

No. 10

**BASIC DESIGN STUDY REPORT
ON
THE ESTABLISHMENT PROJECT
OF
THE CONSTRUCTION EQUIPMENT TRAINING CENTRE (CETC)
AT
THE TENTH OF RAMADAN CITY
IN
THE ARAB REPUBLIC OF EGYPT**

JANUARY 1983

JAPAN INTERNATIONAL COOPERATION AGENCY

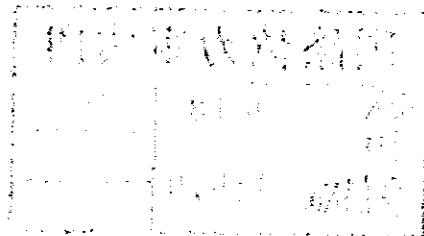


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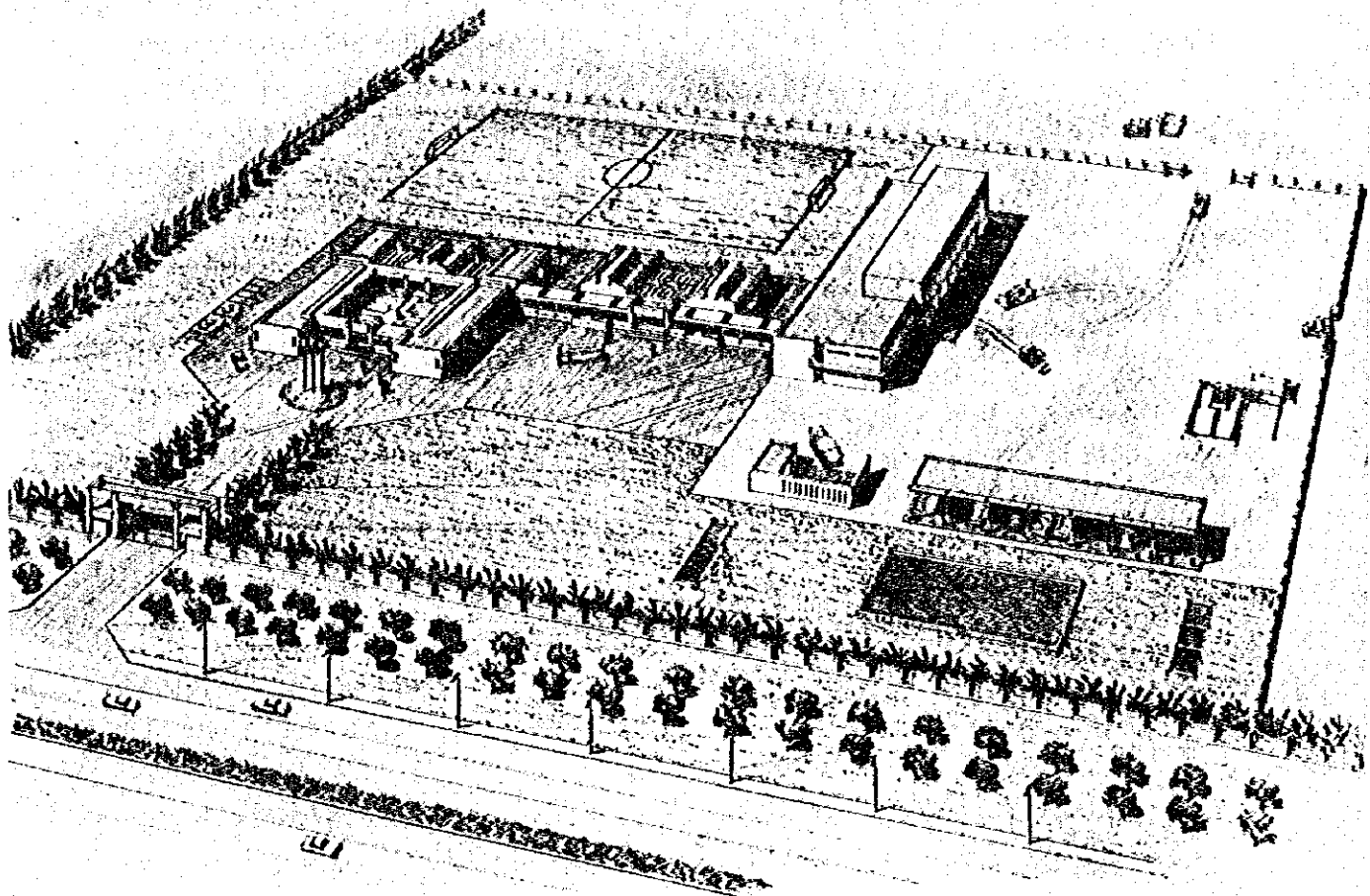
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JAPAN INTERNATIONAL COOPERATION AGENCY

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CONSTRUCTION EQUIPMENT TRAINING CENTRE (CETC)
AT THE TENTH OF RAMADAN CITY

JICA

PREFACE

In response to the request of the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a basic design study on the Project to establish the Construction Equipment Training Centre at the Tenth of Ramadan City and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Egypt a study team headed by Mr. Isamu Goto, Director of Kanto Technical Branch Office, Ministry of Construction from September 12 to October 1, 1984.

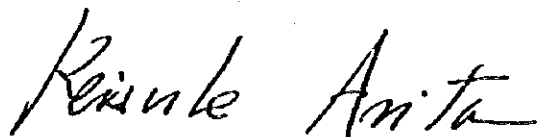
The team had discussions on the Project with the officials concerned of the Government of Egypt and conducted a field survey in the Project site.

After the team returned to Japan, further studies were made, and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the team.

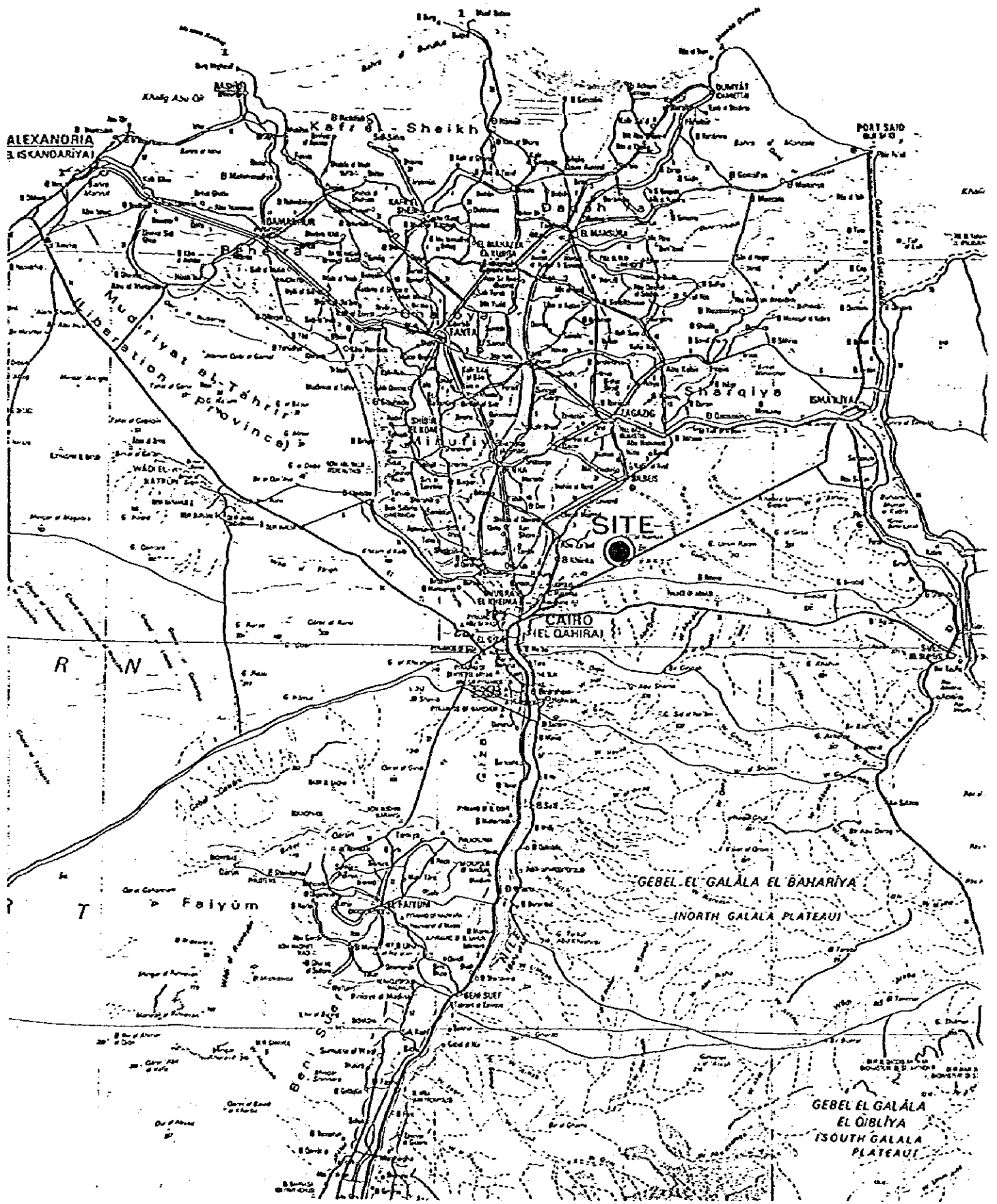
January, 1985



Keisuke Arita

President

Japan International Cooperation Agency



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SUMMARY

Egypt has been maintaining a high annual economic growth of 8 - 9% since the latter half of 1970's, however, with its total population expected to jump to 65,000,000 by the end of this century, the country is faced with a pressing need to accelerate its pace of development furthermore.

Under these circumstances, the Government of Egypt has been drafting and implementing economic plans including many major projects for the purpose of raising economic productivity and coping with overcrowdings caused by population growth. However, the limited capacities of the construction field, namely, the shortage of capable contractors and skilled laborers, shortage and delays on procurement of necessary construction materials and equipment and lack of funding capabilities, are causing delay in the execution of these projects and creating serious problems.

As a solution for this problem, the Government of Egypt has established the Five-Year plan for economic and social development focused on the reinforcement of the construction field, by founding a Vocational Training Organization in the Ministry of Housing and Reconstruction (TOMOHAR). The plan includes establishment of building and construction skills training centre in 66 locations throughout the country covering ten regular occupations mainly necessary for housing construction.

Many major projects are now being executed in Egypt, necessitating infrastructural construction works including site preparations and road construction prior to the intended construction works, and these situations have rapidly increased the demand for large construction equipment.

It has therefore become essential to establish a special sector in the above TOMOHAR to execute the training and education of skilled laborers for operation and maintenance of construction equipment. The Government of Egypt has drawn up a plan to establish six construction equipment training centres within the country and, as the model facility thereof, requested the Government of Japan for economic cooperation on Grant Aid

for construction works and equipment procurement for the Construction Equipment Training Centre (CETC) in the Tenth of Ramadan City, as well as Technical Cooperation on training programs.

In response to the above request, the Government of Japan decided on the execution of a Basic Design Study, and Japan International Cooperation Agency (JICA) dispatched its Preliminary Study Team to Egypt from the 18th to the 31st of May, 1984. Missions were also sent in the form of Preliminary Study Team for Technical Cooperation from the 9th to the 22nd of September, 1984, and Basic Design Study Team, from the 12th of September to the 1st of October, 1984, after analyses were made on the results of the initial study.

After preparing a Draft Final Report based on the results of the said study, JICA dispatched the Study Team for explanation of the Report to Egypt, from the 7th to the 16th of December, 1984.

The purpose of these studies was to confirm the contents of the request made by the Government of Egypt and establish a basic concept through surveys on the projected site and relevant infrastructures and studies on the present situations of relevant facilities.

The aim of the Project is to provide systematic training to supervisors on construction sites and engineers related to the operation and maintenance of construction equipment, to raise skilled engineers who can handle those equipment correctly and efficiently, and to execute the construction works for relevant facilities and procure necessary equipment for the training program.

The Project Site is situated in the western part of the Tenth of Ramadan City, one of the new communities in Egypt, located about 55 km northeast of Cairo. The Site forms a rectangle of 500 m x 1,000 m (500,000 m²), sloping gently downward north, and its site preparation and infrastructural preparatory works will be completed soon.

The projected facilities consist of an administration building, instructors' building, service building, training building and other incidental facilities. Areas covered by the above buildings are as shown below:

(1) Administration Building	: Director's Room, Administration Office, Lobby, Reception, Storage, Lavatory, Clinic, etc.	213 m ²
(2) Instructors' Building	: Chief Advisor's Room, Expert's Room, Instructors' Room, etc.	213 m ²
(3) Service Building	: Canteen, Kitchen, Storage, Lavatory, Electricity Room, Janitor's Room, Laundry, Shower Room, Boiler Room, Locker Room, etc.	605 m ²
(4) Training Building	: Chassis Bay, Training Workshop, Testing Rooms, Tool Room, Spare Parts Warehouse, Office, Classroom, A/V Room, etc.	2,428 m ²
(5) Others	: Shed for Construction Equipment, Connecting Corridors, Gate House, Car Wash, Oil Storage, etc.	662 m ²
	Total	4,121 m²

The following equipments are considered to be necessary for the Project, based on the studies made on the current circumstances of construction field and mechanization of construction works in Egypt.

- (1) Construction equipment for operation training (new)
- (2) Construction equipment for maintenance training (second-hand)
- (3) Components for maintenance and repair training
- (4) Workshop machinery equipment
- (5) Training materials and teaching aids
- (6) Vehicles

The total budget necessary for construction of the CETC to be covered by Egyptian side is estimated to be 632,400 LE (about ¥180 million).

A construction period of 15 months is necessary for the Project. The Project will be executed by TOMOHAR supervised by the Central Organization for Development under the control of the Ministry of Development, New Communities and Land Reclamation, and a committee formed by the parties concerned will carry out the actual operations.

About fifty people are necessary for the operation of the CETC, and its annual operation cost is presumed to be around 600,000 LE (about ¥170 million), including personnel expenses.

Judging from the fact that the present training centres are operated by the budget of TOMOHAR for 1984, which is about 15,550,000 LE (about ¥4.4 billion) excluding personnel expenses, no problem is expected in the operation of the CETC in terms of budget.

An earlier completion of the CETC, meeting the request of Egypt, is therefore earnestly desired. When completed, the CETC serving as a model for the construction equipment training centres, will contribute a great deal to the human resources development program of Egypt.

Therefore the significance of the Project will be great, extending from Grant Aid through construction works to Technical Cooperation for training program.

CHAPTER 1: INTRODUCTION

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1-1 Background of Request

To cope with the serious problem of overcrowding in large cities whose populations have been rapidly increasing in these several years, several new communities are being built near Cairo and Alexandria.

Factories, schools, hospitals and many apartment houses are built in these communities, and when completed, the communities will have complete urban functions. Many skilled laborers for various industrial fields will be required in these new communities, particularly in the construction field where there is a great demand for skilled laborers of good quality for the operation and maintenance of construction equipment used in civil engineering works such as land preparations and housing construction.

In view of the situation, the Government of Egypt is placing great importance on the expansion of vocational training for the execution of the new Five-Year plan, which aims as an intensive development of skilled labor to meet economic demands, appropriate distribution of opportunities for vocational training adapted to the demand for labor, and reinforcement of a systematic basis for the development of human capabilities in local areas throughout the country.

Major projects for civil engineering works are expected to increase in the future, and the import of construction equipment is also marking a sharp increase in recent years. However, the quality and quantity of skilled labor force in Egypt for operating and maintaining these equipment are not yet sufficient to meet the demands.

Taking a serious view of this situation, the Government of Egypt decided to establish six construction equipment training centres throughout the country to raise skilled laborers for the operation

and maintenance of construction equipment and to train engineers to handle such construction equipment in these facilities and on large construction sites, so that the equipment will be used correctly and effectively. Program for establishing three of such construction equipment training centres has so far been materialized. In this relation, the Government of Egypt has requested the Government of Japan for economic cooperation on Grant Aid and Technical Cooperation for establishment of the Construction Equipment Training Centre (CETC) at the Tenth of Ramadan City as a model case.

1-2 Dispatch of the Basic Design Study Team

Responding to this request, the Government of Japan decided on the execution of a basic design study, and JICA dispatched its study team headed by Hideo Endo, Director, Grant Aid Department, JICA, for fourteen days from the 18th to 31st of May, 1984 to conduct a preliminary study. The team studied the contents of the request made by the Government of Egypt, confirming the basic concept of the Project, and drew up a "Preliminary Study Report".

JICA next dispatched a Preliminary Study Team for Technical Cooperation headed by Mr. Yasuyuki Uchida, Director of Research Division of the Japan Construction Mechanization Association for fifteen days from 9th to 22nd of September, 1984, prior to the departure of the Basic Design Study Team. The mission met with Egyptian parties to confirm the contents of their requests and discuss details of the basic idea of the Project, particularly the so-called software part including training programs to clarify the items necessary for a smoothly interlocked operation of Grant Aid and Technical Cooperation.

Following the above mission, a Basic Design Study Team headed by Mr. Isamu Goto, Director of Kanto Technical Branch Office, the Ministry of Construction, was dispatched for the purpose of executing a field survey for twenty days from the 12th of September to the 1st of October, 1984.

The main items of discussions and surveys made by the Basic Design Study Team are as follows:

- (1) The following confirmations were made on the basic design:
 - 1) Purpose and function of the CETC
 - 2) Adequacy of the selected site
 - 3) Training programs
 - 4) General scale, main composition and plan of the facilities
 - 5) Outline of training equipment
 - 6) Scope of Works
- (2) Discussions and confirmations on technical matters necessary for the Basic Design
- (3) Survey on the projected site
- (4) Survey on the relevant infrastructure
- (5) Survey on the relevant facilities
- (6) Survey on the construction equipment at the site for major civil engineering works
- (7) Survey on the circumstances of the construction industry

Contents of the basic confirmations stated above were compiled into the Minutes of Discussions dated Sep. 24, 1984 and signed by the representatives of the Government of Egypt and of the Study Team. Refer to Appendix - 4 for the Minutes of Discussions and Member List and Daily Report of the Study Team.

After the Study Team came back to Japan, a Draft Final Report was prepared on the basis of the study results and home office work. JICA next dispatched a Draft Final Report Explanation Study Team headed by Mr. Kaneharu Isobe, Director of Tohoku Technical Branch Office, the Ministry of Construction for the purpose of explanation of the Report to Egypt for ten days from the 7th to the 16th of December, 1984. The Study Team explained the whole contents of the Draft Final Report and could get the approval of Egyptian side. Contents of the discussions were compiled into the Minutes of Discussions dated Dec. 13, 1984 and signed by the representatives of the Government of Egypt and of the Study Team. Refer to Appendix-5 for the Minutes of Discussions and Member List and Daily Report of the Study Team.

CHAPTER 2: BACKGROUND OF THE PROJECT

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In order to recover from the ravages of the wars that tore the country between 1960 and 1972, Egypt began to free the economy in 1973, and also reopened the Suez Canal. In addition, Egyptian oil production increased with the return of the Sinai oilfields, and an economic recovery was set in motion. The outcome of these events has been that an economic growth rate (measured by the GDP) of 8-9% per year has been achieved.

In the new Five-Year Development plan (1983-1987), which carries forward the work of the previous Five-Year plan towards the same goals, the Government of Egypt has placed particular emphasis on the construction of housing and new communities, and has invested a great deal of effort (more than 40% of the whole investment) in construction projects.

Egypt now must solve various problems concerning construction work to achieve the goal of this new Five-Year Development plan.

Recently, a good few of the skilled laborers of Egypt have gone abroad to work in the oil-producing countries where the wages are much higher. This is causing a serious problem in the shortage of the construction skilled laborers.

Furthermore, in 1975 the Ministry of Housing and Reconstruction purchased construction equipment worth 20 million L.E. and provided them to the construction public sectors of the Government.

Unexpectedly those equipment were scraped in short time because of the shortage of capable operators and maintenance engineers in the public sectors.

In the same year the Ministry of Housing and Reconstruction established TOMOHAR to supply skilled laborers in the fields of construction and reconstruction. According to the Five-Year plan (1977-1982) of TOMOHAR, the establishment of 63 training centres and 3 instructor's training centres was planned for supply of the required skilled laborers in the construction work.

As modern construction methods are now generally being introduced by using construction equipment, TOMOHAR desires keenly to establish a special new branch to develop and direct the training program in the field of operation and maintenance of construction equipment.

In view of this situation, the Government of Egypt will establish training centres for operators and mechanics for construction equipment at six locations throughout the country, with the aim of producing technicians skilled in the operation, maintenance and repair of the principal construction equipment, and personnel capable of administration and management related to the use of such machines.

Accordingly, the Government of Egypt has formally requested the Government of Japan for Grant Aid and Technical Cooperation for the setting-up of the CETC at the Tenth of Ramadan City, as a model for such future centres.

CHAPTER 3: SITE CONDITIONS

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3-1 Location of the Project Site

Location of the Project Site is situated about 55 km northeast of Cairo, in the Tenth of Ramadan City built along the Cairo-Ismailia Route highway as indicated in Fig. 3-1-1. At present, construction of 1st Stage area of the Tenth of Ramadan City is nearly completed and construction works are about to start in the 2nd Stage area. Development of other areas after 2nd Stage, which still resemble deserts, is now in the planning process and no actual construction works have started so far.

The proposed Project Site is in Site-D which is located in the southwestern corner of the 2nd Stage, forming a rectangle of 500m x 1,000m as indicated in Fig. 3-1-2.

The ground is generally flat, with the southern part (facing 1st Stage) a little higher and sloping downward to the north. The difference of elevation between the north end and the south end of the Site is about 5m. The Project Site is indicated in photographs of Fig. 3-1-3.

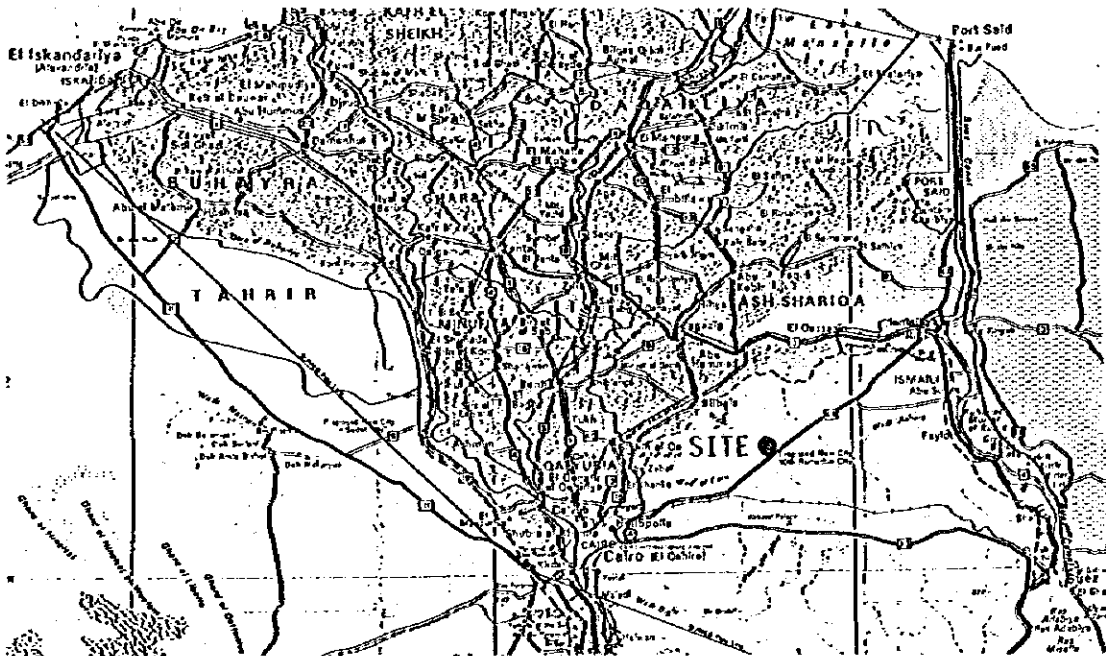


Fig. 3-1-1 Project Site

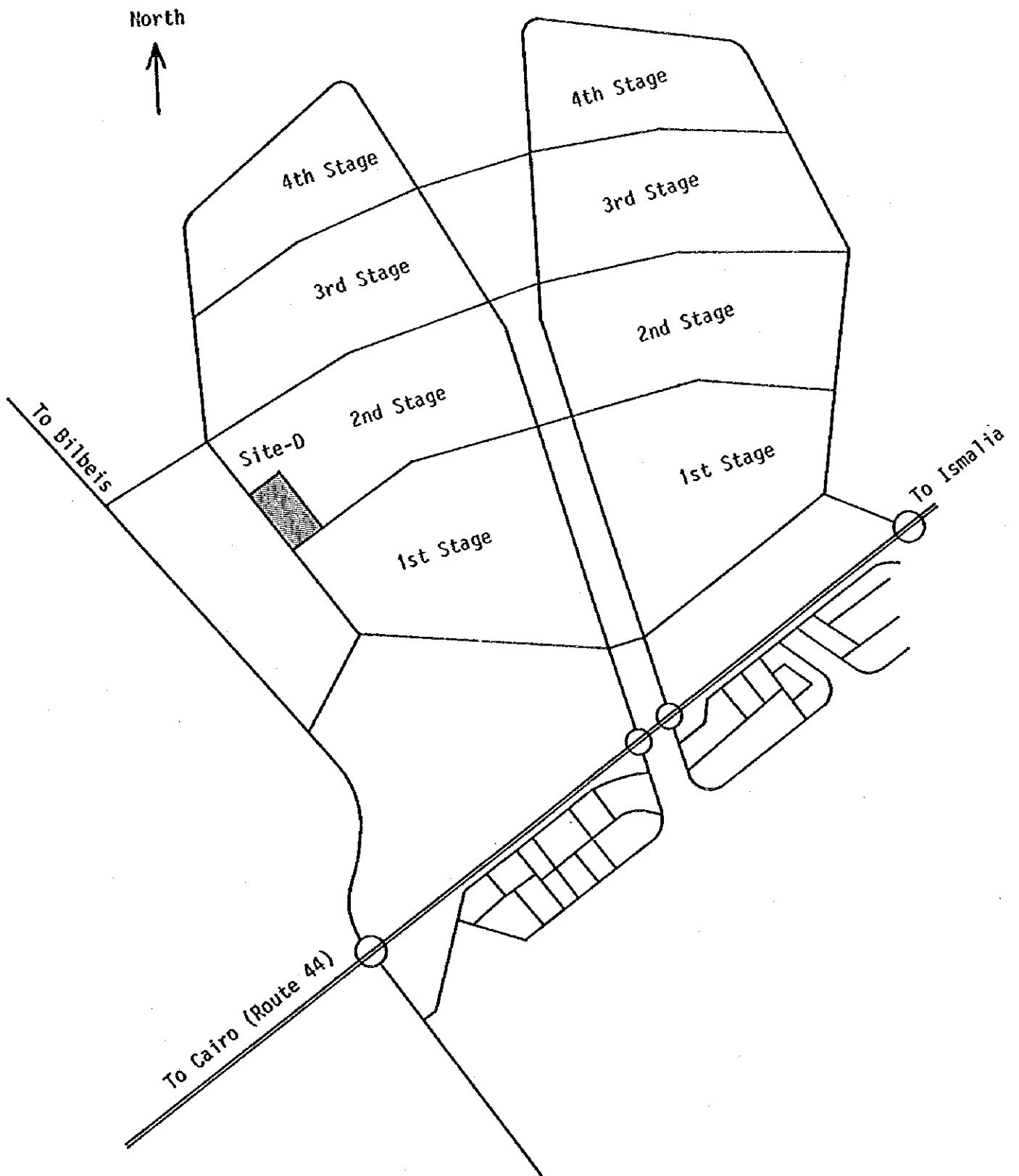
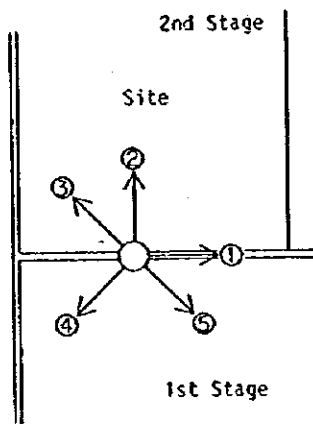


Fig. 3-1-2 Location of the Project Site in the Tenth of Ramadan City

Fig. 3-1-3 Photographs of the Views around the Site

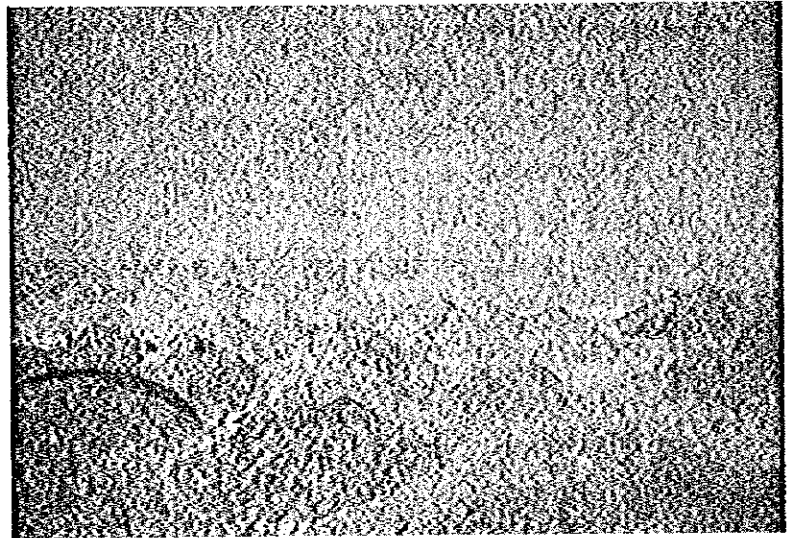


Directions of shots

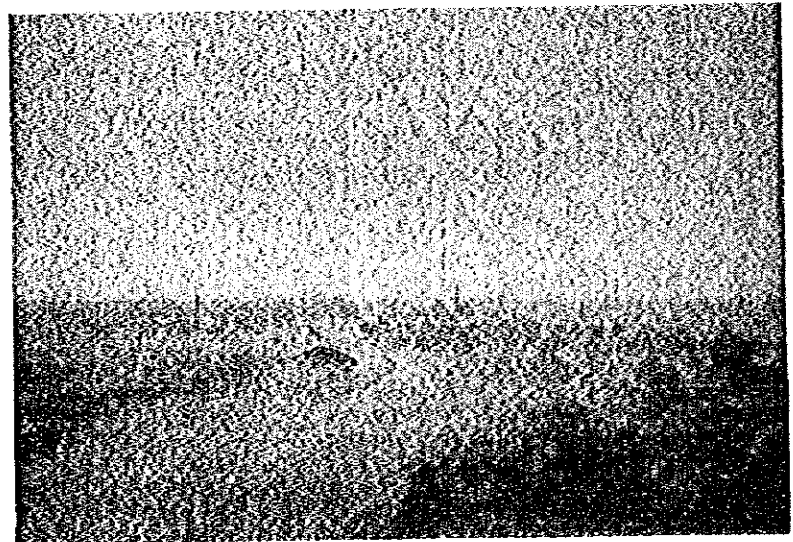
(1)



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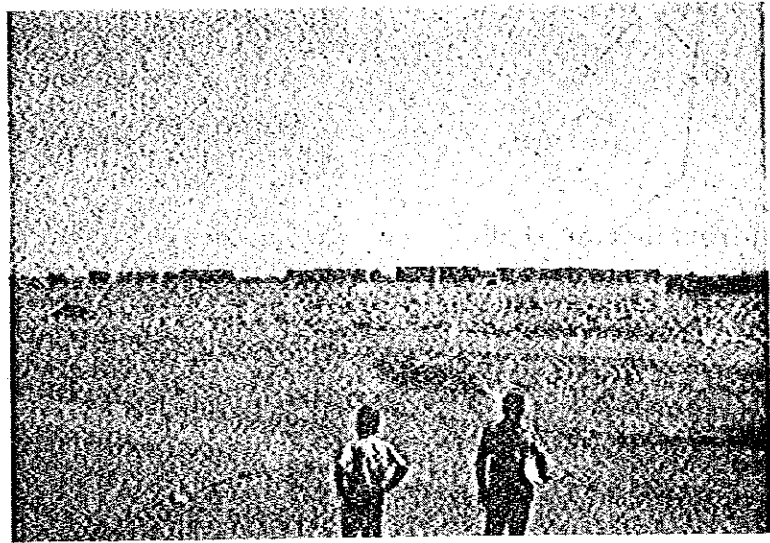


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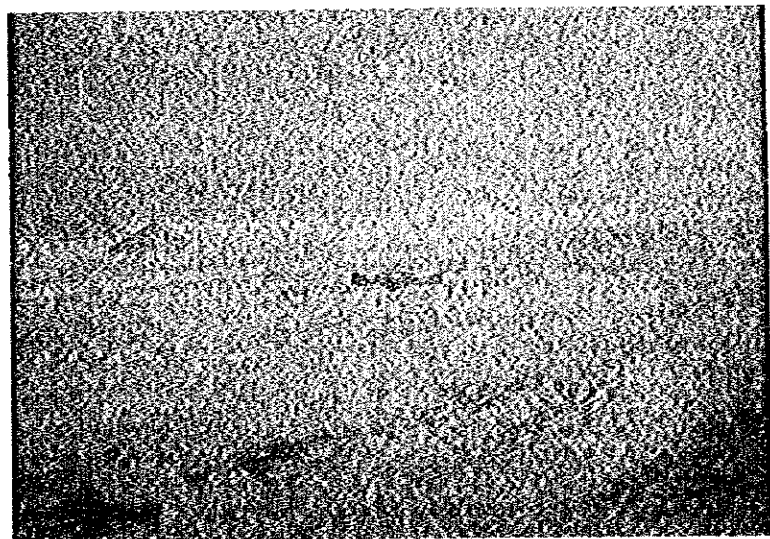




(4) Beholding the Access Road and Illumination Poles from 1st Stage on the right



(5) A view of the Housing Area of 1st Stage



(6) A man-hole in the centre of the road

3-2 Climatic and Geological Conditions

The Tenth of Ramadan City is located in a desert where the temperature variation is quite large as shown in Fig. 3-2-1; the difference between the average monthly maximum temperature and minimum temperature is as high as 20°C. The minimum temperature in winter (December - February) is sometimes below 5°C.

The direction of wind affects site planning considerably, and as Fig. 3-2-2 indicates, the northern and northwestern winds are overwhelmingly prevalent in this area.

In 2nd Stage where the Project Site is situated, the southern part is a little higher, sloping moderately downward to the north and ending in an arid valley. Soil near the valley is of good quality, being free of salt, and trees can be planted without difficulty. Some of the salty soil needs replacement, but climatic conditions are more likely to affect tree planting than geological conditions.

The area around the Tenth of Ramadan City is a desert, so the ground is considered to be composed of similar layers. Fine gravel mingled in sand and solid ground may be attained by digging one to two meters deep into the ground. According to the Egyptian Standard Specification (Ministerial Decree No. 1098/1969), the allowable ground bearing capacity of condensed sand, mingled with fine gravel is about 15 - 30 T/m² in case of such dry ground.

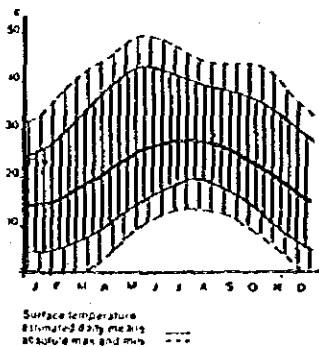


Fig. 3-2-1 Temperature

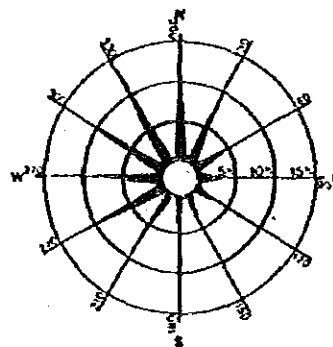


Fig. 3-2-2 Proportion of the Directions of Winds throughout the Year

3-3 Development Plan of the Tenth of Ramadan City

The Tenth of Ramadan City is designed not as a bed-town for Cairo but as an independent new city with functions for employment, education, culture and recreation and, unlike existing overpopulated cities, are so designed that they allow their inhabitants to live in comfort. A nationwide planning for construction of new communities are being made for a better distribution of the population.

The Tenth of Ramadan City was planned as part of the above program and is currently under construction. The ultimate target population is 500,000, which may be achieved before the year 2000. The completed city will have a diameter of approximately 8km, covering an area of about 50km².

The area can be subdivided as follows:

Residential areas	38%
Industrial areas	20%
Servicing areas	8%
Green areas	8%
Road areas	26%

Water for the city for human consumption, industry and irrigation will be supplied from wells at the beginning, while the final water source through city water will be the Ismailia Canal. The city will have a complete sewage system covering the entire area. Network for supplying sufficient electric power is also being built.

The city is divided into four stages as shown in Fig. 3-3-1. A stage is composed of four communities, each of which is again composed of eight or nine neighborhoods. Each neighborhood covers an area of 17 to 21ha and accommodates 4,000 to 5,000 inhabitants.

Construction of the 1st Stage was started in 1978, and various servicing and management facilities, including infrastructures, are now under construction. 50,000 people are already living in the

city. The economic base of the city is industry, and its location is suitable for light and medium-range industries and engineering industries.

There will be many technical schools and training centres to provide industries with skilled labor. The final choice of industries is not yet determined, but it will most likely include the following specialities.

- * Textiles
- * Food processing
- * Packaging
- * Bottles and Bottling
- * Tool industries
- * Metalwork
- * Engineering industry
- * Printing
- * Chemical

There will also be a series of workshops, and the construction industry will play an important role all through the development of the city. Employment for 60,000 people of 150,000 inhabitants may thus be secured at the end of 1st Stage, of which one third will be employed in industry, one third in construction and one third in services and administration.

The implementation schedule indicates a production of three to four thousand family dwellings annually. This high rate of construction is only possible by conventional construction methods combined with modern prefabrication and the use of standardized housing design.

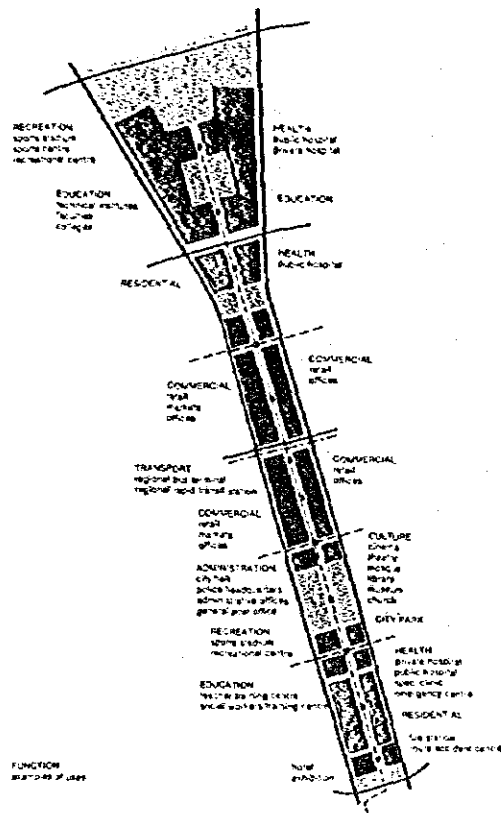
The master plan indicates a basically low-rise city with 1-4 story buildings with the exception of the city centre where rather tall buildings will dominate the scene.

The city will provide on different levels services for its inhabitants so that the citizens can live a fulfilled life in this independent city without having to go to Cairo or elsewhere. Various facilities for education, social and cultural services, health, religion, public services, sports and recreation and commerce will therefore be provided within walking distance as

indicated in Fig. 3-3-2. The city will also be provided with a screen of trees as its perimeter so as to protect it from sandstorms and to give it a character of a green oasis in the desert by securing sufficient green areas within the city.

As to transportation systems, the possibilities will be studied for linking the city with the Cairo-Suez railway in addition to the Metro line connecting it with the Capital. A bus station will be set up on the Cairo-Ismalia highway in the near future. The layout of the city is highly concentrated and the distance from home to work area, as a rule, is very short, so the traffic system is based on the movements on foot or by bicycle for the shorter distances. Buses and trains will run through the community centre, and the distance to the nearest bus stop will be minimized. The road system is based on the principle of high traffic safety and can meet the future demands. In the New Communities Development Plan, the Tenth of Ramadan City was positioned as the nucleus of industrial corridors between Cairo and Ismalia.

With Cairo Airport and an army base to the south and Al Khanka sand hills and reclaimed land to the north, the city has a neutral characteristic lying midway between them. Its potentialities in future, backed by above design, is therefore considered to be great.



Composition of the Tenth of Ramadan City

- (1) 500 Housing Units form 1 Neighborhood
- (2) 8 - 9 Neighborhoods form 1 Community
- (3) 4 Communities form 1 Stage
- (4) 4 Stages form the Tenth of Ramadan City

each Neighborhood has: primary school
mosque
market

- 4 Neighborhoods have: junior high school
- 8 Neighborhoods have: senior high school
police station

Illustration of central area utilization

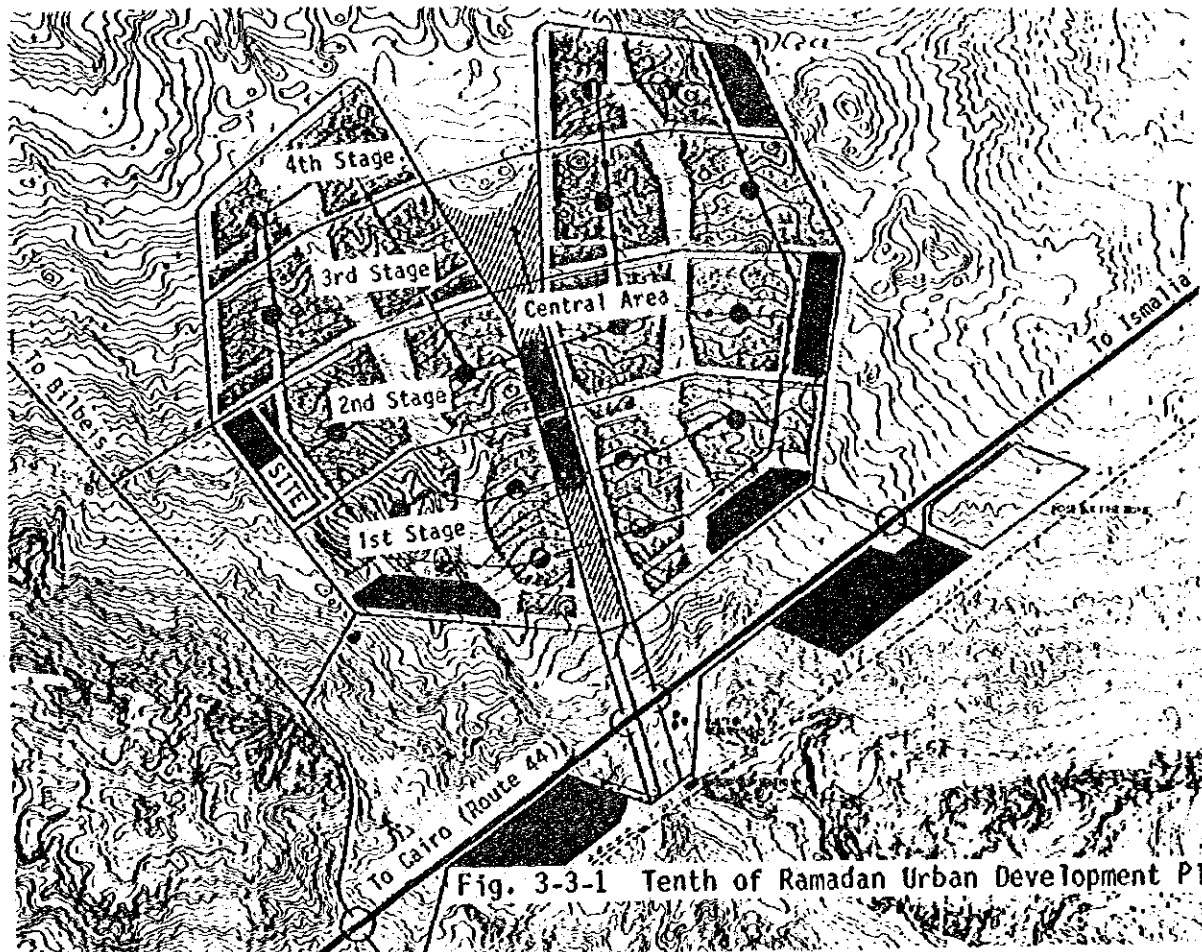
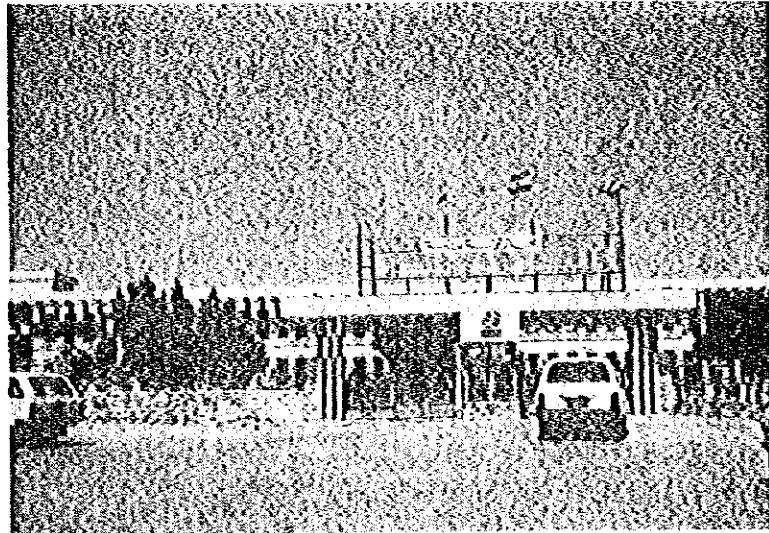
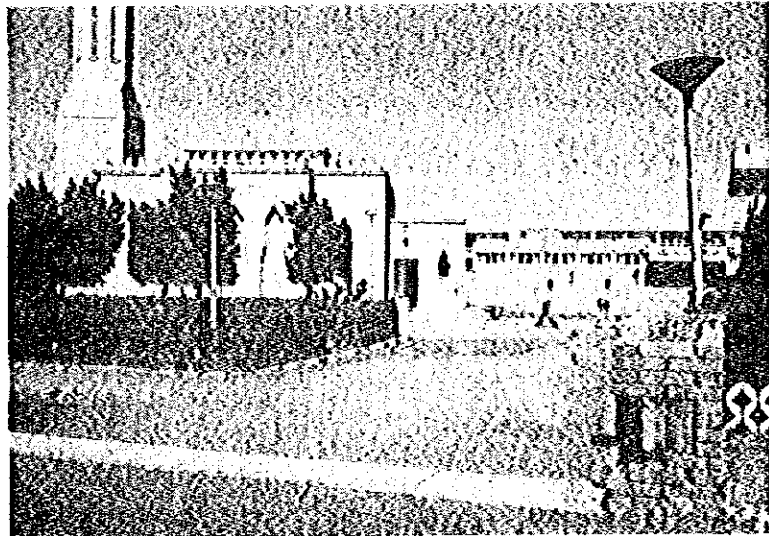


Fig. 3-3-1 Tenth of Ramadan Urban Development Plan

Fig. 3-3-2 Photographs of the views in the Tenth of Ramadan City



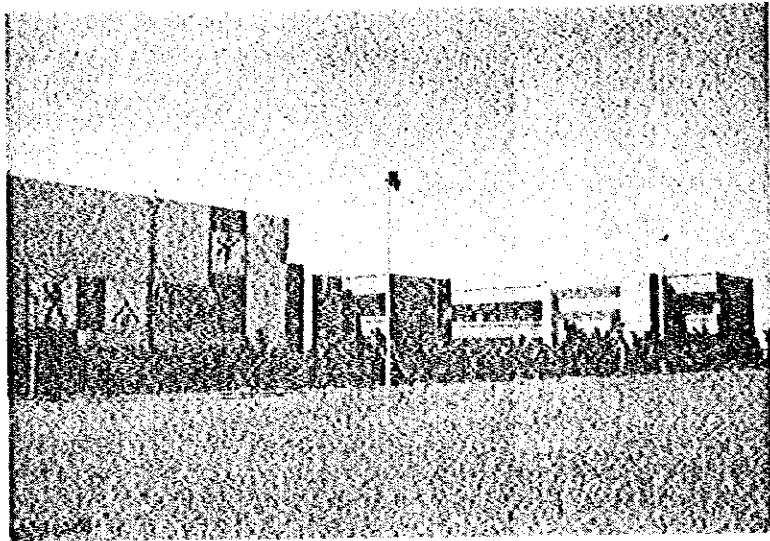
Front Entrance of the Headquarters



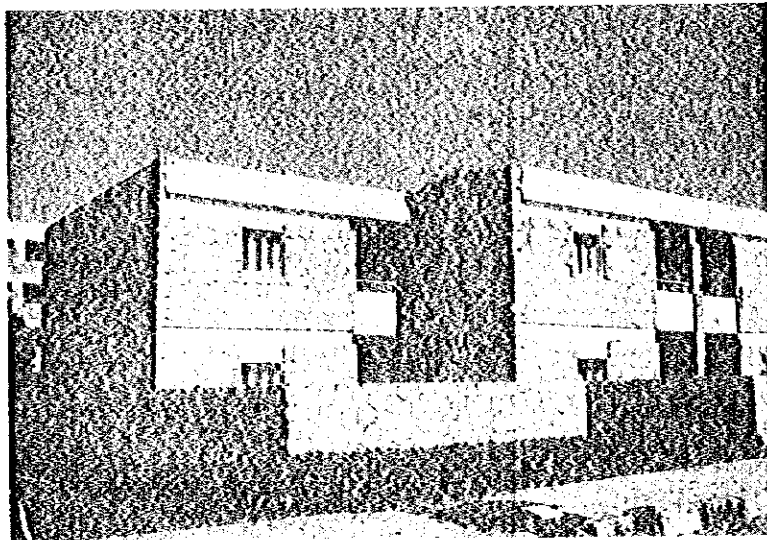
A mosque within the area of 1st Stage



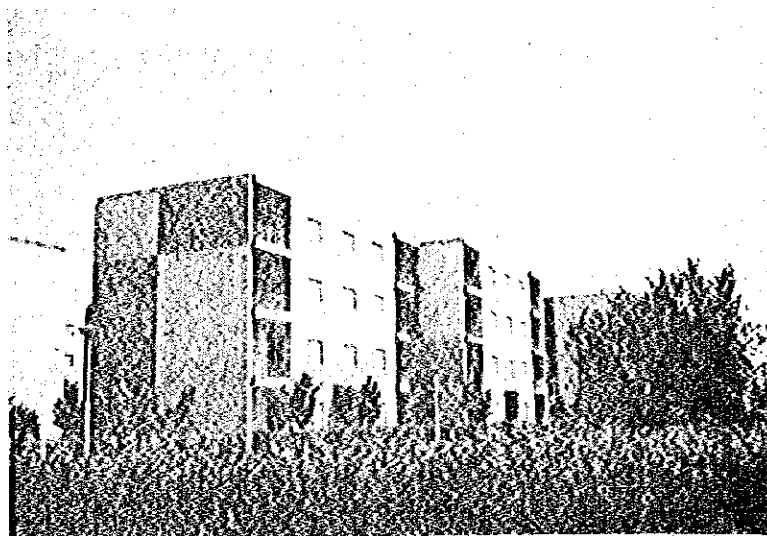
A supermarket within the area of 1st Stage



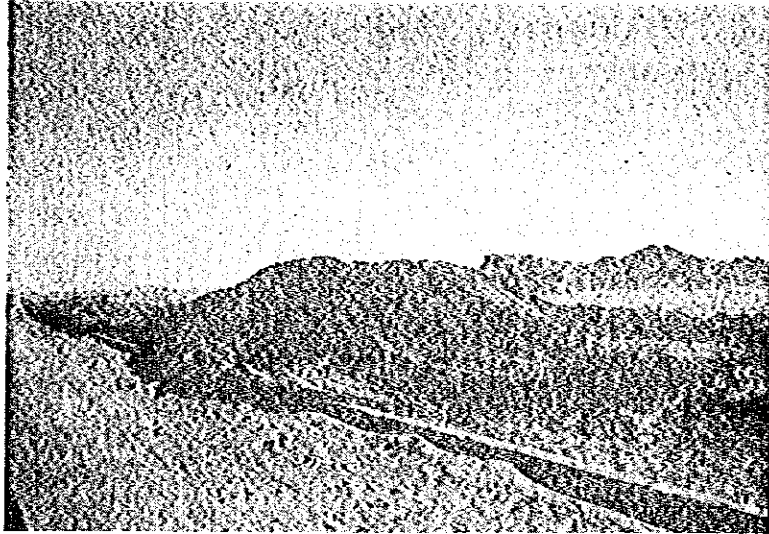
A primary school in 1st Stage



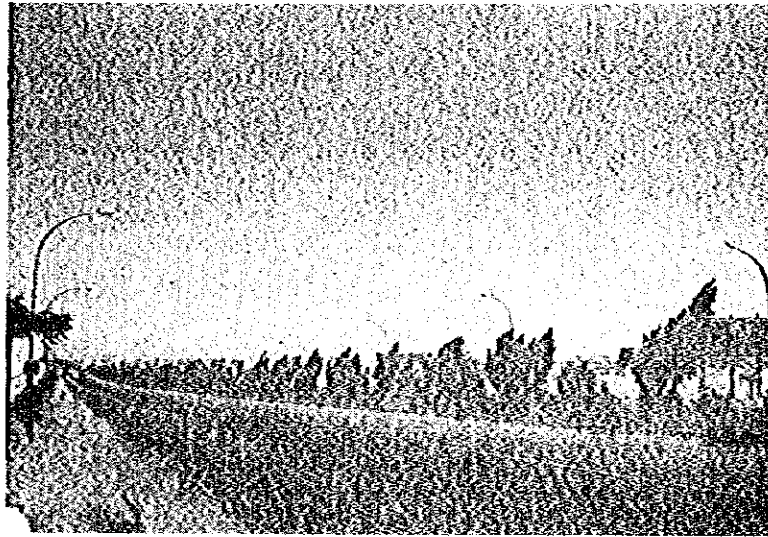
A stone-walled house in 1st Stage (150m², 30 L.E./month)



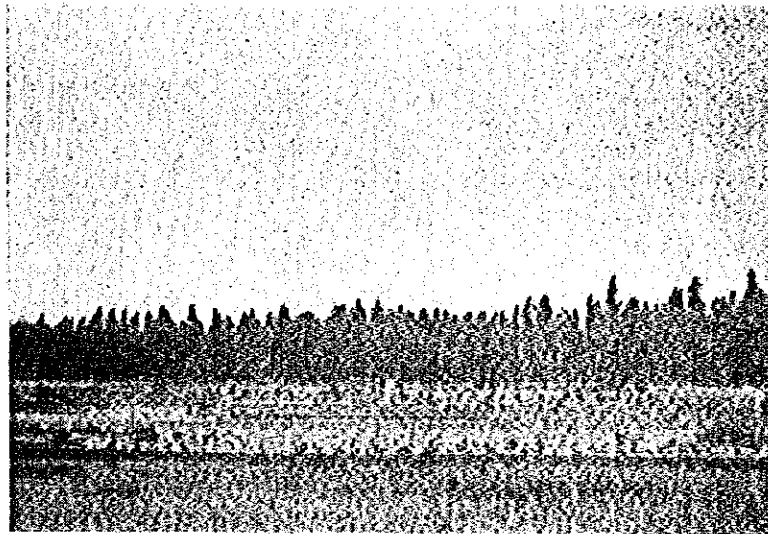
An apartment house in 1st Stage (130m², 13 L.E./month)



Replacing soil for planting trees



A completed green belt of trees along the road



Dense forest

3-4 Infrastructure

3-4-1 Electrical Power

There are 6 electrical power substations in the Tenth of Ramadan City. Three of them are substations of 66/11KV and the remaining three are of 220/66/11KV transformers. In the 2nd Stage area where the CETC will be located, power cables have not yet been completed. However, power cables will have been completed around the CETC area by the time the CETC is constructed, enabling the facilities to receive power. Electricity will be supplied by underground cables:

- (1) Primary : 11KV, 3 phase, 3 wire, 50Hz
(supplier)

- (2) Secondary : Single phase 220V
(consumer)
Three phase 380V

The locations of substations and power cables are shown in Fig. 3-4-1. The stability of power supply in the Tenth of Ramadan City is good. Power interruption occurs only during maintenance. The fluctuation of voltage in the Tenth of Ramadan City is 11KV $\pm 5\%$.

The average electricity charge of factories is 10 piastres per Kwh, and this is applied to the CETC.

3-4-2 Telephone

There is a telephone exchange station near the Site. This telephone exchange station is connected to the main station in Cairo by 20,000-line microwave. Telephone lines will have been completed around the CETC area by the time the CETC is constructed, enabling the facilities to utilize the telephone lines. The charge is 30 L.E. per year for about 1,000 calls.

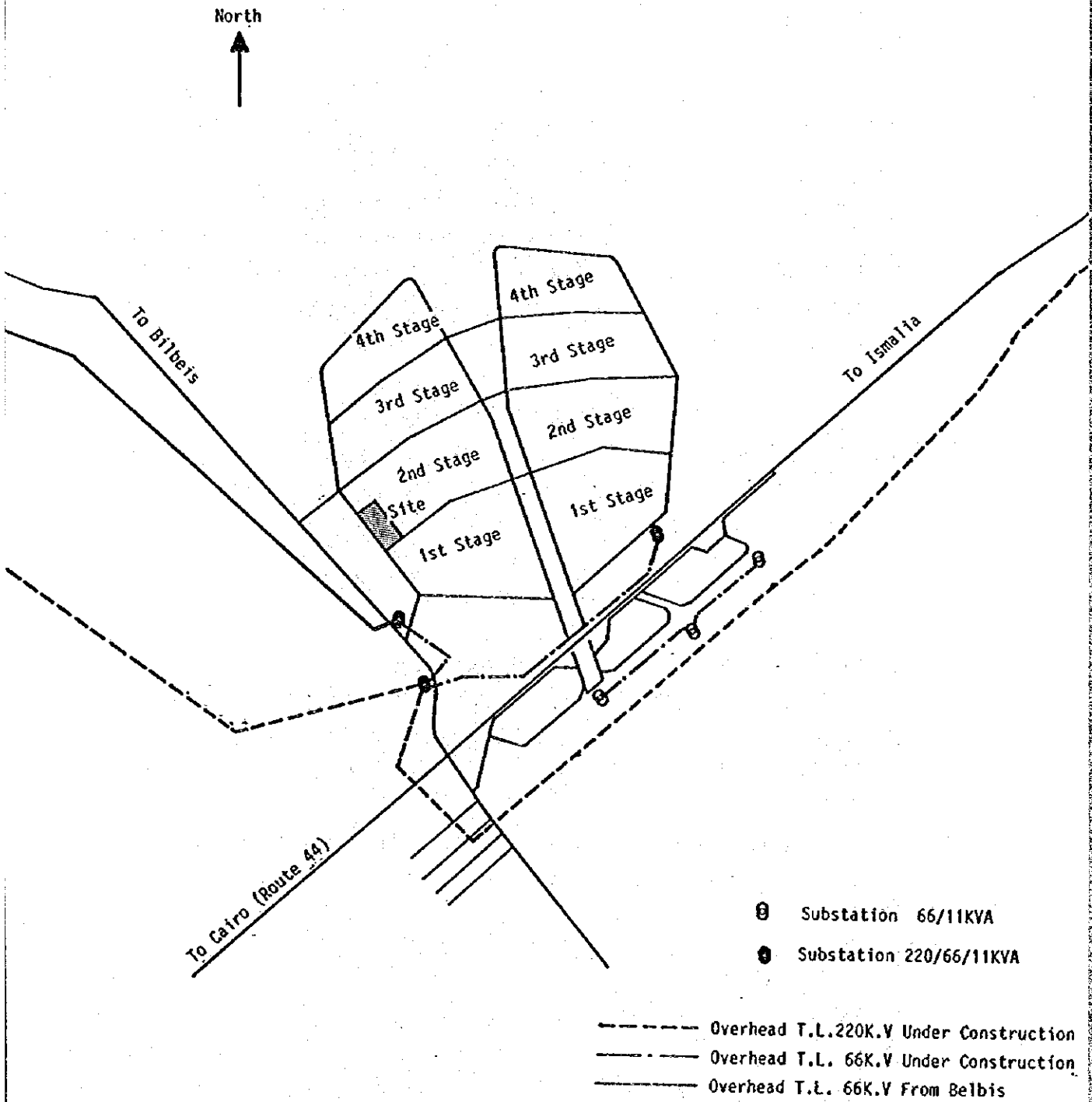


Fig. 3-4-1 Location of Substations and Power Lines

3-4-3 City Water

Water is currently supplied to the 1st Stage area from the nearby deep wells, the depth of which is about 150m. In the near future, the water will be supplied through city water mains from Ismailia Canal which connects Cairo and Ismailia.

The water pressure being strong (10 bars), a water tank is not necessary in the CETC, and the water pipes can be directly connected to the city water main. The water charge is approximately 10 piastres per $1m^3$ for factories. The quality of water is good.

3-4-4 Sewage and Drainage

Although sewage and drainage systems have already been completed in the 1st Stage area, they are not yet available in the 2nd Stage area, because it will take several years to complete the 2nd Stage.

Penetration into the ground and transportation by sewage carriers are considered for the CETC to be temporary solutions until the sewage and drainage mains are completed. The sewage disposal charge by a sewage carrier is about 10 L.E. per $10m^3$ (one carrier).

3-4-5 Gas

City gas is currently not available. It will be available in two years, although this is not certain. Cylinder gas is to be used at the CETC. The gas (butane gas) costs 65 piastres per $1m^3$ (capacity of one cylinder.)

3-4-6 Garbage Treatment

Garbage has to be carried to the dumping area and buried there. The dumping area is approximately 3km away from the CETC site.

3-5 Construction Conditions in the Tenth of Ramadan City

The Tenth of Ramadan City is a new city with a development plan based on the new concept of city planning. Therefore careful rules for construction plans were set up, so that the city would maintain functional and scenic harmony with each other.

The CETC was planned to be established in an area designated to an industrial area. Construction rules for an industrial area are as follows:

(1) General rules

- 1) Construction of only factories is permitted in an industrial area.
- 2) The site cannot be divided for other purposes.
- 3) Examination of engineering drawings by the municipal special committee is necessary for the permission to start construction works.
- 4) The amount equal to 2% of the total construction cost should be either insured or guaranteed by a Letter of Guarantee issued in the name of the municipal government after the same amount is deposited with a bank. This Letter of Guarantee is valid until it is acknowledged that the contractor has finished its construction works without any fault.

(2) Fences

The entire site should be surrounded by fences as specified below.

- 1) The height of fences should be more than 2m.
- 2) The thickness of fences should be 25cm where they face roads, and 15cm where they face adjacent sites.
- 3) Fences are to be built with sand bricks. However, if other materials are to be used, they should be finished with mortar and painted

(3) Entrances

- 1) Two entrances should be provided, if the area of the site is $4,000\text{m}^2$ or more. The two entrances should be set apart at an appropriate distance.
- 2) The floor area of the gate house should be 15m^2 or less and the height should be 3.2m or less.

(4) Surface line of wall

The distance between the border-line of the site and the surface of the wall of a building should equal or exceed the lengths indicated below.

- 1) 10m from the border-line facing roads.
- 2) 10m from the border-line facing the adjacent site, if the site area is $10,000\text{m}^2$ or more.
- 3) 7.5m from the border-line facing the adjacent site, if the site area is between $3,400\text{m}^2$ and $10,000\text{m}^2$.
- 4) 5m from the border-line facing the adjacent site, if the site area is $3,400\text{m}^2$ or less.

(5) Floor area of buildings

Total floor area should be 50% or less of the site area.

(6) Height of building

- 1) The height of a building should be 15m or less.
- 2) The height of a chimney should be 30m or more, and twice or more compared with the height of the tallest of the surrounding buildings.

(7) Green area

- 1) 3% or more of the site area should be green area.
- 2) A Greenery plan should be drawn up and presented to the municipal authorities prior to the start of the construction works.

(8) Documents necessary for the application for Building Licence

- 1) Three copies of design drawings and specifications**
- 2) A receipt certifying the payment of supervisory fees for design drawings**
- 3) Certificate of supervisor of construction works**
- 4) A written oath clearly promising to execute various tests**
- 5) An insurance policy for the amount equivalent to 2% of the construction costs or a Letter of Guarantee for the same amount**
- 6) Progress schedule for construction works**

**CHAPTER 4: ESTABLISHMENT OF THE CONSTRUCTION
EQUIPMENT TRAINING CENTRE**

CHAPTER 4: ESTABLISHMENT OF THE CONSTRUCTION EQUIPMENT TRAINING CENTRE

4-1 Objectives of the CETC

As previously mentioned in the Background of the Project, new communities are currently being built in Egypt, in many locations around Cairo and Alexandria, to solve the problem of concentration of the population in large cities. In addition to the above, many major construction works including factories, houses, subways, city water and sewage systems, irrigation channels, harbors, and land preparation, etc. are being actively carried out. Many construction equipment were introduced into these construction works, increasing the number of construction equipment imported from abroad, and the correct use and maintenance of those equipment has become an important issue. However, the quantity and quality of workers and engineers for their operation, maintenance and repair works are rather questionable, and cannot sufficiently satisfy the current demand.

To solve the above problem, the Government of Egypt planned to set up six construction equipment training centres in TOMOHAR under the auspices of the Ministry of Housing and Reconstruction as the vocational training section on the field of operation and maintenance of construction equipment, and the CETC to be built in the Tenth of Ramadan City is positioned as a model facility for this program.

The CETC mainly aims at efficient utilization of construction equipment and increase of productivity of construction work by accepting managers, operators and maintenance engineers working at workshops in the head offices and job sites of the public sector as trainees for certain periods of time to improve the levels of their technical capabilities. It also aims at meeting the strong demand in the construction industry by supplying the desperately needed skilled labor force of high quality. The CETC plans to train an annual number of 210 trainees consisting of 30 managers, 120 operators and 60 maintenance engineers.

4-2 Policies of the CETC

Based on the request from the Government of Egypt for implementation of the Project, JICA conducted Preliminary Studies on the basic design and technical cooperation to draw up a basic concept for the CETC.

Concepts on the so-called software part of the Project including training programs and managerial organization were devised at this stage, followed by confirmation on the contents of the basic plan, including equipment and facility plan, through surveys in Egypt conducted by the Basic Design Study Team.

The results of the above studies have been compiled into specific plans for the Project, and are reflected in the Basic Design of Equipment and Facilities outlined in CHAPTER 5: BASIC DESIGN.

Fig. 4-2-1 is a flow chart showing the process in which decision on the contents of the plans have been made.

The functions of the CETC can be roughly divided into administrative functions and training functions.

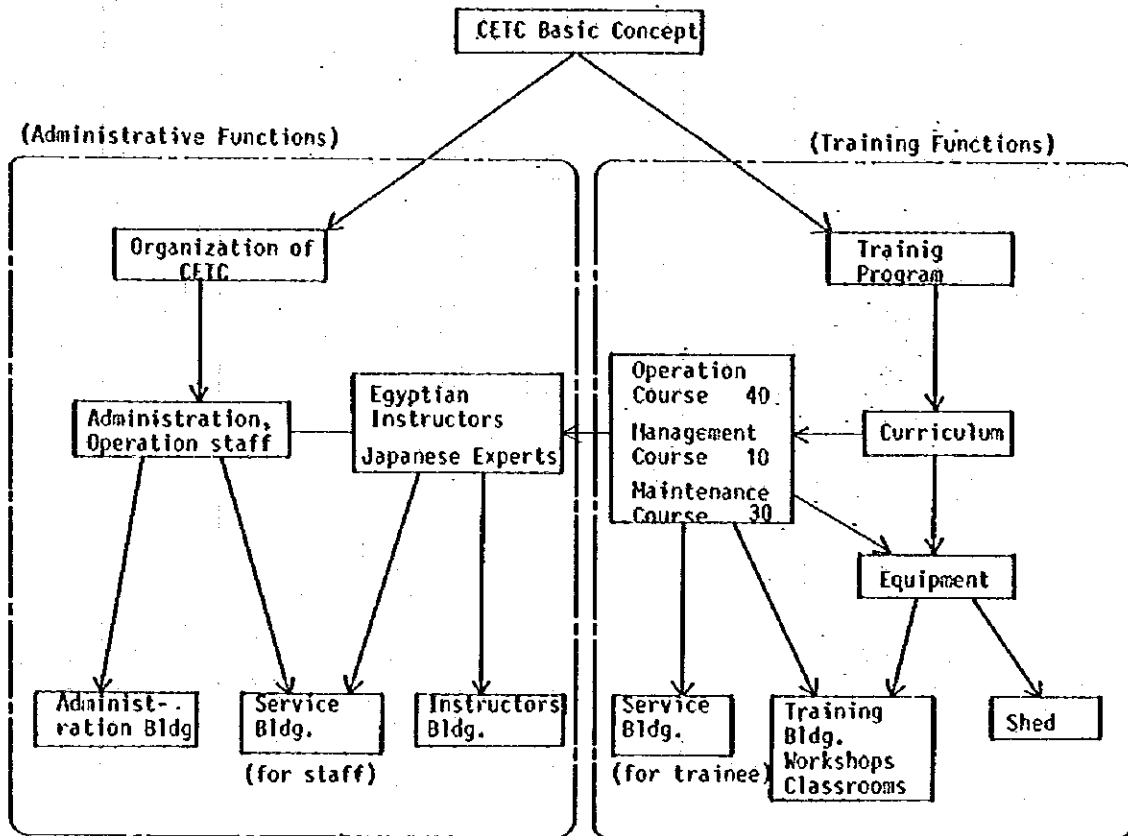


Fig. 4-2-1 Flow Chart for Decision-Making for the Project

The software part of the contents of the Project has been confirmed by the Preliminary Study Team for Technical Cooperation, and the training program of the CETC will consist of 3 courses (Management Course, Operation Course and Maintenance Course) as outlined in Table 4-2-1.

As to training curriculums for each course, modules necessary for attaining each training target should be established, as shown in Table 4-2-2.

Equipment plan and managerial organization required for the realization of above training program will be drawn up, and facilities to accommodate them will be designed.

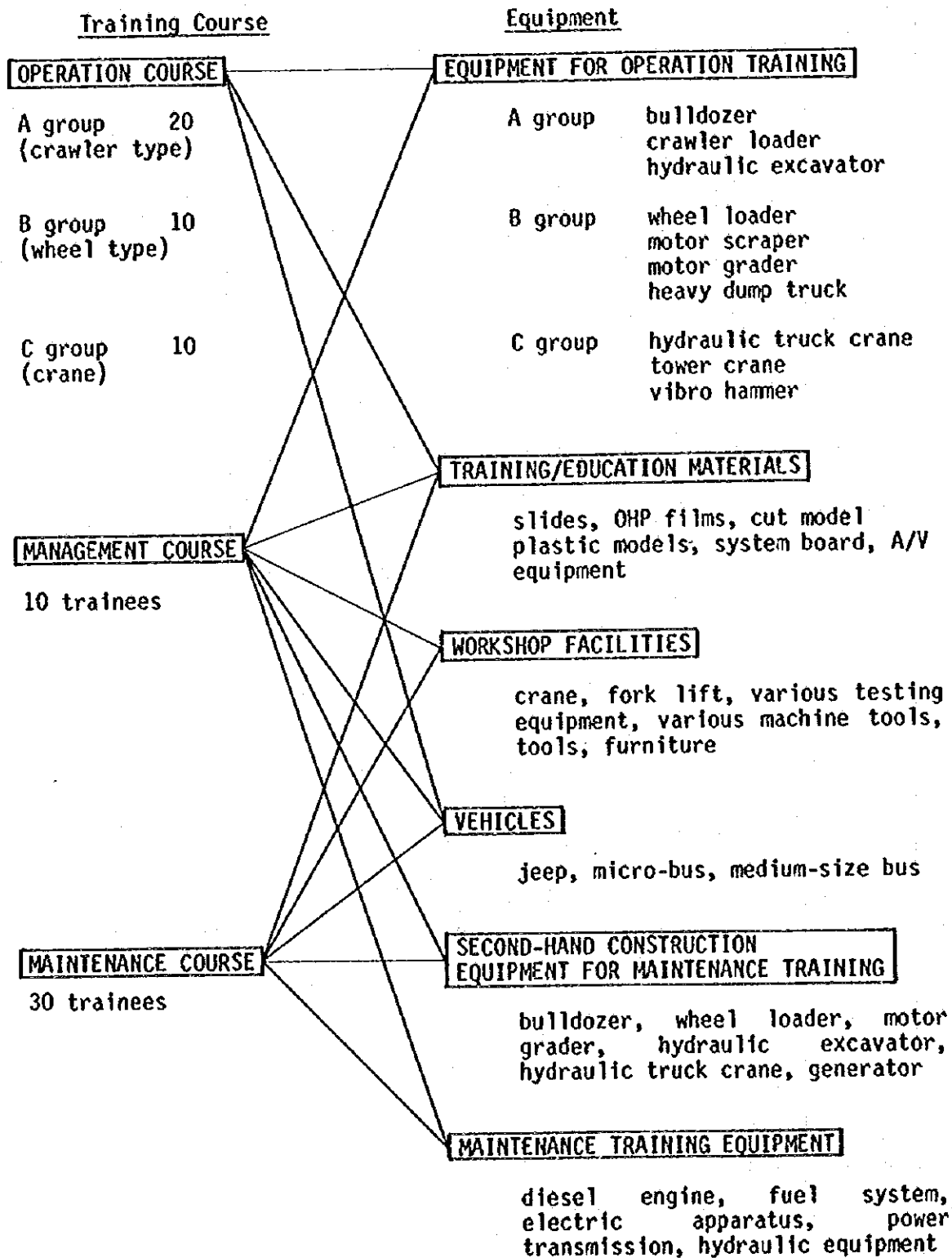
Table 4-2-1 Training Program

COURSE	MANAGEMENT	OPERATION	MAINTENANCE
TRAINING TARGETS	Education of managers in organizations owning various and many construction equipment for construction works.	Education of operators capable of operation of construction equipment.	Education of maintenance engineers engaged in maintenance and repair of construction equipment.
TRINEES PER COURSE	10 trainees	(A) 20 trainees (B) 10 trainees (C) 10 trainees	30 trainees
TRAINING PERIOD	3 months	3 months	5 months
ANNUAL NUMBER OF TRAINING	3 times	3 times	twice
CURRICULUMS	Lectures : 8 weeks Training : 4 weeks	Lectures : 3 weeks Training : 9 weeks	Lectures : 6 weeks Training : 14 weeks
TRAINEE QUALIFICATION	Graduate from Engineering Department of Universities	Graduate from Technical high school or similar levels	Graduate from Technical high school or similar levels
(1) TRAINEES	Business experience of 3 years	Business experience of 3 years	Business experience of 3 years
(2) INSTRUCTORS	ditto	ditto, plus 3 months experience as assistant instructor	ditto
(3) ASSISTANT INSTRUCTORS	nil	Graduate from Technical high school plus business experience of 5 years	ditto
ANNUAL CAPACITY	30 trainees	(A) 60 trainees (B) 30 trainees (C) 30 trainees	60 trainees
NO. OF INSTRUCTORS	2 instructors	2 - 3 instructors	2 - 3 instructors
NO. OF ASST. INST. (TOTAL)	0 (2 persons)	3 assistant instructors (5 - 6 persons)	3 - 4 assistant instructors (5 - 7 persons)

Table 4-2-2 Outline of Training Curriculum

COURSE	MANAGEMENT	OPERATION	MAINTENANCE
TARGET	To provide general managerial knowledge necessary for operation of construction equipment.	Operational theory, practice and general maintenance for selected types of equipment.	Maintenance knowledge for correct assembly, disassembly, repair, adjustment of malfunction, diagnosis of breakdown.
CONTENTS OF LECTURES	<p>Lectures : 8 weeks</p> <ul style="list-style-type: none"> * Summary of construction equipment * Composition and function of equipment * Equipment management * Construction methods and plans * Summary of maintenance and repair * Management of repair shop * Standard man hour for repair * Economy, financial analysis, cost program 	<p>Lectures : 3 weeks</p> <ul style="list-style-type: none"> * Summary of construction equipment * Composition and function of equipment * Operational methods * Execution methods * Basics of civil engineering * Safety and environmental issues * Laws and regulations * Basics of maintenance and repair * Daily examination, periodical examination * Emergency countermeasures 	<p>Lectures : 6 weeks</p> <ul style="list-style-type: none"> * Summary of construction equipment * Composition and function of equipment * Basics of maintenance and repair * Composition, function and maintenance methods of main body * Periodical examination and maintenance * Emergency countermeasures * Fuel and lubricating oil * Methods of repair on construction site * Laws and regulations
CONTENTS OF TRAINING	<p>Training : 4 weeks</p> <ul style="list-style-type: none"> * Operation of main equipment * Working methods * Maintenance and repair of main equipment 	<p>Training : 9 weeks</p> <ul style="list-style-type: none"> * Operational training of various equipment * Construction works using equipment 	<p>Training : 14 weeks</p> <ul style="list-style-type: none"> * Dismantling of main components * Dismantling, cleaning & measuring * Replacement of parts * Fitting and assembly * Examination methods * Testing methods and reports * Periodical examination

The outline of the equipment considered necessary for each Training Course is as follows:



The building required for the facilities of the Project can be divided by functions as follows:

- (1) Administrative functions :
 - Administration Building
 - Service Building (for staff)
 - Instructors' Building

- (2) Training functions :
 - Service Building (for trainees)
 - Training Building
 - Shed

Detailed contents of the plan are stated in 5-3 Architectural Planning.

4-3 Technical Cooperation

The shortage of skilled laborers engaged in management, operations and maintenance of construction equipment is becoming a serious problem in Egypt.

In view of the present circumstances in which educational organizations have not yet been established in this field, training plan of capable instructors is essential for bringing a smooth management and operation of the CETC.

Accordingly, the Government of Egypt has requested the Government of Japan for establishment of the CETC.

In response to the above request, the Government of Japan decided to forward Technical Cooperation for the Project, and JICA dispatched a Preliminary Study Team for Technical Cooperation in September 1984, prior to the departure of the Basic Design Study Team, to hold discussions with Egyptian parties and confirm the basic concept of the objectives and contents of Technical Cooperation.

The following items are considered to be the contents of Technical Cooperation from Japan:

- (1) To convey necessary information, knowledge and techniques to the parties concerned in Egypt, in setting up an execution plan for the three training courses (management training, operation training and maintenance training).
- (2) To train 5-7 Egyptians for about six months in Japan in theory and practice of management, operations and maintenance of construction equipment before sending Japanese experts to Egypt, so that they will play a leading role as instructors at the CETC in future.

- (3) To send 5-7 Japanese experts to Egypt one year in advance to the inauguration of the CETC to give advice on drawing up of curriculum and selecting teaching material as well as on management and operation of the CETC.
- (4) Main equipments necessary for the operation of the CETC are to be provided by means of Grant Aid by the Government of Japan. However, the procurement of supplementary training equipments is to be expected.
- (5) The term of Technical Cooperation is estimated to be 5 years.

The detailed contents and implementation schedule of Technical Cooperation are to be discussed in the coming survey and Record of Discussions, etc.

It is earnestly hoped that these technical cooperations will result in the effort for self-reliance of Egypt and its unassisted operation of the Centre.

CHAPTER 5: BASIC DESIGN

CHAPTER 5: BASIC DESIGN

5-1 Basic Design Principles

The CETC aims at raising skilled laborers of high technical levels through trainings for operation and maintenance of construction equipment.

The facilities and equipment for the CETC should therefore be carefully planned to satisfy the required functions for training, comply with the intensions of the Egyptian side, and also be appreciated by the local people. The CETC should also be designed with features worthy of its status as a model facility for the six construction equipment training centres planned to be established in Egypt.

It is important for the facilities of the CETC to be easy to operate/maintain and safe to use, corresponding to local situations and environmental features including climate.

Special consideration should be given on the following points.

- (1) To draw up a design which harmonizes with the forms and exteriors of existing facilities in the Tenth of Ramadan City.
- (2) To pay due regard to natural conditions of the area, particularly the temperature, wind direction and sand storms.
- (3) To pay special attention to noise, dust and other effects in the CETC may produce on neighboring districts.
- (4) To draw up a design which links together the hardware features (facilities, equipment) and the software features (training objectives, curriculum).
- (5) To adopt a design which is both energy-saving and easy to maintain.