第７章　結論と提言

７－１　結　論

今回実施した基本設計調査は、別冊でとりまとめたNarayanganj Townを含めて、次の８Town の飲料水給水施設整備計画について調査、解析を行なった。

① Narayanganj Town　　⑤ Gaibandha Town
② Narsingdi Town　　⑥ Kurigram Town
③ Jenidah Town　　⑦ Feni Town
④ Chuadanga Town　　⑧ Sunamganj Town

調査、検討の結果、上記Townにおける飲料水の給水施設が整備された場合には、バングラデシュ国政府が目的としている　安全で、清潔な飲料水が各Townの住民に供給されることになる。今まで非衛生的な生活用水の使用から発生していた伝染病その他の大幅な減少が期待され、Town住民の生活の安定と向上、保健衛生環境の改善に大きく寄与することになり、その効果は非常に大きなものがあると判断される。

従って、上記Townの飲料水給水施設の整備が早急に実現されることが望まれる。

しかし、追加要請された衛生設備整備計画については、

① 各Townにおけるし尿処理に対する基本計画が未定である。
② Water Seal Latrineは、し尿の土中浸み込み式であるから、浅井戸、洗濯用溜池等との位置、標高関係を十分、調査、検討する必要がある。
③ 他のし尿処理方法との検討が必要である。

などの理由から、今回の無償資金協力からは除外することが望ましいと判断される。

７－２　提　言

(1) 総論

前述の様に、本計画は、住民の生活の安定と向上、保健衛生環境の改善の面で非常に大きな効果を発揮するものと期待されている。　本計画の目標年次は１９９０年としており、種々の懸案事項を早急に解決され、本計画の建設が実施に移されることが望まれる。

そのため、バングラデシュ国政府においては、次の事項について事前に処置されることが必要である。

① 生産井、ポンプ小屋、給水塔、除鉄装置、浄水場、及び公共水栓などの建設敷地の買収、補償　等

② 配水管及び送水管の管埋設について道路管理者の承認及び地主に対する調整（補償、その他）

③ 前記諸施設の施工設計のための詳細測量のため、建設敷地及び路線敷地内の立木等の伐採と撤去

④ 建設工事に必要な資機材置場、現場事務所等の用地の提供、場所の確保

⑤ 給水施設建設工事の実施に関し、必要な法的な手続き

⑥ 日本から輸入する必要のある資機材に対する関税等の費用の手当

(2) 建設工事期間

本計画は、給水塔基礎、管布設など、土工事を含むためと、バングラデシュ国の雨季においては地下水位が地表近くにあるため、雨季における土工事は非常に難しい。そのため、建設工事は乾季に実施出来る様、日本とバングラデシュ国政府の適切なる処置が必要であると考える。

(3) 実施設計期間

実施設計においては配管に沿った道路地図の作成、井戸予定地でのTest boring、給水塔など構造物予定地点での基礎ボーリング及び地耐力テストなどを実施する必要があり、E/N締結にあたっては、これらの作業を行なう期間を考慮した工程計画を作成する。

(4) 施設の維持管理

水道事業の維持管理の重要性については、既に第5章維持管理計画の項において述べた通りである。水道事業の適正な維持管理を行なうためには、経営組織の整備、要員の養成、施設の管理運営はもとより、水道料金の徴収による維持管理費の確保が重要である。

第6章6－2項において試算している様に、現在の水道料金による各Townの水道料金収入（1990年）は、維持管理費用の30%程度である。その不足する費用は、バングラデシュ国政府の予算から支出されるため、施設の維持管理には支障がないとの、バングラデシュ国政府側の説明であり、健全な財政のもとに適正な管理運営がなされれば、安全で清潔な飲料水を国民に供給することが出来るものと考える。また、今後バングラデシュ国政府により、適正な水道料金の検討を含めて、維持管理計画と組織の整備が実現化され、本計画により完成した諸給水施設が当初の計画通り管理運営されなければならない。

給水塔容量は、日給水量の20%程度として設計しているが、第3章　資料編に述べてある様に、給水塔容量とポンプ稼動時間について水収支計算を行なった結果からみると、1990年における水需要に対しては、1日当り12時間の稼動では24時間の給水

は不可能である。そのため、バングラデシュ国内の時間使用水量の調査をふまえて、適正なポンプ稼動時間を設定することが必要である。ポンプ稼動時間は、各戸給水の普及状況、即ち、需要水量によって変化するものであり、これらの要因も含めて検討される必要がある。

(5) 将来計画

バングラデシュ国政府の長期目標としては、2,000年には給水率100%となる様計画している。2000年における給水対象人口は、1990年の約1.5倍となり、給水量は各戸給水率の増加にともない、それ以上の伸びで増加するものと予想される。本計画においては、ポンプの稼動時間を12時間としているので、給水施設の稼動時間を16～24時間とすれば、2000年における需要水量に対しては、現在計画している水源施設で十分給水が可能であると算定される。(Table 7－1参照)

Table 7－1　将来計画に対する検討

Town	1981年 人口	1981→90 人口増加率	1990年 給水人口	1990年 需要水量	1990→2000 人口増加率	2000年 給水人口	2000年 需要水量	考察
Narsingdi	70,006人	10%	152,700 (165,000)	12,369 m³/day	5%	248,732人	25,480 m³/day	18.2m³/min×60×24＝26,208m³/day 23時間20分稼動
Jenidah	49,355	10	69,000 (116,000)	5,589	5	112,394	11,514	180m³/hr×24×3＝12,960m³/day 21時間20分稼動
Chuadanga	47,815	6	68,000 (81,000)	5,508	3	91,386	9,362	180m³/hr×24×3＝12,960m³/day 17時間20分稼動
Gaibandha	38,342	6	54,000 (64,800)	4,374	3	72,571	7,434	150m³/hr×24×3＝10,800m³/day 16時間30分稼動
Kurigram	46,132	6	48,000 (78,000)	3,888	3	64,508	6,608	180m³/hr×24×2＝8,640m³/day 18時間20分稼動
Feni	23,199	6	40,000 (40,000)	3,240	3	53,756	5,507	85m³/hr×24×4＝8,160m³/day 16時間10分稼動
Sunamganj	21,565	6	37,000 (37,000)	2,997	3	49,725	5,094	処理施設能力は5,275m³/dayとして設計してある。
Total	296,414		468,700	37,965		693,072	69,999	16～24時間稼動にて供給可能

（注）　(1)　現計画井戸ポンプ　12hr/day稼動
　　浄水場　　15　〃　　〃

(2)　2000年における計画給水量の各戸給水は人口の80%とし、90ℓ/日、公共水栓は人口の20%とし、34ℓ/日、Wastageを30%とする。

(3)　1990年給水人口の欄の（ ）内はTownの総人口である。

附　屬　資　料

Annex - I

Minutes of Discussion
on
The Establishment Project for Water Supply Facilities
in
The Peoples' Republic of Bangladesh

In response to the request made by the Government of The Peoples' Republic of Bangladesh for a Project for water supply facilities(hereinafter referred to as "the Project"), the Government of Japan has sent, through the Japan International Cooperation Agency(hereinafter referred to as "JICA") which is an official agency implementing the technical cooperation of the Government of Japan, a team headed by Mr. Yutaka HOSONO, the deputy director of Grant Aid Department, JICA, to conduct the survey for 73 days from April Ist to June 12th 1984.

The team carried out a field survey, held a series of discussions and exchanged views with the authorities concerned of the Government of the Peoples' Republic of Bangladesh.

Both parties have agreed to recommend to their respective Governments and the authorities concerned to examine the result of the survey attached herewith toward the realisation of the Project.

June 11th, 1984.

YUTAKA HOSONO
Head, Japanese Basic Design Survey Team.

M. AZIZUL HAQUE
Joint Secretary, LG Division, Ministry of LGRD & Cooperatives, Govt. of the Peoples' Republic of Bangladesh.

Attachment

1. The objective of the project is to establish the most appropriate water supply facilities for the eight towns described below on priority basis

1. Narayangonj	5. Shunamganj
2. Gaibandah	6. Feni
3. Kurigram	7. Jenidah
4. Narsingdi	8. Chundanga

2. Both parties confirmed the basic concept of water supply facilities and location plan for each town.
The basic concept is shown in Annex I.

3. The Japanese survey team will convey to the Government of Japan the desire of the Government of the Peoples' Republic of Bangladesh that the former takes necessary measures to cooperate in implementing the project and bears the cost of the water supply systems requested by the latter shown in Annex I within the scope of Japanese economic cooperation program in grant form.

4. The Government of the Peoples' Republic of Bangladesh will take necessary measures listed in Annex II under the condition that the grant aid assistance by the Government of Japan is extended to the Project.

5. In spite of clause 2 and 3 in Annex II, the Government of the Peoples' Republic of Bangladesh requested the Government of Japan to bear the costs of access roads and the costs for extension of electric lines to the sites including transformers etc and fences around the facilities to be constructed under the Project. The request has been made due to the constraints of local resources of the Government of Bangladesh.

6. The Government of Peoples' Republic of Bangladesh requested the association of local consultant(s)/Engineers with the Japanese consultant in course of the field survey for detailed design and construction supervision period.

7. The Japanese team explained the difficulty to include the sanitation component in the project. But Government of Bangladesh made strong request for the inclusion of sanitation component for the reason of improvement of health.

8. Both parties confirmed that the Survey team explained Japan's grant aid program and the Bangladesh side has understood it.

9. The Japanese team requested the Bangladesh side to ensure prompt aqusition of construction sites and payment of taxes etc for imported goods as mentioned in clause 1 and 5 of annex - II in order that delay or interference is not caused in project implementation.

(Annex I)

1. The basic concept of water supply facilities and location plan for each town requested by the Proples' Republic of Bangladesh, are shown on the attached maps.

2. Regarding Shunamgonj, study will be made on, surface water in comparison to ground water as water source and the result will be included in draft final report.

3. Priority of implementation for Narayangonj Town requested by the Bangladesh side is as follows:

   (1) Expansion of the treatment Plants.

   (2) Rehabilitation of the main pipe line system.

   (3) Construction of overhead tanks.

   (4) Rehabilitation of distribution system other than the main pipe line system.

   (5) Extension of distribution system.

(Annex II)

The following arrangements are requested to be taken by the Government of the Peoples' Republic of Bangladesh.

1. To secure necessary lands for the Project, and to clear, fill and level the sites as needed before the start of the works.

2. To provide facilities for distribution of electricity, and other incidental facilities outside of the site, if necessary.

3. To construct access roads to the sites when necessary.

4. Provision of respective data and information to a Japanese consultant and a contractor necessary for the detailed engineering services and construction.

5. To ensure prompt unloading, tax payment, customs clearance, and prompt internal transportation therein of the products purchased under the grant.

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

7. To provide and accord necessary permissions, licences and other authorization required for execution of the Project.

8. To maintain and use properly and effectively the facilities constructed under the grant, and to arrange the budget for maintenance and operation.

9. To bear all the expenses, other than those to be borne by the grant, necessary for the Project.

A－2　調査日程及び調査団員名簿

日程	月日	曜日	移動	滞在地	作業内容
1	3月31日	土	東京→Bangkok	Bangkok	移動
2	4月 1日	日	Bangkok→Dhaka	Dhaka	〃、大使館打合せ
3	2	月		〃	関係省庁表敬、JICA事務所
4	3	火		〃	DPHE打合せ、資料収集
5	4	水		〃	Dhaka EE、Narsingdi SDE 打合せ
6	5	木		〃	Narsingdi 調査
7	6	金		〃	〃
8	7	土		〃	〃
9	8	日		〃	〃
10	9	月		〃	基本プランとりまとめ
11	10	火		〃	Dhaka EE、Narsingdi SDE説明、協議
12	11	水	Dhaka→Jessore	Jessore	移動
13	12	木		〃	Jessore EE、Jenidah SDE 打合せ
14	13	金		〃	Jenidah 調査
15	14	土		〃	〃
16	15	日		〃	〃
17	16	月		〃	基本プラン　とりまとめ
18	17	火		〃	Chuadanga 調査
19	18	水		〃	〃
20	19	木		〃	〃
21	20	金		〃	基本プラン　とりまとめ
22	21	土		〃	Jessore EE、Jenidah及びChuadanga SDE 説明・協議
23	22	日	Jessore→Bogra	Bogra	移動
24	23	月	Bogra→Rangpur	Rangpur	〃
25	24	火		〃	Rangpur EE、Kurigram SDE 打合せ
26	25	水		〃	Kurigram 調査
27	26	木		〃	〃
28	27	金		〃	〃
29	28	土		〃	〃
30	29	日		〃	Gaibandha 調査
31	30	月		〃	〃

日程	月 日	曜日	移　　動	滞在地	作　業　内　容
32	5月1日	火		Rangpur	Gaibandha調査
33	2	水		〃	〃
34	3	木		〃	Kurigram 基本プランとりまとめ
35	4	金		〃	Gaibandha基本プランとりまとめ
36	5	土		〃	Rangpur EE、Kurigram及びGaibandha SDE 説明、協議
37	6	日	Rangpur→Bogra	Bogra	移動
38	7	月	Bogra→Dhaka	Dhaka	移動　　武藤・東京→Bangkok
39	8	火		〃	大使館、JICA報告　　〃 Bangkok→Dhaka
40	9	水		〃	DPHE打合せ、Dhaka EE及び Narayanganj SDE打合せ
41	10	木		〃	Narayanganj 調査
42	11	金		〃	〃
43	12	土		〃	〃
44	13	日		〃	〃　　（碓井、武藤）
45	14	月	Dhaka→Comilla	Comilla	移動　　Narayanganj 調査
46	15	火		〃	Comilla EE、Feni SDE打合せ　　〃
47	16	水		〃	Feni調査　　〃
48	17	木		〃	〃　　〃
49	18	金		〃	〃　　〃
50	19	土		〃	基本プランとりまとめ　　〃
51	20	日		〃	Comilla EE、Feni SDE 説明・協議　　〃
52	21	月	Comilla→Sylhet	Sylhat	移動　　〃
53	22	火		〃	Sylhet EE、Sunamganj SDE 打合せ　　〃
54	23	水		〃	Sunamganj 調査　　〃
55	24	木		〃	〃　　〃
56	25	金		〃	〃　　〃
57	26	土		〃	基本プランとりまとめ　　〃
58	27	日		〃	Sylhat EE、Sunamgamj SDE説明・協議　　〃
59	28	月	Sylhet→Comilla	Comilla	移動　　〃
60	29	火	Comilla→Dhaka	Dhaka	〃、国内打合せ　　〃
61	30	水		〃	DPHE、大使館、JICA中間報告
62	31	木		〃	Narayanganj 調査
63	6月2日	金		〃	〃
64	2	土		〃	〃

日程	月日	曜日	移　　動	滞在地	作　業　内　容
65	6月3日	日		Dhaka	Narayanganj 調査
66	4	月		〃	基本プランとりまとめ　　JICA：東京→BKK
67	5	火		〃	Dhaka EE、Narayanganj SDE説明・協議　〃　BKK→Dhaka
68	6	水		〃	計画内容打合せ
69	7	木		〃	〃
70	8	金		〃	〃
71	9	土		〃	〃
72	10	日		〃	メモランダム提出
73	11	月		〃	ミニッツ・サイン、大使館、JICA事務所報告
74	12	火	Dhaka→Bangkok	Bangkok	移動
75	13	水	Bangkok→東京		〃

調査団員名簿

〔A〕 JICA

1. 細　野　豊　　団長　　無償資金協力部次長
2. 横　倉　順　治　　業務調整　　無償資金協力部基本設計課

〔B〕 調査団員

1. 田　村　文　雄　　水道計画　　日本技術開発株式会社
2. 大　栗　久　雄　　水理地質　　〃
3. 碓　井　達　郎　　水道施設計画　　〃
4. 森　下　正　美　　管水路計画　　〃
5. 武　藤　　寿　　社会調査　　〃
6. 森　尾　宗　俊　　浄水場計画　　〃
7. 大　浜　順　治　　調査作業調整　　〃

Annex III 面会者リスト

1. Ministry of L.G., C. & R.A.

Mr. Azizul Hagne	:	Joint Secretary, Local Gov. Div.
Mr. Syed Abdur Rob	:	Deputy Secretary, Local Gov. Div.
Mrs. Rahima Nahar	:	Asstt. Chief in charge, L.G. Div.

2. Department of Public Health Engineering (DPHE)

Mr. M.M. Husain	:	Chief Engineer
Mr. Fariduddin Ahmeduia	:	Asstt Chief Engineer
Mr. Abdur Rahman Mridha	:	S.E., Planning Cell Circle
Mr. Md. Nurul Hoque	:	EE, Planning Div
Mr. Kagi Nasiruddin Ahmad	:	EE, SIR Div
Mr. Abdur Rahman Mia	:	EE, G.W. & E. Div.
Mr. Quadivuzzaman	:	Project Manager, 5D. Town W.S. Project
Mr. Md. Zainal Abedin	:	EE, Dhaka Div.
Mr. A.M. Md. Shamsudduha	:	SDE, Narsingdi, Dhaka
Mr. Md. Shahihul Islam	:	SAE, Narsingji, Dhaka
Mr. Moshtaque Ahmed	:	EE, Jessore Div.
Mr. M.A. Rashid	:	Asstt. EE, Jessore
Mr. Abdur Rahman	:	SDE, Jenidah, Jessore
Mr. A.F.M. Wahid Azhar	:	SDE, Chuadanga, Kushtia
Mr. Ratneswar Biswas	:	SAE, Chuadanga, Kushtia
Mr. Md. Ishaque Ali	:	EE, Rangpur
Mr. Md. Kamruzzaman	:	SAE, in charge SDE, Kurigram, Rangpur.
Mr. Md. Belayet Hossain	:	SDE, Gaibandha, Rangpur.
Mr. Md. Nuruzzaman	:	Asstt. EE, Narayanganj, Dhaka
Mr. Md. Anwar Hossain	:	SAE, Narayanganj, Dhaka
Mr. Shafiguddin Amed	:	EE, Noakhali Div.
Mr. Rafiqul Islam	:	SDE, Feni, Noakhali
Mr. A.S.M. Latifur Rahman	:	EE, Comilla Div.
Mr. Md. Siddiguer Rahman	:	SE, Chittagong Circle.
Mr. Md. Shamsul Huda	:	EE, Sylhet Div.
Mr. Sarwar	:	SDE, Sunamganj, Sylhet

3. Planning Commission, Ministry of Finance & Planning

Mr. Nurul Hag	:	Chief. Physical Infrastructure Div.

Mr. Md. Azizul Hoque	:	Joint Chief, Physical Planning, Water, Supply and Housing Wing.
Mr. Md. Nurul Absar	:	Deputy Chief

4. External Resources Div. (ERD), Ministry of Finance & Planning

Mr. A.K.M. Salamatullah	:	Deputy Secretary (Japan desk)
Mr. A.K.M. Abul Basher	:	Research Officer (Grant Aid)

5. Local Government

Mr. Enamul Karim	:	Deputy Commissioner, Narsingdi Dist.
Mr. Shamsuddin Ahamed	:	Chairman, Narsingdi Poroushaova
Mr. Md. Mosharrof Hossain	:	Chairman, Jhenidah Poroushaova
Mr. C.A.M. Khairul Kabir Khan Pathan	:	Superintendant of Water Works, Narayanganj

6. Gas Company

Mr. S.A.D. Rozario	:	Planning & Design, Titas Gas
Mr. Mahfuzal Alam	:	Programme Officer, Titas Gas
Mr. Mostafezur Rahman	:	Engineer, Bagrabad Gas System

7. Power Development Board (BPDB)

Mr. S.T.S. Mahamud	:	Add. Chief Engineer, Planning & Design
Mr. C.J. Kabir	:	Add. Chief Engineer, Rashahi

8. Geological Survey of Bangladesh, Dhaka

Mr. Abu Bakar	:	Director General
Mr. Mohammad Khurshid Alam	:	Deputy Director

9. Water Development Board (BWDB)

Mr. Ghulam Mowla	:	Director, Groundwater
Mr. Alamgir Hussain	:	Deputy Director, Groundwater data processing & research circle

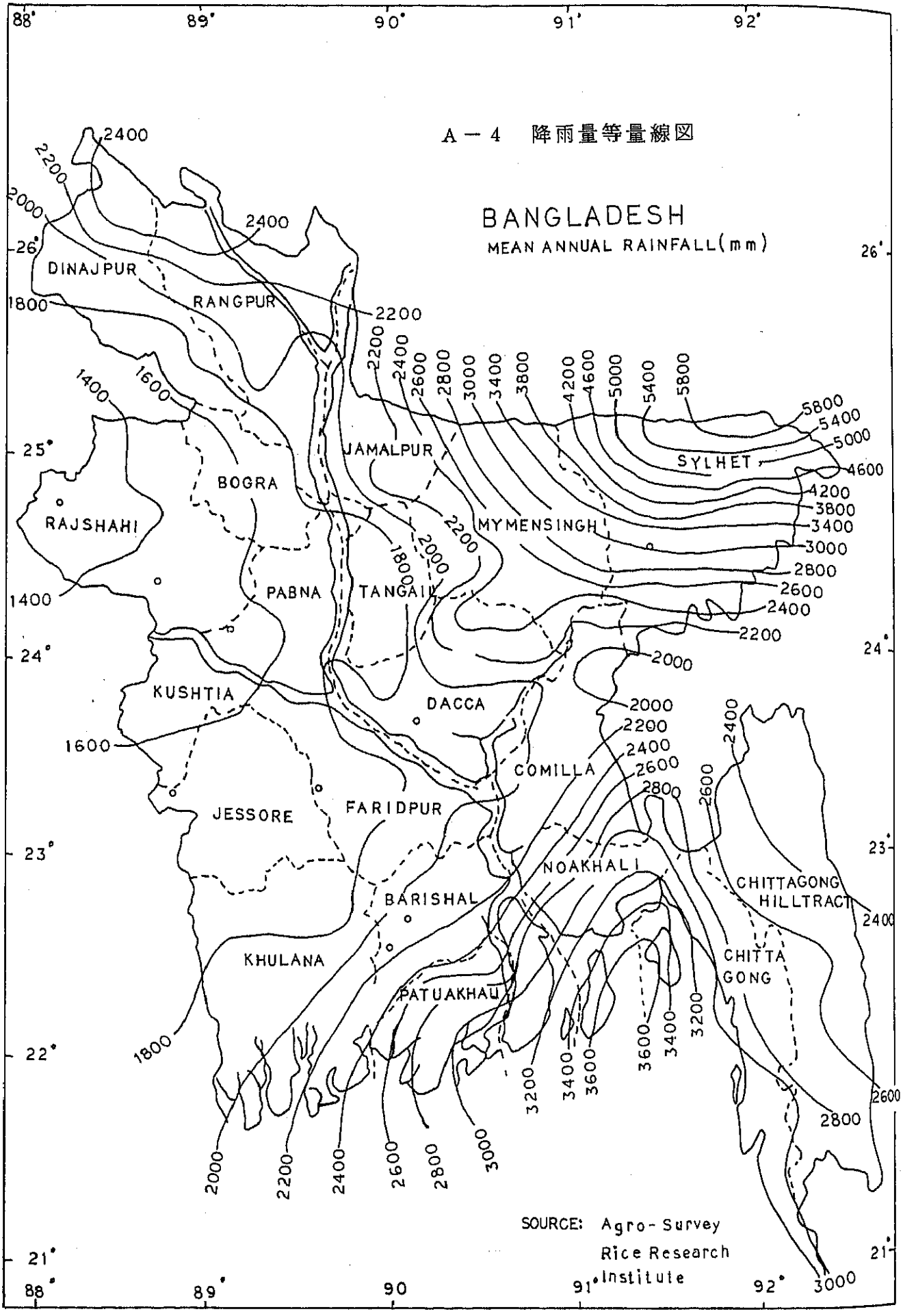
10. KSB Pump

Mr. K.B. Mahmud Khan	:	Sales Manager (Milnars Pumps Limited)

11. Pipe Maker

Mr. M.A. Hashem Bhuiyan	:	Add. Chief Accountant & Incharge Marketing Dept. LIRA Industrial Enterprise Ltd.

A－4　降雨量等量線図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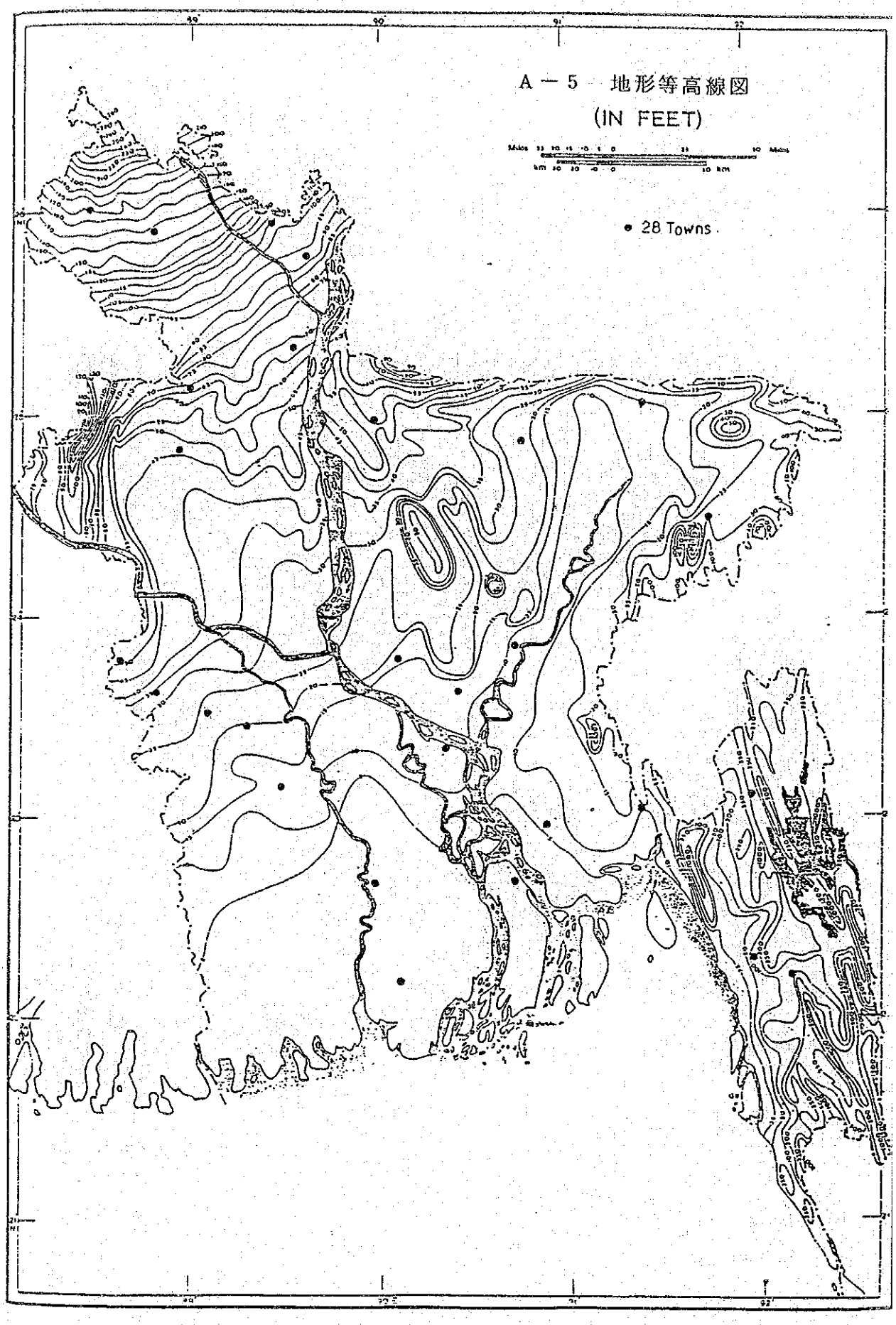
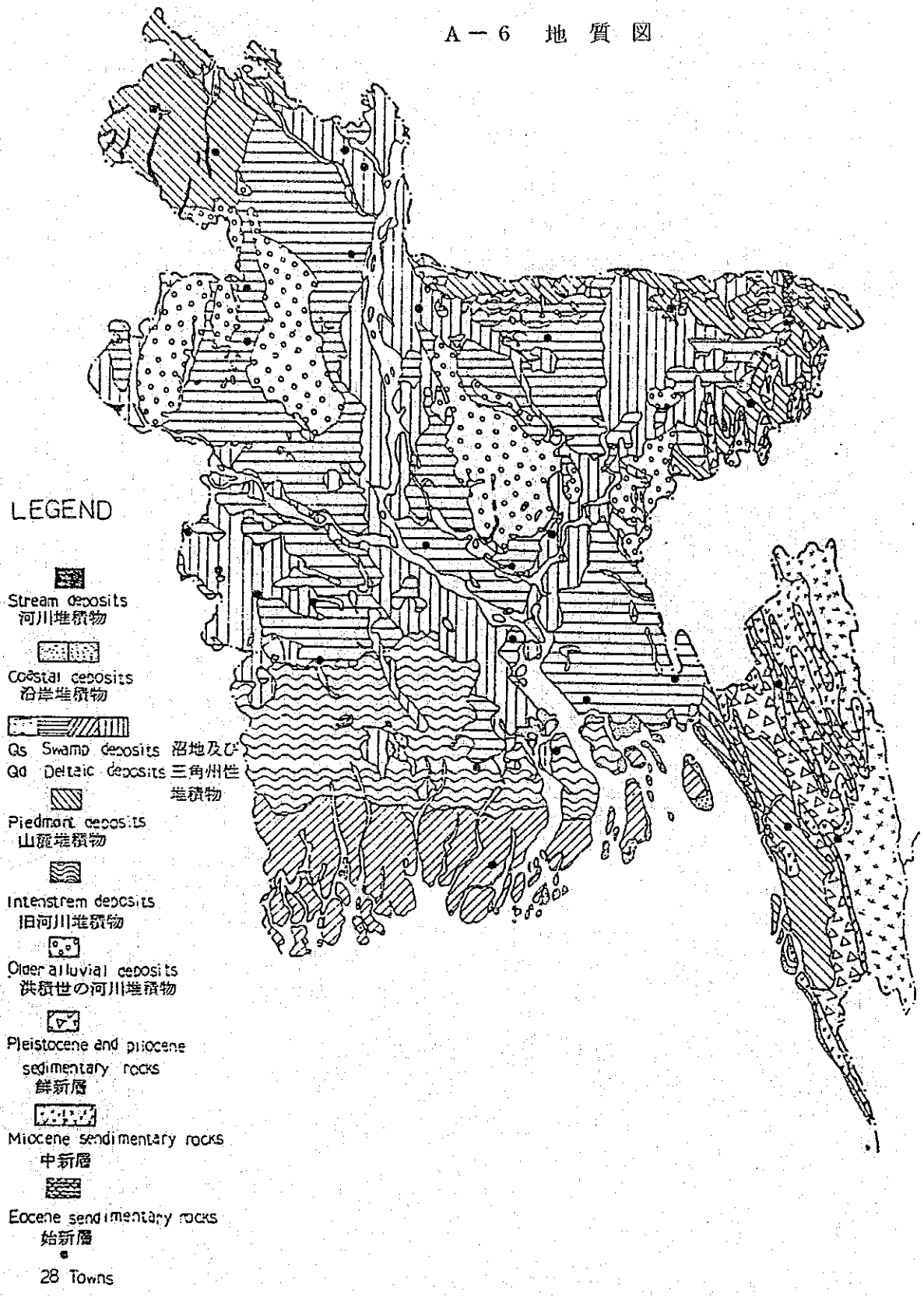
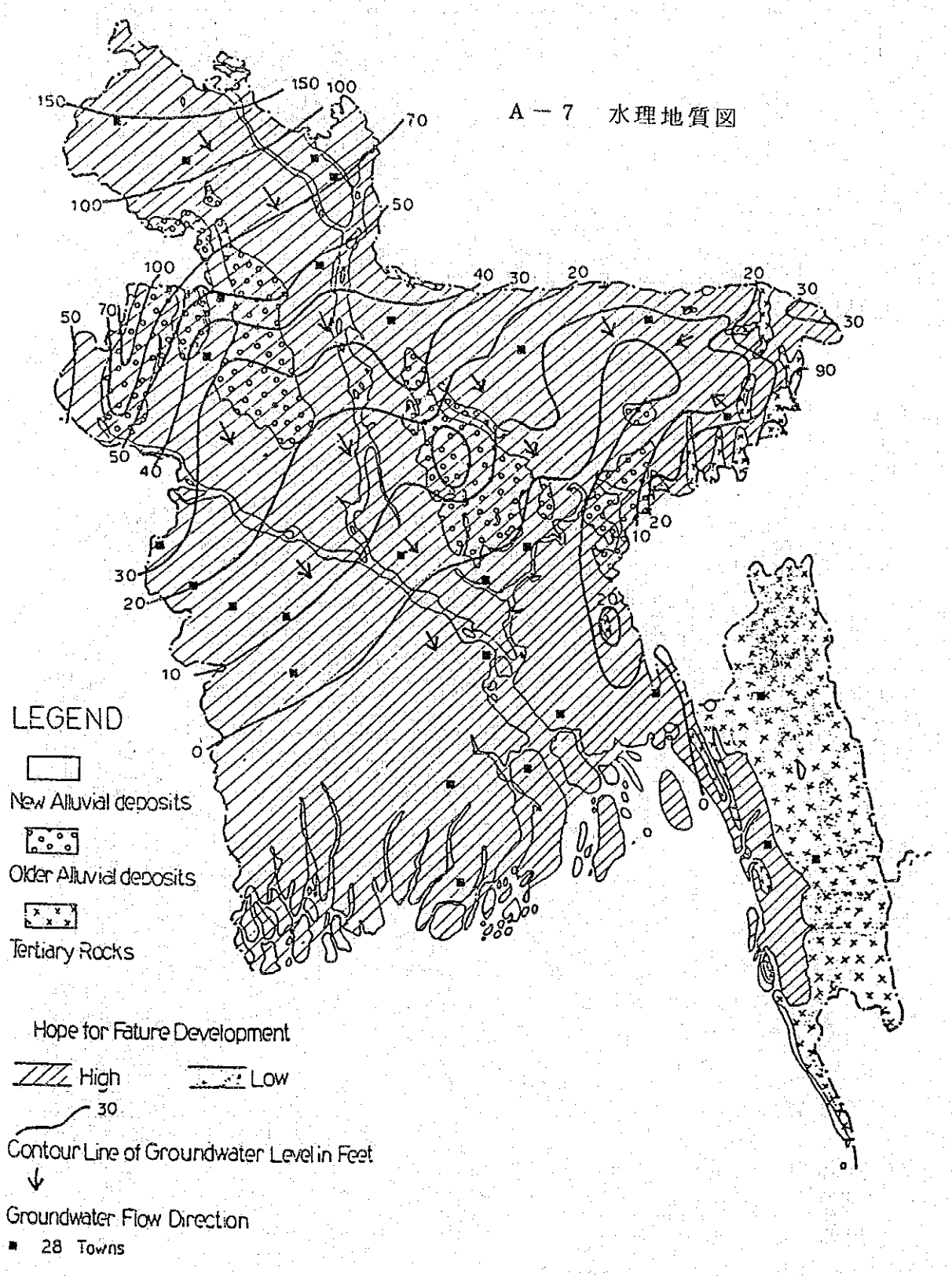
MYMENSINGH
SYLHET
KUSHTIA
DACCA
COMILLA
JESSORE
FARIDPUR
NOAKHALI
BARISHAL
KHULANA
PATUAKHALI
CHITTAGONG HILLTRACT
CHITTAGONG
SOURCE: Agro-Survey Rice Research Institute


A－5　地形等高線図
(IN FEET)
28 Towns

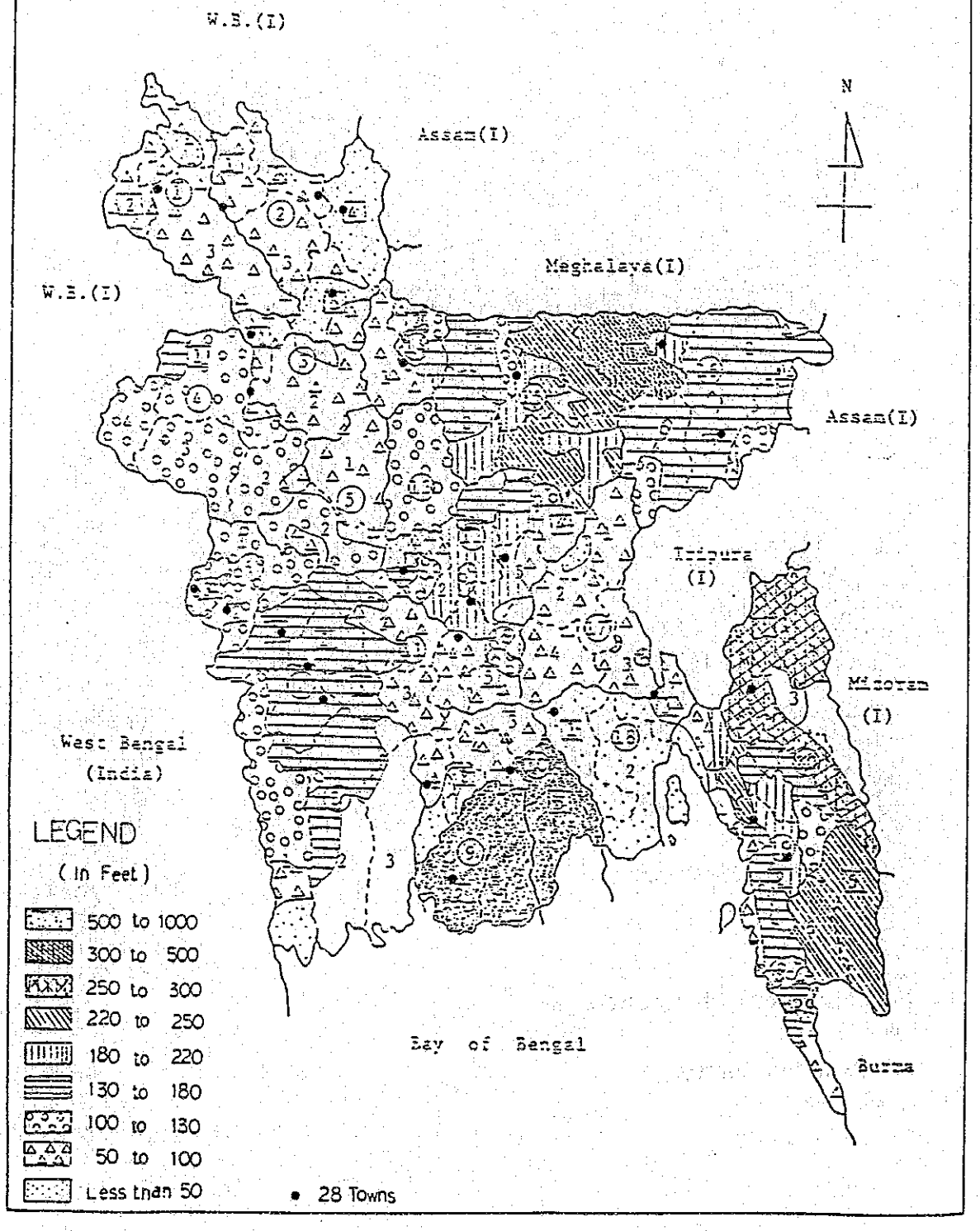
A－6　地　質　図


LEGEND
Stream deposits
河川堆積物
Coastal deposits
沿岸堆積物
Qs Swamp deposits 沼地及び
Qd Deltaic deposits 三角州性
堆積物
Piedmont deposits
山麓堆積物
Intenstrem deposits
旧河川堆積物
Older alluvial deposits
洪積世の河川堆積物
Pleistocene and pliocene
sedimentary rocks
鮮新層
Miocene sendimentary rocks
中新層
Eocene sendimentary rocks
始新層
28 Towns

A－7　水理地質図

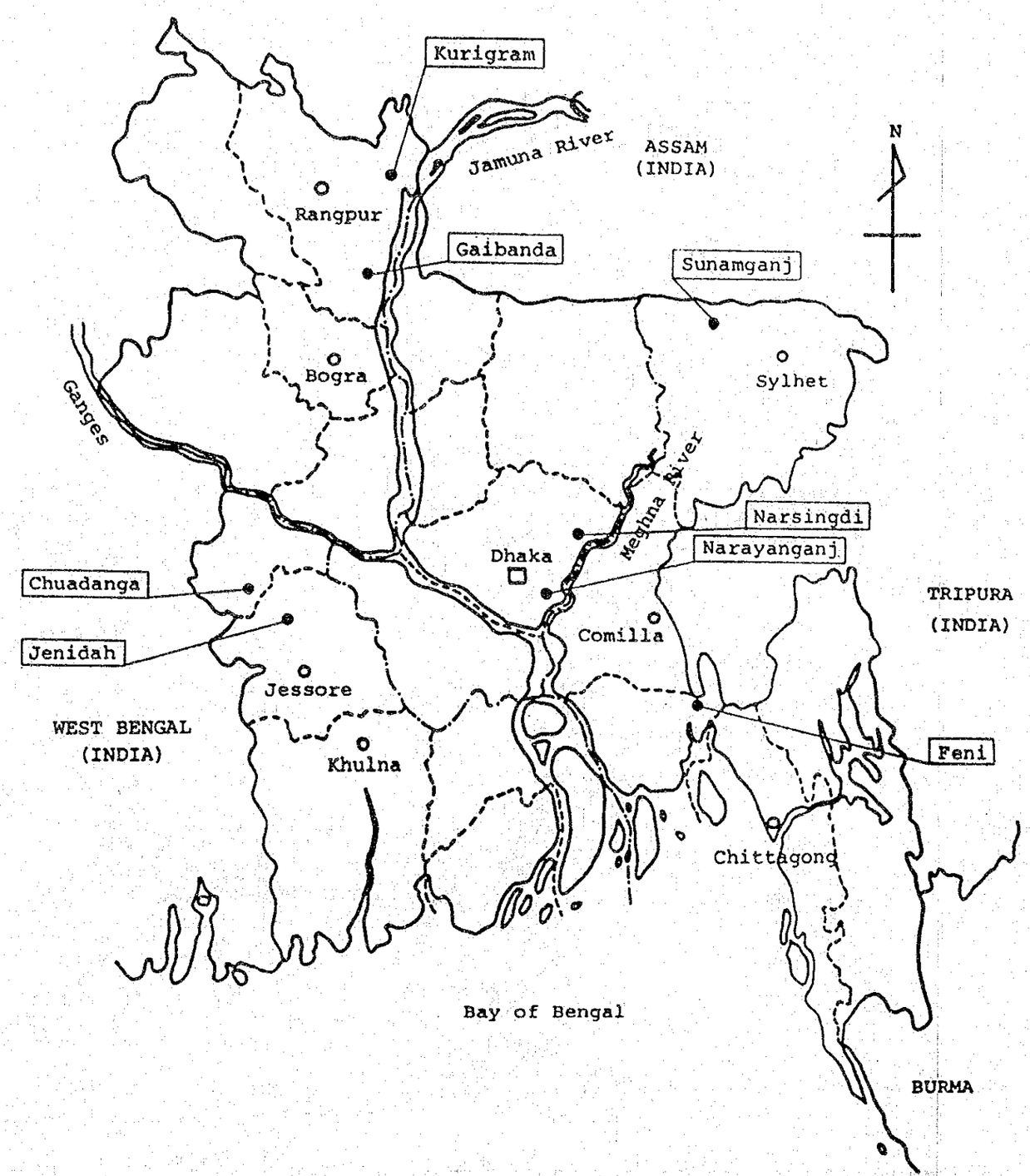

150
150
100
70
100
50
100
50
70
40
30
20
20
30
30
90
50
40
20
10
30
20
10
0
LEGEND
New Alluvial deposits
Older Alluvial deposits
Tertiary Rocks
Hope for Fature Development
High
Low
30
Contour Line of Groundwater Level in Feet
Groundwater Flow Direction
28 Towns

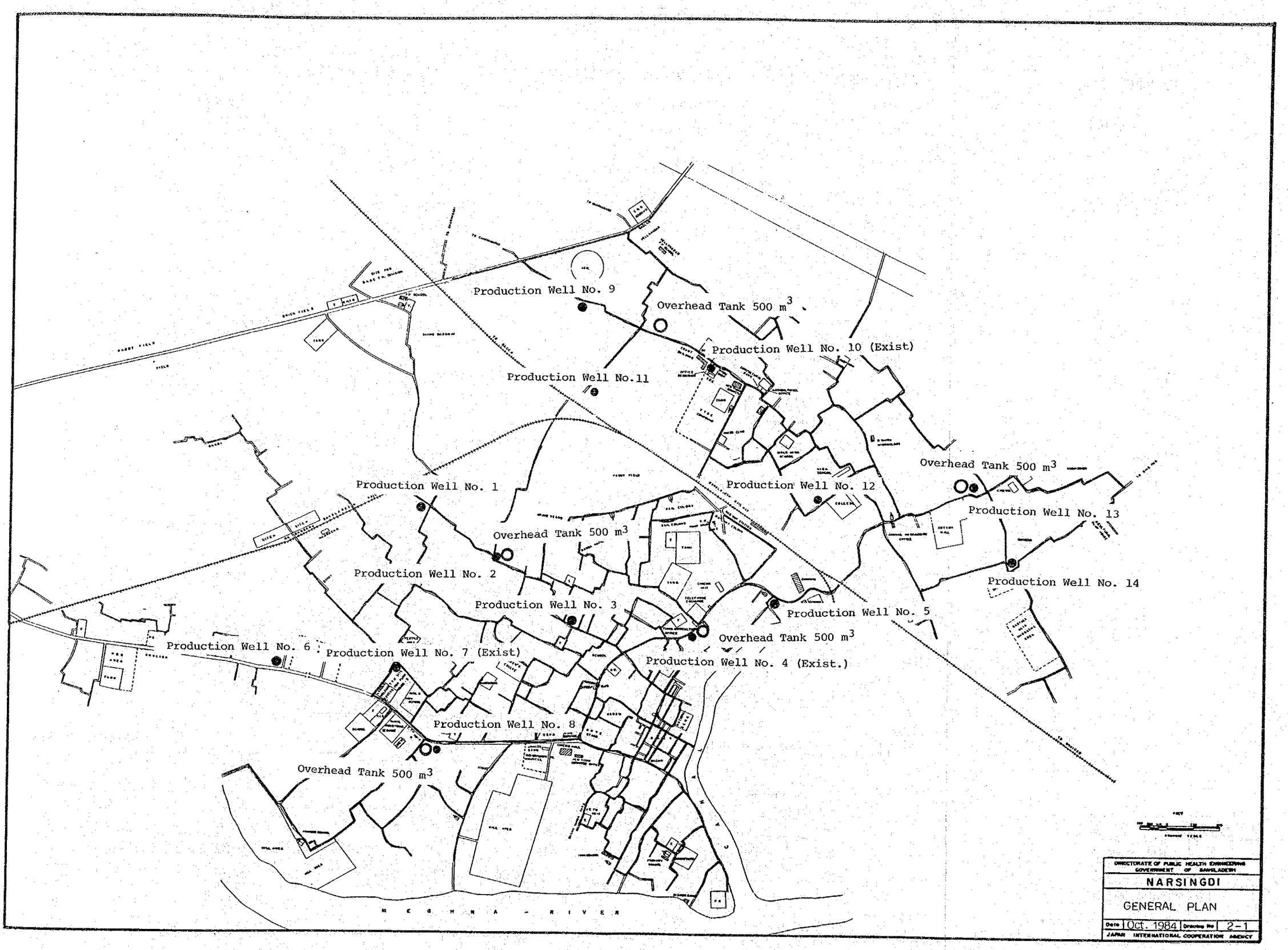
A－8　深井戸の平均深度分布図

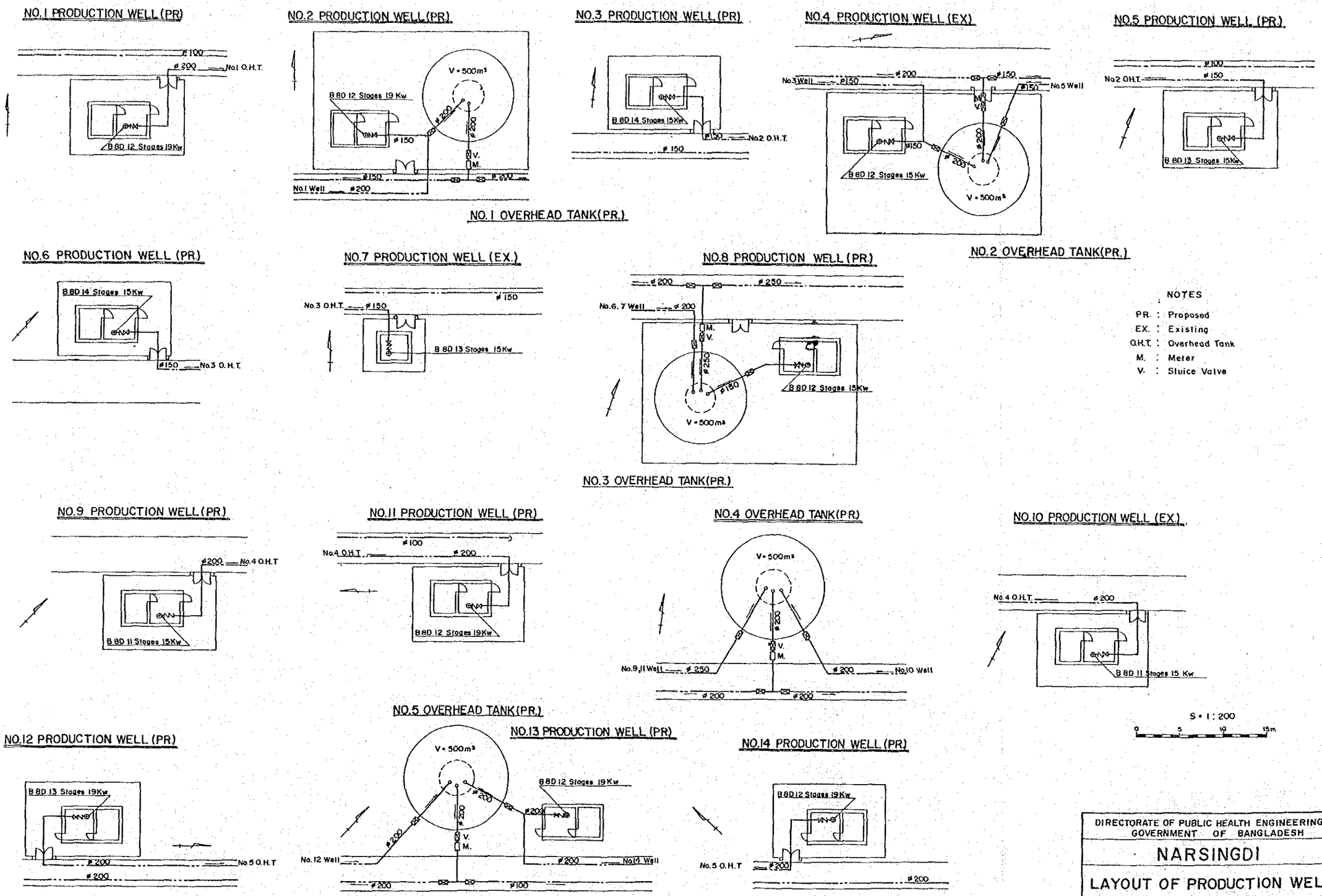


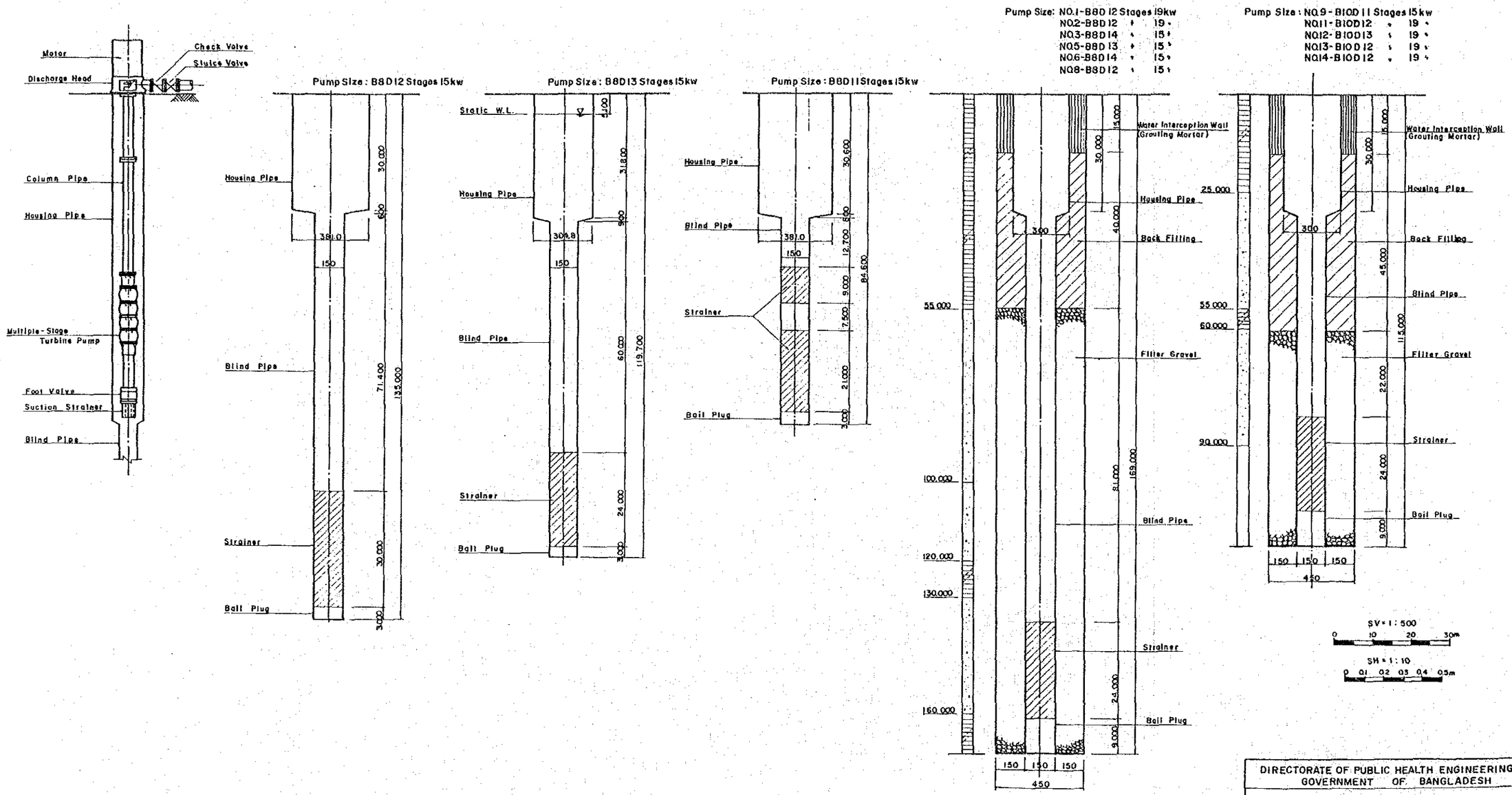
DRAWINGS

Location of the 8 Towns.




Production Well No. 9
Overhead Tank 500 m3
Production Well No. 10 (Exist)
Production Well No.11
Overhead Tank 500 m3
Production Well No. 1
Production Well No. 12
Production Well No. 13
Overhead Tank 500 m3
Production Well No. 2
Production Well No. 14
Production Well No. 3
Production Well No. 5
Overhead Tank 500 m3
Production Well No. 6
Production Well No. 7 (Exist)
Production Well No. 4 (Exist.)
Production Well No. 8
Overhead Tank 500 m3
M E G H N A - R I V E R
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH
NARSINGDI
GENERAL PLAN
Date Oct. 1984
Drawing No 2-1
JAPAN INTERNATIONAL COOPERATION AGENCY


NO.1 PRODUCTION WELL (PR)
ø100
ø200
No.1 O.H.T.
B 8D 12 Stages 19Kw
NO.2 PRODUCTION WELL (PR)
V = 500m³
B 8D 12 Stages 19 Kw
ø200
ø150
V.
M.
No.1 Well
NO.1 OVERHEAD TANK(PR.)
NO.3 PRODUCTION WELL (PR)
B 8D 14 Stages 15Kw
No.2 O.H.T.
NO.4 PRODUCTION WELL (EX)
No.3 Well
No.5 Well
B 8D 12 Stages 15 Kw
NO.2 OVERHEAD TANK(PR.)
NO.5 PRODUCTION WELL (PR)
B 8D 13 Stages 15Kw
NO.6 PRODUCTION WELL (PR)
No.3 O.H.T.
NO.7 PRODUCTION WELL (EX.)
NO.8 PRODUCTION WELL (PR)
No.6, 7 Well
NO.3 OVERHEAD TANK(PR.)
NOTES
PR. : Proposed
EX. : Existing
O.H.T. : Overhead Tank
M. : Meter
V. : Sluice Valve
NO.9 PRODUCTION WELL (PR)
B 8D 11 Stages 15Kw
NO.11 PRODUCTION WELL (PR)
No.4 O.H.T.
B 8D 12 Stages 19Kw
NO.4 OVERHEAD TANK(PR)
No.9, 11 Well
No.10 Well
NO.10 PRODUCTION WELL (EX.)
B 8D 11 Stages 15 Kw
S = 1 : 200
NO.5 OVERHEAD TANK(PR.)
NO.12 PRODUCTION WELL (PR)
B 8D 13 Stages 19Kw
No.5 O.H.T.
NO.13 PRODUCTION WELL (PR)
No.12 Well
No.14 Well
NO.14 PRODUCTION WELL (PR)
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH
NARSINGDI
LAYOUT OF PRODUCTION WELL
AND OVERHEAD TANK
Date Oct. 1984
Drawing No. 2 - 2
JAPAN INTERNATIONAL COOPERATION AGENCY



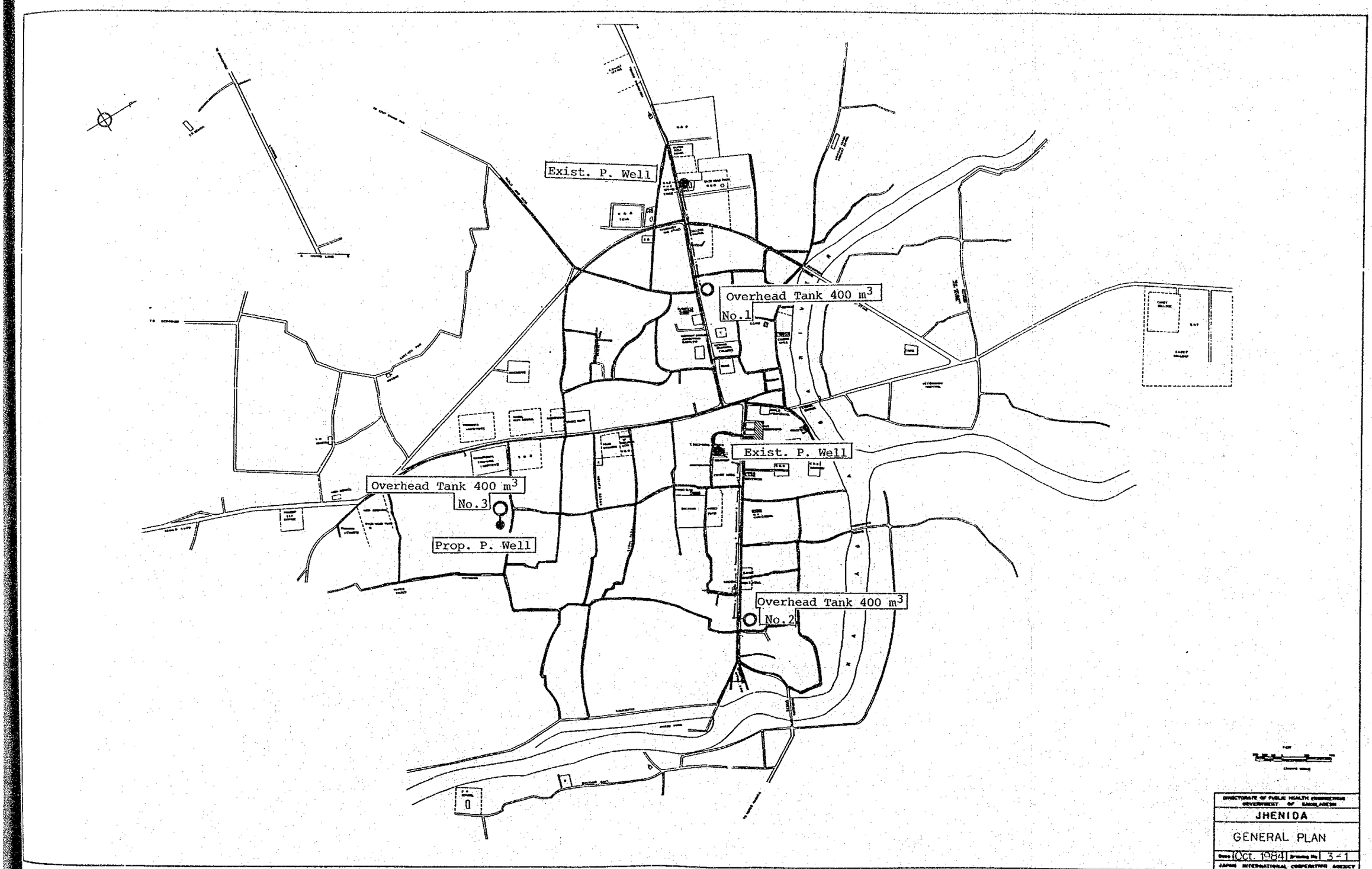
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

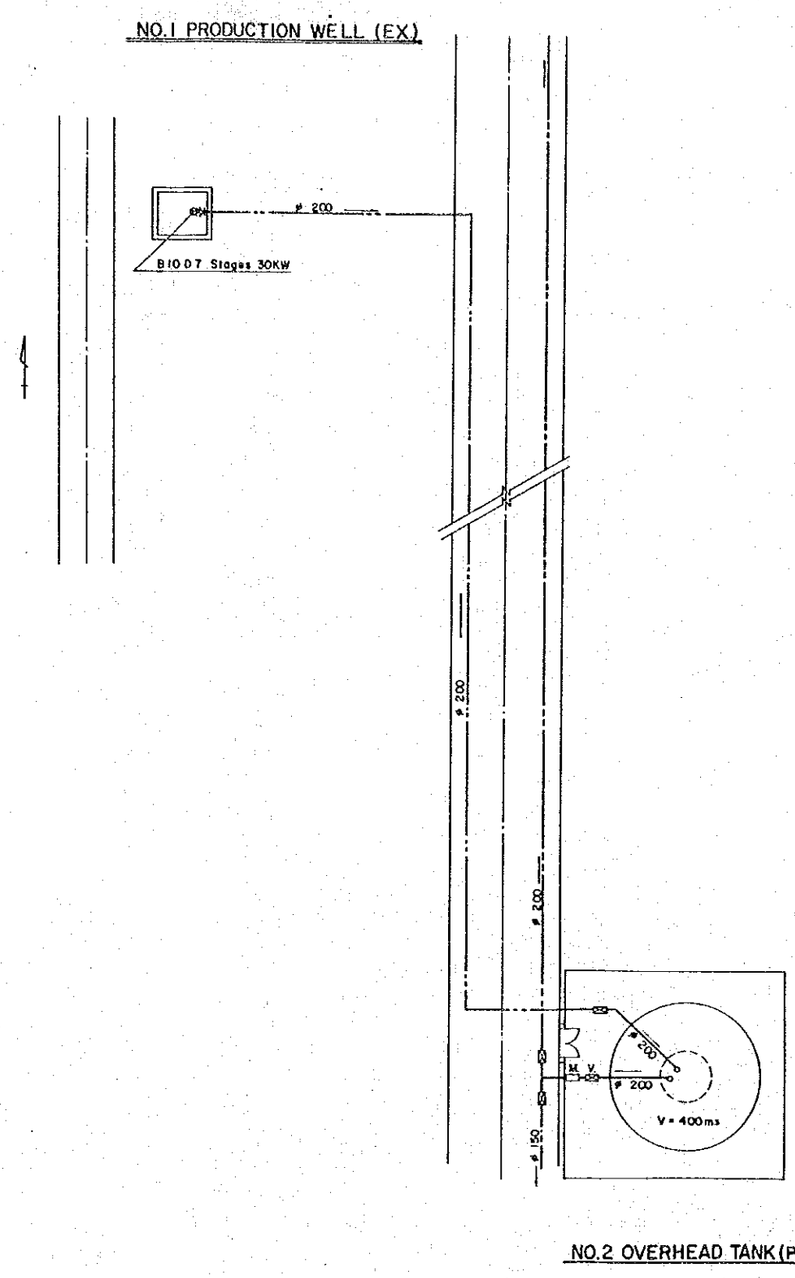
NARSINGDI

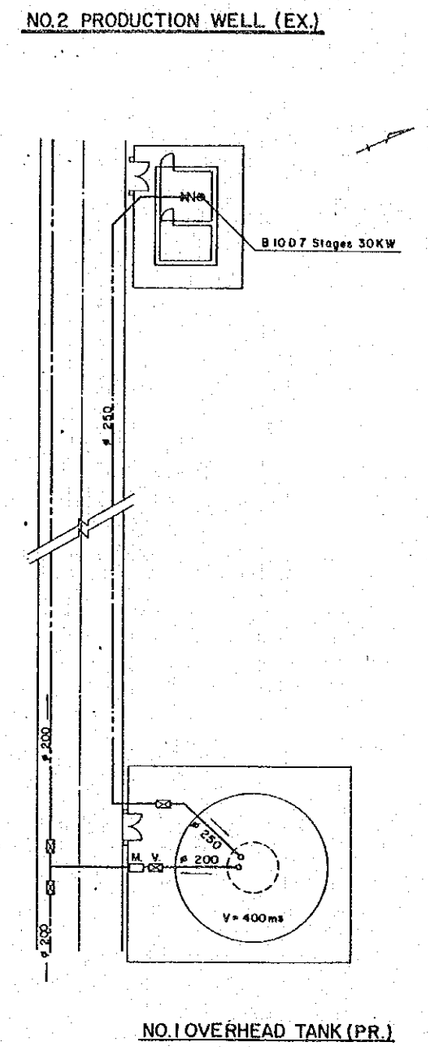
DETAIL OF PRODUCTION WELL

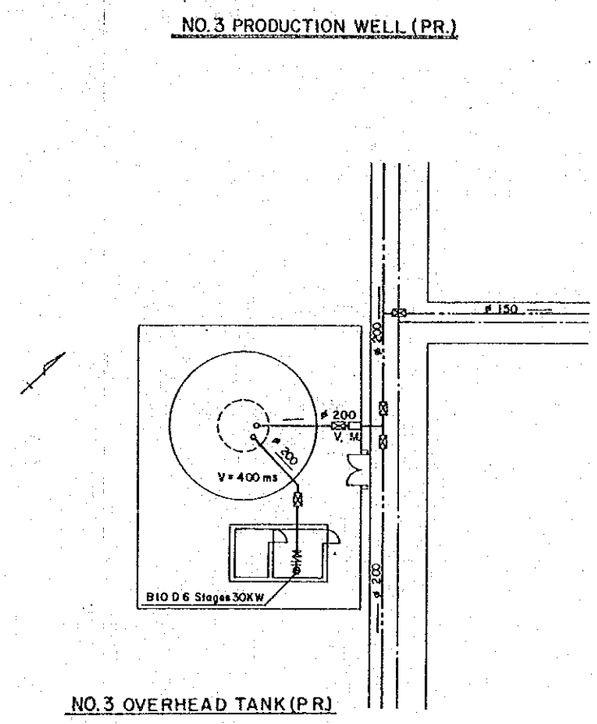
Date	Oct. 1984	Drawing No.	2 - 3

JAPAN INTERNATIONAL COOPERATION AGENCY


Exist. P. Well
Overhead Tank 400 m3
No.1
Exist. P. Well
Overhead Tank 400 m3
No.3
Prop. P. Well
Overhead Tank 400 m3
No.2
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH
JHENIDA
GENERAL PLAN
Oct. 1984
3-1
JAPAN INTERNATIONAL COOPERATION AGENCY







NOTES

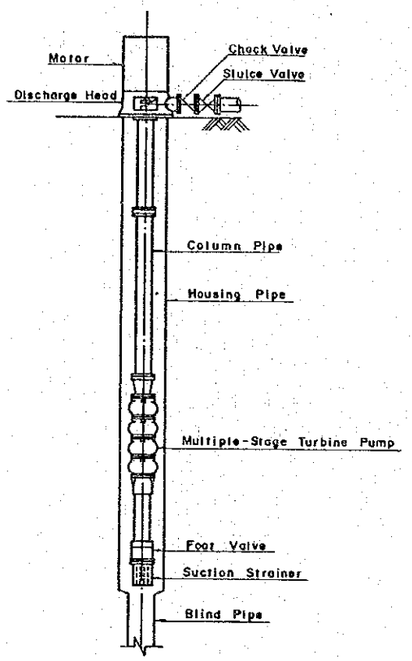
PR. : Proposed
EX. : Existing
M. : Meter
V. : Sluice Valve

S = 1 : 200

0 5 10 15 m

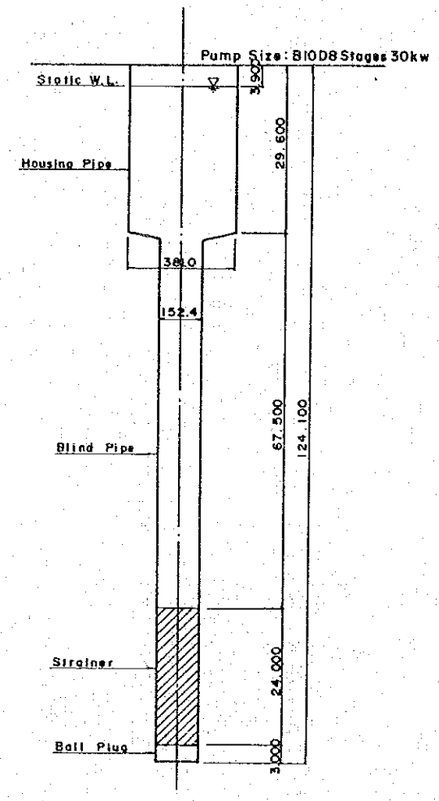
DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
JENIDA			
LAYOUT OF PRODUCTION WELL AND OVERHEAD TANK			
Date	Oct. 1984	Drawing No.	3 - 2
JAPAN INTERNATIONAL COOPERATION AGENCY			

INSTALLATION OF PUMP

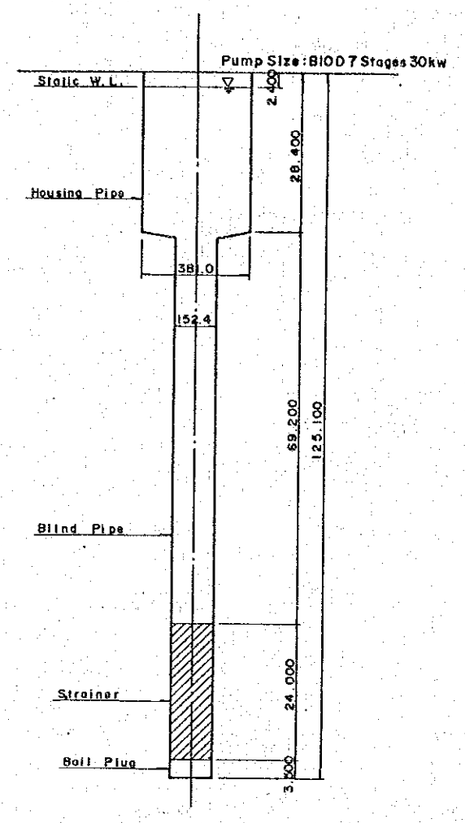


EXISTING PRODUCTION WELL

NO. 1 WELL

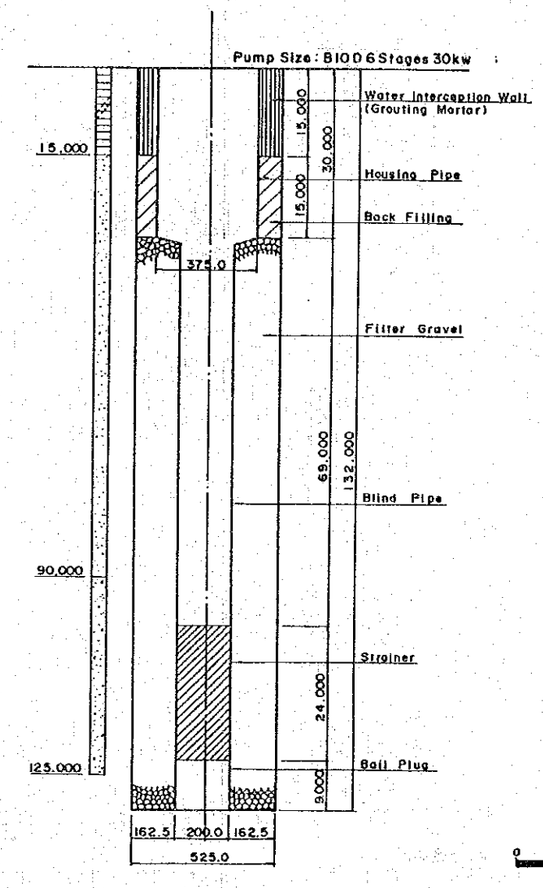


NO. 2 WELL

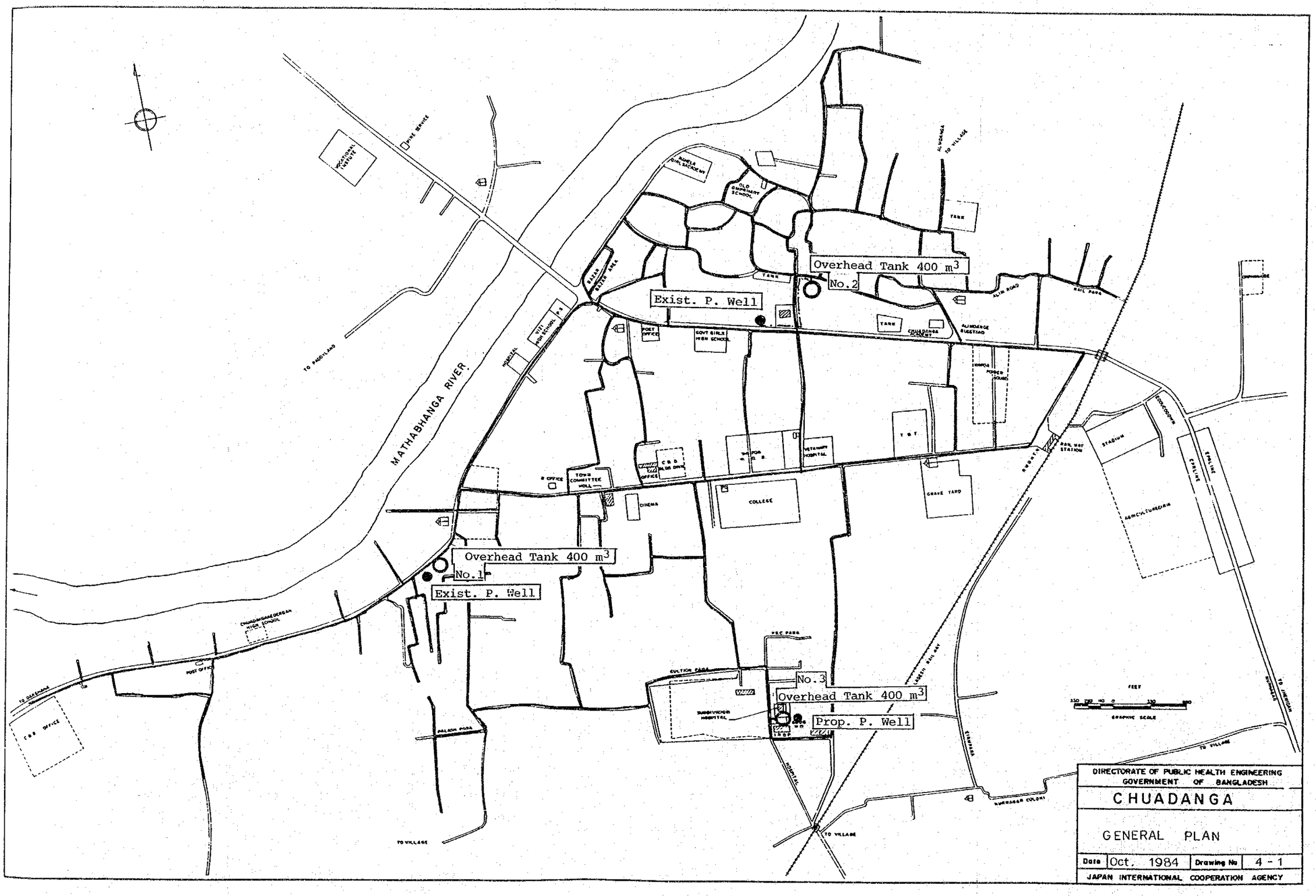


PROPOSED PRODUCTION WELL

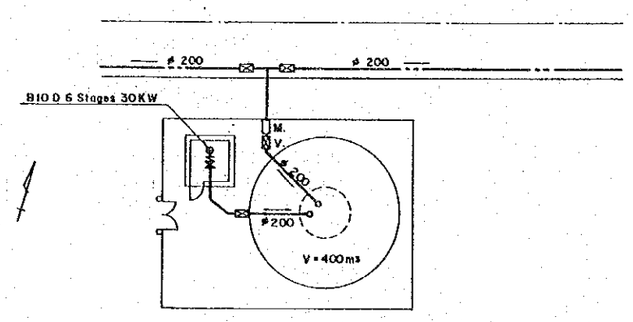
NO. 3 WELL



DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
JENIDAH			
DETAIL OF PRODUCTION WELL			
Date	Oct. 1984	Drawing No.	3 - 3
JAPAN INTERNATIONAL COOPERATION AGENCY			

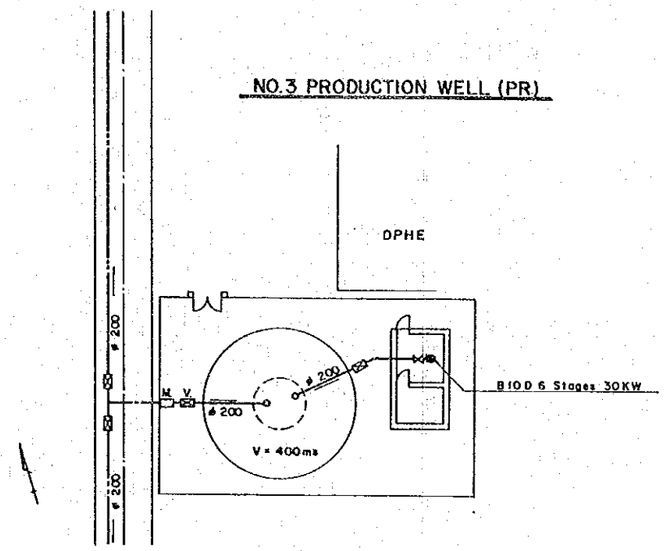

MATHABHANGA RIVER
Overhead Tank 400 m3
No.1
Exist. P. Well
Overhead Tank 400 m3
No.2
Exist. P. Well
Overhead Tank 400 m3
No.3
Prop. P. Well
COLLEGE
CINEMA
GRAVE YARD
STADIUM
AGRICULTURE
TO VILLAGE
TO JAMTOLA
TO PADDYLAND
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH
CHUADANGA
GENERAL PLAN
Date Oct. 1984
Drawing No 4 - 1
JAPAN INTERNATIONAL COOPERATION AGENCY

NO. 1 PRODUCTION WELL (EX)



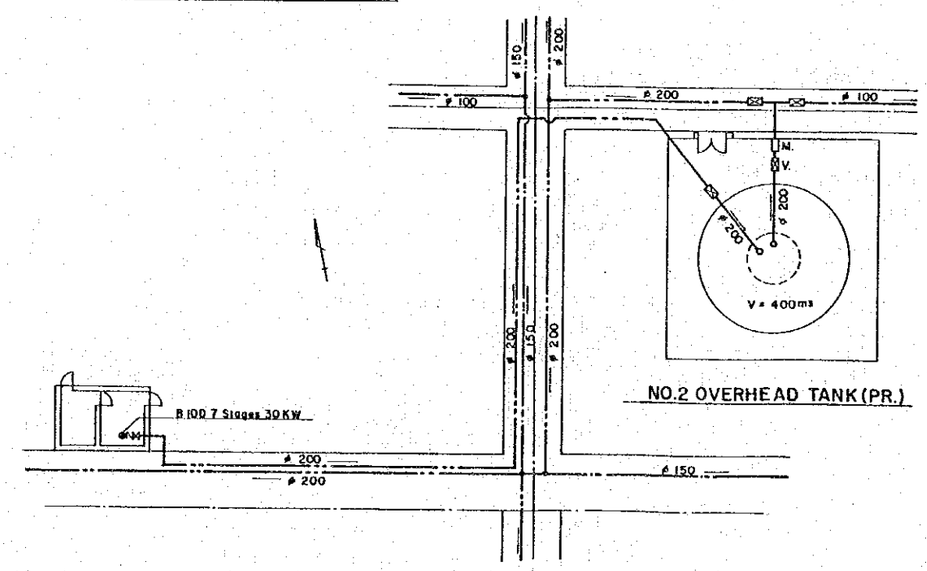
NO. 1 OVERHEAD TANK (PR.)

NO. 3 PRODUCTION WELL (PR)



NO. 3 OVERHEAD TANK (PR.)

NO. 2 PRODUCTION WELL (EX)



NO. 2 OVERHEAD TANK (PR.)

NOTES

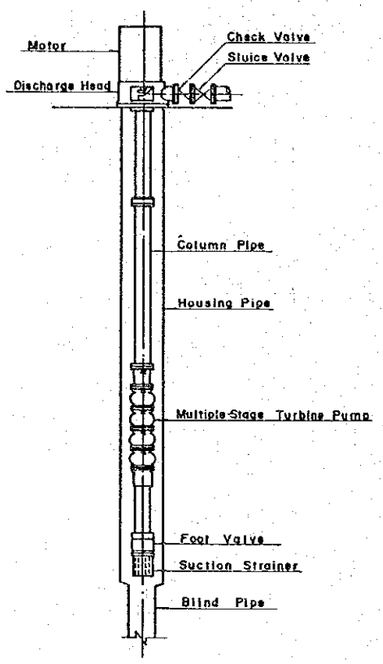
PR. : Proposed
EX. : Existing
M. : Meter
V. : Sluice Valve

S = 1 : 200

0 5 10 15m

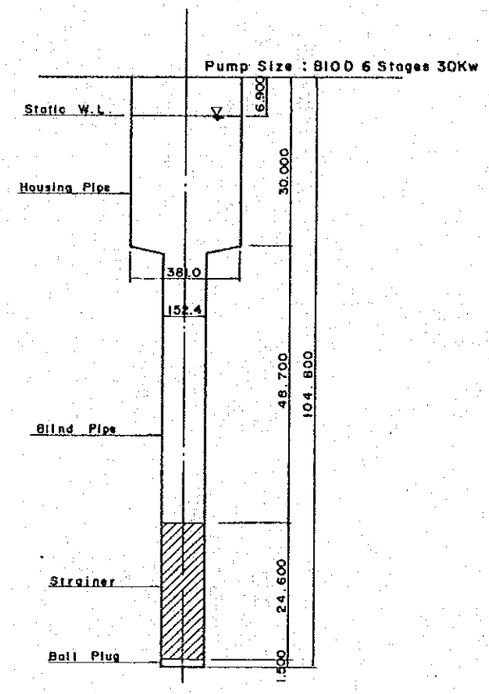
DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
CHUADANGA			
LAYOUT OF PRODUCTION WELL AND OVERHEAD TANK			
Date	Oct. 1984	Drawing No.	4 - 2
JAPAN INTERNATIONAL COOPERATION AGENCY			

INSTALLATION OF PUMP

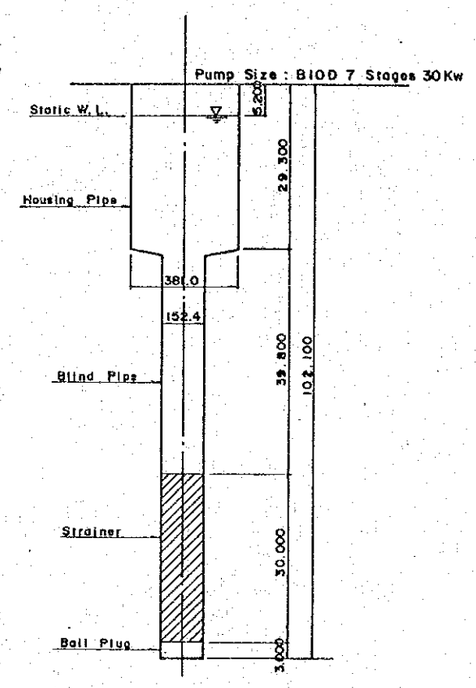


EXISTING PRODUCTION WELL

NO. 1 WELL

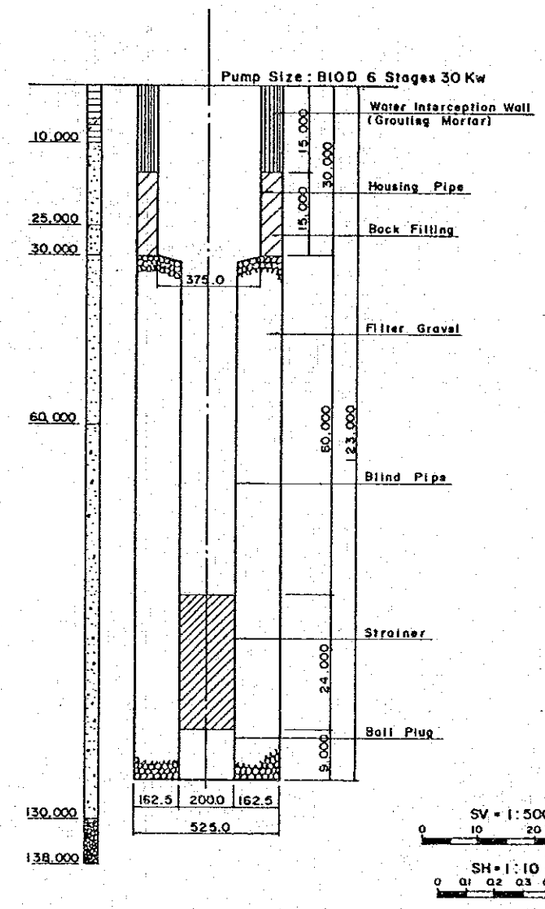


NO. 2 WELL

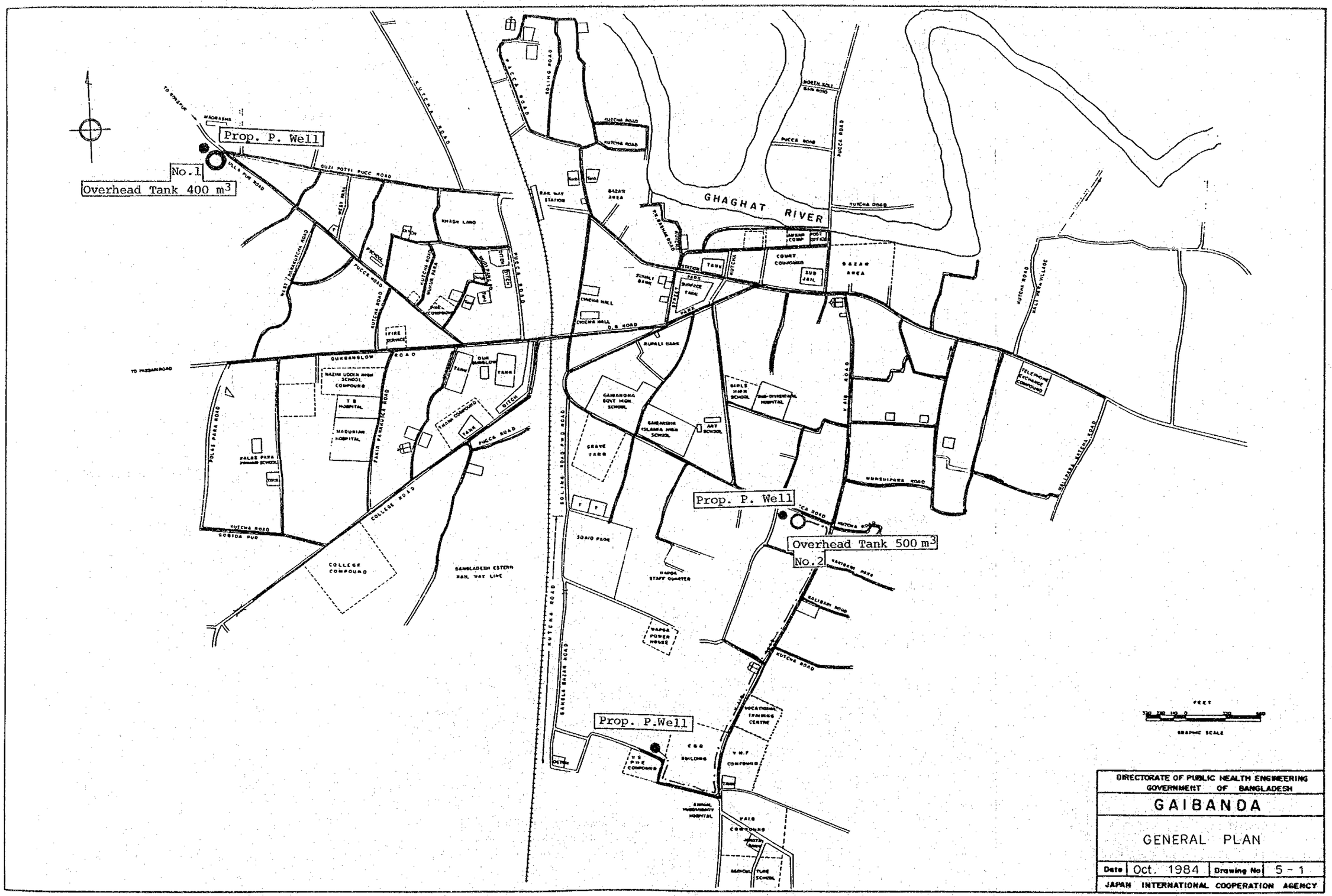


PROPOSED PRODUCTION WELL

NO. 3 WELL

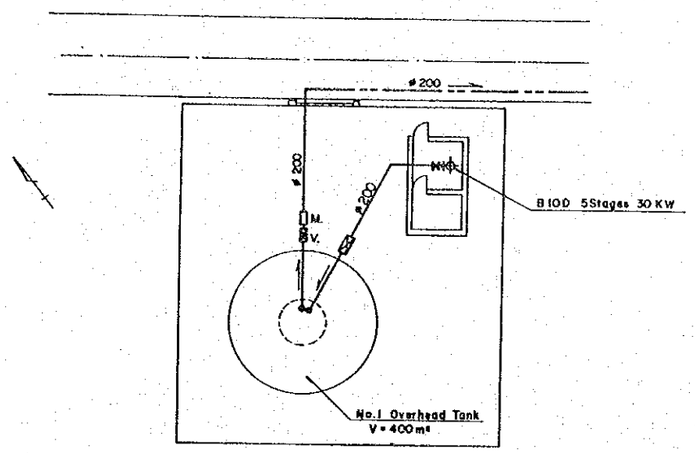


DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
CHUADANGA			
DETAIL OF PRODUCTION WELL			
Date	Oct. 1984	Drawing No.	4 - 3
JAPAN INTERNATIONAL COOPERATION AGENCY.			

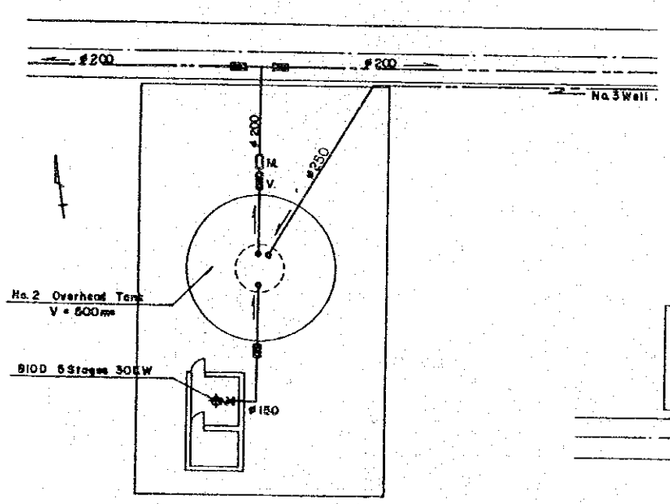

Prop. P. Well
No.1
Overhead Tank 400 m3
GHAGHAT RIVER
Prop. P. Well
Overhead Tank 500 m3
No.2
Prop. P.Well
GAIBANDA
GENERAL PLAN
Date Oct. 1984
Drawing No 5 - 1
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH
JAPAN INTERNATIONAL COOPERATION AGENCY

GAIBANDA

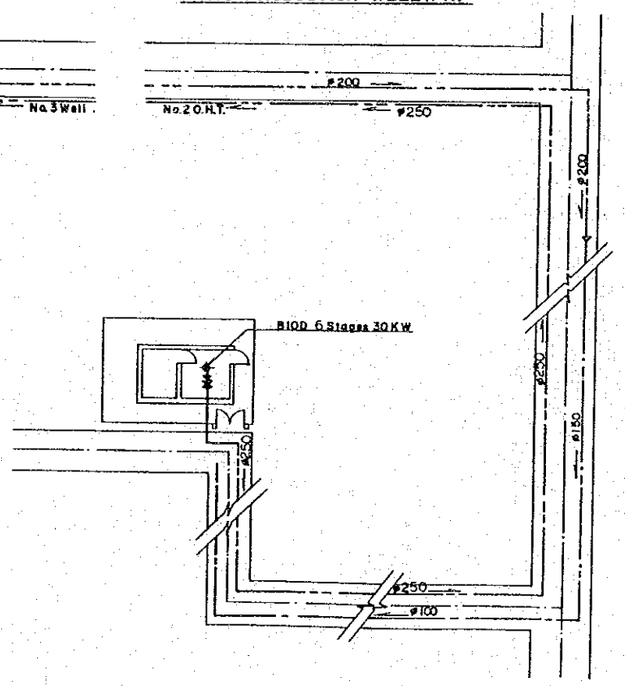
NO. 1 PRODUCTION WELL (PR)



NO.2 PRODUCTION WELL (PR)

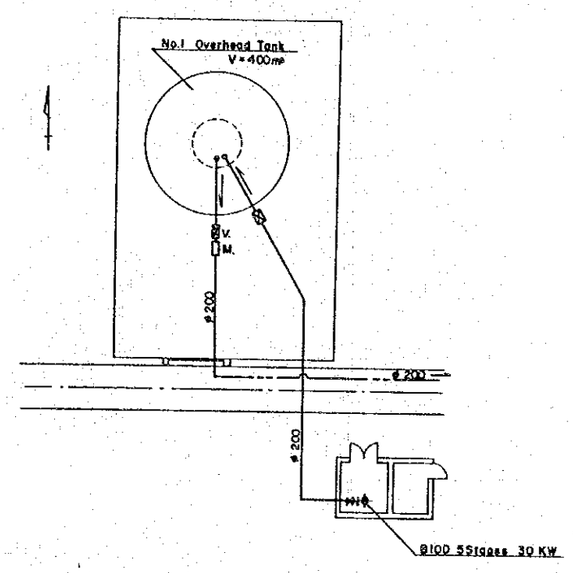


NO.3 PRODUCTION WELL (PR)

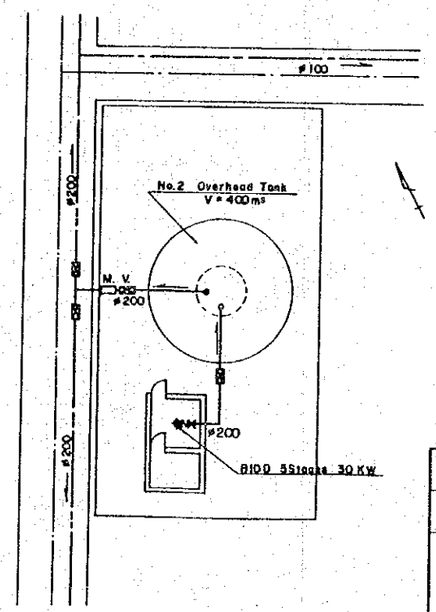


KURIGRAM

NO. 1 PRODUCTION WELL (PR)



NO.2 PRODUCTION WELL (PR)



S = 1 : 200

0 5 10 15m

DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

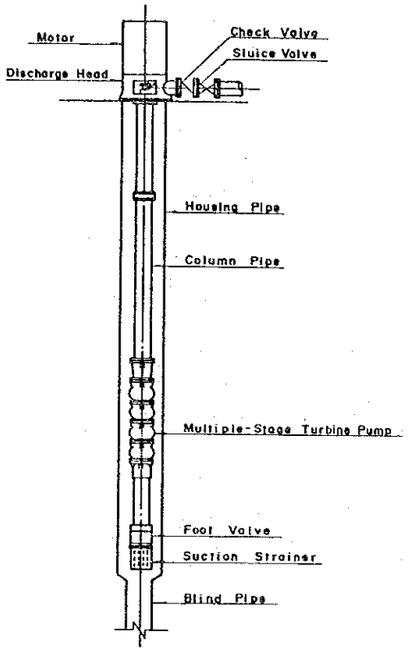
GAIBANDA, KURIGRAM

LAYOUT OF PRODUCTION WELL AND OVERHEAD TANK

Date	Oct. 1984	Drawing No.	5-2.6-2

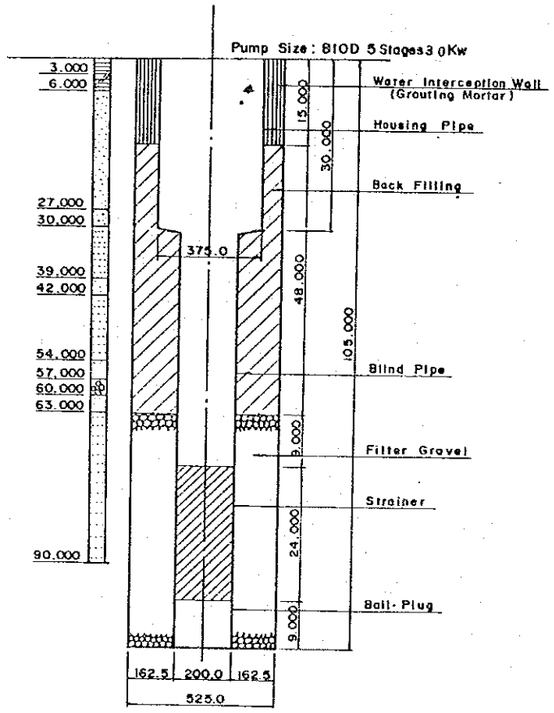
JAPAN INTERNATIONAL COOPERATION AGENCY

INSTALLATION OF PUMP

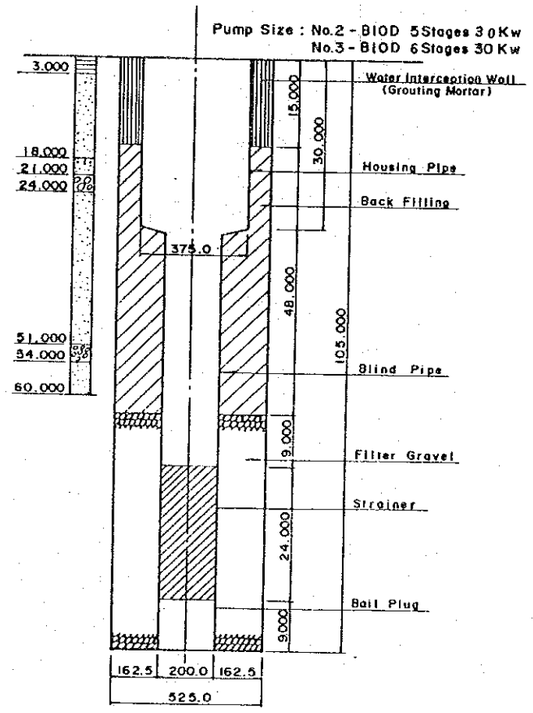


PROPOSED PRODUCTION WELL

NO. 1 WELL



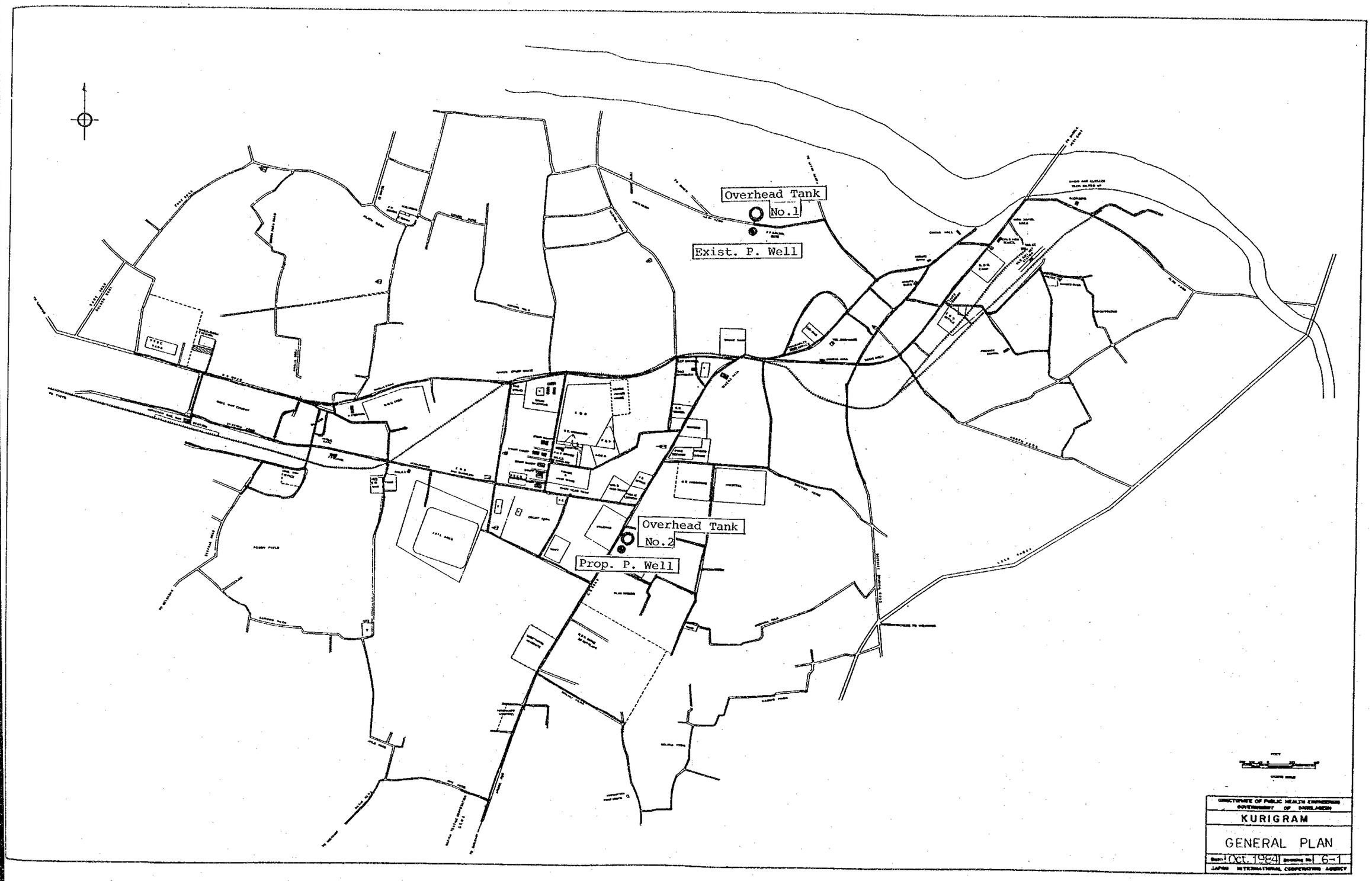
NO. 2, 3 WELL



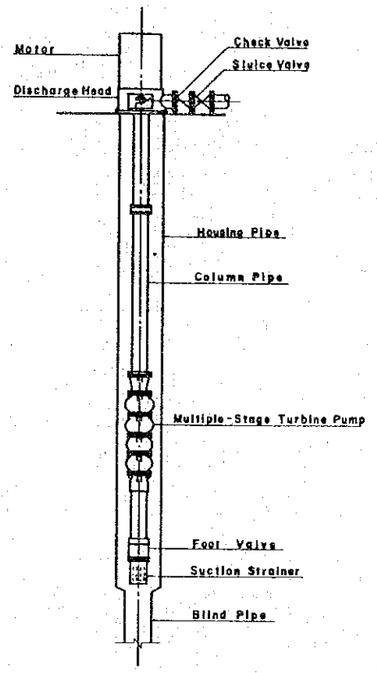
SV = 1: 500
0 10 20 30m

SH = 1: 10
0 0.1 0.2 0.3 0.4 0.5 m

DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
GAIBANDA			
DETAIL OF PRODUCTION WELL			
Date	Oct. 1984	Drawing No.	5 - 3
JAPAN INTERNATIONAL COOPERATION AGENCY			

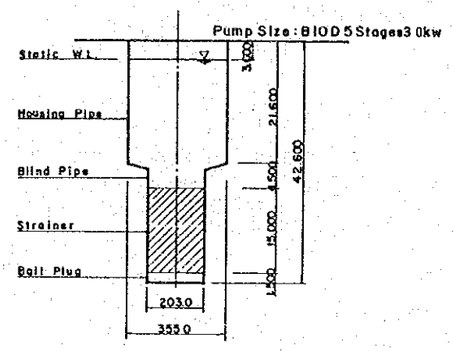

Overhead Tank
No.1
Exist. P. Well
Overhead Tank
No.2
Prop. P. Well
KURIGRAM
GENERAL PLAN
Oct. 1984
6-1

INSTALLATION OF PUMP



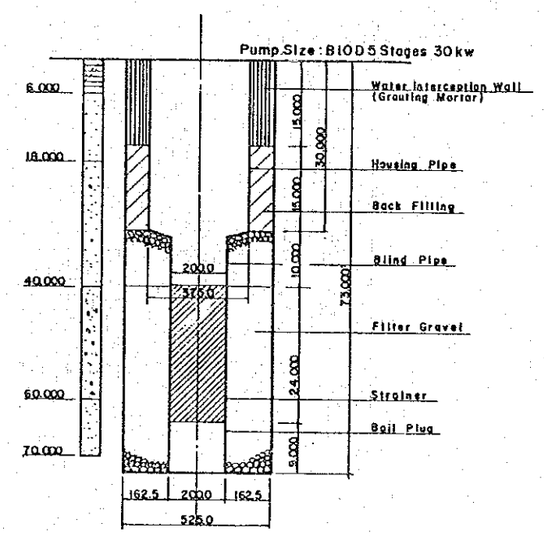
EXISTING PRODUCTION WELL

NO. 1 WELL



PROPOSED PRODUCTION WELL

NO. 2 WELL



SV= 1 : 500

0 10 20 30m

SH= 1 : 10

0 0.1 0.2 0.3 0.4 0.5m

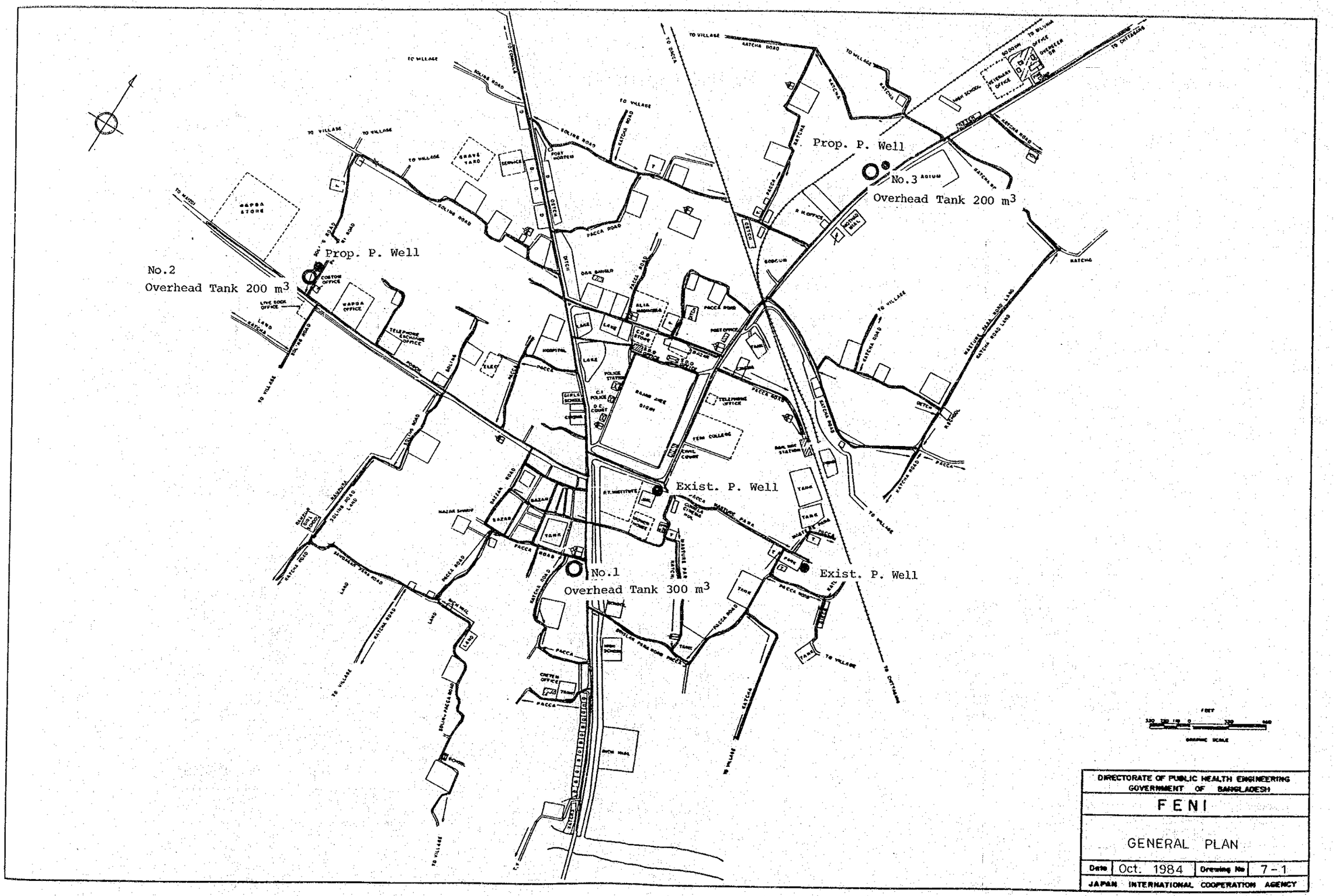
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

KURIGRAM

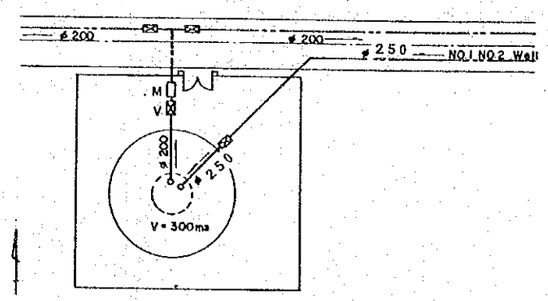
DETAIL OF PRODUCTION WELL

Date	Oct. 1984	Drawing No.	6-3

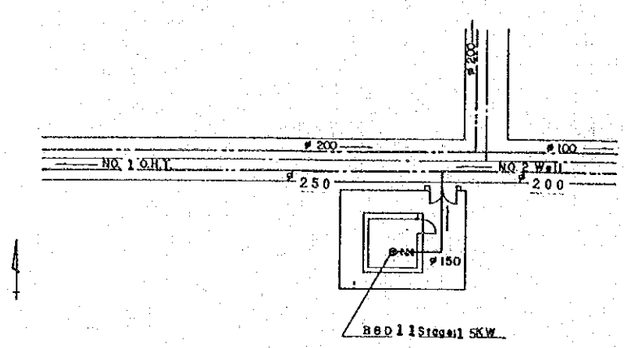
JAPAN INTERNATIONAL COOPERATION AGENCY


Prop. P. Well
No.3
Overhead Tank 200 m3
Prop. P. Well
No.2
Overhead Tank 200 m3
Exist. P. Well
No.1
Overhead Tank 300 m3
Exist. P. Well
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH
FENI
GENERAL PLAN
Date Oct. 1984
Drawing No 7 - 1
JAPAN INTERNATIONAL COOPERATION AGENCY

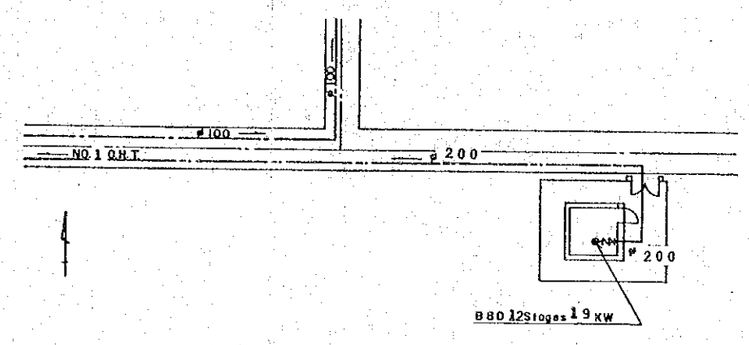
NO.1 OVERHEAD TANK(PR.)



NO.1 PRODUCTION WELL (EX)



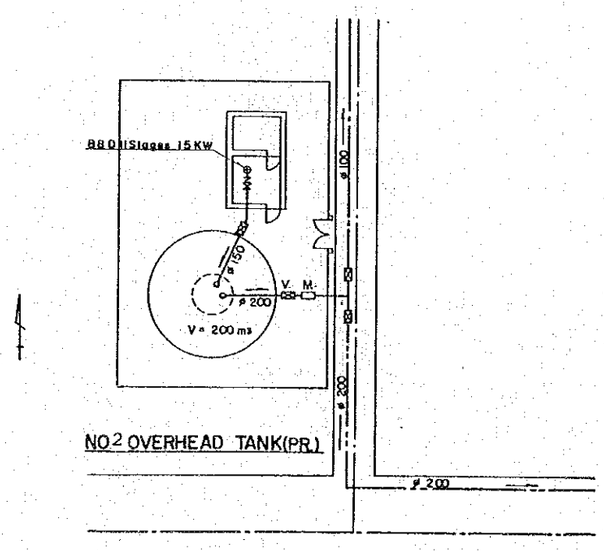
NO.2 PRODUCTION WELL (EX)



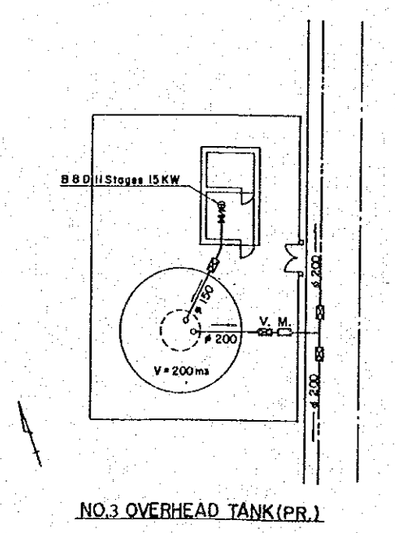
NOTES

PR. : Proposed
EX. : Existing
O.H.T. : Overhead Tank
M. : Meter
V. : Sluice Valve

NO.3 PRODUCTION WELL (PR.)



NO.4 PRODUCTION WELL (PR.)



S = 1 : 200

0 5 10 15m

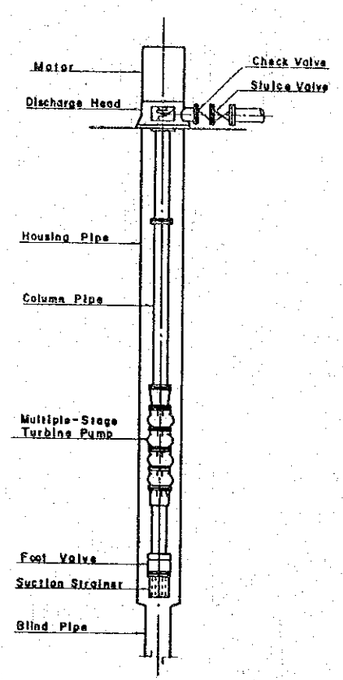
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

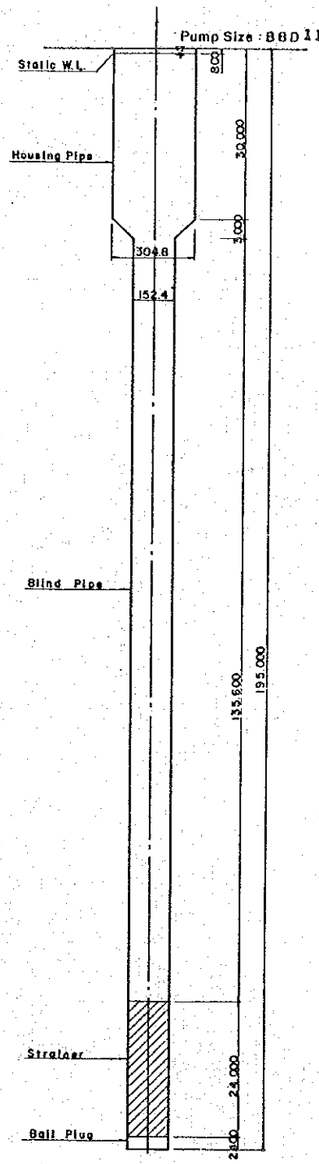
FENI

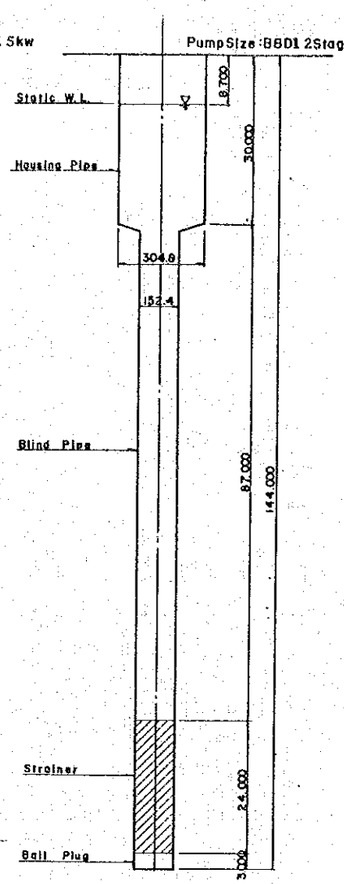
LAYOUT OF PRODUCTION WELL AND OVERHEAD TANK

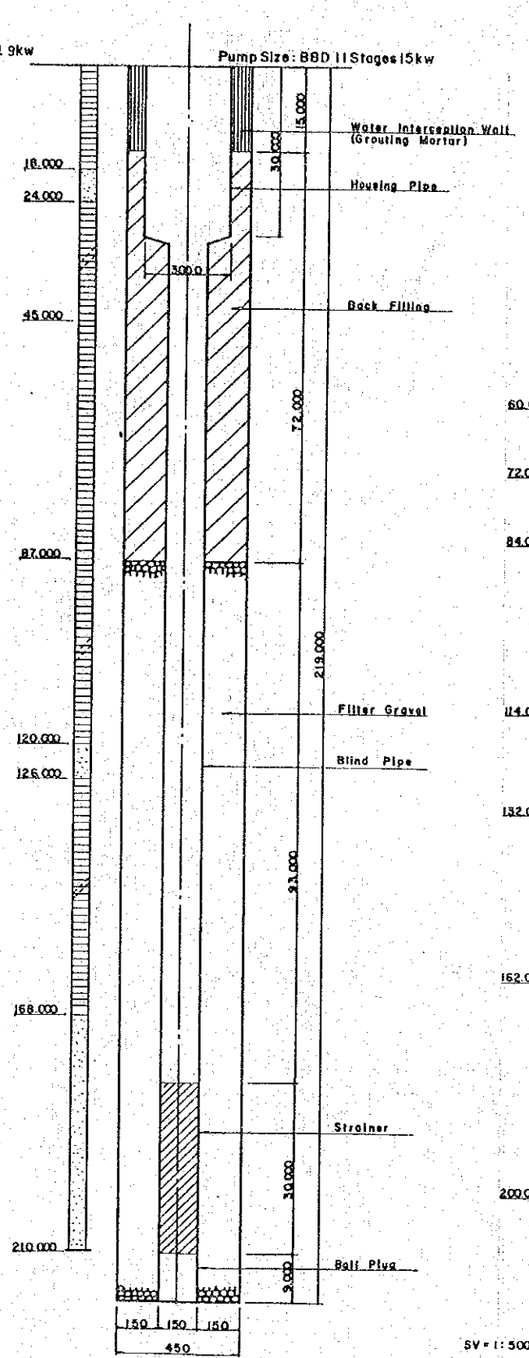
Date	Oct. 1984	Drawing No.	7 - 2

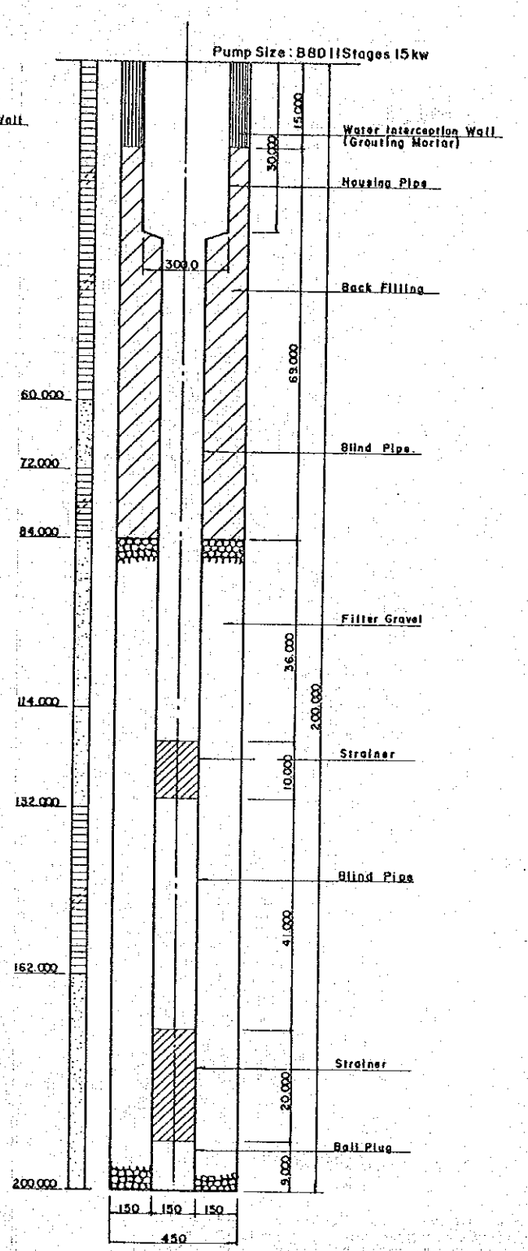
JAPAN INTERNATIONAL COOPERATION AGENCY











SV = 1 : 500

SH = 1 : 10

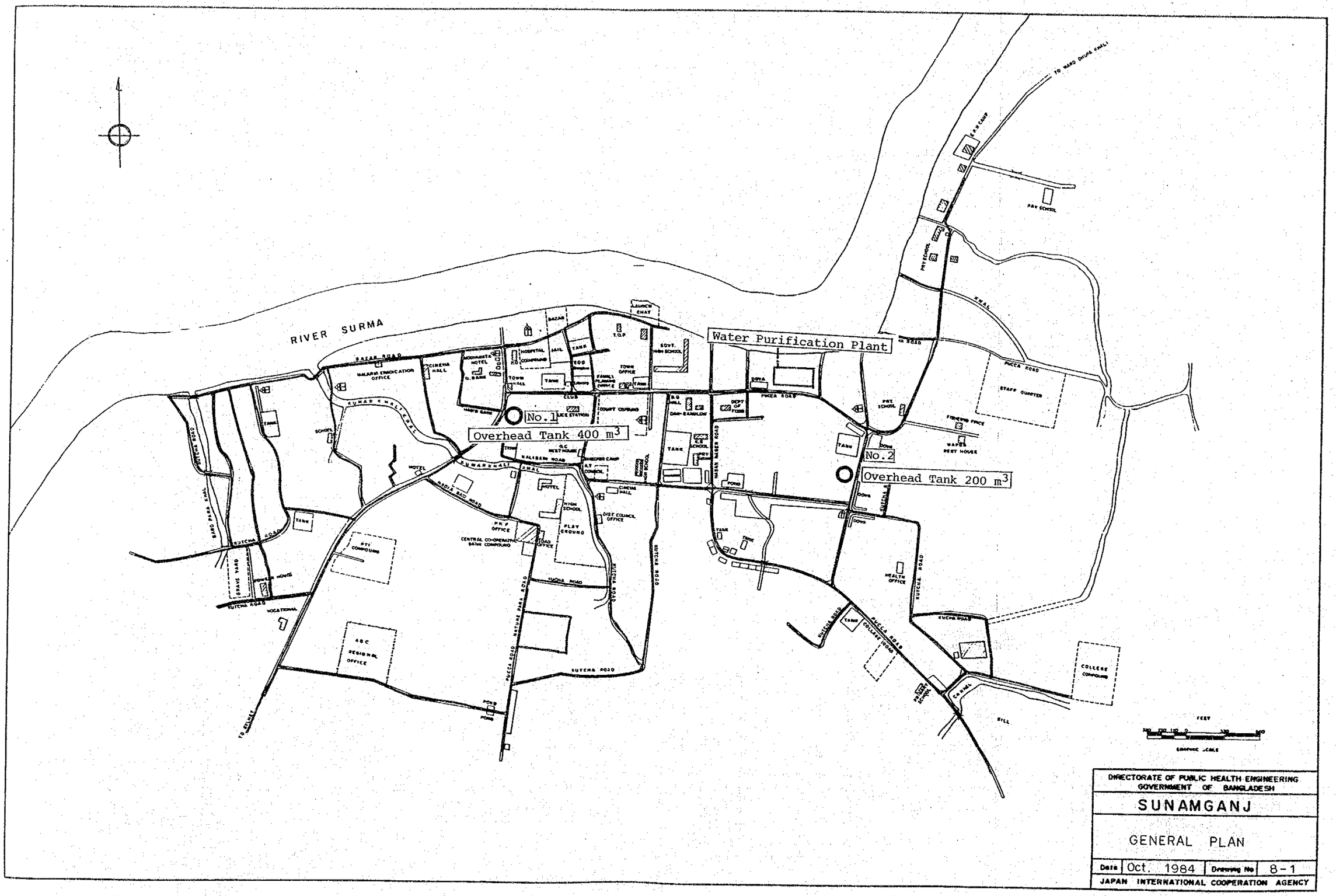
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

FENI

DETAIL OF PRODUCTION WELL

Date	Oct. 1984	Drawing No.	7 - 3

JAPAN INTERNATIONAL COOPERATION AGENCY



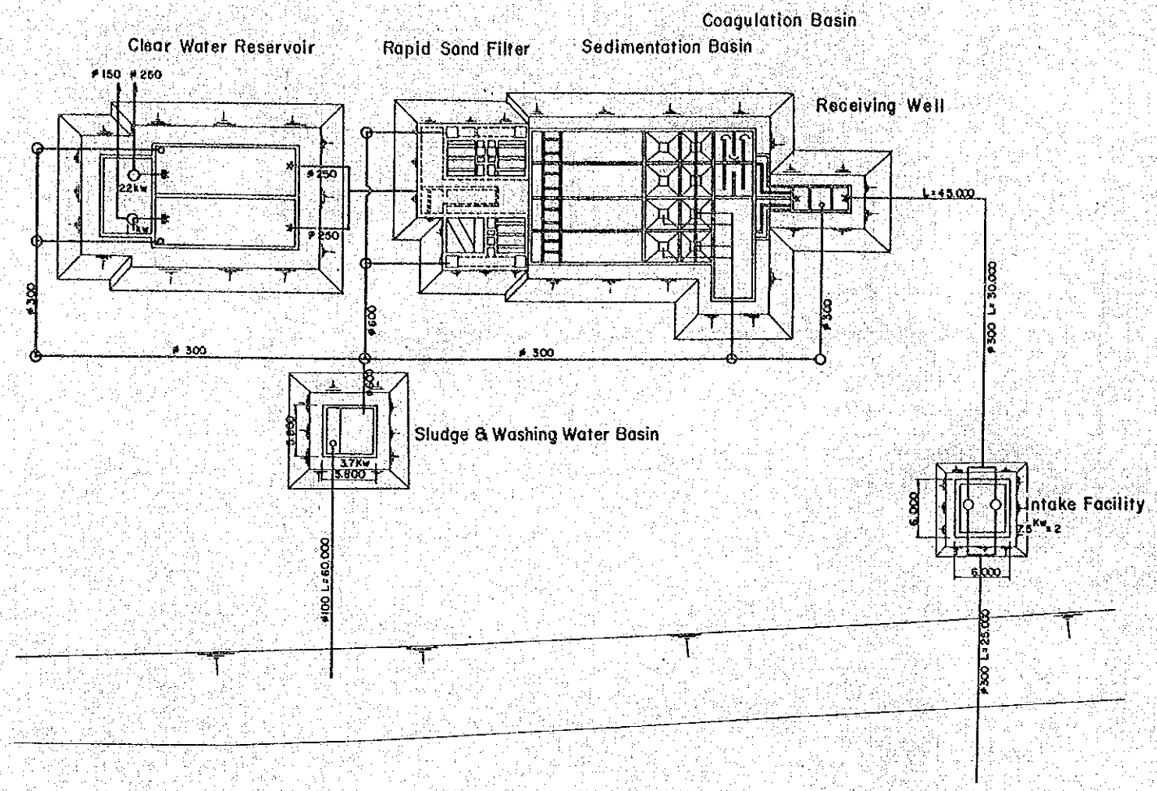
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

SUNAMGANJ

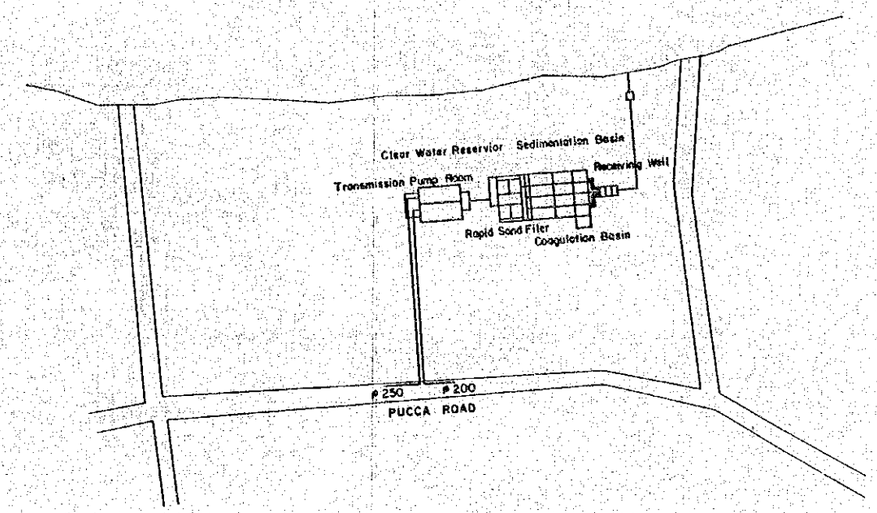
GENERAL PLAN

Date	Oct. 1984	Drawing No	8-1

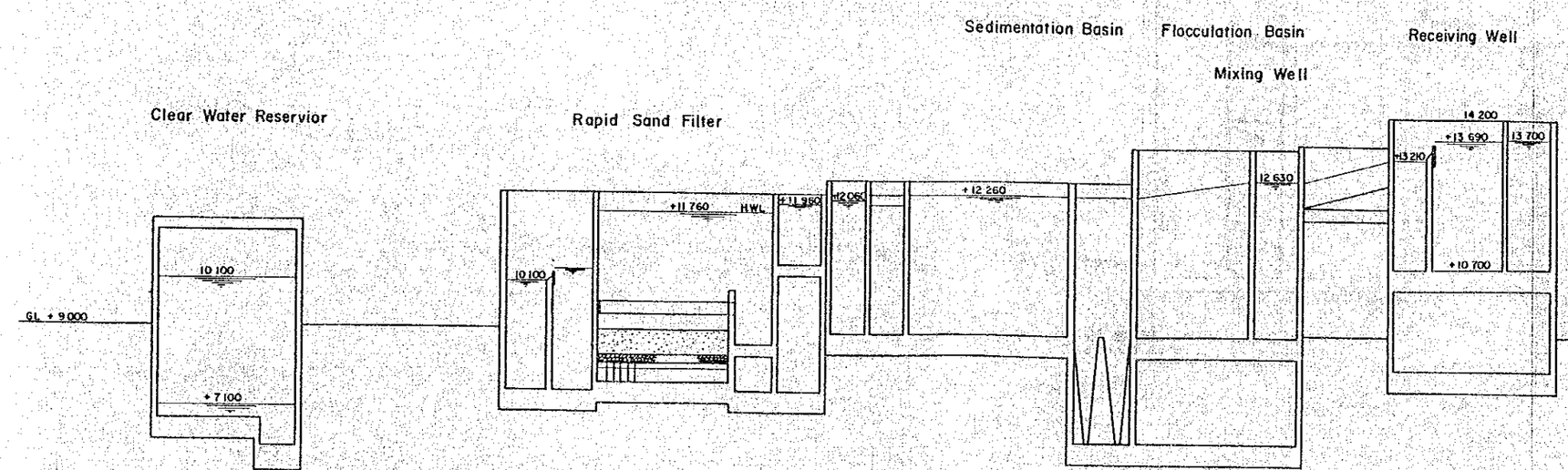
JAPAN INTERNATIONAL COOPERATION AGENCY



LAYOUT s = 1:1000



DIFFERENCE OF WATER LEVELS



DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

SUNAMGANJ

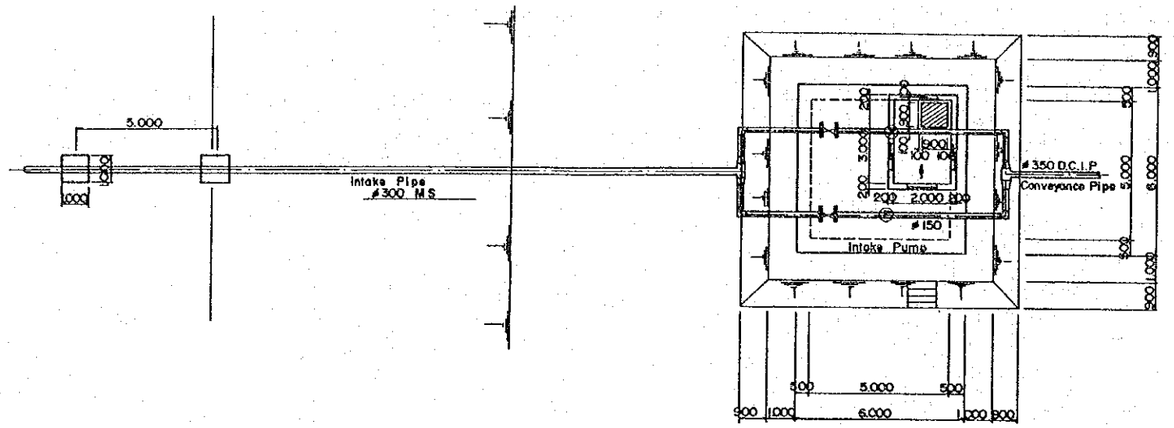
PURIFICATION PLANT

LAYOUT AND DIFFERENCE OF WATER LEVELS

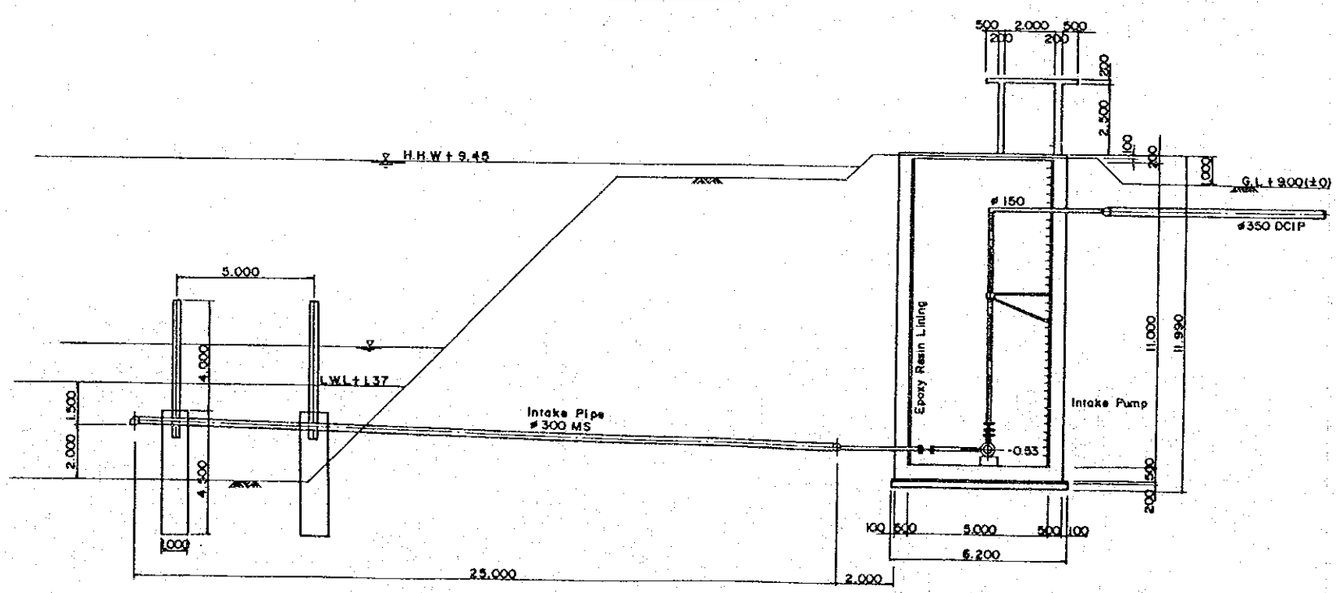
Date	Oct. 1984	Drawing No.	8 - 2

JAPAN INTERNATIONAL COOPERATION AGENCY

PLAN

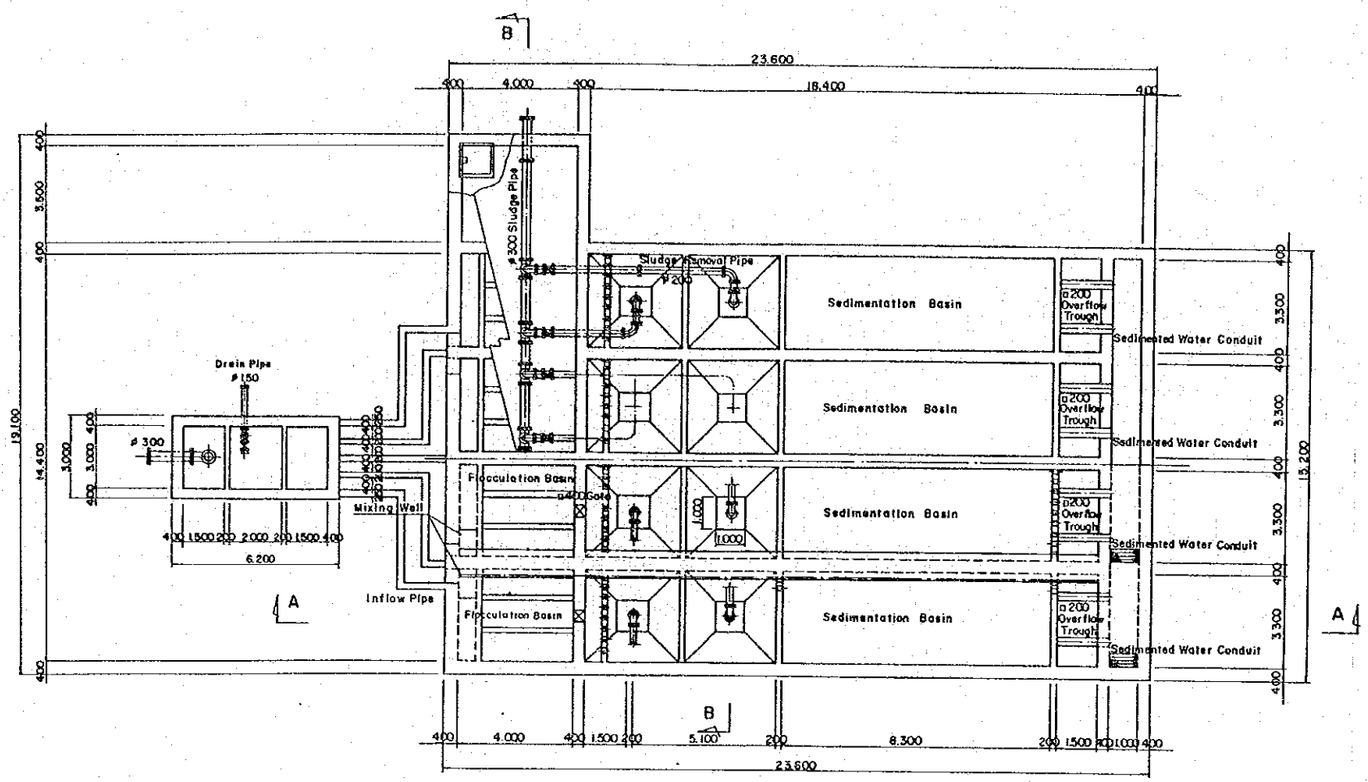


CROSS SECTION

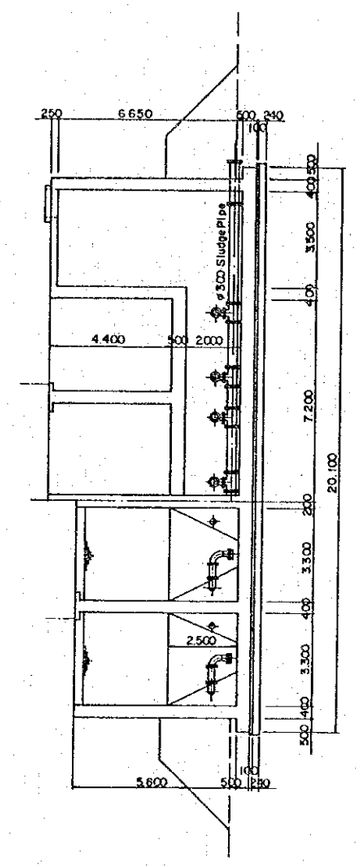


DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
SUNAMGANJ			
PURIEICATION PLANT INTAKE FACILITIES			
Date	Oct. 1984	Drawing No.	8 - 3
JAPAN INTERNATIONAL COOPERATION AGENCY			

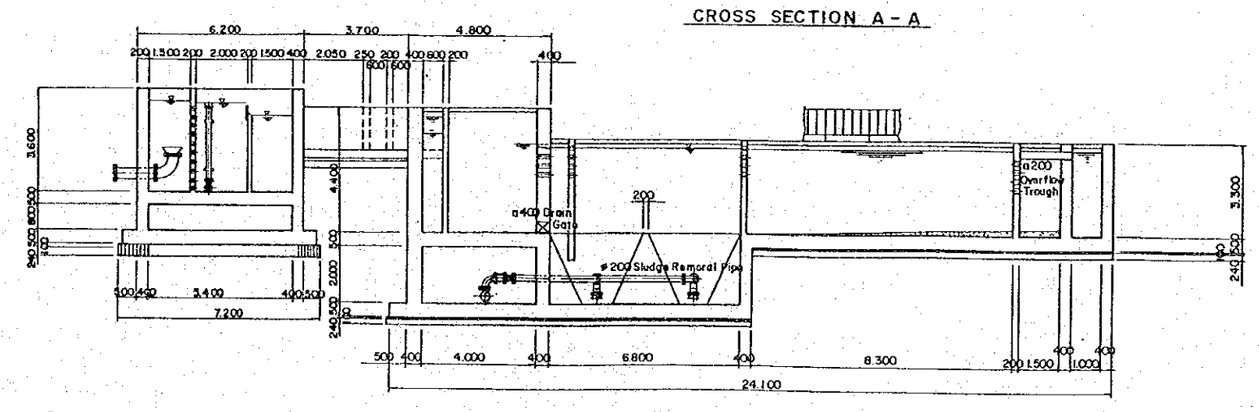
PLAN



SECTION B - B

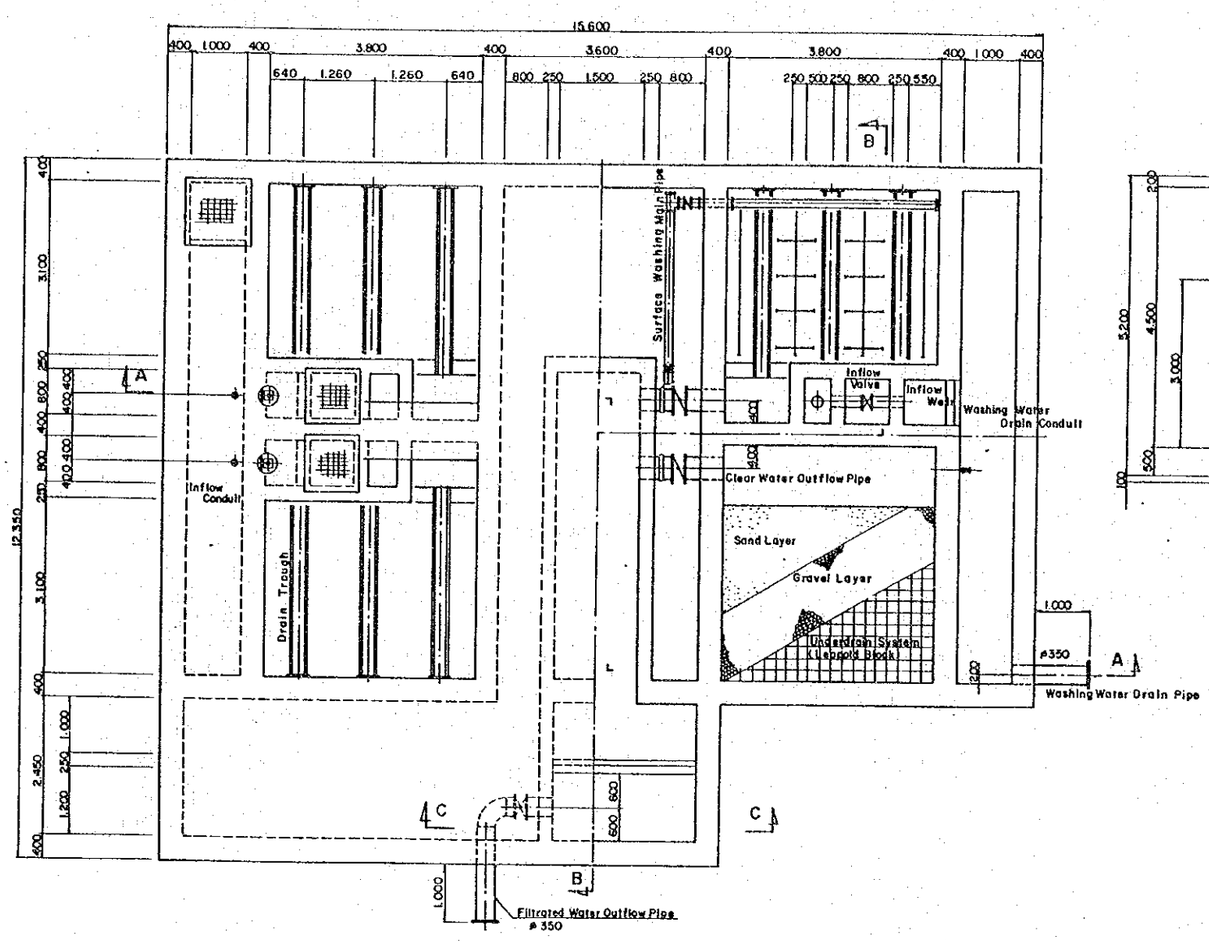


CROSS SECTION A - A

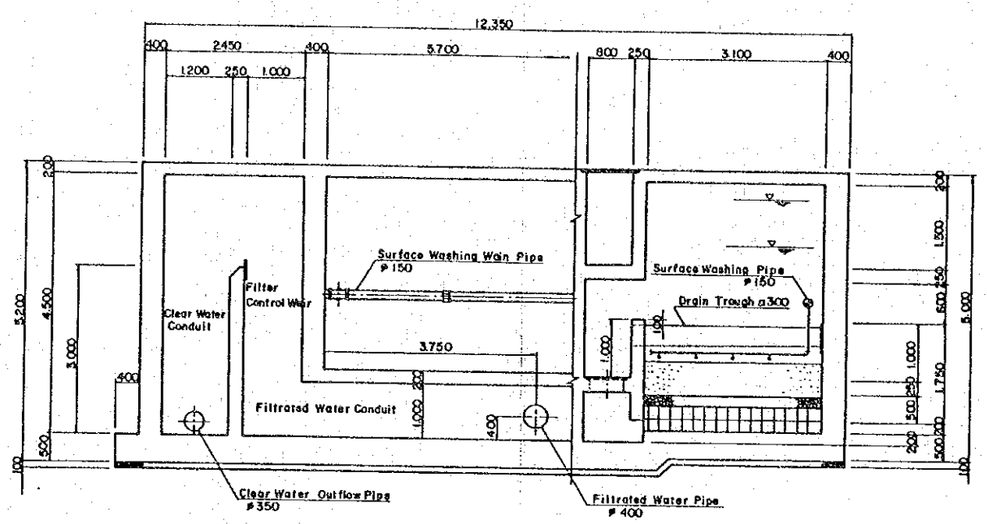


DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
SUNAMGANJ			
PURIFICATION PLANT SEDIMENTATION BASIN			
Date	Oct. 1984	Drawing No.	8 - 4
JAPAN INTERNATIONAL COOPERATION AGENCY			

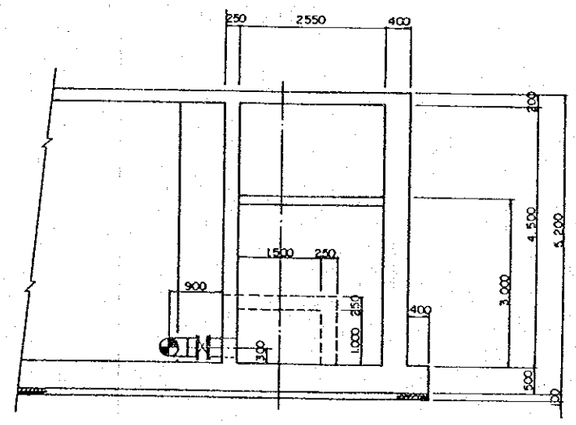
PLAN



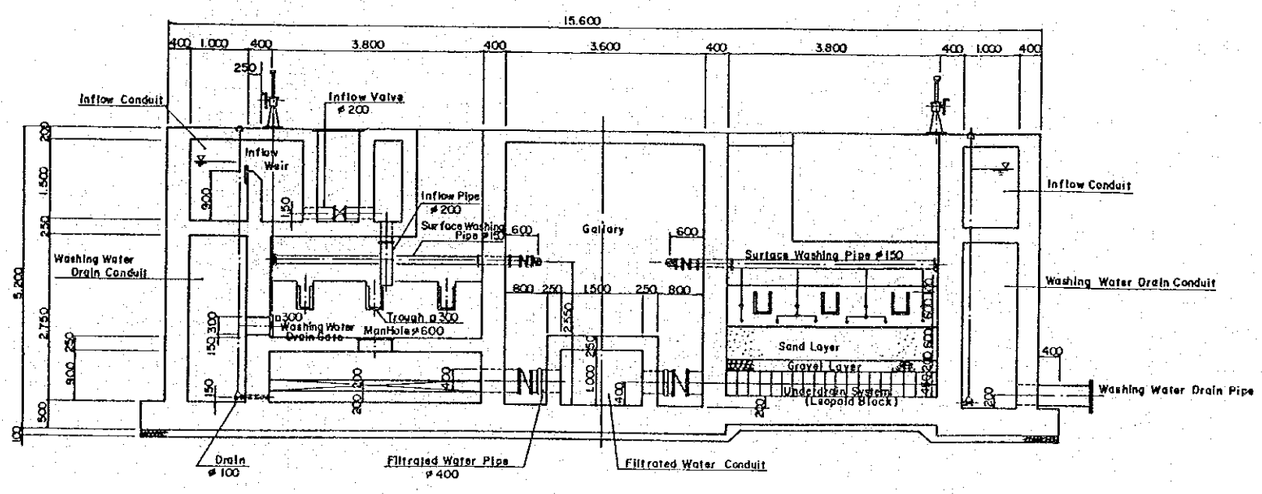
SECTION B - B



SECTION C - C



SECTION A - A



DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

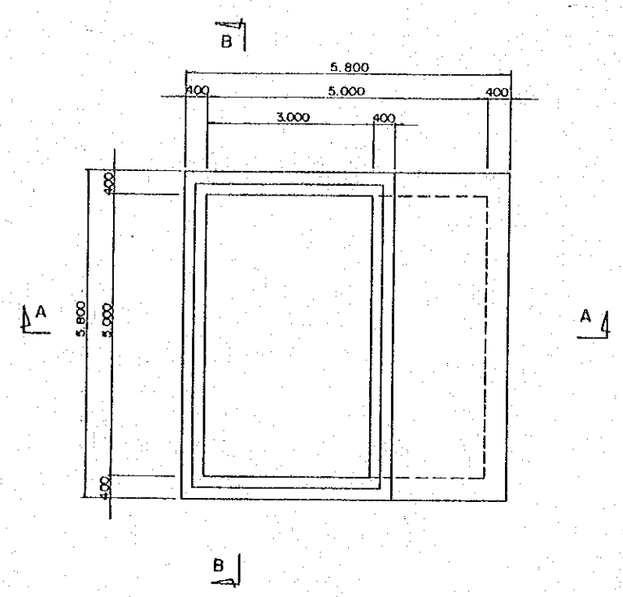
SUNAMGANJ

PURIFICATION PLANT
RAPID SAND FILTER

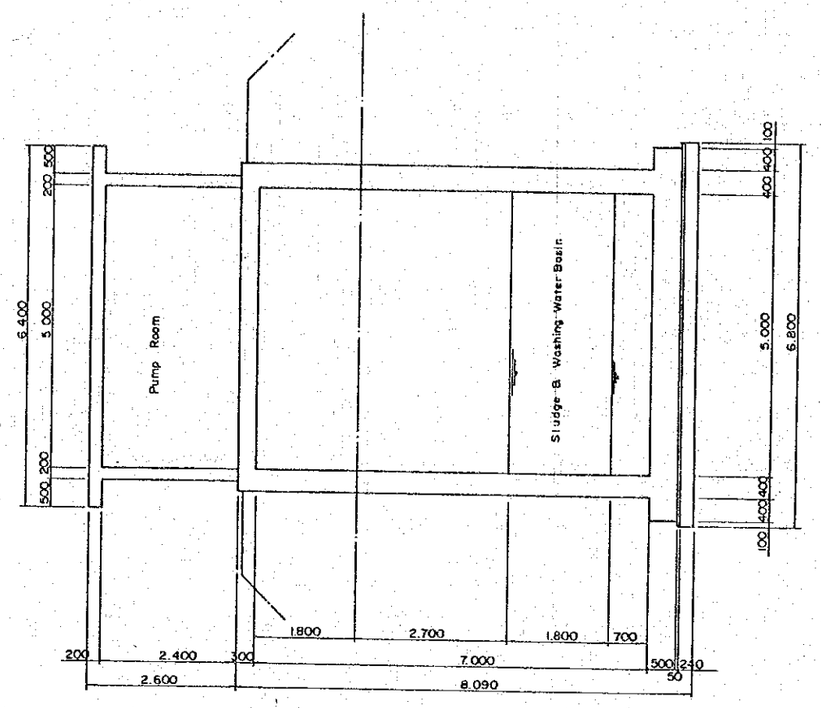
Date	Oct. 1984	Drawing No.	8 - 5

JAPAN INTERNATIONAL COOPERATION AGENCY

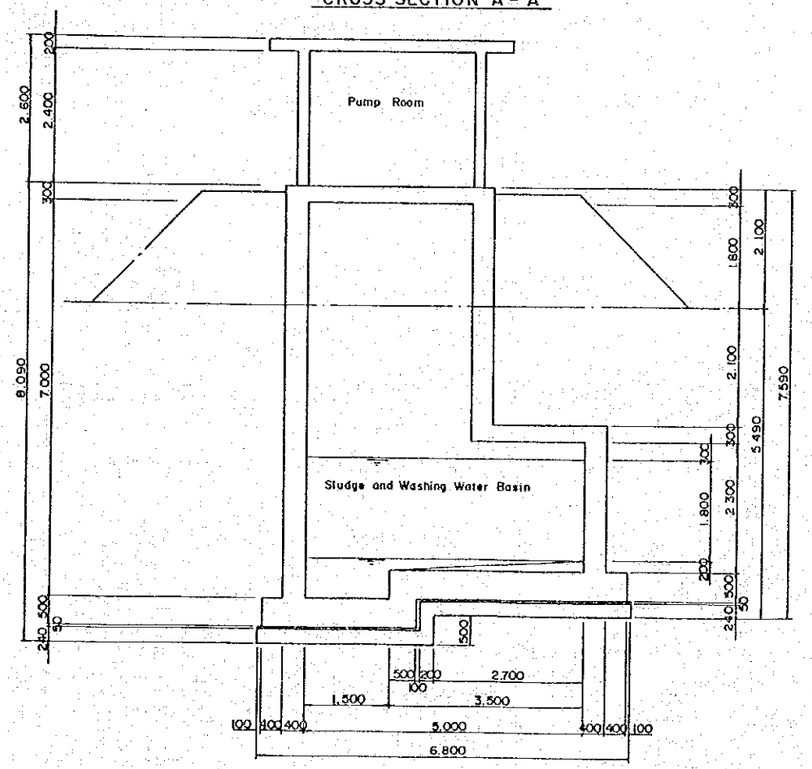
PLAN



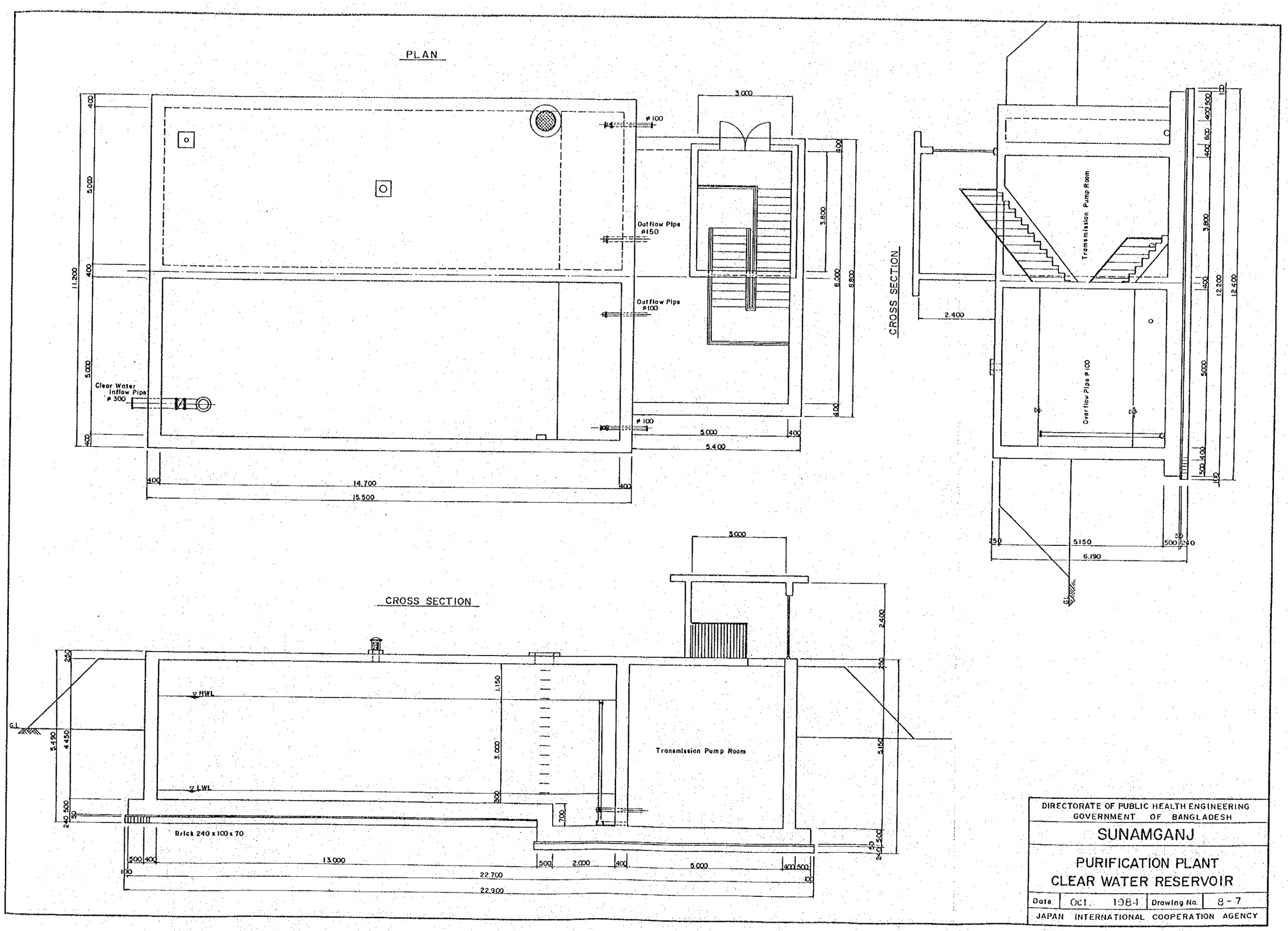
CROSS SECTION B-B



CROSS SECTION A-A



DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
SUNAMGANJ			
PURIEICATION PLANT SLUDGE AND WASHING WATER BASIN			
Date	Oct. 1984	Drawing No.	8-6
JAPAN INTERNATIONAL COOPERATION AGENCY			



DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

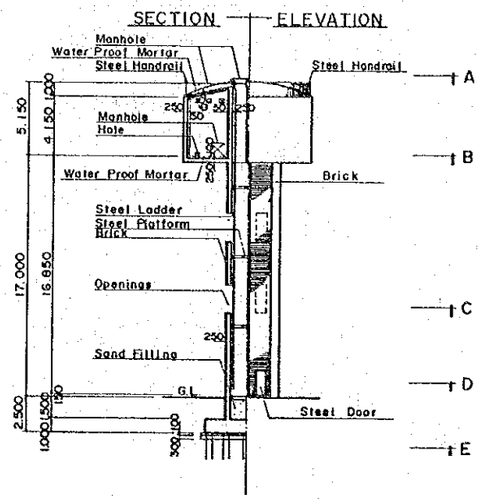
SUNAMGANJ

PURIFICATION PLANT
CLEAR WATER RESERVOIR

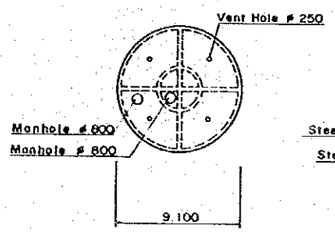
Date	Oct. 1981	Drawing No.	8 - 7

JAPAN INTERNATIONAL COOPERATION AGENCY

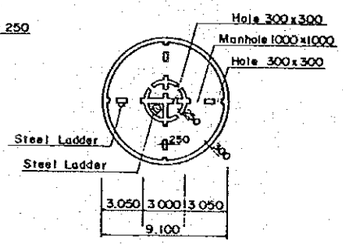
200m³ OVERHEAD TANK



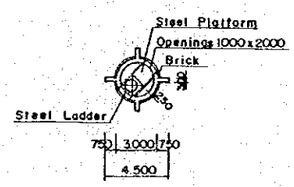
A-SECTION



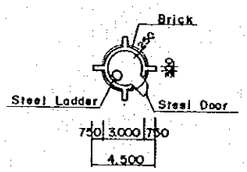
B-SECTION



C-SECTION



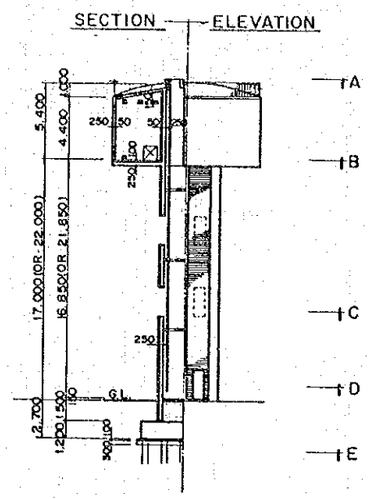
D-SECTION



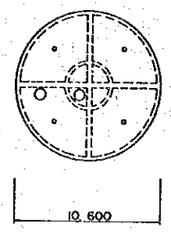
E-SECTION

Pile 21Nos.- 400 ϕ (40T/P)
L=16.000

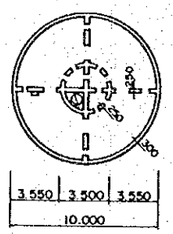
300m³ OVERHEAD TANK



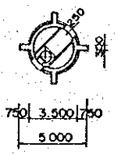
A-SECTION



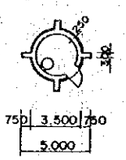
B-SECTION



C-SECTION



D-SECTION



S = 1 : 200

0 5 10 15m

E-SECTION

Pile 27Nos.- 400 ϕ (40T/P)
L=16.000

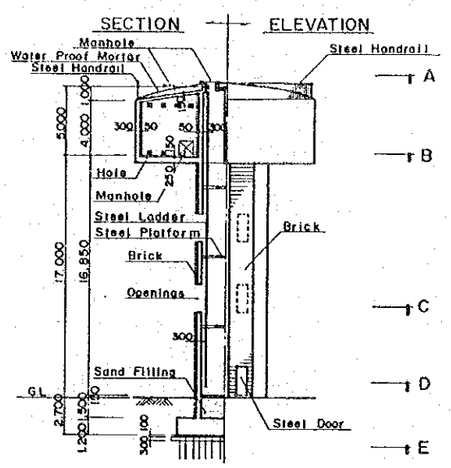
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

OVERHEAD TANK (200m³, 300m³)
SECTION AND ELEVATION

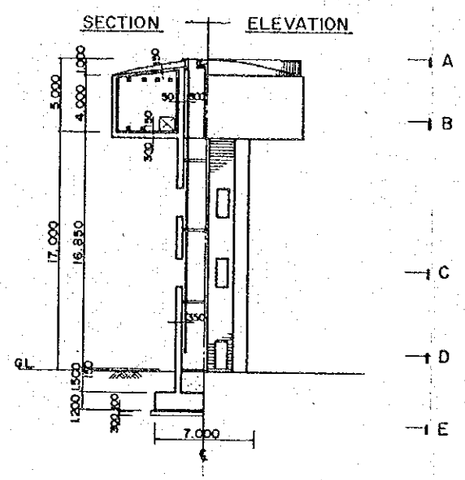
Date	Oct. 1984	Drawing No.	9-1

JAPAN INTERNATIONAL COOPERATION AGENCY

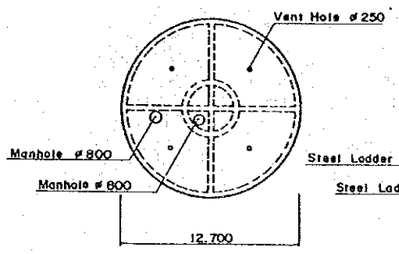
400m³ OVERHEAD TANK



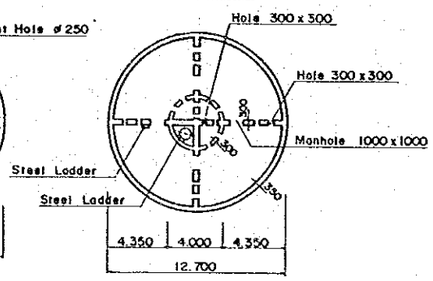
500m³ OVERHEAD TANK



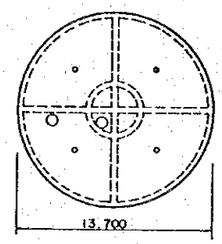
A - SECTION



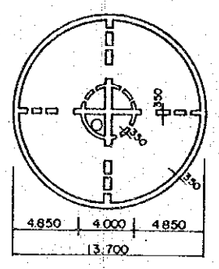
B - SECTION



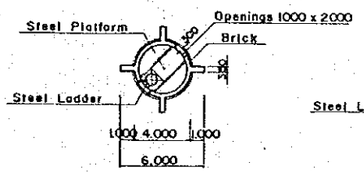
A - SECTION



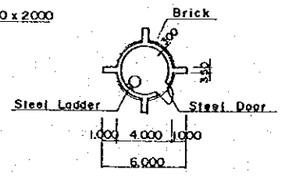
B - SECTION



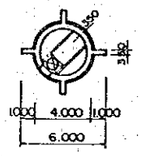
C - SECTION



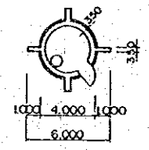
D - SECTION



C - SECTION



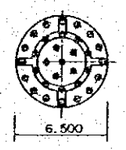
D - SECTION



S = 1 : 200

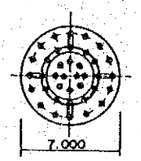
0 5 10 15m

E - SECTION



Pile 32 Nos.- 400 ø (40 T/P)
L = 16,000

E - SECTION



Pile 38 Nos.- 400 ø (40 T/P)
L = 16,000

DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

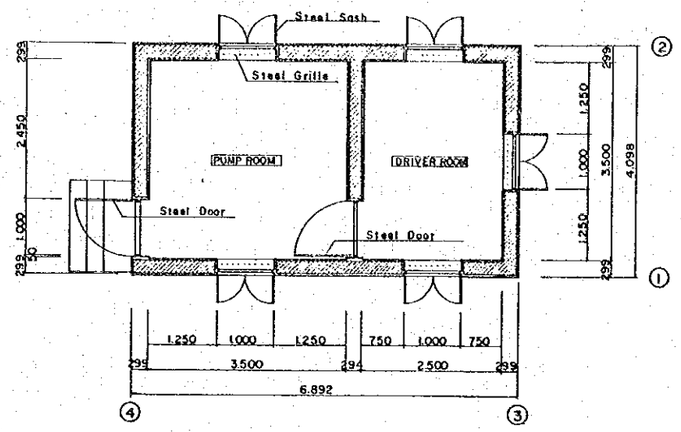
OVERHEAD TANK (400m³, 500m³)

SECTION AND ELEVATION

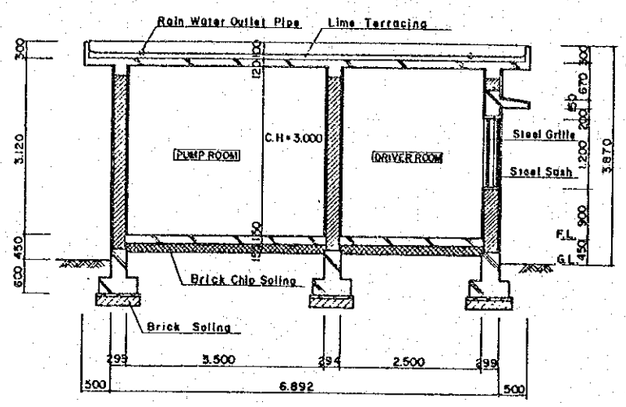
Date	Oct. 1984	Drawing No.	9 - 2

JAPAN INTERNATIONAL COOPERATION AGENCY

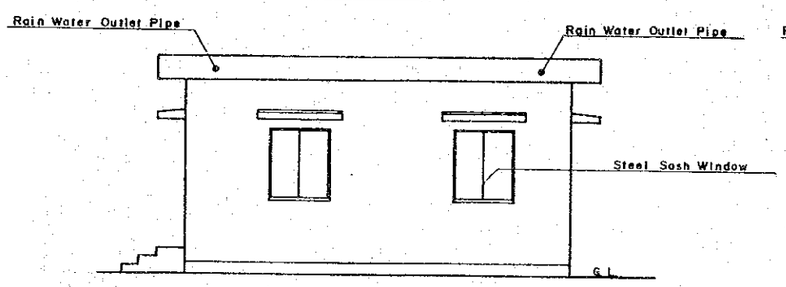
PLAN



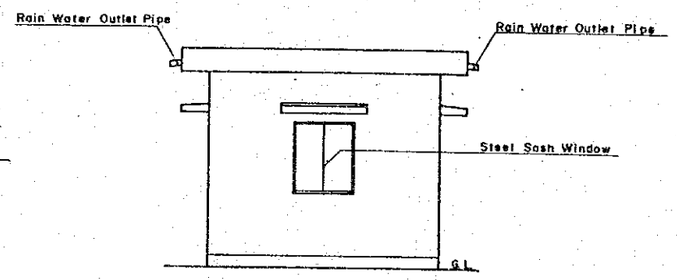
CROSS SECTION



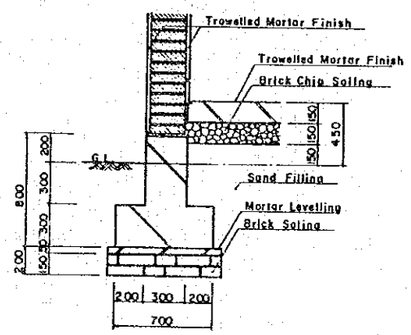
ELEVATION - ①



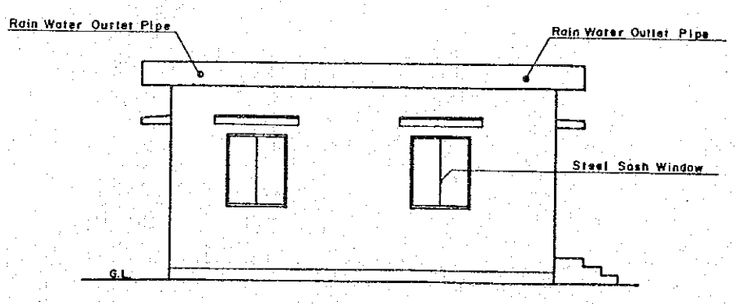
ELEVATION - ③



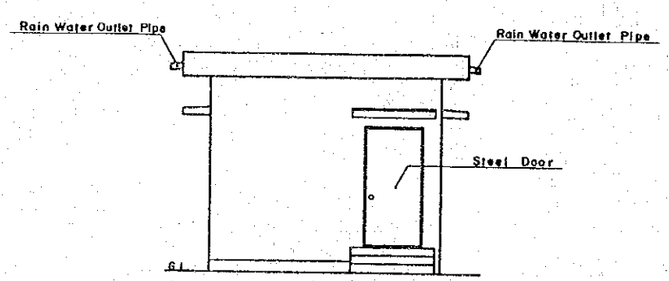
DETAIL OF FOUNDATION



ELEVATION - ②



ELEVATION - ④



S = 1 : 50

0 1 2 3 4 5m

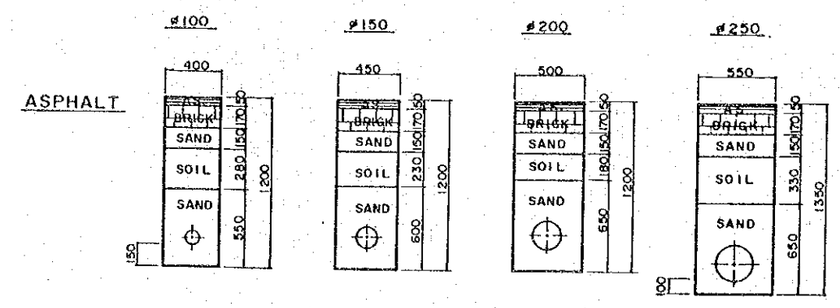
DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

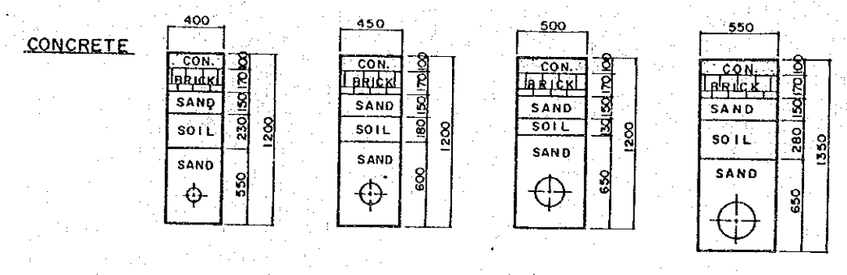
PUMP HOUSE

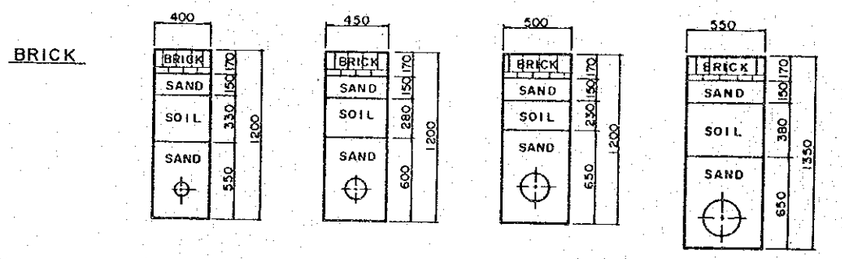
PLAN, CROSS SECTION AND ELEVATIONS

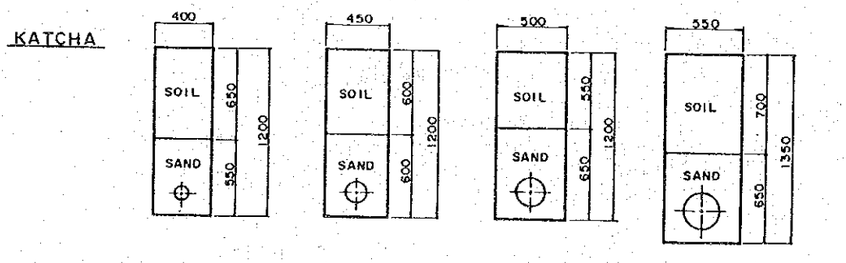
Date	Oct. 1984	Drawing No.	9-3

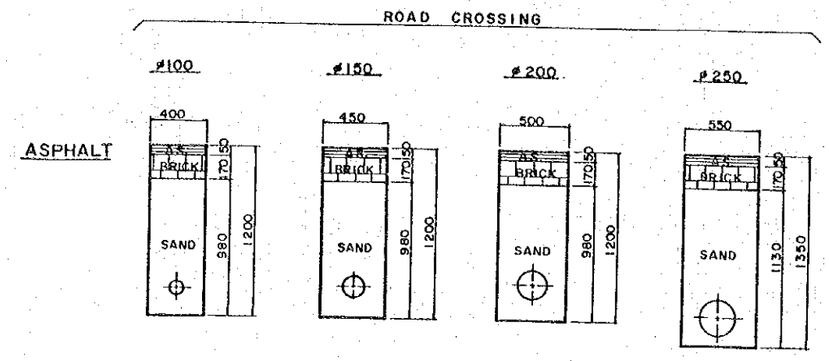
JAPAN INTERNATIONAL COOPERATION AGENCY

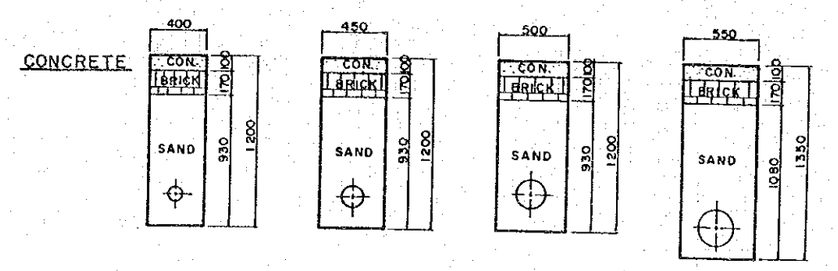


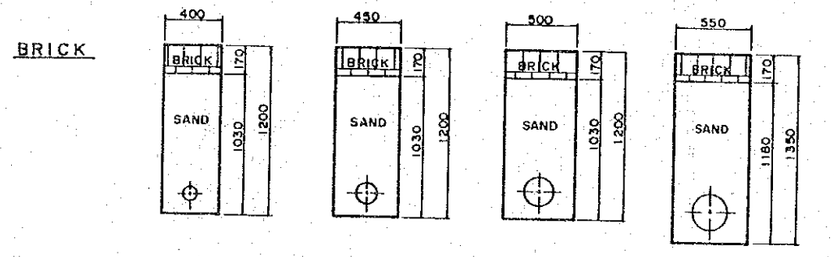


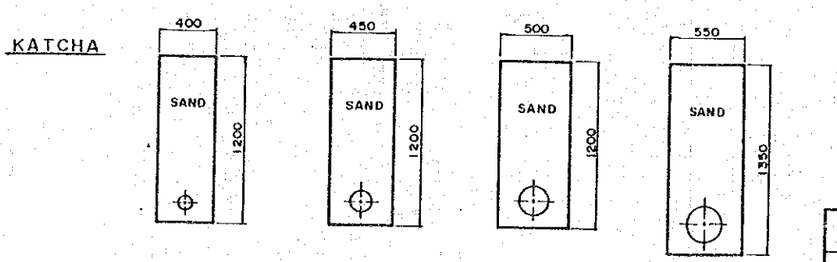


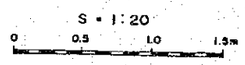












DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

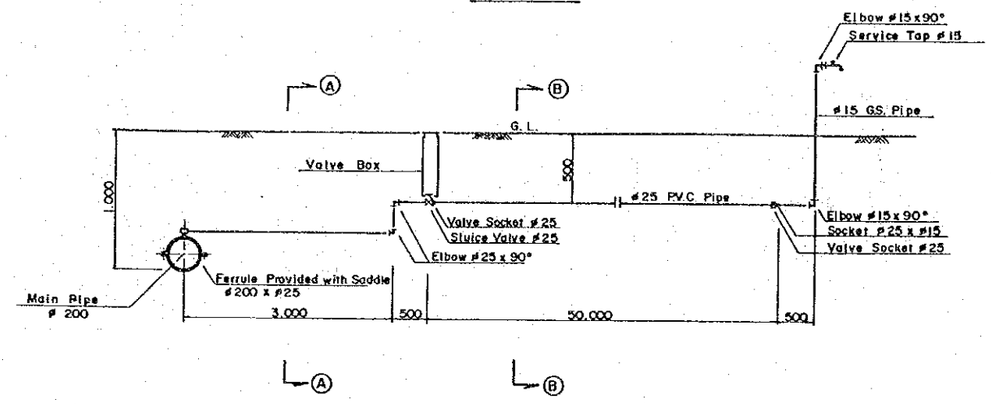
LAYING DISTRIBUTION PIPE EXCAVATION AND REFILLING

Date	Oct. 1984	Drawing No.	9-4

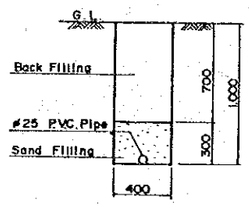
JAPAN INTERNATIONAL COOPERATION AGENCY

HOUSE CONNECTION

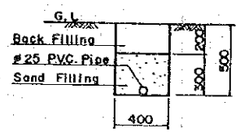
PROFILE



Ⓐ-Ⓐ SECTION

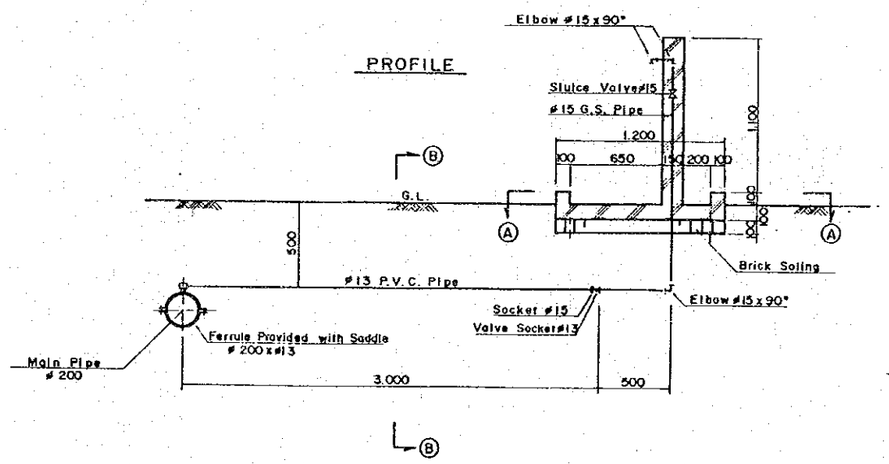


Ⓑ-Ⓑ SECTION

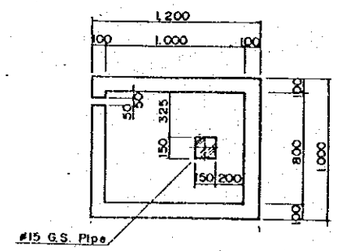


PUBLIC STANDPOST

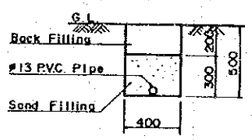
PROFILE



Ⓐ - Ⓐ SECTION



Ⓑ - Ⓑ SECTION



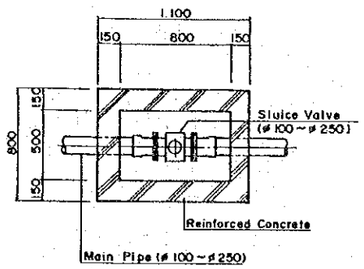
S = 1:20

0 0.5 1.0 1.5m

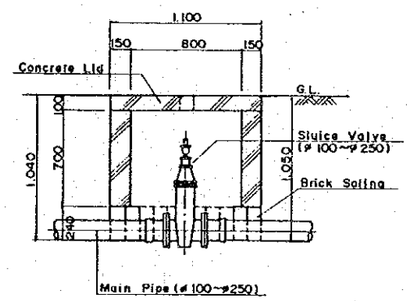
DIRECTORATE OF PUBLIC HEALTH ENGINEERING GOVERNMENT OF BANGLADESH			
HOUSE CONNECTION AND PUBLIC STANDPOST PROFILE AND SECTION			
Date	Oct. 1984	Drawing No.	9-5
JAPAN INTERNATIONAL COOPERATION AGENCY			

VALVE BOX

PLAN

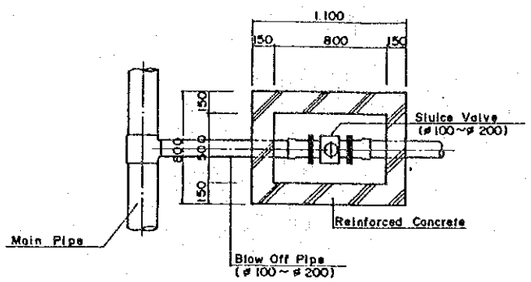


CROSS SECTION

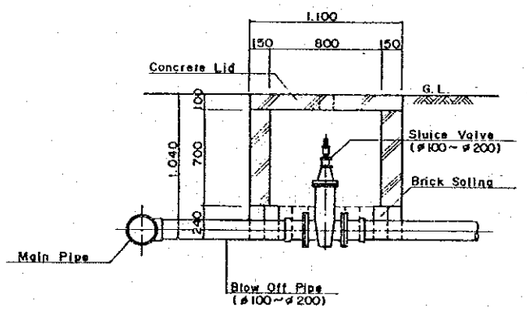


BLOW OFF

PLAN

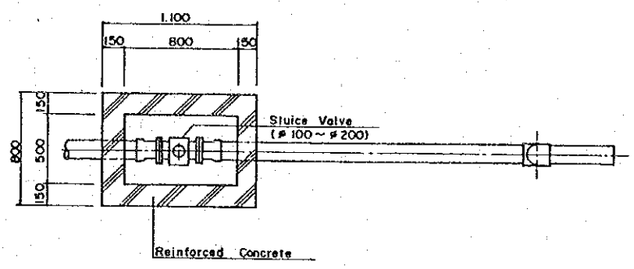


CROSS SECTION

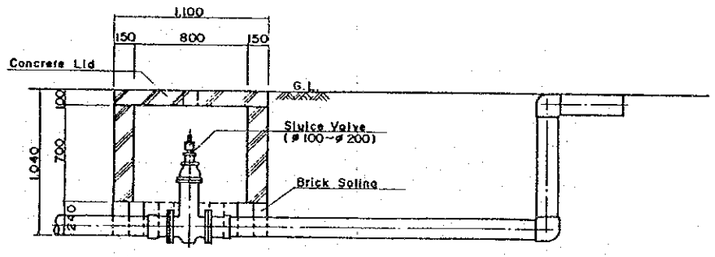


PIPE-END WORKS

PLAN



CROSS SECTION



S = 1 : 20

0 0.5 1.0 1.5m

DIRECTORATE OF PUBLIC HEALTH ENGINEERING
GOVERNMENT OF BANGLADESH

VALVE BOX, BLOW OFF AND PIPE-END WORKS

PLAN AND CROSS SECTION

Date	Oct. 1984	Drawing No.	9 - 6

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA