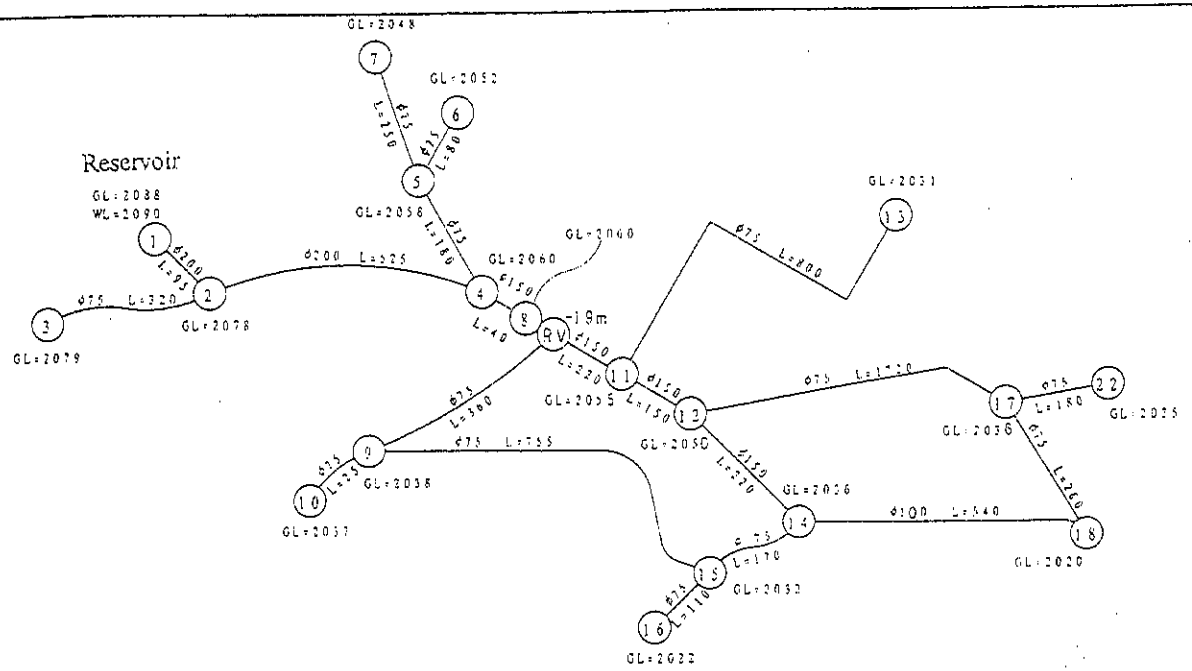
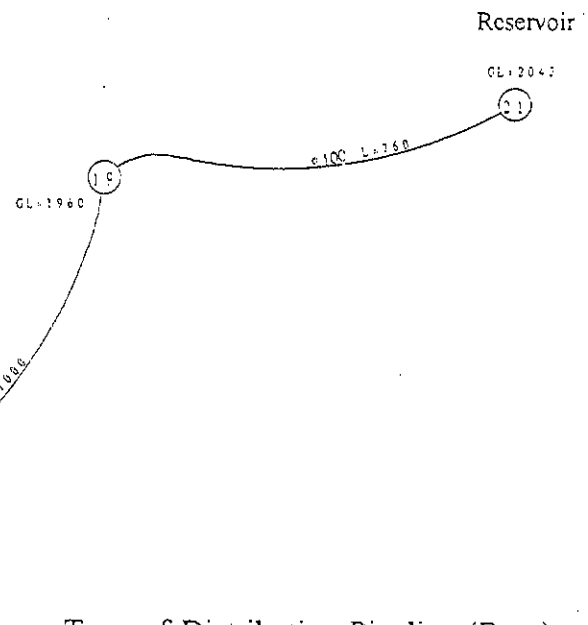
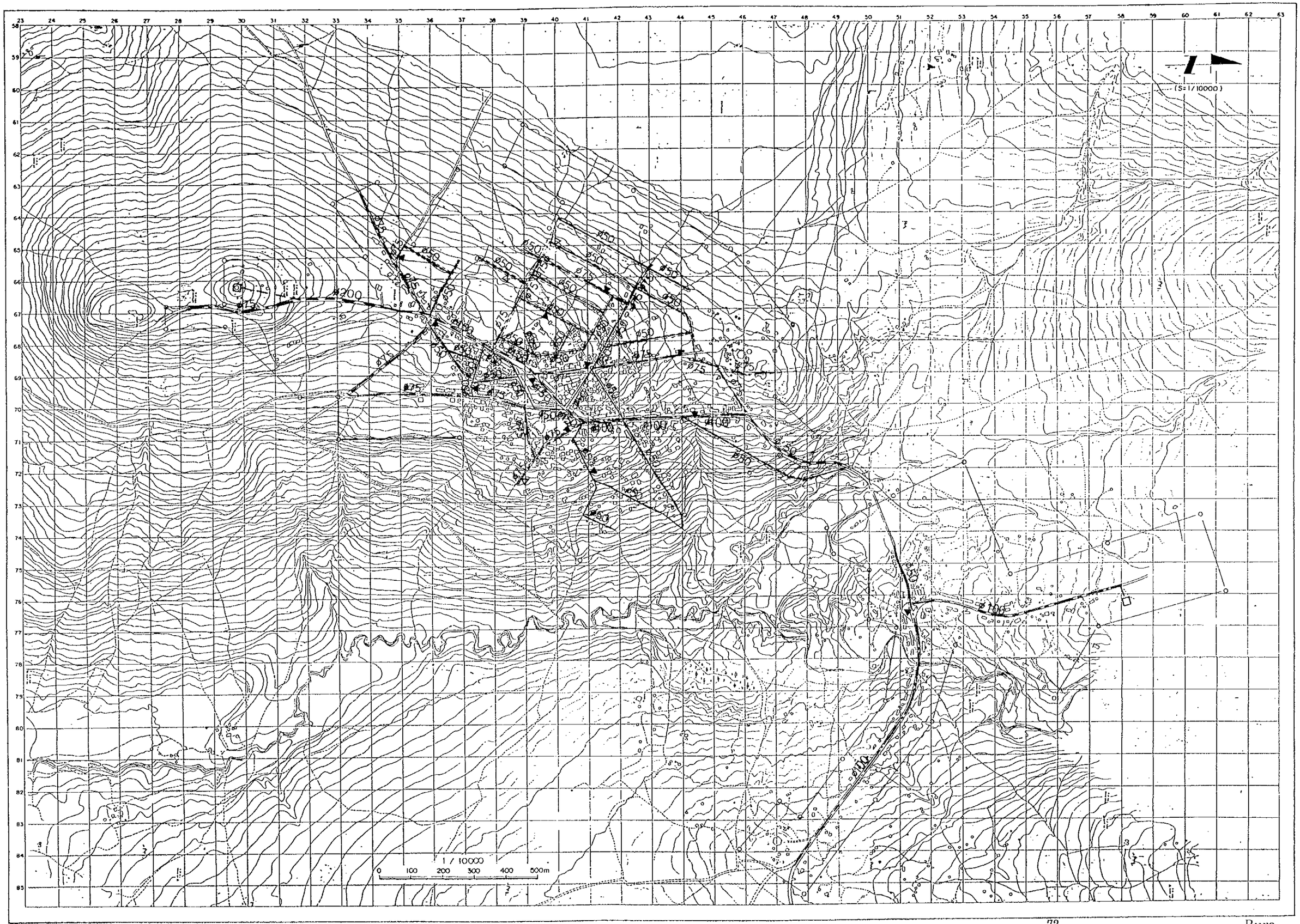




Type of Distribution Pipeline (Bure)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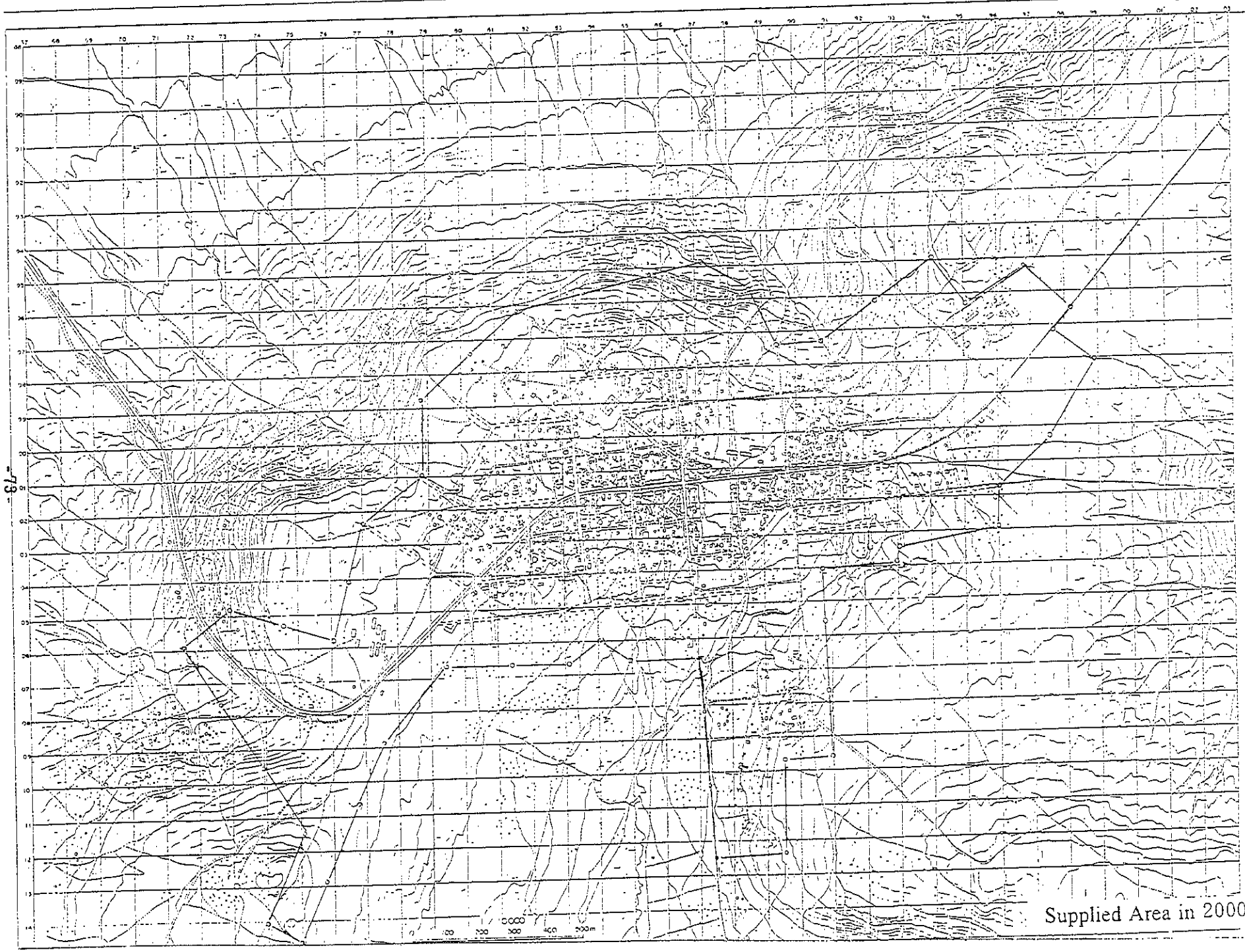
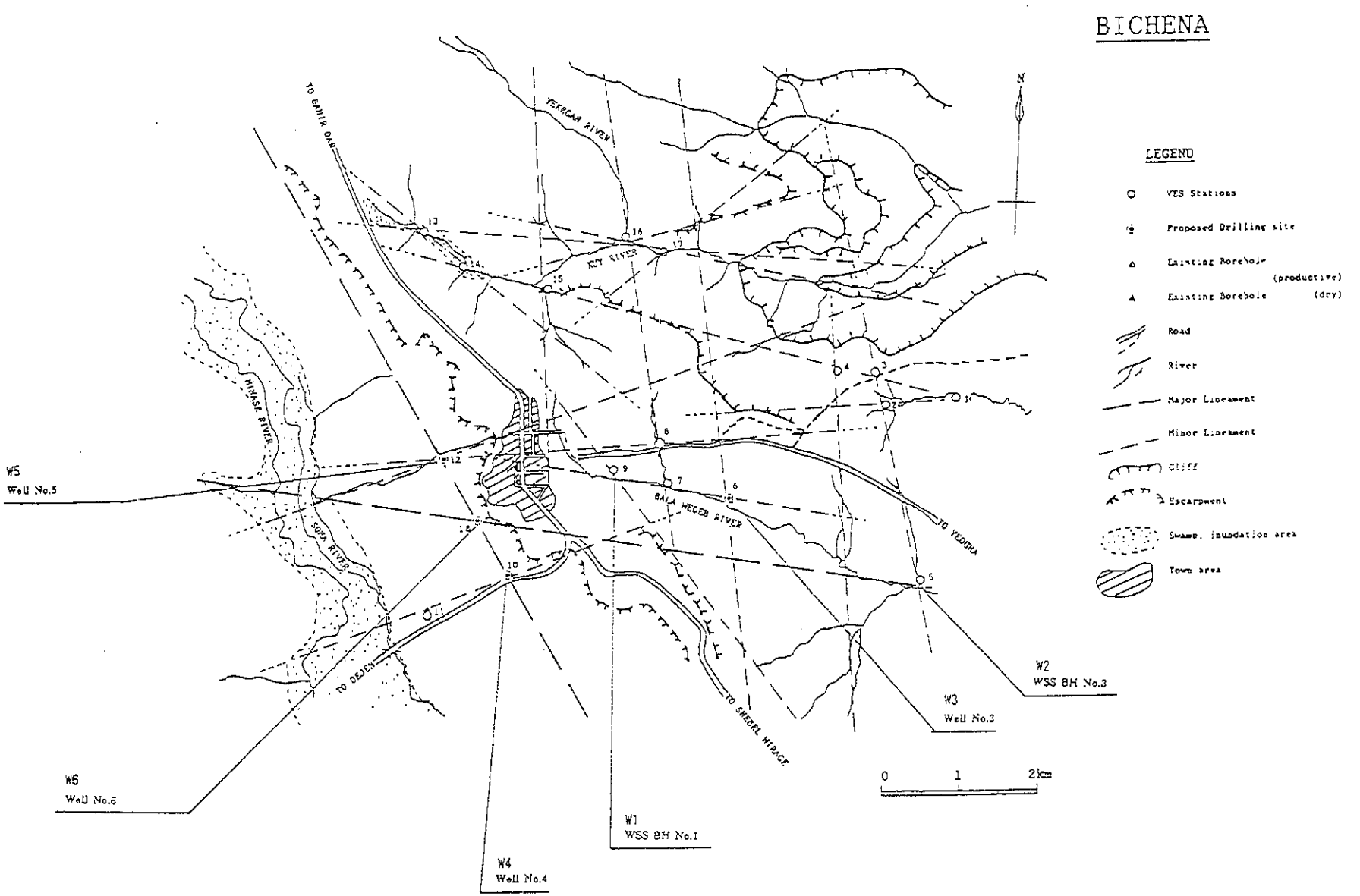
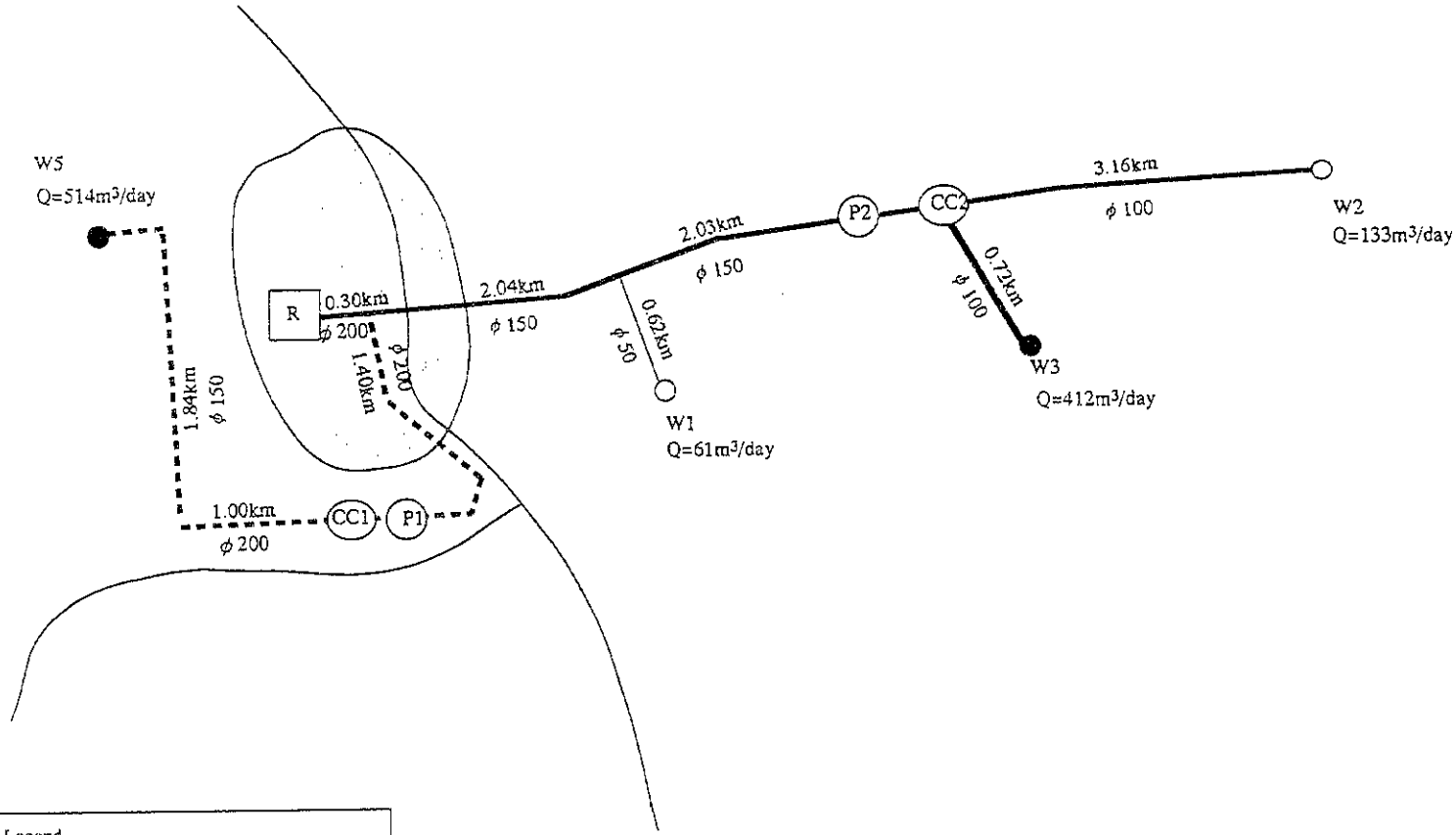
1/10000
0 100 200 300 400 500m



Supplied Area in 2000 (Bichena)



Plan of Proposed Water Sources (Bichena)



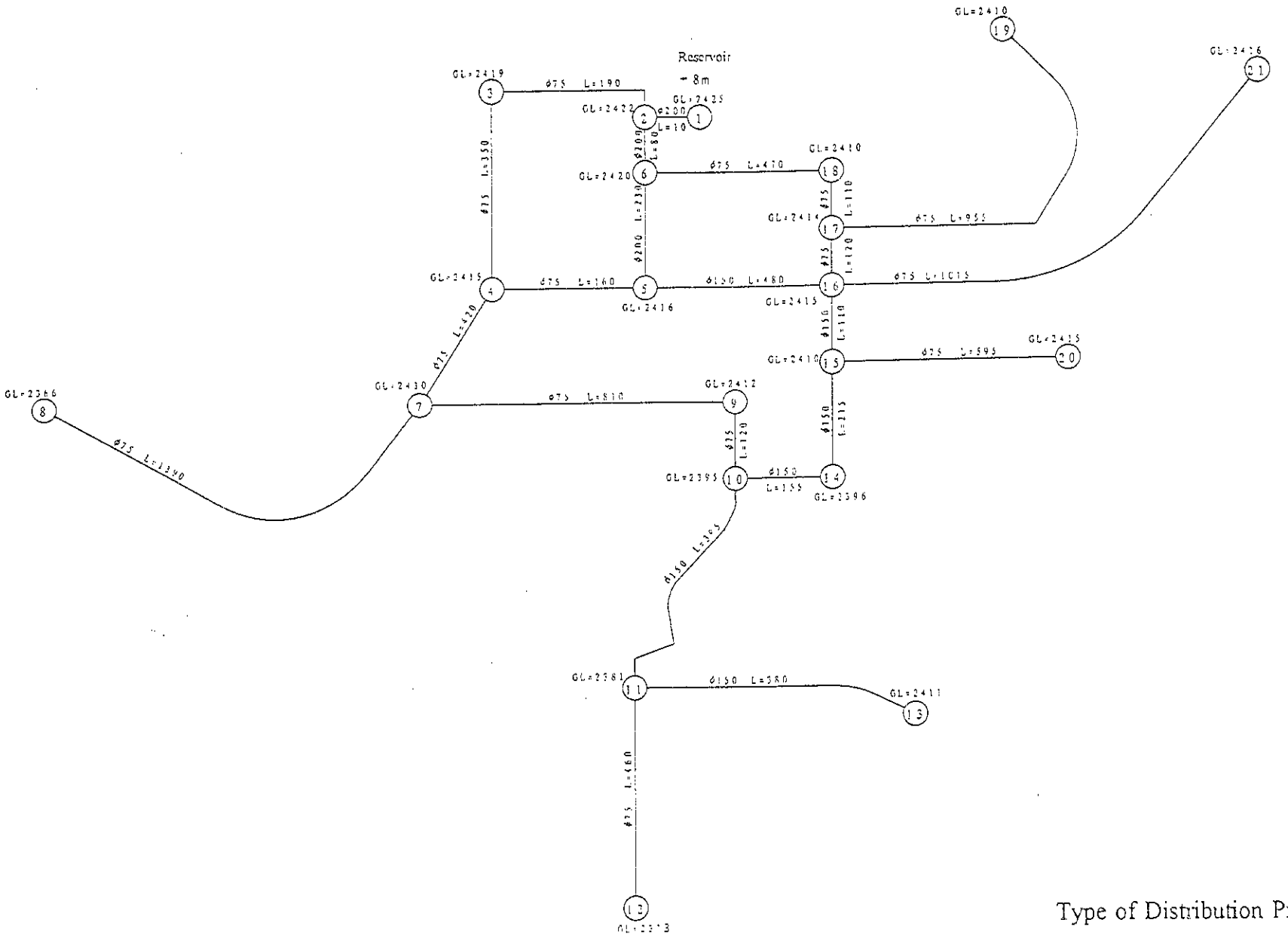
Legend

- : Water Supply Area
- : Existing Well
- : Proposed Well or Spring
- R : Proposed Reservoir
- P : Boosting Pump Station
- CC : Collecting Chamber
- O : Planned production rate (m^3/day)
- 0.6km / φ150 : Dia. & Length of Pipeline
- 0.6km / φ150 : Dia. & Length of Pipeline to be constructed by the year of 2005

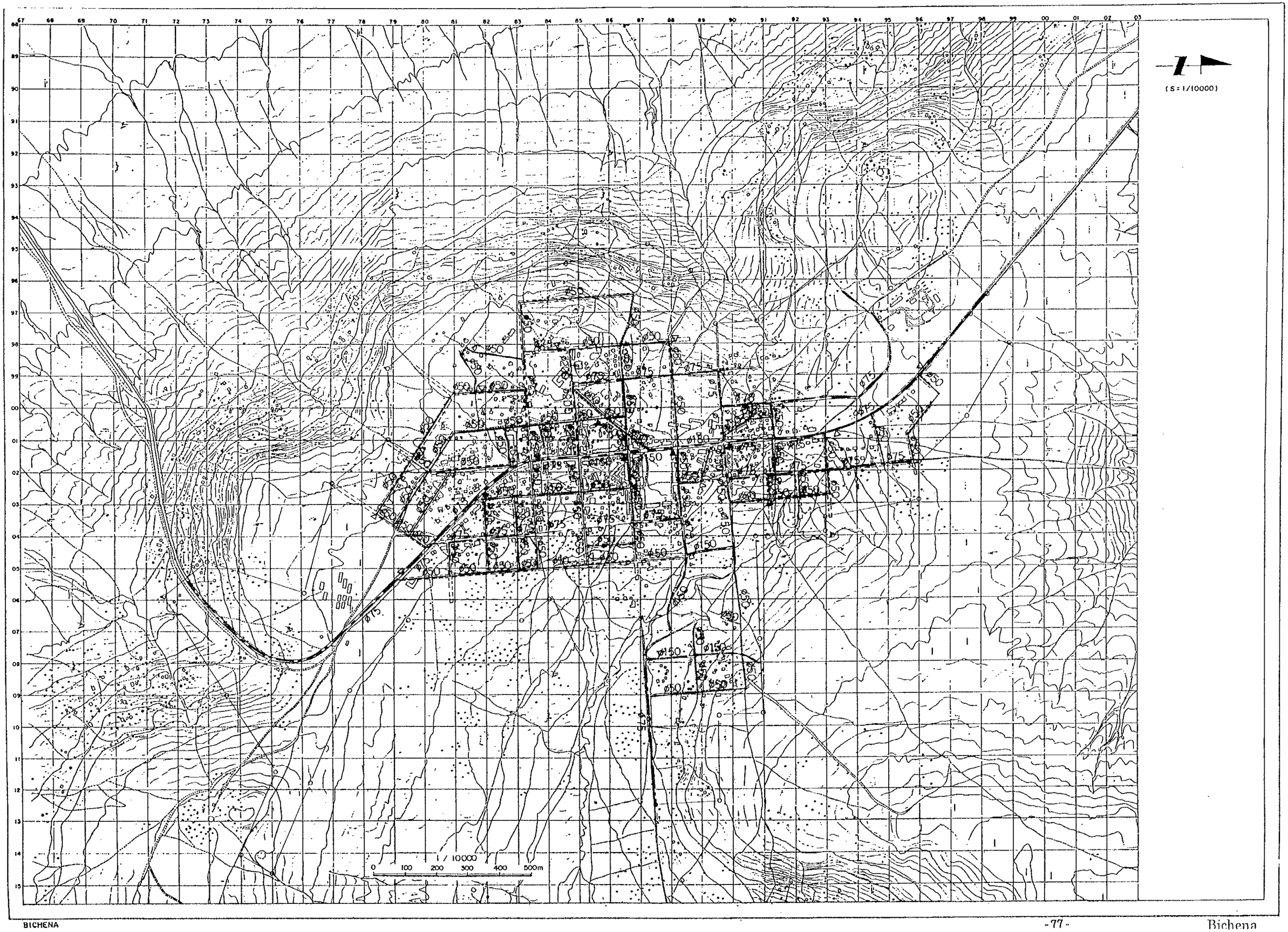
Well Development Plan

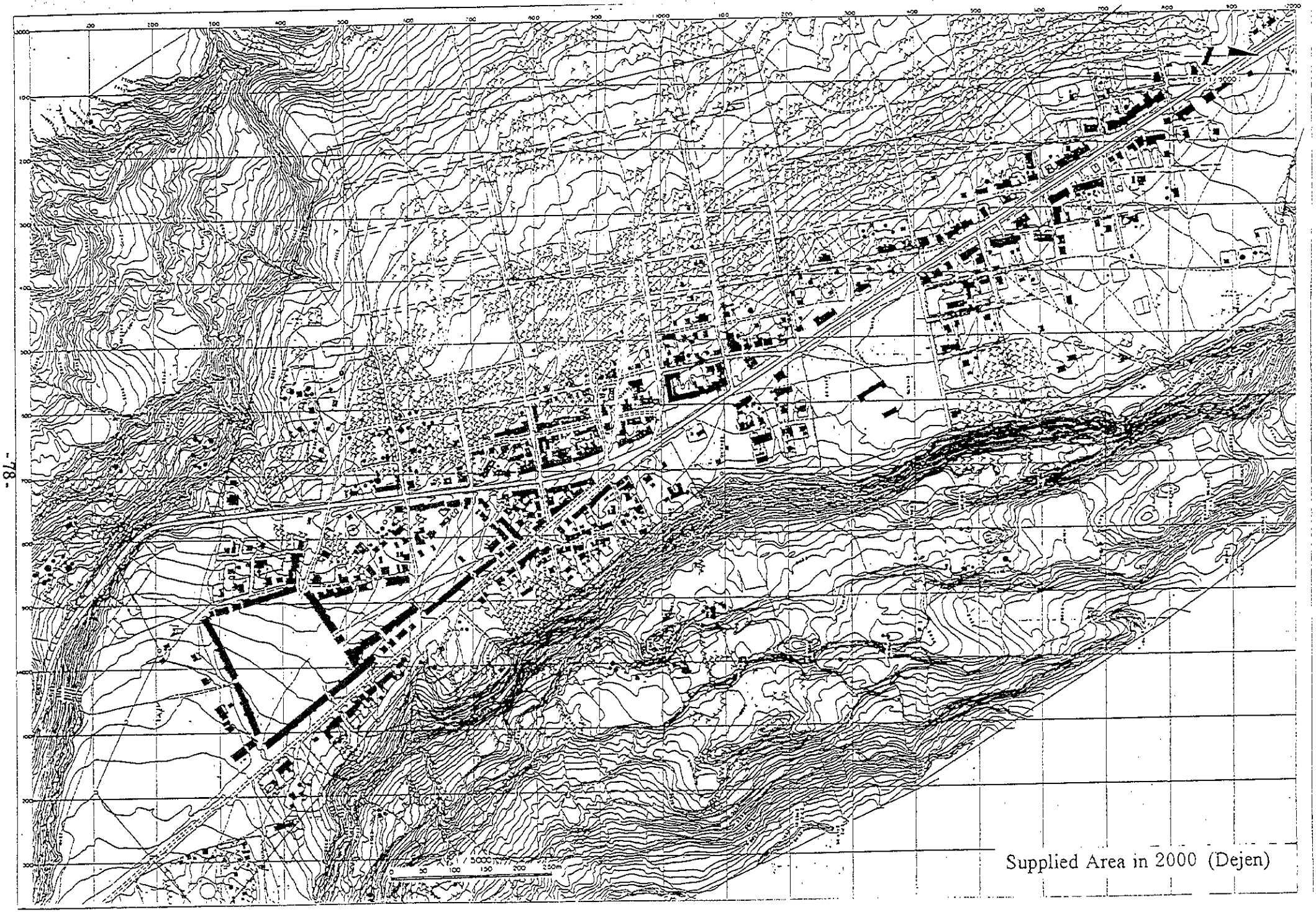
Target Year	Well No.	Production (m^3/day)	Max. Day Demand (m^3/day)
2000	W2+W3	545	504
2005	W2+W3+W5	1,059	920

Plan of Wells and Transmission Facility (Bechena)

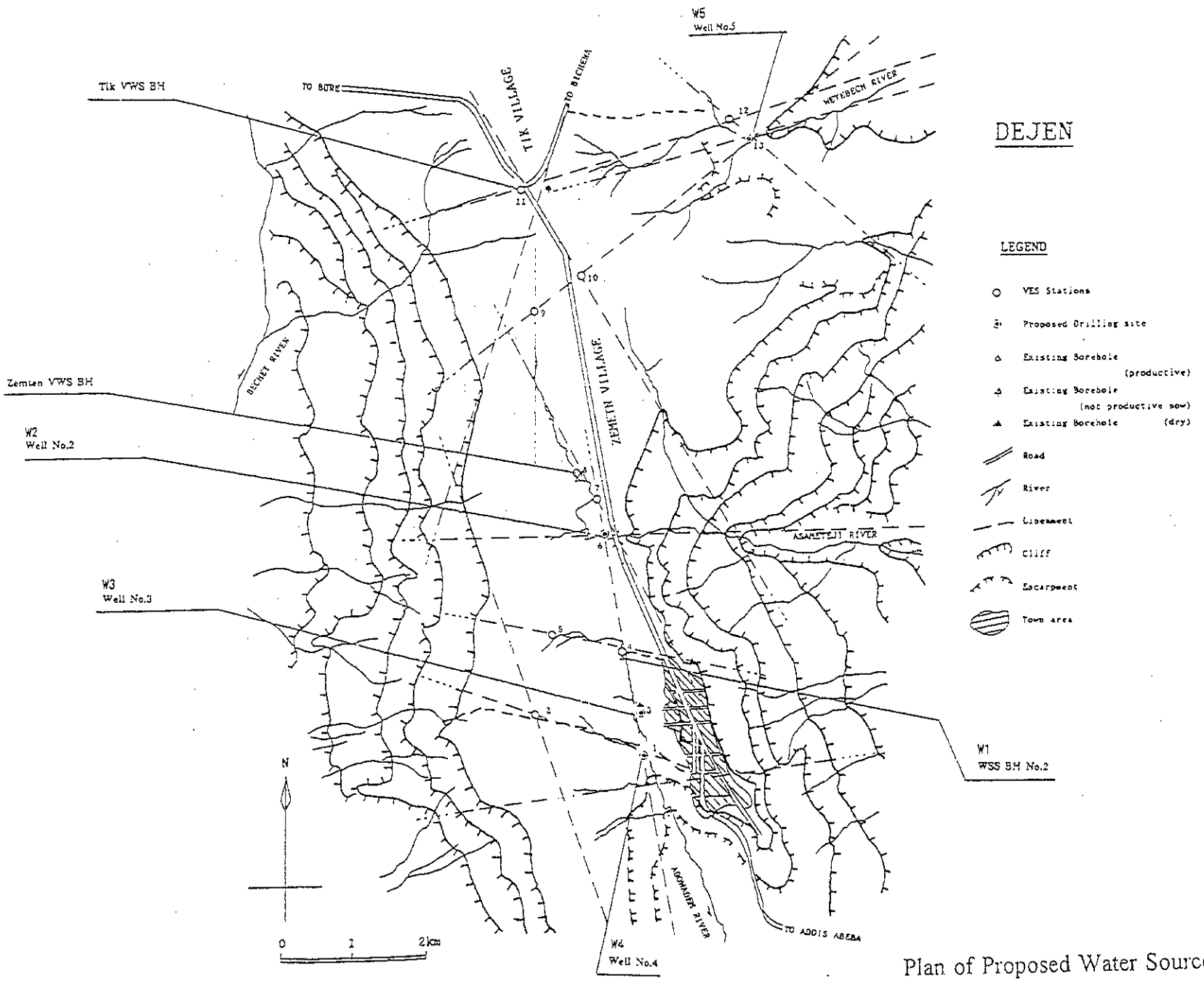


Type of Distribution Pipeline (Bichena)

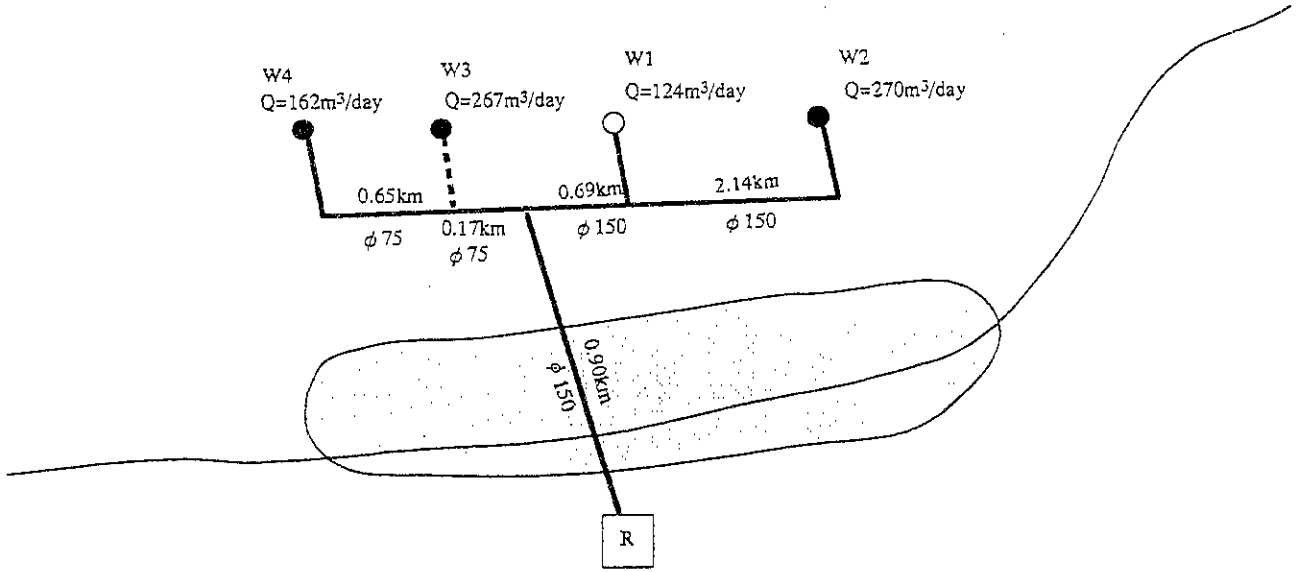

(S = 1/10000)
1 / 10000
0 100 200 300 400 500m



Supplied Area in 2000 (Dejen)



Plan of Proposed Water Sources (Dejen)



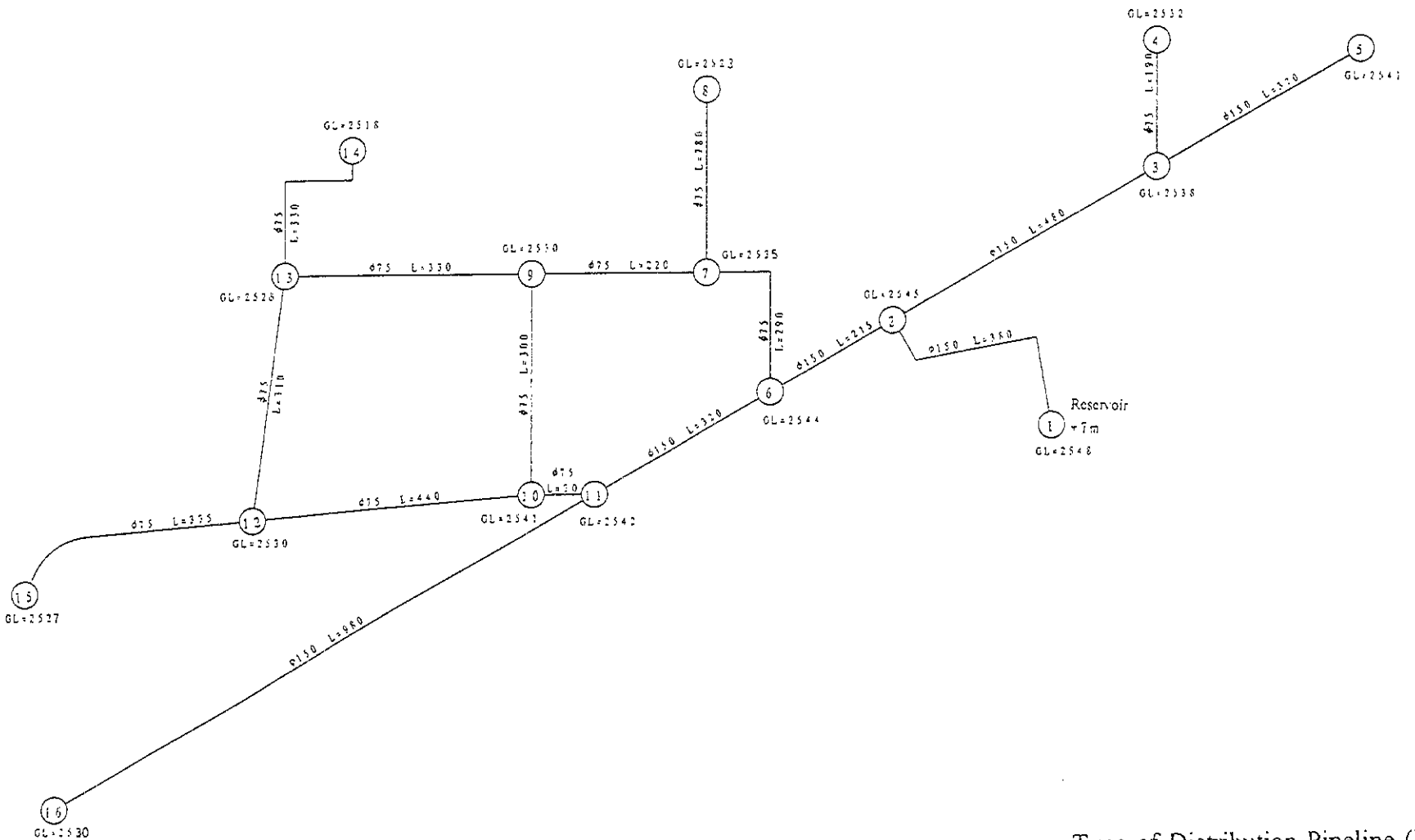
Legend

- : Water Supply Area
- : Existing Well
- : Proposed Well or Spring
- R : Proposed Reservoir
- P : Boosting Pump Station
- CC : Collecting Chamber
- Q : Planned production rate (m^3/day)
- 0.6km / φ150 : Dia. & Length of Pipeline
- 0.6km / φ150 : Dia. & Length of Pipeline to be constructed by the year of 2005

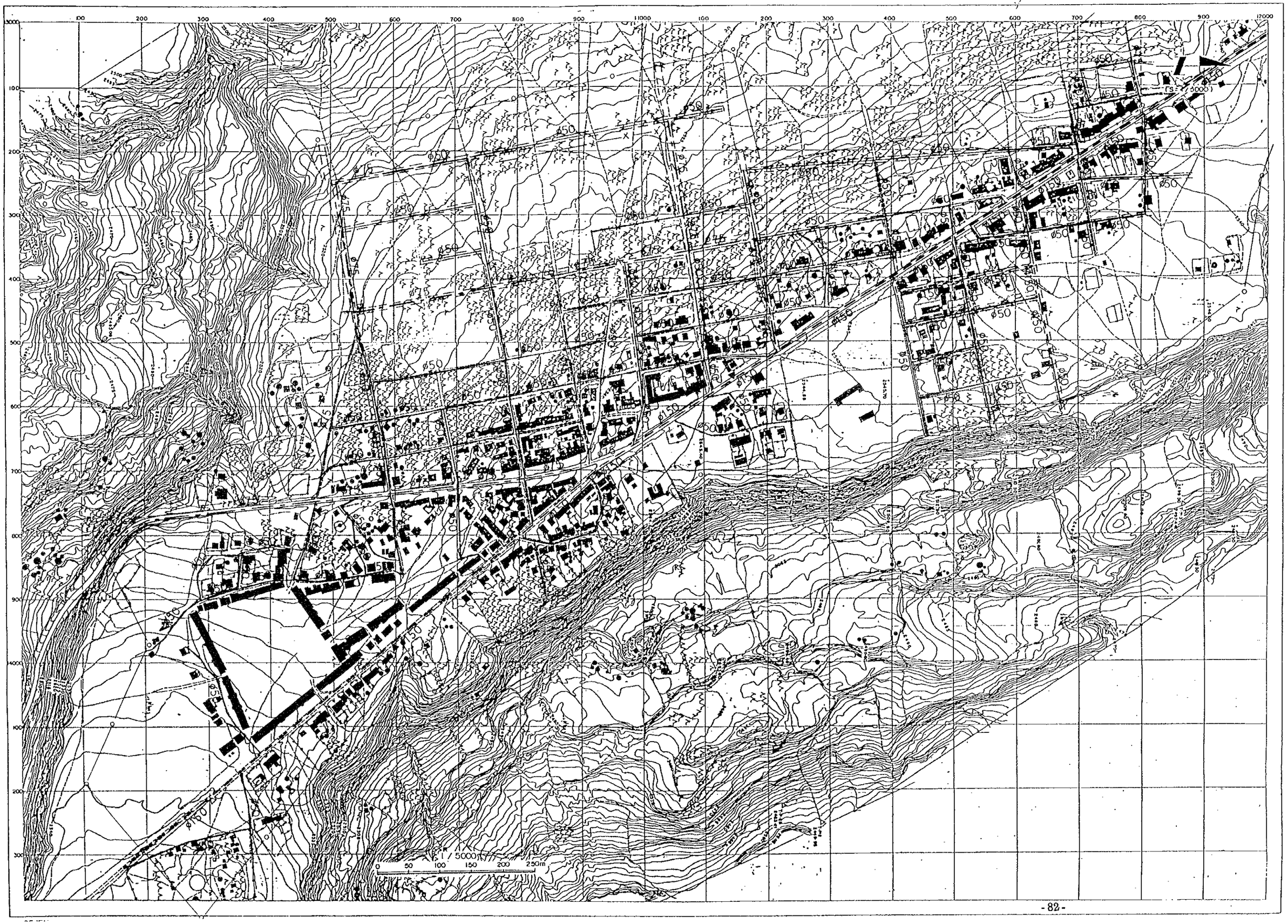
Well Development Plan

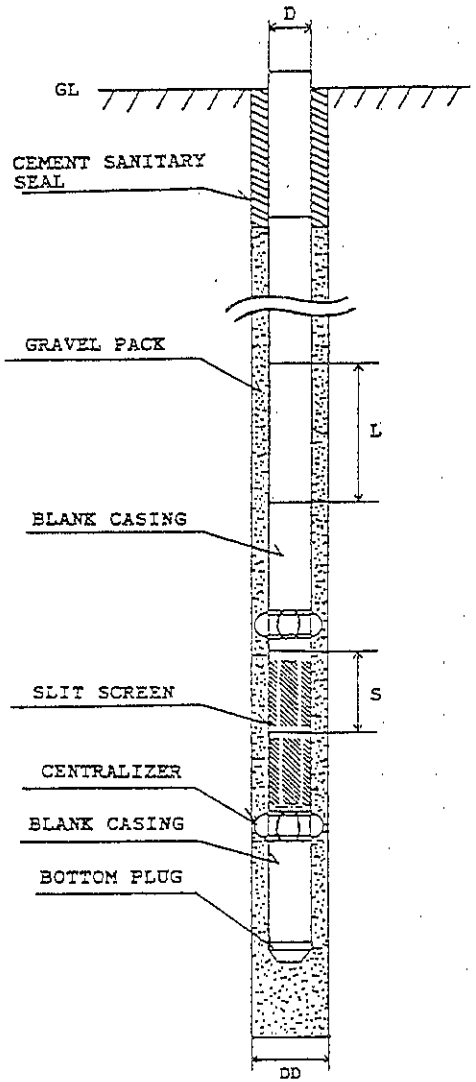
Target Year	Well No.	Production (m^3/day)	Max. Day Demand (m^3/day)
2000	W1+W2+W4	556	436
2005	W1+W2+W4+W3	823	654

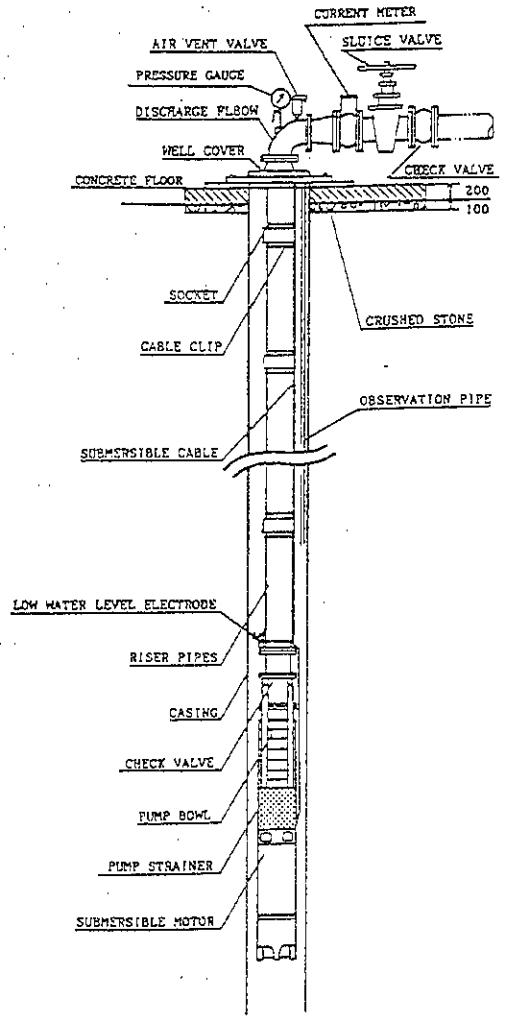
Plan of Wells and Transmission Facility (Dejen)



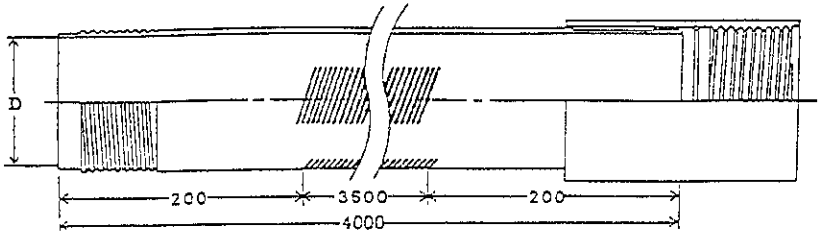
Type of Distribution Pipeline (Dejen)


1 / 5000
0 50 100 150 200 250m

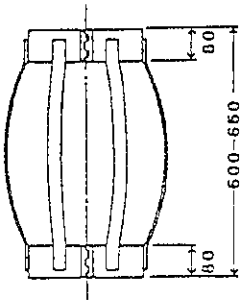




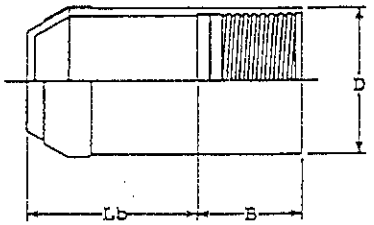
SLIT TYPE SCREEN



CENTRALIZER



BOTTOM PLUG



Dimension

(Unit:mm)

Inner Diameter	Drilling Diameter	Blank Pipe	Diagonal Slit Screen		Bottom Plug	
D	DD	L	S		Lb	B
150	250	6,000	4,000	Approx 12%	160	110
200	300					

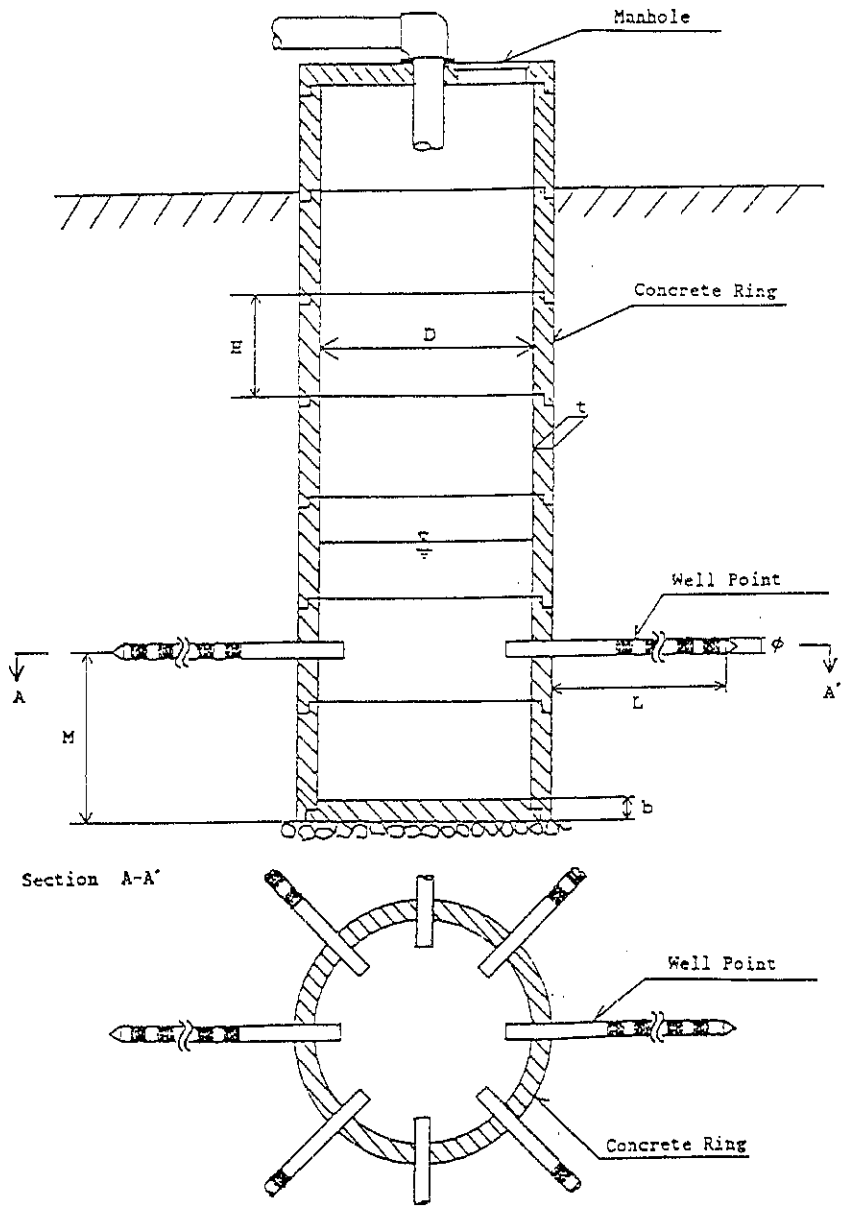
Material

BLANK PIPE : FRP

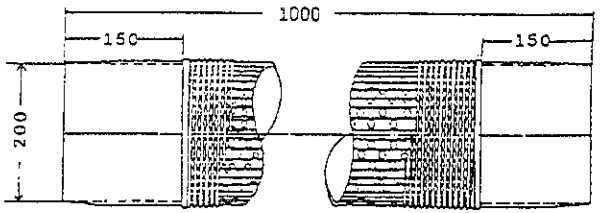
SCREEN : FRP

BOTTOM PLUG : FRP

Layout of Proposed Deep Well



Jhonson Type Screen for the Well Points



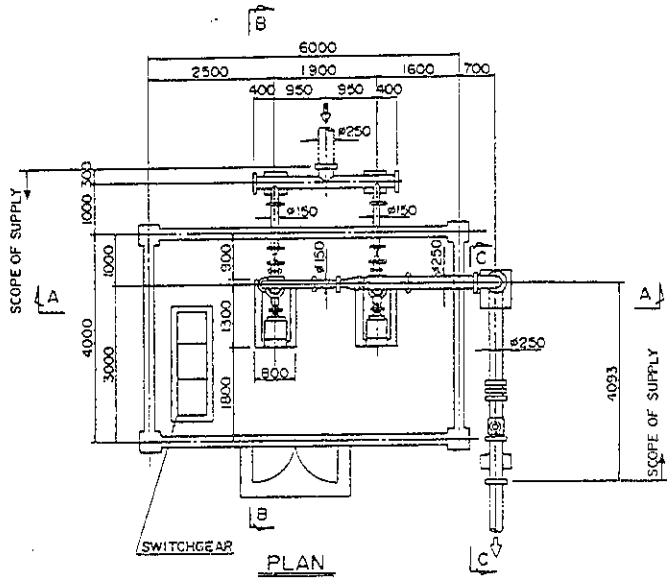
Dimensions

D	2 m
H	1.0 m
t	150 mm
b	0.4 m
L	12.0 m
φ	200 mm
M	1.5 m

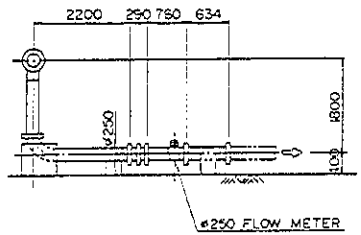
Material

Concrete Ring: Reinforce Concrete
Well Point: Steel
Screen: Jhonson type

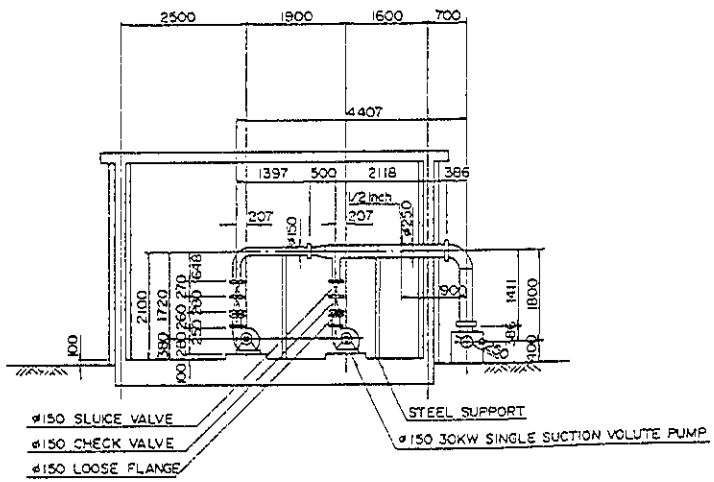
Layout of Proposed Shallow Well



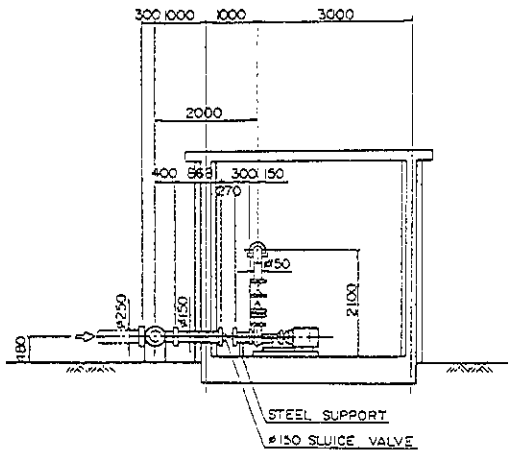
PLAN



SECTION C-C



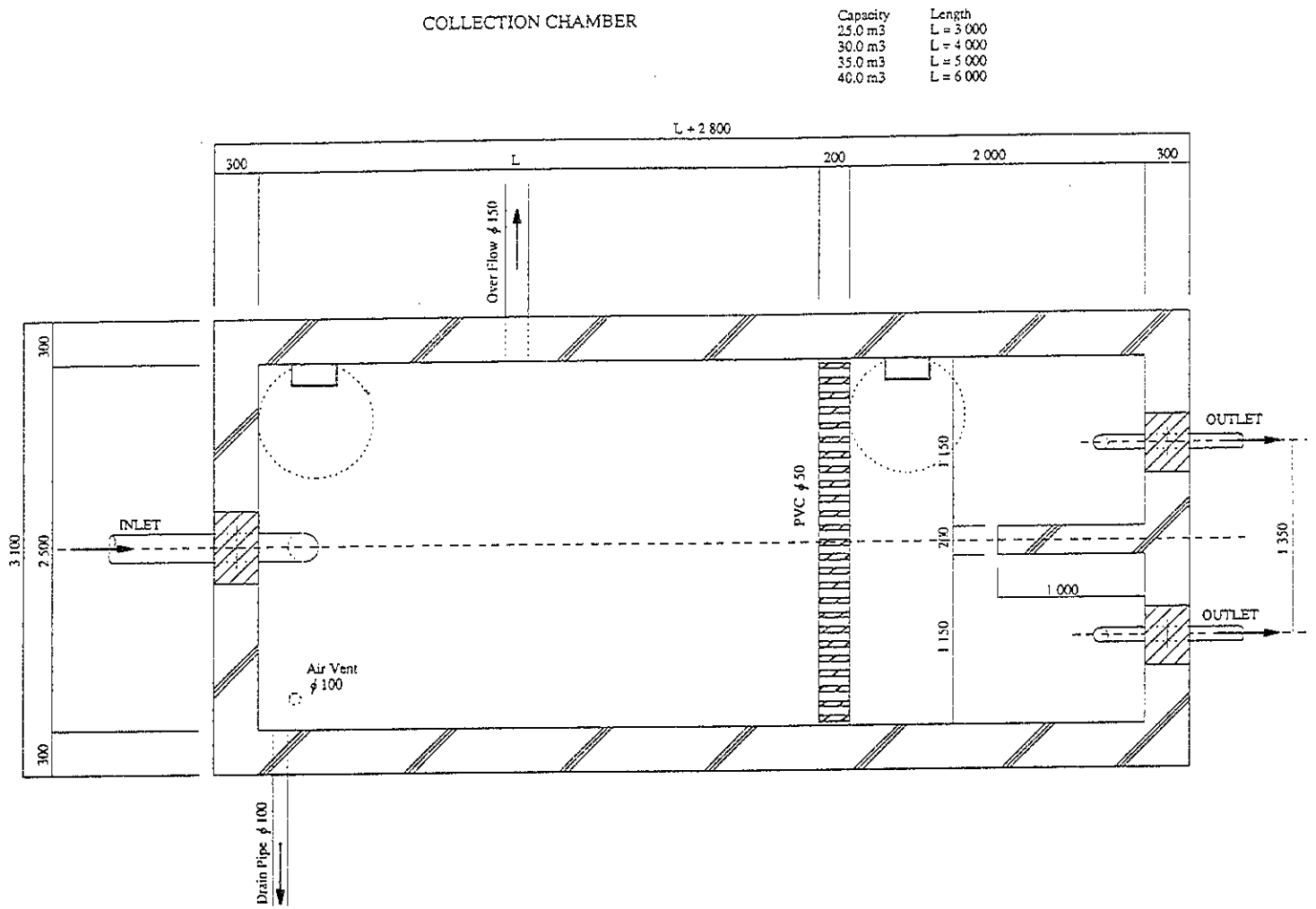
SECTION A-A



SECTION B-B

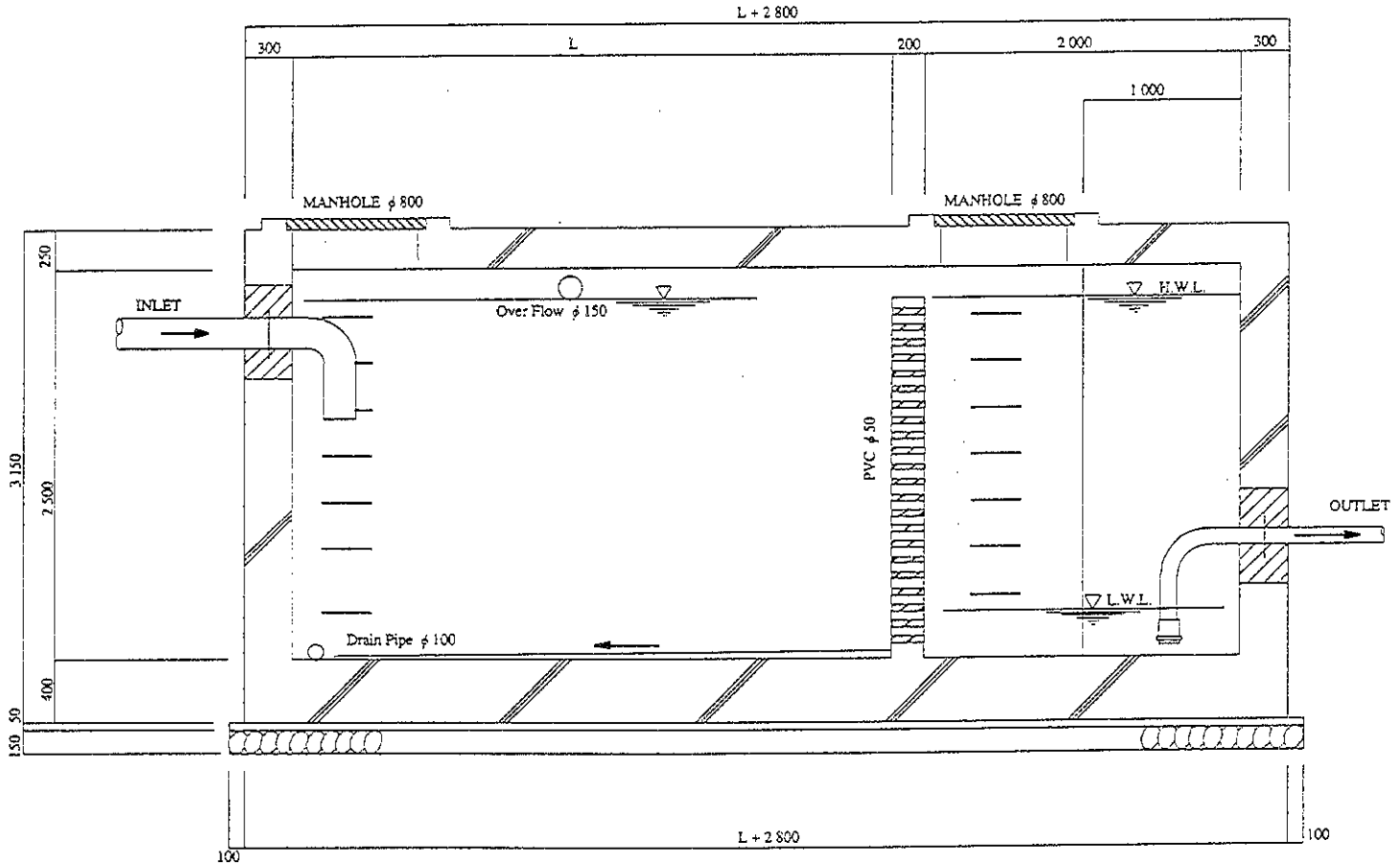
NOTE : unit is millimeter unless otherwise specified.

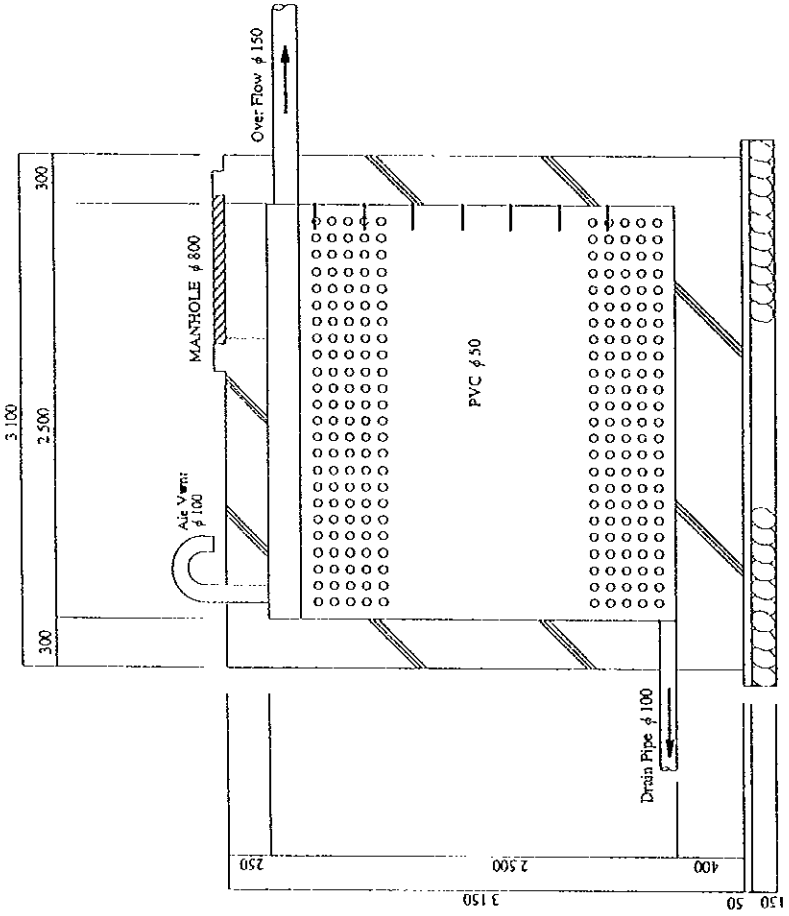
Layout of Proposed Electric House



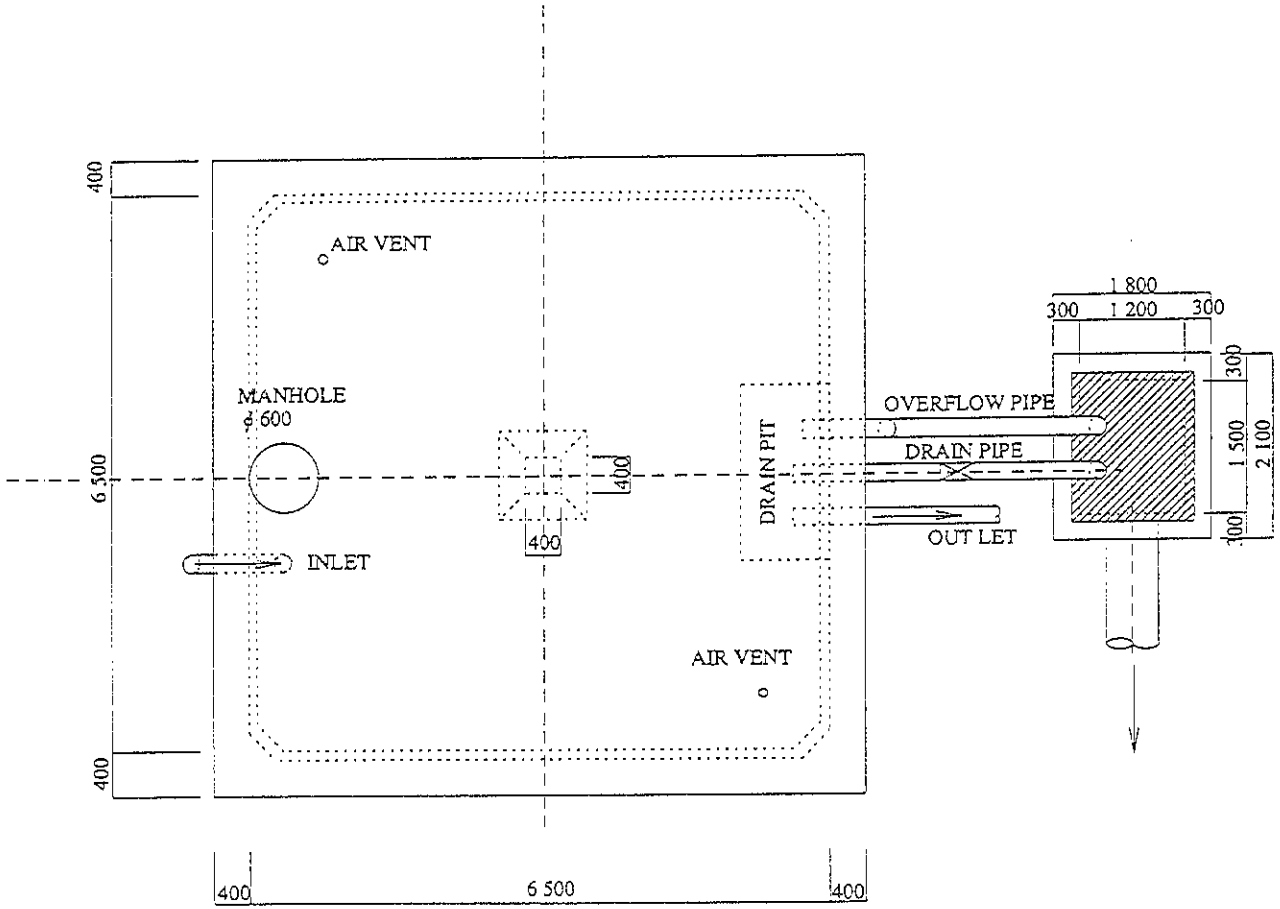
Layout of Proposed Collection Chamber

Capacity	Length
25.0 m3	L = 3 000
30.0 m3	L = 4 000
35.0 m3	L = 5 000
40.0 m3	L = 6 000



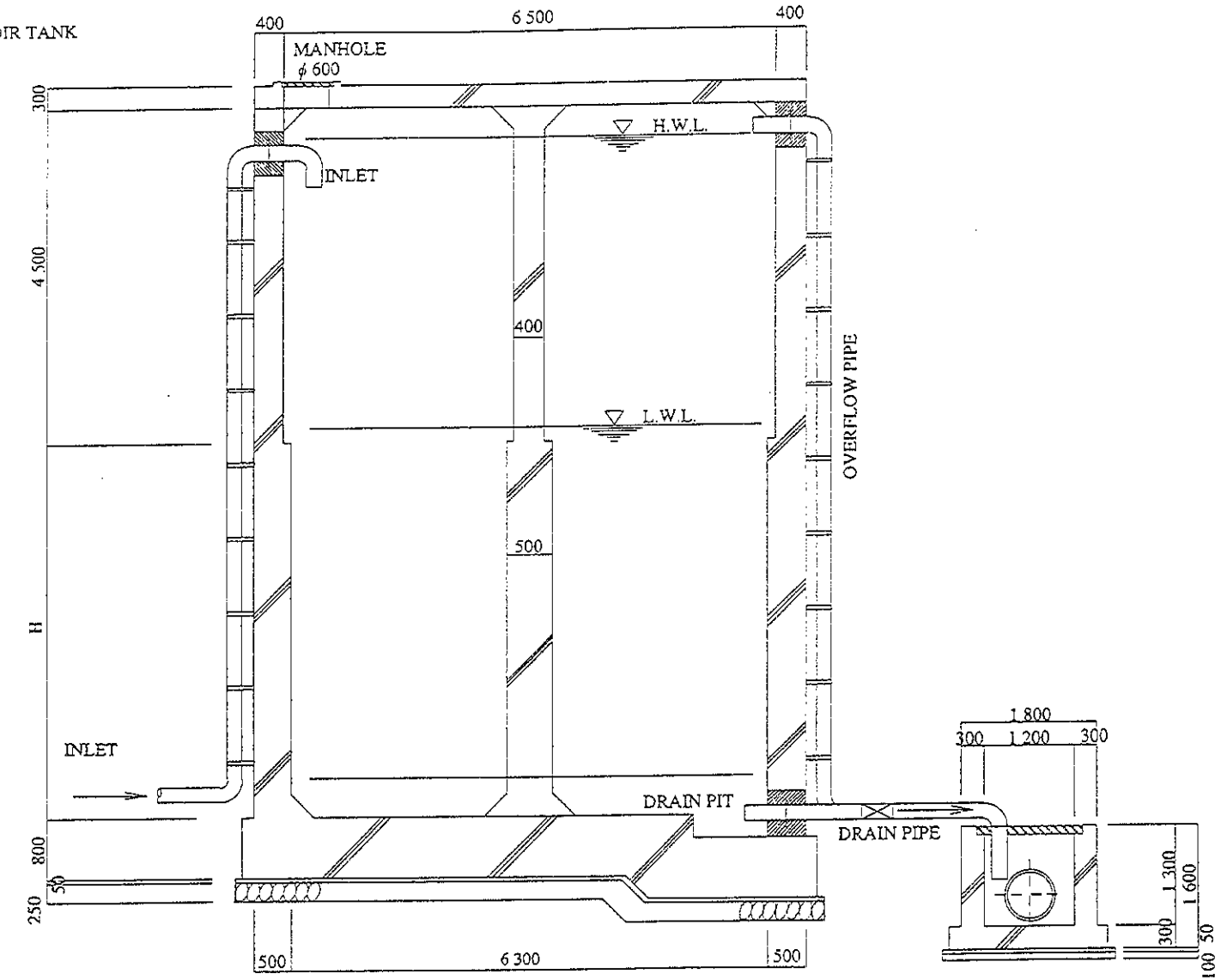

Over-Flow φ 150
300
3 100
2 500
300
MANHOLE φ 800
Air Vent φ 100
PVC φ 50
Drain Pipe φ 100
250
2 500
400
3 150
50
150

150 m3 RESERVOIR TANK

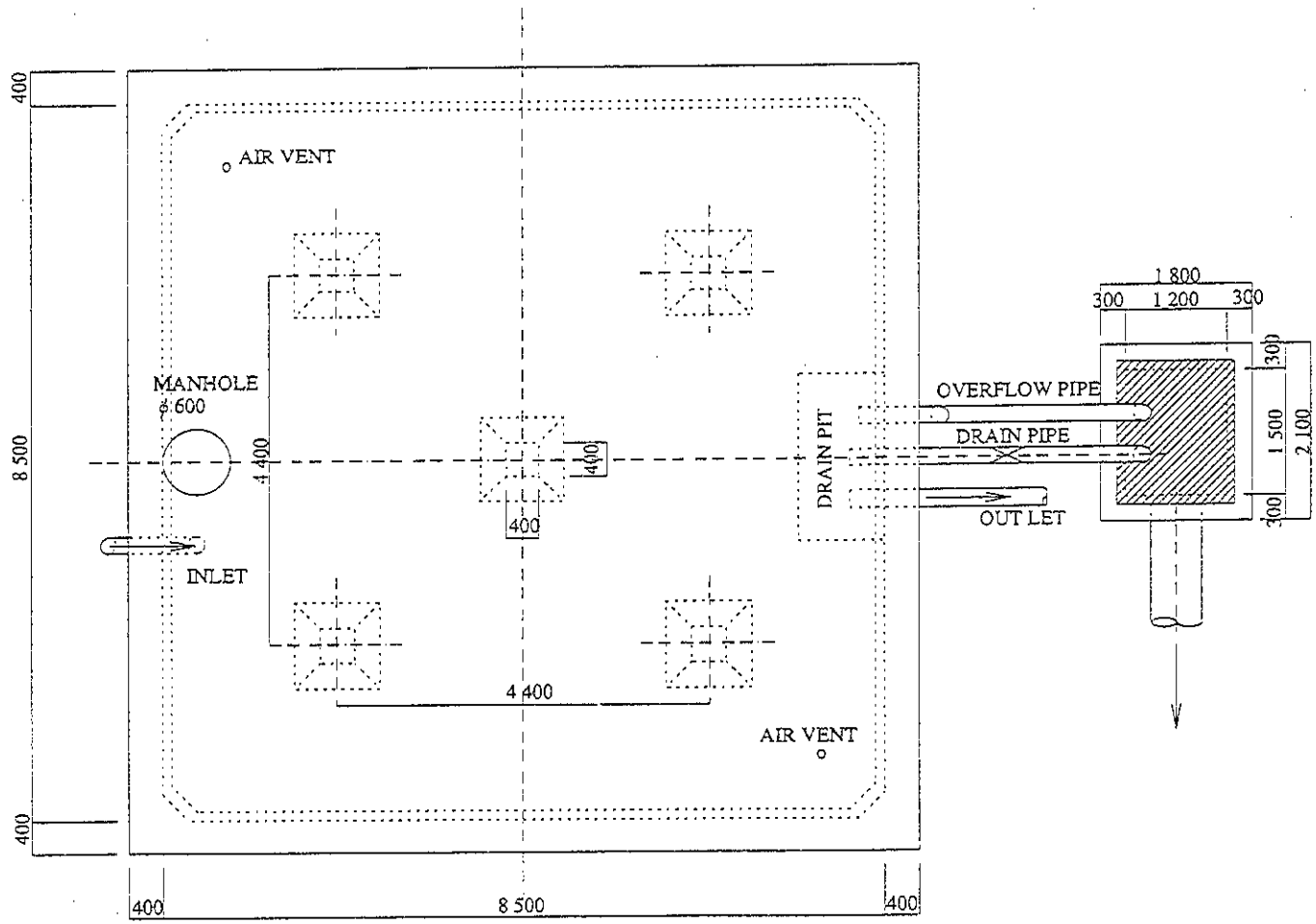


Layout of Proposed Reservoir

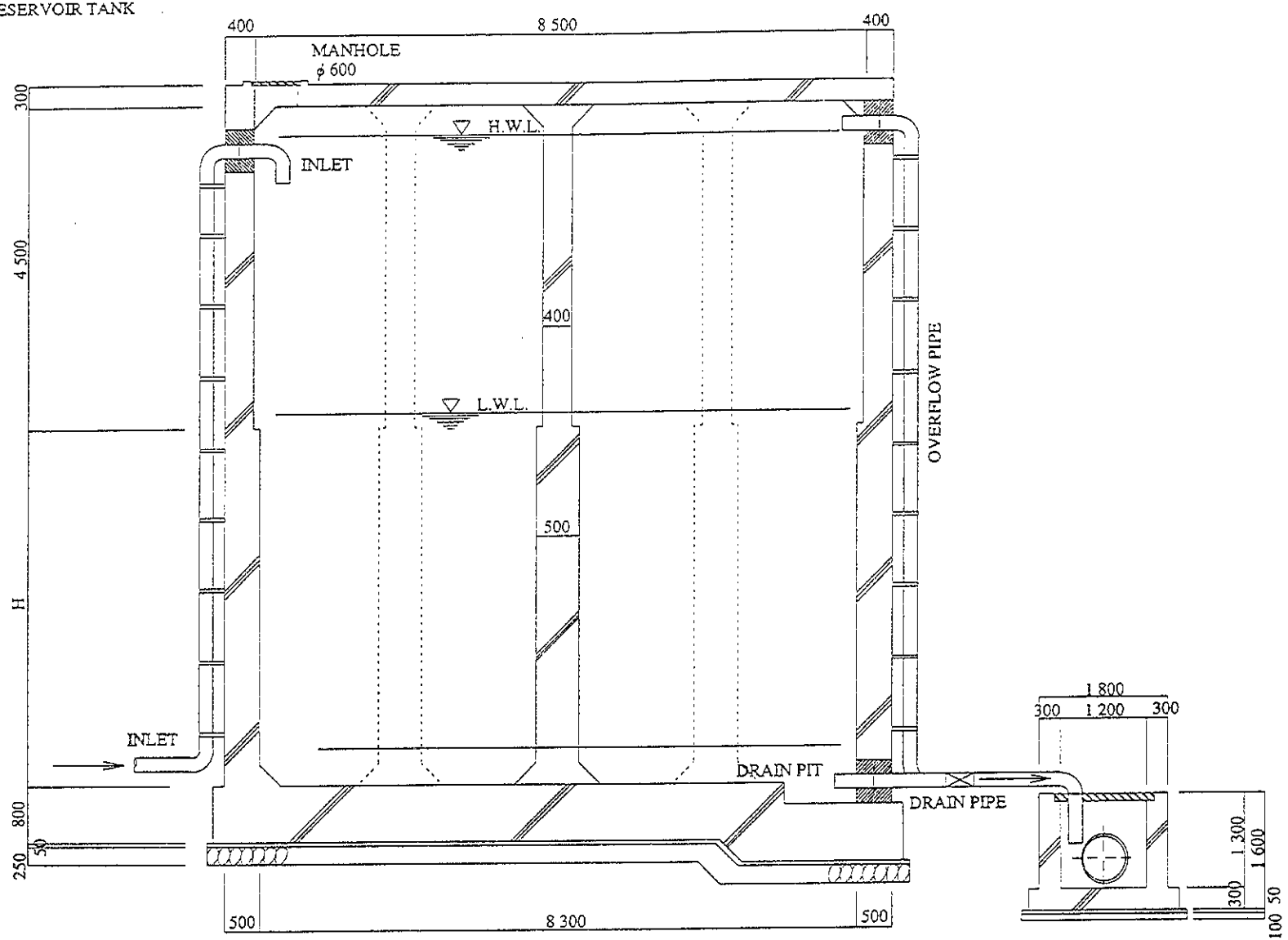
150 m3 RESERVOIR TANK

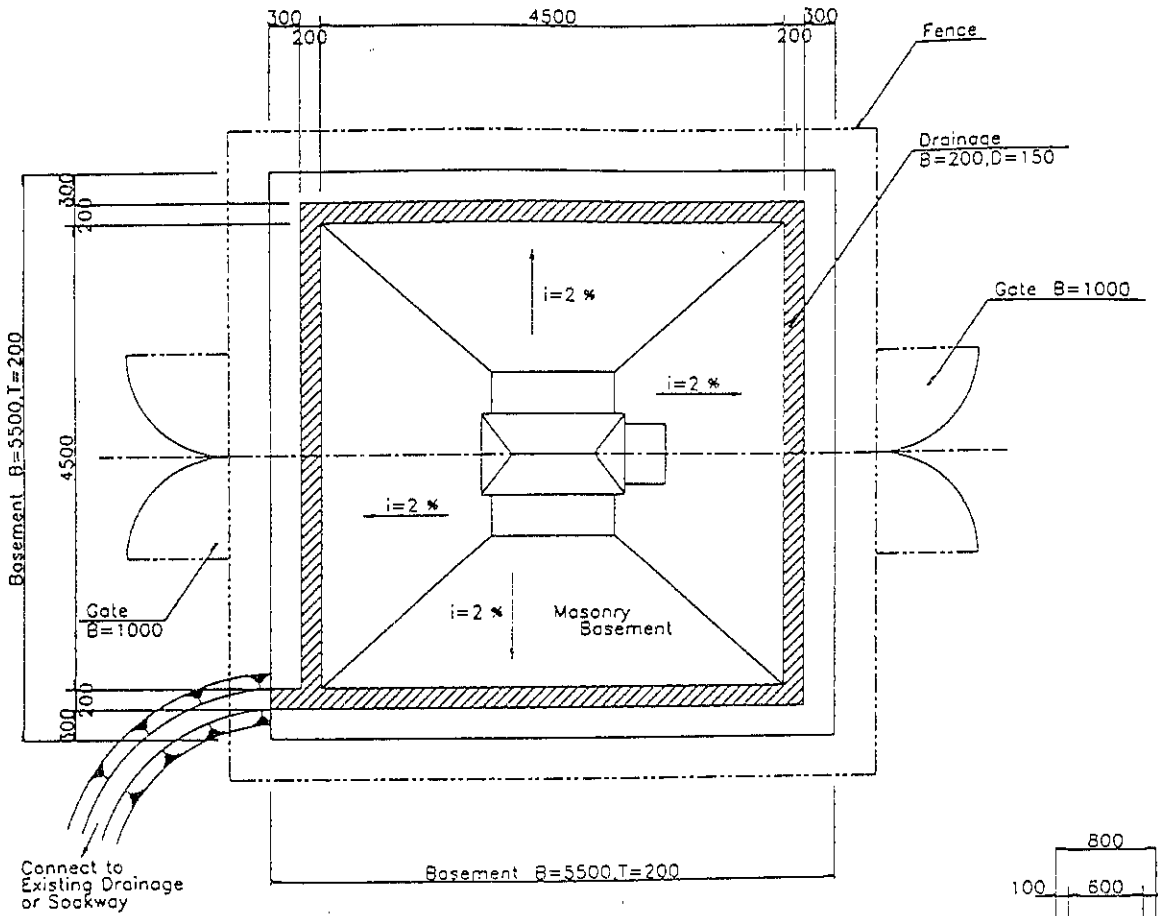


300 m3 RESERVOIR TANK

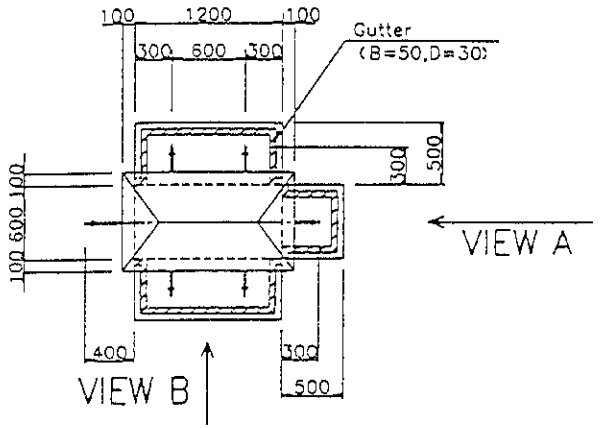


300 m3 RESERVOIR TANK





GENERAL PLAN

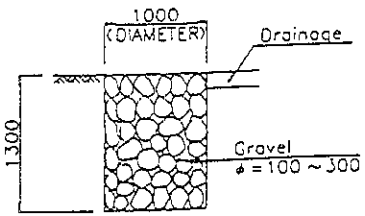


PLAN OF PUBLIC FOUNTAIN

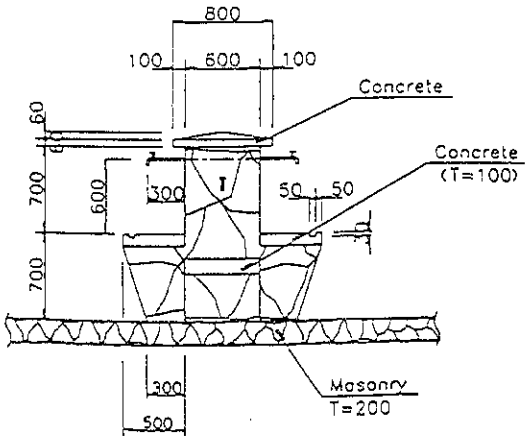
Quantity:

Concrete	:	0.25 m³
Form-work	:	0.66 m²
Masonry	:	7.08 m³
Fence	:	2 m × 20.4 m
Pipe	:	6 m
Tap	:	6 NOS
Meter	:	1 NOS
Valve	:	1 NOS
Excavation	:	13 m³
Gravel	:	1 m³

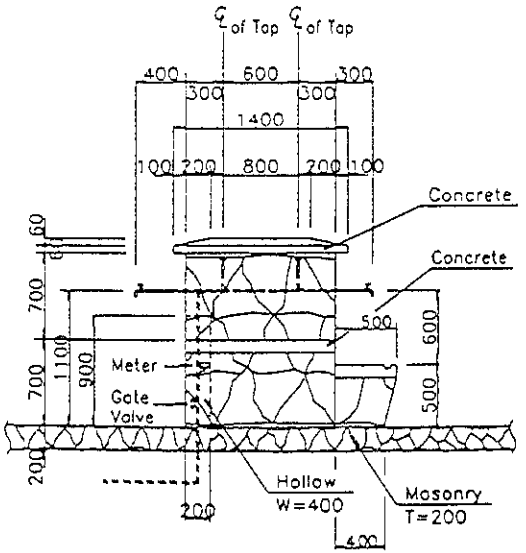
NOTE:
1. All dimensions are shown in millimeter.



SOAKWAY



VIEW A



VIEW B

Layout of Proposed Public Fountain

CHAPTER 3 IMPLEMENTATION PLAN

3-1 Implementation Plan

3-1-1 Implementation Concept

(1) General

Attention should focus on the following points during the implementation stage;

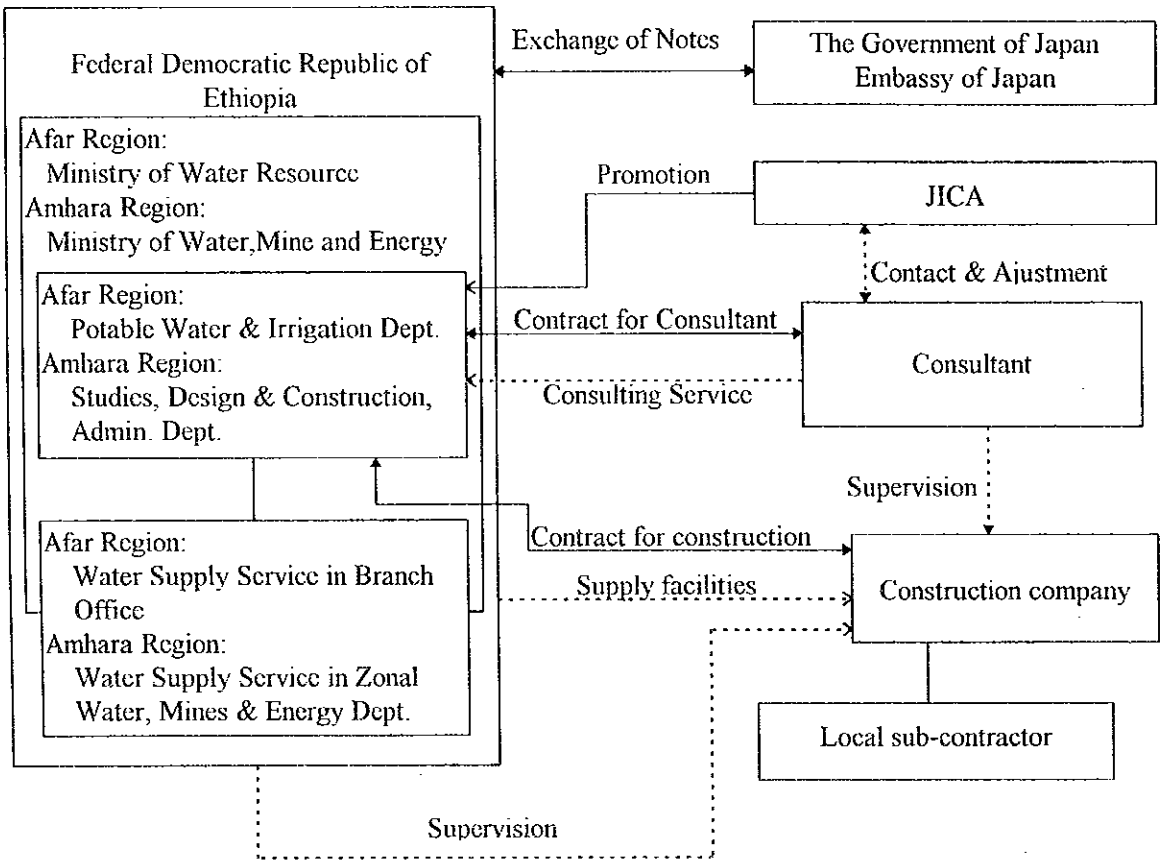
- The construction work shall in any way affect the existing water supply facilities such as the intake facilities, public fountains, etc. and should not stop supply of water during the construction.
- The laying of rising pipes and distribution pipes should be carried out in such a way that it would not cause disturbance to the traffic. Necessary measures should be taken to prevent any hazard to existing water pipes, etc. and other underground objects.
- Possible employment of major local contractors in the capital Addis Ababa in this project since they have a good number of construction machinery and have experiences of water supply projects in the urban centers. Local well drilling companies, although only a few in Ethiopia, can also be employed as sub-contractor.
- Since major equipment and machinery are mostly imported into Ethiopia, local engineers who would available for the installation of mechanical and electric facilities are few. Experts in each engineering field will be dispatched from abroad for the project.
- Since 90% of imported goods will come from Assab Port and considering the proximity to the project sites, these goods shall be transported by road from Assab Port in Eritrea.
- Eleven urban centers project required a long period of implementation and are governed by two regional governments, therefore the eleven urban centers will be divided into three groups for simultaneous construction.

(2) System of project implementation

The agencies responsible for the execution of the project on the Ethiopian side are the two regional governments; Water Supply Department of the Ministry of Water Resources in Afar Region and Water Supply Department of the Ministry of Water, Mine and Energy in Amhara Region.

The project will be carried out under the following organizational structure;

Fig. 3-1 Project Structure



3-1-2 Implementation Conditions

(1) Procurement of materials and equipment

Procurement of equipment and materials will be made through the local agents so as to assure supply of spare parts after installation. As for those to be imported from abroad and are not in the local market even the similar models, their specifications shall be as much as possible similar to the existing ones in order to secure accessibility of their spare parts. Most of the materials are those to be imported and they will be transported from Assab Port by vehicle.

(2) Local contractor

Contractors and skilled laborers in urban centers are few. The local contractors for the project will be limited to those whose headquarters are in Addis Ababa.

In the selection of the contractors, attention shall be paid particularly on the past experiences in water works and available number of construction equipment for actual mobilization.

(3) Land acquisition and permit

Land acquisition for supply reservoirs, pumping stations, etc. and permit for pipe laying work will be acquired by the Ethiopian side. Discussions authorities concerned shall be done as soon as possible so as not to change the location of the land and delay in the issuance of permit.

3-1-3 Scope of Works

(1) Scope of work to be carried out by Japanese side:

1) Transportation of materials and equipment
   (procurement from Japan or the third countries and transportation to the sites)
2) Preparatory & temporary works
   (undertaking of preparatory and temporary works required for construction)
3) Construction of intake facilities
   (construction of water source facilities)
4) Pump installation
   (installation of rising pumps)
5) Construction of transmission facilities
   (laying of rising pipelines and construction of collection chambers)

6) Construction of distribution facilities
(laying of primary and secondary pipelines and construction of reservoirs)
7) Construction of water supply service facilities
(installation of new public fountains and laying of relevant tertiary pipelines)
8) Electrical wiring work
(installation of secondary power source, generators, control panel, etc.)
9) Testing of all facilities
(pump tests, concrete tests, pressure tests, etc.)
10) Procurement of materials and equipment
(procurement of tertiary pipes for laid by Ethiopian side)

(2) Scope of work to be carried out by Ethiopian side:
1) Primary power supply and wiring for pumping facilities by EELPA
2) Laying of tertiary distribution pipes
3) Repair of existing public fountains
4) Installation of private connections
(installation of private connections, such as house connections, yard connections and neighborhood taps, in order to improve the level of supply to 100%)
5) Acquisition of permits, authorizations, agreements etc., necessary for pipe-laying work.
(Ethiopia shall acquire promptly and in line with the works schedule the following permits, authorizations, agreements etc., which are a precondition to the commencement of the works.)
i. Permits for exclusive use and occupancy of roads for rising and distribution pipes.
ii. Acquisition of land for pipe laying.
iii. Acquisition of land for the project facilities such as wells, collection chambers, reservoirs, etc.
iv. Any other permit, authorization or agreement that may be necessary.

3-1-4 Consultant's Supervision

(1) Consultants
For execution of detailed design work for structures, equipment and other facilities under the Grant-Aid program of Japan, a consulting service contract on design and construction supervision will be concluded between the executing agency and a Japanese consulting firm.

(2) Contractors for construction

Japanese contractors, awarded through open bids under the system of the Grant-Aid program of Japan, shall procure and transport the required equipment, materials and facilities to the work sites and execute the construction works. In order to make maximum use of local resources, the contractors shall be well informed of local markets, labor situations, labor laws, etc.

Labor situation in Ethiopia is so severe that contractors experienced in water works and other civil works in the countries in East Africa will be favorable.

(3) Necessity for Japanese experts

The project consists of construction of water source facilities, installation of pumps and electric facilities, laying pipelines and construction of reservoirs etc..

Ethiopia has a technique for the construction of civil works and well drilling work.

It may be difficult to train and secure enough number of local engineers qualified in undertaking those installation of mechanical and electrical works. The project requires specialized engineering technologies for the satisfactory completion and therefore services of Japanese experts shall be required.

(4) Construction supervision

1) Matters to note

In drawing up the works schedule and carrying out supervision of the project under a Grant-Aid project, followings are some considerations which shall be set up during supervision stage.

i) Understanding of the background and details of the Basic Design Study.
ii) Understanding of the system of the Grant-Aid program of Japan.
iii) Comprehensive understanding of the contents of the Exchange of Notes (E/N) between the two countries.
iv) Continuous efforts to monitor basic policies of Ethiopia and programs by other foreign aid organization.
v) Reconfirmation of duties and responsibilities of executing agencies of the government of Ethiopia.
vi) Reconfirmation and coordination with Ethiopia on customs and tax-exemption procedures to import materials and equipment.
vii) Understanding and respect of customs of Ethiopia and Islamic practices, such as the observance of Ramadan, etc.

2) Duties of the consultants

After E/N between the two countries, the government of Ethiopia will conclude a contract with the consultants. The duties detailed in the contract comprise implementation planning and construction supervision.

i) Implementation planning

Implementation planning gives the detailed forms of the concept of the Basic Design. Implementation planning starts from on-site study and proceed to detail design, preparation of tender documents and finally to tendering in Japan. Tendering procedures are as follows.

- Preparation of tender documents
- Assistance in judging qualifications for tender
- Acting as observer at the tender.
- Appraising the results of the tender
- Assistance in works contract negotiations
- Assistance in concluding contracts for the construction

ii) Works supervision

Works supervision can be roughly divided into the following three types of duty.

(i) Supervisory duties

- Consultations with those concerned before the commencement of work.
- Approval of construction drawings
- Inspection of materials and equipment before shipment
- On-site works supervision
- Advice to Ethiopia on laying of tertiary water pipes
- Attendance at installation of machinery
- Preparation of work reports during the period of work
- Issuance of certificates of work completion and certificates of payment
- Inspections on completion of work
- Inspection for flaws, etc.

(ii) Duties at completion of work

- Issuance of completion report
- Procedures for handing over of completed works
- Preparation of comprehensive reports

(iii) Operation and maintenance

- Preparation of operation and maintenance manuals for the pumping facilities and maintenance/management planning sheets
- Training by experts of WAJ personnel (maintenance and management of each pumping facility)

3) Form of supervision

As the urban centers are distant from each other, two civil engineers will be stationed at each site for civil work supervision while other experts, such as mechanical engineers, electric engineers will supervise the works on the spot basis.

3-1-5 Procurement Plan

(1) General

It is expected that the pumps, generators, electrical facilities and pipe materials essential for the project, will be procured from Europe or Japan. Since most of reinforcing bars, cement, timber and other civil materials will also be imported, the time of transporting shall be taken into consideration upon completion of procurement planning.

These materials will be transported by road from Assab Port in Eritrea directly to the site.

(2) Pumps and appurtenances

Pumps employed in the project are well pumps (submersible pumps) and booster pumps (multistage centrifugal pump). These are common types and very important equipment for the project specially when assured quality and delivery times shall be paid. Thus, from viewpoint of quality of products and reliable supply, these pumps will be procured from either Europe or Japan.

(3) Generators

The generators, similar to the pumps, will be procured from either Europe or Japan.

(4) Electrical facilities

Since electrical facilities cannot be procured in Ethiopia, they will be procured from either Europe or Japan.

(5) Pipes

Major pipe materials are ductile cast iron pipes, galvanized steel pipes and PVC pipes. As these materials have been imported and will be needed for the project in large quantities, they will be procured from either Europe or neighboring countries.

(6) Reinforcing bars, cements

Reinforcing bars and cements will be imported from the third countries, but these may be purchased in Ethiopia.

(7) Aggregates

Raw materials such as fine and coarse aggregate, boulders etc. can be locally collected and available in Ethiopia.

(8) Other materials

Other materials will be procured in Ethiopia as much as possible. The items difficult to locally procure in volume, number or on time and to cause possible delay in the project work schedule, will be procured from the neighboring countries.

Table 3-1 shows where the major construction materials will be procured.

Table 3-1 Scope of Procurement

Material	Ethiopia	Third Country	Japan	Remarks
1. Pumps		O	O	
2. Generators		O	O	
3. Electrical facilities		O	O	
4. Sand, gravel	O			
5. Cement	O			
6. Reinforcing bar	O			
7. Timber	O			
8. Plywood frames	O			
9. Ductile cast iron pipes		O		
10. Steel pipes		O		
11. PVC pipe		O		
12. Casing for Well		O	O	
13. FRP Elevated Tank			O	
14. Fuel	O			

3-1-6 Implementation Schedule

(1) Outline

Following the Exchange of Notes (E/N) between the governments of Japan and Ethiopia regarding the Grant-Aid program of Japan, the implementation will be carried out in accordance with the provisions set forth below. The actual construction work will then be followed.

1) On-site survey

On-site survey will be conducted for the implementation by finalizing and certifying the conditions and assumptions employed in the Basic Design Study through the field investigations.

2) Implementation planning

Implementation planning will be carried out on the basis of the results of the on-site survey. The results of this will be reflected in the tender documents.

3) Tender

The tender documents will be prepared first. The potential bidders will be screened by their eligibility on behalf of Ethiopia, and the tendering will be followed. The results of tendering will then be appraised and the necessary documents will be prepared to conclude the contract.

4) Construction supervision

The construction drawings submitted by the contractors will require approval and equipment will be inspected prior to shipment. On the site, operational supervision, preparation of work reports during construction and issuance of piecework certificates, payment certificates and work completion certificates will be made.

5) Works on completion

Work completion certificates will be issued and the procedures for transfer of the works from the Japanese contractor(s) will be proceeded; production of final work report and proceeding of completion procedures.

6) Operation and maintenance

Operation and maintenance manuals for pump facilities will be prepared.

7) Guidance and recommendation

After completion of the construction, Ethiopian staff will be guided and recommended in order to operate and maintain facilities of the project smoothly.

(2) Scope of duties

In order to complete the project, the governments of Japan and Ethiopia will undertake the following duties.

1) Duties to be undertaken by the government of Japan will be the following

- Implementation planning and supervision by Japanese consultants, and
- Construction works by Japanese contractors.

2) Duties to be undertaken by the government of Ethiopia

- Payment of taxes involved in the execution of the Grant-Aid program, and
- Construction works to be carried out by Ethiopia.

3) Implementation schedule

Implementation is scheduled for 6.0 months of detailed design and 31.0 months of procurement and construction work, as shown in Table 3-2.

Table 3-2 Implementation Schedule

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Phase I	Detailed Design	Site Survey																						(Total 3.0 months)				
		Design in Japan																										
		Discussion																										
	Procurement and Construction	Temporary Works																						(Total 11.0 months)				
		Procurement																										
		Construction																										
Phase II	Detailed Design	Site Survey																						(Total 3.0 months)				
		Design in Japan																										
		Discussion																										
	Procurement and Construction	Temporary Works																						(Total 26.0 months)				
		Procurement																										
		Construction																										

3-1-7 Obligations of Recipient Country

The obligations of Ethiopia for the project implementation will be the following:

1. Provide data and information necessary for the project.

2. Pay to the Japanese foreign exchange bank, bank charges for bank services based on the banking agreement.

3. Bear all expenses for customs and duties for the products procured from the neighboring countries under the Grant-Aid program.

4. Exempt Japanese nationals from customs of duties, internal taxes and other financial levies with regard to goods or services supplied under the terms of the Contract.

5. Afford to Japanese nationals with the facilities necessary for entry into Ethiopia and residence in the country for the goods or services deemed necessary under the terms of the Contract.

6. Allocate the personnel and estimated costs necessary for the operation and maintenance of the equipment procured and facilities built under the Grant-Aid program.

7. Use appropriately and effectively the equipment procured and facilities covered under the Grant-Aid program.

8. Bear all other expenses necessary for the project, except those stipulated under the Grant-Aid program.

9. Complete the following by the due date.
   1) After the E/N, and before the start of the construction work
      - Acquisition of land and authorization procedures necessary for the work
      - Land preparation at the site and construction of access roads prior to the commencement of building construction.
   2) During construction work
      - Laying of tertiary distribution pipes
      - Pipe connection to the existing pipes

10. Consult with the superintendents of roads, rivers etc., with regard to the laying of pipelines.

3-2 Project Cost Estimation

(1) Cost components borne by Ethiopia

The breakdown of the cost component to be borne by Ethiopia for each of the urban centers are estimated below.

Table 3-3 Project Cost

Unit:Birr

	Name of Urban Centers	Construction Power Source	Tertiary Distribution Pipe	Office etc.	Total
Afar Reg.	Dupti	183,000	1,022,000	3,369,000	4,574,000
	Mille	127,000	68,000	1,123,000	1,318,000
Sub Total		310,000	1,090,000	4,492,000	5,892,000
Amhara Reg.	Bati	211,000	571,000	1,226,000	2,008,000
	Werota	274,000	757,000	2,925,000	3,956,000
	Aykel	345,000	811,000	993,000	2,149,000
	D.Tabor	463,000	1,319,000	2,830,000	4,612,000
	N.Mewcha	172,000	752,000	1,719,000	2,643,000
	Chagni	221,000	717,000	2,726,000	3,664,000
	Bure	257,000	679,000	3,369,000	4,305,000
	Bichena	222,000	990,000	1,097,000	2,309,000
	Dejen	199,000	1,055,000	759,000	2,013,000
Sub Total		2,364,000	7,651,000	17,644,000	27,659,000

Currency exchange rates: US$ 1 = Yen 121.41 (1997.5)
US$ 1 = Birr 6.3403 (1996.12 - 1997.5)
Birr 1 = Yen 19.15 (1996.12 - 1997.5)

3-3 Operation and Maintenance Plan

After completion of the project, the working hour and cost for operating and maintaining the facilities will be increased so as to increase the number of pumps, length of pipelines, number of public fountains, etc.. Staffing and water tariff for the maintenance are planned below and the operation and maintenance cost is accordingly estimated.

(1) Staff and water tariff

The shortage of water supply for the urban centers is due to superannuated facilities and improper maintenance. Following improvement in operation and maintenance is herein proposed.

1) Staff

In order to improve the facilities, O&M staff may be required, of which the following are proposed and as presented in the feasibility study.

Table 3-4 Proposed Incremental Staff

	Dupti	Mille	Bati	Werota	Aykel	D-Tabor	N-Mewcha	Chagui	Bure	Bichena	Dejen
Manager	1	-	1	1	1	1	1	1	1	1	1
Customer Service	-	-	1	1	-	-	-	-	-	-	-
Auditor	1	-	-	1	1	1	1	1	-	-	-
Administration	8	4	9	11	4	11	8	10	8	7	6
Accounting	9	4	9	13	6	13	10	12	10	8	7
Technical Service	10	5	8	13	4	11	9	12	6	7	6
Total	29	13	28	40	16	37	29	36	25	23	20

2) Progressive water tariff

The present water tariff is a single rate in each urban center, while the progressive water tariff means a system to charge a minimum rate to the minimum consumption and the higher rates are applied as the consumption increases.

It is known that higher income households consume more water per capita. Through this system each household can purchase water at a price conforming to its economic level. Big commerce or manufacturing industries, offices, hotels, etc. automatically pay higher water charge per unit consumption since they use more water.

The proposed water tariffs in the feasibility study are summarized below. It can be roughly said that the proposed water price per cubic meter is about three Birr, two Birr and one Birr for house connections, yard connections and public fountain users respectively.

Table 3-5 Proposed Water Tariff

(unit: Birr/m^3)

	Dupti	Mille	Bati	Werota	Aykel	D/Tabor	N/M'ha	Chagni	Bure	Bi'na	Dejen
HC	3.26	3.03	3.06	3.01	3.15	3.67	3.50	2.93	3.00	3.43	3.00
YC	2.03	1.80	1.94	2.25	2.45	2.23	2.31	2.14	2.07	2.31	2.16
PF	1.10	0.89	1.05	1.04	1.11	1.66	0.82	1.33	0.76	1.48	1.06

N.B. HC: house connection
YC: yard connection
PF: public fountain

(2) Operation and maintenance cost

The costs for operation and maintenance of the improved facilities in each urban center are estimated as follows based on the proposed staffing and water tariffs.

1) Income

In addition to the major income from water charges, technical service charge for installation of connections (40% of materials and transportation cost), rent for water meters (Birr 1/month), contract fees, sales of water appurtenances may be expected at about 3% of the water charge incomes.

2) Expenditure

The expenditure will consists of cost for energy (electricity and/or fuel), sterilization, personnel, installation of connections, purchasing of water meters, office maintenance, etc..

3) Financial balance

The costs for operation and maintenance in each urban center are as shown in the table below. The table indicates that systems can be managed by employing the progressive water tariff. However, the financial balance of Aykel will have a deficit because of operation cost of rising pumps due to the long distance and different level between the intake facilities and the reservoir. (Table 3-6 is estimated by the rough construction cost.)

Table 3-6 Financial Balance of O/M Cost

Item		Unit	Dupti	Mille	Bati	Werota	Aykel	D-Tabor	N-Mewcha	Chagni	Bure	Bichena	Dejen
Revenue	Supply Volume	m3/d	588	268	556	881	290	831	583	716	502	420	363
	Income Percentage	%	80	80	80	80	80	80	80	80	80	80	80
	Total Volume	m3	171,696	78,256	162,352	257,252	84,680	242,652	170,236	209,072	146,584	122,640	105,996
	Unit Price	Bi/m3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Percentage Except Water Sale	%	0.0	5.0	5.0	5.0	0.0	20.0	10.0	15.0	15.0	20.0	20.0
	Water Sale	birr	343,392	156,512	324,704	514,504	169,360	485,304	340,472	418,144	293,168	245,280	211,992
	Others	birr	0	7,826	16,235	25,725	0	97,061	34,047	62,722	43,975	49,056	42,398
	Total	birr	343,392	164,338	340,939	540,229	169,360	582,365	374,519	480,866	337,143	294,336	254,390
Expenditure	No. of Staff	people	29	13	28	40	16	37	29	36	25	23	20
	Av. Salary	B/per	300	190	360	440	125	440	350	390	530	430	460
	Total Salary	birr	104,400	29,640	120,960	211,200	24,000	195,360	121,800	168,480	159,000	118,680	110,400
	Electricity or Fuel		170,820	52,700	195,640	273,750	707,370	521,220	154,760	83,254	194,910	194,180	128,480
	Unit Price		0.4	2.1	0.4	0.4	0.4	0.4	0.4	2.1	0.4	0.4	0.4
	Fuel Expenses	birr	68,328	110,670	78,256	109,500	282,948	208,488	61,904	174,833	77,964	77,672	51,392
	Machinery Cost	birr	210,666	140,139	202,791	134,205	126,217	334,257	163,192	221,222	133,692	152,807	173,348
	Maintenance Cost	birr	2,107	1,401	2,028	1,342	1,262	3,343	1,632	2,212	1,337	1,528	1,733
	Percentage of Other Expenses	%	40	15	35	45	15	30	45	35	25	30	25
	Total for Other Expenses	birr	69,934	21,257	70,435	144,919	46,232	122,157	83,401	120,934	59,575	59,364	40,881
	Total	birr	244,769	162,968	271,679	466,961	354,442	529,348	268,737	466,460	297,876	257,244	204,407
Net Profit		birr	98,623	1,369	69,260	73,268	-185,082	53,017	105,782	14,406	39,267	37,092	49,984

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4-1 Project Effect

4-1-1 Project Benefit

The following benefits are expected through implementation of the project.

(1) To the population of the eleven urban centers, the proportion of water supply will increase by 10% in 2000 on average, while the supplied population will increase from 116,000 to 174,000 during the period.
(2) Water-borne diseases can be prevented by supplying hygiene water.
(3) Women and/or children can be relieved from labor for carrying water by installing of new public fountains
(4) As the number of houses are increasing in each urban center, stable development of the urban centers is expected through stable and hygiene water supply.
(5) Due to improved water supply facilities by the project, financial status of water supply services is expected to turn better by due collection of charges through stable water supply.

4-1-2 Project Justification

Justification of the project will be effective by examining the following effects;

(1) Improved proportion of water supply
The rate of water supply in the eleven urban centers is 67.6 % on average, ranging from 37% in Debre Tabor to 97% in Mille in 1995. Through increase in number of public fountains by the project and private connections to be built by Ethiopia, the rate of water supply will increase up to 78% on average.

(2) Alleviation of water-borne diseases
Among the top-ten disease cases observed in the urban centers, the water-origin diseases such as eye diseases, diarrhea, skin diseases, etc. occupies 30%. Through implementation of the project and supply of hygiene water to the population, these water-origin diseases can be alleviated.

(3) Relief of women and/or children labor from water carrying
As water carrying is a job for women and children in urban centers, their labor such as

carrying water jar for few kilometers, waiting at public fountain for an hour or more, and loss of a half-day time labor for daily carrying will considerably be relieved.

(4) Progress in city development

A rapid increase of population in the eleven urban centers is anticipated even after 2000, and their city planning is programmed till 2010. Progressive in development of the urban centers can be achieved through supply of necessary hygiene water to the population in residential areas.

(5) Improvement in financial status of water supply services

If the water supply systems in the eleven urban centers are improved by the project and the local portions of work duties of Ethiopia are promptly undertaken, an increase in private tap connections is expected. By assuring a stable water supply, income from water charges will drastically increase and the financial status of the supply services will be much improved.

4-2 Recommendation

Supply of safe drinking water and proper arrangements for sewerage are basic social needs. After its completion, the project will supply hygiene water and therefore contribute much to the improvement in living environment and sanitary status of the people in the eleven urban centers. In order to achieve the expected benefits to the maximum extent by implementation of the project, attention shall be paid on the following key issues.

(1) Construction work by the Ethiopian side

Water supply system has to function to send water from water source to consumers. In addition to the facilities to be provided under the project, it is absolutely important to construct tertiary pipelines and to connect private taps by the Ethiopian side.

Ethiopia has sufficient engineering technologies and labor power for construction of pipelines, public fountains and private tap connections. It is necessary that the budget is appropriated for undertaking the work duties of the Ethiopian side the implementation by the Ethiopian side is completed as well as the completion of the project by Japan.

(2) Staffing for operation and maintenance

After implementation of the project, not only the number of water sources and public

fountains will increase but also the number of pipeline appurtenances will substantially increase. In order to assure a reliable and safe water supply to the consumers, reinforcement of operation and maintenance staff is absolutely required.

It is necessary that the reinforcement of these personnel will be not only by the number of staff but also by improvement of staff capability through education and training programs.

(3) Employment of progressive water tariff

Proper water charges have not been collected due to superannuated facilities, water leak, etc. up to present. After improvement of the facilities under the project, the rate of collecting water charges will much increase. In addition, though the present water tariff employs a single water rate, employment of a new progressive water tariff setting a lowest rate for the minimum consumption while the higher rates for the more consumption is required so as to maintain the facilities through the improved water tariff system by charging the rate in meeting the economic levels of households.

Some progressive water tariffs are necessary to employ not only the private water taps and public fountains, but also supply to industries, offices, hotels, etc. at the same tariff.

(4) Reinforcement in water charge collection

Improvement of the water supply rate implies increase in number of public fountains and private water taps. Establishment of a system for efficient and assured collection of water charges will be required.

For improvement of collection rate, preparation of reliable list of water users and establishment of proper collection system will also be required.

(5) Management of public fountains

Public fountains have been ,up to present, managed by the staff of water supply services in the administration. Taking into consideration, increasing operation, maintenance, water charge collection and other tasks by the water supply services, the appointment of a person-in-charge for each public fountain is recommended from viewpoint of user-oriented operation and maintenance. This person-in-charge will be appointed by the public and will collect the water charges and control the fountain on behalf of the staff of the services.

(6) Improvement of sewerage and education

Although the project would contribute to the improvement of water supply systems, improvement of water supply will inevitably improve the in drainage. The feasibility study proposes establishment of some committees for health and sanitary improvement.

Establishment of committees for improvement of sanitary facilities and improvement of lavatories, drains, home sewerage pits, are recommended.

APPENDICES

1. Member List of Survey Team

Dr. Yuji MARUO	Team Leader Development Specialist, Institute for International Cooperation, JICA
Mr. Shinichi MASUDA	Coordinator First Project Study Division, Grant Aid Project Study Department, JICA
Mr. Kazunori TAMAKI	Chief Consultant/Water Supply Planner, Sanyu Consultants Inc.
Mr. Yoichi HARADA	Water Supply Facility Planner, Kyowa Engineering Consultants Co., Ltd.
Mr. Noriyasu KIMATA	Cost Estimator/Procurement Planner, Sanyu Consultants Inc.

2. Survey Schedule

Date	Week	Schedule
Mar. 2	(Sun)	Arrival in Addis Ababa (except Mr.Harada)
3	(Mon)	Courtesy call at JICA, EOJ, MWR and MEDAC
4	(Tue)	Discussion on the draft basic dDesign report
5	(Wed)	- Ditto -
6	(Thu)	Site Survay (Addis Ababa – Bichena – Dejen – Debre Markos)
7	(Fri)	- Ditto - (Debre Markos – Bure – Bahir Dar)
8	(Sat)	- Ditto - (Bahir Dar – Debre Tabor – Werota – Bahir Dar)
9	(Sun)	- Ditto - (Bahir Dar – Addis ababa)
10	(Mon)	Meeting with Ministry of Water Resources Arrival in Addis Ababa (Mr.Harada)
11	(Tue)	Discussion on minutes of meeting with MWR
12	(Wed)	Signing of the minutes of meeting Meeting with MWR and collecting data by Mr.Harada, Mr.Kimata
13	(Thu)	Departure of Mr.Maruo, Mr.Tamaki, Mr.Masuda, Meeting with MWR and collecting data by Mr.Harada, Mr.Kimata
14	(Fri)	Meeting with MWR and collecting data by Mr.Harada, Mr.Kimata
15	(Sat)	- Ditto -
16	(Sun)	Site Survey (Addis Ababa – Adayto)
17	(Mon)	- Ditto - (Adayto – Dupti – Adayto)
18	(Tue)	- Ditto - (Adayto – Mille – Kombolcha)
19	(Wed)	- Ditto - (Kombolcha – Bati – Desse)
20	(Thu)	- Ditto - (Desse – Nefas Mewcha – Debre Tabor)
21	(Fri)	- Ditto - (Debre Tabor – Gonder)
22	(Sat)	- Ditto - (Gonder – Aykel – Gonder)
23	(Sun)	- Ditto - (Gonder – Bahir Dar)
24	(Mon)	- Ditto - (Bahir Dar – Werota – Bahir Dar)
25	(Tue)	- Ditto - (Bahir Dar – Chagni – Kosober)
26	(Wed)	- Ditto - (Kosober – Bure – Debre Markos)
27	(Thu)	- Ditto - (Debre Markos – Bichena – Dejen)
28	(Fri)	- Ditto - (Dejen – Addis Ababa)
Mar. 1	(Sat)	Putting data in order
2	(Sun)	- Ditto -
3	(Mon)	Meeting with MWR and collecting data
4	(Tue)	- Ditto -
5	(Wed)	- Ditto -
6	(Thu)	Report to JICA, Depurture

3. List of Party Concerned in Ethiopia

(1) Ministry of Water Resources

Mr. Abdureshed Dulane, Vice Minister

Mr. Teso Mosisa, Head of Planning & Project Department

Mr. Mesfin Tegene, Head of Contract Administration Department

Mr. Negash Gemtessa, Head of Design Department

Mr. Gulilat Birhane, Head of Project Studies Follow up Team

(2) Ministry of Economic Development and Cooperation

Mr. Admasu Abebe, Head of Bilateral Cooperation Department

Mr. Girma Zewdie, Head of Asian & Australian Team

(3) Water, Mine and Energy Bureau, Amhara Region

Mr. Fekadu Debalke, Bureau Head

Mr. Teferi Menkir, Manager

Mr. Munir Sherif, Head of Studies, Design & Construction Admin. Dept.

Ms. Eniyie Tefera, Chief of CCP

(4) Water Supply Department, Amhara Region

Mr. Damtew Lemma, Manager in Bichena

Mr. Fekadu Belaye, Manager in Dejen

Mr. Tefahun Meles, Manager of Debre Tabor

Mr. Alemayhu Tamerat, Manager of Werota

(5) Municipality in Amhara Region

Mr. Yenehun Wolle, Bure

(6) Ministry of Water Resorces, Afar Region

Mr. Naru Yesuf, Head of Engineering Services

4. Minutes of Discussion

MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY ON ELEVEN TOWNS WATER SUPPLY PROJECT IN THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

In response to the request from the Government of the Federal Democratic Republic of Ethiopia, the Government of Japan decided to conduct a Basic Design Study on Eleven Towns Water Supply Project (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA has sent to Ethiopia a Study Team which is headed by Dr. Yuji MARUO, Development Specialist, JICA, and is scheduled to stay in the country from 2 of February to 26 of February, 1997.

The team had a series of discussions with the officials concerned of Ethiopia and conducted a field survey at the study area.

As a result of discussions and field survey, both sides have confirmed the main items described in the attached sheets.

Hiroshi Matsutani
Resident Representative
of JICA, Ethiopia

Apr. 10. 97

ABDIRASHID DULANE
VICE MINISTER

10.04.97

Witnessed by

Mr. Admasu Abebe
Head,
Bilateral Cooperation Department
Ministry of Economic Development
and Cooperation

ATTACHMENT

1. Objective

The objective of the proposed project is to improve the living condition of the population of urban centers by the construction and rehabilitation of water supply facilities.

2. Project Areas

The project areas are the following towns:

Afar Region

- Dupti, Mille

Amhara Region

- Bati, Werota, Aykel, Debre Tabor, Nefas Mewcha, Chagni, Bure, Bichena, Dejen

The site location map is attached in Annex I.

3. Executing Agency

Ministry of Water Resources is responsible for the implementation of the Project.

Water, Energy and Mines Bureau of Amhara National Regional Government and Water Bureau of Afar National Regional Government are the execution agency for the respective sites.

4. Japan's Grant Aid System

1. The Government of Ethiopia has understood the system of Japan's Grant Aid Scheme described in Annex V explained by the Team.

2. The Government of Ethiopia will take necessary measures, described in Annex IV, for the smooth implementation of the Project on condition that Japan's Grant Aid is extended to the Project.

5. The Project Name

The name of the Project is revised as follows:

Revised: Water Supply Project for Urban Centers
Original: Eleven Towns Water Supply Project

JICA ETHIOPIA JAPAN INTERNATIONAL COOPERATION AGENCY

The Federal Democratic Republic of Ethiopia Ministry of Water Resources

6. Further Schedule

1. Under the consultation of JICA Headquarter and concerned ministries, JICA team will make the draft final report in accordance with the confirmed items in Ethiopia, and submit it to the Government of Ethiopia around April, 1997.

2. JICA will finalize the basic design report after the acceptance of the draft final report by Ethiopian side.

7. Major Points of Discussions

1. Ministry of Water Resources presented region wise tentative priority of 11 towns as shown in Annex II. JICA team requested to present final priority of 1 to 11 as soon as possible. JICA team will consider the implementation plan according to this priority.

2. Ministry of Water Resources strongly insisted to design and implement the water supply facilities for at least the initial target year of 2005. In principle, JICA team agreed on the insistence of Ethiopian side, except for the part of water resources development. Japanese side added that final components of the project will be determined after further consideration in Japan.

3. JICA team proposed the water resources development plan as shown in Annex III, and explained that regarding the water source development the basic principle of Japan's Grant Aid is to fulfill the immediate necessity.

4. Ministry of Water Resources insisted that even water source development should be implemented for target design year of 2005, on which JICA team didn't accept.

5. Ministry of Water Resources pointed out that since a lot of fund has been donated by the Japanese Government to prepare the feasibility study, detail design and implementation based on the same be carried out as soon as possible to avoid the extra cost of updating the study.

   JICA team explained as following;

   i) The feasibility study conducted on the basis that the feasibility study plan could be implemented by any donors (either loan or grant) or even by Ethiopian Government.

JAPAN INTERNATIONAL COOPERATION AGENCY JICA ETHIOPIA

The Federal Democratic Republic of Ethiopia Ministry of Water Resources

i. The feasibility study conducted on the basis that the feasibility study plan could be implemented by any donors (either loan or grant) or even by Ethiopian Government.

ii. The Basic Design Study Team was dispatched responding to the formal application of Japan's Grant Aid made by Ethiopian Government. This basic design study shall follow the policy of Japan's Grant Aid.

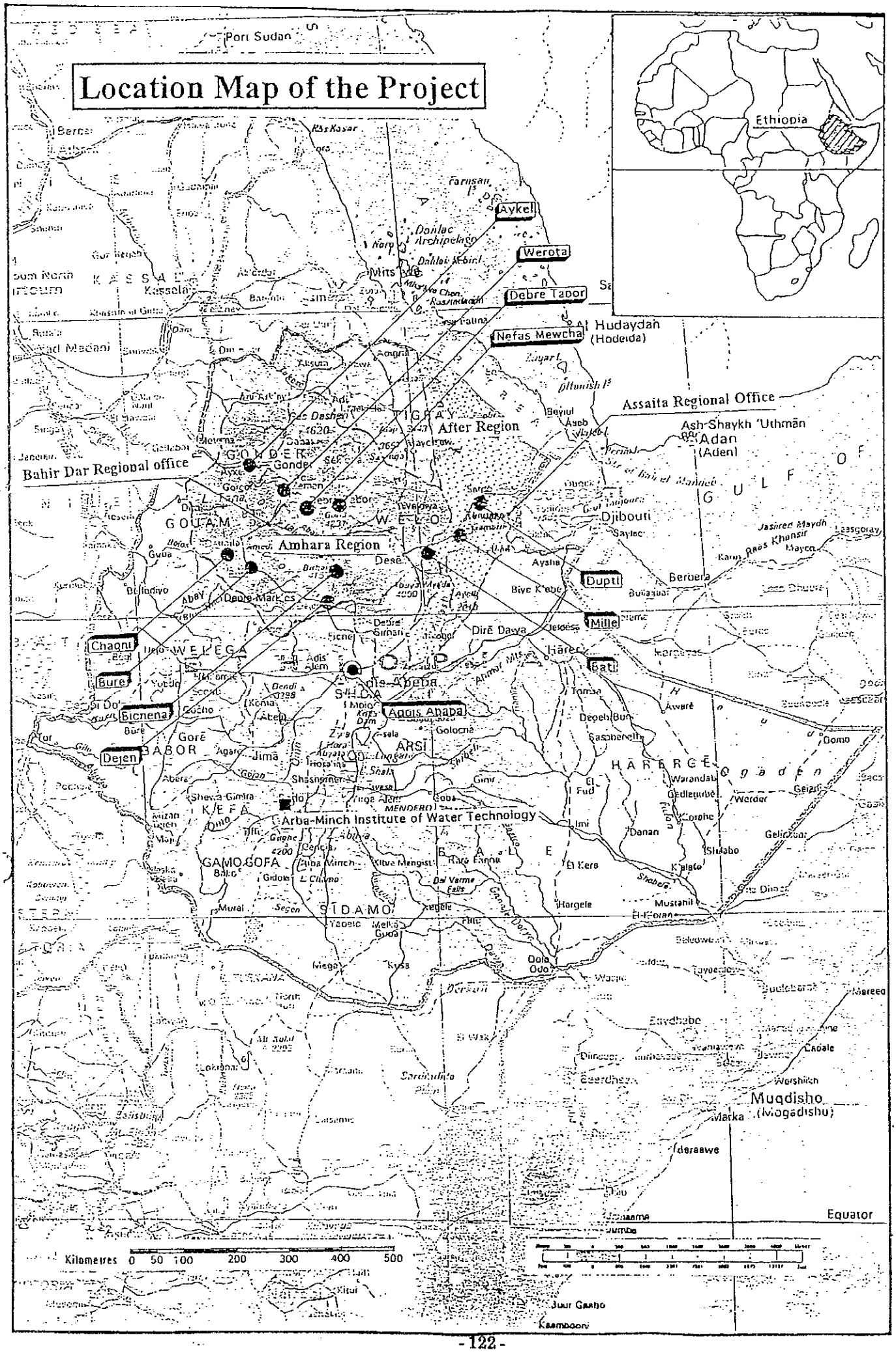
6. After having series of discussions, Ministry of Water Resources and JICA team concluded as follows:-

i. Apart from item 2, 3 and 4 mentioned above, both sides reached a common understanding.

ii. Both sides continue the discussions through JICA Ethiopia Office in order to attain a final agreement.

iii. JICA team will continue the Basic Design Study according to the original schedule.

ANNEX I


Location Map of the Project
Ethiopia
Port Sudan
Aykel
Werota
Debre Tabor
Nefas Mewcha
Hudaydah
(Hodeida)
Assaita Regional Office
Ash-Shaykh 'Uthmān
Adan
(Aden)
Bahir Dar Regional office
Gonder
Amhara Region
Djibouti
Dupti
Mille
Chagni
Bure
Bicnena
Dejen
Batu
Addis Ababa
Arba-Minch Institute of Water Technology
Muqdisho
(Mogadishu)
Equator
Kilometres 0 50 100 200 300 400 500

ANNEX II

Region Wise Tentative Priority

Priorty	Amhara Region	Afar Region
1	Nefas Mewcha	Mille
2	Chagni	Dupti
3	Debre Tabor	
4	Bichena	
5	Bure	
6	Dejen	
7	Bati	
8	Werota	
9	Aykei	

ANNEX III

The Water Source Development Plan

Name of Centers	Water Demand (m3/d)	Proposed Intake Facility (m3/d)	Remarks
Dupti	588	928	
Mille	268	518	
Bati	556	660	
Werota	881	1,078	
Aykel	290	696	
Debre Tabor	831	1,096	
Nefas Mewcha	583	829	
Chagni	716	962	
Bure	502	602	
Bichena	420	545	
Dejen	363	556	

* Water demand may be modified by the census in 1995.

ANNEX IV

Necessary measures to be taken by the Government of the Federal Democratic Republic of Ethiopia on condition that Japan's Grant Aid is extended:

1. To secure the sites for the Project

2. To clear, level- and reclaim the sites prior to the commencement of the construction

3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the sites

4. To take the necessary measures for prompt customs clearance of the materials and equipment brought for the Project at the port of disembarkation

5. To exempt Japanese Nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Ethiopia with respect to the supply of the products and services under the verified contracts

6. To accord Japaneses Nationals, whose services may be required in connection with the supply of products and the services under the verified contracts, such facilities as may be duration of their work

7. To use and maintain properly and effectively all the facilities constructed and equipment purchase under the Grant

8. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

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ANNEX V

ON JAPAN'S GRANT AID PROGRAM

1. Japan's Grant Aid Procedures after the Study

(1) The Japan's Grant Aid Program is executed by the following procedures.

- **Study** (Preliminary Study / Basic Design Study conducted by JICA)
- **Appraisal & Approval** (Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- **Determination of Implementation** (Exchange of Notes between the both Governments)
- **Implementation** (Implementation of the Project)

(2) The Government of Japan appraises to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted for approval by the Cabinet.

The Project approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by the two Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance

with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant etc. are confirmed.

3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

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① to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,

② to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

③ to secure buildings prior to the installation work in case the Project is providing equipment,

④ to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

⑤ to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

⑥ to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

(a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government

of the recipient country or its designated authority under the contracts verified.

(b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

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