

- (6) To reflect upon local construction situations for selection of construction equipment and workshop machinery equipment.
- (7) To adopt a facility plan which satisfies both the general building code and construction conditions applied to the Tenth of Ramadan City.
- (8) To adopt a design which reflects and conforms to local construction techniques, construction methods and technical levels.
- (9) To use locally procured materials wherever possible for economized construction costs and easy maintenance, unless there are problems in the quality or supply.

5-2 Site Planning

The Project Site is located within the 2nd Stage of the Urban Planning Area of the Tenth of Ramadan City. The Site covers an area of 500m x 1,000m and faces roads on the western and southern sides, as shown in Fig. 5-2-1. Preparation works for infrastructure have not yet been commenced in the 2nd Stage, so construction works are required for extending the primary road (40m wide) stretching on the western side of the Site which has almost reached the site but still remains uncompleted. The secondary road (25m wide) extending to the south of the Site has been provided with a simple asphalt paving work and the southern area adjacent to this road will serve as a housing district for those of the middle to lower income brackets.

The Urban Planning Area of the Tenth of Ramadan City is divided into 4 parts from the 1st Stage to the 4th Stage, each of which will take 7-8 years to be completed. It will therefore take another 10 years for the completion of the entire 2nd Stage, where the Project Site is located, and this is expected to cause various inconveniences for several years after the CETC is established.

Field training for operating construction equipment will be conducted at the CETC, so special care should be taken not to

inconvenience neighboring districts with dust and noise. Winds blowing from the north and northwest are prevalent in Egypt throughout the year. An ideal layout would therefore be to place the buildings on the northern part of the Site, a forest area in the far south, and an outdoor training area in between. A forest area in the southern part of the Site with the centre raised to as high as 5 to 10 meters will serve to prevent dust and noise.

The Project Site covers a wide area of 500,000m² (500m x 1000m), and the plan for utilizing and maintaining the field operation training area should be discussed between the Egyptian staff and Japanese experts for technical cooperation as part of the training program after the buildings and equipment for the Project are turned over to the Egyptian side.

It was therefore decided that the construction works to be covered by the Japanese side on Grant Aid are limited to those concerned with the facilities and equipment within the CETC-Area of 250m x 200m (10% of total area). The operation training area, forest area, green zone and fences surrounding the site will be provided by the Egyptian side.

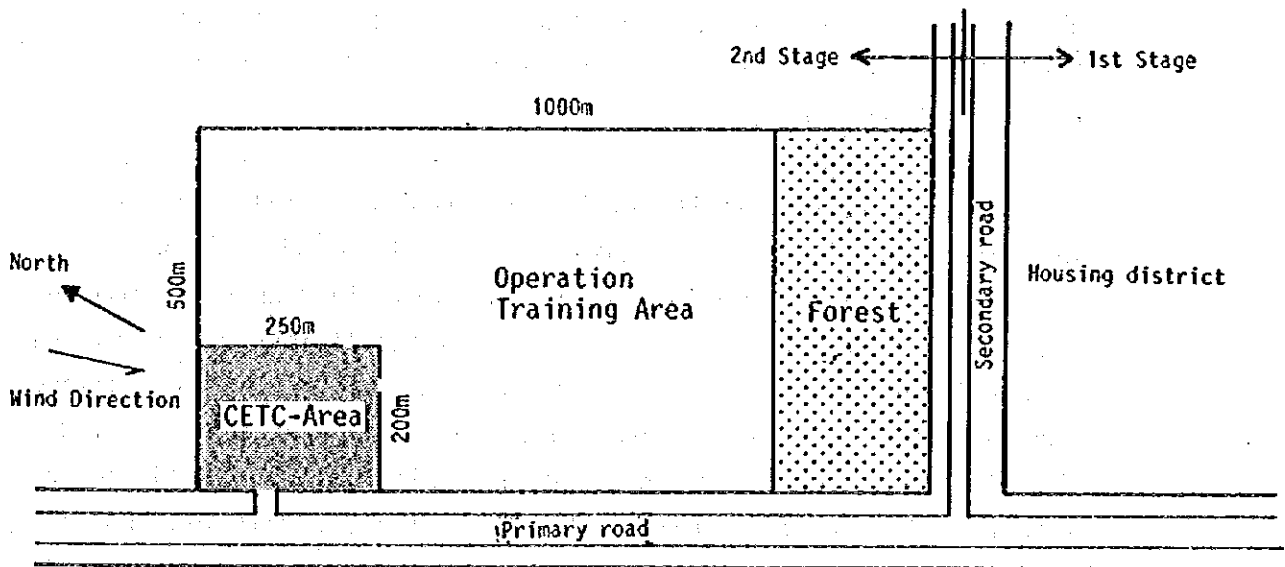


Fig. 5-2-1 Site Planning

The location plan adopted for the Project is one which divides the site into 2 major zones: Administration Function Zone and Training Function Zone, and connects the two with a corridor, as shown in Fig. 5-2-2. This plan will facilitate horizontal extension of buildings in future.

Buildings are to be located with sufficient space between each other, and a courtyard situated between the Administration Building and Instructors' Building will have good lighting and ventilation effects. Traditional architectural styles of Egypt are reflected in the location plan.

The Administration Building, Instructors' Building and Service Building will be connected together with a covered corridor and arranged in a layout surrounding the courtyard to form the Administration Function Zone.

This Zone will provide all functions necessary for the activities of the teaching and administration staff.

The Training Function Zone will consist of a Service Building with Canteen, Shower Room, Locker Rooms, etc. for trainees, Training Building with Workshops, Classrooms and Spare parts Warehouses, Shed for construction equipment, and a field training area for operation training.

As to accommodation facilities for trainees requested at the outset of the plan, discussions with the Egyptian side brought the conclusion that a dormitory provided alone in the CETC with no accompanying buildings such as mosque and facilities for sports and entertainment will be neither practical nor satisfying as a living environment. A substitute plan was adopted to use the Common Use Facility currently under construction with TOMOHAR Headquarters situated 2-3km from the CETC. The Common Use Facility will consist of a dormitory accommodating 300, a large canteen, hospital, gymnasium, swimming pool, mosque, etc, and a bus will be used to transport the trainees between the Common Use Facility and the CETC.

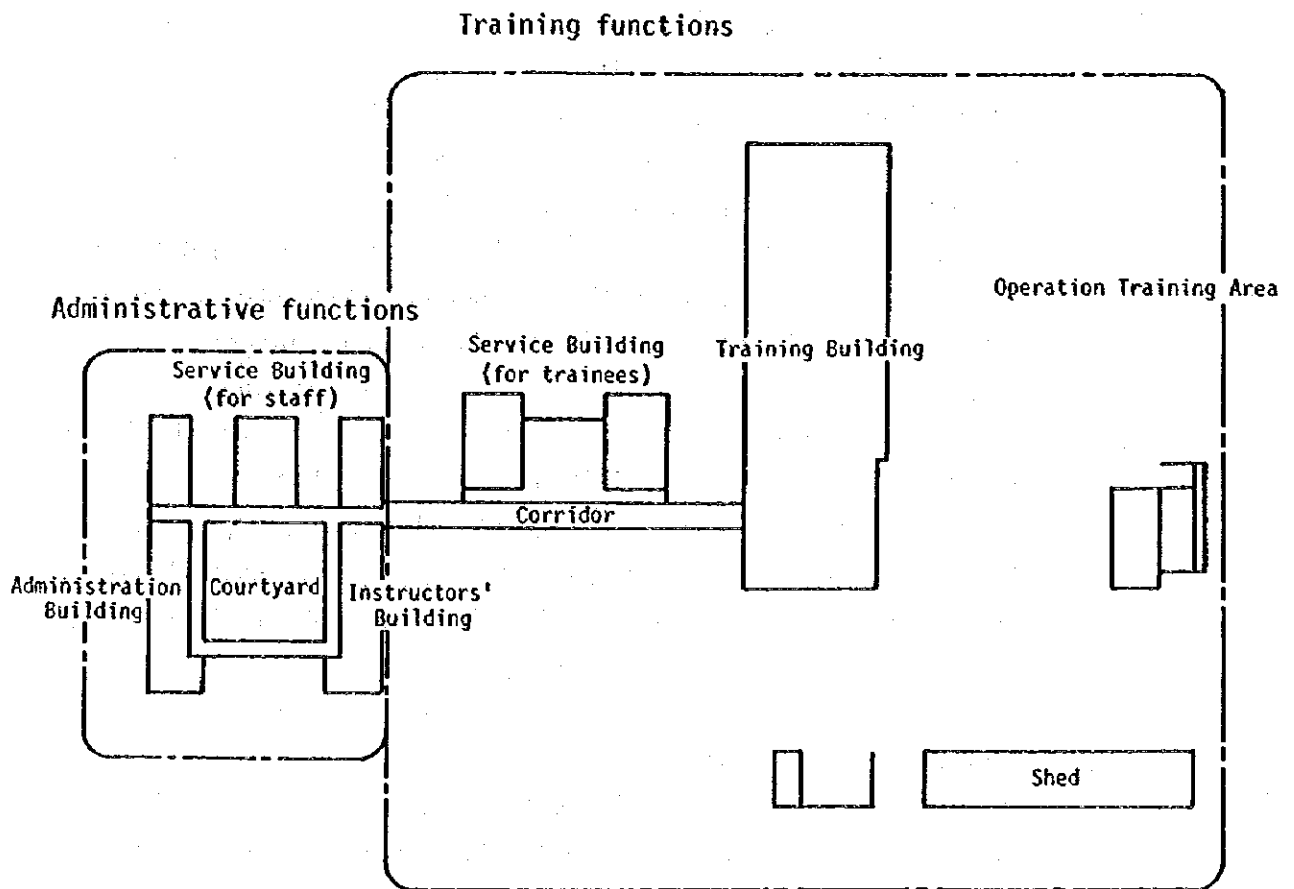


Fig. 5-2-2 Block Layout Plan

5-3 Architectural Planning

5-3-1 Plan of Facilities

(1) Administration Building

An administration area for general management and operation of the facilities is located next to the entrance hall, to the left of the courtyard. An individual room is provided for the Director of the CETC, with sufficient space for receiving visitors and holding small meetings. A large space is allocated for the Administration Office, to be shared by the staff of Business Administration, General Affairs and Accounting sections. Clinic and anteroom for drivers, tea service staff and guards, etc. are also provided. Separate lavatories are prepared for administrators and general users. Each of the rooms are connected with a covered corridor facing the courtyard.

(2) Instructors' Building

This building is to be located to form a symmetry with the Administration Building on opposite sides of the courtyard. Technical Cooperation of Japan for this Project covering a period of 5 years will require 5 to 7 Japanese experts to be permanently stationed on the Site during the period, and the Egyptian instructors will receive guidance from these experts. To promote a smooth communication between these two groups, their rooms were brought together in the Instructors' Building. The Building is also conveniently located close to the Training Building to serve supervisory and educational purposes to trainees. The room to be used by the Japanese Chief Advisor will have a staff consisting of a coordinator and a secretary, as well as a conference space to accommodate 20 people. An anteroom for common use will be prepared between the room for Japanese experts and that for Egyptian instructors, where teaching materials can be prepared and preserved. After the conclusion of Technical Cooperation, the room used by Japanese experts can be converted into a library or conference room.

(3) Service Building

The Service Building will contain Canteen, Kitchen, Laundry, Locker Room, Electricity Room, Warehouses, etc. These rooms are completely divided into those to be used by the staff and those to be used by the trainees. Special consideration will be placed in preparing the Canteen, Locker Rooms and Shower Rooms for trainees close to the Training Building and attaching a door to the corridor connecting the building to the Instructors' Building to clarify the traffic line and to limit the space of activities of the trainees within the Training Building.

(4) Training Building

The Training Building will be two stories high, with the ground floor used as Workshop and the 1st floor providing Classrooms for lectures.

The Workshop on the ground floor will accommodate 4 Chassis Bays (7.5m x 12m each), Welding/Assembly Bay, Engine Bay, etc. In addition to these Bays, there will be a line-up of Workshops for fuel, battery, electrical service apparatus, hydraulic component, power line and machine tools.

A 2-story Spare Parts Warehouse will be built close to the Training Building; the ground floor for storing heavy and large components and the 1st floor for keeping lightweight spare parts. Special consideration will be given for safeguarding the building by locating an Administration Office on the ground floor, next to the entrance hall extending from the connecting corridor. 5-ton and 3-ton overhead cranes are provided for the 12m-span Workshop. The 1st floor accommodates three Classrooms, each of which can be divided into two by movable partitions. The 1st floor will also have one A/V Classroom and Preparation Rooms adjacent to each Classroom. In addition, there will be Rooms for Instructors and Assistant Instructors in the same row as the Classrooms.

(5) Shed

A shed will be built for storing construction equipment to be used for field operation training.

(6) Others

Facilities including Gates, Gate House, Fences, Car Wash and Oil Storage are also planned.

(7) Dormitory

An existing Dormitory within the TOMOHAR headquarters will be used by trainees, who will be transported between the Dormitory and the CETC by bus.

5-3-2 Size of Facilities

Floor Area of each Room

(1) Administration Building

Name of Room	Floor Area (m ²)	Accommodating Capacity	Remarks
Director's Room	54	1	to be also used as Reception Room 54.0m ² /person
Administration Office	70	10	7.0m ² /person
Lobby/Reception Area	13	1	
Clinic	18	1 - 2	
Warehouse	18		
Drivers' Room	9		
Lavatory	32		
Sub-total	213		

(2) Instructors' Building

Name of Room	Floor Area (m ²)	Accommodating Capacity	Remarks
Chief Advisors' Room	72	3	incl. 1 secretary 24.0m ² /person
Experts' Room	53	6	8.8m ² /person
Instructors' Room	70	10	7.0m ² /person
Preparation Room	18		
Sub-total	213		

(3) Service Building

Name of Room	Floor Area (m ²)	Accommodating Capacity	Remarks
Staff Canteen	75	30 - 40	to be also used as Meeting Room 1.9-2.5m ² /person
Staff Kitchen, etc.	45		
Kitchen Resting Room	7	2	3.5m ² /person
Kitchen Warehouse	23		
Janitor Lavatory, etc.	12		
Electricity Room	53		
Staff Lavatory, Shower	23		
Trainee Canteen	125	max. 80	with outdoor terrace (12.5m x 12.5m) 1.6m ² /person
Trainee Kitchen, etc.	50		
Laundry	33		
Boiler Room	13		
Shower Room	74		
Locker Room	55	staff: 14 trainee: 80	
Janitor Room	17	5	3.4m ² /person
Sub-total	605		

(4) Training Building

Name of Room	Floor Area (m ²)	Accommodating Capacity	Remarks
Chassis Bay	360		90m ² x 4 Bay
Welding Shop	180		90m ² x 2 Bay (including undercarriage)
Engine Shop	128		
Engine Test Room	39		
Fuel Battery Electric Service Room	90		
Tool Room	30		
Hydraulic Component Room	150		including power line of 90m ² + 60m ²
Machine Shop	90		
Spare Parts Warehouse	360		GF:180m ² 1F:180m ²
Office	30	3 - 4	can be used for night duty 7.5-10.0m ² /person
Foremen's Room	30	6	5.0m ² /person
Lavatory (for trainees)	30		
Staircase, Corridors	170		
Warehouse	26		
Classroom	240	30 x 3	80m ² x 3 rooms (each can be divided into two)
Preparation Room	40		20m ² x 2 rooms

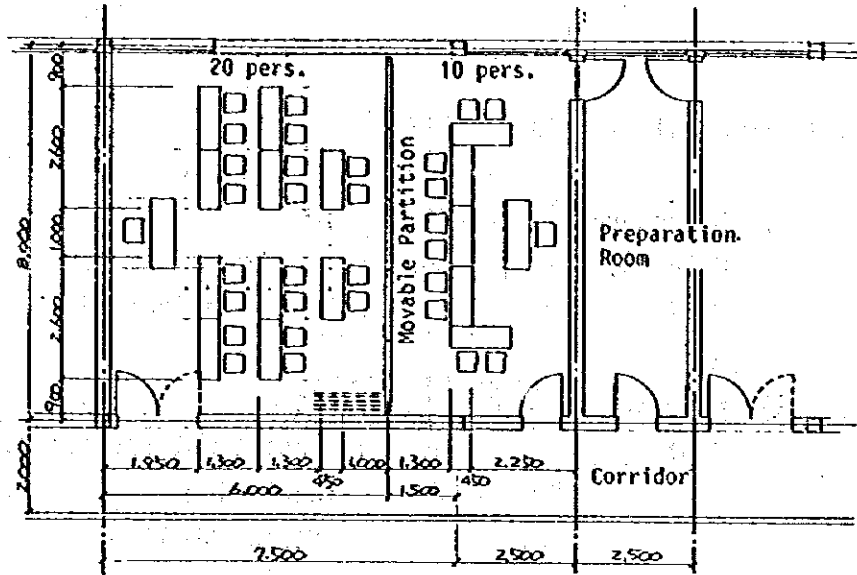
Name of Room	Floor Area (m ²)	Accommodating Capacity	Remarks
A/V Classroom	80	40	
Assistant Instructors' Room	60	8	7.5m ² /person
Anteroom for Instructors	30	4 - 5	7.5-10.0m ² /person
Service Room	30		
Lavatory (for trainees)	30		
Staircase, Corridors	172		
Warehouse	30		
Sub-total	2,428		

(5) Others

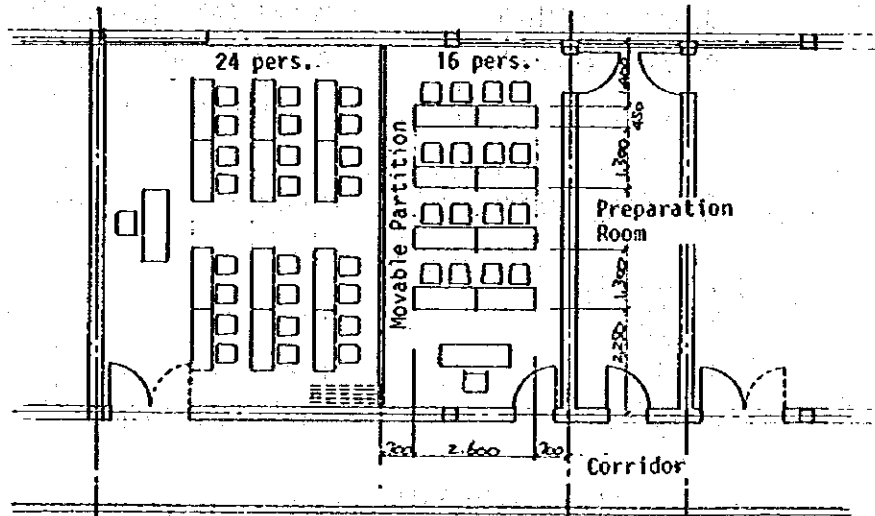
Name of Room	Floor Area (m ²)	Accommodating Capacity	Remarks
Garage	105 x 1/2		located in semi open-air space, the floor areas are calculated by half
Covered Corridors	418 x 1/2		
Shed	600 x 1/2		
Gate House	100		
Sub-total	662		

Grand Total = (1) + (2) + (3) + (4) + (5) = 4,121m²

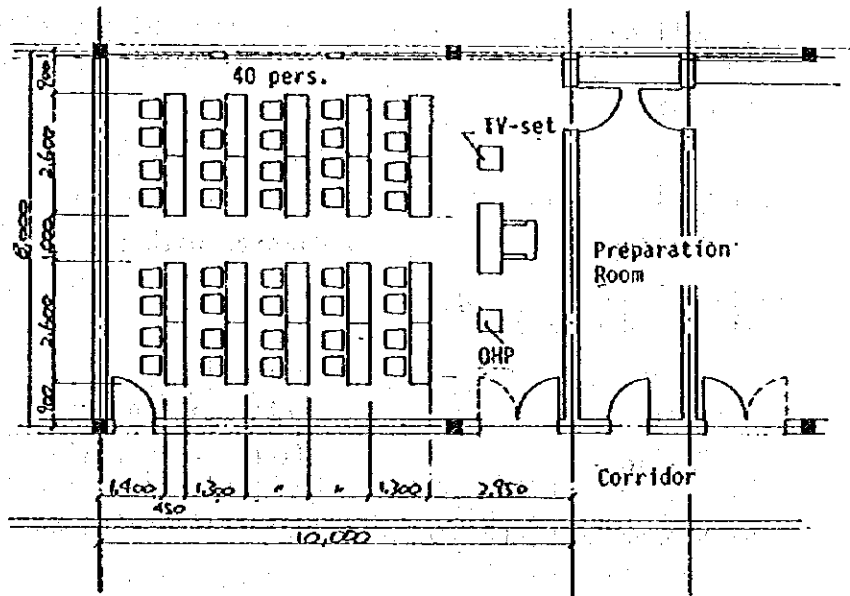
Layout of Classroom and A/V Classroom are shown on the following page.



Layout of Classroom (1)



Layout of Classroom (2)



Layout of A/V Classroom

5-3-3 Material Planning

(1) Structural materials

Columns, Beams, Floors : Reinforced concrete and Steel frame
Walls : Brick and Steel Rib

(2) Exterior Finishing Materials

Roof : Asphalt waterproofing, Heat insulating material, Cement tile (Steel Shell Roof for Workshop and Shed)
Exterior Wall : Artificial stone
Doors and Windows : Metal (Aluminium, Steel), Wood
Covered Corridors : Color cement tile
Terrace : Color cement tile

(3) Interior Finishing Materials for Main Rooms

1) Administration Office

Floor : Vinyl tile
Wall : Mortar with paint
Ceiling : Plaster with paint

2) Classroom, Audio-Visual Room

Floor : Vinyl tile
Wall : Mortar with paint
Ceiling : Sound-absorbing Board

3) Canteen

Floor : Terrazzo block
Wall : Mortar with paint
Ceiling : Plaster with paint

4) Corridor (1F)

Floor : Vinyl tile
Wall : Mortar with paint
Ceiling : Plaster with paint

5) Shower Room, Lavatory

- | | |
|-------------------------|-------------------------|
| Floor | : Ceramic tile |
| Wall | : Porcelain tile |
| Ceiling | : Plaster with paint |
| 6) Training Room | |
| Floor | : Color mortar |
| Wall | : Mortar with paint |
| Ceiling | : Plaster with paint |
| 7) Workshop | |
| Floor | : Mortar, Hardener |
| Wall | : Mortar with paint |
| Ceiling | : Heat insulating board |

5-3-4 Color Planning

It is dusty in Egypt from February through April with rampant sand storms known as "Hamseen", so it is safer to use colors similar to that of desert sand, particularly for exterior walls, to avoid conspicuous stains. The CETC is situated amidst the new city, so it is also important to adopt color tones that harmonize with those of other buildings and matches the environment in general.

5-4 Structural Design

5-4-1 Basic Policies

Special considerations for structural design of the CETC are as follows:

- (1) To adopt a general structural design commonly adopted in the area.
- (2) To try to draw up a design to which local construction methods can be applied.
- (3) To adopt a structural design which is both safe and durable.
- (4) To adopt a structural design conforming to the local environmental conditions and site conditions.
- (5) To use, wherever possible, materials that can be locally procured.

5-4-2 Foundation Design

The Building Code of the Tenth of Ramadan City permits only low buildings of up to four stories. Originally a desert, the area has a comparatively solid ground, and a condensed sand layer with pebbles can be reached by digging 1.5 meters or so underground. Piles seems to be scarcely used in this area. As the buildings of the CETC are two storied at the highest, isolated footing foundation which is a common foundation work method in this area is to be adopted. An engineer of the Municipal Government replied to the questions we raised in the course of our discussion that 15ton/m^2 would be a safe allowable soil bearing capacity for designing in case the bearing ground is 1.5m underground. However, boring tests at four spots on the site are to be conducted by the Egyptian party, to be on the safe side. It is obligatory to coat the surface of underground structures twice with asphalt before the backfilling work, since the soil in this area contains a considerable amount of salt.

5-4-3 Superstructure Design

The framework of the buildings is to be built with reinforced concrete commonly used in Egypt, and the walls are to be constructed by laying bricks or concrete blocks. As to the Training Building which has a long span and is to be provided with overhead cranes, the main framework is to be built of steel. The purlin supporting roofs and girt supporting walls are to be constructed with light gauge steel.

Structures of reinforced concrete and steel are to be designed according to the Code of Practice of Egyptian Standard Specification (E.S.S.) commonly used in Egypt.

Buildings in Egypt tend to expand and contract considerably because of the large fluctuations in temperature throughout the year, and an expansion joint is provided every 30 meters in the existing Training Centre in the Tenth of Ramadan City. The effects of temperature stress should be taken into consideration in designing the buildings.

5-4-4 Allowable Stress and Standard for Design Load

The following is the allowable stress and standard for design load of the main structural materials based on the Code of Practice of Egypt.

(1) Allowable Stress of Materials

1) Reinforcing Bar

Round Bar : Steel 37 ft = 1,400kg/cm²

Deformed Bar : Steel 52 ft = 2,000kg/cm²

2) Concrete : Strength (28d) cube 300kg/cm²
(cylinder 240kg/cm²)

Acid-proof cement should be used for foundation beam and footing.

3) Steel : Steel 37(Domestic).. fc = 1,400kg/cm²

: Steel 42(Import).... fc = 1,600kg/cm²

: Steel 52(Import).... fc = 2,100kg/cm²

(2) Standard for Design Load

1) Live Loads

* Roof 150kg/m²

* Office, Classroom, Locker Room, Shower Room 300kg/m²

* Canteen, A/V Room 400kg/m²

* Reference Room, Preparatory Room 500kg/m²

* Warehouse (Teaching Material) 750kg/m²

* Warehouse (Tools, Spare parts) 1,500kg/m²

2) Dead Loads

The following is the weight of main materials (t/m³)

Steel	7.85
Timber	1.0
Reinforced concrete	2.50
Concrete	2.20
Celton	0.12
Mortar	1.90
Brick	2.0

3) Horizontal Loads (Wind Load, Seismic Load)

Wind loads and seismic loads are quite small compared with those in Japan. The effects of wind loads, in particular, are to be taken into account in the design of materials supporting the roofs and walls of the Training Building.

4) Crane Loads

Dynamic Effects of Running Crane (Vertical Direction)

..... 125% of total loads

Brake Loads of Stopped Crane (Running Direction)

..... 1/7 x wheel load

Horizontal Shocks of Running Crane

(Right angle to running direction)

..... 1/10 x wheel load

5-5 Electrical System Design

5-5-1 Basic Policies

Special considerations for electrical system of the CETC are as follows:

- (1) Regional features, climate, life and customs of the Tenth of Ramadan City, as well as the conditions requisite for the facilities of the CETC, are to be reflected in the electrical system design.
- (2) Modes of electrical system design to be adopted should be simple and easy to operate and maintain.
- (3) The use of standardized goods for apparatus, equipment and their spare parts is recommended wherever possible, to facilitate future replacement work.
- (4) Area controlled by a switch should be minimized for energy-saving.

5-5-2 Power Receiving and Transforming Installations

Electrical power of high voltage 11KV from Electricity Authority will be drawn into the electric room and transformed down to the required voltage by the receiving and transforming equipment as indicated in Fig. 5-5-1.

Secondary Voltage	for Motive Power three-phase, 380V 50Hz
	for lightings and Receptacles single-phase, 220V 50Hz

Power Distribution Diagram is indicated in Fig. 5-5-2.

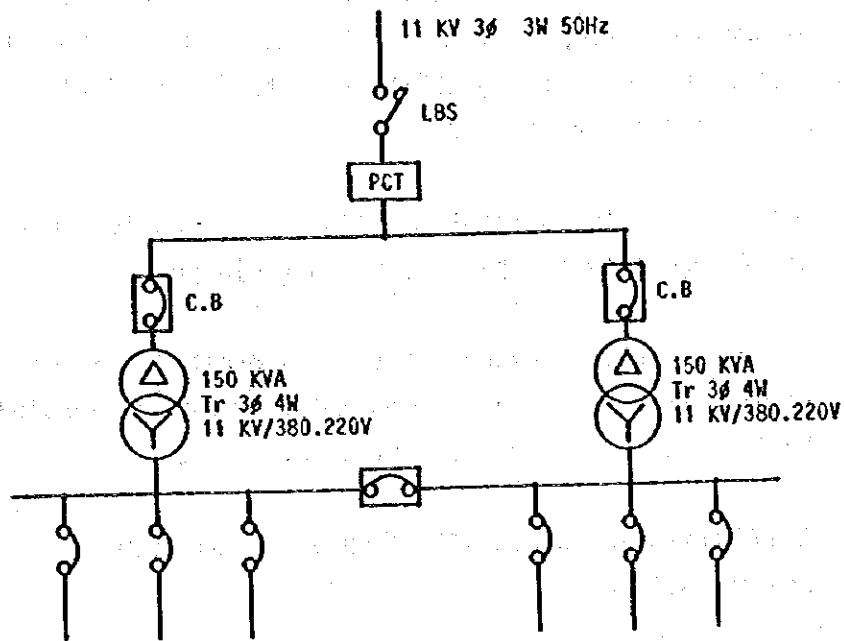


Fig. 5-5-1 Single Line Diagram of Power Receiving and Transforming

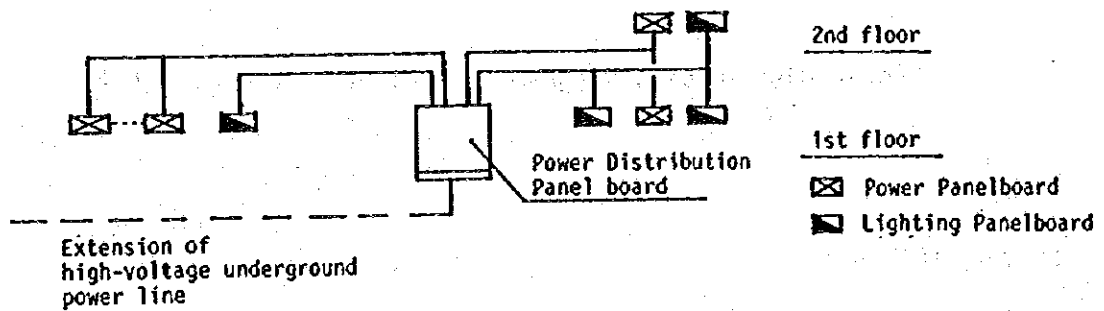


Fig. 5-5-2 Power Distribution Diagram

5-5-3 Lightings and Receptacles

Fluorescent lamps will be mainly used for lighting and receptacles will be installed where necessary.

The followings show the average illuminance of the main facilities:

- | | | |
|-----|---|---------------|
| (1) | Administration Office, Classrooms,
Canteen | 200 lux |
| (2) | Workshop | 100 - 150 lux |
| (3) | Warehouse | 100 lux |

5-5-4 Telephone

Two telephone lines will be drawn in. One line will be used exclusively by the Director and the other will be connectable to extension lines. Extension telephones will be installed in the Administration Office and fifteen other rooms as indicated in Fig. 5-5-3 and Table 5-6-1.

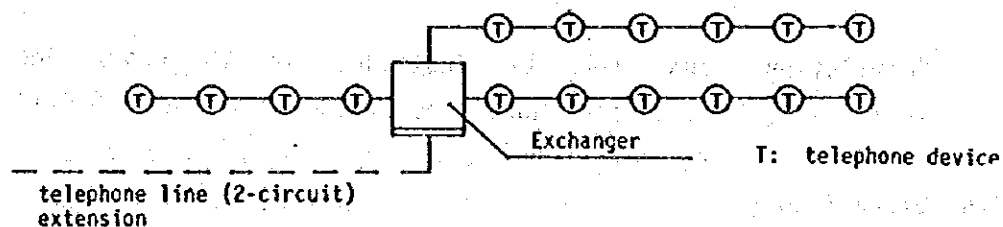


Fig. 5-5-3 Extension Telephone Wiring Diagram

5-5-5 Workshop

Appropriate receptacles and panels will be installed for the equipments in Workshops.

5-6 Mechanical System Design

5-6-1 Design Policy

- (1) Local climate and environmental factors should be taken into account in the design.**
- (2) Equipment easy to operate and maintain should be selected.**

5-6-2 Air-Conditioning

Air-cooling package type air-conditioners will be installed in 9 rooms including Administration Office, Staff Canteen and Clinic. (Refer to Table 5-6-1)

5-6-3 Heating

Receptacles for the exclusive use of electric heaters will be installed in Administration Office, Clinic, Gate House, etc. (Refer to Table 5-6-1)

5-6-4 Ventilation

Ventilation fans will be installed in 15 rooms including lavatories, kitchen and shower rooms. (Refer to Table 5-6-1)

5-6-5 Water Supply

Water will be drawn from the city water main through a pipe for both human consumption and fire extinguishing, to be distributed to rooms wherever necessary. Water will be drawn in directly, without installation of water reservoir tank or elevated water tank, as the pressure of the city water is sufficiently high.

5-6-6 Hot Water Supply

Hot water will be supplied to shower-rooms and kitchens by means of a central system. Installation of a solar water heater is also to be considered.

5-6-7 Drainage System

The drainage consists of soil sewage, general waste water and workshop waste water.

- (1) Soil Sewage : To be left to percolate downward through the soil after being purified in septic tank, or to be carried away for disposal by vacuum cars if necessary.
- (2) General Waste Water : To be left to percolate through the soil.
- (3) Workshop Waste Water : To be left to percolate through the soil after removing oil.

5-6-8 Gas

Gas supply system by means of butane gas cylinders will be installed for boiling water and cooking.

5-6-9 Sanitary Fixtures

Sanitary fixtures will be installed in lavatories, washing room or other rooms wherever necessary. Many of the closet bowls for trainees should be of oriental type.

Table 5-6-1 Mechanical and Electrical Systems of Main Rooms

Room Name	Air-Condition	Heating	Ventilation	Telephone
<u>Administration Building</u>				
Director's Room	○	(○)		○
Administration office	○	(○)		○
Reception				○
Clinic	○	(○)		○
Lavatory			○	
<u>Instructors' Building</u>				
Chief Advisor's Room	○	(○)		○
Experts' Room	○	(○)		○
Instructors' Room	○	(○)		○
<u>Service Building</u>				
Staff Canteen	○			○
Staff Kitchen			○	
Janitor Room				○
Gate House		(○)		○
Shower Room			○	
Laundry			○	
Trainee Canteen			○	
Trainee Kitchen			○	
Locker Room			○	
Lavatory			○	
<u>Training Building</u>				
Foremen's Room				○
Office		(○)		○
Lavatory			○	
Hydraulic Component			○	
Battery Service			○	
Engine Test Room			○	
Service Room			○	
Instructors' Room	○	(○)		○
Assistant Instructor				○
Audio Visual Room	○			○
Classrooms			○	
Fuel/Lubricant Rm			○	

5-7 Construction Equipment Design

Construction equipment (for Operation Course and Maintenance Course) and maintenance equipment are shown in the attached list, and the following points were taken into consideration in selecting them.

5-7-1 Construction Equipment for Operation Course

In addition to the general-purpose construction equipment, those that conform to the construction situations in Egypt were also adopted. (Dump Truck, Motor Scraper, Tower Crane, Vibro Hammer)

5-7-2 Second-Hand Construction Equipment for Maintenance Course

Comparatively new equipment of good quality will be introduced in order to increase the effect of maintenance technical education. Equipment expected to go through model changes shortly are therefor to be avoided, so that no problem will occur in obtaining spare parts. Also, maintenance parts requisite for the full operation of these equipment are to be provided sufficiently.

5-7-3 Apparatus for Maintenance Course

- (1) Various maintenance equipment and testing apparatus with the latest design are to be adopted, in addition to the equipment commonly used in the maintenance workshops of the public sectors, to prepare to meet the future requirements for maintenance engineers.
- (2) Visual and auditory apparatus will be used wherever possible in classroom lessons for upgraded educational effects.
- (3) Cutaway models and plastic models will be used for teaching the specific structures and functions of each of the components.

- (4) As to fuel, hydraulic machines and electric service apparatus, etc., system boards will be introduced for a more effective performance of trouble shooting abilities for each of the systems.

List for construction equipment and maintenance equipment

(1) CONSTRUCTION EQUIPMENTS AND COMPONENTS

1) New Equipments for Operator course

	Q'ty
1. Bulldozer 320HP, 40ton (with ripper)	1
2. Bulldozer 160HP, 16ton	1
3. Crawler Loader 160HP, 1.8m ³	1
4. Wheel Loader 200HP, 3.3m ³	1
5. Wheel Loader 150HP, 2.3m ³	1
6. Motor Scraper 360HP, 16m ³	1
7. Motor Grader 130HP, 3.7m	2
8. Hydraulic Excavator 50HP, 0.25m ³	1
9. Hydraulic Excavator 105HP, 0.7m ³	1
10. Off-highway Dump Truck, 32ton	1
11. Hydraulic Truck Crane, 16ton	1
12. Tower Crane, Hammer head type 30 t.m	1
13. Tower Crane, Jib type 15 t.m	1
14. Vibro hammer 17.5t, 22kw with 75KVA Diesel generator	1

2) Second hand Equipments for Maintenance course

	Q'ty
1. Bulldozer 160HP, 16ton	1
2. Wheel Loader 150HP, 2.3m ³	1
3. Motor Grader 130HP, 3.7m	1
4. Highway Dump Truck 8ton	1
5. Hydraulic Excavator 50HP, 0.25m ³	1
6. Diesel Generator 17HP, 10kw	1
7. Hydraulic Truck Crane, 16ton	1

3) Component for Construction Equipment

	Qty
1. Engine	
Engine Assembly	1
Engine Assembly with turbo and main clutch	1
2. Fuel System	
Fuel injection pump assembly for small engine	2
Fuel injection pump assembly for big engine	2
Fuel pump	2
3. Electrical System	
Starter motor	2
Alternator	2
Generator	2
Regulator	2
4. Power Train	
Torque converter assembly	1
Power shift transmission	1
Transmission for loader	1
Transmission for bulldozer	1
Transmission for dump truck	1
Differential assembly	1
5. Hydraulic System	
Hydraulic pump assembly	1
Pump assembly for transmission	1
Hydraulic control valve	1
Steering control valve assembly	1
Hydraulic pump and regulator for excavator	1
Hydraulic motor for excavator	1
Hydraulic cylinder assembly	1

(2) WORKSHOP FACILITIES

1. Overhead Crane 5t, 3t
2. Jib Crane 1t x 3
3. Fork Lift 3t x 1, 1t x 1 (Diesel type)
4. Engine Dynamometer
5. Precision Lathe
6. Drilling Machine
7. Universal Milling Machine
8. Shaping Machine
9. Hack Sawing Machine
10. Mobile Crane 2t
11. Track Link Press
12. Starter, Generator Test Bench
13. Fuel Injection Pump Tester
14. Injector Flow Comparator
15. Chain Blocks
16. Battery Charger
17. Tire Spotter
18. Welders (Arc, CO² gas)
19. Hydraulic Press
20. Roller Idler Press
21. Track Press
22. Air Compressor
23. Bench Grinder
24. Field Service Truck
25. Hydraulic Component Universal Tester
26. Miscellaneous :
General tools, Special tools, Stream cleaner, Parts wagons,
Hand trucks, Stands for engine, Transmission and other
components, Working benches, Parts racks and lockers.

(3) SPARE PARTS FOR 2 YEARS

(4) TRAINING MATERIAL

1. Slide
2. Overhead Transparencies
3. Cutaway Model:
Engine, Fuel injection pump, Fuel pump, Water pump, Full flow oil filter, Turbocharger, Torque convertor, Powershift transmission, Steering clutch, Truck roller, Truck link, Hydraulic pump, Hydraulic control valve, Starting motor, Alternator
4. Plastic Model:
Diesel Engine, Torque convertor, Transmission Planetary gears, etc.
5. System Board:
Electric system, Hydraulic system, Fuel system, Brake system.
6. Audio Visual Equipment:
Slide projector, Overhead projector, Movie film projector, Video cassette, Color TV for video, Screen, Tape recorder, Cassette recorder, Color video camera, Recorded tape, Film

(5) VEHICLE

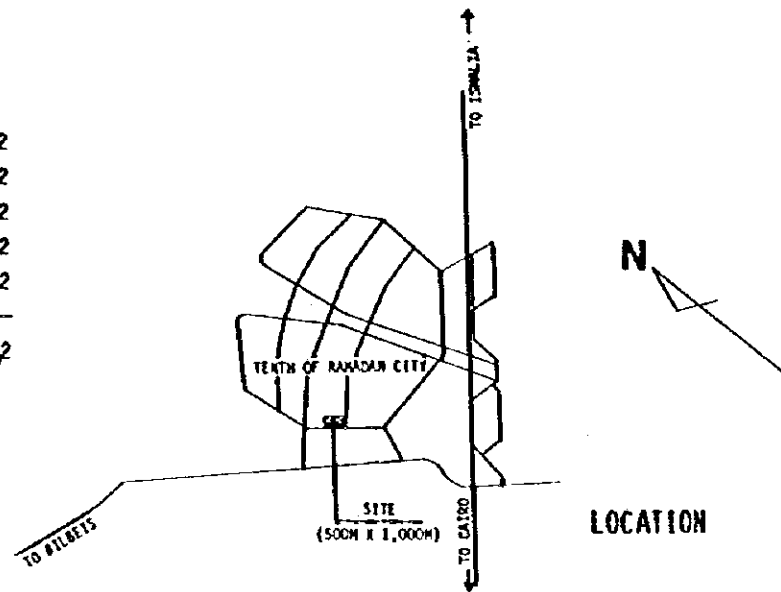
- | | |
|------------------|---|
| 1. Station Wagon | 2 |
| 2. Microbus | 1 |
| 3. Bus | 1 |

5-8 Basic Design Drawings

1.	SITE PLAN	1:4000
2.	LOCATION PLAN (CETC)	1:1500
3.	GROUND FLOOR PLAN	1:500
4.	FIRST FLOOR & ROOF PLAN	1:500
5.	ELEVATION	1:500
6.	SECTION	1:500
7.	DETAILED SECTION	1:70
8.	EQUIPMENT LAYOUT (TRAINING BLDG.)	
9.	POWER DISTRIBUTION CABLES	1:1500
10.	WATER, DRAINAGE AND SEWAGE PIPES	1:1500

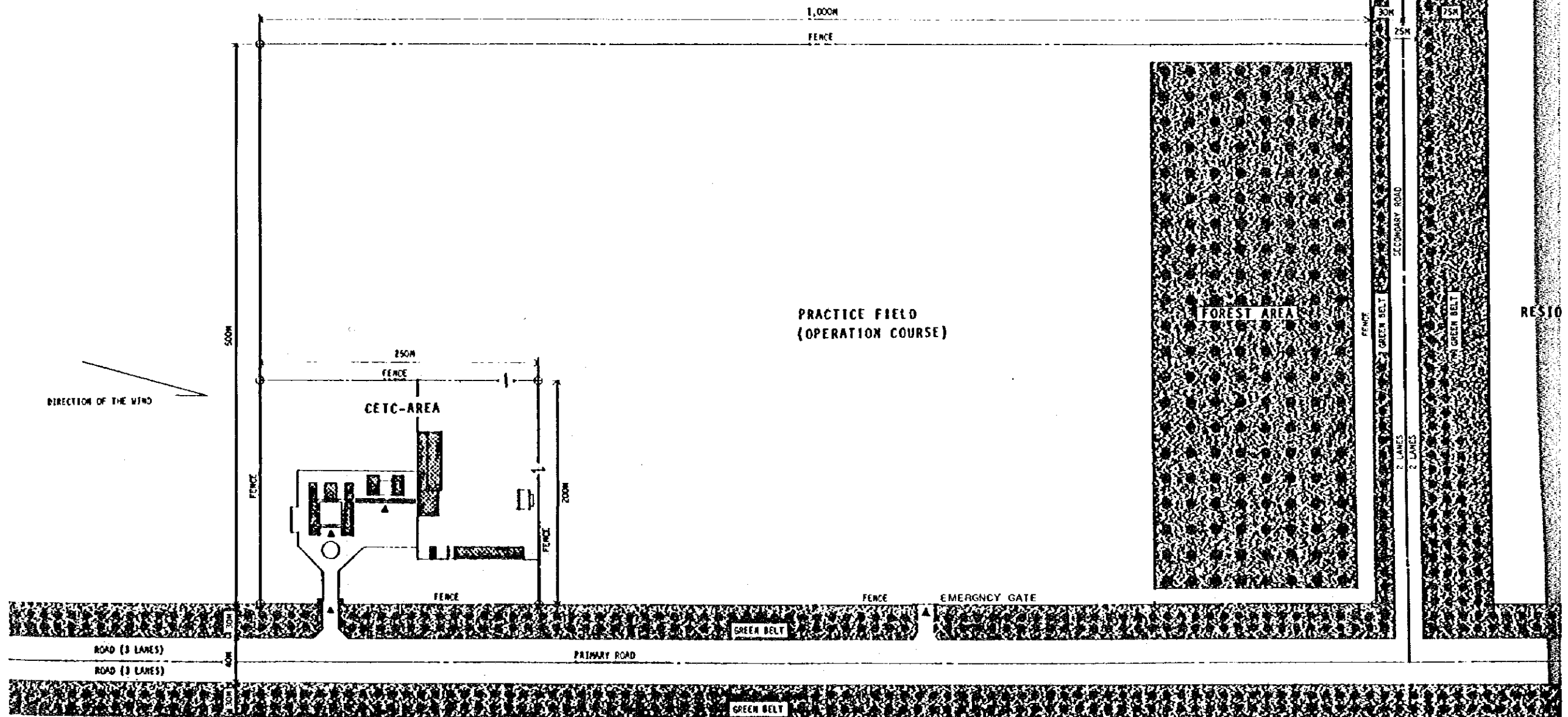
BUILDING FLOOR AREA

ADMINISTRATION BUILDING	213 m ²
INSTRUCTORS' BUILDING	213 m ²
SERVICE BUILDING	605 m ²
TRAINING BUILDING	2,428 m ²
OTHERS	662 m ²
TOTAL FLOOR AREA	4,121 m²

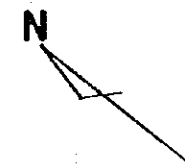


LEGEND

- CETC-AREA LINE
- PROPOSE SITE BOUNDARY LINE



DIRECTION OF THE WIND

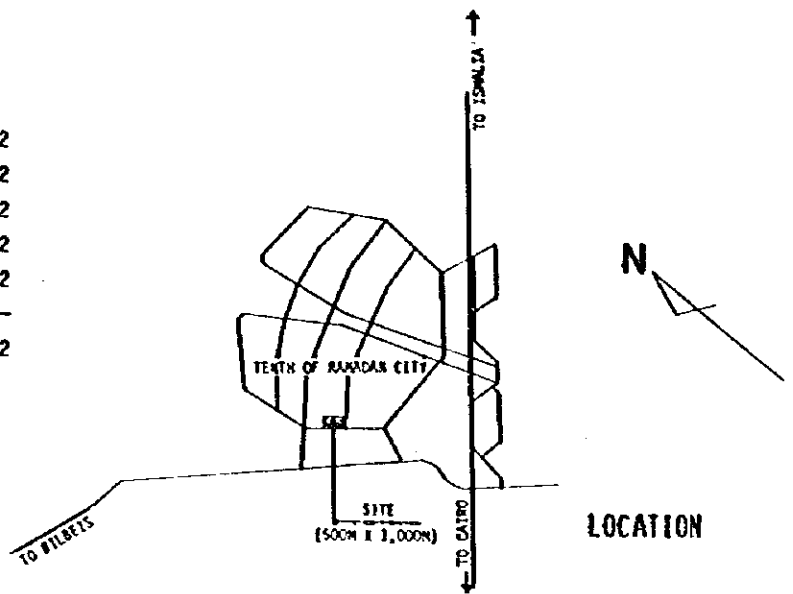


SITE PL

CA

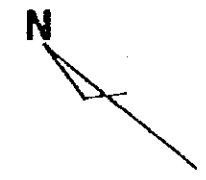
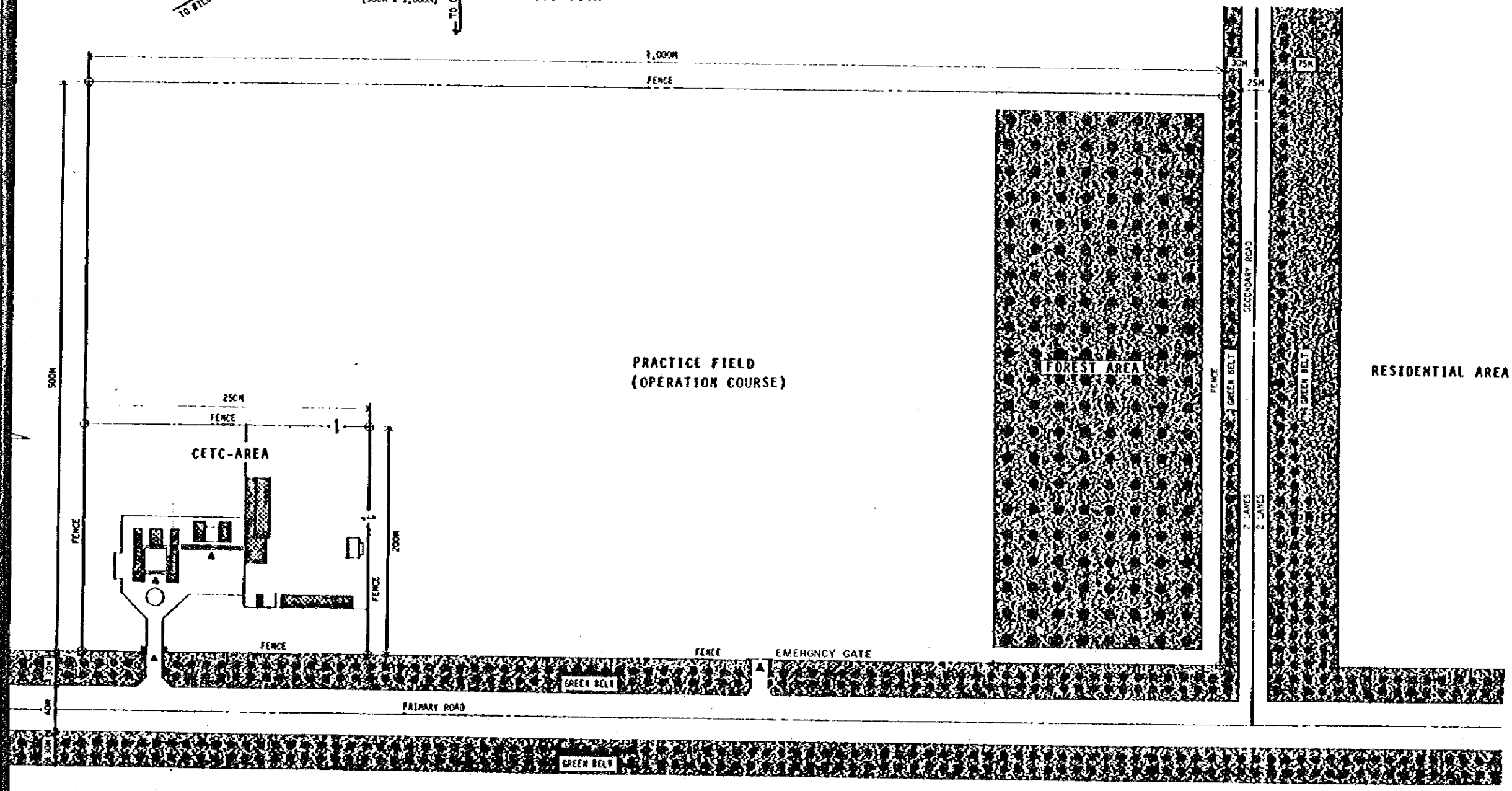
FLOODING	213 m ²
DRAINAGE	213 m ²
	605 m ²
	2,428 m ²
	662 m ²

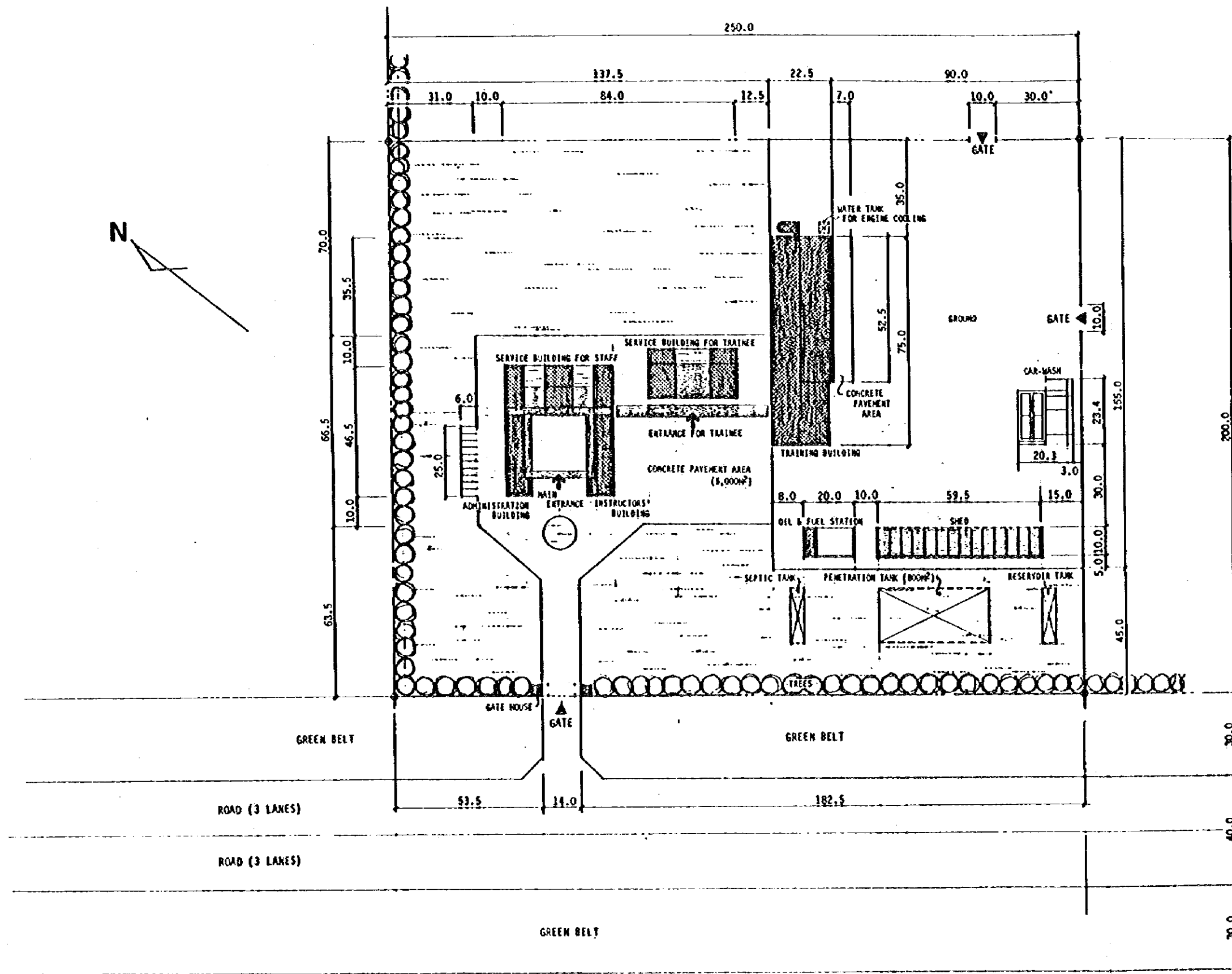
AREA 4,121 m²



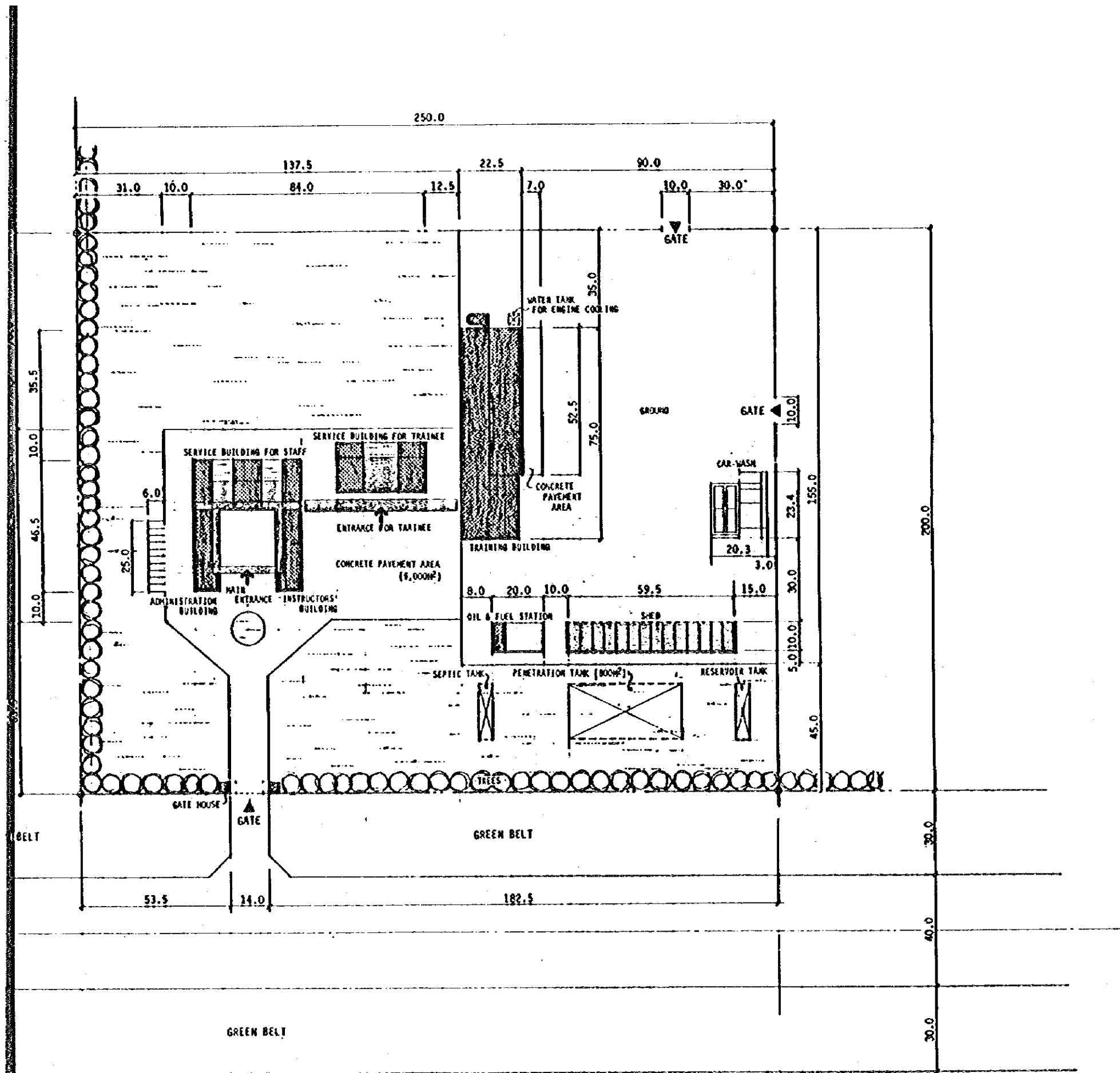
LEGEND:

- CETC-AREA LINE
- PROPOSE SITE BOUNDARY LINE

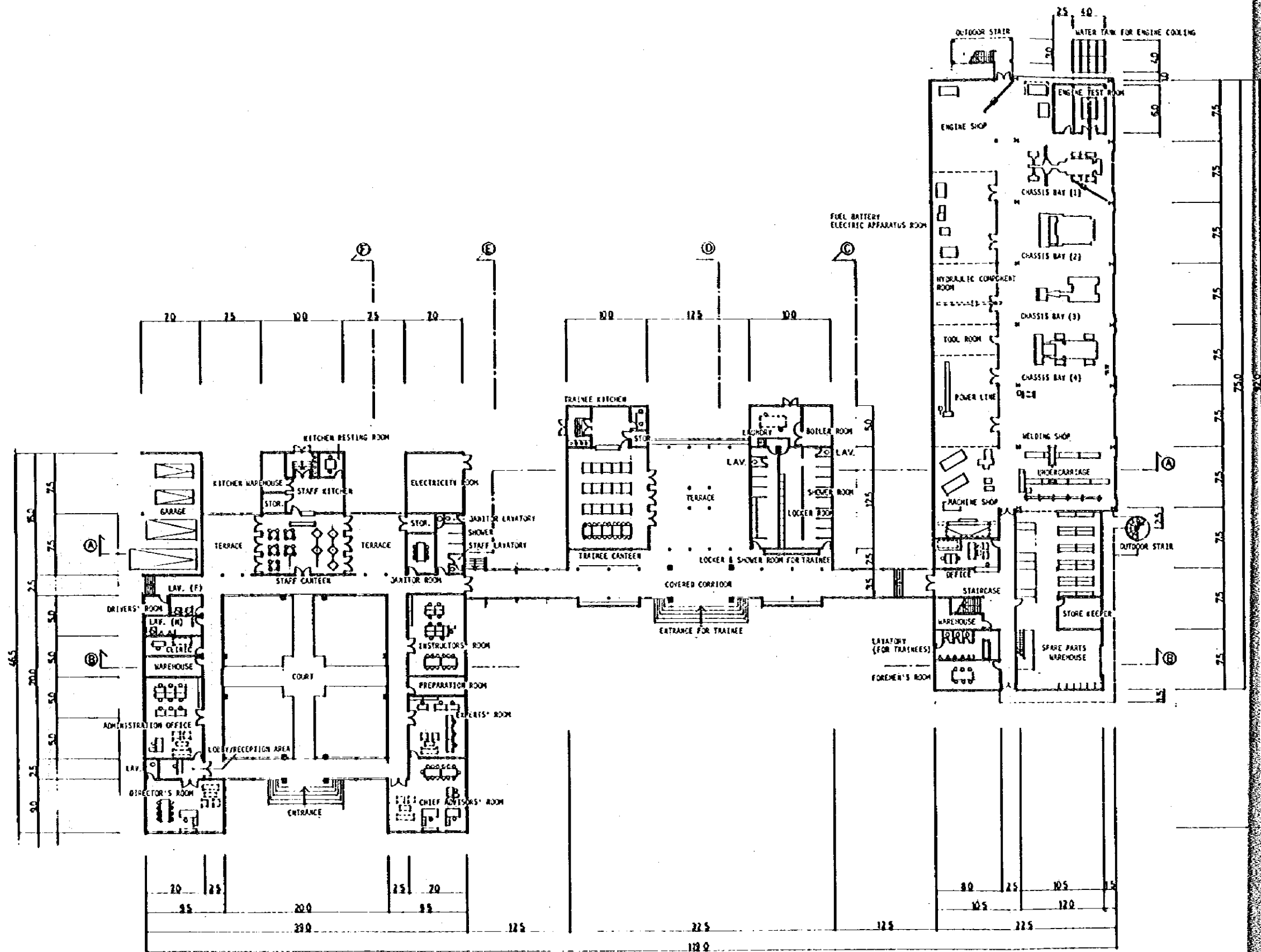




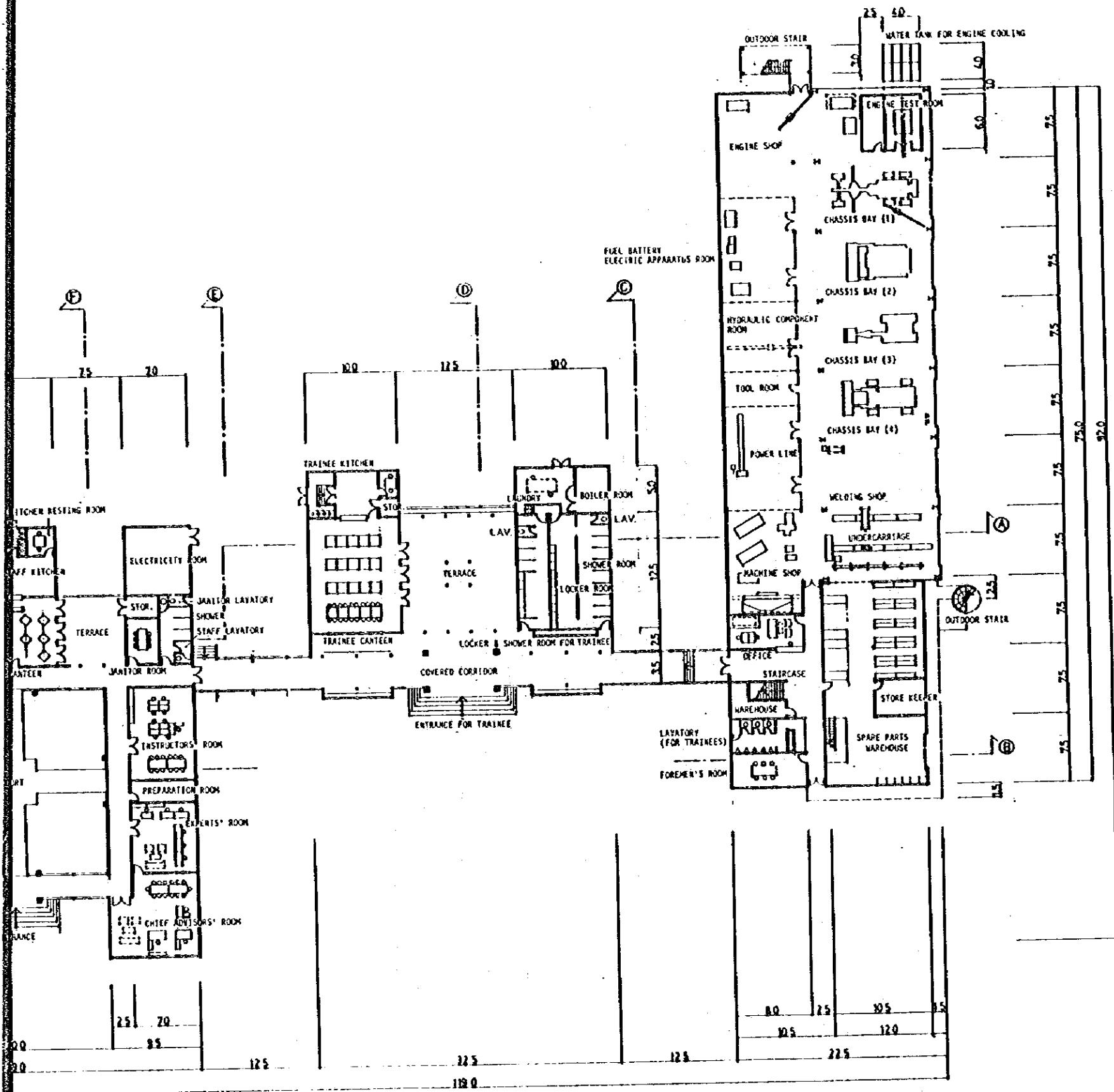
LOCATION PLAN (CET)



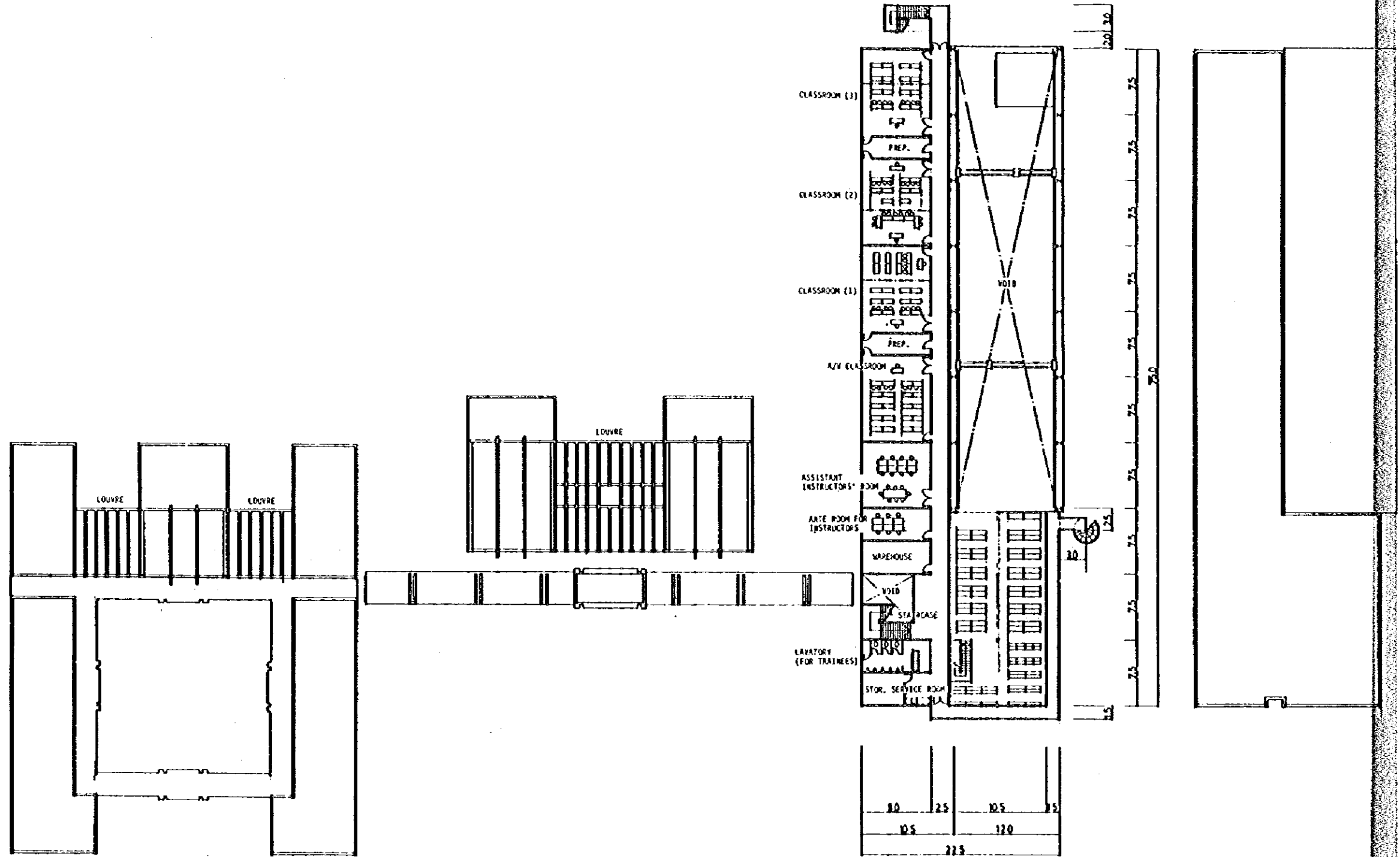
LOCATION PLAN (CETC) SCALE 1:1500 2



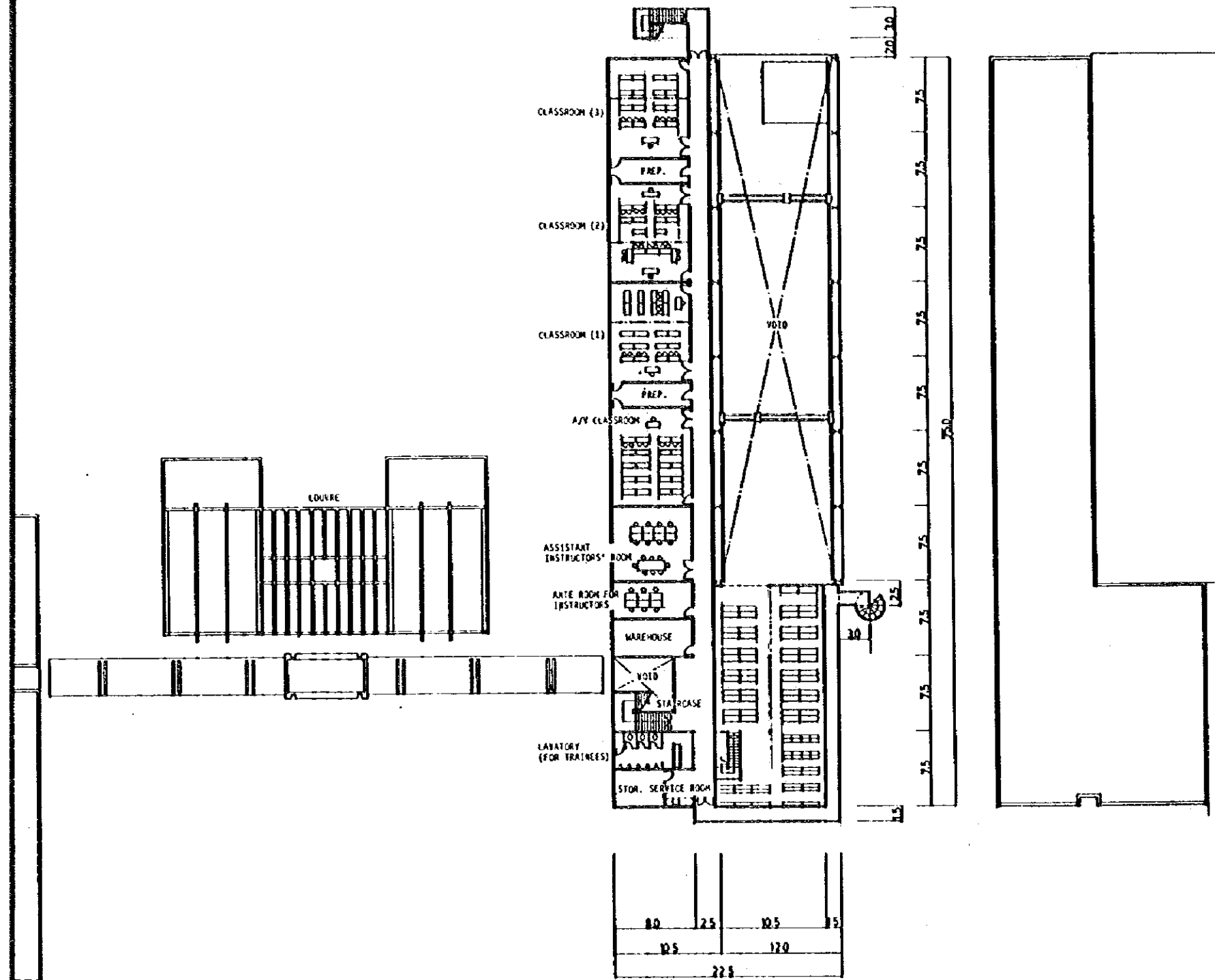
GROUND FLOOR PL



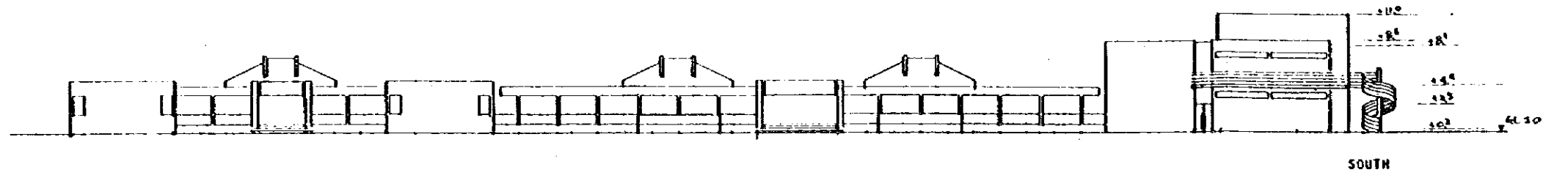
GROUND FLOOR PLAN SCALE 1:500 3



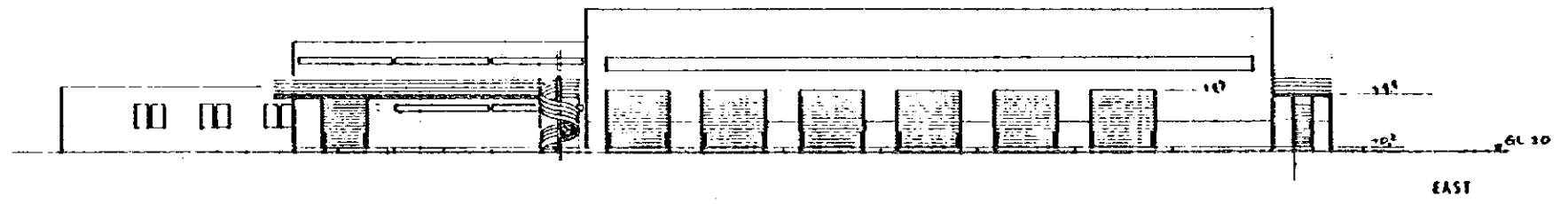
FIRST FLOOR PLAN & ROOF PLAN



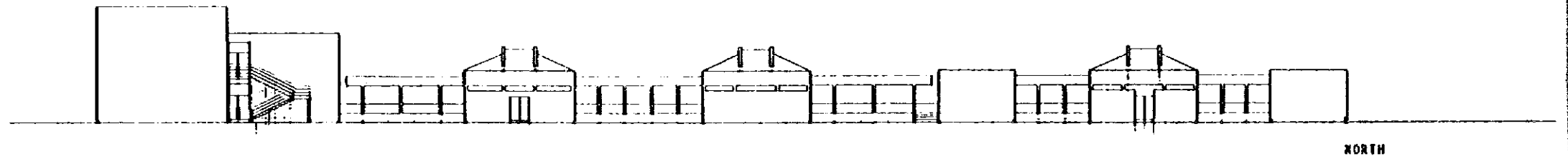
FIRST FLOOR PLAN & ROOF PLAN SCALE 1:500 4



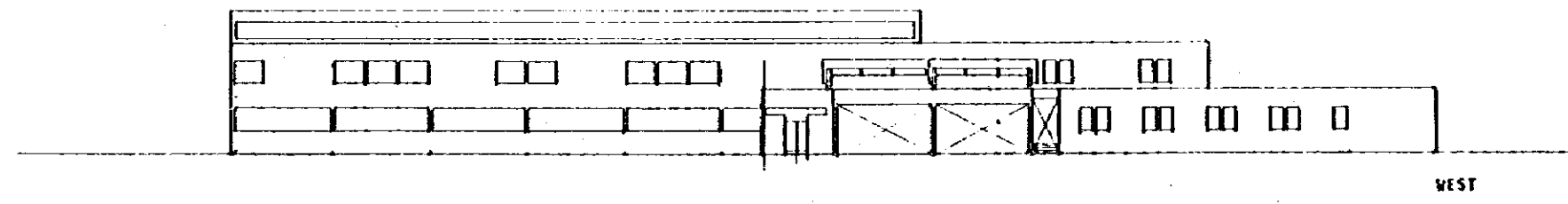
SOUTH



EAST

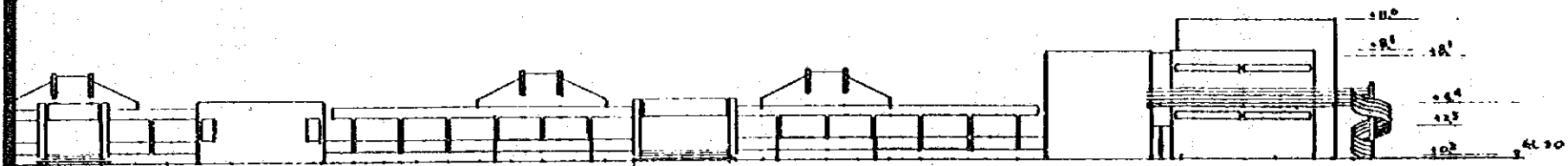


NORTH

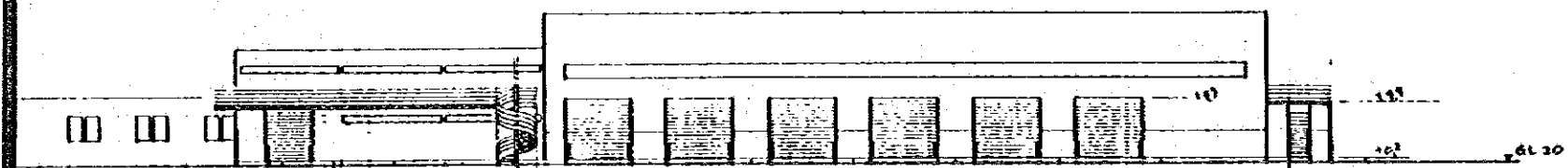


WEST

ELEVATION



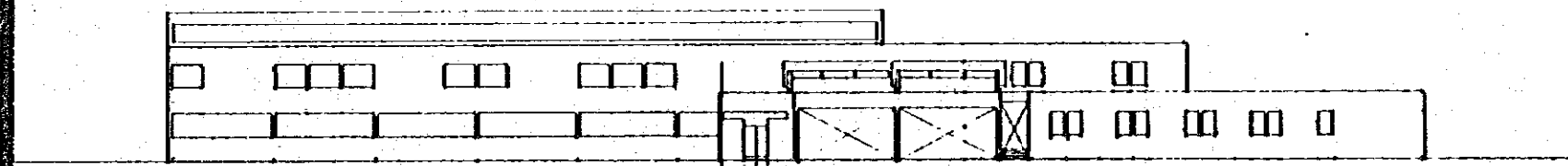
SOUTH



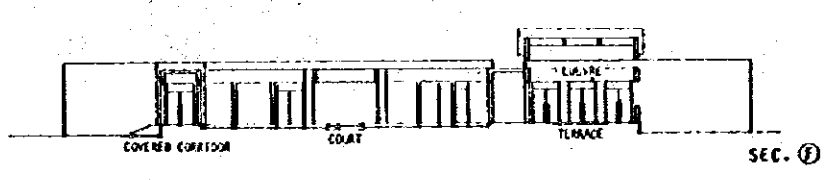
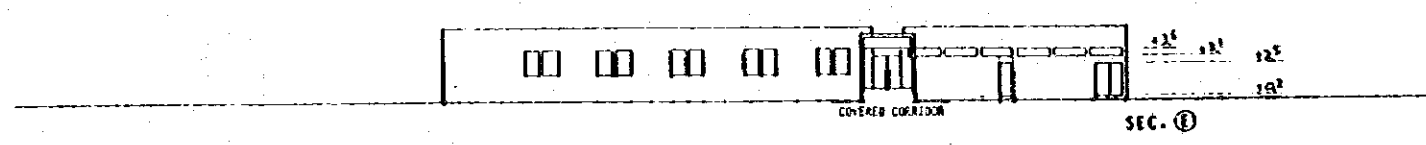
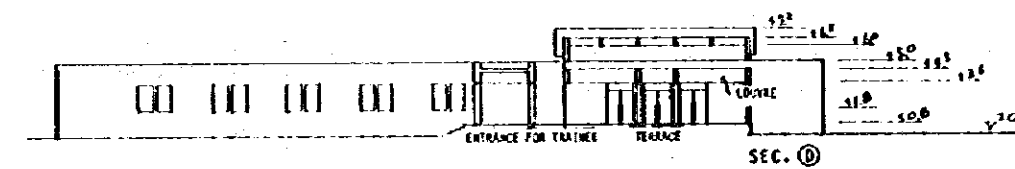
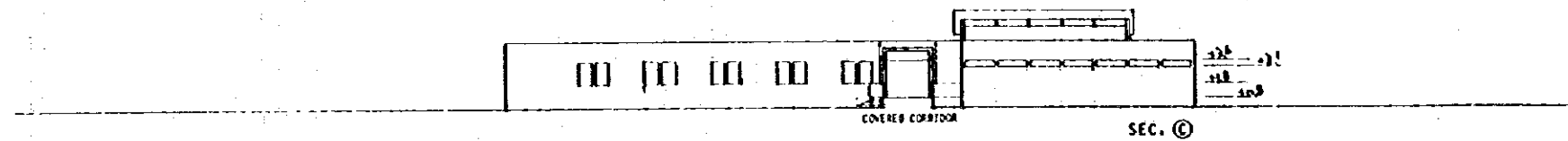
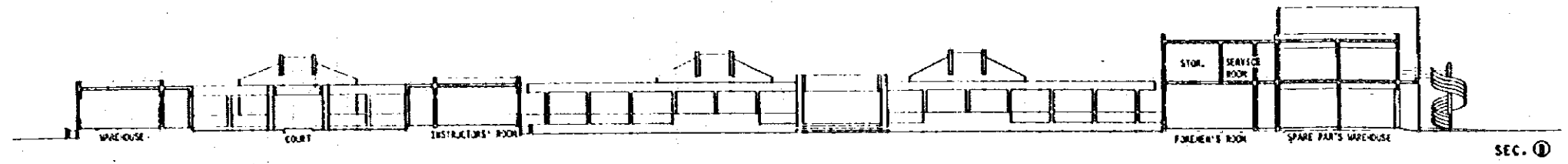
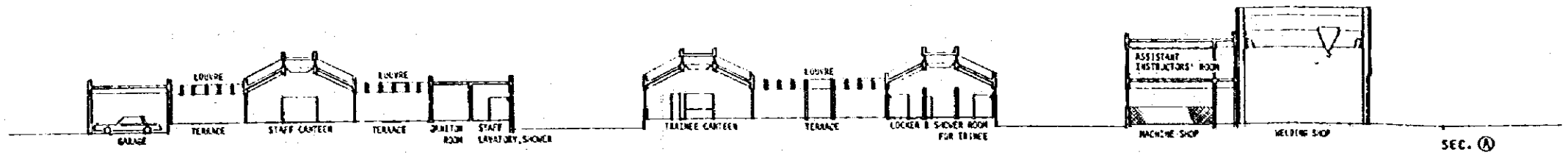
EAST

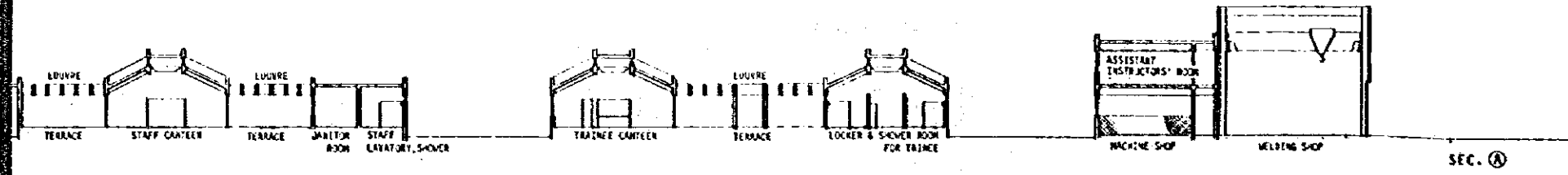


NORTH

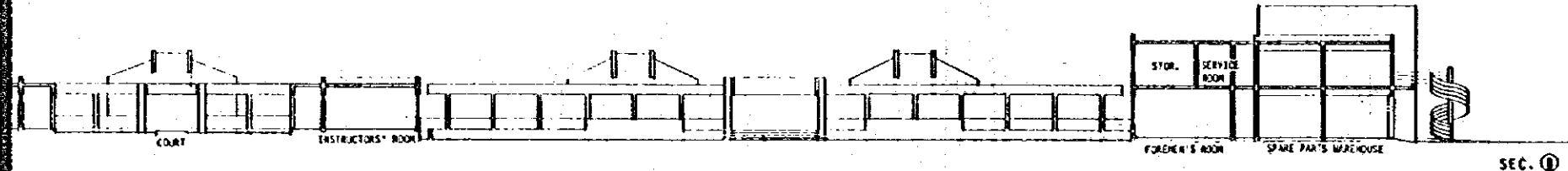


WEST

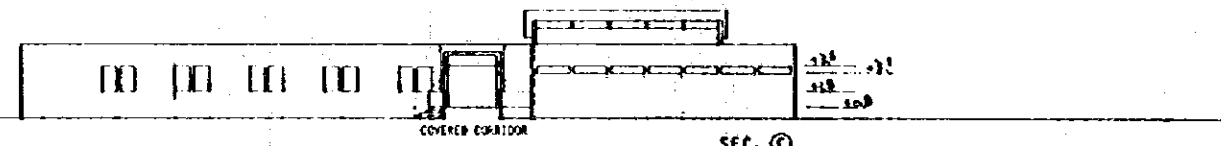




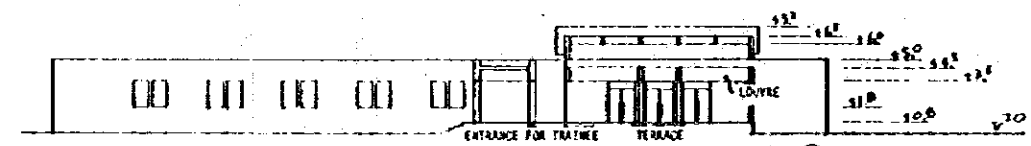
SEC. A



SEC. B



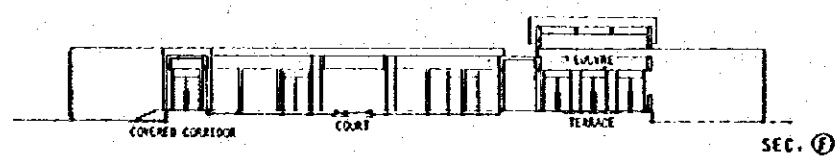
SEC. C



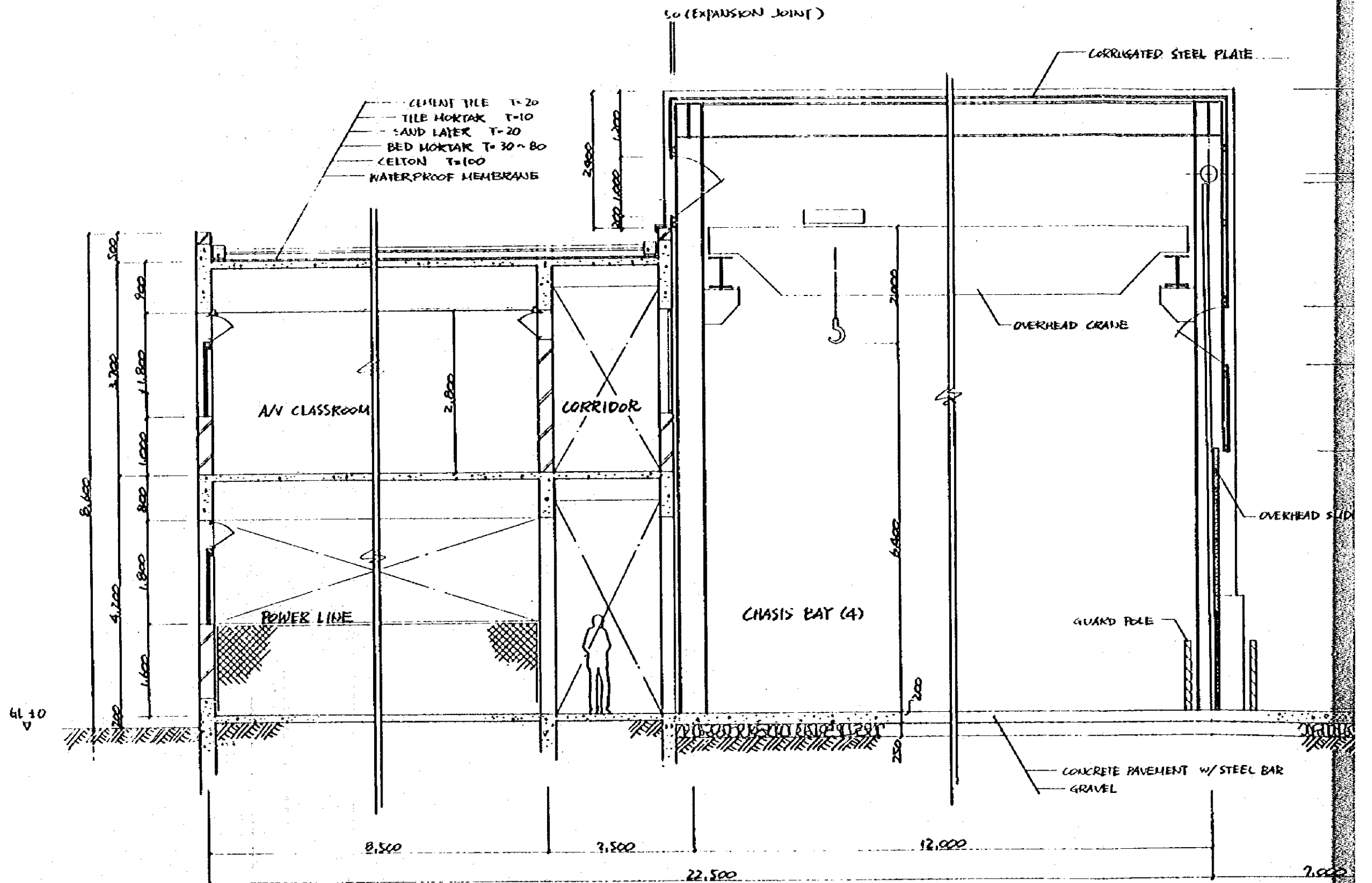
SEC. D



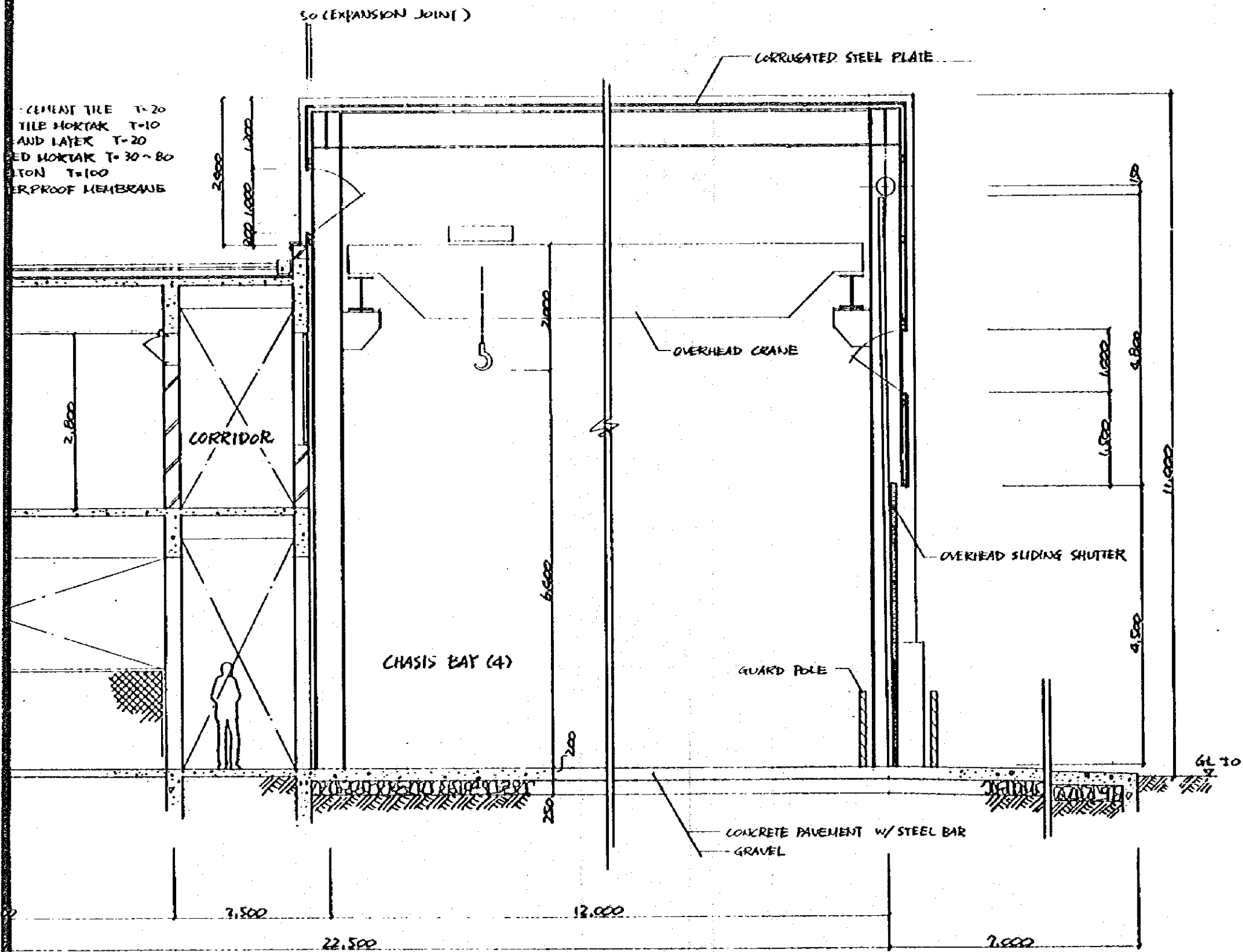
SEC. E



SEC. F

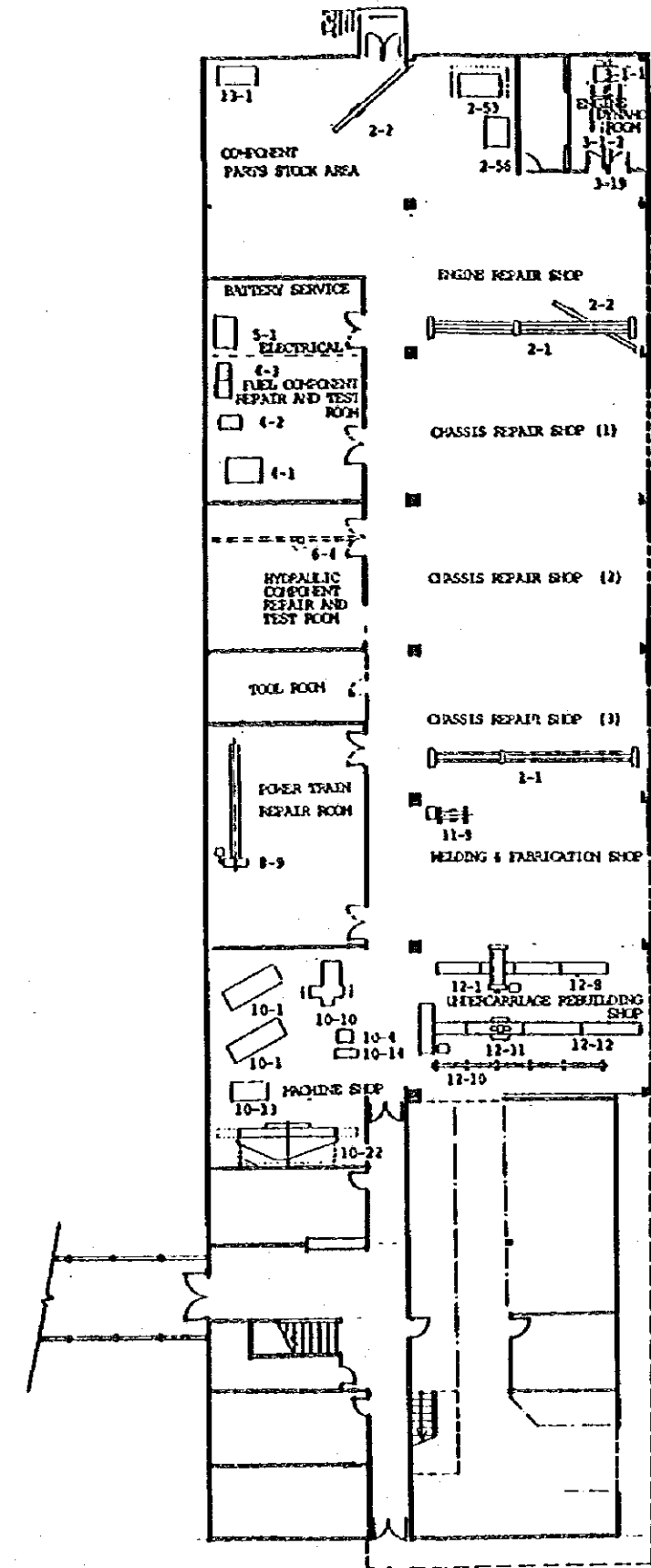


DETAILED SECTION (TRAINING BL)



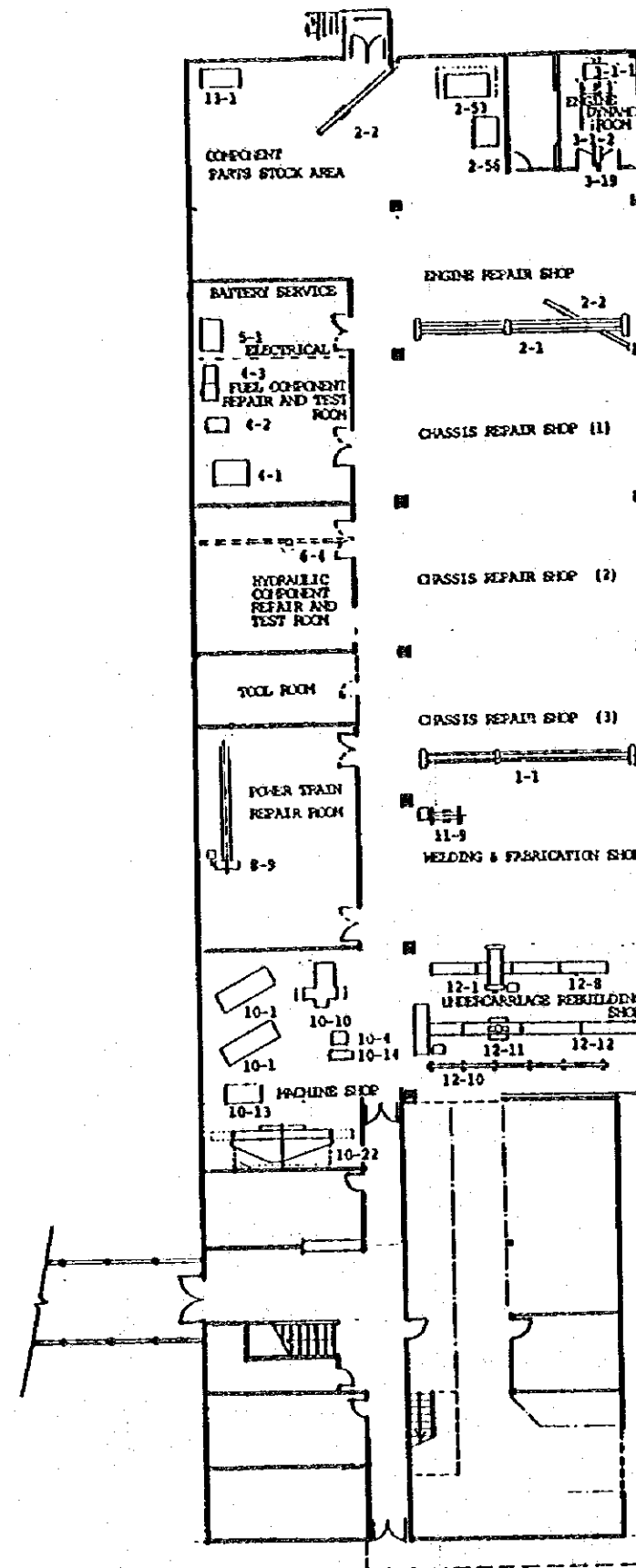
DETAILED SECTION (TRAINING BLDG.) SCALE 1:70 7

Item	Description	Qty
1-1	Overhead Crane, 5 ton, 12 m	1
2-1	Overhead Crane, 3 ton, 12 m	1
2-2	Jib Crane, Wall Type, 1 ton	1
2-53	Connecting Rod Boring Machine	1
2-56	Honing Machine	1
3-1-1	Engine Dynamometer	1
3-1-2	Engine Stand	1
3-19	Electric Chain Block, 2 ton(for Mono-Rail)	1
4-1	Diesel Fuel Injection Pump Tester	1
4-2	PT Pump Test Stand	1
4-3	Injector Flow Comparator	1
5-1	Starter Generator Test Bench	1
6-4	Electric Chain Block 1 ton(for Mono-Rail)	1
8-9	Hydraulic Cylinder Service Stand	1
10-1	Precision Lathe	2
10-4	Upright Drilling Machine	1
10-10	Universal Milling Machine	1
10-13	Shaping Machine	1
10-14	Back Sawing Machine	1
10-22	Crankshaft Grinder	1
11-9	Hydraulic Press, 100 ton	1
12-1	Roller Idler Press	1
12-8	Conveyor Stand for Roller Line	1
12-10	Track Press	1
12-11	Shoe Bolt Impact Wrench	1
12-12	Conveyor Stand	1
13-1	Air Compressor	1

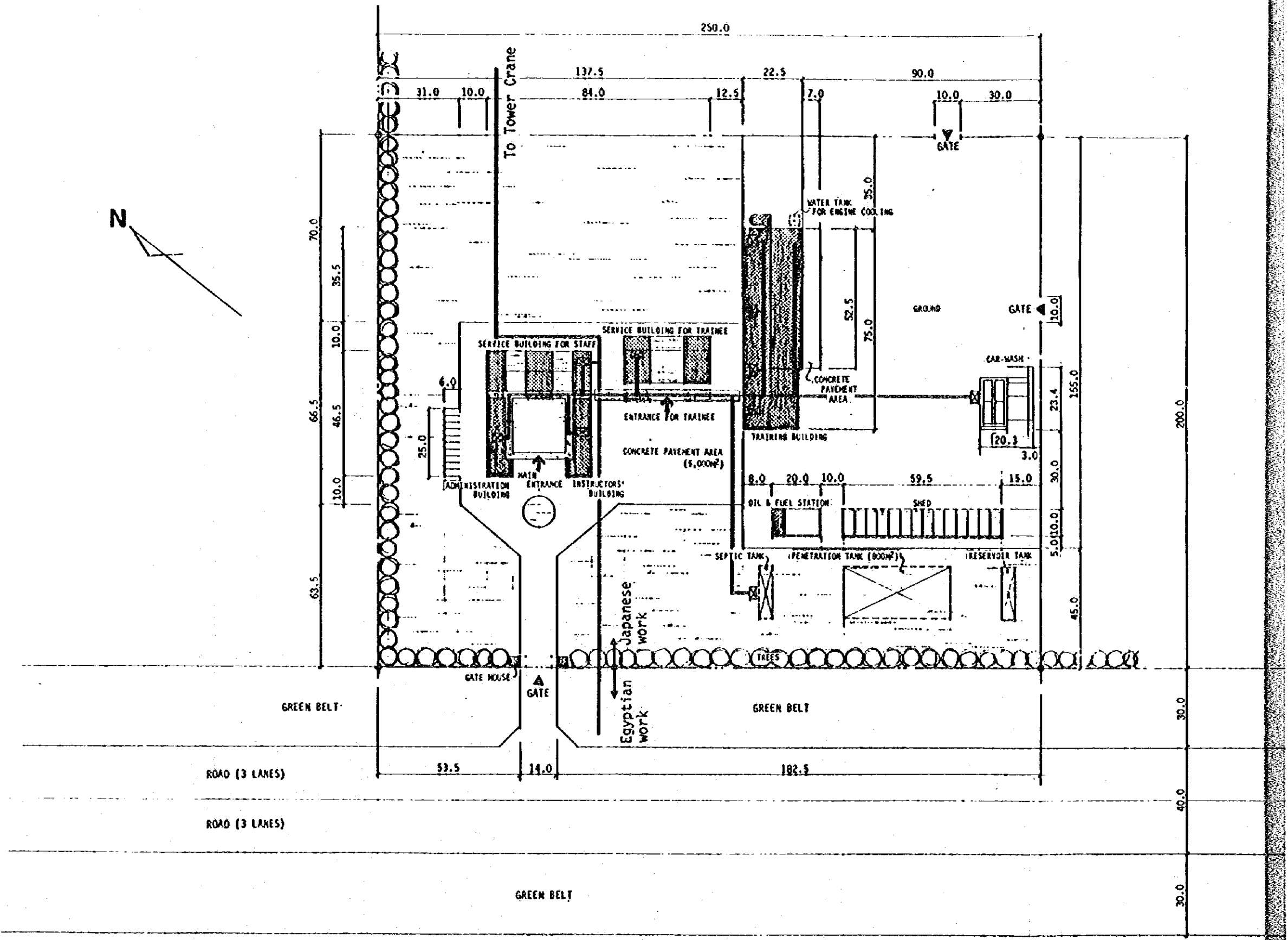
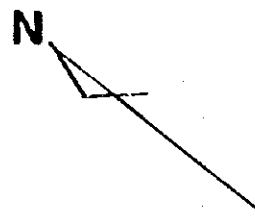


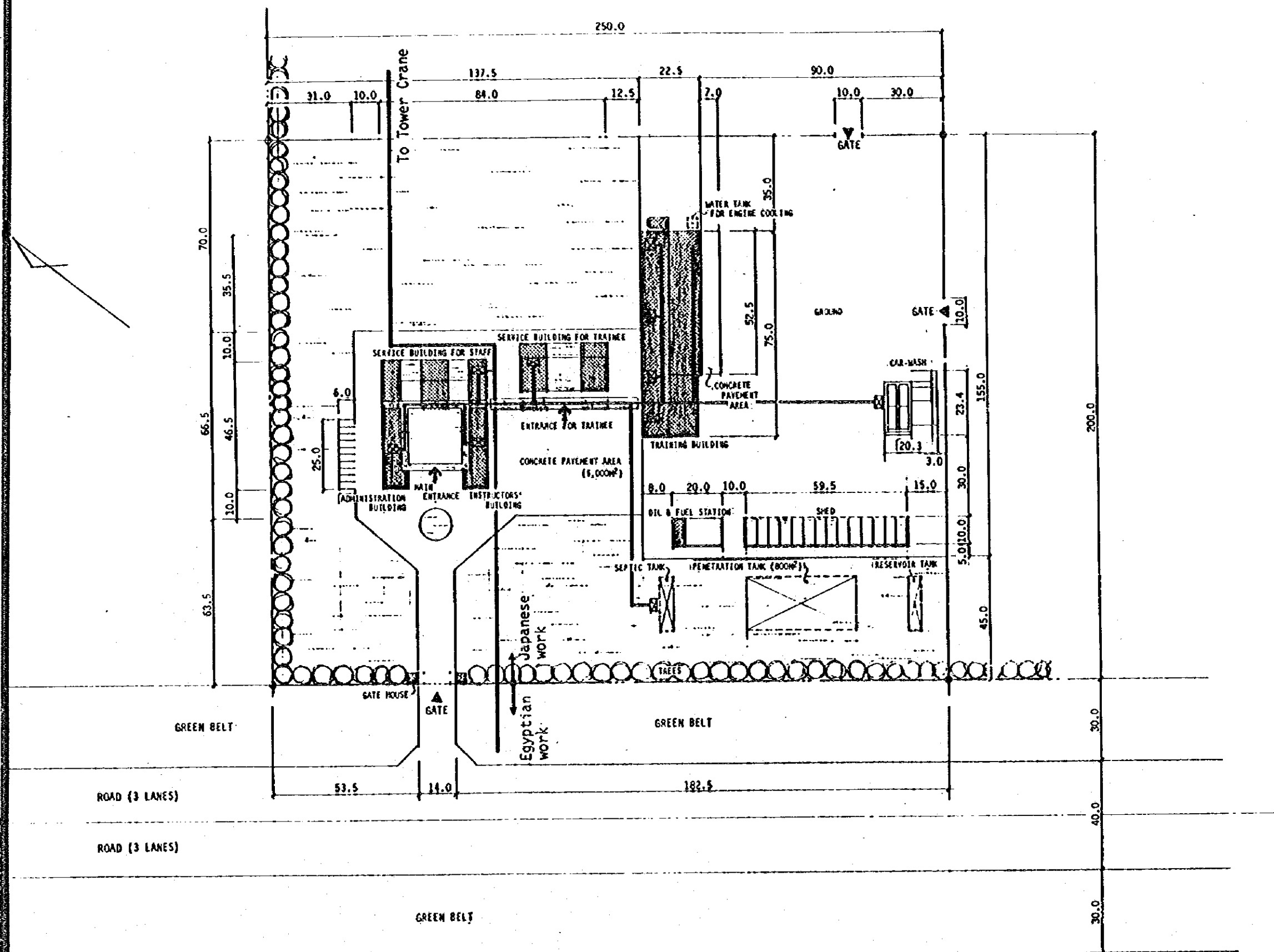
EQUIPMENT LAYOUT (TRAINING)

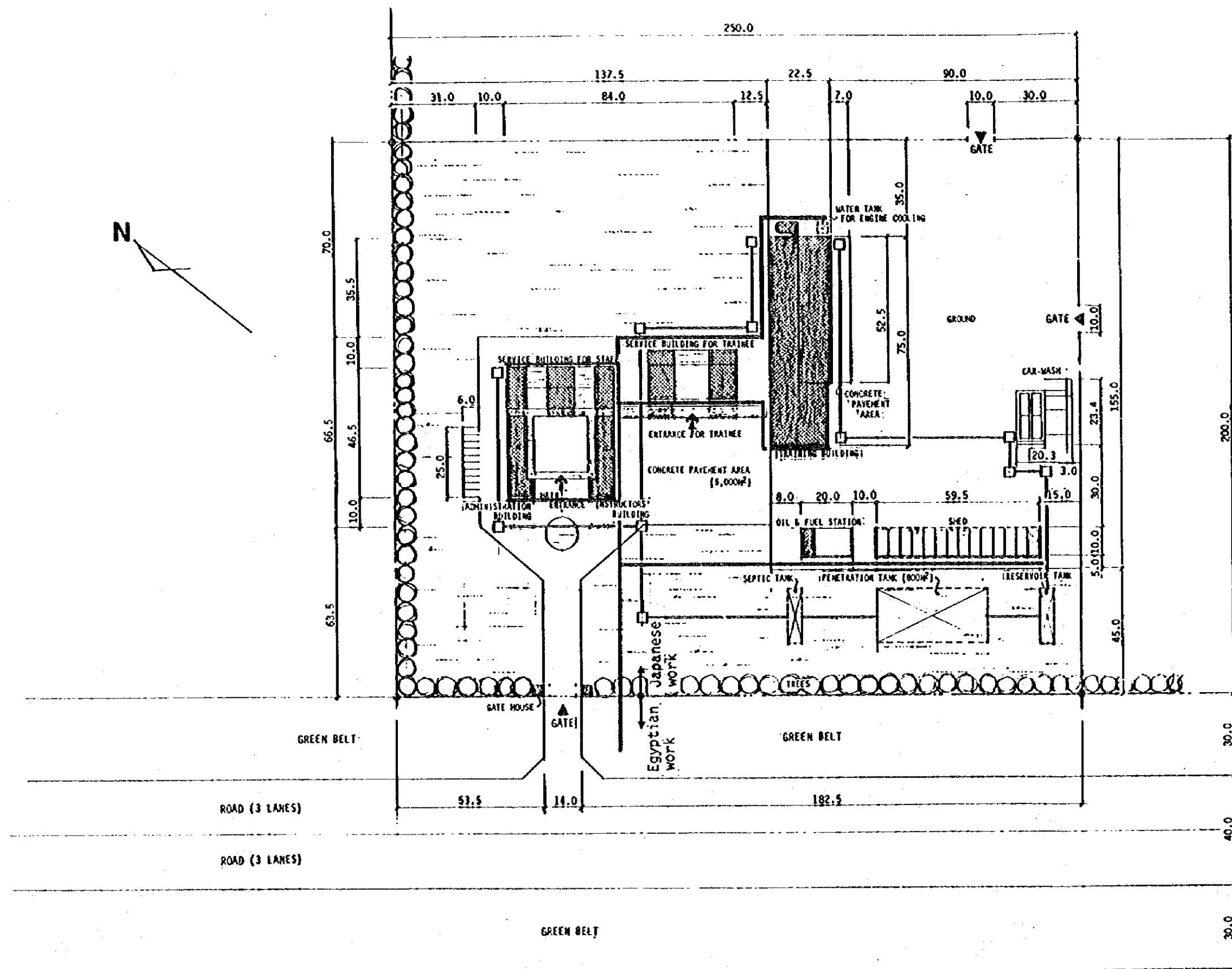
	Description	Qty
1	Overhead Crane, 5 ton, 12 m	1
2	Overhead Crane, 3 ton, 12 m	1
3	Jib Crane, Wall Type, 1 ton	1
53	Connecting Rod Boring Machine	1
56	Honing Machine	1
1-1	Engine Dynamometer	1
1-2	Engine Stand	1
19	Electric Chain Block, 2 ton(for Mono-Rail)	1
1	Diesel Fuel Injection Pump Tester	1
2	PT Pump Test Stand	1
3	Injector Flow Comparator	1
1	Starter Generator Test Bench	1
4	Electric Chain Block 1 ton(for Mono-Rail)	1
9	Hydraulic Cylinder Service Stand	1
1	Precision Lathe	2
4	Upright Drilling Machine	1
10	Universal Milling Machine	1
13	Shaping Machine	1
14	Hack Sawing Machine	1
22	Crankshaft Grinder	1
9	Hydraulic Press, 100 ton	1
1	Roller Idler Press	1
8	Conveyor Stand for Roller Line	1
10	Track Press	1
11	Shoe Bolt Impact Wrench	1
12	Conveyor Stand	1
1	Air Compressor	1



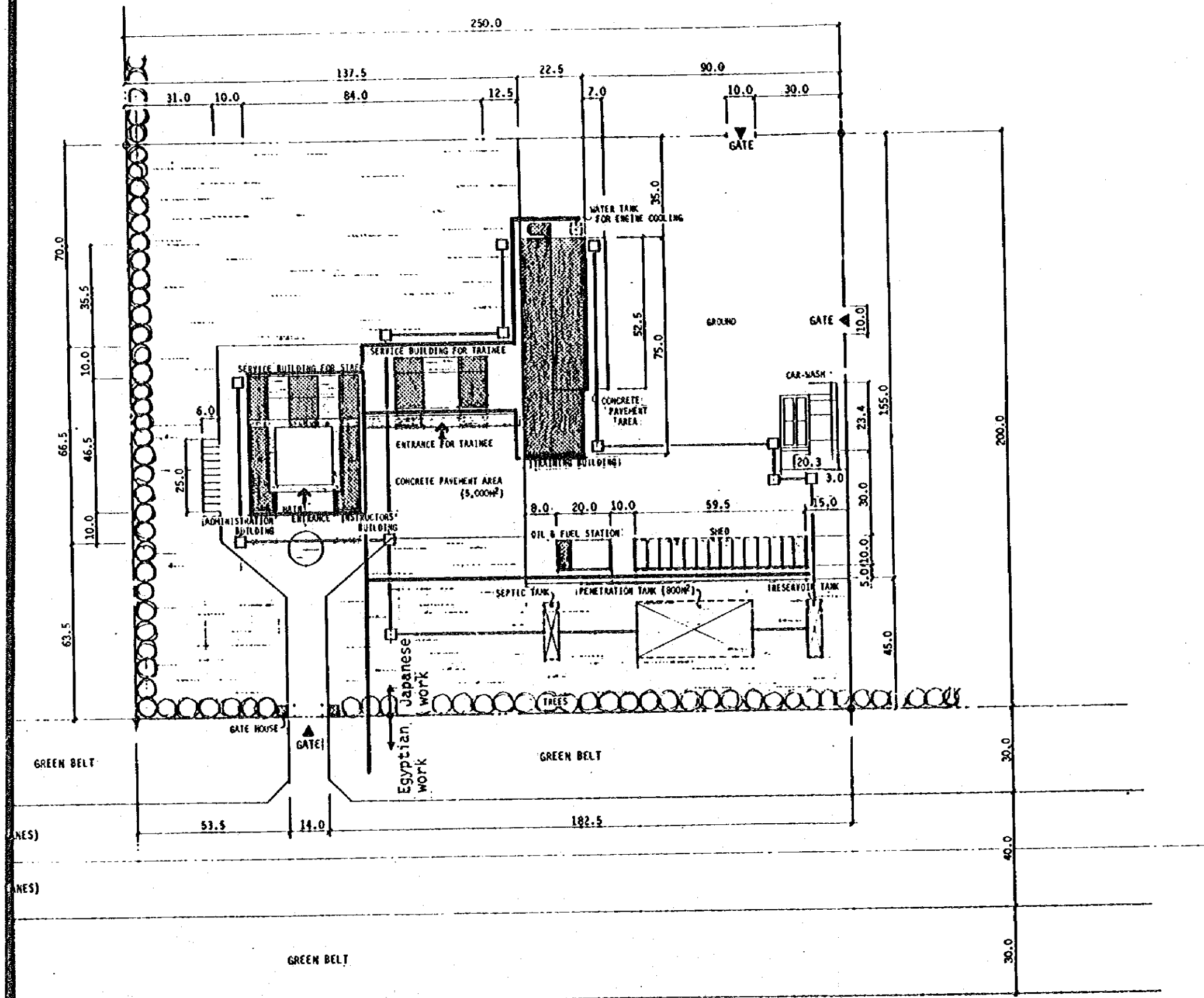
EQUIPMENT LAYOUT (TRAINING BLDG.)







WATER, DRAINAGE AND SEWAGE



WATER, DRAINAGE AND SEWAGE PIPES 1:1500

CHAPTER 6: PROJECT IMPLEMENTATION

CHAPTER 6: PROJECT IMPLEMENTATION

6-1 Executing Agency

The authority concerned in Egypt for the planning and implementation of this Project is the Ministry of Development, New Communities and Land Reclamation shown in Fig. 6-1-1 below. The Central Organization for Development (COD) headed by the first undersecretary of state (Deputy Minister) and belonging to the above Ministry is divided into eight organizations. TOMOHAR, one of the above eight organizations, is in charge of vocational training whereas the remaining seven organizations are mainly in charge of large development projects.

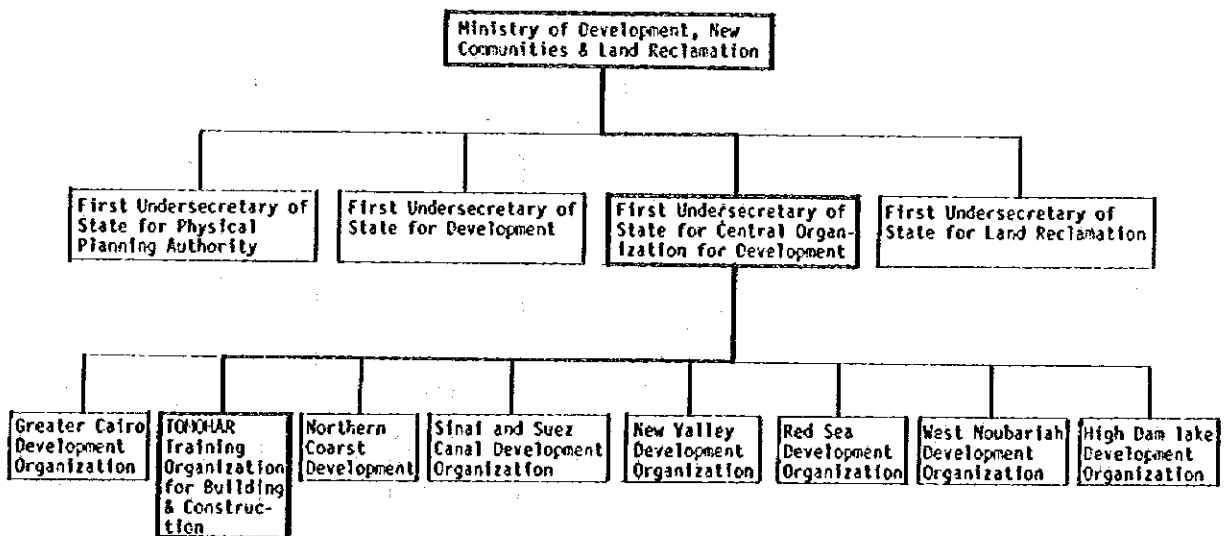


Fig. 6-1-1 Organization Chart of the Ministry

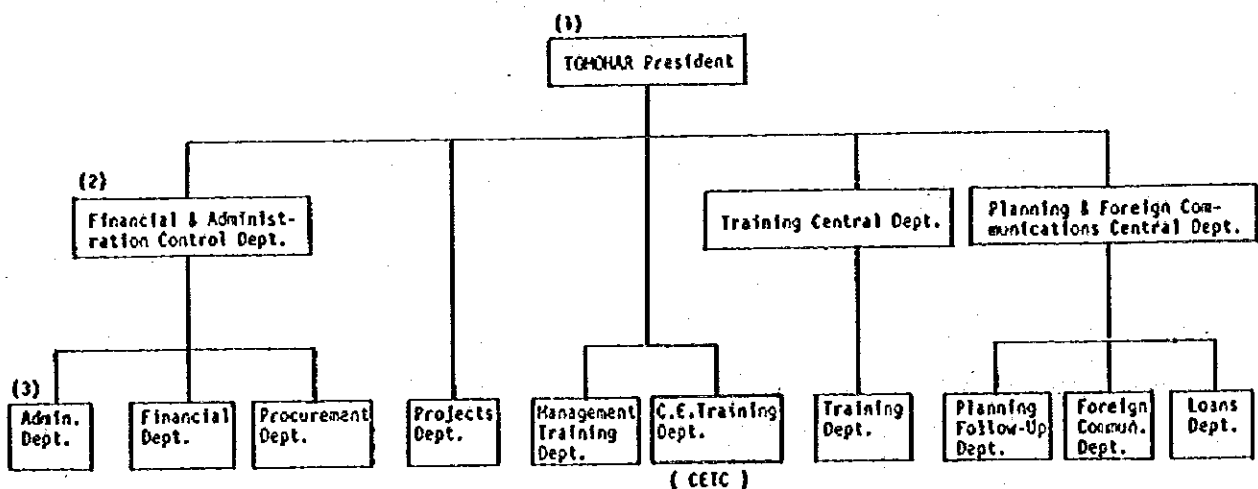
The executive agency of this Project is TOMOHAR, a vocational training organization of construction techniques established in the Ministry of Housing and Reconstruction in 1975, aiming at a dissolution of shortages of skilled laborers in the field of construction, improvement of productivity and enhancement of

employment opportunities to meet the demands from the construction works which are rapidly increasing in Egypt in the years since the end of the Fourth Middle East War.

According to the plans of TOMOHAR, 63 training centres for an intensive training of basic techniques of building and construction and 3 training centres for raising instructors, adding up to 66 centres throughout the country, are to be established.

Furthermore, in view of the recent mechanization of construction works, TOMOHAR has established a special department for vocational training of relevant skilled laborers with a plan to set up 6 construction equipment training centres in the country, out of which the one to be built in the Tenth of Ramadan City will be model facility.

The organization of TOMOHAR is indicated in Fig. 6-1-2 below.



- (1) Means - First Undersecretary level
- (2) " - Undersecretary level
- (3) " - General Director

Fig. 6-1-2 Organization Chart of TOMOHAR

In the new Five-Year plan, target is placed on completion of 66 building and construction skills training centres and 3 construction equipment training centres.

At present, 30 training centres out of 66 have been completed. 10 centres are to be opened in January 1985, 21 centres are under construction, and construction sites are being selected for the remaining 5 centres.

As to the construction equipment training centres, equipment procurement by means of grant aid and technical assistance of West Germany have been decided for the training centre in Bilbeis, Grant Aid and Technical Cooperation of Japan are expected to be realized for the training centre in the Tenth of Ramadan City, and an appropriate aid-providing country is being looked for as to remaining centre in Gesr El Suez.

A committee with the following members was set up in TOMOHAR and was authorized to execute the Project for establishment of the CETC.

Name	Position
1. Mr. Eng. Mohamed El-Said Abd El-Kader	First Undersecretary of State and TOMOHAR President - Leader
2. Mr. Eng. Abd El Aziz Mohamed Hafez	Undersecretary of State - Chief of Central Department for Planning & Foreign Communications - Member
3. Mr. Accountant Mohamed El Arabi Rabi'i	Chief of Central Department for Financial and Administrative Affairs - Member
4. Mr. Architect Hassan F. El Sahar	General Director of Training - Member
5. Mr. Khairi Hassan Ahmed	General Director for Foreign Communications - Member
6. Mr. Eng. Abdallah Ahmed El Baramouni	Director of Training - Member

6-2 Construction Planning

Detailed designs based on the basic design policy will be commenced after the agreement of the E/N (Exchange of Notes) approving the execution of the Project. The consultants shall talk with the committee of the Egyptian side over the details of design and also gain consensus on matters regarding tendering, construction contracts and the execution of works. It is important that the preparatory works on the Site and its neighboring roads are completed by the Government of Egypt without fail, before the actual construction works are commenced. As to the construction plan, it is essential to discuss the limits of construction works to be executed by each of the two countries, and the starting time for connecting various works with infrastructures. Discussions should also be held for determining the appropriate timing for procurement and transportation of construction materials and for the construction work itself, and for setting up the progress schedule. In setting up the progress schedule, it is desirable to adjust the periods of concrete placing to the local climatic conditions, since the Project Site is located in a desert where it is very hot in mid-summer (June through September). An effective progress schedule should be drawn up, taking into account the fact that a period of 2 to 3 months is necessary for the materials procured in Japan to reach the construction site. An appropriate timing should also be set for sending skilled engineers from Japan. The entire period of works is estimated to be 15 months.

Supervision of construction work should be mainly performed by the resident supervisor, who will obtain advice from the designers in the head office whenever necessary. The resident supervisor should deal with technical problems on the site adequately, and also make necessary adjustment to promote a smooth implementation of the Project.

Collaboration from Japan on the Project will be extended not only for construction of facilities and procurement of main materials by means of Grant Aid but also for Technical Cooperation in project

type. A team of several Japanese experts will be dispatched for one year before the inauguration of the CETC, to be engaged in such preparatory activities as setting up training programs, drawing up curriculums, selecting teaching materials and planning of training facilities. It is therefore imperative to act in unison with the above team in the latter half stage of the construction works, especially for the installation of training equipment, so as to promote a smooth progress of the technical cooperation plan.

6-3 Scope of Works

The scope of works to be executed by the Grant Aid of the Government of Japan and the scope of works to be executed by the budget of the Government of Egypt, in case of implementation of the Project, are indicated below.

6-3-1 Construction works, etc. included in the budget of the Government of Japan (within CETC-Area)

(1) Buildings

(2) Facilities

- 1) Electricity facilities
- 2) Facilities for water supply, sewage and drainage, and sanitation
- 3) Airconditioning facilities

(3) Equipment

- 1) Construction equipment for Operation Training
- 2) Construction equipment for Maintenance Training
- 3) Various equipment in Workshops
- 4) Vehicles
- 5) Others (teaching materials for training)

- (4) Outdoor Construction Works
 - 1) Surrounding fences and gates of the area to be constructed by the Japanese side.
 - 2) Parking zone (for 10 cars to be used for servicing)
 - 3) Site roads within the area to be constructed by the Japanese side.
- (5) Furniture for work job

6-3-2 Construction Works, etc. included in the budget of the Government of Egypt

- (1) Procurement of the Site
- (2) Levelling of the ground of the Site (prior to construction works)
- (3) Outdoor Construction Works
 - 1) Gates and fences necessary for enclosing the Site
 - 2) Green belts within the fences
 - 3) Landscape gardening, tree planting, etc.
 - 4) Site roads within the areas to be constructed by the Egyptian side.
- (4) Dormitories for the trainees
- (5) Infrastructure
 - 1) Introduction and connection of electricity into CETC-Area
 - 2) Supply and connection of water into CETC-Area (provision of water meters)
 - 3) Water sprinkling facilities for Forest Area and Green Belt
 - 4) Procurement of Butane Cylinders
 - 5) Connection of telephone cables to the main switchboard
- (6) General Furniture and Curtains

6-4 Tentative Overall Schedule

The tentative schedule in the execution of the Project is as indicated in Fig. 6-4-1.

3 months for detail design, 2 months for tendering activities, and 15 months for construction works are expected to be required after the agreement of the E/N.

-12-11-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

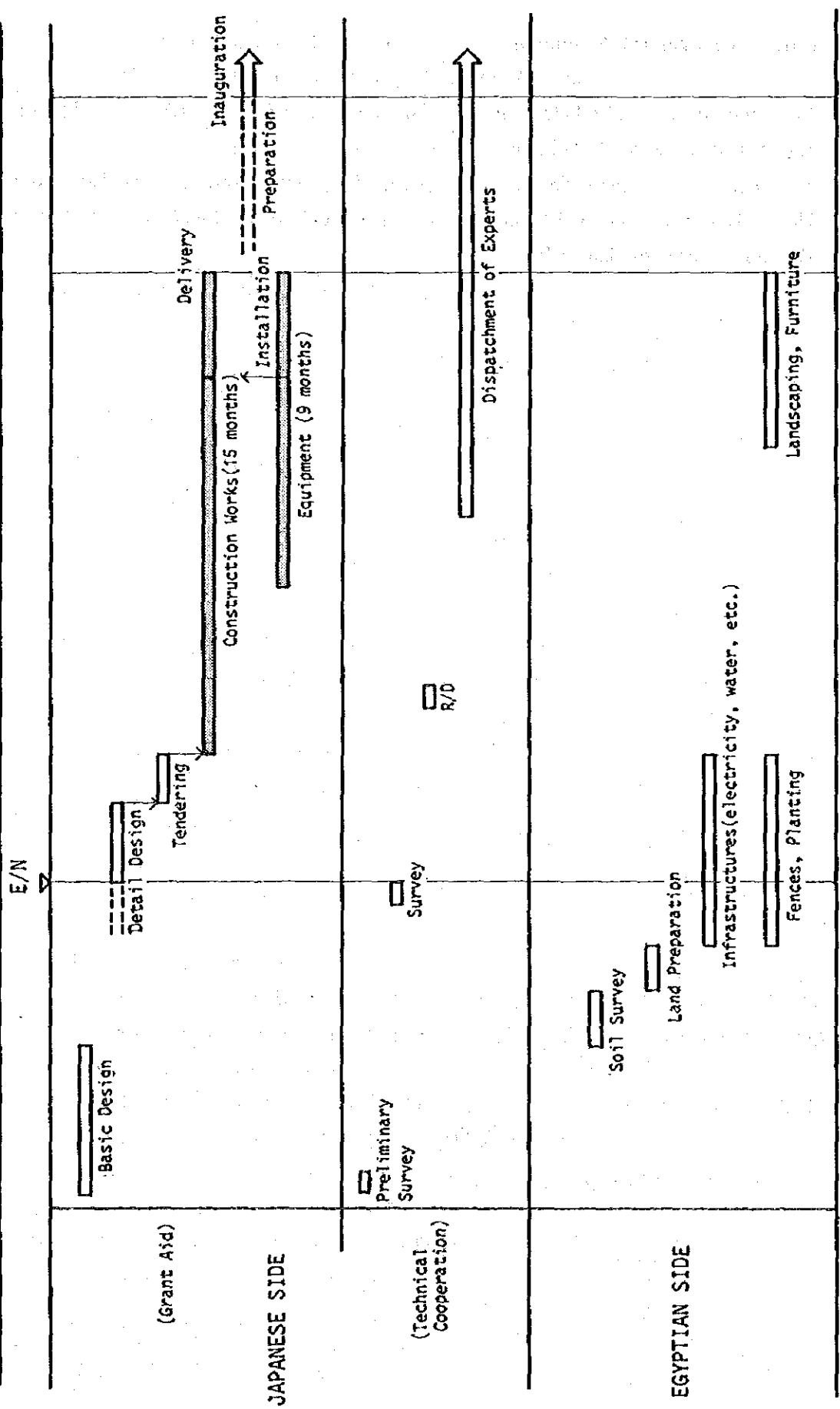


Fig. 6-4-1 Tentative Overall Schedule

6-5 Operation and Maintenance

A supervisory system should be established so as to ensure the smooth operation and maintenance of the CETC after it is completed and delivered to the Government of Egypt.

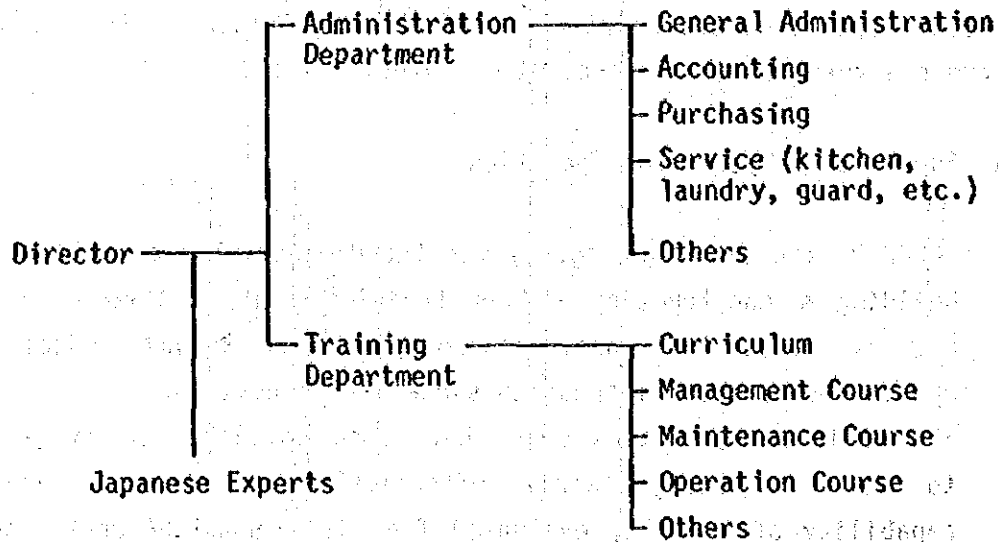
6-5-1 Supervisory System for Operation

TOMOHAR, the executing agency for the Project, has established 30 building & construction skills training centres throughout the country since 1975 and, accordingly, its annual budget for operations has been increasing since its foundation.

The 30 training centres which have been completed so far appear to be functioning fairly effectively and the operational capability of TOMOHAR, evaluated from its record of performance, seems to be reliable. Judging from the size of facilities, contents of training and scale of equipment of the CETC, operational organization indicated in Fig. 6-5-1 is necessary. A plan is drawn up to recruit the approximately 50 personnels required for the management and training sections.

Securing capable personnel is the key to achieving the target of the CETC. Because it is particularly difficult to recruit efficient instructors and assistant instructors in the training section, they should be fostered systematically in the course of Technical Cooperation.

The following shows the outline of the personnel plan.
(Refer to Fig. 6-5-1 Organization Chart for details.)



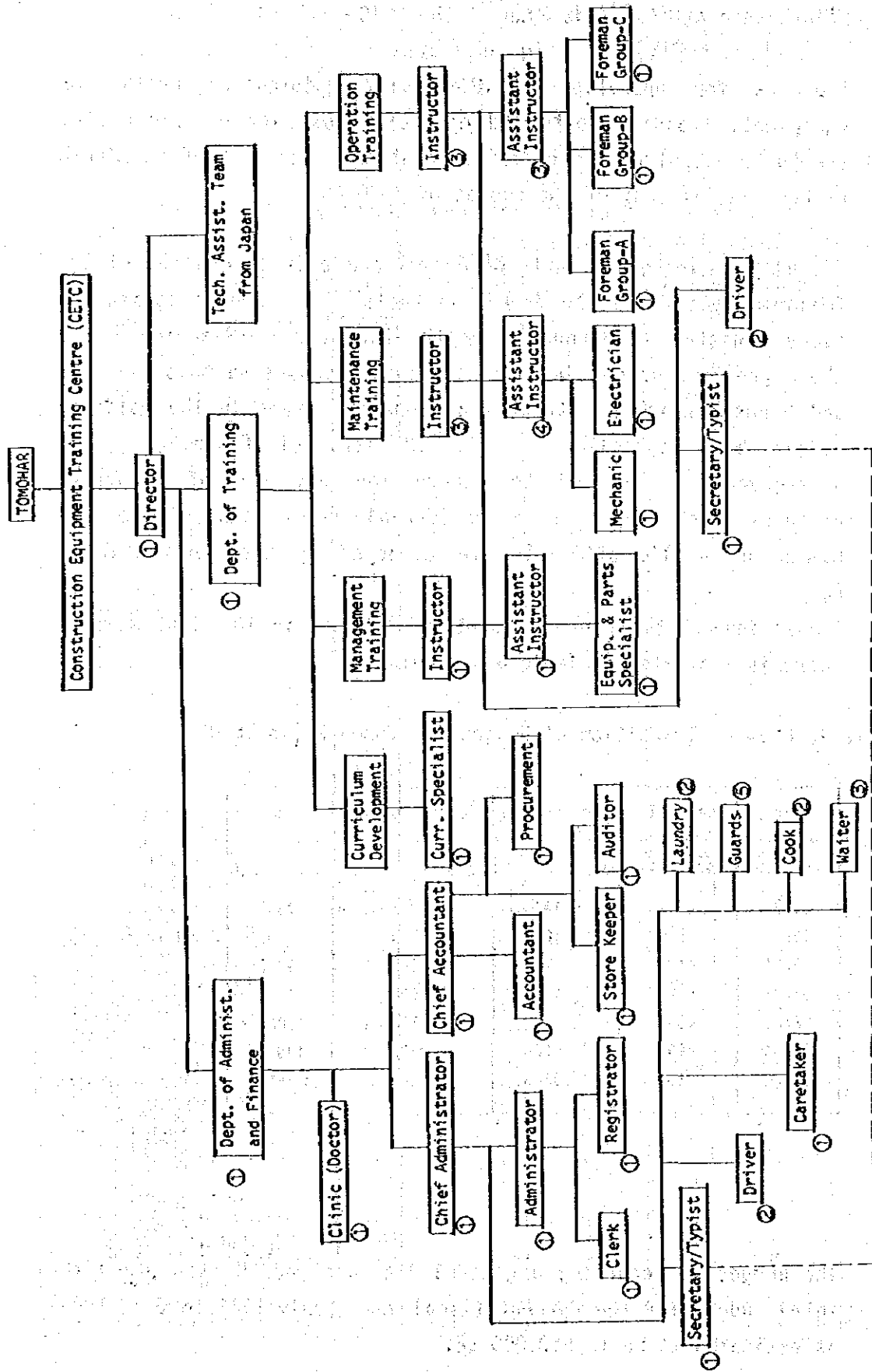


Fig. 6-5-1 Organization Chart of CETC

6-5-2 Maintenance & Management Plan of the CETC

Expenses for operation of the CETC, maintenance costs for equipment, training costs and operation cost for equipment etc. are to be paid from the budget allocated to the CETC of the Tenth of Ramadan City out of the budget of TOMOHAR.

Fiscal year in Egypt starts on July 1 and ends on June 30 of the following year, and the annual financial investment programs for every Ministry is announced by the Ministry of Planning. The above programs do not include personnel expenses such as salaries and bonuses which are treated as separate items in the national Budget and controlled by the Ministry of Finance. This arrangement is adopted to secure the payments of personnel expenses which amounts to a considerable sum because of the vast number of public officials are employed by the Government of Egypt.

Transition of the budget amount of TOMOHAR in the last several years is indicated in Table 6-5-1 below.

Table 6-5-1 Transition of Budget for TOMOHAR (in LE 000)

Year	Capital	Recurrent	Foreign Curre	Total	Remarks
From year 1976 till year 1978 T.B had been included within M.B.					
1979	2097	1445	4217	7359	For 6 months only
1980	1500	1000	500	3000	
80/81	4100	700	5000	9800	
81/82	5200	1300	1900	7400	
82/83	4000	4720	3340	12060	
83/84	8997	6000	3000	17996	
84/85	10850	3500	1200	<u>15550</u>	Excluding personnel expenses

The budget is recording a general increase year by year, and the total budget for the current fiscal year (July 1984 to June 1985) is estimated to be 15,550,000 LE.

According to Table 6-5-2 below, the total amount of investment to TOMOHAR in the new Five-Year plan (1982/1983 - 1986/1987) is estimated to be 64,651,000 LE.

Table 6-5-2 Investment to TOMOHAR based on the new Five-Year plan

TOTAL COSTS AND INVESTMENTS ALLOCATED FOR THE FIVE YEAR PLAN 1982/83 - 1986/87 PROJECTS										
DISTRIBUTED BY FINANCIAL & PHYSICAL COMPONENTS, MINIS. ES AND AGENCIES										
MINISTRY OF RECONSTRUCTION										
L.E. '000										
PROJECT NAME	TOTAL COSTS	IMPLE- MENTED TILL 30/6/82	5 YEAR PLAN TOTAL INVEST- MENT	FINANCIAL COMPONENTS			PHYSICAL COMPONENTS			RESIDUAL COST AFTER 5 YEAR PLAN
				LOCAL CURRENCY	FOREIGN CURRENCY	FOREIGN CREDIT FACILITIES	BUILDINGS CONSTRUC- TIONS	MACHIN- ERY TOOLS TRANSP.	OTHER	
TRAINERS AGENCY FOR CONSTRUCTION & BUILDINGS										
COMPLETION AND EXPANSIONS										
EL FAYOUM CENTER	1250	758	492	492	0	0	492	0	0	0
KARSA MATROUH CENTER	1250	1150	100	100	0	0	100	0	0	0
10TH OF RAMADAN CENTER	3300	2650	650	350	0	300	350	300	0	0
DENA CENTER	1200	635	565	565	0	0	565	0	0	0
AMEREYA CENTER	1340	552	988	698	0	290	698	290	0	0
ETAY EL BAROUD CENTER	1200	774	426	426	0	0	426	0	0	0
DELT DIAMR CENTER	1250	705	545	545	0	0	545	0	0	0
FAYOUS CENTER	1200	726	474	474	0	0	474	0	0	0
ASHAN CENTER	1000	680	320	320	0	0	320	0	0	0
RAS EL SAQUQA CENTER	1730	1330	200	200	0	0	200	0	0	0
MAY 15TH CITY CENTER	815	353	462	452	0	0	452	0	0	0
OCUISNA CENTER	830	360	490	490	0	0	490	0	0	0
HOSH EISA CENTER	823	353	460	460	0	0	460	0	0	0
DEIRB NEGH CENTER	750	523	227	223	0	0	223	0	0	0
BADAT CITY CENTER	870	430	440	440	0	0	440	0	0	0
ASSYOUT CENTER	730	431	298	298	0	0	298	0	0	0
EL MADARA CENTER	720	230	470	470	0	0	470	0	0	0
SCHAO CENTER	740	347	393	393	0	0	393	0	0	0
GERGA CENTER	815	230	585	585	0	0	585	0	0	0
ESNA CENTER	810	250	560	560	0	0	560	0	0	0
IMPLEMENTATION NEEDS FOR CENTERS	20220	0	20220	20220	0	0	700	3340	16180	0
T. COMPLETION AND EXPANSIONS	43083	13734	29231	28741	0	590	9221	3930	16180	0
NEW PROJECTS										
CONSTRUCTION OF TRAINING CENTER EL KOTYA	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER SAMANOUH	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER KOTTOUR	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER DEKERNES	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER BEYALA TRAINING CENTER	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER FARASKOUR	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER TANTA TRAINING CENTER	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER SHEBIN EL KHAYMA	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER BENOURES	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER BULLAK EL DAKROH TRAINING CENTER	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER DITA	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER EL AYAY	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER EL SAF	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER EL FASIR	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER ESHAHAY	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER ABOU TEID	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER TANA	1100	0	1100	800	0	300	800	300	0	0
CONSTRUCTION OF TRAINING CENTER BENI MAZAR	1100	0	600	300	0	300	300	300	0	300
CONSTRUCTION OF TRAINING CENTER DAMANOUR	1100	0	600	300	0	300	300	300	0	300
CONSTRUCTION OF TRAINING CENTER WASTA	1100	0	600	300	0	300	300	300	0	300
CONSTRUCTION OF TRAINING CENTER ARTESH	1100	0	600	300	0	300	300	300	0	300
CONSTRUCTION OF TRAINING CENTER ABOU HANNAD	1100	0	600	300	0	300	300	300	0	300
CONSTR. OF THE CENTER FOR TRAINING ON HEAVY EQUIP. IN BEL BEIG	4690	0	4690	730	0	3940	750	3940	0	0
CONSTR. OF CENTER FOR TRAIN ON HEAVY EQUIP. IN DOKKI RAMADAN CITY	4690	0	4690	730	0	3940	750	3940	0	0
CONSTR. OF CENTER FOR TRAIN ON HEAVY EQUIP. IN BESA EL SUET	4690	0	4240	300	0	3940	300	3940	0	430
T. NEW PROJECTS	38270	0	33320	16900	0	16420	16900	16420	0	2950
TOTAL TRAINING AGENCY FOR CONSTRUCTION & BUILDINGS	81353	13734	62551	45641	0	19010	26121	22350	16180	2950

Table 6-5-3 Breakdown of Budget for the Current Fiscal Year (1984/1985)

The investments which decided for yearly projects 1984/1985 separated by financial and physical components and the main authorities responsible and nature of projects

Ministry of Development - 150000

(x LE 1000)

Project Name	Total investments 1984/85	Financial components		Physical components				Transportation	Furniture	Others
		Local Foreign	Current Credit	Leveling of Land	Dormitory or Staff house	Office Workshop	Construction			
TONOHAR										
Continuation & Extension										
Mersa Matrouh Center	55	0	0	0	0	0	55	0	0	0
El-Amriah Center	71	0	0	0	0	0	71	0	0	0
Itai El Baroud Center	169	0	0	0	169	0	0	0	0	0
Meet Ghamr Center	138	0	0	0	138	0	0	0	0	0
Fakous Center	192	0	0	0	192	0	0	0	0	0
15th May Center	324	0	0	0	324	0	0	0	0	0
Kouwesna Center	209	0	0	0	209	0	0	0	0	0
Housh Eisa Center	115	0	0	0	115	0	0	0	0	0
Dyarb Nigm Center	96	0	0	0	0	96	0	0	0	0
El Sadat City Center	172	0	0	0	172	0	0	0	0	0
Assuit Center	45	0	0	0	0	45	0	0	0	0
Essna Center	18	0	0	0	0	18	0	0	0	0
Implementation Needs for Centers	3500	0	0	242	350	0	0	100	500	2308
Sub-Total	5104	0	0	242	1619	285	0	100	500	2308
New Projects										
El-Kata Center	400	0	50	0	350	0	0	50	0	0
Sahanoud Center	400	0	50	0	350	0	0	50	0	0
Kotfour Center	400	0	50	0	350	0	0	50	0	0
El Manzala Center	400	0	50	0	350	0	0	50	0	0
Belkas Center	400	0	50	0	350	0	0	50	0	0
Faraskour Center	400	0	50	0	350	0	0	50	0	0
El-Santa Center	400	0	50	0	350	0	0	50	0	0

(continued)

(x LE 1000)

Project Name	Total Investments 1984/85	Financial Components		Physical Components			Transportation	Furniture	Other								
		Local Curren	Foreign Credit	Leveling of Land	Dormitory or Staff house	Office Workshop				Construction	Machine & Tools & Equipment	Instruments					
Shebin El-Kou Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
Sen-Noures	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
El-Tour Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
El-Giza Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
El-Aiyat Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
El-Koseya Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
El-Fashne Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
Tameya Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
Abouteig Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
Edfo Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
Maghagha Center	400	350	0	50	0	0	350	0	50	0	0	0	0	0	0	0	0
Abo-Homos Center	410	360	0	50	0	0	360	0	50	0	0	0	0	0	0	0	0
Elwasta Center	550	500	0	50	0	0	500	0	50	0	0	0	0	0	0	0	0
El-Arish Center	550	500	0	50	0	0	500	0	50	0	0	0	0	0	0	0	0
Hurghada Center	550	500	0	50	0	0	500	0	50	0	0	0	0	0	0	0	0
(Construction Equip- ment Training Center)																	
Belbeis	550	500	0	50	0	0	500	0	50	0	0	0	0	0	0	0	0
10th of Ramadan	550	500	0	50	0	0	500	0	50	0	0	0	0	0	0	0	0
Gesr El Suez	100	100	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
Sub Total	10460	9260	0	1200	0	0	9260	0	1200	0	0	1200	0	0	0	0	0

Total	15564	14364	0	1200	0	0	10879	0	10879	285	1200	100	500	0	2308
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Details of the budget for the current fiscal year (1984/1985), an amount corresponding to about 15,550,000 LE indicated in Table 6-5-1, are shown in Table 6-5-3. Personnel expenses, which are treated separately as mentioned above, is excluded.

Judging from the above, the budget operation of TOMOHAR seems to be fairly reliable, and there appears to be no problem for securing the necessary budget for the maintenance and management of the CETC.

The estimated annual maintenance costs for the CETC are indicated below.

Item	Maintenance Fee (LE)
1. Personnel Expenses (for 54 persons)	168,500
2. Allowances for Trainees	37,500
3. Fuel & Lubricating Oil	8,500
4. Energy Expenses	35,200
5. Dining Room (ingredients)	69,000
6. Laundry (detergents, uniforms)	8,600
7. Automobiles (gasoline, maintenance)	6,000
8. Spare Parts (construction equipment)	150,000
9. Maintenance Costs for Facilities	50,000
10. Teaching materials	19,000
11. Cleaning Materials	1,000
Total	553,300 LE

As shown above, the approximate annual maintenance and management cost of the CETC is 554,000 LE, the details of which are indicated below, and the maintenance cost excluding personnel expenses reduced to about 385,000 LE compares favorably with the annual budget of TOMOHAR (shown in Table 6-5-3). It is therefore expected that the CETC will be operated and maintained without trouble by this budget.

Breakdown of Maintenance and Management Costs of the CETC

(1) Personnel Expenses

Personnel expenses for 54 staff members of the CETC calculated on the data shown in the proposal received from Egypt:

Class	Annual Income (LE)	Number of Personnel	Total Annual Income (LE)
General Manager	7,000	1	7,000
Manager	6,200	2	12,400
Chief Instructor	5,500	3	16,500
Instructor	4,800	7	33,600
Assistant Instructor	4,000	11	44,000
Foreman	2,800	10	28,000
Others	1,350	20	27,000
		54	168,500 LE

(2) Allowances for Trainees

Allowance of 2 LE per day for each trainee.

Management

Course : 30 persons x 3 months x 25 days x 2 LE
= 4,500

Operation

Course : 120 persons x 3 months x 25 days x 2 LE
= 18,000

Maintenance

Course : 60 persons x 5 months x 25 days x 2 LE
= 15,000

210 persons 37,500 LE

(3) Fuel and Lubricant

1) Fuel for Construction Equipment

250 l/h x 3h x 12m x 25d x 0.03 LE/l = 7,000

2) Lubricant (20% of above)

7,020 x 0.20 = 1,404

Sub-total 8,500 LE

(4) Energy

1) Electricity

Electricity Consumption

Administration Bldg., Instructors Bldg.

Service Bldg. 40,700kw

141,600kwh

Training Bldg. 100,900kw

141,600kwh x 0.10 LE/kwh = 14,200 LE

2) Water

Water Consumption

Human Consumption

130 persons x 0.2m³/d x 12m x 25d = 7,800m³

Workshop, Car Washing

10m³/d x 12m x 25d = 3,000

Watering Trees

500m³/d x 365 = 182,500

193,300m³

193,300m³ x 0.10 LE/m³ = 19,300 LE

3) Gas Consumption in Catering Room and Boiling Water

1,000 LE

4) Sewage Carriers for Waste Water

100 LE

5) Telephone

	$15 \text{ tel/d} \times 300 \text{ d/1000} \times 30 \text{ LE} \times 2 =$	270 LE
6) Garbage Disposal		300 LE

Sub-total	35,170 LE
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(5) Catering Cost (mainly ingredients)

Breakfast		
	$130 \text{ persons} \times 0.25 \times 0.5 \text{ LE} =$	17 LE
Lunch		
	$130 \text{ persons} \times 1.0 \times 1.0 \text{ LE} =$	130 LE
Supper		
	$130 \text{ persons} \times 0.25 \times 1.0 \text{ LE} =$	33 LE
Others (tea, beverages)		
		50 LE
		<hr/>
		230 LE

$230 \times 12\text{m} \times 25\text{d} =$	69,000 LE
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(6) Laundry

Detergents	$0.5 \text{ LE} \times 25 \times 12\text{m} =$	150 LE
Cost for Uniforms	$20 \text{ LE} \times 210 \text{ persons} \times 2 =$	8,400 LE

Sub-total	8,600 LE
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(7) Maintenance Cost for Cars

Gasoline		3,000 LE
Maintenance Cost		3,000 LE

Sub-total	6,000 LE
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(8) Costs for new Spare Parts (Training)

5% of Cost for new equipments		150,000 LE
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(9) Facility Maintenance Costs	
Repair of Buildings and Facility Maintenance	50,000 LE
(10) Costs of Teaching Materials	
1 LE/d per one trainee	
$(10 \times 9 + 40 \times 9 + 30 \times 10) \times 25d \times 1 \text{ LE} =$	19,000 LE
(11) Costs of Cleaning Materials	1,000 LE

CHAPTER 7: PROJECT APPRAISAL

CHAPTER 7: PROJECT APPRAISAL

The new Five-Year plan (1982/83 - 1986/87) of Egypt mainly aims at reinforcing the bases of the so-called production sector such as agriculture, mining and manufacturing industries by concentrating investments into these fields.

For this reason, the promotion of construction works for the preparation of infrastructures, which forms the basis for this plan, is important. Cutting down construction terms as well as reducing the costs for construction works must be achieved by means of efficient construction equipment with high performance.

The progress of construction works of most of the major projects have so far lagged behind the construction work schedules set up at the planning stages. One of the reasons for this is that, whereas the Government invests a considerable amount of money into the purchase of construction equipment, there is not a sufficient number of skilled laborers to handle them, and efficient operation and maintenance are not being performed.

This Project is part of the vocational training project to raise skilled laborers required in these fields, and since it is to serve as the model case in the field of construction equipment, it will significantly influence similar projects to be conducted in future as well as other relevant fields.

By raising skilled labor force, Egypt will be able to make efficient investments into the production sector, meeting the economic and social needs, and contribute to the improvement of productivity of industries in general.

As outlined above, the Project for establishing a construction equipment training centre in Egypt through Japan's Grant Aid will form the basis for projects of higher ranking activities in the national development program and investment in the Project is to be highly evaluated in terms of economic and social development.

The CETC is to be built in the new city of Tenth of Ramadan, currently under construction 55km northeast of Cairo. The population of this new city is expected to reach 500,000 by the year 2000. The area of its site

is about 50km², out of which one quarter has been completed so far. Many apartment houses as well as factories for light, medium and heavy industries are to be built throughout the city, and preparatory construction works including land preparation, construction of drainage, city water, electricity, telephone and roads are to be conducted in succession. Many construction equipment are to be used in these construction works, so the Project will also meet the demand for relevant skilled laborers. "On the Job Training" on the site of the new community currently under construction is also possible as an important part of the training, and the location of the construction site of the CETC is quite convenient for this sort of vocational training, enhancing the prospective effects of the Project all the more.

Most of the trainees of the CETC are engineers and operators engaged in the actual works, sent by public sectors under the control of the Ministry of Development, New Communities and Land Reclamation and Ministry of Housing.

There are three training courses (Management, Maintenance, Operation) and trainees of the Management Course are mainly university graduates whereas those of the Maintenance Course and Operation Course are mainly technical high school graduates. Generally speaking, education in Egypt leans toward theories, and education in schools mainly depend on textbooks with insufficient practical training using teaching materials. In view of the above circumstances, the CETC will play an important role in providing trainees with a highly technical, practical education which cannot be acquired at schools and workshops, resulting in the upgrading of technical levels at public sector workshops by providing construction industries with active labor force of high quality. This will, in turn, contribute to the improvement of technical abilities of middle class engineers required on the site of large-scaled projects based on the National Development Program, and to supplying skilled labor force leading to better employment situations.

This is the first case for TOMOHAR to establish a construction equipment training centre, and its technological qualities are expected to be quite high compared with the existing training centres.

TOMOHAR therefore regards the CETC as a special section, placing it under the direct control of the President of TOMOHAR, providing about 50 excellent personnel for its staff, and planning to formulate a budget of about 600,000 LE for its annual operation costs. The above amount corresponds to the annual maintenance costs which we have estimated and seems to be quite feasible judging from the past budget results.

As to the budgeting of construction works for the Project to be covered by the Egyptian side, it seems to be feasible as far as we can judge from the case of construction works covered by them in the investment program for training activities during this year.

We therefore conclude that TOMOHAR is capable of executing the Project and operating it satisfactorily after its establishment.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8-1 Conclusions

As explained in previous chapters, the Project was conceived as part of the national development program of Egypt. Under the current circumstances of serious shortages in the number of engineers for management, operation and maintenance of construction equipment introduced into Egypt for the modernization of the construction industry, the Project is aimed as a human resources development program of raising 210 expert engineers each year through vocational education and training of high levels. This will contribute to the construction industry not only by upgrading the efficiency of construction works but also reducing the construction terms.

Recognizing the urgency of establishing the construction equipment training centre, the Government of Egypt requested to the Government of Japan the cooperation for an early establishment of the CETC. The Study Team dispatched from Japan also confirmed the necessity of the CETC through various surveys they conducted in Egypt on the background of the Project.

TOMO HAR, the executing agency in Egypt for the Project, is highly relied upon for its ability to implement the Project for the establishment of the CETC, judging from its performances in the past.

We therefore considered the Project to be appropriate and in line with the objectives of Japan's Grant Aid, and that the CETC will play an important role in the construction industry in Egypt when completed. It is earnestly desired that the Project is put into effect immediately by Grant Aid and Technical Cooperation of the Government of Japan.

8-2 Recommendations

Construction equipment plays a vital role in the preparation works for infrastructures indispensable to the social and economic development of Egypt, and training of expert engineers for handling those equipment is urgently called for. Under these circumstances, Grant Aid and Technical Cooperation from the Government of Japan will be extended to the Project for establishment of the CETC, and the following cooperations of Egypt are required for a smooth and effective utilization of the CETC after its completion.

- (1) It is imperative to complete the system, secure the required personnel, and take appropriate budgetary actions to ensure smooth operations, maintenance and management of the facilities after the completion of the CETC.
- (2) An open-door policy should be adopted as much as possible in the utilization of facilities and acceptance of trainees, thus opening the facilities not only to public sectors but also to private sectors.
- (3) Some fund-raising measures may be necessary, such as collecting fees from companies that send trainees, to cover a part of the operation cost.
- (4) Good salaries should be paid to recruit instructors with high expertise and to have them stay at the CETC.
- (5) It is definitely necessary to complete the construction of the fence around the Site, the levelling of the Site, and the preparation of infrastructure such as roads, electricity and water, which are all to be done by the Egyptian side before the Japanese side commences the construction work of the CETC.
- (6) Prompt actions should be taken by the Government of Egypt whenever necessary during the period of Japanese construction works, for dealing with customs involving import of equipment and material necessary for the works and local procurement of materials.