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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

MINISTRY OF WATER RESOURCES

No. 11

THE STUDY
ON
ELEVEN CENTERS WATER SUPPLY AND SANITATION
IN
FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

DRAWINGS
BICHENA

(Volume IV-X)

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FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF WATER RESOURCES

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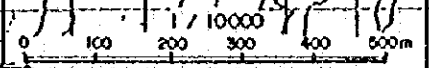
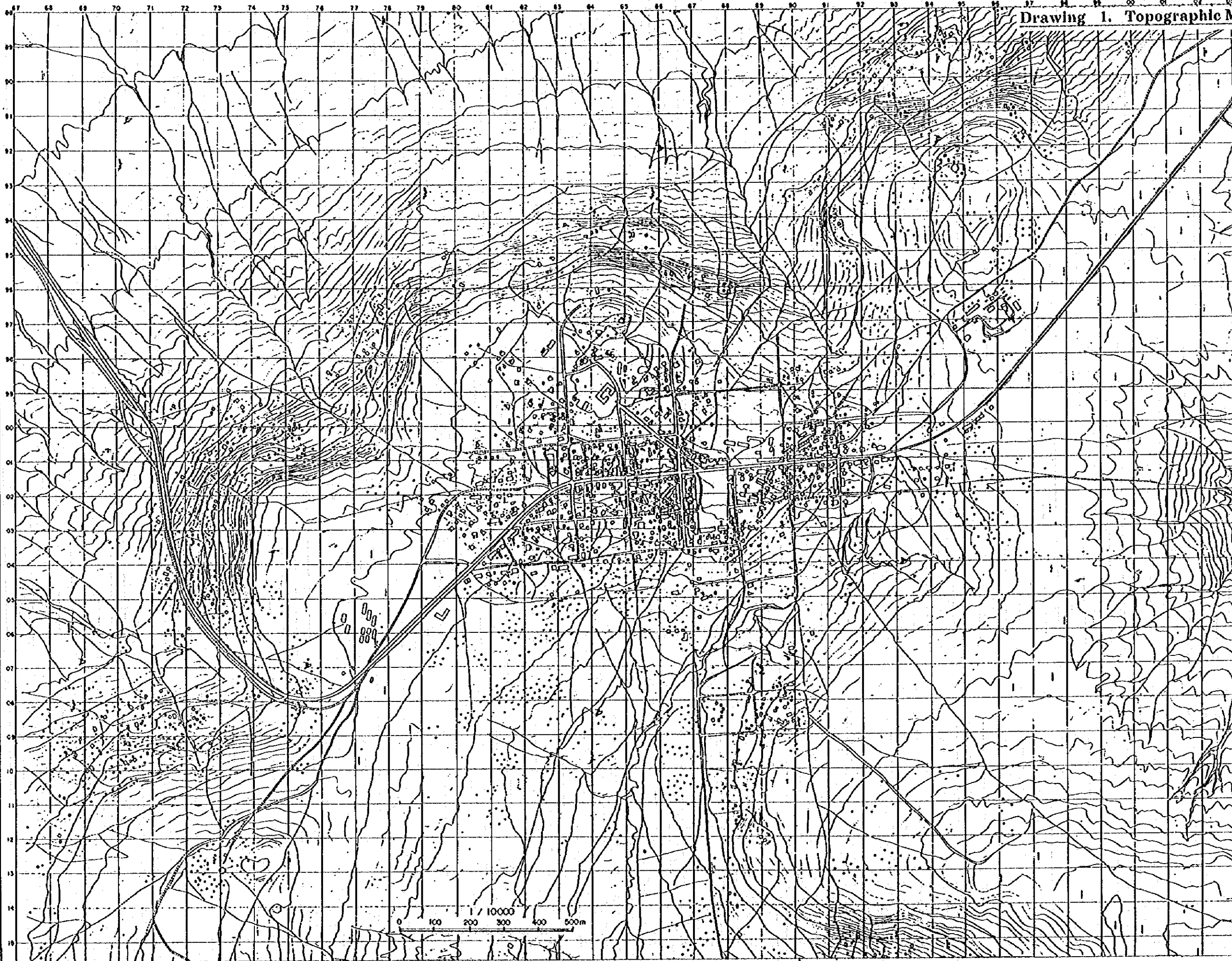
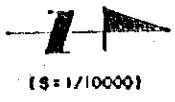
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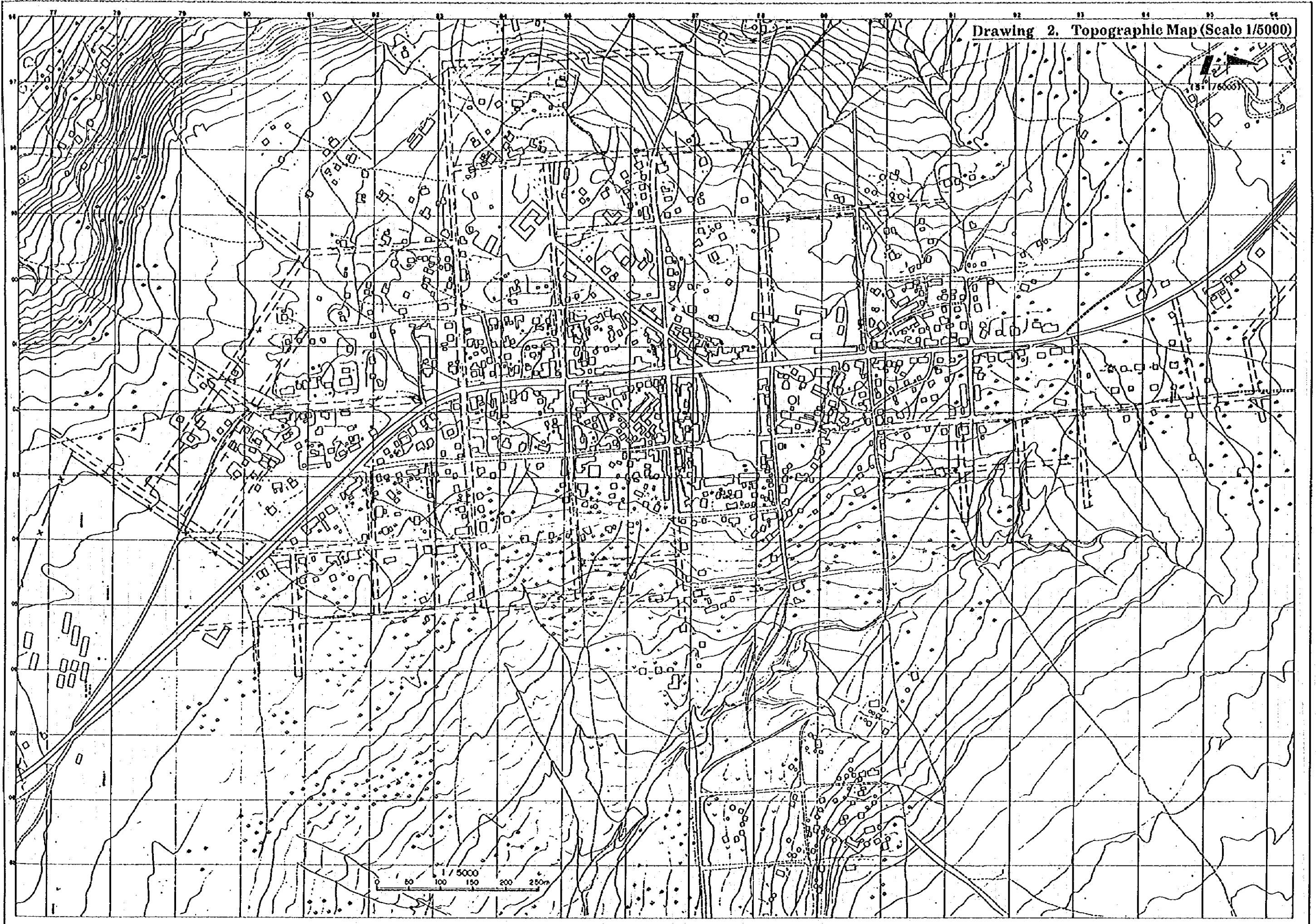
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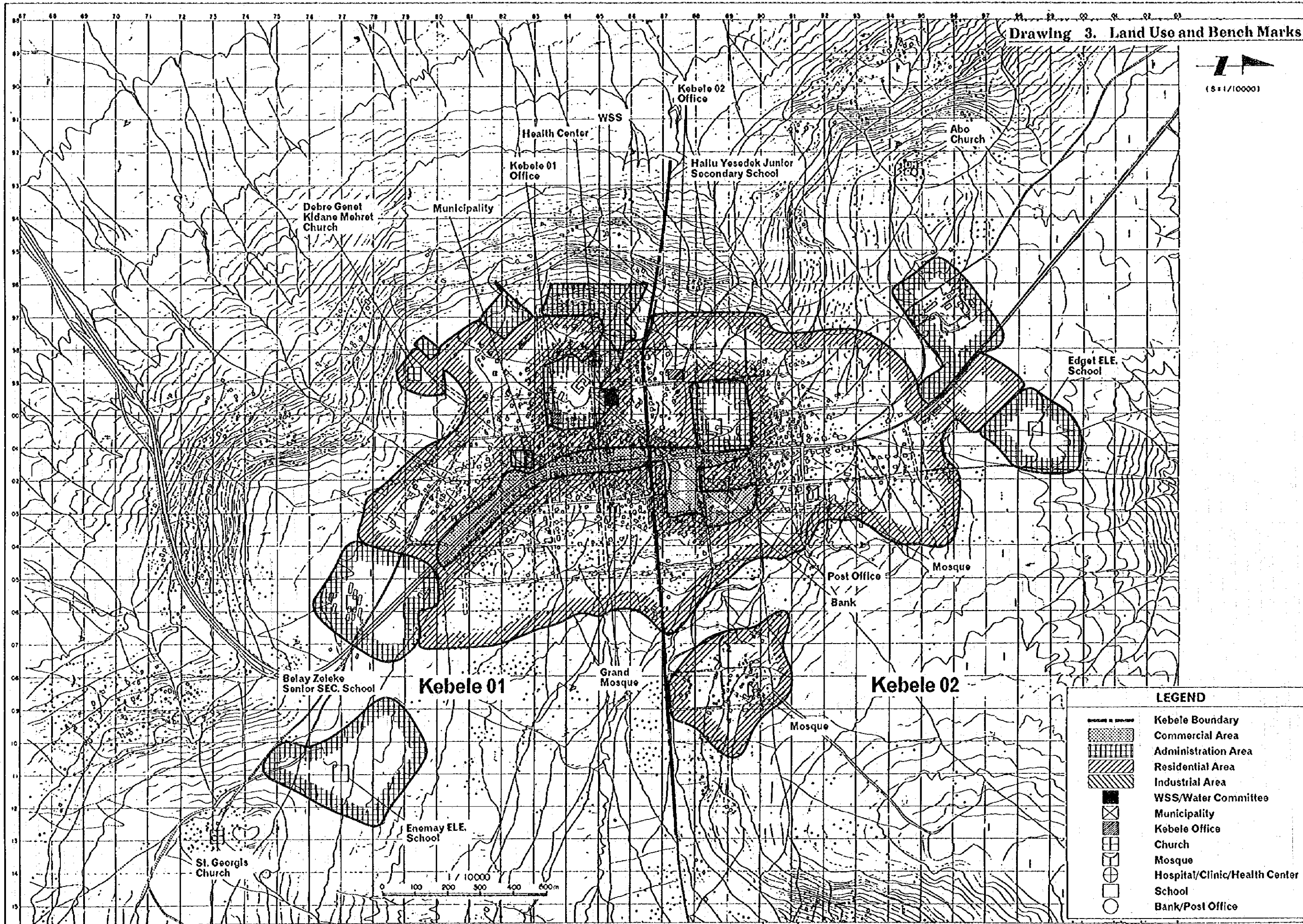
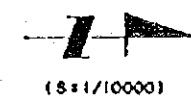
Drawing 1.	Topographic Map (Scale 1/10000)
Drawing 2.	Topographic Map (Scale 1/5000)
Drawing 3.	Land Use and Bench Marks
Drawing 4.	Current Available Water Sources
Drawing 5.	Plan of Proposed Water Sources
Drawing 6.	Layout of Proposed Deep Well
Drawing 7.	Layout Between Water Sources and Reservoir
Drawing 8.	Layout of Water Distribution Pipelines
Drawing 9.	Location of Proposed Public Fountains
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Drawing 11.	Layout of Boosting Chamber
Drawing 12.	Layout of Household Waste Water Disposal Pit & Toilet
Drawing 13.	Layout of Community Type Toilet and VIP Public Type Toilet
Drawing 14.	Layout of Pour-flush Public Type Toilet and Sullage Disposal Pit
Drawing 15.	Location of Sanitary Facilities
Drawing 16.	Current Drainage Condition and Improvement Plan



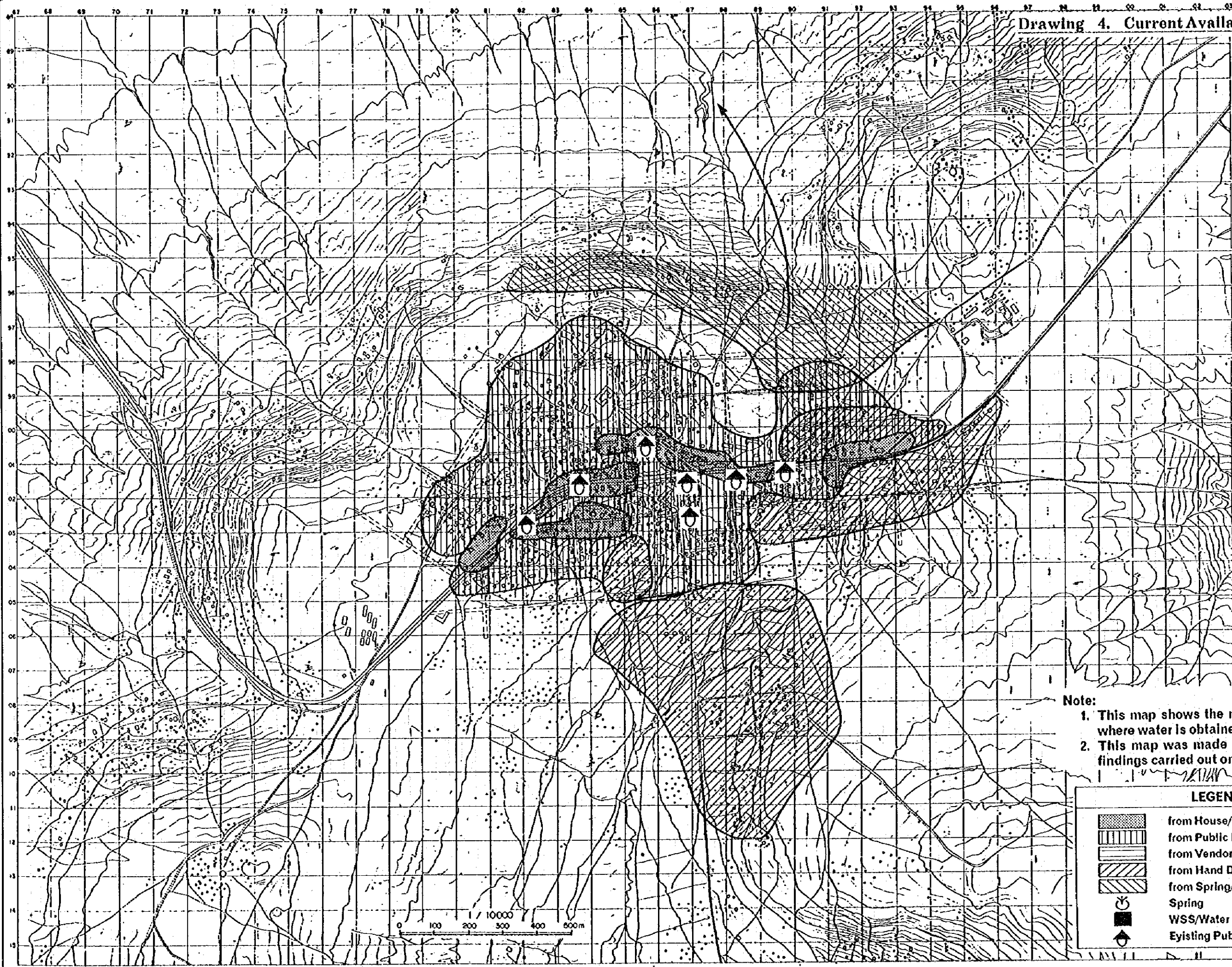
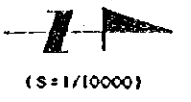
Drawing 2. Topographic Map (Scale 1/5000)



Drawing 3. Land Use and Bench Marks



Drawing 4. Current Available Water Sources



- Note:
1. This map shows the main places/means where water is obtained.
 2. This map was made based on the field findings carried out on June 1995.

LEGEND

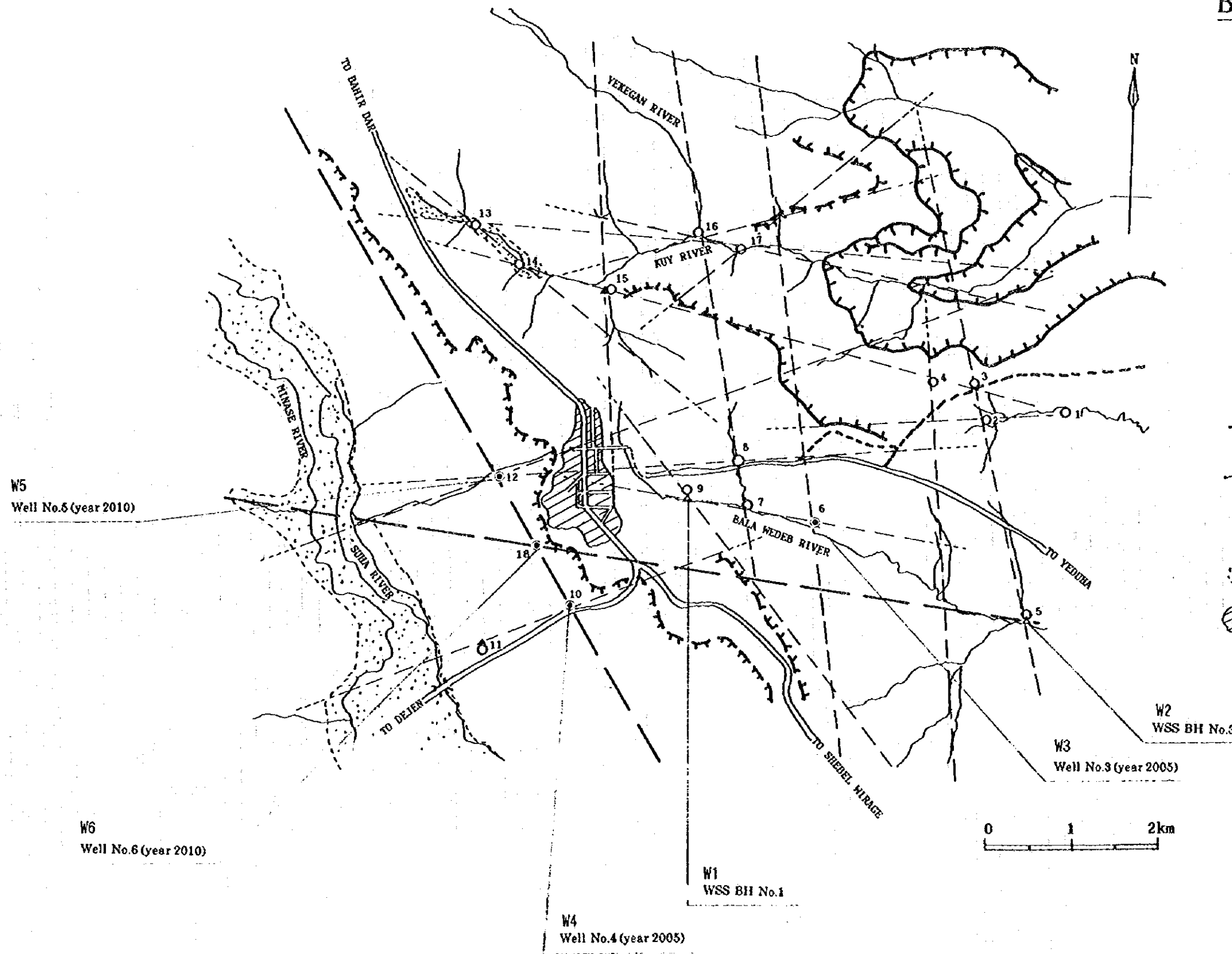
	from House/Yard Connection
	from Public Fountain
	from Vendor
	from Hand Dug Well
	from Spring/River
	Spring
	WSS/Water Committee
	Existing Public Fountain

Drawing 5. Plan of Proposed Water Sources

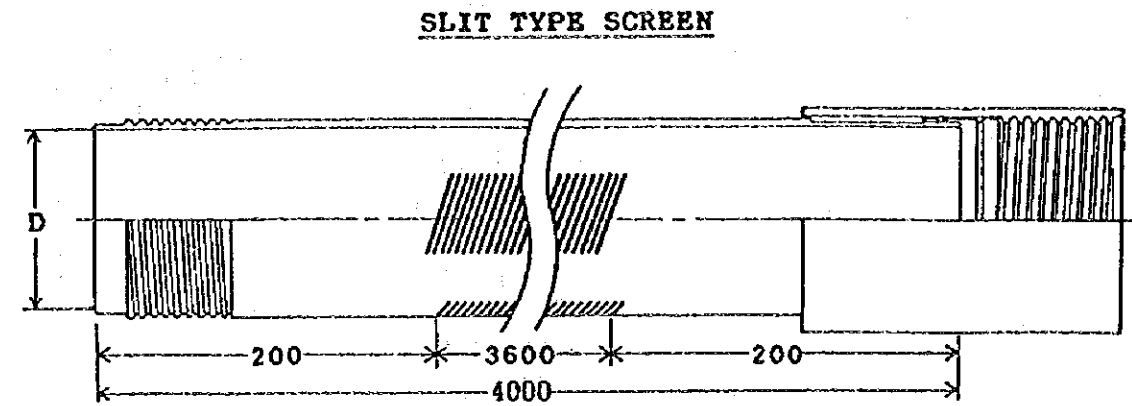
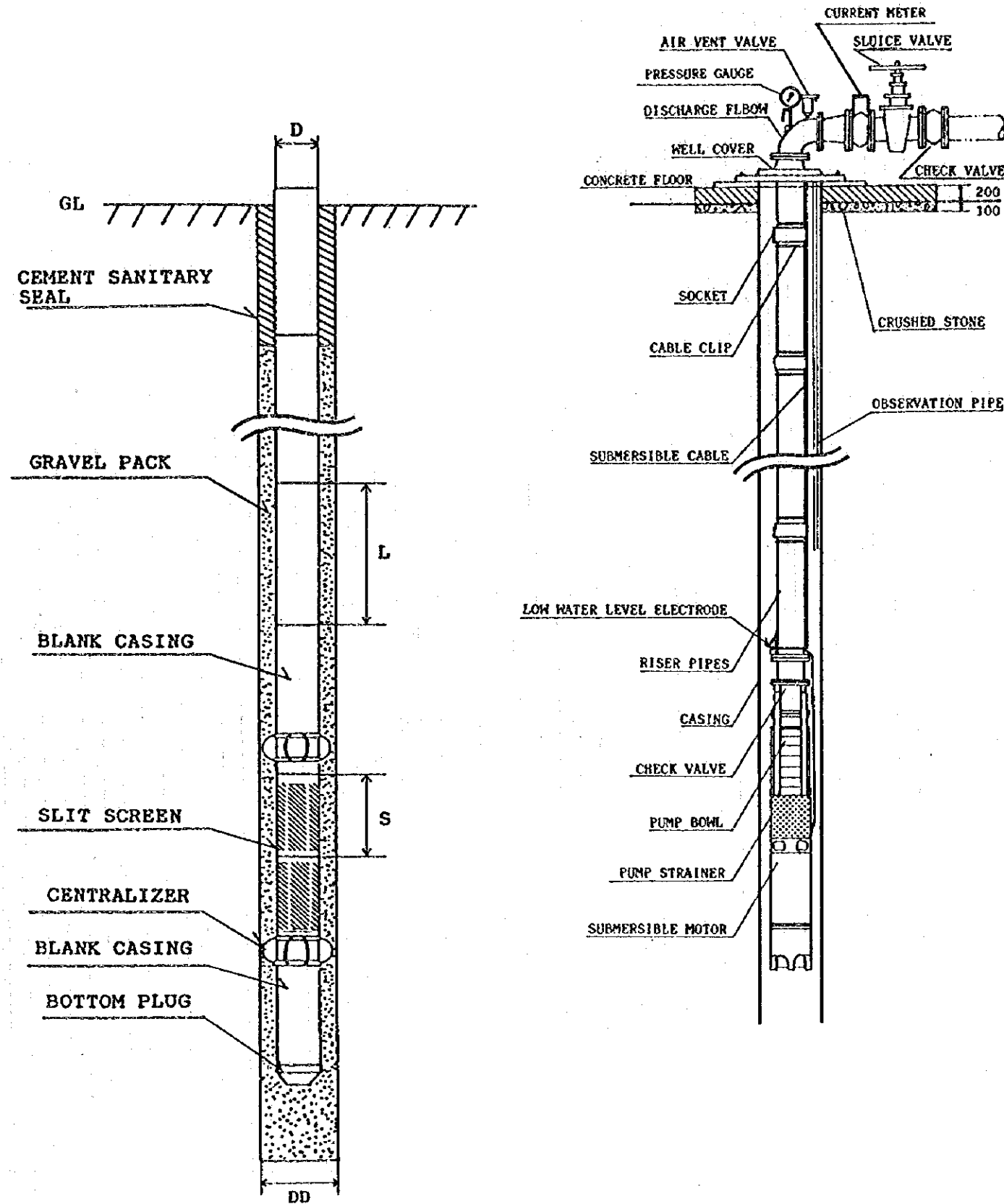
BICHENA

LEGEND

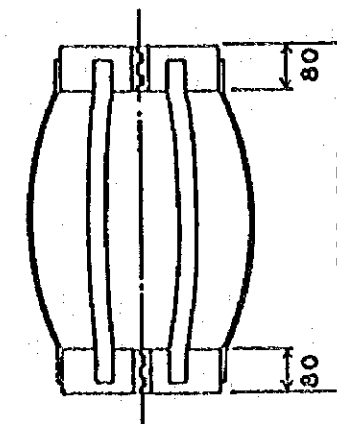
- VES Stations
- ⊙ Proposed Drilling site
- △ Existing Borehole (productive)
- ▲ Existing Borehole (dry)
- Road
- River
- Major Lineament
- - - Minor Lineament
- ⌋ Cliff
- ⌋ Escarpment
- ⊘ Swamp, inundation area
- ▨ Town area



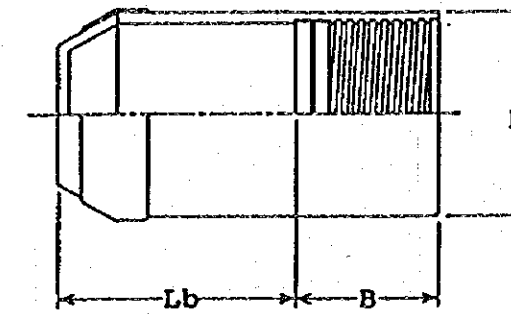
Drawing 6. Layout of Proposed Deep Well



CENTRALIZER



BOTTOM PLUG



Dimension

(Unit: mm)

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

Material

BLANK PIPE : FRP
 SCREEN : FRP
 BOTTOM PLUG : FRP

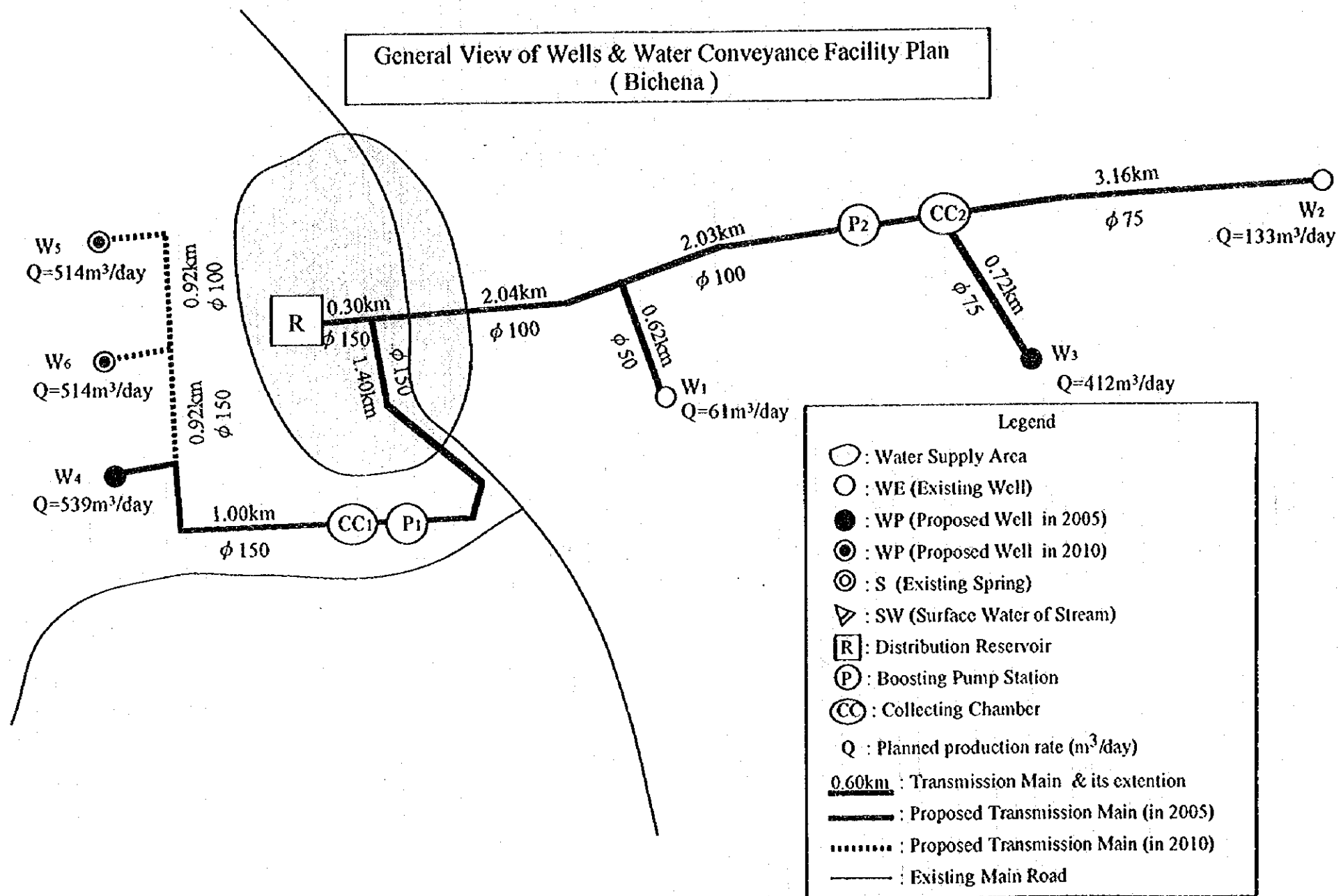
Drawing 7. Layout Between Water Sources and Reservoir

Total Water Demand in Target Years (m³/day)

	1995*	2000	2005	2010
Domestic	79	330	610	1,127
Non Domestic	12	48	65	86
Losses	10	42	92	214
Total	101	420	767	1,427

*Actual consumption





General View of Wells & Water Conveyance Facility Plan (Bichena)

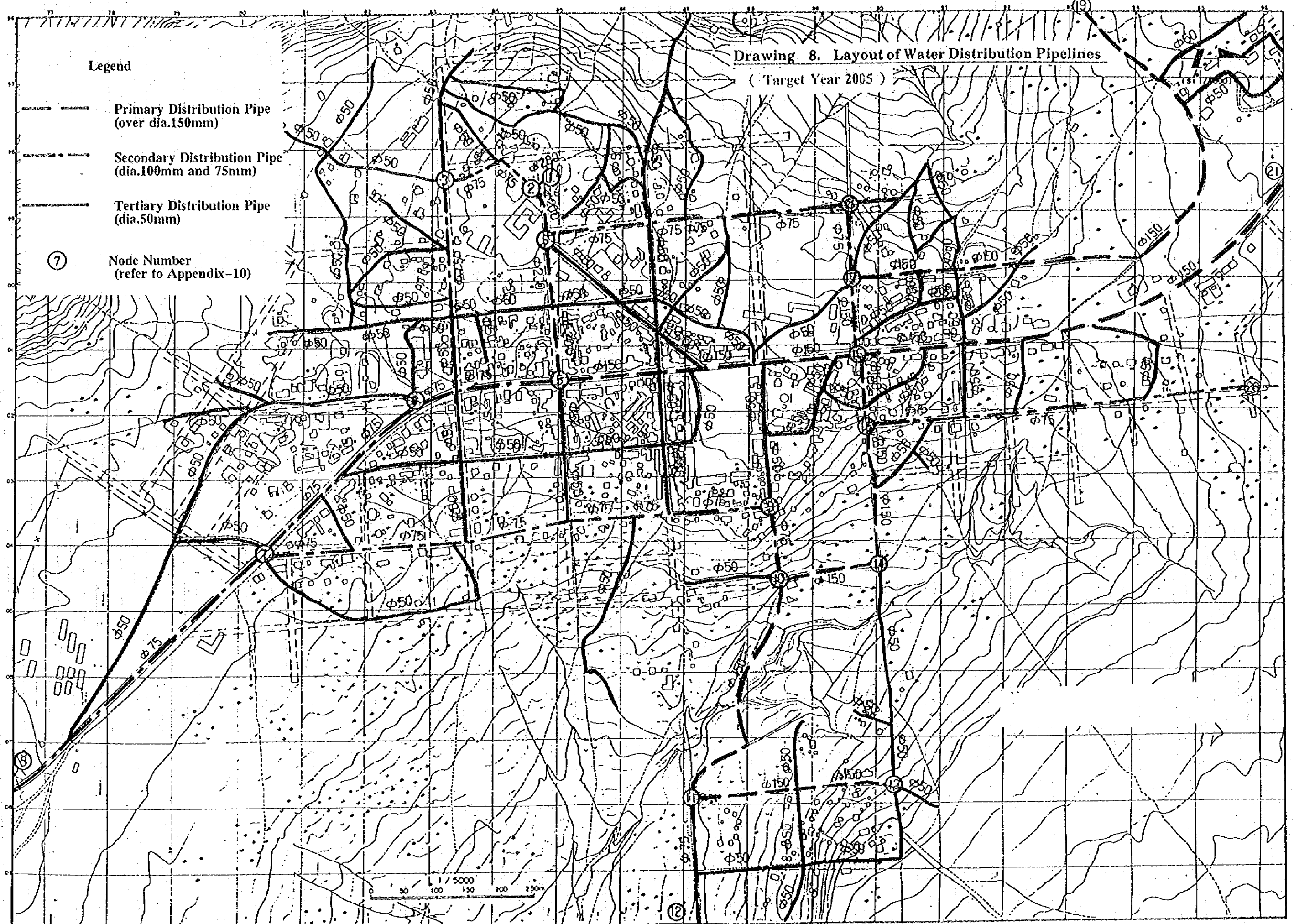


Drawing 8. Layout of Water Distribution Pipelines

(Target Year 2005)

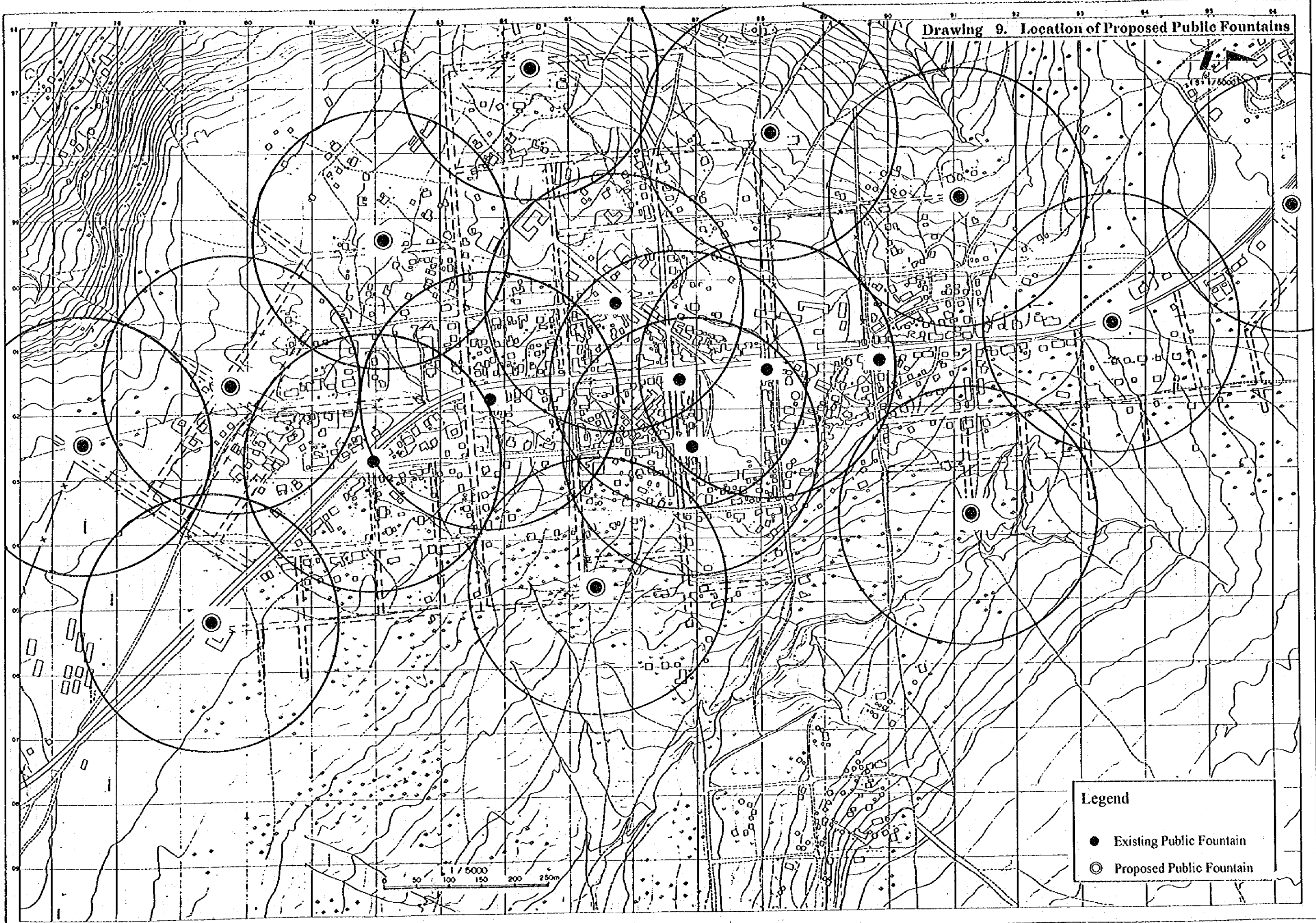
Legend

-  Primary Distribution Pipe (over dia.150mm)
-  Secondary Distribution Pipe (dia.100mm and 75mm)
-  Tertiary Distribution Pipe (dia.50mm)
-  Node Number (refer to Appendix-10)

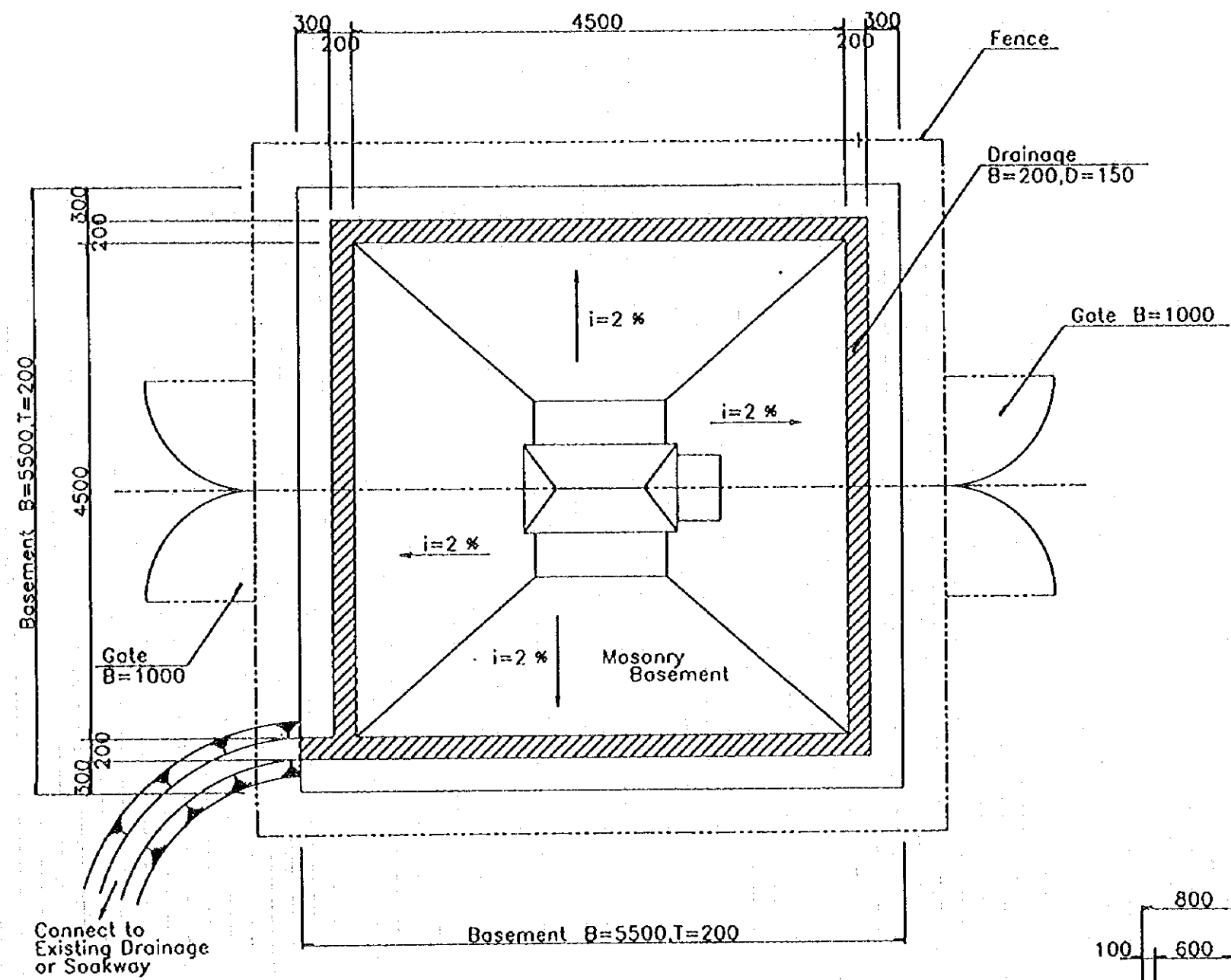


(Bichena)

Drawing 9. Location of Proposed Public Fountains

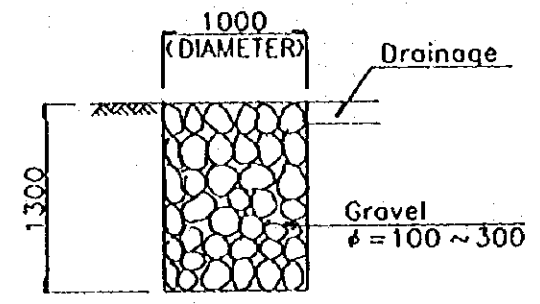


- Legend
- Existing Public Fountain
 - ⊙ Proposed Public Fountain

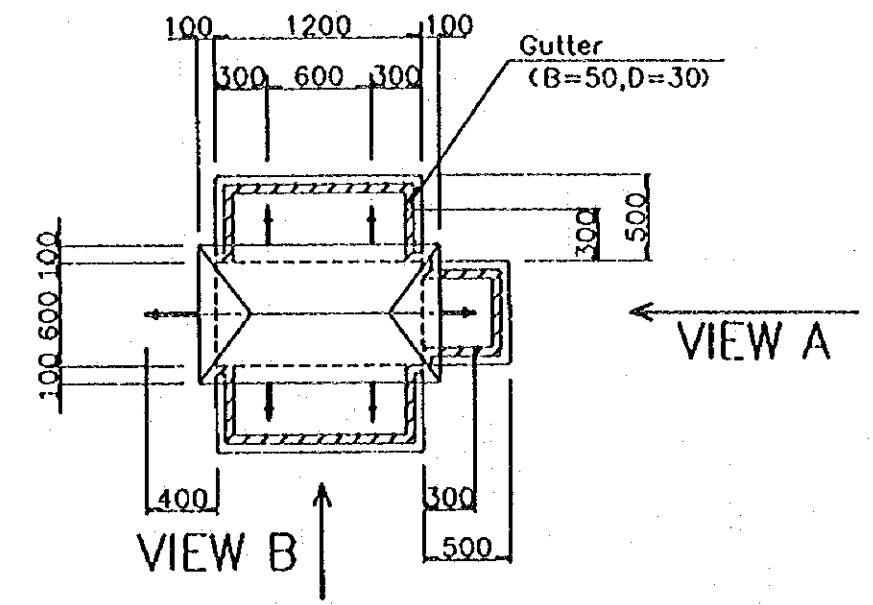


GENERAL PLAN

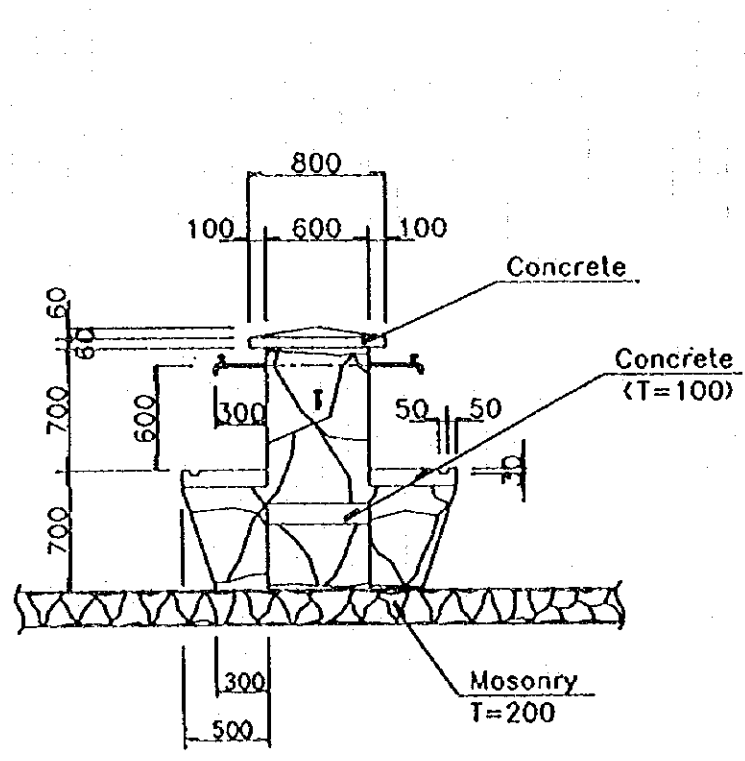
- Quantity:
- Concrete : 0.25 m³
 - Form-work : 0.66 m²
 - Masonry : 7.08 m³
 - Fence : 2 m x 20.4 m
 - Pipe : 6 m
 - Tap : 6 Nos
 - Meter : 1 Nos
 - Valve : 1 Nos
 - Excavation : 13 m³
 - Gravel : 1 m³



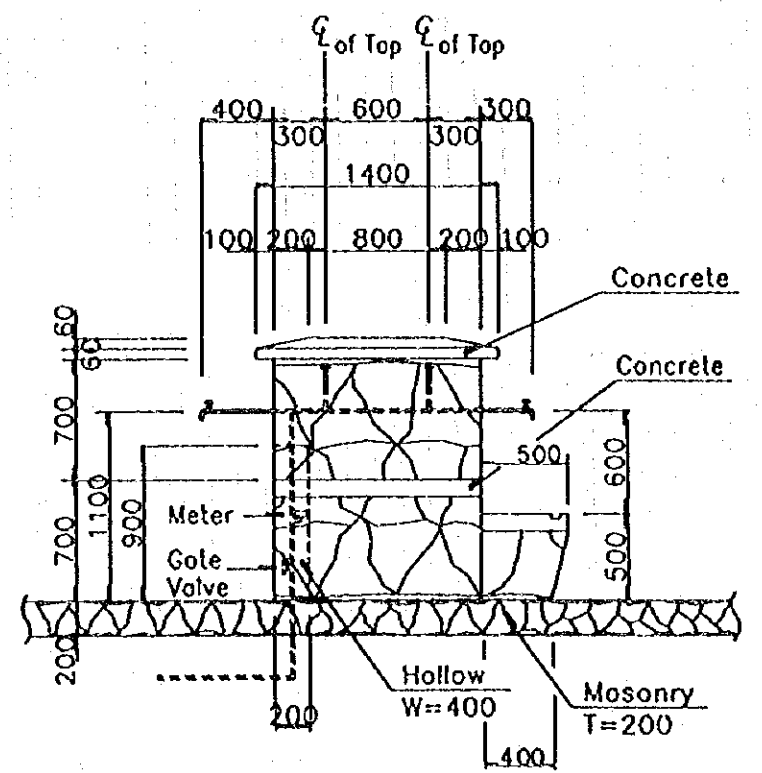
SOAKWAY



PLAN OF PUBLIC FOUNTAIN

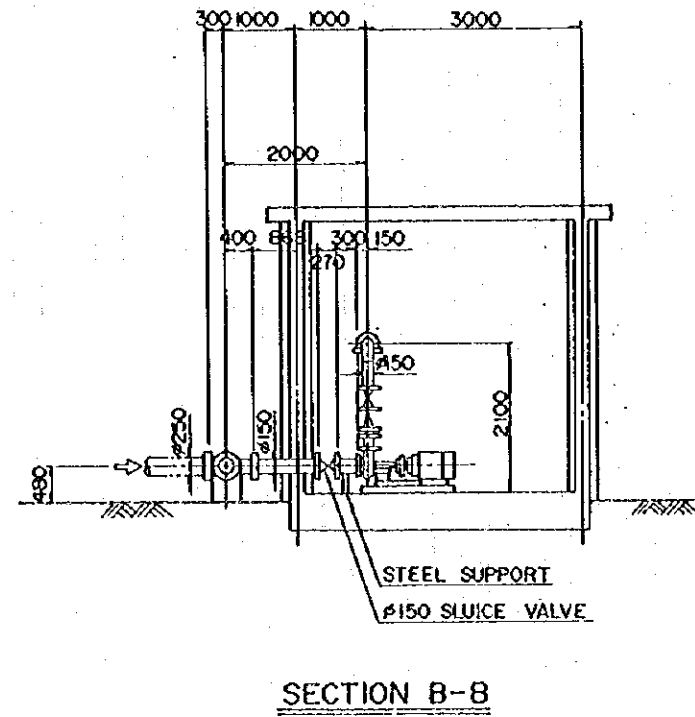
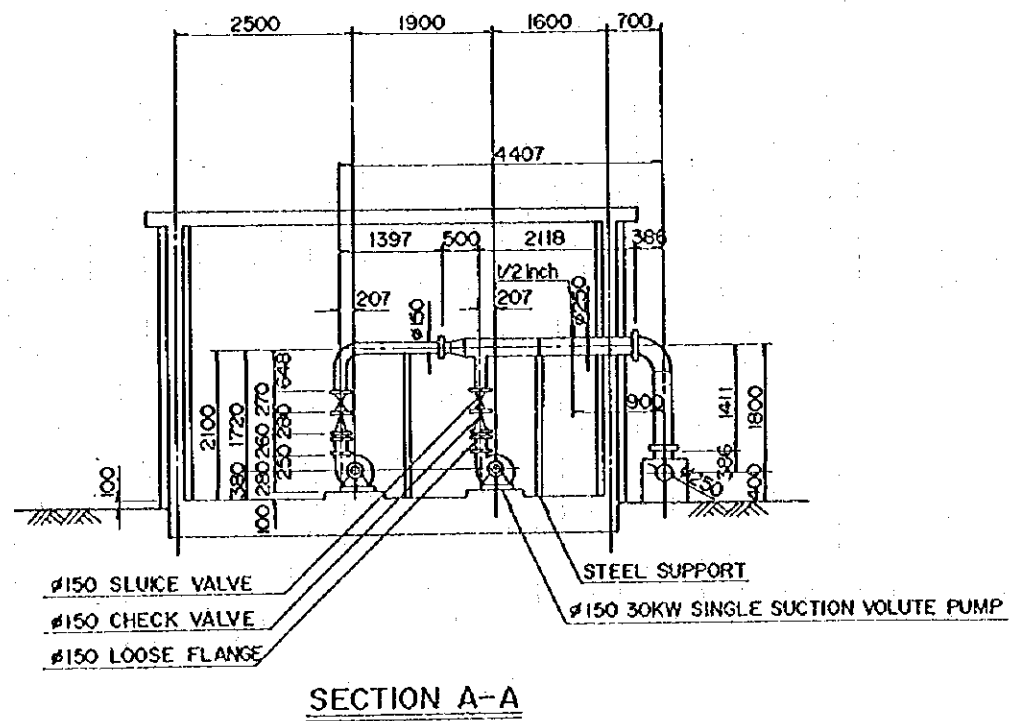
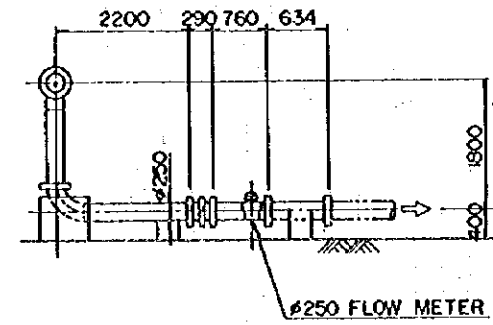
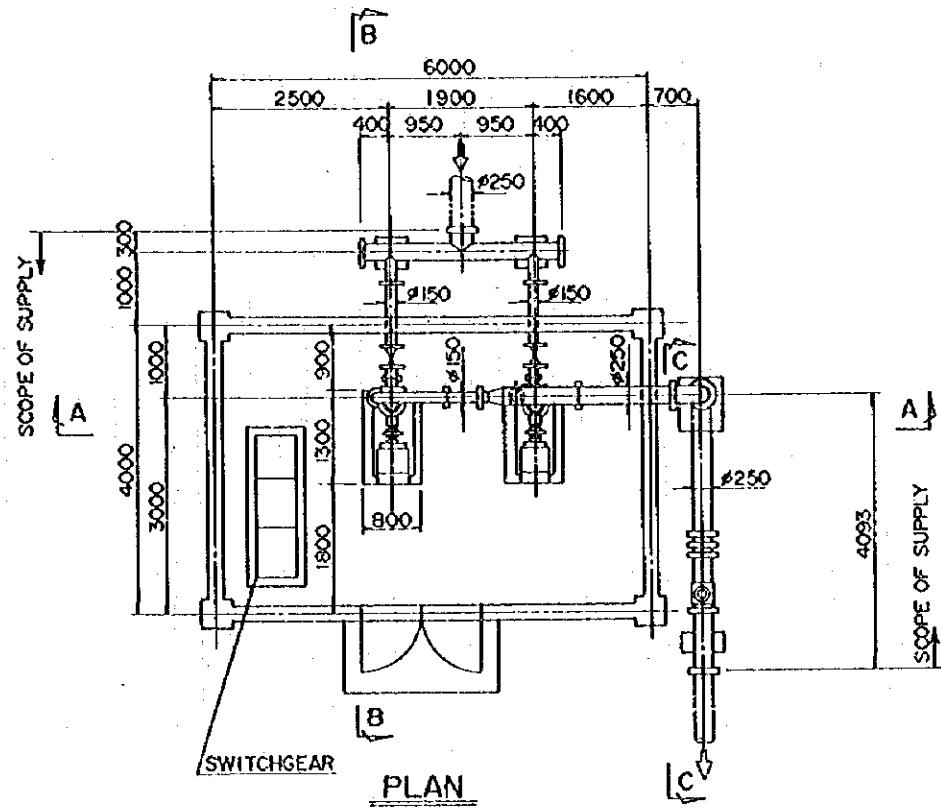


VIEW A

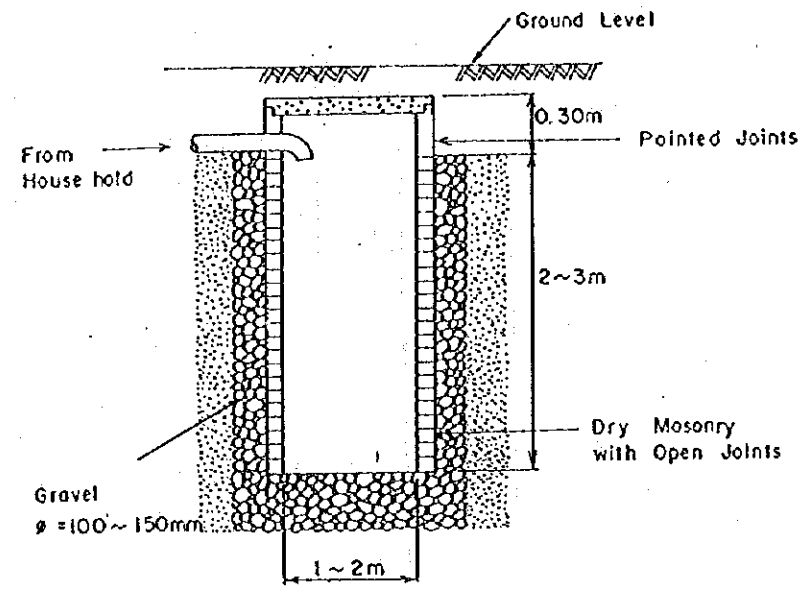


VIEW B

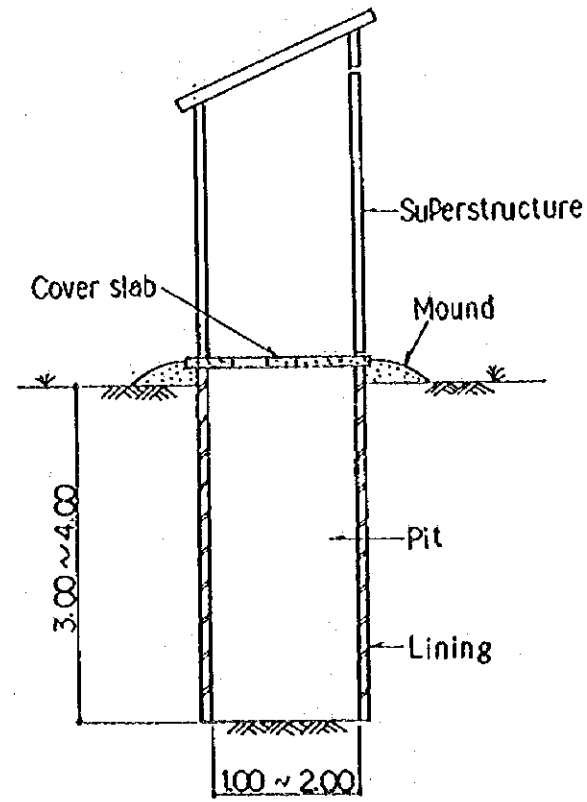
NOTE:
1. All dimensions are shown in millimeter.



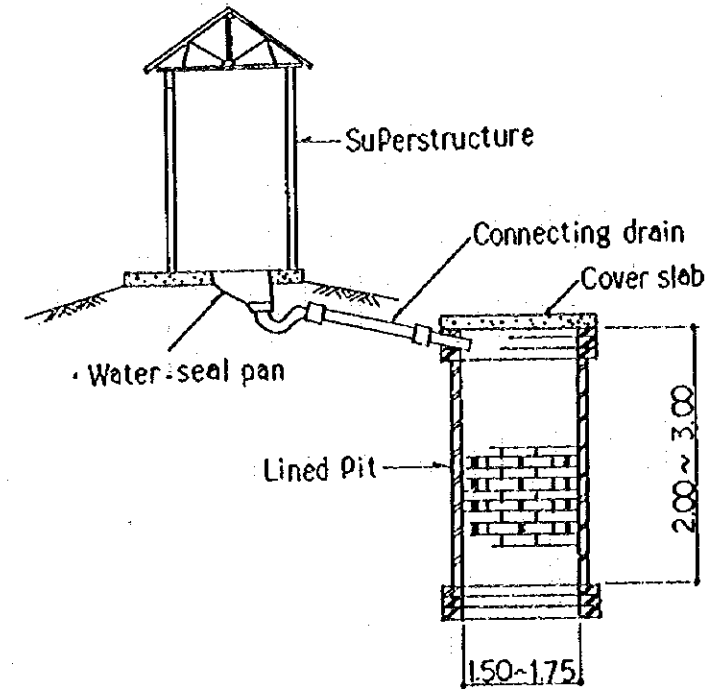
NOTE: unit is millimeter unless otherwise specified.



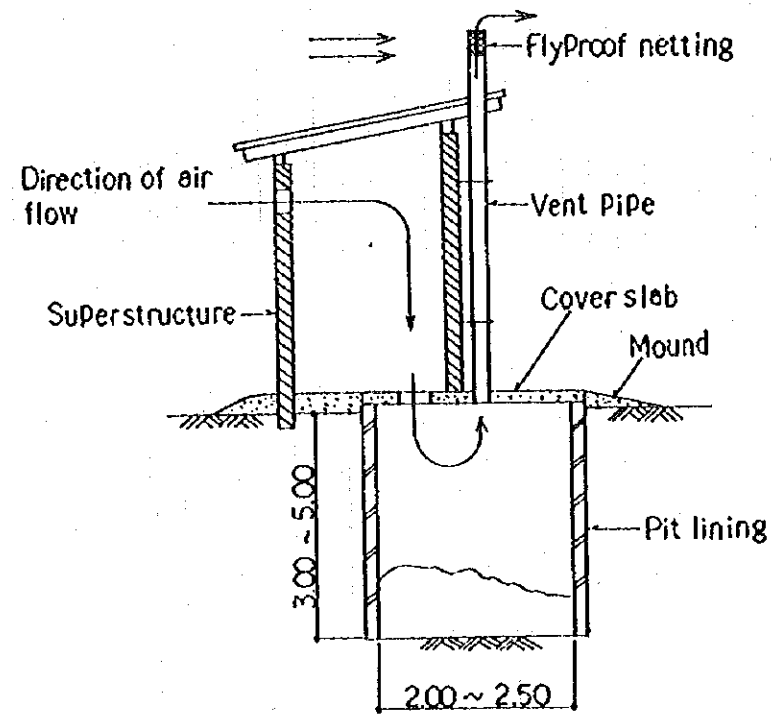
Waste Water Disposal Pit



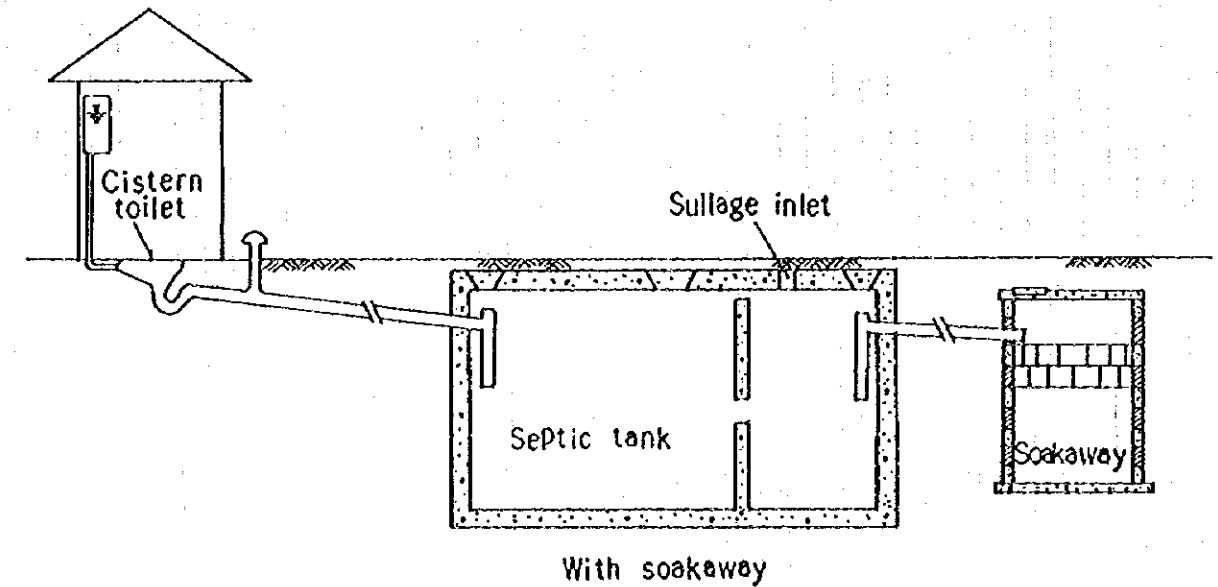
Improved Traditional Pit Latrine



Pour-flush latrine and Soakaway Pit

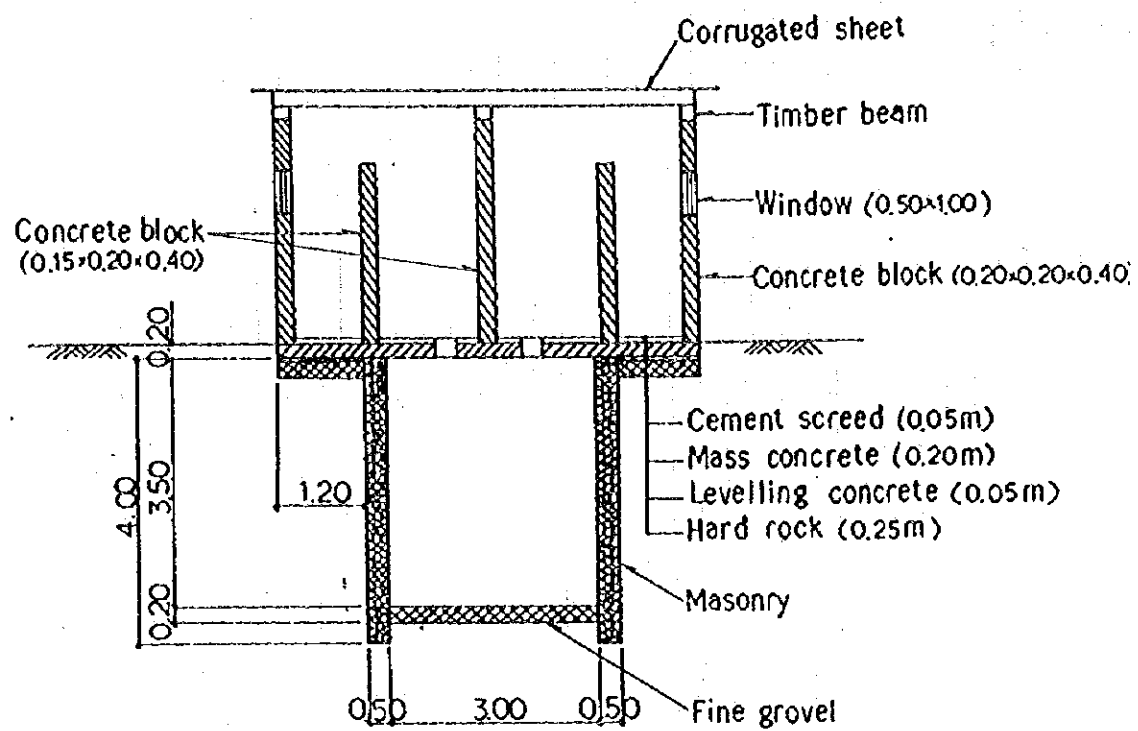


VIP Latrine

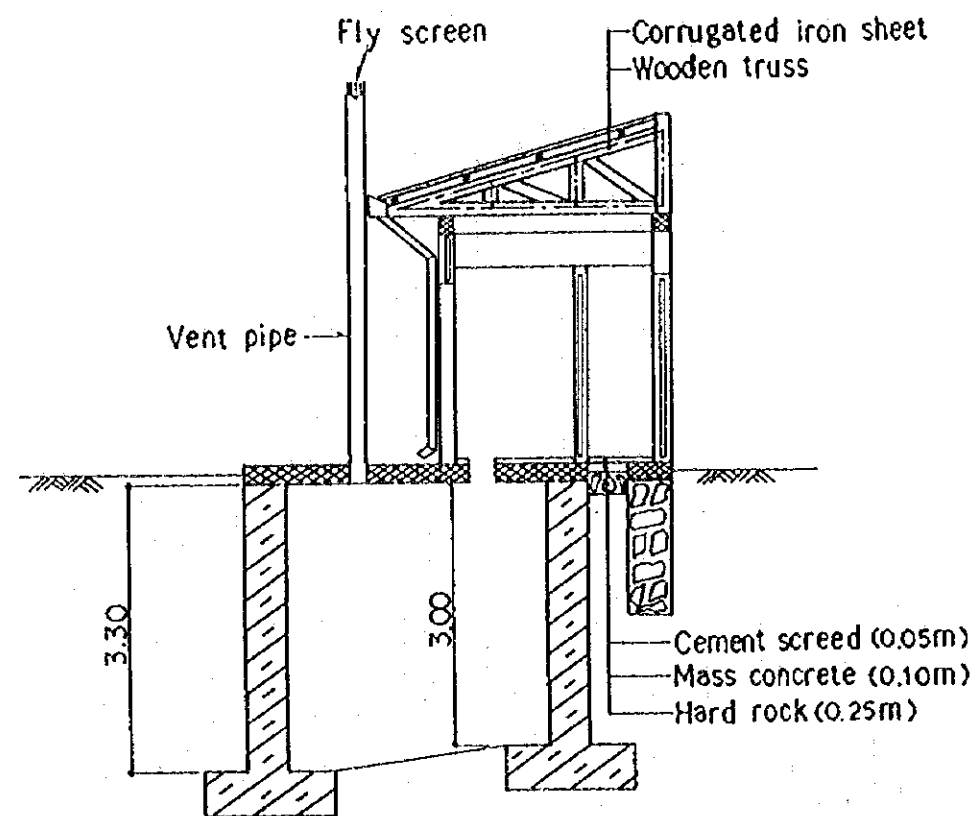


Cistern-flush Toilet and Septic Tank

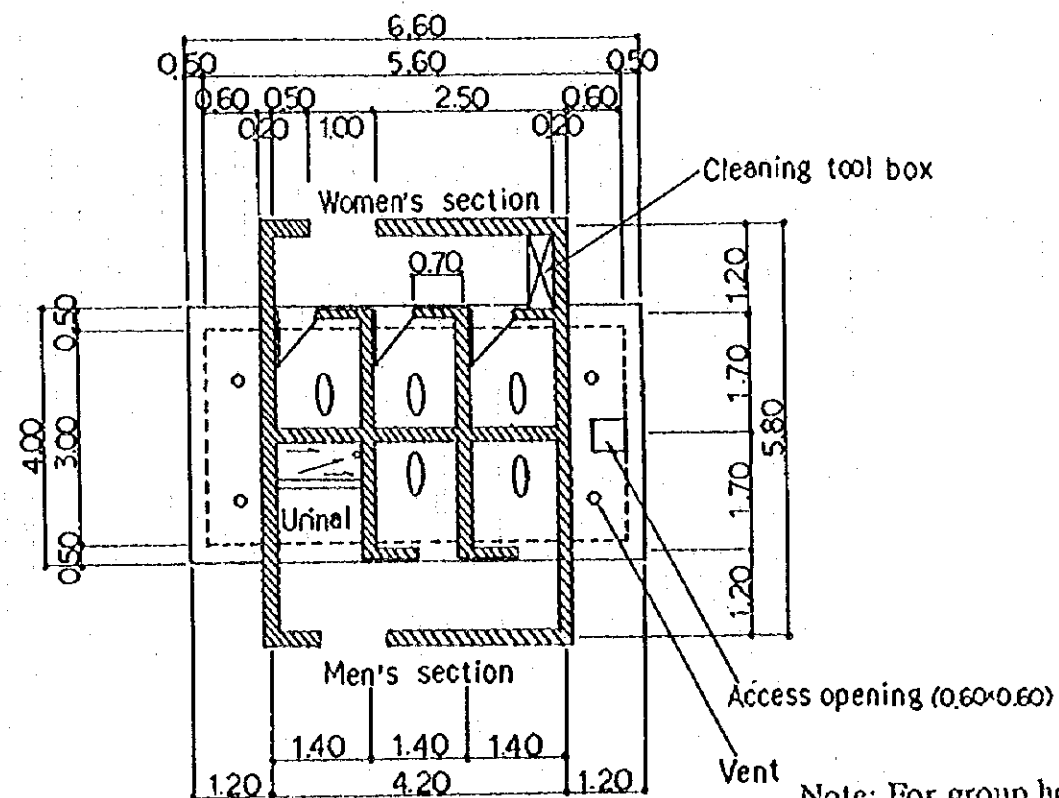
Drawing 13. Layout of Community Type Toilet and VIP Public Type Toilet



Typical Section

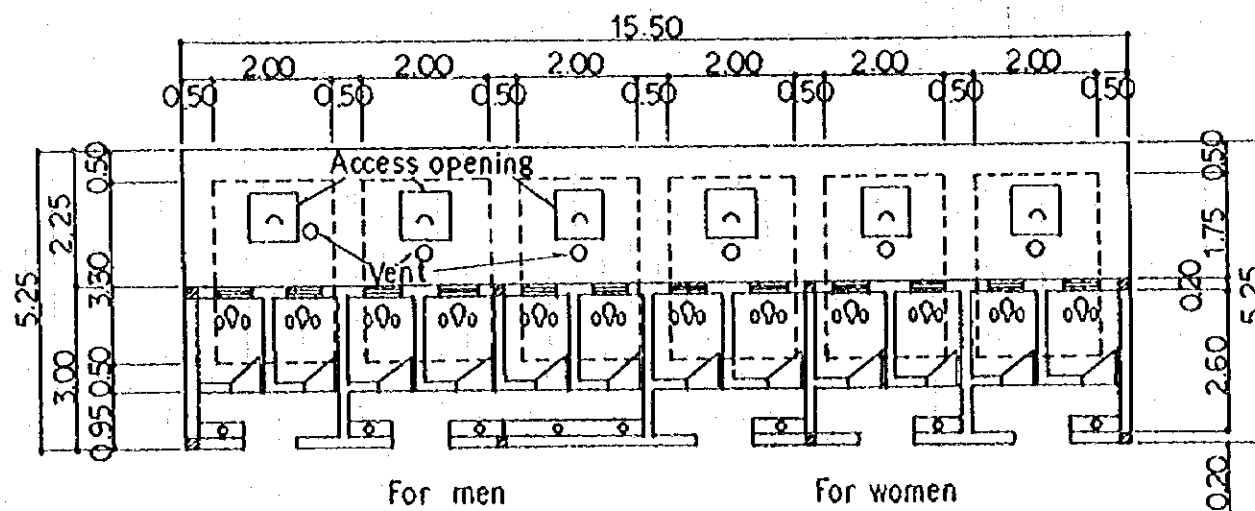


Typical Section



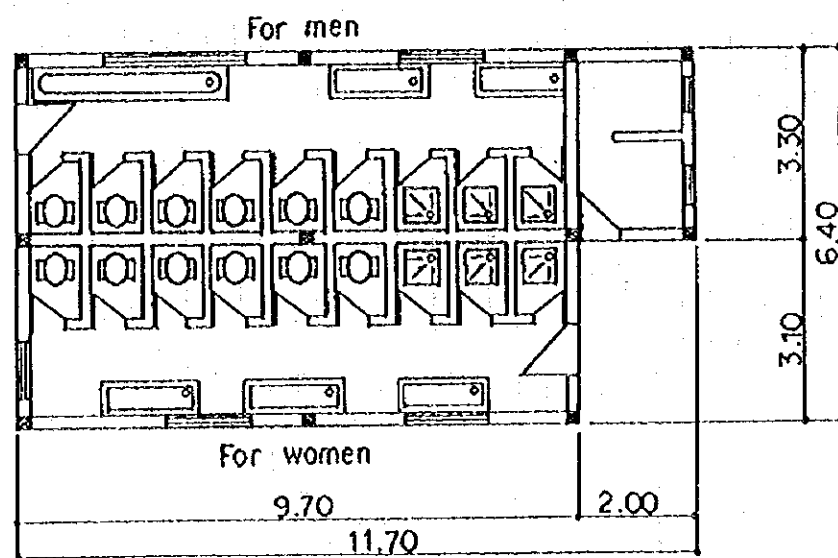
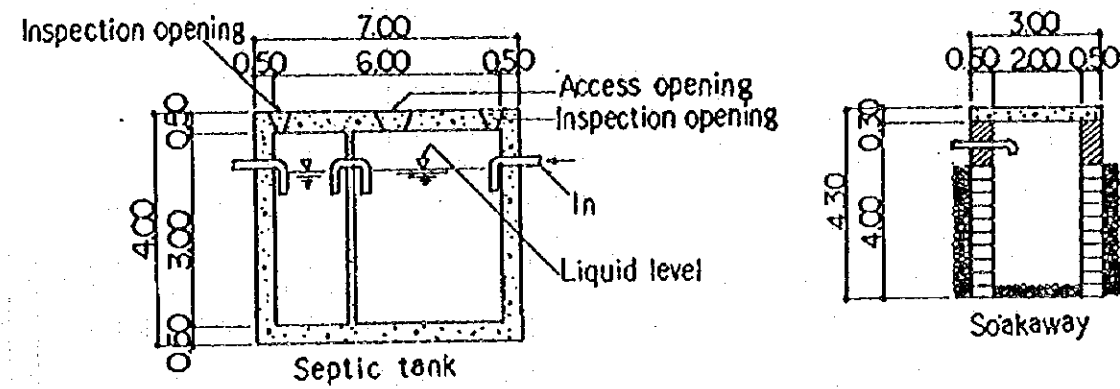
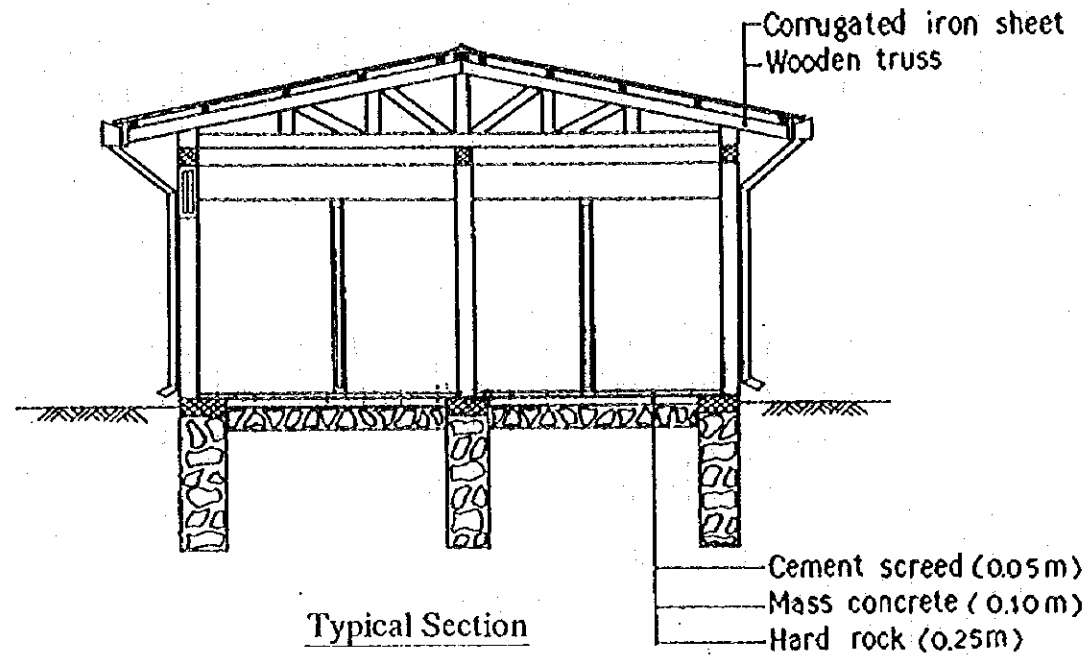
VIP Latrine (Community Type)

Note: For group household use, urinal is changed to 6th cubicle.

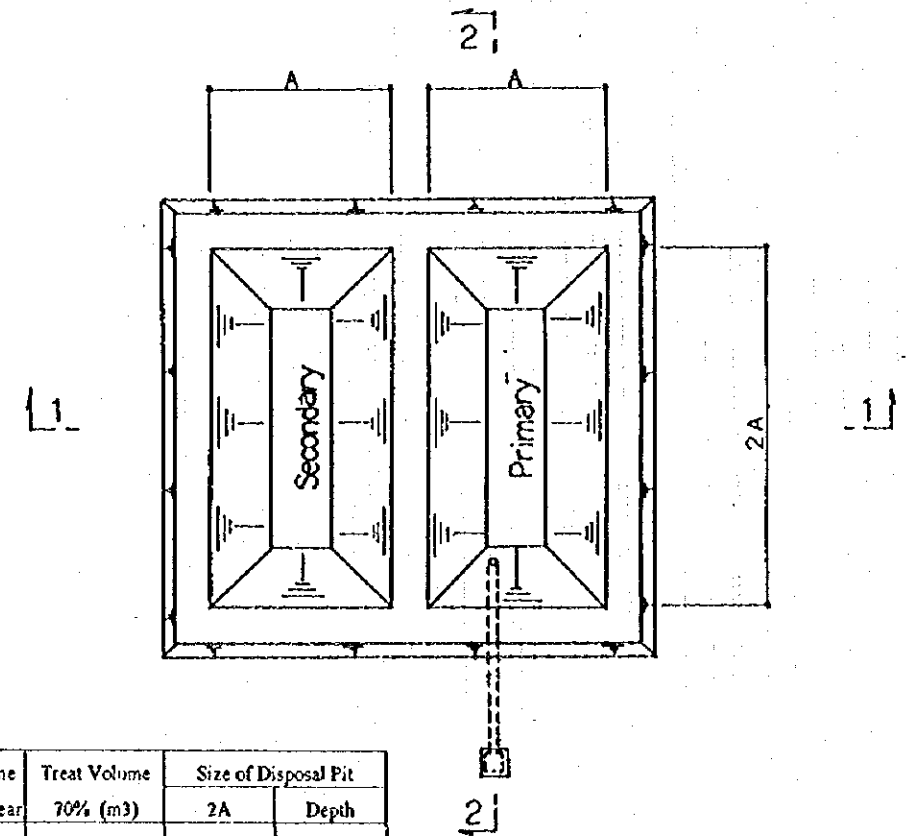
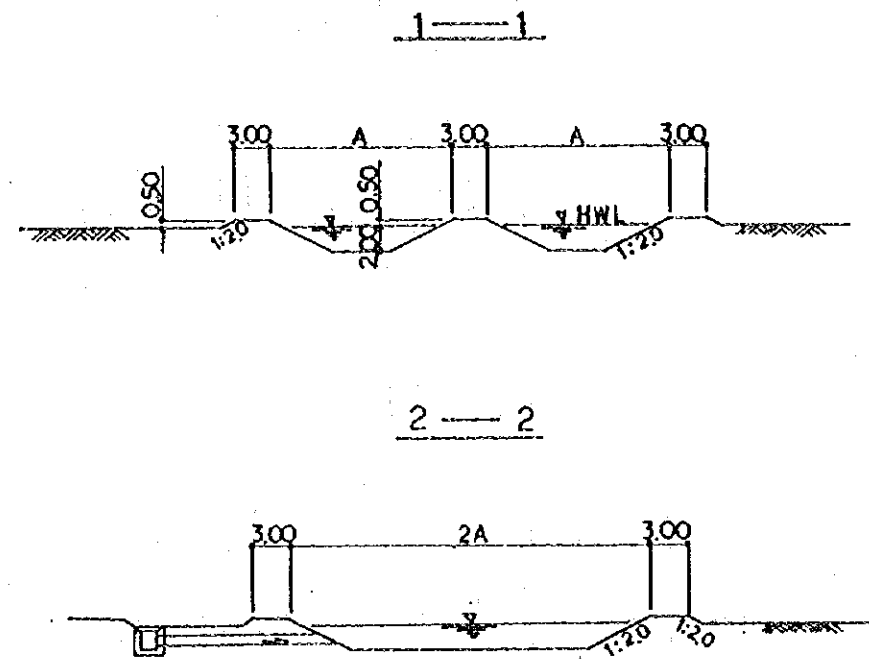


VIP Latrine (Public Type)

Drawing 14. Layout of Pour-flush Public Type Toilet and Sullage Disposal Pit

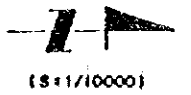


Pour-flush Latrine with Shower (Public Type)

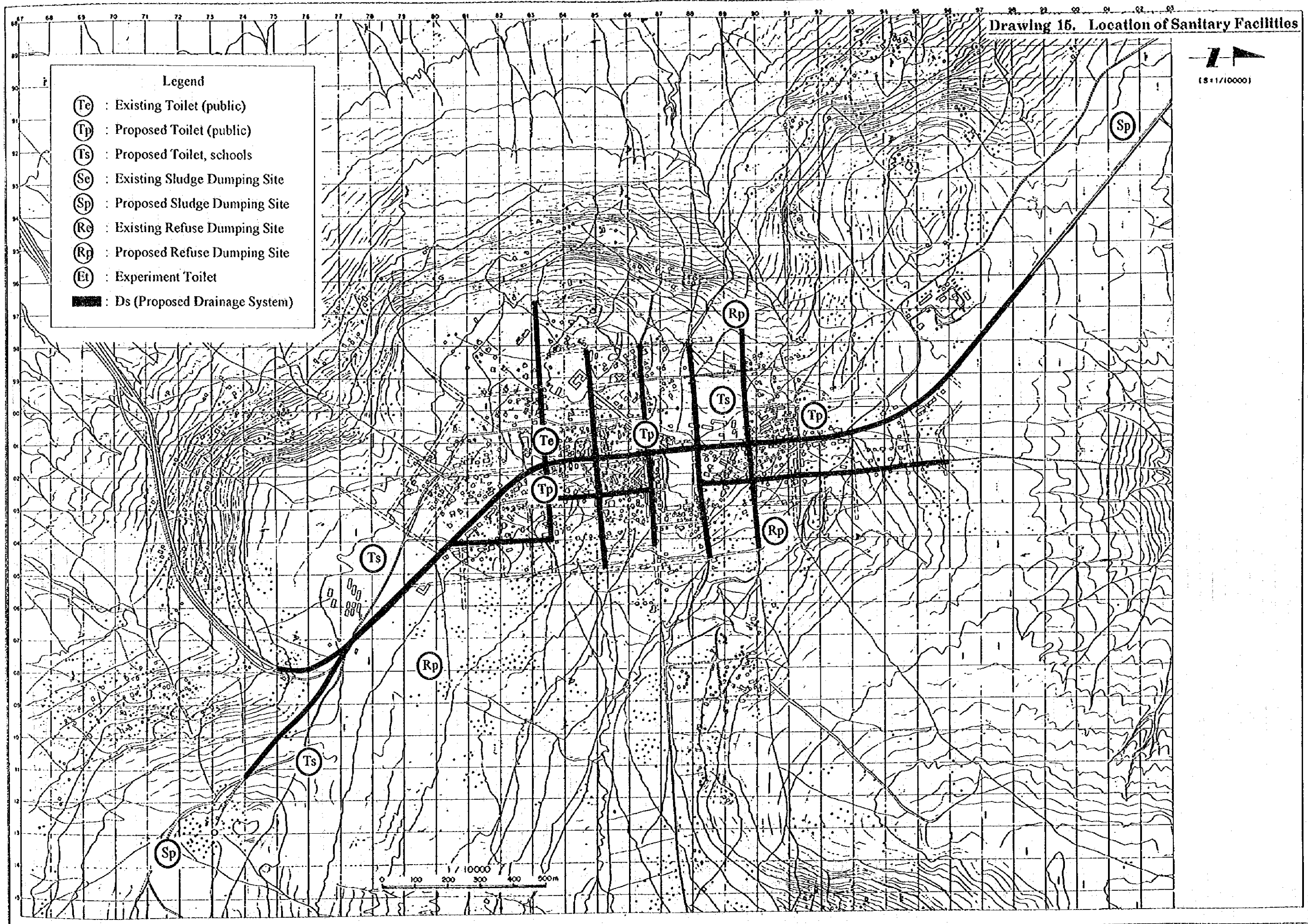


Urban Center	Population	Sludge Volume	Treat Volume	Size of Disposal Pit	
				2A	Depth
Bichena	19,700	0.2m ³ /Man/Year	70% (m ³)	37m	2m

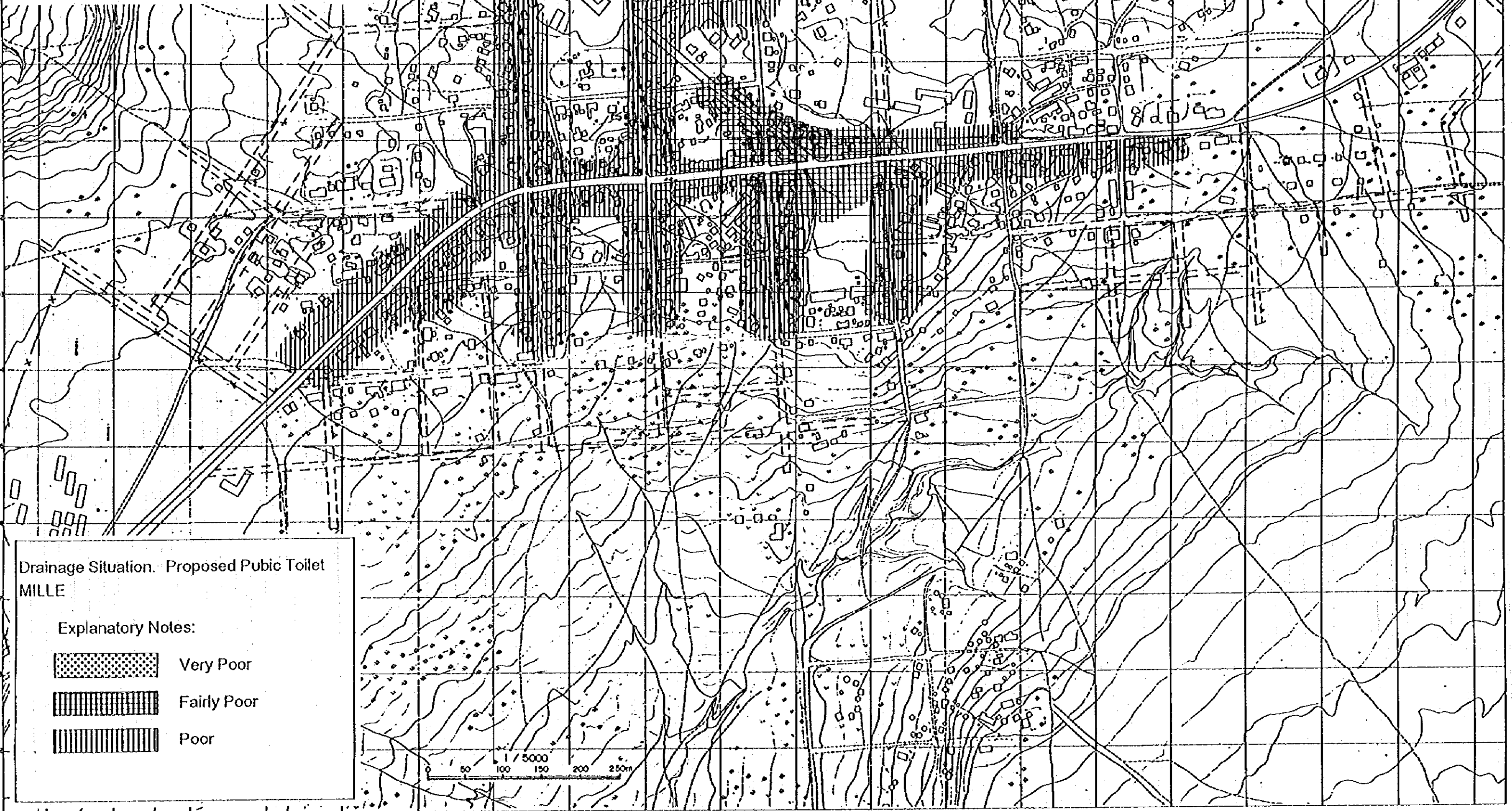
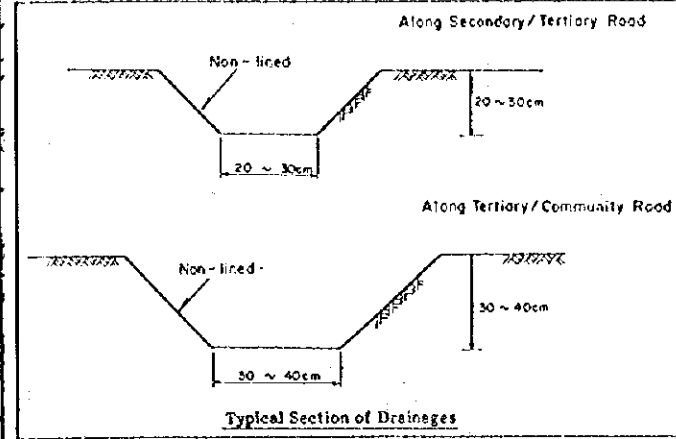
Drawing 15. Location of Sanitary Facilities



- Legend
- (Te) : Existing Toilet (public)
 - (Tp) : Proposed Toilet (public)
 - (Ts) : Proposed Toilet, schools
 - (Se) : Existing Sludge Dumping Site
 - (Sp) : Proposed Sludge Dumping Site
 - (Re) : Existing Refuse Dumping Site
 - (Rp) : Proposed Refuse Dumping Site
 - (Et) : Experiment Toilet
 - : Ds (Proposed Drainage System)


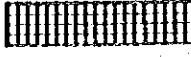



Drawing 16. Current Drainage Condition and Improvement Plan



Drainage Situation. Proposed Pubic Toilet MILLE

Explanatory Notes:

-  Very Poor
-  Fairly Poor
-  Poor

0 50 100 150 200 250m

1/5000

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