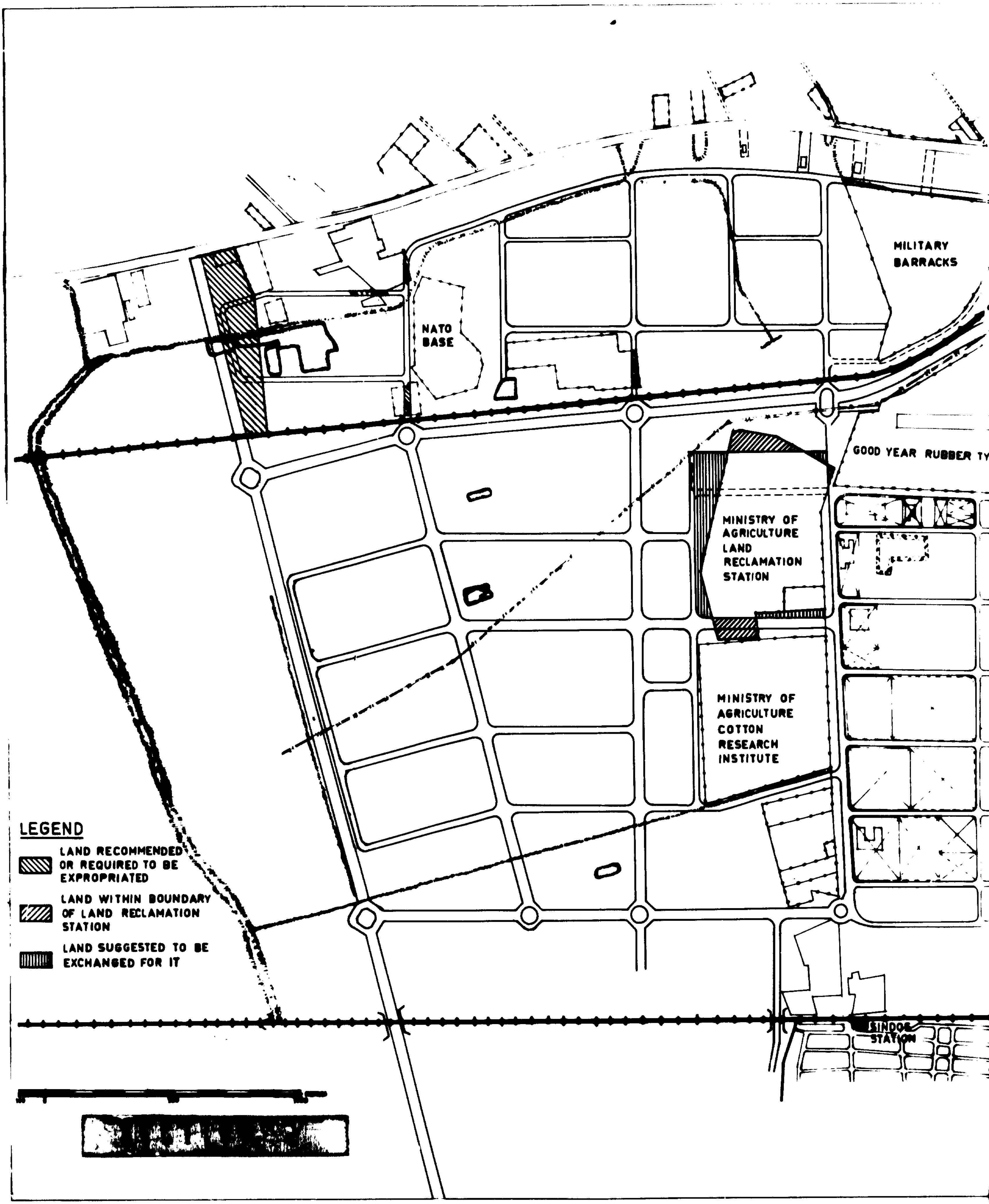

NORTHERN HIGHWAY
TO ATHENS
CHANNEL
SINDOS
PROJECTED RAILWAY
CENTRAL LINK ROAD
NATO BASE
MILITARY BARRACKS
GOOD YEAR RUBBER
MINISTRY OF AGRICULTURE LAND RECLAMATION STATION
MINISTRY OF AGRICULTURE COTTON RESEARCH INSTITUTE
ROAD No 8
ROAD No 7
ROAD No 6
ROAD No 5
ROAD No 4
SINDOS STATION
SINDOS VILLAGE
TO ATHENS
SECTION 1
LEGEND
SERVICES CENTRES
FREE CUSTOMS ZONE
PLOTS WITH RAIL ACCESS
RAIL FREIGHT DEPOT
INDUSTRIAL ESTATE
INDUSTRIAL PLOTS BELOW 1 HECTARE
INDUSTRIAL PLOTS BETWEEN 1 TO 3 HECTARES
INDUSTRIAL PLOTS BETWEEN 3 TO 30 HECTARES
R PUBLIC RECREATION AREA
P PUBLIC PARKING AREA
E ELECTRICITY SUB-STATION
W WATER TANKS, ETC
N LANDSCAPE NURSERY



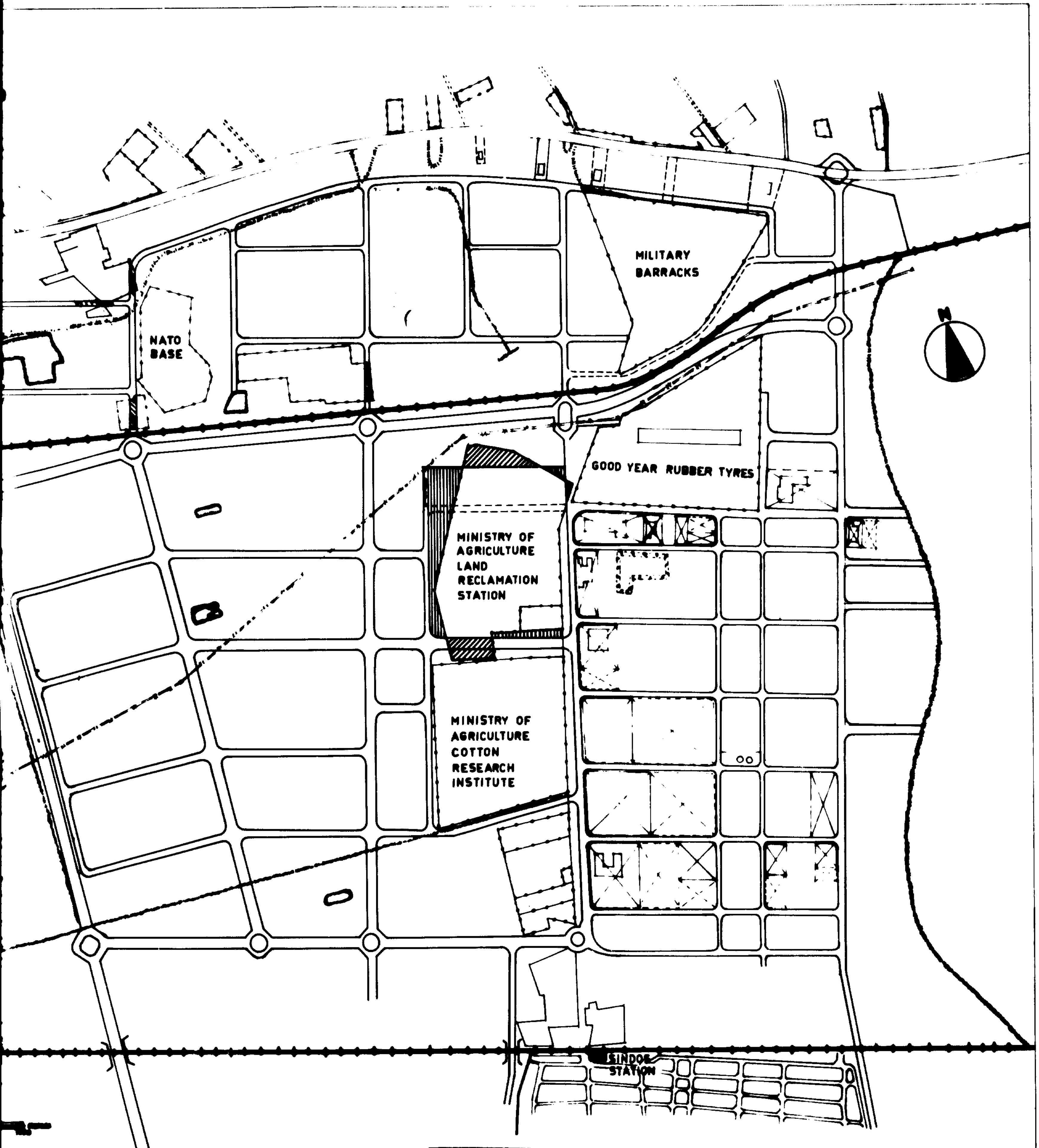
MASTER PLAN

PLATE 2

SECTION 2

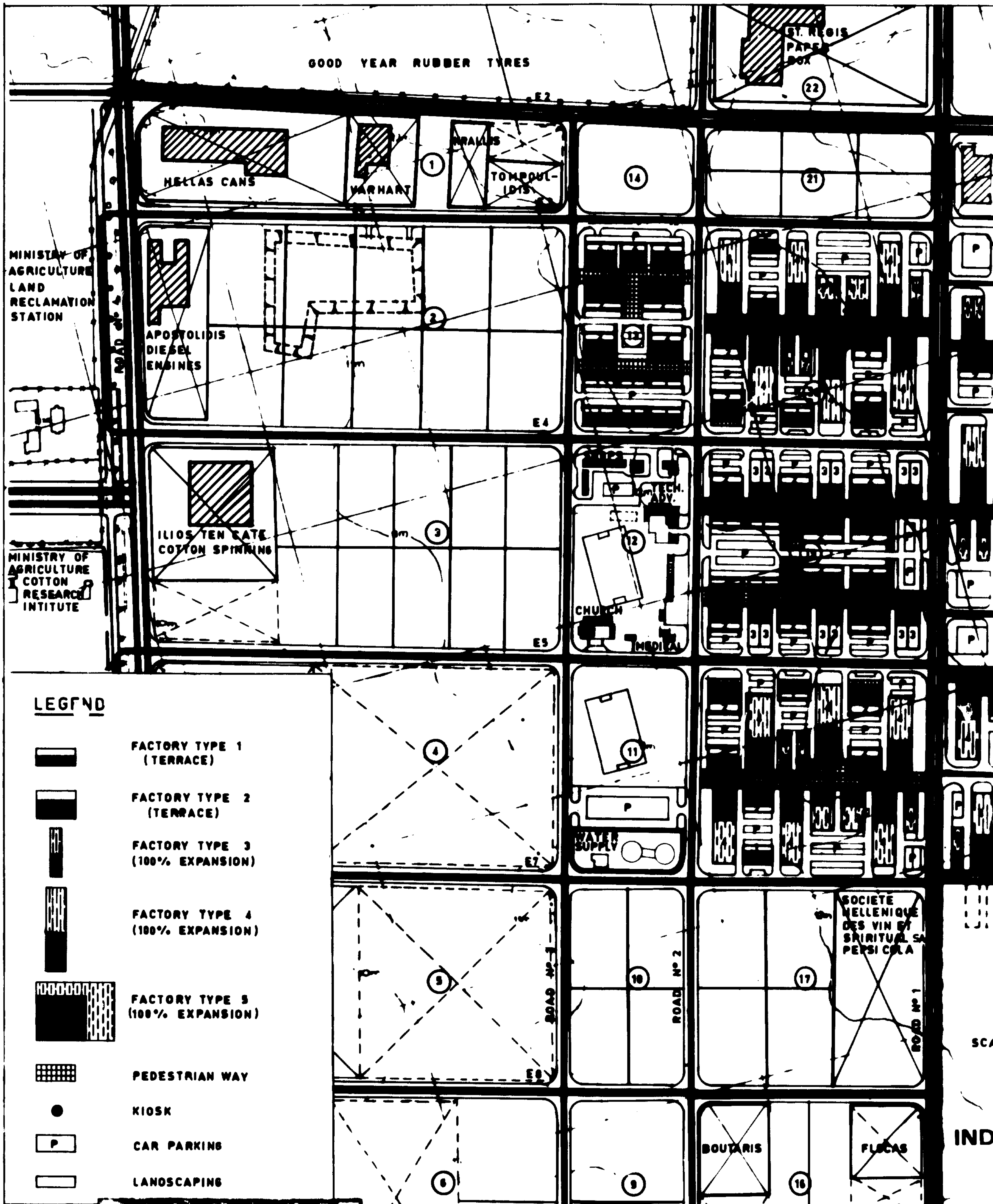


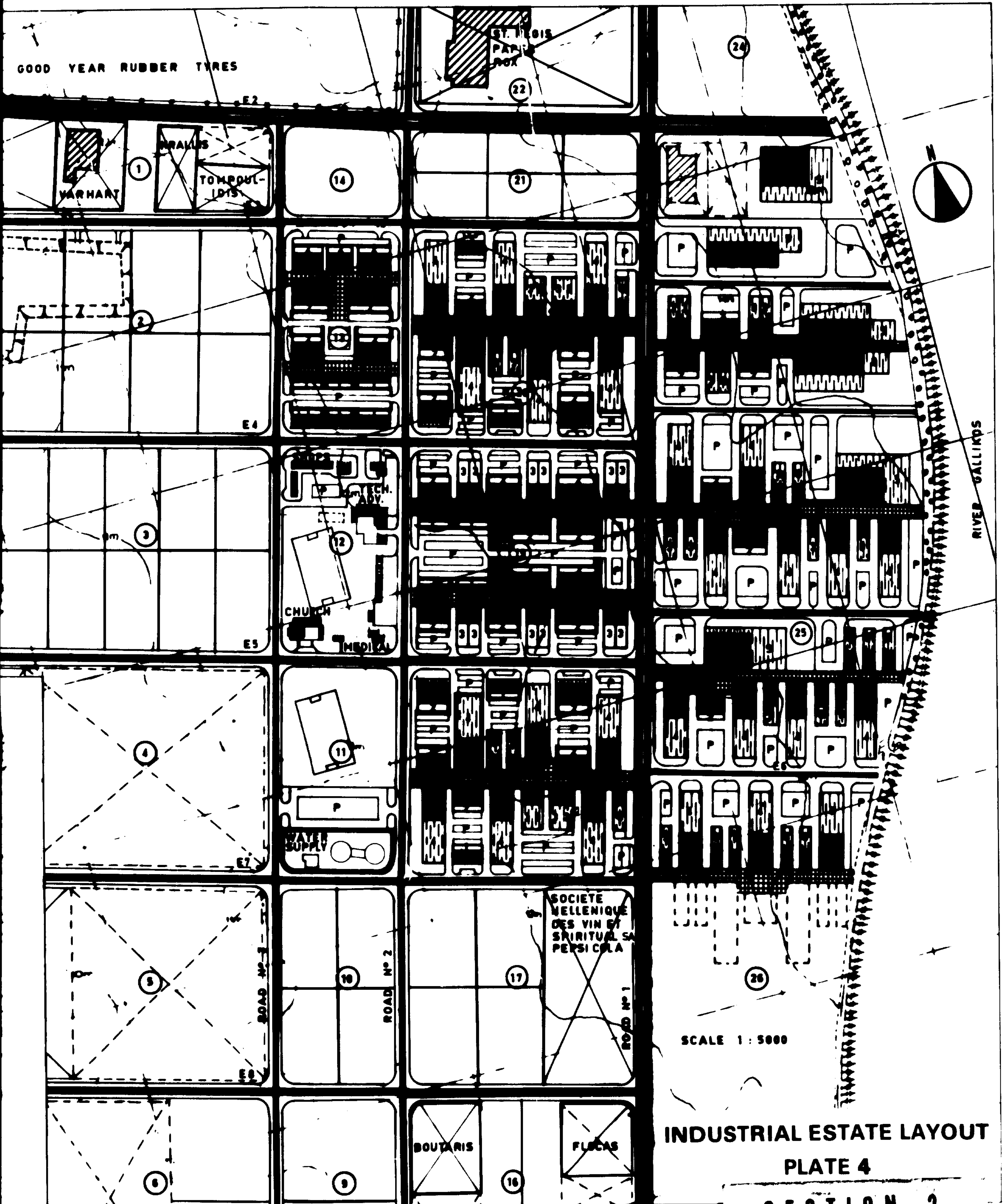
NATO BASE
MILITARY BARRACKS
GOOD YEAR RUBBER TY
MINISTRY OF AGRICULTURE LAND RECLAMATION STATION
MINISTRY OF AGRICULTURE COTTON RESEARCH INSTITUTE
SINDOS STATION
LEGEND
LAND RECOMMENDED OR REQUIRED TO BE EXPROPRIATED
LAND WITHIN BOUNDARY OF LAND RECLAMATION STATION
LAND SUGGESTED TO BE EXCHANGED FOR IT



LAND EXPROPRIATION

PLATE 3

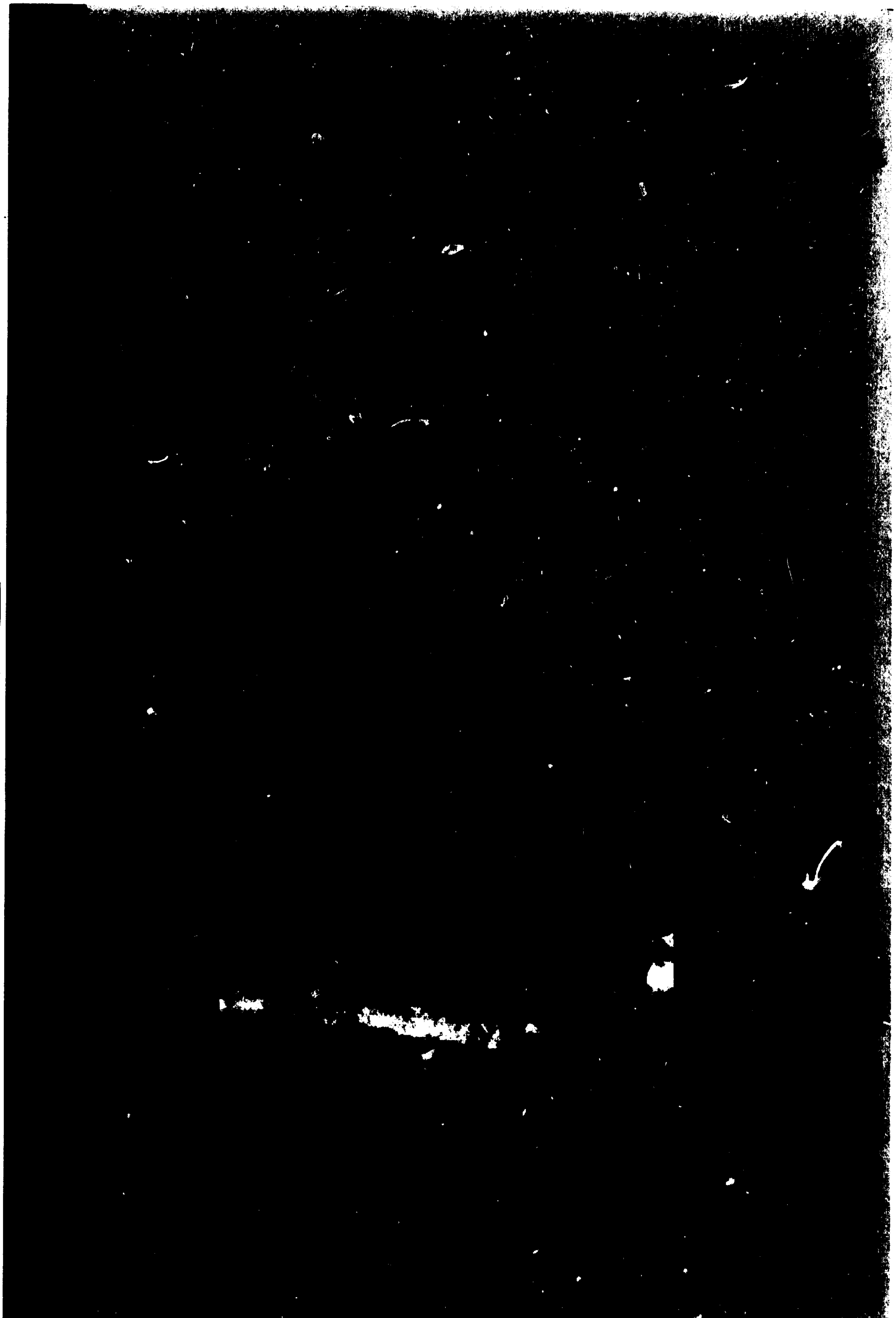

GOOD YEAR RUBBER TYRES
ST. REGIS PAPER BOX
HELLAS CANS
VARHART
TOMPOULIDIS
MINISTRY OF AGRICULTURE LAND RECLAMATION STATION
APOSTOLIDIS DIESEL ENGINES
ILIOS TEN CATE COTTON SPINNING
MINISTRY OF AGRICULTURE COTTON RESEARCH INTITUTE
TECH. ADV.
CHURCH
MEDICAL
WATER SUPPLY
SOCIETE HELLENIQUE DES VIN ET SPIRITUAL SA PEPSI COLA
ROAD Nº 1
ROAD Nº 2
BOUTARIS
FLOCAS
LEGEND
FACTORY TYPE 1 (TERRACE)
FACTORY TYPE 2 (TERRACE)
FACTORY TYPE 3 (100% EXPANSION)
FACTORY TYPE 4 (100% EXPANSION)
FACTORY TYPE 5 (100% EXPANSION)
PEDESTRIAN WAY
KIOSK
CAR PARKING
LANDSCAPING



INDUSTRIAL ESTATE LAYOUT

PLATE 4

1 SECTION 2



FS 420 B

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANISATION

S/F INDUSTRIAL AREA OF THESSALONIKI

C/F GREECE

VOLUME 2

p. 124

containing

CHAPTER II - SERVICES CENTRE
CHAPTER III - INDUSTRIAL ESTATE

for

HELLENIC INDUSTRIAL DEVELOPMENT BANK

MAY 1972

Gibb-Ewbank Industrial Consultants,
24 Queen Anne's Gate,
London S.W.1

HELLENIC INDUSTRIAL DEVELOPMENT BANK

INDUSTRIAL AREA OF THESSALONIKI

FINAL REPORT

CHAPTER II - SERVICES CENTRE

INDEX

DRAWINGS

This Report is accompanied by a separate folder of drawings containing the following:

FIGURES

APPENDICES

HELLENIC INDUSTRIAL DEVELOPMENT BANK

INDUSTRIAL AREA OF THESSALONIKI

FINAL REPORT

CHAPTER II SERVICES CENTRE

1. INTRODUCTION

The terms of reference for Chapter II - Services Centre of the Industrial Area of Thessaloniki, are outlined in the Contract between United Nations Industrial Development Organisation (UNIDO) and Gibb-Ewbank Industrial Consultants dated August 1971, and revised by Amendment No. 1 dated November 1971.

The work to be carried out under those terms of reference is briefly:

To prepare a layout plan of the Services Centre and designs of buildings.

To prepare Specifications of Machinery and Equipment to be installed in a Technical Advisory and Training Centre

The complete terms of reference are given in Appendix No. 1 of Volume I of this Report.

All aspects of the Services Centre have been freely considered even where these may have been in conflict with the original outline intention.

Many discussions were held with the HIDB, and the users of the area to examine and identify their needs.

Further meetings and discussions were held with UNIDO and HIDB in the course of the work on the project, and after the presentation of a Report on the Planning requirements for the Services Centre in July 1971 to prevent any divergence of views. Agreement was then reached to proceed with the preparation of a Draft Final Report and the planning of the Services Centre on the lines indicated above. The Draft Final Report was presented and discussed in February, 1972. The Final Report incorporates the comments made at these discussions.

As a result of all these discussions it is confidently believed that the proposals of this Report are in accordance with the needs of the Industrial Area, both at the outset and as the project develops in accordance with the Master Plan. They are also based on the Consultants' specialised knowledge of the many facilities required.

2. THE FUNCTIONS OF THE SERVICES CENTRE AND THE SERVICES SUB-CENTRES

2.1 Services Centre

The functions of the Services Centre were defined in the Preliminary Report of July, 1971, Appendix No. 4. Discussion of this Report resulted in the establishment and definition of the Services Sub-Centres, and in a shift in emphasis towards commercial development in the Centre. Apart from these, the definitions of the preliminary report still stand:

2.1.1 The Services Centre must provide a base for the management and administration of the Industrial Area, from which the development of the Area will be organised and supervised.

2.1.2 The Services Centre must provide a base for the Public Service Authorities. This is a logical conclusion, since the Services Centre is the most suitable position to establish functions which administer to the needs of the users of the Industrial Area and which should be centrally located, but in a place set apart from those users.

2.1.3 The Centre must provide a meeting point for the users of the Industrial Area and the Administrative Authority. Users in this sense embrace owners, managers and workers in already established factories and in factories yet to be set up.

2.1.4 The Centre must provide a base for the HIDB Services and for Commercial Services to the users of the Industrial Area. The HIDB Services will consist of advice on Commercial, Marketing, Transportation and Financing problems, plus the Free Customs Zone Administration and the Computer Service. The Commerical Services may include an Import-Export Agency, a Travel Agency and a Transport Agency, and in addition the offices of the Customs Administration and the National Warehousing Company. Some of the HIDB services will be provided free of charge and some will be hired by users. The Commercial organisations will charge the users for their services and will pay HIDB for the space they occupy.

2.1.5 The Centre must provide a base for the maintenance of the Industrial Area.

2.1.6 The Centre will not be a recreational area. This conclusion has been reached after discussions with present and potential users and after examination of their needs. The Services Centre as defined above will be an administrative complex and there will be a conflict of interest if recreational functions are developed in the same area.

2.1.7 The Centre will not be a shopping area in the initial stages of development but shops may be established as the commercial activities develop. Some small concessionaire shops have been provided to administer to the needs of the working population of the Centre itself.

2.1.8 The Technical Advisory and Training Centre is intended to improve the technical effectiveness and standards of the Industrial Area users, especially the users of the Industrial Estate.

The Centre will not be required to provide facilities for training factory operatives in basic skills, nor will management training be required.

2.2 Services Sub-Centres

There are certain functions that will be undertaken by the HIDB and by outside authorities which will be better established in locations other than the Services Centre. Such functions can be classified as those which by their nature, scope and size require more than one establishment from which to operate. The only exception to this classification will be the Technical Training and Advisory Centre, and the reasons for establishing it on the Services Sub-Centre will be found in Section 6.9.

The first Services Sub-Centre will be established in Area 1 and this is the only one described in detail within this chapter.

3. FACILITIES PROVIDED BY THE SERVICES CENTRE AND THE SERVICES SUB-CENTRES

The establishment of the following facilities (subject to certain provisos, in the case of the Computer Centre) is recommended in order to promote the objectives of the project;

Centre Building, with an Exhibition Hall
Computer Centre
Restaurant for the use of managerial and office staff of the Centre, business visitors, etc.
Police Station
Fire Station
Telephone Exchange
Post Office
Industrial Health Centre
Maintenance Depot, to be called the Works Services Depot.

Space should be allocated for the establishment of commercial buildings. Parking and taxi stands and areas for tree planting and green space should be included.

The principle of establishing separate Services Sub-Centres has been approved. It is recommended that Sub-Centre No. 1 on Area 1 shall have the following facilities:

A Technical Advisory and Training Centre
A Satellite Medical Centre
A Satellite Works Services Depot
A Cafeteria

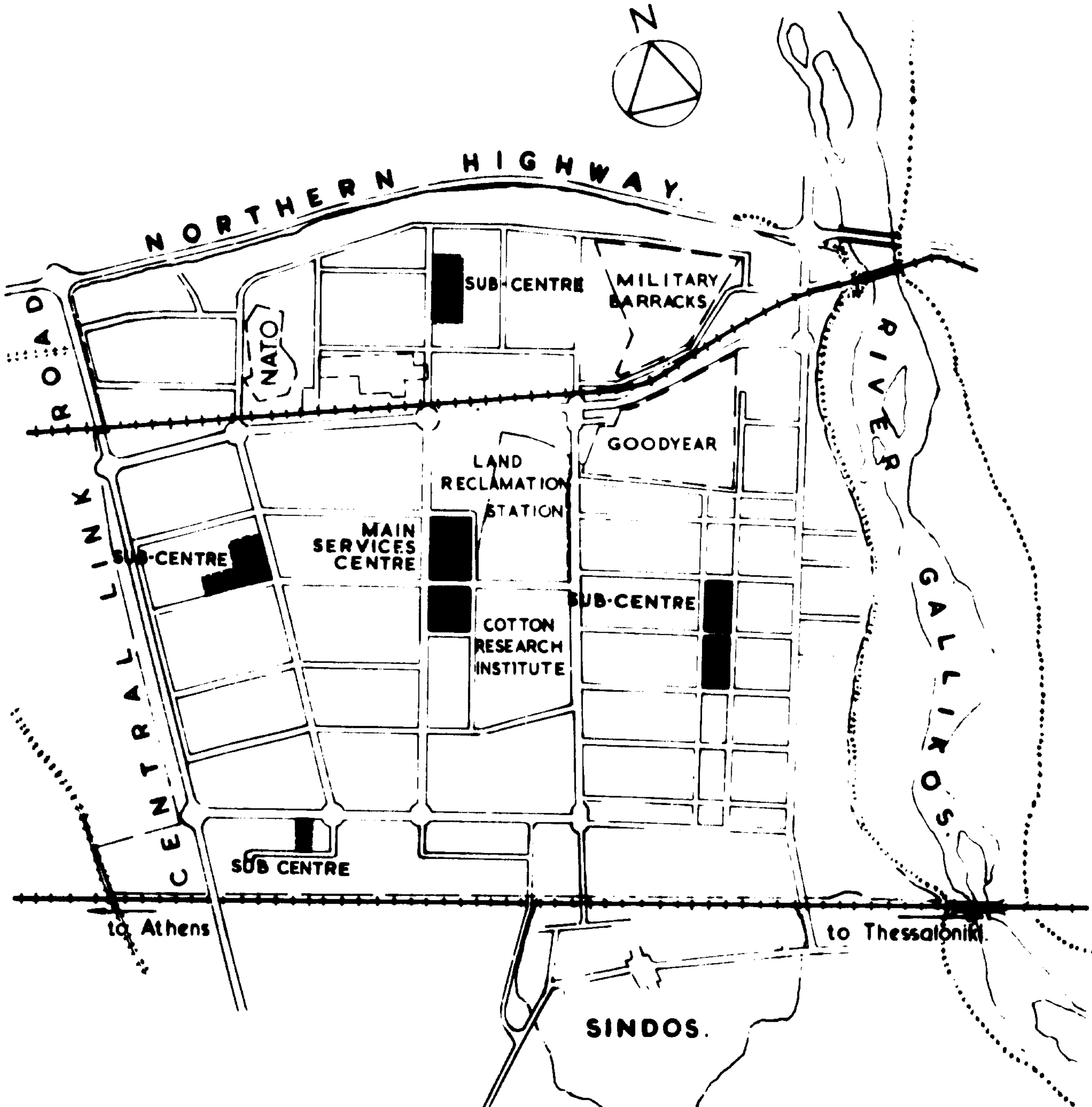
Provision has been made in the plan for bus parking and a Recreational Area and Football Field. Space has been allocated for the following:

Banks and Offices
Petrol Station/s
A Creche
A Chapel

4. LOCATION OF THE SERVICES CENTRE AND THE SERVICES SUB-CENTRES

The location of the Services Centre is shown on Figure No. 1 overleaf, to the west of the existing Cotton Research Institute and the Land Reclamation Station, and virtually in the centre of the whole Industrial Area. The Services Centre will occupy an area of approximately 500 metres by 200 metres, with the longer dimension in the north-south direction.

The Services Sub-Centre will be established in Area 1 on Plot 12 and part of Plot 11. The proposed location is central to Area 1 with the established network of roads providing access to all parts of the Area, and is situated next to the Industrial Estate. Based upon experience gained in the developmment of Area 1, similar Services Sub-Centres will be established on Area 2 at later stages of the project.



LOCATION OF SERVICES CENTRES

FIGURE 1

5. LAYOUT OF THE SERVICES CENTRE AND THE SERVICES SUB-CENTRE (DRAWING No. 2/1)

5.1 The Services Centre

The Master Plan proposes that the main roads in Area 2 should be aligned north-south as they are in Area 1, and that industrial development in Area 2 will proceed from the south end of the Area northwards. There will, therefore, be a stage at which industrial development approaches the Services Centre from the south while the Area to the north and west of the Services Centre will be undeveloped. These factors have influenced the alignment of buildings in the Centre and their layout as shown on Figure No. 2. Firstly, the area reserved for the Services Centre will have its longer axis in the north-south direction, alongside the Cotton and Land Reclamation Stations, which are expected to remain, and this will reduce the disruption to Area 2 development. Secondly, the main group of buildings has been placed to the north side of the east-west through road connecting the Services Centre to Area 1. It is fitting that the administrative buildings should face on to the developing area rather than away from it.

Centre Group

The Centre Building is the heart of the administration of the Area and will naturally form the focal point. The other buildings will be grouped about the Centre Building according to their degree of association with it, and their own particular requirements in terms of access to main roads or to the public.

The Computer Centre, Restaurant and combined Post Office and Telephone Exchange will be immediately adjacent to the Centre Building; the first two of these buildings have a definite association with it, as the Computer Centre will be an offshoot service of the central administration, and the restaurant will draw its customers from the staff of the Centre Building plus visitors to the Centre. The Post Office and Telephone Exchange Building will be included in the central grouping as it will naturally form part of the centralised communications network linking all aspects of the Industrial Area.

It is recommended in Section 6.2 that a study be undertaken in connection with the Computer Centre. The study may conclude that there will be no need for a Computer Centre immediately or in the future. The architectural balance of the central group can be maintained without the Computer Centre by the balancing effect of the Restaurant and the Post Office and Telephone Exchange.

The Lecture Hall will also be associated with the Central Administration in a more personal sense, and space has been allocated for this building in the same central grouping, allowing for its construction at a later stage. As an alternative, the Computer Centre site should be considered if the further studies indicate that the Computer Centre will not be required.

These buildings will be positioned around a central green area which will form the main approach to the Centre Building, and will provide an appropriate setting for its important role.

Police and Health Group

The Police and Health facilities will have an association with the central administration of an advisory and statistical nature. They will need good access to the main roads within the Industrial Area and to the City of Thessaloniki and will be located at the north end of the Services Centre area.

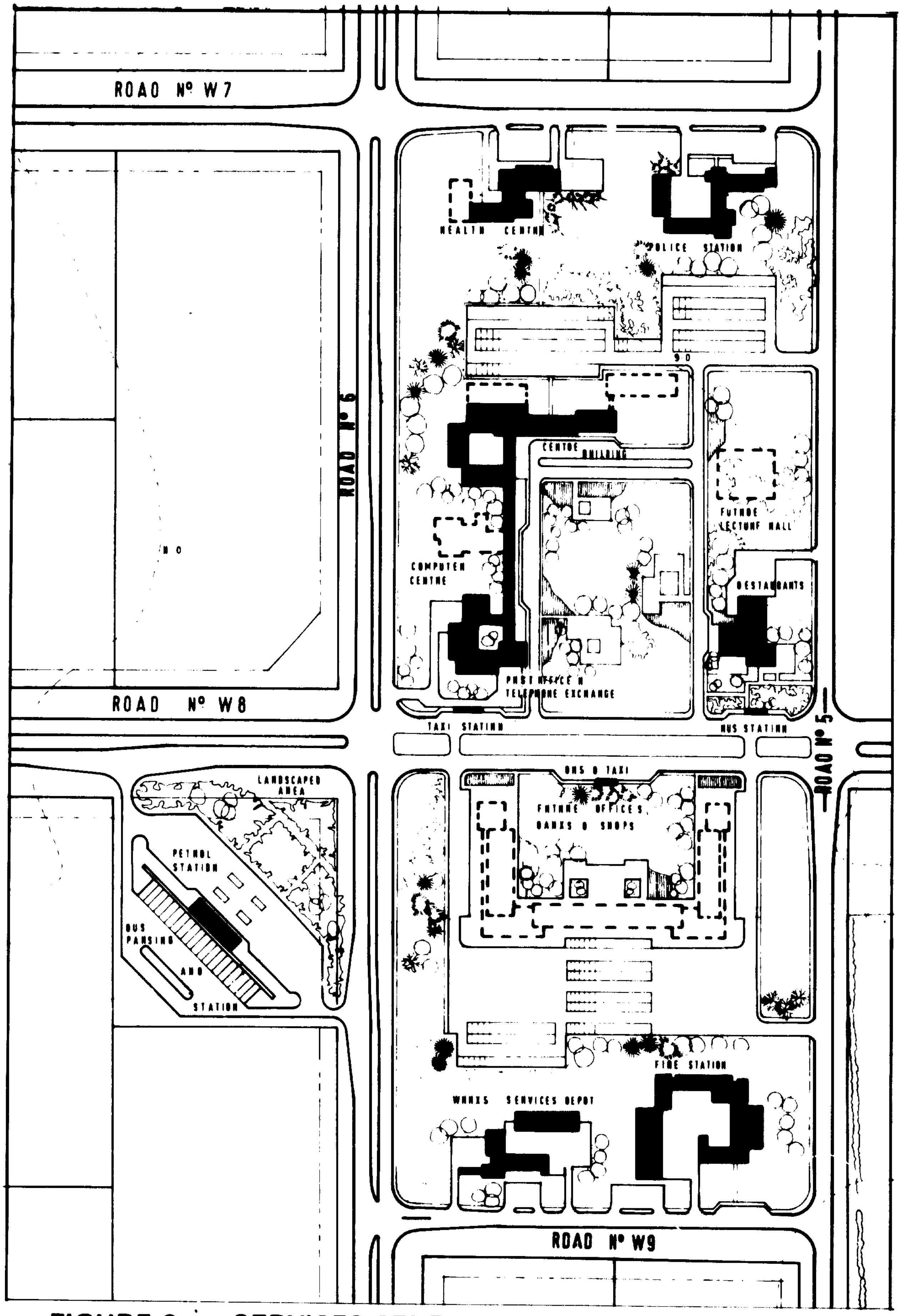


FIGURE 2 SERVICES CENTRE - SITE PLAN

The area between the Centre Building and the Police Station and Health Centre is allocated for future expansion to the buildings, car parking and landscaping. The landscaped areas will be decreased as they are taken over by the expansion of the buildings and the car parks.

Fire Station and Works Services Group

The Fire Station and the Works Services Depot will be situated at the south end of the Services Centre facing on to the south lateral road, with good access to all parts of the Industrial Area. These facilities will be established well away from the Centre Building complex because the nature of the functions carried out there will conflict with the type of work carried out at the central complex. It is however appropriate that both these facilities should be situated at the Services Centre and the configuration adopted combined with tree planting to the north of the Fire Station and Works Services Depot to isolate them from the central group will provide the best solution to their location.

Consideration has been given to the possibility of combining different functions within one building in order to achieve economy of construction. This principle has only been adopted in the case of the combined Post Office and Telephone Exchange, where such an approach is consistent with the administrative policies of the service authorities. In other cases the problems of different activities and requirements, hours of work, nature of work, rate of development and expansion of buildings, etc., have rendered the proposal impracticable and the buildings have generally been designed to provide the most effective setting for the various individual functions.

Commercial Group

The area immediately south of the main through road will be allocated for the development of the banks, offices and commercial buildings, and possibly also shops. These buildings will be constructed and operated independently of HIDB except in so far as they will be subject to the regulations governing all users of the Industrial Area. The space allocated will provide for development and operation without interference with the Services Centre functions. It is not anticipated that they will be built until the Industrial Area has become well established, probably some time after the full exploitation of the first part of Area 2. In the meantime it is proposed to create a green area with some tree planting.

5.2 The Services Sub-Centre (see Drawing No. 2/1)

The Sub-Centre has been planned to separate the commercial and service facilities (Shops, Banks and Cafeteria, Technical Advisory and Training Centre and Satellite Works Services Depot) from the welfare facilities (Satellite Medical Centre, Creche and Chapel). The separation will be maintained by the playing field which will be established in the centre of the area. The link between the two divided parts of the area will be provided by the bus parking area. This will form a natural meeting point for the users of all the facilities of the Services Sub-Centre and the Industrial Area.

Services to industrialists and industrial workers will be located at the eastern side of the Area, towards the Industrial Estate which make the most use of them.

Space is allocated in Plot No. 11 for expansion of the Services Sub-Centre and the playing field will be re-located in this plot so that the facilities in Plot No. 12 can expand if required into the space now occupied by the playing field. The layout is also shown on Figure No. 3 overleaf

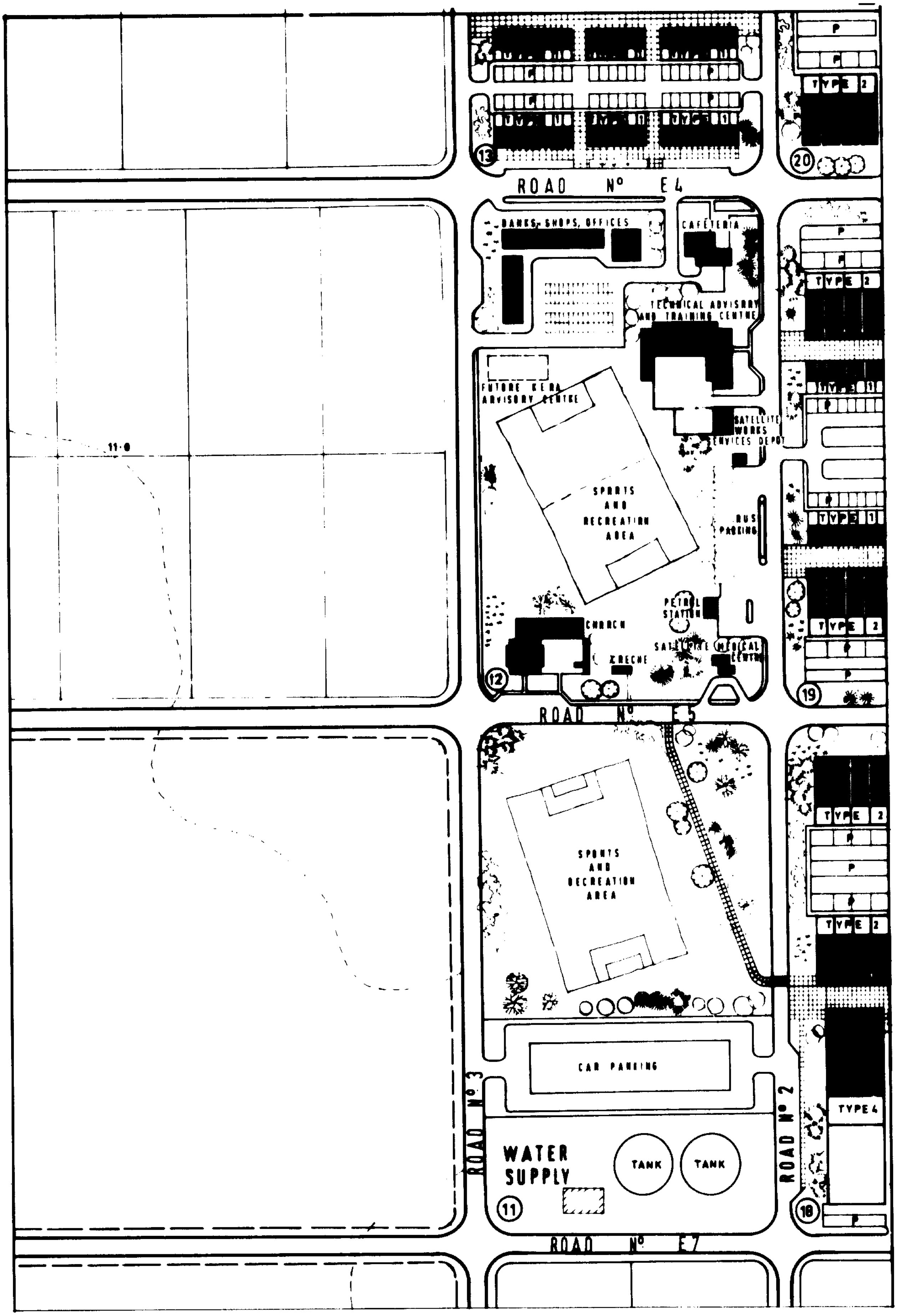


FIGURE 3 SERVICES SUB-CENTRE - SITE PLAN

6. DESIGN AND LAYOUT OF BUILDINGS THE CENTRE BUILDING

6.1 The Centre Building - (Drawings Nos. 2/2, 3, 4)

6.1.1 Planning Considerations

The planning requirements for the design of the Centre Building are based on recommendations in the Master Plan, Section 29 for the staff structure and its rate of build-up.

This staff, together with details of the rooms required for them, and for the agencies and shops associated with the Centre Building, are given in Appendix 6.1.A at the end of this section.

6.1.2 Layout

(a) External Layout

The Centre Building will be approached by the central east-west road (No. W/8) joining Area 1 and Area 2. A one-way access road on the north side of this main road will carry traffic to and from the Centre Building. The access road will have a lay-by in front of the Centre Building for cars to put down or pick up passengers. This lay-by will not be used as a car park. The car park is at the rear of the building, with vehicle access to the perimeter road and a footpath to the Centre Building.

The Central area between the eastern and western roads will be landscaped with grass, trees and ornamental flower beds, and paved areas with benches and seats.

(b) Internal Layout

Two main entrances will be provided; the eastern entrance will be used by staff only and the western one by both staff and public.

The building itself has been planned outwards in two directions from the main public entrances, so that the administrative offices will extend from the entrance to the right and the agencies and shops will be located to the left. The entrance forms the link between these two functions, and will contain a reception desk, public toilets and janitors room, a public reception lobby and exhibition hall. The exhibition hall will display a selection of the products manufactured on the Industrial Area, and will also be used to mount promotional displays aimed at attracting Industrialists to the Area. The exhibition hall adjoins an enclosed courtyard and will be used as an extension to the hall for staging outdoor exhibitions.

The Administrative offices will be reached by a flight of stairs from the public entrance lobby. The offices have been located on either side of a central corridor, at the eastern end of which are the management offices including a conference room and reference library. The eastern entrance and staircase will lead directly to this group of offices, which will be a self-contained management unit.

The layout of the other offices along the corridor has been decided by the degree of identification each function has with the management. The final layout for these offices will depend upon how the staff structure evolves in practice. Removable partitioning is recommended in order that the size and layout of the offices can be changed as required without difficulty.

The agencies and shops will be grouped around a central open court-yard with a pillared arcade or "Stoa" linking them and providing covered access. This arcade will also lead to the Computer Centre and the Post Office.

The initial expansion of the Centre Building will be by taking over the shops and agencies in the western wing for use as offices; later a new building of a complementary type will be constructed to the east of the existing building. Space is allocated in the layout for this expansion.

The shops and commercial agencies displaced from the Centre Building will move into the commercial development proposed on the south side of the through road. The open arcade will then be enclosed with a glazed wall.

6.1.3 Air Conditioning Heating and Ventilating

The main office area, the management offices and the conference room, and the public reception areas and the exhibition hall will be air conditioned to provide cooling in summer and heating in winter. The agencies and shops will not be air conditioned; they will be heated in winter with hot water convectors.

For office areas the system will consist of vertical window-type fan-coil units. For public areas the system will consist of a conventional all-air ducted system. Ducting and pipework will be concealed.

The cooling load is 70 tons.

6.1.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.1.B at the end of this section.

APPENDIX 6.1.A

SUMMARY OF PLANNING REQUIREMENTS FOR THE CENTRE BUILDING

STAFF

General Manager
Company Secretary
Accountant
Commercial Manager
Head of Technical Division
Head of Maintenance Division
Head of Transport Division
Plus appropriate Assistants, private secretaries, typists, clerks and others
See attached proposed structure chart

STAFF EXPANSION

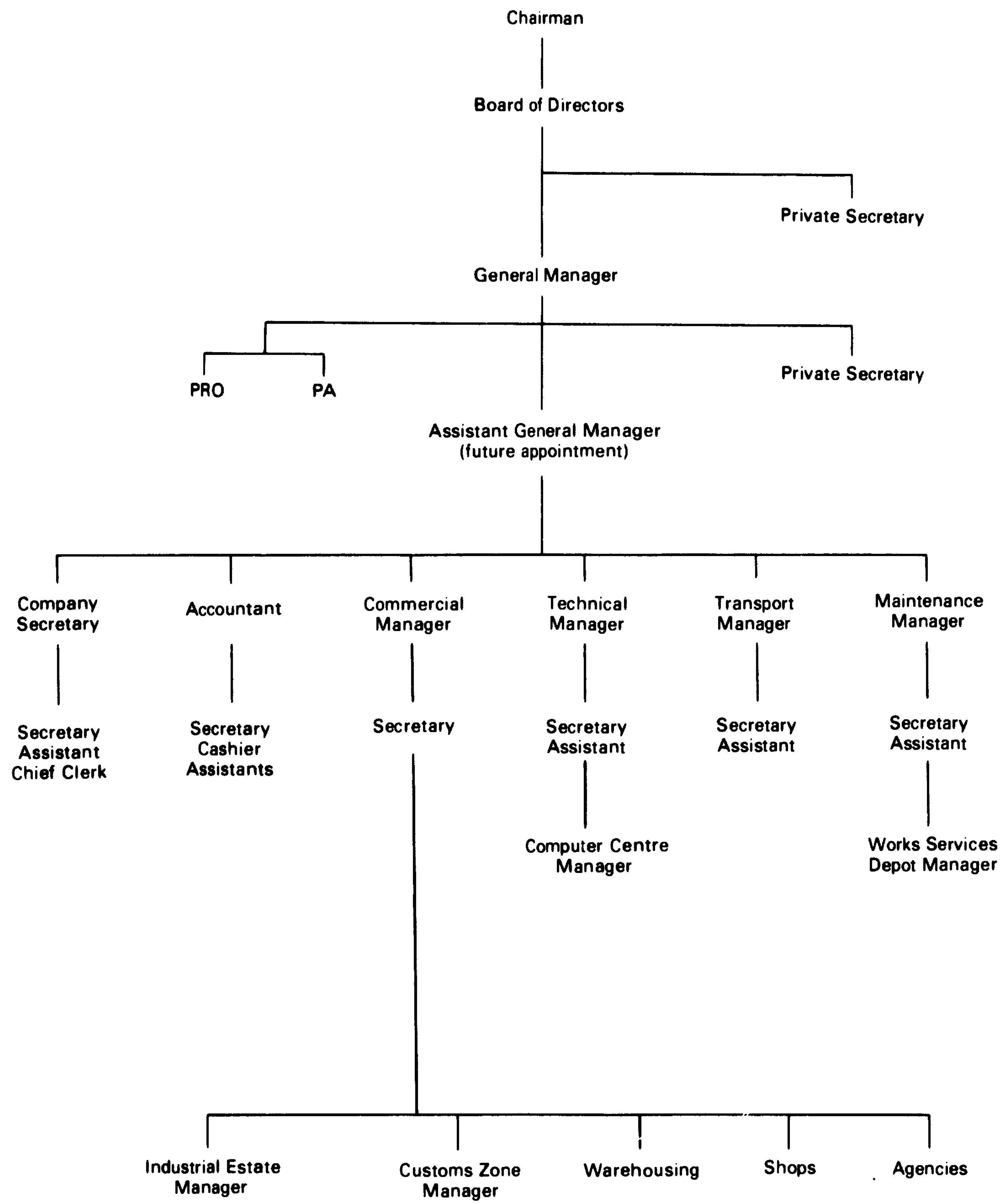
See attached proposed structure chart

FACILITIES

Offices for above
Public Reception Area
Exhibition Hall
Board Room to accommodate 25 people
Reference Library
Toilets
Plant Room
4 Agencies with separate entrance to Main Building
4 Lock-up shops with separate entrance to Main Building
Offices to be provided with removable partition walling to allow alterations to configuration

VEHICLES

Access for official and visitors cars
Car parking facilities



PROPOSED MANAGEMENT STRUCTURE

APPENDIX 6.1.B

CENTRE BUILDING

SCHEDULE OF FINISHES

EXTERIOR	
Paved Areas	500 x 500 p.c. concrete slabs
INTERIOR	
Shops and Agencies	
Floors	Unglazed ceramic tiles
Skirtings	Ditto
Walls	Plastered and painted
Ceiling	Ditto
Doors	Timber tongued and grooved Polyurethane finished
Windows	Aluminium framed. Clear glass 6mm and 10mm thick
EXHIBITION HALL AND LOBBY	
Floors	Marble or unglazed ceramic tiles
Skirtings	Ditto
Walls	Plastered and painted
Ceiling	Suspended Aluminium Strip Ceilings ('Luxaclair' or 'Luxalon' or plastered and painted
Doors	Aluminium framed, glazed. Timber flush veneered or painted
Windows	Full height as shown Aluminium frames, clear glass 10 mm thick protected with steel security grilles and venetian blinds. Other windows Aluminium framed clear glass 6 mm thick
PLANT ROOM	
Floor	Screed or granolithic finish
Walls	Plastered and painted
Ceiling	Ditto
Doors	Steel
Windows	Fresh air louvres only
OFFICES AND CORRIDORS	
Floors	Vinyl Asbestos tiles
Walls	Plastered and painted
Partitions	Lightweight demountable system partitioning. Aluminium frames with double skin sandwich or glazed infill panels
Ceilings	Plastered and painted
Doors	To suit partitioning system
Windows	Aluminium frames side pivoted. Clear glass 6 mm thick

TOILETS (PUBLIC AND OFFICE)

Floors	Marble
Walls	Marble
Ceilings	Plastered and painted
Doors	Timber. Flush, painted both sides
Windows	Aluminium frames, opaque 4 mm thick glass 'Standard Ideal' range. Marble tops to handbasins

(CARETAKER)

Floors	Unglazed ceramic tiles
Walls	White glazed ceramic tiles
Ceiling	Plastered and painted
Doors	Timber flush painted both sides or painted inside and veneered outside
Window	Aluminium Frames opaque glass 4mm thick
Fittings	White Ideal Standard

STAIR CASES

Treads and Risers	Marble as for ground floor
Balustrades	Tubular steel

COMPUTER CENTRE

6.2 The Computer Centre (Drawing No. 2/5)

6.2.1 Planning Considerations

The initial costs and running expenses of a Computer Centre are high, the equipment is sophisticated and the techniques required fully to utilise the advantages of such an installation are very specialised, and it is beyond the terms of reference of this report to advise for or against the establishment of a Centre. A further study should be made by a Computer Consultant to assist HIDB in making a decision. This Report outlines in general terms the uses to which a computer can be put and plans the construction of a Computer Centre capable of taking medium sized hardware, with a limited amount of expansion.

Apart from some small calculating capacity at the University of Thessaloniki there is at present no computer available for wide scale use in the Thessaloniki Area. The University intends to install a larger machine in the near future, but Universities, according to experience elsewhere, tend to use their computers intensively and this may preclude hiring of time by outside users.

During development stages of the Industrial Area a computer could co-ordinate planning and construction, and would be used to predict future capital requirements and to administer current capital financing. These development functions will run concurrently with activities associated with established industries and an established administration. Factories could be linked to the central computer via hired terminals. The computer would provide inventory, accounting, production and cost control and payroll services for factories. The administration would require some of these services, but the main advantages would be from their use by the Free Customs Zone, Rail Freight Depot, National Warehousing Company and Industrial Estate organisations.

The layout envisages a central computer in the Services Centre linked by telephone line to terminals in factories in the Customs Free Zone and the Container and Freight Depots. The Health Centre would be a future user as its records become more extensive.

6.2.2 Layout

There will be three branches of activity undertaken at the Centre, the managerial, programming and computer activities. The layout of the Centre has been planned with these three branches in mind. A summary of the planning requirements which have formed the basis for design will be found in Appendix 6.2.A.

The manager will be opposite the main entrance, removed from the noise and activity of the inner area by the set of double doors which will also serve to prevent unauthorised access to the computer area. The managerial functions will cover administration of the staff, finances, etc., of the Centre and meeting new clients, dealing with existing clients and maintaining liaison with the central administration of the Area.

The data managers and the programmers will be the link between the client and the computer itself. They will have access to the computer to carry out trial runs on new programmes and they will need well lit, well ventilated offices, soundproofed if possible, to discuss requirements with clients and to prepare or modify programmes.

The Computer Branch has been laid out to provide the most efficient flow of data and equipment to and from the Computer, with the Punch Card Room leading to the Data Preparation Room which in turn will lead to the Computer Room. From the Computer Room the print-out will go to the mailing room for checking and despatch to clients. There will be a great deal of traffic between the Data Preparation Room, Computer Room and Mailing Room and double swing doors will be provided to facilitate this. Glass partitions will be provided in the walls common to these three rooms to allow constant visual supervision of the equipment and of any particular operation.

The Data Preparation Room will contain the card punching and checking machines and will be an area of heat and noise, such that there should be statutory limitations on the time an operator may work in this room without a rest. The Staff Rest Room will be placed opposite the entrance to this Room across the corridor from it.

The Engineer's Office will be placed next to the Computer Room, with immediate access to the equipment in case of breakdowns or stoppage.

6.2.3 Air Conditioning

The Computer Centre will require a dust-free atmosphere without excessive fluctuations in the temperature or the humidity in the Computer Rooms and will require air conditioning throughout. The estimated load on the system will be 25 refrigerated tons in the Computer Area and 15 refrigerated tons in the remaining areas.

6.2.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.2.B at the end of this section.

APPENDIX 6.2.A

SUMMARY OF PLANNING REQUIREMENTS FOR THE COMPUTER CENTRE

STAFF

General Manager
Secretary to General Manager
Data Manager
4 Programmers
Engineer
4 or 5 Punch Card Operators, generally female, 1 of whom will be a Supervisor
Mailing Clerk
Operator

ACCOMMODATION

Offices for General Manager, Secretary, Data Manager and Programmers (Maximum 2 Programmers in an office)
Office for Engineer, convenient to computer
Punch Card Room
Preparation Room
Computer Room
Mailing Room
Stationery Store
Staff Rest Room with automatic vending machines for hot and cold drinks
Toilets
Plant Room

LAYOUT

See sketch overleaf for diagrammatic representation of operation of the Centre and the Computer Room.

Typical equipment sizes (Approx.) associated with an ICL 1900 or equivalent computer:

Card Punch (with keyboard)	1.5m x 1.0m x 0.75m
Card Control	2.0m x 1.0m x 1.2m
Disc Storage Cabinet	1.75m x 0.75m x 2.0m
Tape Storage Cabinet	1.75m x 0.75m x 1.3m
Card Reader	1.5m x 1.5m x 2.3m
Disc Unit	1.5m x 1.5m x 1.3m
Mag. Tape Unit	1.5m x 1.5m x 2.3m
Control Unit	1.5m x 1.5m x 2.3m
Memory Unit	1.5m x 1.5m x 2.3m
Printer	1.5m x 1.5m x 2.5m
Consoles	1.0m x 1.0m x 0.75m

EXPANSION

The capacity of the Centre will be increased by additional disc or magnetic tape units. This will be associated with additional card punching capacity and additional storage for discs or magnetic tapes. Generally computers can process information stored on both discs and magnetic tapes. The former are the more expensive. Beyond a certain point it becomes uneconomical to invest in more discs and magnetic tapes are used instead.

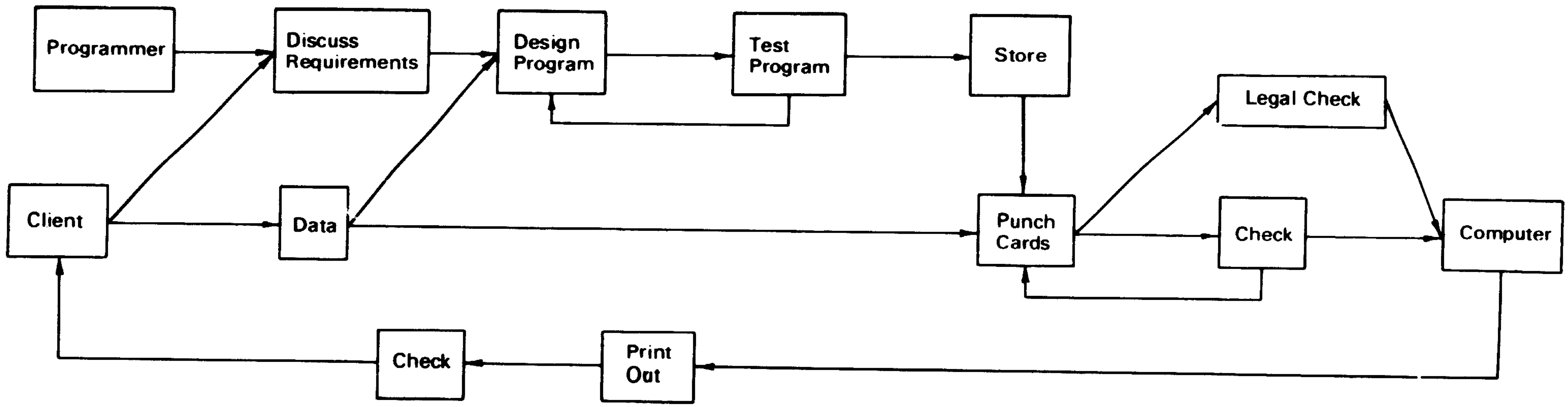
SPECIAL REQUIREMENTS

Data Preparation Room, Computer Room and Mailing Room require air-conditioned dust free atmosphere, controlled temperature and humidity. The Computer Room requires false floor for cables, etc. Windows for the Computer Room should be double glazed and must *never* be opened.

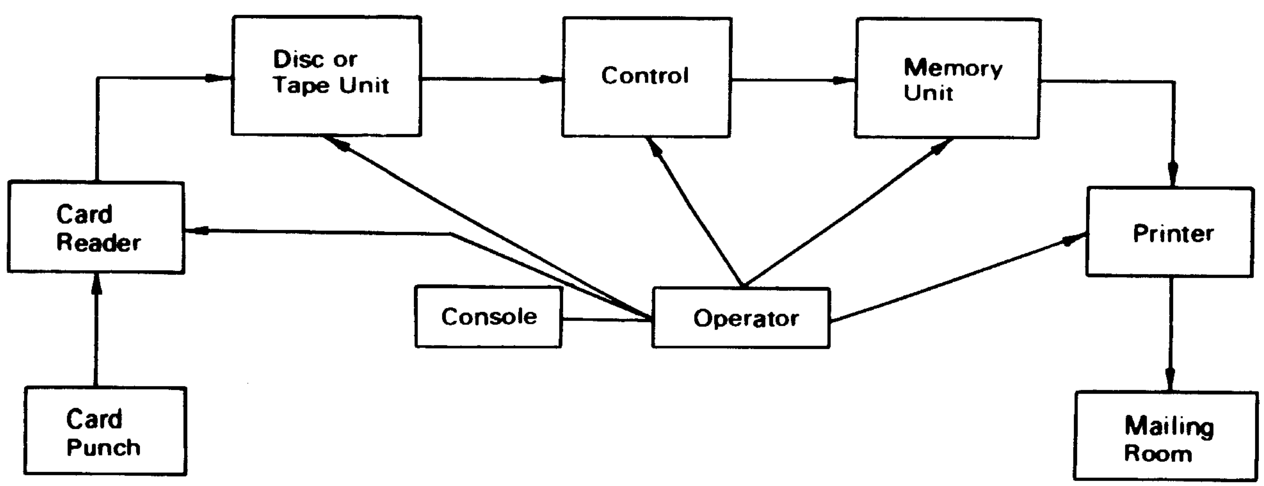
The card punching room requires controlled temperature and humidity and a carpeted floor and an acoustic ceiling. Very noisy and hot atmosphere generally.

REFERENCES

Computer Techniques International, Athens
IBM, Athens
Ostlands - Data, Hamar, Norway



FLOW CHART - OPERATIONS



LAYOUT DIAGRAM - COMPUTER ROOM

APPENDIX 6.2.B
COMPUTER CENTRE
SCHEDULE OF FINISHES

OFFICES STORE AND REST ROOM

Floors	Vinyl Asbestos tiles
Walls	Plastered and painted
Ceilings	Plastered and painted, or suspended ceiling of 600 x 600 plain asbestos tiles
Doors	Timber. Tongued and grooved at entrance. Flush painted or veneered interior. To Plant Room steel as specified.
Windows	Aluminium frames. Clear glass 6 mm thick M.S. grilles to Plant Room

TOILETS

Floors	Unglazed ceramic tiles
Walls	Coloured glazed ceramic tiles Plaster and paint in Cleaner's Room
Ceilings	Plastered and painted
Doors	Timber flush painted
Windows	Aluminium framed. Opaque glass 4 mm thick
Fittings	Ideal Standard good quality

COMPUTER ROOM

Floor	Vinyl Tiles bonded to plywood slabs supported on adjacent tubular steel pedestals. Proprietary system as advised
Walls	As advised

THE RESTAURANT

6.3 The Restaurant (Drawing No. 2/6)

6.3.1 Planning Considerations

Users of the restaurant will fall into two categories; the majority who require a quick and simple meal in their lunch hour, and the minority who wish to take longer over their meals and who will require an unhurried atmosphere in which to do so.

The former will be made up of workers from the Services Centre or the Industrial Area, and will generally be employees and junior staff for whom a self-service canteen will be provided. The extent of the facility provided by this type of activity will be limited by the number of meals that can be served in an appropriate length of time spanning the usual lunch-break interval.

The remainder will be factory managers and Area Administrative staff, business visitors and guests who will require a dining room designed to give a favourable impression to visitors and prospective users of the Industrial Area, and so more luxurious standards of facilities, furniture and decoration have been planned.

A summary of the planning requirements for the Restaurant will be found in Appendix 6.3.A.

6.3.2 Layout

The layout will be governed by the self-service and table-service areas and there will be a central kitchen with direct access to both of them. Three entrances will be provided, one for each eating area and one for staff. The entrance to the self-service area will face on to the central green area and will lead from a lobby to the queuing, serving and eating areas. A toilet block will be provided. The entrance to the table-service area will face on to a green area immediately north of the main east-west access road and will lead to the dining room by way of a lobby and cloak-room. A smaller toilet block will serve this area.

The layout of the kitchen and servery area has been planned as an open area in which the preparing, cooking and serving of food, and washing-up will be carried out. Prepared food will be carried to the dining room or stored in heated cupboards in the common wall between the kitchen and self-service area. Dirty dishes, table linen, etc. will be removed from these two areas through double swing doors. Refrigerated and other stores will be provided near the staff entrance and refuse and waste will be taken to a garbage disposal cupboard next to the control booth beside this entrance.

Male and female locker rooms, showers and toilets will be provided in the area of the building normally only occupied by the staff.

The building may be expanded to give increased capacity to the self-service and table-service areas by new construction to south and east respectively.

All kitchen equipment will be provided with grease traps between outlets and the sewer system.

6.3.3 Air Conditioning

The building will be air conditioned by a conventional all-air ducted system. The kitchen area will be ventilated by a hooded exhaust system over the cooking and heating equipment that will ensure a minimum of 20 changes of air per hour and will use 100% outside air. The exhaust system will be provided with grease filters. Pipework and ducting will be concealed by false ceiling and skirtings.

The total cooling load will be 40 refrigerated tons.

The total heating load will be 190,000 KCAL/Hr.

6.3.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.3.B at the end of this section.

APPENDIX 6.3.A

SUMMARY OF PLANNING REQUIREMENTS FOR THE RESTAURANT

NUMBER USING THE SELF-SERVICE FACILITY

From Services Centre	140
From Industrial Area (assumed)	100
From outside (assumed)	100
Total:	340

Number of meals served at a rate of 3 meals per minute in a lunch period of 2 hours = 360.

Each meal takes 20 minutes therefore the number of seats required = 3 x 20 = 60 seats (minimum)

Assume 2/3 of total (i.e. 240 people) arrive in the first hour, then 3 x 60 = 180 meals will have been served, i.e. queue space for 60 will be required. At 5 people per metre queue space of 12 metres will be required.

NUMBER USING THE TABLE-SERVICE FACILITY

Total assumed guests, managers and senior staff from centre = 60
Allow 45 minutes per sitting and 2½ hour serving time.
Three sittings say 25, 25 and 10
Allow seating for 35 people

APPENDIX 6.3.B
RESTAURANT
SCHEDULE OF FINISHES

SELF SERVICE	
Floors	500 x 500 p.c. concrete slabs outside 150 x 300 coloured cement tiles inside
Walls	Plastered and painted
Ceilings	600 x 600 plain Asbestos panels
Doors	Exterior - Timber tongued and grooved, polyurethane finish Interior - Timber flush, painted
Windows	Aluminium frame. Clear glass 10 mm thick pivoted as
Serving Counter	Cement tiled wall under Counter top wood with polyurethane finish Guide rail in tubular steel
KITCHEN	
Floor	150 x 300 coloured cement tiles
Walls	White glazed tiles to door height Plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush painted
Windows	M.S. grilles painted Aluminium frames. Clear glass 6mm thick
RESTAURANT	
Floor	Unglazed ceramic tiles 150 x 300 or smaller
Walls	Plastered and painted
Ceiling	Wood strip suspended ceiling with incorporated lighting
Doors	Exterior, timber tongued and grooved polyurethane finish. Interior, timber frame glazed
Windows	Aluminium framed. Clear glass 10mm thick Timber screen as shown
TOILETS TO SELF-SERVICE	
Floors	Unglazed ceramic tiles
Walls	White glazed ceramic tile 150 x 150
Doors	Timber flush painted both sides or painted inside veneered outside
Windows	Aluminium frames. Opaque glass 4mm thick
Fittings	White Ideal Standard
TOILETS TO RESTAURANT	
Floors	Marble
Walls	Marble
Ceilings	Plastered and painted
Doors	Timber flush painted both sides
Windows	Aluminium frames. Opaque glass 4mm thick
Fittings	Ideal Standard quality range. Marble tops to basins

THE POLICE STATION

6.4 The Police Station (Drawings Nos. 2/7 and 8)

6.4.1 Planning Considerations

Discussions have been held with the Thessaloniki Police Authorities to establish the main requirements for a Police Station for the Industrial Area. Sketch plans were prepared and further discussions held with the Police Authorities to define more clearly certain requirements and to approve in principle details incorporated in the sketches.

The growth of the Area will present problems of traffic regulation, crowd control, traffic accidents, vandalism, personal disputes and the like which will require Police action. The growth of industry will present problems ranging from the direction of visitors to the protection of goods and property.

A summary of the requirements to enable the Station to carry out these duties, and which has formed the basis of planning, is included in Appendix 6.4.A.

6.4.2 Layout of Station

The major function of the Station will be as official premises where the administration will be conducted, and the Police will carry out their duties, and to which the public will have access. The minor function will be as a base in which policemen will be stationed when off duty. The areas for these two functions will be separated in the plan.

The official area will consist of an entrance lobby, on one side of which will be the radio room, and on the other a corridor leading to the offices, an interrogation room, toilets, and two detention rooms, one for men and one for women. The windows of the detention rooms will face on to a small airshaft to prevent them from being approached from outside the building.

The radio room will serve three functions:-

(i) as a centre of operations, maintaining radio contact between police cars and the duty officer in the staff room,

(ii) as a reception desk to provide information to visitors,

(iii) as a check on the activities in the vehicle yard outside.

The lobby will also open on to an armoury which will have no windows.

Another door from the lobby will give access to the private part of the Station. This will contain bedrooms, recreation room, canteen, kitchen and toilets which will be used by off-duty policemen. An officer's bedroom will be included although it is anticipated that officers will not normally be resident on the Station. However, in times of emergency the Station will be fully manned day and night, and full accommodation will be provided against that possibility.

The bedrooms will be linked by a corridor with doors opening on to the yard. In the normal line of duty policemen will pass from the yard into the buildings through the door next to the radio room to make their reports and to be dismissed from duty. There will be occasions when it will be necessary to pass from the yard to the private part of the building and doors have been provided to allow this.

A canteen and kitchen will be provided for use by the staff.

Beside the kitchen there will be a plant room which will house the central heating and hot water supply plant, and the fuel storage. The plant room and kitchen will have service doors opening to the back of the building for delivery of fuel, supplies and disposal of waste.

The canteen will also open to the back of the building to the garden behind.

6.4.3 Heating and Ventilation

The Station will be heated by an oil fired boiler and a hot water circulation system with convector type room heaters. The total heating load will be 78000 KCAL/Hr.

6.4.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.4.B at the end of this section.

6.4.5 External

Parking space for eleven cars will be provided in front of the building. A flagged footpath will surround the parking space and form the approach to the front door of the Station.

Police cars will enter the Station garages by a separate gated entrance, which will be set in a 2 metre high wall. Covered parking will be provided for 5 police cars and one of these spaces will be equipped with a workbench and an inspection pit. Between the covered garages and the main part of the building there will be a gravel courtyard for cleaning vehicles, turning, etc.

There will be a gravel service road to provide access to the back of the kitchen and plant room. Dustbins and refuse will be hidden from view from the offices in the building by a low wall projecting from the kitchen wall and by tree planting behind the office wing. The area outside the canteen will be landscaped with green areas, flowers and gravel paths to make it a pleasant place to sit and eat or relax.

APPENDIX 6.4.A

SUMMARY OF PLANNING REQUIREMENTS FOR THE POLICE STATION

STAFF

Director
Assistant Director
1 Other Officer
2 NCO's
15 Policemen (maximum required for all stages of development)

FACILITIES

Public reception area
Radio Room
Offices for Director, Assistant Director, Secretary and Staff Officer
Interrogation Room
2 Detention Rooms (1M 1F) with barred windows and doors and reinforced concrete walls
Separate toilet facilities adjacent to Interrogation Rooms
Armoury
Canteen and recreational facilities
Sleeping accommodation for all staff. Dormitories can sleep 6 per room

VEHICLES

2 Police cars
2 Motor cycles
1 Van
3/4 private cars
Covered parking required for official vehicles
Workbench and Inspection Pit required
No fuel storage or pumps required

OTHER REQUIREMENTS AND INFORMATION

Station will be on duty 24 hours per day
Central heating required
Laundry will be contracted to local cleaners

APPENDIX 6.4.B

POLICE STATION

SCHEDULE OF FINISHES

CORRIDORS, EQUIPMENT STORE, RECREATION ROOM, CANTEEN AND TELEPHONE EXCHANGE	
Floors	Coloured cement tiles 150 x 300
Walls	Plastered and painted
Ceilings	Ditto
Doors	Exterior: Glazed side windows. Tongued and grooved timber painted doors Interior: Timber flush painted both sides
Windows	Painted steel frames. Clear glass 6 mm thick
OFFICES AND DORMITORIES	
Floors	Vinyl Asbestos tiles 300 x 300
Walls	Plastered and painted
Ceilings	Ditto
Doors	Timber flush painted both sides
Windows	Painted steel frames. Clear glass 6 mm thick Wooden shutters to dormitories
TOILETS AND KITCHEN	
Floor	Coloured cement tiles
Walls	White glazed ceramic tiles to height of 2.00 m. Plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush, painted both sides
Windows	Steel frames opaque glass 4 mm thick
Toilet fittings	White Ideal Standard
EXTERIOR	
Approach	500 x 500 p.c. concrete slabs
Yard	Gravel
Garage	Concrete screed

THE FIRE STATION

6.5 The Fire Station (Drawings Nos. 2/9 and 10)

6.5.1 Planning Considerations

At present the nearest major fire station is on the outskirts of Thessaloniki approximately 6 kilometres from the Industrial Area, and present practice is to disperse vehicles in the area around this station during daylight hours to wait for emergency calls to direct them to the scene of a fire. Additional vehicles are retained at the Station to provide back-up capacity. The possible delay in bringing the back-up vehicles to the scene of an intense industrial fire in a highly populated area could result in considerable loss and damage, particularly in view of the heavy volume of traffic on the road between the Thessaloniki Fire Station and the Industrial Area. It will not be appropriate for HIDB to set up their own fire-fighting force for the Industrial Area, as this would involve financing, equipping, maintaining, manning and training the force. Inevitably it could deal only with the smaller fires, and its activities would have to be fully co-ordinated with the overall fire plan of the Thessaloniki area Fire Service Authorities.

It is considered that all fire-fighting on the Industrial Area should be the concern of the Fire Service Authorities, apart from minor fires, which can be extinguished by the factory maintenance staff or workers.

From the above considerations it becomes clear that a new public service Fire Station will need to be established close to or on the Industrial Area.

Following discussions with the Thessaloniki Fire Service Authorities, the preliminary planning requirements for such a Fire Station were prepared and approval was obtained in principle from UNIDO and HIDB to continue planning on the lines indicated. Sketch plans were prepared and further discussions were held with the Fire Service Authorities to clarify some points of detail These sketches have formed the basis for the following proposals and a summary of the planning requirements will be found in Appendix 6.5.A.

6.5.2 Layout

The Station has been planned around a central courtyard which will be a focal part in the lives of the firemen. It will be used for recreation, training, exercise and for servicing and cleaning vehicles and equipment. Vehicles on duty will be prepared and will wait in the court-yard for emergency calls, and since the duty life of the firemen will be directed to action in response to emergency calls, the courtyard has been given special significance in the layout.

Vehicle garages, sleeping quarters, community areas and the administrative area will be arranged around the yard.

Covered garages will be provided for all vehicles. One of the garages will have an inspection pit in the floor and will be equipped with a work bench for carrying out routine maintenance and repairs to the vehicles. The garages will be adjacent to the equipment store, which will contain equipment connected with fire-fighting and vehicle maintenance.

Sleeping accommodation will be provided for 48 firemen and three officers. During normal times the firemen will mostly live at their homes in the neighbouring villages, but facilities will be provided for full occupation in time of National

Emergency, such as serious flooding, war, etc., when the Station will be wholly residential for the fire fighting crews. The bedrooms will be positioned next to a corridor with easy access to the courtyard for emergency action. All the doors to the bedrooms will open outwards but will be recessed so that they will not impede movement in the corridor. Toilets and showers will be positioned at both ends of the corridor. At the eastern end of the corridor there will be a Plant Room and Domestic Store.

The Community Area will comprise a kitchen, dining room and community room which will also be used as a lecture room or a waiting room for firemen on duty or on stand-by and as a recreation room for resident firemen while off duty.

The administrative area will be located on either side of the public entrance, to the right of the entrance will be the radio room which will contain the main fire alarm switchboard and a counter for public reception duties. The duty officers' room and the remaining administrative offices adjacent to it will be across the corridor from the Radio Room. The corridor linking the administrative offices will lead to a toilet block and to the outside courtyard.

The training tower will be positioned to allow as much free space as possible in front of each face without taking up an excessive amount of the courtyard, and enable firemen to practice escape drills from the tower to the roof of the adjacent equipment store.

6.5.3 Heating and Ventilation

The Station will be heated by an oil fired boiler and hot water circulator system with convector type room heaters. The total heating load will be 103,500 KCAL/Hr.

6.5.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.5.B at the end of this Section.

APPENDIX 6.5.A

SUMMARY OF THE PLANNING REQUIREMENTS FOR THE DESIGN OF THE FIRE STATION

STAFF

Sleeping and living accommodation will be required for 51 men; 3 officers and 48 firemen.

VEHICLES

4 Fire trucks
1 Fire truck with turntable and 50 M extension ladder
1 Crane
1 Assistant's Car
1 Bus for firemen

ACCOMMODATION

Covered parking for vehicles 11.0m x 3.8m x 5.5m clear
5 Administrative offices (1 to be a radio room)
Equipment store (5m x 5m)
Domestic Store
Dormitories
Cummunity Area: Lecture Room, Dining Room, Kitchen and Recreation Room
Plant Room
Toilets, showers, etc.
Practice tower

PRACTICE TOWER

Uses: Accustom firemen to heights
Training with fixed and rope ladders
Training with escape chutes and bo'suns chairs
Physical fitness
Hose drying

Dimensions and Description

4 x 4.0m high with an access hole in each floor and a concrete parapet in each face. Attachments for central ladder fixing and hose drying required. Rectangular or octagonal section. Space in front to rest ladders against faces, sufficient width for each face for training purposes.

GENERAL

Practice Yard to be concrete paved.
10 cu.m of underground fuel storage will be required. Storage and pumps to be outside of Station area.

APPENDIX 6.5.B
FIRE STATION
SCHEDULE OF FINISHES

CORRIDORS, EQUIPMENT STORE, DOMESTIC STORE, LECTURE HALL, TELEPHONE EXCHANGE AND RADIO ROOM

Floors	Coloured cement tiles 150 x 300
Walls	Plastered and painted
Ceilings	Ditto
Doors	Exterior, glazed. Interior, timber flush, painted
Windows	Painted steel frames. Clear glass 6 mm thick

OFFICES AND DORMITORIES

Floors	Vinyl Asbestos tiles 300 x 300
Walls	Plastered and painted
Ceilings	Ditto
Doors	Timber flush, painted
Windows	Painted steel frames. Clear glass 6 mm thick Wooden shutters to dormitories

BATHROOMS, TOILETS AND KITCHEN

Floors	Coloured cement tiles
Walls	White glazed ceramic tiles 150 x 150 to 2.0m, Plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush, painted
Windows	Painted steel frames. Clear glass 6 mm thick
Fittings	White Ideal Standard

EXTERNAL

Garage	Concrete screed floor Roller shutter doors as required by Fire Service
Yard	Concrete or gravel as required by Fire Service
Gates	M.S.

THE COMBINED POST OFFICE AND TELEPHONE EXCHANGE

6.6 The Combined Post Office and Telephone Exchange (Drawing No. 2/11)

6.6.1 Planning Considerations

The decision to establish a branch of the Post Office and Telephone Service at the Industrial Area will be taken by the authorities responsible for these services, after discussion with the HIDB. It is not the purpose of this report to anticipate such a decision but to advise the HIDB of a likely demand for these services and to present the planning and design of a telephone exchange and post office which will satisfy the demand in so far as it can be predicted.

The growth of the Industrial Area will inevitably be accompanied by a rapid increase in the demand for postal services. The existing facilities at Sindos will be inadequate for the development proposed in the Master Plan and an extension of these facilities will certainly be required. It is believed that this will best be located in the Services Centre.

With regard to telephones, it has been estimated in Section 25 of Chapter 1 Master Plan that the Industrial Area will require about 1500 lines by 1980 and 5000 lines by 1990.

The new exchange being installed by OTE at Nea Aghialos will have 3000 lines and will be able to give better service to the Area than the existing exchange at Sindos. However, it is assumed that many of these lines will be required for other users, outside the Industrial Area, and that OTE will need an exchange on the Industrial Area.

It should be planned to accommodate all the 5000 lines that are estimated as the future requirement.

6.6.2 Layout

The building has been designed to accommodate the functions of a Post Office and of a Telephone Exchange. Both these functions will be kept separate and each service will have a layout suitable for its particular requirements.

6.6.2.1 Post Office Area

The public and the official functions of a post office will be defined and isolated by the layout of the building. The public will have access to the mail drop and the post office boxes from outside the building sheltered by a covered portico and access to the sales counter inside the building. The cashiers at the sales counter will have access to the sorting office and the administration office. The offices will be located away from the noise and movement of the sorting office and loading areas. The loading area will be located to provide easy access to the primary road network for the delivery of mail to central sorting offices in Thessaloniki or at the rail depot as the south end of the Industrial Area which may be developed as a mail handling depot.

A kitchenette will be provided for preparation of coffee, cool drinks and sandwiches for the staff of the Post Office, especially for early morning or late night shifts.

A shower and locker room will be provided for the postmen as they return from their deliveries, or from loading or unloading vehicles. Separate toilet facilities will be provided for female staff.

6.6.2.2. Telephone Exchange Area

The layout of the telephone exchange will be divided into an area to which the public will have access and an area to which OTE personnel only will have access. The former area will be for the public to pay bills, to receive advice concerning telephone accounts, to make private telephone calls and to send telex messages and telegrams. The latter will be concerned with the operation and maintenance of the telephone system, including the exchange, and with line maintenance.

A summary of the planning requirements for the exchange is attached as Appendix 6.6.A.

There will be two modes of access to the exchange: a staff entrance on the south side of the building and a public entrance on the north side of the building giving access from the central area of the Services Centre. The separate staff entrance will allow entry to the building when the exchange is closed to the public.

Adjacent to the public entrance will be two public coin-operated call boxes sheltered by the portico that will form the main entrance, and accessible at all times. Within the building there will be a further four call boxes, accessible during open hours; calls made from these boxes will be timed and paid for at the cashier's counter. Telegrams, telex messages and telephone accounts will also be paid at the cashier's counter. The telegraphic and telex equipment will be housed in the working area behind this counter. The counter will have a flap in it to give access to the public area, but if a member of the public seeks an interview with the Accountant he will be reached via the door in the public area next to the desk for writing telegrams or telex messages.

The central feature of the non-public part of the building will be the relay room in which the automatic telephone relay equipment will be housed. The size of the relay room will be sufficient for racks of equipment for message transmission and reception metering. The equipment will be battery operated and a battery room will be established next to the relay room. There will not be direct access between these rooms since the acid fumes given off by the batteries would have a harmful effect on the telephone equipment. The batteries will be charged from the public electricity supply, but in order to safeguard against a possible supply failure, space will be provided for a stand-by generator to take over battery charging.

Adjacent to the relay room and with access to it and to the telephone store room will be a room for the technicians who will service, maintain and repair the relay equipment. These technicians will have direct supervision of the relay equipment through a window in the dividing wall. A second store for general and linesmens' equipment will be provided. This store will be positioned near the staff entrance since the linesmen, who will use the store as an office, will generally be out on site and will load their vehicle from the store with tools and equipment before leaving.

The public power supply sub-station will be positioned in the south west corner of the building. This sub-station will be a completely separate entity from the exchange, and has been fixed in this position as being the most suitable place for the distribution of power supplies to the Services Centre (see also Electricity Supply.)

6.3.3 Heating and Ventilation

The public and office areas of both sections of the combined building will be heated in the winter by a piped hot water and radiator system originating from an oil fired boiler situated in the plant room in the Telephone Exchange Area. Fuel for the boiler will be stored in the plant room and in a protected tank. Access to the fuel tank will be through a safety door, push bar type, in the outside wall of the plant room. The plant room will also house the battery generator and its fuel supply.

The total heating load will be 67,500 KCAL/Hr.

The battery and plant rooms will be ventilated by four extractor fans in the outside walls.

The remainder of the building will be naturally ventilated.

6.6.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.6.B at the end of this Section.

APPENDIX 6.6.A

SUMMARY OF THE REQUIREMENTS FOR THE COMBINED POST OFFICE AND TELEPHONE EXCHANGE

POST OFFICE

STAFF

Five postmen with ten post office staff. Expansion areas should be allocated. Demand and rate of growth during initial development will provide the best guide to expansion and enable a decision to be reached whether to increase the size of the building or provide a new sub-Post Office in the Stage 3 area.

ACCOMMODATION

1 office for General Administration
Public Sales Area with counter
Sorting office 4m x 3m
Kitchenette
Toilets
Showers

VEHICLES

2 Post Office vans
10 Private cars

TELEPHONE EXCHANGE

STAFF

Accountant
2 (max. 3) in Public Sales Area
2 to deliver telegrams
3 Technicians
1 or 2 for external work

ACCOMMODATION

Public Area 150m² floor space, with public telephones writing tables and benches
Cashiers Area, with telex equipment
Accountants office
Battery room 3.0m x 6.0m
Generator room (separate from Battery room)
Telephone Relay room 200m² floor space - height of room 3.5m
Plant room
Stores
Toilets, Kitchenette, Showers etc.

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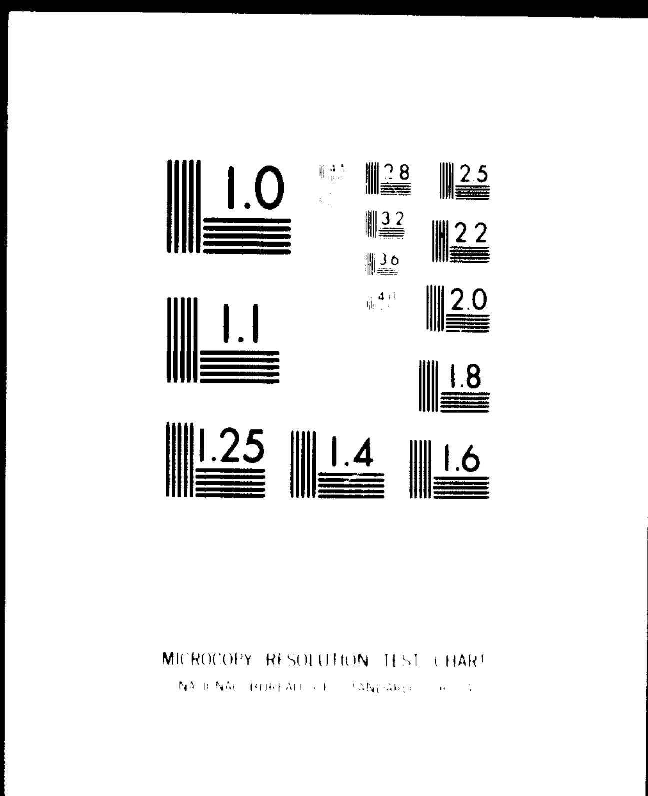

1.0
2.8
2.5
3.2
2.2
3.6
2.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART

24x

A

TELEPHONE EQUIPMENT REQUIREMENTS

5000 lines

Battery operated (60V 120A batteries). The batteries are charged from the mains supply. If the mains supply fails a standby generator (60V 30A DC) takes over. The batteries should not be in the same room as the relay equipment or the generator, the battery room should be well ventilated.

Relay room will contain metering equipment.

Temperature in relay room must be maintained at 18° - 22°C in winter.
No air conditioning required.

VEHICLES

1 light van for outside work. It will not require covered parking.

APPENDIX 6.6.B

POST OFFICE/OTE

SCHEDULE OF FINISHES

RELAY ROOM, SUB-STATION, BATTERY ROOM, PLANT ROOM, TELEPHONE STORE AND GENERAL STORE

Floors	Granolithic
Walls	Plastered and painted
Ceilings	Ditto
Doors	Timber flush painted or M.S.
Windows	Aluminium frames. Clear glass. M.S. grilles painted as required

OFFICES, PUBLIC AREAS AND CORRIDORS

Floors	Glazed coloured ceramic tiles
Walls	Plastered and painted
Ceilings	Ditto
Doors	Exterior, Glazed Aluminium frames, Interior, Timber flush, painted
Windows	Aluminium frames, Clear Glass 6mm thick

TOILETS

Floors	Coloured cement tiles
Walls	White glazed ceramic tiles 150 x 150 to 2.0m plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush, painted
Windows	Aluminium frames, opaque glass 4mm thick
Fittings	White Ideal Standard

6.7 The Industrial Health Centre (Drawings Nos. 2/12 and 13)

6.7.1 Planning Considerations

The Brief for the Industrial Health Centre was to prepare a Scheme which will be up to international standards and comparable to similar facilities established at Industrial Areas and Estates in other countries. Advice on how the scheme should be financed, or by what Authority it should be operated was not required.

However, recommendations for the staff necessary to operate the Industrial Health Centre are made, since this has been an essential planning requirement for the preparation of the Scheme. How such staff will be recruited and by whom it will be paid has not been considered.

The need for industrial health facilities has been recognised in Europe and elsewhere in the contexts of social welfare and improved industrial efficiency, and private and Government bodies have established facilities to promote both of these aims.

The aim of the Industrial Health Centre will be to treat workers suffering from accidents and to reduce the accident figures by constant propaganda and advice. It is stressed that a prime purpose of the Centre is to anticipate and, as far as possible, prevent industrial accidents and sickness by giving advice and by educating both employers and employees alike in good industrial practice and in particular the elimination of the harmful effects of processes which could otherwise cause industrial diseases.

6.7.2 Location

Accidents fall into three categories: those which do not incapacitate a worker but which will become serious if not attended such as particles in the eye, those which incapacitate a worker but will not require immediate emergency treatment, and those which will both incapacitate a worker and require immediate emergency treatment. The Health Centre will provide treatment facilities for the first case; it will provide ambulance facilities to provide transport to a treatment centre at Thessaloniki or elsewhere for the second case, and ambulance and emergency treatment facilities for the remainder.

In order to reduce the amount of time lost walking to get treatment for accidents of the non-emergency type it is proposed that several Medical Satellites will be located throughout the Industrial Area. Area 1 will be served by a typical satellite treatment station located on the Services Sub-Centre. Area 2 will be served directly from the Industrial Health Centre and additional satellite treatment stations in sub-centres to be built in other parts of Area 2.

The Health Centre at the Services Centre will be primarily concerned with the second and third categories of accidents and with improving the health and safety standards of the Area generally.

6.7.3 Layout

A summary of the planning requirements which have formed the basis of design for the Industrial Health Centre will be found in Appendix 6.7.A.

The building will consist of two wings. In the first will be the doctors' examination rooms and rooms associated with immediate treatment of patients, some of which work will be done by the nurses and some by the doctors, especially broken bones, crushings or injuries to the eyes. This area of the building will be approached from the public entrance and waiting room by patients who arrive on foot, or from the ambulance entrance at the east end of the building. The treatment room will be situated close to the ambulance door. The nurses rest room and toilets are adjacent to the room for routine dressings and injections.

The public waiting area will open to the outside so that the public will be able to sit in the open or inside the building while waiting for attention. The public area will be controlled by a reception desk and the secretarial and recording functions of the Centre will be carried out from this same office.

A second wing of the building will accommodate a seminar room, X-ray unit and physiotherapy unit. The layout of this wing anticipates future expansion of the Centre when an operating theatre and laboratory will be added to the western end of the building. The X-ray unit will be convenient for the doctors' examination room and the future operating theatre. The seminar room, on the other hand will be associated with both the doctors and the public and will be suitably located. People attending the physiotherapy section will not need to be associated with the rest of the functions in the building and this section will be located away from the main body of the building.

6.7.4 Layout of the Medical Health Satellites

The satellite treatment stations will consist of a public waiting area leading into a treatment room. Toilet facilities will be provided. The treatment room will provide cubicles for changing and treatment and will accommodate offices and medical equipment for the use of the attendant nurses and visiting doctors.

6.7.5 Air Conditioning, Heating and Ventilation

Air conditioning will not be provided in the building before expansion, but will be required once an emergency operating theatre has been established, and the extension wing when built will require a suitable plant room to accommodate equipment.

Initially the building will be heated by an oil fired boiler and low pressure hot water circulator system with convector type room heaters.

The total heating load with be 62,500 KCAL/Hr.

6.7.6 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.7.B at the end of this section.

APPENDIX 6.7.A

SUMMARY OF PLANNING REQUIREMENTS FOR THE DESIGN OF THE INDUSTRIAL HEALTH CENTRE

STAFFING

3 Doctors, 10 Nurses and 1 Physiotherapist.

LOCATION

Patients should not walk for more than 10 minutes to obtain treatment.

Plan Industrial Health Centre in Services Centre and Satellites throughout the Area. 1 Nurse per satellite.

FACILITIES

3 Consulting/Examination Rooms for Doctors
Treatment Room (with clean and dirty utilities)
Dressing Room
Seminar Room
X-ray unit with machine room, viewing room and dark room.
Physiotherapy Room with 2 cubicles
Public Waiting Room/Reception area
Administrative office
Nurses Rest Room with locker space
Toilets
Plant Room
At Satellite Treatment Station: Waiting Room
Treatment Room/Admin Room
Toilets

VEHICLES

1 or 2 ambulances with "straight through" access to the Centre and to the treatment room.

APPENDIX 6.7.B
INDUSTRIAL HEALTH CENTRE
SCHEDULE OF FINISHES

TOILETS	
Floors	Coloured cement tiles
Walls	Glazed white ceramic tiles 150 x 150 to 2.0m, plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush, painted
Windows	Aluminium frames. Opaque glass 4 mm thick
Fittings	White Ideal Standard
OTHER ROOMS	
Floors	Vinyl asbestos tiles 300 x 300
Walls	Plastered and painted
Ceilings	Ditto
Doors	Exterior glazed. Interior timber flush, painted
Windows	Aluminium frames. Clear glass 6 mm thick

THE WORKS SERVICES DEPOT

6.8 The Works Services Depot (Drawings Nos. 2/14 and 15)

6.8.1 Planning Considerations

In order to establish the functions to be undertaken and facilities to be provided, discussions have been held with local authorities in Athens, Pireaus and Thessaloniki.

It is recommended that the following duties should be undertaken:

(a) **Street Cleaning**

The streets will be cleaned by labourers with brushes and hand-carts which will be left overnight at the main depot or at a sub-depot. Lorries will patrol the area to pick up the contents of the cans and transport them to the refuse disposal tip. Further back-up capacity will be supplied by a mechanical street sweeping vehicle and a water tanker.

In Area 1 the street sweepers will be based at the Services Sub-Centre. A Sub-Depot will be established there to keep the hand-carts. As Area 2 is developed, further street sweepers will be employed. These will be based at the main Works Services Depot and at one other sub-depot. Twenty labourers will be required at each of the Depots and the two Sub-Depots.

(b) **General Maintenance**

The Depot will undertake repairs to the fabric of the roads, kerbs and footpaths as they deteriorate due to weathering or accidental damage, maintenance of street lighting, road signs and markings, maintenance of fences and the maintenance of storm water drains and channels.

Large scale road repair jobs will be let to outside contractors and accordingly the Depot will not carry large stocks of cement, sand, aggregate, etc., but will order from local suppliers as required for jobs which will fall within its scope. Such jobs would cover replacing broken lamp standards, repairing broken manholes, etc. and would be carried out by small gangs of labourers each one supervised by a foreman with good all round experience in this type of work. They will use vehicles and tools from the Depot as needed and materials from the Depot or ordered from outside as required. The number of labourers employed for this type of work will fluctuate depending upon the work load. Provision will be made for three foremen and a maximum of twenty general labourers. The Depot will also employ four drivers who will have the ability to carry out routine maintenance and repairs to their vehicles at the Depot. Vehicles requiring major overhauls and repairs will be sent to garages in Thessaloniki.

(c) **Building Maintenance**

Internal and external routine maintenance of buildings owned or operated by the HIDB will be undertaken from the Depot which will employ a carpenter, a plumber and an electrician. These specialists will have their own working space at the Depot which will each be equipped with storage space and work benches suited to their needs.

The carpenter will be required to undertake internal and external joinery, glazing and painting. The plumber will carry out work connected with domestic water supply and drainage and routine maintenance of central heating and air conditioning fittings. The electrician will undertake domestic electrical repairs, repairs to street lighting and road signs and service to electrical equipment used at the Depot. He will not be responsible for the public electricity supply network.

(d) **Landscaping**

The Master Plan includes various parts of Area 1 and Area 2 that will be landscaped with tree planting, grassed areas, and ornamental flower beds. The planting and care of these areas will be undertaken from the Depot, part of which will be allocated for nursery space. The gardeners will have at their disposal a tractor with trailer and mower attachments. For any other vehicle requirements he will call upon the other vehicles of the Depot.

A summary of the requirements for carrying out all these duties is given in Appendix 6.8.A.

6.8.2 Layout

The layout will provide central administrative offices and messing facilities for the employees of the Depot situated between the courtyard and storage area on one side and the nursery and gardeners' facilities on the other. This will enable labourers to have access to either of the outside areas and the administration staff will be in contact with all the activities undertaken in the Depot.

Staff and visitors will use the public entrance adjacent to the administrative offices. The staff will pass from the entrance lobby to the mess area, which will be provided with toilets, showers, a locker room and some kitchen facilities. The mess room will open on to the covered walkway which will provide sheltered access to the technicians offices and stores along the south side of the courtyard. The covered store at the end of the walkway will be established next to a fenced open storage area, visible to and under the control of the storekeeper, who will also be able to control deliveries to and from the yard to his office. Covered parking, two bays of which will be provided with a workbench and one bay of which will be provided with a vehicle inspection pit, will occupy the north side of the courtyard. Further open parking will be provided at the end of the courtyard to accommodate a future increased investment in vehicles. At the north end of this space there will be an underground fuel storage tank, with a buried pipeline leading to a fuel pump in the courtyard. Facilities will be provided for vehicle washing in a special bay next to the covered parking. Pressure hoses and special drainage will be required at this bay.

The gardeners' area will consist of a walled nursery with appropriate storage sheds, a greenhouse and a gardeners' office. This area will be provided with its own external gate to close it off from the rest of the Depot if required.

A large tree nursery is provided in the south-east corner of the Industrial Area.

6.8.3 Heating and Domestic Water Supply

The offices, messing area and technicians workshops will be heated by oil fired boiler and a hot water circulation system with convector type room heaters. Workshops will be heated from the same system using unit heaters.

The total heating load will be 32,500 KCAL/Hr.

6.8.4 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.8.B at the end of this section.

6.8.5 Sewage System

The maintenance of the sewers, the sewage pumping stations and the sewage treatment plant will be undertaken by HIDB personnel but these will not be based on the Works Services Depot; this is an inappropriate site for such work. It will be preferable to establish a sewage maintenance depot in conjunction with the treatment plant, when final arrangements for this are made. This will be described in Chapter V.

APPENDIX 6.8.A

SUMMARY OF THE PLANNING REQUIREMENTS FOR THE WORKS SERVICES DEPOT

GENERAL

No. of Area Buildings:	
In Service Centre	8
Elsewhere	6 approximately
Approximate total length of roads	45 Kms
Approximate total length of drains	45 Kms
Approximate total no. of street lights at 60 m spacing	1500
Landscaped areas:	
Services Centre	88,000 m²
Sub-Services Centre	40.000 m²
Roads	15,000 m²
Green Areas	300,000 m²
Total	443,000 m²

STAFF

Superintendent
Cashier/Clerk
Storekeeper
4 Drivers
1 Janitor

Street Cleaning, General Maintenance, Architectural Maintenance:

20 sweepers	3 Firemen	Carpenter
	Max. 20 labourers	Plumber
		Electrician

Landscaping:
Gardener
Max. 10 labourers

VEHICLES

2 Land Rovers
2 Tipper Lorries
1 Tanker (with water spray and pump)
1 Street sweeper
1 Tractor (with gang-mower and trailer attachments)
3 Mobile compressors
1 Hydraulic Truck for street light access

ACCOMMODATION

1 office for superintendent
1 office for cashier clerk
1 Kitchenette and cleaning cupboard for janitor
1 office for Foremen, with locker and cupboard space
1 office for each of Carpenter, Plumber and Electrician
(each to have locker space, desk and workbench)
Covered Store for Storekeeper, plus open store
Mess for labourers, with locker space and shower and toilet facilities
Plant Room
Nursery with office for gardener and storage for tools, seeds, fertilisers and insecticides, and glass house.
Covered parking for above vehicles. One to have workbench and inspection pit.
Parking area for 20 hand carts.

OTHER REQUIREMENTS

Vehicle washing facilities
3000 litre fuel tank and pump

STORAGE

Covered Storage	Open Storage
Cement	Pipes
Wheelbarrows	Pipe fittings
Picks	Timber
Shovels	Scaffolding
Compressed Air tools	Ladders
Buckets	Kerbstones
Pumps	Paving Slabs
Hoses	Fence Posts
Tarpaulin	Lamp Posts
Fencing Materials	Manhole Covers
Wire	Sand
Road Signs	Gravel
Light fittings	Sheet metal
Storm Lamps	

Domestic Fixtures:

Paints
Stepladders
Glass
Piping
Vehicle spares
Mechanics tools
Welding equipment
Tyres
Batteries
Oil and grease
Block and tackle
Fuel drums

APPENDIX 6.8.B

WORKS SERVICES DEPOT

SCHEDULE OF FINISHES

CORRIDORS, OFFICES, MESS HALL

Floors	Cement tiles 150 x 150
Walls	Plastered and painted
Ceilings	Ditto
Doors	Timber flush, painted
Windows	Steel frames. Clear glass 6mm thick

STORES AND TECHNICIANS' OFFICES

Floors	Cement screed
Walls	Plastered and painted
Ceilings	Ditto
Doors	Timber flush, painted
Windows	Steel frames. Clear glass 6mm thick

TOILETS

Floor	Coloured cement tiles
Walls	White glazed ceramic tiles to 2.0m, plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush, painted
Windows	Steel frames, clear glass 6mm thick

EXTERIOR

Garages	Concrete floor screed
Yard	Gravel
Greenhouse	Backing wall white brickwork, wood frame with glass sheeting
	Floor concrete screed
	Entrance gates M.S.
	Galvanised chain link fence with M.S. fence posts and gate frame to open storage area

THE TECHNICAL ADVISORY AND TRAINING CENTRE

6.9 The Technical Advisory and Training Centre (Drawing Nos. 2/16 and 17)

6.9.1 Planning Considerations

The Technical Advisory and Training Centre will be established on the Services Sub Centre, near to the Industrial Estate in Area 1. Its services will be sufficient to serve the fully developed Industrial Area.

The function and scope of the Technical Advisory and Training Centre has been discussed with UNIDO and HIDB and advice and specialist knowledge has been supplied by KEBA (The Small Industries Development Centre) and ILO. They may be summarised as follows:

(i) The objective of the Centre will be to improve the technical effectiveness and standards of the users of the Industrial Area, and especially the users of the Industrial Estate.

(ii) Materials and products will be tested at the centre to determine their quality or the degree to which they conform to standard specifications. Production techniques will be demonstrated and manufacturers will be able to obtain technical advice and assistance.

(iii) The Technical Advisory and Training Centre will not undertake training in basic artisan skills or management training. The establishment of Technical Schools for basic industrial training is a matter for the appropriate Ministries to decide, but it is the general policy in Greece to establish such schools close to residential areas rather than industrial areas and UNIDO and HIDB have decided that such facilities will not be provided at the Thessaloniki Industrial Area.

Management training will not fall within the scope of the Technical Advisory and Training Centre. Space will be provided on the Services Sub-Centre for a KEBA office, to undertake this function, located close to and in association with the Technical Advisory and Training Centre.

6.9.2 Location

Because of the identity of interest between the users of the Industrial Estate and the directors of the Technical Advisory and Training Centre, the Centre will be located on the Services Sub-Centre across the road from the Industrial Estate. The Centre established at this location will be sufficient to serve the fully developed Industrial Area. When the Area has been fully developed the non-central location will be a disadvantage, but one which will be outweighed by the advantage of being close to the Industrial Estate during the early development of the Area.

6.9.3 Layout

The layout has been designed to separate the areas of physical testing and demonstration, the laboratories and workshops, from the areas of communication, advice and administration, and the principle of separation has been followed to establish the facilities producing the most noise or nuisance at the greatest distance from the administrative section of the building.

Users of the Centre will be directed by a receptionist in the entrance lobby to the workshop and laboratory area or to the office area. The former will contain chemical and testing laboratories, a fitting shop, a machine shop, foundry and sheet metal shop. These facilities will be linked by an external covered walkway along the northern side of the delivery yard. A toilet block, with showers and locker facilities for male employees, and a plant room will be established at the west end of the yard.

6.9.4 Heating

Space heating will be provided by two systems. The office areas and the chemical and testing laboratories will be heated by a circulating hot water system originating from an oil fired boiler system located in the plant room. The workshops will be heated by unit heaters taking hot water from the same system. The total heating load will be 120,000 KCAL/Hr.

6.9.5 Machinery and Equipment Technical Specifications

A general list of machinery and equipment to be installed in the Technical Advisory and Training Centre has been approved by the Project Manager.

Detailed Technical Specifications to enable competitive tenders to be obtained from suitably qualified international firms form Appendix A at the back of this Chapter.

6.9.6 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.9.A at the end of this section.

APPENDIX 6.9.A

TECHNICAL ADVISORY AND TRAINING CENTRE

SCHEDULE OF FINISHES

OFFICES, CLASSROOMS, CORRIDORS AND CHEMICAL LABORATORY

Floors	Cement tiles 150 x 300
Walls	Plastered and painted
Ceilings	Ditto
Doors	Internal Timber flush, painted External Doors glazed
Windows	Painted steel frames. Clear glass 6mm thick

TOILETS

Floors	Coloured cement tiles
Walls	White glazed ceramic tiles 150 x 150 up to door height. Plastered and painted above
Ceilings	Plastered and painted
Doors	Timber flush, painted
Windows	Painted Steel framed opaque glass 4mm thick

SHEETMETAL SHOP, FOUNDRY, MACHINE ROOM, FITTING SHOP TESTING LABORATORY

Floors	Granolithic
Walls	Plastered and painted
Doors	Timber flush, painted
Windows	Steel Frames clear glass 6mm thick

CAFETERIA

6.10 Cafeteria (Drawing No. 2/18)

6.10.1 Planning Considerations

The Cafeteria should be run by a commercial catering organisation operating under license from the HIDB. Hours of opening, cleanliness, hygiene, etc. will be subject to the statutory regulations in force.

The design and layout proposed by the Consultants is intended as a guide to the architectural standards to be maintained and as a model to indicate a possible layout which will suit the planning requirements.

The Cafeteria will serve the population of Area 1 and in particular the population of the Industrial Estate.

The building will operate as "Cafenion" and "Taverna" depending upon the time of day, i.e. cooked meals will be served during the lunch hours and in the evenings if demand justifies it, and during other times coffees, soft drinks, etc.

The lunch hours will be taken as from 13:00 hrs. to 15:00 hrs.

Two sittings of 150 people each will be accommodated.

This figure represents 10% of the future population of the Industrial Estate, the remainder of whom are expected to provide their own meals.

The final size and type of establishment to be built will depend on an assessment of the likely support as ascertained by the Caterer.

The dining room and kitchen area will be sufficient to seat the above numbers for cooked meals. The outdoor seating area will increase the total number who will be able to use the Cafeteria in the summer months.

6.10.2 Location

The Cafeteria will be located at the north east corner of the Services Sub-Centre, adjacent to the proposed location for the shops and the Banks and immediately north of the Technical Advisory and Training Centre.

Car parking facilities and service roads will be provided to the south-west of the building. The central bus parking area will be within easy walking distance.

6.10.3 Layout

The kitchen will have good communication between the dining room and the outside eating area.

Two entrances will be provided, one for the public and one for the staff. The public entrance will face on to Road No. E4 and will lead from an entrance lobby to the dining room.

The dining room will be provided with a serving counter and a bar. The main windows of the dining room will open onto the outside areas. Access to the bar from the outside seating areas will be through these windows.

Toilet blocks for men and women will be provided for the Dining Room.

Staff and suppliers will use the service entrance at the rear of the building. This entrance will provide access to a short corridor and to the kitchen, stores and staff toilets.

The layout of the kitchen will depend upon the type of equipment to be provided by the operator of the cafeteria.

A common store room and a refrigerated store room will be provided. The refrigeration plant will be located in the store room.

Access to the plant room will be from the rear of the building.

6.10.4 Heating

The Cafeteria will be heated by an oil fired boiler and hot water circulation system, with convector type room heaters. The boiler and fuel tank will be located in the plant room.

The kitchen and toilets will be ventilated by a ventilation plant located in the plant room.

The total heating load will be 82,500 KCAL/Hr.

6.10.5 Schedule of Finishes

A Schedule of Finishes forms Appendix 6.10.A at the end of this section.

APPENDIX 6.10.A

CAFETERIA

SCHEDULE OF FINISHES

DINING ROOM AND ENTRANCE LOBBY

Floors	150 x 300 coloured cement tiles
Walls	Plastered and painted
Ceiling	Plastered and painted
Doors	Exterior: Aluminium framed, glazed Interior: Timber framed, glazed
Windows	Aluminium frame clear glass 10 mm thick opening as shown
Service Screen	Timber painted

TOILETS

Floors	Unglazed ceramic tiles
Walls	White glazed ceramic tiles
Doors	Timber flush, painted both sides or painted inside veneered outside
Windows	Aluminium frames. Opaque glass 4 mm thick
Fittings	White Ideal Standard

KITCHEN AND STORES

Floor	150 x 300 coloured cement tiles
Walls	White glazed tiles to door height Plastered and painted above
Ceiling	Plastered and painted
Doors	Timber flush, painted
Windows	Aluminium frames. Clear glass 6 mm thick M.S. grilles as shown.

PLANT ROOM

Floor	Screed or granolithic finish
Walls	Plastered and painted
Ceiling	Ditto
Doors	Steel
Windows	Fresh air louvres only

OUTDOOR EATING AREA

Paved 500 x 500 p.c. paving slabs

7. ARCHITECTURAL CONSIDERATIONS

This section provides a brief description of the Architectural considerations which form the basis of the proposals

The architectural work has been carried out in three inter-related stages: planning, choice of building methods and design

The planning stage has been used to build up the overall Services Centre concept and to define the uses and requirements for each of the facilities provided and the part that each facility will play both in the Services Centre and the project as a whole, and to decide an appropriate layout and design. The state of the existing site, the type and style of existing buildings in the area, and the landscaping possibilities of the site have also affected the planning.

Decisions on building methods have been taken after assessment of the planning requirements, after consideration of the structural limitations of the site and the building materials available locally, and with reference to traditional building methods in Greece. Materials have been considered as to their appearance, weatherproofing properties and need for maintenance, and cost.

The design of buildings has followed from consideration of the planning requirements and the choice of materials. The buildings will generally be of one storey and the plan layouts have taken account of their function, the convenience of users and visitors, and the prevailing architectural limitations imposed by factors such as the overall shape of the Services Centre, the situation of the Centre relative to the Industrial Area as a whole, wind direction, the orientation of the sun and variations in the sun's path and so on.

The traditional building method in the Thessaloniki area is to construct a reinforced concrete framework and to fill in the wall panels with brickwork or concrete blockwork, externally rendered and painted as required.

External rendering, which will deteriorate and require maintenance, has been considered inappropriate to the buildings of the Services Centre, which will have a prestige purpose apart from their individual utilitarian purposes. Facing bricks of clay or concrete and concrete blockwork have been considered as alternatives and concrete face bricks have been chosen for external walls as they will provide a neat and attractive appearance, will be weatherproof and will require little maintenance. Concrete brickwork will be comparable in cost to clay facing bricks. Concrete brickwork will permit the walls to carry loads and this property has been utilised wherever possible.

Where roof spans and storey heights preclude the use of load bearing walls, a reinforced concrete framework with concrete brick infills has been adopted. In such a case the concrete columns of the frames will be featured but recessed behind the general line of the brickwork, and will provide interesting architectural features designed to break up the monotony of large areas of wall and introduce a vertical element into an otherwise horizontally expressed concept.

8. STRUCTURAL CONSIDERATIONS

An attempt has been made to use building methods adapted to Greek conditions and to utilise materials of Greek origin. This is in conformity with the Contract. Buildings constructed on or near the Industrial Area have been examined to obtain the benefit of previous experience of foundation problems in order to augment the very small available borehole data on areas adjacent to the Services Centre.

The Consultants have considered the permeability of the soil in the light of local experience and the available data as well as its bearing capacity and have noted the tendency of the water table to rise near the ground surface in times of heavy rain.

Foundations for buildings at the Services Centre will be either reinforced concrete strip foundations to walls or spread footings to columns. External walls will be 200 mm (approx.) concrete brickwork reinforced with horizontal layers of brick reinforcement every three courses. Internal walls will be 100 mm (approx.) hollow precast concrete blockwork suitably reinforced. External walls will be plastered and painted on the inside. Internal walls will be plastered and painted both sides.

Roofs will be reinforced concrete slabs spanning between load bearing walls, or on the structural frame of reinforced concrete. Roofs will be suitably insulated and waterproofed externally and will be plastered and painted as required internally. An architectural feature of the roofs will be a reinforced concrete parapet around the outside edge standing proud of the roof level, which will add structural stiffness to the buildings when subjected to earthquake loads. Roofs to covered garages will be of corrugated asbestos cement sheeting suitably flashed.

Floors will be reinforced concrete laid on a base of compacted fill and hardcore.

Windows will be either wood, steel or aluminium framed depending upon costs and architectural considerations. A feature of certain windows will be a brickwork projection either side of the window opening to provide protection from the sun, and a precast reinforced concrete panel below the window frame which will project into the space formed by the brickwork projections, and provide space inside the buildings for storage or for radiators.

9. UTILITIES

9.1 Water Supply (Drawing No. 2/22)

Water will be required for domestic use, fire fighting and irrigation of green areas.

The water requirement and the size of the inlet for each building is summarised in paragraph 9.1.1 below. However, in order to avoid having to enlarge the water supply network at a later date the domestic water supply requirement for full development of the Services Centre, including the establishment of commercial buildings and the lecture hall, has been considered when deciding the size of the pipes.

For fire fighting purposes, fire hydrants will be established at suitable locations, and spaced at approximately 120 metres.

For irrigation purposes offtake points will be established at suitable intervals. These offtakes will be suitable for both sprinkler and hand hose attachments. The suggested spacing within the green areas of such offtakes is shown on the drawings.

The quantities of water required for these uses in the Services Centre and Sub-Centres has been included in the overall Industrial Area requirements (Section 20 of Chapter 1).

9.1.1 Domestic Cold Water Supply

Cold water will be received direct from the mains supply for all buildings.

The total cold water demand and inlet pipe diameters will be:

Centre Building	135	litres per minute	50 mm
Computer Centre	45	,,	32 mm
Restaurant	225	,,	65 mm
Police Station	113	,,	38 mm
Fire Station	225	,,	65 mm
Post Office and Telephone Exchange	60	,,	32 mm
Industrial Health Centre	60	,,	32 mm
Works Services Depot	110	,,	38 mm
Technical Advisory and Training Centre	112	,,	38 mm
Cafeteria	135	,,	50 mm
TOTAL	1220		

9.1.2 Domestic Hot Water Supply

Hot water will be provided by electric pressure type heaters located as required. Total storage capacities and heating loads will be:

Centre Building	400	litres	15 kW
Computer Centre	100	,,	4 kW
Police Station	400	,,	20 kW
Fire Station	1260	,,	65 kW
Post Office and Telephone Exchange	240	,,	9 kW
Industrial Health Centre	240	,,	9 kW
Works Services Depot	400	,,	20 kW
Technical Advisory and Training Centre	400	,,	14 kW

The hot water for the Restaurant and the Cafeteria will be provided by the heating boilers.

9.2 Electricity Supply (Drawing No. 2/23)

An electrical sub-station will be established in the Post Office building to feed all the buildings within the area at medium tension by means of an underground cable distribution system.

Provision will be made within the sub-station so that electrical supplies to future buildings of the Services Centre can be accommodated without the necessity for extra space to be built.

Each building will have metering facilities to enable the cost of the electricity consumed to be recoverable.

In general, fluorescent strip lighting will be adopted but each area will be provided for according to its individual requirements and lighting intensity and will be in accordance with locally accepted practice.

Suitable provision will be made for electric power points.

The connection load for the buildings will be as follows:

	kVA
Centre Building	200
Computer Centre	150*
Restaurant	280
Police Station	70
Fire Station	140
Post Office and Telephone Exchange	85
Industrial Health Centre	85
Works Services Depot	90
Technical Advisory and Training Centre	200
TOTAL:	1300 kVA

*The estimate for the Computer Centre includes an estimated 50 kVA as being the load required by the computer.

The maximum demand for the Services Centre will be approximately 1300 kVA, which will include the estimated loads after the establishment of the Lecture Hall, Banks, Shops, etc. and allows for diversification.

9.2.1 Road Lighting (Drawing No. 2/24)

All service roads around the Services Centre will be lit by high pressure mercury colour-corrected lamps in lanterns attached to columns, with mounting heights to suit the environment.

9.3 Stormwater Drainage (Drawing No. 2/21)

Stormwater will be collected in pipes and taken by the shortest route to the enclosed culverts running around the perimeter of the area. These culverts then connect into the general drainage system.

9.4 Soil Drainage (Drawing No. 2/20)

The sewage system has been designed in accordance with the proposals outlined in the Master Plan. It will consist of flexibly jointed salt glaze ware pipework leading to a central pumphouse. From there it will be pumped through a rising main into the sewer running along the western boundary of Area 1.

The pumps will be capable of a discharge of 2 m^3 per minute against a total head including friction and pipe losses of 20 metres.

Two pumps will be required for duty and a third for standby.

9.5 Services Sub-Centre

Water and electricity supply will be provided from the Area 1 systems. Stormwater and soil drainage systems will be of the conventional gravity sewer design and will discharge into the existing Area 1 infrastrucuture works.

10. FUTURE EXPANSION

As a guideline for future expansion of the Services Centre facilities it was decided to plan the buildings to serve initially an industrial population of up to 15,000 people without the need for structural additions This population is equivalent to a full development of Area 1.

To deal with a growth of population above this figure the buildings have been designed so that additions may be made into adjacent spaces designated for this purpose. The time interval before undertaking further buildings will depend upon the implementation ot the Master Plan and the rate of growth of demand for particular services. Since this cannot be predicted except by reference to past experience the guideline adopted for design purposes will assist in planning subsequent construction, by allowing a suitable time interval in which to gain information on the rate of growth of the various factors affecting demand.

The Police Station, Fire Station and Telephone Exchange will require no expansion for development of the Area up to 50,000 workpeople since the facilities provided as described above will be sufficient to provide the appropriate service to this population and will be sufficiently flexible to serve a smaller population economically.

The development of the commercial offices may only be estimated from consideration of the incentives to entrepreneurs to establish these facilities in the Industrial Area. The main incentive to entrepreneurs will be the success of the Industrial Area itself which will stimulate demand for the available space. Office and shop space for up to 1,000 working people can be allocated at the Services Centre with ample room for expansion towards the Fire Station and the Works Services Depot so that considerable expansion of the anticipated commercial activities will be possible. As the likely rate of growth of the commercial offices becomes more defined, it may be necessary at a later stage to allocate more space for this purpose close to, or adjacent to the Services Area. There should be time to take this decision and implement the necessary planning in the early stages of development.

11. STAGES OF DEVELOPMENT

Stages

The stages in which buildings will be constructed will depend upon the policies and requirements of outside authorities in the case of facilities such as the Fire and Police Stations and the Post Office and Telephone Exchange. It will also depend on the extent and rate of implementation of the recommendations of the Master Plan.

The stages given below are based on the assumption that the Master Plan proposals will be implemented and the area will develop as foreseen in Chapter I.

Development has been divided into the following stages:

Services Sub-Centre - Area 1

Immediate works 1972 - 1973

Temporary HIDR offices, Satellite Works Services Depot and Satellite Medical Centre, Technical Advisory and Training Centre.

Subsequent Works 1974 - 1975

Cafeteria

Services Centre - Area 2

Stage 1 1974 - 75	Centre Building, Works Services Depot
Stage 2	Restaurant, Post Office and Telephone Exchange, Industrial Health Centre, Police and Fire Stations.
Stage 3	Computer Centre and Lecture Hall (if required) Centre Building and Restaurant, Industrial Health Centre and Works Services Depot expanded as required.

The dates listed are approximate. The start of each phase will depend upon development planning and there will be some overlapping of start times.

12. ORDER OF COST

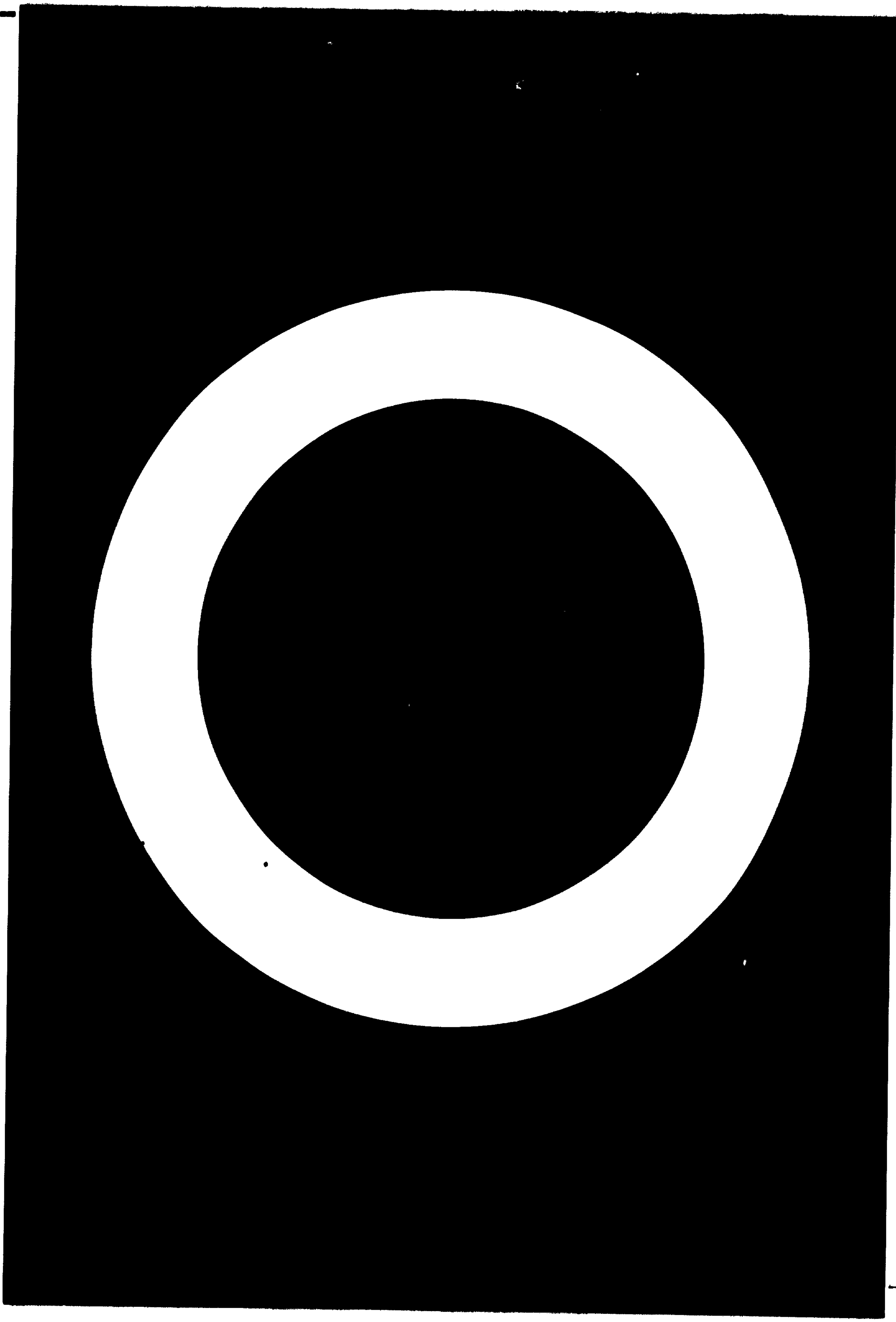
Based upon the Report drawings, the following figures indicate the Order of Cost of the buildings and site development for them.

Closer estimates of cost can be made when final details are prepared of the buildings as they will be actually constructed.

The figures do not include the roads and main utility distribution networks surrounding the site, nor the sewage pumphouse, which are included in Chapter I. The cost of the Sub-Centre does not include the other facilities on this site - Bus Station, Chapel, Creche, Petrol Station and recreational facilities.

They are based on the cost of building and civil engineering in Greece at the date of this Report. No provision has been made for any escalation in the cost of labour and materials.

Description	Initial Construction Drs	Final, after Expansion Drs
SERVICES CENTRE		
Buildings		
Centre Building	8,800,000	13,900,000
Computer Centre	4,000,000	4,000,000
Restaurant	4,000,000	4,700,000
Police Station	2,300,000	2,300,000
Fire Station	4,900,000	4,900,000
OTE and Post Office	2,200,000	2,200,000
Industrial Health Centre	1,900,000	3,400,000
Works Services Depot	1,900,000	2,700,000
	30,000,000	38,100,000
Extra Infrastructure Works		
Roads, Drainage, Water and Electricity Distribution	8,000,000	9,000,000
Landscaping	3,000,000	3,000,000
TOTAL (SERVICES CENTRE):	41,000,000	50,100,000
SERVICES SUB-CENTRE	**Final Cost Drs**	
Buildings		
Technical Advisory and Training Centre	3,700,000	
Satellite Works Services Depot	180,000	
Satellite Medical Centre	250,000	
Cafeteria	1,250,000	
Equipment		
Workshop	4,028,000	
Laboratory	646,000	
Library and Audio Visual	306,280	
Electrical Test Instruments	13,680	
Extra Infrastructure Works		
Roads, Pavings, Drainage, etc.	900,000	
Landscaping	700,000	
	11,973,960	
SAY	12 Million	



APPENDIX A

SERVICES SUB-CENTRE

TECHNICAL ADVISORY AND TRAINING CENTRE

Machinery and Equipment
Technical Specifications

1. **Fitting Shop**

(a) Double ended grinder (large)
Pedestal type motor-driven double ended grinder, with wheels approximately 305 x 40 mm, with provision for wet grinding, and for twist drill grinding attachments, up to 52 mm diameter drills. Wheel guards to be in accordance with statutory requirements, and adjustable. Tool rests to be adjustable for maximum wear of wheels. Dust extraction unit and low voltage lighting equipment to be incorporated. A set of spare wheels to be included. Height, floor to centre, not less than 1.00 m.

(b) Double ended grinder (small)
Pedestal type motor-driven double-ended grinder, arranged as a combined grinding and polishing machine, the grinding wheel to be not less than 254 x 25 mm. Height, floor to centre, not less than 1.00 m.

(c) Pedestal Drill and Stand
Pedestal type drilling machine, capacity 13 mm, size of table 330 x 330 mm, maximum distance, chuck to table, 165 mm, maximum distance, chuck to base 395 mm, fitted with vice and full work table, with maximum distance column to centre of spindle, 220 mm, with 5 drilling speeds, 340-2850 rpm complete with tool tray and depth stop.

(d) Power hacksaw
Heavy duty motor-driven saw, capacity not less than 200 x 200 mm 3 speeds fitted with swivel vice for cutting to angles, automatic stop and bar support stand.

(e) Cleaning Tank
Electrically operated pressure cleansing tank complete with removable filter; tank to be 2 x 1 x 1 m deep approx.

(f) Flexible grinder
Flexible motor-driven hand grinder, capable of 3,500 rpm with a wheel of approximately 150 mm diameter complete with 1500 mm flexible shaft, grinding wheels and arbor, control switch, flexible power cable and plug.

(g) Portable Power Press
Portable power press, incorporating 10 ton hydraulic hand-operated pump, high

pressure flexible hose, ram and assortment of attachments, including pull-clamp attachment and carrying case.

(h) Fixed Hydraulic Press
Vertical open front hydraulic press, of 15 tons capacity, of fabricated steel construction, arranged for medium ram advance speed with slow power stroke and spring return of ram, for similar cycle with hydraulic ram return and for a cycle using fast approach, normal power stroke and fast power return of the ram. The daylight dimension to be not less than 500 mm and the stroke approx. 230mm.

(i) Air Compressor, 40 cfm at 7.07 Kg/cm^2.

2. **Machine Shop**

(a) Universal Miller
Universal Milling Machine, complete with all standard equipment and fitted with electrical equipment suitable for a 380 volt, 3 phase, 50 Hz supply. Work table approx. 1200 x 280 mm, feed range not less than 750 mm, cross power feed not less than 200 mm, vertical power feed, not less than 400 mm, twelve speeds and feeds, rapid traverses to be approx. 2500 mm longitudinal and cross, and 1250 mm vertical, complete with spanners, grease gun, two mandrel steadies and staybrace.

(b) General Purpose Lathes

(i) Small
Lathe, 200 mm swing, 400 mm between centres, for general purpose maintenance work including screwing up to 60 mm dia., complete in all respects including all chucks, faceplate, cutting tools, chasers and other accessories suitable for a wide range of general work.

(ii) Medium
2 No Lathes, as above, but with 400 mm swing and not less than 500 mm between centres.

(iii) Large
Heavy duty, 1270 mm swing, 1525 mm between centres, surfacing and boring lathe, headstock with 18 spindle speeds, saddle with extra-wide cross-slide, carrying 360° swivelling compound slide, gap type bed, feed gearbox with wide range of feeds, complete with all accessories, set of spanners and keys, speed, feed, screwcutting and instruction charts, installation, operation and maintenance instructions.

(c) Engraving Machine
Pantograph engraving machine, suitable for engraving and light duty milling and profiling with robust pantograph rigidly supported from the sliding head, enclosed primary drive with 8 speed changes, graduated handwheels on all table motions with pantograph reductions between 1:1 and 50:1, cutter speeds from 3000 to 18000 rpm, cutter feed full screw feed of 12.7 mm, and part lever and part screw feed of 9 mm, and work table of approx. 500 x 350mm.

(d) Radial Drill

Elevating table type radial drilling, boring and tapping machines, 1219 mm radius with drilling capacity up to 50 mm (steel), boring up to 230 mm, tapping up to 75 mm pipe thread and trepanning up to 250 mm, 18 spindle speeds, from 25 to 1500 rpm and 9 feed speeds from 0.088 to 1.040 mm per revolution. The table and baseplate to be machined out of solid, the column face to be ground finished, the spindle to be balanced. The machine to be supplied complete with accessories and tools, and with electrical drive and control gear, fully wired internally.

(e) Surface grinder (Universal)

Production surface grinding machine, capacity approx. 300 x 700 mm, complete with grinding wheels, wheel flange and spare, wheel balancing mandrel, wheel truing attachment, table guards, wheel guard with dust exhaust nozzle, spanners, grease gun and spares. The work table to be not less than 280 x 685 mm, with 3 tee slots, wheel speeds to give up to 5,300 feet per minute.

(f) Tool and Cutter Grinder

Motorised. 380 volt 3 phase 50 Hz supply. All similar to Elliot model No.5 with comprehensive standard equipment.

(g) Large shaper

Shaping machine, with self-contained motor drive, automatic down feed to toolhead, automatic cross feed to swivelling table, ram with adjustment for wear on the slide guides, with stroke adjustable in motion and tool head capable of 45° set either side of vertical, complete with all spanners and accessories. Maximum length of stroke 500 mm, horizontal travel of table up to 600 mm, maximum distance, ram to table 450 mm, number of speeds to ram 6, range of speeds, 10-80 strokes per minute.

(h) Small shaper

Shaping machine similar to Item 2(g), but smaller with maximum length of stroke 250 mm.

3. Sheet Metal Shop

(a) Gas burning equipment

Gas (oxy-acetylene) welding equipment, complete with all necessary fittings including regulators, pressure gauges, torch, hoses and spare nozzles of various sizes for cutting and welding of different thicknesses of metal encountered in general maintenance work, together with trolley for cylinders, oxygen and acetylene regulators with pressure gauges, twin 7 m flexible connections, pair of goggles, 40 Kg of assorted welding rods and 4 Kg of flux.

(b) Brazing equipment

Light duty propane brazing equipment comprising torch screwed directly to bottle complete with assorted nozzles, and all accessories; propane capacity to be 1 Kg.

(c) Electric Arc equipment

Electric arc welding equipment, transformer type, trolley mounted on rubber tyred wheels, infinitely variable output from 12 to 150 amps, suitable for both 220 volts single phase or 380 volts, 3 phase, 50 Hz supply, complete with 30 m of flexible cable for input lead, output lead with electrode holder, and earthing lead, with clamp. The equipment to be suitable for fabrication of small prototype manufacturing lines, and for general maintenance work, and should be supplied complete with the following:

(i) Approx. 2000 m of assorted electrodes of various sizes, suitable for welding mild steel and cast iron.

(ii) One spare electrode holder with 30 m welding lead.

(iii) One welding operator's face shield with spare glasses.

(iv) Arc welding inspector's face shield with spare glasses.

(v) Two pairs welding operator's gloves.

(vi) One chipping hammer.

(vii) One operator's apron.

(viii) Two wire brushes.

(d) Roll Bender

Bending Rolls, pyramid type construction, capacity 2000 x 6 mm, rolls diameter approx. 150 mm of solid forged steel, the machine to be complete with swinging end frame, centrifugal clutch drive, finger tip control by single lever swing forward and reverse running and inching, electric motor drive through suitable reduction gear, and all accessories.

(e) Blacksmith's hearth and equipment

Blacksmith's forge and welding hearth, size approx. 1250 x 1250 mm, constructed of heavy gauge sheet steel and mounted on a rigid angle iron frame, the plates and angles to be bolted together, cast iron detachable hearth back to protect the mild steel back, cast iron tue-iron, silent type motor-driven blowing fan with slide valve control, connected for bottom blast, exhaust canopy with discharge flue comprising two right angle bends, one straight section 1.5 m long, and sections for a 4 m. vertical run with weather cowl, complete, with the following accessories:

1 - each 3.2 and 4.5 Kg straight Pein Sledge Hammer
1 - each 0.7, 0.9 and 1.37 Kg Hand Hammers
1 - Flatter
1 - Set Hammer
6 - pairs Top and Bottom Swages of assorted sizes.
3 - Round Punches of assorted sizes
3 - Square Punches of assorted sizes
2 - Hot Sets
2 - Cold Sets
2 - Hardies
3 - Hand Punches, assorted
1 - each Flat Cut, Cross Cut and Half Round chisel
1 - each Poker, Rake and Shovel
6 - pairs of Tongs of assorted patterns
1 - Blacksmith's quenching tank, 300 x 300 x 460 mm long
1 - 80 Kg cast steel single Bick anvil, having one round and one square hole in face, complete with cast iron stand.
1 - 450 x 450 x 150 mm cast iron swage block and stand.

(f) Power operated guillotine
Manually inserted plate cutting guillotine, arranged to cut up to 4 mm. mild steel plate.

(g) Hydraulic edge bending machine
Edge bending machine, 60 tonnes, hydarulic electric motor driven, approx. 2 m between frames, suitable for forming 4 mm thick mild steel in a 75 mm diameter opening, to an inside radius of 12 mm, the main structure to be best quality mild steel, pump to provide power for pressing and return strokes, control by foot pedal, complete with all accessories, including removable angle bolsters to ram and bed for carrying press dies.

(h) Band saw for metal
Bandsawing machine, for contour sawing and capable of quick adaption to band filing and polishing, complete with tee slotted sliding table and work holding attachment suitable for straight line or angular sawing. Throat 345 mm, main table size 525 x 525 mm, main table stroke 216 mm, 10 speeds from 15 to 900 metres per minute.

4. **Foundry**

(a) Pattern making tools and equipment

(i) Wood working and pattern-maker's lathe, 1 m between centres, with 0.5 m diameter faceplate for pattern making, dual purpose tool post for fixed tool for screw threading, and tool rest for woodwork turning, geared headstock, motor drive and all accessories.

(ii) Hand Feed Saw Bench, 508 mm diameter saw, depth of cut 178 mm, table approx. 900 x 950 mm, complete with driving motor, rise and fall mechanism, saw-dust hopper, adjustable outer support rail to table, adjustable fence, saw guard and all accessories.

(iii) Band Saw, 610 mm diameter of saw wheels, 45° tilting table, approx. 760 x 760 mm, height under guide 300 mm, the saw to be completely guarded except cutting portion, adjustable saw guides, fence and quick acting brake, complete with all accessories.

(iv) Hand Feed Planer and Surfacer, maximum width of timber to plane, 405 mm, maximum depth of cut on surfacing table 16 mm, maximum depth of rebate, 15 mm, length overall of table, approx. 1800 mm for planing, surfacing, jointing, chamfering, rebating, etc., with fence to tilt up to 45°, adjustable telescopic guard over cutterblock, renewable steel lips adjacent to cutter, complete with motor and control equipment and all accessories.

(b) Induction Furnace
Electric Melting Furnace, suitable for non-ferrous metal, with a maximum capacity of 50 Kg. To be complete with switchgear and transformer, range of pots and all accessories, and spares including furnace lining bricks.

(c) Annealing Furnace

An electrically heated forced convection furance, with internal dimensions of work compartment approximately 1 m wide x 1 m deep x 1 m high, of double skin construction, with single door, wheel guides, adjustable air intake and exhaust, temperature controller and control panel, complete with motor starter, switchgear and pilot lamps, suitable for drying, curing, normalising, tempering and annealing to 550°C.

(d) 500 Kg moulding sand, 100 Kg core sand, 14 lbs mould dressing blacking, 6 in No. assorted moulding boxes, suitable for castings up to 50 Kg weight non-ferrous metal, set of moulding equipment including hand rammers, shovels, trowels, cleaners, upsets, beads, studs, chaplets and dowels, etc.

5. General

(a) Benches, Vices, etc.

(i) 2 No. all steel benches, approx. 3 m long and 1 m high x 0.75 m deep, with bench top, side and back boards of 3 mm mild steel sheet, height of side and back boards not less than 130 mm legs and cross rails of mild steel angles, with welded feet drilled for bolting down, drawers 2 No. each bench, 750 mm long x 450 mm wide x 100 mm deep on strong runners, fitted with strong lock and 2 keys, for Fitting Shop.

(ii) 1 No. all steel bench, 1.5 m long and 1 m high x 0.5 m deep, for Machine Shop.

(iii) 2 No. all steel bench tables, flat tops without back or side boards, 2 m long x 0.7 m wide x 1 m high, for Sheet Metal Shop.

(iv) 2 No. Cabinet Maker's benches, with heavy top 75 mm thick, integral end vice with steel spindle and slideways, tool well with sweep out chute, slot tool rack at back of well, front vice and drawer, 500 mm long x 400 mm deep x 100 mm high, for Pattern Making Shop.

(v) 2 No. all steel storage cupboards, high ledge type, approx. 1 m long x 2.2 m high x 600 mm deep, with double sliding doors, shelves, brass handles, complete with lock and 2 keys, for Fitting Shop.

(vi) 10 No. all steel tool cabinets, constructed of heavy gauge steel throughout, with reinforced door and padlock type fitting, with positions for two removable shelves. Size of cabinet approx. 1 m high x 0.5 m wide x 0.5 m deep, for Machine Shop.

(vii) 3 No. tool cabinets, as item (vi), for Sheet Metal Shop.

(viii) 3 No. tool cabinets, as item (vi), for Pattern Making Shop. and foundry.

(ix) 6 No. Mechanic's quick grip bench vices, 150 mm jaws and
2 No. ditto, 90 mm jaws, for Fitting and Machine Shops.

(x) Portable hoisting gantry comprising R.S.J. cross beam with 'a' type end frames, fitted with substantial corner gusset plates and mounted on steel castors. The cross beam to be fitted with a push type travelling carriage and 1000 Kg hand operated hoisting block. Height of cross beam from floor level 2.75 m; distance between 'A' frames 1.8 m, maximum height of hoisting block hook to be at least 2.1 m above floor level.

(xi) Bench type pipe vice, self locking, malleable cast iron body, steel screw, with hardened steel jaw, capacity ⅞" to 4½" pipe.

(xii) Pipe vice as above, fitted to portable (folding) tripod stand, with tray and footboard frame, capacity ⅛" to 2" pipe.

(xiii) Bench type instrument vice, adjustable to any position or angle with swivelling head, the stake vice jaws to be 12 mm wide, with a capacity of 24 mm.

(b) Hand Tools

(Note: Based on advice that 50% of screw and pipe threads in the Thessaloniki area are to B.S. Standards, appropriate tools are included)

1 - Screwing Machine, hand operated, suitable for bench mounting and complete with dies as follows:

(a) Whitworth, ⅛" - 1¼"

(b) BSF as above

(c) BSPT ⅛", ¼", ⅜", ½", ¾" and 1"

(d) 1 Set of stocks for above dies

1 - Set of taps, Whitworth thread comprising one each plug and taper for ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1⅛" and 1¼" complete with tap wrenches.

1 - Set of taps BSF thread comprising one each plug and taper taps, sizes as for Whitworth taps.

1 - Set 0.10 BA thread, stocks and dies, with tap wrench and plug and taper taps for each size, in strong polished hardwood case.

1 - Set of chaser stocks for cutting BSP threads from ⅛" to 4" dia. the chaser heads to be fitted with a ratchet, and the means of quick release and resetting of chasers.

Ditto for Metric Sizes

2 - Hand hacksaws 250-320 mm, with substantial frame and pistol grip type handle, complete with 4 dozen medium cut and 4 dozen coarse cut-blades.

2 - Small hacksaws 125 mm with chromium plated steel frame and rubber finger guard, complete with 4 dozen fine cut blades.

1 - Hand drill brace, with malleable cast iron frame, machine cut gears, and three jaw chuck for drills.

2 - Sets of hammers, ball pein, each set comprising one ¾lb one 1¼lb and one 2lb hammer, with one spare handle for each size.

2 - Copper rawhide combination hammers, one ¾lb and one 2½lb.

2 - Sledge hammers, one 7lb and one 14lb.

3 - Sets cold chisels each set comprising one ½", one ¾" and one 1".

1 - Set spanners, open end and double ended, chrome-vanadium Whitworth (and BSF) each set comprising ⅛" x 3/16", 3/16" x ¼", ¼" x 5/16", 5/16" x ⅜", ⅜" x 7/16", 7/16" x ½", ½" x 9/16", 9/16" x ⅝", ⅝" x ¾", ¾" x ⅞", ⅞" x 1", 1" x 1⅛", 1" x 1¼" and 1⅛" x 1¼".

1 - Set ring spanners, double ended, chrome-vanadium, Whitworth (and BSF) in sizes as above item.

1 - Set spanners, open end, double ended, chrome-vanadium, thin type, Whitworth (and BSF) set comprising 1" x 3/16", 3/16" x ¼", ¼" x 5/16", 5/16" x ⅜", ⅜" x 7/16" and 7/16" x ½".

1 - Set spanners, open end, double ended, chrome-vanadium, thin type, BA sizes 0 x 2, 2 x 4, 4 x 6, 6 x 8, 8 x 10.

1 - Set socket screw (Allen screw) hexagonal wrenches, 1/16", 3/32", ⅛", 5/32", 3/16", 7/32" and ¼".

1 - Set tubular box spanners, Whitworth (and BSF) sizes as above item for open end spanners complete with Tommy bars and in wooden case.

1 - Set tubular box spanners, BA sizes as above item for BA open end spanners complete with Tommy bars and in wooden case.

1 - Adjustable wrench, with fine adjustment screw to jaws, designed to give strength with lightness of weight 4" size suitable for ¼" Whitworth down. Equal to "Red Diamond" (Garrington).

1 - Stilson type pipe wrench 10" for pipes ⅛" to 1".

1 - Stilson type pipe wrench 24" for pipes ¼" to 2½".

1 - Stilson type pipe wrench 48" for pipes 1" to 5".

1 - Chain type pipe wrench for pipe up to 5".

2 - Sets "Stubs" needle files, each set comprising:-
Flat (warding), half-round, round (taper), three square (taper), hand (parallel), one smooth cut and one medium cut for each type i.e., 10 files per set.

4 - Sets best quality files 8", each set comprising:-
Flat (taper), hand (parallel), half-round, round (taper), square (taper), three square (taper), one second cut and one smooth cut of each type, i.e. 12 files per set. Each file to be supplied complete with wooden handle.

2 - Sets of files as above item, but 12" and one second cut and one bastard cut of each type, complete with wooden handles.

3 - Combination pliers, best quality, flat nose, chamfered edge, side cutter, burner hole and joint wire cutter 6".

3 - ditto but 8".

2 - Long snipe nosed pliers, with side cutter 8".

2 Electrician's combination pliers 7" with insulated handles, flat nose, side cutter, burner hole and joint wire cutter.

2 - Small snipe nose pliers 5".

1 - Tinman's snips 8" for straight or curved cutting.

1 - ditto but 12".

2 - Side cutting nippers 6".

2 - Screwdrivers, spindle pattern, with 3" chrome vanadium steel blade and polished boxwood handle.

2 - as above but with 6" blade.

2 - as above but with 10" blade.

2 - Electrician's screwdrivers with 3" blade and insulated handle.

2 - as above but with 8" blade.

1 - Blow lamp, paraffin type, 1 pint capacity, complete with prickers, spare nipple and spare pump leathers.

12 Kg Plumber's metal in sticks.

1 No. - Electric soldering iron, 65 watts, with pencil bit, suitable for 220 volts AC supply.

1 - ditto but 125 watts with oval taper bit.

6 Kg Tinman's solder in sticks.

2 Kg Resin cored solder on reels.

4 No. - 50 gram tins of "Fluxite" soldering flux.

4 - 100 gram bottles Baker's soldering fluid.

3 - Straight shank high speed steel twist drills ⅛" - ¼" x 1/64".

Set high speed steel parallel helical fluted reamers ¼" - 1" x 1/64".

Set high speed steel taper pin reamers ¼" - ¾" x 1/64".

2 - Cast Iron Vee Blocks 120 x 80 mm.

3 - Carborundum Stones, 200 x 50 x 25 mm combination.

Set of joiners saws, with polished handles, 18", 22" and 26".

Set of brass backed tenon saws, 8" x 10" x 12" and 14".

Adjustable saw set, for hand saws.

Joiners Mallet, with lignum vitae head.

Set of firmer chisels, with ash handles, size of blades 3/16" x ¼", ⅜", ½", ⅝", ¾", ⅞", 1", 1½", 2".

Set of curved blade chisels, 6 sizes.

3 - Spokeshaves with raised handle, adjustable cutter, and 2⅛" cutter.

Set of iron planes, with end and side adjustment of cutters, hard wood handles and knobs, lengths 8", 14" and 24".

(c) Measuring tools

1 - 50 ft steel tape, marked in British and metric graduations.

1 - Steel straight edge, with one edge bevelled, 1 m long.

2 - Steel rules, 12" long, graduated in British and metric marking.

2 - Steel tapes, rigid flexible type in case, 6' - 0" long graduated in British and metric marking.

1 - Vernier calliper gauge, 6" graduated in British and metric marking with fine adjustment and locking screws, complete in substantial case.

1 - Vernier, as above but 12".

1 - Chesterman or equal combination set comprising 12" steel rule graduated with British and metric markings, protractor head, centre head, and square head, heads to be drop forgings, hardened and ground.

1 - Adjustable Bench Level, 4" with ground and graduated vial, vial protector, and grooved base, equal to "Starrett" No. 96.

1 - Level as above but 12" long.

1 - Universal Dial Test Indicator complete, equal to "Starrett" No. 196A.

2 - Engineer's squares 3" blade, hardened solid steel accuracy to 1/1,000" per foot.

2 - Squares as above but with 6" blade.

2 - Squares as above but with 12" blade.

2 - Squares as above but with 18" blade.

1 - Set of Outside Calipers, lock joint transfer type, equal to "Starrett" type No. 36, each set comprising one 4", one 8", one 12" and one 18".

1 - Set of Inside Calipers, lock joint transfer type, equal to "Starrett" type No. 37, each set comprising one 4", one 8", one 12" and one 18".

1 - Spring type dividers with fine adjustment screw 4".

1 - ditto but 8".

1 - ditto but 12".

1 - Universal Surface Gauge (scribing block) with 9" and 12" spindle, equal to "Starrett" type No. 57B.

3 - Scribers, shop model with knurled body and with one straight point, and one right angle point.

3 - Centre Punches 4" x ⅜" with knurled body.

2 - Thickness gauges (feelers) with 10 blades 1½ to 25 thousandths of one inch.

1 - Micrometer Caliper Set with black enamelled drop forged frame, capacity 0 to 4", complete with interchangeable anvils, ratchet stop and four standards, the whole contained in a finished wood case. Equal to "Starrett" type No. 224AA.

1 - Seven pitch gauge, 4 - 60TPI.

1 - Imperial standard wire gauge.

1 - Surface or fitting plate, in best quality cast iron, 600 x 300 mm, finished to .02 mm per metre.

1 - Engineer's plumb bob.

Set of pattern maker's construction scales, for iron, brass, bronze, and aluminium castings.

(d) Portable drills etc.

(i) Electric pistol grip drill, ¼", 5/16" to ⅜" in steel, complete with 3 jaw chuck, 3 m flexible cable, and side handle.

(ii) Heavy duty portable electric drill, ½" to 1" in steel, with 3 jaw geared chuck and key, spade handle, and 3 m flexible cable with double insulation.

(iii) Portable jig saw, for wood, metal and plastics, cutting capacity, wood, up to 50 mm, complete with 3 m flexible cable.

(iv) High speed heavy duty portable grinder, 100 mm 5000 rpm running light, 3500 rpm full load, complete with 3 m flexible cable.

(v) Portable disc sander, 4200 rpm running light, 2600 rpm full load with 175 mm wheel.

(e) Marking Plate or Table

Marking out table, approx. 1.5 x 1.0 x 0.5 m high, with machined surface, heavy pattern of cast iron, with tee slots.

(f) Electrical Test Instruments

(i) Megger Insulation Testing Set, or equal, with ranges up to 2,000 Megohms, 1000 volts.

(ii) Avometer Model 8 or equal universal multi-range volt-amp-ohm meter.

(iii) Power Factor Meter, single phase, moving iron type.

(iv) Tong Test Ammeter, moving iron type, for AC or DC measurement, scaled 0-100A, and 0-400A.

(g) Machine Tools - Accessories and Tools

(i) Lathes.
Turning Tools, tipped, various
Tool Holders, various
Face Plates, with dogs, various
4 Jaw Chucks, various
3 Jaw Chucks, various
Chasers
Boring Heads
Revolving Centres
Clamps or Dogs
Steadies
Angle Plates.

(ii) Milling Machine.
Cutters, various
Cutter guards
Arbors
Magnet chucks.

(iii) Drilling Machines.
Drills, various
Chucks
Boring Bar
Machine Vice
Angle plates

(iv) Shaping Machines.

Tipped Tools, various
Clamps
Machine Vice.

(v) Grinding Machines.

Wheels, various grades and sizes
Wheel dressing tools.

(vi) Wood Working Machines.

Band and Circular Saws, various

(vii) Engraving Machine.

Cutters, various
Cutter grinder
Collets and Collet spindle
Forming Attachments and Forming Blanks
Milling Attachments
Machine Vice
Style and Rollers
Dividing Head
Circular Table
Copy and Copyholders, various
Fillers
Etcher
Work Clamps

(h) Workshop Stock

Steel Bar
Steel Channels
Steel Conduit
Steel Flat
Steel Round
Steel Signal
Steel Angle
R.S.J.s
Bright Hexagon Steel
Flat Spring Steel
Bright polished steel bars
Cast Steel (Annealed) Flat
Cast Steel (Annealed) Round
Cast Steel (Annealed) Square
Bolts and Nuts, various
Screws, various
Tubes, iron, steel and copper, various

WORKSHOP EQUIPMENT MANUFACTURERS

(1) United Kingdom

General:-	Staveley Machine Tools Ltd. Portland House Stag Place London SW1
	Alfred Herbert Ltd. PO Box 30, Edgwick Coventry
	Reynolds & Wilson Ltd. Richmond Surrey
	Noble & Lund Ltd. The Northern Machine Tool Works Felling Gateshead 10
	SOAG Machine Tools Ltd. Transport Avenue Brentford Middlesex
Woodworking Machines:-	Wadkins Ltd. Green Lane Works Leicester
	Thomas Robinson & Sons Ltd. Rochdale
	S. Tyzack & Sons Ltd. 341 - 345 Old Street London EC1
Grinding Machines:-	A. A. Jones & Shipman Ltd. Narborough Road South Leicester
Welding Equipment:-	Murex Welding Processes Ltd. Waltham Cross Herts.
Furnaces:-	Metalectric Furnaces Ltd. Cornwall Road Smethwick
Smithy & Foundry Equipment:-	Alldays & Onions Ltd. Great Western Works Birmingham 11

(2)	**France**	Sliaky SA 94 Vitry-sur-Seine
		Somenor 75-Paris (8e) 52 Av. des Champs-Elysees
		Manutar France SA Paris (16e) 32 R. Charnon-Lagache
(3)	**Germany**	Karl Huller, GmbH Ludwigsburg Schwieberdinger Str 80
		H. A. Waldrich GmbH 5900 Siegen Postfach 310
		Freidrich Deckel Munich
(4)	**Italy**	Oerliken Italiana - SlpA Milano, Via Scarsellini, 14
(5)	**Japan**	Oerliken Machine Tool Works Buhole AG Tokyo
(6)	**Sweden**	Lindkopings Mekaniska Verkstads AB Lidkoping
(7)	**United States**	Browne & Sharpe Mfg. Co. Centerdale, RI
		The Cincinnati Lathe & Tool Co. Cincinnati, Ohio
(8)	**Yugoslavia**	"Ivo Lolaribar" Maschinenfabrik Zeleznik-Beograd

(Names from Jaeger Waldman World Telex '71) 11/10 Machine Tools

APPENDIX B

LABORATORY EQUIPMENT

SECTION I

Schedule of Main Laboratory Apparatus

Standard accessories to be included with each main item.

ITEM	QTY	DESCRIPTION
1	1	Fuel oil water content testing apparatus, comprising copper still, water cooled glass condenser, glass spray tube and graduated glass. The apparatus to BS 2869.
2	1	Laboratory, heavy duty, Oertling type 21a balance, capacity 2 kg with sensitivity 5 mg. Brass stand, finished black, with polished and lacquered gunmetal beam and aluminium pans and mounted on polished mahogany board with levelling screw and plummet and enclosed in polished mahogany glazed case. Set of weights 100 g. to 500 g.
3	1	Laboratory balance, aperiodic, precision, projector type, with full rider attachment, lighting transformer and six spare bulbs, to weigh 200 gm including necessary standard weights. Class "A" adjustment with graticule 0-10 mg, 0.1 mg per half division.
4	1	Anti-vibration table for supporting Item 3. Consisting of polished wood case enclosing a heavy cast plate interposed between sheets of plastic material and cork and suspended on a system of shock absorbers. The top plastic sheet to be flush with the case and form the balance table.
5	1	Steelyard-type rough balance without case. Capacity 5110 g, sensivisity 0.2 g over whole range.
6	1	Minimum free space oven and desiccator complete with spare tray, spare heating elements, 8 dishes and spare thermometer.
7	1	General purpose electric oven about 2 cubic metres capacity, temperature thermostatically controllable up to 3000°C., with air circulation. Standard accesscries to include thermometer. (Internal dimensions - 400 x 400 x 400 mm and loading of 2 Kw.
	3	Spare indicating lamps.
	1 Set	Spare heaters.
8	1	Electric muffle furnace, for working temperatures up to 1000°C. Automatic temperature control, with indicating pyrometer and sheathed chromelalumel thermocouple. Capacity about 3000 cu.cms. Standard

Section I (Contd.)

ITEM	QTY	DESCRIPTION
8		accessories. (Internal dimensions - 250 x 150 x 75 mm. Loading - 2 Kw. b 5721, d 8624, d 8634/1 & d 5727).
		Additional accessories:-
	1	Bare standard thermocouple, with sub-standard millivoltmeter for checking above pyrometer.
	1	Spare wound muffle.
	1	Spare winding only, plus 2 kg cement.
	12	Spare excess temperature fuses.
	2	Spare thermocouples for working pyrometer.
9	1	"Cambridge", or equal, disappearing filament pyrometer, with leather carrying case and NiFe battery, range 900 to 1600°C, complete with wooden adjustable tripod stand with clamp.
10	2	Dean & Stark apparatus, or equal, for determination of water by distillation with an immiscible liquid, as Type 2 of B.S. 756, but with 10 ml receiver. Standard accessories.
11	1	Portable Orsat apparatus, 3-bulb type, for flue gas analysis, capacity 100 ml.
12	1	"Hay's" type portable CO^2 meter, for rapid spot tests.
13	1	Nesslerizer B.D.H. Lovibond, or equal, complete with white light cabinet, dulling screen and holder, and disc NN (for silica), and two Nessler Cylinders. Standard accessories.
		Additional discs:-
	4	Ammonia.
	2	Chlorine.
	6	pH
	1	NLG.
	1	NMB (Phosphate by Deniges method).
	1	Brightness screen (for disc NMB only).
	2	Stoppered shaking tubes (acid wash).
	1	Box B.D.H., or equal, Multi-range indicator papers, containing 1 gross books and colour chart (six ranges).

Section I (Contd.)

ITEM	QTY	DESCRIPTION
14	1	Portable Dionic water tester, with 3-range meter (0-30, 0-300 and 0-3000 units), with outer container. Spare calibrated tube, spare inner and spare outer electrode.
15	1	Wanklyn Hardness (Soap) test set in cabinet with plywood door and clip fastener. 12 tubes - 1 litre Wanklyn soap solution.
16	1	Pensky-Martens Flash-Point apparatus, electrically heated, with oil test jet and all standard accessories. Thermometers to include ranges I.P. 15C, 15F, 16C and 16F. Polished hardwood case with lock and carrying handle.
17	1	"Baker" microscope Model 4 BW, or equal. Stand only. Straight monocular, complete with Optical Outfit No.9 to suit, also 3 additional objectives, 50, 30 and 10 mm. Suitable microscope lamp. One gross 1 mm. slides and cover glasses No.1 with 18mm circles.
18	1	Complete 4-test set of apparatus for Oxidation Testing of Transformer Oil etc., and all other standard accessories for testing to B.S 148. Complete with electrically heated oil bath, (double walled, welded steel tank, overall dimensions 300 x 270 x 200 mm high, insulated with glass fibre and provided with a drain plug. Cover plate to have 4 apertures, fitted with removable covers, to take the reaction flasks and supports), thermostat, motor stirrer, thermometers, flask, condenser and air inlet tube, purifying and drying train, pressure regulating and flowmeter unit and all other standard accessories, and complete set of glassware. Spare parts:- 1 - immersion heater. 4 - flasks. 4 - Condensers. 4 - Air inlet tubes.
20	1	Electric Hotplate 500 x 300 mm, with set of spare heating elements, with 3 heat control.
21	1	Water Bath - 6-hole, electrically heated, with set of spare elements.
22	1	Electric heating mantle for flasks, all-flexible multi-size type, 300 watt, complete with energy regulator.
23	1	Electric "Bunsen", Electrothermal Engineering, Ltd., or equal, complete with energy regulator, support rod and attachment, and spare element.
24	1	Portable Hanovia Model 16, or equal, fluorescence lamp suitable for condenser leak detection by fluorescine method.

Section I (Contd.)

ITEM	QTY	DESCRIPTION
25	1	Stop clock timer, spring-driven, 60 mins. Concentric minutes and seconds read on open dial.
26	30	Reagent bottles, 500 ml. narrow mouth, glass-stoppered, best quality, with sand blasted labels as follows:-
		Acetic Acid
		Acetone
		Alcohol
		Ammonium Chloride
		Ammonium Hydroxide
		Ammonium Molybdate
		Ammonium Sulphate
		Ammonium Thiocynate
		Barium Chloride
		Benzene
		Carbon Tetrachloride
		Copper Sulphate
		Ether
		Ethyl alcohol
		Hydrochloric Acid conc.
		Hydrochloric Acid dil.
		Lime Water
		Nessler's Reagent
		Nitric Acid conc.
		Nitric Acid dil.
		Petroleum Ether 80/100°
		Potassium Ferricyanide
		Potassium Ferrocyanide
		Potassium Hydroxide
		Silver Nitrate (amber bottle)
		Sodium Hydroxcide
		Sodium Hypochlorite
		Sulphuric Acid conc.
		Sulphuric Acid ¼ dil.
		Toluene
		Deeply cut sandblast letters with white cellulose enamel borders except in the case of concentrated acids which shall have red cellulose enamel borders.
27		Reagent bottles, wide mouth glass stopper:-
	24	250 ml. capacity
	24	500 ml. capacity
28		Bottles with bakelite screw cap:-
	12	30 gm. capacity
	12	120 gm. capacity

Section I (Contd.)

ITEM	QTY	DESCRIPTION
29	2	Polythene bottles, screw stoppered, 250ml.
30		Weighing bottles, wide squat shape:-
	3	Height - 30mm, dia - 50mm
	3	Height - 30mm, dia - 60 mm
31		Pyrex Aspirator bottles with moulded outlet and stopcocks:-
	1	10 litre capacity
	2	5 litre capacity
32		Evaporating basins, Royal Worcester, flat form with lip, glazed inside and out:-
	12	Size - 95 mm.
	6	Size - 125 mm.
	3	Size - 177 mm.
	3	Size - 225 mm.
33	12	Pyrex evaporating basins R.B., with spout, 65 mm. diameter.
34		Beakers, Pyrex squat form with spout:-
	12	50 ml. capacity
	24	100 ml. capacity
	60	250 ml. capacity
	144	SC x 400 ml. capacity
	72	SC x 600 ml. capacity
	3	1000 ml. capacity
	3	3000 ml. capacity
35	1	Dropping bottle, T.K. pattern, 100 ml. capacity with ground in slotted stopper.
36	1	Density bottle, 50 ml. Castel Evans', or equal, modification.
37	3	Burettes, automatic delivery, with 2,500 ml. reservoir and B.S. joint B24, with drying tube, capacity 25 ml. x 1/10 ml., clear glass burette.
38	2	Burettes as Item 37, but 5 ml. capacity by 1/50 ml.
39		Burettes Grade A:- with straight stopcock
	6	50 ml. capacity
	2	10 ml. capacity
40		Crucibles, Royal Worcester Porcelain, with lids, glazed inside and out, Form A:-
	12	28 ml. capacity
	6	50 ml. capacity

Section I (Contd.)

ITEM	QTY	DESCRIPTION
41	3	Sheet-iron crucibles 45 mm. dia. with covers.
42	3	Pure nickel crucibles 45 mm. dia. with covers.
43		Measuring Cylinders to B.S.S.604. Unstoppered; with spout:-
	1	2000 ml. capacity
	2	1000 ml. capacity
	3	500 ml. capacity
	3	250 ml. capacity
	12	100 ml. capacity
	3	50 ml. capacity
	3	25 ml. capacity
	3	10 ml. capacity
44		Measuring Cylinders as Item 43, but stoppered:-
	2	250 ml. capacity
	2	100 ml. capacity
45		Watch glasses, thin clear unground edges:-
	6	15 cm. dia.
	24	10 cm. dia.
	12	5 cm. dia.
46		Dessicators, resistance glass, plain type, with knob lid and perforated zinc tray:-
	2	24 cm. dia.
	1	18 cm. dia.
47	1	Dessicator, Pyrex BLWA pattern, or equal, with stopcock and porcelain. plate. 25 cm. dia.
48		Pyrex flasks, flat-bottomed:-
	12	1000 ml. capacity
	3	500 ml. capacity
49		Conical flasks, Pyrex, or equal, narrow mouth:-
	6	1000 ml. capacity
	24	500 ml. capacity
	12	250 ml. capacity
	12	100 ml. capacity
	6	50 ml. capacity
50		Conical flasks, Pyrex, or equal, wide mouth:-
	6	500 ml. capacity
	12	250 ml. capacity

Section I (Contd.)

ITEM	QTY	DESCRIPTION
51		Conical filter flasks, Pyrex, or equal, heavy wall, with side tubulure:-
	2	1000 ml. capacity
	2	500 ml. capacity
	2	250 ml. capacity
52		Volumetric flasks, Elliots E-Mil Brand, or equal, Green Line, with plastic stopper:-
	2	2000 ml. capacity
	2	1000 ml. capacity
	3	500 ml. capacity
	3	250 ml. capacity
	6	100 ml. capacity
	3	50 ml. capacity
53		Funnels, plain glass:-
	6	5 cm. dia.
	24	10 cm. dia.
	3	15 cm. dia.
54		Funnels, Phoenix glass, or equal, precision pressed:-
	6	7.5 cm. dia.
	6	5 cm. dia.
55	1	Enamelled steel funnel, 200 mm. diameter.
56		Buchner, or equal, filter funnels, Royal Worcester Porcelain:-
	1	Size 2 (65 mm.)
	1	Size 5 (125 mm.)
57		Separating funnels, Pyrex, or equal, stoppered, cylindrical:-
	1	100 ml. capacity
	1	250 ml. capacity
	1	500 ml. capacity
	1	1000 ml. capacity
58	6	Thistle, or equal, funnels, 30 cm. long.
59	2	Thistle, or equal, funnels, with two bulbs, 30 cm.
60		Gas sampling tubes, with two stopcocks, B.S. 2069, Type 2:-
	3	250 ml. capacity
	3	100 ml. capacity
61	1	Pestle and mortar, acid proof stoneware.
62	1	Pestle and mortar, Agate. Diameter - 60 mm. ext, 51 mm. int.

ITEM	QTY	DESCRIPTION
63		Pipettes, Bulb type:-
		"Technico" Grade A, or equal.
	6	1 ml. capacity
	3	2 ml. capacity
	2	5 ml. capacity
	3	10 ml. capacity
	4	25 ml. capacity
	2	50 ml. capacity
	2	100 ml. capacity
		Graduated type, Grade A.
	2	1 ml. (in 0.01) capacity
	2	2 ml. (in 0.02) capacity
64	6	Dropping Pipettes, 1 ml. capacity
	12	Rubber teats for same, Size 1.
65		Automatic type pipettes:-
	4	2 ml. capacity
	3	5 ml. capacity
	1	10 ml. capacity
66		Test tubes, Pyrex, or equal, with rims:-
	36	75 x 9 mm.
	24	100 x 12 mm.
	24	125 x 15 mm.
	24	150 x 25 mm.
	4	Wooden stands for test tubes. To take 12 test tubes.
67		Nessler cylinders:-
	12	with mark at 50 ml.
	12	with mark at 100 ml.
68		Mercury-in-glass thermometers, solid stem, red-reflector type:-
	6	0° to 110°C.
	3	0° to 360°C.
	6	0° to 240°F.
	3	50° to 650°F.
69		Sintered glass filter crucibles, 15 ml. normal form - 20 mm. disc:-
	6	with disc porosity 4
	2	with disc porosity 3
	3	Funnels for above, with rubber rings.
	12	Spare rubber rings.
70	2	Distillation flasks, side tube, 500 ml.

Section I (Contd.)

ITEM	QTY	DESCRIPTION
71	3	Glass condensers, 25 cm. coil.
72		Hydrometers, 15-18 cms.
	2	0.900 to 0.950 range
	2	0.950 to 1.000 range
	2	Hydrometer jars, 250 mm.
73		Miscellaneous brushes:-
	12	Test tube 20 mm. dia.
	3	Bottle, 350 mm. long
	3	Bottle, 400 mm. long
	3	Bottle, 450 mm. long
	12	Squirrel hair in quill holders. Medium size.
	1	Squirrel hair in quill holder. 25 mm. flat, with hardwood handle.
74	2	Aluminium scoops, 10 cm. long
75	1 pair	Nickel-plated, blunt pointed scissors, 120 mm.
76	1 pair	Dissecting forceps, sharp points, 115 mm.
77	1	Glass-cutting tool.
78		Marking equipment:-
	24	Grease pencils to write on glass, 12 each red and blue.
	1 bottle	Label varnish - 150 gm.
	1	Graduation filler, white - 60 gm.
79	500 gm.	White vaseline. (Paraffin soft white).
80	3 tins	Rubber grease, medium grade.
81		Retort stands with polished stainless steel rods, and accessories:-
	4	Size 1
	2	Size 2
	12	Bossheads, Technico 9719, or equal.
	12	Clamps, Technico 9710, or equal.
		Rings, plain rod 9806:-
	1	60 mm. dia.
	1	80 mm. dia.
	3	100 mm. dia.
	1	130 mm. dia.
82		Mohr, or equal, pattern clips:-
	12	45 mm. long
	12	75 mm. long

ITEM	QTY	DESCRIPTION
83		Hoffman, or equal, pattern clips:-
	24	18 mm between bars
	6	25 mm. between bars
	6	36 mm. between bars
84		Whatman's, or equal, filter papers:-
	4 boxes	No.1 - 24 cm.
	3 boxes	No.1 - 11 cm.
	[illegible] box	No.1 - 9 cm.
	3 boxes	No.41 - 11 cm.
	1 box	No.42 - 11 cm.
	1 box	No.541 - 12.5 cm.
	1 box	No.41 - 9 cm.
	1 box	2 kg. filter clippings, ordinary.
	1 box	ashless pellets.
85	4	Burette stands, with 10 mm. plated rod, hardwood base and white technolite top, to take two Burettes each, with spring-type burette holders.
		Spares:-
	144	Rubbers for holders.
	24	Springs for holders.
86	4	Wash bottles, 1000 ml.
87	3	Spatulas, nickel, flat 12.5 cm.
88		Rubber bungs:-
	6 doz.	1 doz. each Sizes G to M inclusive.
	3 only	1 each Size N, O & P.
89		Bark corks, best quality assorted, long pattern:-
	1 gross	12 each Sizes 3 to 14.
	1 gross	12 each Sizes 7 to 18.
90	1	Cork Press.
91	1 set	Cork borers, set of 16-range 5 to 30 mm. complete with sharpener.
92		Soda glass tubing in 1.5 m lengths:-
	5 kg.	1 kg. each sizes 4/5, 6/7, 8/9, 10/11 and 20/21 mm. external dia.
	2 kg.	Glass rod, assorted sizes to 8 mm. 0.5 kg. each 4/5, 5/6, 6/7 & 7/8 mm.
93	2 pairs	Crucible tongs, bow end, nickel, 200 mm. long.
	1 pair	Ward tongs, 450 mm. long, hand shield.

Section I (Contd.)

ITEM	QTY	DESCRIPTION
94		Porcelain tiles, glazed:-
	3	15 cm. square, plain.
	1	8 5 x 11.5 cm., with 12 cavities.
95		Triangles, pipeclay, on iron wire:-
	6	40 mm. side
	6	50 mm. side
	6	60 mm. side
		Ditto, silica on nickel chrome wire:-
	3	40 mm. side
96		Tripod stands iron, 200 mm. high:-
	4	200 mm. x 125 mm. with triangular top
	1	200 mm. x 125 mm. with circular top
97	144	Gas mantle support rings, fireclay.
98	24	Iron wire gauzes with asbestos centres, 12.5 cm. square.
99	1	Bench blowpipe for LP gas. ABTDU Flamemaster, or equal.
100	6	Bunsen burners for LP gas 10 mm. tube.
101	4	Meker type burners for LP gas, diameter of flame 25 mm., top 22 mm.
102		Best quality Neoprene, or equivalent, plastic tubing:-
	40 m	2 coils for LPG burners. 1.5 mm. wall x 8 mm. bore
	20 m	1 coil 2 mm. wall x 10 mm. bore
	20 m	1 coil 2.25 mm. wall x 12.5 mm. bore
	10 m	1.5 mm. wall x 6.5 mm. bore
	10 m	7 mm. wall x 17 mm. O/D.
		Vacuum tubing, heavy wall, best quality oil resisting synthetic material.
103	1	Deadweight gauge tester complete with elements and weights to cover a range of 70 to 3500 kN/m^2 in increments of 7 kN/m^2.
	5	Additional 700 kN/m^2 weights for up to 7,000 kN/m^2.
104	1	U-tube liquid gauge, with adjustable scale, for checking draught gauges, 0 to 9 kN/m^2.
105	1	Mercury column for testing vacuum gauges etc. Scale graduated 100 kN/m^2 x 0.3 kN/m^2, with vernier to 0.03 kN/m^2. Complete with mercury reservoir and interconnecting piping, also 10 mm union for gauges. Wall mounting.
106	1	100 mm jaw quick-closing mechanic's vice.

Section I (Contd.)

ITEM	QTY	DESCRIPTION
107	1	40 mm jaw jeweller's vice.
108	1	LORCH precision lathe model KD50, or equal, arranged for motor drive. Complete with compound slide rest No.28. Height of centres - 50mm Length of bed - 400mm Distance between centres - 175mm Spindle bore - 8mm Collet capacity, right through - 4.5 mm Collet capacity, short length - 7mm Rod and guide pulley No.13a. 2 - collets. Universal chuck No.44c. 220V single phase 1400 r.p.m. motor with centrifugal switch 0.125 Kw. Drilling tailstock to take Collets, lever operated, No.696. Set of 5 disc. chucks No.22. Set of 5 ring chucks No.22a. Sets of 8 carriers for holding work from 1 mm. to 6mm. Counter shafting No.66 - 1/3. Hardwood box to carry the foregoing equipment.
109	1	Fortin type Barometer, bore of tube 6mm.

TOTAL, SECTION I £7,000

LABORATORY EQUIPMENT

SECTION II

SCHEDULE OF REAGENTS

ITEM	QTY	DESCRIPTION
1	500 gm.	Ammonium Hydrogen Carbonate
2	500 gm.	Ammonium Bicarbonate
3	6 x 500 gm.	Ammonium Chloride
4	5 x 500 gm.	Ammonium Molybdate
5	500 gm.	Ammonium Oxalate
6	500 gm.	Ammonium Sulphate
7	500 gm.	Ammonium Thiocyanate
8	500 gm.	Ammonium Carbonate
9	2 x 500 gm.	Asbestos for Gooch, or equal, Crucibles
10	10 litres	Normal HC1 Hydrochloric Acid
11	6 litres	Concentrated HC1 (Hydrochloric Acid)
12	10 litres	Sulphuric Acid
13	6 litres	Nitric Acid (Sp.gr - 1.41/1.42)
14	12 litres	Nitric Acid N/1
15	2 litres	Glacial Acetic Acid
16	4 x 500 gm.	Barium Chloride
17	3 x 500 gm.	Barium Hydroxide
18	3 x 100 ml.	Bromine (Sp.gr. about 3.1)
19	500 gm.	Calcium Carbonate
20	2 x 500 gm.	Charcoal (decolourising) Powder (activated) purified

Section II (Contd.)

ITEM	QTY	DESCRIPTION
21	3 x 500 gm.	Chromium Oxide
22	2 x 500 gm.	Cadmium Chloride hydrated
23	500 gm.	Copper Acetate
24	2 x 500 gm.	Copper Sulphate
25	500 gm.	Cuprous Chloride
26	500 gm.	Cupric Chloride
27	250 gm.	Ferrous Sulphate
28	2 x 500 gm.	Ferrous Ammonium Sulphate
29	500 gm.	Ferric Chloride hydrate Solution containing 60% W/V $FeCl_3$
30	3 x 500 gm.	Fusion Mixture
31	2 x 500 ml.	Hydrogen Peroxide 100 vols.
32	2 x 500 gm.	Iodine
33	5 x 500 ml.	Indicator solution, pH 3.5, 4.4, 4.5, 4.6 and 6.0
34	3 x 250 ml.	Indicator solution, pH 4.4 - 6.0, red to green
35	3 x 250 ml.	Indicator solution, pH 9.0, 9.5, 10.0, 10.5 and 11.0
36	3 x 250 ml.	Universal Indicator, pH 3.0 to pH 11.0
37	5 x 100 ml.	Bromophenol Blue Indicator Solution
38	5 x 100 ml.	Bromocresol Green Indicator Solution
39	5 x 100 ml.	Bromocresol Purple Indicator Solution
40	500 gm.	Diphenylamine
41	500 gm.	Eriochrome Black T. (Solochrome black)
42	6 x 500 gm.	Fluorescein Sodium Salt
43	250 gm.	Methylene Blue
44	500 ml.	Buffer Solution pH10

Section II (Contd.)

ITEM	QTY	DESCRIPTION
45	2 x 250 gm.	Methyl Orange
46	2 x 250 gm.	Methyl Red
47	2 x 5 gm.	Murexide Ammonium Purpurate
48	500 ml.	Phenol Red
49	3 x 500 gm.	Phenolphthalein
50	250 ml.	Thymolphthalein Indicator Solution
51	2 x 250 ml.	Thymol Blue
52	2 x 250 gm.	Xylene Cyanol FF
53	6 x 250 gm.	Tetrahydroxy quinine Indicator
54	2 x 1 kg.	Silica Gel self-indicating
55	1 Case	of 2 x 2½ litre Ethyl Alcohol absolute
56	1 x 2½ litres	Amyl Alcohol
57	6 x 2½ litres	Benzene
58	2 x 2½ litres	Toluene Sulphur free
59	1000 gm.	Carbon Disulphide
60	1 x 2½ litres	Ether
61	1 x 2½ litres	Acetone
62	1 x 2½ litres	Chloroform
63	3 x 2½ litres	Isopropyl Alcohol
64	2 x 2½ litres	I.P. Petroleum Ether conforming to S.P. Specification for Analytical purposes
65	1 x 2½ litres	Petroleum Ether 80 - 100°C.
66	250 gm.	Lead Chromate precipated Litharge
67	250 gm.	Lead Oxide Litharge
68	250 gm.	Lead Dioxide

Section II (Contd.)

ITEM	QTY	DESCRIPTION
69	8 x 500 gm.	Mercury metal
70	2 x 250 gm.	Mercurous Chloride
71	2 x 250 gm.	Mercuric Chloride
72	250 gm.	Mercuric Iodide (red)
73	8 x 25 gm.	Mercuric Nitrate
74	250 gm.	Manganese Chloride
75	4 x 500 gm.	Manganese Sulphate
76	500 gm.	Magnesium Carbonate (Light or heavy)
77	500 gm.	Magnesium Chloride
78	500 gm.	Magnesium Sulphate
79	4 x 500 gm.	Oxalic Acid
80	500 gm.	Potassium Bromide
81	3 x 500 gm.	Potassium Chlorate
82	2 x 500 gm.	Potassium Dichromate
83	2 x 500 gm.	Potassium Dihydrogen Phosphate
84	250 gm.	Potassium Ferricyanide
85	500 gm.	Potassium Ferrocyanide
86	4 x 500 gm.	Potassium Hydroxide pellets
87	4 x 500 gm.	Potassium Iodate
88	4 x 500 gm.	Potassium Iodide
89	4 x 500 gm.	Potassium Hydrogen Phthalate
90	4 x 500 gm.	Potassium Metabisulphite
91	4 x 500 gm.	Potassium Permanganate
92	500 gm.	Potassium Thiocyanate

Section II (Contd.)

ITEM	QTY	DESCRIPTION
93	2 x 500 gm.	Potassium Palmitate Technical
94	4 x 500 gm.	Sodium Bicarbonate
95	250 gm.	Sodium Bismuthate
96	3 x 500 gm.	Sodium Carbonate Anhydrous
97	2 x 500 gm.	Sodium Dihydrogen Phosphate
98	500 gm.	Sodium Borate
99	500 gm.	Sodium Hypochlorite (not suitable for storage or long transit)
100	5 x 500 gm.	Sodium Hydroxide Pellets
101	500 gm.	Sodium Nitrite
102	500 gm.	Sodium Nitroprusside
103	250 gm.	Sodium Nitrate
104	500 gm.	Sodium Phosphate (dibasic) anhydrous
105	500 gm.	Tri Sodium orthophosphate hydrated
106	5 x 500 gm.	Sodium Sulphate anhydrous
107	6 x 500 gm.	Sodium Thiosulphate
108	6 x 500 gm.	Silver Nitrate
109	1 siphon	Sulphur Dioxide liquified (containing almost 1½ kg)
110	1 Kg.	Flowers of sulphur sublimed
111	2 x 500 gm.	Stannous Chloride
112	2 x 250 gm.	Amino 2 Naphthol 4: Sulphuric Acid Purified
113	2 x 500 gm.	Benzidine
114	4 x 25 gm.	Sym-Diphenyl Carbazone
115	250 gm.	Dimethyl Glyoxime
116	500 gm.	Benzoic Acid 25 x 20 gm. tubes Thermochemical Standard certified by National Physical Laboratory.

Section II (Contd)

ITEM	QTY	DESCRIPTION
117	2 x 2½ litres	Glycerol
118	2 x 500 gm.	(Hydroquinone) Quinol
119	500 gm.	8 Hydroxy Quinoline
120	500 gm.	8-hydroxy 7-iodo quinoline-5 sulphonic acid
121	6 x 2½ litre	E.D.T.A. Solution N/50
122	2 x 25 gm.	Diphenyl Thiocarbozone
123	5 x 100 gm.	Cupferron
124	250 ml.	Aniline
125	6 x 500 gm.	Starch soluble
126	3 litre	O-Tolidine
127	500 gm.	Sucrose
128	500 gm.	Tartaric Acid
129	500 gm.	Phenol
130	3 x 500 gm.	Pyrogallol Cryst. Alline
131	1 x 2½ litres	Pyridine Analar
132	500 gm.	Tannic Acid B.P.
133	250 gm.	Nitrose B Naphthol
134	250 gm.	1 - Napthyl Amine
135	250 gm.	Sulphanilic Acid
136	500 gm.	Zinc (metal) granulated
137	6 x 2½ litre	Nessler Reagent, for detection of ammonia
138	250 gm.	Sodium Tungstate
139	2 x 100 gm.	Vanadium Pentoxide
140	500 gm.	Glass wool lead free

Section II (Contd.)

ITEM	QTY	DESCRIPTION
141	3 x 500 gm.	Soda asbestos carbosorb 6 - 12 mesh
142	1 x 2½ litres	Triethanolamine. Technical
143	2 x 500 gm.	Sodium Sulphate Anhydrous
144	500 gm.	Sodium Oxalate
145	2 x 450 ml.	Hydrofluoric Acid in powder cap polythene bottles
146	500 gm.	Succinic Acid
147	500 gm.	Urea
148	250 gm.	Sodium Diethyl Dithiocarbamate
149	1 lb.	Gelatine sheet
150	4 x 25 gm.	Salicylaldoxime
151	500 gm.	(Potassium Bisulphate) Potassium hydrogen sulphate crystals
152	4 x 25 gm.	Benzion A-Oxime
153	2 x 500 gm.	Sodium Potassium Tartrate
154	2 x 25 gm.	Quinalizarin
155	2 x 500 gm.	Ammonium Nitrate
156	1 x 25 gm.	1:10 Phenanthrolime monhydrate
157	500 gm.	Hydroxy - ammonium Chloride
158	5 x 5 gm.	9 - Phenyl-2:3:7-Trihydroxy-6-fluorone
159	250 gm.	Nickel Ammonium Sulphate
160	250 gm.	(Gum Arabic) acacia powder No.1
161	500 gm.	Sodium Metasilicate technical
162	500 ml.	Phenol 2:4 Disulphonic 25% W/V. in sulphuric acid
163	2 x 2½ litres	Carbon Tetrachloride
164	3 x 2½ litres	Concentrated Ammonia Solution

Section II (Contd.)

ITEM	QTY	DESCRIPTION
165	2 x 250 gm.	Potassium Nitrate
166	2 x 500 gm.	Potassium Chromate
167	2 x 25 gm.	Sodium Cobaltinitrite
168	100 gm.	Para Nitrobenzene Azo resorcinol (Magneson)
169	10 x 1 gm.	Germanium Dioxide
170	100 gm.	Brucine
		TOTAL, SECTION II £1,500

APPENDIX C

SPECIFICATION FOR BUILDING MATERIALS AND WORKMANSHIP

1. GENERAL

The Specification is intended to provide a description of the Materials and Workmanship recommended by the Consultants in general terms. A schedule of Suppliers is attached (Appendix A) but this schedule is based on information available at the time of compiling the Report and it is recognised that the information given by the schedule may be superseded or incomplete by the time construction work starts on the Services Centre Buildings and hence the schedule should only be taken as a general guide for further planning purposes.

The Specification which follows is applicable to all the buildings on the Services Centre and the Services Sub-Centre. Information which is particular to any building will be found in the Sections which deal with that building.

2. EXCAVATION

Excavation will generally be in soft material. Precautions shall be taken to keep the excavations clean and free from water at all times, particularly during the winter months when the ground water table is expected to rise near the surface of the ground.

3. CONCRETE

All concrete, including materials, mixing, placing, compacting, curing and testing shall comply with the requirements of DIN 1045 or any Greek Regulations that may be introduced in place thereof.

All steel for concrete reinforcement shall comply with the requirements of DIN 1045 or any Greek Regulations that may be introduced thereof, including fixing, spacing, lapping, bending, testing, etc.

Ordinary Portland cement shall be used for all classes of concrete.

The following classes of concrete shall be used:-

- Class B 160 for blinding to reinforced concrete, floor and roof screeds, and mass concrete work generally.
- Class B 225 for reinforced concrete floors and foundations unless shown otherwise.
- Class B 300 for structural reinforced concrete to columns, beams, and suspended slabs, when required.

The following classes of plain round or distorted mild steel bars shall be used:-

- St I for foundations and columns
- St III for columns, beams and slabs
- St IV (mesh) for floor and roof slabs

4. BRICKWORK AND BLOCKWORK

Bricks shall be grey or white cement bricks for external walls of overall dimensions 205 x 55 x 95 mm

Blockwork shall be carried up in hollow precast concrete blocks to the following overall dimensions

400 x 200 x 200mm
400 x 200 x 100mm

Brickwork and blockwork will generally be laid in stretcher bond.

Lime mortar shall be used for all brickwork and blockwork. The mortar shall consist of one part cement to two parts hydrated lime to nine parts building sand by volume. Alternatively an approved mortar plasticiser may be added to a mortar consisting of one part cement to six parts building sand by volume.

Brickwork and blockwork shall be reinforced horizontally at every third course of bricks and every second course of blocks with an approved welded mild steel mesh to give the following reinforcement.

For 200mm thick walls 2 No 5mm dia bars at 150mm centres with cross wires 3 mm dia. at 300mm centres

For 100mm thick walls As above but longitudinal bars at 75mm centres

Horizontal damp proof courses shall be provided of three ply hessian based built up bituminous felt of nominal weight 3.8 kg/m²

External walling generally shall consist of an outer skin of white cement (facing) bricks and an inner skin of grey cement bricks as shown on the drawings. The inner face of the wall shall be plastered and painted as described in Sections 6 and 9.

Internal walling generally shall consist of precast concrete hollow blocks to the thickness shown on the drawings plastered and painted both sides.

5. ROOFING

1. Built up Roofing

Roofing shall be built up as follows:-

(i) Structural slab
(ii) Vapour barrier of hessian reinforced felt suitably lapped and bonded
(iii) Insulation layer of 40 mm nominal thickness glass wool industrial quality resin bonded insulating slabs.
(iv) Screed to falls.
(v) Three layers roofing felt. The top layer shall be finished with white stone chippings 10 to 13mm in size laid in a dressing coat of bitumen.

2. Sheet Roofing

Sheet roofing shall be carried out in corrugated asbestos cement sheets supported on light steel trusses spanning between reinforced concrete structural members. Ridge capping pieces, edge flashings rooflights etc., shall be provided as required. All laps shall be sealed to pitches flatter than 30°.

6. FLOOR, WALL AND CEILING FINISHES

(i) Marble

To Floors, minimum thickness 20 mm bedded on 1 : 4 cement sand mortar.
To skirtings 100 mm high 15 mm thick fixed on with 1 : 4 cement sand mortar.
To stair treads 30 mm thick bedded on 1 : 4 cement sand mortar
To stair risers 20 mm thick fixed with 1 : 4 cement sand mortar.

(ii) Unglazed Ceramic floor tiles.

150 x 150 x 12 to 15 mm bedded on 1 : 4 cement sand mortar.

(iii) Glazed Ceramic Wall tiles.

150 x 150 x 6 mm thick fixed to plastered surfaces with approved adhesive.

(iv) Vinyl or Vinyl Asbestos tiles.

To floors 300 x 300 x 2.5 mm thick fixed to minimum to 50 mm thick prepared screed with approved adhesive.
To skirtings 100 mm high black vinyl tiles fixed with approved adhesive.

(v) Cement tiles.

150 x 300 x 12 mm thick bedded on 1 : 4 cement sand mortar.

(vi) Granolithic finish.

Minimum 50 mm thick.

2. **Plaster**

Plaster to walls and ceilings shall be applied as follows:-

Rough cast coat of 1 : 4 cement sand rendering followed by two coats of plaster to the proportions 1 part cement to ½ part lime to 5 parts sand by volume.

7. DOORS AND WINDOWS

1. The following types of doors shall be used:-
   (i) Timber framed doors. Flush, tongued and grooved or part glazed.
   (ii) Metal framed doors. Aluminium framed, fully or part glazed.
   Zinc coated mild steel framed (14 gauge) with
   zinc coated mild steel leafs (18 gauge)
2. The following types of window shall be used:-
   (i) Timber framed
   (ii) Steel framed
   (iii) Aluminium framed

For types (i) and (ii) glass shall be fixed with putty and frames shall be painted in accordance with Section 9. For types (iii) glass shall be fixed with approved neoprene gaskets. The aluminium frames shall be anodised to a white satin finish.

8. GLAZING

Glass shall be 4, 6 or 10 mm thick depending upon window sizes and shall be clear or opaque as required. Clear glass shall give clear undistorted vision and reflection.

9. PAINTWORK

Paints shall be of approved manufacture and to the colours, tints, quality (Interior or Exterior) as required. All paint shall be applied strictly in accordance with the manufacturer's instructions.

Paintwork shall be applied as follows:-

(i) Concrete.
Brush off efflorescence or salts and apply two coats approved cement paint.

(ii) Woodwork.
Prime, stop apply undercoat and two coats approved gloss or matt oil or enamel finish coat as required.

(iii) Plaster.
Allow thoroughly to dry, brush off efflorescence or salts apply primer and two coats approved plastic emulsion paint.

(iv) Steelwork.
Clean off all rust with a wire brush, apply red lead primer, two undercoats and one coat approved finish. For exterior work the finish shall be gloss or semi-gloss.

(v) Pipework.
Galvanised mild steel, as for steelwork. Asbestos Cement, as for concrete.

(vi) Brickwork.
As for Concrete.

10. DRAINAGE AND WATER SUPPLY

1. External work

Asbestos cement or salt glazed pipes shall be used for rain water and soil drainage.

Water supply service pipes shall be in galvanised mild steel.

Manholes inspection chambers etc. shall be constructed in brickwork rendered internally and fitted with cast iron covers and frames.

2. Internal work

Rain water down pipes shall be asbestos cement or unplasticised P.V.C.

Soil drainage down pipes and vent pipes shall be unplasticised P.V.C.

Waste pipes above ground level shall be unplasticised P.V.C.

Hot and cold water distribution pipes shall be galvanised mild steel.

Pipework generally shall be concealed.

All pipes and fittings including bends, junctions, traps etc. shall be accessible and fitted with rodding eyes as required.

11. PAVEMENTS

1. Footpaths

Footpaths shall consist of a 100 mm thick layer of rolled hardcore covered with 40 mm thick precast concrete paving slabs bedded in 20 mm of 1 : 3 lime sand mortar.

Kerbs shall be precast concrete, bedded and haunched in 1 : 4 cement sand mortar.

2. Gravel Areas

Gravel areas shall consist of a 100 mm thick layer of rolled hardcore surfaced with a 100 mm thick layer of selected graded gravel well watered and compacted.

All vegetation shall be removed under gravelled areas and an approved weed killer of the sodium chlorate or equal type applied to retard vegetable growth.

3. **Asphalted Areas**

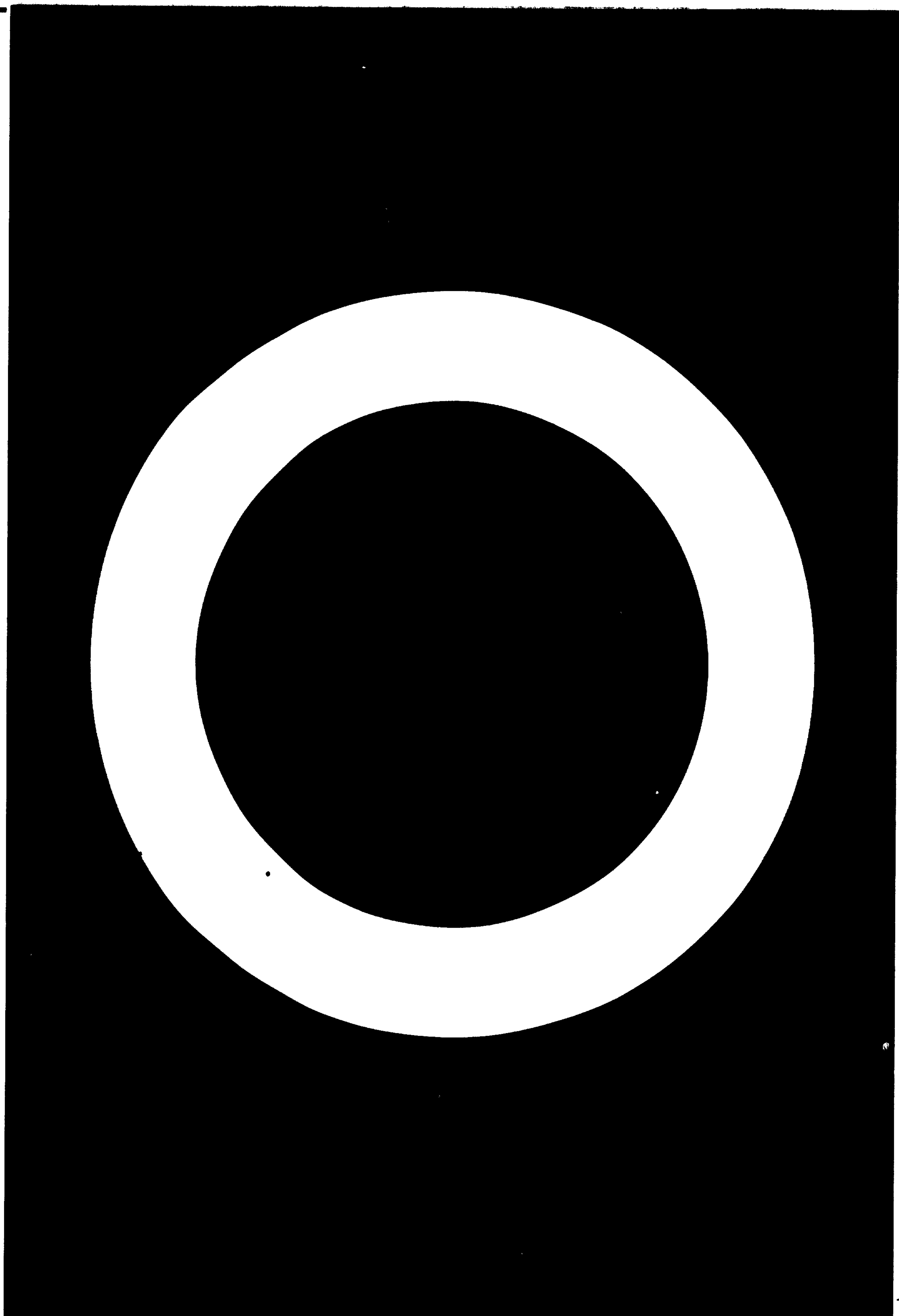
Asphalted areas shall consist of 100 mm thick compacted hardcore, a base course of 40 mm compacted thickness of Tarmacadam and a wearing course of 10 mm compacted thickness of Tarmacadam or fine cold asphalt. Falls to drainage gulleys etc. shall be provided as required.

MATERIALS

Cement	Titan (Greece) Olympos Iraklis (Greece)
Reinforcing Steel	Viohalko (Greece) Halivourgiki (Greece)
Cement Bricks	Plinthochrome (Greece)
Concrete Blocks	Lambrinos (Greece)
Asbestos cement sheeting	Hellenit (Greece) Evelit (Greece) Amiandit (Greece)
Roof Insulation	Monyal (Greece)
Roofing Felt	Viasphalt (Greece) Bituleum (Holland)
Marble	Stamatopoulos (Greece) Moshous (Greece)
Unglazed Ceramic floor tiles	Philipou (Greece) Alatini (Greece) Buchtal (Germany)
Glazed Ceramic Tiles	Filkeram-Johnson (Greece) Cedit (Greece) Akmi (Greece)
Vinyl and Vinyl asbestos tiles	Evepi (Greece) Marley (U.K.) Dunlop (U.K.) Armstrong (U.K.)
Cement Tiles	Aias (Greece) Amorjanos (Greece)

Doors	Zylopan - Timber (Greece) Viohalko - Aluminium (Greece)
Window frames	Arconal (Greece) Viohalko - Aluminium (Greece)
Partitions	Zylopan (Greece) Panlock (Greece) Helarco (Greece)
Security Grilles	Manzioros (Greece) Alfalumin (Greece) Technosidirourgiki (Greece)
Venetian Blinds	Diamandis (Greece) Stor Primalux (Greece) Faber (Greece)
Glass	St. Gobain (Belgium) Pilkington (U.K.)
Paint	Chrotex (Greece) Amiadit (Greece)
Toilet Fittings	Ideal Standard (Greece) Viohalko-Vitruvit (Greece)
Asbestos cement pipes	Ellenit (Greece) Evelit (Greece) Amiadit (Greece)
Galvanised M. S. pipes	Metallurgiki (Greece) Solinourgia Athinon (Greece)
Unplasticised P.V.C. pipes	Eladur (Greece) Evpa (Greece)
Boilers	Thermis (Greece) Soulis (Greece) Viohalko (Greece)
Burners	Sun-Ray (U.S.) Rielo (Italy)
Electric Water Heaters	Elco (Greece) Strauss (Greece) Izola (Greece)

Convector Heaters	Stassimopouli (Greece) Viohalko (Greece) Thermis (Greece)
Unit Space Heaters	Phyrogenis (Greece) Issaris Vassiliadis (Greece) Varsos (Greece)
Fan Coil Units	As above
Air Handling Units	As above
Fans	As above
Cooling Towers	As above and Baltimore Air Coil Co. (U.S.)
Refrigeration Plant	Carrier (U.S.) Frame (U.S.) Westinghouse (U.S.) Dunham Bush (U.S.)
H & V Controls	Satchwell (U.K.) Honeywell (U.S.)



HELLENIC INDUSTRIAL DEVELOPMENT BANK

INDUSTRIAL AREA OF THESSALONIKI

FINAL REPORT

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HELLENIC INDUSTRIAL DEVELOPMENT BANK

INDUSTRIAL AREA OF THESSALONIKI

FINAL REPORT

CHAPTER III - INDUSTRIAL ESTATE

1. INTRODUCTION

The Terms of Reference for Chapter III, Industrial Estate of the Industrial Area of Thessaloniki are outlined in the Contract between the United Nations Industrial Development Organisation (UNIDO) and Gibb-Ewbank Industrial Consultants dated August 1971 and as revised by Amendment No. 1 dated November 1971.

The work to be carried out under these Terms of Reference is briefly as follows:

"To prepare a layout plan of the Industrial Estate and a phased Development Programme and to provide designs for four or five different types of standard factories".

It is intended that the Industrial Estate shall have an area of approximately 50 hectares.

The full Terms of Reference are included as Appendix 1 in Volume 1.

The object of the Industrial Estate is to promote small scale industries in rented factories at economic rents so as to assist in the establishment of a variety of industries. For this purpose a number of different standard factories complete with utility services would be built in advance of the demand and thus be available for early occupation when applications are received.

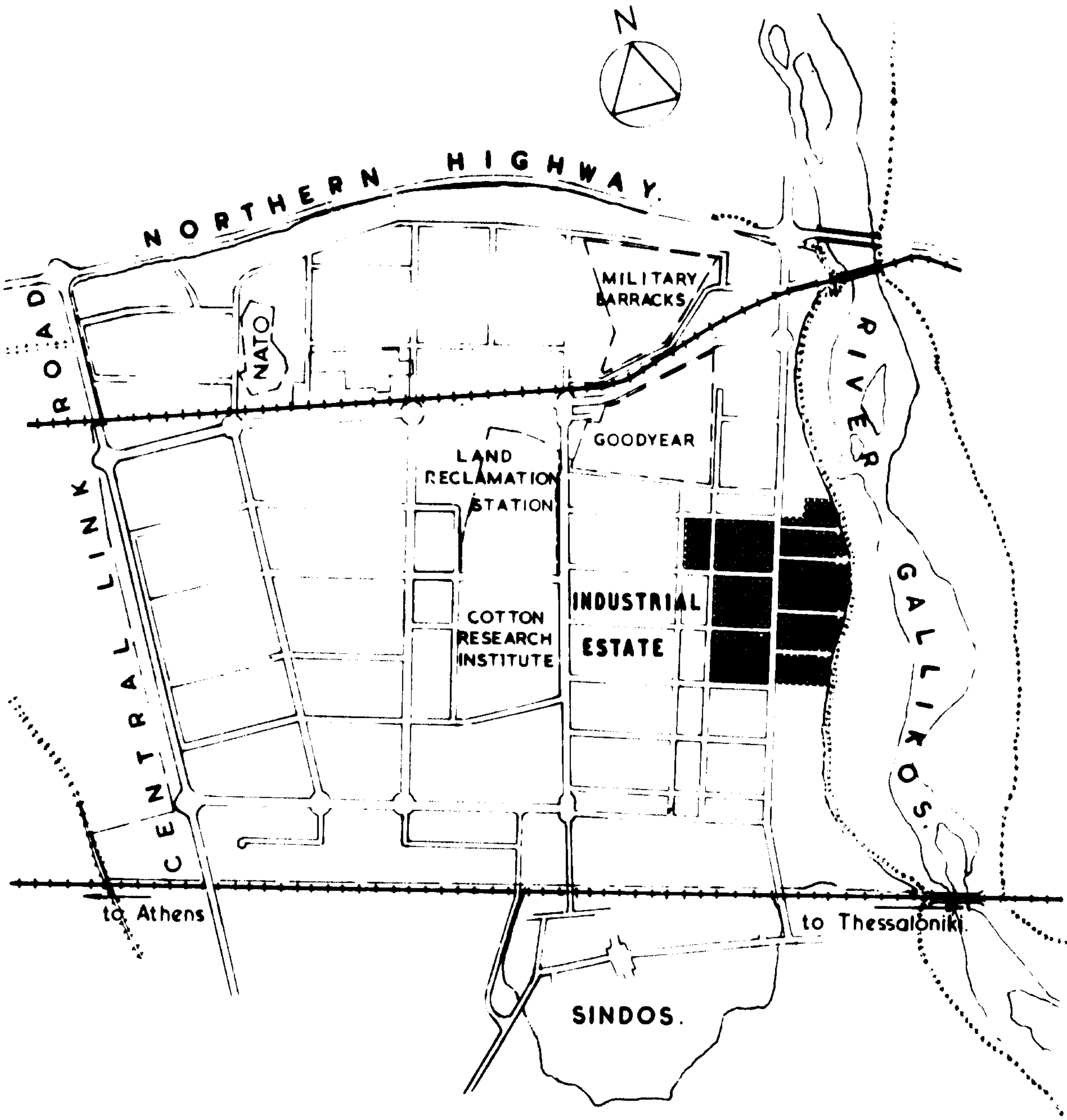
2. LOCATION

Following local inspections and discussions, it is proposed to locate the Industrial Estate on Area 1, as shown on Plate No. 1, on the HIDB's Plots Nos 13, 18, 19, 20, 25 and that part of No. 26 which lines up with the southern boundary of Plot No. 18. The total area is 54 ha. and the net usable area, after deduction of main roadways, is 51.4 ha.

The location is also shown on Figure No. 1.

This choice of site has been influenced mainly by the present state of the infrastructure works for Area 1 which are now virtually complete, thus enabling an early start to be made with the construction of standard factories.

Access to the site already exists in a preliminary form via the "country road" from the Northern Highway and Thessaloniki. Also via the "country road" the site has an outlet to the south to the village of Sindos which will be one source of labour. The permanent outlets from the Area will be provided to the Northern Highway by an extension of Road No. 1 and, later, to the south by a connection with the new Southern Highway which is in the course of construction.



LOCATION OF INDUSTRIAL ESTATE

FIGURE 1

3. LAYOUT

The layout must obviously accept the existing road pattern and the standard factories have thus had to be planned within the resultant blocks. Nevertheless, these blocks are large enough to provide sufficient flexibility to enable the layout to be adapted from time to time to meet current circumstances. This need for flexibility is essential to the scheme as it is quite impossible to forecast the relative demand for the different types of factories.

The smaller factories, Type 1, have been generally located next to the Services Sub-Centre so that they will have ready access to the technical facilities provided for their benefit. Similarly, the other factories will be grouped in relation to their size, the largest, Type 5, being located on the perimeter.

All factories have their frontages in the east-west direction and face on to pedestrian ways parallel to the existing east-west secondary roads which generally form the access to the goods yards at the back of the factories. The east-west orientation permits the adoption of a standa d system of north-light construction which is considered most suitable for the variety of industries that may be housed.

The layout is shown on Drawing No. 3/1, and indicated on Plate No. 1 at the back of this volume. A more detailed layout of part of the Estate is shown on Drawing No. 3/7.

4. STANDARD FACTORIES

4.1 Size Requirements

Studies have been carried out to assess the possible demand for factories on the Industrial Estate and, to establish as far as possible, the size of the factories and the type of industry that will require them. These factors cannot be determined with any precision, but a series of standard sizes are proposed which should meet the various demands.

In order to provide an economic structure compatible with flexibility in the selection of factory size, a basic unit suitable for incremental planning has been adopted. It is desirable that this unit should be suitable for the smallest factories, be structurally economic for larger factories and finally, meet the regulations of seismic design.

Studies of a sample area of industries around Thessaloniki showed that 14% of the total of 75 factories visited were small concerns operating in buildings of 50 m^2 or less. 20% of the industries occupied buildings of between 50 and 100 m^2. The choice of basic module which met the lower range of requirements was thus between 10m x 5m (50m^2) and 12m x 6m (72m^2). The final selection of 10m x 5m met the possible demand for the smallest factories, and gave a suitable increment of 50m^2 for meeting the demands of the next range of relatively small factories. It is dimensionally convenient for factory design, very economic, and has only the marginal drawback of a greater number of columns as compared with larger modules.

4.2 Standard Types

Designs for 5 different standard types are provided with sizes varying from 50 m^2 to 2400 m^2. These are shown on Drawings Nos. 3/2, 3/3, 3/4, and 3/5 in the folder relating to this Chapter, and diagrammatically on Plate No. 2 herein.

The first four types are of a size for which it would be reasonable to anticipate a demand and some could thus be constructed with confidence in advance. The fifth type has a size such that any prospective tenant may have particular requirements in respect of his process layout, and it is recommended that factories of this type should not be built until it is clear that there is a need for them.

The basic areas and the expansion potential of the five types are given in Table 4.1.

TABLE 4.1

STANDARD FACTORY TYPES

	Basic Unit	Two Units	Three Units	
Type 1	50 m^2	100 m^2	150 m^2	
Type 2	200 m^2	400 m^2		
	Basic Unit	**1st Expansion**	**2nd Expansion**	**Two Units**
Type 3	300 m^2	450 m^2	600 m^2	1,200 m^2
Type 4	1,200 m^2	1,500 m^2	up to	2,400 m^2
Type 5	2,400 m^2	—	—	4,800 m^2 and over

The above are net production areas in square metres and do not include offices, toilets or storage yards.

4.3 Future Expansion

Careful consideration has been given to the problem of future expansion of individual factories. Unless a properly devised scheme is arranged, the undue granting of options and space for expansion can result in an uneconomic use of the roads and utilities provided with a resultant increase in rents.

This applies particularly to the smaller types and therefore they are not designed to expand; tenants should have the opportunity of renting an additional unit when the initial occupancy has been outgrown. Provision for expansion is shown for the other types up to 100%; experience has shown this to be the general maximum. Expansion areas have been indicated at the rear of the factories, and not at the side, so that there is an economy of utilities laid along the factory frontages.

Type 1 - Small Workshop Unit

This anticipates the need for small workshop units where small components may be made or assembled or light work carried out. The considerable number of small workshops of this size - and smaller - existing in Thessaloniki confirms the need but the extent to which the demand has already been satisfied is difficult to assess. It would be unwise to build more than two or three blocks of eight units initially. The single units would have production floor area of 50 m^2, each with its own toilet and storage yard additional to the workshop area.

This type would be built in terraces but a tenant could rent one or more units as may be required, giving a range of 50, 100 or 150 m^2. Beyond three units, 150 m^2, it is expected that tenants would apply for transfer to the next larger type of standard factory.

These workshop units would be constructed on a single 5 m x 5 m module with north lights, having a clear height of 4 m all as shown in the drawings.

Type 2 - Nursery Unit Factory

This type would also be built as a terrace and anticipates the needs of small industries. No provision would be made for expansion of the basic unit and the tenant should have the opportunity to rent a single or double unit. The production area of each will be 200 m^2 plus toilet and office at one end and the storage yard at the other. The construction of this factory would be based upon the module of 10 m x 5 m with north light glazing, which is the repetitive design structure of Types 3, 4 and 5. A clear height within the factory of 4 m is proposed.

Type 3 - Small Expandable Factories

This factory will provide 300 m^2 of production space, plus toilets and offices at one end with a storage yard at the other. Provision will be made for 100% expansion in units of 150 m^2 giving a range of 300, 450 and 600 m^2 or up to 1,200 m^2 in a pair. These factories can be built as detached units or in pairs. Again the tenant should have the opportunity to rent one or more units as may be required.

The size of the office and toilet annexe shown on the Drawing can be reduced initially, and completed when the factory is extended. The same module of north light construction would be used for the factory with a clear internal height of 5m.

Type 4 - Medium Expandable Factory

This factory has a total area of 1,200 m^2 plus toilets, offices and yard space. This comprises the equivalent of four of the Type 3 units and is based upon the use of the same constructional details. The factory would be built as a detached building with the opportunity of expanding by 100% but could be expanded by units of 25%, thus providing a range of 1,200, 1,500, 1,800, 2,100 and 2,400 m^2. The proposed clear height is 5 m.

Type 5 - Larger Factories

This design assumes the use of the same constructional module adopted for Types 3 and 4 but anticipates the enterprise which will require more than 2,400 m^2. Applications of up to 4,800 m^2 and more can be anticipated.

4.4 Storage Space

Some types of industry will require more land for open storage than has been provided in the standard layout plans. This will apply particularly to the vehicle trade. This need could be met by suitable site selection, as the layout of the plots is flexible and additional areas could be leased.

4.5 Offices and Toilets

The requirements for offices and toilets must also vary according to the number of personnel employed, and can differ from 10 m^2 to 25 m^2 or more of covered area of factory per person. Accordingly, the plans are based on the higher population need, but only the minimum provision would be installed when building in advance of a Lease.

5. BUILDING DESIGN AND CONSTRUCTION

5.1 Principles Adopted

The design of standard factories must essentially combine economy of construction with appearance. The series of standard factories provides the opportunity to introduce a repetitive building form and this normally aids appearance by being orderly in character though rather monotonous. Economy also stems from repetition and this in turn suggests the adoption of prefabrication or system building.

There are several examples of prefabricated housing, multi-storey flats and offices being used in Greece but apparently no existing form of prefabrication for industrial buildings. It will be appreciated that a considerable time is necessary to evolve a system of prefabrication. The final product of a system initiated now would probably be too late for application at the Thessaloniki Industrial Estate, which is ready for immediate development. Nevertheless it is understood that manufacturers are considering, and possibly developing, prefabricated forms of industrial buildings and it would be wise to keep the position under review.

Structural steel frames for buildings are imported and expensive. Steel trusses have been used on some factories in Thessaloniki but the Terms of Reference require that Greek materials should be adopted where possible.

It is recommended that a partial form of system building is adopted whereby certain prefabricated units are allied to a traditional form of construction. Precast concrete offers the most suitable material for use in the production of repetitive frame units. There are several examples of successful precast concrete structures in the Athens area and elsewhere and it is evident that most contractors are familiar with this form of construction.

The module recommended for Factory Types 2, 3, 4 and 5 is 10 m x 5m. The merits of this module have been described earlier herein and it provides a very economical basis for the design of a precast portal frame. The north-light form of construction which has been adopted provides a good daylight factor, even distribution of light and freedom from direct sunlight. The span between the north light units will be 5 m which is an economic dimension for purlin design.

Earthquakes occur in Thessaloniki and the calculations for the standard module include the additional loadings required by the Terms of Reference. A larger module could have been adopted without substantially adding to costs. For the Industrial Area, it is believed that the one chosen will be best, as the factories should be capable of letting at low rents which most tenants will prefer.

Factory Type 1 is designed on a 5m x 5m module. It could be adapted to a 10m x 5m module if required, but architecturally its appearance would be impaired and would look out of scale. The smaller roof form also provides a pleasant contrast to the larger repetitive roofs.

5.2 Specification

The Terms of Reference for the Industrial Estate require specifications to be given for building materials.

Precast Frame Units

There is already a factory in the Industrial Area producing cement products, mostly pipes. In view of the future building potential in the Thessaloniki Region it is possible this factory or another enterprise will be prepared to make the structural elements such as are proposed for the standard factories Alternatively the builder of the factories could cast the units on the site They are designed so that this can be done

Roof

The roof would be asbestos sheets with a rigid insulation lining of glass wool

Walls

The alternatives are bricks or concrete blocks A suitable clay brick has not been seen in the area and concrete bricks are proposed for most of the external walls The concrete brick is also proposed for buildings on the Services Centre and thus there will be an affinity of appearance between the two areas

The use of solid walls externally, 200 mm thick, is typical in Thessaloniki but if brick is used it is difficult to achieve a fair face each side This is acceptable when the inner face is plastered, but not so suitable for the flush pointed and painted finish specified for the factories. It is therefore proposed that the walls shall be built in two skins, the outer skin in concrete brick and the inner skin in concrete brick or blocks, suitably bonded with wall ties and reinforced every three or four courses To provide contrast in the external appearance, some external walls would be rendered on blockwork and coloured either by painting or by use of a colouring additive in the rendering and others could be partly covered with sheeting

Floors

The floor will be 150 mm mesh reinforced concrete over a 100 mm bed of hardcore, with a floor finish of 50 mm cement and sand treated with a hardener and laid on an approved waterproof membrane Alternatively, the waterproof membrane can be laid on a binding layer over the hardcore bed and the structural floor slab topped with a monolithic grano finish

Windows and Doors

Locally made metal windows will be used and patent glazing for the north lights Sliding folding doors are shown for main access to production areas from the yard and in the larger factories it will be necessary also to provide personnel escape doors

Flat Roofs

For the flat roofs over the office and toilet areas hollow precast concrete beams are proposed, covered with a suitable thermal insulation layer and finished with a waterproof covering of roofing felt or other waterproof surfacing.

Finishes

The internal finishes are simple; the walls of the production areas are fair-faced brick or blockwork with emulsion paint finish The walls of the offices and toilets are plastered and painted, with some wall tiling in the toilets. The floors in offices and toilets are finished with a vinyl plastic tile

Yards

The open yards are not paved but are enclosed with brick walls, including a pair of gates, to improve the appearance and general amenity. This is a potential economy if necessary, either by omitting the walls or providing a cheaper form of boundary enclosure

Typical building details are included to a scale of 1/25 on Drawing No. 3/6.

The specification of building materials and workmanship is the same as that for the Services Centre, included as Appendix C to this volume.

6. UTILITIES

Each factory will be provided with electricity, domestic water and drainage.

6.1 Heating and Ventilation

Electric socket outlets will be provided for appliances to heat the offices and other areas.

For reasons of economy it is not intended to provide a central heating system for the Estate, nor boilers in each factory.

Ventilation of production areas is provided by wall louvres and also by non-motorised extract units fitted in the roof sheeting.

Piped gas will not be available on the Industrial Area.

6.2 Electrical Installation

Each factory will have a complete lighting installation and power points.

6.3 Electricity Supply and Distribution

The electricity supplies required for the standard factories in their final form when fully extended, are estimated as follows:

Type 1	6 kVA
Type 2	25 kVA
Type 3	50 kVA
Type 4	175 kVA

Some factories in the Industrial Estate may have a sufficiently large electrical demand to require a direct 20 kV intake and their own sub-station. Most smaller consumers will be supplied from sub-stations in the Industrial Estate by a low voltage (380/220 volt) overhead line system in the rear access and service roads. Connections to the sub-stations will be made from an adjacent 20 kV line with open jumpers to fuse protected 500 kVA ground mounted transformers.

The sub-stations will be located in corners of plots outside the services reserve to the rear of the plots or in the car parks.

6.4 Street Lighting

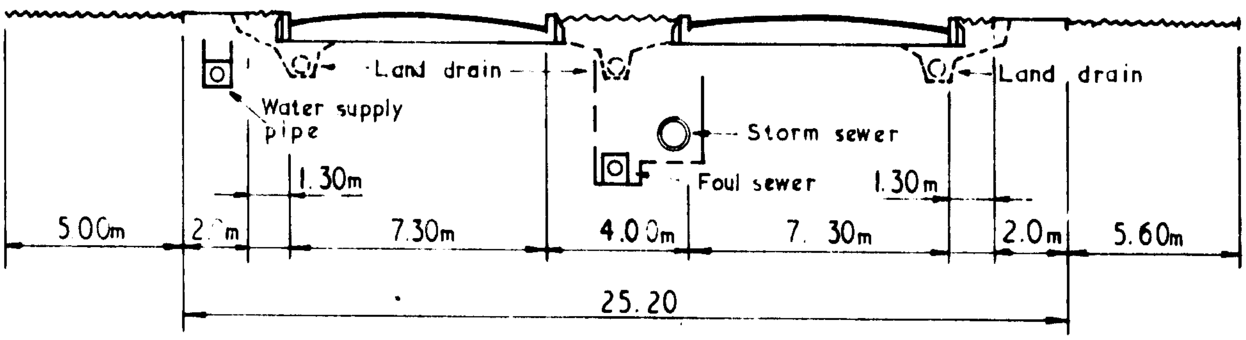
Precinct lighting in the Industrial Estate will be mounted on the fascias of buildings overlooking the roads and pedestrian ways. Power used for this service would be metered separately from the power used by the factory occupiers.

6.5 Water Supply

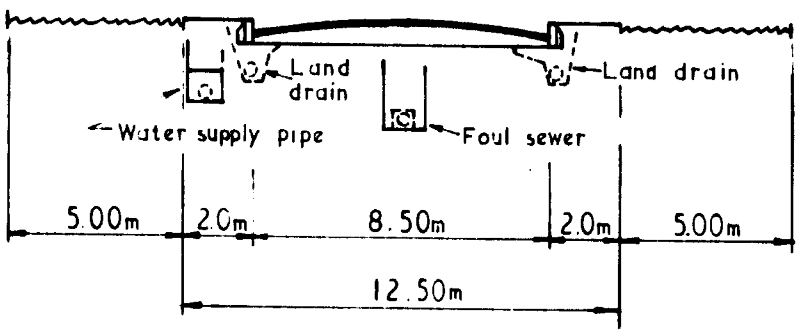
Each factory will have its own supply, from a main along the pedestrian way, complete internal plumbing and an electric water heater in the toilet area.

6.6 Drainage

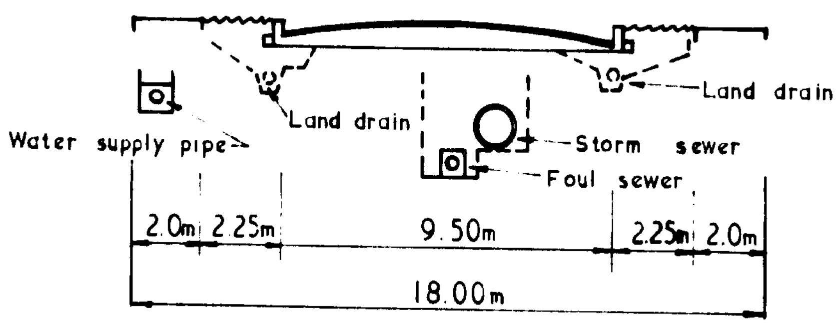
The surface water drains and sewers are suitably located in relation to the groups of factories and each will terminate with a resultant single connection to the existing sewers. This is preferable to making separate connections from each factory, as much cutting-up of the existing roads would be required. Sections of the existing roads showing the positions of the drains are given in Figure No. 2.



CLASS I



CLASS II



CLASS III

EXISTING ROADS - AREA I

FIGURE 2

6.7 Telephones

Telephones will be applied for and installed in the normal way through the Telephone Authority (O.T.E.).

6.8 General

The various services within the Industrial Estate are shown on the layout Drawing No. 3/8 in the folder of drawings which accompanies this Chapter

7. APPEARANCE AND AMENITY

The standard factories have been designed with economy of capital costs very much in mind, but nevertheless their appearance and environment are most important. The adoption of a series of repetitive north-light factories can result in a monotonous appearance, especially if all are built in similar materials.

Particular attention has therefore been given to the layout to breaking up the regimentation by mixing factory types and locating the Car Parks as further interruptions of the rigid forms. It is proposed to introduce colour by the adoption of some rendered walls to factories.

It is also proposed to introduce suitable panels on the gable walls for the use of name displays. Such features will be particularly advantageous on the appearance of the north-south roads which, due to the essential orientation of the factories, contain only the side elevations of the buildings. This aspect is illustrated in the drawings.

It is essential that advertising and name boards are properly controlled and tenants are encouraged to display their name and wares in good quality form.

The layout drawings of the factories indicate landscaping with tree planting, flower boxes, concrete paved areas, forecourts of cobble paving and areas for leisure with tables and seats. This is a most worthy aim providing pleasant surroundings for the workers and contributing to the recruitment of labour.

8. CAR PARKS

The ratio of cars to workers is increasing rapidly in many countries and it is recommended in Chapter I that a ratio of 1 car to 4 people should be used generally throughout the Industrial Area in assessing the parking space required by 1980. In the Industrial Estate it would be prudent to exceed this so as to anticipate the need for greater areas in the future, particularly because the building on the Estate will be more dense than elsewhere.

It has been recommended in Chapter I that provision for parking workers' cars should be made within each of the factory plots in the Industrial Area. Clearly this is not possible in the Industrial Estate and a policy of communal car parks has therefore been adopted.

Throughout the Industrial Estate these Car Parks will be located so that there is a minimum walking distance to the factories. The layout plan also shows Executive Car Parks close to the offices, where applicable, and these will also be available for visitors.

In the case of Type 5 factories, land will be available within the plot to provide parking space as has been recommended for the Industrial Area generally.

9. SERVICES SUB-CENTRE

The Terms of Reference for the Services Centre require that a plan shall be provided for a Technical Advisory and Training Centre. This building has been included in Area 1 Services Sub-Centre which is sited immediately to the west of the Industrial Estate. A description of it is given in Chapter II of this report.

The Services Sub Centre will provide other communal facilities for the Industrial Estate as follows:

- Cafeteria
- Satellite Medical Centre
- Satellite Works Services Depot
- Bus Station
- Petrol Service Station
- Banks, Shops, Offices
- Sports Ground
- Creche
- Church

The layout of these is shown on Drawing No. 3.1, and building drawings for the Cafeteria and the Satellite Medical and Works Services Centres are included with the drawings for Chapter II.

10. NUMBER OF FACTORIES, AREA AND POPULATION

Studies have been made to assess how many of each type of factory will be required. In the Thessaloniki Region 51.3% of the existing factories have a staff between 5 and 15, 32.3% employ between 16 and 40, 5.6% employ between 41 and 80 and 10.9% employ 81 and over. With the exception of the latter classes, these proportions compare with other parts of Greece. There are, however, a few very large enterprises in Thessaloniki which would tend to affect these proportions. It would be reasonable to expect that industries with employment registers of over 80 personnel will seek larger plots in other parts of the Industrial Area.

Section 4.1 refers to another study of a sample number of existing factories, 34% of which were smaller than 100 m^2.

This preponderance of small factories, indicates the main demand is likely to be for the smaller standard types, either as single or multiple units and the layout of the Estate includes the factories shown in Table 10.1 below. It is emphasised however that the layout is flexible, and different numbers of the various types can be built if demand requires.

TABLE 10.1

NUMBER OF FACTORIES

Factory Type	Number	Percentage
1	108	33
2	140	43
3	45	14
4	25	8
5	6	2
	324	100%

The areas of these factories will be as shown in Table 10 2

TABLE 10.2

STANDARD FACTORY AREAS

(Square Metres)

Type	No. Shown	Basic Area	Total Area	Possible Expansion	Possible Total Area
1	108	50	5,400		5,400
2	140	200	28,000		28,000
3	45	300	13,500	13,500	27,000
4	25	1,200	30,000	30,000	60,000
5	6	2,400	14,400	14,400	28,800
TOTALS	324	–	91,300	57,900	149,200

Population

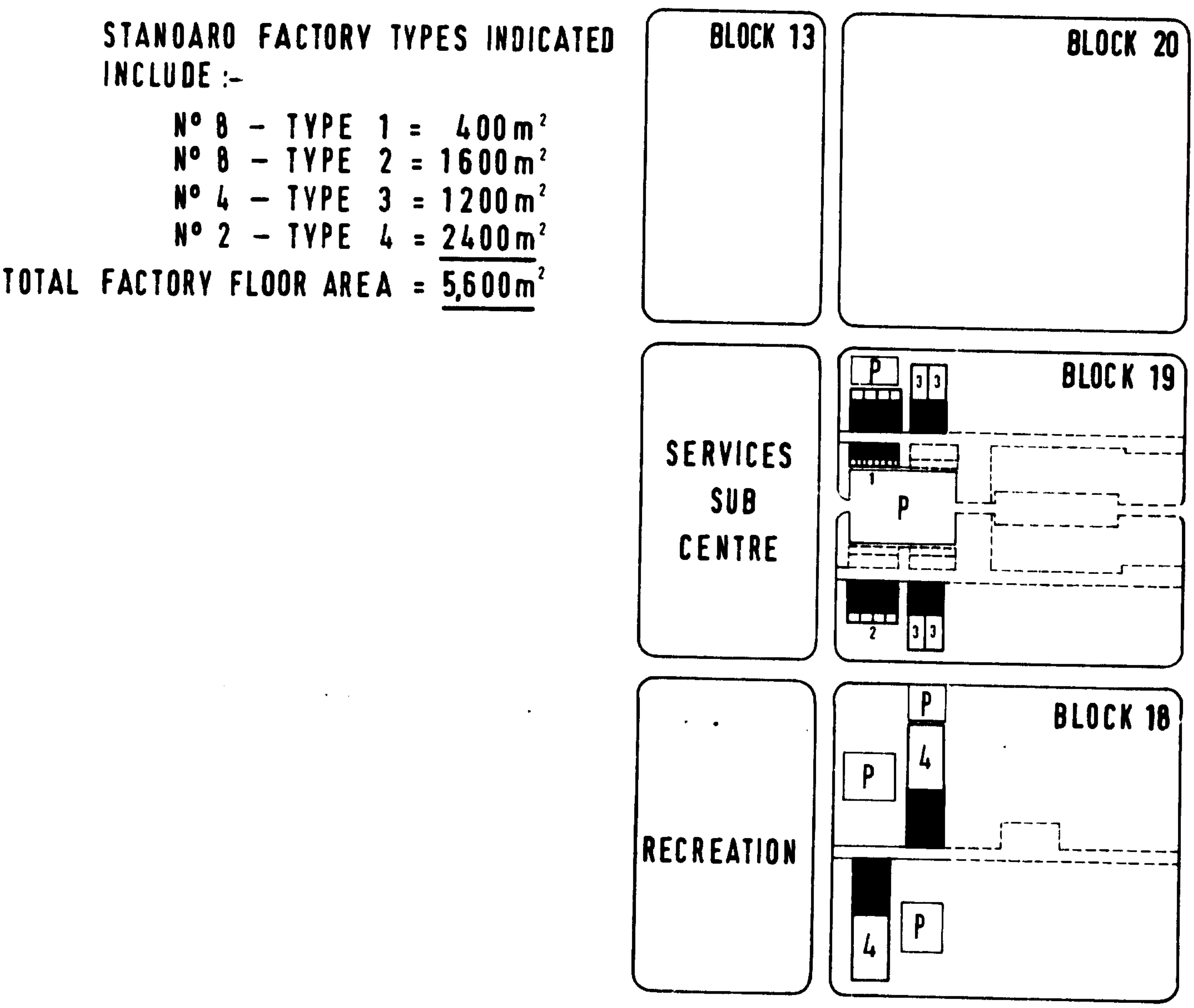
The area required for each worker obviously varies according to the industry. It can vary from 10 - 12 m² per employee in textile and similar industries to 45 m² in some food processing factories, tile making, cement products. In some plants manufacturing large items of equipment, figures of 200 m² and more per employee occur. For the purposes of assessing possible future population of the Industrial Estate an average of 26 m² per employee has been assumed.

With the Industrial Estate fully developed, but excluding any expansion of the individual factories, the potential population would be about 3,500 and with full expansion of the factories it could reach 6,000. This represents the employment of about 120 persons per hectare of Industrial Estate - an area of 51 hectares.

11. PROGRAMME OF DEVELOPMENT

It is difficult to assess the demand for the standard factories with any certainty. It is therefore recommended that the first stage should include provision for a small number only of Types 1, 2, 3 and 4, sited on Blocks 18 and 19 immediately adjacent to the Services Sub-Centre, as shown on Figure No. 3. These initial factories should comprise:

8 x Type 1	Total Area 400 m^2
8 x Type 2	Total Area 1600 m^2
4 x Type 3	Total Area 1200 m^2
2 x Type 4	Total Area 2400 m^2
	5600 m^2



PROPOSED INITIAL CONSTRUCTION

FIGURE 3

These factories, complete with all utilities and finished with all external works, should be made to look as attractive as possible in their finished form so as to serve as an advertisement to prospective tenants

Future factories should be constructed as the demand becomes clearer The design, using standardised components and a standard module, will make it relatively easy to effect changes in the construction programme as required

The total area of factories on the Industrial Estate on Area 1 is 91,000 m^2 and approximately 150,000 m^2 after expansion of Types 3, 4 and 5

It is not considered possible to anticipate the period which may elapse before these factories will all be required. Should the demand prove greater than the Estate on Area 1 can provide, the Master Plan contains suitable Blocks on Area 2 which could be developed as a further extension to the Industrial Estate

12. ADMINISTRATION

12.1 Industrial Estate Sub-Division

Within the framework of the administrative organisation for the Industrial Area, described in Chapter I Section 28 a Sub Division will be necessary to administer the Industrial Estate The main responsibilities of this Sub Division will be

(a) promotional attracting industrialists and negotiating the terms for occupancy

(b) the day-to-day administration of the Estate including its maintenance

The maintenance duties requiring technical skill, could be undertaken by the appropriate Divisions of the Industrial Area Company's Organisation but under the aegis of the Industrial Estate Manager It is anticipated therefore that his particular staff would be small and mainly clerical Included in his duties would be the administration of the Technical Advisory and Training Centre

12.2 Estate Development

The Estate Manager should be responsible for the forward planning of the number of factories required to meet the needs of potential tenants, and also for dealing with any particular detailed requirements of the tenants The main work involved in the development of the Estate such as the organisation of Contracts for factory building and adaption would be best undertaken by the Area Company's technical staff and their Consultants who will also be responsible for all other construction work on the Industrial Area

Building Regulations

Reference has been made in Chapter I to the Greek General Building Regulations and the Regulations contained in Decree No 750 for operation by HIDB Subject to the comments made in Chapter I, all these Regulations are reasonable in their general application to the Industrial Area as a whole but need to be modified in respect of the Industrial Estate

The first three types of standard factory do not conform with the statutory minimum plot sizes contained in Article 3, Clause 2 of Decree No 750 Clause 4 does not permit a terrace form of development and this needs adjustment to permit Factory Types 1 and 2

The subject of site coverage, dealt with in Clause 5, needs some qualification when applied to the Estate. It should apply to the development of a block of factories, instead of individual plots, so that the open areas, which are communally used by the factory tenants can be included in the calculations. The summation of these areas will be more than sufficient to meet the principle of the requirements; in fact the resultant site coverage factor, including future extensions, will be below 40%.

A new Regulation has been recommended to cover the provision of car parking within factory plots of the Industrial Area. In the case of the Industrial Estate this should only apply to the Type 5 standard Factory.

12.3 Rental Arrangements

The rental policy should include an arrangement whereby reasonable particular requirements of an individual tenant, not likely to be of use to later tenants of a factory, can be carried out by the Estate Division and their cost rentalised. This is preferable to tenants making their own alterations, and the work can mostly be done in advance of the tenancy.

13. ORDER OF COST

The figures in Table 13.1 are based upon the cost of building in Greece as at the date of this Report. No provision has been included for any future escalation of the cost of labour and materials.

The figures are approximate and may vary when the final details of the designs for actual construction are prepared. They provide a basis upon which to assess the cost of development of the Industrial Estate, so that rental values can be considered. They do not include the cost of existing roads and main utilities, details of which are available to HIDB. A contribution from these costs should be added to the rental terms of the factories.

TABLE 13.1

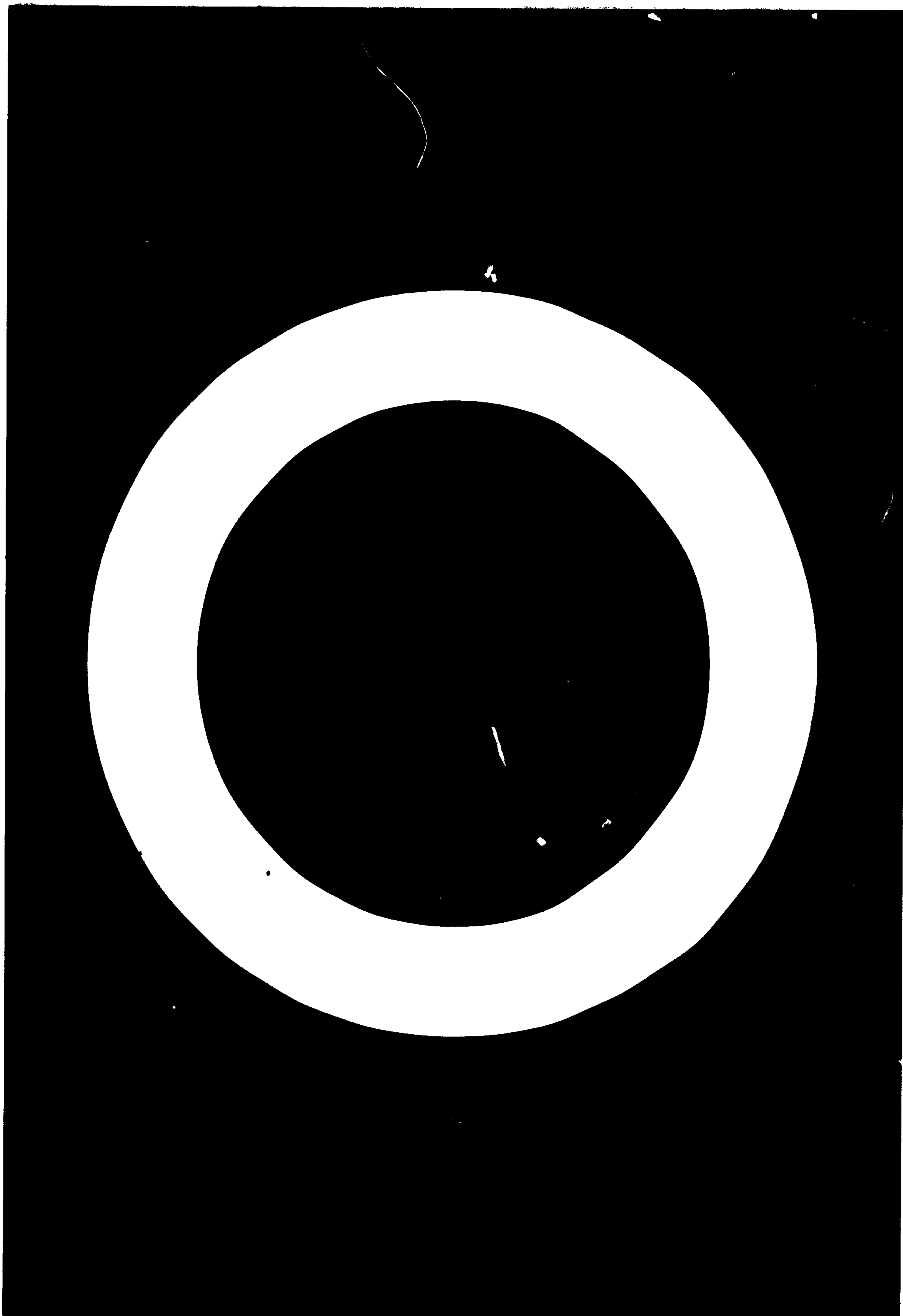
COST OF STANDARD FACTORIES

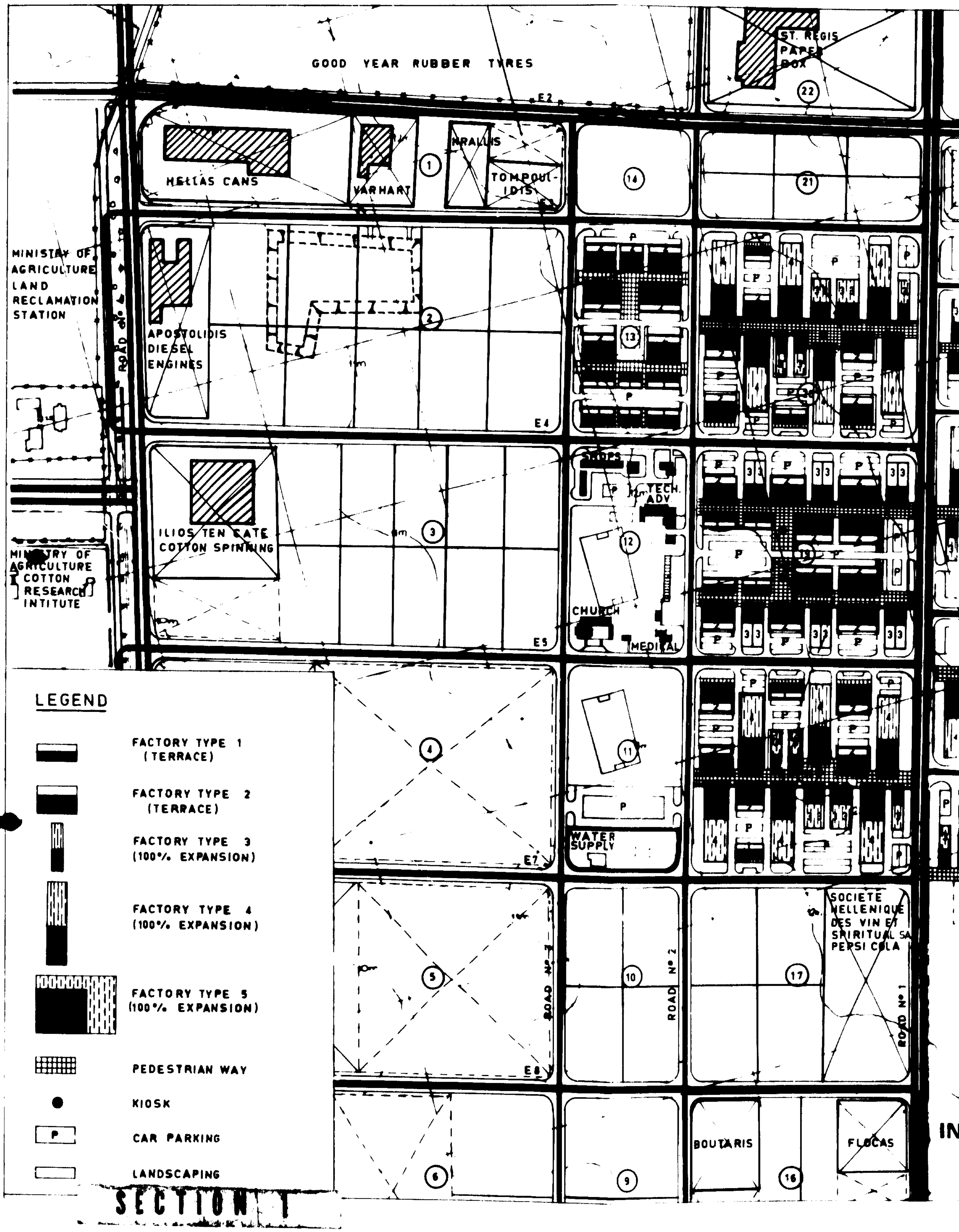
Factory Type	Production Area (sq. metres)	Office and Toilet Area (sq.metres)	Total Factory Area (sq. metres)	Building Cost Drs.	Building Cost Drs/m^2	Extension to existing Infrastructure Cost - Drs.	Total Cost of providing Factory Drs.	Total Costs Drs/m^2
1	50	3	53	138,000	2604	35,000	173,000	3264
2	200	50	250	430,000	1720	128,000	558,000	2232
3	300	75	375	760,000	2027	210,000	970,000	2587
4	1200	150	1350	2,200,000	1630	858,000	3,058,000	2265
5	2400	150	2550	3,510,000	1376	1,330,000	4,840,000	1898

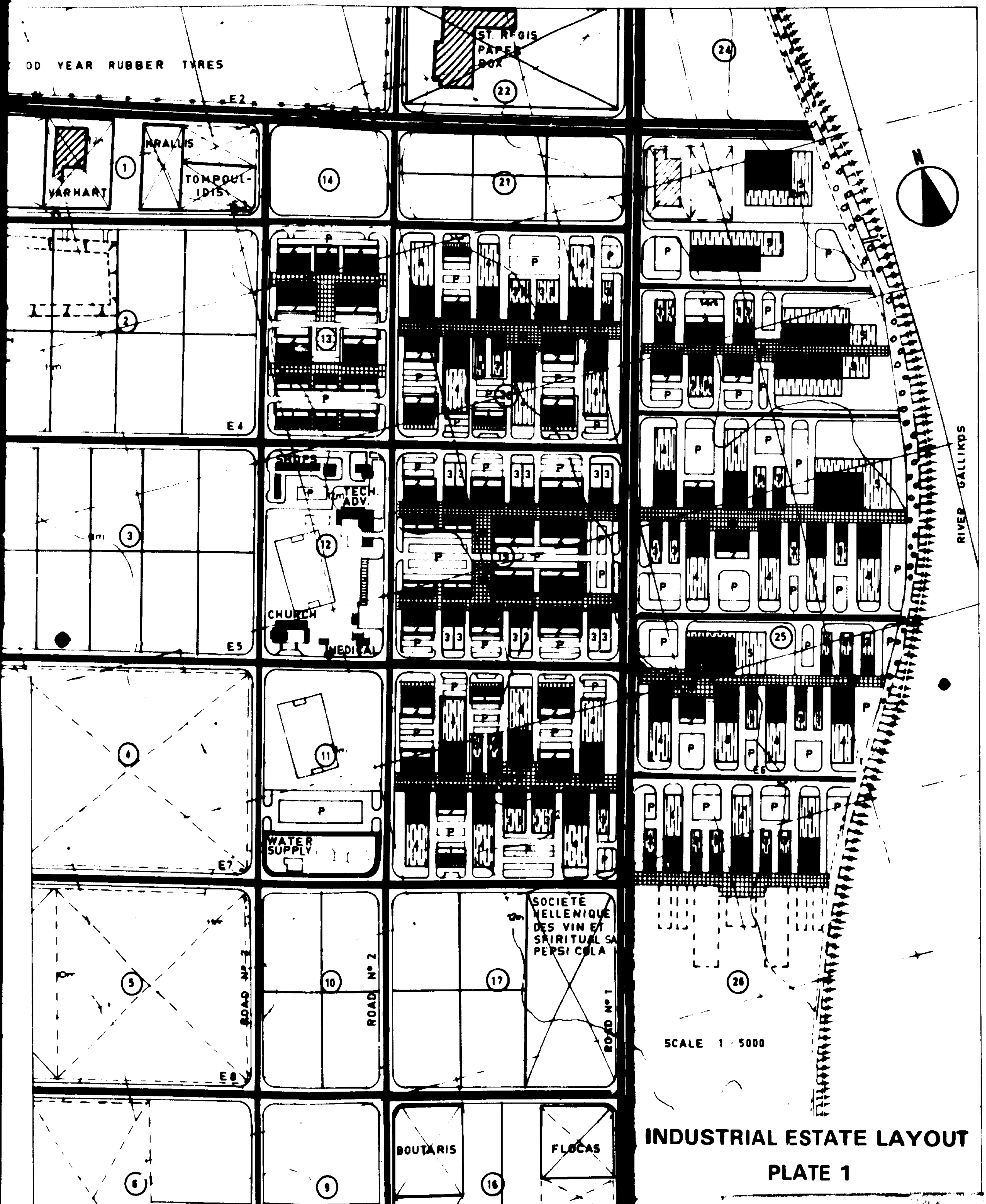
TABLE 13.2

COST OF STAGES OF DEVELOPMENT

Factory Type	First Stage of Estate		Final Estate	
	No.	Cost	No.	Cost
1	8	1,400,000	108	18,750,000
2	8	4,500,000	140	78,000,000
3	4	3,900,000	45	43,650,000
4	2	6,100,000	25	76,500,000
5			6	29,000,000
TOTAL:	Drs.	15,900,000	Drs.	245,900,000



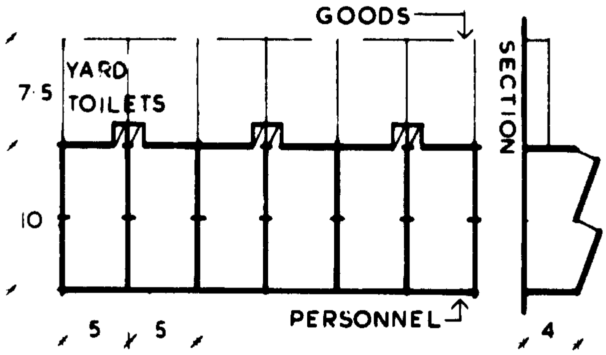

GOOD YEAR RUBBER TYRES
ST. REGIS PAPER BOX
HELLAS CANS
VARHART
KRALLIS
TOMPOUL-IDIS
MINISTRY OF AGRICULTURE LAND RECLAMATION STATION
APOSTOLIDIS DIESEL ENGINES
ILIOS TEN CATE COTTON SPINNING
MINISTRY OF AGRICULTURE COTTON RESEARCH INTITUTE
ROAD No 4
SHOPS
TECH. ADV.
CHURCH
MEDICAL
WATER SUPPLY
SOCIETE HELLENIQUE DES VIN ET SPIRITUAL SA PEPSI COLA
ROAD No 3
ROAD No 2
ROAD No 1
BOUTARIS
FLOCAS
LEGEND
FACTORY TYPE 1 (TERRACE)
FACTORY TYPE 2 (TERRACE)
FACTORY TYPE 3 (100% EXPANSION)
FACTORY TYPE 4 (100% EXPANSION)
FACTORY TYPE 5 (100% EXPANSION)
PEDESTRIAN WAY
KIOSK
CAR PARKING
LANDSCAPING
SECTION 1



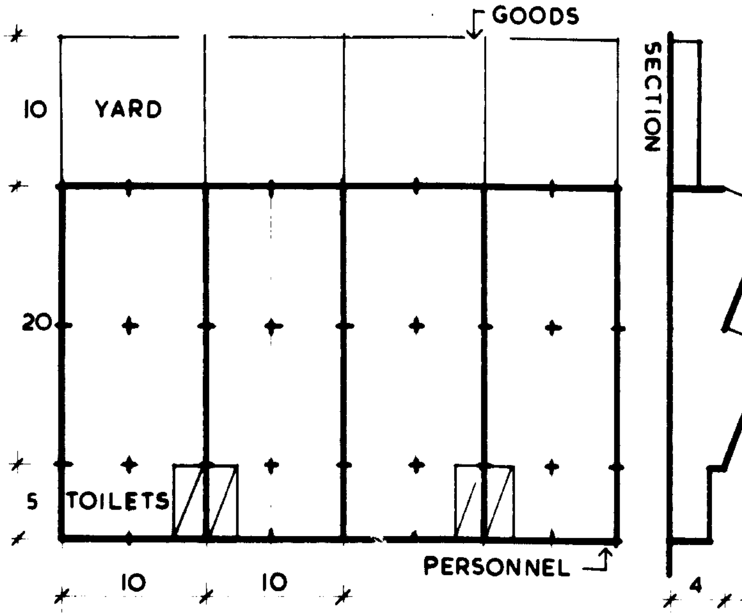
INDUSTRIAL ESTATE LAYOUT

PLATE 1

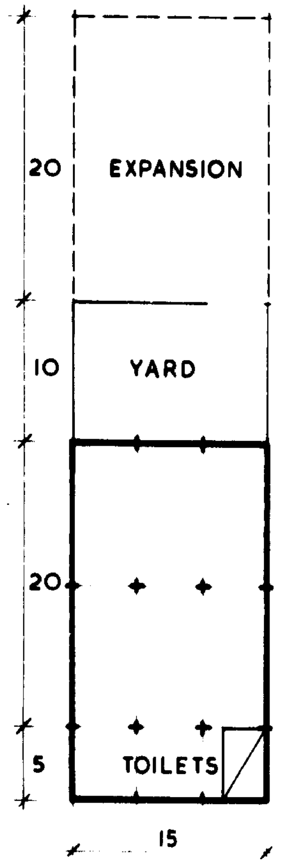
SECTION 2



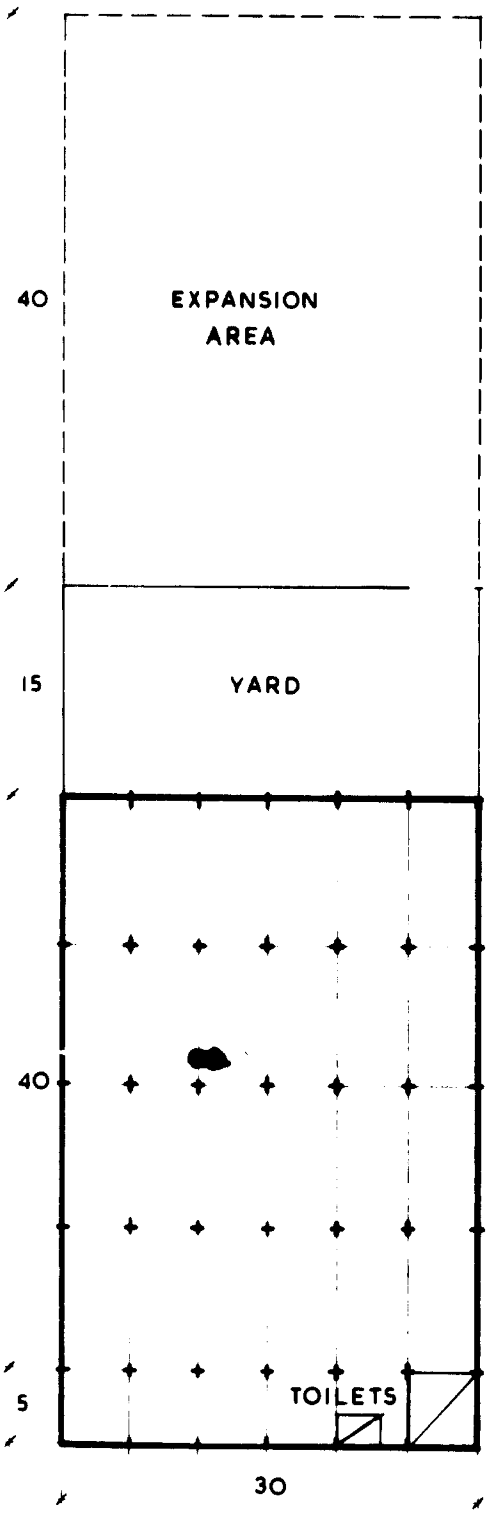
TYPE 1. EACH 50m² + TOILET
ALL BUILT AS TERRACES
NO PROVISION FOR EXTENSION



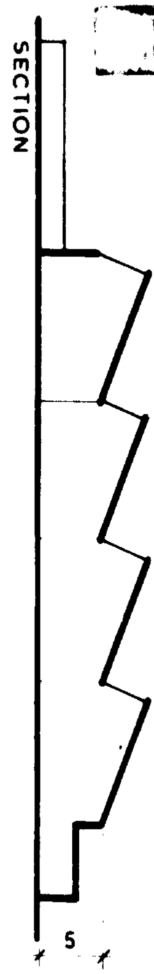
TYPE 2. EACH 200m² + TOILETS & OFFICE
BUILT GENERALLY AS TERRACES WITHOUT
PROVISION FOR 100 % EXPANSION

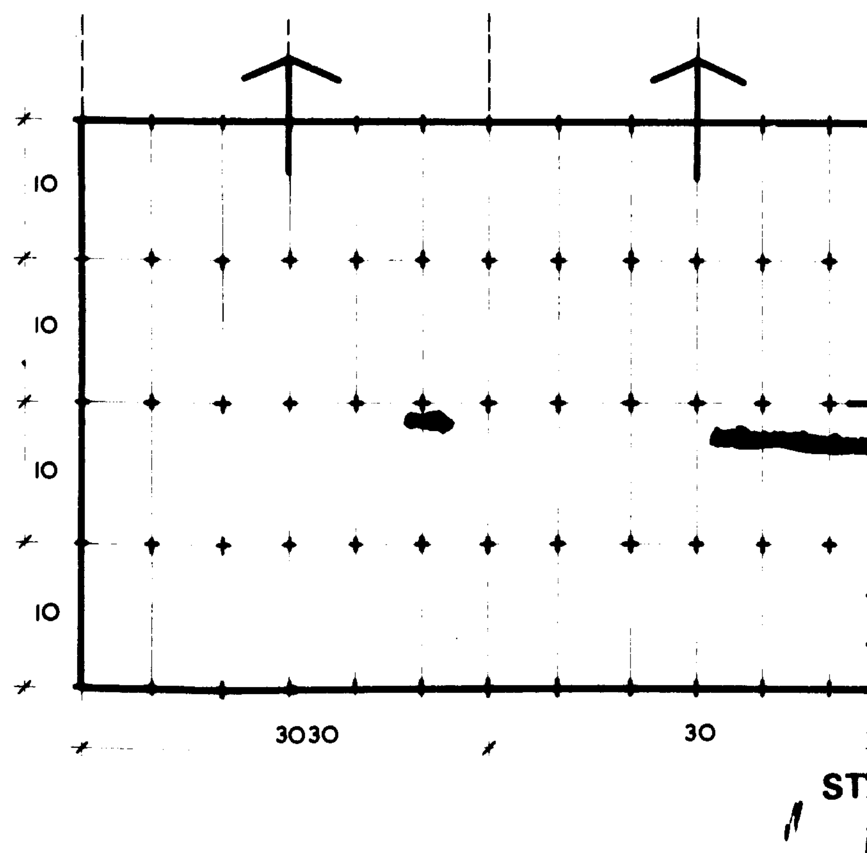


TYPE 3. EACH 3
WITH PROVISION
DETACHED BUT CA



TYPE 4. 1200m² + TOILETS & OFFICES
WITH PROVISION FOR 100 % EXPANSION
DETACHED.





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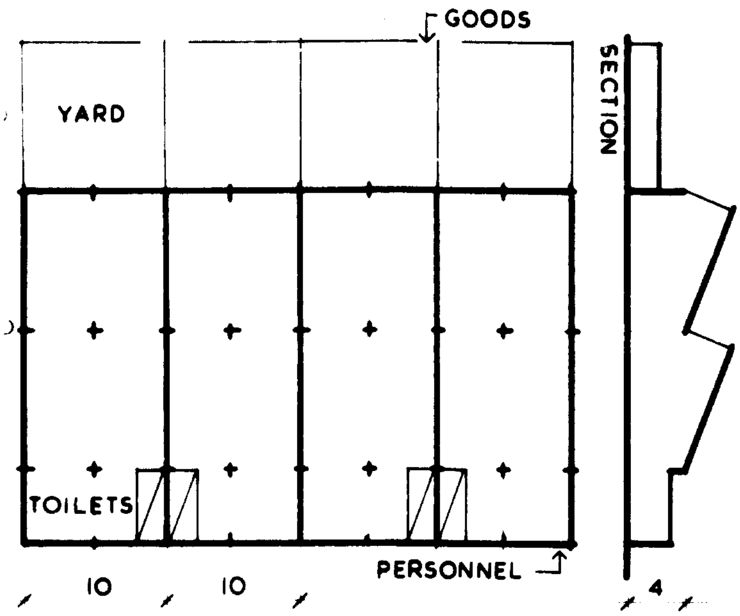
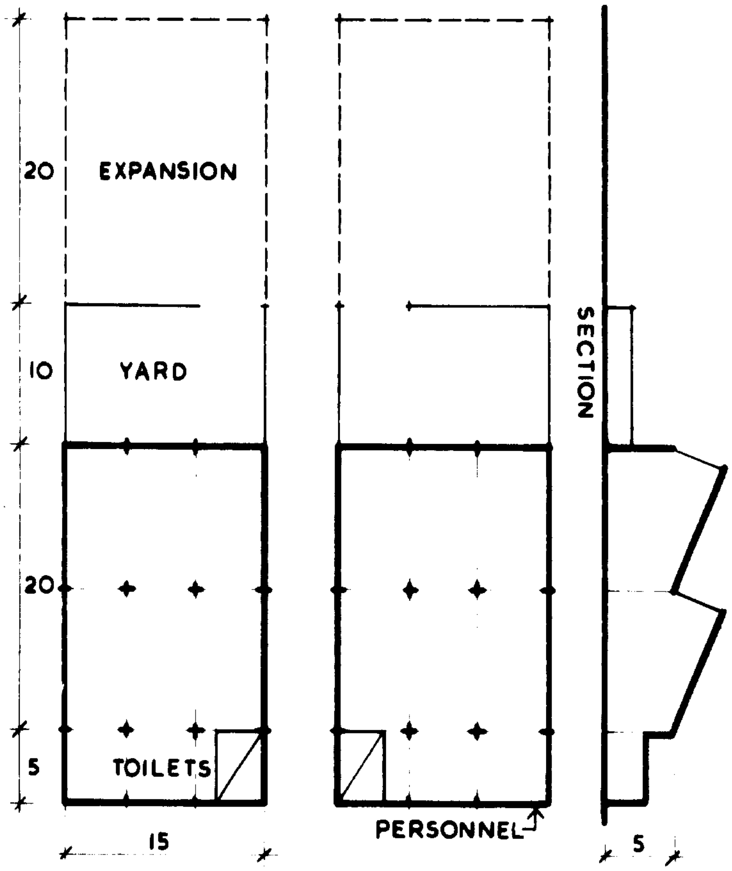
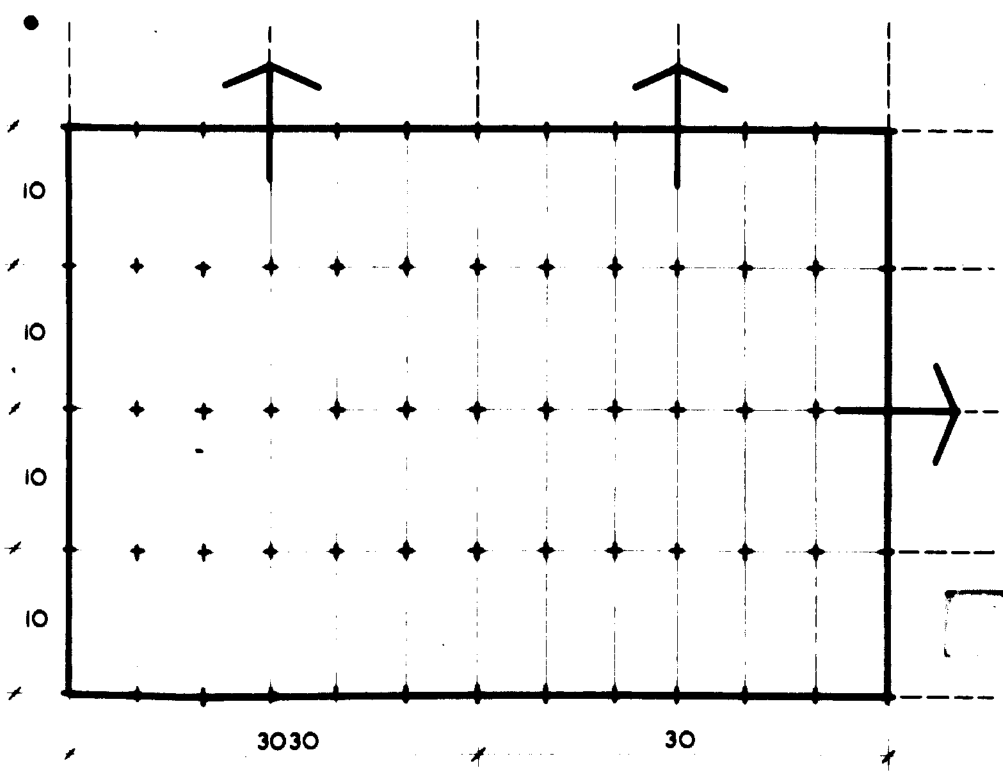


TYPE 2. EACH $200m^2$ + TOILETS & OFFICE BUILT GENERALLY AS TERRACES WITHOUT PROVISION FOR 100 % EXPANSION

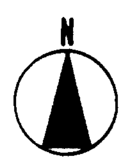


1200m^2 + TOILETS & OFFICES
VISION FOR 100 % EXPANSION
D

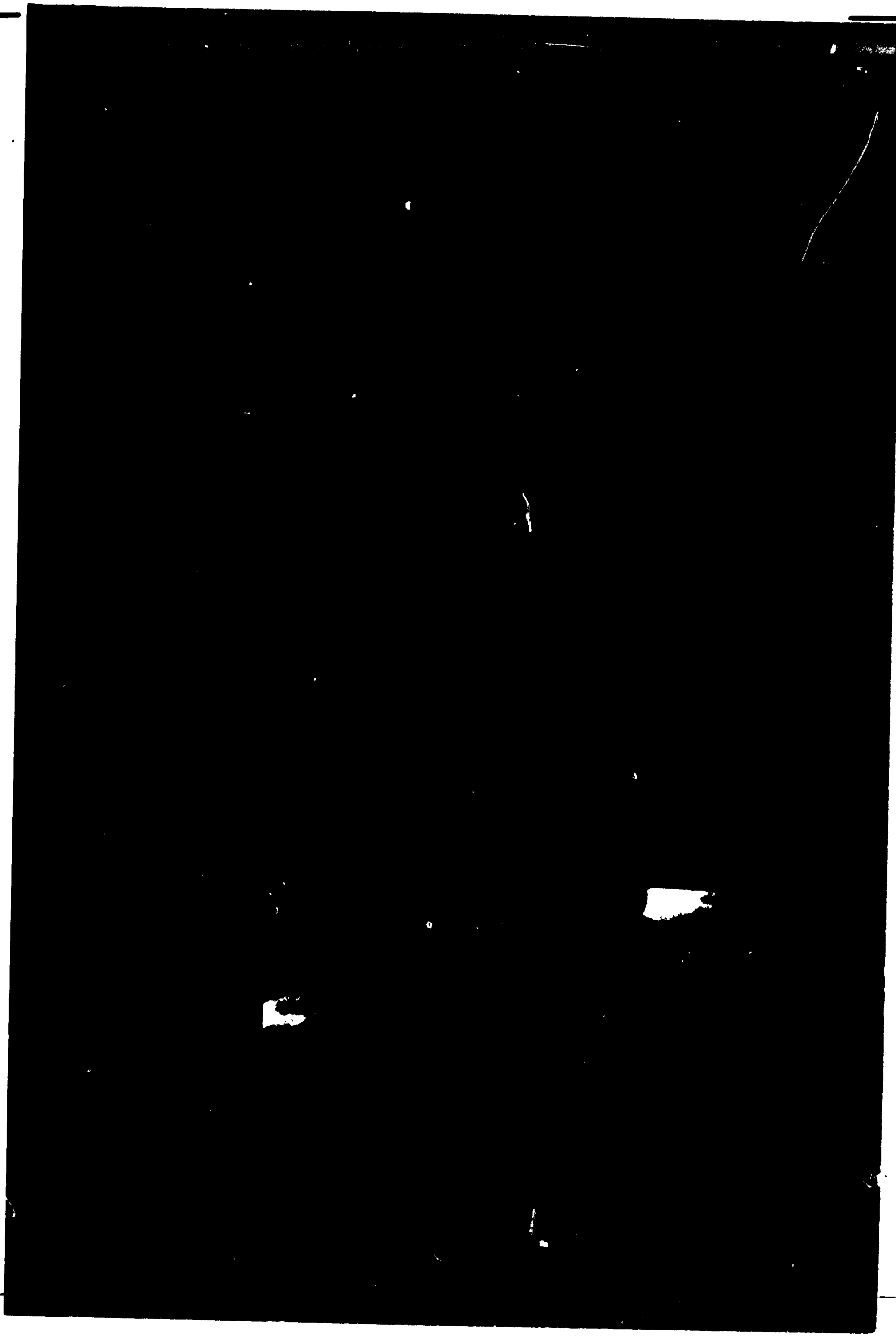
TYPE 3. EACH $300m^2$ + TOILETS & OFFICES WITH PROVISION FOR 100 % EXPANSION. BUILT DETACHED BUT CAN BE BUILT AS PAIRS



TYPE 5. BASIC UNIT OF 10m × 5m SIMILAR TO TYPE 4 BUT BUILT TO TOTAL SIZE REQUIRED WITH 100 % EXPANSION



STANDARD FACTORY TYPES
PLATE 2



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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANISATION

S/F INDUSTRIAL AREA OF THESSALONIKI

C/F GREECE

VOLUME 3

P. 106

containing

CHAPTER IV - FREE CUSTOMS ZONE

for

HELLENIC INDUSTRIAL DEVELOPMENT BANK

MAY 1972

Gibb-Ewbank Industrial Consultants,
24 Queen Anne's Gate,
London S.W.1

CONTENTS

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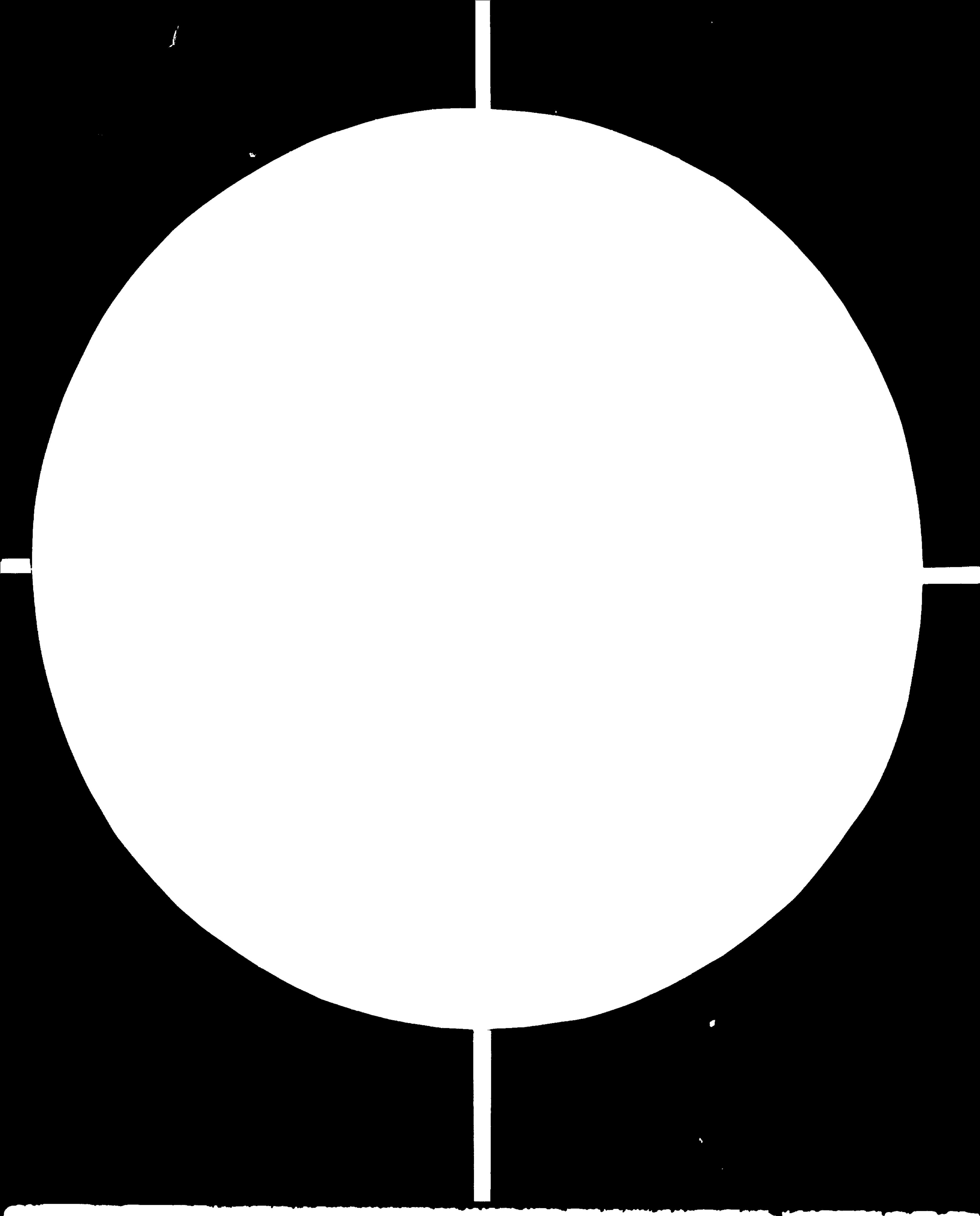

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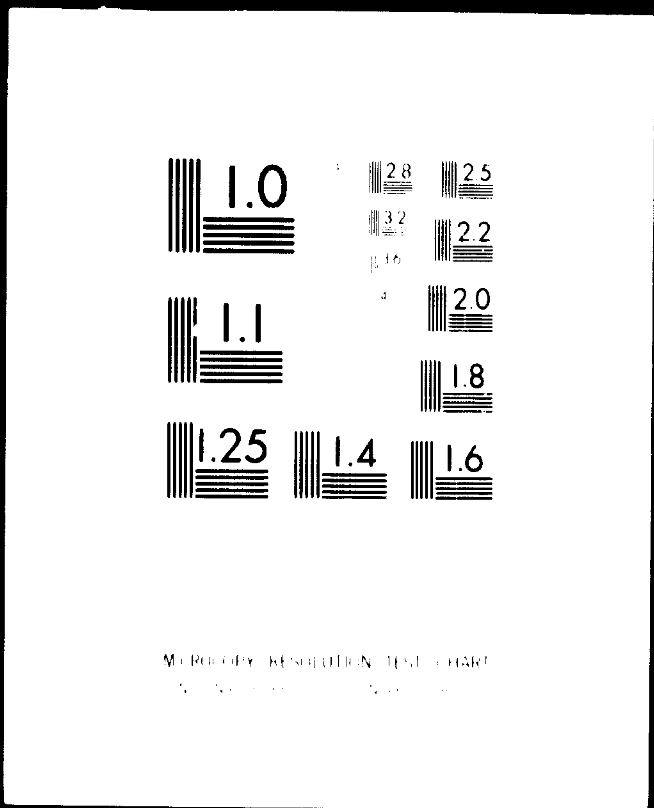

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CHARTS AND DIAGRAMS

APPENDICES

SECTION 1

INTRODUCTION

The factors which were considered in preparing the Feasibility Study (discussed at the Review Meeting in July 1971) are summarised in Section 2.1 below. The implications of the Feasibility Study on the establishment of the F-ee-Customs Zone are set out in the Final Report and summarised in Sections 2.2.1 to 2.2.8. The decisions necessary for establishing the Free-Customs Zone are summarised in Section 2.2.3.

It is understood that national policy on Free-Customs Zones is currently under review by a Government Committee. The decisions of this Committee made in the wider context of other selected locations in Greece could affect the outcome of the establishment of a Free-Customs Zone at Thessaloniki.

This Report examines the planning and operational requirements for the successful establishment of the Zone with particular emphasis on the economic situation in Thessaloniki. Commercial and social benefits and costs are considered in Section 6 and the general conceptual issues behind the cost-benefit model are described in Appendix B. A more detailed analysis of the costs and benefits would require sensitivity analyses to be carried out on all the variables on different assumptions and could more profitably be undertaken when the policy matters indicated have been resolved and the recommendations of the Government Committee proposed.

SECTION 2

SUMMARY OF THE FEASIBILITY STUDY

Consideration was given to the conditions necessary for the establishment and operation of a Free-Customs Zone in Thessaloniki. The Study examined in some detail the operation of the Shannon Free Airport Development Company, under which goods are transported not only by air but also by ship and road. The analysis revealed that two factors were important for the successful operation of a Zone:-

- Appropriate Policies and Administration.
- A favourable economic and social structure for the attraction of industrialists from home and abroad.

The Study emphasized that the economic feasibility of the Free-Customs Zone will depend upon the attraction of foreign investors. This in turn is dependent upon prospects for development and growth in the region of Thessaloniki generally, and Sindos in particular.

Factors of location, manpower availability, infrastructure, industrialization and other facilities important for attracting investment were considered and found to be favourable.

SECTION 3.

CONSIDERATIONS FOR THE ESTABLISHMENT OF A FREE-CUSTOMS ZONE IN THESSALONIKI

3.1 OBJECTIVES

The objectives of establishing a Free-Customs Zone in the Industrial Area in Thessaloniki which have been examined in detail in the Feasibility Study may be summarised as follows:-

(i) To attract foreign investment to Greece.

(ii) To promote exports and improve the balance of payments.

(iii) To create new investment opportunities for local industrialists.

(iv) To create new job opportunities.

(v) To promote balanced regional development.

The proposed Free-Customs Zone can be seen as an integral part of the economic policy pursued by the Government in the Development Plan. Its contribution could be evaluated in terms of the above objectives as well as others such as the promotion of medium to small scale industry, contribution towards industrialization and benefits of a more indirect nature. The likely impact of the Zone in terms of costs and benefits is examined in Section 6.

3.2 THE LOCATION

The feasibility of the location has been considered in the previous study. The two locations examined were the Port Area and the Industrial Area at Sindos. The more important factors involved are summarised below.

3.2.1 Location - Port of Thessaloniki

This location is rejected for the following reasons:-

(a) The maximum area of expansion for the Zone is estimated to be 100 stremmata, which is not considered to be sufficient.

(b) Any expansion would involve greater congestion in the Port Area and conflict with plans for the development of other Port facilities

(c) Cost of land in the dock area is high as it is on a prime urban site.

(d) A Free-Customs Zone in the dock area would require multi-storied factories which would add greatly to the overall cost.

(e) Companies locating in the Industrial Area are expected to use mainly road and rail transport, thus lessening the advantages of tying the Zone directly to the port.

3.2.2 Location - Sindos (Thessaloniki)

The location of the Zone at Sindos is considered to be favourable for the following reasons:-

(a) Distance from Thessaloniki will not be disadvantageous either for labour requirements or for communications.

(b) Most of the raw materials and finished products would be imported and exported by road and rail.

(c) The location would qualify for provincial incentives, as well as additional ones laid down by the Government for industrial estates.

3.2.3 Regional Factors

As a location, Thessaloniki offers certain advantages for industrialists. In geographical terms, potential export markets in Europe, the Middle East and North Africa are within access. These markets are currently being served by Companies established in the town in recent years. Road and rail communications with European countries are good, and the Thessaloniki - Athens highway is expected to be completed in the near future.

The town offers an adequate supply of manpower, a forecast of which is made in the Master Plan.

A relatively high level of industrialisation has been reached thus encouraging the shift from agriculture into industry. Cultural and recreational facilities including higher education schools, a university, cinemas, theatres and other entertainment are provided. In addition, an hourly air service connects the town to Athens. All these factors are of importance in attracting foreign investors to the area.

3.2.4 Incentives

In addition to the advantages mentioned above, certain incentives will be provided to make investment in the Industrial Area and the Free-Customs Zone more attractive. These are examined in detail below and include fiscal concessions, and also the provision of readily available infrastructure including storage space in warehouses in the early years of the project, and standard factories at a later stage.

3.3 ALTERNATIVE PROPOSALS

Three possible approaches have been considered on the establishment of a Free-Customs Zone in the Industrial Area. These are:-

(i) Designation of the whole Industrial Area for Free-Customs Zone treatment.

(ii) Designation of a specific site within the Area as a Free-Customs Zone.

(iii) Establishment of a Bonded Warehouse Compound System within the Industrial Area.

The first possibility was rejected since the Industrial Area has other objectives in addition to increasing exports. The proposal for establishing a Free-Customs Zone within the area is considered to be the most straightforward solution in terms of customs procedure and control but is regarded as unnecessary as all manufacturers are able to secure remission of tax on dutiable imports of raw meterials used in the production of exports. The Bonded Warehouse Compound, is recommended as the most acceptable solution.

3.4 THE BONDED WAREHOUSE COMPOUND

3.4.1 The System Proposed

The Bonded Warehouse Compound will consist of an area within which a Warehouse Complex is to be set up to include storage space and goods handling facilities. Raw materials and intermediate goods imported into Greece are to be bonded through the country from the point of entry to the warehousing area. They would then be distributed to the firms in the Industrial Area operating through the Compound under licence. Goods manufactured from these raw materials will be exported after being bonded in the Warehouse Compound.

3.4.2 General Considerations

The system of tax exemption offered by a Bonded Warehouse Compound has been selected as being the most appropriate form for a Free-Customs Zone in the Industrial Area. The major consideration influencing this decision is the system of tax exemption currently in operation for the promotion of exports.

This system will have considerable influence on the success of a Free-Customs Zone in the Industrial Area at Thessaloniki since it will form the basis of comparison with regard to incentives offered by the alternative systems. An examination of existing procedures and their implications is made below.

3.4.2.1 Existing Procedures

One of the objectives of customs laws in Greece is to encourage the export of goods through the avoidance of bureaucratic procedures. This is at present achieved by means of a system of temporary duty exemption. In order to avoid the payment of duties on imports of raw materials, which will be processed into goods for export, two systems are currently in operation. These are:-

1. The "drawback" or rebate system.
2. Tax exemption or "admission temporaire".

Under the first system, duty and taxes are paid on imported raw materials and rebates given once the goods manufactured from these materials are exported.

Under the second system no duty is paid on the raw materials provided that a guarantee is given for the re-exportation of the goods, which can only be stored for a limited period of time. This system is very similar to the Bonded Warehouse Compound.

At present, about 70 manufacturers in Thessaloniki are operating under the system of tax exemption. These include firms such as Hellenic Steel, Ethyl Hellas, and Hellas Can. Products covered include iron and steel products, cans, chemicals, paper and paper products, synthetic curtains, shoes and food products such as sugar, citrus and wine.

Any manufacturer wishing to operate under the present system can, with the approval of the Customs Authorities, apply for a resolution from the Ministry of Finance. Decrees are issued to each firm or for specific sectors, under which manufacturers are allowed to import materials through the Free-Customs Zone in the Port of Thessaloniki subject to the condition that the goods are exported within a year. (In practice, the Customs Authorities may grant an extension of a further year). The manufacturer may load his raw materials straight into his own "lorries of compliance" under the supervision of Customs officials. He then keeps the goods in storage in his own warehouse drawing upon them when he needs them.

The onus is therefore on the manufacturer to ensure that no raw materials are lost. The Customs Authorities must approve the storage arrangements and visit the warehouses once every six months.

The major check is maintained by way of the principle of equivalence which relates the quantity of raw materials to the number of finished products. This is usually covered by the decree issued for a particular firm, as in the case of Hellenic Steel where requirements of steel, lead, zinc and tin are related to production of iron sheets, tin plate etc.

Decrees relating to manufacturers in Thessaloniki are listed in Appendix D.

3.4.2.2 **Implications**

The system described above, while granting concessions to industrialists, does not operate effectively for a number of reasons. These are:-

(i) Customs Authorities do not have strict control.

(ii) Infrequency of visits by the Customs Authorities once every six months means a loose system of operation.

(iii) The system operates entirely on trust.

(iv) A breach of the rules results in a fine and not strict penalties such as revocation of licence; this may prove a temptation for manufacturers to cheat.

(v) No high value goods can be allowed under this system.

It has, nevertheless, been in operation for a number of years and is a system, with which both industrialists - local and foreign - and the Customs Authorities are familiar.

The adoption of a similar system - that of a Bonded Warehouse Compound - can be regarded as a practical way of implementing a Free-Customs Zone.

The proposed system has been discussed with the Customs Authorities in Thessaloniki and is regarded as being a viable one.

3.5 CONSIDERATION OF A FREE-CUSTOMS ZONE (MANUFACTURING AREA)

In considering the incorporation, in the Free-Customs Zone, of an area with manufacturing facilities in addition to the Bonded Warehouses, we are of the opinion that the provision of manufacturing facilities cannot be justified under present conditions.

The major reason for adopting this approach is that experience of industrial estate development in the United Kingdom and elsewhere has shown that the adoption of two systems to achieve one objective, in this case the promotion of exports generally causes a less effective operation of both systems.

The introduction of manufacturing facilities in the Free-Customs Zone in Thessaloniki would result in a situation where similar industries were producing the same type of product for export both within the Free-Customs Zone and throughout the Industrial Area including the Industrial Estate.

The system of granting import duty relief for exporting companies which is in operation renders unnecessary the introduction of manufacturing facilities in a Free-Customs Zone. The establishment of Bonded Warehouses in the Free Customs Zone will provide duty free raw materials and facilities for the export of the products made from them for factories in all parts of the Industrial Area. The provision of factories within the Free Customs Zone would be an unnecessary complication.

3.6 PROPOSAL FOR DEVELOPMENT

3.6.1 Scope

According to forecasts made in the Master Plan for the Industrial Area and in Section 5 of this report, industrial development is expected to occur mainly by way of import substitution. There is a high probability that firms established to serve local markets will move into the export field and could operate through the Bonded Warehouses in order to take advantage of tax exemption and other incentives offered for exports.

Firms which are already established in the Industrial Area and are operating through the present tax rebate (draw-back) and tax exemption systems would make use of the facilities offered, when the Bonded Warehouses came into operation.

One of the major advantages of the proposed system is the scope given to medium and small scale industry. These firms will not have any capital expenditure in constructing warehouses and storage space but will be able to rent space in the bonded warehouses at reduced rates. In addition opportunities will exist for cooperation between firms in importing raw material and in exporting finished products to other countries, resulting in a saving in transportation costs.

The use of containers and the TIR system could improve the opportunities for manufacturers to cooperate since loads could be assembled within the Compound which were destined for the same countries.

3.6.2 Planning Considerations

The adoption of a system of Bonded Warehouses together with manufacturing facilities in a Free-Customs Zone is considered to be impractical. Establishing a Bonded Warehouse Compound only, will introduce considerable flexibility in planning the area as all types and sizes of factories will have access to duty-free raw materials under present arrangements.

SECTION 4
ESTABLISHMENT AND DEVELOPMENT OF THE FREE-CUSTOMS ZONE

4.1 THE DEVELOPMENT

The initial stage for the establishment of the Free-Customs Zone is the construction of a single Bonded Warehouse adjacent to the Rail Feight Depot. Subsequent development would result from an evaluation of the operation of the Bonded Warehouse after a number of years and the possible extension of Bonded Warehouse and handling facilities to fill the remainder of the 7.5 ha site allocated to the Free-Customs Zone. (See Appendix E).

The site for the Free-Customs Zone was originally designated as 60 hectares adjacent to the railway line at the southern boundary of Area 2 of the Industrial Area.

4.2 SITE ALLOCATION

This siting, which can if necessary have rail sidings, has now been recommended and an overall view of the capital expenditure involved in relation to the timing and location of development has been taken. The Master Plan envisages the spread of development from east to west across the Industrial Area site. The establishment of a Bonded Warehouse Compound adjacent to the Rail Freight Depot on Area 1 will leave free the 60 hectare plot in Area 2 for future industrial use. At the same time capital will not be expended on infrastructural development until it is required.

4.3 THE RELATIONSHIP OF THE ZONE TO THE INDUSTRIAL AREA

The development of the Free-Customs Zone on the site recommended conforms with the overall development of the Industrial Area. It could be initiated in the near future as infrastructural facilities have already been established in Area 1. It will be close to the factories on Area 1 which will be able to make use of the service. It is also near to the Services Centre to be built on the first stage of the Area 2 development. The pattern of development for the Zone will conform to the general pace of development in the Area. By establishing the Bonded Warehouse Compound adjacent to the Rail Freight Depot, expenditure on roads and utilities to the area of 60 hectares previously allocated can be deferred till a later date when the use of this land will be decided.

4.4 INITIAL DEVELOPMENT

For the first stage, 2000 m^2 of warehouse space will be provided, with the possibility of later expansion to provide a total area of 14000 m^2.

Rail access can be provided if desired.

An administrative building and customs post will be provided at the entrance to the Compound.

The following initial development is proposed for the Bonded Warehouse in 7.5 ha site near the Rail Freight Depot.

1. The development of a fenced-in site containing plots to house bonded warehousing facilities.
2. Construction of infrastructure to include the provision of roads, drainage and water supply, electricity works in the fenced compound.

4.4.1 Railway

In the Plan, space has been provided for the construction of a railway siding into the Free-Customs Zone site should this be required.

SECTION 5

FORECAST OF POTENTIAL INDUSTRIES AND RATE OF DEVELOPMENT

5.1 FORECAST OF POTENTIAL INDUSTRIES

Economic conditions in the area of Thessaloniki were examined in the Feasibility Study and found to be favourable for the attraction of foreign industry and for future industrial development. A forecast is made in this Section of the type of industries likely to be attracted to the Industrial Area in conjunction with either a Bonded Warehouse Compound or a Free-Customs Zone Manufacturing Area. The rate of growth of the proposed Zone is dependent upon such factors as the alternative opportunities for investment in other countries, incentives offered, economic and political conditions etc. At this stage it is only possible to indicate the types of industries that could be attracted to a Free-Customs operation given the particular advantages and limitations which have been examined in the previous study.

Industries with some or all of the following characteristics will find the Free-Customs Zone attractive:-

(a) Low weight goods.
(b) High value added goods.
(c) High export propensity of finished products.
(d) High import propensity of raw materials.
(e) High growth rate.
(f) Labour intensive industries.
(g) Industries with wide dispersion tendencies, (based on a coefficient of localization index which has been calculated for various industries in the United Kingdom).

5.1.1 Conditions for Admission of Industries

Industries will of necessity be limited to those which conform to the general criteria laid down by the Industrial Area Company in its admission policies. The two major conditions to which they are expected to be subject are:-

1. Industries should not belong to the heavy industrial sector in view of the load bearing capacity of the soil.
2. Noxious industries should be excluded.

5.1.2 Priority for Establishment

An indication is given below of the types of industries suitable for establishment in the Free-Customs Zone; forecasts are based on criteria in the U.K. which may be regarded as being typical for specific industries, and are examined in the light of export, import and production statistics in Greece. On this basis a priority is drawn up for their establishment in conjunction with the Free-Customs Zone. A detailed analysis of prospects for specific industries is shown in Appendix G.

5.1.3 Potential Growth Industries

An assessment of the areas where investment is most likely to occur, is made by examining the trend in growth rates over recent years. Table 5.1 shows the change in value added in certain industrial sectors in Greece between 1958 and 1966.

TABLE 5.1

ESTIMATED PER CAPITA VALUE ADDED IN INDUSTRIAL SECTORS IN GREECE

(U.S. Dollars)

SECTOR	VALUE ADDED 1958	1966	GROWTH RATE (% p.a.)
Electrical appliances and apparatus	1411	3737	12.9
Publishing and printing	1578	3092	8.7
Transportation equipment	847	2529	14.7
Food industry	1416	2877	9.2
Wood and Cork	1028	2000	8.6
Non metallic industry	1444	3205	10.5
Metal products	1167	2854	11.8
Basic metals	2791	6459	11.1
Machinery	1205	2167	7.6
Paper industry	1521	2692	7.4
Clothing and footwear	877	1685	8.5
Textiles	1338	2554	8.4
Furniture	942	2129	10.8
Tobacco	1200	3240	13.2
Beverages	2988	4677	5.8
Petroleum and coal products	2381	9190	8.4
Leather	983	2338	11.4
Rubber	1710	3196	8.1
Chemicals	1775	4320	11.8
Miscellaneous	1349	2338	7.1

NOTE: Figures apply to firms employing 10 persons or more.

Source: Hellenews: Economy of GREECE 1969/1970.

According to an analysis carried out in the Master Plan the following sectors are expected to develop in the Industrial Area:-

Textiles
Ready made clothing
Footwear
Food processing
Metal industries and engineering products
Pharmaceuticals
PVC, Polyethylene and plastics industries
Electrical products
Printing and publishing
Wood products
Construction industries
Chemicals and paint.

Of these, sectors which depend upon imports of raw material and have export possibilities at the same time include:-

Ready made clothing
Metal and engineering industries
Pharmaceuticals
Plastics industries
Electrical products

In addition, the following industries could make use of Free-Customs facilities offered:-

Electronic products
Printing and publishing
Service industries such as data processing
Warehousing companies.

In Table 5.2 export propensities have been calculated for specific sectors in Greece. However due to conflicting data it has not proved possible to work out details for all sectors. Export propensities of textiles, food processing and chemicals have increased greatly over recent years and these sectors can be expected to continue to expand their exports.

Sectors with high import propensities are indicated in Table 5.3. It is feasible to expect that those sectors where the import propensity has been dropping while the export propensity has increased or has remained steady, could effectively utilize facilities offered through the Free-Customs Zone.

5.1.4 Conclusions

Table 5.4 summarises the criteria for the various industrial sectors likely to utilize Free-Customs facilities. Sectors with the greatest possibility for investment in the Free-Customs Zone are textiles and ready made clothing, metal and engineering industries, electrical apparatus and electronic industries.

Appendix G identifies in more detail specific products which may be manufactured within the most promising sectors.

TABLE 5.2

EXPORT PROPENSITIES BY MANUFACTURING BRANCHES IN SELECTED YEARS. GREECE

EXPORTS AS A PERCENTAGE OF GROSS VALUE OF OUTPUT

	1958	1964	1968
Processed food & tobacco	9	3	18
Textiles	2	3	
Clothing, footwear	2	3	13.6
Leather goods	12	26	13
Wood manu,acturers & paper & printing	2	2	1
Rubber manufacturers	-	3	1
Chemicals	6	7	15
Petroleum refining	-	1	n.a.
Non-metallic minerals	3	1	n.a.
Iron, steel & non-ferrous metals	4	4	n.a.
Transport equipment	1	6	2
Electrical Engineering machinery and other metal using industries	2	3	2
TOTAL	5	4	6

Source: 1958 and 1964 Data from Economic Commission for Europe.
1968: Data from statistical Yearbook of Greece 1970.

TABLE 5.3

IMPORT PROPENSITIES BY MANUFACTURING BRANCHES IN SELECTED YEARS. GREECE

IMPORTS AS A PERCENTAGE OF DOMESTIC AVAILABILITIES
(output + imports - exports)

	1958	1964	1968
Processed food & tobacco	14	14	6
Textiles	17	14	
Clothing, footwear	4	4	20
Leather goods	17	14	
Wood manufacturers & paper & printing	34	31	31
Rubber manufacturers	41	44	39
Chemicals	38	54	40
Petroleum refining	95	33	n.a
Non-metallic minerals	12	11	n.a.
Iron, steel & non-ferrous metals	62	64	n.a.
Transport equipment	81	71	85
Electrical Engineering machinery and other metal using industries	64	55	62
TOTAL	36	34	39

Source: 1958 and 1964 Data from Economic Commission for Europe.
1968: Data from statistical Yearbook of Greece 1970.

TABLE 5.4

ANALYSIS OF INDUSTRIAL SECTORS LIKELY TO UTILIZE A FREE-CUSTOMS OPERATION

INDUSTRY	Annual rate of increase in per capita added value 1958 - 1966	Labour costs as % of total costs	Coefficient of Localisation (in U.K. 1951)	Export propensity 1968 %
1. Textiles & Ready made clothing	8.5	18% to 20%	0.53	13.6
2. Metal & Engineering Industries	11.8	19%	0.39	2
- Machinery	7.6	30%		2
3. Pharmaceuticals*	11.8	22%	n.a.	15
4. Plastics	n.a.	n.a.	0.31	n.a.
5. Electrical Machinery and Apparatus	12.9	20%	0.32	2
6. Electronic Products	-	-	n.a.	-
7. Printing and Publishing	8.7	38%	0.35	-
8. Paper and Packaging	7.4	n.a.	n.a.	n.a.

***NOTE**: Figures are for the Chemical Sector including pharmaceuticals.

Source: Data from Hellenews: The Economy of Greece, 1970
Statistical Yearbook of Greece 1970;
Economic Commission for Europe;
Annual Abstract of Statistics, U.K.

5.2 PROJECTION OF THE RATE OF DEVELOPMENT

Projection of the rate at which industries will be attracted, cannot, as in the case of the Industrial Area, be based on firm factors such as growth of local markets and rate of import substitution. Such predictions would involve detailed surveys with the indentification of potential industrialists from other countries and an analysis of those countries' markets. The timing of investment from abroad is also impossible to predict since this is dependent upon numerous economic and political factors beyond the control of the host country, and not just on the relative attractions of incentives available in that country.

5.2.1 Factors Affecting Growth

In order to arrive at a possible rate of growth for the Free-Customs operation in Thessaloniki, certain influential factors as well as the experience of other Free-Customs Zones, are considered.

Factors indicating the rate of growth include :-

1. The trend of foreign investment in Greece in recent years.
2. The overall rate of development of industries in Greece and in Thessaloniki.
3. The rate of increase of manufactured imports in potential overseas markets.
4. The rate of growth of development of other Zones and Areas.

5.2.1.1 The trend of Foreign Investment in Greece

Details of foreign investment approvals and capital imports are shown in Table 5.5 from 1960 to 1968. While the annual statistics have been erratic, there

TABLE 5.5

PRIVATE GROSS CAPITAL FLOW GREECE

(in million US $)

Year	Private Gross Capital Investment in Manufacturing and Mining	Foreign Capital Imported Under Law 2687/53	Foreign Capital as Percent of Total Private Investment
1960	52.5	11.7	22.5
1961	52.0	13.5	25.9
1962	61.0	16.8	27.5
1963	71.4	40.0	56.0
1964	99.6	59.7	59.0
1965	139.7	111.6	80.3
1966	139.7	157.6	112.5
1968	-	285	-

Source:- Greece Investment Guide H.I.D.B.

has been a steady increase in the number of applications approved. The majority of investment has been in manufacturing industry - accounting for about two thirds of all imported capital between 1954 and 1969. Despite the apparent increase of interest shown in Greece by foreign investors no trend can be observed. Moreover, difficulties have been encountered over the past few years in attracting foreign investment generally.

These indicate that any projections are likely to be uncertain due to the many factors involved before an investment is realised.

An indication may however be obtained by looking at long-term trends of of private investment in Greece. Average annual increases were as follows:-

1956 - 1966: 11.6% per annum

1962 - 1966: 15.8% per annum

1966 - 1970: 10.0% per annum

There has in the latter period been a shift in investment from less productive sectors into manufacturing industry e.g. private investment in building decreased its share from 31% in 1968 to 27% in 1970 while investment in mechanical equipment increased its share from 18% to 20% in the same period. It is therefore assumed that the average rate of increase of 10.0% per annum is a fair indication of investment in manufacturing industry.

That investment is likely to continue at this high rate is indicated by the increasing share of investment to GNP. In 1965 the ratio was 22%; in 1970 it had increased to over 26%.

5.2.1.2 The Rate of Development in Manufacturing Industry

The rate of growth of manufacturing industry in Greece between 1962 and 1969 was estimated to be about 9% per annum. In Thessaloniki the rate of growth between 1958 and 1969 was estimated to be 10% per annum.

5.2.1.3 The Rate of Increase of Imports into Potential Markets

The major markets which will be served by the Free-Customs Zone are expected to be in the EEC countries and in North Africa. The rate of increase of manufactured goods imported into these areas will give an indication of the opportunities available. Estimated growth of imports of selected products into the EEC countries is given in Table 5.6.

TABLE 5.6

GROWTH OF IMPORTS INTO EEC OF SELECTED PRODUCTS 1955 - 1967

(Percentage increase per annum)

Category	World	Source Developed Countries	Developing Countries
Non-ferrous metals	9	9	7 7
Chemicals	13 5	13 8	5 6
Manufactured goods	12 4	12 3	13 7
Machinery & transport equipment	14 4	14 4	n a

Source: UNCTAD: Handbook of International Trade and Development Statistics 1969

Eastern European countries had rates of imports of 14.6% for manufactured goods during the same period (16 5% p a increase from developed countries and 31% per annum from developing countries The latter figure may be regarded as high since there has been a sharp fall in recent years In 1967 the figure was only 3.7% above the previous year)

With regard to North African markets, no forecast of imports is reliable since there has been an erratic jump from a rate of 2 8% between 1955 to 1966 to 6.7% in 1966/7 and 14.6% in 1967/8

The indication from this brief analysis is that imports of manufactured products in potential markets from developing countries is likely to continue to increase in the range of 10% to 15% per annum.

5.2.1.4 The Rate of Growth of Other Free-Customs Zones

The rate of growth of other Free-Customs Zones has naturally varied for many reasons such as location, and economic and political factors there and in their potential markets Some Zones have experienced a fast rate of growth early in their operation while others have increased their rate after a few years

For example the Free Zone at Colon, Panama had an estimated annual rate of growth of about 10% p.a in the increase of goods imported into the Zone between 1965 and 1968 In the same period the Shannon Free Airport Development Co. experienced a growth rate of over 16% p.a in imports and almost 16% in exports (as shown in Table 5.7)

However, experience of growth rates of industrial estates in the United Kingdom indicates that the rate of growth may be much lower Measured by the increase in working population growth at the Team Valley Industrial Estate in England was as follows:-

1951 to 1956	22 7%	(for five years)
1956 to 1961	11.5%	(for five years)
1961 to 1971	Nil	

These erratic growth rates are to a large extent a reflection of the economic and political situation in the country.

The long term growth rate at Team Valley is estimated to be approximately 4% per annum between 1951 and 1966.

5.2.2 Conclusions

The following indicators are a guide to the probable growth rate of the Free-Customs Zone:-

1. Rate of private investment in Greece:-

	1956 to 1966	11.6% p.a.
	1966 to 1970	10.0% p.a.

2. Rate of growth in manufacturing industry:-

Greece	1962 to 1969	9.0% p.a.
Thessaloniki	1958 to 1969	10.0% p.a.

3. Rate of growth of imports of manufactured goods:-

EEC	1955 to 1967	12.4%
E. Europe	1955 to 1967	14.6%

4. Rate of expansion of other Zones:-

Colon	1965 to 1968:	10.0%
Shannon	1964 to 1968:	16.0%

On this basis, it is reasonable to assume a rate of growth in the Free-Customs Zone of around 10%.

However, as indicated the rate of investment may be expected to vary with economic conditions in Greece and other countries which are its main trading partners.

TABLE 5.7

TRADE BY VALUE AT THE INDUSTRIAL ESTATE, SHANNON

	1964	1965	1966	1967	1968
			(£ millions)		
Exports -					
Air	11.2	18.8	27.1	27.6	30.6
Surface	2.9	3.9	4.6	5.0	4.6
Total	14.1	22.7	31.7	32.6	35.2
Imports -					
Air	8.0	12.4	19.7	17.1	15.3
Surface	3.2	3.6	4.5	5.4	4.9
Total	11.2	16.0	24.2	22.5	20.2
Added Value	2.9	6.7	7.5	10.1	15.0

Source: Shannon Free Airport Development Company.

SECTION 6.

COSTS, BENEFITS AND FINANCIAL ASPECTS OF THE FREE-CUSTOMS ZONE

6.1 GENERAL

Any evaluation of the Free-Customs Zone in the Industrial Area at Thessaloniki must be made in the light of policies adopted by HIDB. Questions of what is acceptable in principle on prices and costs and the extent to which the balance of social costs and benefits would justify non-optimal pricing policy are aspects on which decision can only be made by HIDB. In this respect, the recommendations of the Committee, which is currently drawing up the policy on Free-Customs Zones in Greece, would also be relevant.

The analysis in this section is concerned with the justification of the Free-Customs Zone in the Industrial Area and not with other locations. The conceptual issues behind the analysis are indicated in Appendix B. Of necessity the analysis has been based on a number of assumptions.

6.2 NATIONAL ECONOMIC AND COMMERCIAL ASPECTS

The starting point is to regard the Free-Customs Zone as a commercial operation in which revenues can be increased or decreased by varying rents and selling prices to achieve the desired rate of return. However, the establishment of the Zone would cause certain national economic and social benefits to accrue on the basis of which the commercial rate of return expected could be reduced. These benefits (and costs) are considered in this section and an overall cost-benefit ratio arrived at as an evaluation of the project. On the assumptions which are used, the Free-Customs Zone would be justified if the benefits exceeded the costs at the chosen accounting rate of discount.

6.3 THE MAIN ISSUES

The recommendation of the Feasibility Study is for the establishment of a Bonded Warehouse Compound in an area of 7.5 hectares near the Rail Freight Depot. The possible future development of an area of 55 hectares as a Free-Customs Zone is not considered appropriate at the moment.

The establishment of the Bonded Warehouse Compound near the Rail Freight Depot leaves provision for the use of facilities by the Depot in the event of a change of policy or location. The recovery of capital expenditure in this case improves the profitability of the Compound. On the other hand, the development of 55 hectares involving the transfer of the Compound as well as the operation of two systems at the same time (Free-Customs Zone and tax-exemption generally) involves large expenditure as well as the possibility of an inefficient operation leading to reduced profitability. A cost-benefit analysis for the latter area is shown in Appendix B.2.

6.3.1 Assumptions

In order to arrive at a rate of return on the project a number of assumptions are made on the development of the Compound.

6.3.1.1 Development

New warehouse space could be provided according to the following possible time scale:-

1974/5	2000 m²
1975/6	4000 m²
1976/8	8000 m²

6.3.1.2 Project Life

A project life of 25 years (1974 - 1999) has been assumed. On this basis, the total number of warehouse space/years is estimated to be 306,000 m^2.

6.4 COST ESTIMATES

6.4.1 Purchase and Development Costs

These costs are based on available industrial plots in Area 1, which are shown in Table 6.1. Purchase costs are considered by officials of HIDB to be much lower in the proposed area. An average price for the gross area has been estimated in the Report on the Thessaloniki Industrial Area by the Committee on Industrial Areas to be Dr. 200,000 per hectare. However, it is likely that the price of land would be much higher since it is adjacent to the area already being developed. An estimate of Dr. 270,000 per hectare is considered more realistic. This would take into account some of the social costs involved in the project, and described below.

Based on Table 6.1 Development Costs are estimated to be Dr. 740,000 per hectare.

6.4.2 Warehouse Construction Costs

These are estimated to be Dr. 1500/m^2 (based on a quotation for basic pre-cast concrete shed type industrial units in Greece and including such items as cladding etc.)

6.4.3 Administrative Building

An administrative building consisting of the Customs post and offices will be provided. An area of 320 m^2 has been estimated at Dr. 2000 per m^2.

TABLE 6.1

COST OF AVAILABLE INDUSTRIAL PLOTS (AREA 1)
(Drachmae)

		Stremmata	Cost per Stremma
1. With distribution of the Service Centre Costs			
Cost of plots	82,669.478	2315	35 710
Cost of studies	5,380.000	2315	2 311
Cost of infrastructure works	165,582.152	2315	71 525
	253,631.630	2315	109.546
2. Without distribution of the Services Centre Costs			
Cost of plots	75,198.145	2315	32 483
Cost of studies	3,750.000	2315	1 820
Cost of infrastructure works	140,507.153	2315	60.857
	219,455.298	2315	95.160

NOTE

The State covers 40% of the expenses that have been taken into account

The expenses incurred in connecting the Area with the Railway, Telephone, and Electric Power networks is primarily the responsibility of these organisations, without, however, eliminating the possibility of HIDB sharing the expenses.

In the above cost estimate the past and future Administrative Expenses (salaries, rents, etc.) of the Company and of the Division of Industrial Areas, and the interest of the capital of the Bank offered for the development of the Area have not been included.

Source: Hellenic Industrial Development Bank.

6.4.4 Other Costs

Items which have not been costed include railway sidings and facilities for which provision has been made in the layout plan, if required.

6.4.5 Capital Costs

Estimates for the purchase of site and development and construction costs are indicated in Table 6.2. Total costs are estimated to be Dr. 29.315 million.

6.5 THE COMMERCIAL PROFITABILITY OF THE ZONE

Consideration is given to the financial policies for the operation of the Zone on a commercial basis. The appropriate rate of return is considered to be 8% which is the maximum rate of interest charged on credit in Greece and ½% above the rate charged on long term loans to industrial enterprises. The Bonded Warehouse Compound considered below is based on a number of assumptions.

TABLE 6.2

FREE CUSTOMS ZONE

COST ESTIMATES
BONDED WAREHOUSE COMPOUND

7.5 Hectares in Rail Freight Depot Area

			Dr. Million
1.	Purchase of land at Dr. 170,000 per ha.		2.025
2.	Development costs at Dr. 740,000 per ha.		5.550
		Sub-total	7.575
3.	Cost of Warehouses 14000 m^2 at Dr. 1500/m^2		21.000
4.	Cost of Administrative building at Dr. 2000/m^2		0.640
5.	Other costs (e.g. fencing, container part etc.)		0.100
		Sub-total	0.740
		TOTAL	29.315

6.5.1 **Revenue**

The rents to be charged will depend upon the policies of HIDB or the National Warehousing Company as to the rate of return to be expected. Table 6.3 shows the possible rents to be charged at different levels of utilization for the recovery of capital costs over a period of 25 years. As a general guide a case is presented showing an 8% rate of return.

TABLE 6.3

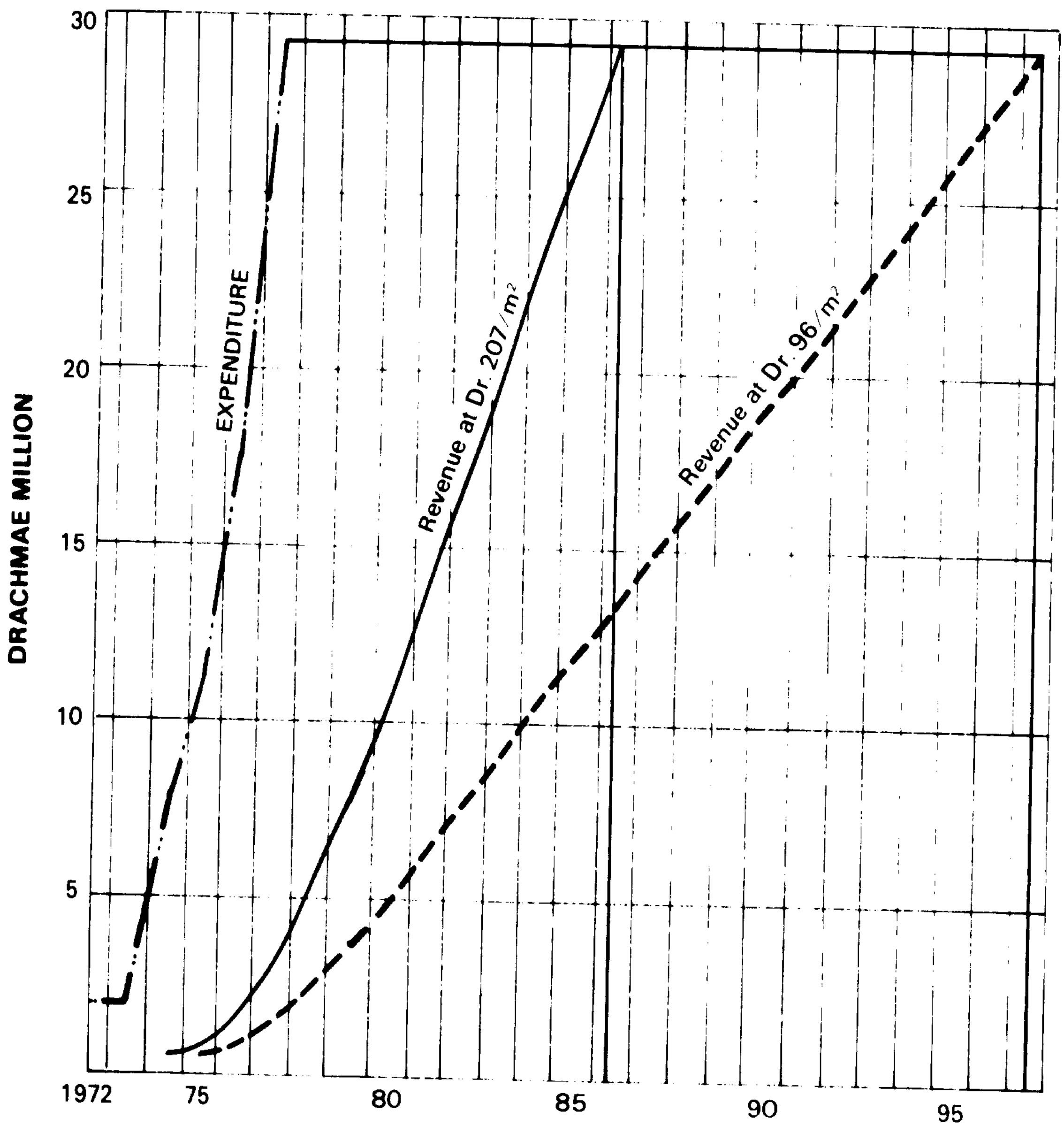
ALTERNATIVE RENTS FOR WAREHOUSE SPACE

	Utilization level of warehouse space			
	50%	70%	90%	100%
Recovery of the following:-				
	Drachmae per m^2			
1. Capital costs	192	137	105	96
2. Plus 8% profit	207	148	113	104

Should HIDB decide to subsidise the project through provision of facilities at cost, and not at an 8% profit, the element of subsidy could range from Dr. 8 to Dr. 15 per m^2. Rents could be further reduced if the 40% of investment costs which the State has undertaken to provide under Decree 533/68 was regarded as a grant. Subsidisation of rents to attract industrialists may prove to be necessary during the early years of the project. This reduction in revenue may be justified in the light of the social benefits accruing to the project which are mentioned below. Such a system is in operation in India where a lower than economic rent is charged on industrial estates in the early years of a project.

6.5.2 **Rate of Return**

Diagram 6.1 shows expenditure and revenues over a project life of 25 years.



RECOVERY OF CAPITAL COSTS
BONDED WAREHOUSE COMPOUND
100% utilization of warehouse space

DIAGRAM 6.1

Expenditure is envisaged on the following basis:-

		Dr. Million
1972/3	site purchase	2.025
1973/4	site development	5.550
1974/5 (1)	Construction of administration building etc.	0.740
(2)	Construction of 2000 m^2 warehouse space	3.000
1975/6	Construction of 4000 m^2 warehouse space	6.000
1976/8	Construction of 8000 m^2 warehouse space	12.000

Two cases are shown in diagram 6.1 on the basis of minimum and maximum rents that could be charged within the assumptions mentioned above.

A minimum rent of Dr. 96/m^2 is shown for the recovery of capital costs over a period of 25 years at 100% utilization of space. A maximum rent of Dr. 207/m^2 would recover capital costs plus an 8% profit at only 50% utilization of space. A utilization of 100% at this rent will, as shown in diagram 6.1 bring forward the break even point to the year 1986. At this rent, the discounted cash flow rate of return over the life of the project would be about 9%.

6.6 ESTIMATED OPERATING COSTS

These are given in Table 6.4. Wages and salaries are based on general rates of pay existing in Greece. Arbitrary figures are used for maintenance and utility charges. Promotion costs would vary according to HIDB policy but as a guideline approximately 20% to 25% of operating costs are used for promotion purposes at Shannon.

TABLE 6.4

OPERATING COST ESTIMATES

(Annual Costs)

1.	**Wages and Salaries**		
	1 Manager	at Dr. 14,000/month	Dr. 168,000
	1 Assistant Manager	at Dr. 10.000/month	Dr. 120,000
	2 Secretarial Staff	at Dr. 4.000/month	Dr. 96.000
	6 Unskilled labour	at Dr. 2.500/month	Dr. 180.000
	2 Security Staff	at Dr. 2.500/month	Dr. 60.000
			624.000
2.	**Electricity, utilities, maintenance etc.**		500.000
3.	**Promotion etc.**		500.000
		TOTAL	Dr. 1.624.000

6.7 SOCIAL COSTS AND BENEFITS

The establishment of the Bonded Warehouse Compound entails further costs and benefits which have not been assessed above on a commercial basis. These are factors of national economic and social profitability. In order to arrive at a realistic return on the compound, these factors are quantified over the life of the project and discounted back at an accounting rate of interest.

6.7.1 Some general assumptions

The major implications in terms of economic benefits lie in the relationship of the Compound to the Industrial Area, and beyond that to the regional and national level. Benefits (and costs) accruing to firms that are operating in the Industrial Area through the Bonded Warehouse Compound, need to be partly assigned to the Compound to the extent of their use of the facilities provided.

6.7.1.1 The question of shadow pricing

For the purpose of the analysis, prices used have been calculated on the basis of the existing price level in the initial year. Market prices have been used for the evaluation of purchase, development and construction costs.

In view of the complexities involved in calculating realistic shadow prices and wages, the adjustment to these values, necessary to take into account the overstatement of social costs and understatement of social benefits, is made by estimating the direct and indirect effects and adding them to the benefits side of the equation.

The pricing of output and exports from firms operating through the Bonded Warehouse Compound has been based on taking the typical production value of establishments in Greece in the forecasted branches of industry. The foreign exchange value of these industries has been increased by 10% in order to take into account the difference between the official rate of exchange and the probable real market value of the exchange to the country.

6.7.1.2 Employment

The employment effect of the Compound may be measured in terms of income generated directly through personnel employed in the Compound and indirectly through the further increases in income caused through the multiplier effect on the rest of the economy. A regional multiplier could be in the range of 2.5 to 3.0.

6.7.1.3 Regional income effect

The effect of the increased income is greater to the extent to which additional consumption leads to further production elsewhere. The question of 'induced' investment through linkages in production is one aspect which does not directly concern the Bonded Warehouse Compound, but is of importance if a Manufacturing Area was to be established within a Free-Custom Zone. This aspect is examined in Appendix B.2.

With regard to wages, the increased consumption caused as a result of expenditure by project-users, would be of no importance if the purpose of the cost-benefit analysis was in comparing different projects, since the increase to aggregate consumption would be the same in terms of national economic benefits. However, since the Bonded Warehouse Compound is being considered on its own, the impact of the additional income generated through the regional multiplier is likely to be an important benefit.

6.7.1.4 Project Life

No definite time scale can be put on the possible project life of industrial developments such as Industrial Estates and Free-Customs Zones. In project evaluation, the life of infrastructure could vary from 10 years to as much as 75 years for warehouses. The rate of return on the project as a whole would vary with different time-scales. For the Bonded Warehouse Compound, 25 years is used as a basis for calculating the cash flow.

Development of the Compound is assumed to be over 5 years as indicated in Section 6.3 above. Income is calculated on the basis of a return over 25 years.

6.7.1.5 An Accounting Rate of Interest

The selection of an appropriate rate of return on the project is a decision to be taken by H.I.D.B. and the Government. In order to arrive at what may be the indicative level of return, factors of the marginal productivity of the investment and of the social time preference rate need to be taken into account - such an exercise involves analysis of the capital market, of government infrastructure projects and the weight attached to allocation of resources between investment and consumption. This is clearly beyond the scope of this Report.

However, the purpose of carrying out a cost-benefit analysis on the Bonded Warehouse Compound may be seen as one of indicating whether the Zone will show any "profit". A cash flow is therefore drawn up below and adjustments made to the costs and benefits.

6.8 EVALUATION OF COSTS

Development and construction costs have been estimated at market prices. The purchase price however has been increased to take into account development near the planned area for the construction of the Compound as well as to contain an element of the social costs involved. Other costs arising from the establishment of the Compound are considered below.

6.8.1 Alternative Usage of Land

The area of 7.5 hectares allocated to the Bonded Warehouse Compound at present consists of agricultural land and has a few houses from the village of Sindos standing upon it.

It is assumed that 5 hectares of the site could be used for agricultural purposes. With a product such as wheat grown on it, a calculation can be made of the loss of income entailed. Taking as a basis the average yield per hectare in Greece (1.470 Kg.) and the current price paid by the Greek State to farmers (Dr. 3000 per ton) the annual loss of production from the land is estimated to be Dr. 22,140 per annum.

With regard to the houses currently standing in the area, costs of demolition, relocation of villagers and construction of new houses will have to be met.

A total cost of Dr. 500,000 is assigned to this aspect to be spread over the first three years of the project.

6.8.2 Cotton Research Institute and Land Reclamation Centre

Although these Institutes are located at some distance from the Bonded Warehouse Compound, a part of the losses caused to them by the development of the Industrial Area around them, should be allocated to the Compound. A total value of Dr. 100,000 is proposed.

6.8.3 Loss of Amenity

The proximity of the Bonded Warehouse Compound to the village of Sindos will cause some inconvenience to which a value must be assigned. To some extent the amount of inconvenience is reflected in the purchase price of land which has been adjusted upwards. In addition the level of pollution of industries in the Industrial Area is likely to be low. A small value is therefore attached to this figure. Dr. 100,000 is proposed. The establishment of the Industrial area will provide certain amenities which will offset some of these costs.

6.8.4 Summary of Costs

Total costs are estimated to be as follows:

	Dr. million
Purchase and Development costs	29.315
Loss of income from agriculture	0.5535
Alternative usage of land	0.500
Research Institutes	0.100
Loss of amenity	0.100
TOTAL	30.5685

6.9 EVALUATION OF BENEFITS

These may in broad terms be divided into those which are direct and those caused indirectly as a result of the establishment of the Free-Customs Zone. Items which are non-quantifiable are indicated at the end of this section.

6.9.1 Direct Economic Benefits

6.9.1.1 Income from Rent

The commercial aspect of the renting of warehouse space has been examined in Section 6.5. In order to arrive at a realistic value of the social costs and benefits a rent of Dr. 207 per m^2 is assumed to recover capital costs at a discounted rate of 8%.

6.9.1.2 Wages and Salaries

While wages and salaries may in a sense be regarded as transfer payments from one sector to another, these payments are considered part of the national economic benefits in certain cases. Where labour is previously unemployed, the wages of workers would be a benefit. Similarly, where workers are employed at a higher level of wages the additional income can be assigned to the project as an advantage. In the case of the Bonded Warehouse Compound the latter may be expected to be valid. An estimate is made below of the additional income likely to be earned at different levels of operation. The total value of this income is calculated for the life of the project to be Dr. 3 million. Details of the part of the income of each staff member which can be regarded as a national economic benefit are shown in Table 6.5.

TABLE 6.5

INCREASE IN INCOME OF STAFF EMPLOYED OVER PREVIOUS EARNINGS

(Drachmae)

Staff	Monthly increase	Annual increases
Manager	1 at 3,500	42,000
Assistant Manager	1 at 1,500	18,000
Secretarial	2 at 500	12,000
Labour	6 at 500	36,000
Security	2 at 500	12,000
	TOTAL	120,000

6.9.2 Indirect Economic Benefits

The main benefit consists of the increased income of personnel employed by companies operating through the Bonded Warehouse Compound, and the impact of this income on regional development generally. The impact of the Bonded Warehouse Company on the balance of payments is also assessed.

6.9.2.1 Increased Employment

The additional wages that are being earned by employees can be regarded as a benefit of the project insofar as additional consumption takes place increasing production elsewhere. The estimation of a shadow wage rate which would be realistic would require an analysis of the marginal propensity of consumption (and saving) of the employees. This benefit of the project is likely to be large since industries which are forecasted for the Free-Customs Zone will tend to be labour intensive.

As a general guideline it is assumed that factories operating through the Bonded Warehouse Compound will occupy 50 hectares in the Industrial Area. (This figure is close to the 55 hectares allocated to a possible Free-Customs Zone in the future). On a planning basis of 50 persons per hectare, 2,500 persons will be employed in these factories.

Most of these people are expected to have previously been working in the Agricultural Sector.

Assuming an increase in income of Dr. 500 per month per person employed annual increases in income of staff employed as a result of the establishment of the Zone would amount to Dr. 15,000,000 per year when the Zone is fully developed.

This sum will need to be allocated as a benefit between the Industrial Area and the Free-Customs Zone. On the assumption that 50% of the products manufactured by the firms are exported, a total value of Dr. 7,500,000 per annum is assigned as a national economic benefit to the Free-Customs Zone when fully developed.

6.9.2.2 The Balance of Payments

The value of increased earnings through higher exports is one of the major benefits that will result from the establishment of a Bonded Warehouse Compound. In addition to the initial investment made, the amount of foreign exchange earnings that are reinvested or retained in Greece may be regarded as a direct benefit to the project. The value of the foreign exchange earned in this way is likely to be far more than the nominal amount since the indirect impact in allowing further increases in imports of raw materials and capital equipment will lead to a boost in domestic production.

In order to estimate the possible foreign exchange earned through the Free-Customs Zone a number of assumptions are made.

(1) The average production value of establishments within the sectors operating through the Compound is estimated. Based on the Annual Industrial Survey for 1968 the average value of production per establishment was estimated to be Dr. 1,628,000 for 25,000 firms in the relevant sectors. Most of these establishments were in the medium to small sectors of industries. The probability of a few large investors in the Industrial Area in addition to medium sized industries is likely to raise the gross value of production to a higher level. A production value of Dr. 2,000,000 per firm is used.

(2) On the assumption that at least 50% of the products are exported, it can be expected that each firm may bring in about Dr. 1,000,000 in foreign exchange. Assuming that 50 firms were operating through the Compound total foreign exchange may be in the region of Dr. 50,000,000 per annum.

(3) With a 10% adjustment for the overvaluation of the Drachma, the real value of the foreign exchange may be estimated to be Drachma 55 million.

The value of the foreign exchange to the economy is therefore estimated at the real contribution i.e. the 10% premium on the official rate of exchange. This is estimated to be about Dr. 5 million per annum.

6.10 NON-QUANTIFIABLE FACTORS

These benefits are related mainly to factors of industrial environment. The contribution towards industrialisation through for example the acquisition of skills by workers, is reflected in the increased wages earned. The impact on industrialisation through the linkage factor on related industries is another effect which may be regarded as a benefit. This aspect is examined in Appendix B.2.

The provision of amenities such as better transportation services, better facilities including electricity, sewage and water supply to the neighbouring villages and also the provision of housing are all beneficial factors.

A value of Drachma 5 million is assigned to these factors.

6.11 SUMMARY OF BENEFITS

On the assumption that the Bonded Warehouse Compound will have a project life of 25 years, total benefits are estimated as follows:-

		Dr. Million
Income from rent		60.000
'Direct' income effect		3.000
'Indirect' income effect		132.000
Foreign exchange effect		88.000
Non-quantifiable benefits		5.000
	TOTAL	288.000

6.12 RATE OF RETURN ON THE PROJECT

6.12.1 Costs and Benefits

Based on assumptions which have been mentioned in this Section, the cash flows of economic and social costs are summarised in Tables 6.6 and 6.7.

TABLE 6.6

CASH FLOW OF COSTS

	Drachma Million					
Year	1972	1973	1974	1975	1976	1977 to 1997 (per annum)
Expenditure	2.025	5.550	3.740	6.000	12.000	-
Loss of Agricultural income			— 0.02214 per annum —			
Alternative usage	0.167	0.167	0.167	-	-	-
Loss to the Institutes	0.100	-	-	-	-	-
Loss of amenity	0.100	-	-	-	-	-
TOTAL	2.414	5.739	3.929	6.022	12.022	0.022

In order to calculate the flow of benefits over time, assumptions have been made on the "contribution" of various effects over time. These are summarised below.

1. The income from rents will remain steady after 1977 when the Compound has been fully developed.
2. The indirect income and foreign exchange effect will have their full impact after the Compound has been in operation for 15 years.

3. The 'direct' income effect of personnel employed in the Compound will have an effect in every year of the project.
4. The value given to non-quantifiable factors is spread out over the life of the project.
5. The regional impact caused by the multiplier is not taken into account - an indicative rate of 2.5 may be used to evaulate this effect.

6.12.2 Rate of Return

The cash flow for the project are shown in Table 6.7. The Social discounted rate of return on the project is estimated to be 25%. This figure is likely to be higher since the multiplier effect of the increase in incomes will raise the value of the benefits.

TABLE 6.7

CASH FLOW OF COSTS AND BENEFITS OF THE BONDED WAREHOUSE COMPOUND

	Costs	Total Benefits
1972/3	2.414	0.320
1973	5.739	0.320
1974	3.929	3.726
1975	6.022	4.026
1976	12.022	4.768
1977	0.022	5.958
1978	0.022	6.831
1979	0.022	8.038
1980	0.022	8.519
1981	0.022	9.040
1982	0.022	9.632
1983	0.022	10.273
1984	0.022	10.980
1985	0.022	11.755
1986	0.022	12.609
1987	0.022	13.547
1988	0.022	14.581
1989	0.022	15.718
1990	0.022	15.718
1991	0.022	15.718
1992	0.022	15.718
1993	0.022	15.718
1994	0.022	15.718
1995	0.022	15.718
1996	0.022	15.718
1997	0.022	15.718

SECTION 7

INVESTMENT INCENTIVES

7.1 PRINCIPLES OF INCENTIVES

Investment incentives, in an international context, are intended to induce entrepreneurs to set up business in one country rather than another. At the national level they discriminate between localities and can be used to steer industry away from areas of congestion or attract it to regions where unused resources are available.

The incentives offered by the Greek Government to foreign investors examined in the Feasibility Study are described in greater detail in Appendix H. At this stage it is not suggested that any additional incentives are required. The existing incentives are concerned with the treatment of foreign capital with regard to taxation and repatriation and the allocation of duty-free raw materials. These are compared below with measures offered in a number of other countries. From this examination it emerges that the major incentive offered to investors elsewhere, which is not available in Greece, is the provision of grants for the construction of buildings and the purchase of machinery; whether such grants are appropriate or not, depends on the system of tenure under which factories are held. If companies are purchasing the land and building their own factories the situation is clearly different from that where the Industrial Area Company owns the land and builds and rents out factories. The conditions under which factories are held by owners or tenants clearly open the way for a variety of different incentives which are capable of variation according to the pressure of demand for accommodation in the Industrial Area.

7.2 ADOPTION OF INCENTIVES FOR THE INDUSTRIAL AREA

The adoption of attractive incentives and promotion policies are considered fundamental to the successful establishment of the Industrial Area. It is expected that most foreign investors setting up manufacturing facilities in the Industrial Area will export some proportion of their production. The advantages offered by the Bonded Warehouse Compound could be one of the factors attracting investment to the Area.

It is important that an industrial area should be a viable proposition not dependent in the long term on artificial conditions. The conditions necessary to enable foreign companies to operate, for example, and rules concerning the repatriation of profits and capital must not be confused with special inducements such as tax-free holidays. What a locality has to offer in the way of resources, an adaptable labour force, efficient local administration, good communications, adequate power supplies, and access to markets are the really important factors which go into corporate decision making. A tax-holiday is, after all, only effective in the case of companies which are making profits.

The conclusion of this Study is that the main emphasis should be on providing a framework of regulations within which companies can operate with the minimum of frustration and administrative delay. The list of investment incentives provided below should be regarded as first line reserves from which items should be selected for use as and when the occasion arises.

7.3 COMPARISON WITH INCENTIVES OFFERED IN SELECTED COUNTRIES

A summary table of the types of incentives for industrial exports offered by selected countries is shown in Table 7.1.

TABLE 7.1

SUMMARY OF TYPES OF INCENTIVES

An International Comparison

	Currency retention a	Export bonus/import entitlement b	Special import licenses for exporters c	Foreign Exchange allocations to exporters d	Multiple exchange rates e	Production and sales tax a	Income tax b	Export tax c	Other taxes d	Import duties e	Incentives for capital including export credit and export credit insurances a	Other input incentives b	Financial assistance for export promotion a	Collection and dissemination of foreign market information and foreign market surveys b	Export publicity and exhibitions abroad c	Training of export managerial personnel d
Algeria	*		*			*			*	*						
Brazil						*	*	*	*	*					*	
Ceylon		*					*	*		*				*	*	
Chile					*				*	*	*			*		
China (Taiwan)				*			*			*	*			*		
Federal Republic of Germany						*	*		*	*	*			*	*	
France	*					*	*			*	*			*	*	
Greece						*	*		*							
India			*			*	*	*		*	*	*	*	*	*	*
Ireland						*	*			*			*	*	*	*
Israel						*	*		*	*	*	*	*	*	*	
Italy						*				*	*		*	*	*	*
Japan						*	*			*	*			*	*	
Mexico							*	*		*	*	*	*	*	*	
Pakistan		*	*			*	*			*	*		*	*	*	*
Panama										*						
Thailand							*				*		*			
Turkey				*		*	*		*		*					
United Kingdom						*				*	*		*	*	*	*
United States						*				*	*			*	*	*

Source: United Nations (Conference on Trade and Development, Geneva), New York, 1970.

7.4 COMPARISON WITH INCENTIVES OFFERED IN THE U.K., IRELAND AND MALTA

Table 7.2 compares incentives in the following countries:-

The United Kingdom - the incentives in development areas are shown in the Table as these would compare with the provincial incentives offered in Greece.

Ireland - the incentives offered by the Irish Development Authority and the Shannon Free Airport Development Company are shown as being of the type likely to be required in a Free-Customs Zone in Greece.

Malta - the incentives offered by the Malta Development Corporation are geared almost wholly to the attraction of foreign capital.

TABLE 7.2

COMPARATIVE INCENTIVES OFFERED FOR INDUSTRY

A UNITED KINGDOM	B IRELAND	C MALTA	D GREECE *See text for details
APPLICABLE TO DEVELOPMENT AREAS FACTORIES (provided by Department of Trade and Industry) Advance factories of 900 M² (10.000 sq ft) to 4.500 M² on Industrial estates or sites. Custom Built factories both for rent or sale Special cases may get rent-free period for two years	Standard or custom built factories for rent or sale	Standard factories at a rent of 3% of capital cost. Special purpose factories provided on request	Standard factories to be provided on the Industrial Estate
BUILDING GRANT 35% or 45% LOANS at moderate rates of interest for a) buying or building premises (not of building grant) b) buying plant, machinery or equipment c) Working capital	Non repayable cash grants given for fixed assets including machinery and equipment. Special projects get 50% max grants in designated areas. 35% in others, where fixed assets are up to £1m and Investments job ratio is up to £10.000	Grants for fixed assets up to 33 1/3% of cost special grant up to 50%	Credit Incentives Concessional interest rates (up to 4 percentage point on interest rates)
REMOVAL GRANTS	Long term and medium loans (ICC)		
TAX ALLOWANCES a) New machinery and plant 100% for period in which expenditure is incurred b) Other machinery and plant and mobile equipment 60% for first year, writing down allowance of 25% p.a. on the declining balance c) Buildings 44% of cost of construction (less grant) can be written off against tax in first year 4% in subsequent years	Total relief of tax exemption for profits derived from exports up to 1990. Free transfer of dividends and profits in foreign exchange. Repatriation of capital, no capital gains tax	Total exemption from income tax for 10 years Concessions on customs duties on plant and raw material Low company taxation Specific deductable expenses No exchange control with U.K	Exemption for re invested profits Remittance of capital 10% p.a. Remittance of interest and profits 12% Freezing of income tax, specific exemptions on machinery, construction materials etc • Reduction of charges and fees. Depreciation allowance (Thessaloniki 15% buildings 20% machinery 52% Motor trucks) Exemption of duty on imports of machinery for modernisation. Provincial Incentives (income tax exemption on profits reductions in T.O tax etc Export enterprises
LABOUR COSTS Regional employment premium in addition to refund of Selective Employment Tax	Provision of housing for key workers		
TRAINING AND TRANSFER COSTS Weekly grants Free services Government training Centres Industrial rehabilitation Help for transferred workers	Training Grants for workers Management training Instructors and consultants Government training Centres	Training grants and subsidies for 4, 5 or 6 year apprentices (Wages paid by Government in declining percentage)	
CONTRACTS PREFERENCE SCHEME			GOVERNMENT PREFERENCE OF PRODUCTS

Comparison of the incentives offered in the different circumstances of these countries may be made in terms of finance allowances, economic privileges and other incentives.

7.4.1 Fiscal Incentives

In general terms these consist of tax exemptions and allowances, transfer and repatriation of capital and increased depreciation allowances. It is apparent from the Table that tax allowances are not high in Greece as in other countries.

The major fiscal advantage offered by the other countries which Greece does not offer is a period of tax holiday for foreign investors. This aspect was considered to be the most important in attracting foreign investors in Ireland. According to the scheme in Ireland profits attributable to export trade are eligible for relief from Income Tax and Corporation Tax for a maximum period of twenty consecutive years. Relief granted is 100% remission from tax for the first fifteen years and part remission at reducing rates for the following five years. (The scheme is however limited till the year of assessment 1989/90 as the last year in which full relief will be granted). Similarly the Malta Development Corporation exempts new industries from paying income tax for a period of ten years. In Greece exemption is granted only for re-invested profits.

While the effectiveness of tax holidays as against investment allowances is a matter of debate, experience at Shannon Free Airport has shown them to be a primary attraction for foreign investors.

7.4.2 Economic Incentives

An examination of the table of comparison shows that the development agencies of the U.K., Ireland and Malta offer substantial grants for construction of buildings and purchase of machinery.

From the promotional literature of HIDB it is apparent that such facilities do not exist in Greece, although long-term loans are offered for acquisition of fixed assets at concessional rates of interest. Further concessions are made on the interest rates charged on loans and lines of credit of domestic banks for export industries.

In Ireland construction grants are applicable to the poorer areas, including the Shannon Free Airport Development Co. Firms which receive grants at Shannon also qualify for special loans from the Industrial Credit Company Ltd. Grants which are awarded to companies which have obtained a certificate of authority from the Ministry of Finance may amount to two-thirds of the cost of new plant etc. as well as the full cost of training.

In Malta grants are given of up to one third of the cost of fixed assets (in special cases up to half of the cost).

Any system of grants should take into account their impact on the economy in the light of the criteria on which they have been selected e.g. value added, percentage exported, labour employed etc.

This judgment does not necessarily mean that the HIDB should introduce additional incentives or vary those already in existence. What is required is a flexible system which can be adapted to meet the current needs of the Industrial

Area and the changing conditions as it develops without undue expense and without causing ill-feeling about the different treatment of similar companies at various times.

The following incentives might be considered for holding in reserve for introduction as required.

(a) **Tax Holidays**

Exemption from tax on profits derived from exports for a specific number of years.

(b) **Grants**

Provision of non-repayable cash grants for the purchase of fixed assets including machinery and equipment up to a certain percentage of costs. These should be applicable to industries of a certain size and subject to criteria such as high value-added.

(c) **Training grants**

Provision of grants for the training of workers and apprentices or provision of facilities where workers may receive appropriate training.

(d) **Rail freight concessions**

Reduction of freight rates within Greece.

(e) **Provision of housing facilities**

Housing conveniently located and at low cost is a considerable advantage in attracting labour. Consideration of this aspect is made in the Master Plan for the Industrial Area.

7.4.3 Other Incentives

The provision of advance standard factories can prove to be a major attraction, as shown by the case of Shannon. Ready availability of factory space and low rents make a favourable impact on the profitability of a project through a reduction of the pay-back period. The amount of the rent to be paid by the potential investor is a critical factor which needs to be thoroughly investigated. Subsidisation of rent should be weighed against other incentives allowed. Experience in Free-Customs Zones in other countries has shown that charging the economic rent for factories is not necessarily a deterrent to investors provided that no comparable facilities are available in the region at the same order of costs. In Thessaloniki in terms of rent and cost of land in relation to infrastructure, such as access to main roads, it was found that in the opinion of industrialists land could be purchased at much cheaper rates along the main highway than in the Industrial Area. However, material advantages offered by the Free-Customs Zone and the Industrial Area could outweigh the advantages of other sites in the neightbourhood when all incentives are taken into account.

This cost differential may have important repercussions for the initial development of the Industrial Area. An indication of the price differential in Thessaloniki is given in Table 7.3.

TABLE 7.3

LAND PRICES IN GREATER THESSALONIKI

a.	Near Urban areas	Dr. 30 to 2000 per m^2
b.	Rural areas with good traffic connections and qualified labour	Dr. 5 to 20 per m^2
c.	Rural areas (others)	Dr. 1 to 5 per m^2

A further incentive which is offered in other Industrial Estates e.g. in Italy, is a concessionary railway freight rate. This is important in view of the fact that the products of industries expected to be attracted through the Bonded Warehouses are low weight and high value added. Transport costs are a key factor in their operation and a reduction in these would prove attractive to marginal industries whose profitability is greatly influenced by such costs. The existence of an efficient, low cost transport system is in itself a major inducement to industrialists to establish their business in a particular area.

7.5 CONCLUSIONS

7.5.1 Analysis of Incentives

The advantages offered by such incentives must be offset against their cost and any loss of revenue suffered by HIDB and other Ministries. The attraction of each incentive to different industrialists must be evaluated. For example, at the Shannon Free Airport Company incentives were rated by industrialists in the following order of importance:-

(i) Exemption from taxes on exports.

(ii) Availability of grants.

(iii) Availability of transportation facilities.

(iv) Availability of good factory buildings.

(v) Availability of labour.

(vi) Freedom from import duty.

(vii) Other less tangible factors.

A consideration of incentives in Greece by two taxation experts* concluded:

> "The incentives taken together are probably not sufficiently attractive to justify a new Greek venture for tax reasons alone .... "

Analysis of the incentives offered by the Greek Government for the attraction of foreign investors show that these are in general similar to those offered in development areas in the U.K., and in Ireland and Malta. Certain incentive policies which have proved attractive to foreign investors in these

* "Greece offers more than sunshine to Greek Industry" by John Chown and George Stathopoulos - "Financial Times" 2nd April 1970.

countries, have not been adopted in Greece. It is, however, recommended that these policies should be held in reserve and only be introduced at a later stage, if necessary.

Advantages should be stressed which are related to potential industries. These advantages offered by the Industrial Area at Thessaloniki are summarised at the beginning of this Report. Recommendations on subsidies and other measures required for the promotion of the Industrial Area as a whole are made in the Master Plan Report.

7.5.2 Discrimination in Favour of the Industrial Area

The importance of stressing these advantages is underlined by the fact that very few limitations exist on the establishment of industries in Thessaloniki. This has resulted in ribbon development along the major roads where infrastructural advantages such as good access to communications and power exist. The introduction of restrictive policies on construction in the locality may prove necessary to ensure the success of the Industrial Area. With regard to the Bonded Warehouse Compound the advantages of the Area must clearly be tied up with the advantages of the proposed system since manufacturers are currently able to enjoy tax-exemption of imports on certain conditions but regardless of where their factories are situated. As noted in this Report the advantages of the Area coupled with the system proposed are likely to be of attraction to the medium and small-scale industries.

SECTION 8

OPERATION OF THE BONDED WAREHOUSE COMPOUND SYSTEM

8.1 INTRODUCTION

The initial development of the Free-Customs Zone as a Bonded Warehouse Compound is seen as an extension of the existing system of tax exemption which is used by about 70 manufacturers in Thessaloniki at present. The adoption of this system would prove advantageous from the administrative point of view insofar as existing paperwork and procedures could be adapted. As a part of the general development of the Industrial Area, the system can offer the advantages of the tax exemption system together with those of the Area.

Over the long term, development would consist of a Bonded Warehouse Compound; originally a Free-Customs Zone with manufacturing facilities was envisaged but this is not considered to be justified by the existing fiscal arrangements. A review held in 1976 of the working of the Bonded Warehouse System and its possible extension within the area of 7.5 ha would form part of the sequence of development of the Industrial Area as a whole.

Consideration is given below to the operating aspects of the Bonded Warehouse Compound System and the decisions needed for its establishment and successful operation.

Aspects of the operation of a Free-Customs Zone with manufacturing facilities are examined in Appendix F and the indications there may serve as a guide, should a decision be taken to adopt this elsewhere.

8.2 OPERATING PROCEDURES

Under the Bonded Warehouse Compound system, raw materials will be imported free of duty and, after being processed in factories in the Industrial Area will be exported, again without payment of duty. Aspects involved in the functioning of this system are considered below.

8.2.1 Legal Aspects

Under the present system in Greece, Free-Customs Zones are given legal validity under the following laws concerning Industrial Estates:

Law 4458/27.2.1965 "Concerning Industrial Estates"

Royal Decree No. 750: Jan. 1970 "Concerning approval of Regulations for the operation of the Industrial Estate in Thessaloniki".

(The Industrial Area of Thessaloniki is in this context included as an Industrial Estate).

The effect of these Laws on the proposed Free-Customs Zone is summarised below.

8.2.1.1 **Law 4458/1965** is concerned with the establishment, organisation and operation of Industrial Estates at Thessaloniki, Patras, Volos, Kavalla and Heraklion and other areas by HIDB either by itself or with other legal entities.

(a) Under Article 1 sub-section 5 Free-Customs Zones may be established within Industrial Estates by Decrees and the Ministers of Co-ordination, Finance, Industry and Public Works.

(b) Also under Article 1, sub-section 5 "Industrial units situated within such districts shall be under the control and supervision of the relevant Customs Authorities".

(c) The terms and conditions of operation and supervision of Industrial units are to be prescribed in the Decree.

(d) The principles of operation of the proposed Zones are stated, viz. exemption of import duty and taxes on raw materials unless disposed of for consumption within the customs territory in Greece.

8.2.1.2 **Royal Decree 750/1969** concerns the operation of the Industrial Estate at Thessaloniki. The clauses in the Decree likely to affect the operation of the Free-Customs Zone include application procedures, purchase or rental of sites, building terms, and administration, control exercised by HIDB, utility services and financial charges, provisions concerning investment and construction, and arbitration. Most of these aspects are the concern of the Industrial Area Management Company. Items relating to operation procedures are considered below.

8.2.1.3 Terms and Conditions of Operation

In accordance with Law 4458 it is necessary to prescribe the terms and conditions of operation in a Decree. It is assumed that regulations arranging for the operation of the Free-Customs Zone will have to be submitted to the Ministry of Industry within two months of purchase of sites, as stated in Article 5 of the Law.

Similar types of regulations to those drawn up for the Estate could apply to the operation of the Free-Customs Zone. According to Article 5 these are to include -

(a) The terms and conditions under which parts or the whole of the Industrial Estate will be allocated to third parties for the establishment therein of enterprises mentioned in pars. 1 and 4, Article 1

(b) All matters relevant to the management and administration services of the Industrial Estate, the functions of such services and all rights and obligations between the developer and the enterprises installed therein.

(c) All matters relevant to the control which is to exercised by the HIDB as the developer of the Estate - or a Company established by the Bank, - on the enterprises installed therein.

(d) All other details required in respect of the development and operation of the Estate.

These regulations are to be drawn up by officials of HIDB and submitted to the Ministry of Industry.

8.2.1.4 **Factors Affecting Legislation**

Laws on existing Free Zones in Greece give an indication of the contents of the proposed Decree for the Free-Customs Zone in the Industrial Area. Two Laws are appropriate:-

Law 2551/23.8.1953 which gives legal status to the Free Zone and Port of Thessaloniki and by which the Free Zone Commission and Port of Thessaloniki Trust Fund Commission were amalgamated.

Law 1559/55 (amended by Statutory Law No. 3398/55 Article 6, paragraph 2), which covers the Free Zone of Peiraeus.

The following aspects are relevant:-

(a) The Peiraeus Free Zone is commercial i.e. a transit zone with bonded warehouses. Its system of operation would be applicable to the Bonded Warehouse proposed at Thessaloniki.

(b) The existing Free-Customs Zone in the Port of Thessaloniki includes warehouses and also two manufacturing facilities. Under present regulations each manufacturing facility for the Zone requires a Decree to be promulgated in order to operate within it.

(c) At both Peiraeus and at Thessaloniki, Customs Authorities may not exercise any control within the areas (except in the case of monopoly goods).

8.2.2 **Licensing of Industries**

It is proposed that licences be granted to the manufacturing firms operating in the Industrial Area through the Bonded Warehouse System, by the Industrial Area Company in order that a strict control may be kept on their operation. A heavy penalty should be laid down for breach of regulations.

Under the present system in operation in Thessaloniki, decrees have been issued for various forms for duty exemption on condition that goods are exported. This system was examined in Section 3.

The fur and skin trade at Kastoria provides an example of conditions which are currently laid down for the operation of this system. Law 665/20 concerning the manufacture of skins is summarised below. The conditions laid down in this Law may serve as the basis for regulations for the operation of the Bonded Warehouse Compound.

Law 665/20 Concerning the manufacture of skins at Kastoria.

Article 1: (1) The import of raw material for manufacture in Kastoria is duty free provided that goods are exported within one year.
(2) The time limit can be extended by the Customs Authorities.

Article 2: Permission must be obtained from Free-Customs Authorities in Kastoria by means of an application form giving name, address and quantity required over one year.

Article 3: Customs Authorities will examine the type and quantity of raw material being imported - number, kind, weight, colour and special characteristics as a check.
Two copies of a form are to be signed by the clerk of the zone and the manufacturer. The form concerns the processing of goods. One copy will be used as a permit (see Article 4)

Article 4: A special book will be kept listing all the manufacturers, and giving all details of raw material. It will consist of two columns showing debit and credit, and details of stock.

Article 5: The manufacturer must fill in a special form for exports showing:
- the quantity of finished products
- the weight
- the quantity of raw materials
- the colours
- the weight of the rest of the stock
- the waste

Article 6: A committee of experts will examine the detailed forms and the special book to ensure that they are correct.

Article 7: If the manufacturer operates through another Customs he must declare it to the Kastoria Customs and fill in all the forms.

Article 8: Credit will be given on the balance according to the above details.

Article 9: It is forbidden to sell goods on the domestic market. If the manufacturer is caught selling on the home market, he will be arrested and charged with smuggling.

8.2.3 Implications for the Bonded Warehouse Compound

The Law covering the operation of the Bonded Warehouse Compound would need to cover all these aspects. A similar system is proposed insofar as licences will be issued to all manufacturers operating through the Compound and account will have to be kept at all times of the raw materials and intermediate goods which have been imported. The procedure of 'equivalence', by which raw materials will have to be accounted for in relation to the finished products, will need to be adopted with regard to each manufacturer working through the Compound. Documentation required for the functioning of this system is considered in Section 8.2.5. Individual licences would therefore be needed for the Compound, whereas manufacturers working within a Free-Customs Zone Manufacturing Area would be covered by the general principles laid down for its operation.

8.2.4 Issue of Leases or Sales Agreements

These would be drawn up by the Industrial Area Company and would be subject to the clauses of the agreements as at present. It is recommended that a system of leasing be adopted rather than selling of the freehold of plots. In this way more effective control can be maintained by the Industrial Area Company over the planning and operation of the Area. In addition, more realistic financial policies may be adopted by granting leaseholds rather than selling the freehold of plots at prices which may only reflect short-term considerations. However, it is recognised that current Greek practice tends towards the ownership rather than leasing of property. In the event of the sale of plots either directly or by way of an option policy or by hire purchase, care should be exercised in drawing up contracts to ensure that control over vital matters remains in the hands of the Industrial Area Company.

8.2.5 Documentation Procedures

The procedures involved in the operation of the Bonded Warehouse Compound require an account to be kept of raw materials and finished products at all stages of manufacture. Measures are needed to ensure the correct operation of the system. These procedures are illustrated in Diagram 8.1 where a hypothetical example is taken of the processing of one ton of aluminium. Raw materials imported will either have to be bonded or will be coming in sealed transport under the T.I.R. system.

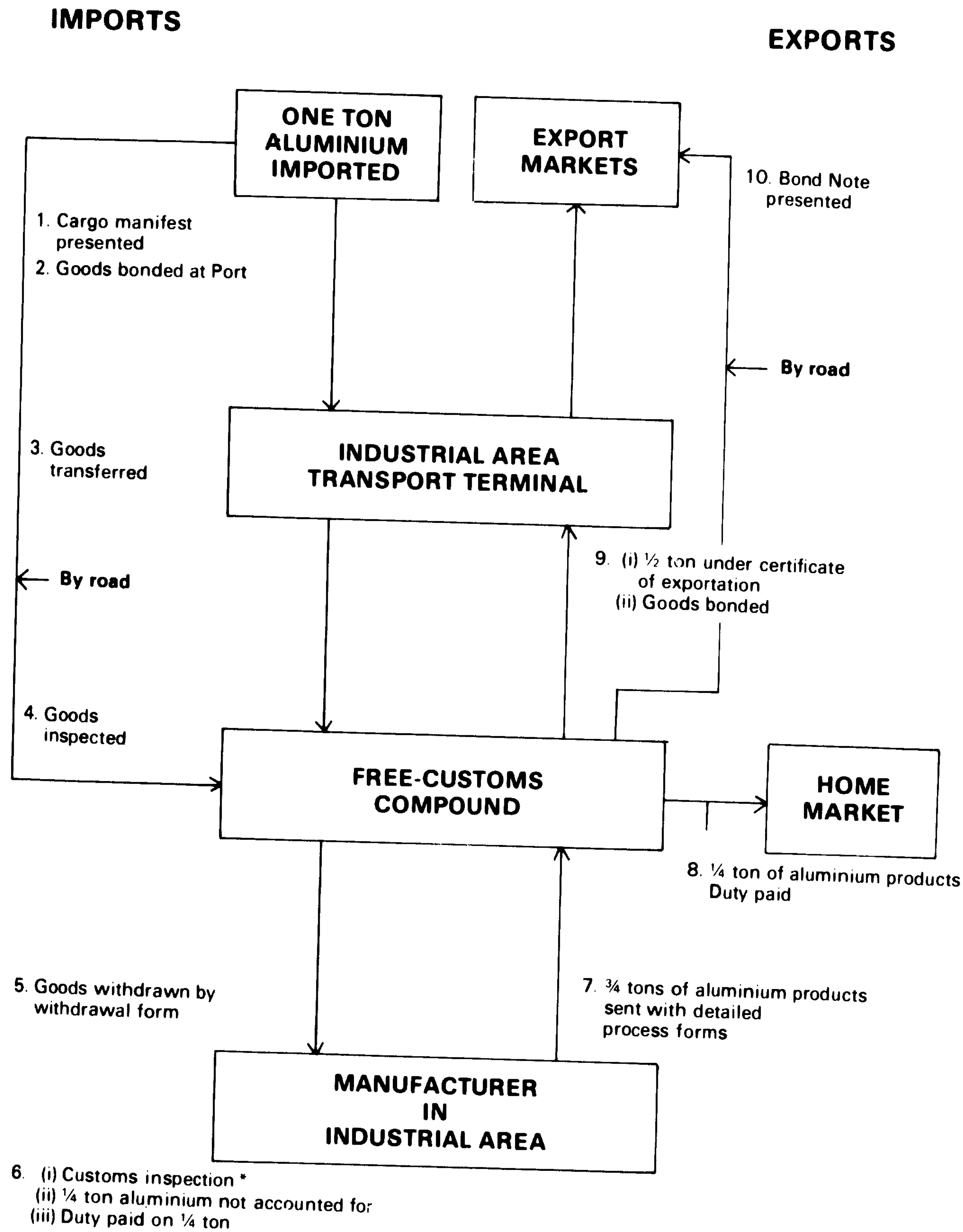
Under the T.I.R. system, to which Greece is a signatory, hauliers are free of any customs delay or inconvenience caused when the goods are in transit, vehicles being subject to Customs inspection only at the Customs Office of departure and the Customs Office of destination. In transit, vehicles are effectively sealed and carnets issued by trade associations to the operators, which serve as bond notes. (In the event of default, duty for which an operator becomes liable is normally paid by the guaranteeing association and recovered from the haulier concerned). The T.I.R. Convention also applies to containers carried on road vehicles. Goods which are imported by rail will be offloaded at the proposed container terminal and transported by trailer into the Compound where they will be stored in Bonded Warehouses, or in the Container Park of the Compound.

Manufacturers may remove their goods from the Container Park or warehouses after checking by customs officials. Goods may also arrive into the Compound by road.

On withdrawal, the manufacturer will have to indicate on an approved form the quantity being taken out. During processing the manufacturer is obliged to account for all the raw material withdrawn. If he is unable to do this - as in the example shown - than he will be subject to a penalty stipulated in his licence.

Manufactured goods are then sent back to the Compound with detailed process forms showing quantities of raw materials used, finished products and amount of wastage.

Any goods which are sent to domestic markets will be subject to payment of duty. Goods destined for export markets will be bonded and sealed in the Bonded Warehouse Compound under the supervision of the Customs Authorities and exported after a certificate of exportation has been issued.



*Note if deficiency is serious enough customs may recommend the withdrawal of manufacturers licence.

EXAMPLE OF A MANUFACTURER OPERATING THROUGH A FREE-CUSTOMS BONDED WAREHOUSE COMPOUND

DIAGRAM 8.1

8.3 PROPOSED DOCUMENTATION

It is recommended that existing documentation be adapted by the Customs Authorities. A list of documents used by the Authorities in connection with the Free-Customs Zone in the Port of Thessaloniki is summarised below:

Reference	Description
T-02.01	Declaration of goods for storage in the warehouses. (a) Request for storage and handling. (b) Copy (in brief)
T-02.03	Declaration of goods for processing. (a) Request for temporary withdrawal and undertaking to re-export the goods. (b) Copy (in brief).
T-02.05	A. Request for the consumption (withdrawal) of goods. B. Permit for the delivery of customs goods from storage. C. Copy of B to be kept by the Authorities. Copy of B to be kept by withdrawer.
T-02.06	A. Request for the despatch of goods from storage or processing to domestic or foreign markets. B. Permit for the removal of goods mentioned in "A". C. "Passport" (Permit) for the despatch of goods from storage to the domestic market. D. Guarantee for taking goods from storage into the domestic market (sent to the Customs despatching the goods). E. Copy of 'A' kept by the withdrawer.
T-02.07	Request for the acknowledgement of ownership of the goods in storage.
T-02.08	Request for withdrawal of goods from storage and temporary processing and for re-export.
T-02.09	Request for the storage of goods which have been processed.
T-03.01	A. Declaration for the transfer of goods. (Subjected). B. Permit for carrying export goods. C. Declaration of goods for export.

8.4 PROPOSED LEGISLATION FOR THE FREE-CUSTOMS ZONE

It is recommended that the operation of both the Bonded Warehouse Compound and the Free-Customs Zone (manufacturing area) should be considered in the legislation establishing the Industrial Area Company since all the functions of operation except day to day administration willbe undertaken by the Company.

The Decree concerning the proposed Free-Customs Zone should:-

(i) Enable HIDB to establish an Industrial Area Company which will be responsible for organising and operating the Free-Customs Zone and to lay down obligations and rights.

(ii) Establish and define the site selected for initial and subsequent development as a Free-Customs Zone in the Industrial Area.

(iii) Lay down provision for future expansion and use of the site.

(iv) Indicate the exemption of import and export laws to the Zone.

(v) Lay down the application of import and export laws to traffic between the Zone and Customs areas (with the exception of goods in transit through the bonded warehouses).

(vi) Indicate the responsibilities of HIDB officials to the relevant Ministry with regard to the granting of licences to carry on trade or manufacture in the Zone.

(vii) Lay down the conditions to be attached to licences, issued to manufacturers operating through the Bonded Warehouse Compound.

SECTION 9

MANAGEMENT AND ADMINISTRATION OF THE FREE-CUSTOMS ZONE

9.1 DEFINITION OF RESPONSIBILITIES

All functions of policy making in its financial, technical and commercial aspects will be the responsibility of the Board of the Industrial Area Company working through its specialist divisions.

It is proposed that only the day-to-day administration of the Free-Customs Zone should be carried out by a separate Division of the Industrial Area Company. Its relationship to the Industrial Area Company is illustrated in Chart 9.1.

9.2 MANAGEMENT AND OPERATION

The management and operation of the Free-Customs Zone will be undertaken by:-

(a) A Manager appointed by the Industrial Area Company who has overall responsibility for the operation of the Zone.

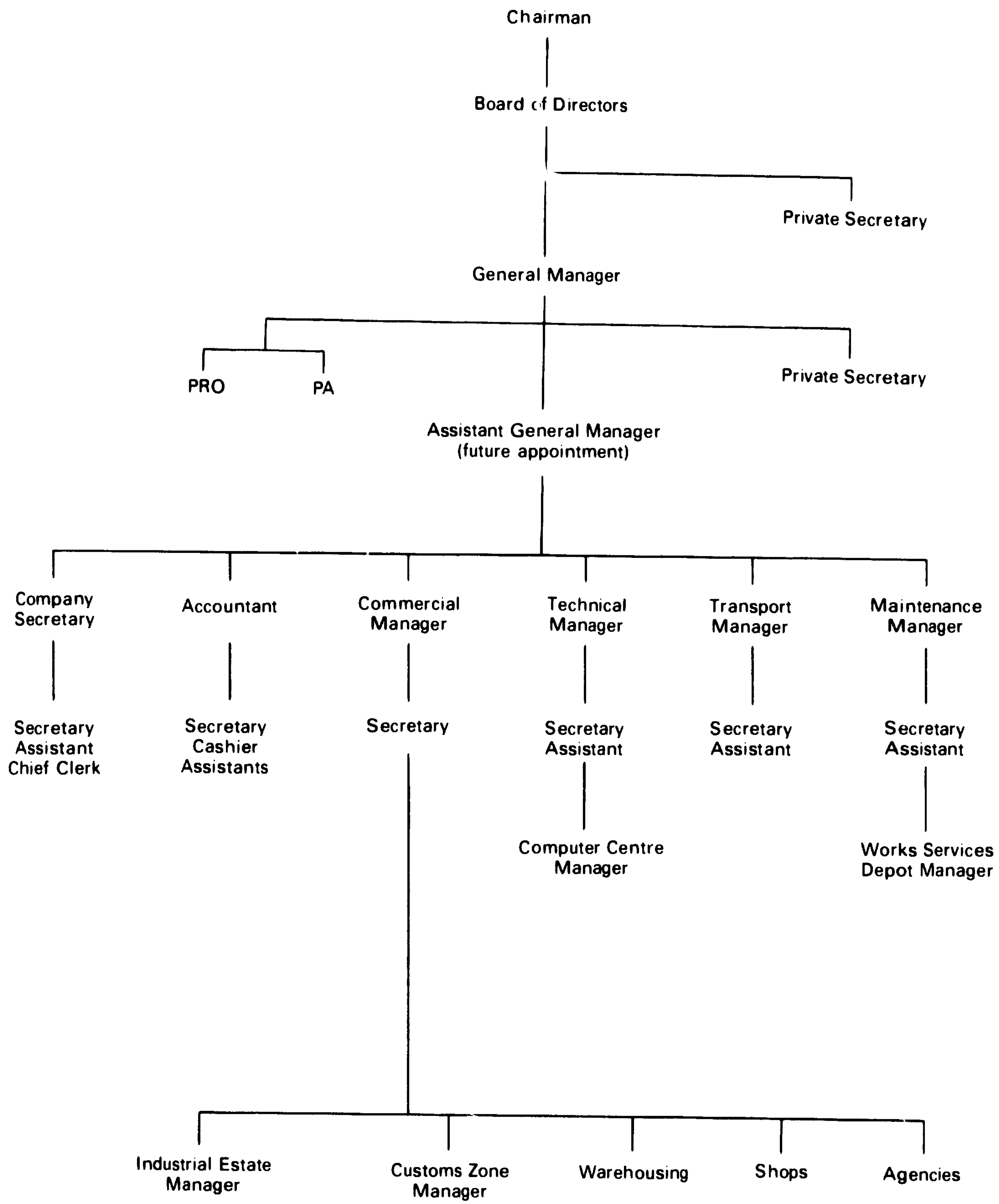
(b) Officials appointed by the Customs Authorities to administer customs procedures.

(c) Administrative personnel who may be employees of the National Warehousing Company.

(d) Staff to handle the following aspects:-
- Loading, discharge and transportation.
- Storage.
- Goods handling.
- Invoicing and clerical aspects.
- Security.

In line with recommendations made in the Master Plan, the following points are stressed:-

(a) Legal validity should be given to the responsibilities of the Industrial Area Company with regard to the Free-Customs Zone.



PROPOSED MANAGEMENT STRUCTURE

(b) The functions of day-to-day operation within the Zone should be undertaken by the Free-Customs Zone Administration, but with a clear division of responsibility in operating matters between the Staff of the Zone, the National Warehousing Company and the Customs Authority.

(c) A strict separation should be maintained between the internal management and legal control of the Zone in order to prevent a conflict of interests.

9.3 LEGAL STATUS

A Decree will be needed to define the extent, purpose, and operation of the Bonded Warehouse Compound system. This will establish the principles for its operation and indicate the responsibilities for its administration and its relationship to the Industrial Area.

9.4 FUNCTIONS OF OPERATION

These may be basically divided into the following:-

1. Finance
2. Planning and Promotion
3. Technical
4. Maintenance
5. Transportation
6. Day-to-day administration

By assigning all policy decisions to the Industrial Area Company, the Free-Customs Zone can be efficiently worked within the planning arrangements for the whole area. At the same time operating costs to the Industrial Area Company will be minimised through optimum use of personnel. This structure would comply with the condition that care must be taken that the Company does not rush into appointing staff before they are needed.

9.4.1 Operational staff

Responsibilities to be undertaken by the various personnel may be summarised as follows:-

9.4.1.1 General Manager of the Industrial Area

The importance of this post indicates that selection for the job should be at the highest level but subject to the conditions on administration stressed in the Master Plan. An appointment will have to be made at an early stage of the planning so that the General Manager may play a decisive role in evolving an effective management and organisational structure for the operation of the Industrial Area and Free-Customs Zone. In general terms, his responsibilities for the Free-Customs Zone will be to secure its efficient overall operation; to ensure that it is being run in accordance with the aims and objectives laid down in the Decrees; that it is making an effective contribution to industrial development; and that there is no conflict in its operation with other developments taking place in the Industrial Area. In addition he will be involved in planning the future development of the Zone and with the planning of the Area as a whole. The General

Manager will make recommendations regarding decisions on the future of the Bonded Warehouse Compound system, and in particular advise on the desirability of establishing a Free-Customs Zone with manufacturing facilities at a later stage, or whether the site allocated for the manufacturing facilities should be developed in other ways.

9.4.1.2 Administration and Finance

The senior personnel will be a **Company Secretary** and **Accountant**. Aspects covered by them will include:-

(a) Preparation of financial statements, overall budgetary control and internal auditing.

(b) Forecasting financial requirements and determining and arranging sources of finance.

(c) All legal aspects relating to the operation of the Zone. This could cover matters concerning leases or sales agreements etc.

(d) All matters of internal administration, general services (paperwork, typing, office management etc).

(e) Personnel Management and training matters, whether taking place in Greece or abroad.

(f) Official correspondence.

9.4.1.3 Planning and Promotion

These aspects are considered to be important ones for the Free-Customs Zone since its successful development will depend upon attracting industrialists both from abroad and home.

The key personnel will be a **Public Relations/Advertising Officer** and an **Industrial Economist.**

The functions may be summed up as follows:-

(a) Their collection and analysis of national and international statistical and market information on all matters relevant to the Company's operations.

(b) Economic and industrial studies; projections of economic development and provision of information to executives for decision-making i.e. Corporate planning and forecasting for all matters connected with the Industrial Area. Analysis of the impact of the Warehouse Compound.

(c) All aspects of industrial promotion.

(d) Maintaining contact with industrialists and potential investors at home and abroad.

(e) Assisting the General Manager in negotiations and investigation of proposals for potential investors

The importance of promotional aspects is recognised by the Committee on Industrial Areas in their report of 23.12.71 which calls for a major effort by HIDB for a big scale publicity campaign of the advantages offered by the Area.

9.4.1.4 Technical

This will be under the supervision of a **Chief Technical Officer** who is likely to be a highly qualified **Engineer/Architect/Planner.**

He will be responsible for physical planning, design and construction work for the Free-Customs Zone.

9.4.1.5 Maintenance

This will be concerned with repairs and maintenance to all installations belonging to the Industrial Area Company and the provision of services as appropriate.

9.4.1.6 Transportation

This will deal with all matters concerning transportation in the Industrial Area. It will be concerned with the operation of the Rail Freight Depot and for transportation arrangements between the Depot and the Bonded Warehouse Compound and factories operating in the Industrial Area.

At the same time the section will ultimately be concerned with the transportation of personnel within the Area e.g. from the Zone to the proposed Services Centre.

9.4.1.7 Day-to-Day administration

This function will be carried out by the Manager for the Warehouse Compound, who will ensure that the system is efficiently operated. Since it is probable that the National Warehousing Company of Greece may undertake the operation of the Warehouses, the size of staff under the Manager is not expected to be very large in the initial stages. This may increase with the expansion of the Zone.

In order to facilitate the operation of the Free-Customs Zone Division, it is proposed that it will be housed initially in the Customs building at the entrance to the Compound and have office facilities provided in the General Administration building in the Services Centre.

9.5 DIVISION OF RESPONSIBILITIES

It has been stressed above that the effective operation of the Bonded Warehouse Compound system will be dependent upon a division of functions between internal management of the Zone and the control of customs procedures.

The proposed system of operation has been discussed between the Consultants and the Customs Authorities in Thessaloniki. It was agreed that this system could be operated by a small organisation with administrative facilities to be set up in the Zone.

9.5.1 Functions of Customs Officials

Customs officials operating in the Zone will maintain vigorous control. This is expected to involve the following functions:-

(a) Checking bonds and seals and documents on goods entering by the T.I.R. system to manufacturers in the Area operating through Bonded Warehouses.

(b) Checking bonded goods against invoices where these are brought in by conventional means of transport, i.e. not under seal.

(c) Maintaining the security of the Warehouse Compound by checking all transport into and out of the Zone.

(d) Periodic checking of stocks at factories in the Industrial Area operating through the Bonded Warehouse Compound.

(e) Maintaining detailed accounts of imports and exports and production of all companies operating through the Compound.

(f) Collecting duty on relevant goods and raw materials.

(g) Informing the Free-Customs Zone Management of any breaches of rules of operation.

(h) Liaising with the Management on any matters of common interest e.g. transportation arrangements.

(i) Liaising with other Customs Authorities to ensure that the proposed system is operating correctly.

9.5.2 Staffing Requirements

The staffing requirements of the Customs Authorities will depend upon the rate of growth of the Free-Customs Zone. In the initial stages it is proposed that the customs officers be seconded under direct control of the Customs Authorities in the Port of Thessaloniki. The following personnel may be required in the initial stages:-

(a) A senior customs official to organise staffing and operational arrangements and be available to advise companies operating through the Zone.

(b) Experienced clerks to ensure correct documentation and procedures.

(c) Supervisory clerks to check raw materials and finished products on arrival or prior to dispatch, and to visit factories using these to ensure that all materials are accounted for.

(d) Staff for the manning of the Customs post at the entrance to the Zone and for supervision of the Container Park facilities.

9.5.3 Office Space

Office space is expected to be provided for the Customs Authorities as follows:-

(i) The Customs post at the entrance to the Zone.

(ii) The Customs post at the Rail Freight Depot.

(iii) An office in the Administrative building for the Industrial Area in the Services Centre.

9.6 WAREHOUSING

It is possible that all matters connected with warehousing operations in the Free-Customs Compound will be undertaken by the National Warehousing Company of Greece, which has expressed an interest in the development of the Free-Customs Zone. The terms of operation and the responsibilities of the Company would be a subject of negotiation with the H.I.D.B. and the Management of the Industrial Area Company.

9.7 TRAINING

It is recommended that personnel involved in the management of the Free-Customs Zone and the Customs Officials involved in its administration should visit similar Zones in operation overseas.

9.8 DEFINITION OF RESPONSIBILITIES

In view of the fact that there will in effect be three agencies concerned with the operation of the Free-Customs Zone, it is essential that functions are firmly defined at an early stage.

10. SUMMARY OF REPORT

10.1 Alternative proposals

The Report considers various approaches to the type of development and recommends the establishment of a Bonded Warehouse Compound as the most appropriate. The main reasons for adopting this solution are summarised as follows:-

(i) The proposed system will prove more practical since it is similar to the existing system of tax exemption.

(ii) A Free-Customs Zone with manufacturing facilities will require alterations to be made to the existing system of tax exemption, if it is to succeed. The introduction of this system would otherwise result in similar industries producing the same type of product for export both within the Free-Customs Zone and outside it.

(iii) The Bonded Warehouse Compound will encourage manufacturers, initially established on the basis of import substitution, to move into the export field.

(iv) Scope will be given to medium and small-scale industry to cooperate in importing raw material and exporting finished products.

(v) Considerable flexibility has been given to the planning of the Industrial Area. Siting the Compound in Area 1 will enable it to be initiated in the near future and to utilize infrastructure provided most effectively.

(vi) The facilities provided could if necessary be used by the Industrial Area, preventing a waste of capital expenditure.

10.2 Establishment of the Bonded Warehouse Compound

It is proposed that an initial warehouse area of 2000 m^2 will be provided with capacity for expansion to 14,000 m^2. Space has been allowed for future expansion of the Zone and for railway sidings if required. An administrative building and customs post will be provided at the entrance to the area.

10.3 Forecast of Development

A long-term rate of growth of 10% per annum is predicted for the Free-Customs Zone based on economic factors and the experience of growth of other Zones. A list of potential industries is indicated.

10.4 Costs, Benefits and Financial Aspects

Based on a number of assumptions, costs are estimated at Dr. 29 million for the Bonded Warehouse Compound system, and Dr. 225 million for the development of 55 hectares in the area allocated for the Free-Customs Zone. An indicative rate of return on a commercial basis of 8% is used for calculating revenues. National economic and social costs and benefits are assessed and a cost-benefit analysis presented based on numerous assumptions. The conceptual background for a cost-benefit model is presented in Appendix B.1.

A social discounted rate of return of 25% is calculated for the Bonded Warehouse Compound.

An analysis for the area of 55 hectares is presented in Appendix B and a cost-benefit ratio shown which can be used as a comparable basis for other projects involving public expenditure.

10.5 Investment Incentives

A list of investment incentives is provided which should be regarded as first line reserves from which items could be selected for use if and when required. The provision of standard factories is considered to be a major incentive in attracting industrialists to the Zone. Other incentives include subsidization of rent and concessionary railway freight rates.

The provision of factories and plots at a lower than economic rent may prove to be a major factor in the successful development of the Free-Customs Zone in the early years of the project.

The importance of discriminating in favour of the Industrial Area against other local sites is stressed. This is necessary to ensure the success of the area as a national investment with maximum utilization of infrastructure. It would also prevent undesirable activity in Thessaloniki such as ribbon development along main roads.

10.6 Operating Aspects

Consideration is given to the Legal Aspects, Licensing of Industries, Leases and Documentation procedures required. Policies on which action will be required to be taken by H.I.D.B. are indicated in Section 2.2.

10.7 Management and Administration

The importance of a clear cut division of responsibilities between the Industrial Area Agency, the Customs Administration and the National Warehousing Company is stressed.

It is proposed that:

(a) legal responsibility for the Free-Customs Zone operation will be vested with the Industrial Area Company by Royal Decree.

(b) the General Manager of the Industrial Area Company will have overall responsibility for the Free-Customs Zone with a Manager for its administration.

(c) all functions except the day-to-day administration of the Compound will be undertaken by the Industrial Area Company. These will include finance, planning and promotion, technical aspects, maintenance and transportation.

Customs officials will be responsible for administrating procedural regulations in the Zone.

Matters concerning Warehousing are expected to be undertaken by the National Warehousing Company or by H.I.D.B. subject to the negotiation of acceptable terms of reference.

10.8 The Future of the Free-Custom Zone

Consideration is given in the Appendices to factors which provide the basis on which decisions for the future of the Free-Customs Zone operation may be taken. These include considerations on a Cost-Benefit Analysis (Appendix B) and the operation of a Free-Customs Zone with manufacturing facilities (Appendix F). Details of forecasts for development of individual industrial sectors are shown in Appendix G.

10.9 Policy Priorities

In order to establish a Free-Customs Zone in the Industrial Area at Thessaloniki, decisions will need to be taken in principle and in detail by the Hellenic Industrial Development Bank and other Authorities. It is understood that a Government Committee is currently reviewing national policy on Free-Customs Zones in Greece, and its recommendations will clarify the position of a possible Free-Customs Zone in Thessaloniki.

10.9.1 Decisions in Principle

(a) Establish the aims and objectives of the Free-Customs Zone: draw up admission policies and lay down priorities for establishing the Zone in the context of the Industrial Area.

(b) Decide upon the division of responsibility between H.I.D.B., the Industrial Area Company and the Customs Authorities within the appropriate system of operation.

(c) Agree upon a policy to attract investment in the Industrial Area compared to other localities.

10.9.2 Decisions in detail

(a) **Legal Aspects**

A special Decree will give legal status to the Industrial Area Company and lay down principles of operation and responsibilities with regard to the Free-Customs Zone.

(b) **The Operation of the Bonded Warehouse Compound System**

(i) Establishing documentation and procedures

(ii) Drafting of conditions for use of the Compound by companies operating in the Industrial Area.

(iii) Drafting of the form of licence to be issued to these companies.

(iv) Agreement on the division of responsibility and the terms and conditions for the operation of bonded warehouses, and with the Customs Authorities on procedural aspects.

(v) Establishing a management structure for the Industrial Area with proper division of responsibility for the Free-Customs Zone.

(c) **Financial Aspects**

(i) Sources of finance.

(ii) Policies concerning subsidies and grants.

(iii) Policies concerning revenues from the operation of bonded warehouses.

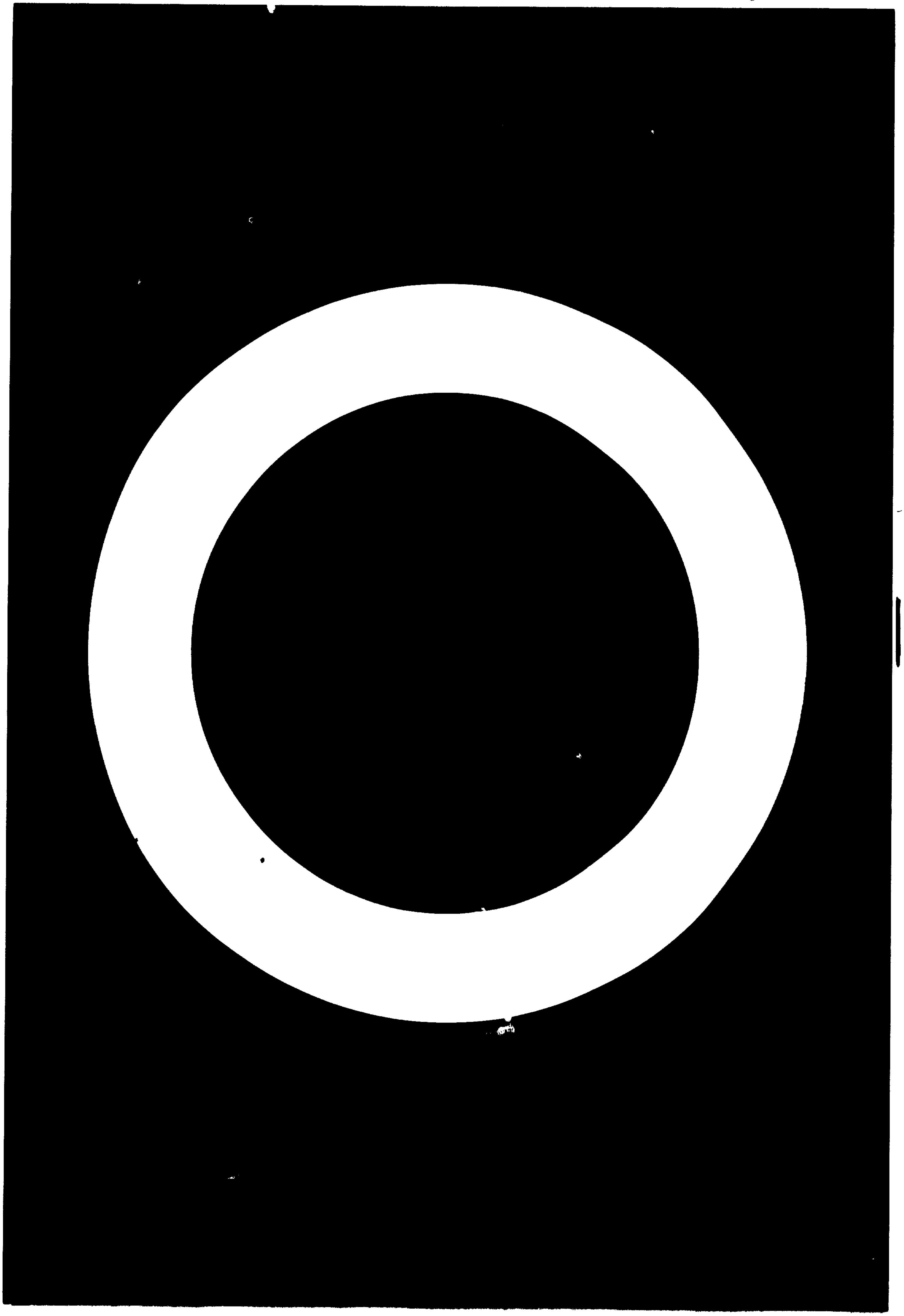
(iv) Policies on the purchase of land.

(v) Allocation of a budget to cover operation and promotion costs.

(d) **Promotional Aspects**

(i) Evaluation of the likely impact of incentives.

(ii) Agreement on incentives which may be offered to potential investors from abroad and at home.



APPENDIX A

CONTRACTUAL TERMS OF REFERENCE

2.01.d. FREE CUSTOMS ZONE - Function IV

The Contractor shall perform the following functions with respect to the establishment of a Free-Customs Zone:

1. **Feasibility Study**

(a) The Contractor shall undertake a feasibility study for the establishment and operation of a Free-Customs Zone in an area of 40 ha. The study shall provide answers to the following questions:

1) whether it is feasible and desirable to establish the Zone;

2) what will be the most suitable site and how much land should be earmarked;

3) what type of industries and, if need be, commercial activities will be attached to the Free Zone;

4) what types of facilities are required;

5) whether and to what extent it is necessary to provide such things as improved plots of land, standard factory buildings built in advance of demand, warehousing facilities and a commercial area.

(b) In determining the feasibility of the Zone, the following factors which shall be examined and considered shall include, but not necessarily be limited to the following:

1) **Advantages and disadvantages of Thessaloniki as a location**

(a) Suitability and geographical location of the site.

(b) Local industria! development and other economic factors.

(c) National economic development and its relevance to Thessaloniki.

(d) Availability of plans for infrastructure and utilities in Salonika.

(e) Raw materials availability.

(f) Manpower availability.

(g) Transport and communication comparative costings.

(h) Scope for development of local and foreign industry.

2) **Potential industries and activities**

(a) Export industries.

(b) Industries for processing hitherto exported raw or semi-processed materials.

(c) Industries assembling imported components.

(d) Introduction of appropriate service industries.

(e) Entrepot activities.

3) **Relevant experience of other Free-Customs Zones**

4) **Local planning**

(a) Types and sizes of industries suitable for location in the Zone.

(b) Selection of site for Free-Customs Zone in relation to the Master Plan for Industrial Area.

5) **The National Legal and Fiscal Framework**

(a) Existing fiscal and financial incentives
   i) National
   ii) Regional

(b) Administrative framework

(c) Legal aspects

(d) Other operational factors

(c) The Contractor shall submit the feasibility study in accordance with paragraph 2.09 d).

2. **Plan for Establishment and Operation of the Free-Customs Zone**

(a) Based upon the conclusions and recommendations contained in the feasibility study conducted under paragraph 1 above, the Contractor shall prepare a plan for the establishment of a Free-Customs Zone, which shall include the following:

1) **Layout and Location**

(a) Precise location of the Free-Customs Zone.

(b) Incorporation of the Zone into the Industrial Area.

(c) Facilities and utilities to be provided including warehousing and administrative offices.

(d) Detailed layout plan of the zone, including size of proposed plots and factories.

2) **Constructional Aspects**

(a) Policy regarding plot improvement.

(b) Consideration of types of factories required.

(c) Design of standard factories.

(d) Provision and design of facilities.

3) **Financial Aspects**

(a) Financial organisation.

(b) Capital cost estimates.

(c) Profitability criteria for the operation of the Zone.

(d) Expected return on investment.

4) **Administrative Aspects**

(a) Constitution of administration.

(b) Organisation chart for construction, operation and management of the Zone.

(c) Rules and regulations for the operation of the Zone.

5) **Incentives for the Development of the Free-Customs Zone**

Incentives which shall be considered and on which recommendations shall be made shall include the following:

(a) **Fiscal Incentives**

i) Exemption from import duties.

ii) Selective export subsidies.

iii) Corporation and business tax reductions.

iv) Income Tax reduction/exemptions for expatriates.

v) Tax Holidays.

vi) Tax exemptions for specific capital e.g. capital for re-investment and formation of services.

(b) **Economic Incentives**

i) Repatriation of capital

ii) Depreciation allowances

iii) 'Soft' loans and easy access to credit

iv) Policies for selling/leasing sites, plots, and factories

v) Reduced charges for infrastructure usages including but not limited to cheap rates for energy supply

vi) Provision of training of workers.

(b) **Draft Final Report**

The Contractor shall submit a draft final report containing the above plans and recommendations and proposals for the establishment and phased development of the Zone in accordance with paragraph 2.09 e).

(c) **Final Report**

Based upon the approved draft final report mentioned in paragraph (b) above, the Contractor shall submit a final report with final recommendations in accordance with paragraph 2.09 f).

APPENDIX B.1

CONSIDERATION OF A COST-BENEFIT ANALYSIS FOR THE FREE-CUSTOMS ZONE

A brief summary is given below of the scope of cost-benefit analysis and an indication is given of the type of analysis that would be applicable to the Free-Customs Zone and the factors which need to be evaluated in order to draw up some meaningful conclusions.

1. INTRODUCTION

All investment decisions involve choice: either a choice between several projects or, where only one possibility exists, a choice between that project or nothing. Capital investment appraisal methods, aimed at rationalising the basis for such decision making, use a systematic approach for collection and analysis of the relevant factors. Conventional methods for investment appraisal base the decision on purely financial calculations of profitability; they use only the private monetary costs and revenues which are incurred directly by the investors as a result of the investment. This approach may be suitable for a profit-making enterprise. For government agencies, with different criteria of effectiveness and multiple objectives, conventional methods are too limited in scope. There may be a whole range of other costs and benefits, not necessarily monetary, which result from the investment; these are costs and benefits to the community rather than to the parent enterprise. For this type of project the more comprehensive technique of cost-benefit analysis, which attempts to quantify all other costs and benefits, is more appropriate.

2. METHOD OF COST-BENEFIT ANALYSIS

In common with conventional methods for investment appraisal, cost benefit analysis attempts to quantify the basis for investment decisions. The cost-benefit approach comprises the following tasks:

1) Define the project or projects.
2) Identify all costs and benefits.
3) Assign a value to the costs and benefits.
4) Evaluate cost and benefit relationships.
5) Test the sensitivity of the result to input assumptions.

2.1 DEFINE THE PROJECTS

The first task is a detailed description of the project: physical description, method of operation, estimated demand and price of the output, manpower requirements, effect on the neighbourhood, etc. It is important to specify any constraints on the projects: physical, legal, administrative, or budgetary.

2.2 IDENTIFY THE COSTS AND BENEFITS

The analysis must identify not only the costs and benefits which accrue to the investors, but also those which accrue to the community. The latter are often referred to as social costs and benefits. The social benefits are not necessarily monetary but may include, depending upon the scheme, reduced travelling time, increased employment opportunities, improved environment, etc.

When identifying the costs and benefits it is most important to include the following information:

1) The particular section of the community to which they apply.

2) In what circumstances they apply.

3) The time period when the costs are incurred and benefits gained.

It is important to define the scope of the cost-benefit in two ways:

1) The geographic limit beyond which costs and benefits are ignored. This may be at local community, regional, or national level.

2) The limit beyond which the benefits are so indirect that they are ignored, e.g. national prestige.

2.3 ASSIGN A VALUE TO THE COSTS AND BENEFITS

To enable meaningful comparison between costs and benefits a common measure of value should (as far as possible) be used. Monetary expression of value is preferable: it is generally understood by the community; it is used for direct costs and revenues; methods are being refined for expressing social benefits, e.g. cost of time, amenity, etc., in monetary terms. Alternatively index numbers can be used to compare projects.

Those costs and benefits which cannot be measured must nevertheless be listed if possible, in order of importance.

It is useful to divide costs and benefits into three classes:-

1) Those which can be measured in monetary terms with reasonably accuracy. These items are usually a feature in the conventional financial appraisal, e.g. direct costs, revenues, etc.

2) Those social costs and benefits which can be valued in monetary terms using current techniques. These include value of time saved, value of increased employment, cost of congestion etc.

3) Those intangible items not expressible in monetary terms; for example, environmental improvements. These should be listed in order of magnitude as far as possible.

2.4 EVALUATION OF COST-BENEFIT RELATIONSHIPS

Cost-Benefit analysis uses the analytical techniques of ordinary capital investment appraisal to assess the worth of an investment. The following methods, not a complete list, all take into account the time value of money.

1) **Net present value method** discounts the costs and benefits to the present, using

The Bank is of course not the only body likely to benefit from the project. Two other potential beneficiaries are:

1) The local population in Thessaloniki directly affected by the site.

2) Greece as a whole.

Cost-benefits can also be performed from the viewpoints of these two groups and the factors involved in each case are given below.

3.1 THE LOCAL POPULATION

The costs to the local population include:

1) The loss of agricultural employment together with the other employment partially dependent upon this.

2) The loss of amenities in the area e.g. natural beauty.

3) The displacement and rehousing of residents.

The first item can be measured in terms of the total decrease in incomes involved, with an addition for the loss of income in the other employment affected (this is normally referred to as the Multiplier Effect).

The measurement of the second factor is always difficult and is probably best left as a qualitative item.

The third factor is dependent upon the compensation paid to residents and the inconvenience caused through relocation.

The benefits to the local population are:

1) The increase in industrial employment together with the increase in other employment affected.

2) The improvement of certain amenities connected with the building of the site such as local public transport.

3) Qualitative factors such as skill formation.

The benefits of the first item can be measured as for the cost of the loss of agricultural employment described above.

The second factor is best left as a qualitative item.

3.2 GREECE AS A WHOLE

If a cost benefit for Greece as a whole is to be performed it must first be established who and what are to be included. For example that part of the profits made by foreign industrialists that were not being reinvested in the country would presumably be excluded. Because of the restrictions that might be imposed on repatriation of the capital and earned income from an enterprise each year however, a set of separate cost benefits might help with this problem. The set of cost benefits (C.B.s) could assume:

1) All profit is reinvested in the country.

2) As much money as possible is repatriated.

3) A chosen intermediate proportion of the profits is repatriated.

a given discount rate. The excess of benefits over costs or vice versa is the net present value and gives a measure of worth.

2) **Benefit-cost ratio method** is similar to method 1) except that the discounted benefits and costs are expressed as a ratio and not as an absolute difference.

3) **Internal rate of return method** calculates a discount rate such that the discounted benefits and costs are equal.

Methods 1) and 2) are most appropriate to single-project decisions where the enumeration and comparison of costs and benefits is important. Method 3) makes many assumptions about intermediate cash flow and is more useful for comparing projects.

The most appropriate discount rate depends upon the particular priorities. Commonly a rate at which the investor can borrow money plus a premium for risk is used. The rate may be higher for private companies than for government agencies. For projects where there is a high social benefit a much lower rate is used. Part of the cost-benefit study involves analysis to select the most appropriate rate.

2.5 TEST THE SENSITIVITY OF THE RESULTS TO INPUT ASSUMPTIONS

The result may be sensitive to certain of the assumptions made. It is therefore necessary to examine the variation in the result with changes in the assumptions. Among the factors which may be varied are:

1) Pricing policies.

2) Forecasts of revenue, employment.

3) Discount rate.

3. COST BENEFIT APPLIED TO THE FREE-CUSTOMS ZONE

Before performing a cost benefit study of the Free-Customs Zone at Thessaloniki it must be decided from whose viewpoint the analysis is to take place. An obvious first choice is the Hellenic Industrial Development Bank (or an Industrial Area Company operating through the Bank).

The costs to the Bank would include:

1) The costs of buying the land.

2) The costs of developing the site and infrastructure.

The benefits include:

1) The rents charged for storage of the raw materials or finished products in the bonded warehouses.

2) The rents charged for use of the factories.

3) The revenue from the sale of plots and/or factories.

These assessments must make assumptions about the rate at which Industrialists are likely to come to the area. These assumptions may themselves depend on the rents charged and on the level of some of the incentives offered. This is discussed more fully later on when the view-point of intending Industrialists is considered.

If this approach were to be adopted, the C.B. would include that part of the industrialists' profit that is reinvested in the country.

Because in some cases what are costs to one section of Greece will be benefits to another section (e.g. tax paid by the firms to the Government) it might seem reasonable to ignore such items as they will appear on both sides of the equation. This would be true if equal weight is always to be given to all sections of the community. If, however, more value is to be placed on the costs and benefits to one section compared with another then the contribution of these items must be evaluated separately.

The costs to be included would be:-

1) The loss of agricultural employment. This could be measured as the loss of agricultural income together with the Multiplier.
2) The loss of natural beauty. As before this is probably best left unquantified.
3) The payments made by the firms for tax, rent and other services.

The benefits will be:

1) The increase in National Income produced by the extra employment provided, both in the development of the site and in working for the incoming firms afterwards.
2) The profits which are reinvested.
3) The income to the Bank from the rents paid, to the Government from the taxes paid, and to the local services (e.g. electricity) from their charges.

3.3 RATE OF ENTRY OF INDUSTRIALISTS

All the cost benefit analysis described above will need to make assumptions about the rate at which Industrialists will be attracted to the area. Because this rate is likely to depend on the profitability an incoming industrialist estimates he can achieve, it would be instructive to the Bank for an example of such a profitability study to be performed in order to see whether the incentives they are offering appear insufficient or over-generous. It will only be possible to do this if assumptions about the type of products, expected markets and present countries of manufacture are made. Based on general trends within Greece and on the experience of other Free-Customs Zones in operation elsewhere, an indicative rate of growth of 10% per annum has been estimated for the Free-Customs Zone at Thessaloniki.

For a firm producing a given range of products in a given location the financial considerations involved in using either the Free-Customs Zone or the Industrial Area would be.

1) The cost of labour.
2) The cost of raw materials.
3) Transport costs of raw materials to the factory and finished products to the expected markets.
4) The cost of buying (or leasing) the factory.
5) The cost of using the bonded warehouses.
6) Ground rent of the factory.
7) Ancillary costs associated with using the site.
8) Taxation levels.

9) Other financial incentives offered on the site.

There would also be less quantifiable costs such as the difficulty involved in persuading key employees to move and the availability of competent local labour.

If such a calculation is performed for a chosen set of values of the quantifiable factors listed above, the expected profitability of the enterprise will be obtained. There is still a problem. What one Industrialist considers an acceptable profit, another may not. In addition, because of the unquantifiable costs mentioned above the Industrialist may decide the acceptable level of profit must be larger than he would normally accept in his own country. In other words, the problem has to be faced of determining the elasticity of demand for use of the site to the profitability it can provide. It is highly unlikely that anything more than a very approximate guess can be made at this function before the development has been under way for some time. The best approach would probably be for HIDB to agree on what they think the average incoming industrialist will require for his investment and ensure that the results of his commercial profitability is likely to result in this figure.

This exercise may well constrain the levels of the incentives offered and these levels can then be used in performing the cost benefit analysis described earlier.

4. CONCLUSIONS

One of the purposes of carrying out a Cost Benefit analysis for the Free-Customs Zone would be to optimise the policies for its operation. If the Free-Customs Zone is not attractive enough industrialists will not come. The first step should therefore be to perform a few mock profitability studies for typical industrialists. This will enable the minimum total incentive levels (although not necessarily the mix of these) to be fixed. A C.B. analysis can then be performed for HIDB. If this shows the Bank will make a profit on the project it may be decided to increase the incentives some way towards the break-even point. If however the study shows the Bank will make a loss it implies that either the project is not worthwhile or that it is only worthwhile because of the benefit to the rest of the country In this case a C.B. for Greece as a whole will be necessary to decide between these two possibilities. In addition a C.B. for Greece as a whole will make it possible to calculate the maximum total incentive levels that can be offered consistent with Greece benefitting (or breaking even) on the project.

APPENDIX B.2

COSTS, BENEFITS AND FINANCIAL ASPECTS OF A POSSIBLE FREE-CUSTOMS ZONE WI.H MANUFACTURING FACILITIES

1.1 DEVELOPMENT

A possible scale of development for an area of 55 hectares is indicated in Table B.1 with a planned warehouse area of 44,000 m^2 and 56 standard factories of 1200 m^2 provided with space for expansion.

1.2 COST ESTIMATES

1.2.1 Purchase and Development Costs

Purchase and development costs are those shown in Table 6.1, and warehouse construction costs are based on those used for the analysis of the Bonded Warehouse Compound (i.e. Dr. 1500/m^2).

1.2.2 Standard Factories

These will be provided by the Industrial Area Company. Costs have been estimated at Dr. 1,810,000 for a unit of 1200 m^2. It is assumed that 56 basic factory units will be constructed. The number may be higher if land allocated for their expansion is used for the construction of new units. Costs of expansion of these units have not been taken into account should factories of different sizes be constructed, costs would vary as indicated in the Report on the Industrial Estate.

TABLE B.1

ANALYSIS OF AREA ALLOCATED AS A FREE-CUSTOMS ZONE

1.	Total Area			55 Hectares
2.	Total "Warehouse Compound" Area			14.5 Hectares
	- of which planned covered area:-			
	500 m^2 x 4 - Four Areas		8,000 m^2	
	10,000 m^2 - Two Areas		20,000 m^2	
	8,000 m^2 - Two Areas		16,000 m^2	
		TOTAL	44,000 m^2	
3.	Services Sub-Centre			3.5 Hectares
4.	Manufacturing Area			37 Hectares
	- to include:			
	56 standard factories with expansion space.			

1.2.3 Administrative Buildings

It is assumed that an area of 700 m² will be provided for office facilities required. Building costs have been estimated at Dr. 2000/m².

1.2.4 Other Costs

Other items, which have not been costed, include railway sidings and facilities for which provision has ben made in the Plan.

1.3 CAPITAL COST ESTIMATES

Approximate cost estimates, inclusive of warehouses, administrative buildings and standard factories are Dr. 225 million. Details are shown in Table B.2.

TABLE B.2

FREE-CUSTOMS ZONE

COST ESTIMATES

DEVELOPMENT OF TOTAL AREA OF 55 HECTARES		Dr. Million
A. Purchase and Development of Total Area		
Purchase of land at Dr. 270,000 per ha.		14.850
Development costs at Dr. 740,000 per ha.		40.700
	Sub-total	55.550
B. Warehouse Development		
4 x 500 m² (Four areas)		
2 x 10,000 m²	at Dr. 1500/m²	
2 x 8,000 m²		
		66.000
C. Standard Factories		
Basic Units of 1200 m² (at Dr. 1.81 million)		
56 Units at Dr. 1.81 million each.		101.360
D. Administrative Buildings (at Dr. 2000/m²)		1.400
E. Other Costs (Fencing, factory approaches etc.)		0.500
	TOTAL	224.810

1.4 THE COMMERCIAL PROFITABILITY OF THE ZONE

Consideration is given to the financial policies for the operation of the Zone on a commercial basis. The appropriate rate of return is considered to be 8%.

1.4.1 Return on investment

Capital costs are calculated to be approximately Dr. 225 million including cost of warehouses and standard factories. For the purpose of estimating the profitability of the Zone it is assumed that a Bonded Warehouse Compound of 14.5 hectares, as well as an area with manufacturing facilities of 37 hectares will be established. The remainder of the area (3.5 hectares) is reserved for service facilities if required.

A further assumption is that policies for the operation of the Bonded Warehouse system will differ from those of the Manufacturing Area. The former is expected to operate as described above through renting space in the warehouses, while in the latter case factories and plots will be sold.

The costs of the two types of development in the area are estimated to be as follows:-

(a) Warehouse Area (14.5 hectares)

		Dr. Million
Purchase and development costs		14.645
Warehouses (44,000 m²)		66.000
Administrative buildings, fencing etc. (one third of costs in this category)		0.634
	TOTAL	81.279

(b) Manufacturing Area (37 hectares)

		Dr. Million
Purchase and development costs		37.370
Standard factories (56)		101.360
Administrative buildings, fencing etc. (two thirds of costs in this category)		1.266
	TOTAL	139.966

The total costs of these two areas is estimated to be Dr. 221,275 million. In addition, the purchase and development costs of the area of 3.5 hectares allocated to the Service facilities must be met; these are estimated to be Dr. 3,535 million.

Costs of individual plots with standard factories, of which 56 are to be provided, are estimated to be almost Dr. 2.5 million each.

The cost for purchase and development per hectare is estimated to be Dr. 4.088 million. With an 8% margin for profit, the cost per hectare would be about Dr. 4.4 million. This could be reduced to Dr. 2.6 million should the Government finance be regarded as a subsidy.

1.4.2 Estimated Operating Costs

An estimate of operating costs for the Free-Customs Zone (55 hectares) is given in Table B.3. It is assumed that two sub-managers will be required - one for the warehouse compound and one for the manufacturing area. Total operating costs, estimated to be Dr. 2,832,000 are expected to be covered by a service charge.

TABLE B.3

OPERATING COST ESTIMATES

			Annual
1. Wages and Salaries:			
Management	2 at Dr. 14,000/month		336,000
	2 at Dr. 10,000/month		240,000
Clerical	2 at Dr. 5,000/month		120,000
Secretarial	2 at Dr. 4,000/month		96,000
Labour	12 at Dr. 2,500/month		360,000
Security	6 at Dr. 2,500/month		180,000
		Sub-Total	Dr. 1,332,000
2. Electricity, utilities, maintenance, general expenses etc.			750,000
3. Promotion, training etc.			750,000
		TOTAL	Dr. 2,832,000

1.4.3 Expenditure and Revenue

The Free-Customs Zone could develop in a number of ways, but for the purpose of drawing up a financial cash flow a number of assumptions have been made.

1.4.3.1 Financial Policies

The following policies are put forward based on assumptions concerning the growth of the Free-Customs Zone.

(i) Expenditure costs of Dr. 225 million are spread out evenly over 15 years at Dr. 15 million per year.

(ii) Standard factories are sold in the year following construction at an 8% profit. The income from selling standard factories is estimated to be Dr. 10.076 million per year.

(iii) Warehouses are constructed at the rate of 3000 m² per annum and 2000 m² in the 15th year in order to reach a total of 44,000 m² of space. Income from warehouses is recovered over 25 years at an 8% profit. Assuming 100% utilisation of space and an availability of space of almost 800,000 m^2 over the life of the project, rents to be charged are to be Dr. 102 per m^2 in order to recover costs and 110m^2 to make an 8% profit.

1.4.3.2 Rate of return

The above rents and costs have been based on a return of 8% per annum as a commercial basis. However, this return can be substantially reduced if all the social benefits and factors of national economic profitability are taken into account. These are considered in the next section and a cost-benefit ratio evolved.

1.5 COST-BENEFIT ANALYSIS

1.5.1 Assumptions

Similar assumptions are used in the analysis to those used in Section 6. These concern shadow prices, employment, direct and indirect income effects, and the value of foreign exchange and the accounting rate of return.

1.5.2 Project Life

No definite time scale can be put on the possible project life of industrial developments such as Industrial Estates and Free-Customs Zone. In project evaluation, the life of infrastructure could vary from 10 years to as much as 75 years for warehouses. Obviously the rate of return on the project as a whole would vary with different time-scales. In terms of the Free-Customs Zone 25 years is considered appropriate, although its life is likely to be much longer.

Development of the Free-Customs Zone is assumed to be over 15 years at a steady rate of expansion. Expenditure is estimated to be Dr. 15 million per annum. Income is calculated on the basis of a return over 25 years.

1.6 EVALUATION OF COSTS

Purchase, development and construction costs have been estimated at market value to be Dr. 225 million. As noted in Section 6.4.1 the purchase price of land has been adjusted upwards to take into account certain factors of social costs and benefits. Nevertheless, other costs will arise as a result of the establishment of the Free-Customs Zone and these are considered in this section. Certain costs cannot be precisely evaluated at this stage and provision has been made for these under a general category.

1.6.1 Loss of Agricultural Income

Only a part of the land in the allocated area is currently under cultivation. The loss over the life of the project would amount to the value of the crops foregone. Against this loss of income, the displaced villagers are likely to be employed in the factories and warehouses at much higher wages. (These are considered under benefits below).

On the assumption that about 40 hectares of the site is under cultivation for wheat, total annual production could average 58,000 kg at 1,470 kg per hectare, the average yield for wheat in Greece as a whole for the years 1953-1969.

Assuming a price of Dr. 3,000 per ton, which is that paid by the Greek State to Farmers, the total value of the wheat grown is calculated to be Dr. 176,400 per annum. The loss of income from agricultural produce over the life of the project may be estimated to be Dr. 4,410,000.

1.6.2 Loss of Housing

At present, there are a number of houses standing in the area allocated for the Free-Customs Zone. These would need to be demolished, thus adding to the development costs of the site. In addition costs would be involved in the relocation of villagers. This would involve the costs of transportation and the provision of new houses. To a small extent, these costs will be reflected in the purchase price paid by HIDB to the landowners reflecting a level sufficiently high to induce them to move. It is assumed that costs of rehousing will be met by HIDB. A cost of Dr. 500,000 is assigned to this factor.

1.6.3 Cotton Research Institute and Land Reclamation Centre

The development of the Industrial Area around these two Institutes is likely to have some adverse effect on research being carried out there through a change in environment caused by increased traffic and factory operation. The Free-Customs Zone area is planned to be some distance away from the Institutes but some factories in the Industrial Area are expected to operate through the Bonded Warehouse Compound. A part of these costs must therefore be allocated to the Free-Customs Zone. It is not proposed to relocate these Institutes until the Area has been well developed. In the long term costs of relocation must be attributed to costs for the Area. An overall cost of Dr. 500,000 is proposed.

Should the Institutes be adapted to carry out research on industrial environment, some benefit could be attributed to the Industrial Area.

1.6.4 Loss of Amenity

This figure is likely to be low since it is expected that no polluting industries will be established in the Zone. At the same time the planning of the Industrial area has taken into consideration good presentation and layout in the Master Plan. This cost has been included in general costs.

1.6.5 Total Costs

Total costs over a 25 year period are estimated to be as follows:

		Dr. million
Purchase costs } Construction costs }		225.000
Loss of agricultural income		4.410
Loss of housing		0.500
Others		1.000
	Total	230.910

These costs will not occur within any one year. A possible time-scale is indicated in Table B.4.

TABLE B.4

TIME-SCALE OF EXPENDITURE AND COSTS

(in Dr. millions)

Year	Purchase & Development Costs	Loss of Agricultural Income	Loss of Housing	General
1972	15	0.1764	0.250	0.200
1973	15	0.1764	0.250	0.200
1974	15	0.1764	-	0.200
1975	15	0.1764	-	0.200
1976	15	0.1764	-	0.200
1977	15	0.1764	-	-
1978-1986 (per annum)	15	0.1764	-	-
TOTAL (15 years)	225	2.646	0.500	1.000

1.7 EVALUATION OF BENEFITS

These may in broad terms be divided into those which are direct and those caused indirectly as a result of the establishment of the Free-Customs Zone. Items which are non-quantifiable are indicated at the end of this section.

1.7.1 Direct Economic Benefits

1.7.1.1 Sale or rent of factories and warehouses

These consist of the income from the renting of warehouse space and from the sale of factories. Full development of the Zone will take place over 15 years and is expected to be complete by 1991. On the assumption of a project life of 25 years and an 8% rate of return income is expected to be as follows:-

Standard factory sales		Dr. 151.140 million
Rent from warehouses		Dr. 87.890 million
	TOTAL	239.030

1.7.1.2 Wages and Salaries

An estimate is made below of the additional income likely to be earned at different levels of operation. The total value of this income is calculated for the life of the project and estimated to be Dr. 6.352 million:-

Staff	Monthly Increase in Income	Annual Increase
Management	2 at 3500	84,000
	2 at 1500	36,000
Clerical	2 at 500	12,000
Secretarial	2 at 500	12,000
Labour	12 at 500	72,000
Security	6 at 500	36,000
	Total increase Dr.	252,000

1.7.2.1 Indirect Economic Benefits

These benefits arise from the operation of companies through the bonded warehouse compound and the Free-Customs Zone on the one hand and the effect they have on the region and nation as a whole in the manufacturing area. Most of these people are expected to have previously been working in the Agricultural Sector.

Assuming an increase in income of Dr. 500 per month per person employed annual increase in income of staff employed as a result of the establishment of the Zone would amount to Dr. 12,000,000 per year when the Zone is fully developed. Assuming a 10% rate of growth for the Free-Customs Zone (which has been estimated in Section 5), this 'indirect' income effect could amount to Dr. 220.4 million over the life of the project.

1.7.2.2 Regional income effect

The effect of the increased income is greater to the extent to which additional consumption leads to further production elsewhere. The question of 'induced' investment through linkages in production is examined below. With regard to wages, the increased consumption caused as a result of expenditure by project-users, would be of no importance if the purpose of the cost-benefit analysis was in comparing different projects, since the increase to aggregate consumption would be the same in terms of national economic benefits.

However, since the Free-Customs Zone in Thessaloniki is being considered on its own, the impact of the additional income generated through the regional multiplier is likely to be an important benefit. A multiplier of 2.5 has been considered as reasonable to use in the context of Thessaloniki.

1.7.2.3 The balance of payments

The value of increased earnings through higher exports is one of the major benefits that will result from the establishment of a Free-Customs Zone. In addition to the initial investment made, the amount of foreign exchange earnings that are reinvested or retained in Greece may be regarded as a direct benefit to the project. The value of the foreign exchange earned in this way is likely to be far more than the nominal amount since the indirect impact in allowing further increases in imports of raw materials and capital equipment will lead to a boost in domestic production.

In order to estimate the possible foreign exchange earned through the Free-Customs Zone a number of assumptions are made.

(1) The average production value of establishments within the sectors forecast in the Zone is estimated. Based on the Annual Industrial Survey for 1968 the average value of products per establishment was estimated to be Dr. 1,628,000 for 25,000 firms in the relevant sectors. Most of these establishments were in the medium to small sectors of industries. The probability of a few large investors in the Free-Customs Zone in addition to medium sized industries is likely to raise the gross value of production to a higher level. A Production value of Dr. 2,000,000 per firm is used.

(2) On the assumption that at least 80% of the products are exported, it can be expected that each firm may bring in about Dr. 1,600,000 in foreign exchange. With 56 firms operating in the Free-Customs Zone total foreign exchange may be in the region of Dr. 89,600,000.

(3) With a 10% adjustment for the overvaluation of the Drachma, the real value of the foreign exchange may be estimated to be Drachma 98.5 million.

(4) A figure of Dr. 100 million per annum may be regarded as being the contribution of foreign exchange by the Free-Customs Zone.

The value of the foreign exchange to the economy is therefore estimated at the real contribution i.e. the 10% premium on the official rate of exchange. This is estimated to be about dr. 10 million per annum. The total value over the life of the project is estimated to be Dr. 173.636 million.

1.8 NON-QUANTIFIABLE FACTORS

1.8.1 Skill formation

The main benefit is the training and experience given to workers in an industrial environment. To a large extent this will be reflected in the higher wages paid to workers once they have been trained.

1.8.2 Secondary benefits

Two major benefits may occur as a result of the establishment of foreign industry in the Zone. First, local industrialists may be encouraged to invest in similar industries. This demonstration effect should encourage the shift towards industrialisation. Second, some effect should be felt by means of backward linkages. While the majority of firms with factories in the Zone are expected to import all their raw materials, other firms operating through the Bonded Warehouse Compound will only import part of their raw material requirements. These firms are likely to cause further investment in industries supplying intermediate products. An indication of the industries likely to induce further investment in linked industries is given by examining their intermediate to total demand. An investigation of various industries in Japan, Italy, Norway, Republic of South Africa and Israel ranked them in terms of this ratio (The higher the industry deliveries to intermediate demand as a percentage of total output the higher the rank). The ranks of various industries forecast for the Industrial Area are shown in Table B.5.

TABLE B.5

RANKING OF POTENTIAL INDUSTRIAL SECTORS ACCORDING TO INDUSTRY DELIVERIES TO INTERMEDIATE DEMAND

Potential Industrial Sectors	Ranking according to ratio of intermediate to Total Demand
Chemicals	3
Metal industries	1
Textiles	7
Food processing	16
Electrical machinery etc.	12
Footwear and clothing	17
Furniture	13
Plastics	9
Paper and packaging	4
Leather and Fur	14
Electronics etc.	-
Printing and publishing	8
Toys	-
Petroleum products	2

Source: "Inter-industry relations, external economies and regional economic development" by C. Michalopoulos (Table 1) quoted in "Industrial location and regional development" UNIDO, New York, 1971.

Of those industries forecast for the Industrial Area, metal industries, petroleum products, chemicals and paper products are likely to have the biggest impact in inducing investment through linkages.

1.8.3 Provision of amenities

These benefits are the most difficult to quantify in terms of value but would obviously be important side effects of the Free-Customs Zone.

They include better communications, better bus services, more effective provision of electricity, water supply and sewage facilities to villages in the vicinity.

The development of a housing estate which is expected to take place as a result of the establishment of the Industrial Area will provide further facilities such as entertainment, restaurants etc. which would not otherwise have been available to the villages.

1.8.4 Evaluation

A value of Dr. 5 million is attributed to factors such as amenities. The impact of the linkage effect on secondary industries is likely to be quite high but no realistic figure can be calculated pending further detailed investigation of the industries forecast.

1.9 A COST-BENEFIT RATIO

On the assumptions made for costs and benefits above, the total values over the life of the project are:-

Total Costs	Dr. 230.910 million
Total Benefits	Dr. 664.366 million

The benefit-cost ratio of the project is therefore 2.8. This ratio can be used to compare similar projects in other locations and can be assessed against cost : benefit ratios of other Government projects.

APPENDIX C.1

IMPORTS AND EXPORTS OF ENGINEERING PRODUCTS MAY. - DEC. 1970

	IMPORTS	EXPORTS
1. Common Metals and fabrications		
Fuel tanks	212 tons	5 tons
Containers (above 300 litres)	972 tons	
Cans, drums (above 50 litres)	366 tons	1927 tons
Cans, drums (below 50 litres)	283 tons	
Cast containers for compressed gas	349 tons	70 tons
Others	407 tons	
Cables (iron/steel) uncovered	795 tons	
Cables (iron/steel) covered	51 tons	
Stoves (of all kinds)	344 tons	
Central heating apparatus (non electric)	49 tons	
Copper tubes	134 tons	711 tons
Hand tools (pincers, cutters etc)	464 tons	
- Others	716 tons	
- interchangeable with machines	283 tons	
Cutting blades for machines	117 tons	
Stainless steel cutlery	132 tons	
Locks, (iron, simple/varnishes)	147 tons	
Locks, copper	62 tons	
Locks, others	140 tons	
Buckles, clasps, rivets etc.	219 tons	
2. Machines & Apparatus		
Parts for steam boilers	4119 tons	
Spare parts	672 tons	
Outboard motors	1290 (No.)	
Motorcycle motors (detachable)		
250 cm³ or less	11,992 (no.)	
Petrol engines (220 cm³ or less)	8,494 (No.)	
Petrol engines (220 to 250)	1,552 (No.)	
Car engines (250 +)	379 (No.)	
Motor cycle engines (250 +)	445 (No.)	
Motor cycle engines - others	2179 (No.)	
Petrol engines (250 cm³ +)	2356 (No.)	
Other combustion engines	7809 (No.)	
Cylinder block, cylinder head jackets etc.	356 tons	
Rods and pistons	270 tons	

Engine parts (non spec)	520 tons	
Pumps for raising liquids	1,188 tons	154 tons
Centrifugal compressors		
(weight 25 to 250 kg)	209 tons	
(weight 250 kg +)	671 tons	
Non centrifugal compressors		
(25 kg or less)	632 tons	
(25 to 250)	119 tons	
(250 +)	551 tons	
Air and vacuum pumps, parts	207	
Ventilators (built in motor - 150 kg+)	77 (No.)	
Air conditioners	1696 (No.)	
Ovens (non baking) and parts	4992 tons	
Regrigerators (250 kg or less)	18,660 (No.)	1183 (No.)
	21,610 (No.)	
Others	2,200 (No.)	
Machines for transporting products	152 tons	
	533 tons	
Lifts	123 tons	
Other digging machines (250 kg +)	5169 tons	
Parts	1597 tons	
Boring/drilling machines	603 tons	
Ploughs (specials)	258 tons	
Agricultural machines	277 tons	
Agricultural machines - parts	186 tons	
Harvesting/mowing machines	181 tons	
Hay pickers	394 tons	
Printing/graphic machines	584 tons	
Washing machines (250 kg or less)	36468 (No.)	
Sewing machines ($65+)	3,389 (No.)	
Other sewing mach. (Shuttle)	17,621 (No.)	
Metal working machine tools	3,043 tons	
Typewriters	7,563 (No.)	
Agricultural sprayers	4,000 tons	

Source: Monthly Bulletin of Foreign Trade Statistics, December 1970. NSSG

APPENDIX C.2

IMPORTS OF ELECTRICAL PRODUCTS
MAY - DECEMBER 1970

	IMPORTS	
Electromotors (less than 10 kg)		
less than 1 cv	150 tons	
10 kg +, less than 1 cv	11,541 (No.)	
10 kg +, 1 - 50 cv	5,056 (No.)	
Generators (10 kg + 20 kva +)	350 tons	
Electronics (100 cv + 10 kg +)	137 tons	
Transformers (10 kg less 1 Kva less)	335 tons	
Radio coils	57 tons	(Dr. 17,672)
Transformers (10 kg + 1 Kva +)	1414 tons	
Convertors (10 kg +; 10 Kva +)	239 tons	
Electric batteries	1535 tons	
Accumulators	233 tons	
Electro-mechanical hand tools	187 tons	
Electric razors	8416 (No.)	
Starters	342 tons	(Dr. 46 million)
Car lights	246 tons	
Kitchen stoves (10 kg +) Iron, tin	835 (No.)	
Kitchen stoves (40 kg +) Enamel	3019 (No.)	(Dr. 332 million)
Switchboards/multiples	1836 tons	
Broadcasting receivers (six tubes or less)	37,112 (No.)	
Others	147,073 (No.)	
T.V. receivers	13,120 (No.)	
Microstructure radio apparatus	147 tons	(Dr. 46 million)
Other parts	496 tons	(Dr. 73 million)
Condensers (For radio)	48 tons	(Dr. 210 million)
Circuit Breakers	520 tons	(Dr. 59 million)
Contact switches	91 tons	
Lamps. electric		
15w or less	1,041,726 (No.)	
60w +	221,508 (No.)	
Fluorescent tubes etc	297 tons	
Electronic + lamp valves	1350 tons	
Cables and wires in rubber etc		
C.I.F. Dr. 500 for 1000 million)	906 tons	(Dr. 50 million)
Below (Dr. 500)	401 tons	(Dr. 20 million)
Electrodes (electrolysis)	2552 tons	
Electrodes (industrial)	2795 tons	

Source: Monthly Bulletin of Foreign Trade Statistics, December 1970. NSSG.

APPENDIX D.1

DECREES ISSUED GRANTING EXEMPTION FROM IMPORT DUTY IN SPECIFIC INDUSTRIES IN THESSALONIKI

1. **PYRAMIS THORMETAL**

   Decree U.A.P. 6399/221/13.11.70 T.E. 527/70
   (F.E.K. 846/70 Paragraph B)

2. **HELLENIC STEEL**

   Decree E. 778/24/2.2.70 T.E. 140/70
   (Reference K.B. 125/16.2.70)

3. **ETHYL HELLAS**

   Decree Th. 4779/131/24.11.69 T.E. 33/70
   (Reference K.B. 799/4.12.69)

4. **SUGAR AND FOOD FACTORIES (25)**

   D. 6658/17.6.67 T.E. 418/67
   (Reference K.B. 427/30.6.67)

5. **VEPSY (Synthetic Fibres)**

   E. 14913/23.10.61 T.E. 485/61
   (Reference K.B. 399/4.11.61)

   P. 4709/109/20.12.69 T.E. 141/70
   (Reference K.B. 16/14.1.70)

6. **METAL INDUSTRIES INCLUDING HELLAS CAN, ETC.**

   G. 2180/24.1/64 T.E. 116/64
   (Reference K.B. 50/8.2.64)

7. **DRINK FACTORIES**

   CH 686/12.3.59 T.E. 232/59
   (Reference K.B. 112/28.3.59)

   D.11441/15.11.67 T.E. 555/67
   (Reference K.B. 699/28.11.67)

8. **SHOE FACTORIES**

   S. 545 9/13.7.70

   P.9769/333/30.10.70 T.E. 529/70
   (Reference K.B. 810/14.11.70)

9. **MEL**

E. 5547/529 a/25.5.64 T.E. 325/64
(Reference K.B. 222/16/6/64)

10. **SAINT REGIS HELLAS - VARHART**

D.13885/16.12.65 T.E. 271/66 T.E. 223/67
(Reference K.B. 258/19.4.67)

APPENDIX D.2

EXAMPLES OF DOCUMENTATION FROM
SHANNON FREE AIRPORT DEVELOPMENT COMPANY

Customs
and
Excise

Cu. 49

Import Particulars.

Station...

Import Conveyance	Date of Report

Country of Consignment..

BOND NOTE AND SHIPPING BILL FOR TRANSHIPMENT AND EXPORTATION
(to be furnished in duplicate).

Export Particulars

Station
Export
Conveyance

Destination...

Whether goods are *In transit
Re-directed

Exporter's Name

and Address ....

No. and description of packages	Description of Goods	Value Duty Goods	Value Free Goods

Amount of Duty £.. **Total**

I enter the above goods for transhipment and *Exportation / Shipment as Stores and I declare that the above particulars are generally correct.

Date.................... Signature of Exporter or Agent.........................

† I hereby declare that the goods entered herein are for use as Ship's Stores on board my ship during a voyage, the duration of which is estimated at.................. days.

.... Master or Owner

Authorised.......................................Collector. Date.........................

For Official Use.

I certify that bond has been given for the transhipment and *Exportation / Shipment as Stores of the above-mentioned goods.

Bond No...

Date.................................. Collector...

Import Officer's Certificate.

Received the above-mentioned packages on board this conveyance.

....Master, Guard or Authorised person.

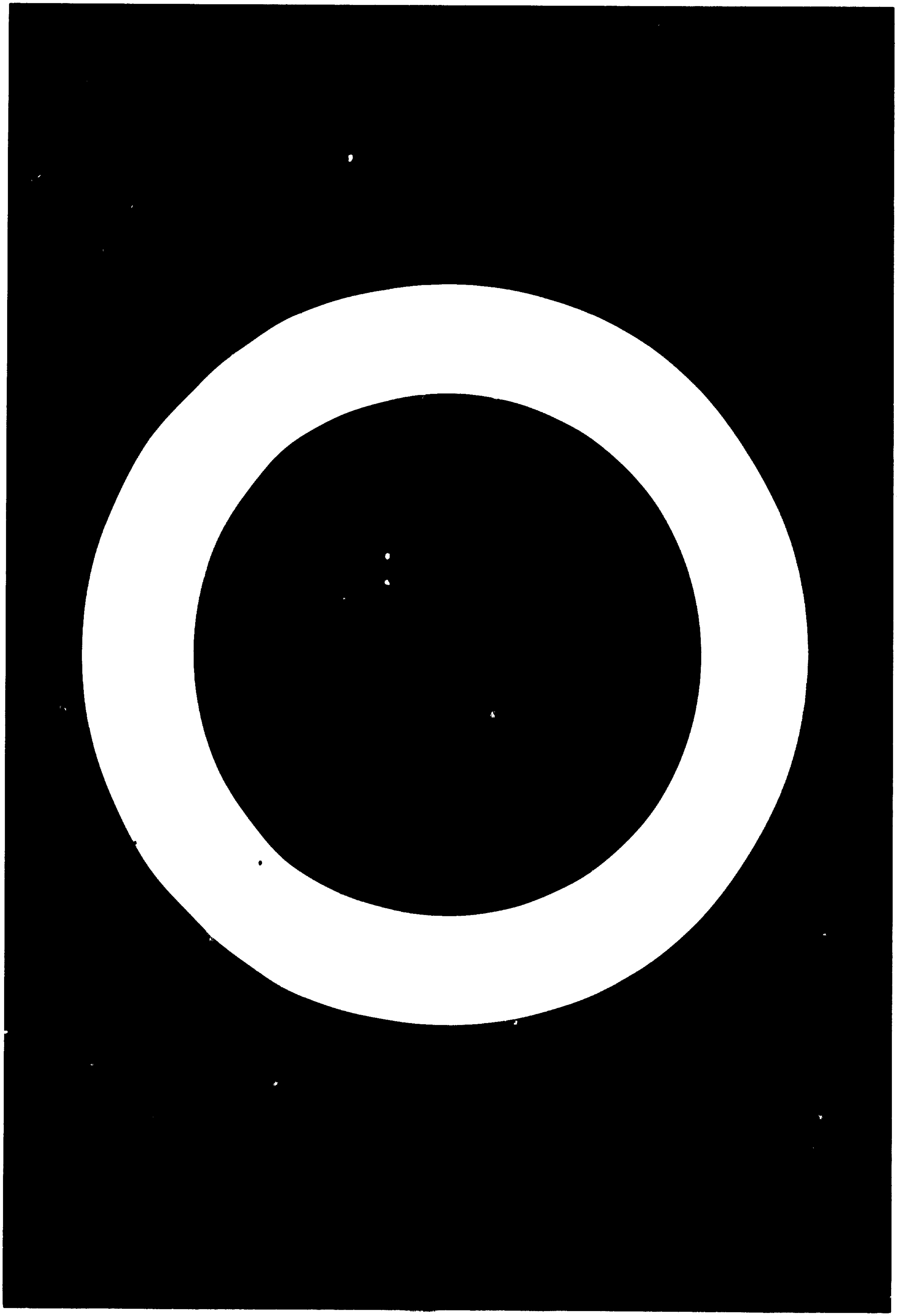
..................................Date

Export Officer's Certificate.

*Delete words inapplicable.
† To be completed in the case of Ship's Stores.

(C.C. Vol. II, part 5).

(585) C U 49 100,000 8-69. F.P. G21



Cu. 29

SPECIFICATION* for goods which are the produce or manufacture of the State and for which no bond is required.

EXCEPT ARMS, AMMUNITION, &c. [FORM No. Cu. 26]

Customs and Excise

Number:

Ship or other Conveyance.. For.. Port or Station..

Date and Time of Final Clearance of Conveyance..

*This Specification must be presented with the goods to the proper Officer, at the time of exportation.

NOTE—Imported goods which, before re-exportation, have passed into use in the State or have been subjected to any operation in the State which has altered their character, composition or value, are to be regarded as the produce or manufacture of the State.

Marks and Nos.	Number and description of Packages	Export List Description No.	Description of Goods in accordance with the requirements of the Official Export List	Net Weight or Quantities	Value†	Country of Final Destination	Name and Address of	
							Consignor	Consignee
				TOTAL VALUE				

†NOTE—The value given should be the f.o.b. value, i.e., the cost of the goods plus insurance and other charges for delivery on board the exporting conveyance, or for conveying them to the Land Frontier, as the case may be. It must not include (a) any sums receivable by the exporter by way of bounty or (b) any foreign customs duties or freight charges beyond the port or place of exportation that may be payable by him.

I declare that the particulars set forth above are true and correctly stated.

Signed..‡

Dated.................................19.....   Address..

....

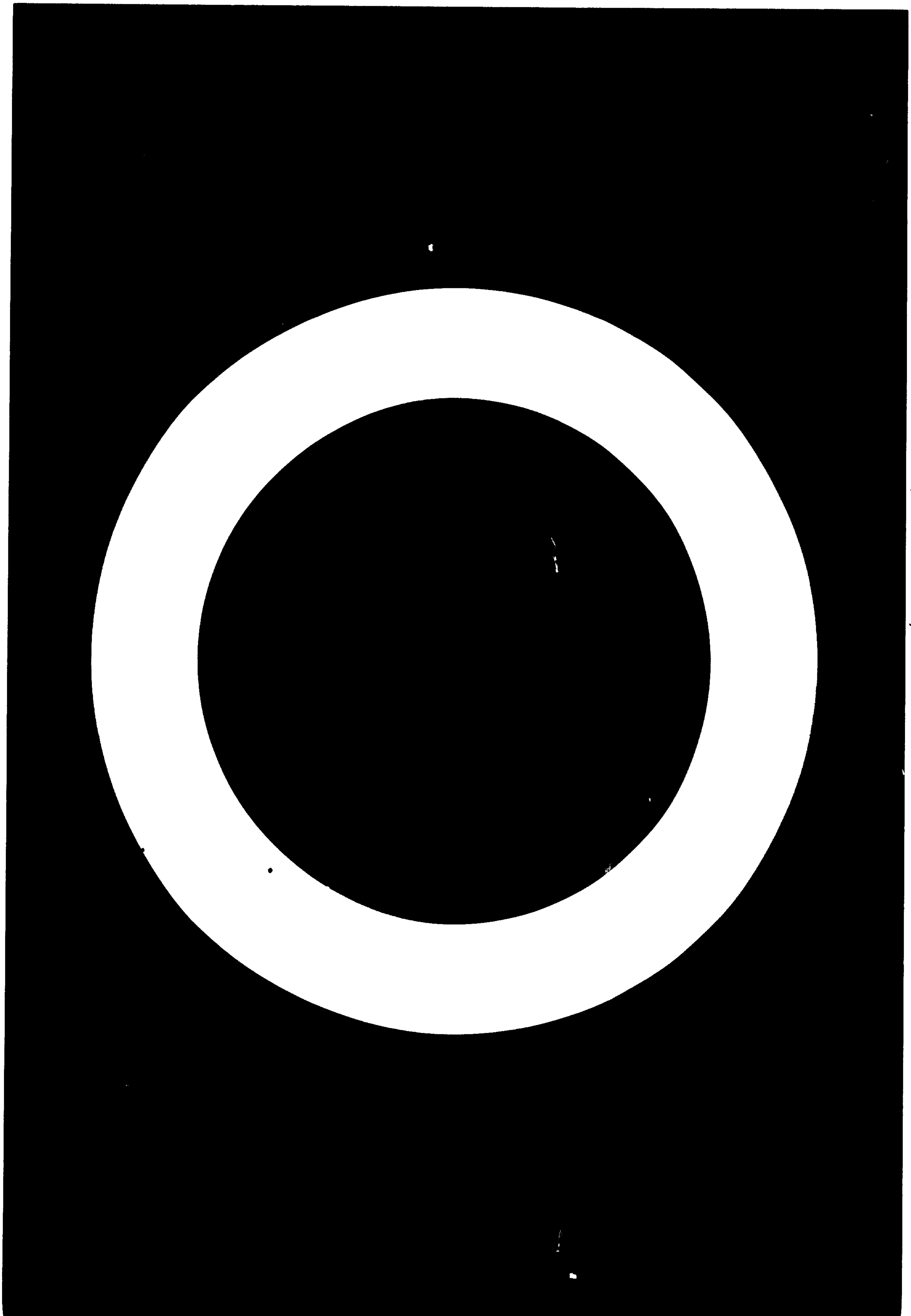
‡Adding Exporter or Agent as the case may be.

Record of Examination

....Officer of Customs and Excise

OFFICIAL STAMP

SO 32/51 750   K50194 4/67 G MSPLtd



No. 23 (Sale)

ENTRY FOR FREE GOODS

See Notes overleaf and in Part 3 of the Customs and Excise Tariff

FOR OFFICIAL USE

Number and Date of Entry

Passed

Passing Officer

PORT OR PLACE OF IMPORTATION ....

DATE OF REPORT ....

STATION ....

SHIP OR OTHER CONVEYANCE ....
(See Note A)

PORT OR PLACE OF LOADING OF GOODS ....

CARRYING COMPANY'S REFERENCE ....

NAME AND ADDRESS OF IMPORTER ....

....

COUNTRY WHENCE CONSIGNED ....
(See Note B)

For Official Use	Date of Presentation of Entry	Initials

FOR OFFICIAL USE

Examination	Marks and Numbers	Turnover Tax Registration Number of Importer	Country of Origin (See Note C)	Official Import List Description Number (See Note D)	Tariff Heading Number (See Note D)	Number (in words) and Description of Packages and Description of Goods (See Note D)	Quantity (See Note D)	Value (See Tariff)

NOTICE
ANY PERSON WHO MAKES OR SIGNS OR CAUSES TO BE MADE OR SIGNED ANY FALSE DECLARATION IN ANY MATTER RELATING TO CUSTOMS INCURS A **PENALTY**

I enter the above goods as free of duty and turnover tax and declare the above particulars to be true and complete.

SIGNED this .... *day of* .... 19....

*Delete whichever is inapplicable .... *Importer or *Agent for the Importer(s)

.... Address of Signatory

For Official Use (Long Room)

NOTES

A. If the goods are imported by

(i) SHIP, state the name of the ship.

(ii) MOTOR VEHICLE or AIRCRAFT, state the registration marks or numbers.

(iii) TRAIN, state the time of arrival and name of Railway Company

B. The country of consignment is the first country from which the goods moved outward *specifically directed to the State.* The country of consignment is not necessarily the country of origin or shipment or manufacture. If when first directed to the State the goods were aboard a vessel, aircraft, or other vehicle in course of transit from one country to another, or were moving through a third country under the regime of direct transit, then the country in which the goods began the transit in question shall be the country of consignment.

C. The expression "Country of Origin" means, in the case of natural products, the country where the goods were produced, and, in the case of manufactured products, the country where they were transformed into the condition in which they are introduced into the State, it being understood that packing, re-packing, sorting and blending do not constitute transformation.

D. The Tariff Heading Number, the Official Import List Number and, where required, the quantities designated on the Official Import List, must be quoted in all cases. Goods must be described in sufficient detail to enable them to be identified for Tariff and Import List purposes. To this end the trade description (which should not be confused with the proprietary or patented trade name) ordinarily used in trade must always be given.

To be purchased from the Government Publications Sale Office, G.P.O. Arcade, Dublin, or through any bookseller.
Price 2d each. Per 100 4s. 0d

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Wt.—. H43974 300,000. 11/61. C.&Co. (342). G.9.

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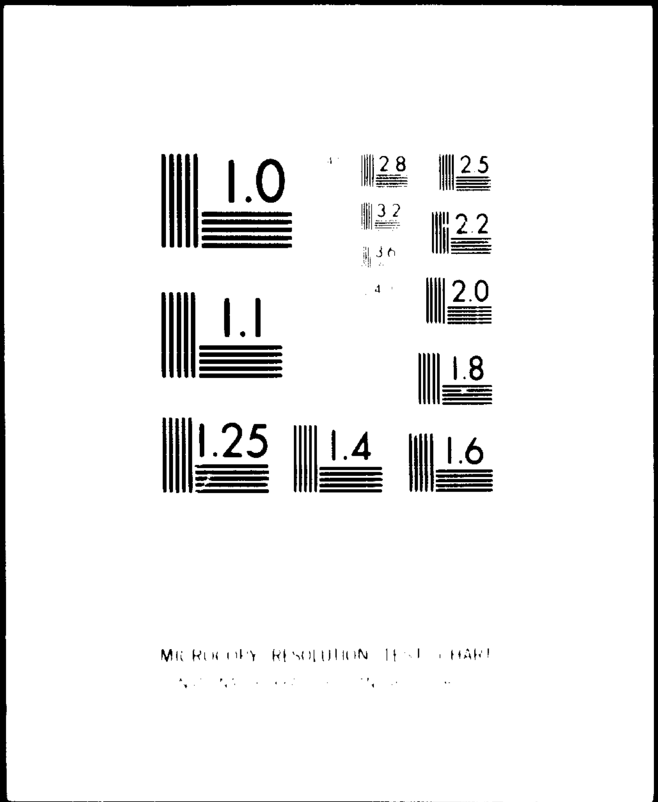


24x

A

For official use on removal from Shannon Customs-free Area.

Bond in force. Ref. No. .... or Deposit No. .... Amount £ .... Bond Form No. 56 completed. Goods examined and cleared. .... Officer.	Examined at Boundary Post. .... A.P.O.

For official use on return of goods to Customs-free Airport.

AT BOUNDARY POST			BY OFFICER	
No. of Packages	Description of Goods	Officer's Signature and Stamp	Examination	Signature and Stamp

Sec. 972/15156/60

Form C. & E. 912.

(388) F36780E. 2,000 4.61 W.W.& S LTD G28

CUSTOMS AND EXCISE

Rotation No. ....

Warrant for removal of goods temporarily from

Shannon Customs-free Airport

Consigned to .... of ....

Purpose of removal ....

Conveyance .... Carrier ....

Import List No.	Tariff Ref. No.	Quantity	Value	Number and description of Packages, trade description and description in accordance with Import List

I request permission to remove above goods and declare the particulars to be true. I undertake that the goods will be re-exported to Shannon Customs-free Airport within .... from this date.

Signed .... Agent for ....

who is the owner of the goods. Date ....

NOTES: (1) Security by means of bond or deposit must be given before removal of goods liable to duty.

(2) This form (duly completed) **must** be presented to the proper Customs and Excise Officer at the Airport Boundary when the goods are leaving the Airport and when the goods (or any portion of them) are being returned to the Airport.

This part to be completed by consignee before return of goods.

Export List No.	Quantity	Cost of processing	Description of process (if any) to which above goods subjected

Conveyance Signed

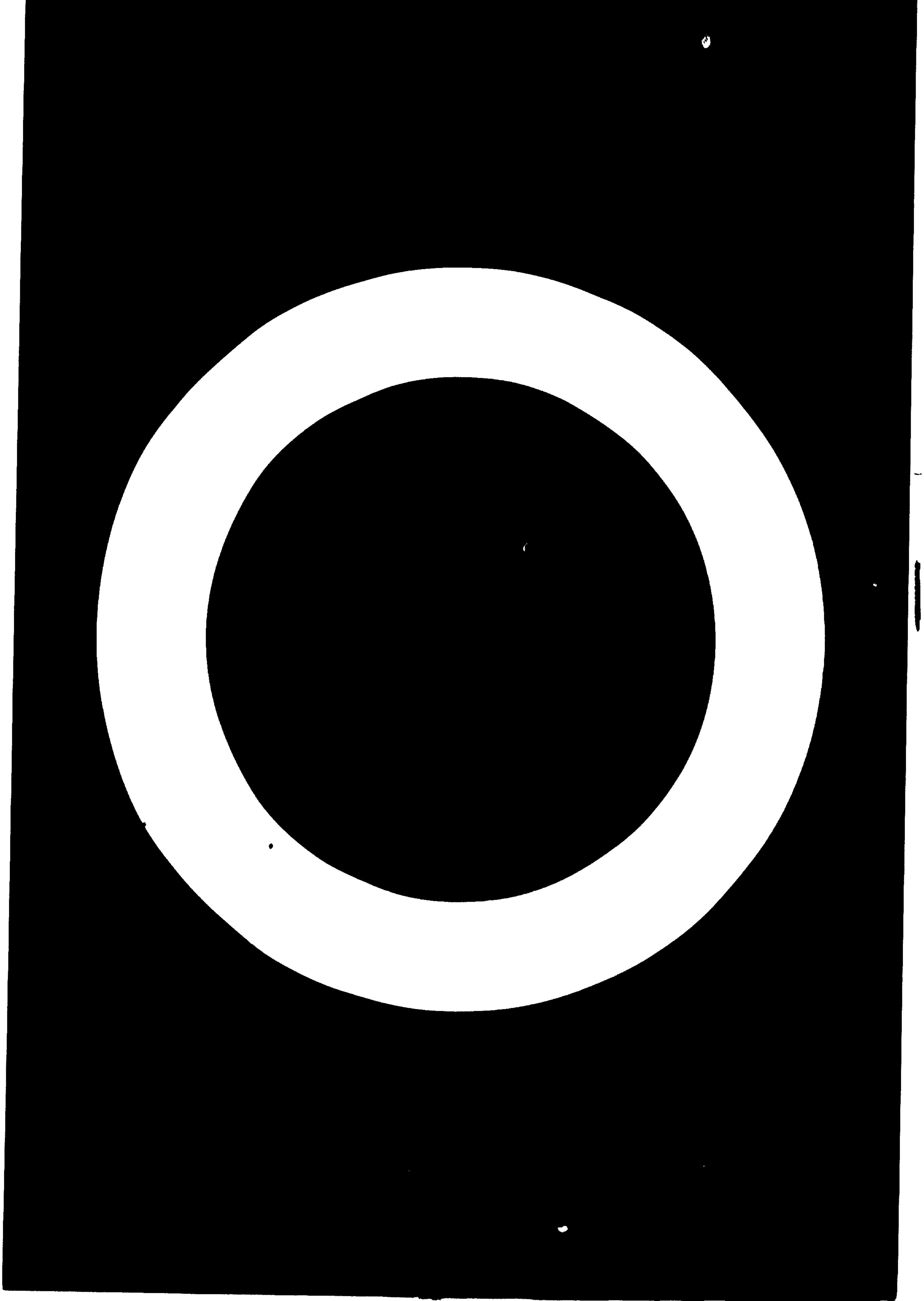
APPENDIX E

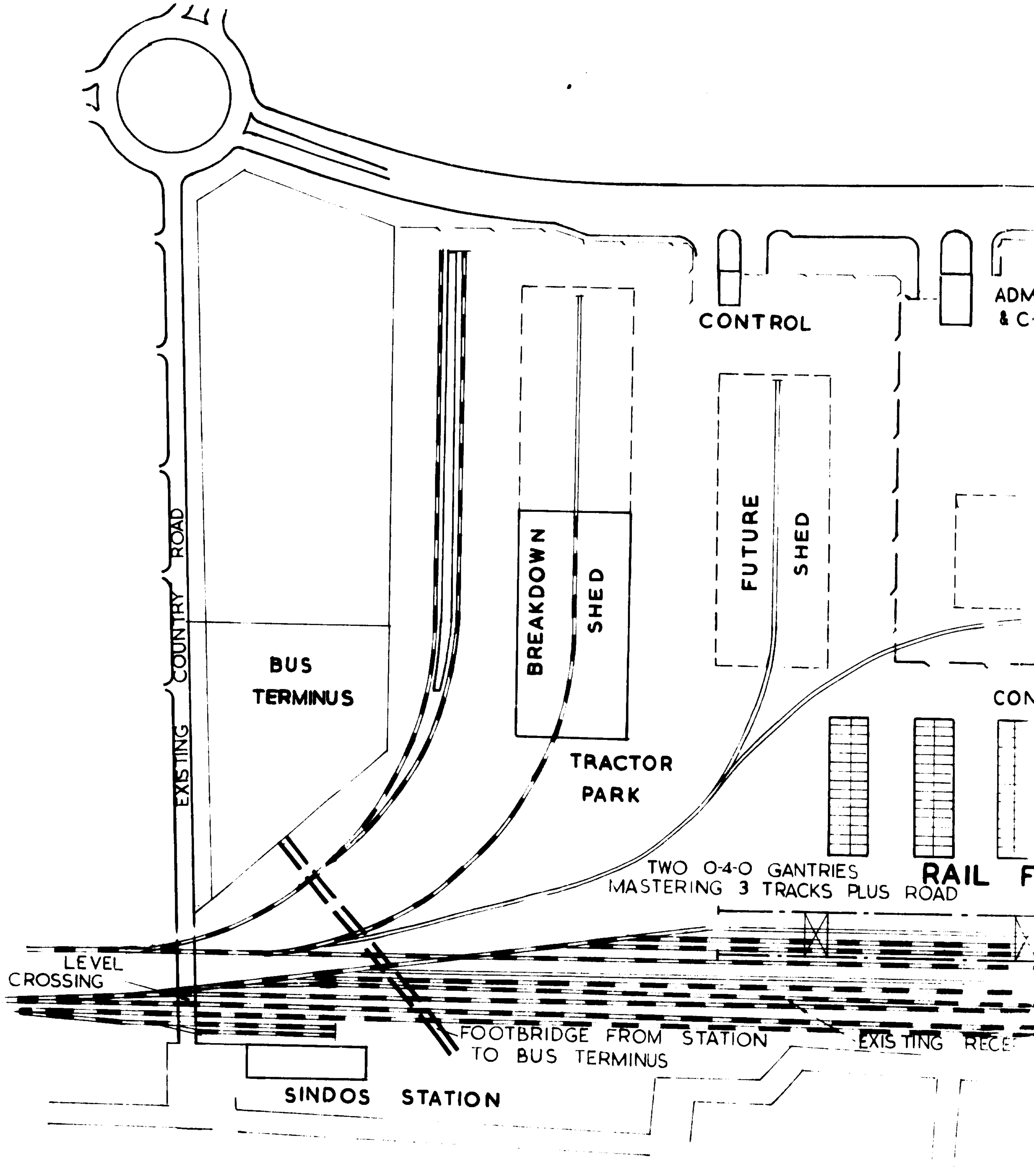
PROPOSED LAYOUT OF THE FREE-CUSTOMS ZONE

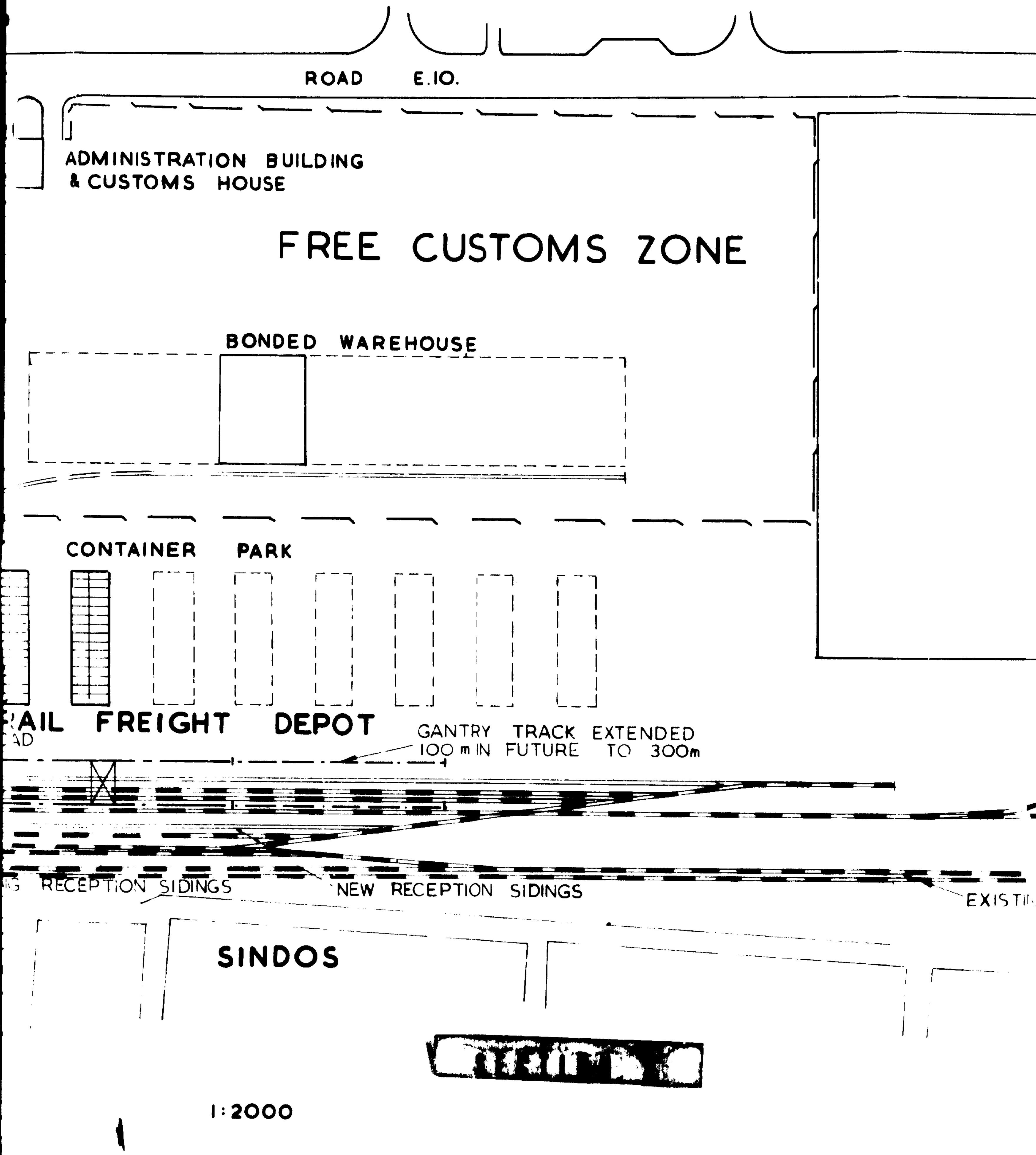
E.1 FREE-CUSTOMS ZONE

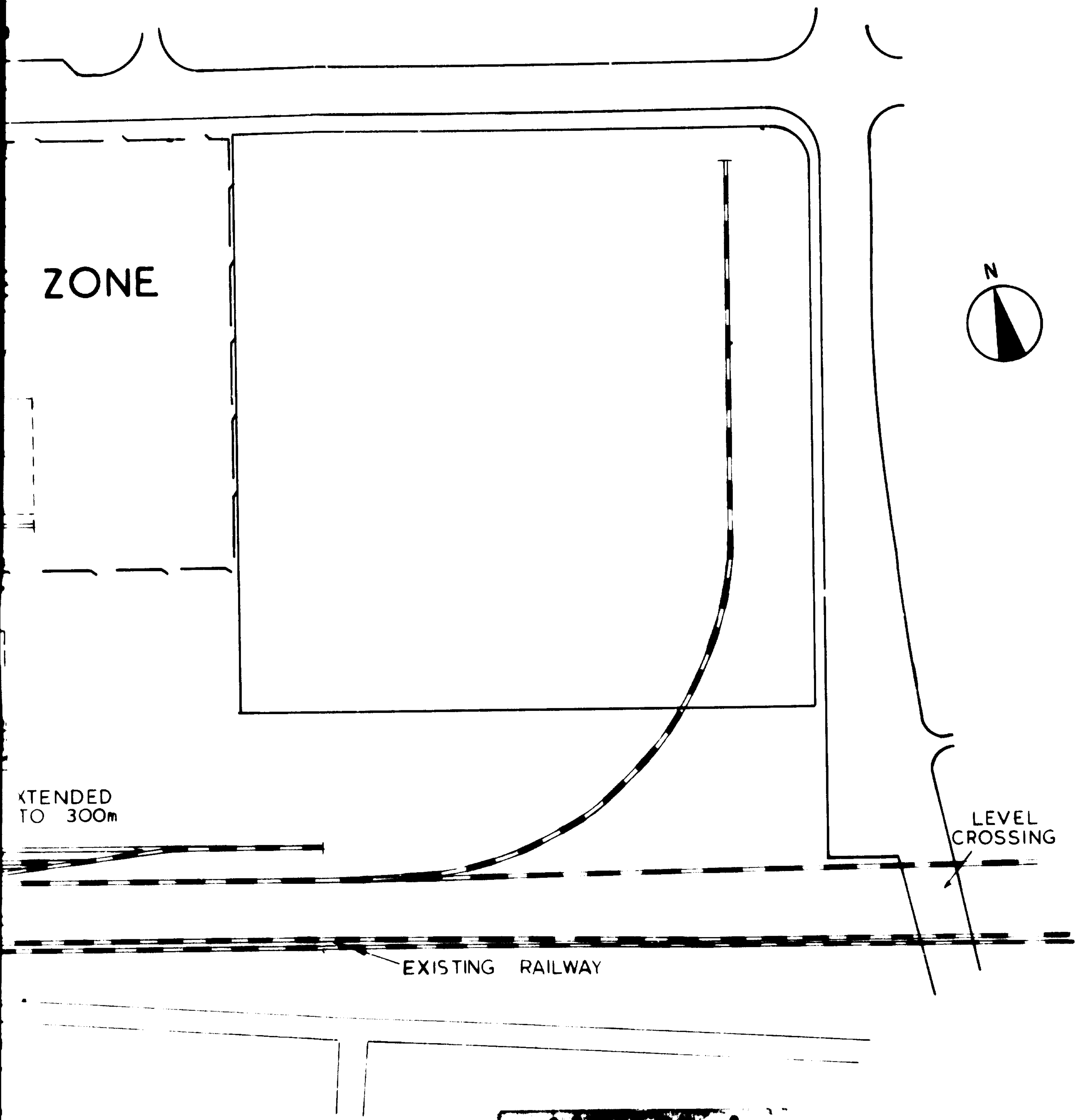
E.2 MASTER PLAN

E.3 STANDARD FACTORY TYPES




CONTROL
ADM
BREAKDOWN SHED
FUTURE SHED
EXISTING COUNTRY ROAD
BUS TERMINUS
TRACTOR PARK
CON
TWO 0-4-0 GANTRIES
MASTERING 3 TRACKS PLUS ROAD
RAIL
LEVEL CROSSING
FOOTBRIDGE FROM STATION TO BUS TERMINUS
EXISTING
SINDOS STATION

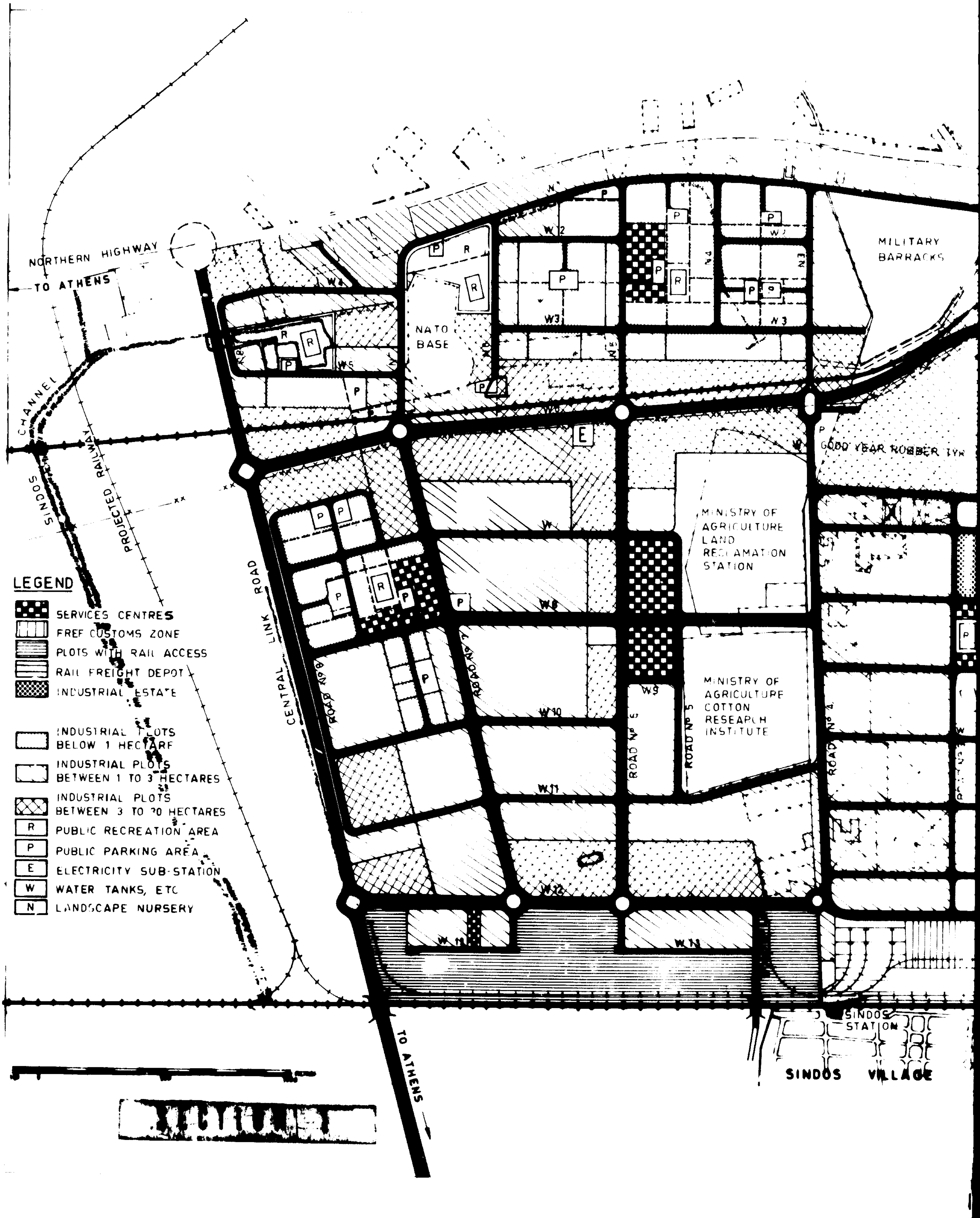

ROAD E.IO.
ADMINISTRATION BUILDING
& CUSTOMS HOUSE
FREE CUSTOMS ZONE
BONDED WAREHOUSE
CONTAINER PARK
FREIGHT DEPOT
GANTRY TRACK EXTENDED
100 m IN FUTURE TO 300m
RECEPTION SIDINGS
NEW RECEPTION SIDINGS
SINDOS
1:2000



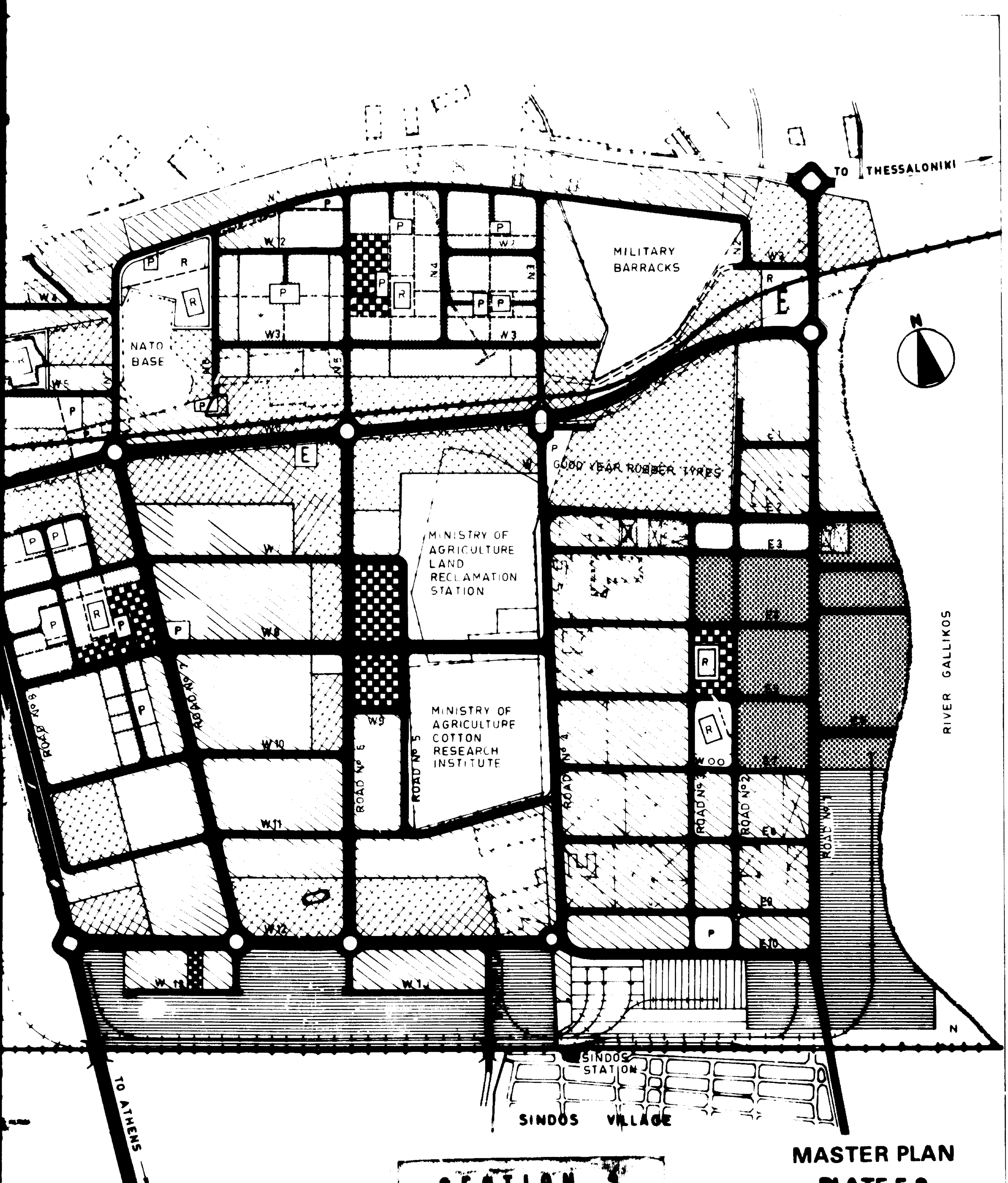
SECTION 3

FREE-CUSTOMS ZONE

PLATE E.1

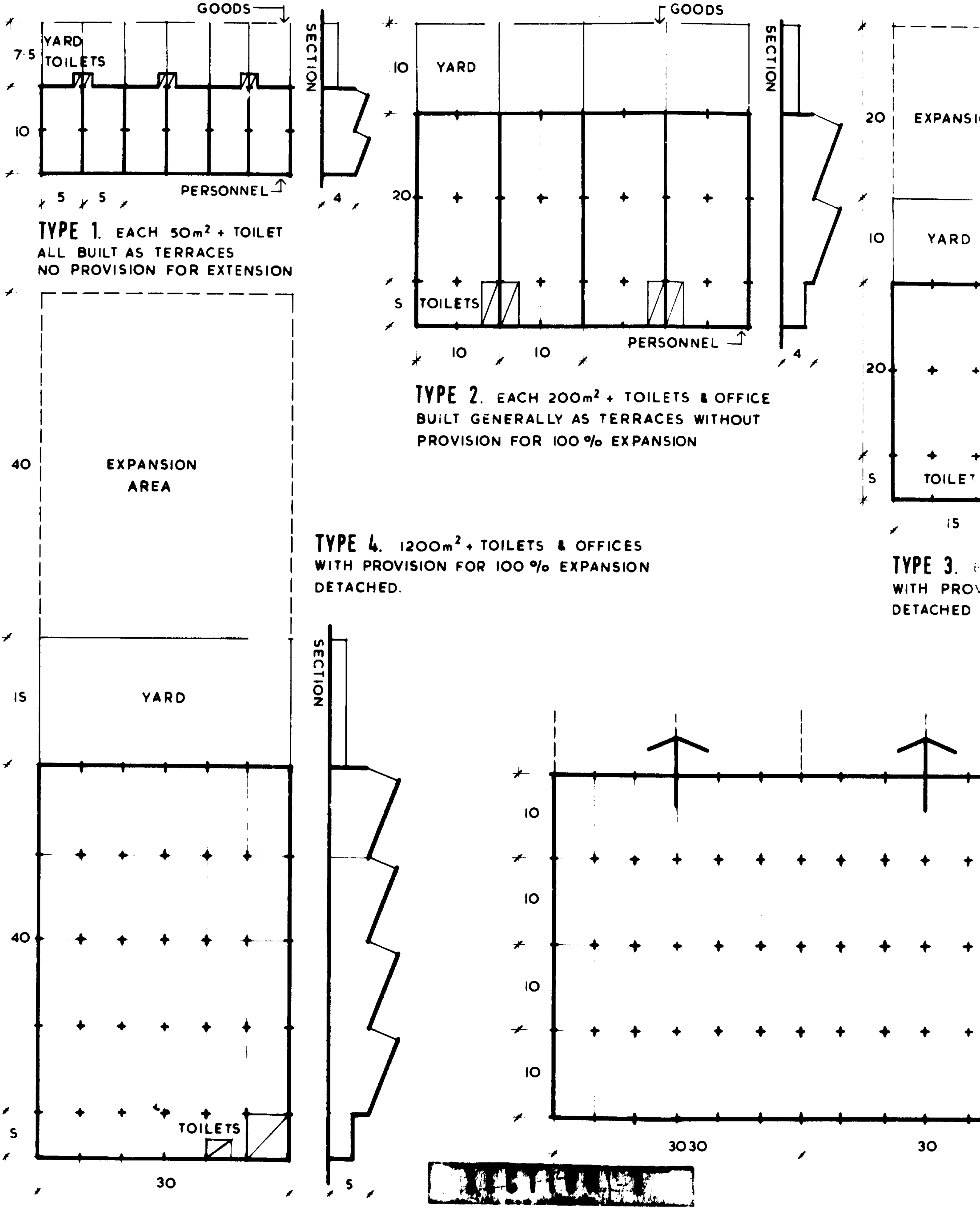


NORTHERN HIGHWAY
TO ATHENS
MILITARY BARRACKS
NATO BASE
GOOD YEAR RUBBER TYR
MINISTRY OF AGRICULTURE LAND RECLAMATION STATION
MINISTRY OF AGRICULTURE COTTON RESEARCH INSTITUTE
CHANNEL
SINDOS
PROJECTED RAILWAY
CENTRAL LINK ROAD
ROAD Nº 8
ROAD Nº 7
ROAD Nº 6
ROAD Nº 5
ROAD Nº 4
LEGEND
SERVICES CENTRES
FREE CUSTOMS ZONE
PLOTS WITH RAIL ACCESS
RAIL FREIGHT DEPOT
INDUSTRIAL ESTATE
INDUSTRIAL PLOTS BELOW 1 HECTARE
INDUSTRIAL PLOTS BETWEEN 1 TO 3 HECTARES
INDUSTRIAL PLOTS BETWEEN 3 TO 20 HECTARES
R PUBLIC RECREATION AREA
P PUBLIC PARKING AREA
E ELECTRICITY SUB-STATION
W WATER TANKS, ETC
N LANDSCAPE NURSERY
TO ATHENS
SINDOS STATION
SINDOS VILLAGE



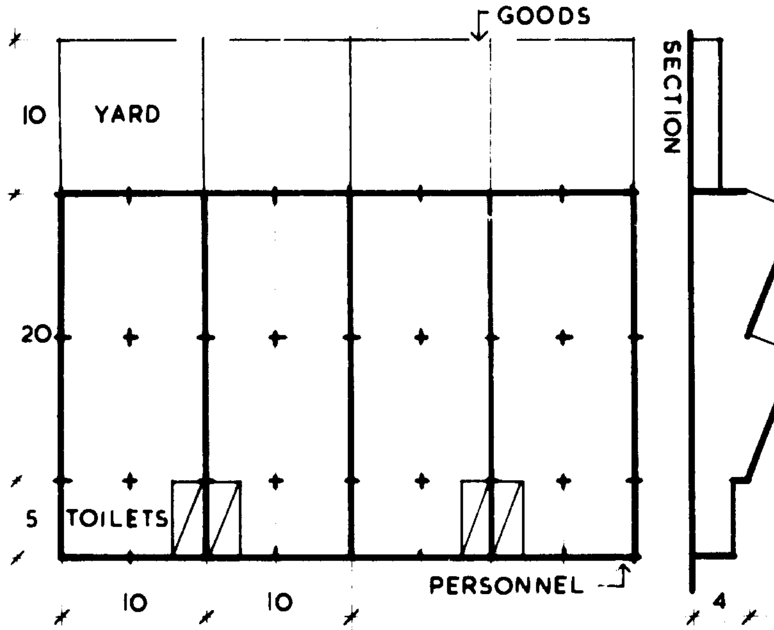
MASTER PLAN

PLATE E.2



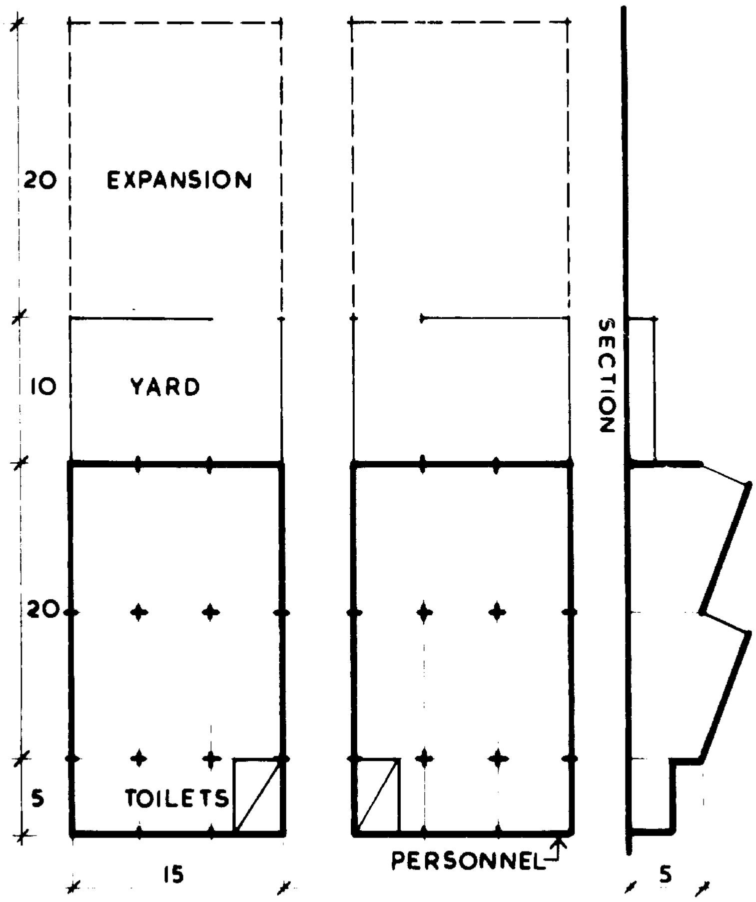
ANNEX

GREECE'S TREATY OF ASSOCIATION WITH THE E.E.C.

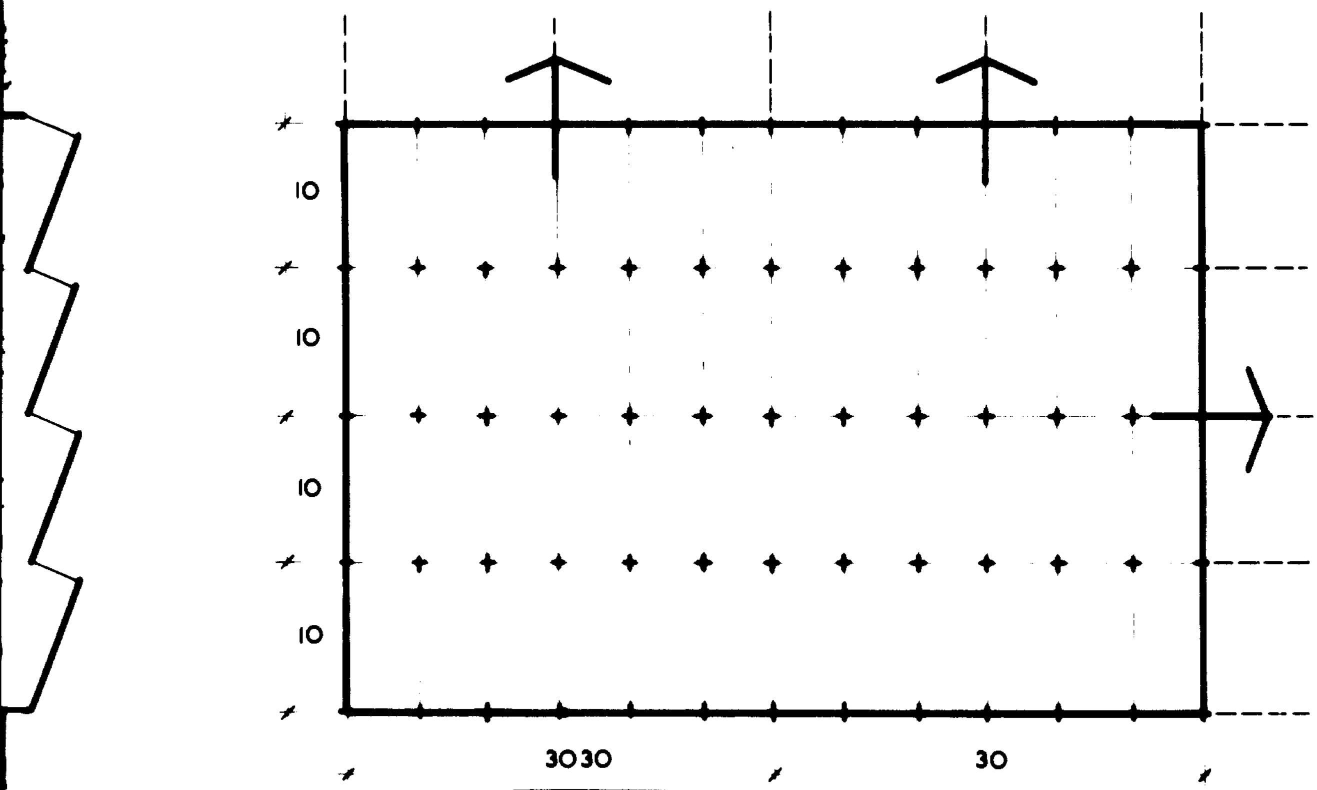


TYPE 2. EACH 200m² + TOILETS & OFFICE BUILT GENERALLY AS TERRACES WITHOUT PROVISION FOR 100 % EXPANSION

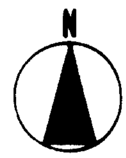
4. 1200m² + TOILETS & OFFICES
PROVISION FOR 100 % EXPANSION
HED.



TYPE 3. EACH 300m² + TOILETS & OFFICES WITH PROVISION FOR 100 % EXPANSION BUILT DETACHED BUT CAN BE BUILT AS PAIRS



TYPE 5. BASIC UNIT OF 10m × 5m SIMILAR TO TYPE 4 BUT BUILT TO TOTAL SIZE REQUIRED WITH 100 % EXPANSION



STANDARD FACTORY TYPES
PLATE E.3

APPENDIX F

OPERATING CONSIDERATIONS FOR A FREE-CUSTOMS ZONE WITH MANUFACTURING FACILITIES

Factors involved in the operation of such a zone are presented below and would need to be taken into account, should a decision be made at a later stage to proceed with a Free-Customs Zone with manufacturing facilities.

1. Issue of Licences

It is proposed that licences be issued to all manufacturers in the Zone, laying down conditions of operation. The following aspects should be covered in the licence.-

(a) The right of the Industrial Area Company to restrict the operations of a manufacturer to products covered in the licence.

(b) The responsibility of the manufacturer to safeguard raw materials and products on which no duty is paid.

(c) The accountability of the manufacturer for any missing materials and products and payment of duty by the company for any deficiency to the Customs Authorities.

(d) The keeping of stock accounts to show all particulars concerning raw materials, processing and finished products

(e) The right of the Customs officials to examine accounts when required.

(f) The provision of sufficient evidence to Customs officials on such matters as delivery of goods abroad.

2. Issue of Leases or Sale Agreements

Whether the policy of the Free-Customs Zone Company is to lease or sell plots or standard factories, agreements will have to be drawn up to cover the operating aspects of factories within the Zone. These may be based on the existing Estate Sale Agreements by which HIDB has hitherto been selling land. The Agreement will essentially bind the manufacturer to the clauses of operation stipulated in the legislation. In addition, it will lay down the rights and responsibilities of the manufacturer with regard to his constitution, use of premises, infrastructure, maintenance, transfer of property, financial liabilities, building regulations, insurance and other aspects.

3. Documentation Procedures

In order to ensure the successful operation of the Free-Customs Zone practical procedures and documentation will need to be provided. The operation procedures involved in a Free-Customs Zone are illustrated in Diagram F.1. This shows the possibilities involved in processing goods through the Zone and the documentation likely to be required. It assumes that cases may exist where local raw materials are processed within the Zone.

(a) **Imported Raw Materials**

These are inspected at the customs post at the frontier or port of entry and checked against a cargo manifest giving details of contents and of the consignor and consignee. It is expected that a Bond note would be issued against these goods (if they are not already bonded or are not already sealed under the T.I.R. system). Under this Bond note the manufacturer or transporter undertakes to pay a fine (normally exceeding the value of the goods transported) on goods either not exported or which cannot be accounted for to the Customs Authorities.

In practice the T.I.R. (Transport Internationale Routiere) system is more convenient. This is the system which many manufacturers in Thessaloniki are at present using and it is expected that manufacturers in the Free-Customs Zone will tend to use it.

If raw materials are imported under the T.I.R. system, only seals are checked at the Frontier customs posts. Goods need not be checked against invoices until they reach their point of destination - in this case the Free-Customs Zone For goods which enter the Zone for storage and bulk breaking and are exported again, only a copy of a bond note or carnet is required to ensure that none are missing. Goods which are sent to local markets will have duty paid on them.

Where raw materials are processed and exported as finished products a bond note and an export specification etc. are issued showing details of goods exported. Under the T.I.R. system sealing of vehicles will take place under super vision by the Customs Authorities.

(b) **Local raw materials**

Should any such materials be processed by manufacturers in the Zone, details will have to be shown of raw materials. Details of processing will be required by Customs Officials whether these goods are exported or not. It is unlikely that local raw materials will be processed in the Free-Customs Zone at Thessaloniki.

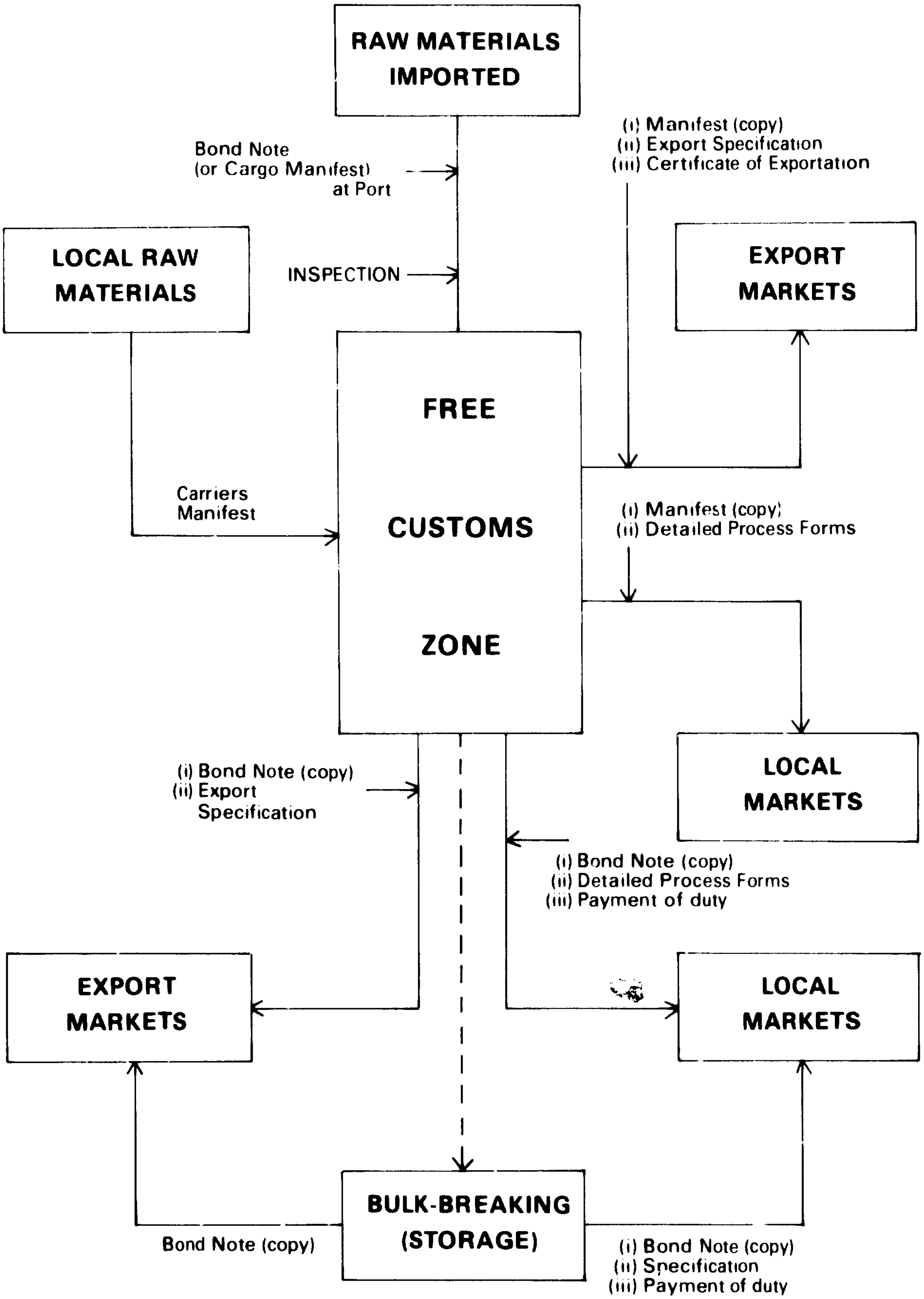
4. Documentation Required

Documentation required in operating the Free-Customs Zone may be summarised as follows:-

1. CARGO MANIFEST AND BOND NOTE
   OR T.I.R. CARNET.
2. COPY OF MANIFEST EXPORT SPECIFICATION AND BOND NOTE
   OR T.I.R. CARNET.

Specimen copies of Bond Notes and shipping bills for transhipment or exports in use at Shannon Free Airport are presented in Appendix D.2.

It is possible that further documentation will be needed in order to take account of special situations such as temporary withdrawal of goods from the Zone or export of goods manufactured outside the area. Such documentation will need to be drawn up by the Customs Authorities. Specimen copies of such documents are also shown in Appendix D 2, and may be used as a basis on which documentation for the Free-Customs Zone could be drawn up.



OPERATION OF A FREE-CUSTOMS ZONE

DIAGRAM F.1

APPENDIX G

PROSPECTS FOR THE DEVELOPMENT OF SPECIFIC INDUSTRIES IN THESSALONIKI

1. Textiles and Ready made clothing

Prospects for the establishment of these industries in the Free-Customs Zone in Thessaloniki may be considered to be good. The textile industry is well established in Greece and in Thessaloniki.

The rate of growth of consumption of clothing products has been particularly high within Greece, estimated at 9.1% per annum between 1960 and 1970.

This industry is also one of the growth sectors in Thessaloniki: - ten new enterprises were established there in clothing and five in weaving between 1967 and 1969. Two companies in ready made clothing are currently operating successfully in the Free-Customs Zone in the Port.

The industry is labour-intensive and has a tendency to disperse rather than be located near the source of the raw material (Its coefficient of localisation in the U.K. was calculated to be 0.53).

In general it may be expected that the type of industry in the textiles sector to be established with a Free-Customs operation would be in the range of finished clothing rather than raw materials. The latter type of industry namely, cotton ginning, thread manufacture etc. may be expected to be established in the Industrial Area using local raw materials, as in the case of Ilios Ten Cate.

An indication of the possibilities for future development of this sector is given by the import-export figures for the industry shown in Table G.1.

TABLE G.1

IMPORTS AND EXPORTS OF TEXTILES, GREECE, 1968 and 1969

	Imports (Tons)		Exports (Tons)	
	1968	1969	1968	1969
Textile yarn, thread	5.824	5.383	7.134	8.895
Cotton fabrics	3.236	3.154	121	660
Textile fabrics (excl. cotton)	3.398	3.500	314	460
Special textiles etc.	2.054	2.925	53	73
Made up articles of textiles	1.602	790	123	384

Source: Statistical Yearbook of Greece, 1970.

Production of certain items is shown in Table G.2.

TABLE G.2

PRODUCTION OF SELECTED TEXTILE PRODUCTS, GREECE, 1967 and 1968

	1967	1968
Socks (000 dozen)	2.434	2.735
Blankets (tons)	4.412	5.050
Threads (tons)	7.894	9.171
Yarn (tons)	68.929	66.243
Fabrics (tons)	38.036	36.171

Source: Statistical Yearbook of Greece, 1970.

Products which are being exported by textile firms in Thessaloniki are as follows:-

Cotton products; woven textiles; silk, cotton and blended fabrics; elastic yarns; cotton linters; blankets and fabrics of synthetic yarn; women's clothing and sisal.

It may be expected that these products will be manufactured and exported through the Free-Customs operation.

The success of the two factories in the Port indicates that factories processing **ready made clothes** are potentially the most likely industries to be attracted to the Zone.

2. Metal and Engineering Industries

Prospects for the development of such industries in the Free-Customs Zone appear to be very favourable. Engineering industries tend to have a relatively higher ratio of wages to gross and to net output as shown in Table G.3 for the United Kingdom.

TABLE G.3

SHARE OF WAGES AND SALARIES IN OUTPUT, UNITED KINGDOM

	Wages and Salaries	
	(i) As % of Gross Output	(ii) As % of Net Output
Light metals	15	58
Metal working machine tools	30	61
Engineers small tools & gauges	43	63
Industrial engines	31	69
Office machinery	37	61
Other machinery	29	57

Source: Data from Annual Abstract of Statistics, U.K.

These industries reflect a high level of labour intensity and therefore of wages to total costs. They should prove attractive to foreign investors in view of the relatively cheap labour supply in Greece.

Labour costs in establishments in the metal industries employing 10 persons or more were estimated to be almost 19% of production costs. A further characteristic of these industries is that their coefficient of localisation is favourable i.e. these industries do not need locating near their raw material suppliers. In addition metal industries in other countries (such as the U.K.) tend to export a large proportion of their output.

The development of the metal products industry in Greece has been encouraging over recent years. Growth of production between 1961 and 1968 was almost 11% p.a. At the same time productivity has been increasing in the industry. Value added per capita increased from $1,167 in 1958 to $[illegible],854 in 1966 - a net increase in productivity of 67% after wage increases have been taken into account. These factors should prove encouraging to foreign investors.

On the other hand the machinery industry itself has not had much growth in recent years - in fact production declined up to 1968. However, labour costs are estimated to represent 30% of total costs of production and this factor could prove attractive to foreign investors.

An indication of specific areas in which the engineering industries in Greece will expand is given by an examination of import and export statistics of engineering products. These are shown in Appendix C. It can be seen that only in one instance (cans & drums) did exports exceed imports. Expansion in the engineering sector may therefore be expected initially in the area of import substitution. Areas where production already exists include heating apparatus, central heating and steam boilers, outboard motors, light weight motor cycle motors, pumps, ventilators, ovens, refrigerators, washing machines and agricultural equipment. It is quite possible that manufacturers will start increasing exports once they have expanded their production to meet domestic demand. However, for certain products, competition is expected to be too severe in foreign markets for Greek exporting firms or foreign firms established in the Industrial Area. Such items would include refrigerators and washing machines where for example Italian production methods result in very cheap exports.

However, certain factors may overcome the disadvantages which Greek industrialists may have in export markets. Firstly the rate of inflation in Greece has been amongst the lowest in the world. Should this continue at the same rate the margins of advantage of foreign producers are likely to be cut. Secondly, there may be specific instances where the incentives offered by the Free-Customs Area may prove to be sufficient to overcome any price disadvantage that may exist in foreign markets. However, it is impossible to indicate these products unless specific market surveys were to be carried out.

On the assumption that the major export markets of any industry established in the Industrial Area will be in the EEC, an examination of Greece's Treaty of Association with the EEC (see Annex on page 103) gives an indication of items where export opportunities could lie. In the engineering field these could be:-

Miscellaneous agricultural and domestic hand tools

Spark ignition & compression ignition engines

Pumps

Air Conditioners

Agricultural equipment

Other possibilities in the engineering industries include:-

Components for cars

Engineers small tools, gauges and discs

Office machinery

Bolts, nuts, screws etc.

Further prospects for expansion in the Industrial Area may be related to the development of Hellenic Steel as a supplier of raw materials. It is possible that Hellenic Steel may provide certain raw materials (e.g. sheet steel) while others will have to be imported in order to manufacture a particular product.

3. Pharmaceuticals

These may be considered suitable products for production in connection with a Free-Customs operation since they are light weight, high value added products. Imports between May and December 1970 totalled above Dr. 850 million for pharmaceuticals and medicines. Exports totalled Dr. 18 million consisting mainly of specialised products and antibiotics.

Production and imports of pharmaceuticals in 1968 are shown in Table G.4.

TABLE G.4

PRODUCTION AND IMPORTS OF PHARMACEUTICALS, GREECE, 1968

	Production	Imports
Antibiotics	127 tons	644 tons
Sedatives	104 tons	248 tons
Agricultural pharmaceuticals	Dr. 24 m	n.a.
Veterinary pharmaceuticals	Dr. 23 m	n.a.

Source: Annual Industrial Survey, 1968 NSSG.

Exports of pharmaceutical products have been running at about 1 million dollars per annum:-

1968: $1,158,000

1969: $1,445,000

1970: $ 875,000

As one of the largest importing sectors accounting for about 20% of imports in the Chemical field prospects for expansion of the industry appear to be very good from the point of view of import substitution.

Prospects for industries manufacturing pharmaceuticals will depend almost entirely on foreign investment. American investment in the pharmaceutical industry in Europe has been fairly heavy and it may be possible that the incentives offered by the Free-Customs operation and Industrial Area will prove to be attractive.

4. Plastics industries

The probability of plastics industries being established in the Zone may be regarded as very good. The plastics industry has had high rates of growth over recent years and projections point to a continuation of the use of plastics in place of other materials. At the same time the industry is not necessarily tied to the source of the raw material and firms are already operating in Thessaloniki which import raw material and export finished plastic products. Vepsy who have recently established a factory in the Industrial Area import all their raw material. Production of plastics products in Greece in 1968 is shown in Table G.5.

TABLE G.5

PRODUCTION OF PLASTICS PRODUCTS, GREECE, 1968

-Household use	5,362 tons
-Building purposes	1,248 tons
-Packing	8,271 tons
-Plastic Toys & Flowers	846 tons
-Other	10,818 tons
-Shoes	4 million pairs
-Foam plastic	2,360 tons
-Tubes	6,673 tons
-Synthetic leather	2,092 tons

Source: Annual Industrial Survey, 1968 NSSG.

While it is difficult to predict the actual products likely to be manufactured, it is highly probable that these will be extrusions or mouldings of PVC and Polythene products. Firms operating in Thessaloniki are currently engaged in manufacture of these products or in Synthetic rubber.

5. Electrical machinery and apparatus

Industries in this field are suitable for establishment in connection with a Free-Customs operation for a number of reasons. Firstly the products have a high added value (estimated at $3,737 per capita in Greece in 1966). At the same time the growth rate of productivity has been one of the fastest in Greece (12.9% p.a. between 1958 and 1966). A third attraction offered by these industries is that labour costs are quite an important factor - in the 1966 survey in Greece they accounted for about 20% of production costs. (In the UK the figure is much higher, being 32%). Fourthly, the coefficient of localisation shows a tendency for the industry to disperse.

An indication of the probability of such industries being attracted to Thessaloniki is given by the successful operation of the Siemens factory which has expanded its manufacturing facilities within a few years of its establishment. The firm is, moreover, exporting its products to Middle Eastern countries.

Production already exists in Greece in the following products:-

Electromotors

Electric batteries

Accumulators

Lamps

Imports of electrical and electronic products into Greece are shown in Appendix C. Greece has hitherto only exported electric batteries, switchboards and electric lamps. Any products likely to be manufactured in connection with the Zone will tend to be lightweight. It is therefore possible to exclude heavy products from potential products.

Probabilities could exist in the following areas:-

Electromotors (below 10kg)

Transformers (below 10kg)

Electric batteries

Accumulators

Electro-mechanical handtools

Electric car components

Lamps

6. Electronic products

Industries involved in this field are suitable for operating through a Free-Customs Zone, being low weight, high value added and labour intensive industries. In addition the world industry has had a very high growth rate in recent years.

Foreign investment in the electronics industry has mainly been made in areas where cheap labour has been available such as Hong Kong, Taiwan and Shannon. A good example is the investment made by foreign companies at the Duty Free Export Zone (KEPZ) at Kaoshiung in Taiwan. Between 1964 and 1968 foreign investment totalled $50m in 43 installations. Production was valued at $180m. The main reasons for foreign investment in this industry in Taiwan may be summarised as follows:-

(i) Low cost labour

(ii) Calm political atmosphere

(iii) Liberal incentives

(iv) Good strike records

(v) Modernised plant and facilities.

It is expected that all these conditions will exist in the Industrial Area in Thessaloniki. In view of the high US investment in Europe in this field, there is good reason to believe that investors will look for opportunities such as Thessaloniki offers.

Forecast of products is difficult since this depends largely on the state of markets overseas. The industry in Taiwan for instance, depends upon the supply of components from the US and cheap access of finished products into US markets. Japanese investors have in recent years shown an interest in European markets for electronic products and may well consider the possibility of investing in an assembly plant in Thessaloniki.

Products which could be manufactured in the Zone could include the following:

1. **Domestic**

Radio receivers; T.V. receivers, tape recorders, record players, etc

2. **Industrial**

Resistors, condensors, electron tubes, semi-conductor elements, transistors, computer components such as memory cores, transformers, integrated circuits and other parts.

7. **Service industries and warehousing companies**

Such industries would include transportation, freight forwarding and warehousing firms involved for example in bulk-breaking of containers. In addition service industries such as consulting firms, sales and marketing agencies may be attracted to the Industrial Area.

TABLE G.6

POTENTIAL INDUSTRIAL SECTORS FOR DEVELOPMENT IN THE INDUSTRIAL AREA, THESSALONIKI

	Growth Industry		Export	Established in	
Sector	**National**	**Thessaloniki**	**oriented**	**(i) Shannon**	**(ii) Kaoshiung**
Chemicals	*	*	*	*	*
Metal Industries	*	*		*	*
Textiles	*	*	*	*	*
Food Processing	*	*	*		
Electrical and Other Machinery		*			*
Footwear & Clothing	*	*			*
Furniture		*			*
Plastics		*		*	*
Paper & Packaging	*				*
Handicrafts	*				*
Leather & Fur	*		*		*
Electronics etc.				*	*
Printing & Publishing				*	*
Toys					*
Petroleum Products	*	*	*		
Tobacco		*			

8. Printing and publishing

While such industries have limited export possibilities there is some prospect of their being attracted to the Zone at Thessaloniki. Both Shannon and the Kaoshiung Zone in Taiwan have attracted firms in this sector - in the case of Shannon the Irish University Press serves a specialised field viz reproduction of historical documents.

9. Other industries

In Part I of the Feasibility study consideration was given to the types of industries which may be attracted to the Industrial Area at Sindos. A summary table of these types of industries is reproduced here in Table G.6. Some industries which were judged as possibilities then have, after further discussion with industrialists, been rejected for the reasons mentioned below.

9.1 Chemicals

It is expected that all chemical development (except end products in plastics) will take place in the Esso-Pappas complex. Companies in the complex such as Esso-Pappas and Ethyl Hellas have been given special dispensation by Decree from payment of import duties on the understanding that they will export most of their products. It is expected that any chemical companies wishing to establish themselves in Thessaloniki will be given the same treatment.

The development of the Esso-Pappas complex is highlighted by the degree of inter-dependence that exists between the firms in operation there. This is illustrated in Table G.7.

Chemical products which are manufactured in Thessaloniki but not at the Esso-Pappas complex include the following products:-

Oxygen, Acetylene, Nitrogen, Explosives, Resins, Bleaching agents, soap, aniline, dyes, colophony and turpentine oils.

None of these products would have scope for production in the Industrial Area.

However, the proximity of the Esso-Pappas petro-chemical complex to the Industrial Area may result in certain types of industries being established. PVC and polyethylene are currently being processed and manufactured by Esso-Pappas and Ethyl Hellas. Development of intermediate products may be expected to take place in the Esso-Pappas industrial area but it is highly likely that end-product manufacturers, for example, in the plastics industry will locate in the Industrial Area at Sindos. Hitherto four manufacturers are involved in the plastics sector on the Industrial Area and a fifth is in the process of being established to produce industrial plastics.

9.2 Food Processing and furniture are likely to be concerned with the Free-Customs Zone operation since they will be either processing local raw materials or concerned with the local market.

9.3 Leather and Fur industries are expected to develop in Kastoria where a Free-Customs arrangement currently exists.

TABLE G.7

BY-PRODUCTS OF ESSO-PAPPAS

Product	Disposal
Ammonia	105,000 metric/tons/year supplied to Chemical Company of Northern Greece for conversion into NPK fertilisers (excluding Urea).
Ethylene	sold entirely to Ethyl Hellas.
Chlorine	35,000 tons supplied by pipeline, to Eth,i Hellas for conversion into monomer chlorine compounds and alkyl compounds.
Solvents	20,000 tons.
Caustic Soda	40,000 tons; 50% liquid and 50% solid flakes supplied to paper mills, rayon, aluminium and soap factories around Greece.
Hydrochloric Acid	
Steam Cracker	15,000 tons: Naptha to Hellenic Steel for heating and to solvent units.
Fuel Gas	To all Esso-Pappas plants.
Hydrogen	Sold to Ethyl Hellas.
Sodium Hypochlorite	
P.V.C. Plant	20,000 tons; This completely covers the Greek market leaving a surplus to be exported to Italy the Common Market and Middle East Countires.
Petroleum Products	The refinery has expanded capacity from 75,000b/d to 80,000b/d. Products used by ships and aviation gasoline.

Source: Esso-Pappas.

ANNEX

GREECE'S TREATY OF ASSOCIATION WITH THE E.E.C.

Selected products covered by the Treaty and currently manufactured in Greece are shown below. These products are subject to Article 15 whereby duty on imports into Greece was reduced by 5% on the initiation of the Treaty and by 5% every 30 months over a period of 22 years).

BTN Number	
17	Sugar Confectionery
18	Cocoa and cocoa preparations
22	Soft Drinks, Malt Beer, Vermouth and other wines
24	Manufactured tobaccos and extracts
25	Gypsum, quicklime, cement etc.
27	Coal, coke, petroleum residues, bitumen etc.
28	Chlorine, Hydrochloric Acid, Hydrogen, Oxygen, Nitrogen, Sulphuric and Nitric Acid, etc.
30	Medicaments (excl. quinine, morphine, anti-biotics)
31	Mineral/Chemical Fertilisers
32	Tanning Extracts, Varnishes and Lacouers
34	Soap and Washing agents
	Rubber and Synthetic Rubber
	Leather
	Fur
	Wood
	Cork
48	Paper and paper board (excluding ordinary Newsprint from chemical and mechanical pulp (up to 60 g per sq. metre); excluding magazine, tissue, cigarette, and filter paper, cellulose wadding.)
	- Corrugated paper and paperboard
	- Building board of woodpulp and vegetable fibre
	- Carbon paper
	- Envelopes, post-cards etc
	- Exercise books
	- Box files etc.
	Man-Made Fibres
	Cotton
	Metallised Textiles
	Carpets, mats, narrow fabrics etc.
64	Footwear
68	Articles of cement, concrete or artificial stone. Friction materials for brakes, clutches etc.
69	Ceramic products

70	Glass -Unworked - cast, rolled, drawn or blown -Safety -Mirrors -Bottles Bricks, Tiles etc.
71	Jewellery. Iron and Steel Products (selected within and outside the jurisdiction of ECSC) Copper and Copper Articles (selected) Aluminium and Aluminium Articles (selected) Lead Zinc
82	Miscellaneous Hand Tools -Agricultural -Domestic cutlery
84	Spark ignition engines (220cc or more) Compression ignition (50cc or less) Motor Cycle Engines Pumps - Liquid, Air and Vacuum Air conditioning units Refrigerators Ploughs, threshers, pressses and crushers Grain milling machinery
85	Generators Primary cells and batteries Electric accumulators Room fans Portable electric batteries Insulated Wire
87	Motor Vehicles -Bodies -Chassis
94	Furniture
97	Toys

APPENDIX H

INVESTMENT INCENTIVES IN GREECE

Incentives currently offered in Greece for local and foreign investors have been adequately described in various publications of H.I.D.B. Those which will be applicable to potential foreign investors in Thessaloniki are briefly described below. These may be summarised as:-

A. Incentives to attract venture capital from abroad.

B. Incentives for provincial enterprises.

C. Incentives for export enterprises.

A comparison of these incentives with those offered in other countries is made in Section 7 of this Report. It is understood that a Committee is currently reviewing incentives to be applicable to the Industrial Area at Thessaloniki.

1. Incentives for the Attraction of Venture Capital from Abroad

These are contained in:

- Law 2687/1953
- Law 4171/1961
- Law 4256/1962 (amending Law 4171/1961).

In brief the following incentives are offered:

a. Foreign investment is safeguarded against expropriation under Law 2687 which enjoys **Constitutional coverage** under Article 23 and cannot be amended by ordinary legislation.

b. **Repatriation of capital** is offered under the following terms:

i. At a maximum of 20% p.a. one year after the commencement of operation financed out of imported funds.

ii. Remittance of foreign exchange:
- 12% of imported equity capital for the payment of dividends.
- 10% of imported loan capital for the payment of interest.
- a specified amount for the payment of rental e.g. for hired machinery.

In special cases Law 4171 provides for large scale investments to remit a higher percentage of capital, up to 70% of the foreign exchange earned from exports.

c. **Tax Concessions**

Tax concessions offered under Law 4171 for "productive" investments include the following:

i. Tax on net profits may be frozen at current rates for a period up to 10 years.

ii. Exemption (total or partial) from customs duties, taxes etc. on imports of machinery etc. for a period of up to 10 years.

iii. Exemption (total or partial) from taxes etc. of local authorities, port authorities or other public bodies for a period up to 10 years.

iv. Exemption (total or partial) from contractual and registration fees etc.

d. **Special privileges**

i. Duty free import of most material requirements for surveys, research etc.

ii. Reduction in fiscal charges incurred in construction such as fees, stamp duty.

iii. Interest on loans and credits paid up to the end of the first year following the beginning of operation can be written off over the following 5 years at an annual rate of 20%.

iv. Freezing of the rate of corporate income tax until repayment of long term loans contracted prior to the start of operations.

2. Incentives for Provincial Enterprises

The main privileges may be summarised as follows:

i. Exemption from all local taxes, duties and dues.

ii. Reduced business turnover tax by 20% or 30%.

iii. Non-taxable limit of profits:
(a) to cover cost of new cap tal expenditure in manufacturing enterprises: 60% p.a.
(b) to cover contingent future losses: 25% p.a.

iv. Exemption from import duties on machinery and spare parts.

v. Depreciation allowances as follows for investment in Thessaloniki.
15% p.a. for buildings.
28% p.a. for machinery.
52% p.a. for motor trucks.

vi. Reduced contributions to IKA (Social Insurance Instruction etc.)

vii. Exemption from 6% tax on pay-roll.

3. Incentives for Export Enterprises

i. 1% to 4% of gross earnings from exports may be deducted for tax purposes from net profits.

ii. Gross receipts from exports are exempt from business turnover tax and stamp duty.

iii. Rebate on import duty paid on raw materials, fuel and packing material used in most categories of export under a system of "drawback".

iv. Exemption from fixed stamp duty for all documents prepared for exports of domestic products.

v. Low rates of interest on bank loans to export industries.

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