5-3-2 Sewer Facilities

GENERAL PLAN S = 1:2 000

NOTES

1 UNLESS OTHERWISE NOTED, THE FOLLOWING APPLY:
- ALL DIMENSIONS ARE IN MILLIMETERS.
- ALL LEVELS ARE IN METERS ABOVE MEAN SEA LEVEL DATUM AT ALEXANDRIA.
- DISTANCES ON PROFILES ARE IN METERS.

2 PIPE OUTLINES ON THE PROFILE SHEETS ARE DRAWN TO THE PIPE INSIDE OR NOMINAL DIAMETER.

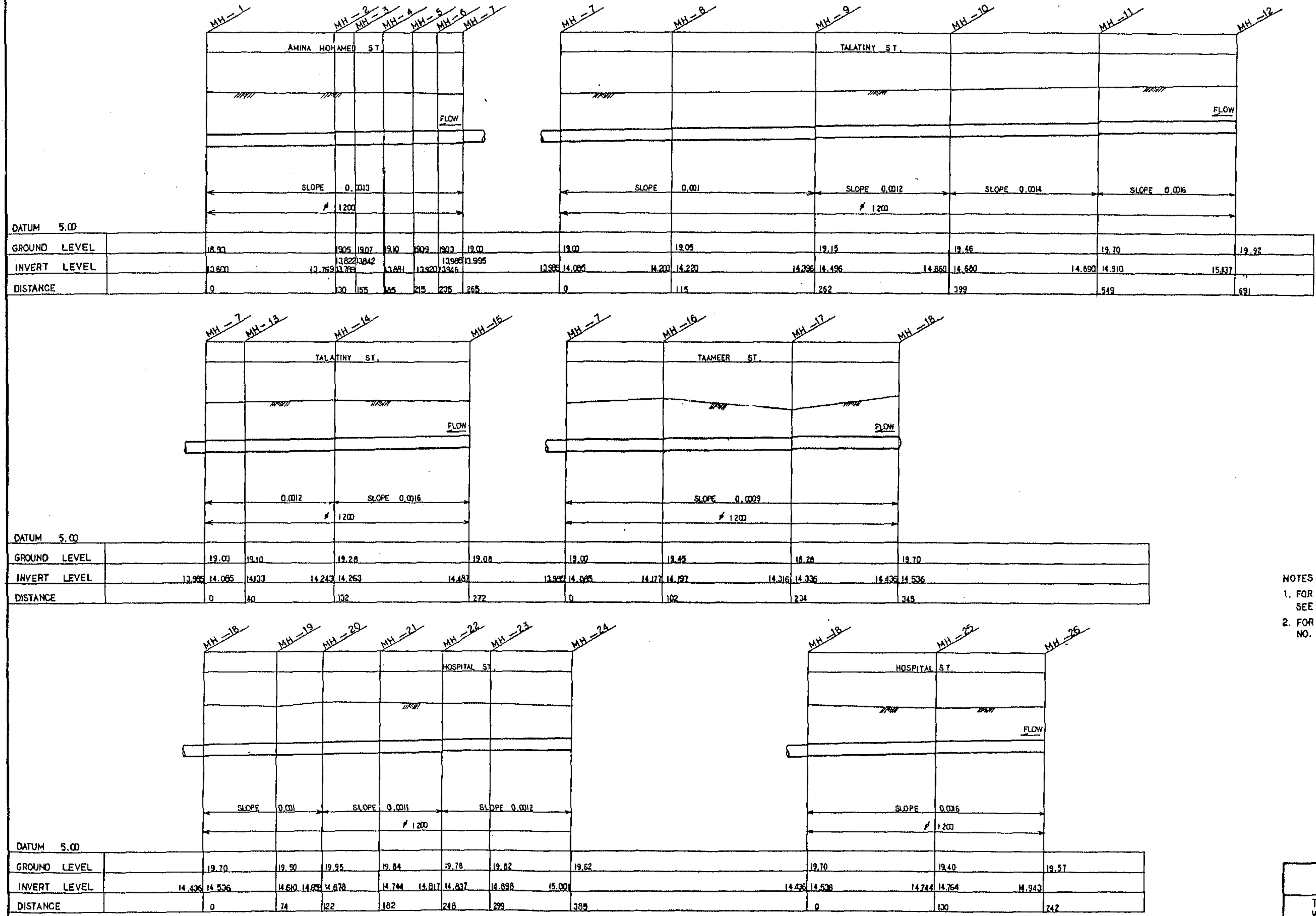
3 ALL WASTEWATER FLOW IS TO BE MAINTAINED DURING CONSTRUCTION.

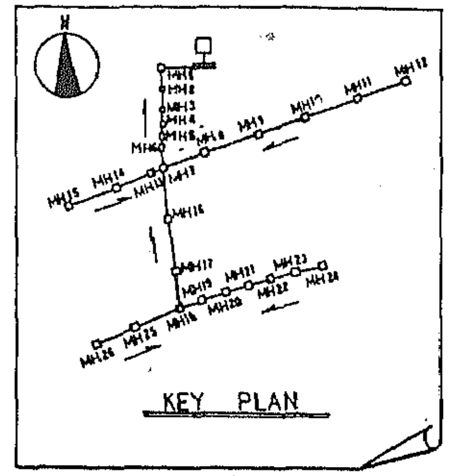
4 ALL MANHOLES TO BE ABANDONED ARE TO BE BACKFILLED TO EXISTING GRADE. MANHOLE FRAMES AND COVERS ARE TO BE REMOVED. ALL CONNECTIONS ARE TO BE PLUGGED.

LEGEND

- PROPOSED SEWER MAIN LINE (CENTRIFUGAL REINFORCED CONCRETE PIPE φ1200)
- CONNECTION PIPE (VITRIFIED CLAY PIPE φ225 ~ φ450)
- EXISTING SEWER LINE
- NEW MANHOLE
- EXISTING MANHOLE

THE ARAB REPUBLIC OF EGYPT GIZA CITY, GIZA GOVERNORATE	SCALE 1 : 2000
THE PROJECT OF OMRANIA WEST WATER SUPPLY AND SEWER UPGRADING	DWG NO.
SEWER MAIN LINE - PLAN	EGU - S - 01
DATE / DESIGNED / CHECKED / APPROVED	REVISION
JAPAN INTERNATIONAL COOPERATION AGENCY	





NOTES

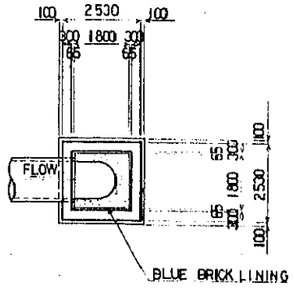
1. FOR THE GENERAL PLAN OF SEWER MAIN LINE, SEE DRAWING NO. EGU-S-01.
2. FOR THE DETAIL OF MANHOLE, SEE DRAWING NO. EGU-S-03.

PROFILE

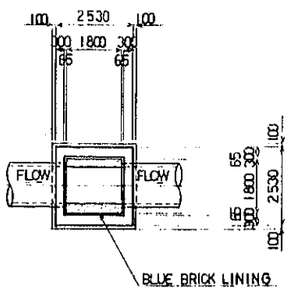
SCALE (VERTICAL) 1:200 meter 0 1 5 10 meters

SCALE (HORIZONTAL) 1:2000 meter 0 10 50 100 meters

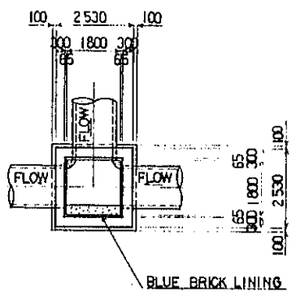
THE ARAB REPUBLIC OF EGYPT GIZA CITY, GIZA GOVERNORATE		SCALE 1 : 200 1 : 2000
THE PROJECT OF OMRANIA WEST WATER SUPPLY AND SEWER UPGRADING		DWG. NO.
SEWER MAIN LINE LONGITUDINAL SECTION		EGU-S-02
DATE	DESIGNED	CHECKED	APPROVED	REVISION
JAPAN INTERNATIONAL COOPERATION AGENCY		



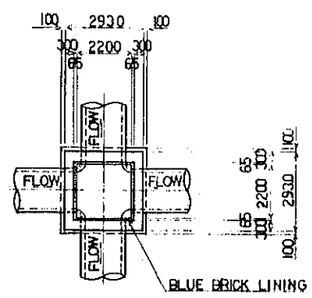
PLAN



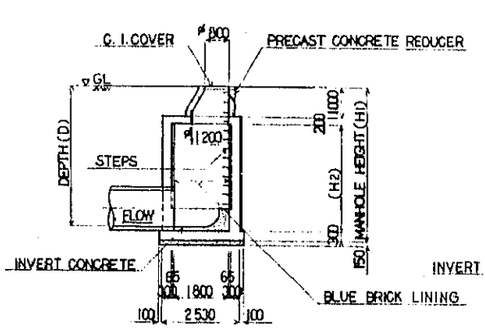
PLAN



PLAN

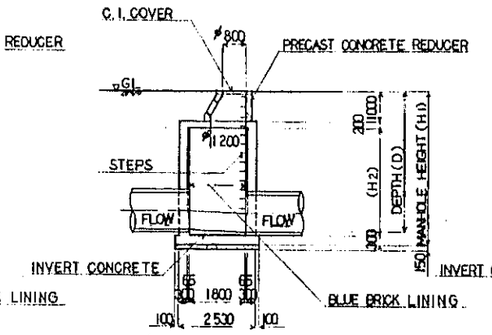


PLAN



SECTION

TYPE - 1



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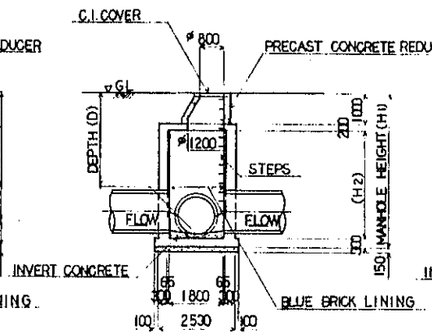

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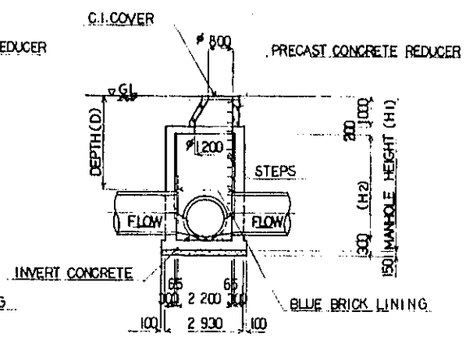
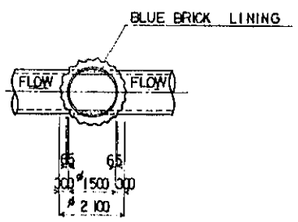
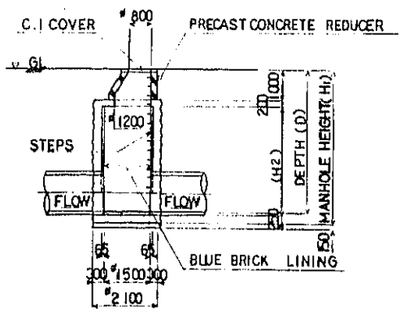


SECTION

TYPE - 4



PLAN



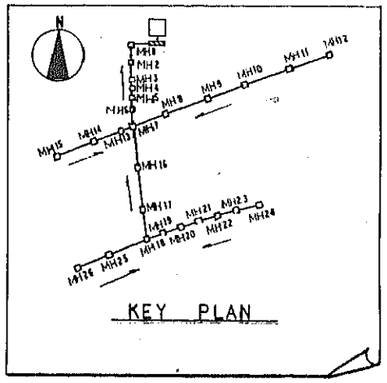
SECTION

TYPE - 5

MANHOLE LIST

MANHOLE NO.	DEPTH (D) (m)	TYPE	MANHOLE HEIGHT (m) (H1)	(H2)
1	5.200	2	5.615	4.115
2	5.216	2	5.631	4.131
3	5.200	2	5.615	4.115
4	5.186	5	5.601	4.101
5	5.152	5	5.567	4.067
6	5.076	5	5.491	3.991
7	5.022	4	5.437	3.937
8	4.857	2	5.272	3.772
9	4.792	2	5.207	3.707
10	4.840	2	5.255	3.755
11	4.850	2	5.265	3.765
12	4.744	1	5.159	3.659
13	4.974	5	5.389	3.889

MANHOLE NO.	DEPTH (D) (m)	TYPE	MANHOLE HEIGHT (m) (H1)	(H2)
14	5.046	2	5.461	3.961
15	4.607	1	5.022	3.522
16	5.282	2	5.697	4.197
17	3.975	2	4.390	2.890
18	5.197	3	5.612	4.112
19	4.825	5	5.190	3.740
20	5.228	2	5.643	4.143
21	5.034	5	5.399	3.949
22	4.905	2	5.320	3.820
23	4.785	5	5.150	3.700
24	4.483	2	4.898	3.398
25	4.589	2	5.004	3.504
26	4.561	1	4.976	3.476



KEY PLAN

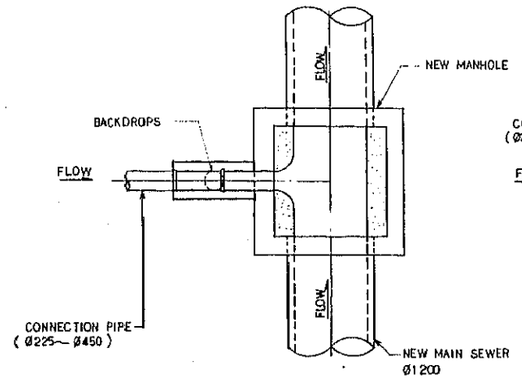
NOTES

1. MANHOLE WALL AND SLAB SHALL BE CAST - IN - PLACE REINFORCED CONCRETE.
2. C.I. COVER DENOTES CAST IRON COVER.

THE ARAB REPUBLIC OF EGYPT GIZA CITY, GIZA GOVERNORATE	SCALE NOT TO SCALE
THE PROJECT OF OMRANIA WEST WATER SUPPLY AND SEWER UPGRADING	DWG. NO.
DETAIL OF MANHOLE	EGU - S-03

DATE	DESIGNED	CHECKED	APPROVED	REVISION

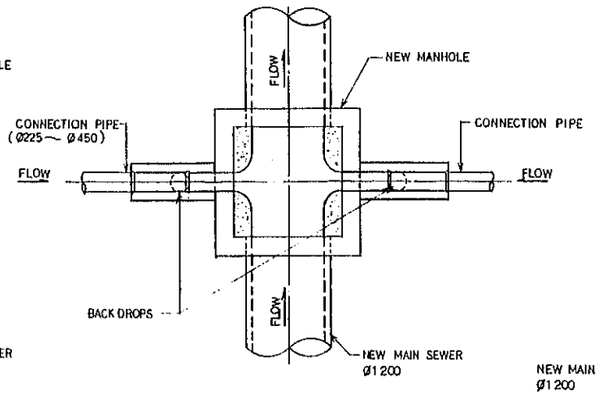
JAPAN INTERNATIONAL COOPERATION AGENCY



PLAN

TYPE-A

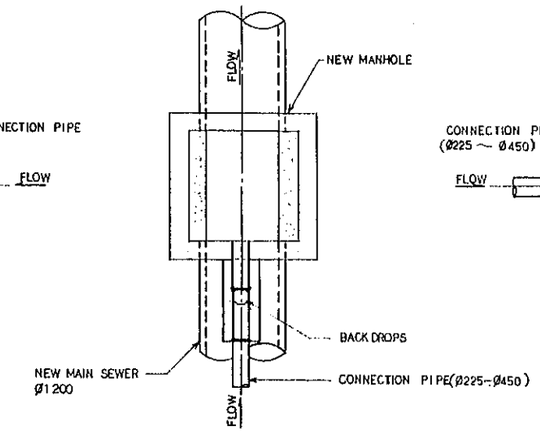
(MANHOLE NO.1,11,12,14,15,24,25)



PLAN

TYPE-B

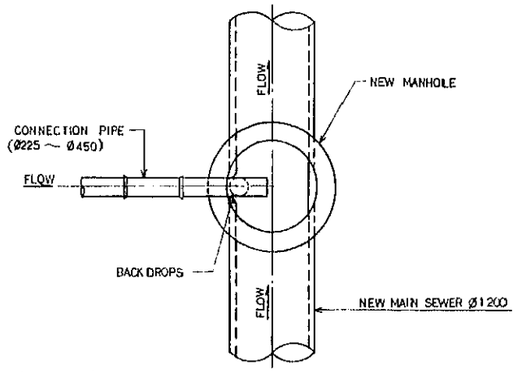
(MANHOLE NO.7,8,9,10,18,20,22)



PLAN

TYPE-C

(MANHOLE NO.16,17)



PLAN

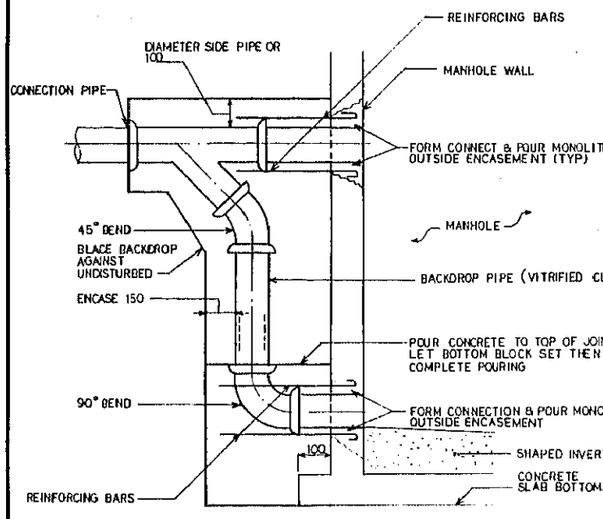
TYPE-D

(MANHOLE NO.4,5,6,13,19,21,23)

NOTES

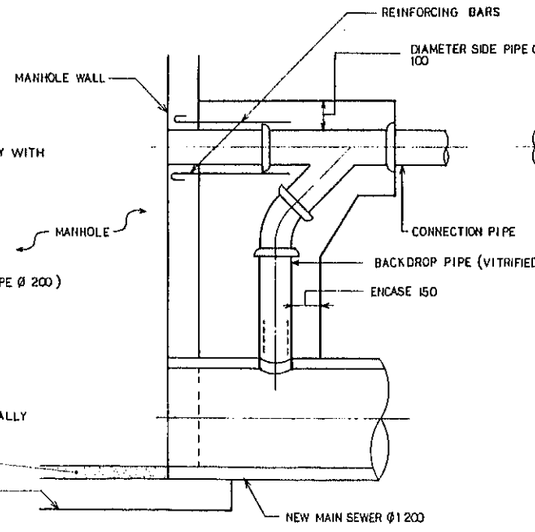
1 FOR THE LOCATION OF NEW MANHOLE AND CONNECTION TO EXISTING MANHOLE, SEE DRAWING NO. EGU-S-01

2 BACKDROP CONNECTION SHALL BE APPLIED IN CASE THE BACKDROP HEIGHT IS NOT LESS THAN 1200 MIN.



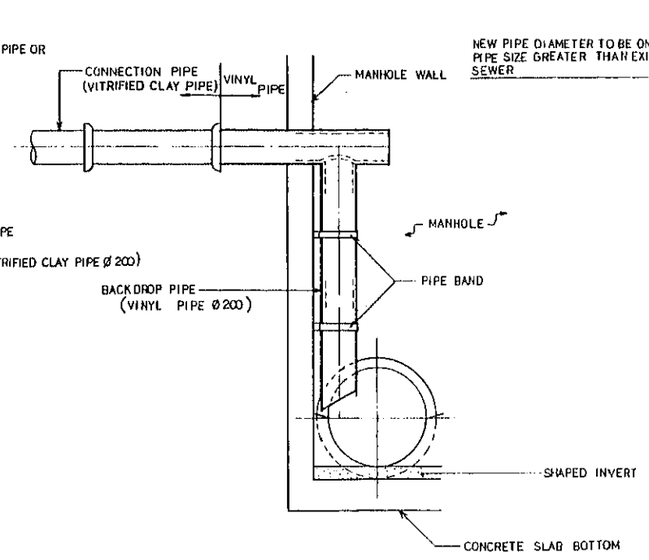
SECTION

BACKDROP CONNECTION AT TYPE-A & B



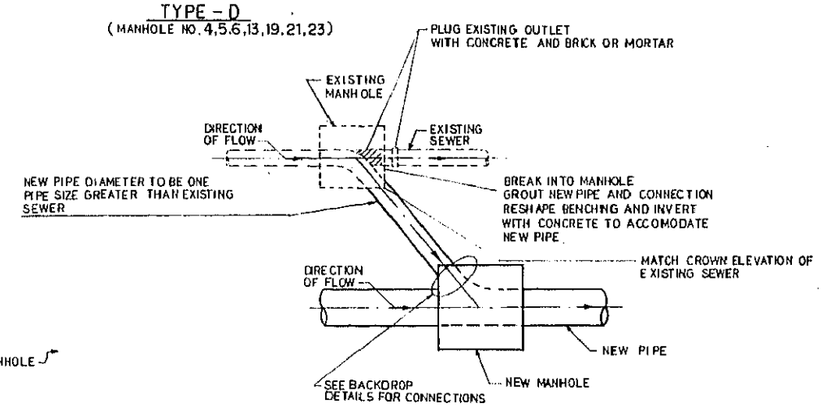
SECTION

BACKDROP CONNECTION AT TYPE - C



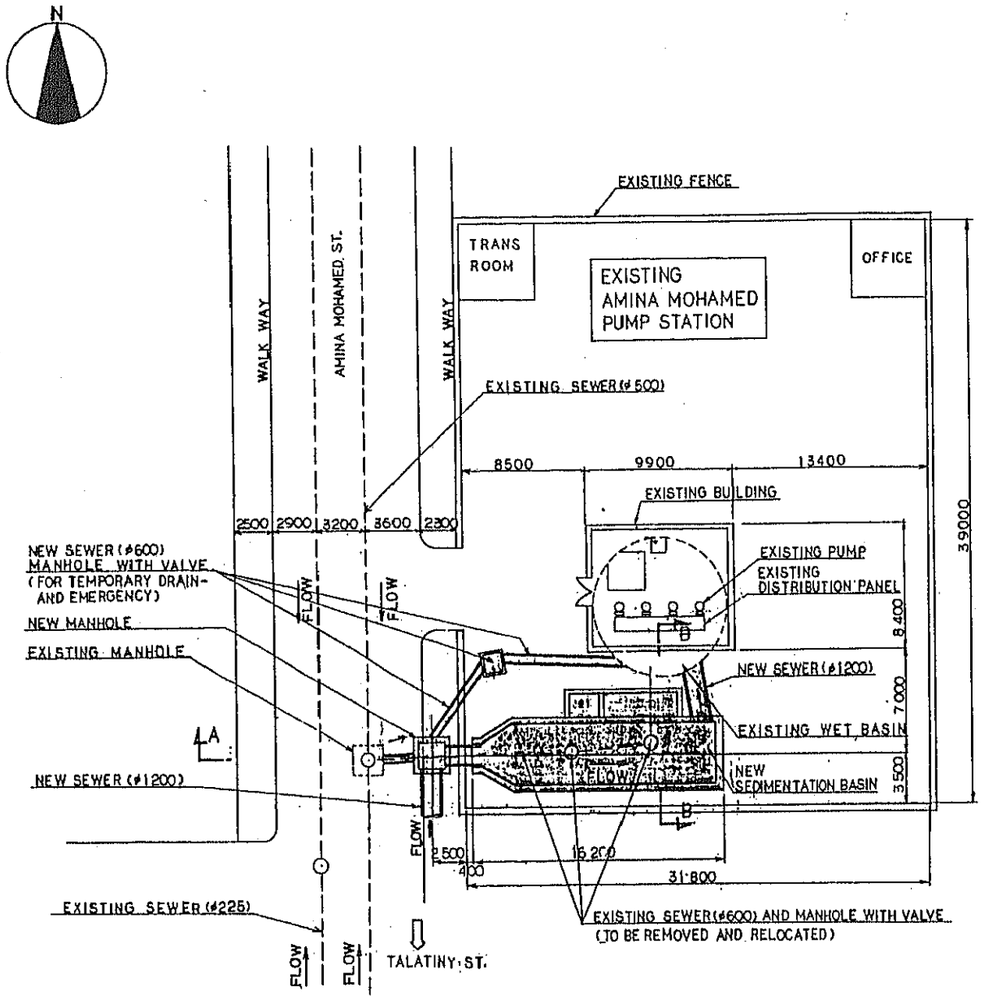
SECTION

BACKDROP CONNECTION AT TYPE - D

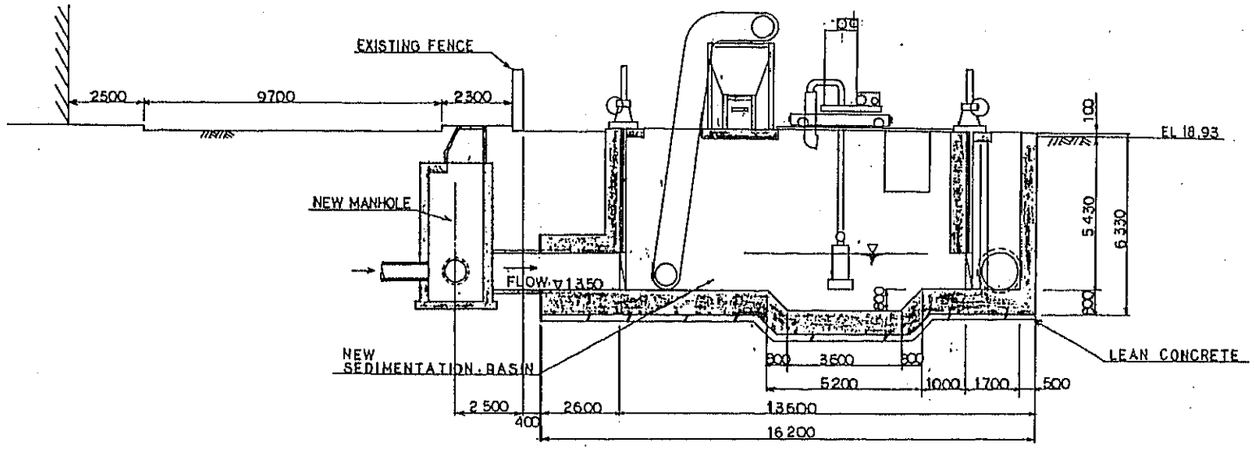


CONNECTION TO EXISTING MANHOLE

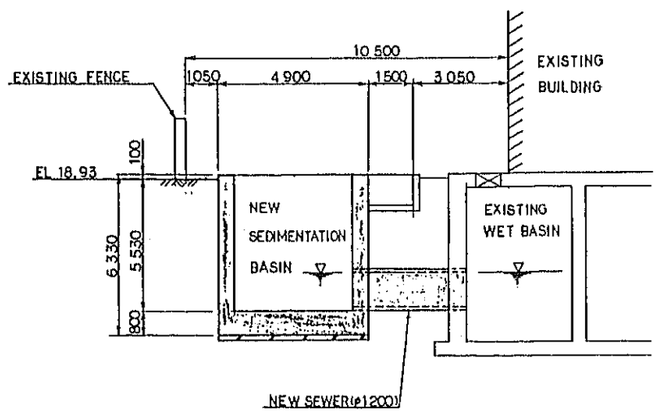
THE ARAB REPUBLIC OF EGYPT GIZA CITY, GIZA GOVERNORATE	SCALE NOT TO SCALE
THE PROJECT OF OMRANIA WEST WATER SUPPLY AND SEWER UPGRADING	DWG.NO.
CONNECTION TO EXISTING SEWER LINE	EGU - S - 04
DATE / DESIGNED / CHECKED / APPROVED	REVISION
JAPAN INTERNATIONAL COOPERATION AGENCY	



SEDIMENTATION BASIN - PLAN S = 1 : 200



SECTION A - A



SECTION B - B

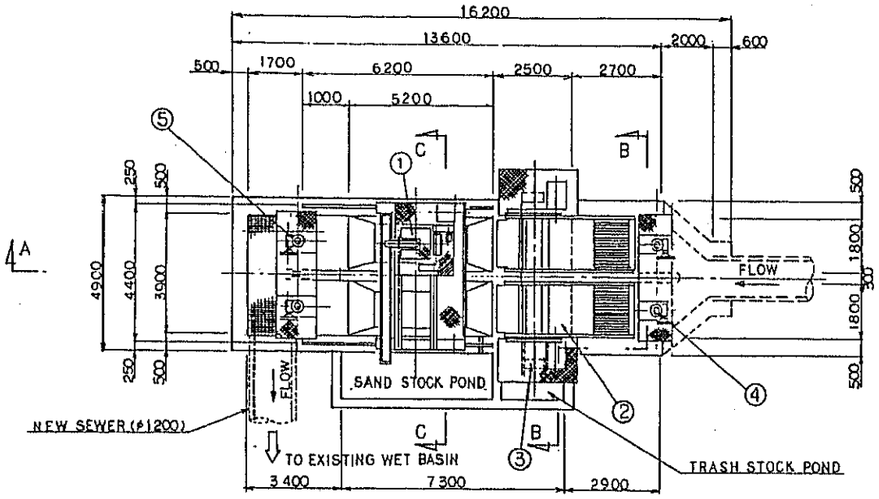
NOTES

1. FOR THE LOCATION OF EXISTING AMINA MOHAMED PUMP STATION, SEE DRAWING NO. EGU - G - 02 .
2. FOR THE EQUIPMENT TO BE INSTALLED ON THE NEW SEDIMENTATION BASIN, SEE DRAWING NO. EGU - S - 06.

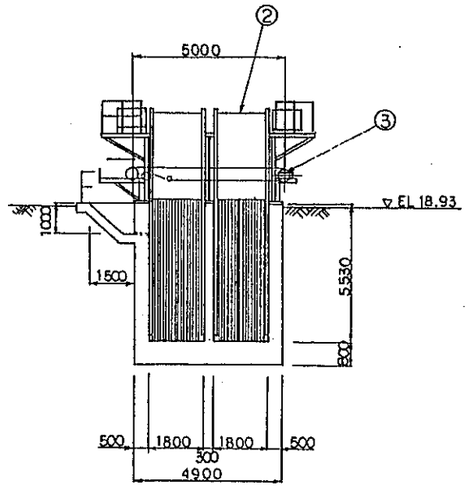
THE ARAB REPUBLIC OF EGYPT GIZA CITY, GIZA GOVERNORATE	SCALE 1 : 200 1 : 100
THE PROJECT OF OMRANIA WEST WATER SUPPLY AND SEWER UPGRADING	DWG. NO.
SEDIMENTATION BASIN PLAN AND SECTION	EGU - S - 05

DATE	DESIGNED	CHECKED	APPROVED	REVISION

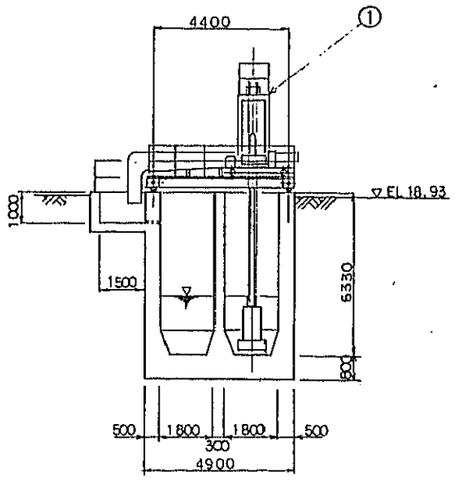
JAPAN INTERNATIONAL COOPERATION AGENCY



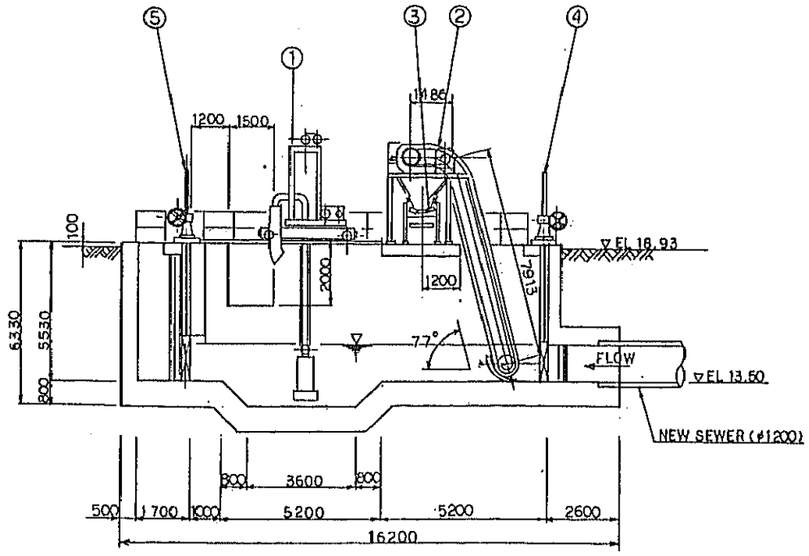
PLAN S=1:100



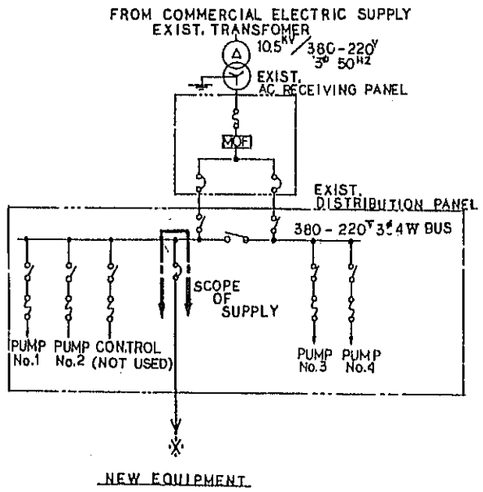
SECTION B-B

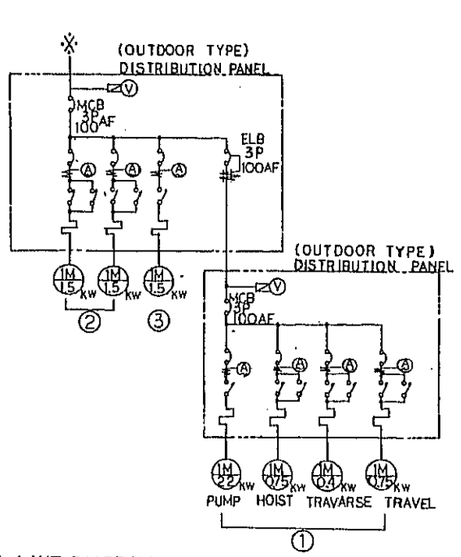


SECTION C-C



SECTION A-A





ELECTRICAL ONE LINE DIAGRAM

EQUIPMENT LIST

No	NAME OF EQUIPMENT
①	TRAVELLING SAND PUMP
②	BAR SCREEN WITH MECHANICAL RAKES
③	BELT CONVEYER
④	INLET GATE (SS41)
⑤	OUTLET GATE (SS41)

NOTE

1. FOR THE ARRANGEMENT OF SEDIMENTATION BASIN, SEE DRAWING NO. EGU-S-05.

THE ARAB REPUBLIC OF EGYPT GIZA CITY, GIZA GOVERNORATE				SCALE 1:100
THE PROJECT OF OMRANIA WEST WATER SUPPLY AND SEWER UPGRADING				DWG.NO.
SEDIMENTATION BASIN ARRANGEMENT OF EQUIPMENT				EGU-S-06
DATE	DESIGNED	CHECKED	APPROVED	REVISION
JAPAN INTERNATIONAL COOPERATION AGENCY				

5-4 Execution Plan

5-4-1 Water Supply

(1) Conditions for the Execution Method

1) Instructions to be followed in execution of construction work.

For the water supply, the execution method should be decided by observing following particular instructions:

a) Efforts should be made to have local residents fully understand the contents of this Project and obtain their cooperation and support in executing the work. Also, every precaution should be taken to prevent residents from being involved in accidents due to this work.

b) In executing work, execution methods, construction machines, work hours, etc. should be carefully selected to minimize nuisance of vibration, noise, etc. to residents.

c) Because there are many pedestrians, automobiles, horse drawn wagons, and stall keepers at the construction site, efforts must be made to ensure traffic flow, safety and commercial activities. Therefore, execution plans for excavation, pipe laying, backfilling, and road reinstatement should be drawn up so that traffic restrictions can be lifted as soon as possible and that all sectional work be completed within a couple of days.

d) Because of the many existing underground services (sewer and water supply pipes, and electric and telecommunication cables), efforts should be made to ensure their functions and to prevent damage.

e) Because construction is undertaken in densely built-up areas, an execution method that will least loosen ground should be used to secure safety of dwellings.

f) To strictly meet the extremely short construction period under the Project, work needs to be undertaken on a 2-shift system with 8 hours per shift.

2) Situation of local construction

Major points in the local construction relevant to execution of this Project are as follows:

a) In Egypt, foremen, skilled workers and ordinary workers can be easily employed. The exception is specially trained engineers needed for pipe jacking work and working with water lines under pressure.

b) Egypt has little experience in pipe jacking work and working with water lines under pressure. All such works have been undertaken by contractors from foreign countries, with pipe jacking machines brought in from their countries and using their own engineers. Consequently, no equipment or machines for such works are available in Egypt. Under this Project, these equipment and machines need to be supplied, and engineers need to be sent from Japan.

c) Except for equipment and machines for special works such as pipe jacking work, ordinary construction equipment and machines can be easily supplied from Egypt.

d) Ductile cast iron pipes for pipe jacking method, ductile cast iron fittings, valves, steel pipes for the aqueduct bridge, and liner plates must be supplied from Japan because none is available in Egypt.

e) Alexandria Port will be selected as the port for landing equipment and materials because it is a open port with many calls by Japanese regular lines and is provided with cargo handling facilities.

f) For inland transportation from Alexandria Port to the site, Desert Road will be selected because it is wide and in a well paved condition and traffic is light.

(2) Execution Method

1) Pipe jacking method for road crossing

a) Pipe jacking method will be used where the water supply main line will intersect Pyramid street. This method will be selected so as not to interfere with vehicular traffic and commercial activities, or damage existing services and buildings.

b) For execution of this pipe jacking method, a pit will be constructed at each end of the jacking section (a jacking pit and a receiving pit). Work will be constructed at each end of the jacking section, work will start mainly from the jacking pit side, and will be continue on a 2-shift system (16 hours per day) to meet the completion date of the Project.

c) The pits will require deep excavation. The water table is shallow and ground is not firm. Moreover, buildings and existing underground services are located adjacent to the construction site. To secure their safety and prevent damage to them, sheathing with sheet piles will be constructed. Sheet piles for this work will be driven in by a hydraulic oil pressure pile driving machine which will produce less vibration.

d) Ground consists of complicated layers of silt and sand and is vulnerable to ground water. Therefore, when pipes are laid in the pit by the jacking method, soil around the pit will be improved to prevent ground water from flowing into the pit. For timbering, H-shape steel will be used. The receiving pit will be covered with a covering steel deck to secure passage and safety of vehicles and pedestrians.

2) Intersection with Cairo-Aswan main railway line

a) Pipe jacking method will be used for the section crossing the railway to secure operation and safety of trains. Double casing method using a 1,200mm-diameter centrifugal reinforced concrete pipe as a sleeve pipe will be used in this section to facilitate maintenance and inspection on the water distribution pipe, as well as to easily increase its diameter in the future if such need arises with further progress in urbanization.

b) After the sleeve pipe is laid, the water main supply pipe (pipe diameter: 600mm) will be laid within this pipe. The sleeve pipe will be provided with a valve chamber on each end and a sluice valve, and a wash-out valve will be installed in the valve chamber. The sleeve pipe will be installed by slurry semi-shield method of pipe jacking method to prevent the railway line from settling. Work will be executed on a 2-shift system (16 hours per day) to maintain the work schedule and safety and to complete the work in a short period.

c) Slurry semi-shield method is the same as the sewer main line construction method that will be described later. For details of this method, refer to Section (5-4-2).

d) The receiving pit on the Cairo-Aswan road side will be constructed by liner plate method. this work will mainly

be done by hand because overhead electric lines run about 5m above the proposed site for the pit. These overhead lines preclude the use of a pile driver for driving sheathing sheet piles.

e) At the request of the Egyptian State Railway, the location of the water supply pipe must be indicated by its distance from the electric pole.

f) Also, as a condition for approval on the construction work for this section, it is believed necessary to entrust its supervisory control to the State Railway authorities. It is our understanding that the request for this service will have to be channeled through Giza City and could not be made directly by Japanese contractors.

3) Aqueduct over Zomor Canal

a) An aqueduct will be used for the water supply main line to cross the Zomor Canal section for reasons of maintenance, control, etc. Its construction work will have no direct effect on the canal. Therefore, it is considered unlikely that the canal or concerned authorities will impose particularly severe restrictions on any part of this construction work.

b) Because the aqueduct (diameter 600mm) will have a long span of about 19.0m, it will be built as an integral aqueduct by welding short pieces of pipes together in the field. An air valve will be installed on the aqueduct. Steel will be used for the pipe material of the aqueduct for ease of work, maintenance and control. A valve chamber will be provided before and after the joint between the ductile cast iron pipe and water supply pipe of the aqueduct section. A butterfly valve and wash-out valve will be installed in the valve chamber.

4) Ordinary sections of water supply main line

a) The detailed route of water supply main line will be decided after the location of existing underground services has been confirmed by conducting test pits in the initial stage of the Project. This is because many services exist including water supply and sewer pipe lines, power and telecommunication cables, etc. For excavation to lay pipes, trenches will be vertically excavated mainly using machines (except for areas around existing pipes and other underground structures where excavation will be done manually). The last 30cm of the bottom level will be excavated by hand and sheathing will be performed, using sheet piles.

b) Trenches will be backfilled, using excavated earth. Earth will be thoroughly compacted by rammer and roller.

c) Existing residential service pipes which will be encountered in construction of the water supply main line will be processed by using PVC pipe of the same diameter as the existing service pipes. In the case of existing branch pipes (100 to 300mm in diameter), most of these pipes are presumed to be fragile asbestos pipes. Therefore, in the construction stage, it should be established whether the area around such pipes be protected, their route changed, or the route of the new water supply main line be changed instead. However, such existing branch pipes should be left undisturbed as much as practicable.

d) Work for connection of the new water supply main line with the existing branch pipes will be promptly performed. The method of working under water pressure will be used for connection with existing main pipe lines (800mm and 1,000mm diameter) so that water supply will

not be cut off in areas served by these existing main lines. This method will be used also to prevent muddy water from being discharged during connection work.

(3) Construction Supervision Plan

To ensure that the construction work for water supply facilities be conducted both positively and safely within the prescribed construction period, adequate execution management over the entire work needs to be carried out.

1) Schedule control

For fabrication and installation of pipes, control will be monitored on the amount of completed work by comparing actual production or performance with the schedule at all times. There is only one manufacturer in Egypt for either of the two types of pipe that will be locally supplied, i.e. ductile cast iron pipes and jacking reinforced concrete pipes to be used for the railway crossing. Because of the possibility that production for some other projects will coincide with that for this Project, guidance will be given to the contractor so that they will promptly place orders with the makers to execute each stage of works on schedule and meet the delivery date under the Project.

2) Quality control

Quality control will mainly consists of quality control over pipe laying work. For this purpose, hydrostatic test, etc. will be conducted according to the instructions of construction contract.

3) Safety control

a) Guidance will be given to the contractor so that even workers at the lowest level will be conscious about prevention of various accidents and the foreman class will be given training to have the ability to prevent dangerous situations.

b) Efforts will be made to prevent accidents by always checking heavy equipment and machines such as cranes, wires and other critical items.

c) When transport vehicles, construction equipment, etc. travel on public roads, local traffic rules will be strictly observed and every caution will be taken to prevent traffic accidents resulting in injuries or death. Great care will also be exercised not to cause damage to roads, buildings, existing services, etc.

d) In the work under pipe jacking method, the receiving pit will be kept closed by hollow steel coverings, except when work is being carried out, to secure vehicular and pedestrian traffic and prevent accidents.

e) Because the diameter of the pipe for pipe jacking method is small, being 600mm, extra care will be taken to prevent accidents to men working in the pipe.

(4) Procurement Plan of Materials and Equipment

All the materials and equipment that are available in Egypt will be locally supplied, and the rest will be brought in from Japan. Major items of materials and equipment will be obtained as follows:

1) Materials

a) To be locally supplied

① Aggregates, cement, reinforcement bars, miscellaneous steel products, plywood forms, concrete blocks, etc.

② Straight pipes of ductile cast iron (standard products), straight pipes of PVC (standard products)

③ As mentioned earlier, there is only one maker each of ductile cast iron pipes and reinforced concrete pipes for jacking method (both in standard type). Production of ductile cast iron pipes started about one year ago under aid from West Germany. Thus, the maker's experience in production and deliveries of ductile cast iron pipes is still limited. However, the decision was made to use local products for the following reasons:

- Products were found acceptable although they were evaluated only visually.
- Good control is being exercised in various production stages at the factory.
- It is believed rigid quality control is being made by both Egyptian and West German engineers.
- Use of local products will contribute to Egypt's economic development and increased job opportunities.

The final decision on the source of supply will be made based on the status of negotiations on delivery and price when the awarded contractor has actually entered into contract negotiations.

For reinforced concrete pipes for jacking method, refer to section 5-4-2 dealing with sewer facilities.

b) Supply from Japan

Items to be supplied from Japan will be limited to those not available in Egypt. At present, the following items are expected to fall under this category:

- Ductile cast iron pipes for jacking method, ductile cast iron fittings, valves, air valves, accessories for fire hydrants, and steel pipes for the aqueduct bridge, PVC pipe fittings
- Liner plates, H-shape steel, I-shape steel, sheet piles, light weight sheet piles, manhole covers, covering steel deck and other items for safety provision such as barricades

2) Equipment

a) Local supply

Because ordinary items of construction equipment can be leased in Egypt, they will be locally supplied.

b) Supply from Japan

The supply from Japan will be limited to special machines that are either not available or difficult to supply in Egypt. At present, the following items are expected to fall under this category:

Jacking equipment (for 1,200mm and 600mm diameter pipes), grouting machines, drilling machines under water pressure, strength testers for external surface of jacking reinforced concrete pipes, hydraulic oil pressure pile drivers and pullers, belt conveyers, truck mixers, ventilators, asphalt paving cutters, breakers for removing concrete.

(5) Implementation Schedule

1) Execution design and supervision of works

a) Execution design and tender procedures

① Execution design and preparation of technical documents for tender

For execution design, after E/N ratification on each Phase of the Project at the People's Assembly, the Japanese consultant will immediately conclude the consultant contract with Giza City and commence making the detailed design.

Based on results of surveys and confirmation regarding basic design and detailed design, the consultant will complete detailed design and prepare tender documents in consultation with Giza City.

② Tender and contract

Acting on behalf of Giza City, the consultant will invite tenders, accept and screen application for participation, hold tender briefings, and distribute tender documents. After a fixed period for tender preparation, the consultant will accept tenders, promptly evaluate them, and conclude the construction contract between Giza City and the successful Japanese construction company, incorporated under Japanese law.

b) Supervision of construction

Upon conclusion of the contract between Giza City and the Japanese construction company, this Project will proceed to the supervisory stage. The consultant will make preliminary arrangements with the construction company on execution of works, and guide and supervise them in transportation of equipment and materials to the site, execution methods, execution of works, etc., manage

progress of works, perform quality control, and complete the contract within the period set forth in E/N.

2) Construction Period

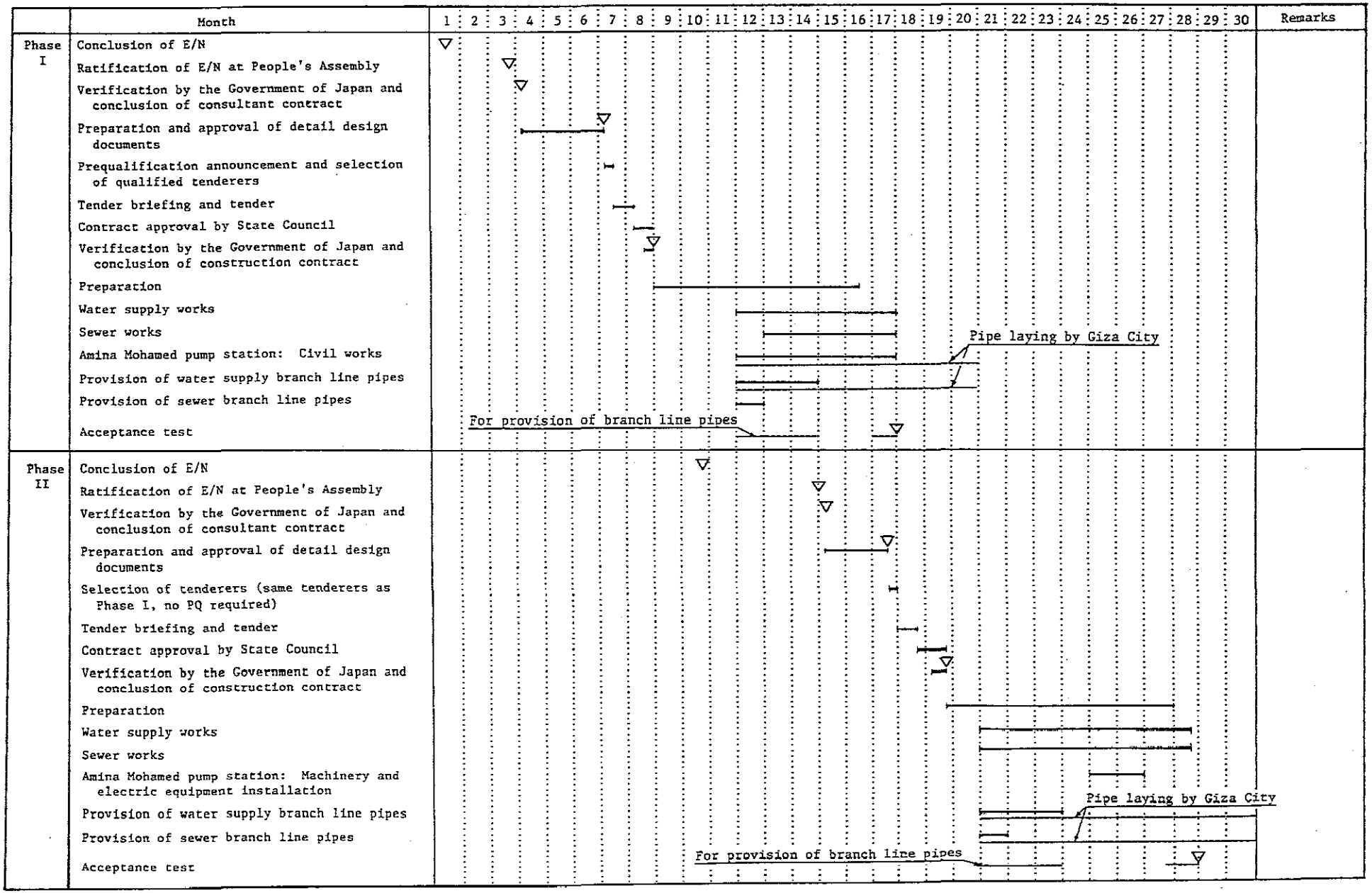
This Project consists of Phases I and II. The construction period for each Phase after coming into effect of E/N is as follows:

Phase I	14 months
Phase II	15 months
Total	29 months

The period for detailed design is 3 months for Phase I and 2.5 months for Phase II.

The tentative implementation schedule of this Project is as shown in Table 5-6.

Table 5-6 Tentative Implementation Schedule



5-4-2 Sewer Facilities

(1) Conditions for the Execution Method

1) Instructions on construction

For particular instructions to be followed in the process of decision on the execution method for sewer facilities works, refer to section 5-4-1 for water supply facilities.

2) Local construction industry situation

Major points relevant to the execution of this Project in the local construction industry are as described below. For commonly applicable situation, refer to the appropriate section dealing with water supply.

① Reinforced concrete pipes for pipe jacking method are not available in Egypt. Therefore, it is necessary to contract a local manufacturer to produce these pipes specifically for this Project by providing Japanese standards (Japan Sewage Association standard JSWAS A-2) and design drawings.
Reasons for manufacture of these pipes to Japanese standards will be given in Section 5-4-2-(4).

② To transfer this technology and give technical advice as required, it is considered necessary to send a Japanese engineer well versed in manufacture of pipes to Egypt for several months in the initial stage of Phase I.

(2) Execution Method

1) Sewer pipe laying work

a) Sewer pipes will be laid by pipe jacking method for the same reasons that have been given in instructions on construction for water supply, Section 5-4-1, (1)-1), and

pipe jacking method for road crossing in execution method, Section 5-4-1-(2). To meet the required delivery under the contract, works will be conducted on a 2-shift basis (16 hours per day) as is the case with water supply works.

b) In this Project, long distance pipe jacking method in which the jacking length of each extension is about 100 to 150m, with intermediate jacking method, will be used to reduce the number of jacking and receiving pits, in order to minimize the effect of noise, vibration, etc. to residents, obstructions to traffic, and the effect on underground services, as well as to lower construction costs. Fig. 5-7 shows location of jacking and receiving pits. Manholes will be installed at the position of receiving pits after completion of jacking work.

c) Pipe jacking method will be implemented by slurry semi-shield method for the following reasons:

- The type of machine that will meet a wide range of soil conditions must be selected because ground water level is shallow at about 1 to 3m from ground surface and because the soil comprises of complex sediments of silt and sand.
- Loosening of ground must be kept to a minimum to prevent damage to and secure functions of existing buildings and underground services.
- The proposed shield method can reduce excavation, concreting and other works on the ground all of which will adversely affect residents, traffic, etc.
- Because ground equipment under this method is relatively small in scale, the effect on residents, traffic, etc. will be limited.

Fig. 5-8 shows and outline of the equipment to be used under this method.

Slurry semi-shield method consists of providing a bulkhead in the form of the shield machine, and injecting a slurry of mud (with a specific gravity of 1.3 to 1.5) into excavated soil that fills the enclosure to give fluidity to soil to prevent collapse of pit facing and facilitate excavation work. Excavation is conducted by balancing earth pressure acting on the facing with water pressure generated by injected slurry.

d) Work under slurry semi-shield method is conducted in the following sequence:

- During excavation, slurry is discharged into the enclosure formed by the bulkhead in front of the shield machine, and earth continues to be excavated.
- During jacking work, excavated soil with fluidity is removed from the facing by screw conveyer.
- This surplus soil is loaded onto a muck car by belt conveyer installed in the rear and is carried to the jacking pit.
- The material is then loaded onto a dump truck standing near the jacking pit, using a truck crane, and is disposed of at dumping yard.
- To reduce loosening of adjacent ground, lubricating material is injected through a grouting hole into the leading pipe until its top semi-circular portion is nearly filled.
- After excavation is completed, backfilling material is introduced to control ground settlement to a minimum.

e) Jacking and receiving pits will have to be located in densely built-up or shopping areas. To secure passage and safety of vehicles and pedestrians, ensure commercial activities, prevent damage to buildings, and minimize the effect of noise, vibration, etc., sheathing work will be performed with liner plates particularly on the canal side of Amina Mohamed street and Hospital street where

many street stalls are open. In the served area, ground water level is high and the soil consists of silt and sand. Therefore, the soil will be improved by injecting grout (cement base) around pits to prevent accidents due to heaving or boiling. For other sections, sheathing will be done by sheet piles.

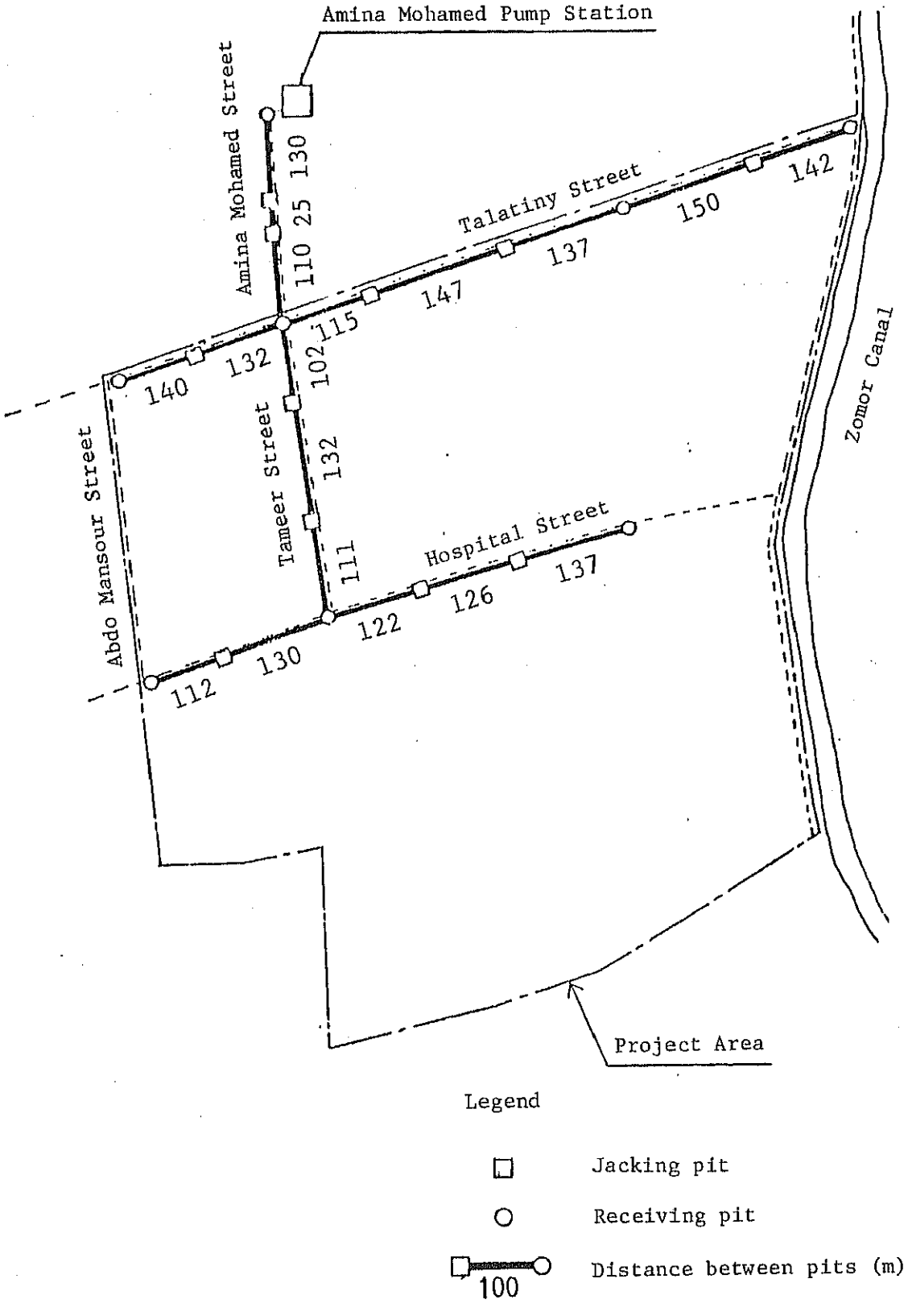


Fig. 5-7 Location of Pits in Sewer Main Line Jacking Work

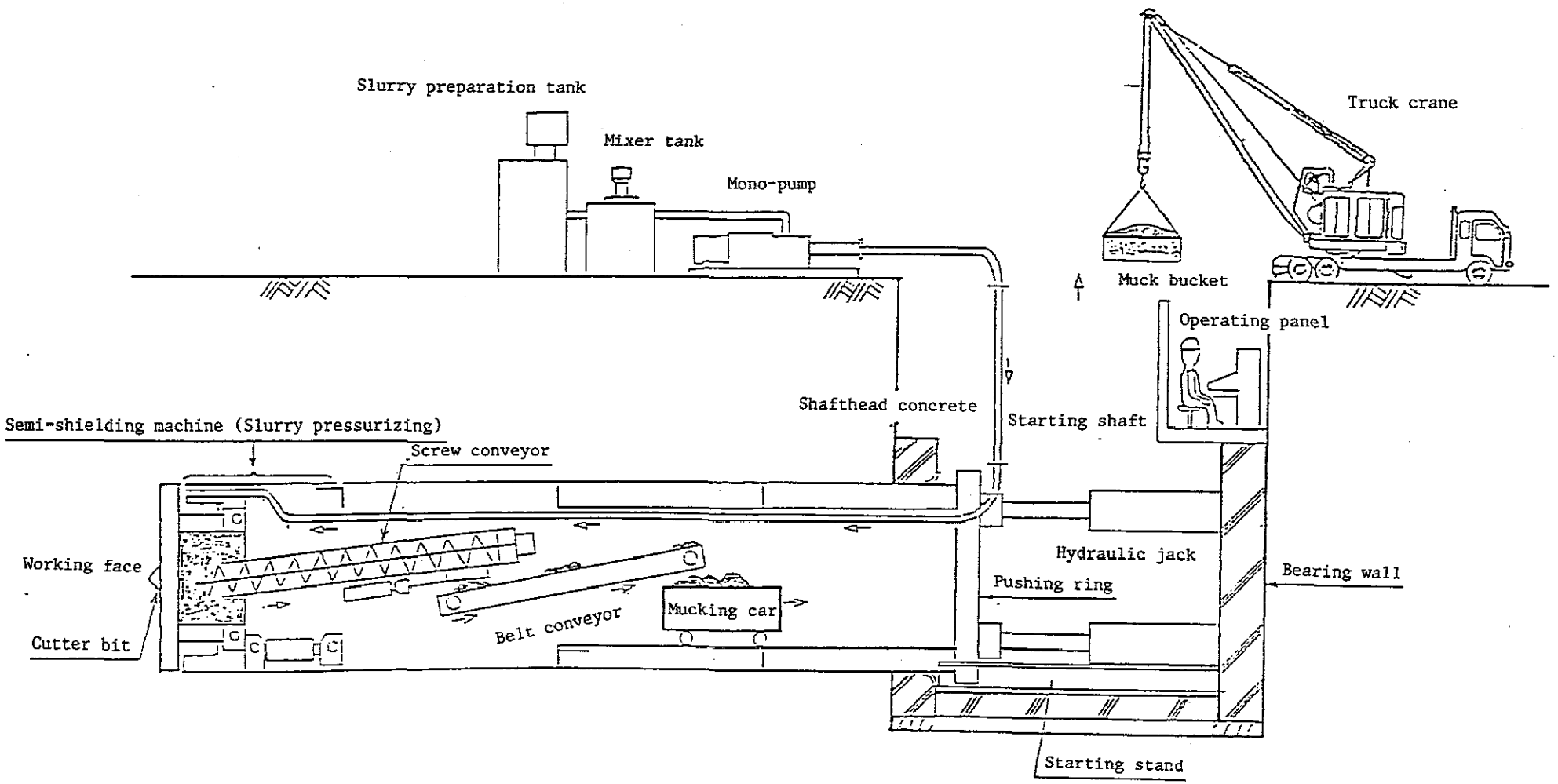


Fig. 5-8 Outline of Jacking Machine for Slurry Semi-shield Method

2) Manhole

Manholes will be constructed according to the design drawing, with their location, depth, etc. checked against the drawing. After concrete is placed, it will be left to completely cure and then backfilling will be performed. The top of manholes will be aligned with the height of the existing road.

3) Sedimentation basin

A sewer pipeline and valve box exist in the proposed site for the sedimentation basin in Amina Mohamed Pump Station. These existing facilities must be relocated before construction of the sedimentation basin. The pipe line will be left to be utilized as an emergency bypass line after completion of the sedimentation basin. For this use, a valve will be installed on the inflow side of the relocated pipe line.

(3) Construction Supervision Plan

Refer to the section for water supply (Section 5-4-1-(3)).

(4) Procurement Plan of Materials and Equipment

As is the case with water supply facilities, materials and equipment will be supplied from both Egypt and Japan. Materials and equipment which are locally available will be supplied from Egypt and the rest from Japan. Major items of materials and equipment will be supplied from the following sources:

1) Materials

a) Supply from Egypt

- Aggregates, cement, reinforcing bars, plywood forms
- Blue brick
- Reinforced concrete pipes for pipe jacking method
- As mentioned earlier, pipes for jacking method shall be

manufactured to Japan's specification. The reasons for this requirement are as follows:

① Pipe manufactures in Egypt have never manufactured reinforced concrete pipes for jacking method. They manufacture prestressed concrete pipes for this method. These pipes are manufactured to American Water Works Association standards (AWWA). The regular size of these products is 6 to 7m per piece, or 2 to 3 times longer than Japanese standard length of 2.43m.

② To reduce ground works, sewer main lines are constructed by long distance pipe jacking method. However, no projects have ever been undertaken by using such long pipes for long distance pipe jacking method in Japan. Consequently, it is difficult to design and construct a safe and highly accurate sewer system.

③ Use of long pipes would also increase the size of pits, construction costs, relocation and protection works for existing underground services, and have a greater adverse effect on residents the vicinities and traffic.

④ Although Egyptian manufacturers have no experience of pipe manufacture to Japanese standards, it is considered that, based on their technical capability and production facilities, there will technically be no problem in their manufacture of pipes to Japanese standards and design drawings. However, for quality control and work progress management, a Japanese engineer fully versed in manufacture of pipes will be sent to Egypt for several months immediately after conclusion of Phase I construction contract. This engineer will verify quality, follow up on delivery and give technical advice as required.

⑤ The strength tester for reinforced concrete pipes, which is not available in Egypt will be supplied from Japan in an effort to ensure the quality of these pipes.

b) Supply from Japan

Materials to be supplied from Japan will be limited only to those which are either not available or difficult to obtain in Egypt. At present, the following items are expected to fall under this category:

- Push-on pipes for pipe jacking method, coupling collars, rubber bands
- Products for safety provision including liner plated, H-shape steel, I-shape steel, sheet piles, covering plates, manhole covers, and barricades
- Compression tester for reinforced concrete pipes

2) Construction equipment

Refer to the section for water supply. Section 5-4-1-(4).

(5) Implementation Schedule

Refer to the section for water supply. Section 5-4-1-(5).

CHAPTER 6
PROVISION OF MATERIALS AND EQUIPMENT

CHAPTER 6 PROVISION OF MATERIALS AND EQUIPMENT

6-1 Plan for Provision of Materials and Equipment

6-1-1 Water Supply and Sewer Branch Pipes

(1) Water Supply

1) Background of the plan for provision of materials

As a result of water supply main lines (pipe diameter: 600mm), being connected with the existing water line as well as the provision of appurtenant equipment, stable water supply will be obtained for a long period. This will also provide suitable pressure for fire hydrants. However, about 20% of the project area cannot receive water supply directly from the water supply facilities but must resort to public water taps or well water which is unsuitable for drinking. Therefore, the provision of materials for branch pipes will be considered for some of these areas.

2) Plan for the provision of branch pipe material

The plan for the provision of materials for water supply branch pipelines will be examined according to the following policy.

a) Provision of materials will be planned for the unserved areas where the water supply lines are planned in the World Bank Loan Project and where it is expected to provide sewer facilities urgently and have good effects thereby.

b) The size of the area shall allow development work to be accomplished to complete the network in the near future.

c) The pipe diameter designated in the World Bank Loan

Project will remain unchanged.

d) The scale of work shall be such that the pipe laying to be undertaken by Giza City can be executed at a early period without extreme financial pressure on Giza City.

e) The additional length of pipes to be provided will be about 10% of the actual design length in consideration of cutting loss and detouring which are necessary in executing the work.

3) Establishment of the area for provision of materials

The area for provision of materials have been established as shown on Fig. 6-1 based on the following reasons.

a) The area is densely populated and totally unserved with direct water supply. The pipes are therefore urgently required and the effects of laying them would be considerable.

b) The scale of work is such that the pipe laying to be undertaken by Giza City can be executed at an early date without extreme financial pressure on Giza City.

4) Length of water supply branch pipes to be provided

The extended length of branch pipe materials will be 11,500m in total and the breakdown by each pipe diameter is as follows.

Table 6-1 Water Supply Branch Pipes to be Provided

Pipe dia. (mm)	Installed net length (m)	Provided gross length (m)
100	about 3,160	3,470
150	" 5,260	5,750
200	" 1,000	1,100
300	" 740	810
400	" 330	370
Total	about 10,490	11,500

5) Effects

The following effects can be expected after the provision and installation of the branch pipe materials and when the network is operational.

a) Stable water supply will become possible.

b) People will be relieved of hard work and worries about securing water.

c) Health and living standard of the inhabitants will be improved.

d) Diseases transmitted by unsuitable water will decrease.

e) Fire damage will decrease as fire hydrants will also be installed.

(2) Sewer

1) Background of the plan for provision of materials

As stated previously, the laying of a new sewer main line and development of the sewage branch lines within the Project area will not only eliminate the overloaded condition of existing sewer pipelines but improve the living environment

of the inhabitants and upgrade the function of the sewer facilities.

However, there are still areas within the Project area where sewage cannot be drained because sewer branch pipelines have not been laid. The provision of materials for branch pipes will therefore be considered for these areas.

2) Plan for the provision of branch pipe materials

The plan for the provision of materials for sewer branch pipelines will be examined according to the following policy.

a) Provision of materials will be planned for the unsewered areas where the sewer lines are planned in the World Bank Loan Project and where it is expected to provide sewer facilities urgently and have good effects thereby.

b) The size of the area shall allow development work to be accomplished to complete the network in the near future.

c) The design criteria, including pipe diameters and materials designated in the World Bank Loan Project will not be changed as far as possible.

d) The scale of work shall be such that the pipe laying to be undertaken by Giza City can be executed at an early date without extreme financial pressure on Giza City.

e) The additional length of pipes to be provided will be about 10% of the actual designed length in consideration of cutting loss and detouring which are necessary in executing the work.

3) Establishment of the area for provision of materials

The areas for provision of materials have been established as shown on Fig. 6-2 based on the following reasons.

a) The areas are the unsewered areas where it is expected to provide sewer facilities urgently and have good effects thereby.

b) The area to the south of the school is the largest unsewered residential quarters.

c) Although a sewer pipeline is laid on the west of the school, sewage cannot drain into it due to inverse gradient of the pipes. The invert of the existing sewer pipeline is higher than that of the drainage outlet on the side of the school. Because of this, cesspits are installed and the sewage is frequently drained by vacuum vehicle. Lately, with the increase in the number of pupils, the school is suffering from the increase of drainage cost and the frequency of the drainage by the vehicle. The school is anxiously awaiting the improvement of the sewer at the earliest possible date. The urgency of the demand for laying of the pipes and their effects therefore are considerable.

4) Length of sewer branch pipes to be provided

The extended length of branch pipe materials to be provided will be 3,900m in total and the breakdown by each pipe diameter is as follows.

Table 6-2 Sewer Branch Pipes to be Provided

Pipe dia. (mm)	Installed net length (m)	Provided gross length (m)
175	about 860	960
225	" 2,040	2,260
300	" 320	370
375	" 280	310
Total	about 3,500	3,900

5) Effects

The following effects can be expected after the provision and installation of the branch pipe material when the facility is operational.

a) Drainage into the sewer pipelines will become possible.

b) The unsanitary environment will be improved.

c) The cost of drainage by vacuum vehicle will be reduced.

d) It will become easier to protect and promote pupils' health.

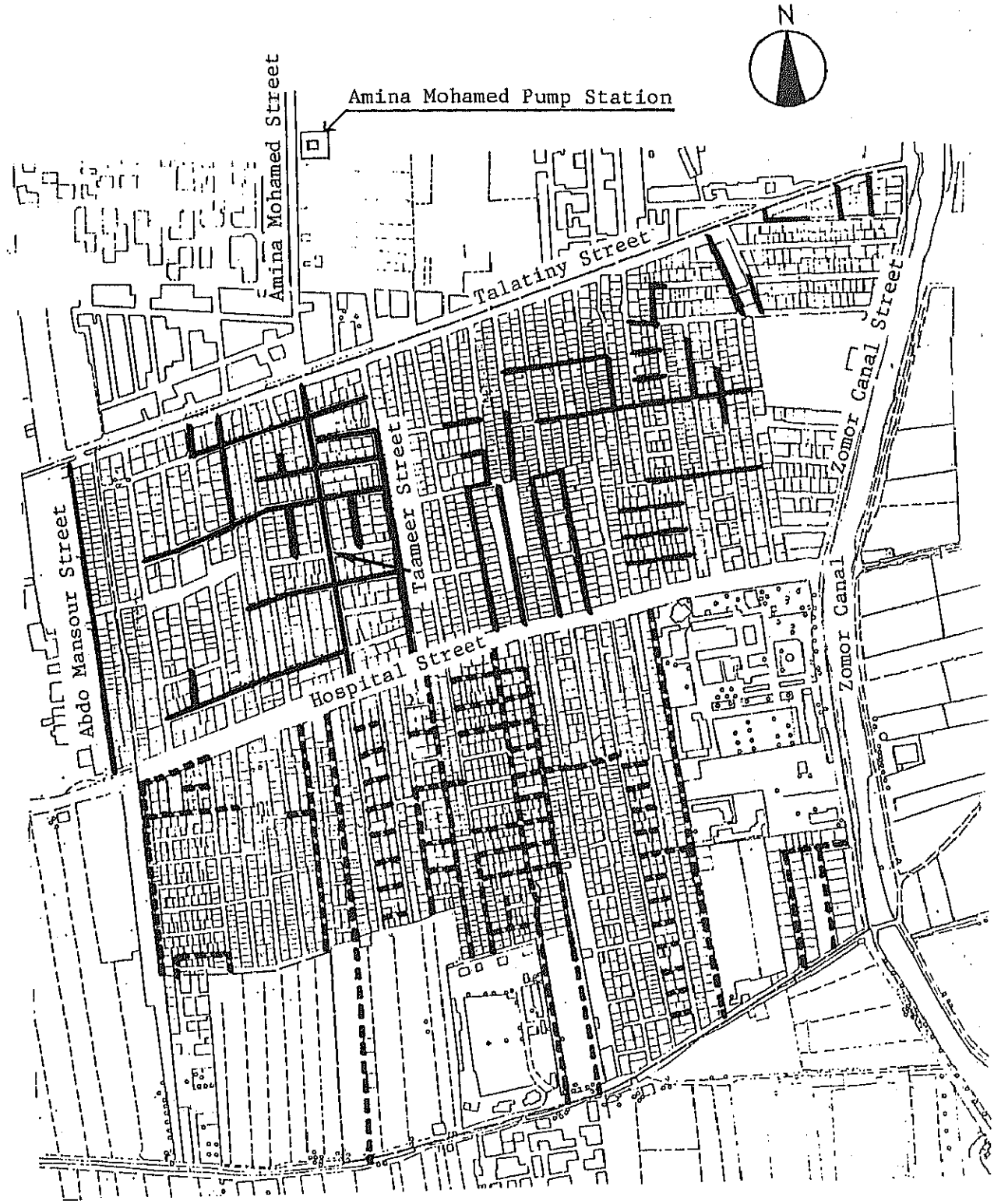


Fig. 6-1 Area for Provision of Water Supply Branch Piping Materials

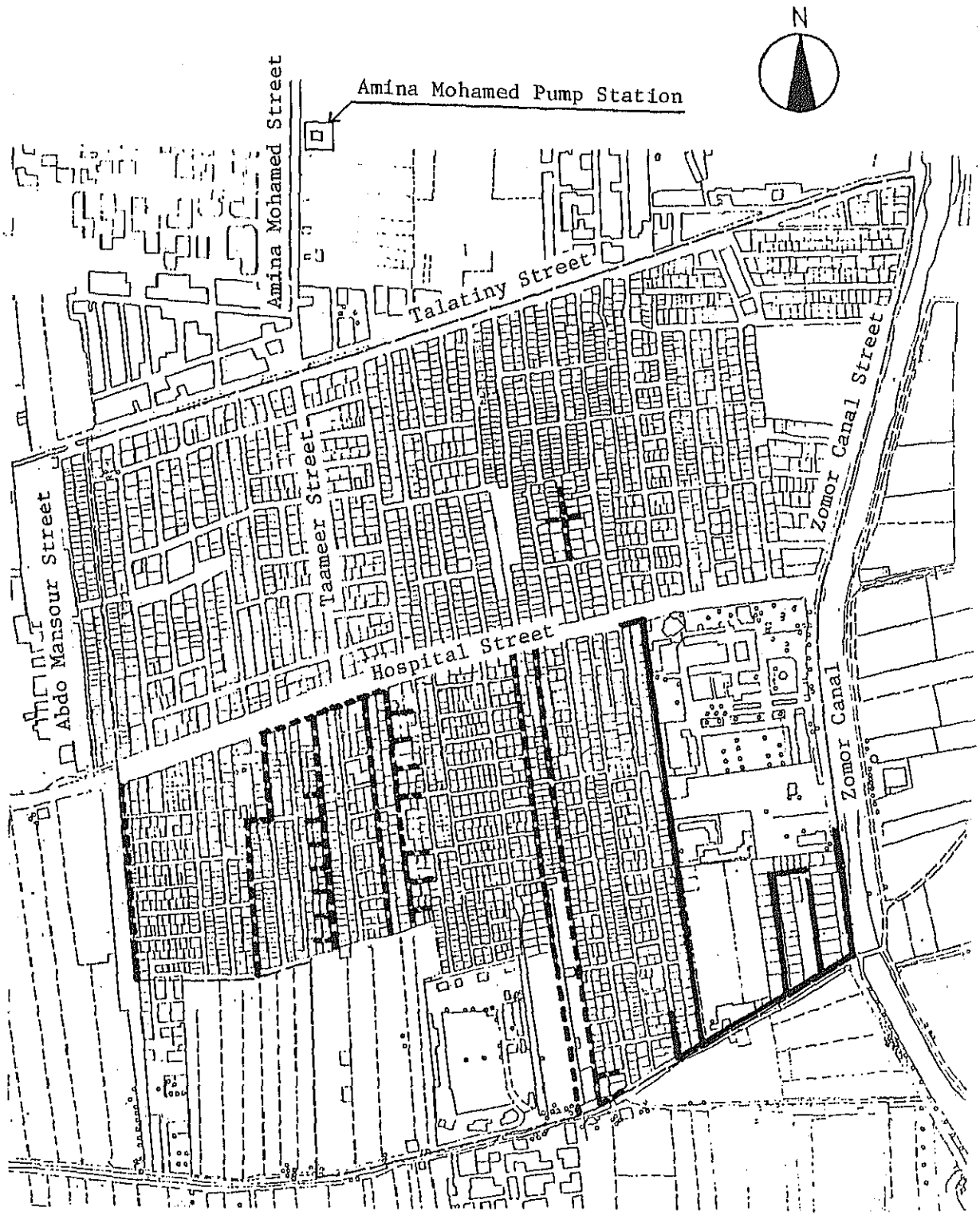


Fig. 6-2 Area for Provision of Sewer Branch Piping Materials

6-1-2 Sewer Pipeline Cleaning Equipment

(1) Present conditions of cleaning work undertaken by the Greater Cairo General Organization for Sanitary Drainage.

1) Pipeline cleaning work in the West Bank Districts of the Nile River including the Project area consists mostly of removing sediment, vinyl, scraps of cloth and other small foreign matter that clog up the small diameter pipes (of 500mm or less in pipe diameter and 40m to 50m in manhole spacing).
In these areas, pipelines which have become cloggeed are cleaned mostly by manually operated dredging equipment that uses a steel bar. This work is carried out every day at about 220 locations by about 500 workers under unsanitary conditions.

2) If pipelines which become clogged cannot be cleaned by the above method, special cleaning vehicles (high pressure jet cleaning vehicles, bucket-machines, catching machines, etc.) are employed which are found only at Giza Pump Station.

However, although there are 5 to 7 such special cleaning vehicles assigned to the west bank districts, they are all worn out and their effective operating rate is only around 50%.
Fig. 6-2 shows the current status of sewer pipeline cleaning work undertaken in the West Bank Districts of the Nile River.

3) Cleaning work with existing equipment and manpower has almost reached its limit. Under these conditions the pipeline cleaning rate per year is only about 10% with the result that sewage is overflowing over the road surface in some places.
Cleaning rate per year is obtained by the following formula;

$$\frac{\text{(Total cleaned pipe length per year)}}{\text{(Total pipe length installed)}} \times 100\%$$

Clogged pipes are concentrated mainly in the small diameter pipes currently in use. The frequency of pipelines becoming clogged, which occurs approximately 40 times a day, is increasing.

4) As all of the existing specially imported cleaning vehicles are worn out so that they are not only difficult to work with but consume considerable time and money, it is strongly desired that more efficient machines and equipment be introduced.

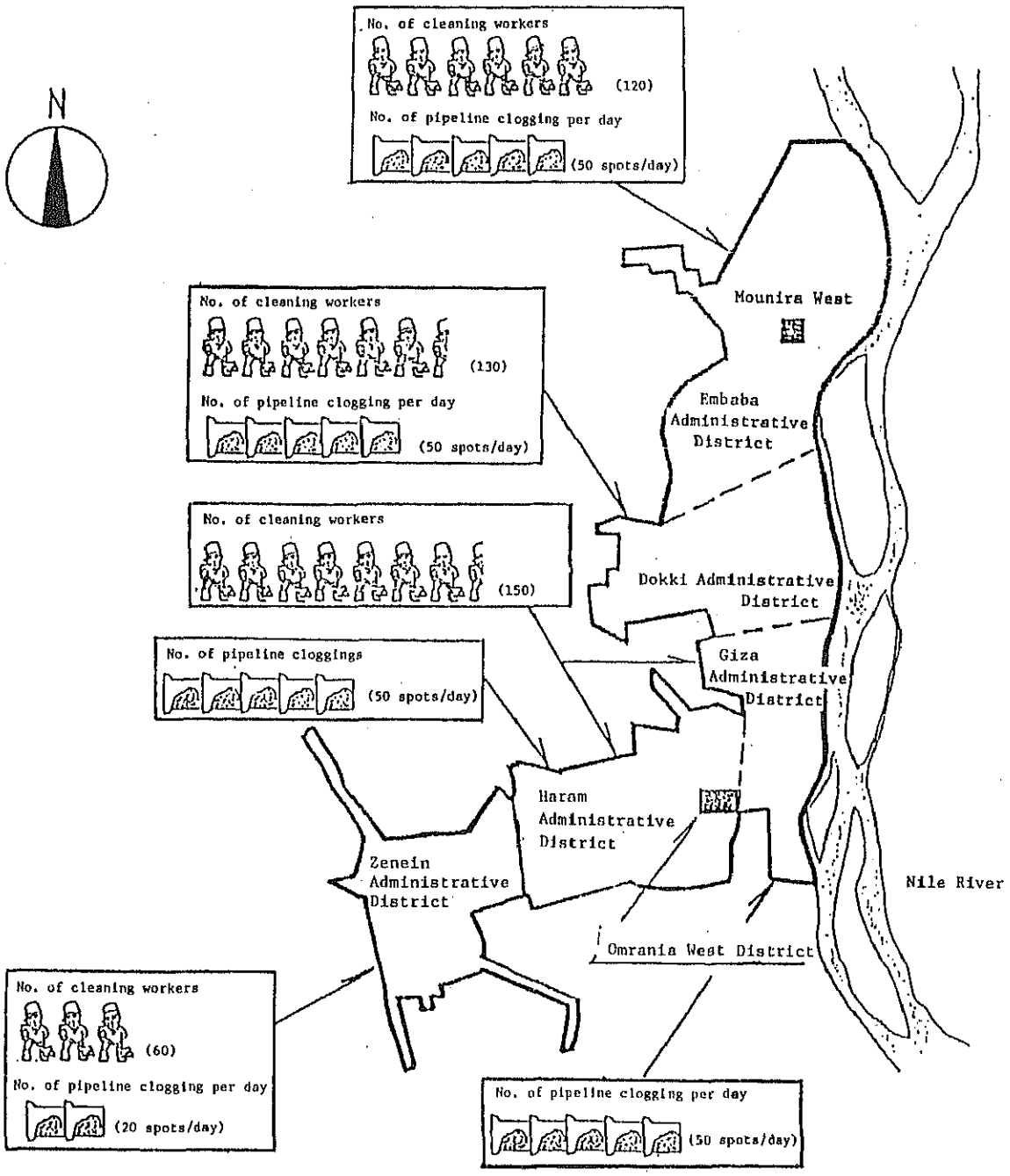
(2) Cleaning equipment to be provided

High pressure jet cleaning and vacuum vehicles shall be provided as cleaning equipment for the following reasons.

1) As a result of the West Bank Waste Water Project (USAID), an extensive expansion of the sewer facilities is expected in the next several years. The provision of cleaning equipment and improved working efficiency are therefore urgently required.

The Greater Cairo General Organization for Sanitary Drainage estimates that if it is to maintain and operate the pipelines using the existing cleaning method it would require twice the existing manpower in the next 4 or 5 years.

2) The Organization considers that a pipeline cleaning rate of about 30% (3 times the current pipeline cleaning rate) must be maintained if the proper function of sewer pipelines is to be secured and overflowing of sewage on the road surface is to be prevented.



(Legend)

——— : Area of sewer line Cleaning in the West Bank Districts of the Nile River (including Project Area), under the supervision of Greater Cairo General Organization for Sanitary Drainage

— — — : Cleaning management districts

: Cleaning workers in the applicable area (one person represented in the figure corresponds to 20 workers)

: No. of pipeline clogging per day in the applicable are (one spot represented in the figure corresponds to 10 spots per day)

Fig. 6-3 Current Status of Sewer Pipeline Cleaning Work Undertaken in the West Bank Districts of the Nile River

The Organization is fairly well equipped with mostly manual cleaning equipment.

The Organization therefore strongly desires to introduce more efficient cleaning machines in order to improve the function of sewer pipelines and efficiency of operation and maintenance.

3) The deposition of foreign matter inside the pipeline not only lowers the flow capacity but is a serious problem that leads to the deterioration of the entire sewer facilities function. These adverse factors must be eliminated systematically and efficiently, and the current system of cleaning the pipeline only when clogging occurs must be changed into a more systematically planned cleaning and maintenance system.

At present, cleaning is mostly done manually and therefore is inefficient. It takes about 3 hours per location. It is causing traffic congestion and the work itself is dangerous.

4) High pressure jet cleaning vehicles which resort mainly to mechanical power are already in use, and Egypt is believed to have the technical capability of operating and maintaining them.

5) With due consideration to the foregoing matters, special cleaning vehicles (high pressure jet cleaning and vacuum vehicles) for high pressure use in small diameter sewer pipelines shall be provided. Provision of this equipment is expected to bring about the following effects.

- Quick recovery of the function of sewer pipeline
- Maintenance of the entire sewerage facilities
- Improved efficiency of cleaning work and reduction of work time
- Reduction of work in unsanitary and hazardous environments

- Realization of a systematically planned pipeline cleaning system
- Prevention of overflowing of sewage on road surface and improvement of living environment
- Reduction in the number of additional pipeline cleaning workers

6) Water used by the high pressure jet cleaning vehicle is replenished by employing a water wagon. The wagon will not be provided under this Project for the following reason.

- The study team considers that the existing water wagon can be used for the vehicles provided under this Project.

6-2 Principal Specifications of Materials and Equipment

6-2-1 Water Supply and Sewer Branch Pipes

(1) Water supply branch pipe

Pipe materials are as shown below:

- Standard length straight pipe of 300mm or less in diameter	:	PVC pipe made in Egypt (according to Egyptian standards)
- Standard length straight pipe of 400mm in diameter	:	Ductile cast iron pipe made in Egypt (ditto)
- Fittings and valves, etc.	:	PVC fittings, ductile cast iron fittings and others made in Japan (according to ISO)

Egyptian-made strait pipes of ductile cast iron are scheduled to be used for the Project, but permission shall be given to use Japanese-made products as an alternative in the case that prices offered by Egyptian manufacturers at the time of contract negotiation are too expensive making it difficult to procure, and/or the time of delivery is so long that the construciton period on the contract cannot be observed. In this case, the

procedures for the above change, including import and customs clearance procedures shall be made smoothly and without delay in Egypt.

(2) Sewer Branch Pipe

The pipe material shall be vitrified clay pipe made in Egypt. Specifications shall be in accordance with the World Bank Loan Project.

6-2-2 Sewer Pipeline Cleaning Equipment

2 sets of high pressure jet cleaning and vacuum vehicles (4 units in total) shall be provided in consideration of the reasons stated below. Their capacity and specifications, etc. shall be the same as those generally used in Japan.

(1) Number of Vehicles to be Provided

In order to maintain and secure the function of sewer pipelines in the Haaram District of Omrania West (refer to Fig. 6-3), the following of mechanical equipment will become necessary if the pipelines are to be cleaned with the use of both manual cleaning equipment and the more efficient mechanical pipe cleaning equipment (high pressure jet cleaning and vacuum vehicles).

$$\text{Required Number of Mechanical Cleaning Equipment} = \frac{\text{No. of clogged pipes to be cleaned by mechanical equipment (spots/day)}}{\text{Daily working capacity of a set of mechanical cleaning equipment (spots/set)}}$$

$$= \frac{15 \text{ spots/day}}{6.4 \text{ spots/set/day}} = 2.3$$

= 2 sets (2 high pressure jet cleaning and 2 vacuum vehicles)

The calculation conditions are as follows:

1) It is difficult to use the existing special cleaning vehicles in Haaram District as there are not enough, and because they are worn out and are already fully utilized in other areas.

2) The number of clogged pipes which must be cleaned by the new mechanical equipment is assumed to be about 30% of all clogged spots in pipelines (50 spots per day) or 15 spots/day in Haaram District.

3) Daily working capacity of a special cleaning vehicle for high pressure jet cleaning (1 set) is assumed to be 6.4 spots/set/day (8hr x 0.8 ÷ (0.5 + 0.5) hr).
For working capacity of a special cleaning vehicle for high pressure cleaning, the following actual performance record in Egypt was used in the calculation.

- Cleaning time : 0.5hr
- Moving time : 0.5hr
- Daily operating time : 8hr
- Daily operating rate : 80%

(2) Cleaning Work

By providing the cleaning equipment, it would become possible to carry out cleaning work efficiently and effectively by mechanically with the combination of high pressure jet cleaning vehicles and vacuum vehicles coupled with manual cleaning.
The cleaning works by high pressure jet cleaning vehicles and vacuum vehicles are as described below, and their operation is relatively simple.

1) High pressure jet cleaning vehicle

This is a vehicle mounted with a pump and water tank. By engaging the high pressure pump, pressure is applied to the water in the water tank and water is ejected from the special ejection nozzle attached to the tip of a hose.

The high pressure jet cleaning vehicle works by inserting the hose into the pipeline from the downstream manhole in the pipeline section to be cleaned toward the upstream manhole. Then water under pressure is injected into the pipeline. By repeating the pushing and drawing back motion of the hose, sediment and other matter is drawn out of the pipeline to the downstream manhole. Fig. 6-4 shows the operation of a high pressure jet cleaning vehicle.

2) Vacuum vehicle

This is a vehicle mounted with a vacuum tank and a storage tank.

It works by applying a suction hose to sediment and other matter collected in the manhole and sucking them into the storage tank.

Fig. 6-5 shows the operation of a vacuum vehicle.

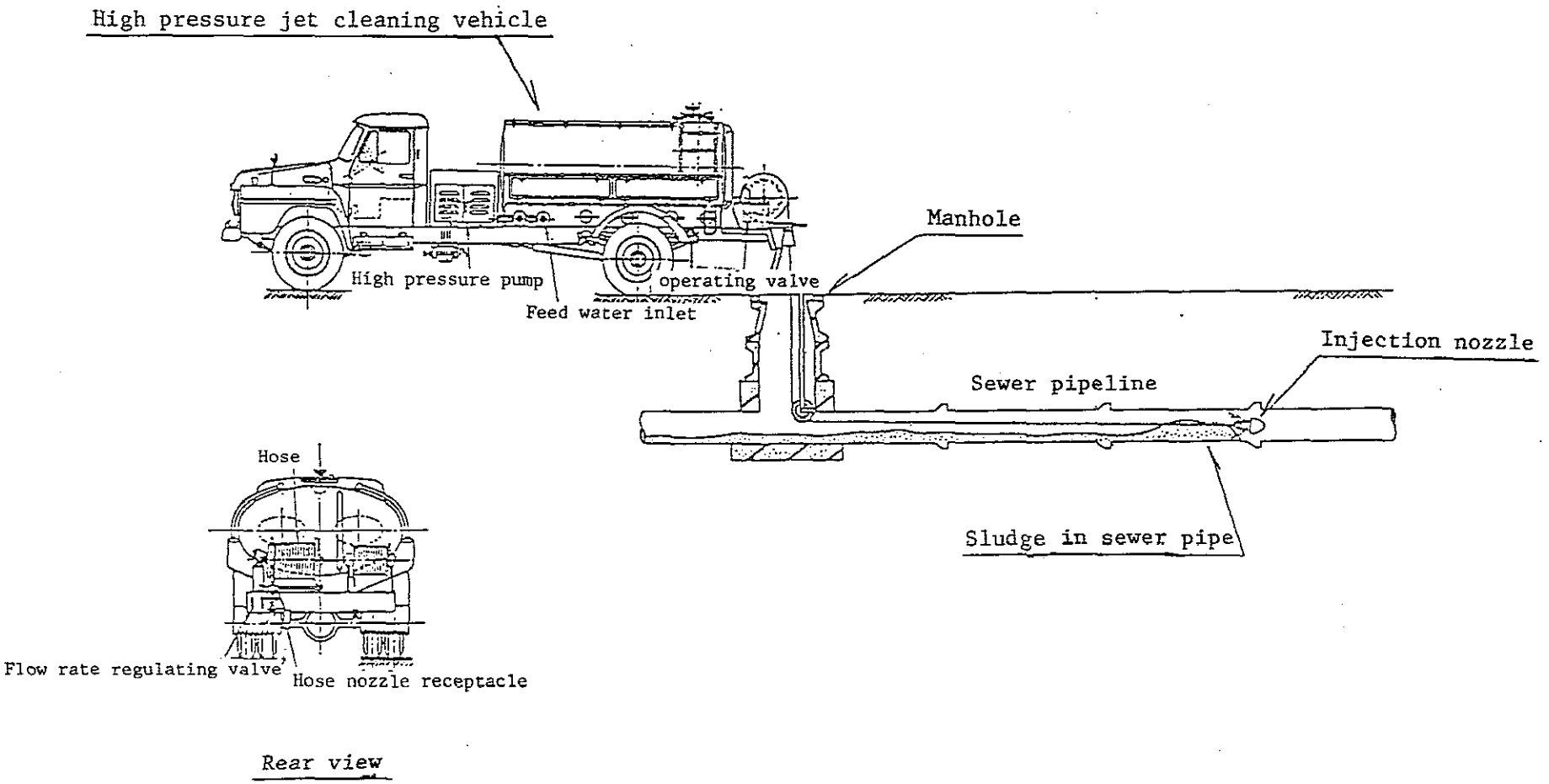


Fig. 6-4 Schematic Drawing of the Operation of High Pressure Jet Cleaning Vehicle

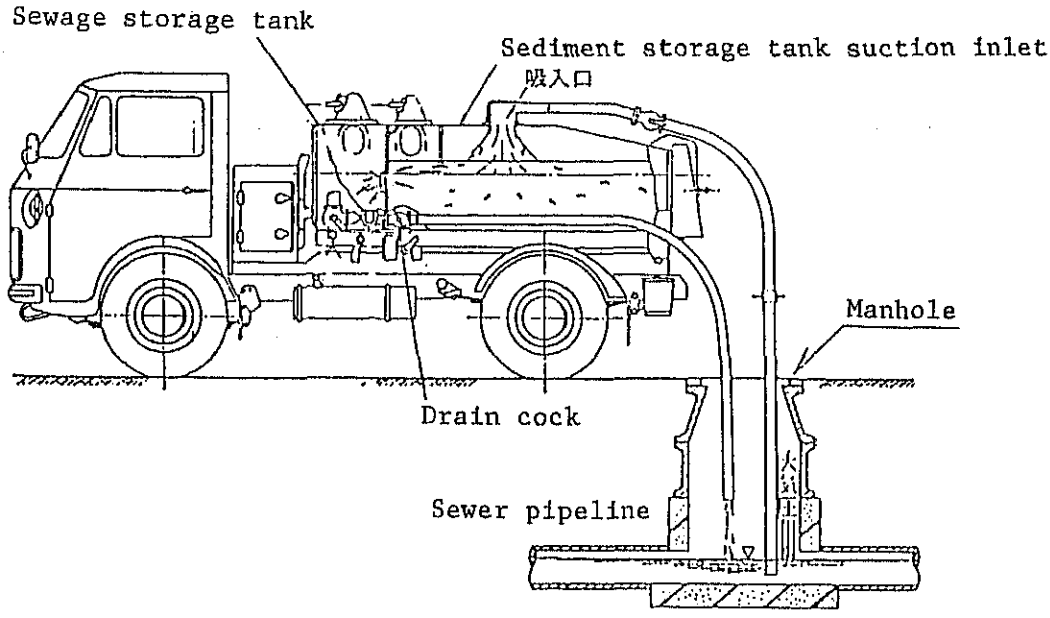


Fig. 6-5 Schematic Drawing of the Operation of Vacuum Vehicle

(3) Principal Specification of each Equipment

1) High pressure jet cleaning vehicle

a) Number of vehicles to be provided : 2 units

b) Vehicle data

- Dimensions (Approx.) : Total length about 6,150mm
  total width about 2,180mm
  total height about 2,470mm
- Number of crew : 3 persons

c) Equipment data

- Tank : Square shaped, 2,700 litres
- High pressure pump: Plunger pump;
  Discharge capacity:
  about 220 litres/min.,
  Maximum pressure about
  150 kg/cm^2
- Main hose : High pressure jet hose (80m long), hydraulic winding method
- Sub-hose : High pressure jet hose (20m long), manual winding method
- Accessories : 1 set
- Maintenance tools : 1 set
- Spare parts : for 2 year

2) Vacuum vehicle

a) Number of vehicle to provided: 2 units
  Equipped with dumping mechanism

b) Vehicle data

- Dimensions : Total length about 6,150mm
  total width about 2,170mm
  total height about 2,650mm
- Number of crew : 3 persons

c) Equipment data

- Tank	:	Cylindrically shaped, 2,700 litres
- Vacuum pump	:	Rotary vacuum pump (Maximum airflow about 19 m^3/min., maximum value of vacuum about -500mmHg)
- Power source for vacuum pump	:	Direct from vehicle's engine
- Accessories	:	1 set
- Maintenance tools	:	1 set
- Spare parts	:	for 2 year

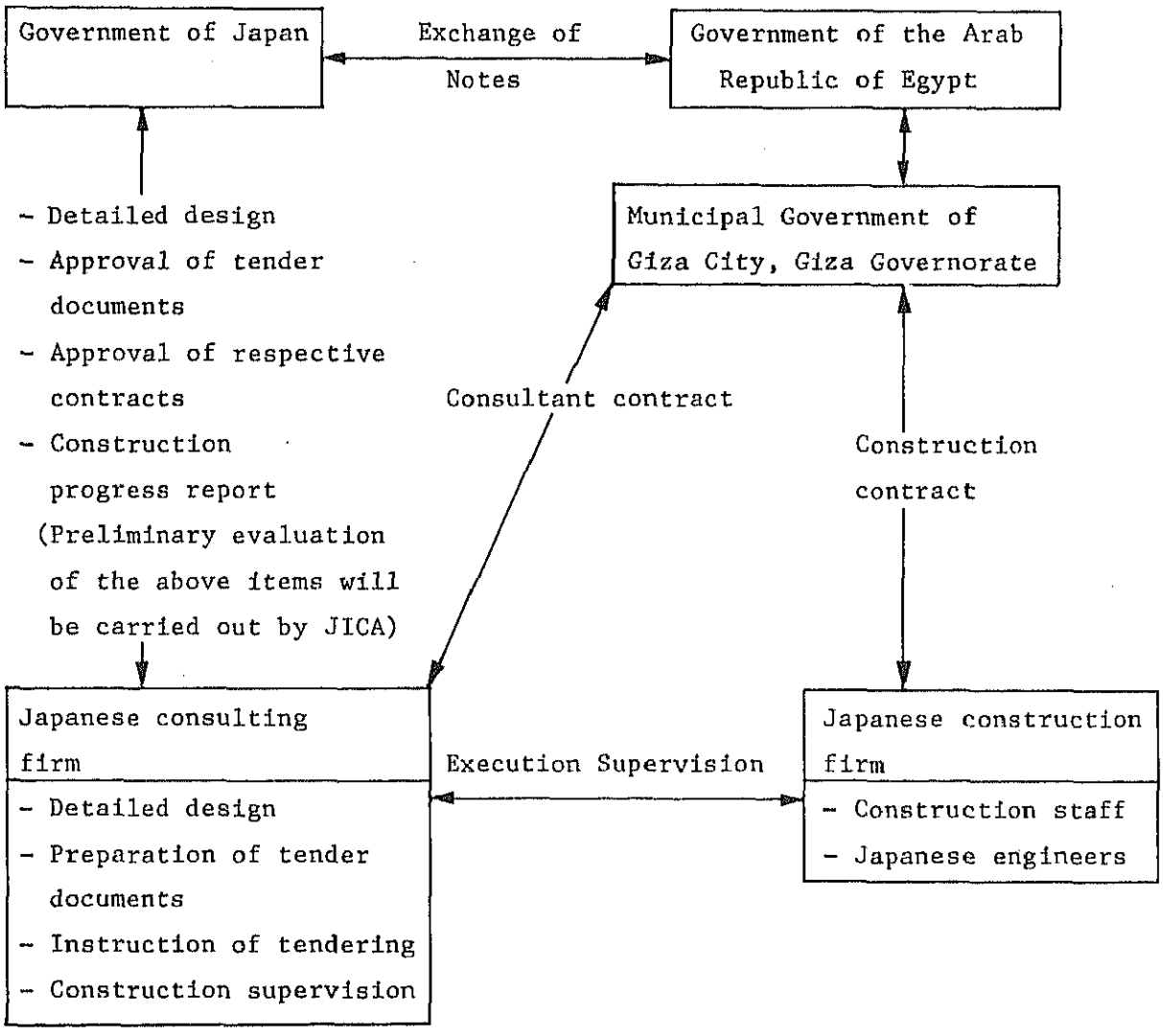
CHAPTER 7
PROJECT IMPLEMENTATION SYSTEM

CHAPTER 7 PROJECT IMPLEMENTATION SYSTEM

7-1 Organization for Implementation

(1) Overall Relationship

The overall relationship among the Implementing Organizations for the Project on the basis of Japanese grant aid is as illustrated below:



(2) Executing Agency

The Governorate of Giza shall be responsible for the implementation of the Project. Giza City will implement the Project. In order to ensure the smooth implementation of the project, the Egyptian side needs to appoint a responsible person to be a full-time officer in charge of the Project so that he may freely liaison between the Japanese consultant, the Japanese contractor and the Egyptian side concerned. The Japanese consultant will be responsible for the detailed design and supervision of construction. The construction work will be executed by a Japanese construction firm who has been awarded with the contract for this Project.

7-2 Scope of Work

7-2-1 Scope of work to be borne by the Government of Egypt

(1) To secure land for water supply and sewer networks and other related facilities.

(2) To provide the temporary land for a construction liaison office, warehouse, stock yard, jacking pit plant, etc., during the construction period.

(3) To secure access roads from the temporary office to the main road for construction, if necessary.

(4) To ensure speedy unloading, tax exemption, customs clearance at ports of disembarkation in Egypt, of the products purchased under the grant aid.

(5) To give the permission required for all the works related to this project, e.g., opening of manholes, entering into railway and canal lot, surveying on the road, etc.

(6) To witness and confirm by the authorities concerned when test pitting and protection and relocation of the existing underground services are carried out.

(7) To take necessary measures for inhabitant's cooperation and traffic control.

(8) To take necessary measures for historical remains which may be encountered during the construction period, if any.

(9) To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract and such facilities as may be necessary for performance of their work.

(10) The Japanese nationals involved in the project will not be subject to any customs duties, internal taxes, and other fiscal levies which may be imposed in Egypt with respect to the supply of the products and services under the verified contract.

(11) to bear all expenses, other than these to be borne by the grant, necessary for the execution of the grant.

(12) To maintain the water supply and sewer networks properly constructed under the grant aid.

(13) To provide necessary data and information for detailed design.

(14) To provide the disposal places of the water including silt, clay, etc., discharged during the construction period.

(15) To secure the suspension of water supply during the connection works of the proposed water supply main line and the existing line.

(16) To take necessary actions to expedite the approval for executions of this project by Egypt.

(17) To give the permission required for test pitting to check underground services at the time of detail design, if necessary.

(18) Bearing of expenses for opening an account with a foreign exchange bank officially approved by the government of Japan.

7-2-2 Scope of work to be borne by the Government of Japan

(1) Construction of a water supply main line for about 4.7km in Omrania West

(2) Construction of a sewer main line for about 2.2km in said area

(3) Construction of 1 sedimentation basin with 2 channels at the Amina Mohamed pump station in said area

(4) Provision of materials for the laying of water supply branch pipes for 11.5km in said area

(5) Provision of materials for the laying of sewer branch pipes for 3.9km in said area

(6) Provision of 2 high pressure jet cleaning vehicles and 2 vacuum vehicles for cleaning sewer pipelines

(7) Procurement of necessary materials, equipment and labor for the construction of water supply and sewer facilities

7-3 Maintenance and Management Plan

(1) Current organizations for maintenance and management

The General Organization for Greater Cairo Water Supply and the General Organization for Greater Cairo Sanitary Drainage are

respectively responsible for the maintenance and management of water supply facilities and sewer facilities.
The current manpower for the operation and maintenance function is about 2,400 for the water supply and about 1,400 for the sewer facilities (of which about 500 is for the operation and maintenance of pipelines).

(2) Maintenance and management system for the Project area

There will be no new organization or a specific personnel assignment plan for this project alone. The present maintenance and management system will be applied for the following reasons.

1) A water supply improvement project under the aid of West Germany and a sewer improvement project under USAID are now in progress in Greater Cairo.

2) The proposed project area is one of the areas that will benefit from the aforesaid two projects.

3) The General Organization for Greater Cairo Water Supply and the General Organization for Greater Cairo sanitary Drainage already have in their employ a large number of staff for operation and maintenance.

4) The operation and maintenance under this project are incorporated under the operation and manitenance system based on the national plan.

5) The implementation of this Project will hardly entail any additional manpower or expenses for operation and maintenance.

CHAPTER 8
PROJECT EVALUATION

CHAPTER 8 PROJECT EVALUATION

Despite the fact that Giza City in Giza Governorate, is close to the political center, it is lagging behind in the development of urban infrastructure. If Giza City is expected to function adequately as the nucleus of Egypt, improvement of the public infrastructure must be given top priority to maintain the living standard of its inhabitants. In this sence both the water supply and sewer facilities are indispensable for basic human needs and the city's development.

Omrania West is suffering from water supply and sewer facilities which are deficient in functional performance and capacity.

Although the percentage of service pervasion of water supply facilities is about 80% in the project area, various deficiencies, inadequate pipe diameter, leakage and so on, causes water shortages in perimeter areas of the water supply network and on second floors and above of the dwellings. In addition, about 20% of the inhabitants still rely on the public water taps or wells.

In the case of sewer facilities, about 94% of the dwellings in Omrania West have house connections, but due to insufficient capacity of sewer main lines and the lack of uniformity of laid pipelines, sewage is sometimes overflowing over the road surface in some places and creating a very unsanitary environment.

The rapid residential and commercial development in the Project area accompanying the population growth is causing further deterioration of the living environment. Thus the demand for improvement of the water supply and sewer facilities and upgrading of their functions is increasing.

These deficiencies in Omrania West increase the difficulties, especially during the summer season due to the shortage of water supply and decomposition of sewage.

With an understanding of the foregoing situation, the effects and propriety of the proposed Project in Omrania West will be evaluated hereunder.

Evaluation concerning Mounira West, is not made in this chapter but detailed technical recommendations for future water supply and sewer facilities are enclosed in Chapter 9.

8-1 Urgency

As described, the current conditions of the water supply and sewer facilities in Omrania West are in a very serious situation.

Because of the total water shortage caused by the insufficient and deficient water supply facilities, people are forced to rely on the public water taps provided along the streets to receive about 20 litres per capita per day of water. In other parts of the area where water supply pipes were laid privately, about 40% of water is lost by leakage. Moreover no fire hydrants are provided in this area and therefore the area is subject to fire hazards.

The sewer main lines in the Project area are insufficient and deficient and parts of the area are totally lacking in sewer facilities so that the inhabitants are compelled to install private cesspits underneath the road. Sewage is sometimes overflowing over the road surface in some place, creating an unsanitary condition.

The Amina Mohamed Pump Station which conveys sewage from the Project area to the Zenein waste water treatment plant has neither a sedimentation basin nor grit and trash removing equipment. 5 workers enter the pump well and spend 2 to 3 hours at night every other week to remove grit and trash under unsanitary and dangerous conditions.

The inflow of a large amount of sediment from the surrounding desert and bare lands clogs the sewer pipelines and lowers their functional

performance and capacity. In order to remove sediment, an extremely large number of maintenance manpower are needed at great expense.

The present inferior environment in Omrania West is anticipated to become even worse with future population growth and an increase in the number of dwellings. The improvement of water supply and sewer facilities and the provision of materials and equipment for the Project area are therefore urgently necessary in order to not only protect and promote the lives and health of the inhabitants but also improve their living standard and the urban function of this area. It is considered that the implementation of this Project at an early opportunity will have a significant effect.

8-2 Effects

8-2-1 Direct Effects

When the water supply and sewer facilities are completed under this Project, these facilities will bring about the following direct effect (refer to Table 8-1 and 8-2).

(1) Water Supply Facilities

1) Effect of Phase I work

The existing water supply main line and branch lines are inadequate in both water supply volume and pressure. The Project areas accounts for a little over 80% of the total. When Phase I work is completed (in 1990), the water supply system will be able to satisfy the requirements of the planned population nearly completely in both volume and pressure in the Project area, even at morning and evening peaks of demand. It is assumed that the Project area will increase to about 90% by installing branch lines to be supplied under the grant aid.

2) Effect of Phase II work

In the year 2010 when the population in the Project area will reach saturation point, the required water supply volume and pressure will be satisfied, even at morning and evening peaks. Moreover, stable water supply will be assured because the water supply main line and branch lines will be laid in a closed circuit arrangement.

Table 8-1 Present Situation and Effect of the Project on Water Supply Pipeline

Item	Present Situation	Effect of This Project		Remarks
		Phase I work	Phase II work	
Planned population (person)	78,800	95,600	175,460	
Project area (ha)	48.57	52.94	58.82	
Percentage of services to the Project area (%)	82.57	90	100	Increase in planned area by provision of branch pipes under grant aid
Amount of water supply volume (m^3/day)	98.84	191.20	350.92	
Design water supply volume per capita per day (lit/capita/day)	125	200	200	
Design water supply pressure (m)	20	20	20	
Water supply pressure (m)	0 ∿ 1.5	15.9 ∿ 20.0	23.1 ∿ 26.1	Water pressure from ground height (AD + 20.0m)

(2) Sewer Facilities

1) Effect of completion of Phase I work

The capacity of the existing sewer main lines is about 70% short of the present sewage volume. About 50% of the existing sewer pipe lines are operating under overloaded conditions, although the percentage of services to the Project area is about 94% of the total area. Thus, the existing sewer facilities can not function fully.

Completion of Phase I work will increase the discharge capacity of sewer main pipe lines to be connected to the Amina Mohamed pump station, and reduce the shortage of capacity and the overloading of the existing sewer lines to about 37% and 20%, respectively.

2) Effect of completion of Phase II work

The discharge capacity will be secured for the sewage volume in the year 2010 when the population in the Project area will reach saturation point. The overloading of the existing sewer will be improved. In addition, the Project area will reach 100% by installing branch pipes to be supplied under the grant aid.

Table 8-2 Present Situation and Effect of the Project on Sewer Pipeline

Item	Present Situation	Effect of This Project		Remarks
		Phase I work	Phase II work	
Project area (ha)	55.29	57.06	58.82	
Percentage of services to the Project area (%)	94	97	100	Increase in Project area by provision of of branch pipes under grant aid
Planned population (person)	89,700	103,000	175,460	
Discharge capacity of pipe line (m^3/sec)	0.14	0.31	0.96	
Shortage of discharge capacity for sewage volume (%)	68	37	0	$\left(1-\frac{\text{discharge capacity}}{\text{sewage volume}}\right) \times 100$ (%)
Overloading of existing sewer pipe lines (%)	50	20	0	Overloading: pipe capacity is not sufficient for sewer discharge

8-2-2 In-direct Effects

(1) Socio-economic benefits

If water supply is secured and the drainage function of public sewer facilities is developed and improved, it is expected that the present serious situation and the anxieties generated among inhabitants can be relieved. The implementation of this Project would offer an important basis for "long-range strategy for socio-economic development" and promote the "coordination and integration of water and sewage projects in accordance with urban plans" of the Second Five-year National Development Plan.

(2) Inhabitants life

The implementation of this project is expected to remove the inhabitants anxieties and improve the deplorable living environment originating from the shortage of water supply, insufficient and deficient drainage of sewage,and lack of fire hydrants, and thereby contribute greatly to the promotion of future urban development programs and to the improvement of the inhabitants life.

(3) Water supply and sewer technology

The water supply and sewer facilities improvement projects for Greater Cairo are now under way with the technical cooperation of West Germany, United States and Great Britain, while the operation and maintenance of those facilities will be carried out by Egypt's own technology.

However, rehabilitating the water supply and sewer facilities in the existing densely populated areas is lagging behind because of the complexity of the work and for financial reasons.

It is hoped that the realization of this Project will bring a successful technical transfer in this field and thereby contribute greatly to the advancement of the water supply and sewer facilities of not only Omrania West but throughout Egypt.

8-3 Suitability

(1) Technical aspects

The long distance pipe jacking method (span length: about 100 to 150m) using reinforced concrete pipe will be adopted for the construction of the water supply and sewer main lines under this Project. To date, this long distance method is not found in Egypt.

The adoption of this method is considered to be quite appropriate under the present circumstance in the Project area. The area is densely populated with pedestrians, and conjested with automobiles. Medium-storied and high-rise buildings which closely line the streets are not strong and durable enough to withstand vibration and shaking by conventional excavation. The adoption of the pipe jackings method will guarantee functional performance and safety of existing infrastructure facilities, safety of the inhabitants, their passages and normal daily life, alleviate noise and vibration, cut down construction costs and allow construction to be completed within a limited construction period.

Also, the benefits of transferring the pipe jacking method and pipe manufacturing technology to Egypt would be to facilitate the improvement of water supply and sewer facilities in densely populated areas of Egypt.

(2) Financial aspect

It is likely that the implementation of this project will not burden the Egyptian side financially. The annual expenses for operation and maintenance of the facilities to be constructed under this project are mainly as follows.

1) Regular inspection of water supply and sewer pipeline

2) Operation and maintenance cost for grit and trash removal equipment in Amina Mohamed pump station

3) Operation and maintenance cost of the aqueduct to be installed over Zomol Canal.

4) Operation and maintenance cost of the high pressure jet cleaning vehicles and vacuum vehicles provided for cleaning of pipelines.

(3) *Operation and maintenance*

Operation and maintaining staffs seem to have a sufficient level of technical competence already. As no special technical competence is required in operating and maintaining the facilities to be completed under this Project, the Egyptian side should have no problem whatsoever. As facilities will be improved and their functional performance and efficiency upgraded, the manpower and expenses spent on maintenance will be reduced, which will allow this saving to be used for the betterment of maintenance in other districts.

The proposed project is therefore considered to be highly appropriate from all aspects; technical, operation and maintenance, and financial.

CHAPTER 9
CONCLUSION AND RECOMMENDATIONS

CHAPTER 9 CONCLUSION AND RECOMMENDATIONS

9-1 Conclusion

The existing water supply and sewer facilities in Omrania West, as described, are dispersed to a considerable extent, but almost all are deficient and insufficient for their purpose. Their deteriorated condition and the population growth and development of the urban areas, is aggravating the already deplorable environment.

It is believed that the deteriorated environment can be remedied to a considerable extent by the construction of water supply and sewer facilities and the provision of necessary materials and equipment for Omrania West.

On examining the feasibility of the implementation of the proposed Project, due consideration was given to its conformity with the existing facilities and future planned water supply and sewer facilities. Emphasis was placed on deriving as much benefits from the Project as possible.

The proposed Project also conforms with the objectives of Egypt's Second Five-Year plan for socio-economic development, which are "long-range strategy for socio-economic development" and "coordination and integration of water and sewage projects in accordance with urban plans".

Accordingly, the implementation of this Project by Japan's grant aid is considered to be both significant and highly appropriate.

It is necessary to coordinate the sewage facilities plan in Mounira West with the schedule of the project being implemented under USAID. As the details are unknown at this time (1988), the Japanese side is unable to conduct a basic design study for this area.

Accordingly, only technical recommendations are made for the future implementation plan of the water supply and sewer facilities in Mounira West.

9-2 Recommendations

This report, consists of the recommendations for the construction of water supply and sewer facilities in Omrania West including the provision of pipe materials for water supply and sewer branch lines and pipe cleaning equipment. This report also contains technical recommendations for the future implementation plan of the water supply and sewerage facilities in Mounira West.

The purpose of the Project, including the diversion and utilization of existing facilities, is basically to construct new water supply and sewer facilities in the Project area.

When the present situation in Omrania West is considered, the development of water supply and sewer facilities will have a more direct impact on basic requirements of the area, such as the securing of urban infrastructure and the protection and promotion of human lives and health, compared to the development of other social infrastructure. Because of this, it is believed this Project is appropriate for implementaion and will keep within the urban development plans and socio-economic development plans of Egypt.

In order to execute this Project smoothly and timely within the tentative implementation schedule, ratification at People's Assembly of Egyptian Government of E/N is very important.

It is recommended that the ratification should be done before the dates on the following schedule:

Phase I : before end of December, 1988
on condition that E/N is concluded in 1988

Phase II: before end of November, 1989
on condition that E/N is concluded in 1989

9-2-1 Omrania West

It is recommended that the Egyptian side take adequate measures regarding the following matters in order to ensure that the Project will be implemented effectively and that the facilities constructed will perform their functions for a long period.

(1) Several engineers who will be responsible for the planning and construction of water supply and sewer facilities and for maintenance and control of those facilities in the future shall be appointed to participate on a full-time basis from the initial stage of the Project. For this purpose, efforts shall be made to expand and amplify the project implementing organization and to select qualified persons in order to fully understand and master the technical aspects of the facilities to be constructed under this Project.

(2) A large amount of articles such as vinyl, pieces of cloth and paper are found among the trash at Amina Mohamed Pump Station. In order to maintain the functional performance of the sewer facilities and to reduce the operation and maintenance expenses, it is desirable to enlighten the inhabitants through the mass-media that it is important not to throw away such articles into sewer pipelines.

(3) The branch pipe materials for the water supply and sewer facilities provided under this Project shall be installed immediately in the Project area by the Egyptian side at its own expenses in order that they may serve to alleviate the deteriorating living environment of the inhabitants.

(4) The sewer pipe cleaning equipment to be provided under this Project shall be utilized not only in this Project area but for cleaning of pipelines over a wider range.

(5) In order to absolutely guarantee the safety of passing trains,

pipe jacking work at the railway crossings must be executed under the supervision of Egyptian State Railway.

(6) Inspection and Maintenance System

The Egyptian side shall perform the following maintenance and inspection work and take necessary measures as required.

1) Water Supply Facilities

a) Routine inspection: once a year or more.

b) Items for periodic inspection

① Check road surfaces on the route of the underground pipeline for cracks, differential settlement, or any other abnormal conditions.

② Always confirm clearly the location of valves, check their functions, and keep them in good working order at all times.

③ In case there is a need to enter into valve chambers for inspection, maintenance, etc., always measure oxygen levels and existence of any harmful gases and confirm safety before entering.

④ For fire hydrants, maintain close contact with fire fighting authorities and keep fire hydrants in good working order so that they will not fail during fire fighting activities.

⑤ Check manhole covers for damage, wear or discrepancy in levels with road surfaces because such damage, etc., may cause danger to pedestrians, etc.

⑥ Check the inside of manholes for differential settlement, corrosion of footholds, etc. to ensure safety and ease of maintenance and inspection work.

⑦ Sediments are liable to collect in low level portions of the pipeline such as at the intersection with Pyramid street and the inverted siphon section at the railway crossing. Remove such sediments by opening the blow-off valve from time to time when such work will not interfere with the water supply.

⑧ Check the aqueduct over the Zomor Canal with the following particular points in mind:

- Leakage of water from the air valve, joint, etc.
- Condition of supporting hardware (bolts, nuts,
- Settlement and inclination of the foundations
- Condition of the paint

⑨ Check the inverted siphon crossing the railway with the following particular points in mind:

- Leakage of water into valve chambers installed in the jacking pits
- Settlement of the railway track

For removing water and sediments being washed out of the valves in the jacking pit, use a portable pump because channel for the disposal is unavailable in the area. Avoid washing the water and sediments into the farm areas near the jacking pit.

2) Sewer Facilities

a) Pipe line

① Routine inspection: once a year or more.

② Items for periodic inspection

- Check the pipe invert for the state and extent of sediments of grit, suspended matter, rags, etc. that have entered into pipe lines.
- Check ground surfaces for any differential settlement and its extent because ground surfaces may settle due to damage to pipes or defective joints.
- Check for existance of harmful sewage from gasoline stations, factories, etc. which can lower the functions of sewer systems.
- Check manhole covers for damage, wear, or discrepancy in levels with road surfaces because such damage, etc., may cause danger to pedestrians, etc.
- Check the inside of manholes for differential settlement, corrosion of footholds, or the state and extend of sediments of grit and debris to ensure safety and ease of maintenance and inspection work.
- In case there is a need to enter into manholes for inspection, maintenance etc., always measure oxygen levels and existance of any harmful gases and confirm safety before entering.
- Check lateral sewers of branch pipes for clogging, damage, and their extent.
- Check inlets of branch pipes for sediments of grit and its extent.

b) Sedimentation Basin

① Routine inspection: every day.

② Items for inspection

- Check to confirm that the flow of water in the sedimentation basin is maintained at about the prescribed average velocity (0.25 to 0.35m/sec).
- Check to confirm if the opening of the gate is correct.
- Frequently remove trash and keep the difference in water level across the screen as small as possible.
- Operate pumps, taking into account the water level in the sedimentation basin.
- Frequently clean concrete slabs because trash and grit will cause unsanitary conditions if they are left uncleaned.
- Promptly remove trash and grit when required and transport them to the specified dumping site outside the premises and dump them at this site.

Inspect and maintain with particular attention and care, mechanical and electrical equipment at the sedimentation basin at a regular interval (more than twice a year) according to their respective inspection manuals. This is because these mechanical and electrical equipments are subject to intensive wear and damage since they are all exposed to severe conditions during use.

c) Sewer pipe line cleaning equipment

① Routine Inspection: everyday.

② Items for inspection

Inspect and maintain, with particular attention and care, equipment at a regular interval (twice a year for special inspection) according to their inspection

manuals. This is because these machines are subject to intensive wear and damage since they are all exposed to severe conditions during use.

9-2-2 Mounira West

It is recommended that in developing the water suply and sewer branch pipes in Mounira West, Egypt take into full account the local conditions and thereupon take adequate measures to cope with the following matters.

(1) Scope of development and the development schedule of branch pipe works shall be coordinated in conformity with the sewer main line installation work to be implemented under USAID.

(2) The route of the branch pipes, pipe diameters and burying depths must be planned so that sewage from all parts of the Project area may be discharged into the sewer main line.

(3) In order to reduce construction costs and the public nuissances that are imposed on the inhabitants during the construction, it is desirable that both the water supply and sewer branch pipe development projects be implemented simultaneously.
If the branch pipes of either one are to be laid first, it is desirable that laying of sewer branch pipes be given priority for the following reasons.

1) Their burying depth is generally deeper.

2) Underground services that are found during construction work are difficult to deal with and result in increasing the construction cost and extending the work period. It is necessary to construct the work under conditions where these services are unlikely to be encountered.

3) Water supply pipes are laid in some places, but sewer pipes are not present.

(4) As the roads are unpaved and extremely uneven (with the difference in level ranging between about 30cm - 80cm) it is difficult to plan and execute the water supply and sewer branch pipe installation work. It is therefore necessary to carry out the water supply and sewer branch pipe development work and the road improvement work simultaneously.

(5) The level of the entrance steps to each dwelling are not the same. There are a large number of dwellings with a difference in levels of about 50cm to 70cm.
Road surface level and entrance level should be designed to prevent water inflow during periods of rain and easy access to dwelling (refer to Fig. 9-1).

(6) Connection of house connection pipes with main pipe

As there is a measurabel difference in the floor heights of dwellings, it is necessary to decide the invert of branch pipes, after investigating the floor level of each dwelling, to ensure that sewage from the dwelling can be discharged into the main line.
The method of connecting each dwelling with the main line is to collect sewage into the intercepting chambers through a lateral pipe, from which discharge sewage flows into the manhole nearby (refer to Fig. 9-1).

(7) Handling of privately installed cesspits and pipe laying method

Privately installed cesspits are found on every road, and it is believed that they will interfere with almost all of the planned pipelines.
According to the World Bank Loan Report there are approximately 2,000 cesspits.
Therefore, in laying the pipelines, the handling of these cesspits is likely to greatly affect the costs and construction period. Regarding these problems, the study team recommends the following (refer to Fig. 9-2).

1) Insteads of removing privately installed cesspits, they should be buried by filling with sand and rubble.

2) If cesspits should interfere with the pipeline, the pipeline should be made to detour around them.

3) If a detour cannot be made, the walls of the cesspits should be chiselled out to let the pipeline through.

(8) Medium-storied residential buildings (3 to 6 stories high) stand closely on both sides of the roads where water supply and sewer pipes are to be laid.
Although their columns, beams and floors are made of reinforced concrete, the walls are made of bricks so they are not considered to be strong.
In order to ensure safety and prevent damage of buildings when their peripheries are to be deeply excavated (particularly for burying sewer branch pipes), it is believed necessary to undertake the following countermeasures.

1) The sheathing material to be used must be made of steel of adequate strength.

2) Excavation and back-filling work must be carried out by employing small machines that generate little vibration and shaking, or done manually.

(9) Many inhabitants live in this area. They are likely to visit the work sites to watch the work in progress.
In order to alleviate public nuisances caused by the construction work and prevent any accidents, the following measures should be taken.

1) Work should be carried out during daytime.

2) Work method and construction equipment which generate as little vibration and noise as possible should be selected.

3) Operation of vehicles must be guided by a security staff.

4) Safety ropes must surround the work site and a security guard must be assigned to keep watch.

(10) At the moment, the work site is dark at night as there is no street lighting.
In order to prevent any accidents, because of the lighting situation, it is believed that the following measures should be taken.

1) Clearing of the site must be rigorously enforce after work each day in order to eliminate scattering of construction materials and equipment and to keep the road surface from becoming rugged.

2) The work site must be surrounded by safety ropes and safety lamps. Also a safety guard must be assigned to the area.

3) Work sections must be allocated and working schedules planned so that excavation, pipe installation and back-filling can be completed all in the same day (1 day operation).

(11) Garbage and waste discarded articles are scattered on the roads which is quite unsanitary. In order to maintain the functional performance of water supply and sewer facilities in good condition, to cut down on operation and maintenance expenses and to improve and upgrade the living environment especially after the facilities have been improved, it is desirable to enlighten the inhabitants through handouts and the mass-media that they should not throw away waste outdoors and into sewer pipelines.

(12) In order to effectively use the limited supply of precious water supply, it is recommended that in providing water supply and sewer branch pipes, water saving type faucets and toilet fixtures be used.

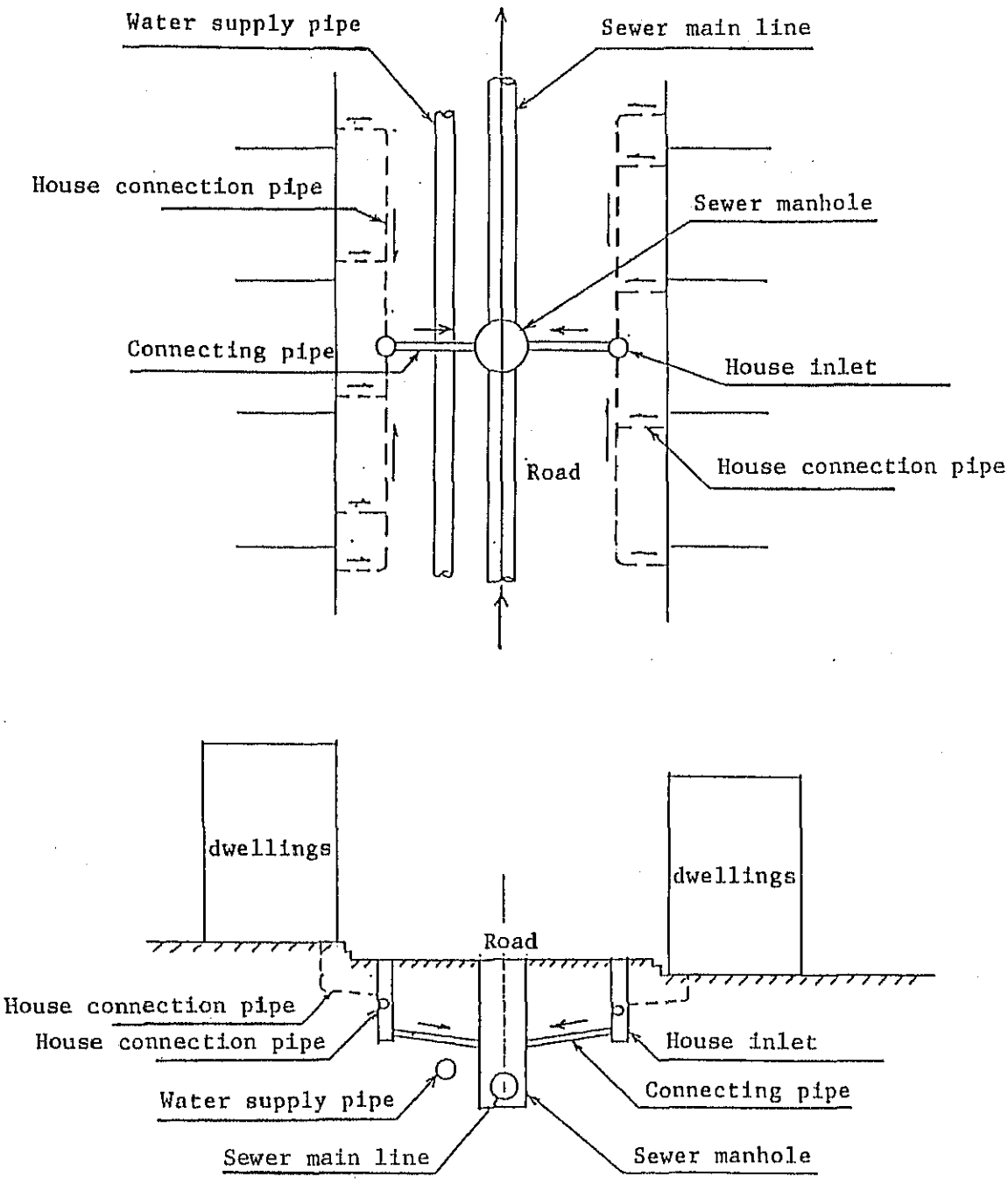
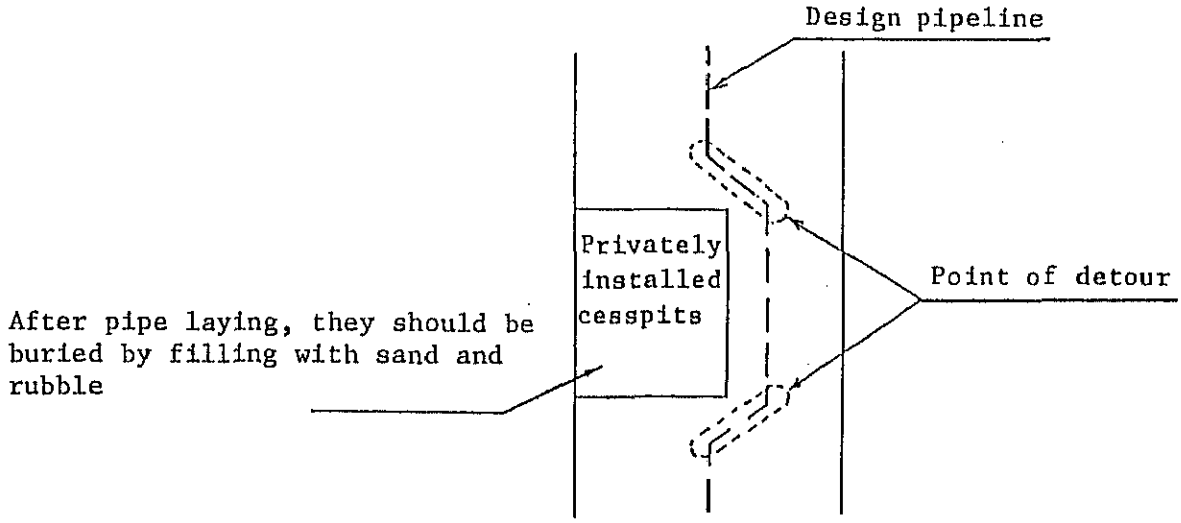


Fig. 9-1 Typical Connection Method for Sewer Pipes between Dwelling and Main Line

Case of a detour can be made



Case of a detour cannot be made

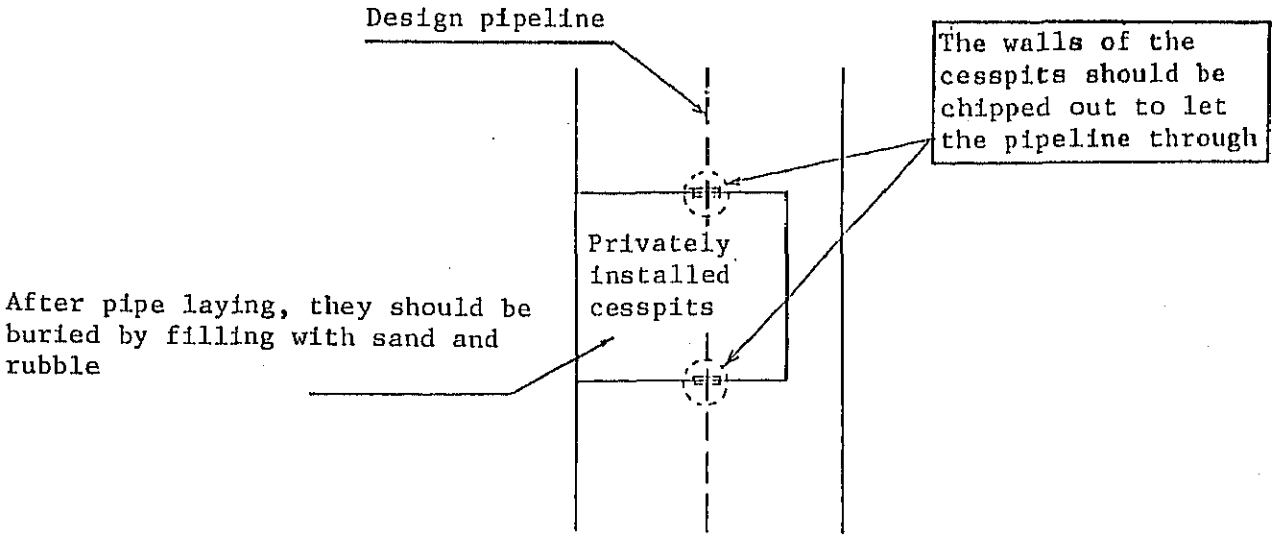


Fig. 9-2 Typical Installation Method for Water Supply and Sewer Pipeline

APPENDIX

APPENDIX I
MINUTES OF DISCUSSIONS

MINUTES OF DISCUSSIONS
ON
THE PROJECT FOR
OMRANIA WEST AND MOUNIRA WEST
WATER SUPPLY AND SEWER UPGRADING, GIZA CITY
IN
THE ARAB REPUBLIC OF EGYPT

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 for Omrania West and Mounira West "Water Supply and Sewer Upgrading", Giza City and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Arab Republic of Egypt the study team headed by Mr. Takeshi Naruse (Team Leader) from May 11 to June 19, 1988.

The Japanese team had a series of discussions and exchanged views on the Project with the authorities concerned of the Government of the Arab Republic of Egypt headed by the Hon. Fouad Khalil, Mayor of Giza City, Giza Governorate, and conducted a field survey on the sites.

As a result of the study and discussions, both parties mutually agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Giza, May 26, 1988

Takeshi Naruse
Leader
Basic Design Study Team
JICA

Fouad Khalil
Mayor of Giza City
Giza Governorate

Witnessed by

Saad Bayoumi
Under Secretary
Ministry of International Cooperation

ATTACHMENT

1. The Objective of the Project

The objective of the Project is to improve the water supply and sewer networks in Omrania West and Mounira West in Giza City in order that the living standards and conditions of the people in these two districts may be upgraded. In so far as Mounira West is concerned, however, only the field survey is to be conducted in view of the future plan. Based on the results of such field survey, moreover, recommendations will be made on the future improvement plan of the water supply and sewer networks to be done by the Government of the Arab Republic of Egypt.

2. Responsible and Coordinating Agency for the Project

Giza Governorate.

Implementation Agency for the Project

Giza City

3. Project Sites

The Project sites are located in Omrania West and Mounira West in Giza City as shown in Annex I-1 and I-2, and both parties have agreed upon the following,

- Basic Design shall be carried out for Omrania West.
- Technical recommendations shall be made for Mounira West.

4. The basic concept of the water supply and sewer networks shall be described in the Field Report which will be submitted to the Egyptian side at the end of the field survey of Basic Design Study.

5. The Basic Design Study Team has agreed to convey to the Government of Japan the desire of the Government of the Arab Republic of Egypt that the grant aid should be extended to Mounira West as Phase II in the future.

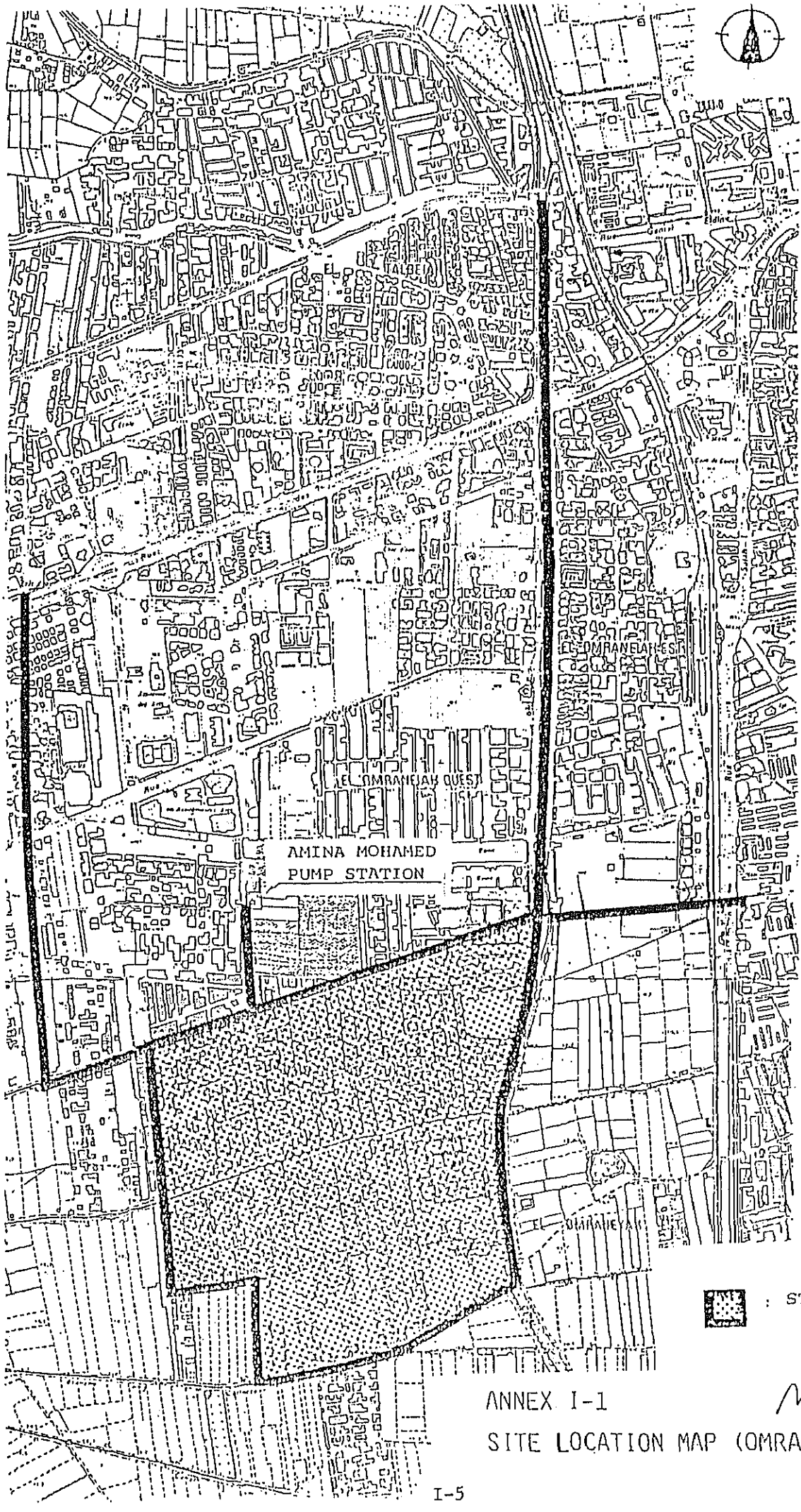
6. The Basic Design Study Team has agreed that the Japanese side relocates the existing underground services which may be encountered during the construction on condition that sufficient information is provided by the Egyptian side during this field survey period.

7. The Egyptian side has understood the Japanese grant aid system as explained by the Study Team including a principle that contracts are to be concluded with a Japanese consulting firm and Japanese general contractor for the implementation of the Project.

8. The Government of the Arab Republic of Egypt has agreed to provide the necessary measures as listed in Annex II on condition that grant aid by the Government of Japan is extended to the Project.

9. The Government of the Arab Republic of Egypt has agreed to provide the necessary budget and personnel for the proper and effective maintenance of the facility provided under the grant aid.

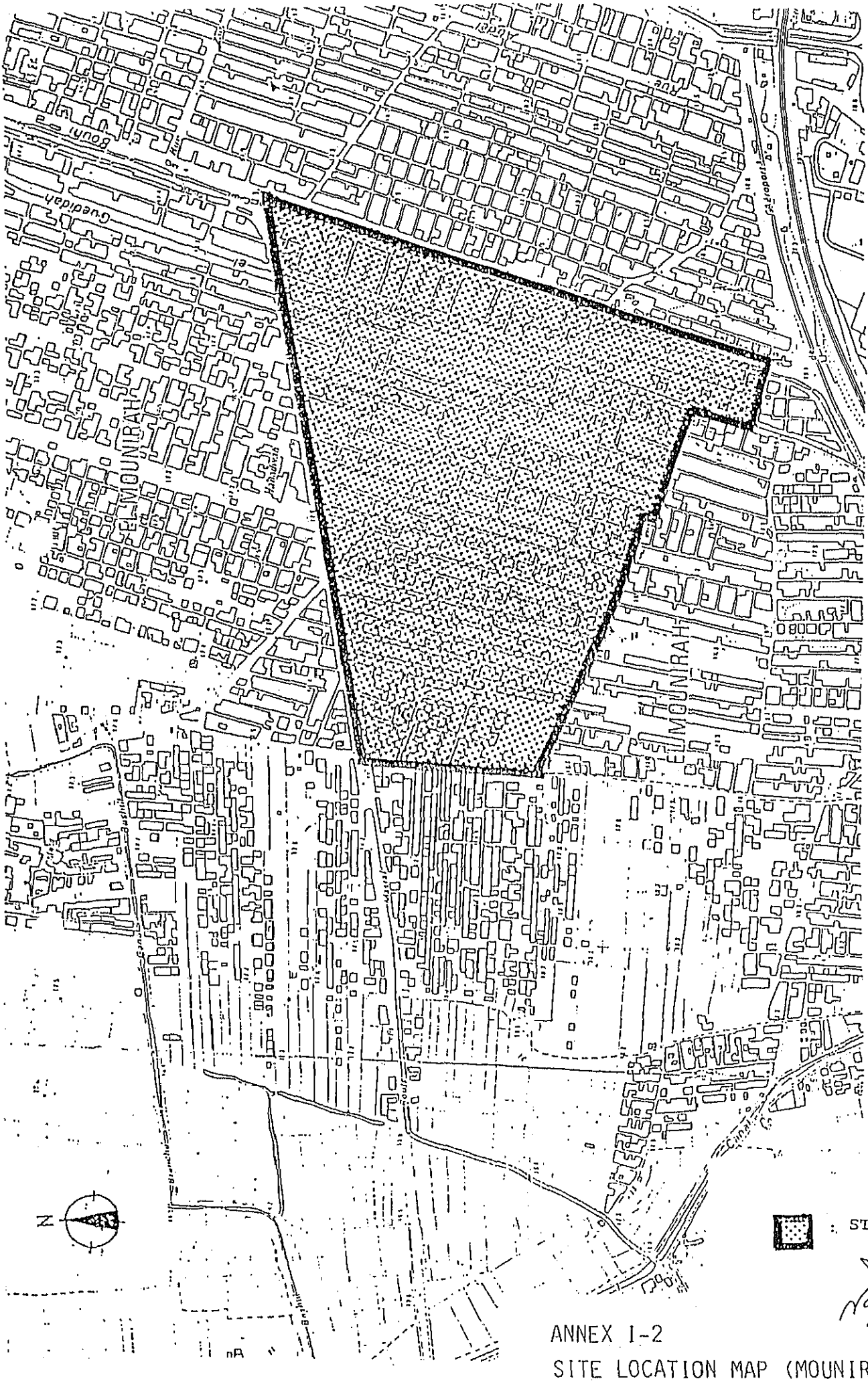
ANNEX I Project Sites



: STUDY AREA

ANNEX I-1

SITE LOCATION MAP (OMRANIA WEST)



ANNEX I-2

SITE LOCATION MAP (MOUNIRA WEST)

ANNEX II - Recommendations for undertakings by the Government of the Arab Republic of Egypt, which are in accordance with Egyptian Regulations and Relevant Laws:

(1) To secure land for water supply and sewer networks and other related facilities.

(2) To provide the temporary land for a construction liaison office, warehouse, stock yard, jacking pit plant, etc., during the construction period.

(3) To ensure speedy unloading, tax exemption, customs clearance at ports of disembarkation in the Arab Republic of Egypt, of the products purchased under the grant aid.

(4) To give the permission required for all the works related to this project, e.g., opening of manholes, entering into railway and canal lot, surveying on the road, etc.

(5) To witness and confirm by the authorities concerned when test pitting and, protection and relocation of services are carried out.

(6) To take necessary measures for inhabitant's cooperation and traffic control.

(7) To relocate the existing underground services which may be encountered during the construction period, and which no or insufficient information and data are provided by the Egyptian side during this field survey period.

(8) To take necessary measures for historical remains which may be encountered during the construction period, if any.

(9) To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract and such facilities as may be necessary for their entry into the Arab Republic of Egypt and stay therein for the performance of their work.

(10) The Japanese nationals involved in the project will not be subject to any customs duties, internal taxes, and other fiscal levies which may be imposed in Egypt with respect to the supply of the products and services under the verified contract.

(11) To bear all expenses, other than those to be borne by the grant, necessary for the execution of the grant.

(12) To maintain the water supply and sewer networks properly constructed under the grant aid.

(13) To provide necessary data and information for detailed design.

(14) To provide the disposal places of the water including silt, clay, etc., discharged during the construction period.

(15) To secure the suspension of water supply during the connection works of the proposed water supply trunk line and the existing line.

(16) To take necessary actions to expedite the approval for executions of this project by the Government of the Arab Republic of Egypt.

(17) To give the permission required for test pitting to check underground services at the time of detail design, if necessary.

MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY
ON
THE PROJECT FOR OMRANIA WEST AND MOUNIRA WEST
WATER SUPPLY AND SEWER UPGRADING, GIZA CITY
IN
THE ARAB REPUBLIC OF EGYPT

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 for Omrania West Water Supply and Sewer Upgrading, Giza City and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Egypt the study team headed by Mr. Takeshi Naruse, First Basic Design Study Division, Grant Aid Planning & Survey Department, JICA, from 11th May to 19th June, 1988.

As a result of the study, JICA prepared a draft report and dispatched a team headed by Miss Harumi Kitabayashi, First Basic Design Study Division, Grant Aid Planning & Survey Department, JICA, to explain and discuss it from 4th August to 13th August, 1988.

Both parties had a series of discussions on the Report and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, would be examined towards the realization of the Project.

Giza, August 10, 1988

Harumi Kitabayashi
Leader, Basic Design Study Team
Japan International Cooperation
Agency (JICA)

Fouad Khalil
Mayor of Giza City
Giza Governorate
The Arab Republic of Egypt

Witnessed by

Saad Bayoumi
Under Secretary
Ministry of International Cooperation

ATTACHMENT

1. The Giza City side has agreed in principle to the basic design proposed in the Draft Final Report and appropriate alterations agreed by both sides, in the course of discussions, will be incorporated in the Final Report.

2. Both sides referred and reconfirmed the Minutes of Discussions which was mutually signed on May 26, 1988.

3. The Government of the Arab Republic of Egypt has agreed to provide the necessary measures as listed in Annex I on condition that grant aid by the Government of Japan is extended to the project.

4. The Giza City side has understood Japan's grant aid system and the arrangement to be taken by the Giza City side for realization of the Project in accordance with the tentative implementation schedule attached herewith (Annex II).

5. Both sides agreed upon the title of this Project "Omrania West Water Supply and Sewer Upgrading, Giza City". This title will be adopted after this minutes of discussion.

6. The Final Report (10 copies in English) will be submitted to the Giza City side before the end of September, 1988.

7. The Giza City side understood Japan's Grant Aid system as explained by the study team which includes the use of the consulting firm which conducted the basic design study for detailed design services and construction supervision.

Annex - I Recommendations for undertakings
by the Government of the Arab Republic of Egypt
In Accordance with the Egyptian Laws and Regulations Concerned

(1) The procedures and arrangements shall be undertaken in Egypt so that the Project can be executed under the tentative implementation schedule (Annex - II). If necessary, the English version of the contracts with the consultant and the contractor shall be translated into Arabic by the Giza City side, however the English version shall be binding upon all parties concerned.

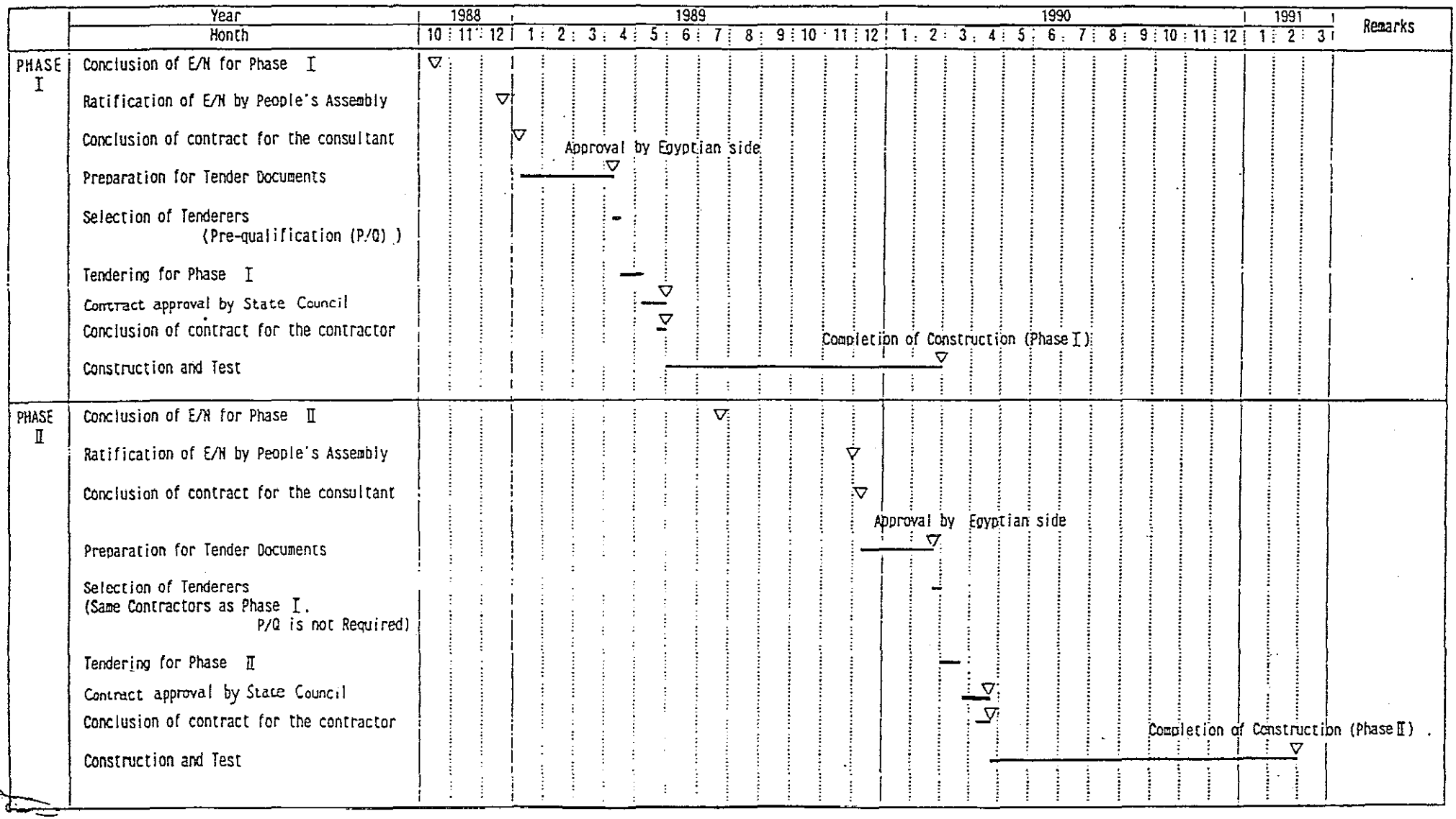
(2) To notify or assist the Consultant and the Contractor in advance, of the existence of all laws, regulations and decrees related to the execution of the works. Such notice shall be informed in advance within sufficient time to prevent any hindrance or delay to the agreed time schedule for the works.

(3) Egyptian-made straight pipes of ductile cast iron are scheduled to be used for the Project, but permission shall be given to use Japanese-made products as an alternative in the case that prices offered by Egyptian manufacturers at the time of contract negotiation are too expensive making it difficult to procure, and/or the time of delivery is so long that the construction period on the contract cannot be observed. In this case, the procedures for the above change, including import and customs clearance procedures shall be made smoothly and without delay in Egypt.

(4) External pressure test shall be conducted on concrete pipe to ensure the quality of reinforced concrete pipe but no such test equipment is available to Egyptian manufacturers. The Giza City side shall recommend such a manufacturer to consent and cooperate in order that the Contractor can install the test equipment in the manufacturer's factory and request the manufacturer to conduct the test.

ANNEX - II Tentative Implementation Schedule

Annex-II Tentative Implementation Schedule



APPENDIX II
MEMBERS LIST OF THE BASIC DESIGN STUDY TEAM

APPENDIX II MEMBERS LIST OF THE BASIC DESIGN STUDY TEAM

FIELD SURVEY FOR BASIC DESIGN STUDY

Name	Assignment	Position
Mr. Takeshi NARUSE	Team Leader	Japan International Cooperation Agency
Mr. Kazuo TAKEISHI	Sanitary drainage planning	Public Works Research Institute, Ministry of Construction
Mr. Shigenobu OHBAYASHI	Water supply planning	Water Resources Development Public Corporation
Mr. Ryosuke TERANISHI	Water supply and sanitary drainage planning	Yachiyo Engineering Co., Ltd.
Mr. Toshio TAKESHIMA	Water supply designing	Yachiyo Engineering Co., Ltd.
Mr. Masahiro TAKEUCHI	Sanitary drainage designing	Yachiyo Engineering Co., Ltd.
Mr. Masatsugu KOMIYA	Mechanical equipment	Yachiyo Engineering Co., Ltd.
Mr. Misashi YAMAUCHI	Civil work planning execution	Yachiyo Engineering Co., Ltd.
Mr. Mohmoud-Saleh RIAD	Coordinator	Yachiyo Engineering Co., Ltd.

EXPLANATION FOR DRAFT FINAL REPORT

Name	Assignment	Position
Miss Harumi KITABAYASHI	Team Leader	Japan International Cooperation Agency
Mr. Ryosuke TERANISHI	Water supply and Sanitary drainage planning	Yachiyo Engineering Co., Ltd.
Mr. Toshio TAKESHIMA	Water supply designing	Yachiyo Engineering Co., Ltd.
Mr. Masahiro TAKEUCHI	Sanitary drainage designing	Yachiyo Engineering Co., Ltd.

APPENDIX III
FIELD SURVEY SCHEDULE

APPENDIX III FIELD SURVEY SCHEDULE

1. Field survey for basic design study

The Basic Design study team carried out a field survey from May 11 to June 19, 1988 in accordance with the field survey schedule as listed below.

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
1	May 11	Wed.	Fine	On plane	Lv. Narita JL-473 17:30	Departure of consultant team from Tokyo
2	May 12	Thu.	Fine	Cairo		Visits to JICA Cairo Office, Japanese Embassy, MOIC, Giza City Gen. Org'n. for Sanitary Drainage
3	May 13	Fri.	Fine	"		Field reconnaissance
4	May 14	Sat.	Fine	"		Discussion with Giza City, Gen. Org'n. for Water Supply, market survey, field surveying
5	May 15	Sun.	Fine	"		Discussion with P.B. Sabbour, market survey, field surveying
6	May 16	Mon.	Fine	"		Discussion with Gen. Org'n. for Sanitary Drainage, market survey, field surveying
7	May 17	Tue.	Fine	"		Compilation of data collected
8	May 18	Wed.	Fine	"		Discussion with Gen. Org'n. for Sanitary Drainage, drafting of rough report
				On plane	Lv. Narita AF-275 13:00	Departure of governmental team members from Tokyo

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
9	May 19	Thu.	Fine	Cairo		Discussion with Gen. Org'n. for Sanitary Drainage, drafting of rough report
					AF-118 22:10	Arrival of governmental team members at Cairo
10	May 20	Fri.	Fine	"		Overall meeting of both teams, field reconnaissance
11	May 21	Sat.	Fine	"		Discussion meeting with JICA Cairo Office (governmental team members), discussions with Gen. Org'n. for Water Supply, market survey, field surveying
12	May 22	Sun.	Fine	"		Visits to JICA Cairo Office, Japanese Embassy, MOIC, Giza City, Gen. Org'n. for Sanitary Drainage Water Supply (governmental team members), market survey, field surveying
13	May 23	Mon.	Fine	"		Meeting with Gen. Org'n. for Water Supply and Giza City, general meeting of the entire study team, preparation of the Minutes of Discussion, market survey, field surveying
14	May 24	Tue.	Fine	"		General meeting of the entire study team at JICA Cairo Office, general meeting with Egyptian personnel concerned at MOIC, field surveying

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
15	May 25	Wed.	Fine	Cairo		Discussion with Giza Governorate, Giza City, Gen. Org'n. for Water Supply and MOIC market survey, field surveying, general discussion meeting of the entire study team
16	May 26	Thu.	Fine	"		General discussion meeting of the entire study team at JICA Cairo Office, general meeting with Egyptian personnel concerned at MOIC, signing of the Minutes of Discussion
17	May 27	Fri.	Fine	"	LH-595 06:30	Departure of governmental team members from Cairo, internal discussion among team members
18	May 28	Sat.	Fine	"		Discussion with State Railway, market survey, field surveying
19	May 29	Sun.	Fine	"		Discussion meetings with Giza City, P.B. Sabbour, Gen. Org'n. for Sanitary Drainage, electric power company, market survey, field surveying
					Tokyo JL-408 11:35	Arrival of governmental team members at Tokyo
20	May 30	Mon.	Fine	"		Discussion with Gen. Org'n. for Water Supply, market survey, field surveying

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
21	May 31	Tue.	Fine	Cairo		Compilation of data collected, market survey, field surveying
22	June 1	Wed.	Fine	"		Compilation of data collected, market survey, field surveying, discussion with Gen. Org'n. for Water Supply. Ministry of Public Works and Water Resources
23	June 2	Thu.	Fine	"		Discussion with Gen. Org'n. for Sanitary Drainage, compilation of data collected, market survey, field surveying
24	June 3	Fri.	Fine	"		Compilation of data collected
25	June 4	Sat.	Fine	"		Discussion with Telephone Office, compilation of data collected, market survey, field surveying
26	June 5	Sun.	Fine	"		Discussion meetings with electric power company and telephone office, market survey, field surveying
27	June 6	Mon.	Fine	"		Discussion meetings with P.B. Sabbour, electric power company and telephone office, market survey, field surveying
28	June 7	Tue.	Fine	"		Market survey, field surveying, preparation of the Field Report

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Deail of study items
29	June 8	Wed.	Fine	Cairo		Market survey, field surveying, preparation of the Field Report
30	June 9	Thu.	Fine	"		Market survey, field surveying, preparation of the Field Report
31	June 10	Fri.	Fine	"		Preparation of the Field Report
32	June 11	Sat.	Fine	"		Presentation and explanation of the Field Report to Giza City, market survey, field surveying
33	June 12	Sun.	Fine	"		Discussion with P.B. Sabbour, market survey, field surveying
34	June 13	Mon.	Fine	"		Discussion meetings with P.B. Sabbour and Gen. Org'n. for Sanitary Drainage, compilation of data collected, market survey, field surveying
35	June 14	Tue.	Fine	"		Discussion with Gen. Org'n. for Sanitary Drainage, compilation of data collected, discussion of the Field Report with Mayor
36	June 15	Wed.	Fine	"		Discussion with Gen. Org'n. for Water Supply, compilation of data collected

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
37	June 16	Thu.	Fine	Cairo		Courtesy call on Japanese Embassy, courtesy call and discussion at JICA, acquisition of a letter of approval and boring data from Giza City, compilation of data collected, market survey
38	June 17	Fri	Fine	London	Lv. Cairo BA-156 09:00	Departure of consultant team from Cairo
39	June 18	Sat.	Fine	On plane	Lv. London BA-007 16:30	Departure of consultant team from London
40	June 19	Sun.	Fine	Tokyo		Arrival of consultant team at Tokyo

2. Explanation of Draft Final Report

The study team conducted explanation of the draft final report (D/F) to the authorities concerned of the Government of Egypt from August 4th to 13th 1988 according to the following schedule.

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Authorities Concerned Explained/ Places Visited
1	Aug. 4	Thu.	Fine	On plane	Lv. Narita TG-741 16:30	Departure of the study team from Tokyo
2	Aug. 5	Fri.	Fine	Cairo	TG-926 05:00	Arrival of the study team to Cairo, internal discussions of the study team, preparation of materials for the explanations
3	Aug. 6	Sat.	Fine	Cairo		Explanation of the D/F to and discussions with authorities of Giza City, internal discussions of the study team
4	Aug. 7	Sun.	Fine	Cairo		Visit of courtesy to the Embassy of Japan and JICA Cairo Office, explanation of the D/F to MOIC and General Organization for Water Supply
5	Aug. 8	Mon.	Fine	Cairo		General meeting with Egyptian authorities at the MOIC, discussions with the General Organization for Sanitary Drainage
6	Aug. 9	Tue.	Fine	Cairo		Discussions with Giza City
7	Aug. 10	Wed.	Fine	Cairo		Discussions with Giza City, signature of the Minutes of Discussion

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Authorities Concerned Explained/ Places Visited
8	Aug. 11	Thu.	Fine	Cairo		Discussions with the General Organization for Water Supply, discussions with Giza City, visit of courtesy to the Embassy of Japan, reporting to JICA
9	Aug. 12	Fri.	Fine	On plane	Lv. Cairo AF-119 11:45	Departure of the study team from Cairo
10	Aug. 13	Sat.	Fine	Tokyo	JL-406 14:45	Arrival of the study team to Tokyo

APPENDIX IV
LIST OF INTERVIEWEES

APPENDIX IV LIST OF INTERVIEWEES

The personnel concerned interviewed by the Study Team are as follows.

Plate of Work and Name	Position
Embassy of Japan in Egypt:	
Mr. Hiroshi Hashimoto	Ambassador Extraordinary and Plenipotentiary
Mr. Tadashi Uemura	First Secretary
Mr. Toshiyuki Furui	Second Secretary
JICA Egypt Office:	
Mr. Keiji Iimura	Resident Representative
Mr. Takeshi Komori	
Mr. Akira Kodama	
Mr. Mohamed Diaa El-Din	
Ministry of International Cooperation:	
Mr. Hamed Mostafa	Director of Department
Mr. Mohsen	Chief of Asia Desk
Giza City:	
Mr. Fouad Khalil	Mayor of Giza City
Mr. Nabil Makhlouf	Advisor of Giza City
Mr. Said Said Mohmoud	Chief of Engineering Department
Mr. Ahmed El Darmely	Administrator
Greater Cairo General Organization for Water Supply:	
Mr. Kamel Hegab	Chairman
Mr. Saad El Deen El Deeb	Vice Chairman
Ms. Sayeda El Shahed	Director of planning & Research Department
Mr. Yousef Elgamat	General Director (Ein El Sira)

Mr. Hussein Kamal Mohamed	General Manager (Ein El Sira)
Mr. Yousef Gad	General Manager (Pyramid Elevated Water Reservoir No.2)

Greater Cairo General Organization for Sanitary Drainage:

Mr. Mohamed Farid Sewalem	Chairman
Mr. Saleh Solunan Wanis	Operation & Maintenance Department, General Manager for West Bank

P.B. Sabbor (Consultant):

Mr. Mohamed Maher El-Sadek	President
Mr. Ramses Attia	Project Manager for Omrania West & Mounira West, Upgrading Project
Mr. Ismail Mohamed Ismail	Civil Engineer, Chief of Sanitary Design Section
Mr. Samy Saad Attia	Civil Engineer, Water Supply Works Design Section

The Arab Contractors Osman Ahmed Osman & Co.,:

Mr. Louther M. Guirguis	Manager of Tendering Department
Mr. Ahmed M. El Gozami	Civil Engineer A.G. Manager *Tendering Department*
Mr. Ibrahim A. Mitkis	Civil Engineer Technical Manager Tendering Department
Mr. Adly Hussein Adly	Civil Engineer

The Egyptian Company for Prestressed Concrete S.A.E. (ECPC):

Mr. Rene Latinus	General Manager
Mr. Ramez I. Moussa	Marketing Manager
Mr. Andre Lucat	Factory Manager

Specialize Contracting & Industrial Co. (SCI):

Mr. Rabha Fadel	Technical Office Manager
Mr. Mohamed Y. Safwat	Factory Manager
Mr. Nasser Bishlaw	Production Engineer

Middle East Trading & Engineering Co. (METRA):

Mr. El Tayend Mohsen	Managing Director
Mr. Attia Mohamed Attia	Technical Study Dept.

El Nasr Casting Co.,

Mr. Hassab M. Amer	Chairman
Mr. Farouk Khalid	General Commercial Manager
Mr. Salah El-Din Mohamed Azzam	Factory Manager
Mr. Badr Metwaly	Production Manager
Ms. Saad Mahmoud	Manager of Planning Section

Construciton & Reconstruction Engineering Company (CRC):

Mr. Mohsen Farag	General Manager
Mr. Farouk Soliman	Senior Civil Engineer, Technical Affaires Sector

MISR International Contracting Corp.:

Mr. Maamoun C. Kaddah	Managing Director
Mr. Mohamed B. Amin	Administrative Director

CECO:

Mr. Mohamed Ezel Din	Operation Manager

LAMEI Fahmy Abdel Shahid Co.,:

Mr. Tarik J. Halim	Commercial Manager

SIEGWART:

Mr. Moustafa M. Hifnawi	Chairman
Mr. Fouad Ahdel Ghani	General Manager for Trading

Mrs. Mary Halim	
Mr. George H. Banoub	General Manager
Mr. Sobhi G. Atriby	Production Manager
Mr. Amir KH. Rizkalla	Commercial General Manager

Egytrans:

Mr. Shukry Tabit	1st Deputy Managing Director
Mr. Mohamed Saadawi	Cairo Branch Manager

Japan External Trade Organization:

Mr. Yoshio Watanuki	

Cairo Branch of the Tokyo Bank:

Mr. Hosei Matsumoto	General Manager

SORNAGA:

Mr. Salah A. Bahassawi	General Sales Manager

EEA (Egyptian Electricity Authority):

Mr. Atea Ez Eldin	General Inspector of Networks

Cairo Distribution Company:

Mr. Abdel Hamid Ismail	Chairman
Mr. Saad Hussein	Deputy Chairman
Mr. Shawki Mostafa	Assistant of Chairman
Mr. Moher Mostafa	Cheif of South Network Sector
Mr. Sayed Eedreldine	Supervisor, Drafting & Supervising Office
Mr. Bahaa Abdel Fattah	Assistant Supervisor
Mr. Hussein Mohmoud Ahmed	Draft Man

Pyramids Distribution Company:

Mr. Ragheb Fahmy	Manager of Drawing Section
Mr. Mohamed Ahmed Fahmy	Drawing Engineer

Dokki Distribution Company:

Mr. Tawfeek Nasr	Manager
Mr. El Ghareb	Drawing Engineer

ARENTO (Arab Republic of Egypt Network Telecommunications Organization):

Mr. Sami M. Nakhla	General Manager

Giza Telephone Exchange Office:

Mr. Hamdy Mcmmoud	Chairman
Mr. Mohammed Maadi Khalaf	Manager of Local Telephone Networks Project
Mr. Ahmed Esmail Ayesh	Project Sector
Mr. Hassni Mohamed Ossman	Maintenance Sector

Siette:

Mr Piero Sequi	Supervising Engineer

The Ministry of Public Works and Water Resource:

Mr. Ab Del Nabialy	General Director of Giza Irrigation
Mr. Ezat Moursi	Engineer

The Egyptian Cement Selling Office:

Mr. Ahmed Ali Hasan	General Manager of Maintenance and Objection

The Egyptian Cement Selling Office:

Mr. Ahmen Morsy	Manager of Export