APPENDICES

APPENDIX 1.

MEMBER LIST OF THE SURVEY TEAM

APPENDIX 1. MEMBER LIST OF THE SURVEY TEAM

(1) Site Survey

Masayuki WATANABE	Team Leader Department Specialist JICA
Tatsuya IMAI	Co-ordinator Second Project Study Division Grant Aid Project Study Department JICA
Sakae NAKAMURA	Project Manager and Architectural Planner Japan Engineering Consultants Co., Ltd.
Tomoko MASUDA	Social Environment, Education Planner and Facilities Utilization Planner
Masayuki MORI	Facilities and Equipment Planner Japan Engineering Consultants Co., Ltd.
Sumitada OKAMOTO	Natural Conditions Surveyor Japan Engineering consultants Co., Ltd.
Hisashi TAKADA	Construction Planner and Cost Estimator Japan Engineering Consultants Co., Ltd.

(2) Draft Basic Design Explanation

Masayuki WATANABE	Team Leader Development Specialist JICA
Sakae NAKAMURA	Project Manager and Architectural Planner Japan Engineering Consultants Co., Ltd.
Hisashi TAKADA	Construction Planner and Cost Estimator Japan Engineering Consultants Co., Ltd.

APPENDIX 2.

SURVEY SCHEDULE

APPENDIX 2. SURVEY SCHEDULE

(1) Site Survey Schedule

No.	Date	Day	Official		Consultants				
			Team Leader (M. Watanabe)	Coordinator (T. Imai)	Project Manager/ Architectural Planner (S. Nakamura)	Social Environment/ Education/Facilities Utilization Planner (T. Masuda)	Facilities/Equipment Planner (M. Mori)	Natural Conditions Surveyor (S. Okamoto)	Construction Planner/ Cost Estimator (H. Takada)
1	10. 09	(Fri)		NRT-BKK	NRT-BKK	NRT-BKK	NRT-BKK		NRT-BKK
2	10	(Sat)		NRT-DAC	NRT-DAC	BKK-DAC	BKK-DAC		BKK-DAC
3	11	Sun	MNL-DAC Courtesy call on/Meeting with JICA/ EOJ/ ERD/ LGRD/PMED/WB/ Joint Meeting Signing of Minutes Data Collection	Courtesy call on/Meeting with JICA/ EOJ/ ERD/ LGRD/LGED Joint Meeting Preparation of Draft Minutes Data Collection	Courtesy call on/Meeting with JICA/ ERD/ LGRD/ LGED/Caritas Preparation of Draft Minutes Data Collection	Courtesy call on/Meeting with JICA/ ERD/LGRD/LGED/ PMED/WB/ BDRCS/Caritas Data Collection	Courtesy call on/Meeting with JICA/ERD Preparation for Site Survey	TYO-BKK	Consultancy call on/Meeting with JICA/ERD Preparation for Site Survey
4	12	Mon						BKK-DAC	
5	13	Tue					DAC-CGP	DAC-CGP	DAC-CGP
6	14	Wed					General Site Survey	General Site Survey	General Site Survey
7	15	Thu	DAC-BKK					Arrangement of Survey Results	
8	16	(Fri)	BKK-OSA	DAC-MIR-CGP General Site Survey	DAC-MIR-CGP General Site Survey	DAC-MIR-CGP General Site Survey			
9	17	(Sat)		CGP-DAC-STG	Arrangement of Survey Results			CGP-DAC	
10	18	Sun		STG-NRT	DAC-MIR-CGP	Detailed Site Survey	Detailed Site Survey	Meeting with Local Surveyors/Assistance in Signing of Local Surveyors' Contracts	Detailed Site Survey
11	19	Mon			Meeting with JICA Signing of Local Surveyors' Contracts			DAC-CGP	
12	20	Tue			DAC-CGP			Natural Conditions Survey (Supervision)	CGP-DAC
13	21	Wed			Detailed Site Survey			Meteorological Survey	Arrangement of Survey Results
14	22	Thu			CGP-DAC	CGP-DAC	CGP-DAC		DAC-CGP
15	23	(Fri)			Arrangement of Survey Results	Arrangement of Survey Results	Arrangement of Survey Results		Site Data Collection
16	24	(Sat)			DAC-MIR-CGP	DAC-MIR-CGP	DAC-CGP		
17	25	Sun			Existing Shelters Survey	Existing Shelters Survey	Site Data Collection		
18	26	Mon			CGP-MIR-DAC	CGP-MIR-DAC	CGP-DAC		CGP-DAC
19	27	Tue			Internal Team Meeting Arrangement of Survey Results	Internal Team Meeting Arrangement of Survey Results	Internal Team Meeting Arrangement of Survey Results		Internal Team Meeting Arrangement of Survey Results
20	28	Wed			Arrangement of Collected Data Hartar	Arrangement of Collected Data Hartar	Arrangement of Collected Data Hartar	Arrangement of Collected Data Hartar	Arrangement of Collected Data Hartar
21	29	Thu						CGP-DAC	
22	30	(Fri)			Meeting with /Data Collection from PMED/WB/ BDRCS/EU/IFAD/ FD/SDC/LGED Schematic Design Planning, Meeting with/Report to JICA, LGED	Meeting with /Data Collection from PMED/WB/ BDRCS/EU/IFAD/ FD/SDC/LGED Schematic Design Planning	DAC-BKK BKK-TYO	Supervision of Compilation of Survey data Meeting with/Data Collection from DPHE/BRAC/ MOEF/BMD/ BIWTA/UNICEF	Meeting with /Data Collection from Local Contractors/BRAC FD/LGED Meeting with/Report to JICA, LGED
23	31	(Sat)				DAC-BKK			
24	11/01	Sun			DAC-BKK	BKK-NRT			DAC-BKK
25	02	Mon			BKK-NRT			DAC-BKK	BKK-NRT
26	03	Tue						BKK-NRT	
27	04	Wed							
28	05	Thu							
29	06	(Fri)							
30	07	(Sat)							
31	08	Sun							
32	09	Mon							
33	10	Tue							
34	11	Wed							
35	12	Thu							
36	13	(Fri)							
37	14	(Sat)							
38	15	Sun							
39	16	Mon							
40	17	Tue							
41	18	Wed							
42	19	Thu							
43	20	(Fri)							
44	21	(Sat)							
45	22	Sun							

LEGEND: NRT:Narita, BKK:Bankok, MNL:Manila, OSA:Osaka, DAC:Dhaka, CGP:Chittagong.
EOJ:Embassy of Japan

(2) Draft Basic Design Explanation Schedule

No.	Date	Day	Official	Consultants	
			Team Leader (M. Watanabe)	Project Manager/Architectural Planner (S. Nakamura)	Construction Planner/Cost Estimator (H. Takada)
1	2/05	(Fri)		NRT-BKK	NRT-BKK
2	06	(Sat)	NRT-BKK	BKK-DAC, Courtesy Call on LGED	Same as Left
3	07	Sun	BKK-DAC Courtesy Call on JICA, E/OJ	Meeting with LGED, JICA Courtesy Call on E/OJ	Meeting with LGED Data Collection on Import of Re-bars
4	08	Mon	Meeting with ERD, PMED, LGED	Same as left	Same as left
5	09	Tue	Hartal (Meeting with LGED)	Same as left	Same as left
6	10	Wed	Hartal (Report to E/OJ, JICA)	Same as left	Same as left
7	11	Thu	Hartal (Joint Meeting Signing of Minutes)	Hartal (Joint Meeting, Assistance in Signing of Minutes)	Hartal (Joint Meeting)
8	12	(Fri)	DAC-BKK	Meeting with LGED	Same as left, Data Collection
9	13	(Sat)	BKK-NRT	DAC-BKK	Same as left
10				BKK-NRT	Same as left

APPENDIX 3.

LIST OF PARTY CONCERNED IN THE RECIPIENT COUNTRY

APPENDIX 3. LIST OF PARTY CONCERNED IN THE RECIPIENT COUNTRY

1. Bangladesh Side

1) ERD

Mr.Suhel Amed	Additional Secretary
Mr. Kamrul Hassan	Deputy Secretary
Mr. Nurul Hoque Mazumder	Senior Assistant Chief
Mr. Shin-ichiro Omote	Economic Cooperation Coordinator

2) Ministry of L.G.R.D. & Cooperation

Mr. A. H. M. Abdul Hye	Secretary, Local Government Division
Mr. Serajul Islam	Deputy Chief, Local Government

3) Local Government Engineering Department (LGED)

[Dhaka H.Q.]

Mr. Quamrul Islam Siddique	Chief Engineer
Mr. Md. Monowar Hossain Chowdhury	Additional Chief Engineer
Mr. Md. Zahangir Alam	Project Director (E.E)
Mr. Farazi Shahabuddin Ahmed	Executive Engineer
Mr. Yoshihiro Suzuki	Technical Advisor

[Chittagong Xen Office]

Mr. Golam Mostafa Patwary	Executive Engineer
Mr. Tofazzal Ahmed	Assistant Engineer
Mr. Rabi Shankar Chowdhury	District Training Officer
Mr. Md. Mahbubur Rahman	Thana Engineer Banskhali
Mr. Raf Alam	Thana Engineer, Anwara
Mr. Akbar Hossain Patwary	Thana Engineer, Sitakunda
Mr. Adnan Aktarul Azam	Thana Engineer, Mirsharai

[Cox's Bazar Xen Office]

Mr. Abdur Razzaque	Executive Engineer
Mr. Fazlur Rahman Talukdar	Thana Engineer, Kutubdia
Mr. S. A. Baset	Thana Engineer, Chokoria

4) Primary & Mass Education Divsion

Dr. Delwar Hossain	Deputy Chief

5) Directorate of Primary Education (DPE)
[Chittagong]

Mr. Md. Nurul Amin Chowdhury	District Primary Education Officer
Mr. Sharial Chowdhury	Thana Education Officer, Mirsharai

6) Facility Department

Mr. Mostafa Kamal	Chief Engineer
Mr. Ahad Ali	Structural Engineer

7) Department of Public Health Engineering (DPHE)

Mr. S. A. K. M. Shafique	Chief Engineer
Mr. Md. Zahurur Hoque	Superintending Engineer, Planning Circle
Mr. Md. Mustafizur Rahman	Executive Engineer, Training Division
Mr. S. M. Ehtishamul Huq	Executive Engneer, R & D Division

8) Ministry of Disaster Management and Relief

Mr.Motaher Hossain	Deputy Chief (Planning)

9) Disaster Management Bureau

Mr.Siraj Uddin Ahmed	Director General
Mr.Khabiruddin Ahmed	Joint Secretary & Director
Mr.A.B.M. Abul Quashem	Deputy Secretary

10) Minstry of Environment & Forest

Mr.Rezaul Karim	Assistant Chief
Ms.Nurun Nahar	Assistant Chief

11) Bangladesh Meteorological Department (BMD)

Mr. Anwarul Kabir	Deputy Director
Mr. Md. Enaifur Rahman Mian	Assistant Meteorologist

12) Bangladesh Inland Water Transport Authority (BIWTA)

Mr. A. K. M. Nurul Alam	Director, Department of Hydrography
Mr. Md. Abdul Matin Mondal	Sr. Deputy Director, - do -
Mr. Md. Mahbub Alam	Deputy Director, - do -

2. International Organizations and Others

1) World Bank

Mr. Henry P. Gassner	Senior Operation Officer
Mr. Jan Weijenberg	Senior Operation Officer
Mr. Imitazuddin Ahmed	Senior Project Officer

2) Asian Development Bank

Mr.Janal Mahmood	Project Director

3) European Union

Mr. Md. Arham Uddin Siddique	Senior Engineer

4) UNICEF

Mr. Aung Chein	Project Officer, Water & Environmental

5) Swiss Development Corporation

Mr. Phillipe Besson	Resident Coordinator

6) KfW

Mr. Gerhard J. Rupprenht	Consulting Engineer

7) International Fund for Agricultural Development (IFAD)

Mr. Rabiul Islam Khan	Project Director

8) Bangladesh Red Crescent Society (BDRCS)

Mr. A. S. M. Akram	Deputy Secretary General
Mr. A. K. M. Harun-al-Rashid	Director
Mr. Mahbub R. Sarker	Construction Director
Mr. S. M. Rafiqul Islam	Director
Mr. Golam Kibria	Jr. Assistant Director (CPP)
Mr. Yutaka Oiwa	Delegate

9) Caritas Bangladesh

Mr. Jeffrey S. Pereira	Executive Director
Mr. Ruben Gomes	Welfare Director

10) BRAC

Mr. M. Mahmood Hossain	Chief Construction Engineer
Mr. Shah M. Obaidur Rahman	Site Engineer

3. Japanese Side

1) Embassy of Japan in Bangladesh

His Excellency Mr. Kazuyoshi Kaneko	Ambassador to Bangladesh
Yoichi Yamauchi	Second Secretary

2) JICA Bangladesh Office

Yuji Okazaki	Resident Representative
Senichi Kimura	Dupty Resident Represent
Masaki Matsushima	Dupty Resident Represent
Kozo Ito	Dupty Resident Represent

APPENDIX 4.

MINUTES OF DISCUSSIONS

APPENDIX 4. MINUTES OF DISCUSSIONS

(1) Site Survey

Minutes of Discussions
On
The Basic Design Study on the Project for the Construction of Multi-purpose Cyclone Shelters (Phase IV)
In
The People's Republic of Bangladesh

In response to the request from the Government of the People's Republic of Bangladesh, the Government of Japan decided to conduct the Basic Design Study on the Project for the Construction of Multi-purpose Cyclone Shelters (Phase IV) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Bangladesh a Basic Design Study Team (hereinafter referred to as "the Study Team"), which is headed by Mr. Masayuki. WATANABE, Development Specialist, JICA, and the Study Team is scheduled to stay in the country from October 10 to November 21, 1998.

The Study Team held a series of discussions with the officials concerned of the Government of the Bangladesh and conducted field surveys at the study sites.

In the course of discussions, both parties confirmed the main items described on the attached sheets. The Study Team will proceed to further works and prepare the Draft Report.

Dhaka, October 13, 1998

Masayuki WATANABE
Leader
Basic Design Study Team,
JICA

Kamrul Hasan
Deputy Secretary
Economic Relations Division
Ministry of Finance.

Witness by

13.10.98

Serajul Islam
Deputy Chief
Local Government Division
M/O. LGRD & Co-operatives.

13.10.98

Md. Zahangir Alam
Project Director
Local Government Engineering Department

ATTACHMENT

1. Objective of the Project

The objective of the project is to construct cyclone shelters which would protect people's lives in case of cyclone accompanied with tidal surge. The shelter should be used as a primary school in usual time.

2. Responsible and Implementing Agency

Local Government Engineering Department (LGED) is responsible for;

a) administration and execution of the Project
b) maintenance practice of all the shelters under the Project
c) coordination with other agencies in Government of Bangladesh such as Economic Relations Division (ERD), Ministry of Local Government, Rural Development and Cooperative (MLGRD&C), Primary and Mass Education Division (PMED).

The organization chart of LGED is shown in ANNEX-1.

3. Project Site

The Project target area is in Chittagong District shown in ANNEX-2.
Primary schools proposed by the Bangladesh side are listed in ANNEX-3.
Both side have agreed that the final sites covered by the Project will be decided on the criteria shown in ANNEX-4 for the Basic Design and they will be presented in the meetings held upon the dispatch of the Draft Basic Design Consultation Team.

4. Major Items Requested by the Bangladesh Side

After discussions, Bangladesh side finally requested the following items

a) two-storied shelters which comprise classrooms, teacher's room, a store room, two toilet rooms.
b) water supply facilities (a tubewell and a manual pump) for each shelter in principle.

The final components of the Project will be decided by the Japanese side at its discretion.

5. Japan's Grant Aid System

The Bangladesh side has understood the system of the Japan's Grant Aid explained by the Study Team; the main feature is described in ANNEX-5.

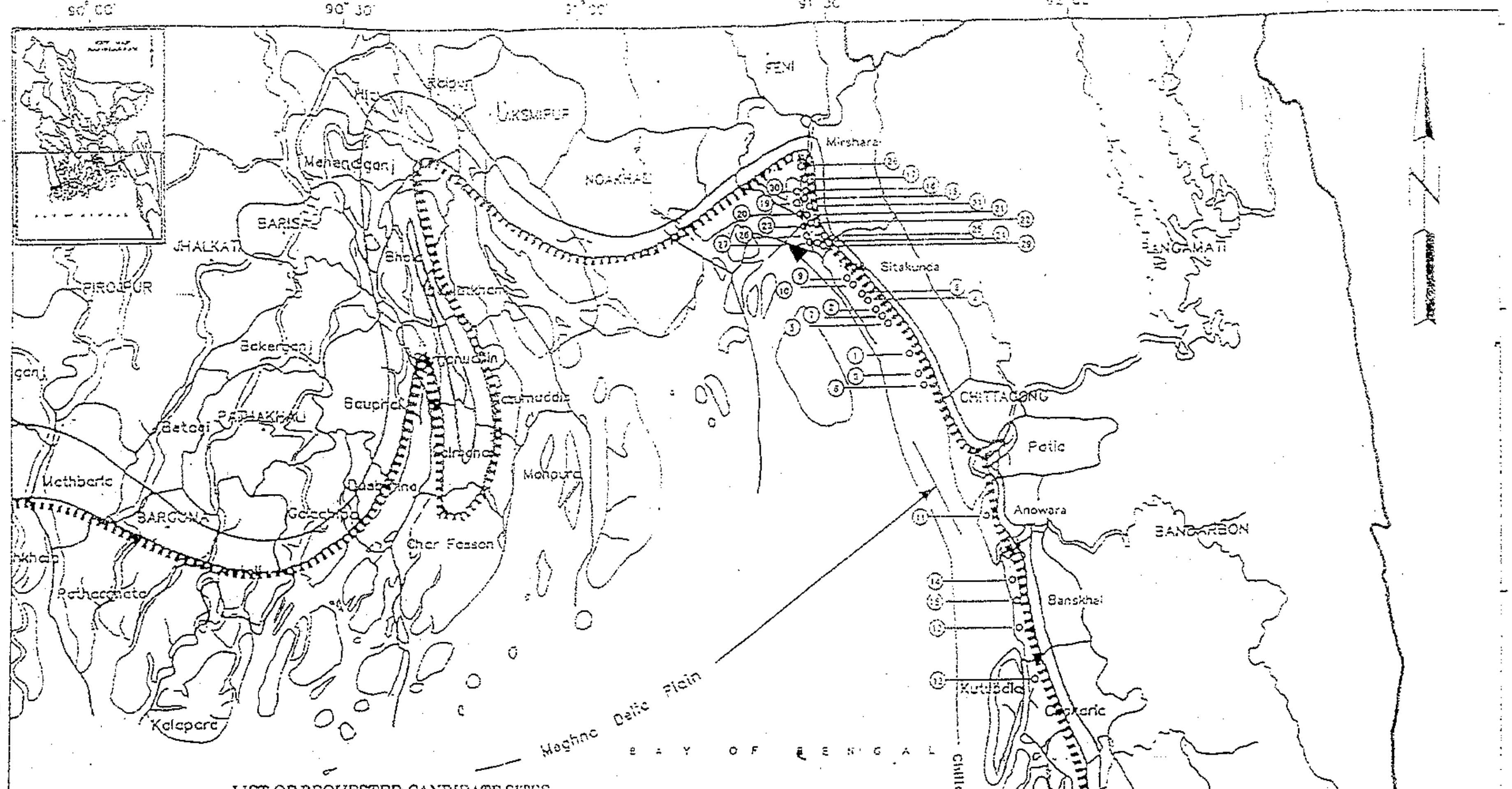
6. Necessary Measures to be Taken by the Bangladesh Side

Necessary Measures to be Taken by the Bangladesh Side are described in ANNEX-6 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. Further Schedule of the Study

1) The Study Team will proceed to further studies in the Bangladesh until November 21, 1998.
2) Based on the results of the fields survey and analysis, JICA will prepare the Draft Basic Design Report and dispatch a team in February, 1999 in order to consult with the Bangladesh side on outline of the Draft Report.
3) Upon acceptance of the Draft Basic Design Report by the Bangladesh side, JICA will complete the Basic Design Study Report and forward it to the Bangladesh side by April, 1999.

ANNEX-2 : PROJECT TARGET AREA

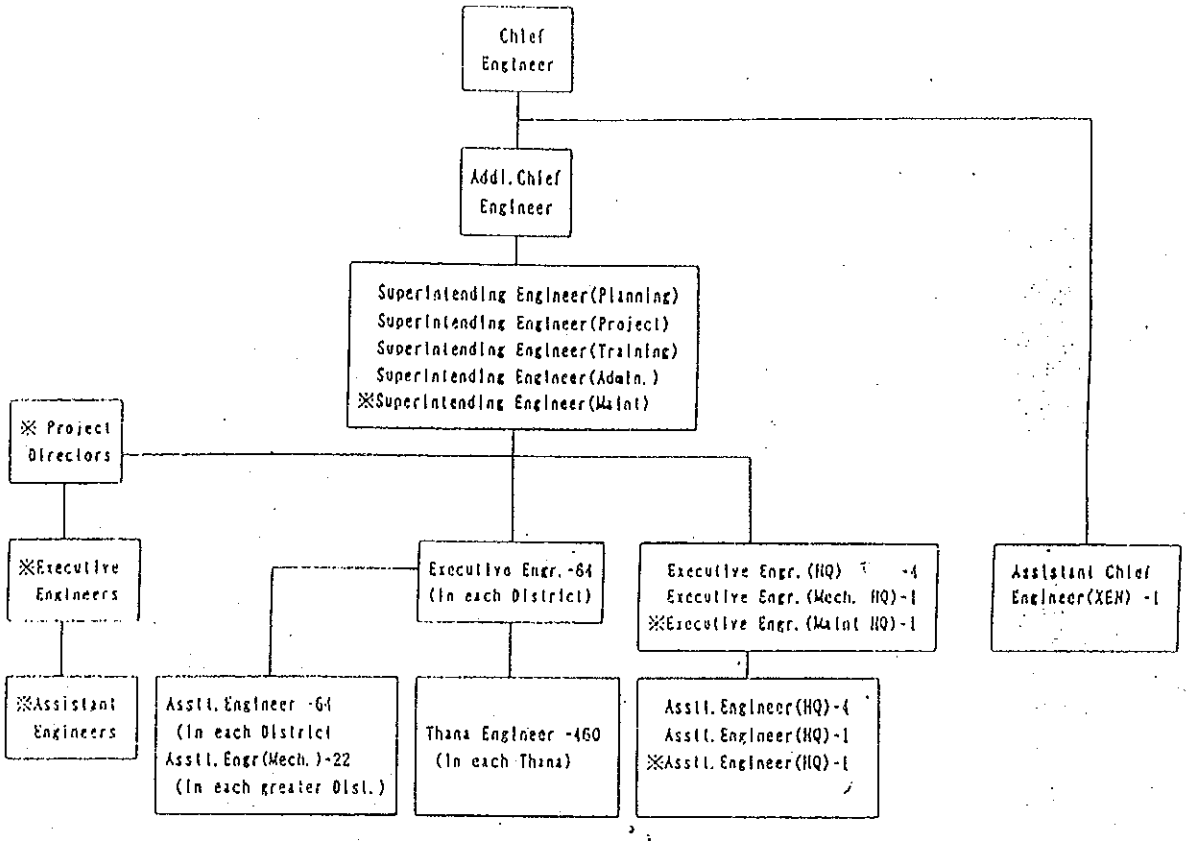


LIST OF REQUESTED CANDIDATE SITES

Site No.	District	Thana	Union	Name of School	Site No.	District	Thana	Union	Name of School
1	Chittagong	Sitakunda	Sonaichari	Sitalpur GPS	17	Chittagong	Mirsharai	Zorwarganj	Jonora Aziz GPS
2	Chittagong	Sitakunda	Barobkunda	Mandariteela GPS	18	Chittagong	Mirsharai	Durgapur	Goonpur GPS
3	Chittagong	Sitakunda	Bhatiari	Kadamrasul GPS	19	Chittagong	Mirsharai	Michanala	Sanatal Chabania GPS
4	Chittagong	Sitakunda	Muradpur	Golabaria GPS	20	Chittagong	Mirsharai	Moghadia	Mandartat GPS
5	Chittagong	Sitakunda	Barabkunda	Narafia GPS	21	Chittagong	Mirsharai	Moghadia	Kazir Taluk GPS
6	Chittagong	Sitakunda	Bhatiari	Bhatiari GPS	22	Chittagong	Mirsharai	Mani	Madhya Mani GPS
7	Chittagong	Sitakunda	Banshbaria	Banshbaria GPS	23	Chittagong	Mirsharai	Mani	Shahid Abdul Kalam GPS
8	Chittagong	Sitakunda	Muradpur	Sadek Mastan GPS	24	Chittagong	Mirsharai	Maithkhandi	Tarasuda GPS
9	Chittagong	Sitakunda	Sayedpur	West Sayedpur GPS	25	Chittagong	Mirsharai	Wahedpur	Khazuria GPS
10	Chittagong	Sitakunda	Sayedpur	Maddha Bagachatar GPS	26	Chittagong	Mirsharai	Saharkhal	East Saharkhal GPS
11	Chittagong	Anowara	Battali	East Baraya GPS	27	Chittagong	Mirsharai	Saharkhal	South Moghadia GPS
12	Chittagong	Banskhali	Chanua	Khudukhhali GPS	28	Chittagong	Mirsharai	Hingoli	North Azamnagar GPS
13	Chittagong	Banskhali	Gandamara	East Gandamara GPS	29	Chittagong	Mirsharai	Haithandi	Kurua GPS
14	Chittagong	Banskhali	Baharchara	Chapa Chari Rashidia GPS	30	Chittagong	Mirsharai	Katachara	West Katachara GPS
15	Chittagong	Banskhali	Sarai	Jaliaghata GPS	31	Chittagong	Mirsharai	Mirsharai	Bamansai GPS
16	Chittagong	Mirsharai	Michanala	Rahamatabad GPS					

注:GPS:公立初等学校

ANNEX-1 : THE ORGANIZATION CHART OF THE RESPONSIBLE AND IMPLEMENTING AGENCY.



Total Posts(Revenue Budget)

Chief Engineer	1
Add Chief Engineer	1
Superintending Engineer	4
Executive Engineer	68
Executive Engineer(Mech)	1
Executive Engineer(XEN)	1
Assistant Engineer/Thana Engineer	528
Assistant Engineer(Mech)	25
Sub-Assistant Engineer	994
Estimator(SAE)	2
Draftsman(SAE)	462
Laboratory Technician	64
Mechanical Foreman	1
Accountant	525
Stenographer	6
Head Assistant	1
UDA	68
Steno-Typist	70
Surveyor	460
Work Assistant	1840
Accounts Assistant	461
Office Assistant/LDA-cum-Typist	926
Store Keeper	460
Electrician	460
Other Support Staff	2131
TOTAL:	9548

HQ LEVEL

Chief Engineer	1
Addl. Chief Engineer	1
Superintending Engineer	4
Executive Engineer	4
Executive Engineer(Mech)	1
Asstt. Chief Engineer(XEN)	1
Assistant Engineer	4
Assistant Engineer(Mech)	1
Estimator(SAE)	2
Draftsman(SAE)	2
Mechanical Foreman	1
Head Assistant	1
Accountant	1
Stenographer	6
UDA	4
Steno-Typist	1
LDA-cum-Typist	1
Accounts Assistant	1
Driver	12
Duplicating Machine Operator	1
Ammonia Machine Operator	1
MLSS	21
TOTAL:	82

District Level

Executive Engineer	1
Assistant Engineer	1
Assistant Engineer(Mech) (In 22 Greater Districts)	1
SAE	1
Laboratory Technician	1
UDA	1
Accountant	1
Steno-Typist	1
Vehicle Driver	1
Truck Driver	1
Road Roller Driver	1
MLSS	1
Each District:	12
Total(All Districts):	726

Thana Level

Thana Engineer	1
SAE(Construction)	1
SAE(Maintenance)	1
Draftsman(SAE)	1
Store Keeper	1
Accountant	1
Surveyor	1
Work Assistant	4
Electrician	1
Office Assistant	1
LDA-cum-Typist	1
Accounts Assistant	1
Chawkider	2
MLSS	2
Each Thana:	19
Total(All Thanas):	8740

※ : The posts are under the Development Budget.

ANNEX-3 : LIST OF PROPOSED PRIMARY SCHOOLS

No	District	Thana	Union	Name of School
1	Chittagong	Sitakunda	Sonaichari	Sitalpur GPS
2	Chittagong	Sitakunda	Barobkunda	Mandaritola GPS
3	Chittagong	Sitakunda	Bhatiari	Kadamrasul GPS
4	Chittagong	Sitakunda	Muradpur	Golabaria GPS
5	Chittagong	Sitakunda	Barabkunda	Naralia GPS
6	Chittagong	Sitakunda	Bhatiari	Bhatiari GPS
7	Chittagong	Sitakunda	Banshbaria	Banshbaria GPS
8	Chittagong	Sitakunda	Muradpur	Sadek Mostan GPS
9	Chittagong	Sitakunda	Sayedpur	West Sayedpur GPS
10	Chittagong	Sitakunda	Sayedpur	Maddho Bagachatar GPS
11	Chittagong	Anowara	Battali	East Gandamara GPS
12	Chittagong	Banskhali	Chanua	Khodukkhali GPS
13	Chittagong	Banskhali	Gandamara	East Gandamara GPS
14	Chittagong	Banskhali	Baharchara	Chapa Chari Rashidia GPS
15	Chittagong	Banskhali	Saral	Jaliaghata GPS
16	Chittagong	Mirsharai	Mithanala	Rahamotabad GPS
17	Chittagong	Mirsharai	Zarwaeganj	Johora Aziz GPS
18	Chittagong	Mirsharai	Durgapur	Gopalpur GPS
19	Chittagong	Mirsharai	Mithanala	Banatali Chabania GPS
20	Chittagong	Mirsharai	Moghadia	Mondarhat GPS
21	Chittagong	Mirsharai	Moghadia	Kazia Taluk GPS
22	Chittagong	Mirsharai	Miani	Moddho Miani GPS
23	Chittagong	Mirsharai	Miani	Shaud Abdul Kalam GPS
24	Chittagong	Mirsharai	Haithkandi	Tarakatia GPS
25	Chittagong	Mirsharai	Wahedpur	Khazuria GPS
26	Chittagong	Mirsharai	Saherkhali	East Saherkhali GPS
27	Chittagong	Mirsharai	Saherkhali	South Moghadia GPS
28	Chittagong	Mirsharai	Hinguli	North Azamnagar GPS
29	Chittagong	Mirsharai	Haitkandi	kurua GPS
30	Chittagong	Mirsharai	Katachara	West Katachara GPS
31	Chittagong	Mirsharai	Mirsharai	Banskhali GPS

Note: GPS; Government Primary School

ANNEX-4: THE CRITERIA FOR THE BASIC DESIGN

1) The subject site shall be the site of a government primary school which is managed by the central government.

2) The subject site shall be located in the HRA designated by the Master Plan for Multipurpose Cyclone Shelter Programme.

3) In principle, the subject site shall not have any solid building or hill of sufficient height to provide a reliable evacuation site vis-a-vis storm surge caused by a cyclone within a 1.5 Km radius.

4) The subject site shall have sufficient land area for construction of the multipurpose cyclone shelter and rights of land ownership shall be secure by the central government. However, even if sufficient space for construction is not available, this does not include cases where it is possible to secure space by removing facilities judged to be unusable or it is possible to secure additional site area on adjoining land, and assurance that removal works or land acquisition will be implemented by the Bangladesh side is obtained. However, the site shall not require large-scale land reclamation.

5) The subject site shall not be surrounded on three sides by large ponds which make landfilling difficult.

6) The subject site shall allow access by vehicle for the transportation of construction materials to the site.

7) The subject site shall not be associated with a similar project or plan of the Government of Bangladesh, a foreign aid association or a donor country to construct a cyclone shelter.

8) The subject site shall have an existing primary school where the number of teachers and pupils justifies the size of the school building to be constructed as a multipurpose cyclone shelter.

9) The subject site shall have a suitable local community organization (for example, a school management committee) which is capable of maintaining the shelter and which is willing to do so.

10) The subject site shall have a killa for the evacuation of livestock within a radius of 0.6 km. Alternatively, there shall be a feasible site for the construction of such a killa, and assurance shall be obtained from the Bangladesh side concerning this construction.

ANNEX-5: JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures:

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval Cabinet)	(Appraisal by the Government of Japan and Approval by
Determination of and Implementation	(The Notes exchanged between the Governments of Japan the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

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

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;

c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
d) preparation of a basic design of the Project; and
e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates the Study and prepares a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

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

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

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

6) Undertakings required to the Government of the recipient country

a) to secure a lot of land necessary for the construction of the Project and to clear the site;
b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the

necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered 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 should open an account in the name of the Government of the recipient country in a 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 the Government of the recipient country or its designated authority under the verified contracts.

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

ANNEX-6: NECESSARY MEASURES TO BE TAKEN BY THE BANGLADESH SIDE

The following necessary measures should be taken by the Bangladesh side on condition that the Grant Aid by the Government of Japan is extended to the Project.

1. To provide data and information necessary for the Project;

2. To secure the land necessary for the execution of the Project, such as the land for cyclone shelters and killas, temporary offices, working areas, storage yards and others;

3. To make all passable roads leading to the Project sites before the commencement of inland transportation of materials and equipment;

4. To remove the existing primary school building and to build a temporary school facilities to maintain education activities during the construction of cyclone shelter, if necessary;

5. To undertake the incidental works, such as gardening, fencing, lighting and other incidental facilities in and around the Project sites, if necessary;

6. To ensure prompt unloading and customs clearance at ports of disembarkation in Bangladesh;

7. 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 for both consultancy and construction;

8. 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 Bangladesh and stay therein for the performance of their work;

9. To maintain and use facilities constructed under the Grant properly and effectively for the Project;

10. To bear commissions to the Japanese bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commissions;

11. To bear all the expenses, other than those covered by the Grant, necessary for the Project; and

12. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

(2) Draft Basic Design Explanation

Minutes of Discussions
on
the Basic Design Study on the Project for the Construction of Multi-purpose Cyclone Shelters (Phase IV)
in
the People's Republic of Bangladesh
(DRAFT REPORT CONSULTATION)

In October 1998, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched Basic Design Study Team on Project for the Construction of Multi-purpose Cyclone Shelters (Phase IV) (hereinafter referred to as "the Project") to the People's Republic of Bangladesh, and through discussion, field survey and technical examination of the result in Japan, has prepared the draft report of the study.

In order to explain and to consult the contents of the draft report with the Bangladesh side, JICA sent to Bangladesh a Study Team headed by Mr. WATANABE, Development Specialist of JICA, and is scheduled to stay in the country from February 6 to 13, 1999.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Dhaka, February 11, 1999

Masayuki WATANABE
Leader,
Basic Design Study Team,
JICA

A.Q.M. SHAFIUL AZAM
ASSISTANT CHIEF
PRIMARY AND MASS
EDUCATION DIVISION

Kamrul Hasan
Deputy Secretary
Economic Relation Division,
Ministry of Finance

MD, Zahangir Alam
Project Director,
Local Government
Engineering Department

ATTACHMENT

1. **Contents of the Draft Report**

The Government of the People's Republic of Bangladesh (hereinafter referred to as "GOB") has agreed and accepted in principle the contents of the Draft Report proposed by the team. The Project Sites are listed in ANNEX-1.

2. **Japan's Grant Aid System**

GOB has understood the system of the Japan's Grant Aid explained by the Study Team; the main feature is described in ANNEX-2.

3. **Necessary Measures to be Taken by Bangladesh Side**

(1) Necessary Measures to be Taken by GOB are described in ANNEX-3:

(2) GOB especially confirmed that it is responsible for the following items

a) To secure additional land for the shelter construction in the sites as shown in ANNEX-4 and to send the agreement of the each land owner to JICA Bangladesh Office until the end of March, 1999.

b) To remove the existing primary school building in the sites as shown in ANNEX-4.

c) To secure the land for the construction of KILLAS.

d) To construct KILLAS in confirmed sites.

e) To construct access road to each Project site, if necessary.

f) To provide adequate teachers after the completion of shelter construction.

4. Further Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and forward it to GOB around March, 1999.

5. Other Relevant Items

(1) GOB requested the Study Team to include the cost for killa construction in a future project for smooth implementation . The

Study Team will convey it to the Japanese Government.

(2) GOB requested the Study Team to include the solar lighting system in this project. The Study Team will convey it to the Japanese Government.

ANNEX-1 SELECTED PROJECT SITES

Old Site No.	New Site No.	District	Thana	Union	School
3	IV-1	Chittagong	Sitakunda	Bhatiari	Kadamrasul GPS
4	IV-2	Chittagong	Sitakunda	Muradpur	Golabaria GPS
5	IV-3	Chittagong	Sitakunda	Barabkunda	Naralia GPS
8	IV-4	Chittagong	Sitakunda	Muradpur	Sadek Mostan GPS
9	IV-5	Chittagong	Sitakunda	Sayedpur	West Sayedpur GPS
10	IV-6	Chittagong	Sitakunda	Sayedpur	Maddho Bagachatar GPS
12	IV-7	Chittagong	Banskhali	Chanua	Khudukkhali GPS
13	IV-8	Chittagong	Banskhali	Gandamara	East Gandamara GPS
14	IV-9	Chittagong	Banskhali	Baharchara	Chapa Chari Rashidia GPS
15	IV-10	Chittagong	Banskhali	Saral	Jaliaghata GPS
16	IV-11	Chittagong	Mirsharai	Mithanala	Rahamotabad GPS
17	IV-12	Chittagong	Mirsharai	Zarwarganj	South Sonapahar Johora Aziz GPS
20	IV-13	Chittagong	Mirsharai	Moghadia	Mondarhat GPS
21	IV-14	Chittagong	Mirsharai	Moghadia	Kazia Taluk GPS
22	IV-15	Chittagong	Mirsharai	Miani	Moddho Miani GPS
23	IV-16	Chittagong	Mirsharai	Miani	Shohid Abdul Kalam GPS
24	IV-17	Chittagong	Mirsharai	Haithkandi	Tarakatia GPS
25	IV-18	Chittagong	Mirsharai	Wahedpur	Khazuria GPS
28	IV-19	Chittagong	Mirsharai	Hinguli	North East Azamnagar GPS
29	IV-20	Chittagong	Mirsharai	Haitkandi	Kurua GPS
31	IV-21	Chittagong	Mirsharai	Osmanpur	Banskhali GPS

Note: GPS = government primary school

ANNEX-2 JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

- Application
  Request made by the recipient country
- Study
  Basic Design Study conducted by JICA
- Appraisal & Approval
  Appraisal by the Government of Japan and Approval by the Cabinet
- Determination of Implementation
  The notes exchanged between the Governments of Japan and the recipient country

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.
Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).
Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.
Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.
Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the study

The purpose of the Basic Design Study (hereafter referred to as "the Study"), conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic point of view.
c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
d) Preparation of a basic design of the Project
e) Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses a consulting firm(s) selected through its own procedure (competitive proposal).

The firm(s) selected participate(s) a Basic Design study and prepares a report, based upon the terms of reference set by JICA.
At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participates in the Study to the recipient country, in order to maintain technical consistency between the Basic Design and Detailed Design.

3. 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 the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

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

3) The period of the Grant Aid means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.
When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.
However the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"
The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country
In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:
   a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
   b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
   c) To secure buildings prior to the procurement in case the installation of the equipment.
   d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation.
   e) 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.

f) 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 the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

8) Re-export

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

9) Banking Arrangements (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 a 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 the Government of the recipient country or its designated authority under the Verified Contracts.

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.

ANNEX-3: NECESSARY MEASURES TO BE TAKEN BY THE BANGLADESH SIDE

The following necessary measures should be taken by the Bangladesh Side on condition that the Grant Aid by the Government of Japan is extended to the Project.

1. To provide data and information necessary for the Project;

2. To secure the land necessary for the execution of the Project, such as the land for cyclone shelters and killas, temporary offices, working areas, storage yards and others;

3. To make all passable roads leading to the Project sites before the commencement of inland transportation of materials and equipment;

4. To remove the existing primary school building and to build a temporary school facilities to maintain education activities during the construction of cyclone shelter, if necessary;

5. To undertake the incidental works, such as gardening, fencing, lightning and other incidental facilities in and around the Project sites, if necessary;

6. To ensure prompt unloading and customs clearance at ports of disembarkation in Bangladesh and internal transportation therein of the products purchased under the Grant;

7. 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;

8. 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 Bangladesh and stay therein for the performance of their

work;

9. To maintain and use facilities constructed under the Grant properly and effectively for the Project;

10. To bear commissions to the Japanese bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commissions;

11. To bear all the expenses, other than those covered by the Grant, necessary for the Project; and

12. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

ANNEX-4 LIST OF THE PROJECT SITES TO BE ARRANGED FOR THE SHELTER CONSTRUCTION

Site No.	Name of School	Additional Land Acquisition	Removal of Existing School
IV-1	Kadamrasul GPS	Necessary	Necessary
IV-3	Naralia GPS	Necessary	Necessary
IV-5	West Sayedpur GPS	Necessary	Necessary
IV-6	Maddho Bagachatar GPS	Necessary	
IV-8	East Gandamara GPS		Necessary
IV-9	Chapa Chari Rashidia GPS	Necessary	Necessary
IV-11	Rahamolabad GPS	Necessary	
IV-12	South Sonapahar Johora Aziz GPS		Necessary
IV-15	Moddho Miani GPS		Necessary
IV-16	Shohid Abdul Kalam GPS		Necessary
IV-17	Tarakatia GPS	Necessary	Necessary
IV-18	Khazuria GPS		Necessary
IV-20	Kurua GPS		Necessary
IV-21	Banskhali GPS	Necessary	Necessary

APPENDIX 5.

COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

APPENDIX 5. COST ESTIMATION BORNE BY THE RECIPIENT COUNTRY

In case of the implementation for the Project (IV) with grant aid provided by the Government of Japan, the Government of Bangladesh will be required to meet the following costs for the successful completion of the Project (IV).

1)	Additional Land Acquisition	TK30,000 (approx. ¥0.08 million)
2)	Construction of Killas	TK22,220,000 (approx. ¥58.66 million)
3)	Removal of Dilapidated Existing Facilities	TK630,000 (approx. ¥1.66 million)
4)	Bank Commission	TK340,000 (approx. ¥0.91 million)
5)	Construction of Access Road	TK52,500,000 (approx. ¥138.60 million)
	Total	TK75,720,000 (approx. ¥199.91 million)

APPENDIX 6.

CALCULATION OF CYCLONIC STORM SURGE HEIGHT

APPENDIX 6. CALCULATION OF CYCLONIC STORM SURGE HEIGHT

In order to avoid the direct onslaught of the wave force of a cyclonic storm, the planned cyclone shelters will have a raised floor supported by stilts. As the stilts of those cyclone shelters of which the floor height is above the expected cyclonic storm height can easily stand firm against the wave force, the necessary cyclonic storm height to determine the floor height of the cyclone shelters is examined here.

In analysing cyclonic storms, the water level with a 50-year return period is used, as in the case of the Project (I)~(III) using the method adopted by the Master Plan for the Multipurpose Cyclone Shelter Programme.

The following 2 equations are proposed to calculate the cyclone storm height at the cyclone shelter sites.

$H_1 = h_{50} - (X - 1)\,k + h_w$ .....(A-6-1)

- h_{50} : design surge height with 50-year return period (m)
- X : distance of shelter from beach (km)
- K : rate of decrease on surge height (m/km)
- h_w : amplitude of local wave in meters from mean water level
- h_w : $(h_{50} - (X - 1)\,k) / 4$, $h_w = 1$ if $h_w < 1$

$H_2 = Y_{50} - Y_g + h_f$ .....(A-6-2)

- Y_{50} : 50-year extreme surface water level (m)
- Y_g : elevation of ground level at shelter site
- h_f : allowance for local wave (1m)

The Master plan suggests that the higher value given by one of the above equations should be used as the design cyclonic storm height. According to the calculation results for the Project (I)~(III), however, Equation A-6-1 gives a much higher value. Consequently, the use of Equation A-6-1 appears appropriate to determine the floor height of the cyclone shelters. The calculation results of the cyclonic storm height using Equation A-6-1 are given in Table A-6-1.

With regard to those sites where the calculated cyclonic surge height is low, the findings of the interview surveys on past cyclonic surge heights conducted as part of the site conditions survey are taken into consideration to determine the actual floor height of the first floor. The

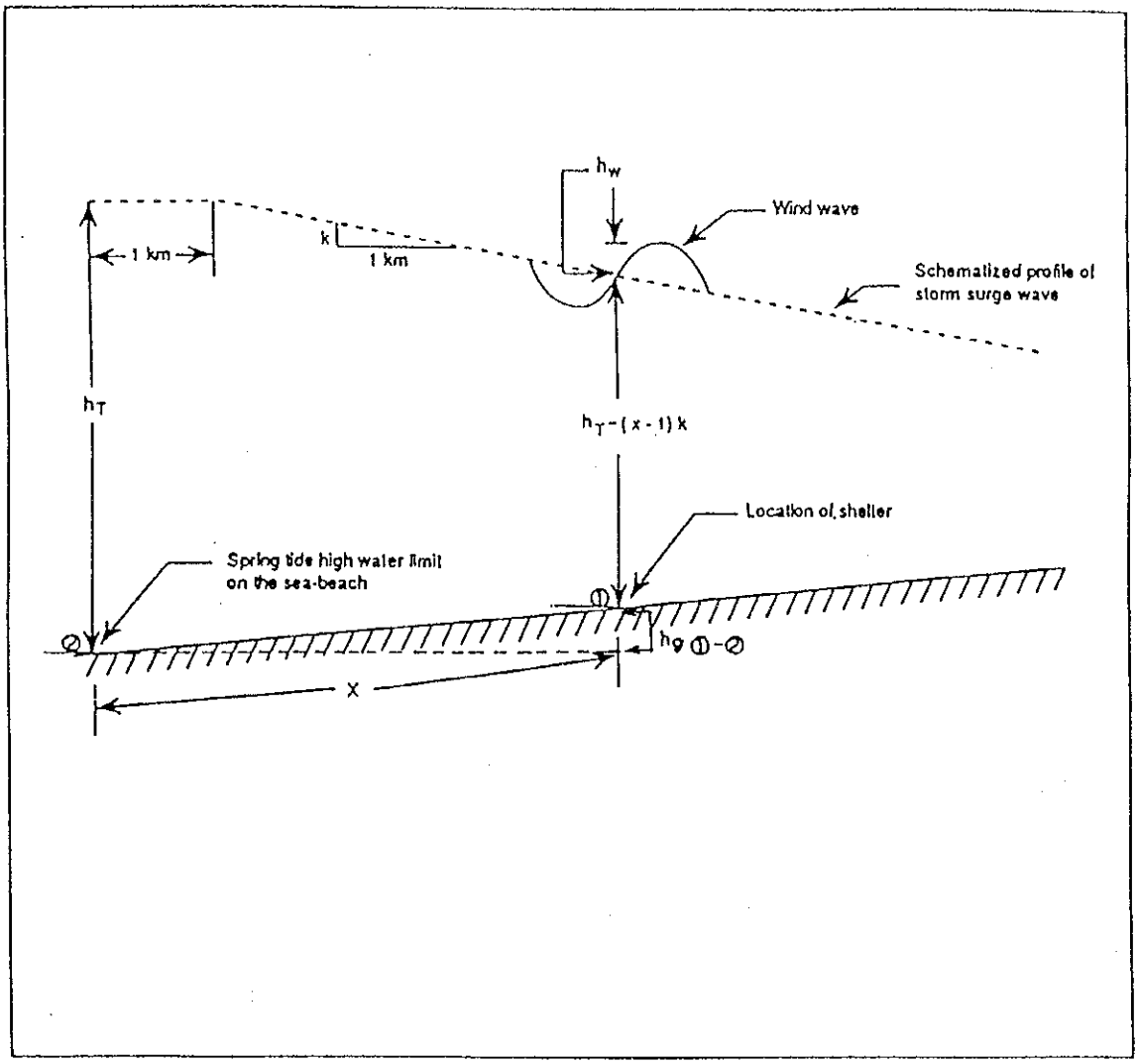
resulting proposed floor heights of the first floor (H_f) proposed for the cyclone shelters to be constructed under the Project (Ⅳ) are given in Table A-6-1.

Table A-6-1 Tide Level at Cyclone Shelter Sites

Site No.	Theme	h_{50}	X	K m/	h_{50} - (X - 1) k	h_w	H_1	Ground Level			H_s	H_h	H_f
		m	km	km	m	m	m	Coastal	Site	hg	m	m	m
IV-1	Situkunda	6.5	0.5	0.5	6.75	1.69	8.44	1.6	5.85	4.26	4.19	4.6	5.0
IV-2	Situkunda	6.5	3.5	0.5	5.25	1.55	6.81	1.6	4.19	2.59	4.22	4.9	5.0
IV-3	Situkunda	6.5	2.0	0.5	6.00	1.30	7.30	1.6	3.40	1.80	5.50	5.0	6.0
IV-4	Situkunda	6.5	3.5	0.5	5.25	1.38	6.63	1.6	6.19	4.59	2.04	3.0	3.5
IV-5	Situkunda	6.5	2.0	0.5	6.00	1.50	7.50	1.6	4.41	2.81	4.69	3.0	5.0
IV-6	Situkunda	6.5	2.0	0.5	6.00	1.50	7.50	1.6	5.61	4.01	3.49	3.5	3.5
IV-7	Banskhali	5.8	0.5	0.5	6.05	1.51	7.56	1.6	3.27	1.67	5.89	5.0	6.0
IV-8	Banskhali	5.8	3.0	0.5	4.80	1.20	6.00	1.6	3.23	1.63	4.37	3.0	5.0
IV-9	Banskhali	5.8	2.0	0.5	5.30	1.33	6.63	1.6	2.79	1.19	5.44	6.0	6.0
IV-10	Banskhali	5.8	3.5	0.5	4.55	1.14	5.69	1.6	2.47	0.87	4.82	4.0	5.0
IV-11	Mirsharai	6.5	4.5	0.5	4.75	1.19	5.94	1.5	4.88	3.28	2.66	5.0	5.0
IV-12	Mirsharai	6.5	6.0	0.5	4.00	1.00	5.00	1.8	4.29	2.59	2.31	3.0	3.5
IV-13	Mirsharai	6.5	4.0	0.5	5.00	1.17	6.17	1.6	4.27	2.67	3.50	3.0	3.5
IV-14	Mirsharai	6.5	5.0	0.5	4.50	1.10	5.60	1.6	4.83	3.23	2.37	3.0	3.5
IV-15	Mirsharai	6.5	5.0	0.5	4.50	1.10	5.60	1.6	4.75	3.15	2.45	2.1	3.5
IV-16	Mirsharai	6.5	6.0	0.5	4.00	1.00	5.00	1.6	4.56	2.95	2.04	3.0	3.5
IV-17	Mirsharai	6.5	5.0	0.5	4.50	1.10	5.61	1.6	4.65	3.05	2.56	3.5	3.5
IV-18	Mirsharai	6.5	5.5	0.5	4.25	1.06	5.31	1.6	4.66	3.06	2.25	3.0	3.5
IV-19	Mirsharai	6.5	1.0	0.5	6.00	1.68	7.68	1.6	4.88	3.28	4.40	3.0	5.0
IV-20	Mirsharai	6.5	5.0	0.5	4.50	1.11	6.61	1.6	4.59	2.99	2.62	3.5	3.5
IV-21	Mirsharai	6.5	2.5	0.5	5.75	1.44	7.19	1.6	4.57	3.07	4.12	3.0	5.0

Hh: Surge height by hearing
H_s: $H_1 - h_g$

Fig.A-6-1 Illustration of the Parameters of Eqs. A-6-1 in Determining the Required Height of Shelter



APPENDIX 7.

CALCULATION OF REQUIRED KILLA SIZE

APPENDIX 7. CALCULATION OF REQUIRED KILLA SIZE

The method to calculate the required killa size is explained here using Site No. IV-1 as an example.

(1) Number of Animals to be Evacuated

As Site No. IV-1 will have a 5-classroom type cyclone shelter, it will have the capacity to accommodate 2,210 evacuees. Assuming that these evacuees bring their animals with them, the number of animals to be evacuated to the killa is calculated as follows.

Cattle: 0.155* × 2,210 × = 342.55 = 343
Goat / Sheep: 0.090* × 2,210 = 198.90 = 199

* 0.155 and 0.090 are the number of animals / person in Sitakunda Thana where Site No. IV-1 is located (source: Master Plan).

(2) Land Area Occupied by Each Animal

Each animal is assumed to require the following land area for safe evacuation at the killa.

Cattle: 1.5m × 0.7m = 1.05m^2
Goats / Sheep: 0.8m × 0.4m = 0.32m^2

The total land area of the killa required to accommodate all animals is, therefore, calculated as follows.

Cattle: 1.05m^2 × 343 = 300m^2
Goats / Sheep: 0.32m^2 × 149 = 63.68m^2 = 64m^2

Total : 424m^2 = 430m^2

Assuming an extra margin of some 30% to allow for passage and other space, the required land area for the killa is approximately 560m^2.

(3) Land Area Occupied by Household Goods

The evacuees are expected to bring some household goods with them and, therefore, extra space should be provided at the killa. As half space of the land area required to accommodate animals should suffice for this purpose, the killa will have an additional 280m^2.

(4) Required Land Area for Killa

Based on (2) and (3) above, the total land area required to accommodate animals and household goods is 840m^2.

(5) Required Killa Size

The top part of the killa cannot be fully used for evacuation purpose as it is necessary not to include areas near the edges (slope shoulders) in the usable land area. The required area of 840m^2 is, therefore, increased by 30% to ensure safety at the top of the killa and the resulting top section of the killa has an area of 1,100m^2.

Based on the standard slope gradient of 1:2.0 used by the LGED for killa design and also based on the killa height of 5.0m being level with the design height of the first floor of the cyclone shelter at Site No. IV-1, the bottom measurements of the killa are given as follows.

$$(24 + 5.0 \times 2 \times 2)\text{m} \times (46 + 5.0 \times 2 \times 2)\text{m} = 44 \times 66\text{m}$$

The required killa size for each Project Site, calculated based on the specific parameter values of each site, is given in the following table.

Site No.	Number of Animal / Person		Shelter Capacity	Design floor	Required Killa
	Cattle	Goats / Sheep	Persons	Height (1st Floor)	Dimensions
IV-1	0.155	0.090	2,010	5.0	44 × 66 × 5.0
IV-2	0.155	0.090	2,010	5.0	44 × 66 × 5.0
IV-3	0.155	0.090	1,910	6.0	42 × 63 × 6.0
IV-4	0.155	0.090	2,010	4.5	42 × 64 × 4.5
IV-5	0.155	0.090	1,650	5.0	40 × 81 × 5.0
IV-6	0.155	0.090	1,650	4.5	38 × 59 × 4.5
IV-7	0.275	0.185	1,550	6.0	52 × 77 × 6.0
IV-8	0.275	0.185	1,550	5.0	48 × 73 × 5.0
IV-9	0.275	0.185	2,010	6.0	52 × 77 × 6.0
IV-10	0.275	0.185	2,010	5.0	48 × 73 × 5.0
IV-11	0.258	0.150	1,910	5.0	50 × 76 × 5.0
IV-12	0.258	0.150	2,010	4.5	48 × 78 × 4.5
IV-13	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-14	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-15	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-16	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-17	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-18	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-19	0.258	0.150	1,650	5.0	50 × 76 × 5.0
IV-20	0.258	0.150	1,650	4.5	44 × 70 × 4.5
IV-21	0.258	0.150	1,650	5.0	46 × 72 × 5.0

APPENDIX 8.

SITE PLANS

APPENDIX 8. SITE PLANS

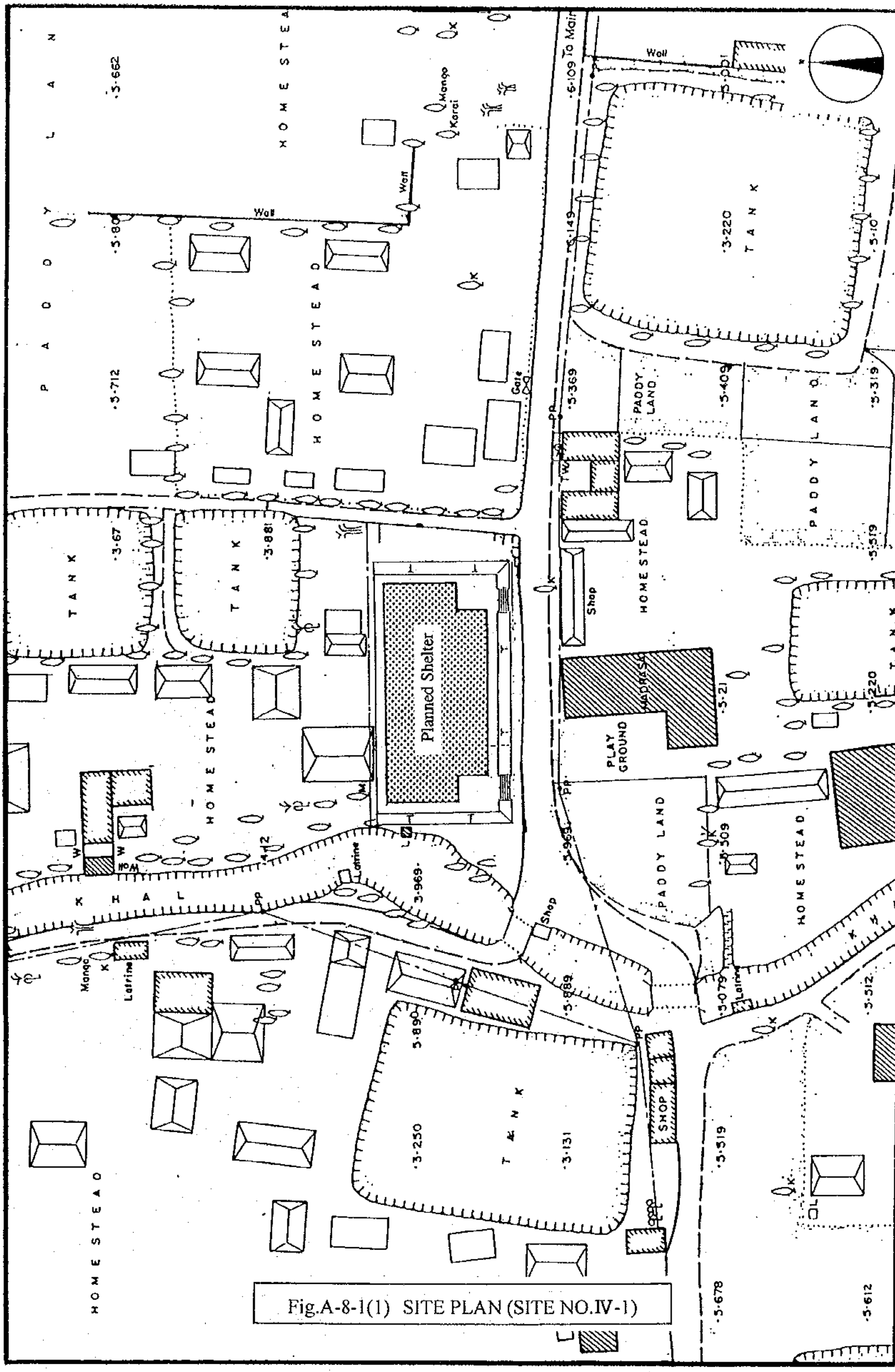


Fig.A-8-1(1) SITE PLAN (SITE NO.IV-1)

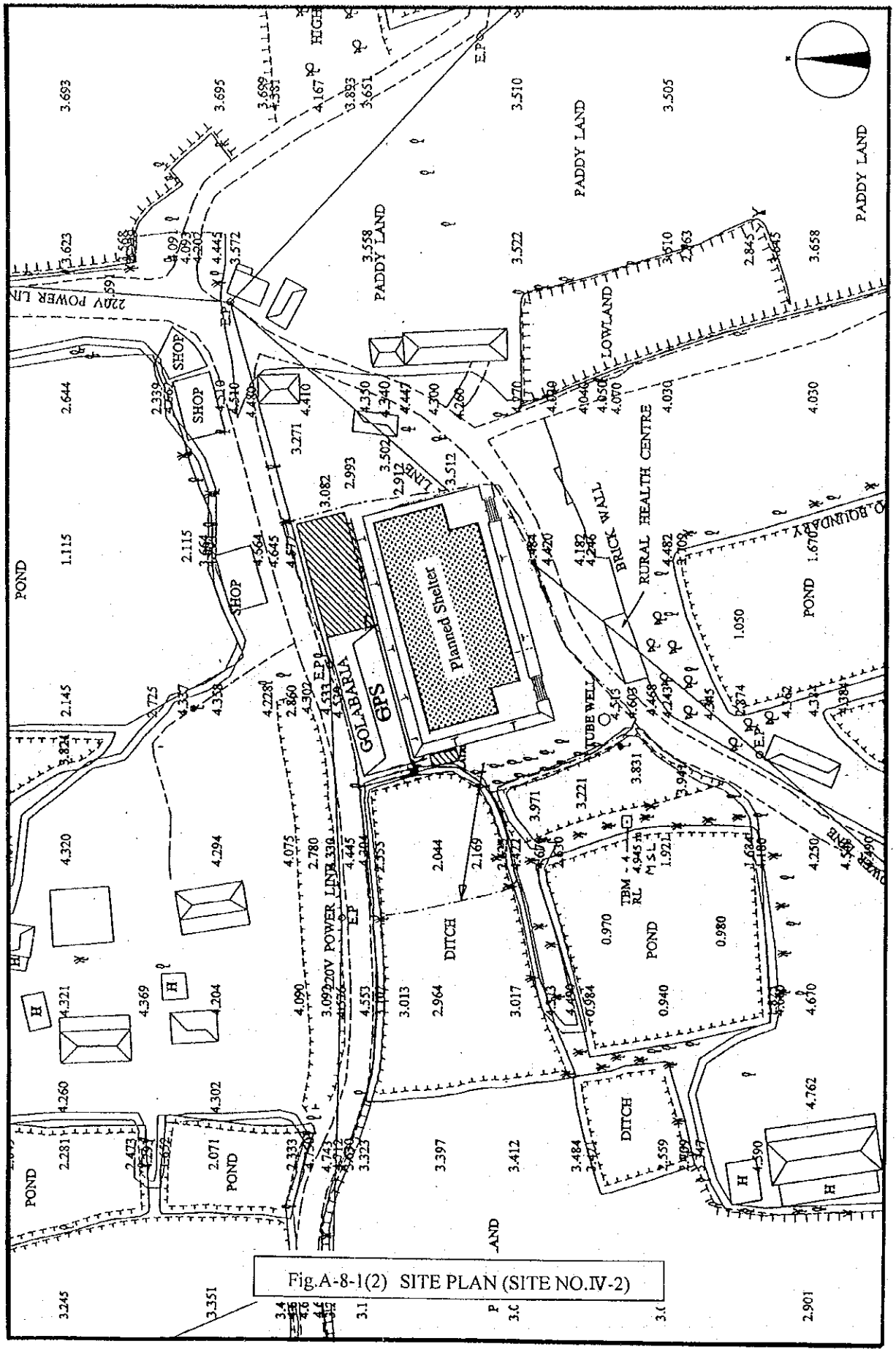


Fig.A-8-1(2) SITE PLAN (SITE NO.IV-2)

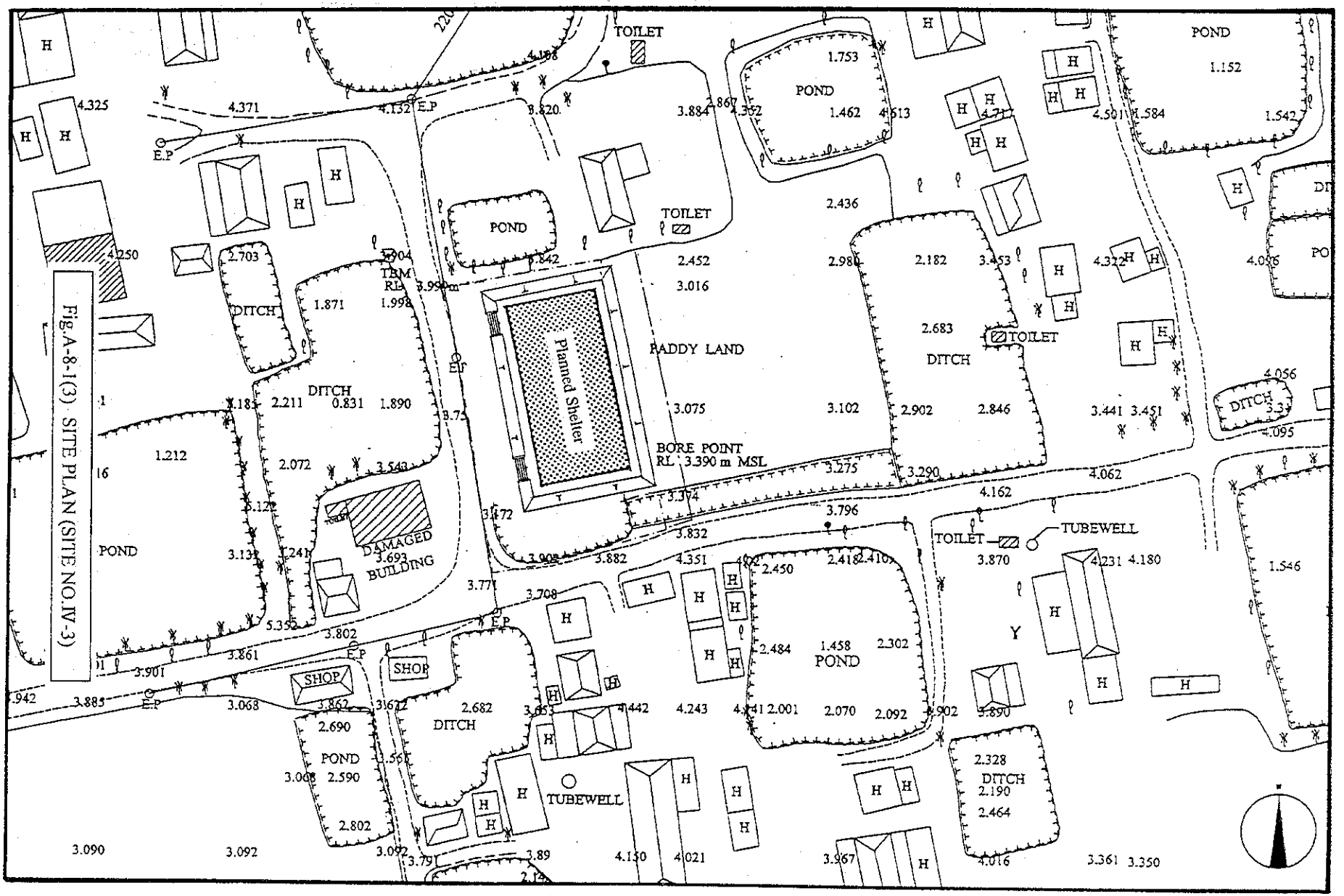


Fig.A-8-1(3) SITE PLAN (SITE NO.IV-3)
Planned Shelter
PADDY LAND
BORE POINT
RL 3.390 m MSL
TBM
RL 3.990 m
TOILET
POND
DITCH
DAMAGED
BUILDING
SHOP
TUBEWELL
E.P

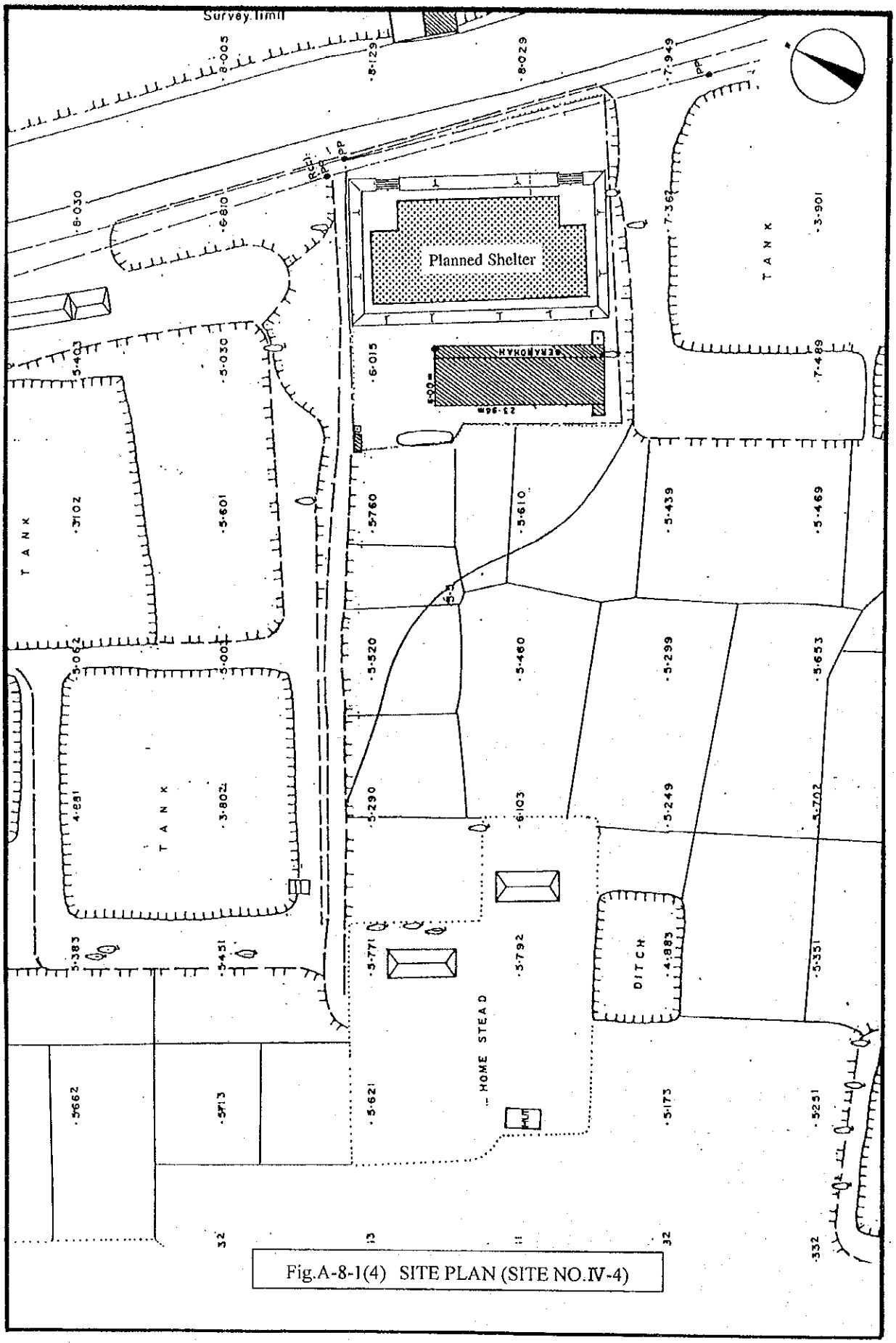


Fig.A-8-1(4) SITE PLAN (SITE NO.IV-4)

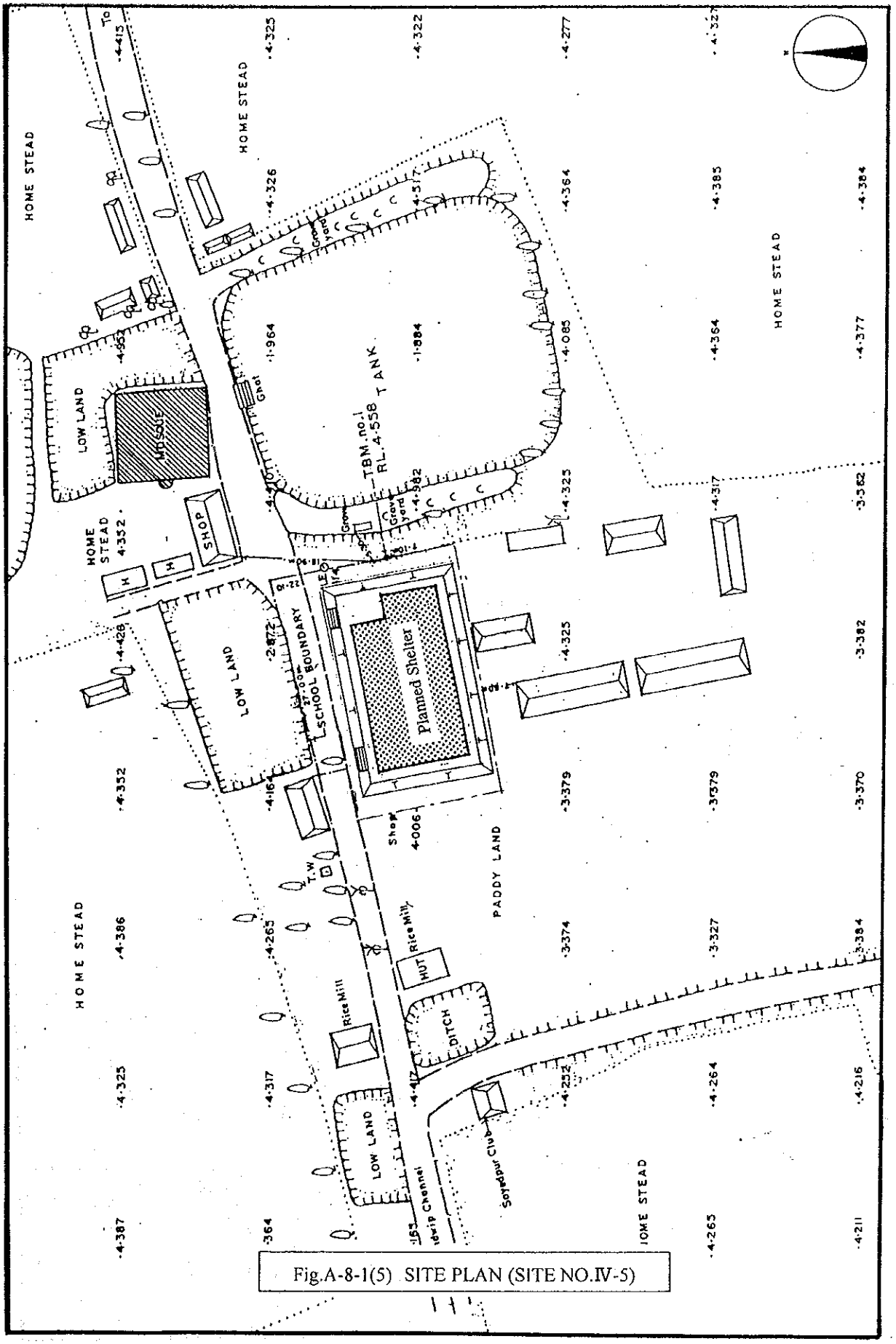


Fig.A-8-1(5) SITE PLAN (SITE NO.IV-5)

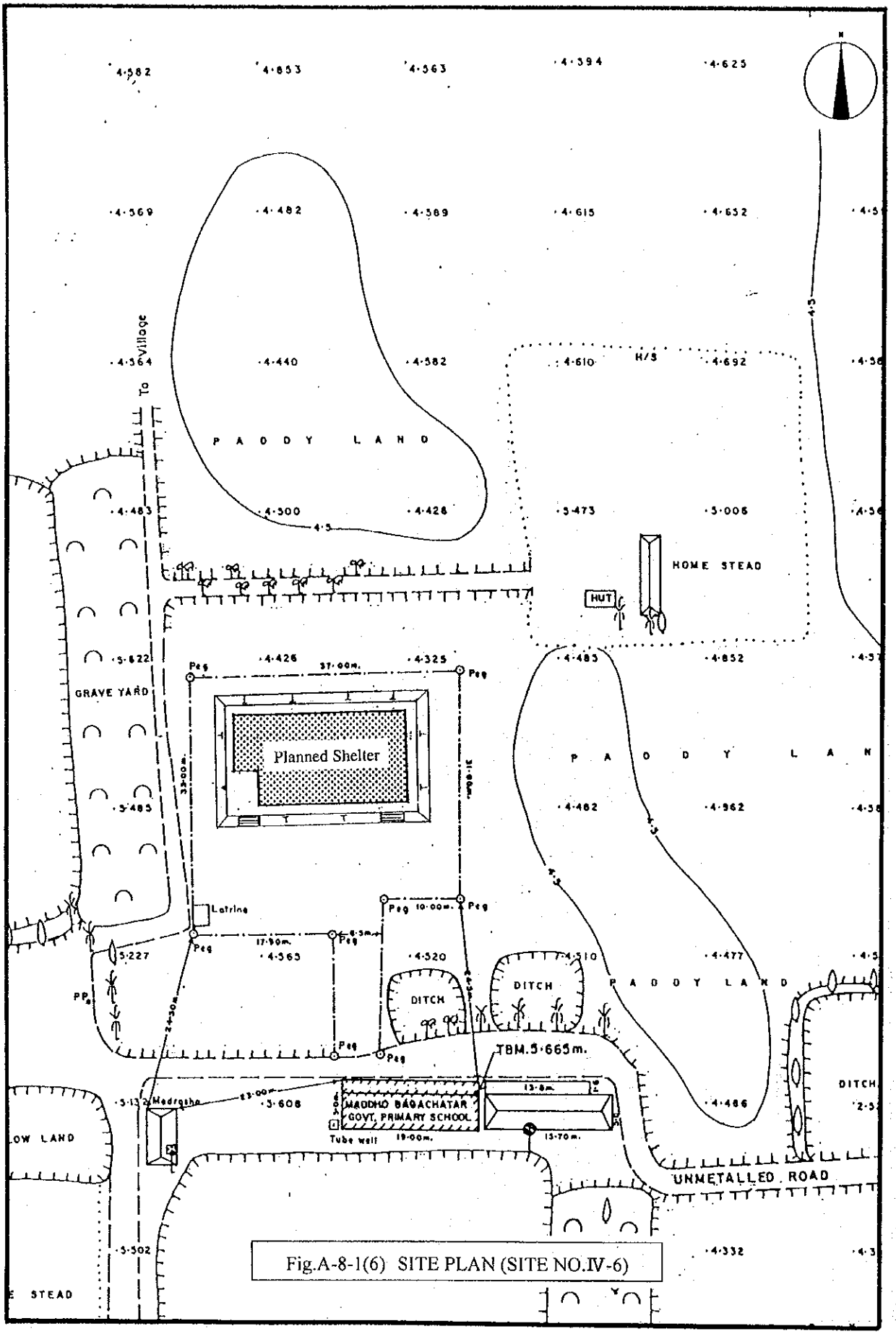


Fig.A-8-1(6) SITE PLAN (SITE NO.IV-6)

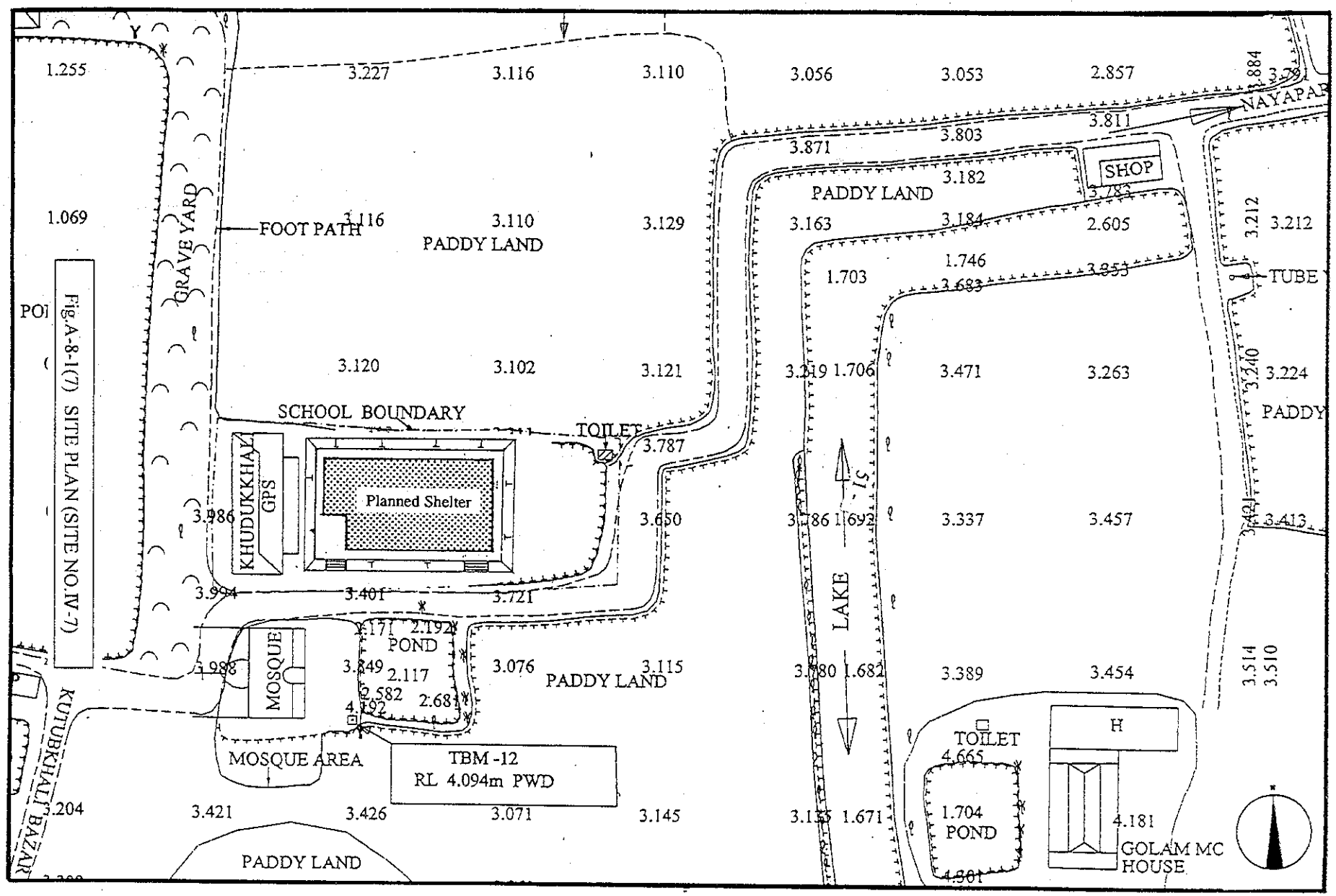
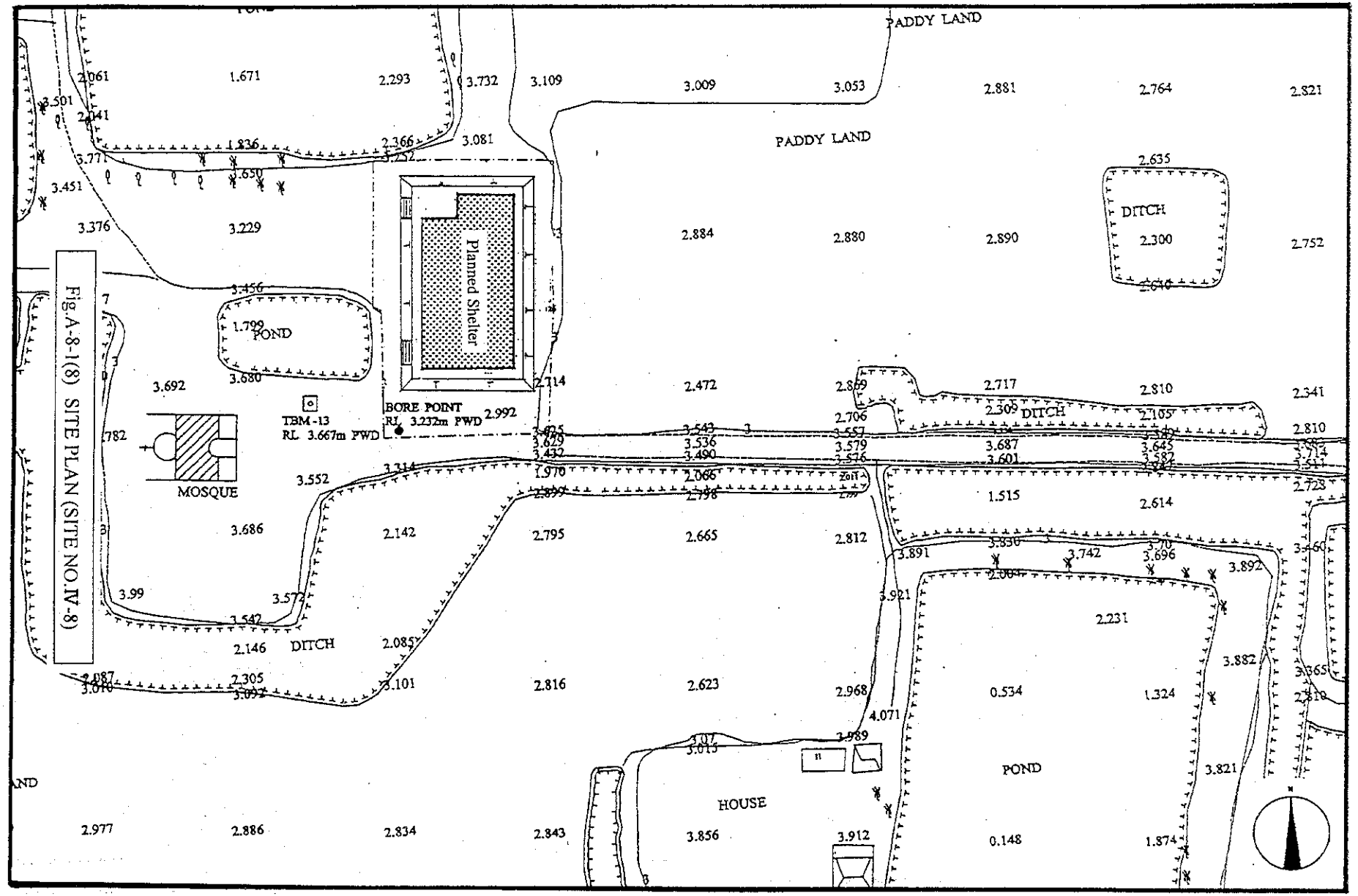


Fig.A-8-1(7) SITE PLAN (SITE NO.IW-7)
GRAVE YARD
FOOT PATH
PADDY LAND
SCHOOL BOUNDARY
TOILET
KHUDUKKHAI
GPS
Planned Shelter
POND
MOSQUE
MOSQUE AREA
TBM -12
RL 4.094m PWD
KUTUBKHALI BAZAR
PADDY LAND
LAKE
SHOP
NAYAPARA
TUBE
PADDY
TOILET
H
POND
GOLAM MC
HOUSE


PADDY LAND
PADDY LAND
DITCH
Planned Shelter
POND
BORE POINT
RL 3.232m PWD
TBM-13
RL 3.667m PWD
MOSQUE
DITCH
DITCH
HOUSE
POND
Fig.A-8-1(8) SITE PLAN (SITE NO.IV-8)

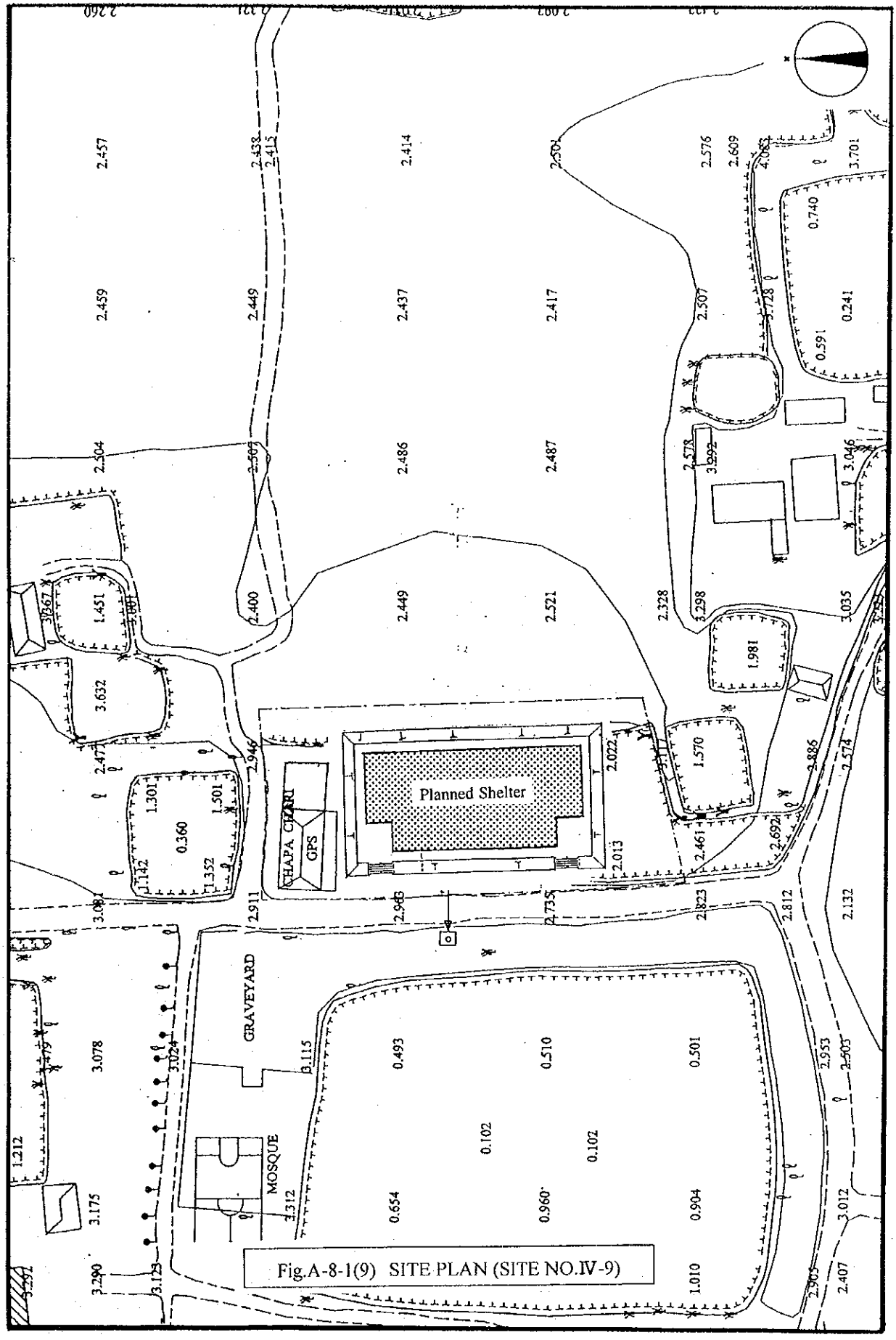


Fig.A-8-1(9) SITE PLAN (SITE NO.IV-9)

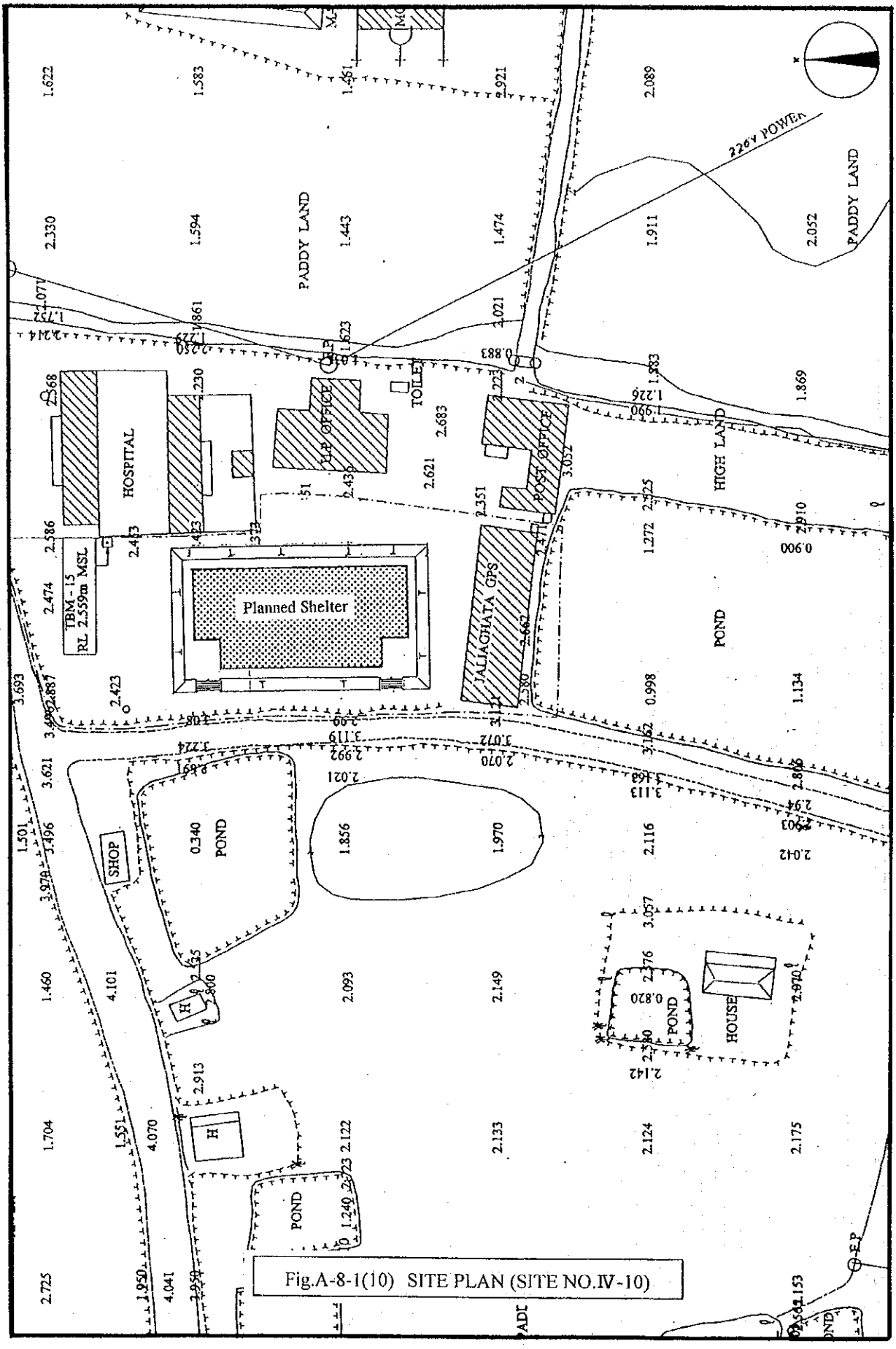


Fig.A-8-1(10) SITE PLAN (SITE NO.IV-10)

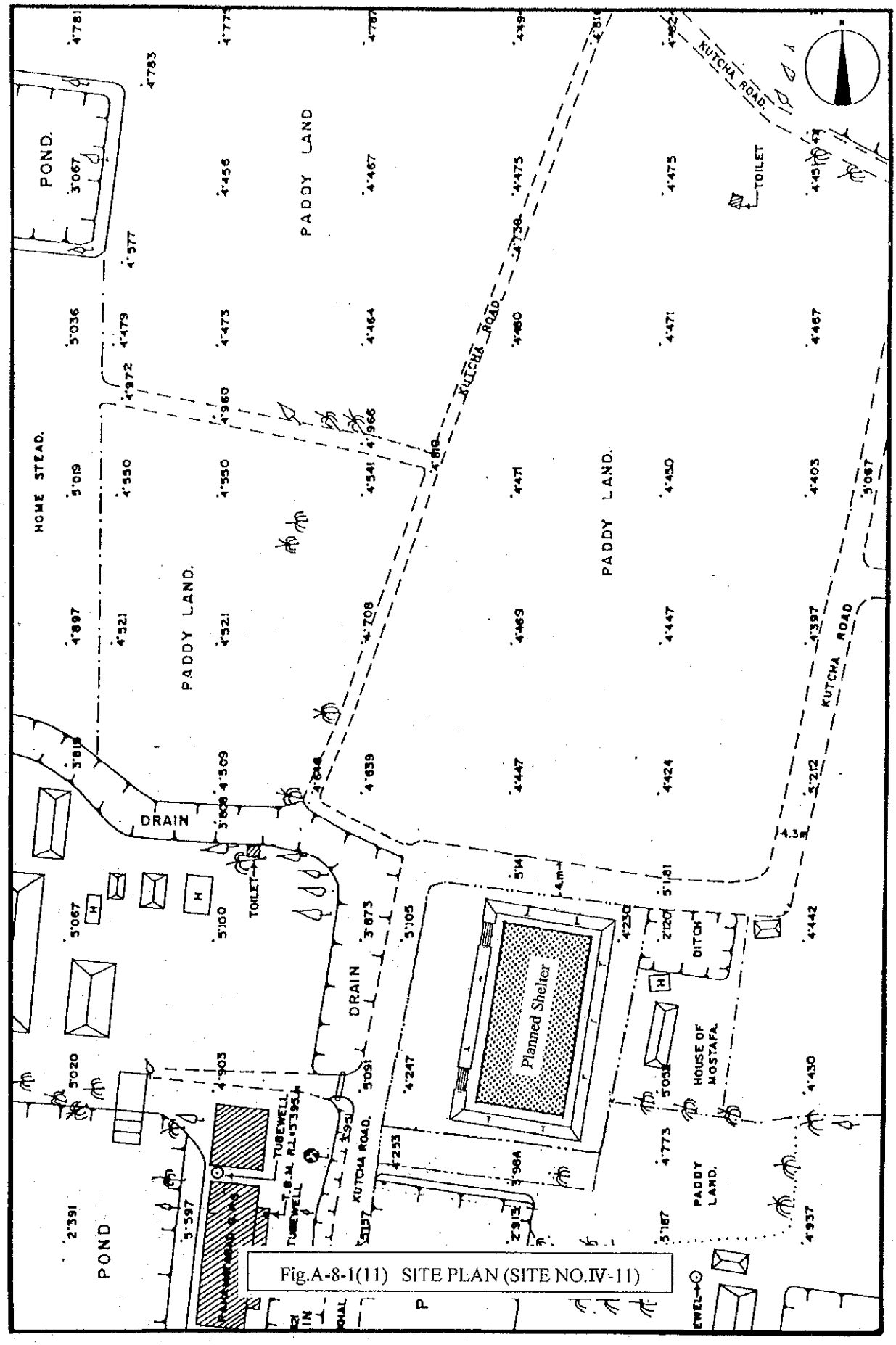


Fig.A-8-1(11) SITE PLAN (SITE NO.IV-11)

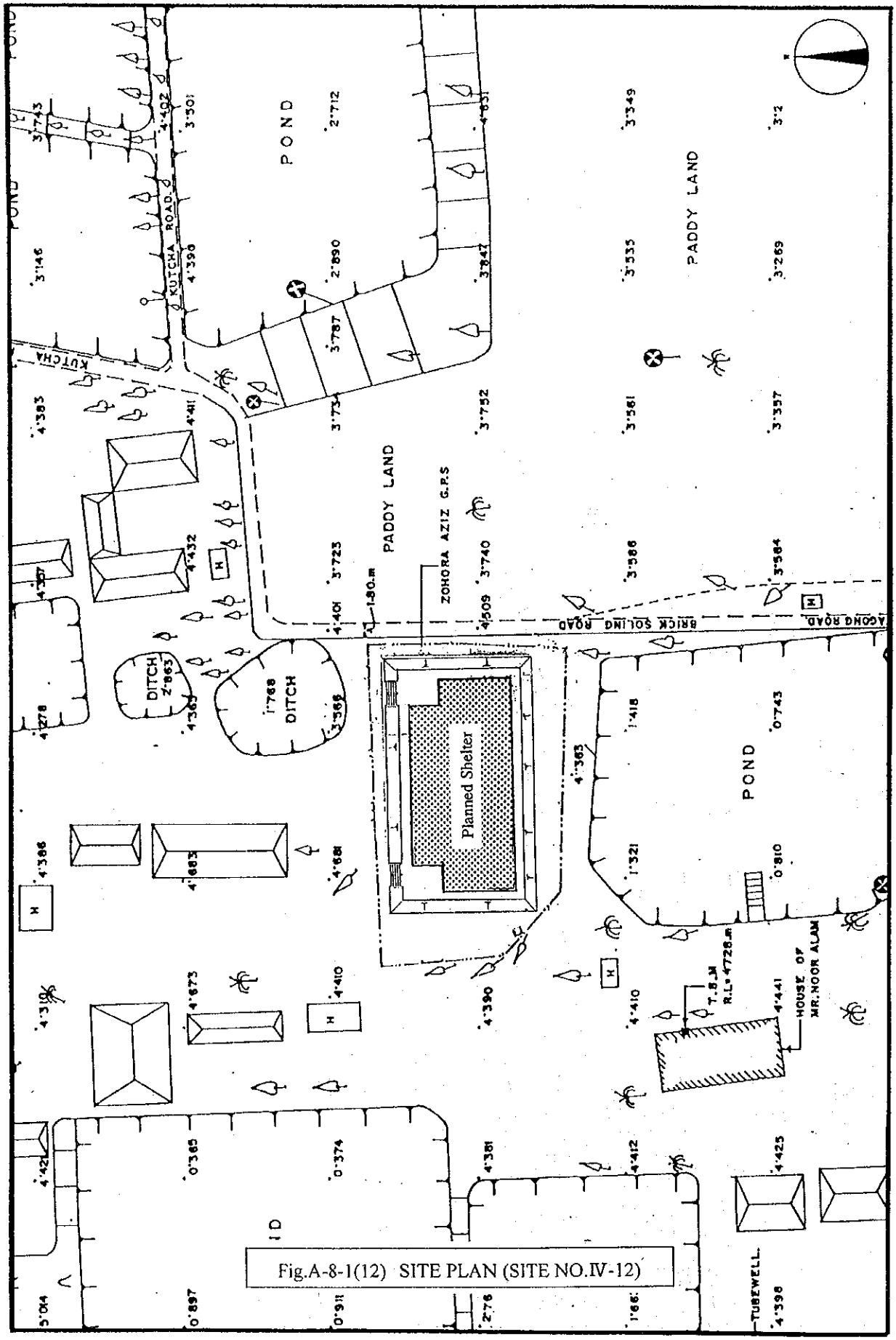


Fig.A-8-1(12) SITE PLAN (SITE NO.IV-12)

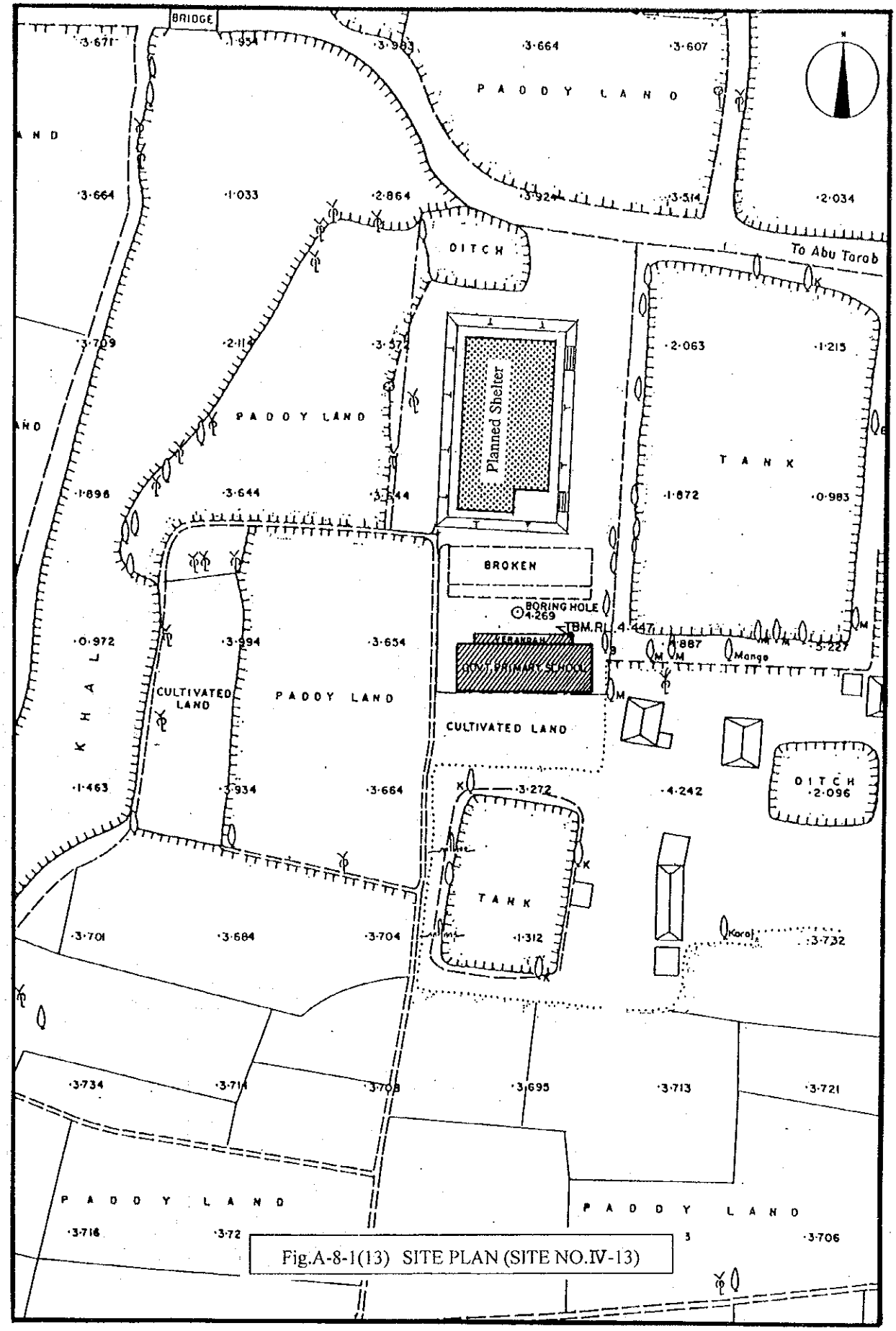


Fig.A-8-1(13) SITE PLAN (SITE NO.IV-13)

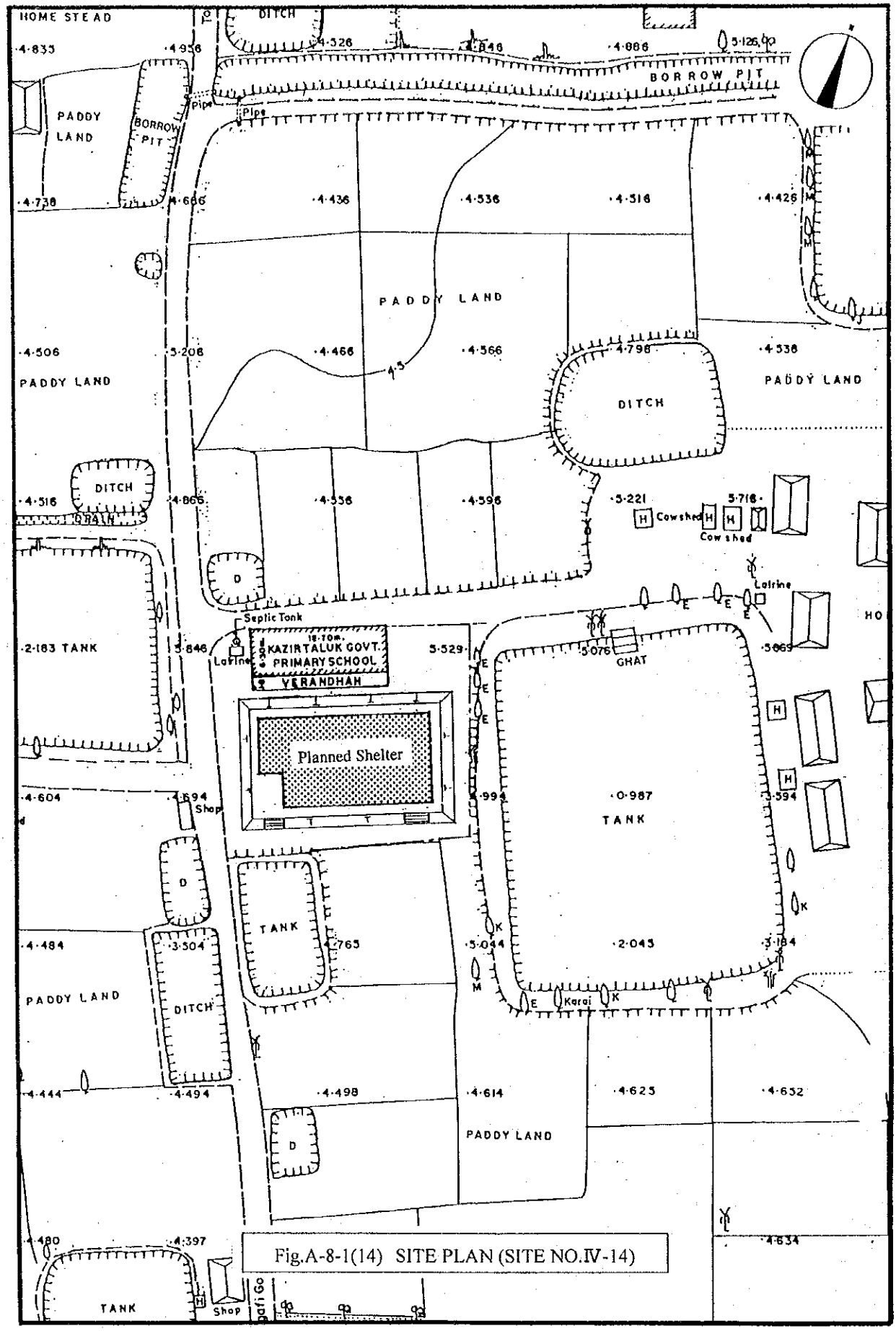


Fig.A-8-1(14) SITE PLAN (SITE NO.Ⅳ-14)

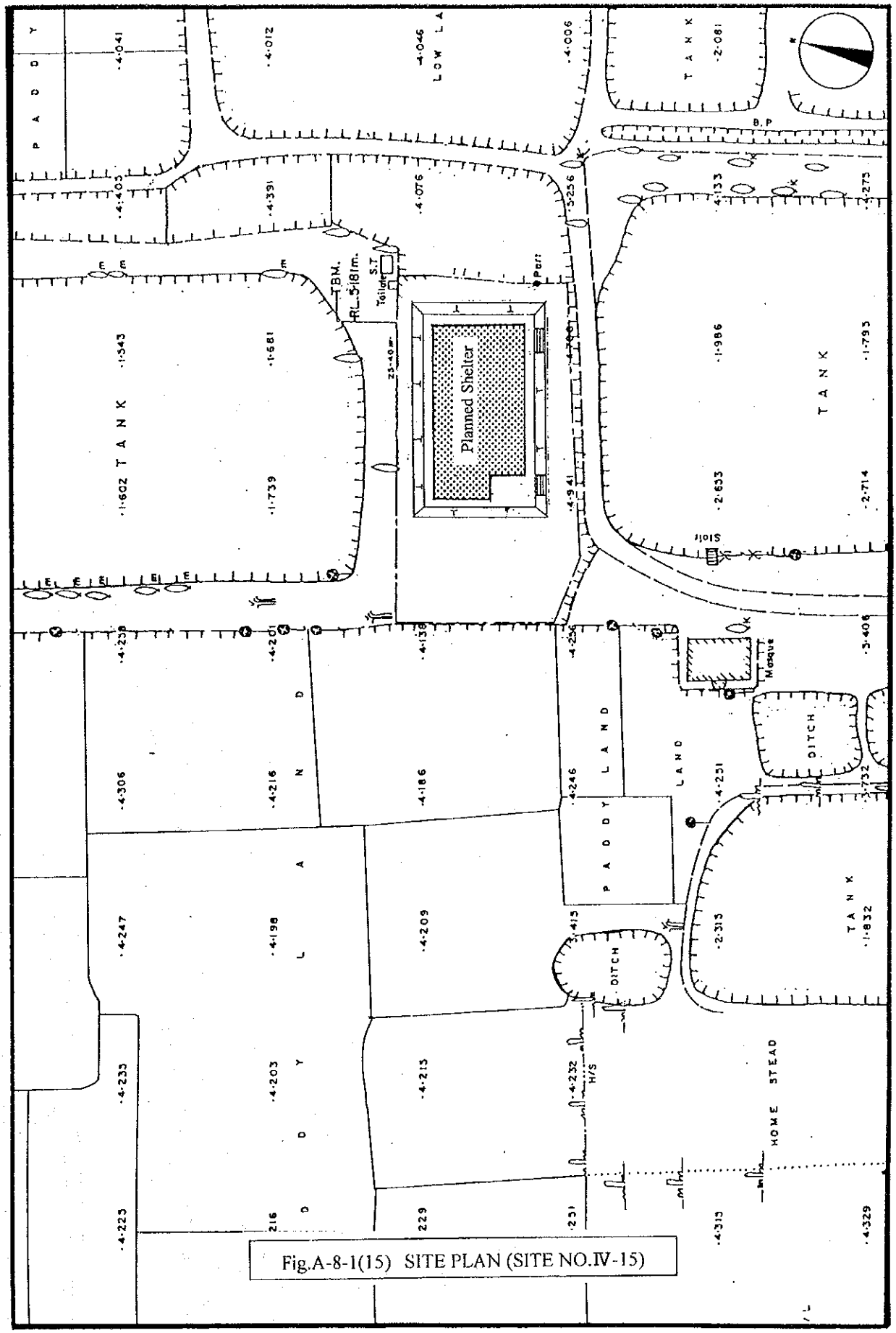


Fig.A-8-1(15) SITE PLAN (SITE NO.IV-15)

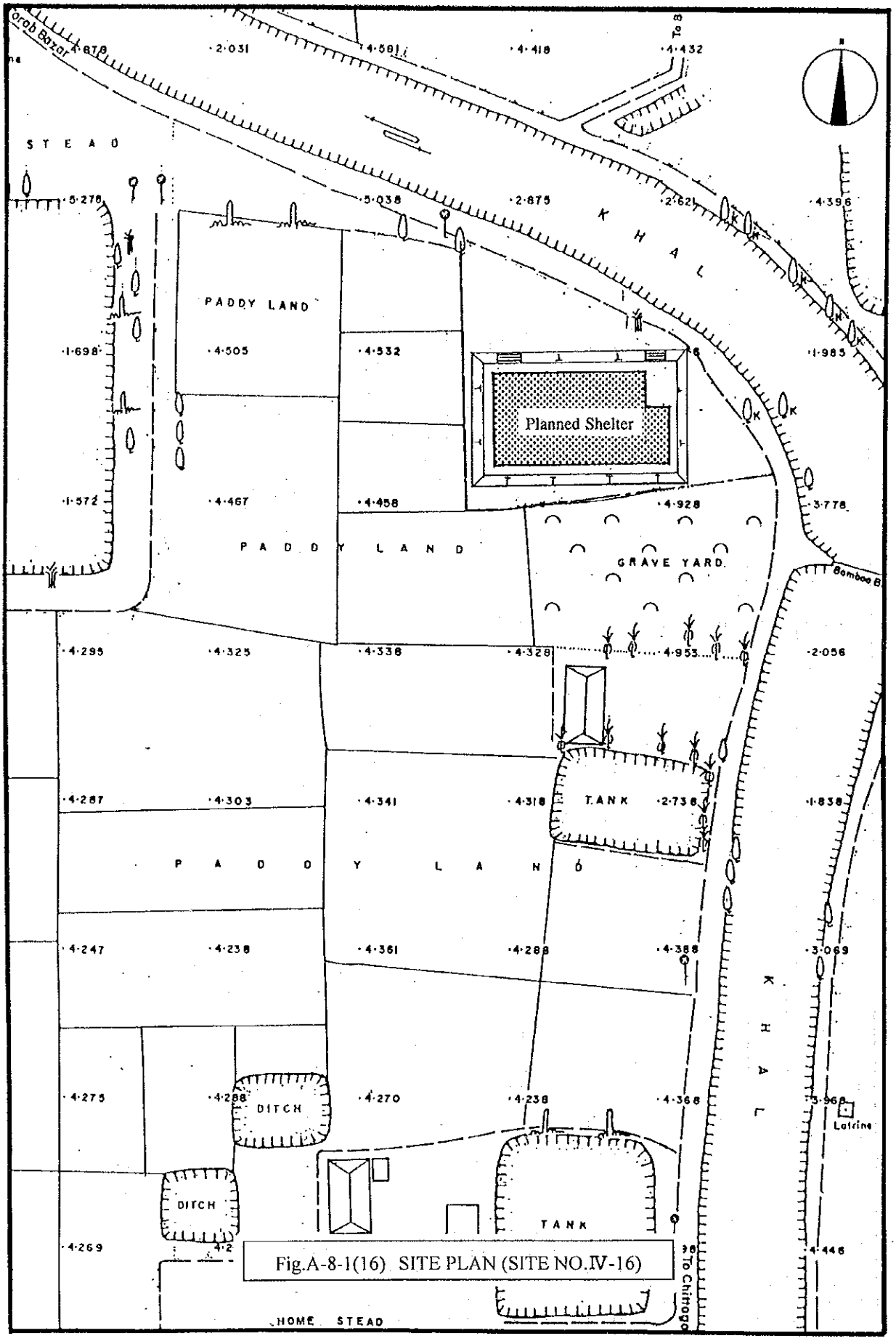


Fig.A-8-1(16) SITE PLAN (SITE NO.IV-16)

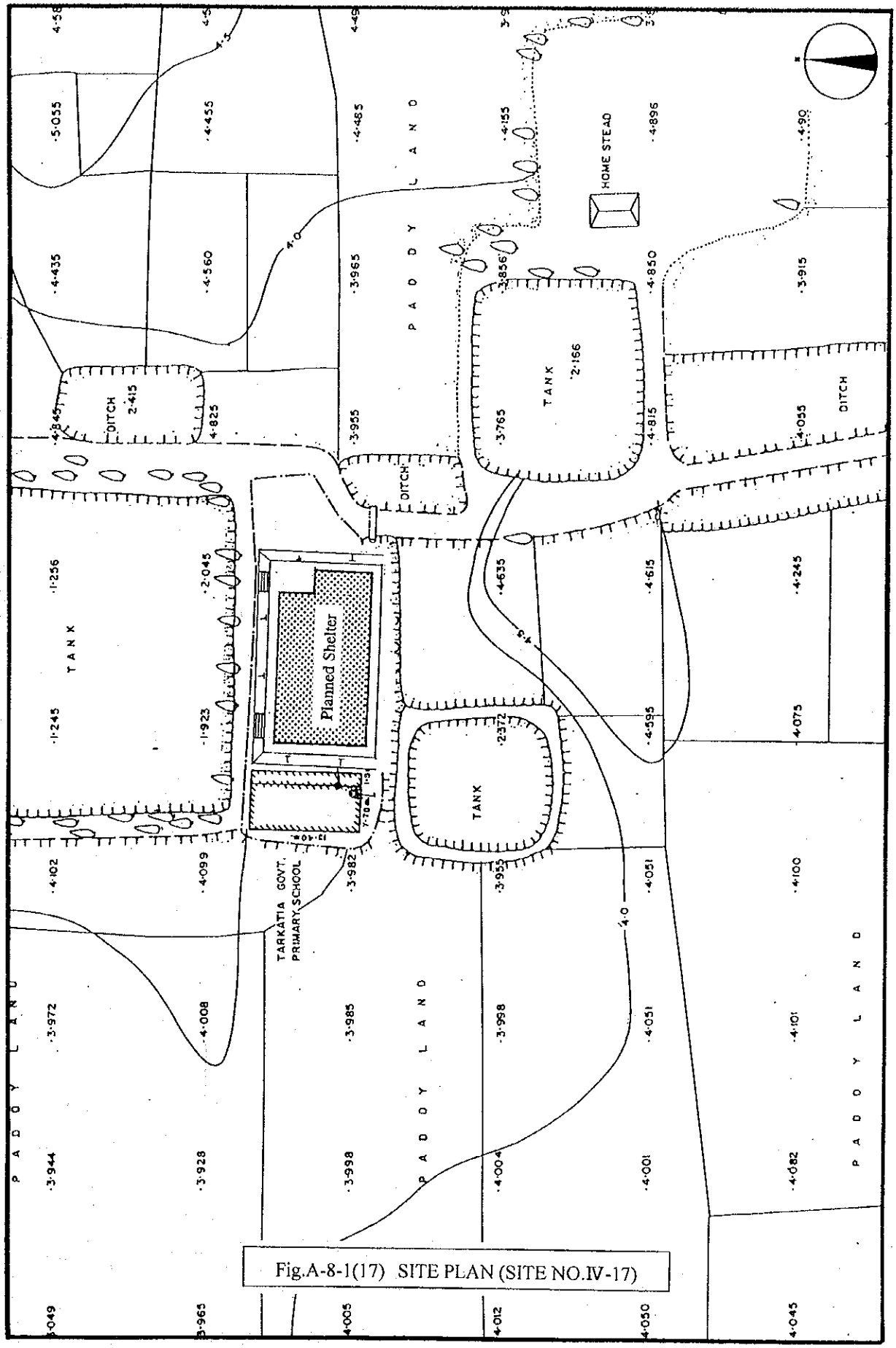


Fig.A-8-1(17) SITE PLAN (SITE NO.IV-17)

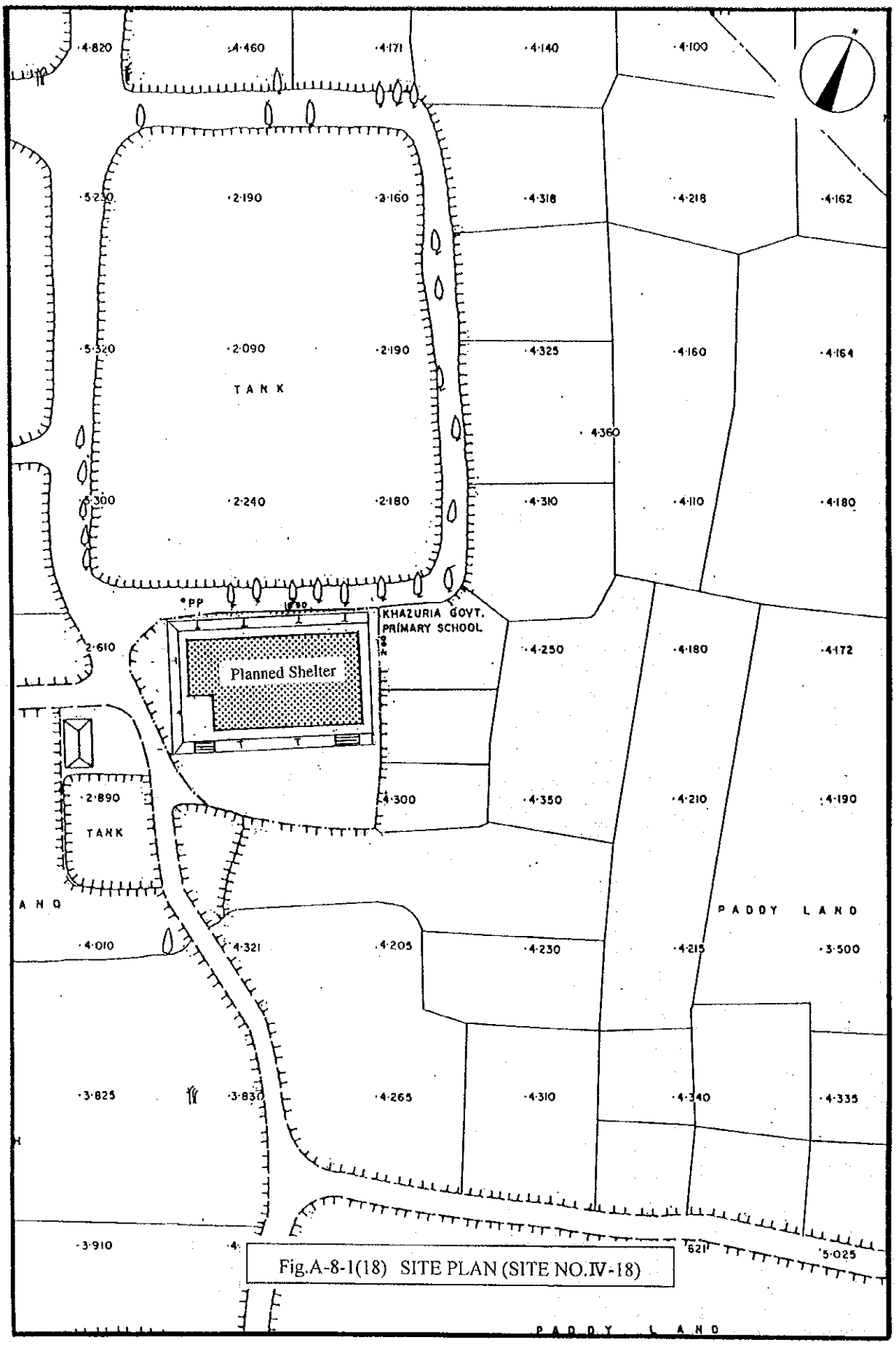
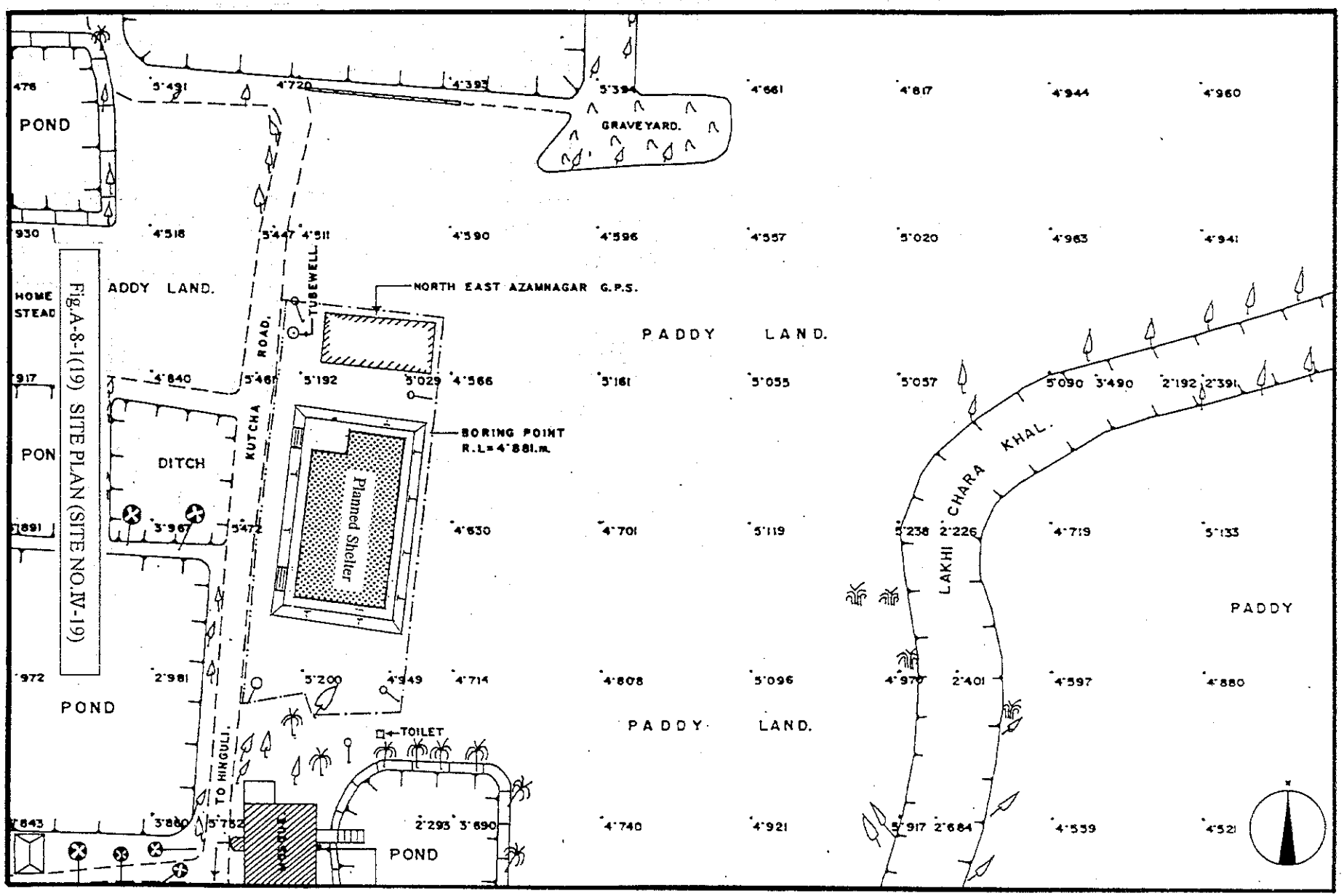


Fig.A-8-1(18) SITE PLAN (SITE NO.IV-18)


POND
GRAVEYARD.
ADDY LAND.
HOME STEAD
TUBEWELL
NORTH EAST AZAMNAGAR G.P.S.
PADDY LAND.
KUTCHA ROAD.
DITCH
BORING POINT
R.L=4·881.m.
Planned Shelter
LAKHI CHARA KHAL.
PADDY
POND
TOILET
TO HINGULI.
BUILDING
POND
PADDY LAND.
Fig.A-8-1(19) SITE PLAN (SITE NO.IV-19)

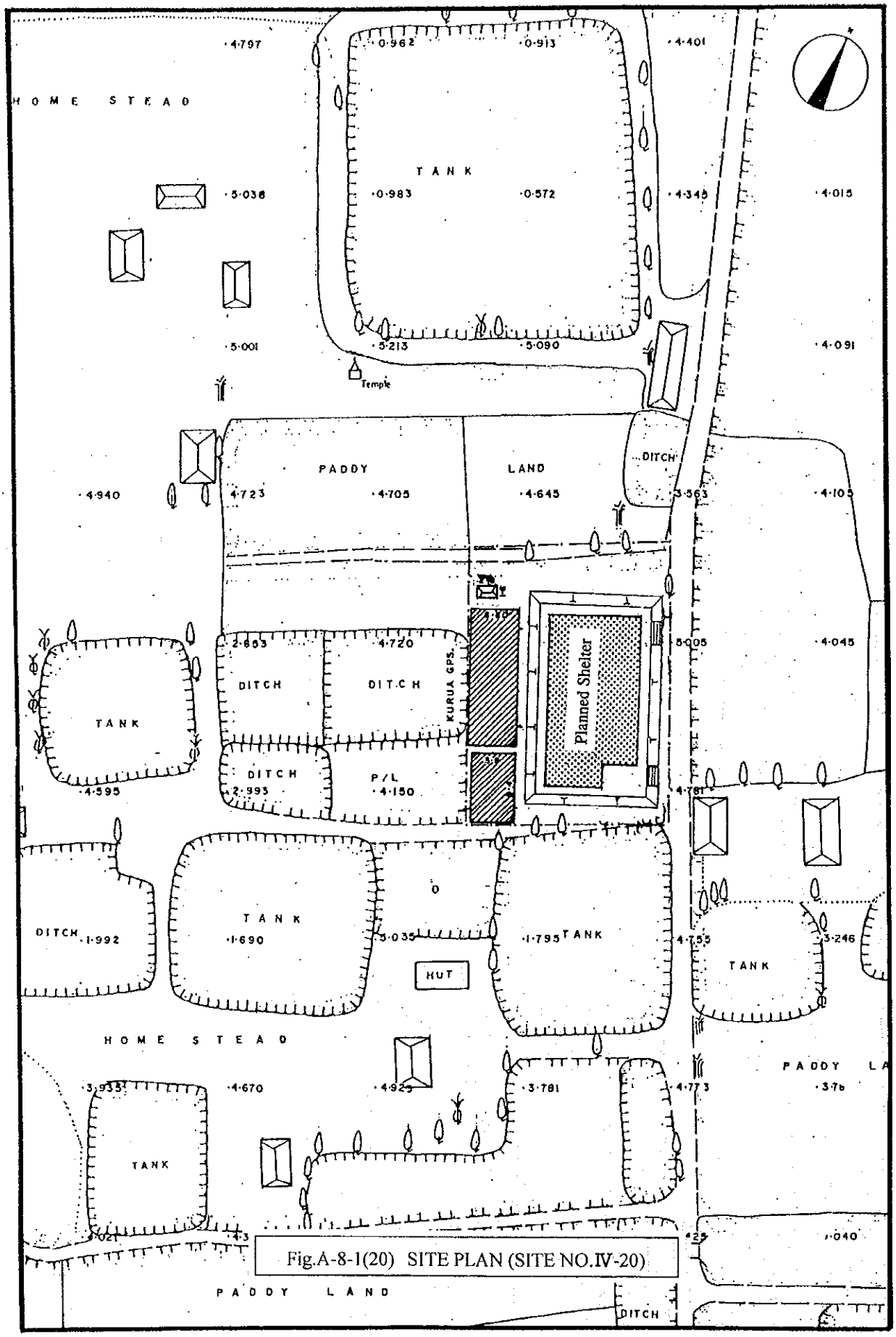
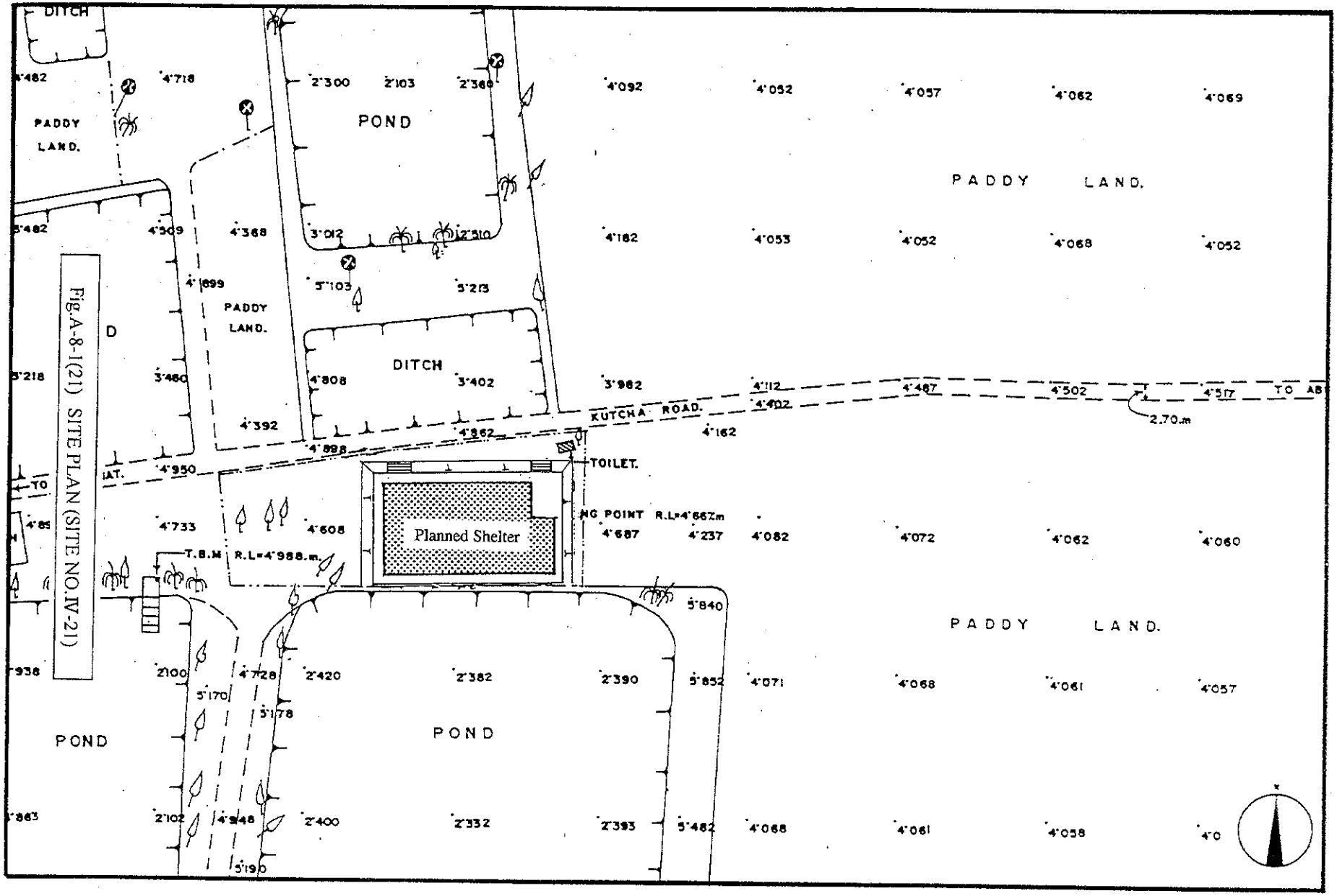


Fig.A-8-1(20) SITE PLAN (SITE NO.IV-20)


DITCH
PADDY LAND.
POND
PADDY LAND.
PADDY LAND.
DITCH
KUTCHA ROAD.
TOILET.
Planned Shelter
T.B.M R.L=4'988.m.
PADDY LAND.
POND
POND
Fig.A-8-1(21) SITE PLAN (SITE NO.IV-21)

APPENDIX 9.

WATER QUALITY TEST RESULTS

APPENDIX 9. WATER QUALITY TEST RESULTS

	Test Item	Unit	Site No. IV-1	Site No. IV-2	Site No. IV-3	Site No. IV-4	Site No. IV-5	Site No. IV-6	Site No. IV-7	Site No. IV-8	Site No. IV-9	Site No. IV-10	Site No. IV-11	Site No. IV-12	Site No. IV-13	Site No. IV-14	Site No. IV-15	Site No. IV-16	Site No. IV-17	Site No. IV-18	Site No. IV-19	Site No. IV-20	Site No. IV-21	WHO Guidelines	Bangladesh Provisional Standard
1	Type of Well*		S/W	D/W	S/W	S/W	S/W	S/W	D/W	D/W	D/W	D/W	S/W	S/W	S/W	S/W	D/W	S/W	S/W	S/W	S/W	S/W	S/W		
2	Location		east of school building front of private house	on site	NE 100 m	inside staffroom	north of school building	NW 50 m	south 200 m	north 50 m	south 100 m	on site	on site	on site	on site	south of school building	west 50 m from school building	south 150 m from school building	inside staffroom	east of school building	south of school building	south of school building	on site		
3	Depth	m	5	300	9	7	11	10	350	350	280	280	10	36	7.5	18	300	11	12	22	25	12	22		
4	Existing Data		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
5	Colour	TCU	slightly yellow	colourless	colourless	colourless	slightly white	colourless	colourless	colourless	colourless	colourless	colourless	slightly white	colourless	colourless	colourless	slightly white	slightly white	slightly white	colourless	slightly white	colourless	15	30
6	Turbidity	NTU	white	clear	clear	slight	slightly white	clear	clear	clear	clear	clear	clear	slightly white	clear	slight	clear	slight	semi clear	clear	clear	slightly white	clear	5	25
7	Odour		none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none		
8	Taste		Fe	none	none	slightly acid	slightly acid	slightly sweet	none	none	Fe	Fe	none	slightly sweet	acidy	Fe	slightly sweet	slightly salty	slightly sweet	slightly sweet	acidy	acidy	none		
9	Temperature	°C	29	20	24	27	28	25	25	20	23	21	22	27	27	28	28	28	28	29	28	27	23		
10	pH		6.6	8.0	7.8	6.6	6.6	7.8	7.6	7.8	7.6	7.8	7.6	6.3	7.4	7.4	6.6	6.4	6.4	7.4	6.4	7.9	7.6	6.5 - 8.5	6.5 - 9.2
11	Electric Conductivity		1,500	800	4,000	900	2,200	2,100	700	600	300	300	2,700	400	480	660	500	960	2,100	1,900	400	3,100	2,200		
12	Fe	mg/l	2.0	0.1	0.1	0.05	0.1	0.05	0.0.5	0.1	1.0	1.0	0.05	0.3	0.5	0.5	0.05	0.3	0.05	0.05	0.3	0.3	0.1	0.3	1
13	Cl	mg/l	485	200	250	345	510	150	465	50	50	50	200	310	860	730	200	720	570	650	300	380	760	250	600
14	Total Hardness	mg/l	450	250	500	460	500	250	450	450	250	250	450	350	860	700	350	762	410	275	250	350	510	500	500
15	NH_4		0.5	0	2.0	2.0	1.0	0.5	0	0.5	0	0	1.0	0.5	0.5	2.0	0	2.0	2.0	2.0	0.5	5.0	1.0		
16	Common Bacilli		none	none	TR	TR	TR	none	none	none	none	TR	TR	TR	TR	none	none	TR	TR	none	none	none	none		
17	Colon Bacilli		TR	TR	TR	TR	TR	none	none	none	TR	TR	TR	TR	TR	none	none	TR	TR	none	none	none	TR		
18	Arsenic	mg/l	0	0	0	(0.09)	0	(0.05)	0	0	0	0	0	0	(0.06)	(0.07)	0	0	0	(0.08)	0	(0.07)	(0.11)		
19	Pump		DPHE 5		New Maya PHF 6	SPAIL 6	SPAIL 6		SPAIL 6	RA 105	SPAIL 6	SPAIL 6	SPAIL 6	SNC SUPM 6	DPHE 9	DPHE 9	UNICEF EPL 93	NGOP	RFL 6	UNICEF L	UNDPH	RFL 6	SPAIL 6		

* S/W: shallow well, D/W: deep well

The results of the water quality test, which was conducted as part of the detailed site survey, are shown in the above Table. While water from shallow wells and deep well at the subject sites and in neighbouring areas tends to show a high total hardness level, the water from boreholes generally clears the provisional total hardness standard set by the Government of Bangladesh. The water from shallow wells shows a high Cl level, indicting the strong likelihood of salt water infiltration. NH_4 is also detected in the water from shallow wells, suggesting the likelihood of the infiltration of sewage from the ground surface. Arsenic above the provisional standard set by the Government of Bangladesh is detected in the water from shallow wells at Site Nos. IV-1, IV-13, IV-14, IV-18, IV-20 and 21 as well as in the neighbouring areas of these shallow wells but is not detected in the water from deep wells. Accordingly, a deep well will be used as the water source at each project site. Should arsenic be found in the water from newly drilled deep wells, people using such deep wells will be instructed not to use the water for drinking purposes

APPENDIX 10.

REFERENCES

APPENDIX 10. REFERENCES

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APPENDIX 11.

RESULTS OF EXISTING CYCLONE SHELTER FACILITIES SURVEY

APPENDIX 11. RESULTS OF EXISTING CYCLONE SHELTER FACILITIES SURVEY

[Objectives]

The survey was conducted to establish the impacts of shelter construction on both disaster prevention and primary education and also to confirm the specific needs of local people for shelter facilities/equipment and the present state of shelter maintenance with a view to incorporating the findings in the present basic design study.

[Survey Method]

Three groups were identified and separately interviewed at each shelter site. These groups were (i) community leaders (union head and influential persons) and school-related persons (headmaster, teachers and SMC), (ii) male local people and parents and (iii) female local people and parents.

[Subject Sites]

The existing shelters visited for the survey are listed below.

	Name of Facility	Donor	Year of Completion
1	East Tetoiya GPS	Japan	1997
2	Boro Bheola GPS	Japan	1996
3	Darbesh Kata GPS	Saudi Arabia	1994
4	IFAD Cyclone Shelter	IFAD	1994
5	Jalilia GPS	EU	1994
6	Pokh Khali Red Crescent PS	BDRCS	1993

[Survey Items and Survey Findings]

The following five issues were mainly surveyed at the group interviews: (i) actual use of shelter, (ii) actual use of auxiliary facilities, (iii) positive effects of shelter construction, (iv) emergency evacuation system and (v) current conditions of shelter maintenance. The survey findings described below generalise the opinions expressed by each group.

(1) Actual Use (Use for Shelter, School and Other Purposes) (see Tables A-11-1, A-11-2)

- Use as Cyclone Shelter

All of the facilities were subject to the onslaught of cyclones in 1997 and 1998 after their completion and were used once or twice as a shelter. In the case of using the facilities as a shelter due to a cyclone, the time usually spent in the shelter by the evacuees has increased to upto two days except for those who have lost their homes. The number of evacuees depends on the scale of the cyclone. At four shelters, it seems that more than 1,000 people moved to the shelter each time.※1

Cyclone shelters play an important role as flood shelters. The cyclone shelter has so far been used as a flood shelter at four sites (No. 1 - East Tetoiya GPS, No. 2 - Boro Bheola GPS, No. 3 - Darbesh Kata GPS and No. 6 Pokh Khali Red Crescent PS) out of the six shelters surveyed. The Pokh Khali Red Crescent PS (No. 6) is located in a flood-prone area (Chokoria) has been used as a flood shelter upto three times a year as the area in which it is located experiences flooding almost every year. The evacuation period at these shelters of one to two weeks is quite long because the flooded water takes a long time to recede. The number of evacuees at these shelters is believed to be almost 1,000 (although a figure of 2,000 - 3,000 was mentioned during the interviews).

It was difficult to obtain detailed information as to whether or not all the people of the neighbouring areas use the shelter, since an official census survey was not conducted. However, it seems that such measures are taken that, in areas with a high population density, those who own pucca※2 or semi-pucca houses and who do not feel the need to evacuate to shelters do not do so and also help their neighbours evacuate to their houses instead.

※1 Although some interviewees put the number of evacuees at 4,000 - 5,000, this may be inaccurate because of the maximum capacity of certain shelters. However, considering the response that there was no space to sit during evacuation, including in the piloti or on the roof, it can be assured that the number of evacuees surpassed the maximum capacity of the shelters in their use both as a cyclone shelter and as a flood shelter.

※2 A pucca is a building with a reinforced-concrete roof and brick wall; a semi-pucca has a tin roof and brick wall.

- Use as School Building

Except for the IFAD cyclone shelter (No. 4), all of the surveyed cyclone shelters usually serve as primary school buildings. These schools have Class 1 through Class 5 (fifth year) and three classrooms are used with two daily shifts. All of the schools except the Pokh Khali Red Crescent PS (No. 6) are government primary schools (GPS) and the previous school buildings were replaced by the present cyclone shelters. In the case of No. 6, the BDRCS originally constructed the shelter and the shelter was subsequently used as a non-government primary school building based on a contract with the BDRCS.

- Use for Other Purposes

At the IFAD cyclone shelter (No. 4), the BDRCS has a contract with the IFAD to provide community development activities, including micro-finance, as well as the BDRCS's own activities. This shelter has been used as a sewing centre in the past to teach sewing skills to local people in view of their earning income through the sale of their products but this is no longer the case. The other shelters, apart from being used as schools, are irregularly used for vaccinations, public health education, religious meetings and community gatherings on holidays, etc.

(2) Current State, Suitability and Problems of Auxiliary Facilities (Toilets, Wells, Electricity and Killas, etc.) (see Table A-11-1)

- Toilets

Although toilet facilities are essential for a shelter, some of the shelters lack a sufficient number of toilets or only have toilets on the ground floor which are rendered useless during a cyclone or flood emergency. Those on the ground floor are usually locked by a teacher at most sites to deter intruders.

- Wells

A similar situation exists in the case of wells on the ground floor which are also rendered useless at the time of a cyclone or flood.

- Lighting

The need for lighting cannot be said to be particularly urgent at the schools concerned. This is because, considering the financial aspects of the present maintenance system for the facilities, maintenance of new lighting facilities that will create an additional maintenance cost appears to be difficult. There is, however, a strong need for lighting

when the building is used as a shelter in order to indicate the location of the shelter to those outside and to light the inside of the shelter. Therefore, the introduction of a lighting system in the future, taking the maintenance capability of local people into consideration, may be considered but only in the case that the SMC, etc. is able to provide maintenance. In fact, among the surveyed shelters, the Darbesh Kata GPS (No. 3) and IFAD Cyclone Shelter (No. 4) have a lighting system but the maintenance is found to be inadequate at both places. The former uses the ordinary distribution line but the school does not pay the electricity cost and seemed not to even know who was responsible for payment. The latter has just installed a lighting system using solar batteries but no-one using this facility so far has made any payment and maintenance is provided by the LGED.

- Killas

As with the other survey results so far, there is a considerable need for killas. At shelters where there is no killa, the local people bring their domestic animals to the piloti areas and it can be seen how the people have a strong wish to keep their valuable animals nearby where they can keep a direct eye on them. Furthermore, in areas where more than one shelter exists nearby, a shelter which is accompanied by a killa is particularly popular and is quickly filled to maximum capacity so that people have to evacuate to other shelters. The IFAD shelter in particular, being built on top of a killa, has a certain height to the shelter and seems to be a style that gives a sense of security to the people. However, at the sites of existing shelters surveyed in this report, the people have had the devastating experience of meeting severe cyclones and so evacuate to shelters even when there is no killa nearby.

- Other Necessities

Regarding food and other necessities, people took dry food with them at the time of evacuation. Although this is inconvenient, no special problem appears to exist in this matter. Compared to the problem of water supply or toilets, the people seem able to cope with this problem on their own.

(3) Positive Effects of Shelter Construction (Effects on Disaster Prevention, Educational Effects) (see Table A-11-2)

- Effects on Disaster Prevention

From the viewpoint of disaster prevention, four out of the six shelters surveyed in this report have been properly used as cyclone shelters as well as flood shelters. The "existence of a shelter" in a village gives local people a sense of security. At those

shelters constructed with Japanese aid, the interviewees pointed out that road improvement in the vicinity by the LGED was a secondary benefit of the project.

- Educational Effects

In regard to the educational effects of shelter construction, the number of pupils attending primary school has generally increased at all of the sites and some of the interviewees stated that there is improved willingness to learn among children and a warmer feeling towards the school among parents, illustrating the positive educational effects of the new shelters, i.e. school buildings. The percentage change of the number of pupils before and after shelter construction substantially varies from 6% to 55%. This is believed to reflect the shelter location (population of catchment area, number of local schools and conditions of school access) and the existence of Food for Education and other programmes rather than the type of shelter constructed.

(4) Emergency Evacuation System (Warning and Evacuation System; Division of Roles Among Various Organizations)

The warning system run by the CPP Unit of the BDRCS is functioning at the surveyed sites. When a cyclone approaches, the CPP Unit hoists the appropriate flag corresponding to the perceived level of risk, sounds a siren and uses a megaphone to alert the villagers. As the HRA represents an area which experienced the brute force of a cyclone in 1991, local people are well aware of the warning and evacuation system and the need for evacuation. During the interviews, everyone was found to be ready to evacuate with the issue of a Signal 6 or Signal 7 or higher. In those regions where cyclones regularly strike every year and the local people are fully aware of the dangers, the people will tie up their domestic animals at a relatively high place, such as a local road, etc., risking their loss due to drowning or theft, and then evacuate to shelters themselves, even if a killa is not located nearby.

Analysis of the consequences of the cyclone disaster in 1991 found that women were more likely to be killed than men because of the difficulty of women to make their own decisions. The latest interviews with women's groups, however, revealed that although the initiative for evacuation is taken by men, women today believe that it is commonsense for them to evacuate to a shelter or nearby safe place without the guidance of men as soon as an evacuation siren is sounded, implying that a drastic change of women's attitudes is beginning to take place due to past experience of disaster as well as to subsequent education.

Under normal circumstances, a shelter is unlocked by the headmaster (or teacher) living nearby. After evacuation takes place, however, either the SMC or CPP Unit is responsible for the running of the shelter. It is difficult to generalise the division of responsibilities at the time of an emergency as the use or the shelter (for example, men and women are accommodated in separate rooms in one case and families are given specific quarters in another, etc.) and the management capability of the SMC or CPP Unit considerably vary from one area to another.

(5) Current Conditions of Shelter (School) Maintenance (see Table A-11-2)

- Daily Maintenance

In the case of a shelter's normal use as a primary school building, the SMC is responsible for its daily maintenance and conducts regular cleaning and low cost maintenance work. However, the maintenance capability and commitment of the SMC greatly varies from one school to another and, in some cases, the teachers and pupils conduct the actual work instead of the SMC. Local people seldom participate in daily maintenance work. On the other hand, a school often struggles to cope with vandalism by local people (for example, blockage of toilets with bricks and rubbish, etc.)

At the IFAD Cyclone Shelter (No. 4) which is in constant use albeit not as a school, the Village Development Committee which has its office at the shelter is responsible for daily maintenance under the supervision of the IFAD.

- Maintenance During Evacuation

Most of the shelters are mainly maintained by either members of the SMC or teachers during evacuation as in the case of normal times. As many of the evacuees use the facilities in less than a polite manner (untidy use of toilets and careless opening and closing of doors, etc.), a shelter tends to be very dirty at the end of the evacuation period and its cleaning by SMC members and teachers is a daunting task. There is little enthusiasm among local people to help to maintain public facilities and it seems that any request to neighbouring residents for assistance for shelter (school) cleaning could not expect a positive response at present. The prospect of such assistance appears to depend on the level of commitment, capability and public relations activities of SMC members, including community leaders, to shelter (school) maintenance. The level of preparedness among local people to provide assistance for shelter (school) maintenance appears to be particularly low in places where the SMC is not deeply involved in school management.

- Large-Scale Maintenance

  As all of the shelters visited this time are relatively new, the oldest being constructed in 1993, no large-scale maintenance (repair) work has yet been conducted and no savings have been made to meet any future major maintenance cost. The Pokh Khali Red Crescent PS which opened in 1993 is the only exception in that the windows and well have been maintained/repaired by donations from teachers and SMC members while the repainting of the walls, planting of trees and repair of the well have been conducted with BDRCS funding. As can be seen from the above accounts, the financial aspects of the maintenance system cannot be said to be sufficient.

The specifications and standards of each of the visited shelters were also surveyed and the results are compiled in Table A-11-3.

Table A-11-1 Basic Information (Facilities and Equipment)

School/Facility	Thana	Donor Organization	Date of Completion	Capacity	Population of Surrounding Area	No. of Classrooms	Date of Visit	Water	Toilets	Killa	Electricity	Size	Other Problems
East Tetoiya GPS	Mirsharai	JICA	Feb. 1997		10,000	3 classrooms + teacher's room + storage	31/10/1998	Easy to use	The ground floor toilets are not usually used and are only used by men at the time of evacuation	Domestic animals are taken to the shelter due to the lack of a killa	No		• Filling on the school grounds is required • A gate to the rooftop should be installed (for safety of children) • Problem with access road to the shelter
Boro Bheola GPS	Chokoria	JICA	Jan. 1996		5,000-6,000	3 classrooms + teacher's room + storage	1/11/1998		• The ground floor toilets are usually locked and are useless due to high waves during a cyclone or high water level during a flood (used by men when usable) • More toilets than the shelters of other donors	Domestic animals are taken to the shelter due to the lack of a killa	No	Higher shelter height than the shelters of other donors	• Unable to meet the shelter demand due to large population of neighbouring area (another floor is required) • The doubled number of pupils has made teaching with two shifts necessary for all grades • Lack of a connecting road • Filling on the school grounds is required • Lack of a perimeter fence • No electricity supply
Darbesh Kata GPS	Chokoria	Saudi Arabia	May 1994		9,000 within a radius of 1.5 km (note: Grameen Bank shelter is nearby)		1/11/1998	The ground floor facilities are unusable during a cyclone or flood	• The ground floor facilities are unusable during a cyclone or flood • A roof top toilet (one place) is unusable during a strong wind	The lack of a killa makes it inevitable that domestic animals are left on the road, etc., risking them being drowned	Yes (used for fans and lighting at normal times)	Relatively small in view of its frequent use for evacuation due to both cyclones and floods	• Shortage of classrooms • Because shelter is close to the seashore and dangerous, a wireless radio for observation and communication is necessary.
IFAD Cyclone Shelter	Kutubdia	IFAD	1994	2,000			2/11/1998	The system is out of order, causing a drinking water shortage	• The ground floor facilities are unusable during a cyclone or flood • The number is insufficient	• The presence of a killa makes it possible for evacuees to bring their domestic animals • The high position of the shelter gives a sense of security	Solar system (mainly used during a cyclone)	• The presence of a killa makes the number of evacuees exceed the shelter capacity	
Jalilia GPS	Kutubdia	European Union	1994	1,000			2/11/1998	Unusable due to salt water	Two places on the GF and one place on the 1F which is used only by men during a cyclone	The lack of a killa makes evacuees head for the nearby IFAD shelter first		Small	
Pokh Khali Red Crescent PS	Chokoria	BDRCS	1993 (Use of school to start in 1996)	250-300		1 classroom + teacher's room	3/11/1998	The ground floor facilities are unusable during a cyclone or flood	The ground floor toilets are only used during school hours and are unusable during a cyclone (the alternative is the use of the corridor, making the provision of first floor toilets essential)			Too small for either a shelter or school building	• Difficulty of reaching the shelter because of flooding of the access road • No partitioning between the classrooms makes the school noisy but is more convenient for use as a shelter • Lack of eaves allows rain into the classrooms • During a cyclone, the available space is small to avoid the rain; impossible to sit in the corridor • Severe rusting of the window frames and doors due to the high salt content of the water and air; wooden frames, etc. are preferable (constant worry in regard to collapse of the windows) • Lack of school grounds

Table A-11-2 Use, Maintenance, and Positive Effects of Existing Shelters

School/Facility	Date of Completion	Shelter Use				Things to be brought into the shelter	Time needed to evacuate	Difficulties in evacuating process	Maintenance					Positive Effects of building the shelter			
		Time of Use	Period of Use	No. of people	Objective for the shelter				Regular maintenance	Maintenance after use as shelter	Main maintenance works implemented so far	System for securing maintenance funds	Problems in use and maintenance	School	Shelter	Community	Notes
East Tetoiya G.P.S.	February 1997	1997 July-August 1998 Twice a year Summer Once a month Every day	1 night 1-2 weeks 9-5 o'clock	500 200 280	Cyclones Floods Religious assemblies People go to cool off in the piloti. Vaccination Primary school	Domestic animals Dry foods	20-25 minutes	It is impossible to evacuate at night because access roads are poor. It is difficult to evacuate if there are men from outside the village (guest workers). Access roads are in poor condition.	SMC teachers, children	SMC	None	None	The use of the toilets is poor, when used as shelter. There are few participants despite requests to the community.	Increase in no. of children 231 (1995)→250 (1997)→274 (1998) Improvement in the motivation of the children	Improvement of access roads Sense of security from "existence of a shelter"	Increase of the parents' interest about the school(interested in adult education if they have the chance)	0.8km east GPS, 0.8km north is Madrasha, 1.0km south GPS, 1.5km west GPS Mothers find going to the school easier since the principal is a woman. The rise in school attendance rate reflects the commencement of the Food for Education Proramme.
Boro Bheola G.P.S	January 1996	May 1997 May 1998 June-July 1998 4-5 times a year Every day	1-2 days 1-2 days 2-3 days 9-5 o'clock	5,000 3,000 690	Cyclones Cyclones Floods Weddings, religious assemblies (plan for use in future as adult literacy centre) primary school	Domestic animals Dry foods Water			teachers(SMC)	teachers(SMC), cleaning staff was hired	None	None(only donations collected for cleaning)	The use of the toilets is poor, when used as shelter. The villagers usually do not want to listen to the teachers. The present SMC leader is not usually in the village; therfore it is difficult to cope with emergencies.	Decrease in dropout rate Increase in no. of children 250 (1995)→ 682(1998)	Improvement of access roads		
Daibesh Kata G.P.S.	May 1994	May 1997 Twice in 1997 1998 Three times in 1998 Only after cyclones and floods Irregular Every day	3 days 10-12 days 3-4 days 10-12 days 9-5 o'clock	4,000 2-3,000 4,000 2-3,000 1,230	Cyclones Floods Cyclones Floods Clinic Health education, EPI, Courses in using the toilet, Courses in BDRCS, etc. Presently not in use but hoping to recommence adult education courses Primary school	Dry foods Water		People can not come if they live more than 1.5km away(women).	SMC, teachers The school does not pay electric fees (it is unclear who is paying).	SMC	None	None	Up to now, SMC and teachers have not made requests for community participation.	Increase in no. of children 800 ~900(1994) →1,219(1998)			The neighbouring population is large and access to the school is good. Effects of the commencement of the Food for Education programme can be seen in the increase of no. of children.
IFAD Center	1994	Twice in 1997 1998 Every day Presently not in use	1 day 1 day	4-5,000	Cyclones Cyclones Community development activities (micro-finance, etc.) BDRCS activities Sewing centre	Important documents, Valuables Dry foods, Domestic animals	30 minutes	Access roads are in poor condition.	BDRCS, Village Development Committee (functions as Cyclone Shelter Management Committee)	BDRCS, UP arranged for cleaning staff	None	Requests from VDC↔ BDRCS→BDRCS main office (BDRCS contract will end in June1999. Therefore, funding and aid from BDRCS will also end).	Requests have not been made so far as to community participation.			Invigoration of community activities	
Jalilia G.P.S.	1994	1997 1998 Irregular Once a year Every day	1 day 1 day 9-5 o'clock	1,000 1,000 290	Cyclones Cyclones Health Education, EPI, Independence Day Assemblies Formerly NGO meetings and adult education programmes by NGOs were held but they are presently suspended. Primary school				teachers	teachers	None	None	After the use of the cyclone shelter, teachers requested cooperation from SMC, the community, and UP but did not receive any.	Increase in no. of children 120(1994)→ 285(1998)		Invigoration of community activities	
Pokh Khali Red Crescent Primary School	1993	1997 1998 1998(every year) Irregular Every day	 1day(longer for those who have lost their homes) 15 days in 1998 9-5 o'clock	 360	Cyclones Cyclones Floods Health programme Plans for use in future for religious assemblies, weddings, etc. primary school			It is difficult to reach the shelter since the roads become flooded.	Until 1996 maintenance was provided by the providers of the land, CPP unit, after 1996, SMC, teachers, and children.	Until 1996 maintenance was provided by the providers of the land, CPP unit, after 1996, SMC, and teachers.	Repairing the windows and wells and filling the courtyard are done by SMC (donations by teachers and SMC). Painting, planting trees, repairing the wells, fences, toilet doors are done by BDRCS.	From 2000, payment of the teachers by BDRCS will end. Payment of maintenance fees may end also (not mentioned in contract).		Increase in no. of children 150(1996)→ 357(1998)			

Table A-11-3 Results of Survey on Specifications and Standards of Existing Shelters

Item	IFAD (LGED)	EU	BDRCS	Saudi Arabia	Japan (II-7)
Main Structure	RC	RC	RC	RC	RC
Floor Area (m^2) (Including Ground Floor Piloti)	446	384	244	469	643
Number of Storys	2	2	2	3	2
Floor Height (m)	GF: 3.3 1F: 3.3 2F: -	GF: 3.3 1F: 3.3 2F: -	GF: 3.3 1F: 3.3 2F: -	GF: 3.8 1F: 3.0 2F: 3.0	GF: 4.5 1F: 4.0 2F: -
Type of Foundations	Pile and bearing foundations		Pile and bearing foundations	Pile foundations	Pile foundations
Main Finish	Mortar with paint finish	Mortar with paint finish	Mortar with paint finish	Mortar with paint finish	Mortar with paint finish
Fixtures, etc.		Desks, chairs and blackboards	Desks and chairs	Desks, chairs and blackboards	Desks, chairs and blackboards
Auxiliary Facilities (Plumbing/Sanitary Fixtures/ Electrical Installation)	Deep well and toilets (indoor)	Deep well (not used due to salt water) and toilets (GF)	Deep well and toilets (GF)	Deep well and toilets (roof top: open type; GF)	Deep well (1F) and toilets (indoor and outdoor)
Purpose of Use	Shelter and BDRCS facilities	Primary school and shelter	Primary school and shelter	Primary school and shelter	Primary school and shelter
Structural Design Standards	ACI	n.a.	ACI	ACI	Japanese
Characteristics	• Built on top of a killa • Indoor lighting system using solar system • Well on GF not usable during a disaster • Toilets on 1F usable during a disaster • Evacuation of domestic animals to a killa	• High floor type with GF piloti • Open type 1F corridor allowing free access at any time • Deep well and toilets on GF unusable during a disaster	• High floor type with GF pilot • Single room on 1F without partitioning • Communication system with CPP • As in case of EU shelter, Deep well and toilets on GF unusable during a disaster	• High floor type with GF piloti • Large accommodation due to large size • Water tank for toilets • As in case of EU shelter, Deep well and toilets on GF unusable during a disaster • 1F used as a mosque, indicating strong religious character of the building	• High floor type with GF piloti • High floor height of 1F, taking water level at the site into consideration (all other shelters use the standard design) • Assured supply of water during a disaster due to 1F Deep well and toilets; more toilets than other shelters and are usable during a disaster • High railings (1.1 m) on the roof top for better safety (0.9 m at other shelters)