

#### 4.3.4 Basic Design Drawings

The list of the basic design drawings is as follows:

#### Basic Design Plan

Table 4-9 List of Drawings

| No. | Name of Plan                                 |
|-----|--|
| 1   | General Plan                                 |
| 2   | Hydraulic Profile                            |
| 3   | Plan of Sedimentation Basin                  |
| 4   | Section of Sedimentation Basin (1)           |
| 5   | Section of Sedimentation Basin (2)           |
| 6   | Plan of Rapid Sand Filter                    |
| 7   | Section of Rapid Sand Filter (1)             |
| 8   | Section of Rapid Sand Filter (2)             |
| 9   | Section of Rapid Sand Filter (3)             |
| 10  | Plan / Section of Chlorination basin         |
| 11  | Section of Chlorination basin                |
| 12  | Plan of Clear Water Reservoir (1)            |
| 13  | Plan of Clear Water Reservoir (2)            |
| 14  | Section of Clear Water Reservoir (1)         |
| 15  | Section of Clear Water Reservoir (2)         |
| 16  | Plan / Section of Administration Office      |
| 17  | Single line diagram                          |
| 18  | Schematic flow diagram                       |
| 19  | Location of Distribution Main Pipe           |
| 20  | Installation Plan for Distribution Main Pipe |

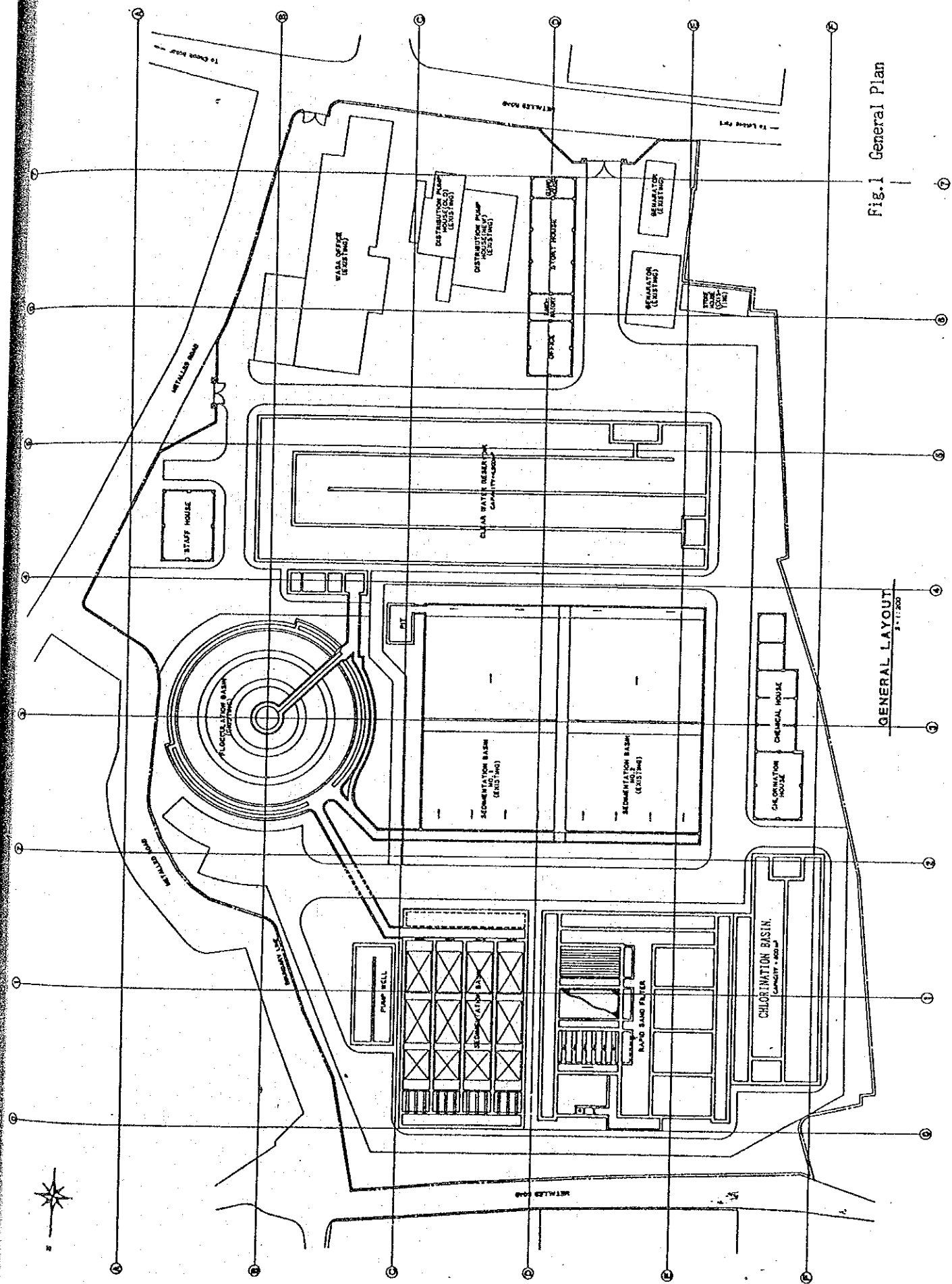


Fig. 1 General Plan

GENERAL LAYOUT  
3-11-200



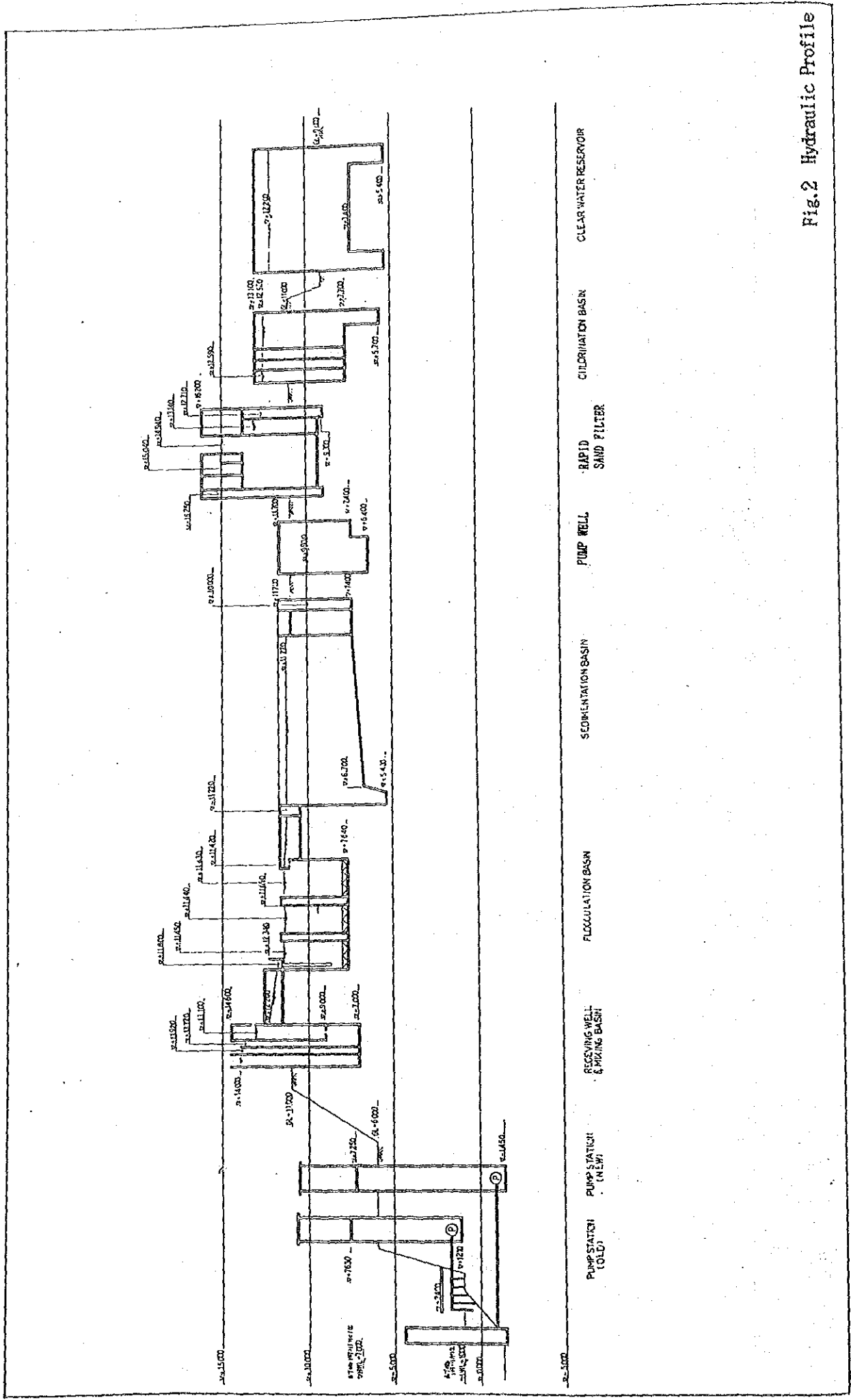


Fig.2 Hydraulic Profile

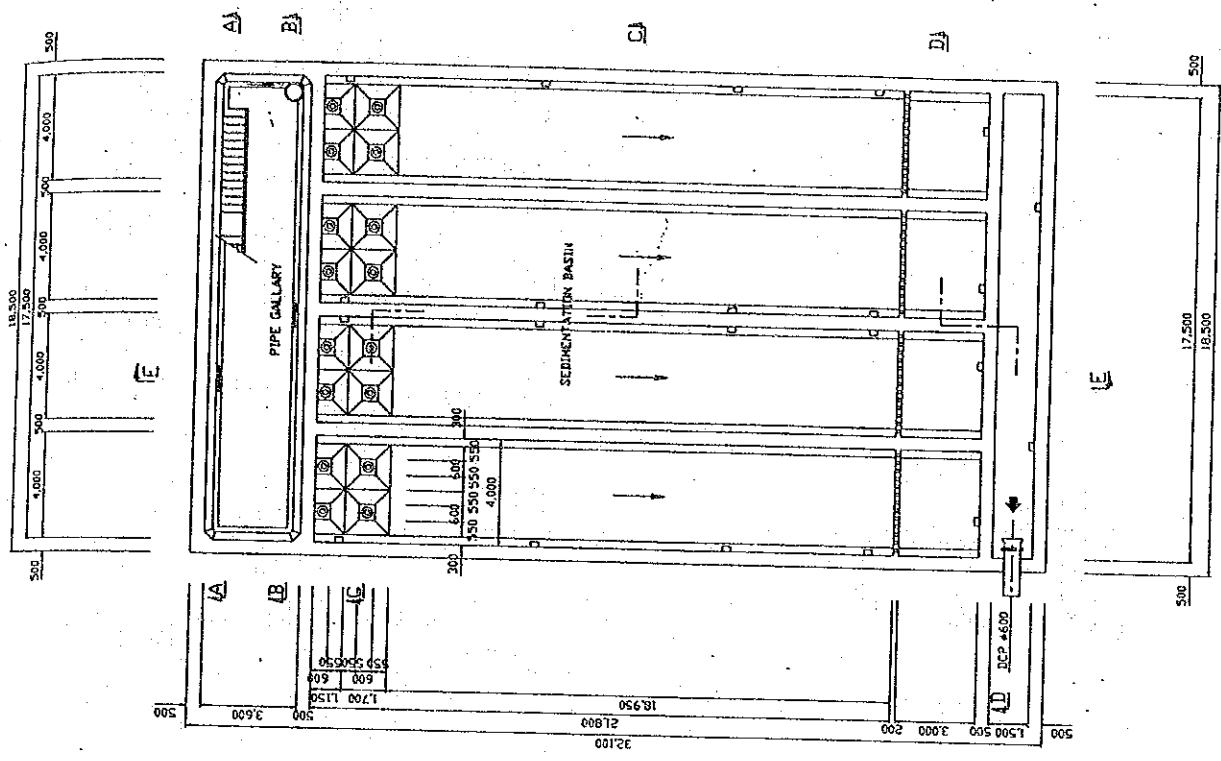
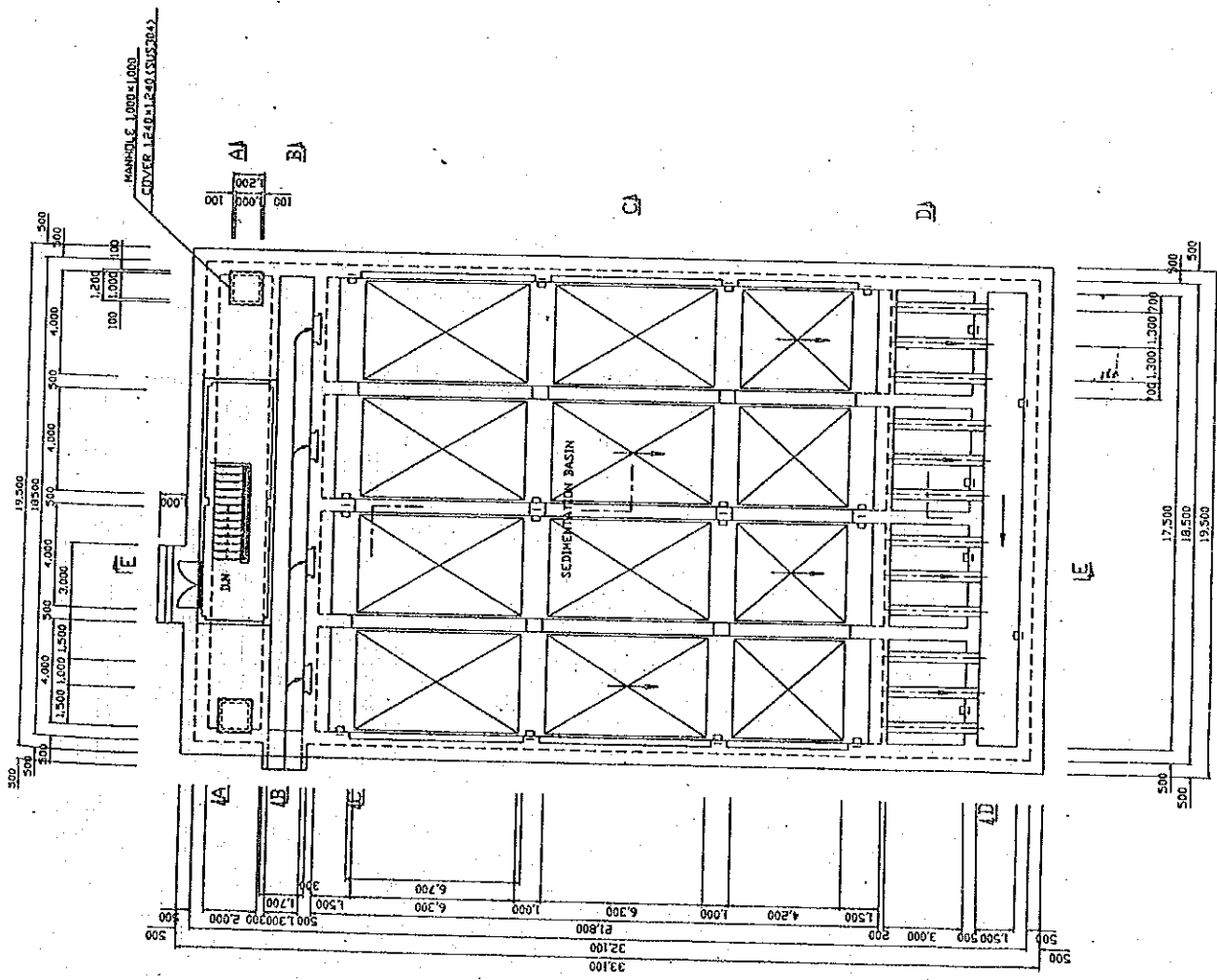
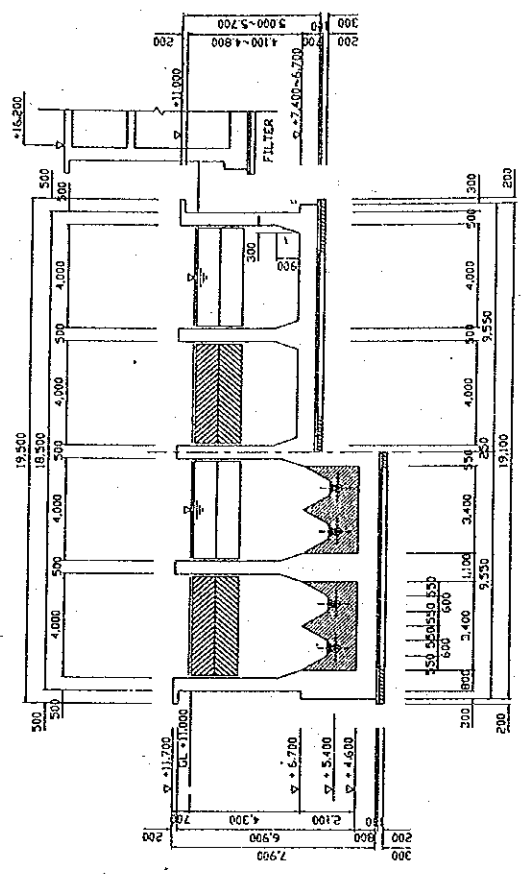
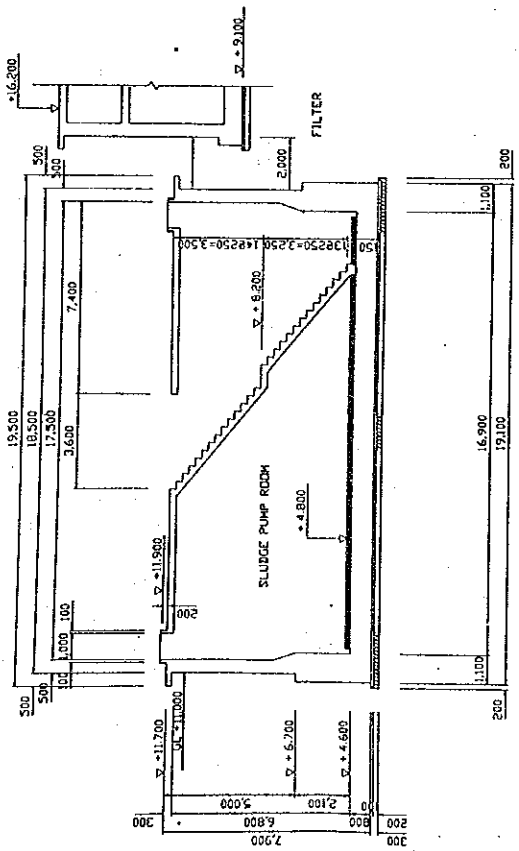
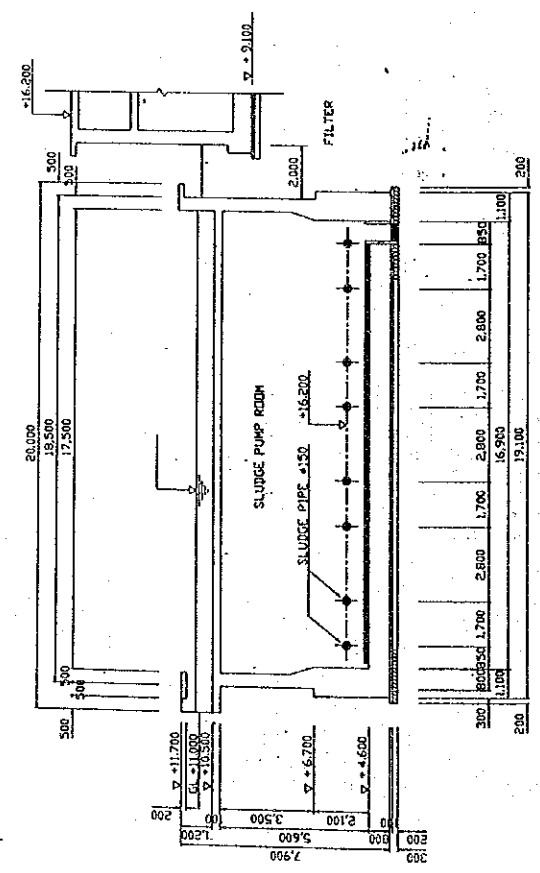


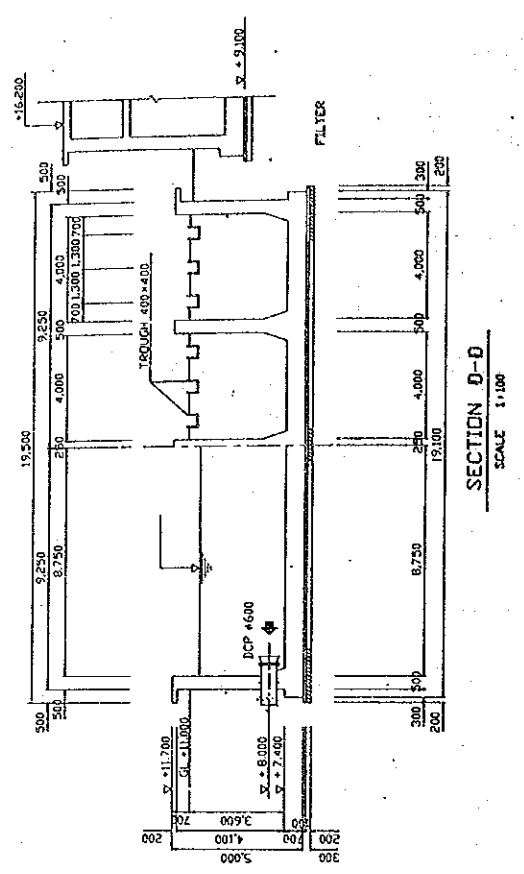
Fig. 3  
 BOTTOM PLAN Plan of Sedimentation Basin  
 SCALE 1:100



SECTION C-C  
SCALE 1:100

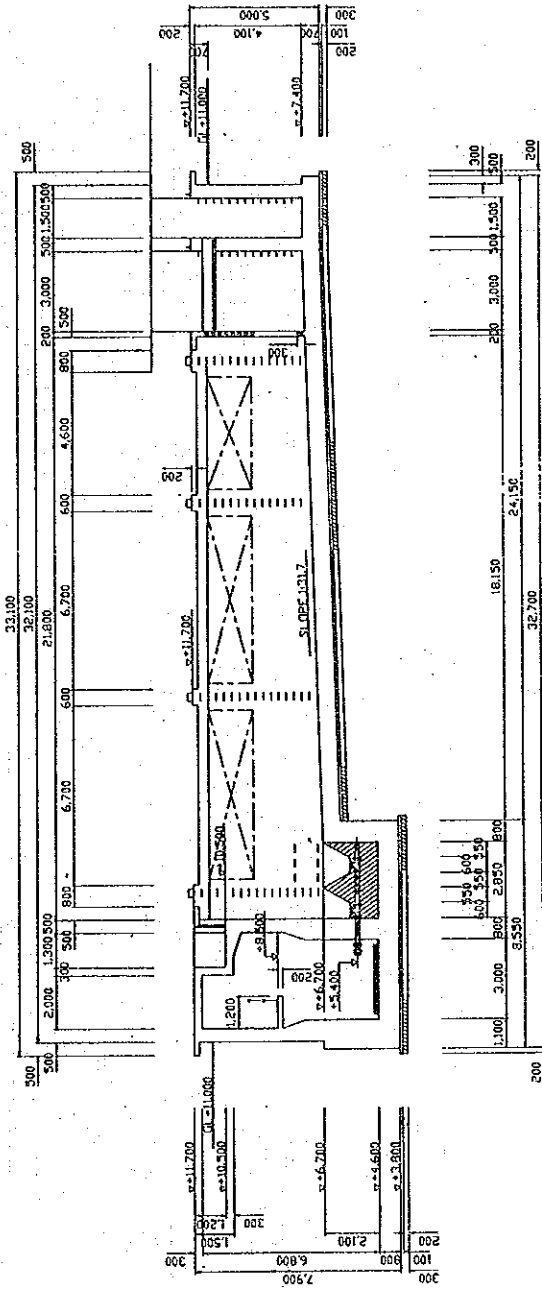


SECTION B-B  
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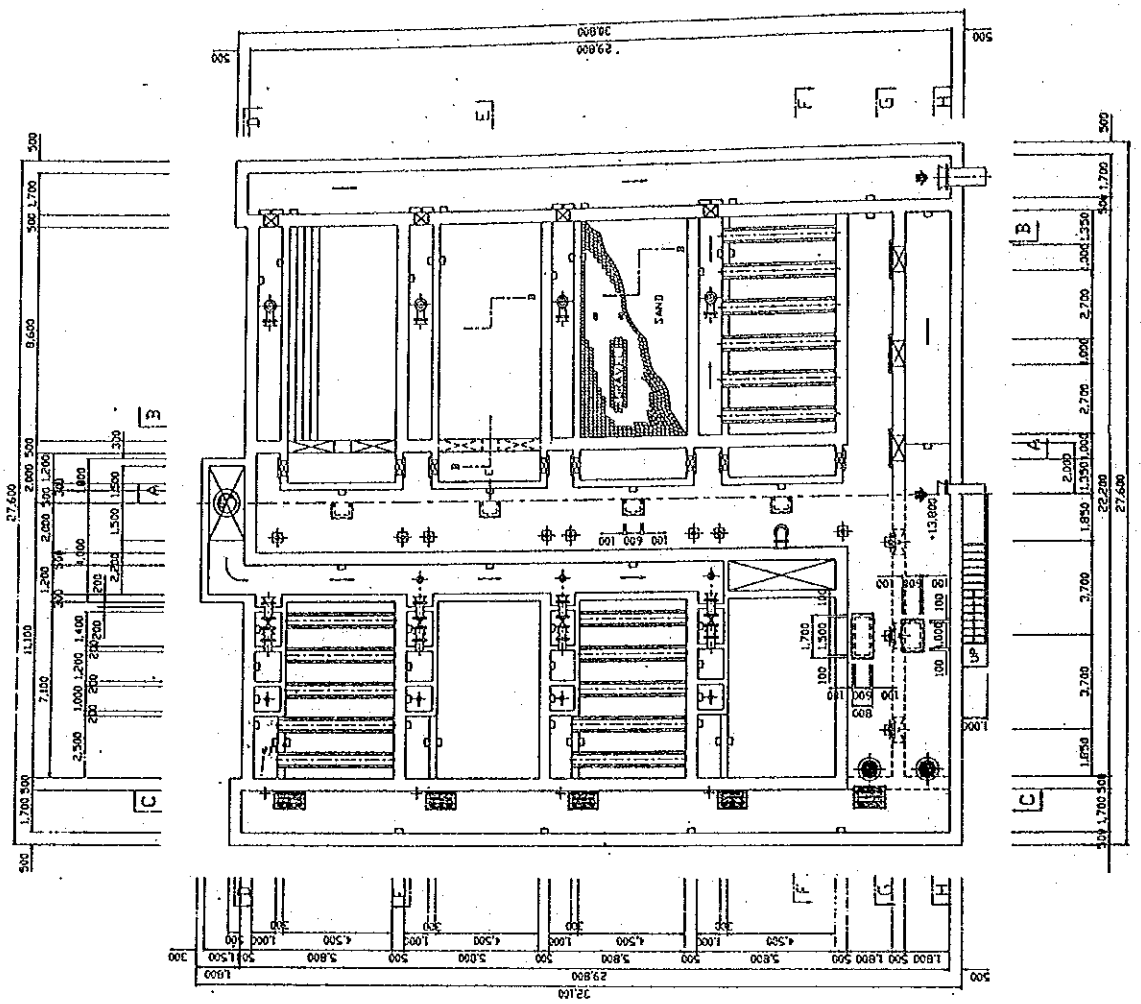
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Fig. 4 Section of Sedimentation Basin (I)

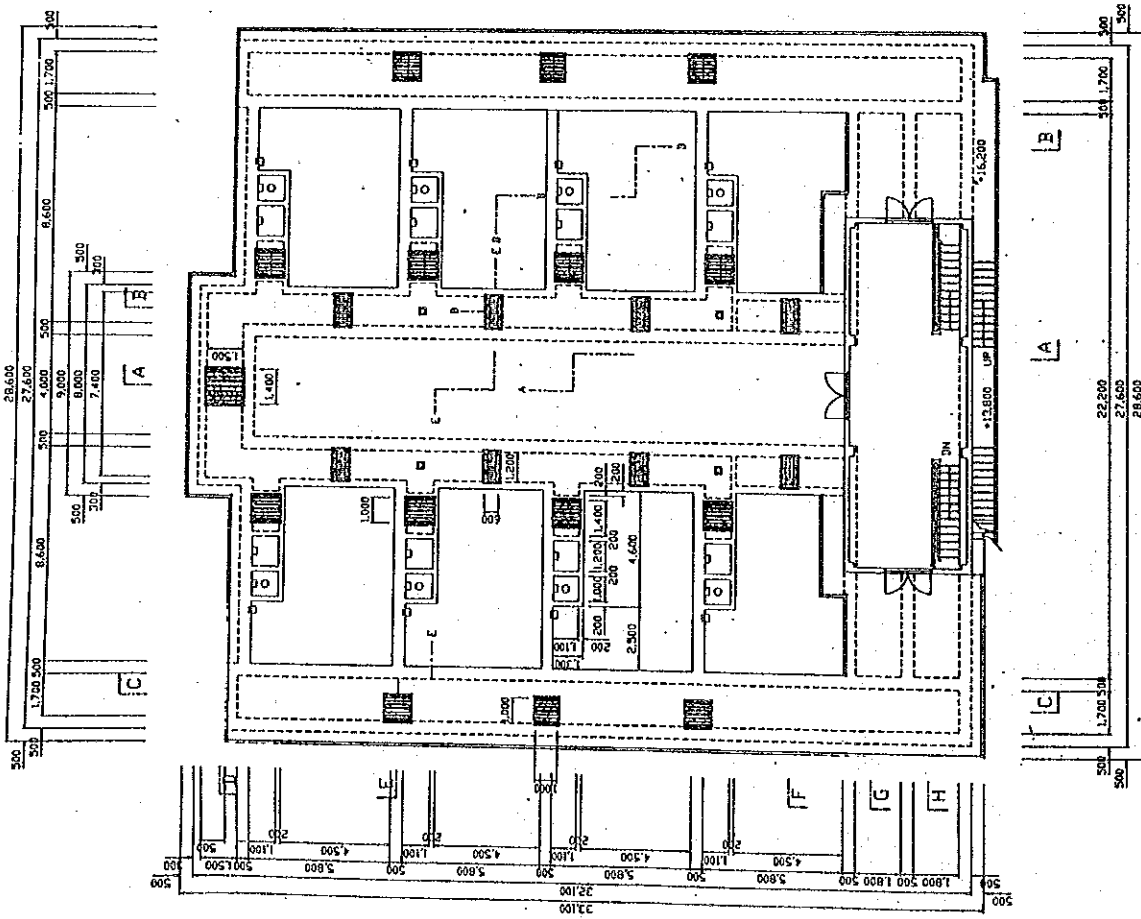


SECTION E-E  
SCALE  
1/8" = 1'-0"

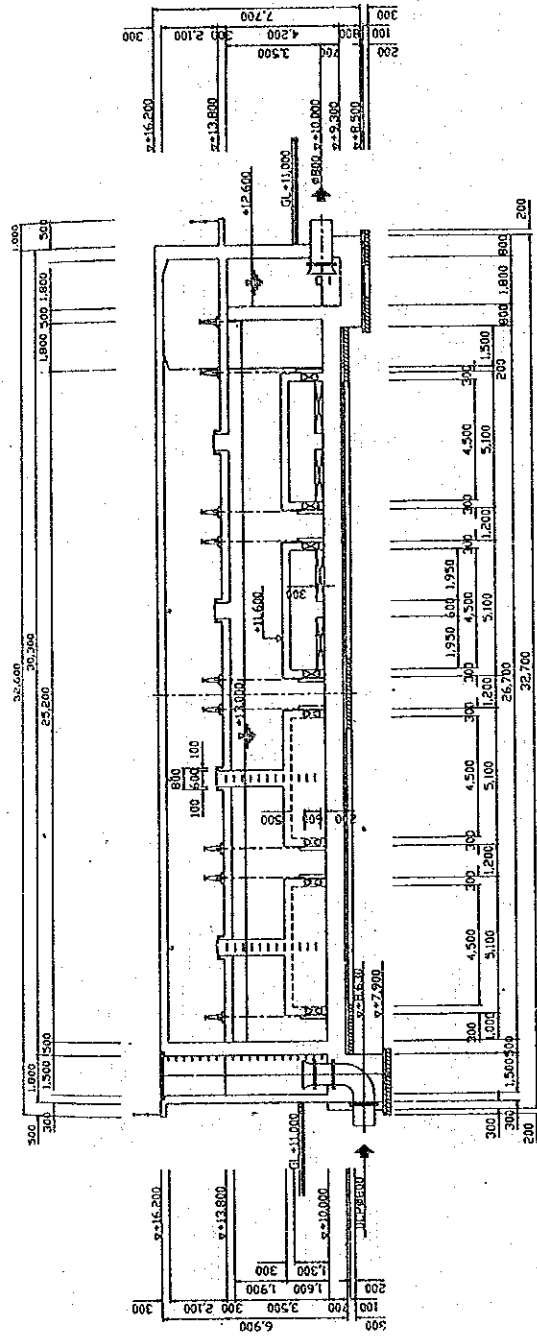
Fig.5 Section of Sedimentation Basin (2)



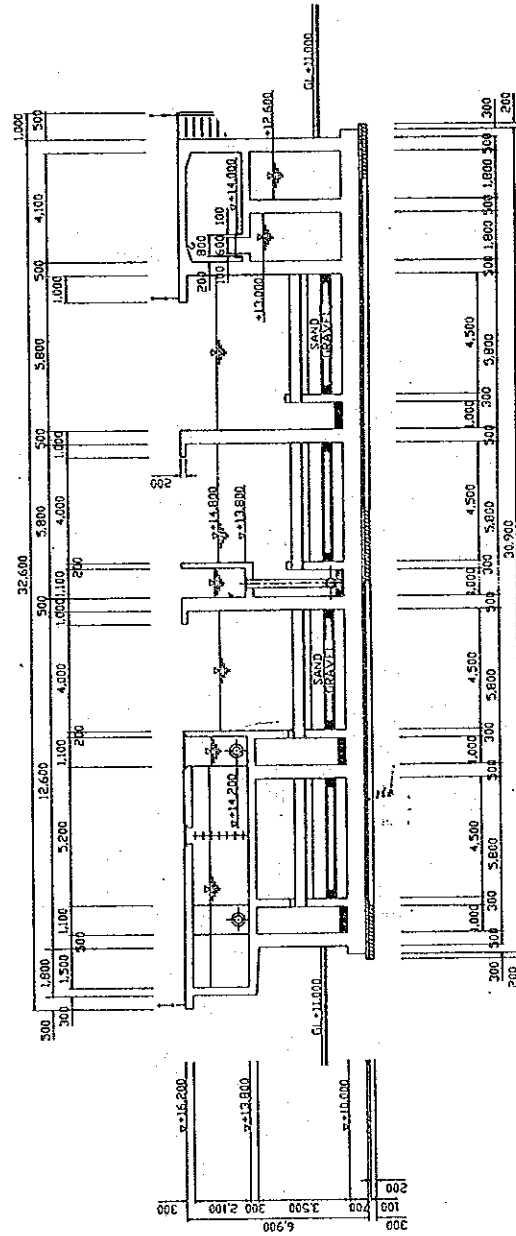
BDJLDM PLAN 1:100 Fig.6 Plan of Rapid Sand Filter



TOP PLAN 1:100



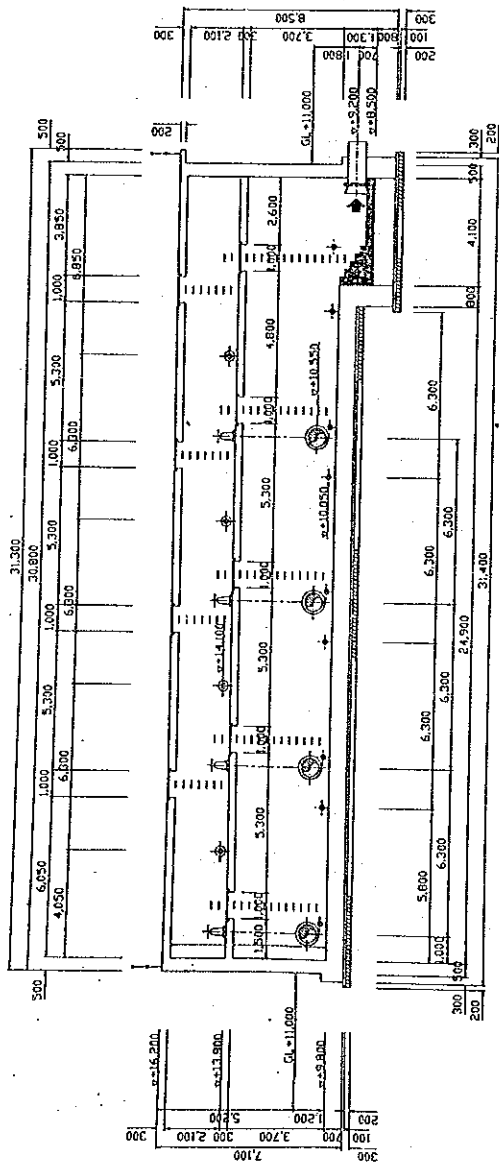
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SCALE 1/1000



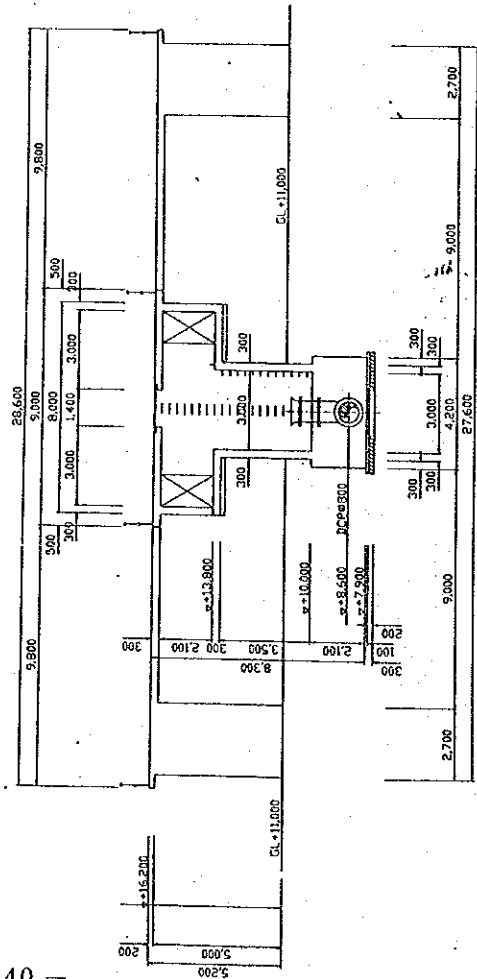
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Fig. 7 Section of Rapid Sand Filter (1)

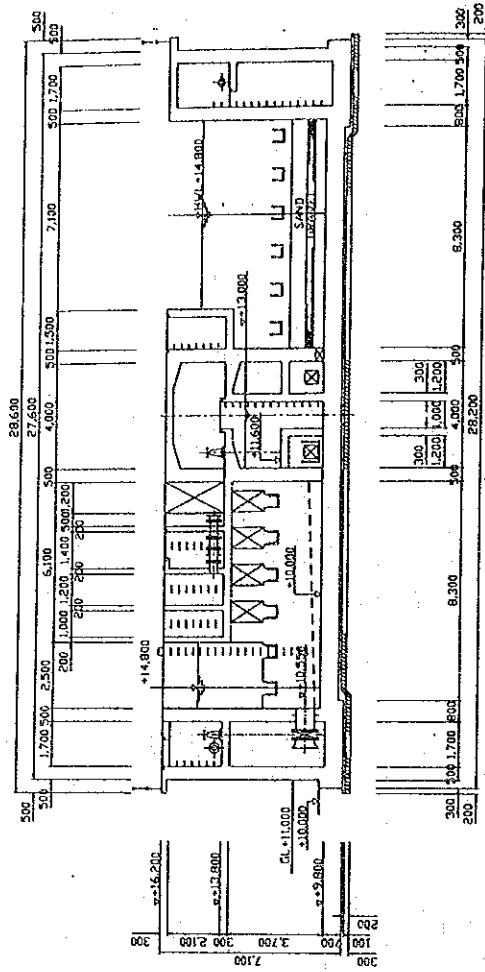




SECTION C-C  
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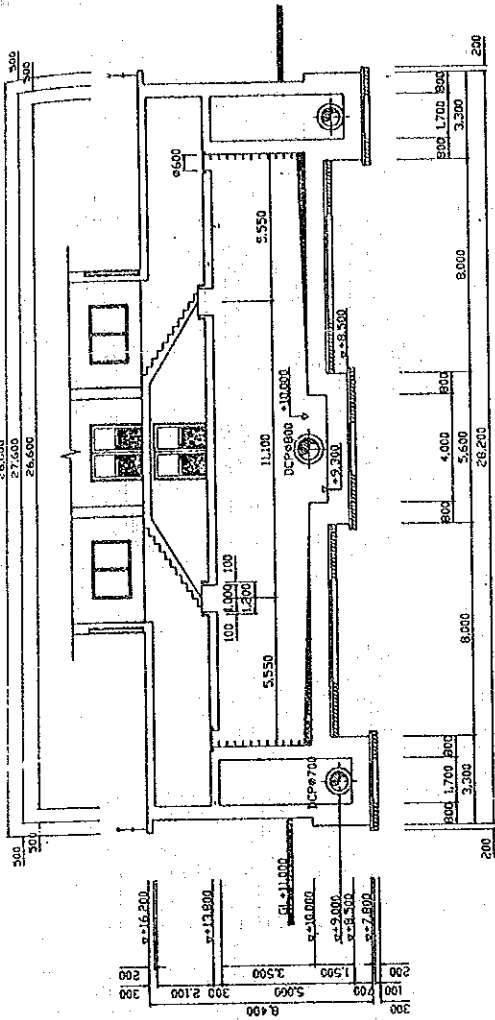


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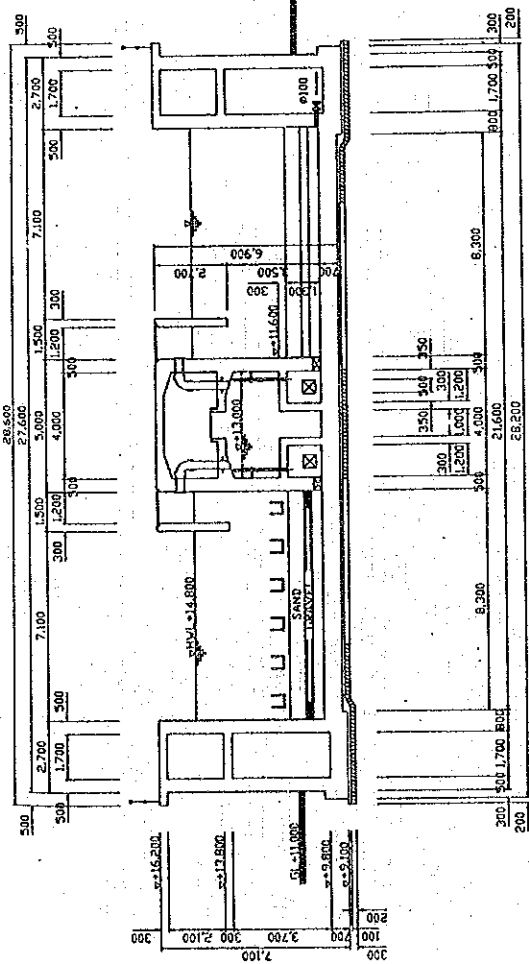


SECTION E-E  
SCALE 1/100

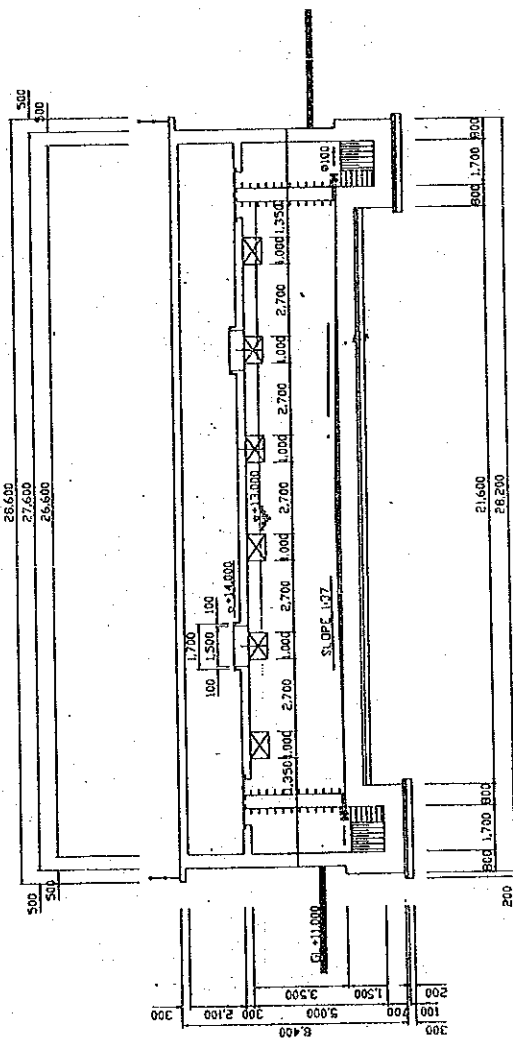
Fig. 8 Section of Rapid Sand Filter (2)



SECTION H-H  
SCALE 1/100



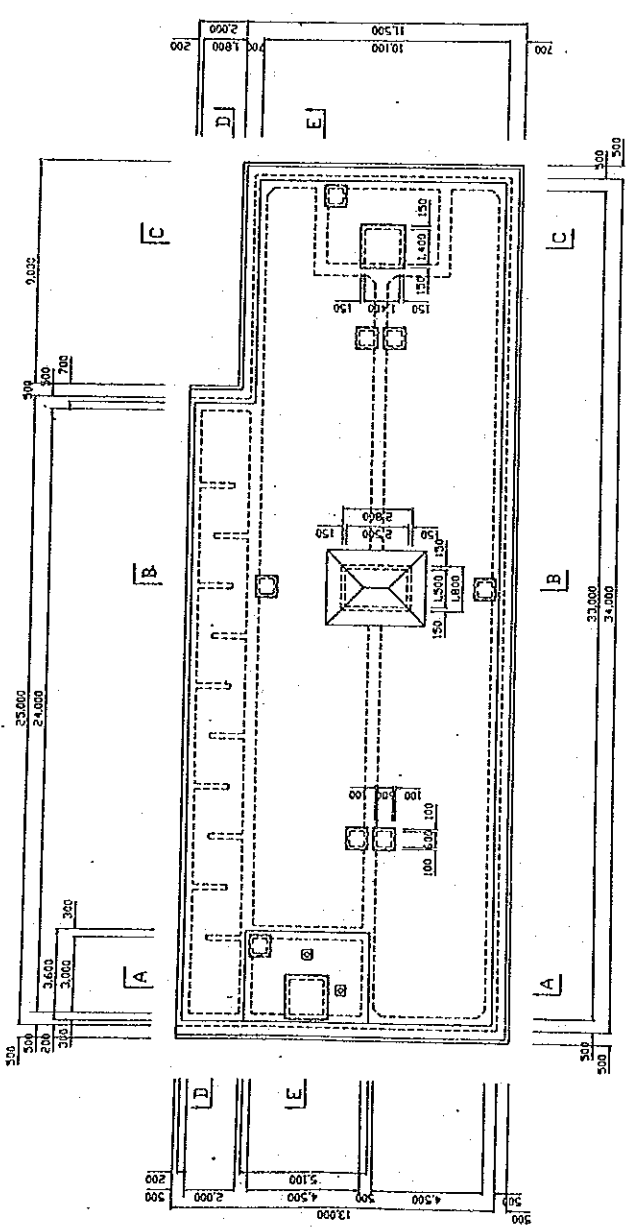
SECTION F-F  
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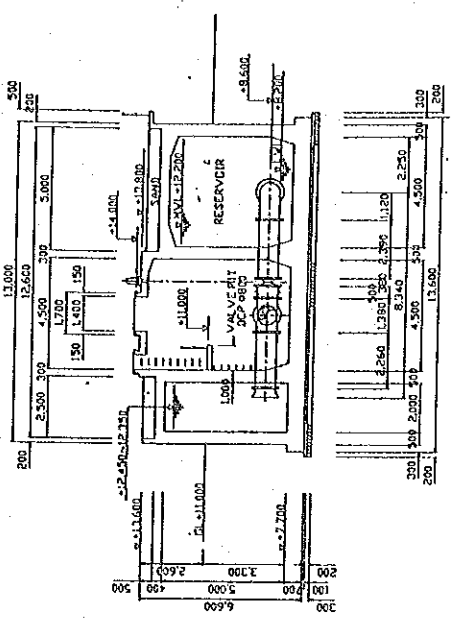
SECTION G-G  
SCALE 1/100

Fig. 9 Section of Rapid Sand Filter (3)

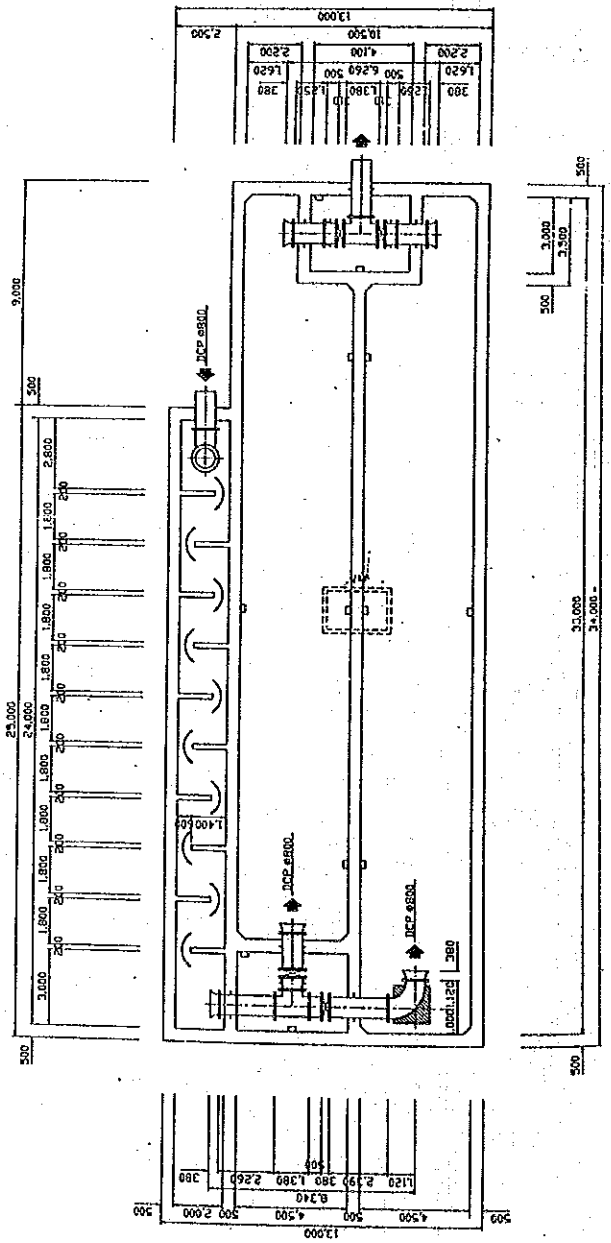
Fig.10 Plan / Section of Chlorination Basin



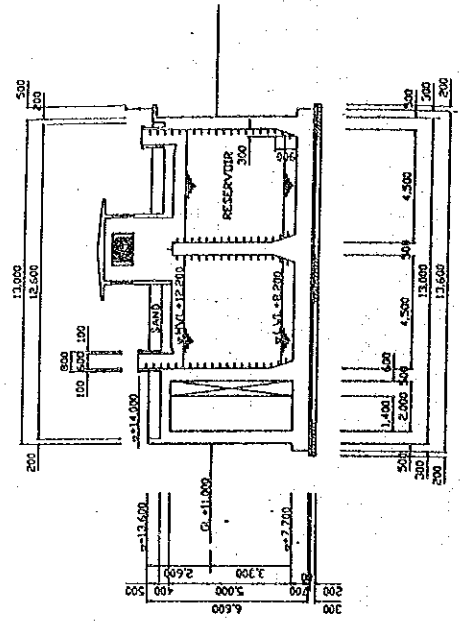
TOP PLAN  
SCALE 1/100



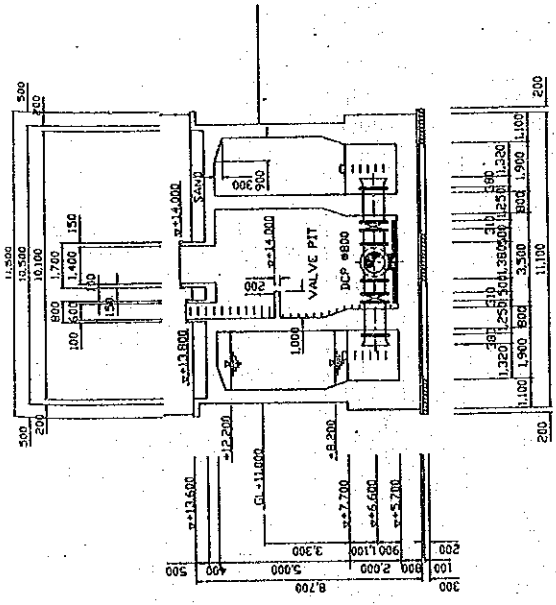
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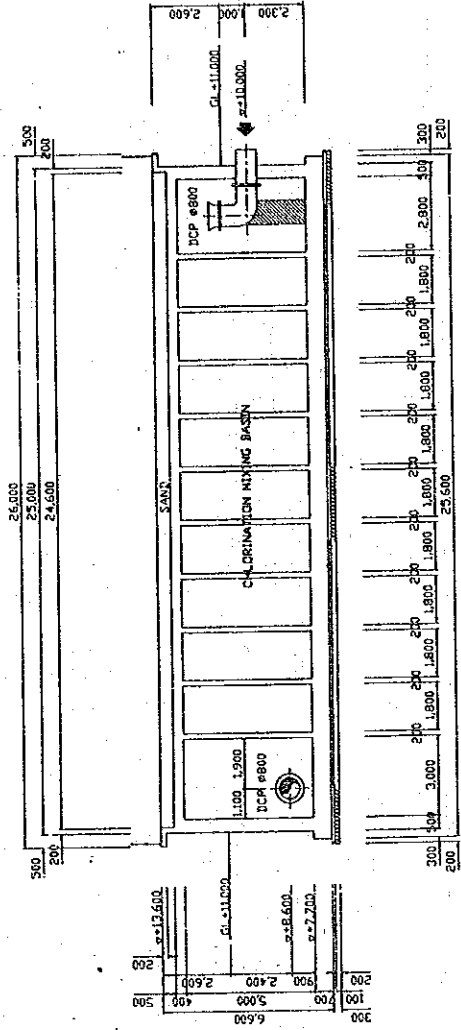
BOTTOM PLAN  
SCALE 1/100



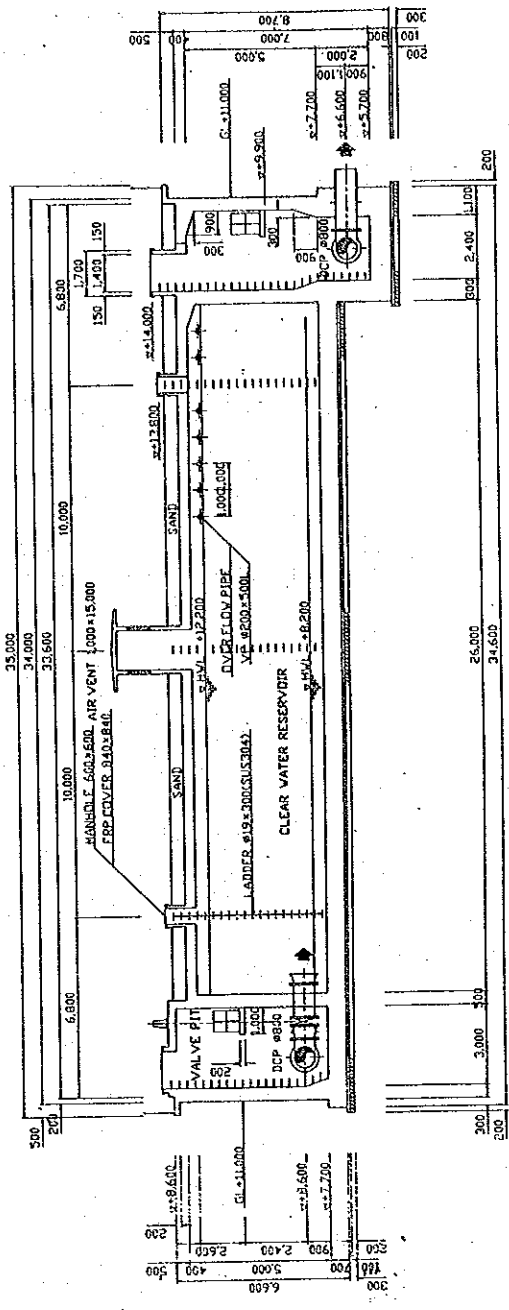
SECTION B-B  
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SECTION C-C  
SCALE 1/100

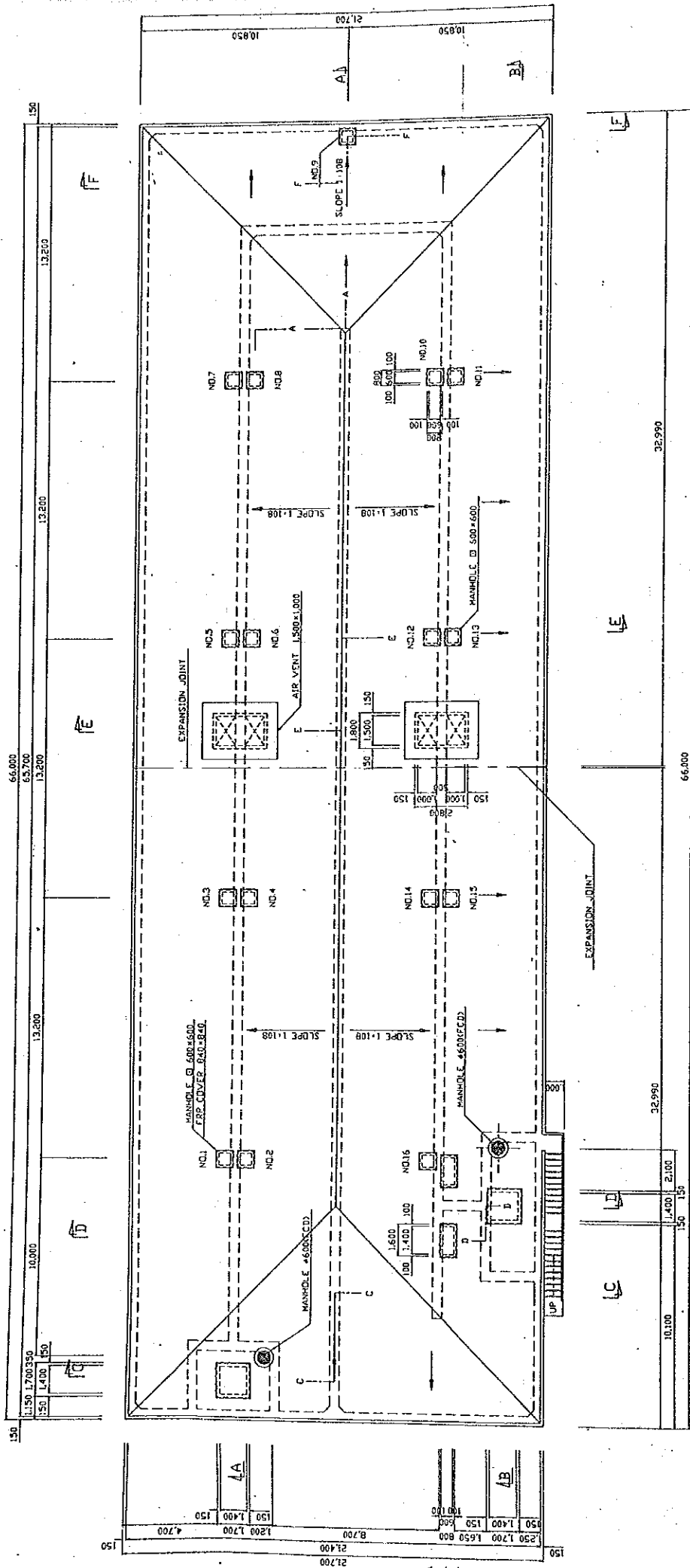


SECTION D-D  
SCALE 1/100



SECTION E-E  
SCALE 1/100

Fig. 11 Section of Chlorination Basin



TOP PLAN  
 SCALE 1:100

Fig.12 Plan of Clear Water Reservoir (1)

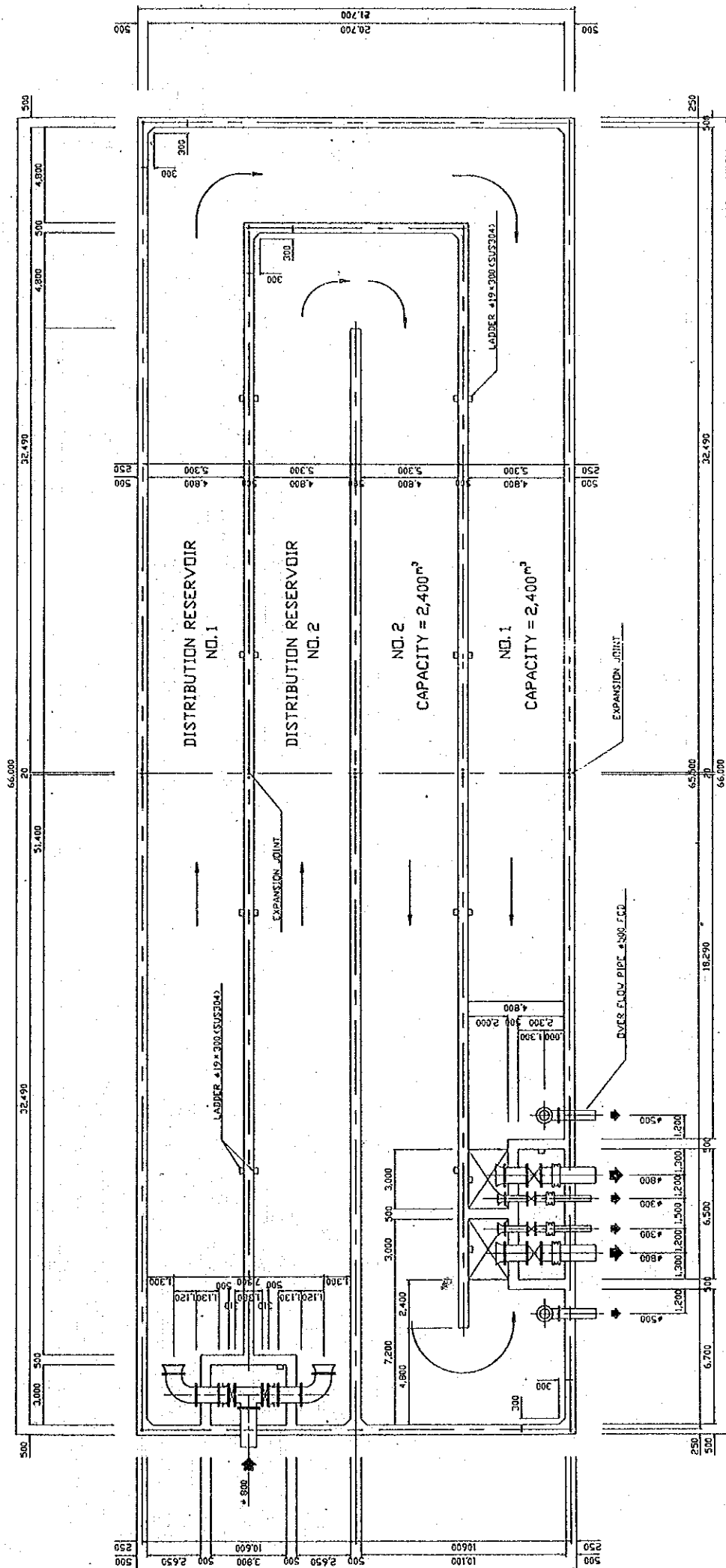
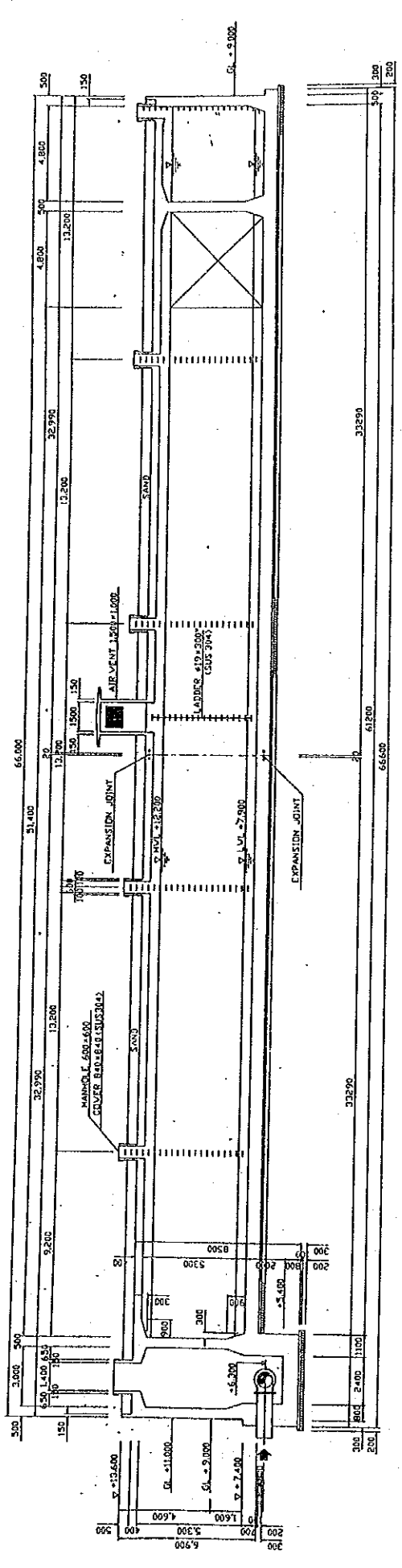
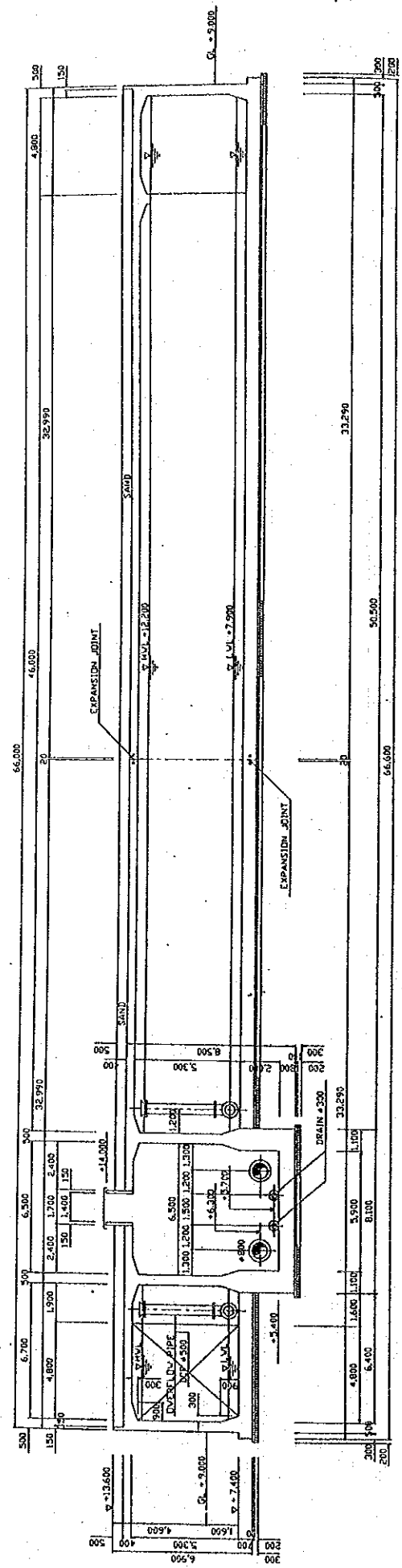


Fig.13 Plan of Clear Water Reservoir (2)

BOTTOM PLAN  
SCALE 1:100

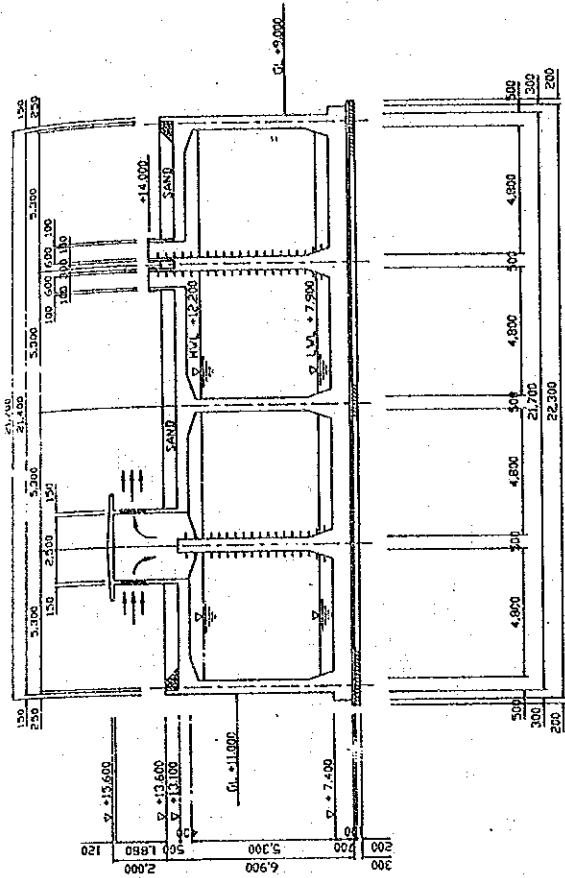


SECTION A-A  
SCALE 1/4\"/>

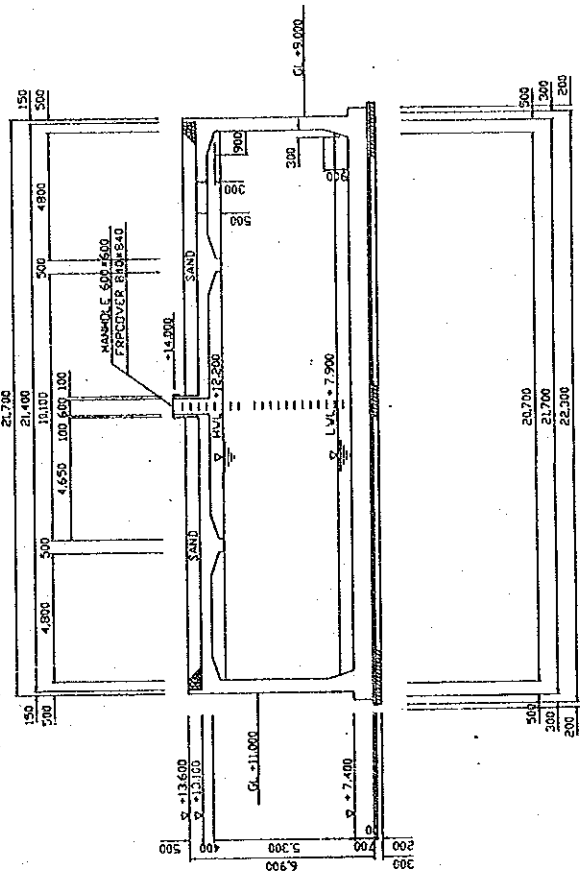


SECTION B-B  
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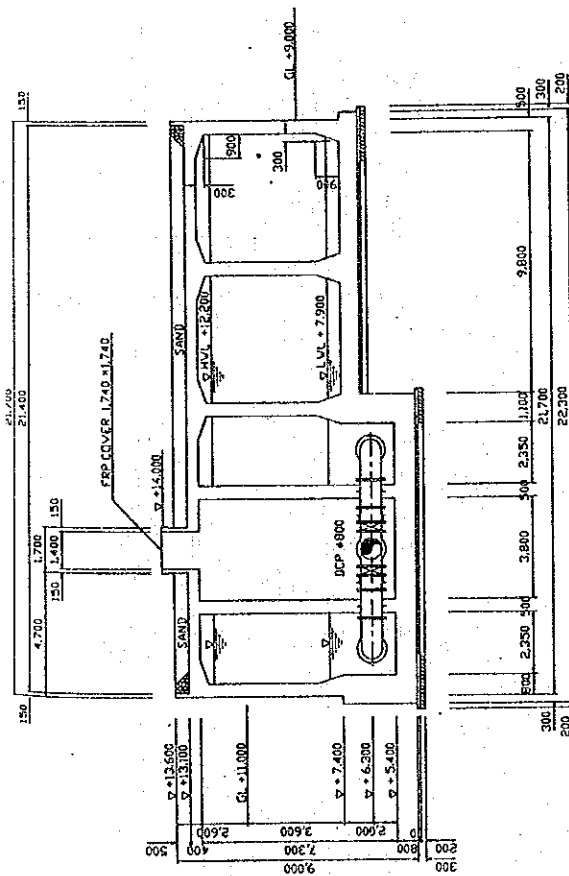
Fig. 14 Section of Clear Water Reservoir (1)



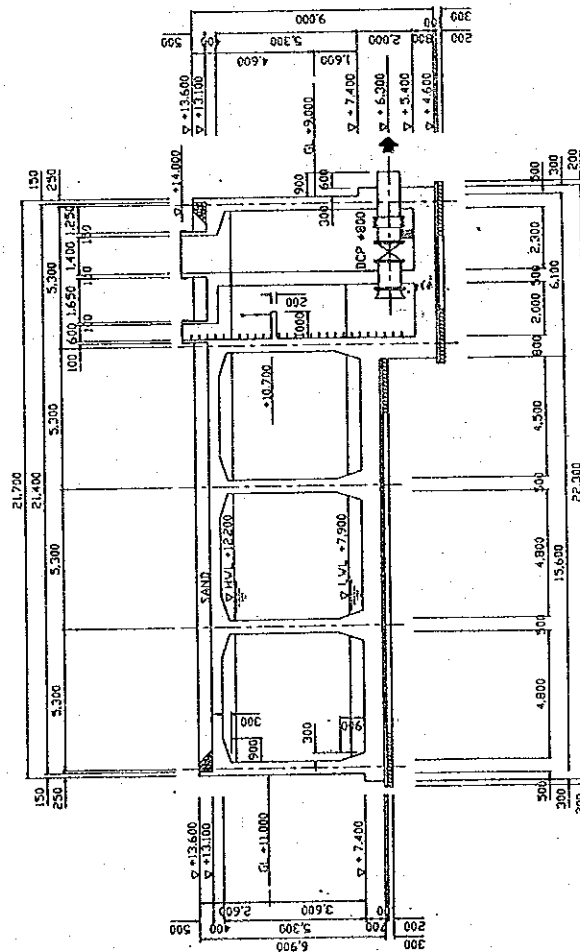
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SECTION F-F  
SCALE 1:100



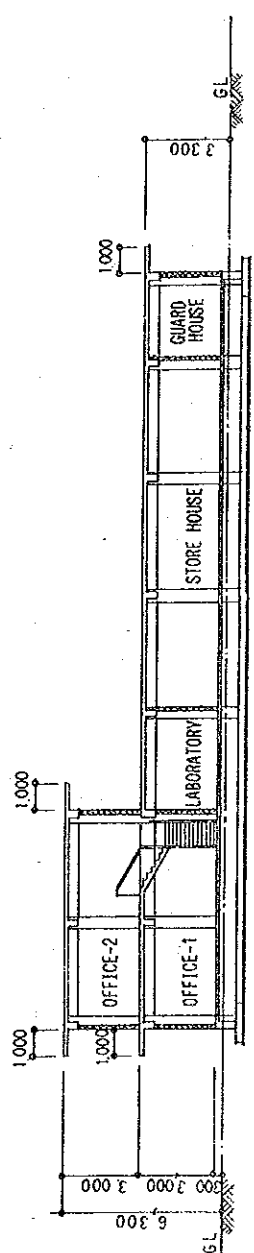
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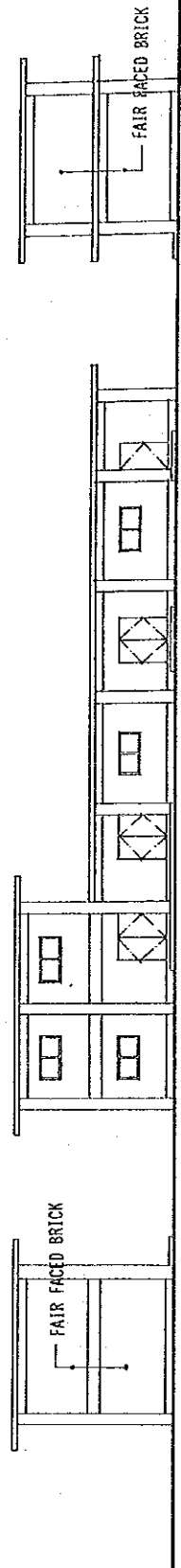
SECTION D-D  
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Fig.15 Section of Clear Water Reservoir (2)

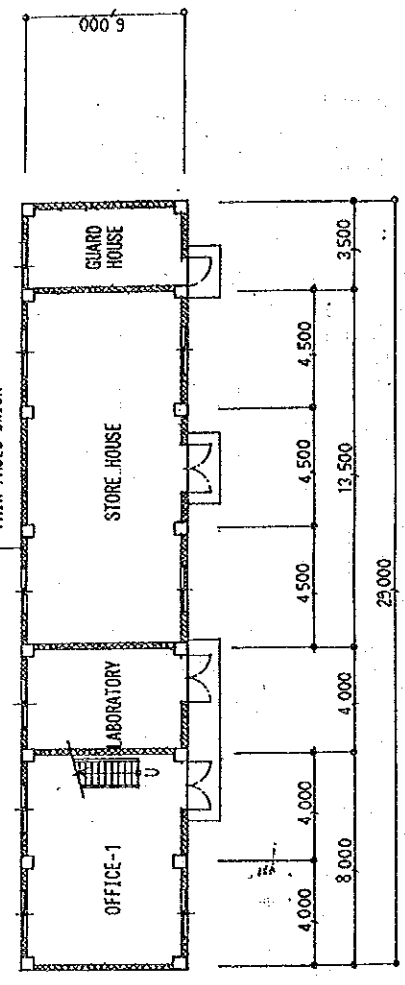




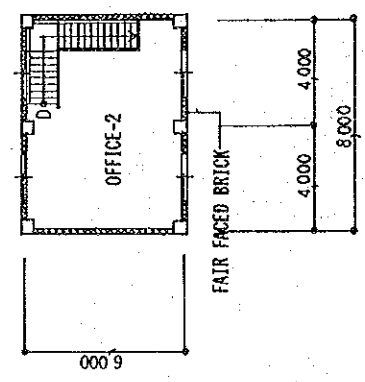
SECTION  
S-1/200



ELEVATION  
S-1/200



GROUND FLOOR PLAN  
S-1/200



1ST FLOOR PLAN

Fig.16 Plan / Section of Administration Office

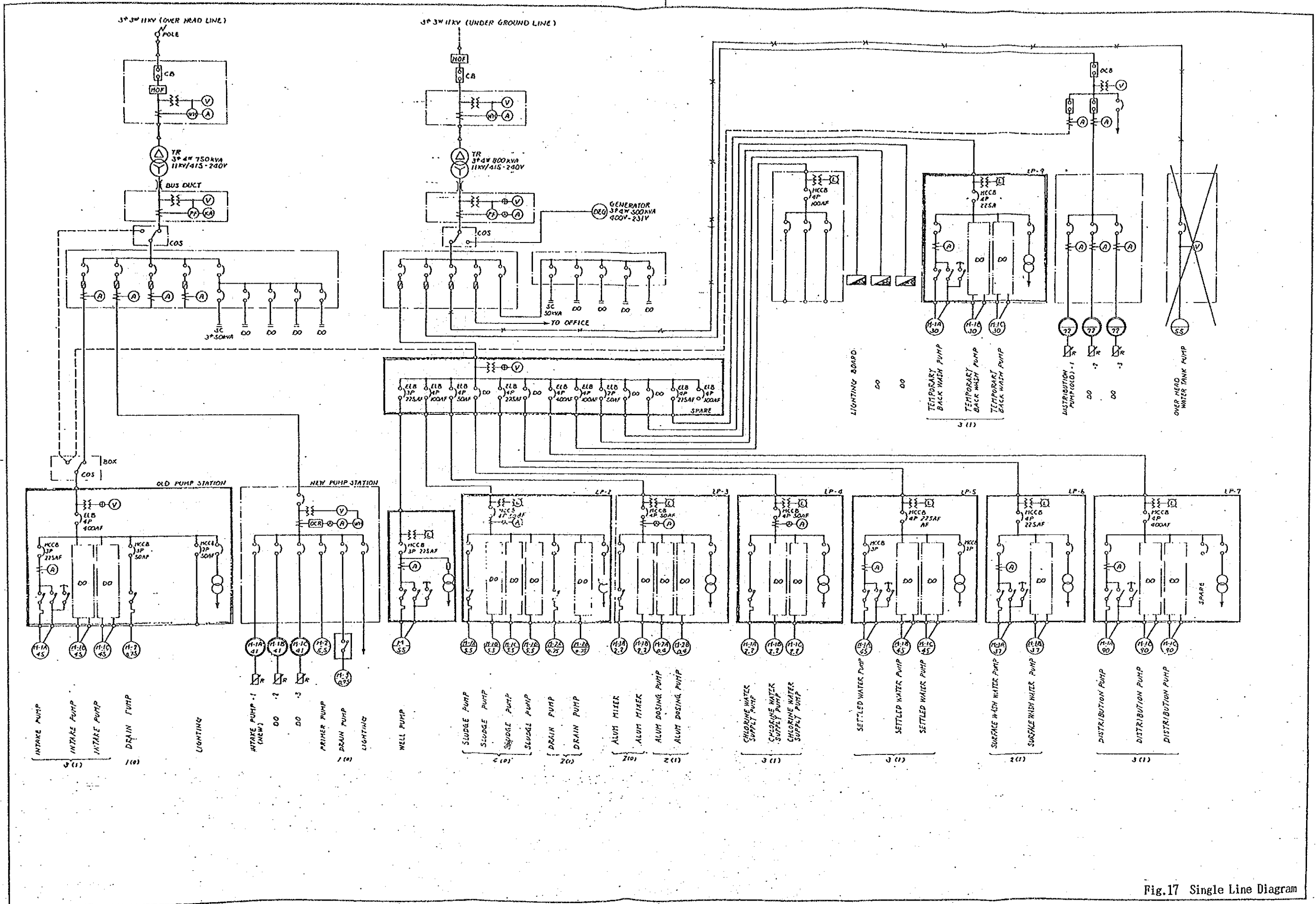


Fig.17 Single Line Diagram

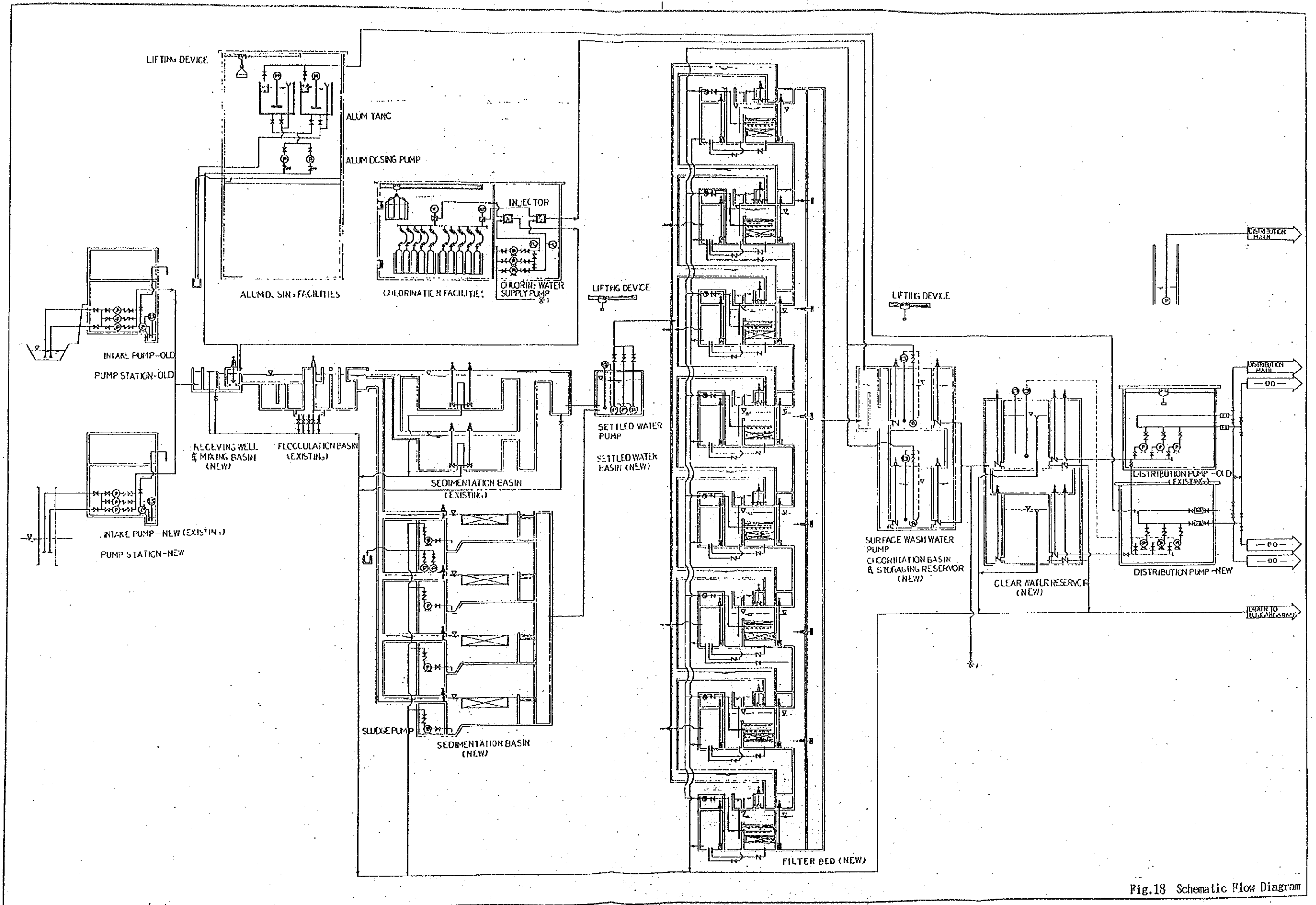


Fig.18 Schematic Flow Diagram

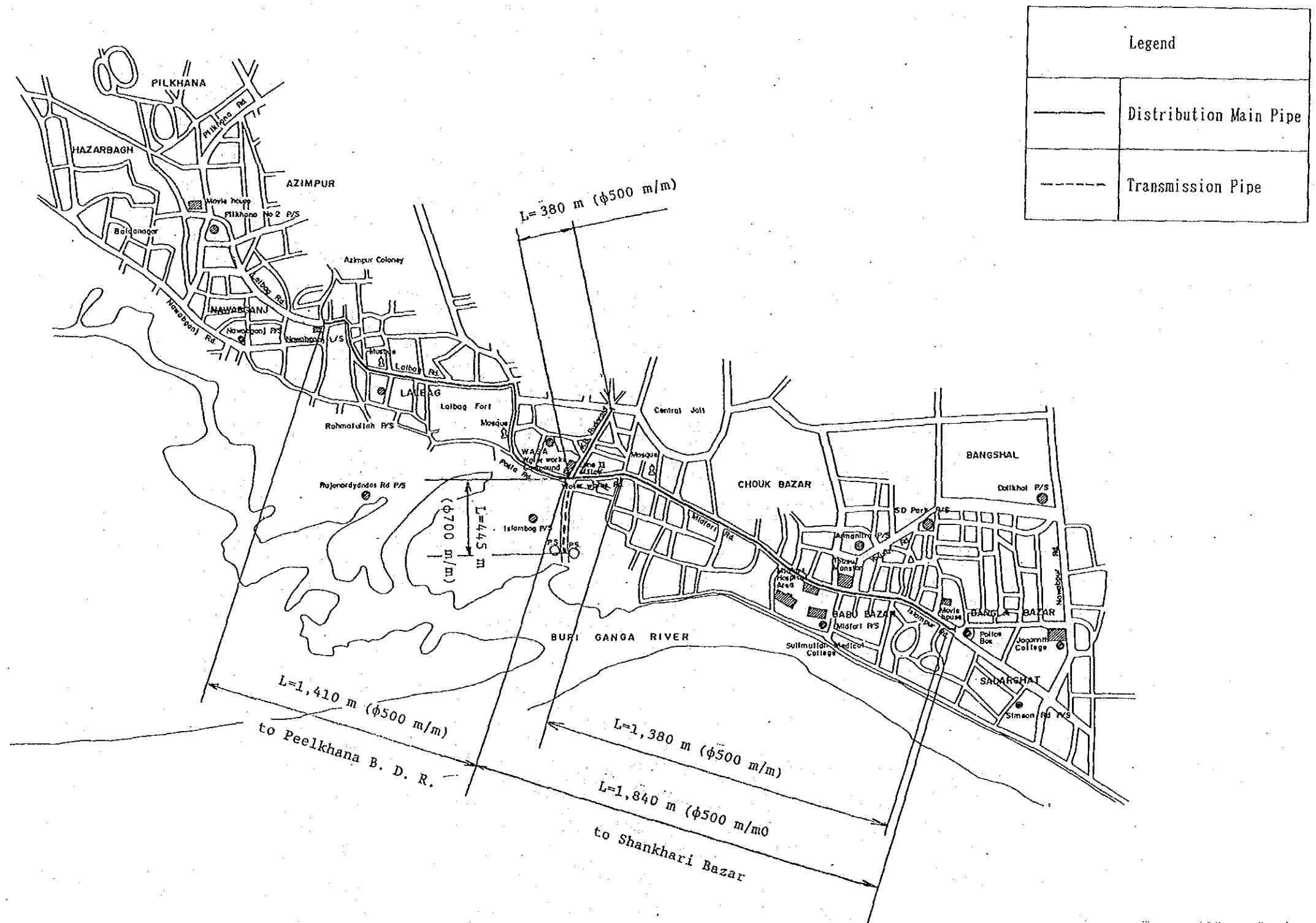
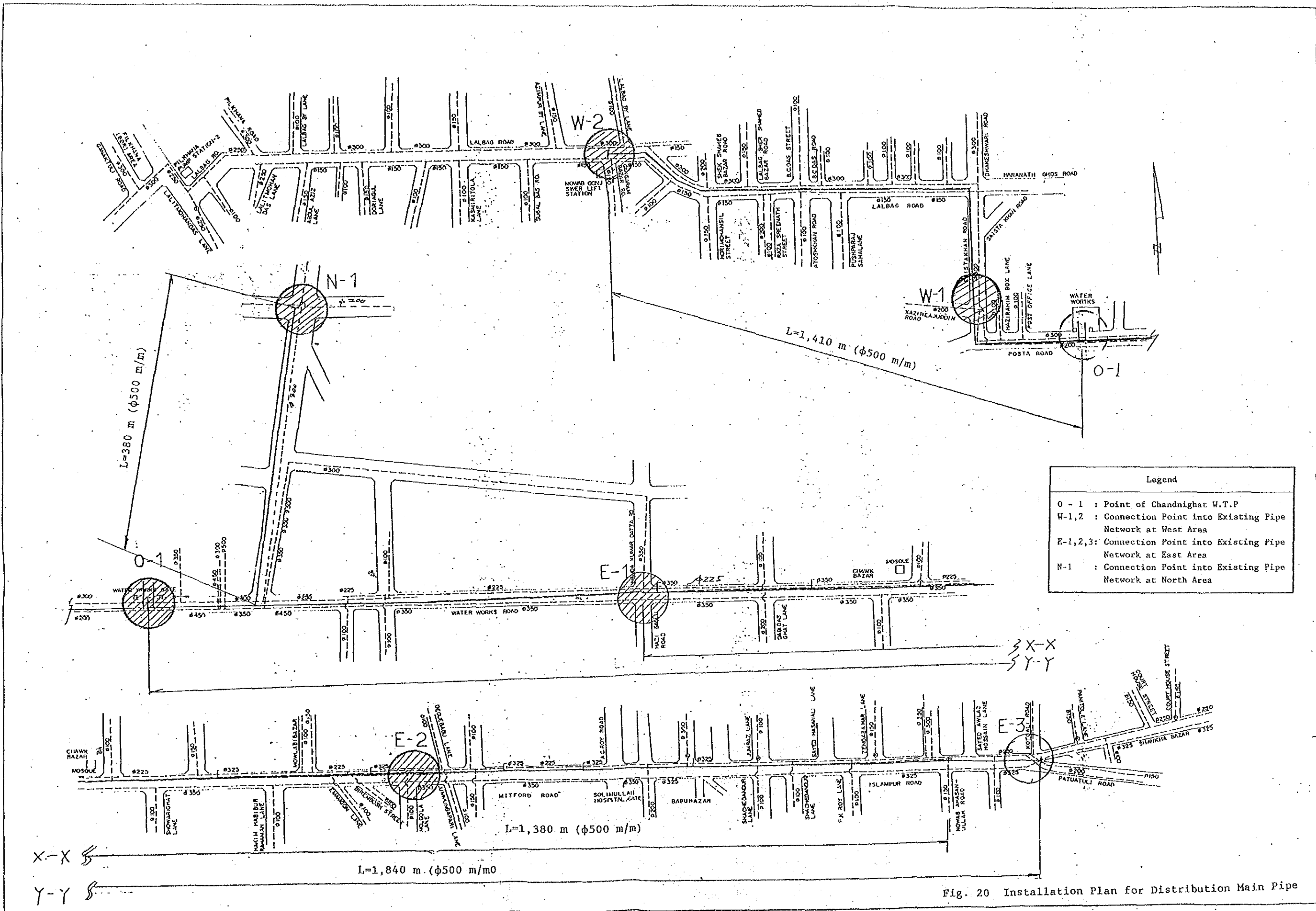


Fig.19 Location of Distribution Main Pipe



| Legend  |   |
|---------|---|
| 0 - 1   | : Point of Chandnight W.T.P                                 |
| W-1,2   | : Connection Point into Existing Pipe Network at West Area  |
| E-1,2,3 | : Connection Point into Existing Pipe Network at East Area  |
| N-1     | : Connection Point into Existing Pipe Network at North Area |

Fig. 20 Installation Plan for Distribution Main Pipe



#### 4.4 Implementation Plan

##### 4.4.1 Construction Management Plan

###### (1) Project Implementing System

The Project will be implemented within the framework of the grant aid assistance system of the Government of Japan. After the signing of the Exchange of Notes (E/N) by the Government of Bangladesh and the Government of Japan, and its verification by the Government of Japan, the grant aid assistance for the Project will be commenced formally. The Dhaka Water Supply and Sewerage Authority (DWASA) of the Ministry of Local Government, Rural Development and Cooperatives (LGRD) of Bangladesh is the agency responsible for the implementation of the Project.

###### (2) Consultant for the Project

Immediately after the signing of the E/N by the Governments of the two countries, ERD or DWASA under guidance of LGRD as a competent agency of the Government of Bangladesh will conclude a consultancy contract concerning the detail design with the Japanese consultant firm.

In order to ensure the smooth implementation of the Project, it is necessary to conclude the said consultancy contract immediately after the signing of the E/N. After the consultant contract is verified by the Government of Japan, the Japanese consultant firm will prepare detailed design drawings and specifications based on the contents of the Basic Design Study Report.

Owing to the necessity of 32 months for construction works, the Project should be implemented as a project of Contract Authorization (acts incurring liabilities on the Treasury). After the signing of the E/N by the Governments of the two countries for implementation works, ERD or DWASA will conclude a consultancy contract with the Japanese consultant firm, who have contract for the detailed design, concerning the assistance of bidding for construction works and consulting supervisory service for the period of construction works.

After the consultancy contract is verified by the Government of Japan and subsequent to obtaining approval of the detailed design documents and tender documents from the Dhaka Water Supply and Sewerage Authority, the consultant firm will carry out tender assistance work and construction supervising work.

(3) Contractor for the Construction Works

A qualified Japanese construction company will be selected for the construction works of the Project. ERD or DWASA will conclude the construction work contract with the tenderer who submits the lowest tender, and will obtain a verification of the contract from the Government of Japan. The contractor shall complete the construction work including civil, mechanical and electrical works and fully hand over the facilities and equipment by the due date shown on the contract.

4.4.2 Present State of the Local Construction Industry and Important Points to Note in Construction

(1) Present State of the Local Construction Industry

In Bangladesh, groundwater development and water supply piping work are commonly executed. However, construction of water treatment plant and sewerage treatment plant have been executed under technical and economical assistance from foreign countries.

Only four to five local contractors are considered eligible for large-scale construction project in light of the general technical level. These large constructors have experiences for construction of building but few for construction of watertight concrete tank and insufficient technical capabilities as well as an adequate of heavy construction equipment such as non-vibration piler. However, they have the ability to recruit the necessary number of construction technical engineer and workers. There will be no problem, therefore, utilizing these large local contractors as subcontractors for the construction of the Project on premise that heavy construction equipment will be provided by Japanese contractor.



(2) Points to Note in Construction

1) Work of the Bangladesh Side

- a) The existing resident house at the proposed project site inside the Plant must be removed by the Bangladesh side before commencement of construction work by Japanese contractor. It is important for the Bangladesh side to recognize its responsibility for the complete removal of the existing facilities within the specified time so that the Japanese side will not be delayed in commencing their construction activities.
- b) Full cooperation from the people living in the concerned area of the Project must be ensured by the Bangladesh side for construction period, particularly for installation of the distribution pipe.

2) Work of the Japanese Side

- a) The projected site for rehabilitation of the Water Treatment Plant do not have sufficient area for its expansion. It is necessary, therefore, to secure space for the project site office and the stock yard for the construction materials before the starting of the construction work.
- b) In Bangladesh, the rainy season lasts approx. for five months, from June to October, and the monthly average rainfall during the rainy season is as large as 350 mm. It is difficult to carry out the excavation and foundation work during the rainy season, which should be taken into account in the construction schedule.
- c) The expansion work including in the Project must continue to be implemented, keeping the constant water supply to the consumer in practice by the existing facilities and newly construction facilities as per water works procedure and schedule.

#### 4.4.3 Construction Supervision Plan

Japanese Consultant firm will conclude a contract for consultancy supervisory service with the Dhaka Water Supply and Sewerage Authority in accordance with the grant aid assistance procedures of the Government of Japan.

Under the contract, the consultant will be responsible for supervision of the construction work to be carried out under the Project. The purpose of construction supervision are to ascertain whether the construction work is carried out in compliance with the contract documents to ensure the quality of the construction work as well as proper performance of the provisions of the construction contract from an impartial point of view.

The consultant shall be responsible for the following activities:

- a) Assistance to tendering and construction contract which includes announcement of tenders, acceptance of applications, prequalification, distribution of the tender documents and collection of tenders' documents, bidding and its evaluation and assistance to construction contract.
- b) Examination and approval of the shop drawings, the manufacturing drawings and other necessary documents submitted by the contractor.
- c) Confirmation and approval of the construction materials and the equipment submitted by the contractor and determine whether they satisfy the contract documents.
- d) Inspection at manufacturers' factories in order to ascertain their quality and performance.
- e) Reporting on the progress of the construction work to both Governments.

- f) Completion inspection and test operations of the completed facilities and the installed equipment by making a test run for each piece of equipment in order to confirm that all facilities and equipment are in compliance with the provisions of the contract documents.

The Consultant shall then submit inspection certificates to the Bangladesh side.

- g) Training in operation of the completed facilities and the installed equipment and advice to the contractor for preparation of training programs and its execution.

Considering the scale of the Project, the consultant will station an engineer at the construction site throughout the period of the implementation of this Project. The consultant shall also dispatch the necessary number of engineers to the Project site for spot inspection, guidance and coordination. At the same time, a back up organization consisting of engineers shall be established in Japan.

The consultant shall report to the pertinent agencies of the Japanese government on the progress of the Project, the payment procedures, the completion of the facilities and the installation of the equipment.

#### 4.4.4 Material Procurement Plan

##### (1) Local Procurement

When procuring the materials for the construction of the facilities, primarily local construction materials and equipment shall be selected taking account of quality and the current level of its supply period.

The followings will be of procurable materials in local market.

- Cement, Sand, Grave, Brick, Steel bar.
- Structural steel, concrete pipe, Wood.

- Plywood, concrete-block, Man-hole wall.
- Gasoline, Diesel and other fuel oil.

(2) Imported Materials and Heavy Construction Equipment

If the locally procurable materials are considered to be of poor quality or in short supply, corresponding Japanese - made materials and equipment shall be imported. In this case, the contractor shall keep in close contact with the competent agencies of the Government of Bangladesh upon importation of them in order to ensure that all the necessary procedures are followed without delay.

The unit price for comparison of the importation of material (including packing, transportation and insurance costs) should be compared with that for its local procurement. If the unit price for its local procurement is judged to be lower than or nearly equal to that for its importation, it should be procured locally.

1) Assumed Importation Equipment for Construction Equipment

- Generator, Compressor, Dump-truck, Submergible pump, Concrete-cutter, Reel compactor, Vibrator, Bar-cutter, Bar-bender, Level-transit, Welder, Pipe-cutter, Pipe-bender, Back hoe, Crane, Non-vibro piler.

2) Assumed Importation Materials and Equipment for Construction Facilities

- Cast iron pipe, Steel pipe, Valve, Waterproof agent, Steel door, Various Tools.
- Pump, Mixer, Chemical feeder, Inclined plates settler, PVC Valve.
- Panel board, Switch board, Power cable.
- Jar tester, Water analysis equipment.

3) Importation Material from the Third Country

Since filter media, sand and gravel, are procurable in local but insufficient in quality, the filtering materials shall be import-

ed.

As procurement from Japan is considerable in quantity and quality management for forwarding overseas but costly, procurement from the third country is recommended.

By examination of the quality, procurement of filter media from Sri Lanka is ensured to be available in quality and at price, provided that sieve analysis test in the presence of Inspector is fulfilled.

As to the procurement of heavy construction equipment and construction materials from Japan, the importation equipment and materials will be transported by sea from Yokohama sea-port in Japan to Chittagong sea-port in Bangladesh and then transported to Dhaka by truck.

As to the procurement of filter media from Sri Lanka, the materials will be transported by sea from Colombo sea-port in Sri Lanka to Chittagong sea-port via Singapore and then transported to Dhaka by truck.

#### 4.4.5 Project Implementation Schedule

After the signing of the Exchange of Notes by the Government of Japan and the Government of Bangladesh the Project will be implemented in two stages, detail design; tender and construction work.

##### (1) Detail Design

After the conclusion of a consultancy contract with the competent agency of the Government of Bangladesh, the consultant, subject to its verification by the Government of Japan, shall start the detail design work. Detail design includes the preparation of design documents such as detailed drawings, specifications, and tender documents on the basis of the contents of this Basic Design Study Report.

The consultant shall discuss the contents of the facilities and equipment with the Bangladesh side upon preparation of design documents, and shall gain approval from the Bangladesh side. The time required to

complete this procedure is estimated at 5.5 months after signing of the consultancy contract.

(2) Tender and Construction Work

After the signing of the Exchange of Notes by the Both Governments for implementation of the Project, the consultancy contract will be concluded with the competent agency of the Government of Bangladesh for consulting supervisory services.

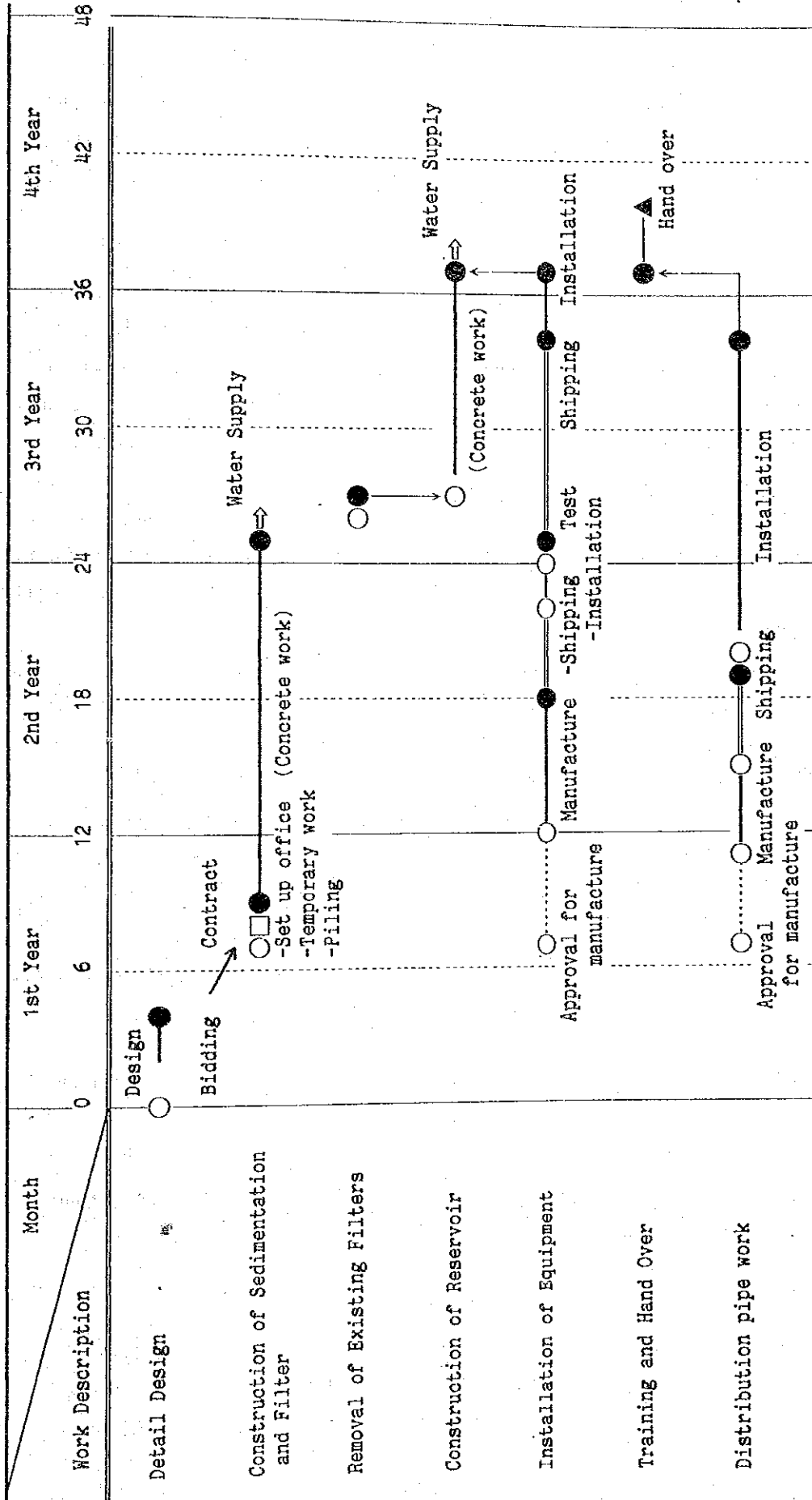
The consultant, subject to its verification by the Government of Japan, shall start the preparation of tender.

The contractor to take charge of the Project will be selected from Japanese general contractors through a public tender. Tender procedure includes public announcement of the tender, collection of applications, prequalification of participants, issue of tender documents, opening of tenders, evaluation of tenders, designation of the contractor, and conclusion of the construction contract. It will take about one and a half months to complete this procedure.

After the conclusion of the construction contract with the competent agency of the Government of Bangladesh, subject to its verification by the Government of Japan, the contractor shall commence the construction work.

The overall implementation schedule, from the detail design to the completion of the entire project, is shown in the following table.

Table 4-10 Overall Implementation Schedule of the Project



#### 4.4.6 Scope of Work

This Project is to be implemented through close collaboration and corporation between the Government of Bangladesh and the Government of Japan within the framework of grant aid assistance from the Government of Japan.

In this Project, the scope of responsibility by the Japanese side is detail design for the rehabilitation and expansion plan, civil work, manufacturing and installation work for mechanical and electrical equipment, development of distribution main pipe and connection into the existing network and its consulting supervisory services. While the scope of responsibility by the Bangladesh side is land acquisition, if necessary, preparation of infrastructure, repair and maintenance of the existing facilities and equipment to be utilized as it is in practice, and operation and maintenance of the water supply system after completion of the Project.

The scope of work to be carried out by each side is as follows:

##### (1) Scope of Work by the Japanese Side

- 1) Water Treatment Facility (includes Civil work and Mechanical and Electrical Equipment)
  - a) Replacement of water intake and distribution pumps with its operation panel which are required to be renewed.
  - b) Replacement of drainage pump for water intake P/S No. 1 No. 2 rooms with its operation panel.
  - c) Newly installation of transmission pipe from water intake pumps to receiving well.
  - d) Receiving Well facilities with wair.
  - e) Newly construction of sedimentation basin for expansion.



- f) Reconstruction of structure inside of existing sedimentation basins.
- g) Newly construction of lift pump facility
- h) Newly construction of filtration facility
- i) Newly construction of reaction basin for chlorination
- j) Newly construction of clear water service reservoir facility
- k) Chemical feeder facilities for alum and chlorination
- l) Control office
- m) Staff house
- n) Exchange of pipes inside of the Plant
- o) Newly installation of drain pipe from the filter to the river
- p) Construction of maintenance road inside of the Plant
- q) Yard lighting inside of the Plant
- r) Instruction and training for operation and maintenance of the Plant
- s) Preparation of project site office and stock yard for construction works
- t) Expendable supplies such as electrical power and water for construction works.
- 2) Distribution Main Pipe
  - a) Newly installation of distribution main pipe

- b) Connection work between existing pipe and the distribution main pipe to be constructed under this Project.

(2) Scope of Work by the Bangladesh Side

1) Construction Site

- a) Land acquisition for expansion of the Water Treatment Plant, if necessary.
- b) Removal of temporary materials on the public road which are unnecessary for the Project.

2) Preparation of Relevant Infrastructure

- a) One telephone communication line covering the whole area of the city shall be provided in the operational office in the Plant, together with one telephone handset unit and protective device.

3) General Maintenance and Repair of Existing Facilities and Equipment to be used as it is.

- a) Repair of supply power meter in the Chandnihat Plant which is provided by BPDB.
- b) General maintenance and repair of existing facilities and equipment which will be used as it is, especially electrical panels and boards.
- c) Maintenance test operation of existing generator, once at intervals of 3 months.
- d) General maintenance and repair of existing water supply pipe network in Zone II.
- e) Repair of leakage of water from distribution pipe.

- f) Repair of common faucets in Zone II area, which are in operation without proper stop valve.
- g) Removal of pitcher pumps in Zone II area, which are illegally connected into distribution pipe line at the lowest water pressure area after completion of the Project.
- h) Expendable supplies such as chemical, electrical power and water for the purpose of water treatment for the period of construction of the Project except for the purpose of the construction works.
- i) Expendable supplies such as chemical, electrical power and water for the period of test run of the Plant.
- j) Water supply service to consumer for the period of exchange of supply pipe line.
- k) Flushing work for cleaning of distribution pipe after exchange of supply pipe connection.
- l) Operation and maintenance work after hand over the Project.

In relation to above mentioned scope of work necessary expenses to be borne by the Bangladesh side during execution of the Project is shown in Table 4-11, and the operation and maintenance cost after completion of the Project is shown in Table 4-12, respectively.

Detailed discription on the operation cost is discussed in 3.3.3 (3) on page 93.

Table 4-11 Incidental Expenses for Implementation of the Project

|    |  |              |
|----|--|--------------|
| 1. | Personnel salary for counterpart engineers<br>3 prs x @TK 6,000/M.M x 30 mts           | = TK 540,000 |
| 2. | Removal expense for WASA personnel residence   | = TK 50,000  |
| 3. | Water supply service expense to consumer<br>2 days/time x 15 times x @ TK 150/time     | = TK 4,500   |
| 4. | Flushing work for cleaning of distribution pipe<br>after connection                    | = TK 50,000  |
| 5. | Repair expense of common faucet without proper stop valve<br>400 units x @ TK 200/unit | = TK 80,000  |
|    | Total  | TK 724,500   |

Table 4-12 Operation and Maintenance Cost for  
Chandnighat Water Treatment Plant

Unit : TK Thousand/Year

| Item                                | Existing Assumption   | After Expansion   |
|-------------------------------------|---|---|
| 1. Personnel salary                 | 1,200<br>(38ps x @2.7/MM x 12mt/year)   | 1,600<br>(51ps x @2.7/MM x 12mt/year)   |
| 2. Electrical Power                 | 4,000<br>(See Table 3-14)   | 9,600<br>(See Table 3-14)   |
| 3. Chemical                         | 1,800<br>(See above)  | 5,900<br>(See above)  |
| 4. Maintenance                      | 240<br>(@20/mt x 12 mt/year)  | 2,850<br>(285,000 x 1 %/year)   |
|                                     | Note: Maintenance fee is only a few because existing status of maintenance is insufficient. | Note: Maintenance cost should be provided in terms of 1 % of direct equipment cost. |
| 5. Cleaning                         | 10  | 50  |
| 6. Monitoring for raw water quality | ---   | 120<br>(@ 10/time x 12 time/year)   |
| <b>Total</b>                        | <b>7,250</b>  | <b>20,120</b>   |



## **CHAPTER 5 PROJECT EVALUATION AND CONCLUSION**





CHAPTER 5 PROJECT EVALUATION AND CONCLUSION

5.1 Expected Effects and Appropriateness of the Project

(1) Expected Effects of the Project

From the study made presently it is assumed that the permanent population and floating (non-resident) population in the Project area are approx. 600,000 and 130,000, respectively. In view of which, the present status of water supply to the town in the area is summarized as follows:

|                       |   |
|-----------------------|---|
| - Production of Water |   |
| Deep Tubewells -----  | Q = 80,400 m <sup>3</sup> /d (17.6 MGD) |
| Treatment Plant ----- | Q = 15,730 m <sup>3</sup> /d ( 3.5 MGD) |
| <hr/>                 |   |
| Total                 | Q = 96,130 m <sup>3</sup> /d (21.1 MGD) |
| - Demand for Water    |   |
|                       | Q =136,560 m <sup>3</sup> /d (30.0 MGD) |

The following table shows positive effects and improvements caused by the Project after its completion with due consideration that the facilities will be maintained and managed properly by DWASA.

Table 5-1 Effects and Improvements Expected from the Project

| Present State and Problems  | Measures to be taken in the Project  | Expected Effects and Improvements   |
|---|--|---|
| 1. The present production of water is 21.1 MGD against demand for water of 30.0 MGD. Therefore, shortage ratio of water is 30 %.  | • The treatment capacity is to be increased from 3.5 MGD to 8.6 MGD.   | • The present shortage of water will be decreased from 8.9 MGD to 4.2 MGD. Therefore, shortage ratio of water will be improved up to 14 %   |
| 2. Although the Water Treatment Plant has been rehabilitated previously during 1964 and 1970, at present the treatment facilities are almost superannuated. Thereby the Plant is incapable to maintain its function | • The treatment facilities are not only to be expanded but also to be rehabilitated.<br>• The existing filter will be removed and new filter will be constructed to meet required design flow in this Project. | • After improvement stable operation will be expected as the deteriorated facilities and equipment will be replaced.<br>• Improvement of the treated water quality will be expected as chemical dosing facility and |

|   |   |  |
|---|---|--|
| from points of view of water quality and quantity control.  |   | filter are to be replaced.   |
| It is incapable for water quality to maintain the water quality standard of WHO.  |   |  |
| 3. Due to no service reservoir in the Chandnighat water supply system, operation of the Plant in night-time is not in practice. Which means the Plant incurs system losses through non producing for water.   | • A service reservoir having a capacity of 5,700 m <sup>3</sup> will be constructed.  | • The Plant will be continually operated even after stop of water supply in night-time, thereby actual production of water will be increased.  |
| 4. There are more than one hundred pitcher pumps directly connected into the distribution pipe line at the lowest water pressure area. Such activity bears dangerous risk of treated water being polluted from the waste water of surrounding area of the pipeline. | • The distribution main of $\phi$ 500 mm in diameter will be installed so as to convey a water smoothly and to maintain water pressure constant even in the area of lowest water pressure at present. | • It is expected to maintain water pressure constant at every corner of the network when the Project is executed. Thereby, local inhabitant can be persuaded to remove all such illegal pitcher pumps which are directly connected into distribution pipeline will be removed. |

## (2) Appropriateness of the Implementation of the Project

### 1) Effects and Benefits

This Project is to be implemented urgently to recover the water shortage of the planned area, and thereby relieve the citizen of old Dhaka from their long awaited problem with water. The benefit of this Project will be equally shared by all inhabitant living in the area. From this point of view, it has also been judged appropriate to implement the Project with a Japanese grant aid assistance.

### 2) Operation and Management of the Project

As the Project concentrates on the rehabilitation and expansion of the existing water treatment plant only, the basic operation and management system will remain the same as it is.

Since the Project is scheduled to be implemented through grant aid

assistance from the Government of Japan, it is quite apparent that there will be no requirement for additional huge funding or personnel involvement from DWASA for the Project even though the operation cost will be increased after completion of the Project. That is because such expenses will be able to be covered by the water rate, as the production unit cost will be maintained almost the same as it is.

However, it is to be noted that DWASA needs to establish a sound water quality management system for the Chandnighat Plant. It is recommended that DWASA should assign a chemical engineer for this purpose. On the job training for such water quality management is possible to carry out during the period of construction of the Project because the period between the plant operation by newly constructed treatment process in the stage 1 and completion of the Project is scheduled for about one year.

## 5.2 Conclusion and Recommendation

In order to resolve unsettled problem pending for long period in relation to water supply DWASA is preparing a master plan for long term scheme, which will cover the entire Dhaka city for its service area and phased in 3 stages with construction of large scale of water treatment plant such as 100 MGD.

On the other hand, DWASA is undertaking an emergency deep tubewell development projects to cope with water shortage in the most severe area on priority basis. The water supply area of Chandnighat Water Treatment Plant covers almost all of the old city of Dhaka. Most of the facilities at the Chandnighat Plant, which is the sole water treatment plant in the city, has been deteriorated from constant operation in terms of water quantity and quality except iron content, which can be removed by appropriate chemical dosing and sufficient removal of turbidity with filtration process, and due to long period operation without sufficient maintenance. Consequently, it is observed that by small scale rehabilitation as planned, it is very hard to recover its original functions.

Under this circumstances, it is recommended for the Plant to take necessary not only for rehabilitation of the existing superannuated facili-

ties, but also expansion of the production capacity as much as possible utilizing the projected site effectively for meeting the requirement and demand for water at the concerned area. From as such point of view, it is expected that the implementation of the Project will make a great contribution towards enhancement of the capability of the Chandnightat water supply system for DWASA. And it has also been judged appropriate to implement the Project with a Grant Aid assistance from Japan as early as possible.

The following are the recommendations presented to both Governments which we felt necessary for the effective and smooth implementation of this Project.

(1) Improvement of Management System of DWASA

Under the organization of DWASA, Planning and Monitoring Cell control the planning of new projects, application and arrangement of the projects to be implemented and works as liaison for Bangladesh government and authorities concerned.

Planning and Monitoring Cell of DWASA is executing quite a few emergency water supply projects and several long-term projects. Since the year 1989, DWASA has not only annexed Narayanganj under its administration but also added drainage system into its territory undertaking. Therefore, the responsibility of the planning and monitoring cell has extended greatly at present.

DWASA has experiences to execute Japanese Grant Aid projects since the year 1987. During the execution of these projects, DWASA has been informed of its capability in system control and operational management.

For instance, at the time of getting an approval from the authority for contract signing between DWASA and Consultant and or Contractor, DWASA's arrangement to take decision or procure approval was slow and time consuming in order to maintain official procedure, and also too much delay to assign and arrange personnel at the site been encountered at the time of taking over the grant aid project.

The system now being followed to get the permission and approval from

the concerned authority is complicated and needs prolong persuasion.

It is to keep in mind that reinforcement of applicant is required to applicate smoothly in such status of the organization of the authorities.

Under above circumstance, the following is recommended to DWASA for improvement of its organization and management system.

- 1) The task and work of the Planning and Monitoring Cell be reviewed and reorganized to meet two fold desk works in order to implement projects smoothly on schedule. Along this line, it is suggested that the Planning and Monitoring Cell should have a planning desk for developing new projects and management desk for planning promotion and execution of implementing projects, separately and act upon to ensure coordination to maintain liaison between concerned government and authorities and the people living in the project site.
  - 2) Assignment of an in-charge-of counterpart engineer for the project, who may be belong to MODS circle, should arrange with dispatch. The engineer must be assigned for the stage of not only construction period but also from detailed design stage upto full turn-key of the project consistently in order to deeply understand of the design policy, conception and the scope of works of the Project to cope with the problem which might take place during the construction period between the client and contractor.
- (2) Provision for Operation and Maintenance Expense

The present operational condition of the existing water treatment plant is not sufficient due to insufficient chemical dosing, causing iron content is over WHO standard. Therefore, more careful water quality management is required.

Since the production capacity of the Plant when the plan is executed under this Project will be increased approx. 2.5 times of the existing capability, its operation and maintenance cost is estimated to be increased upto approx. 2.8 times. Therefore, DWASA should make provision

for such O/M expense and add to annual budget in order to undertake maintenance of the rehabilitated facilities to keep it in proper operation.

Break-down of the O/M expense is shown in Table 4-12.

(3) Promotion of Leakage Detection Control Programme

According to DWASA's report on LDC, physical losses is assumed as 25 % due to low water pressure inside supply pipe.

When this Project is executed, it is assumed that the water pressure will be increased up to 2 - 3 times of its present conditions, which means the leakage ratio will also be increased up to 1.5 - 2.0 times without improvement of technical loss.

Therefore, it is recommended that the LDC programme which is scheduled to implement from the year 1992, should commence for this area in priority basis and ahead of the other areas of Dhaka city.

In this connection, it can be mentioned that DWASA has already understood the importance of leakage control in the water supply system and as a preventive measure has just commenced the LDC programme in 1992.

As shown hereinafter, even if the strength of the production capacity of the Plant is enhanced under this Project, the actual effectiveness for use of water is not expected at its planned level without improvement of system loss due to present water leakage status.

Therefore, it is recommended that the Project must be undertaken on the premise that DWASA submit an action plan on the leakage detection and control programme for MODS Zone-II to the Japanese side to confirm the following points at least.

- (i) Number and location of common faucets in Zone II area which are in operation without proper stop valve for making its rehabilitation program be confirmed and repaired as on the action plan.

(ii) Number and location of pitcher pumps in Zone II area, which are illegally connected into distribution pipe line at the lowest water pressure area be confirmed, for issuance of stern legal warn- ing to remove them after/on completion of the Project.

(iii) Overall scheme on leak detection and control programme for its rehabilitation and replacement in MODS Zone II area be prepared and repaired as on the action plan.

The action plans prepared by DWASA regarding the mentioned above are attached in Appendix A-5.

Estimation of Effective used - for Water at Present

Effectiveness of used-for water at present is calculated by the formula detailed below.

$$Q_1 = Q. \times (1 - T_L)$$

Where :  $Q_1$  = Present effective used-for water

$Q.$  = Present water production

$T_L$  = Present leakage rate assumed (25 %)

$$Q_1 = 15,730 \text{ m}^3/\text{d} \times (1 - 0.25) = 11,800 \text{ m}^3/\text{d}$$

Estimation of Effective Used-for Water after Rehabilitation

Effectiveness of used-for water after this Project will be assumed as below.

$$Q_2 = Q_0' \times (1 - T_L')$$

Where :  $Q_2$  = Effective used-for water after rehabilitation

$Q_0'$  = Water production after rehabilitation

$T_L'$  = Leakage rate after rehabilitation

In case of no improvement measure is taken for remedy :

$$25 \% \times 1.8 * = 45 \%$$

Note : Assuming water supply pressure increases from 0.6 kg/cm<sup>2</sup> up to 1.5 kg/cm<sup>2</sup> (2.5 times), leakage rate is estimated to increase 1.8 times.

$$Q_2 = 39,000 \text{ m}^3/\text{d} \times (1 - 0.45) = 21,450 \text{ m}^3/\text{d}$$

Even though water production will increase 2.5 times from the present status, effective used-for water will only increase 1.8 times of that, as shown above which means the technical loss becomes more higher.

(4) Reinforcement of Water Quality Control System

DWASA has its own water quality control laboratory and is analyzing water to be supplied as a routine work. But, the laboratory is incapable to analyze heavy metals and harmful materials in water which is affected by industrial waste.

Since there is a potential water pollution from the waste disposed in the river water by industries and local inhabitants surrounding the banks of Burhiganga river, it is necessary to establish a patrol system around the water intake area to maintain water quality, with the understanding that safety and clear water supply is an appointed task for water works.

For this purpose, it is recommended to establish a water quality management system by means of expansion of the DWASA water quality laboratory or to make arrangement to contract analysis for harmful materials. Moreover, it is also recommended to consider in having a serious discussion between authorities concerned in relation to preservation of the water quality of the Burhiganga River.

(4) Authentication by Bangladesh Government for Smooth Implementation

The implementation period is estimated to be 5.5 months for the engineering consultant services such as detailed design and preparation of bidding, and 32 months for construction works after contract agreement with Government of Bangladesh.



thorization (acts incurring liabilities on the Treasury). Fig. 4-3 shows overall scheme for the implementation of the Project.

The figure mentioned above is prepared taking into consideration of the local weather condition, especially to start the rehabilitation work before monsoon season for fundamental concrete works.

The Basic Design Study team from JICA has already explained the framework of Japanese grant aid cooperation to the Bangladesh counterparts, and therefore, it is expected that the responsibilities from Bangladesh side for the Project will be carried out properly. However, it is to be ensured that the Government of Bangladesh provides due budgetary allocation at the necessary time for this project relative to its fiscal year, especially the budget given to DWASA to cover the customs duties on imported equipment and materials.

The same must be secured before the start of the Project.



## **APPENDICES A**

- A-1 Organization of Basic Design Study Team, and Interviewee**
- A-2 Minutes of Discussion for Basic Design Study**
- A-3 Minutes of Meeting between DWASA and Representative of Concerned Area**
- A-4 Minutes of Discussion for Technical Subject between DWASA and Member of Basic Design Study Team**
- A-5 Minutes of Discussion for Draft Basic Design Study Report**
- A-6 Comments of DWASA on Draft Basic Design Study Report and Confirmation of the Comments**



**A-1 Organization of Basic Design Study Team,  
and Interviewee**



1. ORGANIZATION OF BASIC DESIGN STUDY TEAM

(1) List of Members of the Study Team

|                           |                   |   |
|---------------------------|-------------------|---|
| Team Leader               | Seiyu KAMATA      | Head of Planning<br>Research Section,<br>Yokosuka City Waterworks<br>Bureau |
| Project Coordinator       | Hidetoshi ISHIOKA | Basic Design Study div.<br>Grant Aid Study and Design<br>Department, JICA   |
| Water Supply Planning     | Kenji HORI        | Nippon Jogesuido Sekkei Co., Ltd.   |
| Water Distribution        |                   |   |
| Pipe Planning             | Tadao MIYAZAWA    | ditto   |
| Water Treatment           |                   |   |
| Plant Planning            | Masao FUJIWARA    | ditto   |
| Mechanical Planning       | Kenji NAGAOKA     | ditto   |
| Electrical Planning       | Hideo KOIZUMI     | ditto   |
| Operation and Maintenance |                   |   |
| Planning                  | Hirokazu SANO     | ditto   |

(2) Schedule of the Study Team

1. April 9 (Thu) Departure from Tokyo
2. 10 (Fri) Arrival at Dhaka
3. 11 (Sat) Courtesy call on ERD  
Courtesy call on LGRD  
Courtesy call on DWASA

4. 12 (Sun) Courtesy call on Embassy of Japan  
Meeting with DWASA at Zone II Office
5. 13 (Mon) Courtesy call on World Bank office  
Meeting with DWASA at Zone II office
6. 14 (Tue) Meeting with DWASA at Zone II office  
field survey
7. 15 (Wed) Meeting with DWASA
8. 16 (Thu) Meeting with DWASA  
(Discussion of Minutes, Signing of Minutes)  
Visit to JICA office and Embassy Japan
9. 17 (Fri) Group A (Team leader and Mr. Ishioka)  
Departure for Japan
10. 18 (Sat) Group B (Consultant team)  
Departure for Japan
- |
- (Through) Group C (Consultant team)  
Field survey and discussion and meeting with DWASA,  
continuously.
- |
- |
- June 6 (Sat) Departure for Japan

(3) List of Member of the Study Team for Draft Final Report Explanation

|                   |              |   |
|-------------------|--------------|---|
| Team Leader       | Seiyu KAMATA | Head of Planning<br>Research Section,<br>Yokosuka City Waterworks<br>Bureau |
| Grant Aid Planner | Koji NOGUCHI | Grant Aid Division<br>Economic Cooperation Bureau                           |



|                       |                   |  |
|-----------------------|-------------------|--|
| Project Coordinator   | Hidetoshi ISHIOKA | Basic Design Study Division<br>Grant Aid Study<br>and Design Department,<br>JICA |
| Water Supply Planning | Kenji HORI        | Nippon Jogesuido Sekkei<br>Co., Ltd.   |
| Water Distribution    |                   |  |
| Pipe Planning         | Tadao MIYAZAWA    | ditto  |
| Water Treatment       |                   |  |
| Plant Planning        | Masao FUJIWARA    | ditto  |

(4) Schedule of the Study Team

1. October 24 (Sat) Departure from Tokyo
2. 25 (Sun) Arrival at Dhaka  
Courtesy call on JICA Office  
and Embassy of Japan
3. 26 (Mon) Courtesy call on ERD  
Discussion with Dhaka WASA on Draft Final Report  
Observation of Project site
4. 27 (Tue) Discussion with Dhaka WASA  
Joint Meeting with ERD, LGRD, DWASA, EOJ  
and JICA Office
5. 28 (Wed) Discussion of Minutes with Dhaka WASA  
Observation of Sewerage Project site
6. 29 (Thu) Signing of Minutes  
Visit to JICA Office
7. 30 (Fri) Departure for Japan

2. LIST OF PERSONS CONCERNED

(1) Government of Bangladesh

1) Economic Relations Division, Ministry of Finance (ERD)

|                              |                      |
|------------------------------|----------------------|
| Dr. A. M. M. Shawkat Ali     | Additional Secretary |
| Mr. Ahmed Shabriar Chowdhury | Dy. Secretary        |
| Mr. Rafiqul Islam            | Asst. Chief          |

2) Ministry of Local Government, rural Development and Cooperation (LGRD)

|                      |               |
|----------------------|---------------|
| Mr. B. R. Chowdhury  | Jt. Secretary |
| Mr. Mossaraf Hossain | Jt. Secretary |
| Mr. Khairul Alam     | Dy. Chief     |

3) Dhaka Water Supply and Sewerage Authority (DWASA)

|                                |                                  |
|--------------------------------|----------------------------------|
| Capt. (R'td) Nurul Islam       | Chairman                         |
| Mr. Abdur Rouf Chowdhury       | Member Finance                   |
| Mr. Abdul Muqueet              | Chief Engineer & Member Engineer |
| Mr. Habibur Rahman Jamaly      | Secretary                        |
| Mr. Mohd. Sanaulah             | SE (MODS)                        |
| Mr. Mohd. Mesbahuddin          | SE (RPE & M)                     |
| Mr. M. Mohsen Ali              | SE (C & D)                       |
| Mr. Abdul Kader Chowdhury      | SE (Drainage)                    |
| Mr. Kazi M. Sheesh             | SE (P & D)                       |
| Mr. Shamsul Alum               | EE, W (P & D)                    |
| Mr. Iqbal Hossain Bhuiyan      | EE (F & M)                       |
| Mr. S. D. M. Quamrul Chowdhury | EE (Zone II)                     |
| Mr. A. K. M. Quamrul Chowdhury | EE, W (C & D)                    |
| Mr. R. J. M. Rabiul Kaisez     | Asst. E (P & D)                  |
| Mr. Sahidur Rahman Pardhan     | P. D (Crash. P)                  |
| Mr. Abdul Matin Akhand         | Dy. Chief of Planning            |
| Mr. M. A. Jalil                | Asst. Chief of Planning          |

(2) Government of Japan

1) Embassy of Japan

Mr. Toshio Saiki

Mr. Yasuyoshi Ichihashi

Mr. Hitoshi Baba

Mr. Keizo Inoue

Ambassador in Bangladesh

Minister in Bangladesh

First Secretary

Second Secretary

2) JICA Bangladesh Office

Mr. Takeshi Imazu

Mr. Haruo Naito

Mr. Takeshi Naruse

Representative

Dep. Representative

Resident officer



## **A-2 Minutes of Discussion for Basic Design Study**



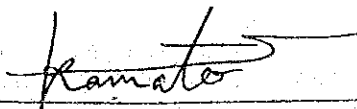
MINUTES OF DISCUSSIONS  
OF  
BASIC DESIGN STUDY ON THE PROJECT FOR  
BALANCING, MODERNIZING, REHABILITATION & EXPANSION  
OF  
CHANDNIGHAT WATER TREATMENT PLANT  
IN  
THE PEOPLE'S REPUBLIC OF BANGLADESH

Based on the results of the Preliminary study, the Japan International Cooperation Agency (JICA) decided to conduct a Basic Design Study on the Project for Balancing, Modernizing, Rehabilitation & Expansion of Chandnighat Water Treatment Plant (hereinafter referred to as "the Project") and entrusted the study to JICA. JICA sent to Bangladesh a study team, which is headed by Mr. Seiyu Kamata, Head of Planning Research Section, Yokosuka City Waterworks Bureau and is scheduled to study in the country from April 11 to June 5, 1992.

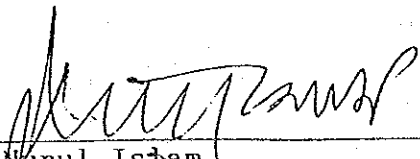
The team held discussions with the officials concerned of the Government of Bangladesh and conducted a field survey at study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets and agreed to recommend to their respective governments and the authorities concerned to examine those towards the implementation of the project. The team will proceed to further works and prepare the Basic Design Study Report.

Dhaka, April 16, 1992



Mr. Seiyu Kamata  
Leader  
Basic Design Study Team, JICA



Mr. Nurul Islam  
Chairman, Dhaka Water Supply  
and Sewerage Authority

## ATTACHMENT

### 1. Objective

The objective of the Project is to rehabilitate the water supply systems in Old Dhaka, specially in MODS (Maintenance, Operation, Distribution and Service) Zone II of Dhaka Water Supply and Sewerage Authority (DWASA) as shown in Annex I and thus contributing to the improvement of water supply situation in that area.

### 2. Project Area

The Project area is MODS Zone II of DWASA.

### 3. Executing Agency

Dhaka Water Supply and Sewerage Authority is responsible for the implementation and administration of the Project.

### 4. Main components of the project requested from DWASA through the Government of Bangladesh.

- 1) Rehabilitation of water intake facilities of Chandnighat Water Treatment Plant. Expansion of intake capacity shall be considered, if necessary.
- 2) Rehabilitation and expansion of treatment capacity of water treatment facilities of Chandnighat Water Treatment Plant up to approximately 50,000m<sup>3</sup>/day.
- 3) Improvement of existing main pipes for the water distribution network in the Project area to ensure smooth supply of water after increase of distribution water by rehabilitated Chandnighat Water Treatment Plant. The total length of main pipes to be improved shall be approximately 5,000m.

However, the final components of the Project may differ from the above items, if it is found necessary after further studies in Japan.

### 5. Cooperation from people in the Project Area

DWASA has understood the importance of cooperation of people in the Project area for smooth implementation of the Project, and agreed that DWASA will take necessary action for getting cooperation from people in the Project area during the project implementation period as Executing Agency of the Project.

S. K



6. Japan's Grand Aid System and Undertakings by the Government of Bangladesh

- 1) The Government of Bangladesh has understood the system of Japan's Grant Aid explained by the Study Team.
- 2) The Government of Bangladesh will take the necessary measures, described in Annex-II, for smooth implementation of the Project on condition that the Japan's Grant Aid is extended to the project.

7. Further Schedule

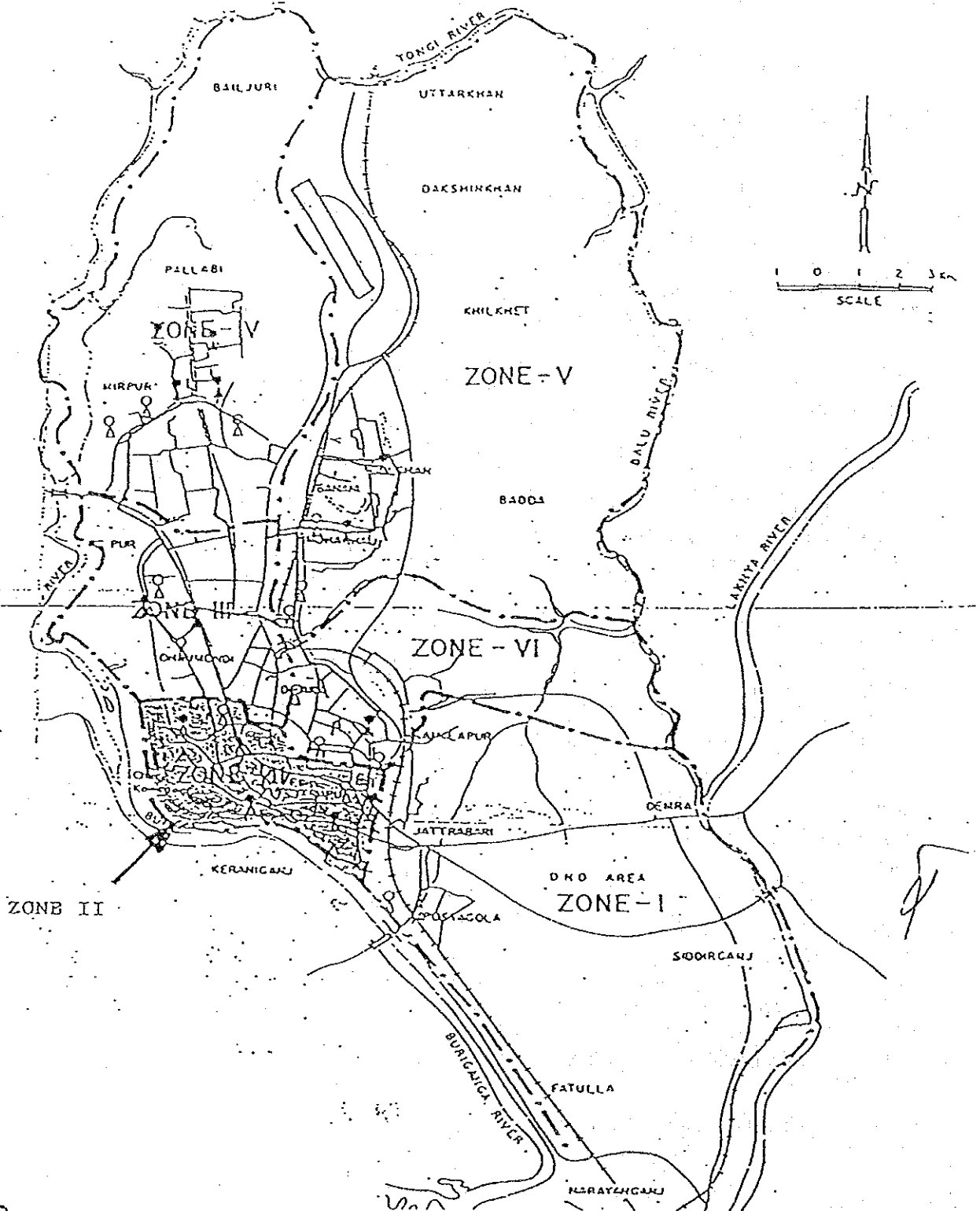
- 1) The consultants will proceed to further studies in Bangladesh until June 5, 1992.
- 2) JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around September 1992.
- 3) In case that the contents of the report is accepted in principle by the Bangladesh side, JICA will complete the final report and send it to the Government of Bangladesh around October 1992.

8. Technical Cooperation

On condition that Japan's Grant Aid is extended to the project the Government of the Bangladesh also showed their hope to improve their technical and management capacity with Japan in the future.

Map of the Project Area

MODS ZONES

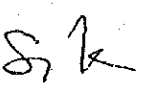


S. b

ANNEX-II

Following arrangements will be requested to be taken by the Government of the People's Republic of Bangladesh.

1. To provide data and information necessary for the project implementation, Basic Design and Detailed Design, and to assign exclusive counterpart personnel.
2. To ensure speedy unloading, tax exemption (providing CDST payment) and custom clearance at the port of disembarkation of products purchased for the Project.
3. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry into the Bangladesh and stay therein for the performance of their work.
4. To exempt Japanese national involved in the project from customs duties, internal taxes and other fiscal levies which may be imposed in Bangladesh with respect to the supply of equipment/machineries and services under the verified contracts.
5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
6. To bear all expenses, other than those to be borne by the Grant Aid necessary for the execution of the project.
7. To take necessary measures for getting permission for construction works under the Project from the authorities concerned, if necessary.
8. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.





**A-3 Minutes of Meeting between DWASA and  
Representative of Concerned Area**



A MINUTES OF DISCUSSION FOR BALANCING,  
MODERNIZING REHABILITATION AND EXPANSION  
OF CHANDNIGHAT WATER TREATMENT PLANT.

1. In pursuance of Article 6 of Minutes of discussion of preliminary study of the project signed on December 12, 1991 between DWASA and the preliminary Study Team, JICA, a joint meeting was held on March 04, 1992 at 6.30 P.M. in the project area. The meeting was held between the WASA represented by Chairman, Chief Engineer and other the representatives of the people in the Project area headed by the Member parliament Lt. General (Retd) Mir. Shawkat Ali. A large number of local people attended the meeting. A list of some of the persons attended in the meeting is enclosed herewith.
2. At the outset of the meeting the Chairman Dhaka WASA opened the discussion welcoming the Member Parliament and local resident and representatives of the Government of Japan and the participants. He said that Chandnighat water Treatment Plant is most important for water supply in old Dhaka City. Its population is more than 1 million. Water demand in this area has increased drastically because of higher concentration of population in this area. DWASA cannot increase water supply as per demand through this small surface water treatment plant unless the production capacity of this plant is enhanced. As such in response to the request from the Govt. of the people's Republic of Bangladesh, the Government of Japan has kindly come forward and decided to give all sorts of co-operation to implement the project. He also said that for the smooth implementation of the project some old rusty & leakage existing main iron pipes for the water distribution network need

to be rehabilitated. During improvement and rehabilitation of required main pipes some roads of the project area need to be stopped for vehicles temporarily and as such normal communication of that roads may be disrupted for some days. He further added that: in order to get the greater benefit of the project there is no alternative but to take some trouble in this regard for the time being. Moreover, local people would have to give the assurance to DWASA & the representative of the govt. of Japan that during implementation of project they would give all sorts of co-operation for the smooth implementation of the project, and then only Japan Government would come forward and provide their technical and financial assistance to the project.

3. The Member of Parliament agreed and gave full assurance. to DWASA for smooth implementation of the project and also confirmation of the same.
4. Some of the local leaders expressed the necessity of implementation of the project very soon to mitigate their sufferings caused by water shortage. They said that they were ready to give if required voluntary services to motivate the local inhabitants. They also gave assurance that during implementation of the project they would co-operate with DWASA and the Japanese Construction Firm for the greater interest of the local people.
5. Finally, on behalf of the local people, the honorable member of the parliament of the area assured the representatives of the Government of Japan that he would extend his all sorts of co-operation for implementation of the project.

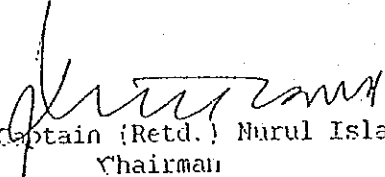


6. At last Mr. Ota, first secretary, the Embassy of Japan in Bangladesh, on behalf the Govt. of Japan told in the meeting that the Government of Japan had already conducted a preliminary study of the project. He further told that he was fascinated to see the inspiration and verbal assurance for co-operation of the local people for implementation of the project very soon. He also told that the Japan Government would despatch a delegation to conduct the Basic Design Study of the project in April 1992 as a part of implementation of the project.

7. After discussion in the meeting it was decided that :

- a. The local people would extend all sorts of co-operation to DWASA and the Japanese firms for smooth and timely implementation of the project.
- b. The representatives of govt. of Japan present in the meeting would try for despatch of a delegation in April, '92 to conduct the Basic Design Study of the project.
- c. DWASA would give an assurance to the govt of Japan that DWASA would take its best efforts for smooth and timely implementation of the project.

Then the meeting ended with a vote of thanks to the participants.

  
(Group Captain (Retd.) Nurul Islam)  
Chairman  
Dhaka WASA.

## List of Participants

|                                       |  |
|---------------------------------------|--|
| 1. Lt. General (Retd) Hir Shawkat Ali | IIP  |
| 2. Mr. Nazir Hossain                  | Ex-Ward Commission   |
| 3. Mr. Meshab uddin sabu              | Local Elite  |
| 4. Mr. Saifuuddin Ahmed Hilon         | General Secretary<br>( Lalbagh Thana)                                  |
| 5. Mr. Atiquallah                     | President<br>Word No. 29   |
| 6. Mr. Md. Rulul Amin                 | Reporter (Newspaper)   |
| 7. Mr. Farooq Ahmed                   | Local Industrialist  |
| 8. Mr. Abdul Hai                      | Social Worker  |
| 9. Mr. Aziz ullah                     | President Word No.-30  |
| 10. Mr. Khatibur Rahman Khokan        | General Secy.  |
| 11. Mr. Abdul Azuim                   | President Jubadal<br>(Lalbagh Thana)                                   |
| 12. Mr. Sharif                        | Vice President,<br>Lalbagh Thana                                       |
| 13. Mr. Abdul Matin                   | President, Word No-28  |
| 14. Mr. Saleh Ahmed                   | Secretary, Word No-29  |
| 15. Mr. Kabir Uddin Sikder            | Local Elite  |
| 16. Mr. Nasir uddin Ahmed             | Local Elite  |
| 17. Mr. Afzal Hossain                 | Local Elite  |
| 18. Mr. Hd. Khokan                    | Local Elite  |
| 19. Mr. Nasiruddin Pintu              | President, Lalbagh Thana<br>Chatradal Vice President,<br>Lalbagh Thana |

## DWASA Personnel

1. Chairman
2. Chief Engineer
3. Secretary
4. Superintending Engineer, HODS Circle
5. Superintending Engineer, P&D Circle
6. Deputy Chief Planning
7. Assistant Chief, (Planning)
8. Executive Engineer HODS Zone-2



**A-4 Minutes of Discussion for Technical Subject between  
DWASA and Member of Basic Design Study Team**



MEMORANDUM OF DISCUSSION  
ON  
BMRE PROJECT FOR CHANDNIGHAT W.T.P.

A meeting was held on May 25, 1992 at the Board Room of DWASA, between the Senior Engineers from Dhaka WASA and Basic Design Study Team to discuss the comments prepared by the Study Team on DWASA's report on rehabilitation & expansion of the Chandnighat Water Treatment Plant as requested by the Chairman, DWASA.

The said discussion is made in order to compare and concentrate on the basic concept of the rehabilitation works for the project.

Mohd. Sanaullah, SE (MODS), DWASA presided over the meeting and the following officials from Dhaka WASA together with the Study Team member attended the discussion ;

1. Mr. Mesbah Uddin, SE(RPE&M)Circle.
2. Mr. Kazi Md. Sheesh, SE(P&D)Circle.
3. Mr. Mohsen Ali, SE (C&D)Circle.
4. Mr. Shamsul Alam, EE(P&D)Water.
5. Mr. A.K.M. Jafarullah, EE W(C&D)
6. Mr. Jahidul Arif, EE (SOC)
7. Mr. Iqbal Hossain Bhuiyan, EE(FM)Division.
8. Mr. Quamrul Alam Chowdhury, EE(MODS ZONE II)
9. Mr. Kenji Hori, Member, JICA Study Team

The Study Team's comment on DWASA's report is attached herewith.

*(2) 25/5/92*  
*(3) 25/5/92*  
*8/5/92*

*fm*

*[Signature]*

*1/2*

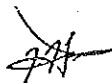
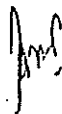
The following is the outcome of the discussion :

*PART 1. Treatment Capacity and Production Capacity*

- 1) Water Treatment Capacity in WASA report shall be read as 9.6MGD /10.08MGD taking into consideration the existing water intake pump capacity and water loss of 5%, which is wasted as backwash of filter and sludge drains etc.
- 2) Actual production capacity of 8.4MGD is expected for 21hrs. operation a day after rehabilitation planned, in WASA report taking into consideration capacity of clear water reservoir.
- 3) While the water treatment capacity proposed by the Study Team is 8.6MGD and actual production capacity is planned for 8.6MGD taking into consideration construction of clear water reservoir as large as possible.
- 4) The reason why the treatment capacity of 11MGD couldnot be recommended are summarized as below;

i) Limitation of Space

-Employing of high-rate settler module in the old sedimentation tanks cannot be recommended from technical, operational and maintenance point of view. Therefore, new construction of sedimentation tank instead of employment of the high-rate settler module in the existing Sedimentation Tank is needed in order to meet the increase of treatment capacity of 11MGD. The limited space for construction of additional sedimentation tank besides the proposed filter and clear water reservoir is to be considered as the main problem for this project site.





-In order to save the land space, the question of constructing high rate filter with high rate settler module were . . . being discussed.

The high-rate settler module will be employed for new construction of sedimentation tank with consideration in the design taking account of operation and maintenance, which is mentioned later at item PART 2.6

As for filter, employment of high-rate filter system, <sup>is</sup> not recommended because coal anthracite is not available in Bangladesh and careless operation cannot allowed for backwashing under this system.

ii) Cost up for Rehabilitation

To increase the treatment capacity upto 11MGD, the replacement of all water intake pumps, its operational panels, transmission pipe lines, distribution pumps and its operational panels also some other facilities concerned are to be replaced by bigger capacity ones. Such replacement works doesnot include in DWASA's original request and as such said works cannot be executed by the allocated projected budget by the Government of Japan, as explained in the previous meeting by the Study Team.

PART 2. *Contents and Basic Concept of Rehabilitation for the Water Treatment Facility.*

1) Water Intake Pumps Facilities

Three(3)pumps of No.1(old)pump station with vacuum pump and sump pump shall be replaced. Electrical sub-station for No.1 and No.2 pump station is used as it is.

2) Transmission Pipe

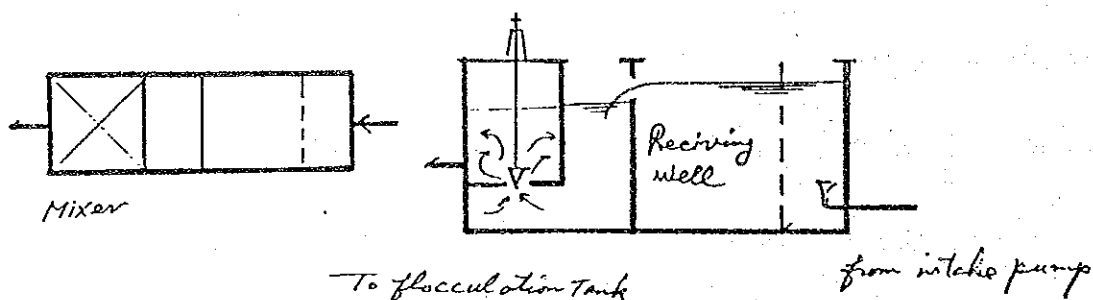
Transmission pipe for No.1 pump station line from the station upto the water treatment plant shall be installed under this project.

*and intake point to be extended upto the main stream of the river and in case of necessity of permission from any agency DWASA will do that. DWASA pointed out this issue in discussion.*

*[Handwritten signatures]*

3) Receiving Well & Mixing

- i) Receiving well shall be newly constructed with a weir for measurement of influent flow.
- ii) Mixing tank shall also be constructed, which will be designed employing hydraulic mixing method as shown below:



4) Flocculation Tank

- i) Since modifying the existing flocculation tank into vertically baffled channel type flocculator is required water head-loss of 30cm to 60cm, mechanical flocculator will be employed in this rehabilitation project. However, whether and how many numbers of flocculator are necessary or not, is a matter of further study.
- ii) Re-construction of a baffled channel type flocculator as proposed by DWASA shall also be considered for further study.

5) Water Channel to Sedimentation Tank

Water channel to sedimentation tank shall be modified to meet standard velocity and to lead gentle distribution towards the sedimentation basin.

6) Sedimentation Tank

- i) Modification shall be done to the existing sedimentation tank so as to Width and Length (W/L) ratio stands 1:3 to 8.
- ii) An additional sedimentation tank shall be constructed to meet the projected water treatment capacity together with the existing one.
- iii) It is also to be considered that new sedimentation tank shall take sludge drainage by pump.

7) Filter

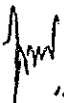
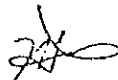
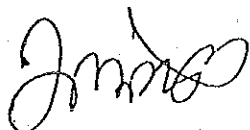
- i) Filter having a capacity of the projected treatment capacity shall be newly constructed in this project.
- ii) Type of the filter shall be employed rapid sand filter with non-valve type.
- iii) Implementation plan shall be made taking into account that the existing filters should be used until the completion of construction of the new filters without disturbing normal water supply.

8) Clear Water Reservoir

Clear water reservoir shall be designed to be bigger as much as possible in order to reserve the treated water produced at night time, so that actual production capacity could be increased as much as possible.

9) Distribution Pump Facility

Three (3) pumps of No.2(new)pump station shall be replaced. Electrical operational panels of No.1 and No.2 pump station are to be used as it is.



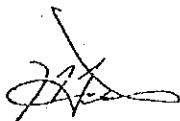
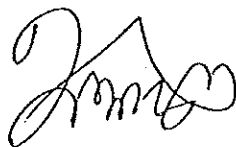
10) Electrical Sub-station Facility

- i) Existing capacity of 800KVA sub-station inside the water works is to be reconfirmed by DWASA.
- ii) There is an emergency cable line for operation of water intake pumps from sub-station in Chandnighat Plant. The line will be used in case of emergency for the purpose. Power consumption for intake pump operation is not necessary to be included in the calculation of total connected load of the Water Treatment Plant.
- iii) Existing electrical facilities of intake and W.T.P. installation should be used. If additional sub-station and generator is needed that will be supplied from DWASA after repair. Only the construction of sub-station and generator room may be considered in this project along with installation.

11) Water Quality Management

For improvement of the treated water quality, chemical feeding equipment shall be considered in order to feed the chemical in suitable volume in this project.

For such purpose, required laboratory facilities shall be included with Jar-Tester.



Member, JICA Study Team.



6/6/02

MD. SANAULLAH

Superintending Engineer

MODS Circle

Dhaka WASA