

**CHAPTER 10**  
**CONSTRUCTION IMPLEMENTATION PLAN**

## **CHAPTER 10 CONSTRUCTION IMPLEMENTATION PLAN**

### **10.1 Construction Policies**

The construction consists of short-term protection works for the Meghna Bridge to enhance its structural stability against scouring around the piers and to prevent the riverbed in front of the revetment on the left bank upstream of the bridge from lowering.

The adopted construction policies are briefly summarized as follows:

- (1) Make maximum use of construction materials available in Bangladesh, and allow for future repairs and protections to be made by the Government of Bangladesh.
- (2) Complete all construction works before the start of the rainy season in 1999.
- (3) Set up construction offices and lodging facilities in RHD's land on the left bank upstream of the Meghna Bridge (Comilla side) to allow round-the-clock construction operations as well as thorough monitoring and inspection of the construction works.
- (4) Strictly control the work progress to meet the extremely short construction period.

### **10.2 Conditions to be Considered**

#### **(1) Utilization of Divers**

Since the major portion of the construction works will be performed underwater, it will be necessary to obtain the services of skilled divers to ensure the quality of the construction.

#### **(2) Procurement of Stone and Gravel**

Stone and gravel to be used for the construction will be procured in the mountainous area of Sylhet near the Indian border. Since large quantities of stone and gravel will be required in a very short period, it is recommended that RHD and other related agencies provide cooperation for the timely procurement of the said materials.

The stone and gravel to be used for the construction will be procured during the high water season of the river (June - November) considering the inland water transport situation.

- (3) Bangladeshi barges, tugboats, lighters, etc., will be utilized for the construction.

### **10.3 Construction Plan and Construction Supervision**

#### **(1) Construction Plan**

##### **1) Construction Period**

To meet the inherent situation of the Project, it will be necessary to complete all construction works before the next rainy season to avoid the occurrence of high flood waters. For this reason, the total construction period could vary somewhat, but is expected to be about six months.

##### **2) Work Components of the Construction**

The work components are classified into the following six categories:

- Preparatory Work;
- Stone or Sacked Gravel Mat Protection Work;
- Grading Work;
- Removal of Damaged Slope Paving;
- Gabion Work; and
- Clean-Up.

##### **3) Construction Camp Yard**

The camp yard space which had been prepared in the framework of "the Project for Protecting Revetment on the Bank of Meghna River, 1992 - 1994" will be used for the construction purposes (refer to Paragraph 10.1 (3)).

#### **(2) Construction Method**

A general description of each construction category is given below.

1) Preparatory Work

a. Offices and Lodging Facilities

The following construction offices and lodging facilities will be provided in the above-mentioned camp yard:

- Contractor's Site Office;
- Sub-Contractor's Office and Lodging Facilities; and
- Consultant's Office.

b. Stock Yard

Procurement of stone and gravel is limited to the rainy season (June - November) due to the inland water transport situation, therefore provision of a stock yard is necessary. The stock yard will be located in the camp yard. Temporary unloading and loading jetties and fencing will be provided as the supporting facilities for the stock yard.

2) Stone or Sacked Gravel Mat Protection Work

- a. A river survey will be carried out for the determining the stone and sacked gravel mat protection areas and the construction limits will be marked by floats and buoys;
- b. Stone or sacked gravel will be hauled to the riverbed protection areas by barge and pitched by hand or equipment;
- c. The pitching stone or sacked gravel pitching will be watched frequently by divers and the construction tolerances should be minimized; and
- d. The various size of pitching stone will be utilized so that the voids can be filled with smaller size stone and a dense stone mat can be obtained.

3) Grading Work

Grading work will be done in the dry season for the area between the abutment face wall and the revetment top line, and will consist of the following steps:

- a. Select material shall be spread in the area and graded neatly;
- b. The top layer will be compacted by vibratory roller; and
- c. The minimum slope toward the revetment top shall be one percent.

4) Removal of Damaged Slope Paving (Geotextile Form Concrete)

Removal work will be done in the dry season when the water surface is at the lower level. Pavement breaker may be used and concrete debris can be disposed of near the toe of slope of the existing revetment.

5) Gabion Work

Existing damaged geotextile form concrete slope paving will be replaced with gabion (i.e. stone-and-wire cylinder) in the following manner:

- a. The slope will be shaped and compared and a gravel filter layer will be placed; and
- b. Gabion shall be installed in such a manner that there is no space between gabion units and they shall be flat and uniform over the entire area.

6) Clean-Up

After completion of the works, all construction equipment used for the construction shall be demobilized as soon as possible, and the camp yard and stock yard shall be restored to their original condition.

(3) Construction Equipment

The equipment necessary for the construction works should generally be as follows:

1) Material Hauling Barges (100-Ton Class)

To haul stone, sacked gravel and other materials from the temporary pier near the stock yard to the pitching locations.

2) Tow Boats (200 PS Class)

For towing material hauling barges.

3) Clamshells, Wheel Loaders and Dump Trucks

- a. Unloading of stone and gravel from barges and hauling to the stockpile yard;
- b. Loading of stone and sacked gravel to the material hauling barges; and
- c. Handling of stone and gravel in the stockpile yard.

4) Air Compressors and Diving Gear

Equipment required for diving operations

5) Lighting Equipment and Generators (100 KW each)

(4) Construction Management

The construction will follow a tight schedule. For this reason strict construction management (materials, equipment, and labor) together with careful control of work progress will be required. The contractor and the consultant will utilize local staff to the maximum extent and the number of Japanese staff will be kept at the minimum level.

#### 10.4 Procurement of Materials and Equipment

The following construction materials and equipment will be procured from the market in Bangladesh.

- Stone and gravel;
- Jute bags; and
- Construction equipment and steel shapes for temporary works.

#### 10.5 Project Implementation Time Schedule

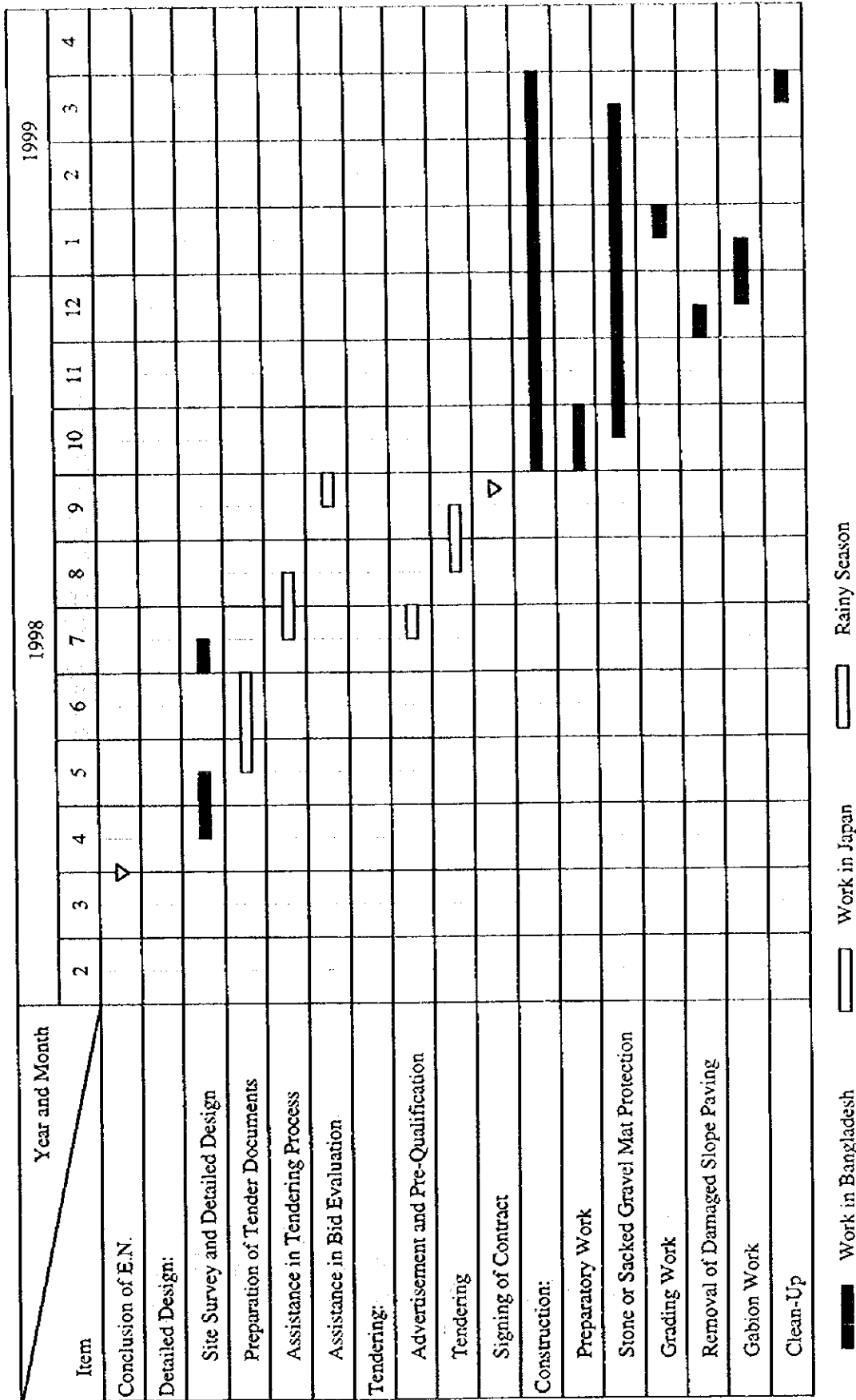
After the Exchange of Notes for the Project will be concluded, detailed design and preparation of tender documents will be carried out and completed within about 2.5 months. The construction period is estimated to be about six month as mentioned in Subparagraph 10.3 (1) I). Figure 10.1 indicates the timing and duration of each work component of the construction.

Figure 10.1 also indicates the principal items of project implementation procedures together with the time deemed necessary.

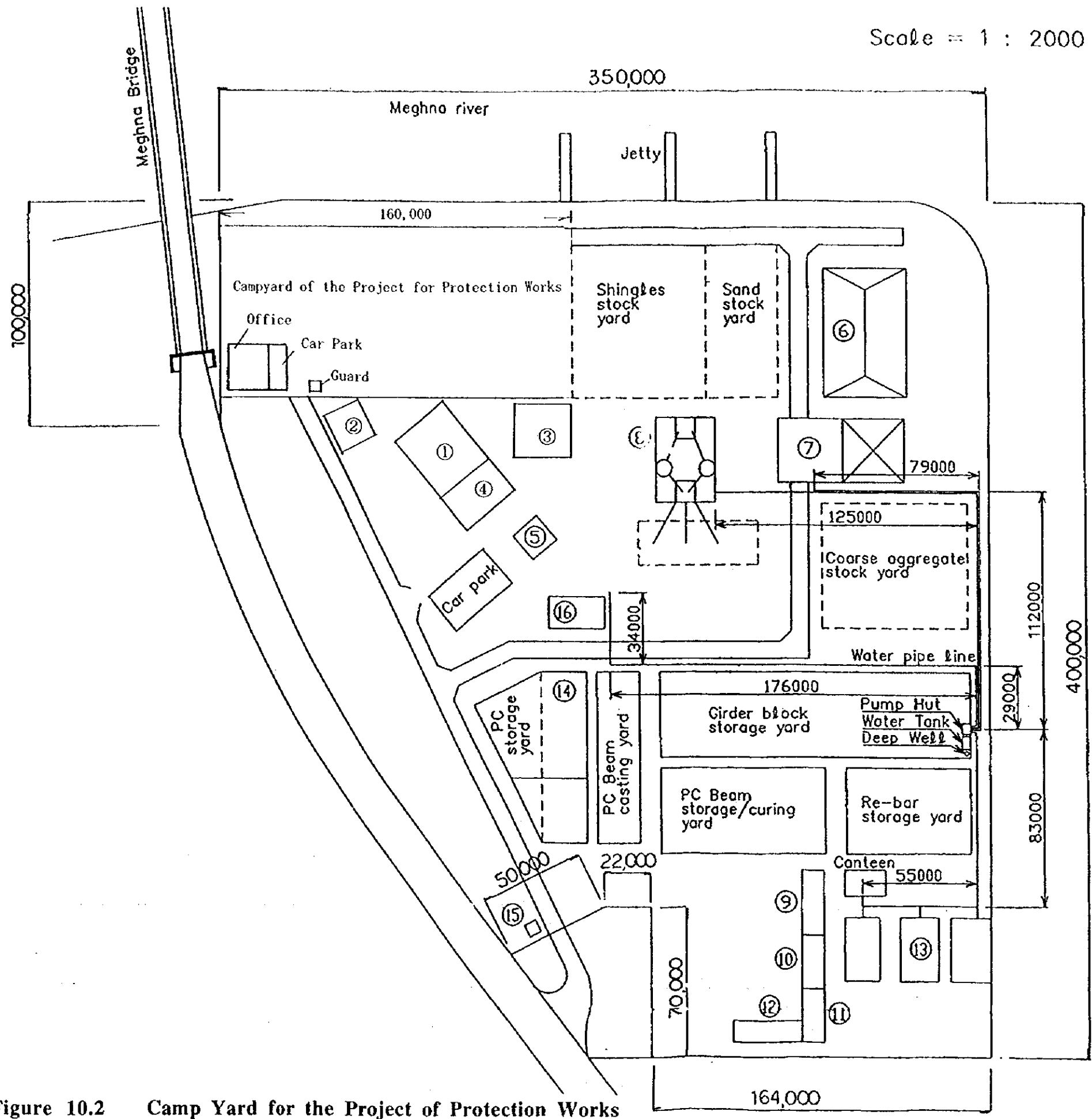
## **10.6 Obligations of the Government of Bangladesh**

- (1) The Government of Bangladesh shall make available RHD's reclaimed land and an access road (Fig. 10.2) which had been constructed in the framework of the "Project for Protecting Revetment on the Bank of Meghna River, 1992 - 1994" in the left bank of upstream of the Meghna Bridge (Comilla side), before the commencement of the construction works in the Project.
- (2) The Government of Bangladesh will not bear any portion of the construction cost in the Project.

Figure 10.1 Project Implementation Time Schedule







AREA  
126,500 m<sup>2</sup>

No.	Description
1	Contractor's office
2	Sub-contractor's office
3	Laboratory
4	Consultant's office
5	Client's office
6	Cement storehouse
7	Batching plant
8	Crushing plant
9	PC storehouse
10	Civil storehouse
11	Mechanic storehouse
12	Machine shop
13	Local accomodation
14	PC, Form fabrication yard
15	Guard hut
16	Generator hut

Figure 10.2 Camp Yard for the Project of Protection Works

## **CHAPTER 11**

### **NECESSITY OF FUTURE MONITORING AND OPERATION AND MAINTENANCE WORKS**

## CHAPTER 11 NECESSITY OF FUTURE MONITORING AND OPERATION AND MAINTENANCE WORKS

### 11.1 Monitoring Work

The chronological features of the Meghna river channel, tendency of erosion and siltation and condition of the local scoured pool immediately upstream of the bridge, etc. as observed during the survey and analyses in 1997 have been described in detail in the previous sections. With regard to the countermeasures against scouring in front of the existing revetment on the left bank, it is concluded after substantial discussion and alternative studies that no large scale treatment is to be provided for the time being. This judgment was reached through examination and review of the findings that i) no significant change of the local scoured pool is identified, ii) the speed of erosion on the left bank upstream of the existing pitched stone revetment seems to become a bit slower after 1994, iii) the right side channel passing by the sand bar is gradually widened.

Therefore, large-scale countermeasures such as extension of the existing revetment or of pervious/impervious groins which were considered as short-term countermeasures in the Interim Report were not adopted. Further, the formulation of mid-term and long-term countermeasures is difficult at present considering the situation of the river channel near the Meghna Bridge as mentioned above.

Because of the hydraulic characteristics of flow in the river stretch where the Meghna Bridge is located, a lot of unknown factors concerning river morphology still remain. Hence more extensive studies and investigations will be needed. For this reason, data collection and surveys are prerequisite for such studies and investigations in the future.

The future studies and analyses should be focused on the stretch from 8 km upstream to 2 km downstream considering the areas in which several studies had been conducted so far. In this river stretch, a total of 15 cross-section survey lines have been determined for the purposes of:

- Water level, velocity and discharge measurement
- Lateral river channel survey
- Bank erosion survey
- Boring survey around deeply scoured area
- Sounding along the centerline of the bridge
- Detailed sounding in front of the existing revetment
- Riverbed material survey (riverbed, bank, and sand bar), as necessary
- SS concentration measurement, as necessary

Further, periodical review of the collected data is necessary. A inventory of the maps and data collected/measured through the past surveys and studies is shown in Table 11.1.1. In order to conduct river survey and measurement, the necessary apparatus are listed in Table 11.1.2.

## **11.2 Operation and Maintenance**

It is recommended that an organization for the surveys and investigation mentioned above be established immediately after the construction of the protection works for the piers and revetment. Large-scale landslide and bank erosion have occurred at many places in the Meghna river. However, in most cases it was quite difficult to foresee the occurrence of such landslide and bank erosion and to assess their damage and influence.

In the vicinity of the Meghna Bridge, bank erosion and silation and shifting of the sand bar seem to become moderate after completion of the revetment on the bank on Comilla side. However, it should be noted that unknown phenomena might occur in case of excessive floods, and this requires immediate provision of countermeasures. Therefore, reinforcement of the organization for operation and maintenance of existing facilities by the Government of Bangladesh is quite important to ensure safety of the Meghna Bridge.



**Table 11.1.2 Required Monitoring Apparatus**

	Unit	Qty
<b>1. Cross section survey</b>		
• Echo sounder	nos.	1
• Transit	nos.	1
• Rod (3 m long)	nos.	1
<b>2. Measurement of flow velocity</b>		
• Current meter (electromagnetic type)	nos.	1
• Weight (around 10 kg)	nos.	1
• Tape (100 m long)	nos.	2
• Anchor with rope (for anchoring boat)	set	2
<b>3. Sampling of river bed material</b>		
• Bed sampler	nos.	1
• Plastic bag	nos.	As required
<b>4. Sampling of water (measurement of suspended load)</b>		
• Water sampler	nos.	1
• Container	nos.	As required

Note : As for the measurement above, two (2) boats shall be prepared.

# **APPENDICES**

## APPENDICES

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## APPENDIX 1 MEMBERS OF THE JAPANESE BASIC DESIGN STUDY TEAM

### Team Leader

Name: Mr. Junji YOKOKURA  
Present Post: Deputy Director of Follow-up Division,  
Grant Aid Project Management Department, JICA

### Project Coordinator

Name: Mr. Tatsuya Imai  
Present Post: Staff of Second Project Study Division,  
Grant Aid Project Study Department, JICA

### Technical Experts

<u>Name</u>	<u>Assignment</u>
Mr. Naoya OGAWA	Chief, Overall Design Manager/Bank Protection Engineer
Mr. Toshinori OSHITA	River/Hydraulic Engineer (A)
Mr. Yoshihiro MOTOKI	River/Hydraulic Engineer (B)
Mr. Seiju IKEDA	Topographical/Geotechnical Engineer
Mr. Yoshimi TAKAI	Scouring Survey/Protection Design
Mr. Koji ENOMOTO	Damage Investigations
Mr. Akira SHIKICHI	Construction Planning/Cost Estimator

## APPENDIX 2 LIST OF PERSONS MET

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

Mr. M. Azizul Islam	Deputy Secretary
Mr. Rafiqul Islam	Deputy Chief
Mr. Muhammad Saifullah	Sr. Assistant Secretary

### RRD, MOC (Roads & Railways Division, Ministry of Communication)

Mr. Muhammad Abul Quasem	Joint Secretary
Mr. A. N. M. Serajul Islam	Joint Chief (Planning)
Mr. Md. Nurul Haque	Deputy Chief
Mr. A. K. M. Moshanraf Hussain	Deputy Chief (Engineering)
Mr. Azizur Rahman	Deputy Secretary
Mr. Karnaluddin Ahmed	Assistant Secretary

### RHD (Roads & Highways Department)

Mr. Anwar Hossain	Additional Chief Engineer, Dhaka Zone
Mr. A. N. Atique Ullah	Additional Chief Engineer, Dhaka Zone
Mr. Afzar Hossain	Superintending Engineer, Dhaka Zone
Mr. Moizuddin Ahmed Jaigirdar	Superintending Engineer, Bridge Design Circle (East)
Mr. Firoz Khan Noon	Executive Engineer, Narayanganj

### Joint Meeting

Mr. Rafiqul Islam	Deputy Chief, ERD
Mr. Md. Nurul Haque	Deputy Chief, Roads & Railways Div., MOC
Mr. M. A. Jaigirdar	Superintending Engineer, RHD
Mr. Md. Saiful Islam	Second Secretary (Customs), National Board of Revenue
Mr. Md. Saifullah	Sr. Assistant Secretary, ERD
Ms. Azizun Nahar	Research Officer, Roads Sector, Planning Commission

### Institute of Flood Control/Drainage Research, BUET

Prof. M. Mozammel Hoque	Project Director, Japan Bangladesh Joint Study Project
Mr. Kiyoji Mori	Project Coordinator, Japan Bangladesh Joint Study Project

### Japanese Embassy

Mr. Yoshikazu Kaneko	Ambassador
Mr. Syuuichi Sakakibara	First Secretary
Mr. Hitoshi Sanada	First Secretary

### JICA

Mr. Morimasa Kanamaru	Resident Representative
Mr. Masaaki Matsushima	Deputy Resident Representative

APPENDIX 3 MINUTES OF DISCUSSIONS, APRIL 10, 1997

MINUTES OF DISCUSSIONS  
BASIC DESIGN STUDY ON THE PROJECT  
FOR PROTECTION WORKS FOR MEGHNA BRIDGE  
IN THE PEOPLE'S REPUBLIC OF BANGLADESH

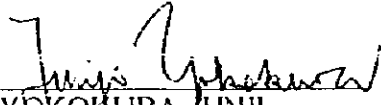
In response to the request from the Government of the People's Republic of Bangladesh (hereinafter referred to as "the GOB"), the Government of Japan decided to conduct a Basic Design Study on the Project for Protection Works for Meghna Bridge (hereinafter referred to as "the Project") in the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

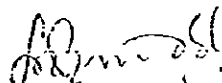
JICA sent to Bangladesh the Basic Design Study Team (hereinafter referred to as "the Study Team"), which is headed by Mr. YOKOKURA Junji, Deputy Director of Follow-up Division, Grant Aid Project Management Department, JICA, and the Study Team is scheduled to stay in the country from April 5 to May 17, 1997.

The Study Team held a series of discussions with the concerned officials of the GOB and conducted field surveys at the study areas.

In the course of discussions and field surveys, both parties confirmed the main items described on the attached sheets. The Study Team will proceed to further works and prepare the next field surveys in August.

Dhaka, April 10, 1997

  
YOKOKURA JUNJI  
Leader,  
Basic Design Study Team,  
JICA

  
MD. RAFIQUL ISLAM  
Deputy Chief  
Economic Relations Division

  
MD. NURUL HAQUE  
Deputy Chief  
Roads & Railways Division  
Ministry of Communications

  
M. A. JAIGIRDAR  
Superintending Engineer  
Bridge Design Circle (East)  
Roads & Highways Department

## ATTACHMENT

1. **Responsible Organization and Implementing Agency**

Responsible Ministry : Ministry of Communications

Implementing Agency : Roads and Highways Department

2. **Project Site**

The Project site is as shown in ANNEX-1.

3. **Major Items Requested by the GOB**

The Major items requested by the GOB are as follows :

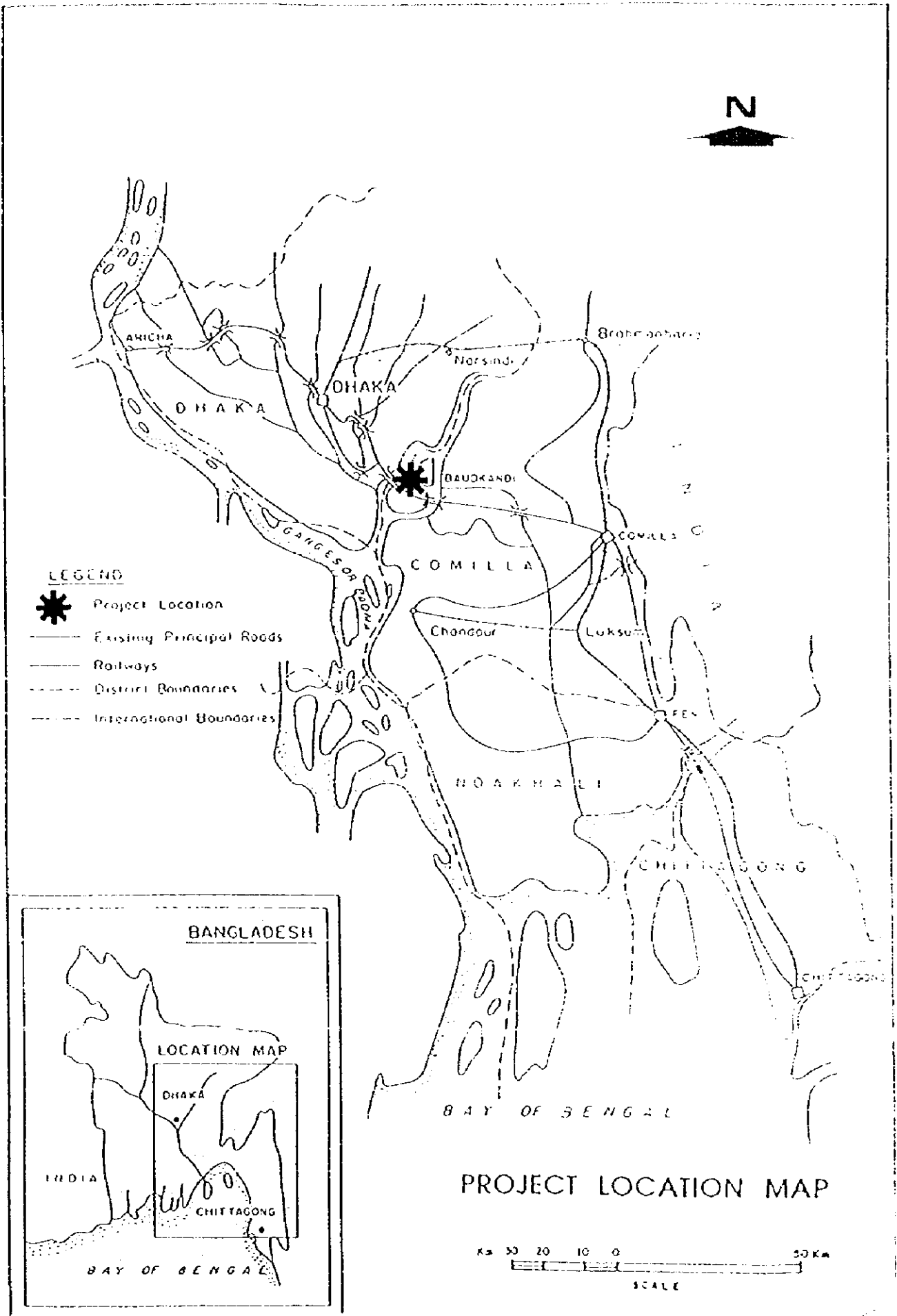
- (i) Short-term protection works for Meghna Bridge at the Comilla side
- (ii) Finding the needs and the study items for the medium/long term protection works for Meghna Bridge

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

- i) The GOB has understood the system of the Japan's Grant Aid explained by the Study Team; the main feature is described in ANNEX-2.
- ii) The GOB will take the necessary measures, described in ANNEX-3 for the smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

5. **Further Schedule of the Study**

- i) The Study Team will continue the field survey in Bangladesh until May 17, 1997 and further study in Japan to analyze the results of the field survey conducted in the dry season.
- ii) Second study team will be dispatched in August 1997 in order to gather data and informations in the rainy season that are necessary for planning more effective counter measures to protect Meghna Bridge.
- iii) Based on the results of the field survey and study in Japan, JICA will prepare the Draft Basic Design Study Report and dispatch a team in November 1997 in order to consult with the GOB on outline of the Draft Basic Design.
- iv) Upon acceptance of the Draft Basic Design by the GOB, JICA will complete the Basic Design Study Report and forward it to the GOB around the end of 1997.



## ANNEX- 2 : 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	(Appraisal by the Government of Japan and Approval by 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 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 as well as to avoid any undue delay caused by the selection of a new consulting firm.

## 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 an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by 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.

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### ANNEX-3 : NECESSARY MEASURES TO BE TAKEN BY THE GOB

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

1. To secure the land necessary for the execution of the Project, such as the land for bridges, temporary offices, working areas, storage yards and others;
2. To make all possible roads and bridges leading to the Project sites before the commencement of inland transportation of materials and equipment;
3. To undertake the incidental works, such as gardening, fencing, lightning and other incidental facilities in and around the Project sites, if necessary;
4. To ensure prompt unloading and customs clearance at ports of disembarkation in Bangladesh and internal transportation therein of the products purchased under the Grant;
5. 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;
6. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into Bangladesh and stay therein for the performance of their work;
7. To maintain and use facilities constructed under the Grant properly and effectively for the Project;
8. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking arrangement, namely the advising commission of the "Authorization to Pay" and payment commissions;
9. To bear all the expenses, other than those covered by the Grant, necessary for the Project; and
10. 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.

**MEMORUNDAM**

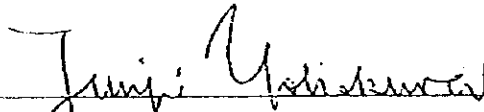
**Basic Design Study  
on the Project for Protection works for the Meghna Bridge  
in the People's Republic of Bangladesh  
(Explanation of Interim Report)**

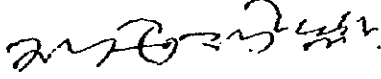
In March 1997, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Protection works for the Meghna Bridge (hereinafter referred to as "the Project") in the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh"), and through discussions, field survey, and technical examination of the result in Japan, has prepared the interim report of the study.

In order to explain to the Bangladesh side on the Interim report and to implement a field survey in rainy season, JICA sent a Basic Design Study Team headed by Mr. YOKOKURA Junji, Deputy Director of Follow-up Division, Grant Aid Project Management Department, JICA, to Bangladesh from July 31 to August 29, 1997.

As a result of discussions, both parties have decided to agree with the items described in ATTACHMENT subject to approval of the respective Governments.

Dhaka, August 4, 1997

  
Mr. Junji YOKOKURA  
Leader,  
Basic Design Study Team,  
JICA

  
Mr. A. N. Atique ULLAH  
Add. Chief Engineer  
Roads and Highways Department

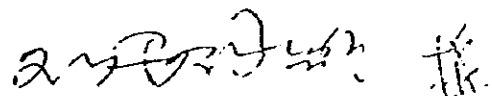
## AT TACHMENT

### 1. Main items discussed


- i) The team explained the contents of the Interim Report. Bangladesh side understood the basic idea of counter-measures against the erosion/scouring occurring around the Comilla side of the Bridge.
- ii) The team pointed out the needs of the stone bund to protect Pier No.8 and the protection works should be implemented by Bangladesh side.
- iii) Landownership of the project site which showed in ANNEX should be clarified by Bangladesh side. The team requested the Bangladesh side to give the result of the clarification by the time the team members leaves Bangladesh on Aug. 29. Bangladesh side has agreed to solve all problems concerned with the landownership of the project site so that there may be no hindrance / inconvenience for the implementation of the project.

### 2. Further Schedule of the Study

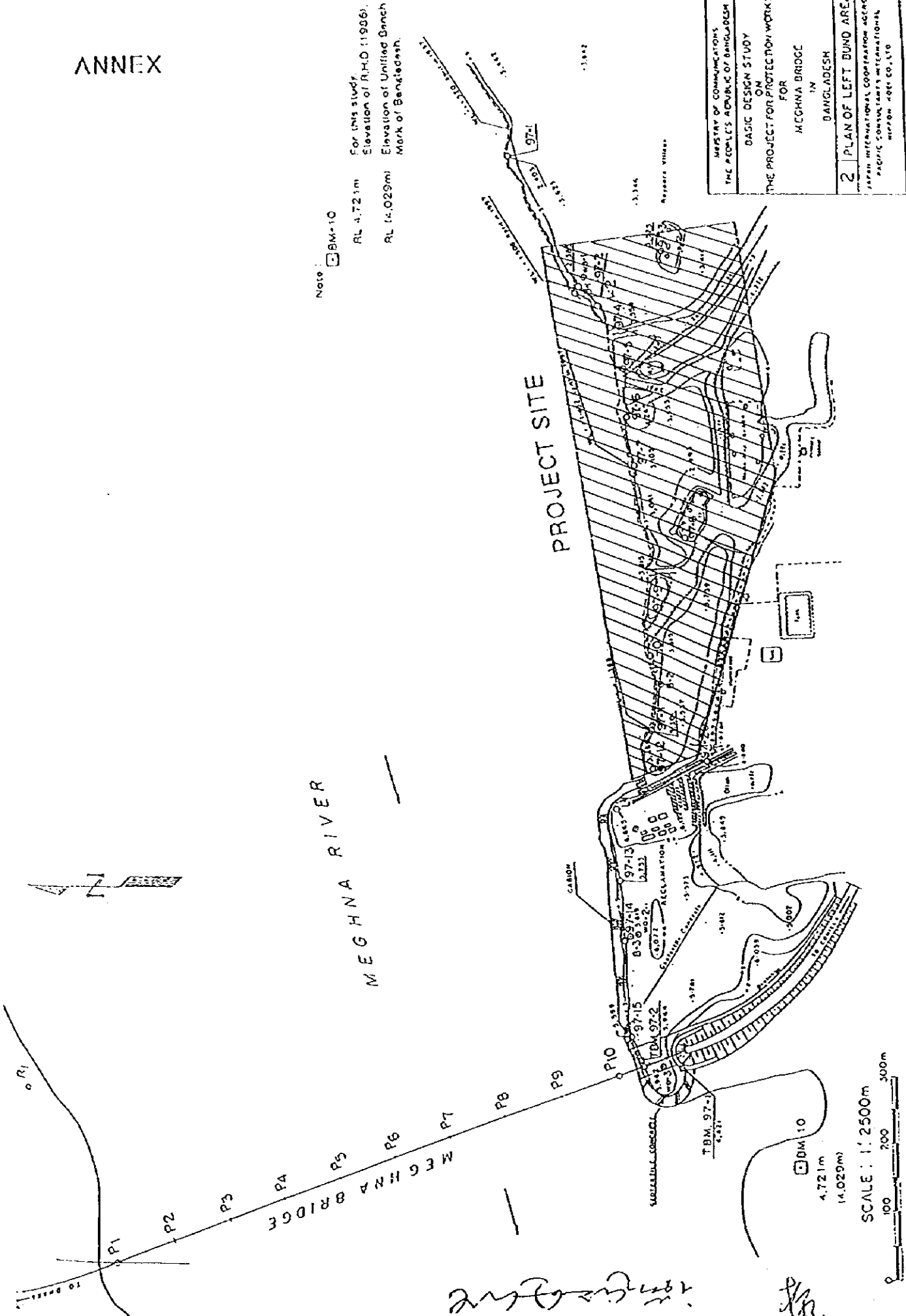
- i) The Study Team will continue the field survey in Bangladesh until August 29, 1997 and further study in Japan to analyze the results of the field survey conducted in the rainy season.
- ii) Based on the results of the field survey and study in Japan, JICA will prepare the Draft Basic Design Study Report and dispatch a team in November 1997 in order to consult with Bangladesh side on outline of the Draft Basic Design.
- iii) Upon acceptance of the Draft Basic Design by Bangladesh side, JICA will finalize Basic Design Study Report and forward it to Bangladesh side around the end of 1997.



# ANNEX

Note:  BM-10  
 For this study  
 RL 4.721m  
 Elevation of R.H.O. (1986)  
 RL 4.029m  
 Elevation of Unified Datum  
 Mark of Bangladesh.

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH
2 PLAN OF LEFT BUND AREA JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL KIRIPON HOEI CO., LTD



APPENDIX 5 MINUTES OF DISCUSSIONS, NOVEMBER 12, 1997

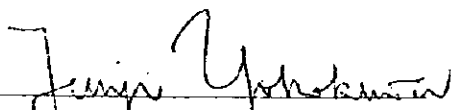
MINUTES OF DISCUSSIONS  
BASIC DESIGN STUDY ON  
THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE  
IN THE PEOPLE'S REPUBLIC OF BANGLADESH  
(CONSULTATION ON DRAFT REPORT)

In March and August 1997, Japan International Cooperation Agency (hereinafter referred to as "JICA") despatched Basic Design Study Teams on the Project for protection works for Meghna Bridge (hereinafter referred to as "the Project") in the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh"), and through discussions, field surveys, and technical examination of the result in Japan, has prepared the draft report of the study.

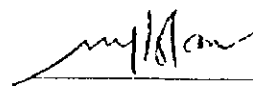
In order to explain and to consult to the Bangladesh side on the components of the draft report, JICA sent to Bangladesh a Draft Report Consultation Team headed by Mr. Yokokura Junji, Senior Assistant to Managing Director of Grant Aid Project Study Department, JICA, and is scheduled to stay in the country from November 9 to 13, 1997.

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

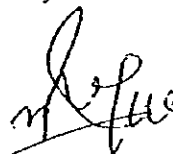
Dhaka, November 12, 1997



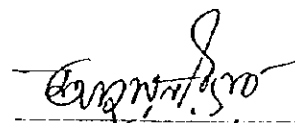
Yokokura Junji,  
Leader,  
Draft Report Consultation Team  
JICA



Mohd. Nurul Islam  
Deputy Chief,  
Economic Relations Division  
Ministry of Finance



Md. Nurul Haque  
Deputy Chief  
Roads and Railways Division,  
Ministry of Communications



M.A. Jaigirdar  
Superintending Engineer  
Roads and Highways Department

## ATTACHMENT

1. Objective  
The objective of the Project is to take emergency safety measures to protect Meghna Bridge and Protecting Revetments.
2. Responsible Organization and Implementing Agency  
Responsible Ministry : Ministry of Communications  
Implementing Agency : Roads and Highways Department
3. Project Site  
The Project site is as shown in ANNEX-1.
4. Components of the Project  
Bangladesh side has accepted and basically agreed the contents of the Draft Report submitted by the Team.
5. Japan's Grant Aid System
  - 1) Bangladesh side has understood the system of the Japan's Grant Aid explained by the Study Team; the main feature is described in ANNEX-2.
  - 2) Schedule for implementation stage is shown in ANNEX-3 .
6. Necessary Measures to be taken by Bangladesh Side
  - 1) Bangladesh side will implement the Stone Bund Work to protect Pier No.8 of the Meghna Bridge until the end of March, 1998.
  - 2) Bangladesh side will take the necessary measures, described in ANNEX-4 for the smooth survey and 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  
JICA will complete the Basic Design Study Report and forward it to Bangladesh side by January 1998.
8. It is understood among Economic Relations Division, Ministry of Communications, and the Executing Agency, Roads and Highways Department that during the project period, in case exemption from custom duty, tax and other charges cannot be granted, such tax and duties, etc. should be borne by the Executing Agency.

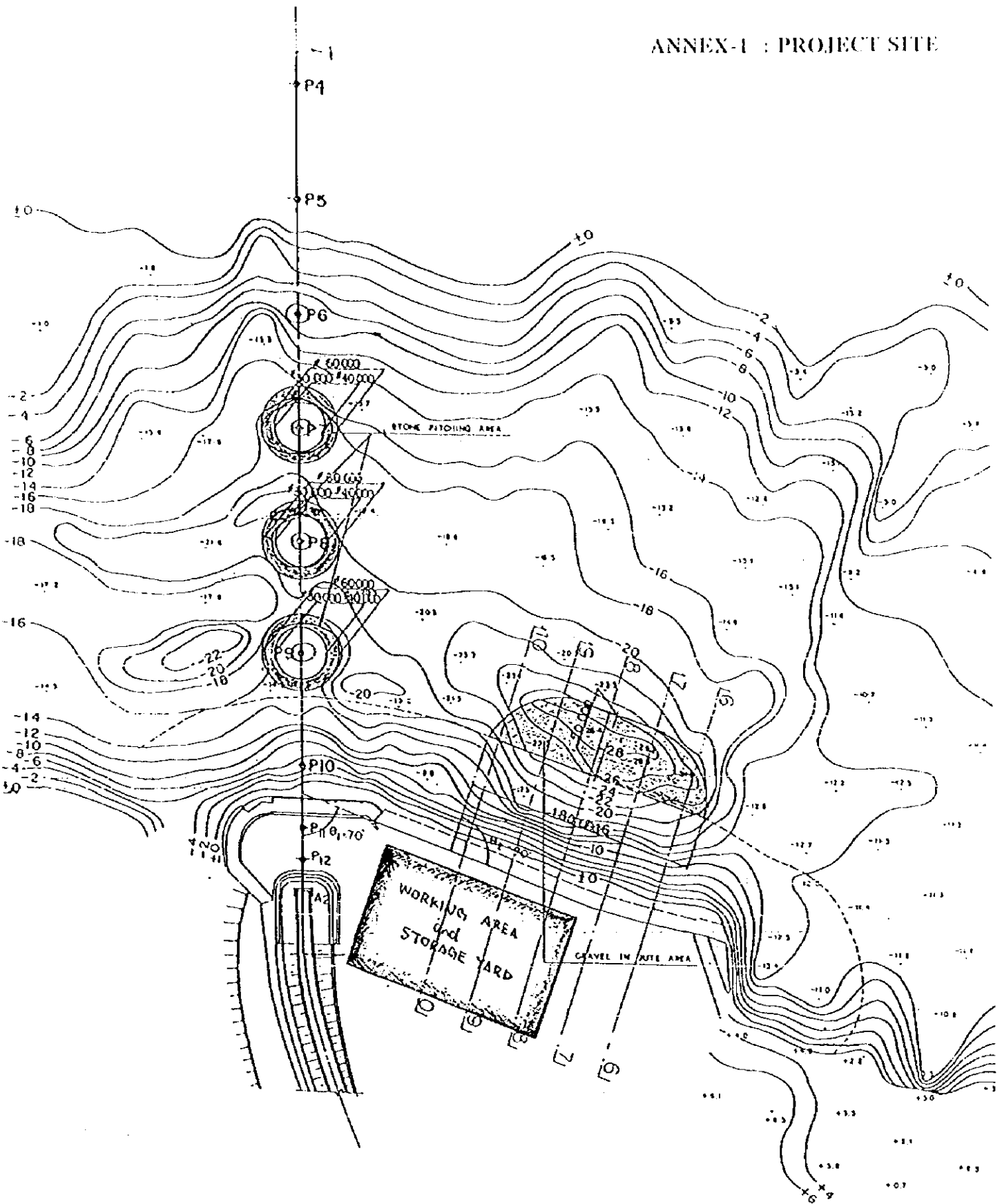
*GR*

*m*

*20*

*RR*

ANNEX-1 : PROJECT SITE



*Handwritten signature*

*Handwritten initials and signature*

## ANNEX-2 : JAPAN'S GRANT AID SCHEME

### 1. Grant Aid Procedure

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

Application Study	(Request made by a recipient country) (Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by 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 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 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 as well as to avoid any undue delay caused by the selection of a new consulting firm.

### 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;

Copy



- 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"

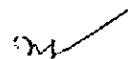

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

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 an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by 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.



Project Implementation Time Schedule

Year and Month	1998												1999			
	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
Item																
Conclusion of E.N.			▽													
Detailed Design:																
Site Survey and Detailed Design																
Preparation of Tender Documents																
Assistance in Tendering Process																
Assistance in Bid Evaluation																
Tendering:																
Advertisement and Pre-Qualification																
Tendering																
Signing of Contract																
Construction:																
Preparatory Work																
Stone or Sacked-Gravel Mat Protection																
Grading Work																
Removal of Damaged Slope Paving																
Gasion Work																
Clean-Up																

 Work in Bangladesh
  Work in Japan
  Rainy Season

*BN*

*29*

*m*

*[Signature]*

#### ANNEX-4 : NECESSARY MEASURES TO BE TAKEN BY BANGLADESH SIDE

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

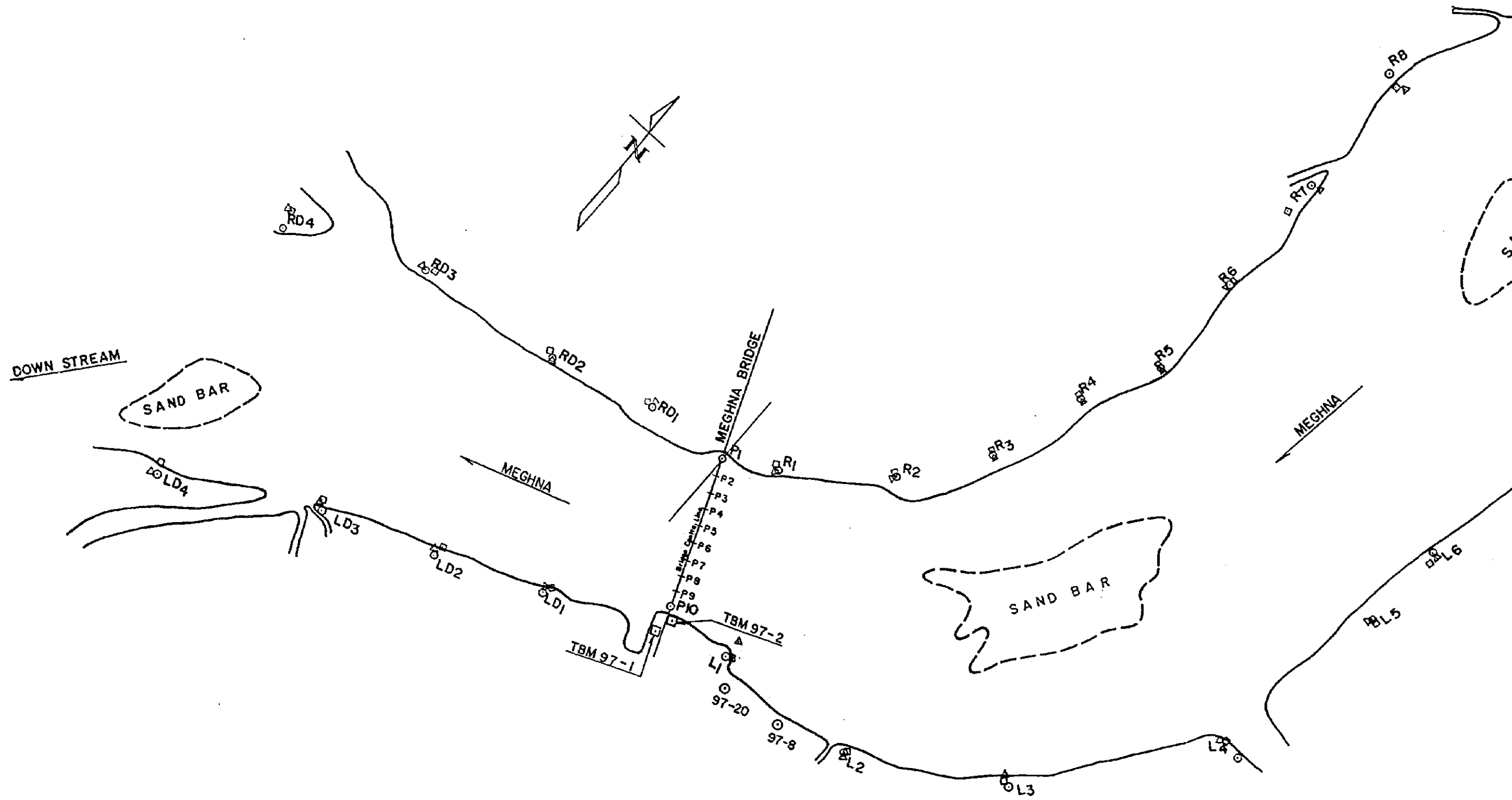
1. To secure the land necessary for the execution of the Project, such as the land for bridges, temporary offices, working areas, storage yards and others;
2. To make all passable roads and bridges leading to the Project sites before the commencement of inland transportation of materials and equipment;
3. To undertake the incidental works, such as gardening, fencing, lightning and other incidental facilities in and around the Project sites, if necessary;
4. To ensure prompt unloading and customs clearance at ports of disembarkation in Bangladesh and inland transportation therein of the products purchased under the Grant;
5. 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;
6. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into Bangladesh and stay therein for the performance of their work;
7. To maintain and use facilities constructed under the Grant properly and effectively for the Project;
8. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commissions;
9. To bear all the expenses, other than those covered by the Grant, necessary for the Project; and
10. 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.



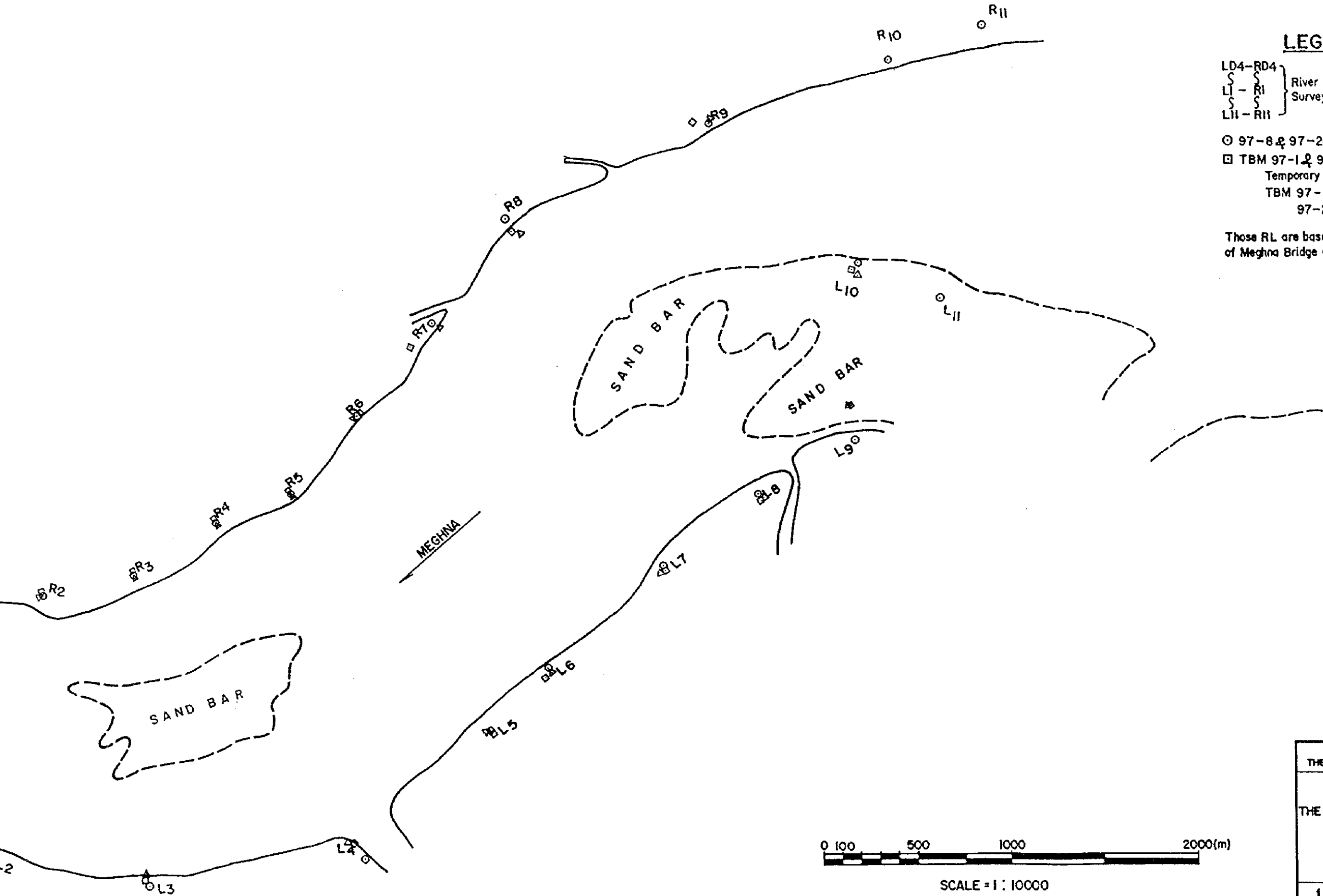


## **APPENDIX 6 REFERENCE**

1. FEASIBILITY STUDY ON MEGHNA, MEGHNA-GUMTI BRIDGES CONSTRUCTION PROJECT, FINAL REPORT AND APPENDICES, JICA, March 1985
2. FLOODS IN BANGLADESH, RECURRENT DISASTER AND PEOPLE'S SURVIVAL, Universities Research Center, Dhaka, August 1987
3. SECOND FLOOD DAMAGE RESTORATION PROJECT, CONSULTANCY SERVICES FOR PROTECTION OF MEGHNA RIVER RAILWAY BRIDGE AT BHAIKAB BAZAR, DRAFT FINAL REPORT (Vol. I & II), Development Design Consultants Limited, December 1989
4. WORKING PAPER FOR THE STUDY OF EROSION PHENOMENON AT UPSTREAM OF MEGHNA BRIDGE SITE, PCI & NK, November 1991 and January 1992
5. MEGHNA RIVER BANK PROJECTION SHORT TERM STUDY, FINAL REPORT, Haskoning Royal Dutch Consulting, February 1992
6. BASIC DESIGN STUDY REPORT ON THE PROJECT FOR PROTECTING REVETMENT ON THE BANK OF MEGHNA RIVER IN THE PEOPLE'S REPUBLIC OF BANGLADESH, JICA, November 1992
7. THE PROJECT FOR THE CONSTRUCTION OF REVETMENT ON THE BANK OF MEGHNA RIVER, FINAL REPORT, PCI & NK, March 1994



GENERAL PLAN OF PROJECT SITE



LEGEND

- LD4-RD4 } 1989 APR.
- S S } River Cross Section
- L1 - R1 } Survey Line
- S S }
- L11 - R11 }
- △ 1994 JAN.
- 1997 APR.
- 97-8 & 97-20 Traverse Point (1997. APR.)
- TBM 97-1 & 97-2
- Temporary Bench Merk
- TBM 97-1 RL = 6.821
- 97-2 RL = 5.964

Those RL are based on the As Build Drawing of Meghna Bridge Construction.

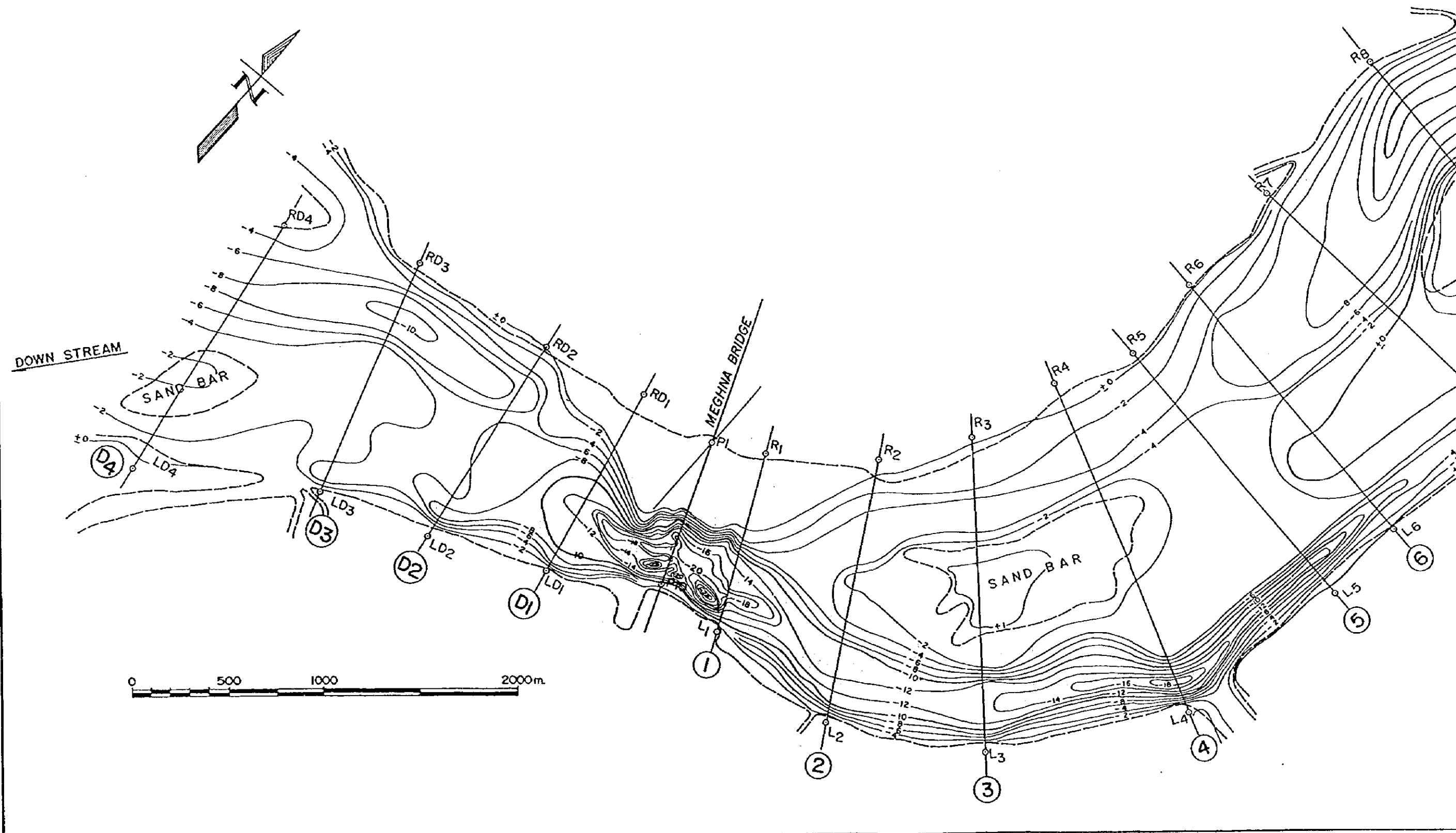


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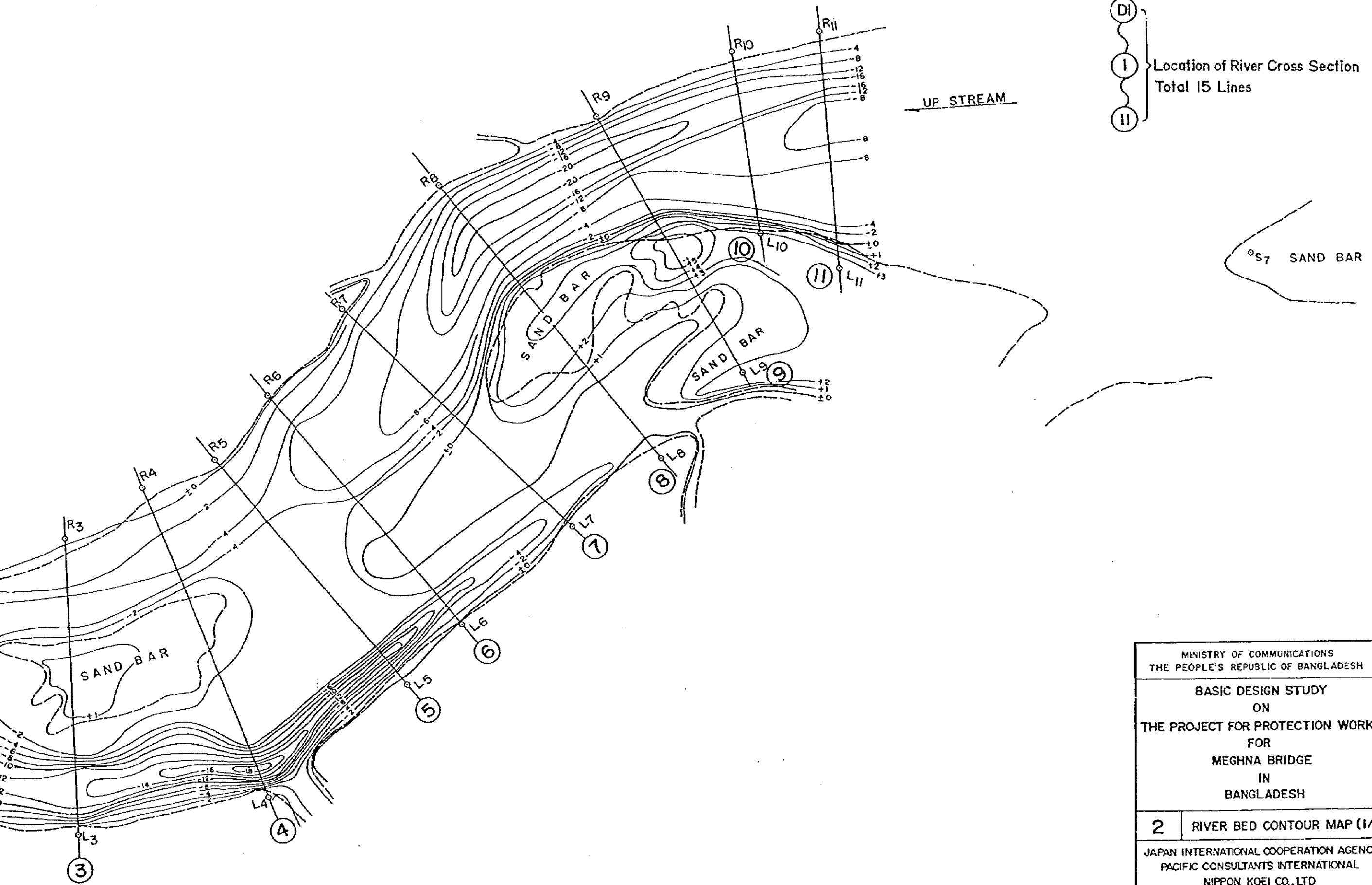
MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
1	GENERAL PLAN OF PROJECT SITE
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO., LTD.	

AUG. 1997

Appendix 8 Riverbed Contour Map and Locations of Cross-Sectioning of Meghna River







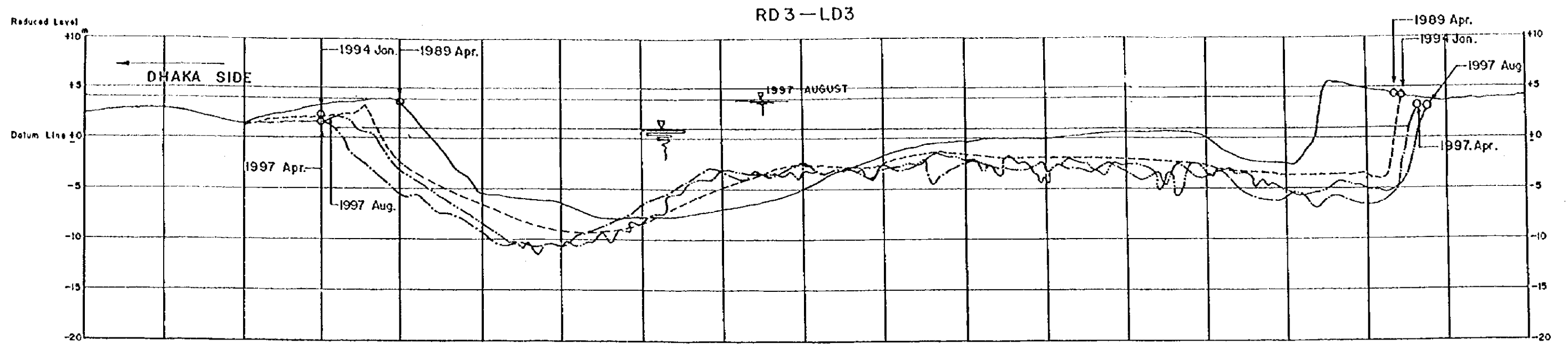
Note :-  
 (DI)  
 I } Location of River Cross Section  
 II } Total 15 Lines

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
2	RIVER BED CONTOUR MAP (1/3)
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO., LTD	

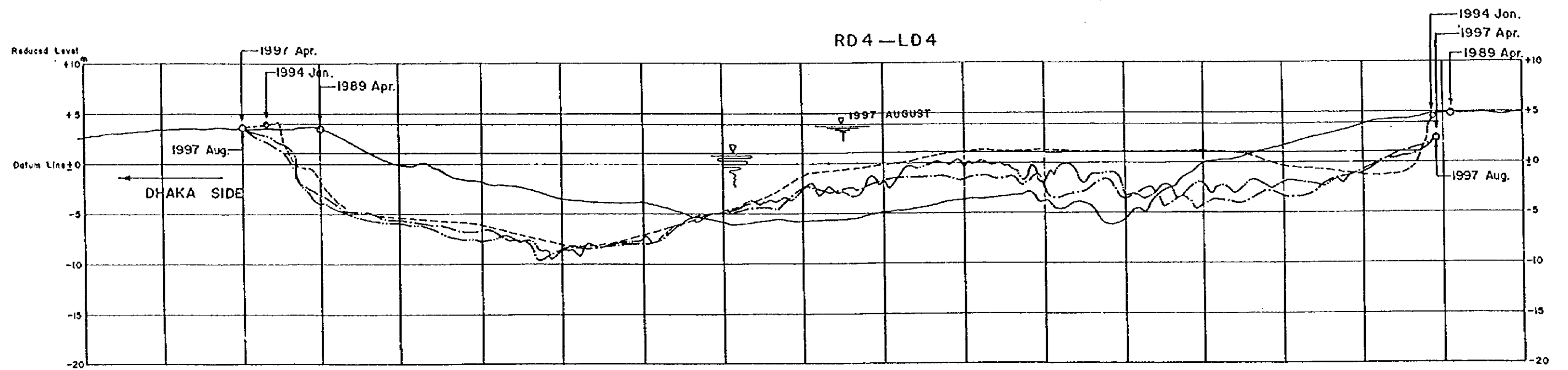
AUG. 1997

Appendix 9 Cross-Sections of Meghna River

CROSS SECTION OF RIVER (1/8)



SECTION NO. (D3)



SECTION NO. (D4)

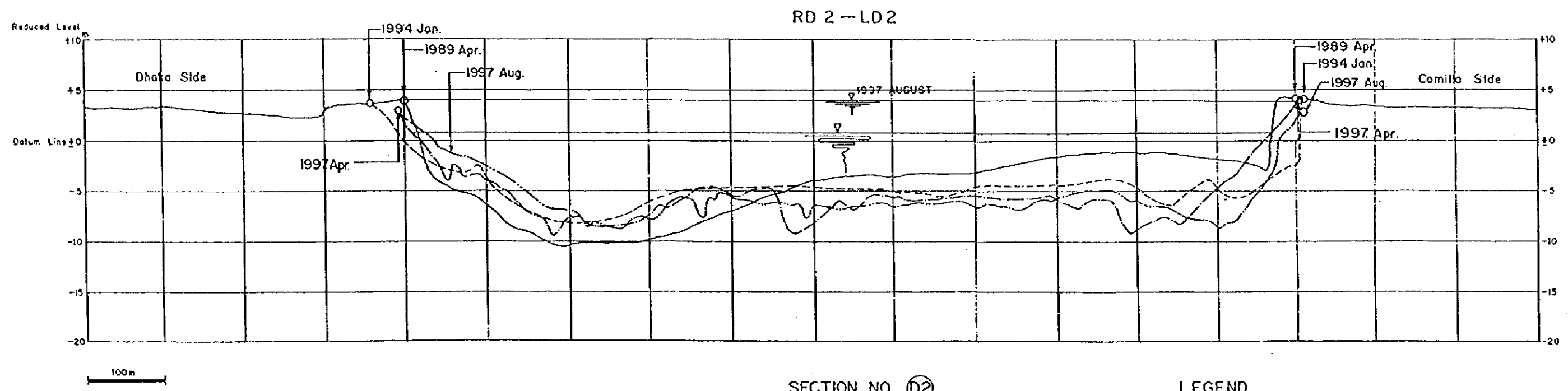
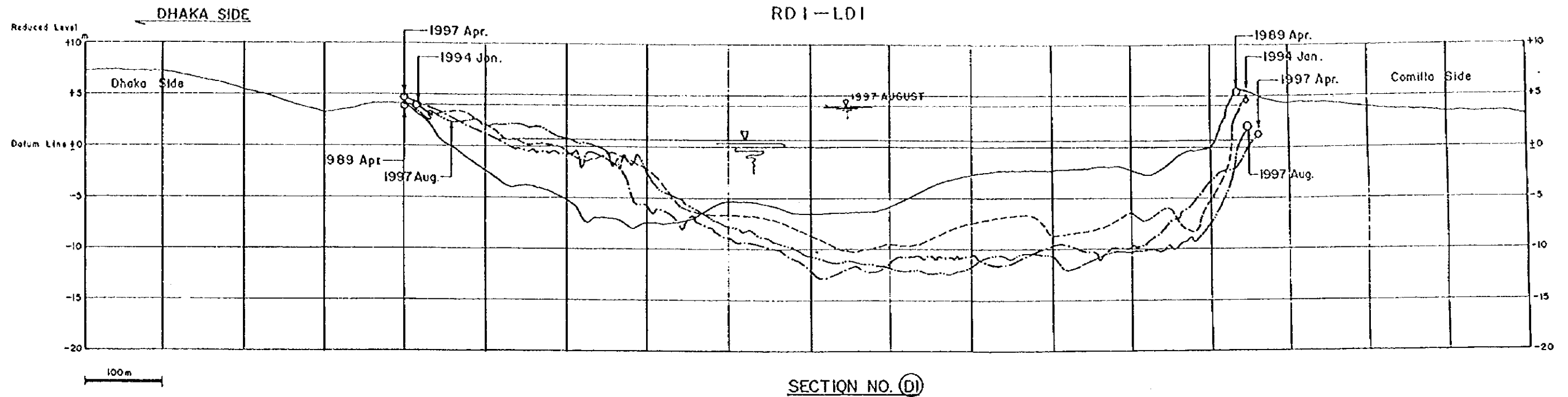
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HOR. 1: 2500 m

LEGEND

- April, 1989
- - - January, 1994
- · - · April, 1997
- · - · August, 1997

AUG. 1997.

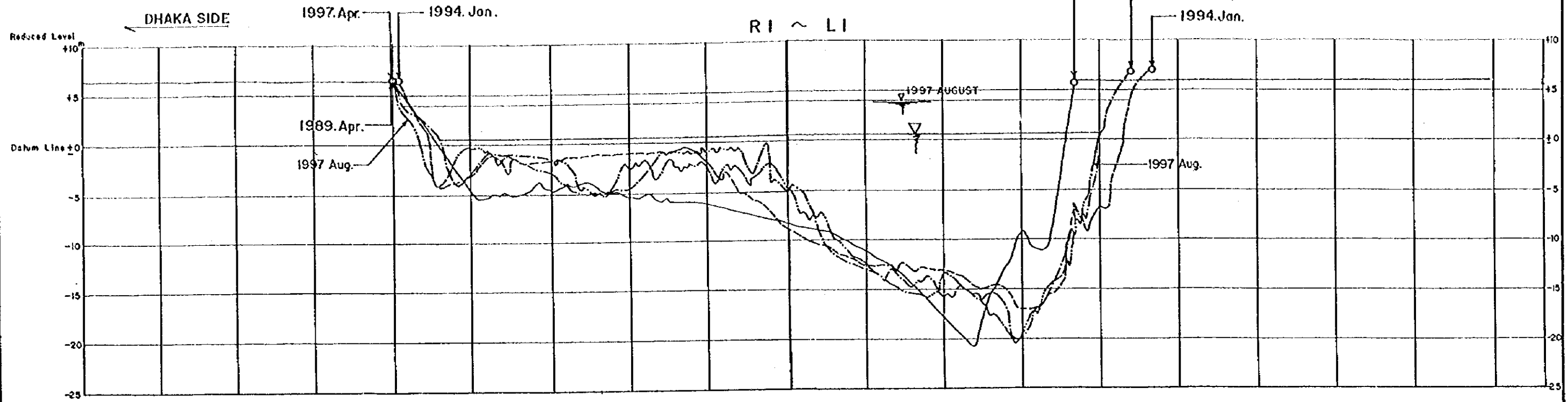
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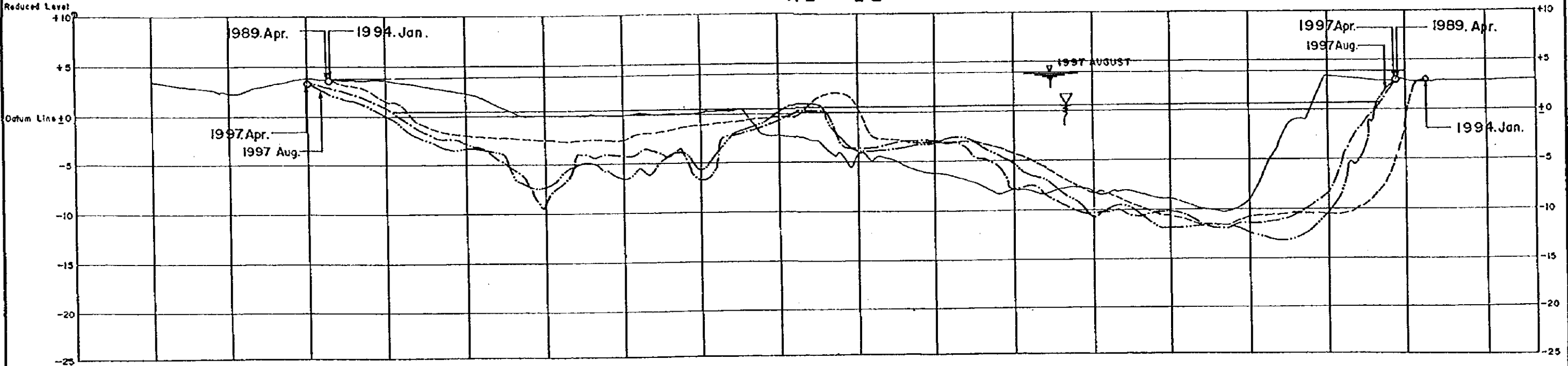
- LEGEND**
- April, 1989
  - - - January, 1994
  - · · April, 1997
  - August, 1997

**CROSS SECTION OF RIVER (3/8)**



**SECTION NO. ①**

R 2 ~ L 2



**SECTION NO. ②**

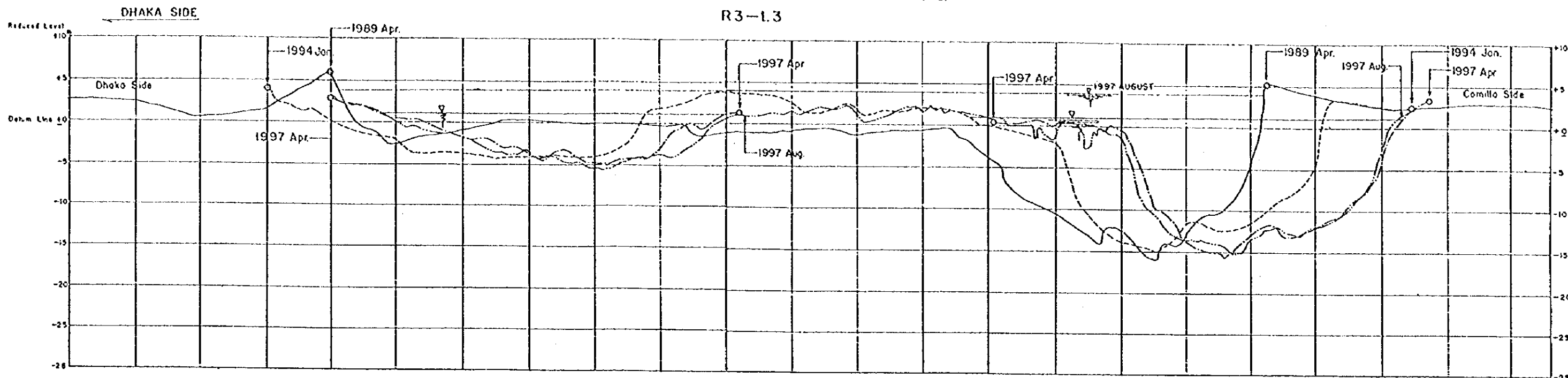
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HOR. 1: 2500

**LEGEND**

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- · - · APR, 1997
- AUG, 1997

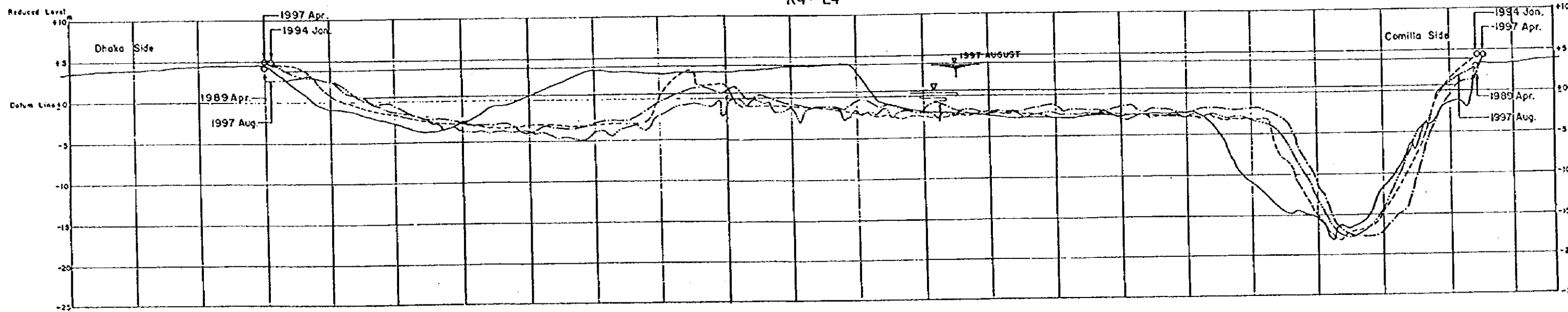
CROSS SECTION OF RIVER (4/8)

R3-1.3



SECTION NO. (3)

R4-L4



SECTION NO. (4)

SCALE: VER. 1: 200  
HOR. 1: 2500

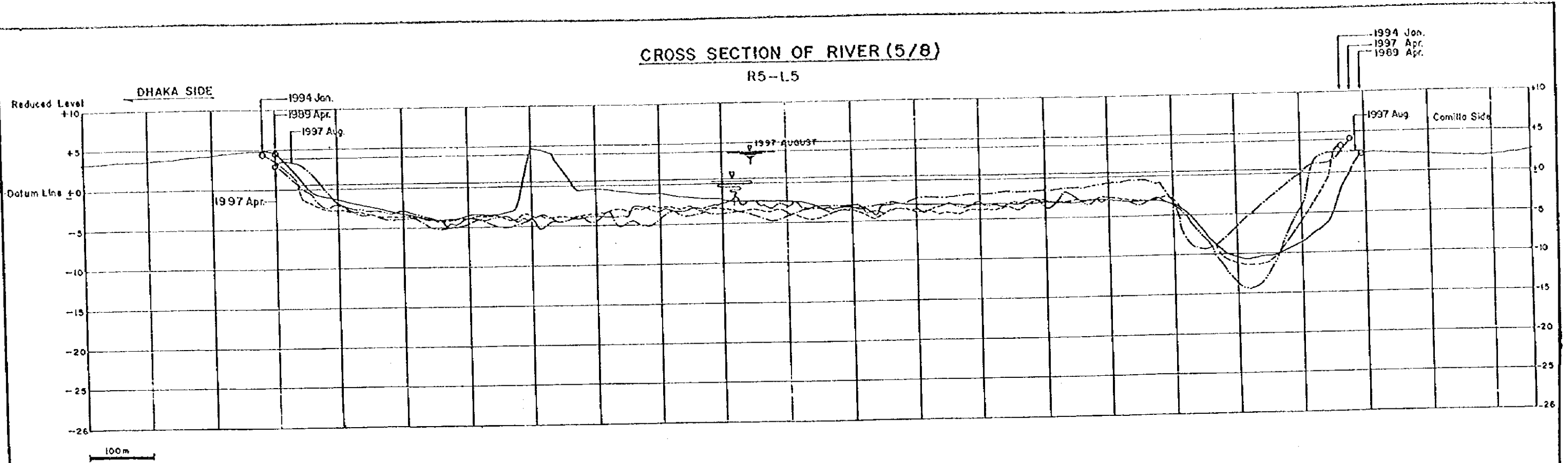
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- · - August, 1997

AUG. 1997

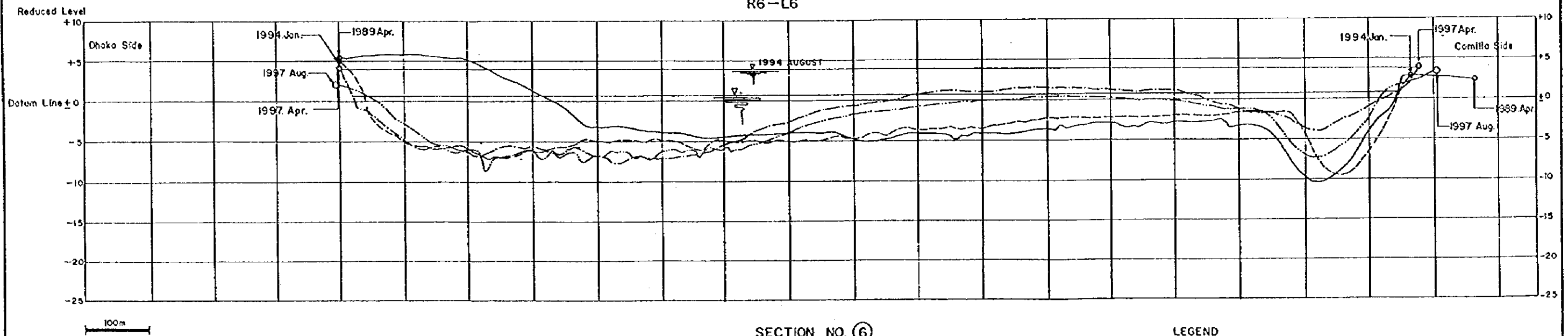
CROSS SECTION OF RIVER (5/8)

R5-L5



SECTION NO. (5)

R6-L6



SECTION NO. (6)

SCALE: VER. 1: 200  
HOR. 1: 2500 m

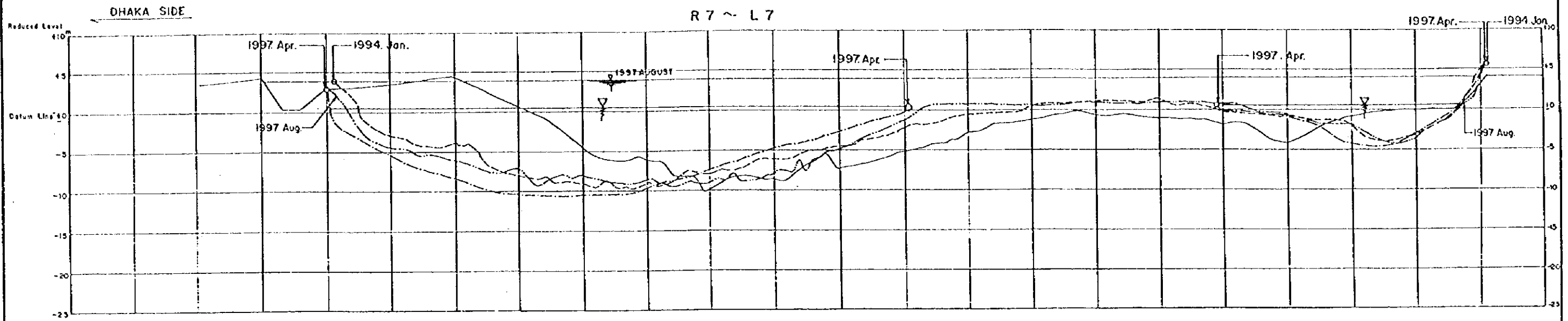
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- April, 1989
- - - January, 1994
- · - April, 1997
- · · August, 1997

AUG. 1997.

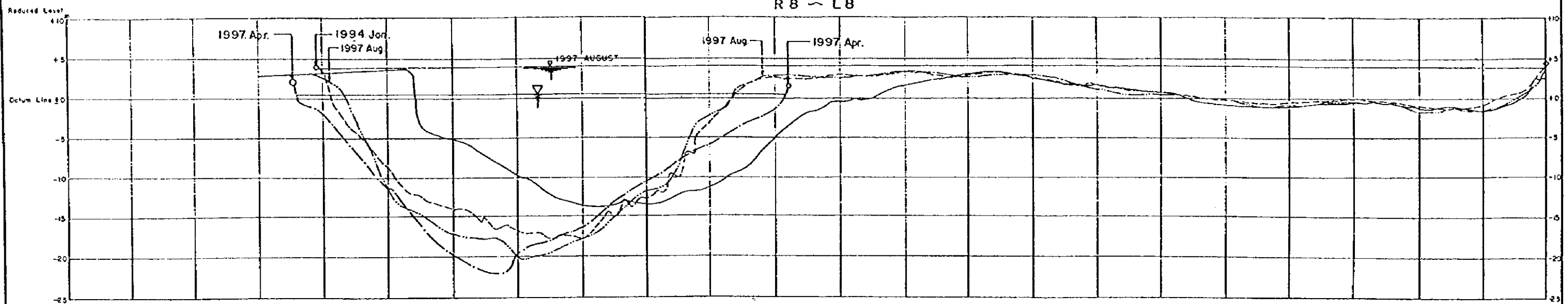
CROSS SECTION OF RIVER (6/8)

R 7 ~ L 7



SECTION NO. (7)

R 8 ~ L 8



SECTION NO. (8)

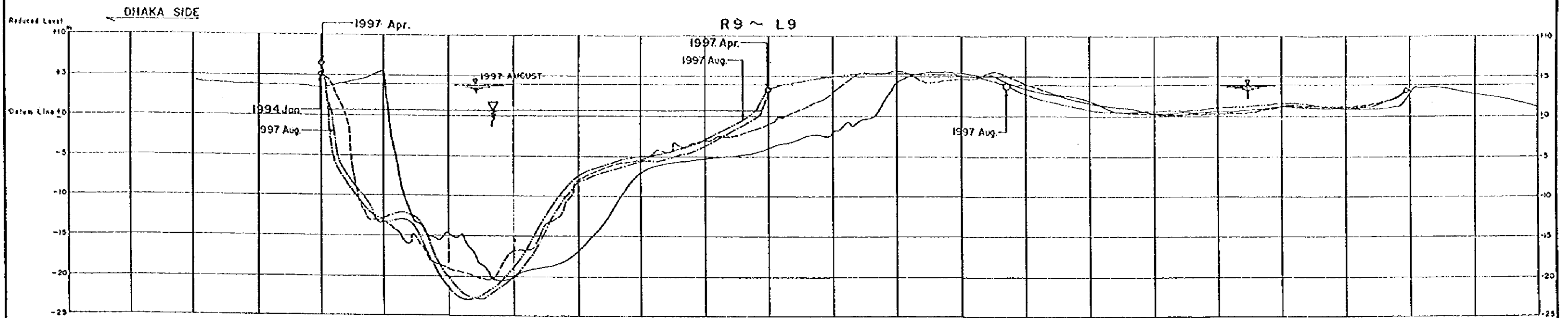
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HOR. 1:2500

LEGEND

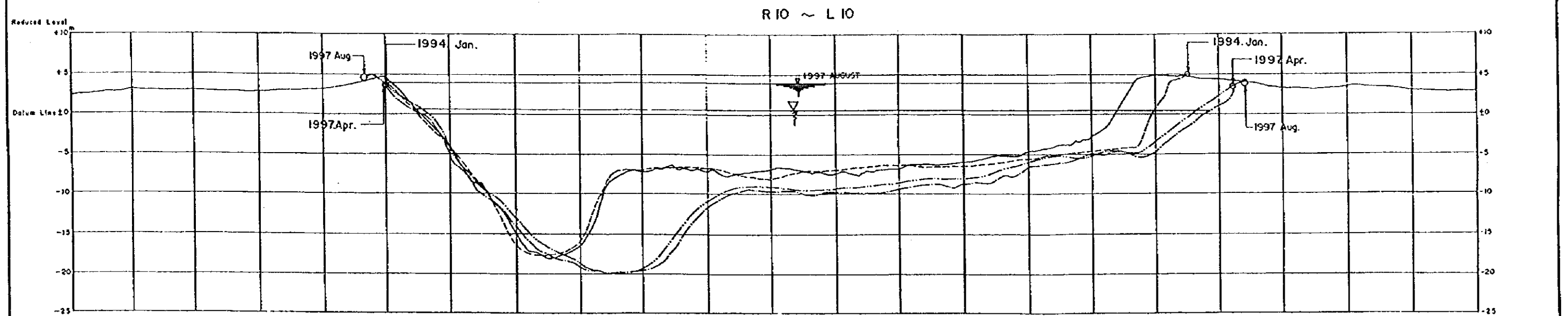
- APR, 1989
- - - JAN, 1994
- · · APR, 1997
- · - · - AUG, 1997

AUG, 1997.

CROSS SECTION OF RIVER (7/8)



SECTION NO. ⑨



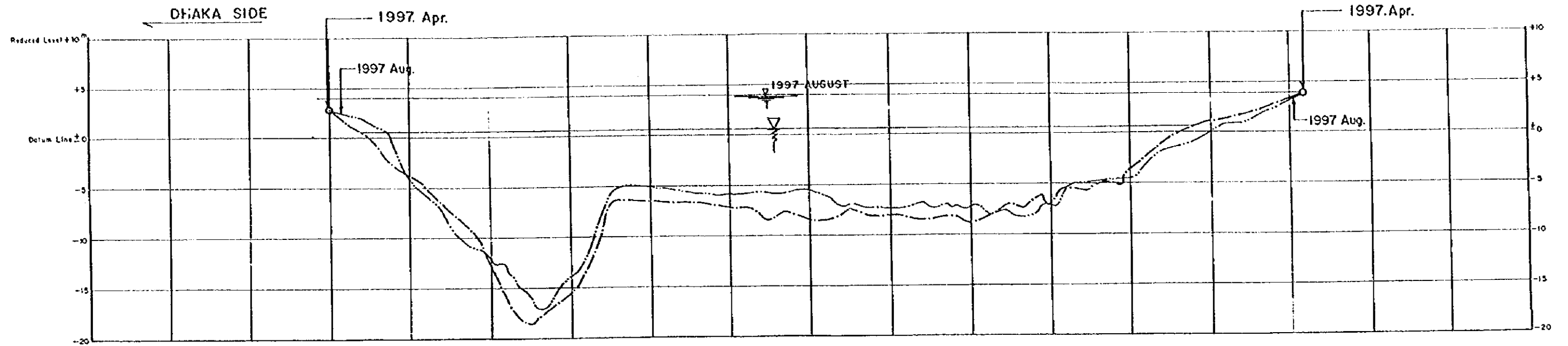
SECTION NO. ⑩  
 VER. 1 : 200  
 SCALE: HOR. 1 : 2500 m

- LEGEND
- APR, 1989
  - - - JAN, 1994
  - · - · APR, 1997
  - · — AUG, 1997

AUG. 1997.



CROSS SECTION OF RIVER (8 / 8)



100m

SECTION NO. (II)

SCALE : VER. 1 : 200  
HOR. 1 : 2500 m

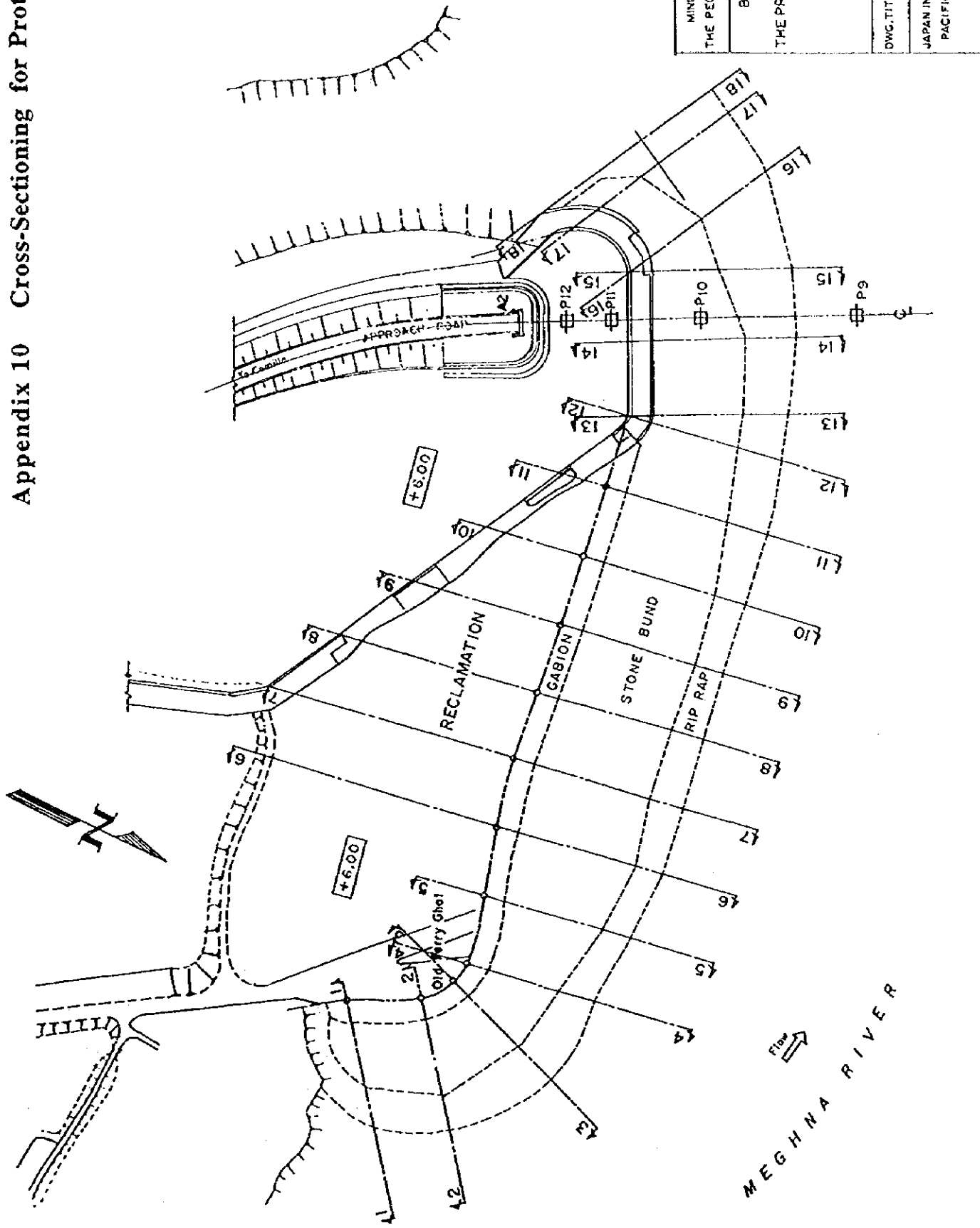
LEGEND

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- - - August, 1997

AUG. 1997.

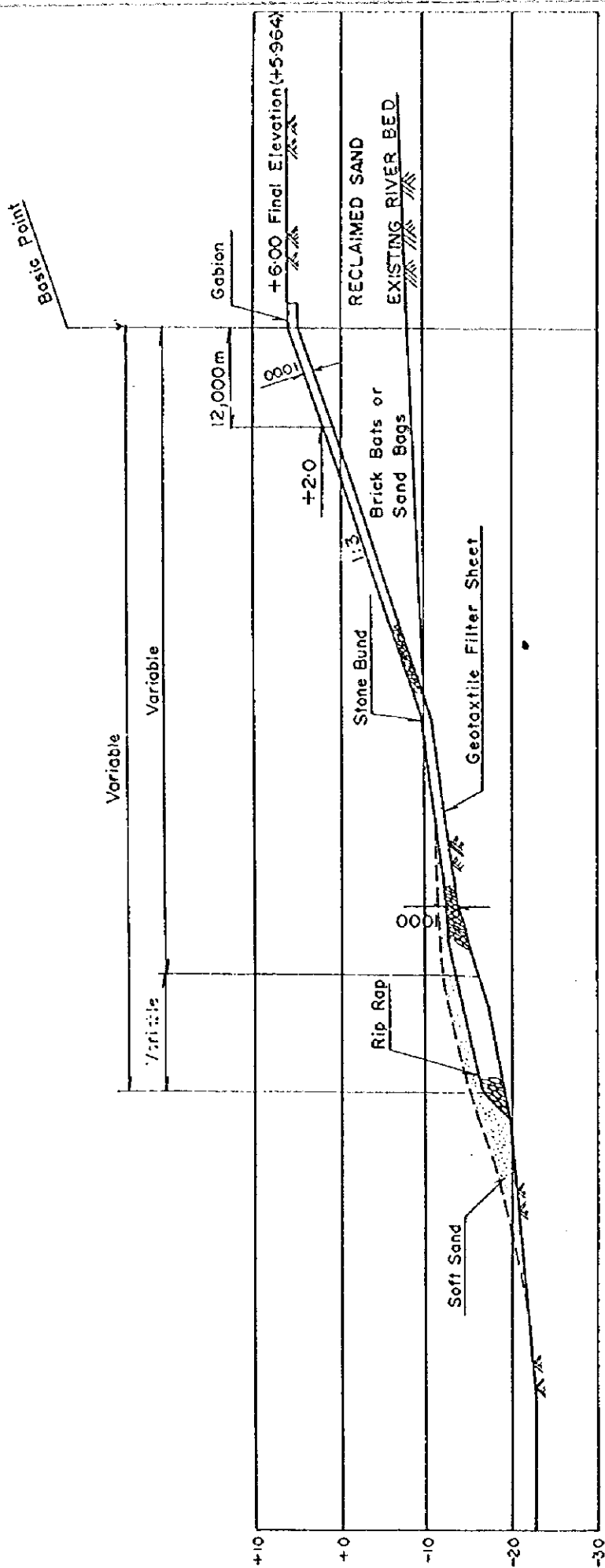


# Appendix 10 Cross-Sectioning for Protection Work



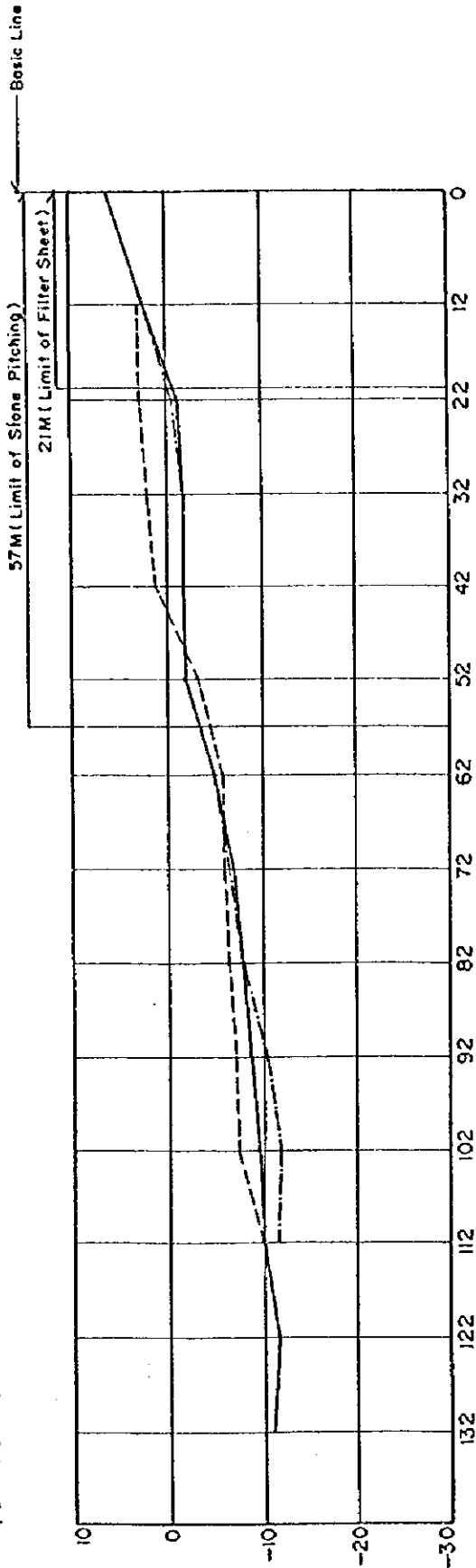
MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO.   PLAN OF REVETMENT
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO. LTD.	

# TYPICAL CROSS-SECTION OF REVETMENT

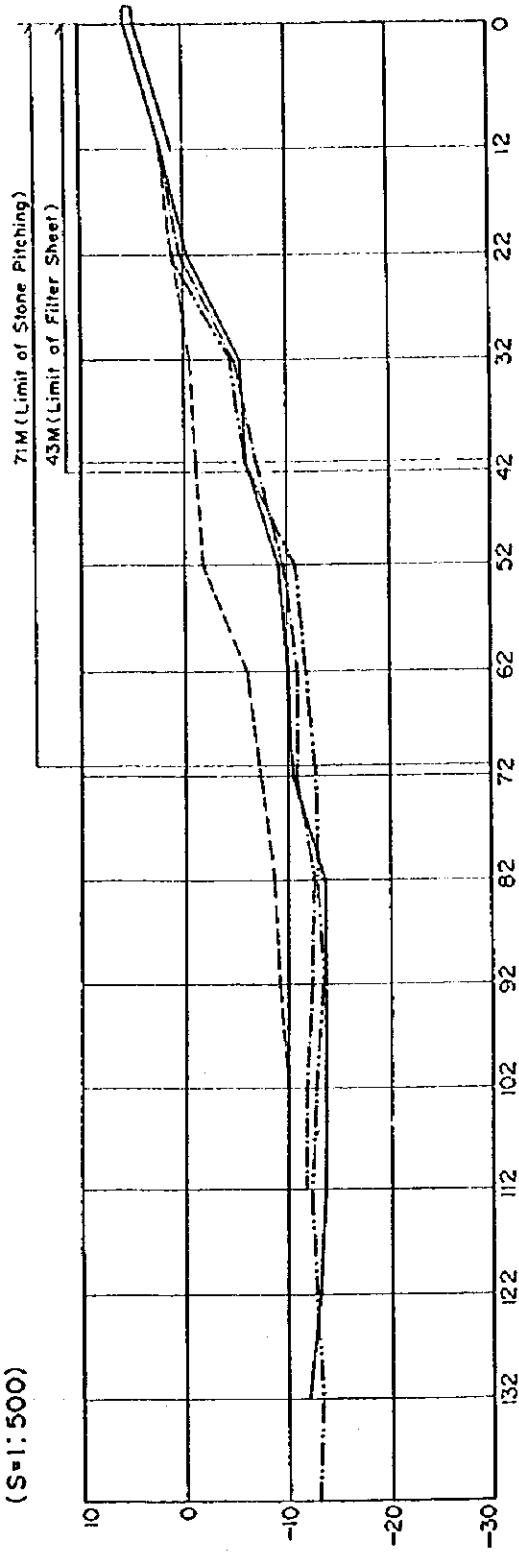


MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
OWG. TITLE	FIG. NO. SECTION OF REVETMENT
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEL CO. LTD.	

**SECTION 0-0**  
(S=1:500)



**SECTION 1-1**  
(S=1:500)



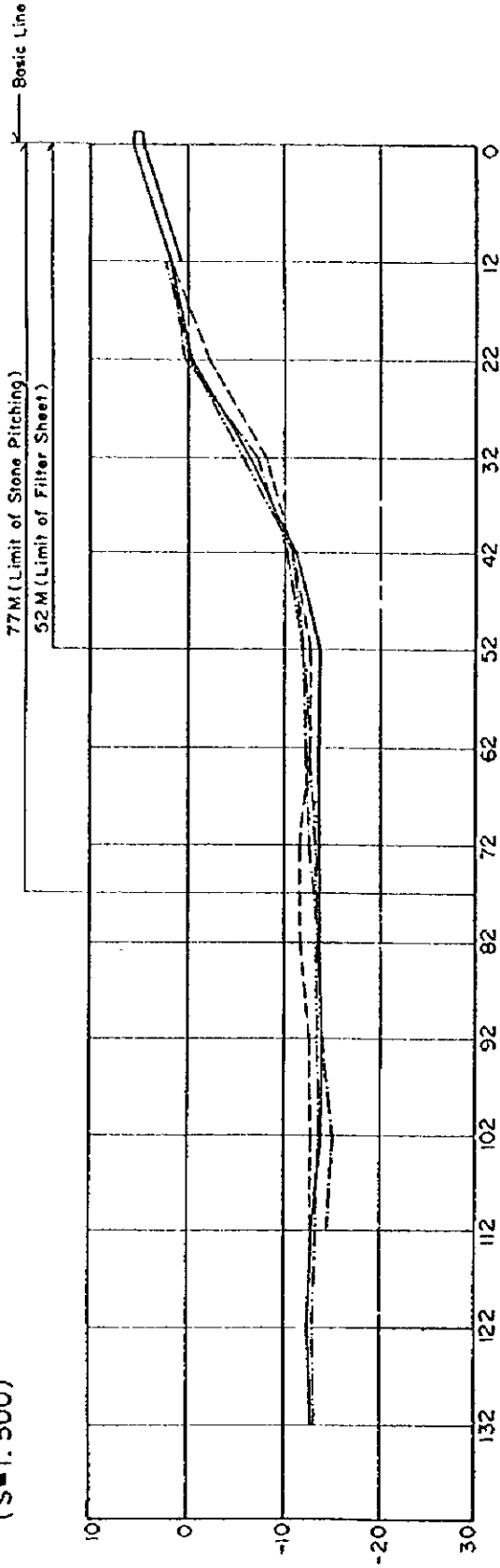
A - 34

**LEGEND**

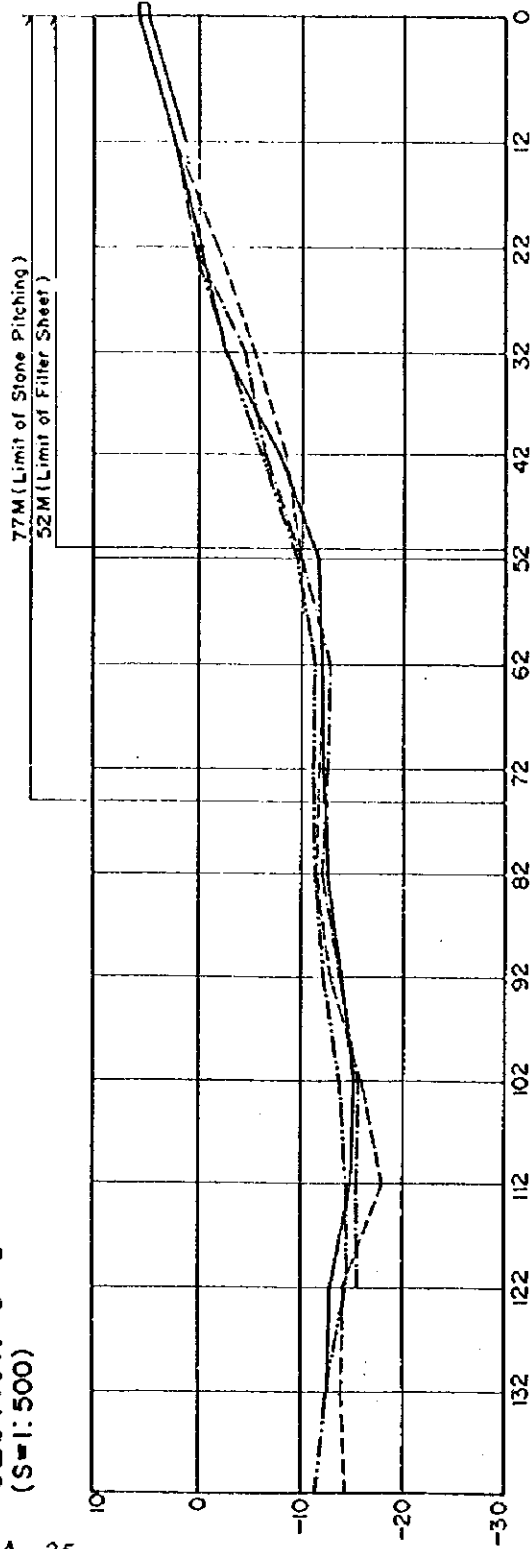
- Level on October 17, 1994
- - - Level on November 22, 1995
- Level on April 1997
- Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO. CROSS SECTION OF PROTECTION WORK
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOGI CO., LTD.	

**SECTION 2-2**  
(S=1:500)



**SECTION 3-3**  
(S=1:500)

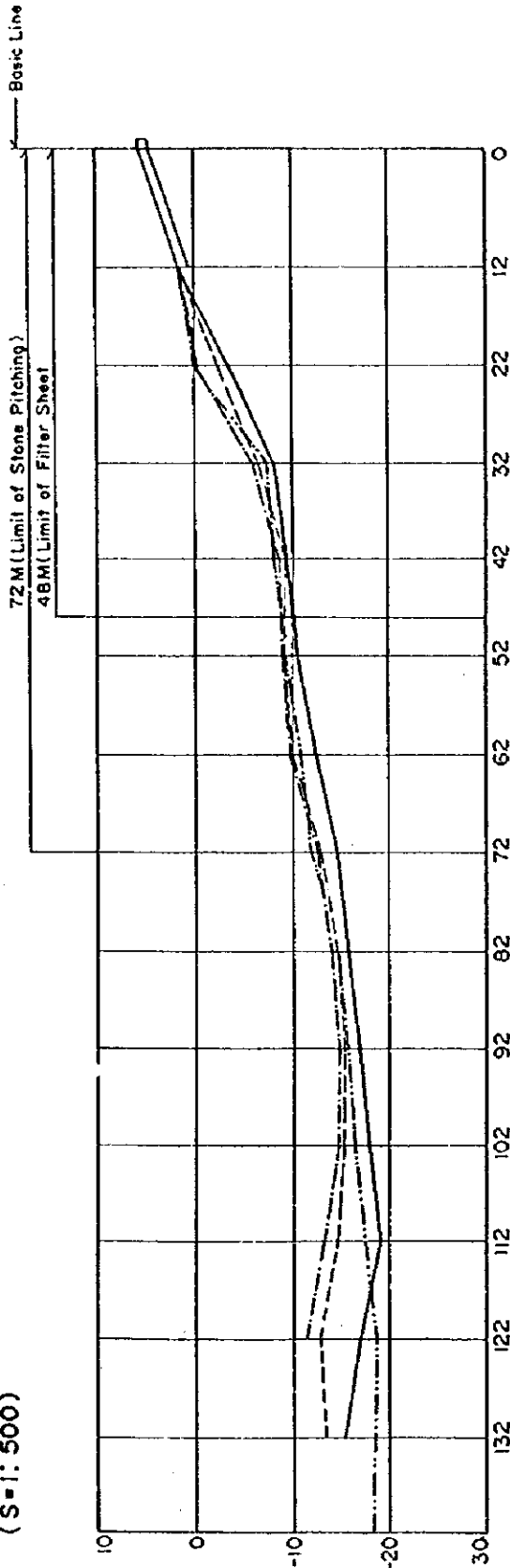


**LEGEND**

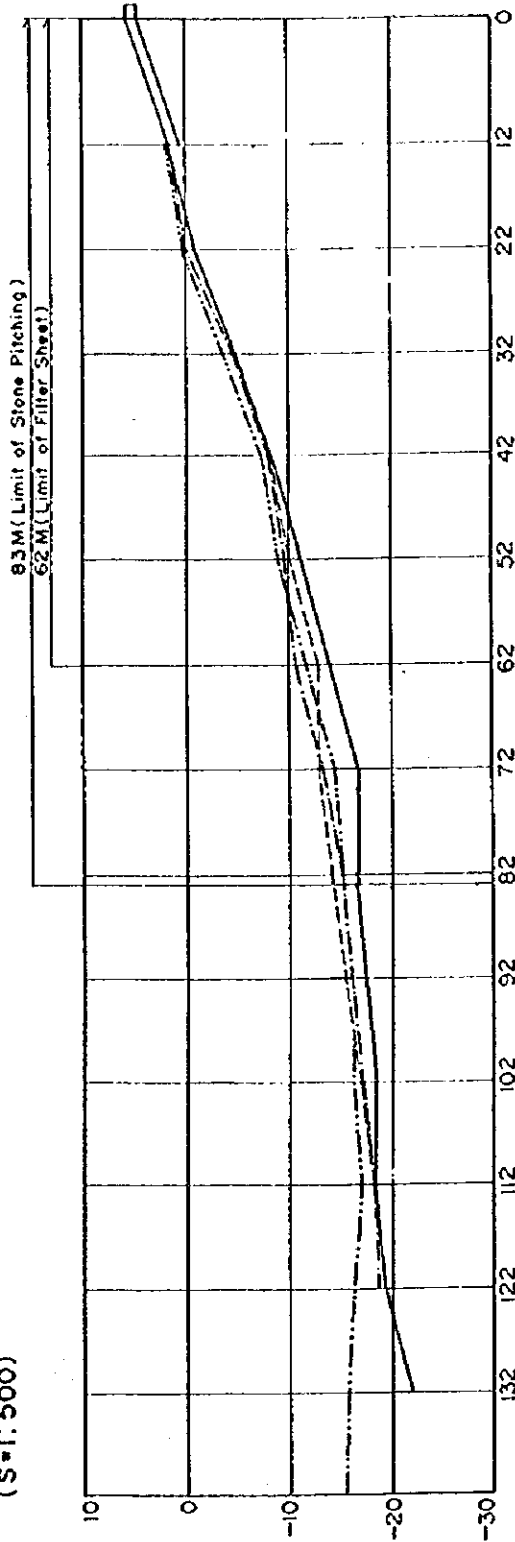
- Level on October 17, 1994
- - - Level on November 22, 1995
- - - - Level on April 1997
- ..... Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO. CROSS SECTION OF PROTECTION 2/10-
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO., LTD.	

**SECTION 4-4**  
(S=1: 500)



**SECTION 5-5**  
(S=1: 500)

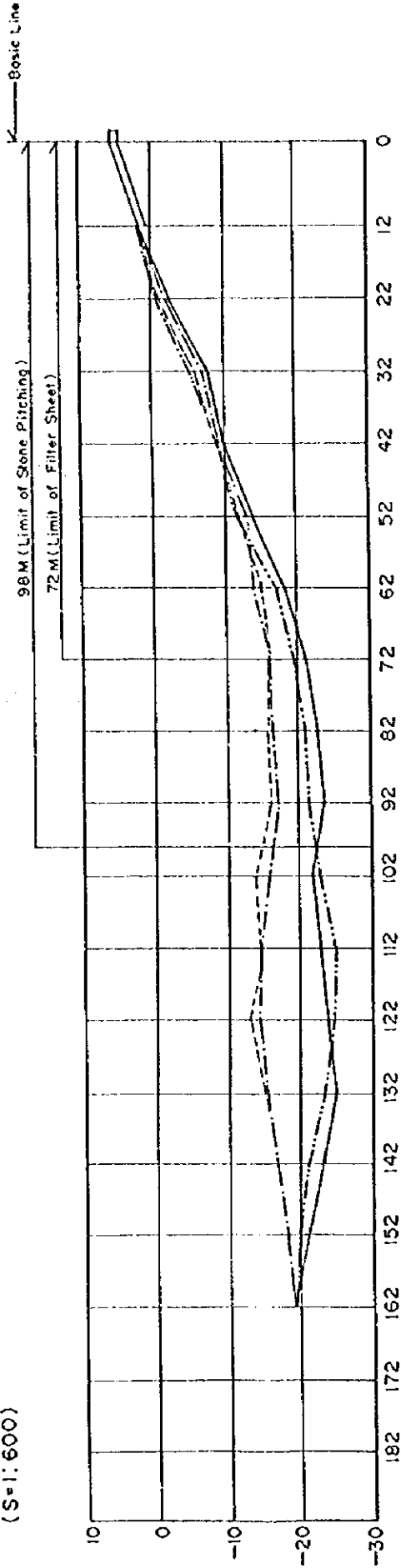


**LEGEND**

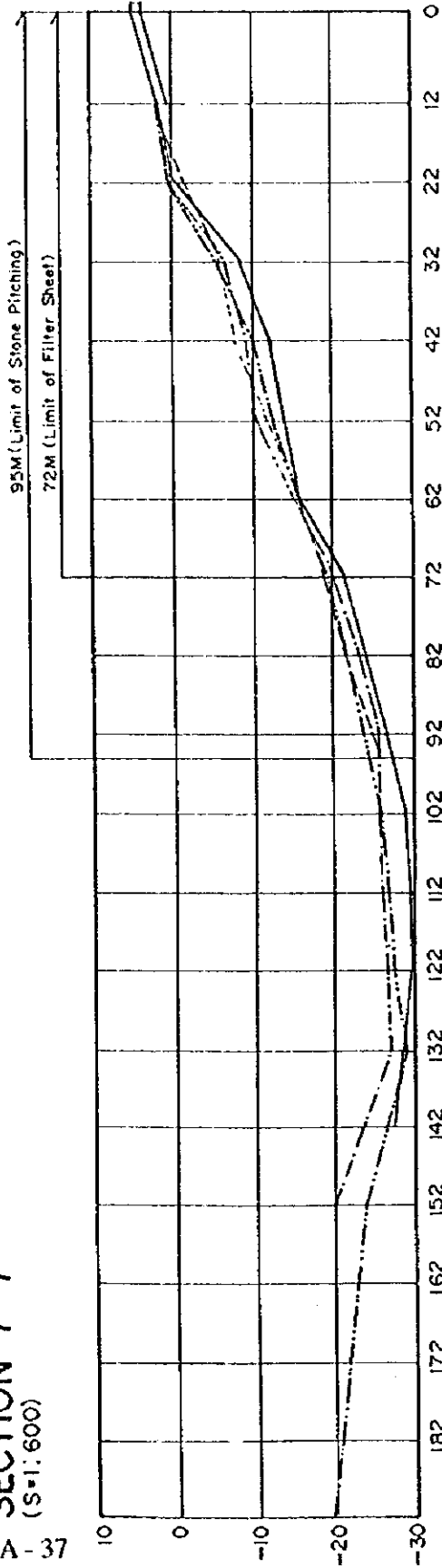
- Level on October 17, 1994
- · - · - Level on November 22, 1995
- Level on April 1997
- - - - Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	: FIG. NO. CROSS SECTION OF PROTECTION 3/10
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO. LTD.	

**SECTION 6-6**  
(S=1:600)



**SECTION 7-7**  
(S=1:600)



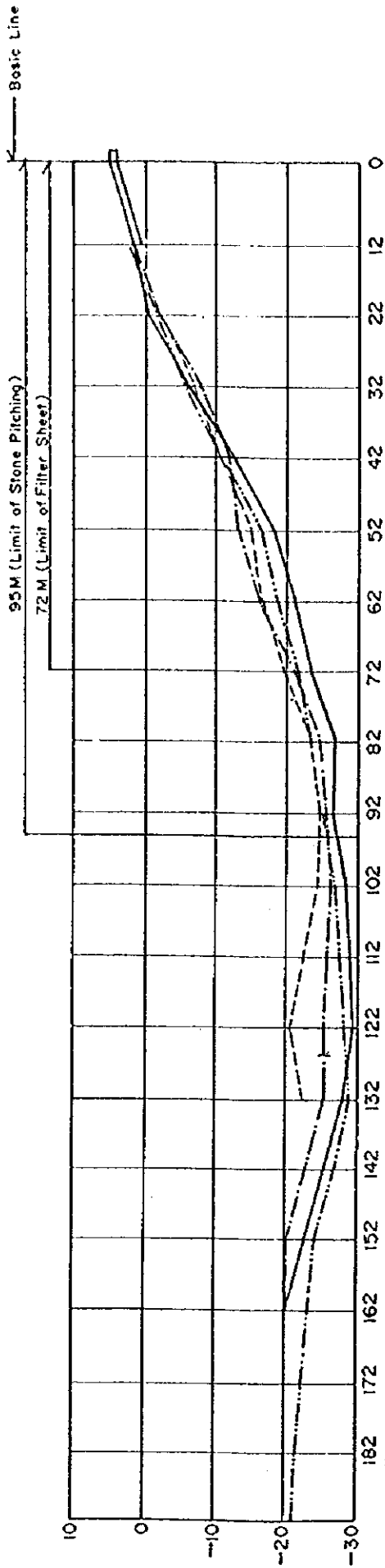
**LEGEND**

- Level on October 17, 1994
- Level on November 22, 1995
- Level on April 1997
- Level on August 1997

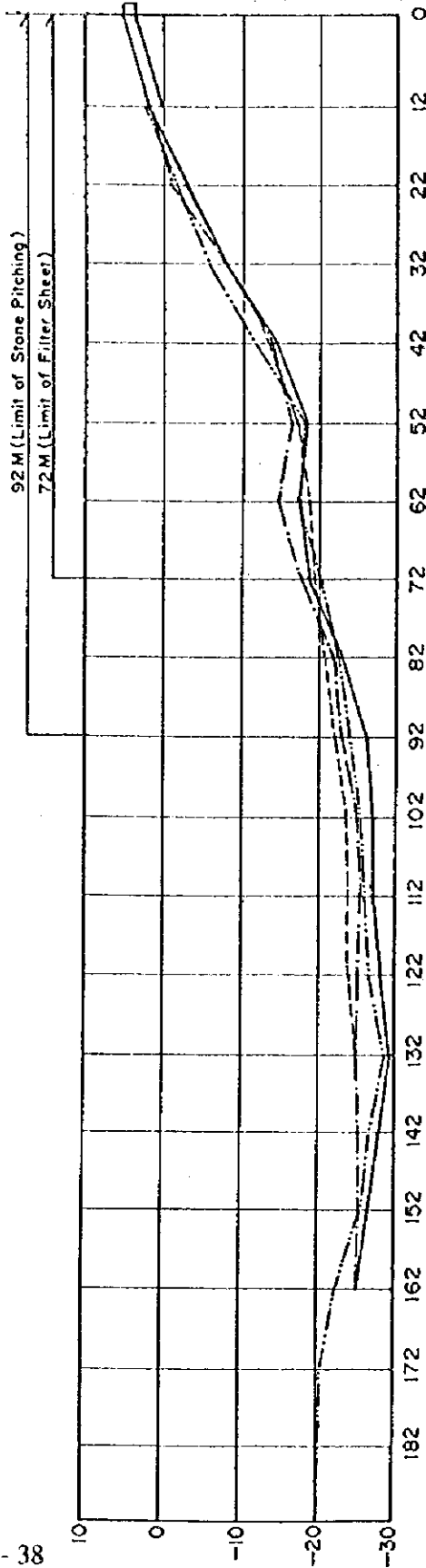
MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO. / CROSS SECTION OF PROTECTION %/10
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOGI CO., LTD.	



**SECTION 8-8**  
(S.I.: 600)



**SECTION 9-9**  
(S.I.: 600)

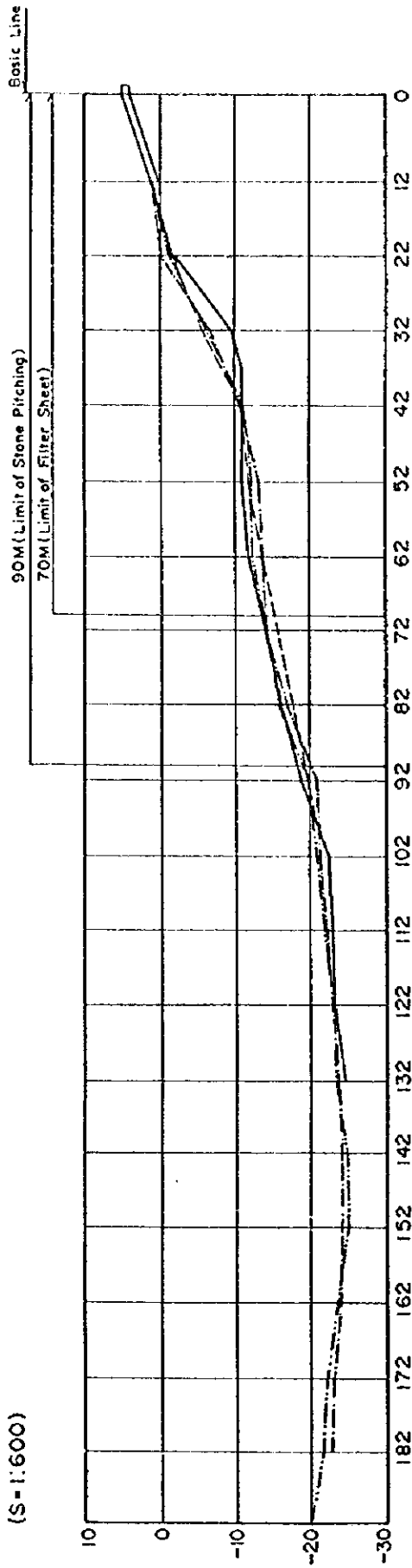


**LEGEND**

- Level on Oct. 17, 1994
- · - · - Level on Nov. 22, 1995
- Level on Apr. 1997
- Level on August 1997

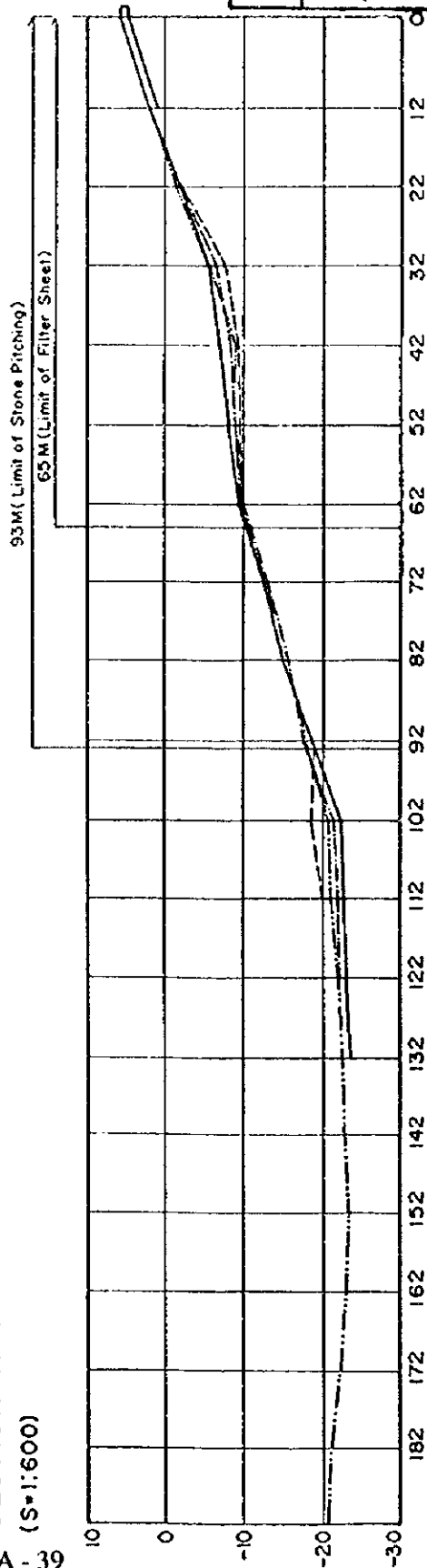
MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON FOR MEGHNA BRIDGE IN BANGLADESH	
FIG. NO.	CROSS SECTION OF PROTECTION 2/20
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS (INTERNATIONAL) NIPPON KOEI CO., LTD.	

**SECTION 10-10**  
(S=1:600)



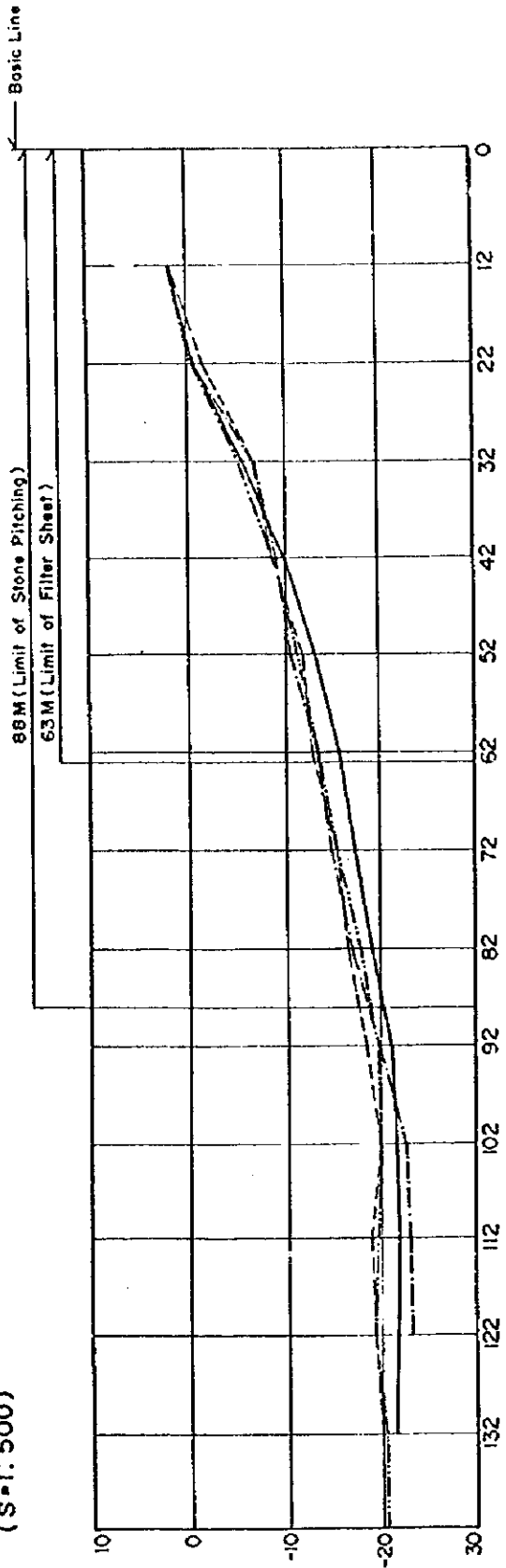
- LEGEND**
- Level on October 17, 1994
  - - - Level on November 22, 1996
  - Level on April 1997
  - Level on August 1997

**SECTION 11-11**  
(S=1:600)

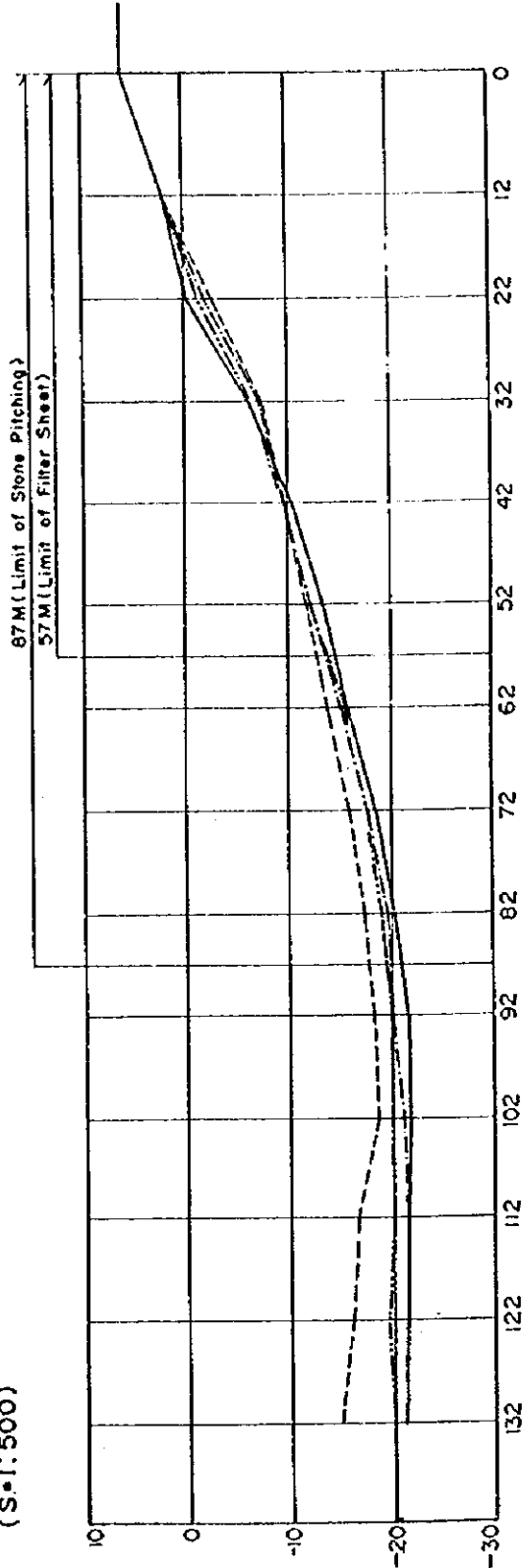


MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTING WORKS FOR MECHINA BRIDGE IN DARULHAJAT	
DWG. TITLE	FIG. NO. CROSS SECTION PROTECTION S/D
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOGI CO., LTD	

**SECTION 12-12**  
(S=1:500)



**SECTION 13-13**  
(S=1:500)

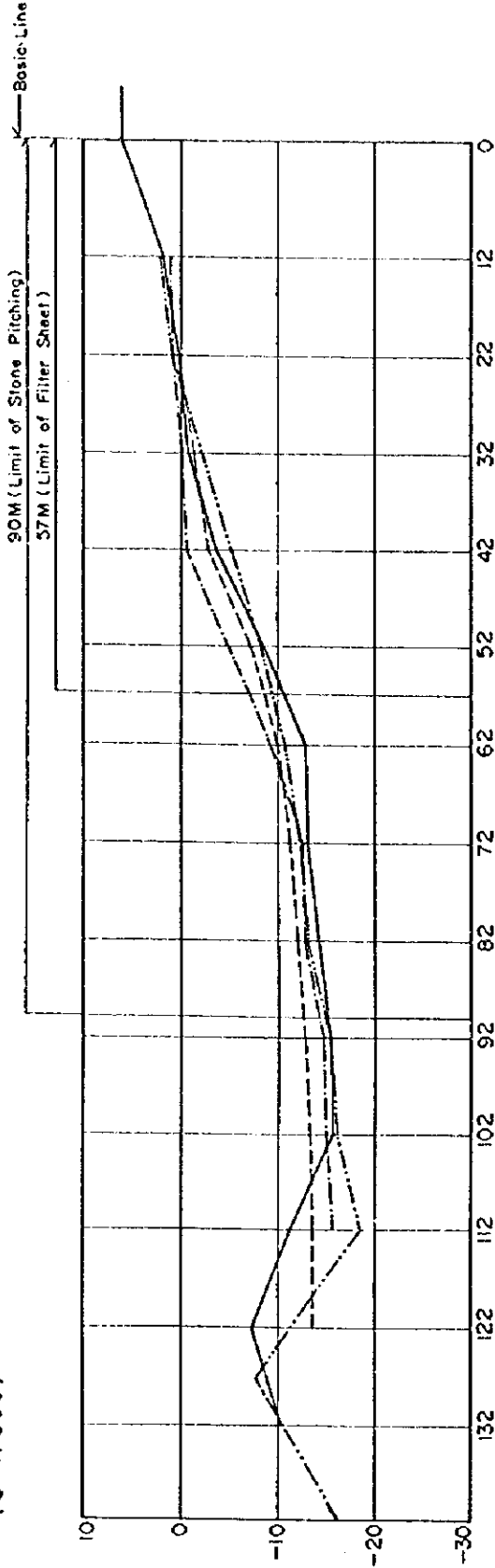


**LEGEND**

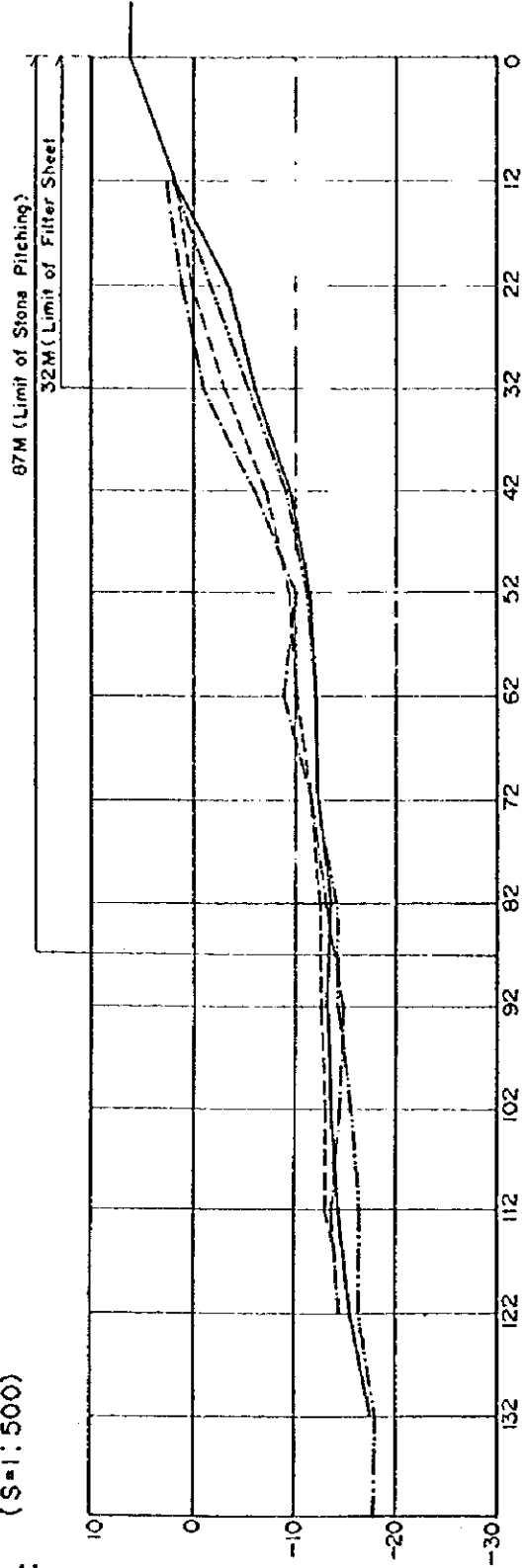
- Level on October 17, 1994
- Level on November 22, 1995
- Level on April 1997
- Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO. CROSS SECTION OF PROTECTION WORKS
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO., LTD.	

**SECTION 14-14**  
(S=1:500)



**SECTION 15-15**  
(S=1:500)



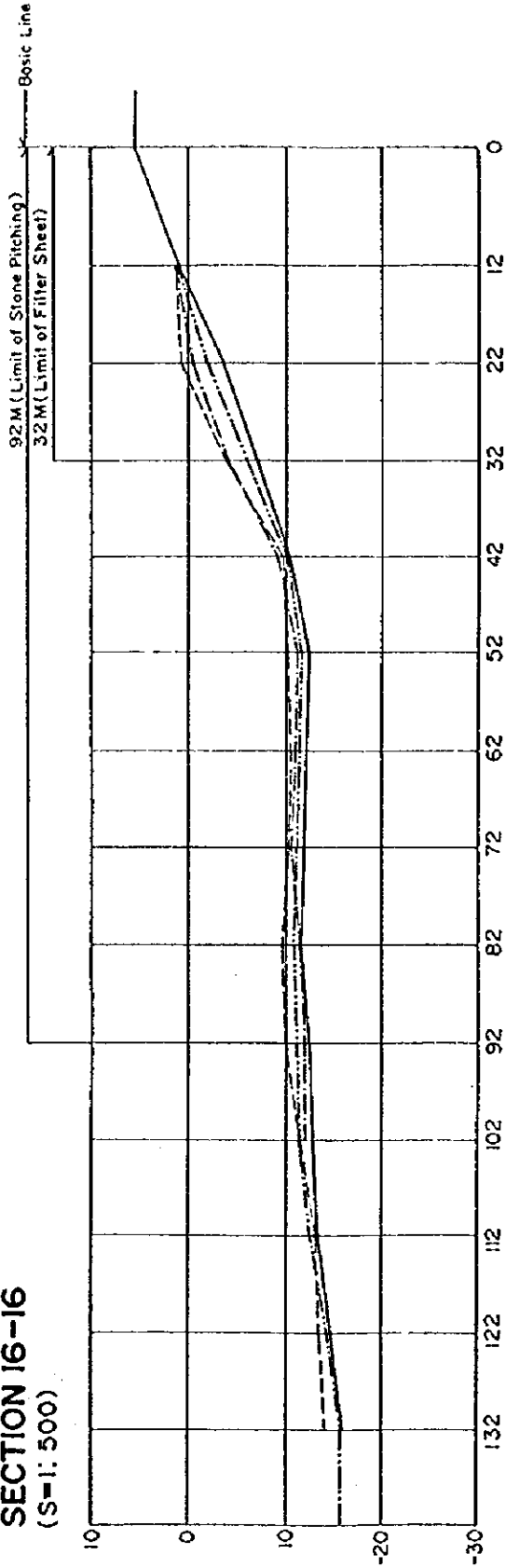
A-41

**LEGEND**

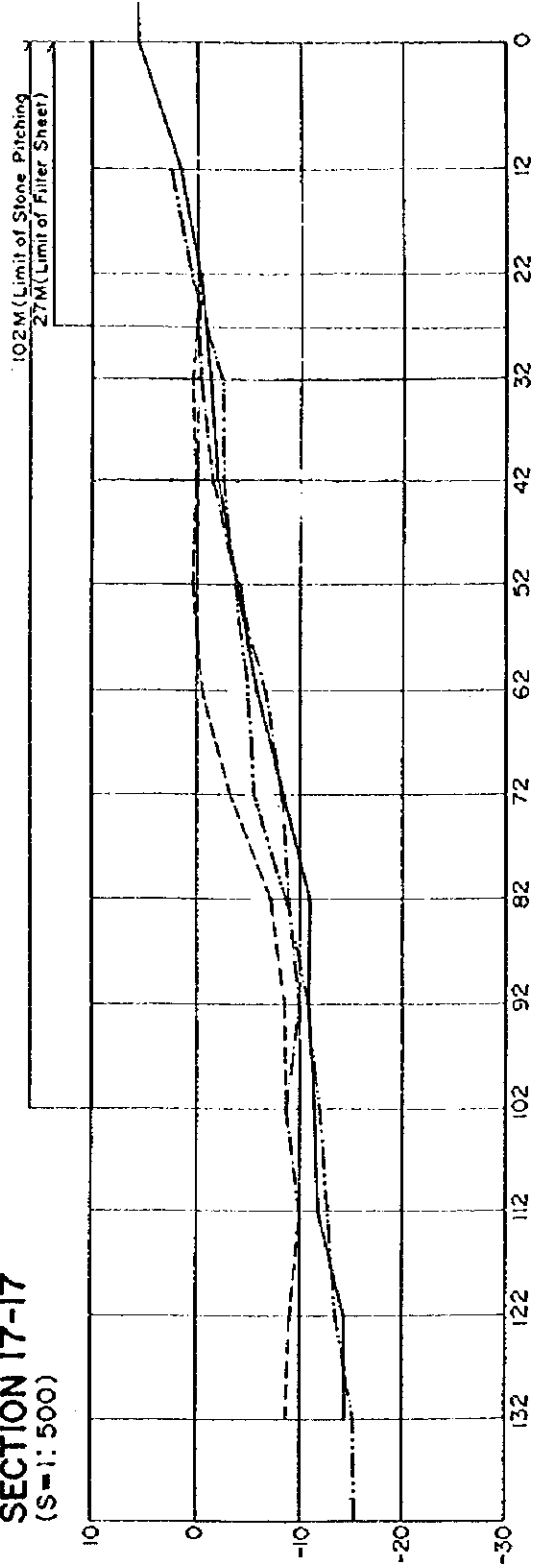
- Level on October 17, 1994
- · - · - Level on November 22, 1995
- Level on April 1997
- - - - Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO. / CROSS SECTION OF PROTECTION P/10
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOGI CO., LTD.	

**SECTION 16-16**  
(S=1: 500)



**SECTION 17-17**  
(S=1: 500)

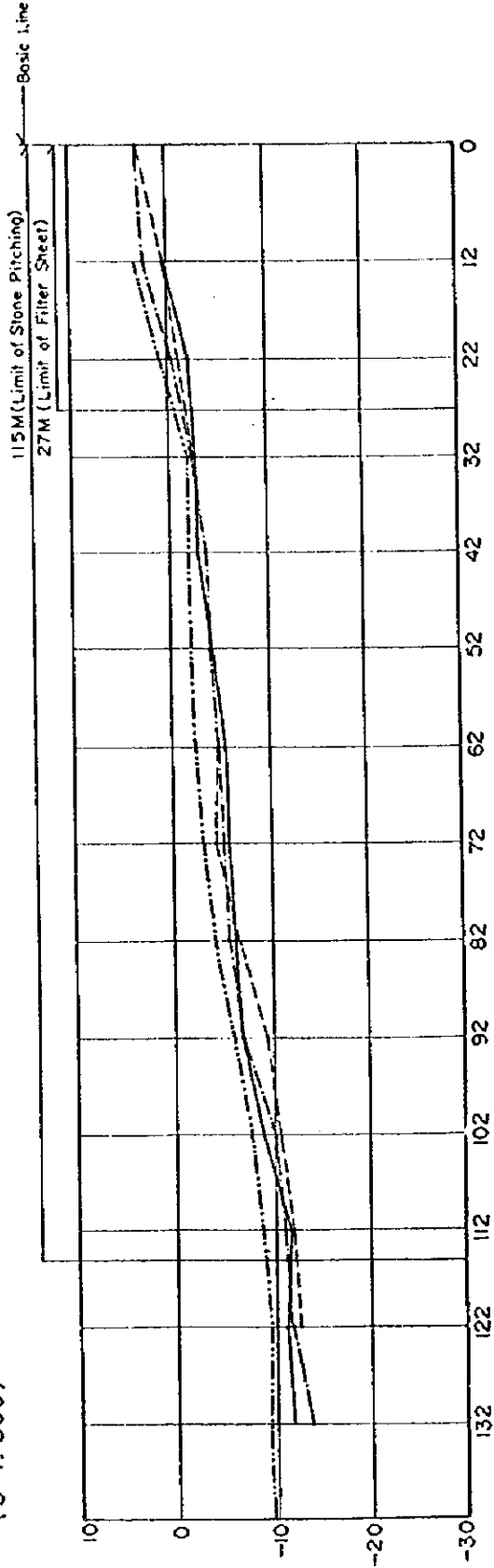


**LEGEND**

- Level on October 17, 1994
- Level on November 22, 1995
- Level on April 1997
- Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON FOR MEGHNA BRIDGE IN BANGLADESH	
DMC TITLE	FIG. NO. CROSS SECTION OF PROTECTION 9/10
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO. LTD.	

**SECTION 18-18**  
(S-1: 500)



**LEGEND**

- Level on October 17, 1994
- · - Level on November 22, 1995
- Level on April 1997
- · · Level on August 1997

MINISTRY OF COMMUNICATIONS THE PEOPLE'S REPUBLIC OF BANGLADESH	
BASIC DESIGN STUDY ON THE PROJECT FOR PROTECTION WORKS FOR MEGHNA BRIDGE IN BANGLADESH	
DWG. TITLE	FIG. NO. CROSS SECTION OF PROTECTION 10/10
JAPAN INTERNATIONAL COOPERATION AGENCY PACIFIC CONSULTANTS INTERNATIONAL NIPPON KOEI CO., LTD.	

## Appendix 11 Results of Scouring Survey by Diver Crew

### Diver's Information

1. Depth to river bed  
from water level

\*  
H= 12m (UPSTREAM)  
11m (DOWNSTREAM)

2. Conditions of river bed  
around piles

-Bed line (undulation)  
\*COVER WITH SAND ON STONE  
\*SOFT SAND FLAT AT SLOPE TOE

-Protected stone  
(scattered in bed, on footing)  
\*SCATTERED ON FOOTING  
\*COVER WITH SAND ON STONE

3. Conditions of foundation  
(footing, piles)

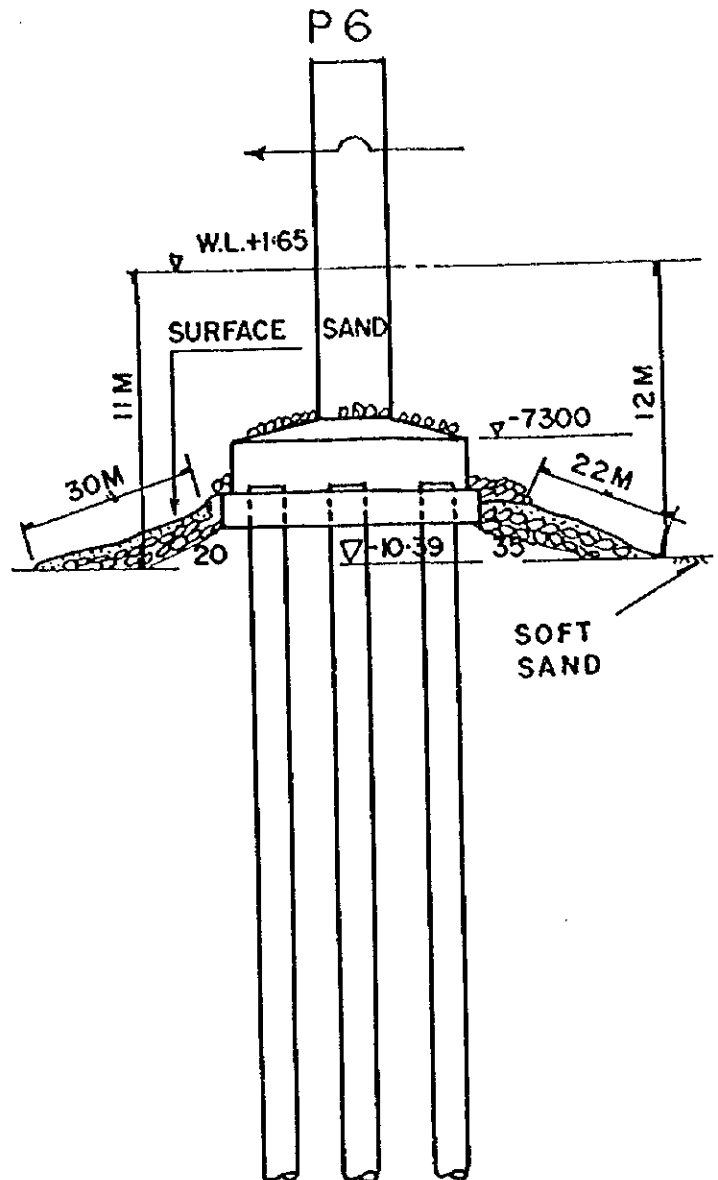
-Damages  
\*NO VISUAL DAMAGE

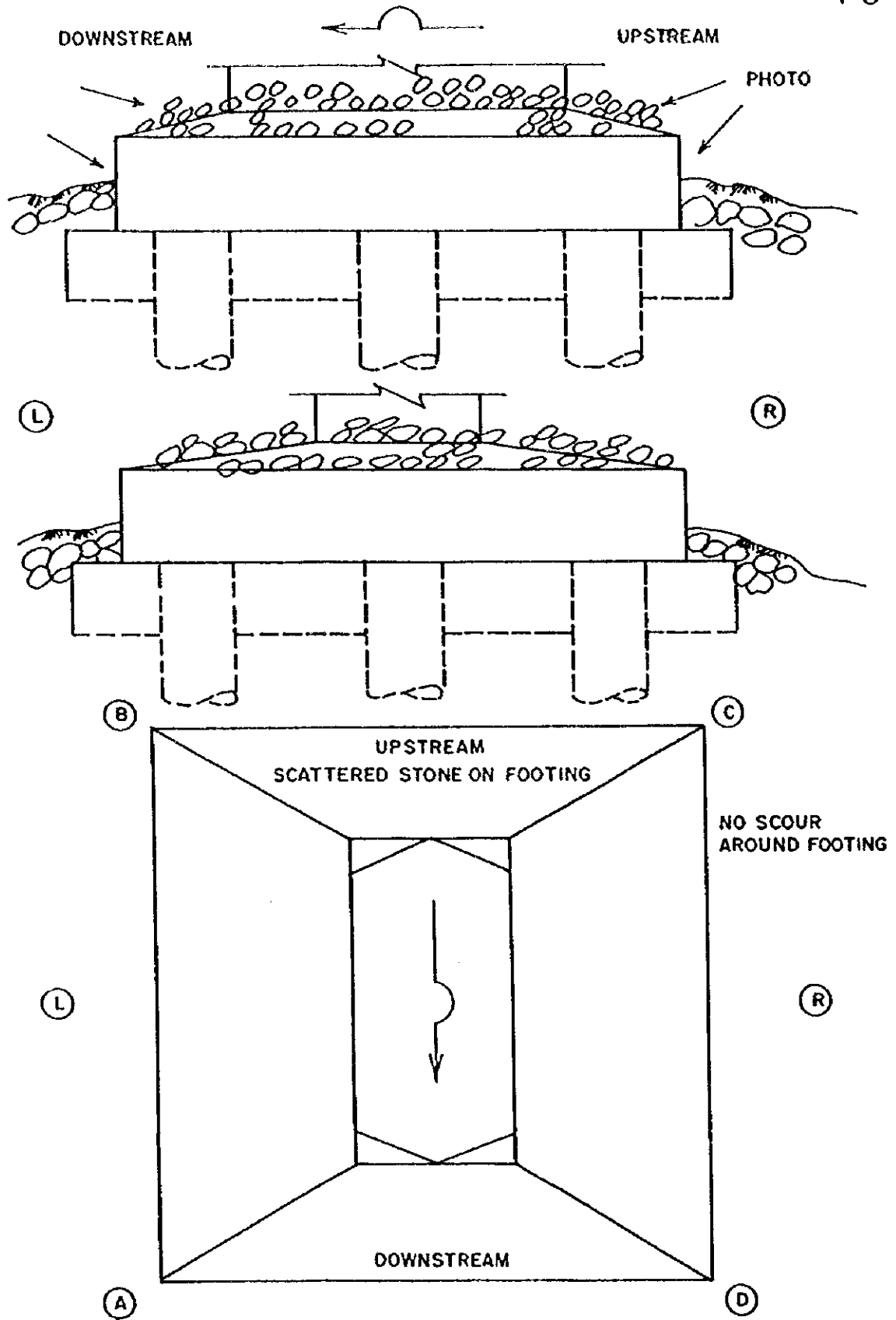
-Others  
\*UNABLE TO SEE LEVELING CONC.  
BASE  
\*TOTALLY COVER

4. Photographs  
(bed, piles, footing)

5. Note

\* measure (50m), camera, light, level)







## Diver's Information

1. Depth to river bed  
from water level

\*

H= 14m

2. Conditions of river bed  
around piles

-Bed line (undulation)

\*FINE SAND

-Protected stone

(scattered in bed, on footing)

\*SCATTERED ON FOOTING

\*NO COVER WITH SAND ON STONE

3. Conditions of foundation  
(footing , piles)

-Damage

\*NO VISUAL DAMAGE

\*NO SCOUR AT FOOTING

-Others

\*UNABLE TO SEE LEVELING CONC.

BASE

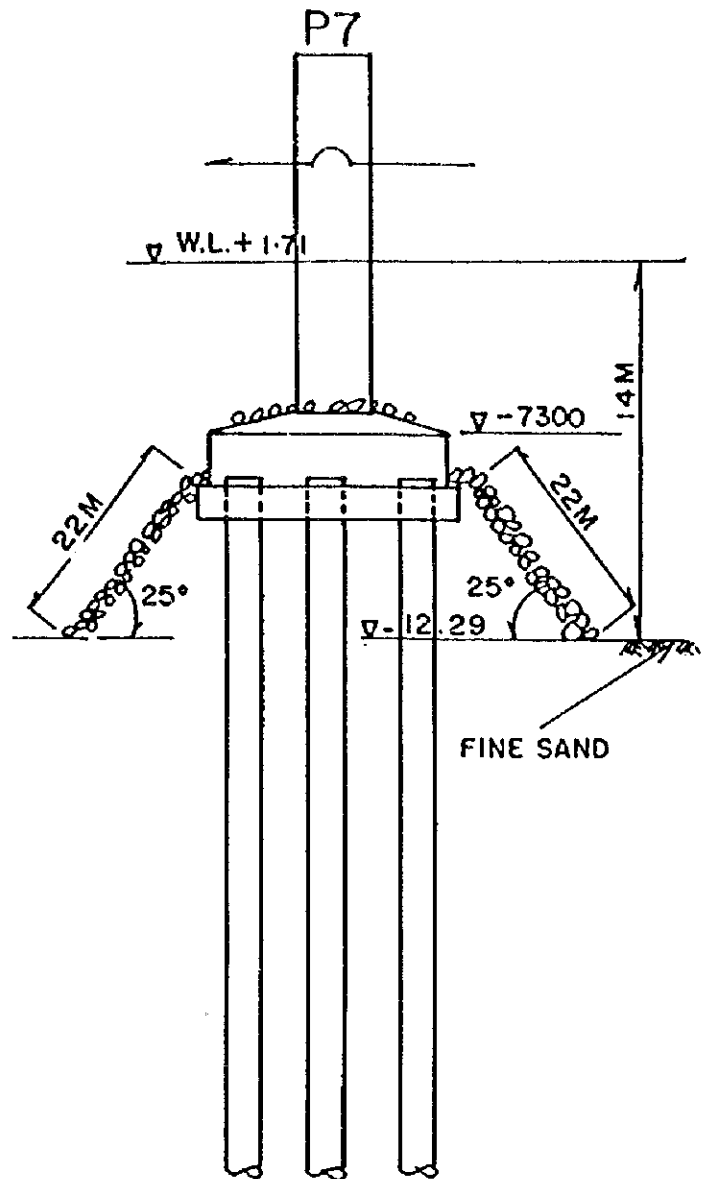
\*TOTALLY COVER

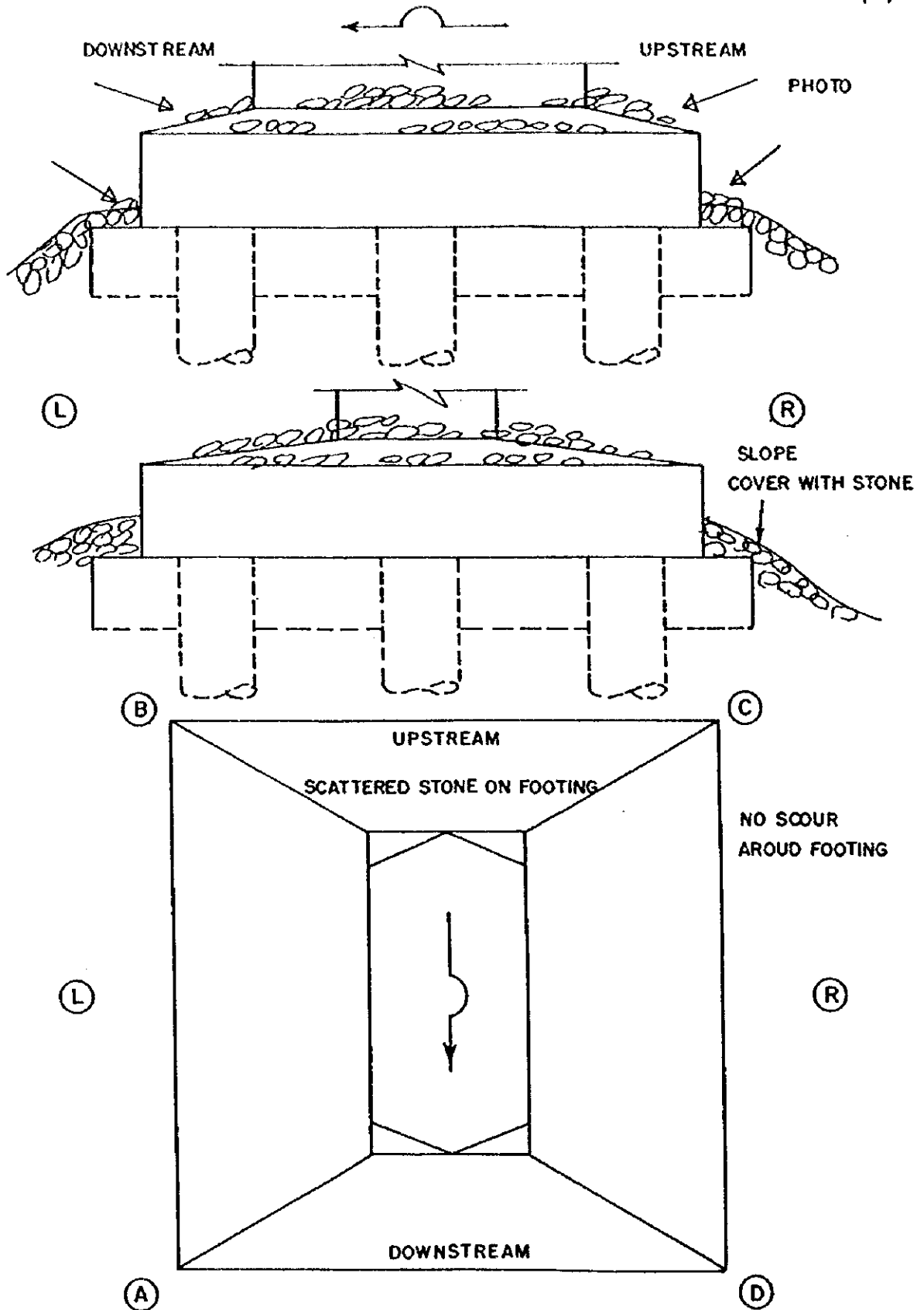
4. Photographs

(bed, piles, footing)

5. Note

\* measure(50m), camera, light, level)





Diver's Information

1. Depth to river bed  
from water level

\*

H= 22 m

2. Conditions of river bed  
around piles

-Bed line (undulation)

\*FLAT/COMPACTED SAND

-Protected stone

(scattered in bed, on footing)

\*NO COVER WITH SAND ON STONE

\*SCATTERED ON FOOTING

3. Conditions of foundation  
(footing , piles)

-Damages

\*NO VISUAL DAMAGE OR CRACK AT  
FOOTING, PILE

\*GAP BETWEEN FOOTING & LEVELING  
CONC. BASA

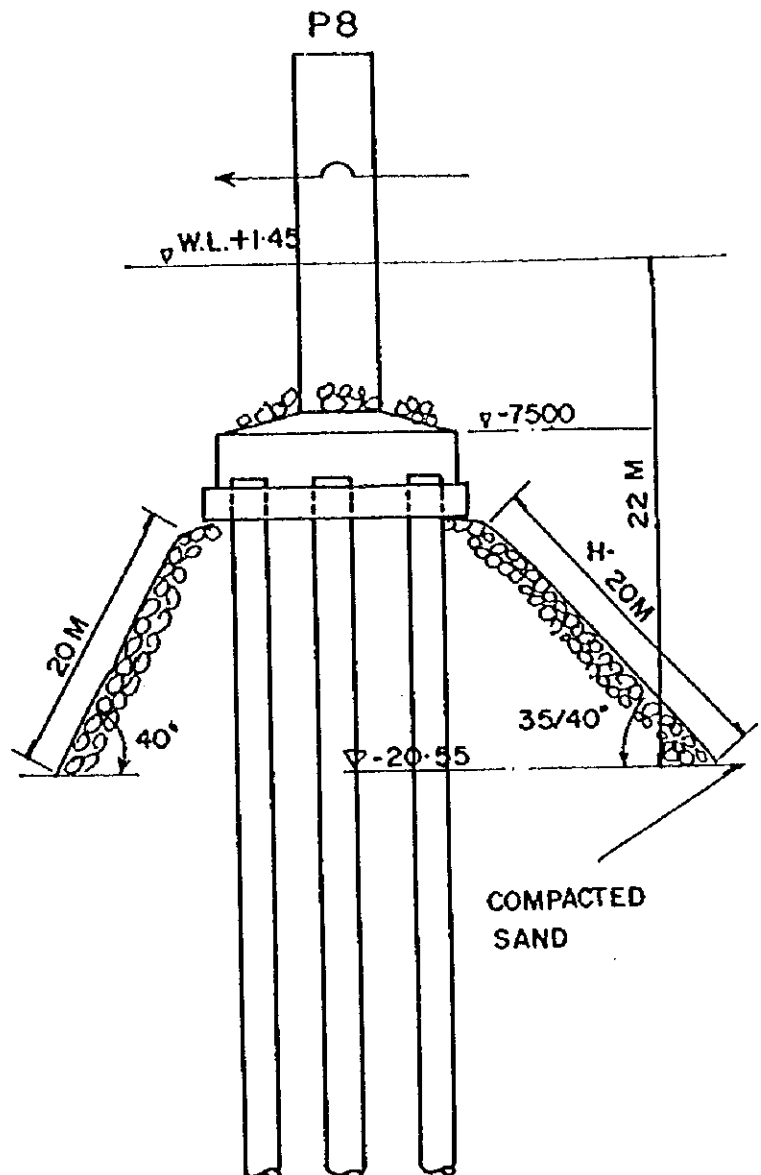
-Others

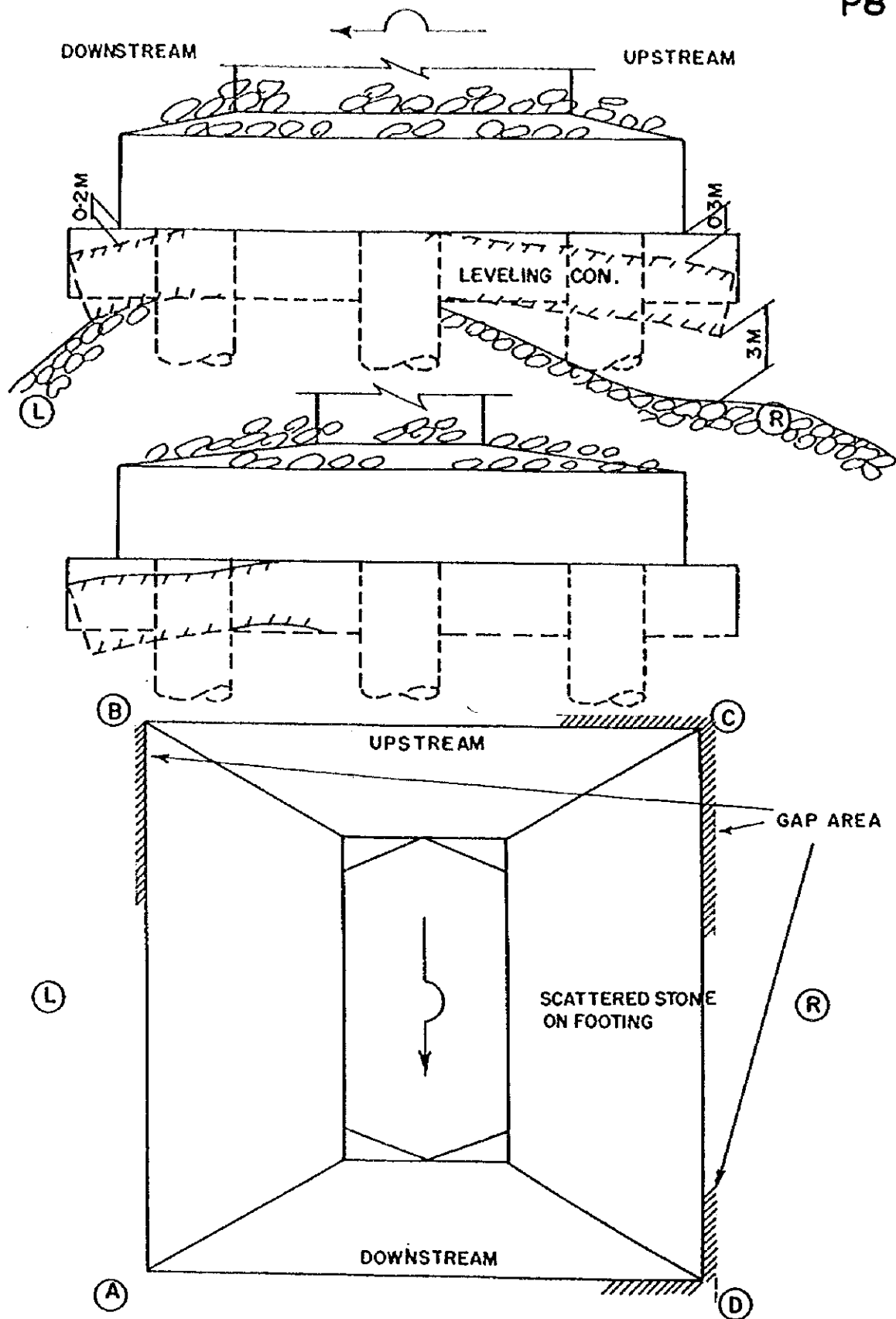
4. Photographs

(bed, piles, footing)

5. Note

\* measure(50m), camera, light, level)





Diver's Information

1. Depth to river bed  
from water level

\*

11= 16m(UPSTREAM)

13m(DOWNSTREAM)

2. Conditions of river bed  
around piles

-Bed line (undulation)

\*FLAT WITH FINE SAND(UP)

\*FLAT WITH COMPACTED SAND(DOWN)

-Protected stone

(scattered in bed, on footing)

\*SCATTERED STONE ON FOOTING

\*SLOPE COVER WITH STONE

(NO SAND )

3. Conditions of foundation  
(footing ,piles)

-Damage

\*NO VISUAL DAMAGE

\*NO SCOUR AT FOOTING

-Others

\*REMAINING TEST PILE

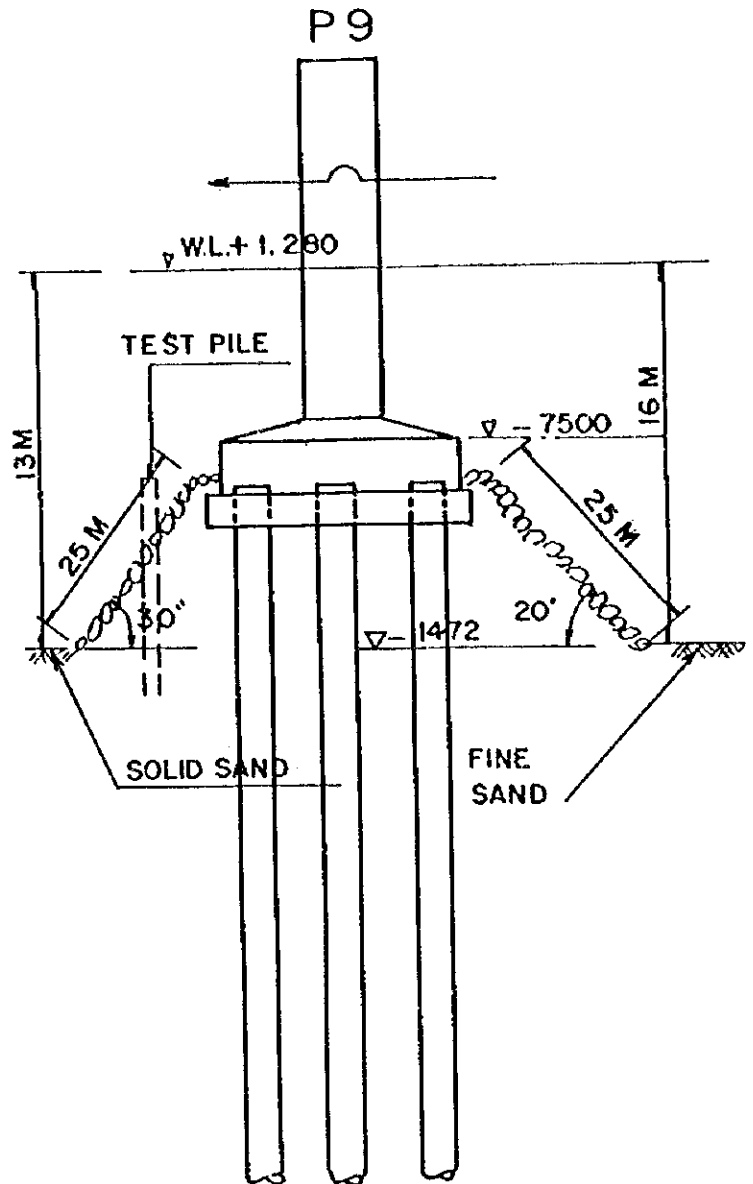
AT DOWN STREAM

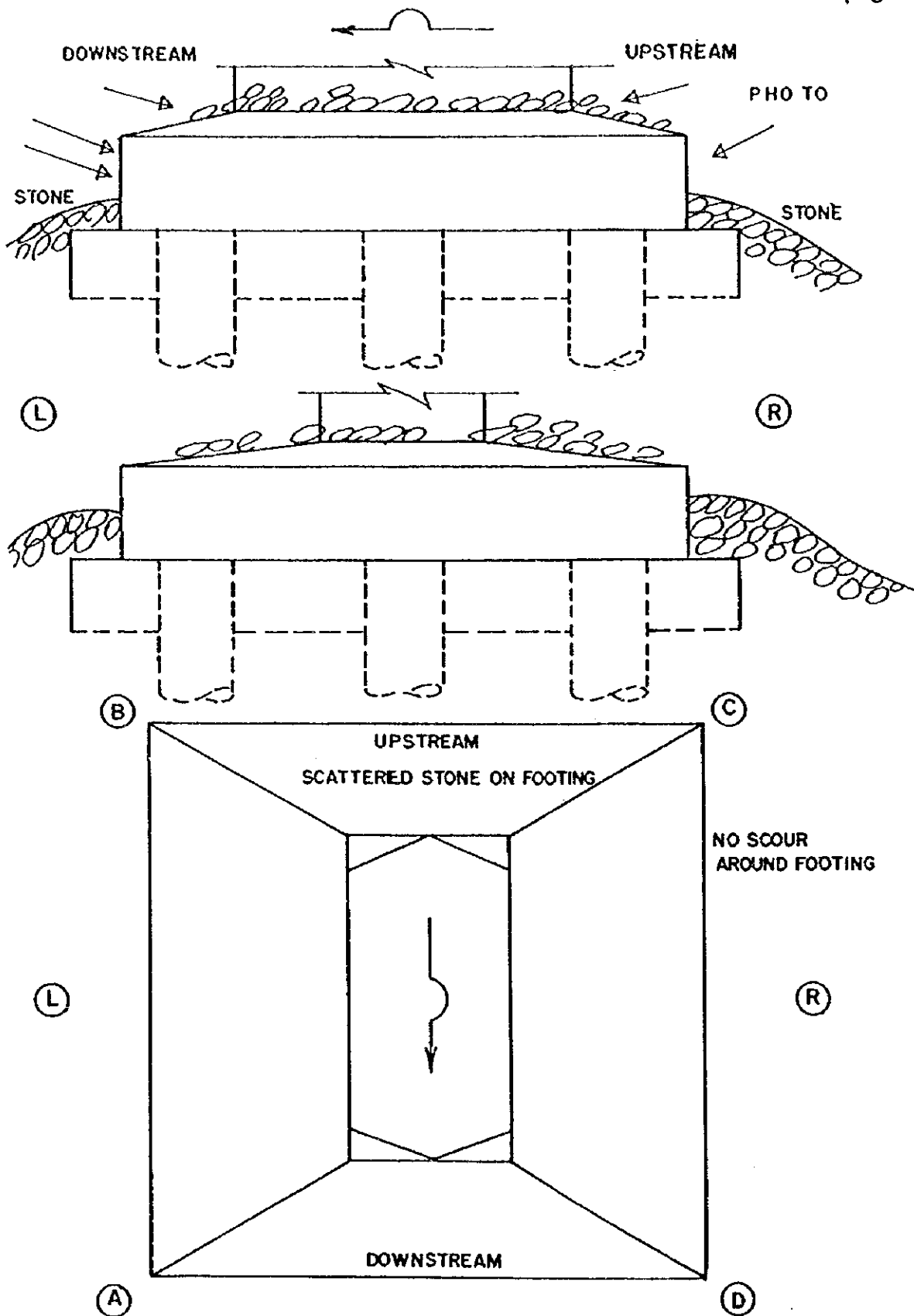
4. Photographs

(bed, piles, footing)

5. Note

\* measure(50m), camera, light, level)





Diver's Information

1. Depth to river bed  
from water level

\*

H = 6 m H = 12 m (DHAKA SIDE)

2. Conditions of river bed  
around piles

-Bed line (undulation)

\*ALL STONE (UPSTREAM)

\*FLAT WITH SOFT SAND (DOWNSTREAM)

-Protected stone

(scattered in bed, on footing)

\*ALL STONE AROUND FOOTING

3. Conditions of foundation  
(footing, piles)

-Damages

\*NO VISUAL ALL FOOTING

NO SCOUR AROUND FOOTING

-Others

\*DHAKA SIDE:

SLOPE WITH STONE

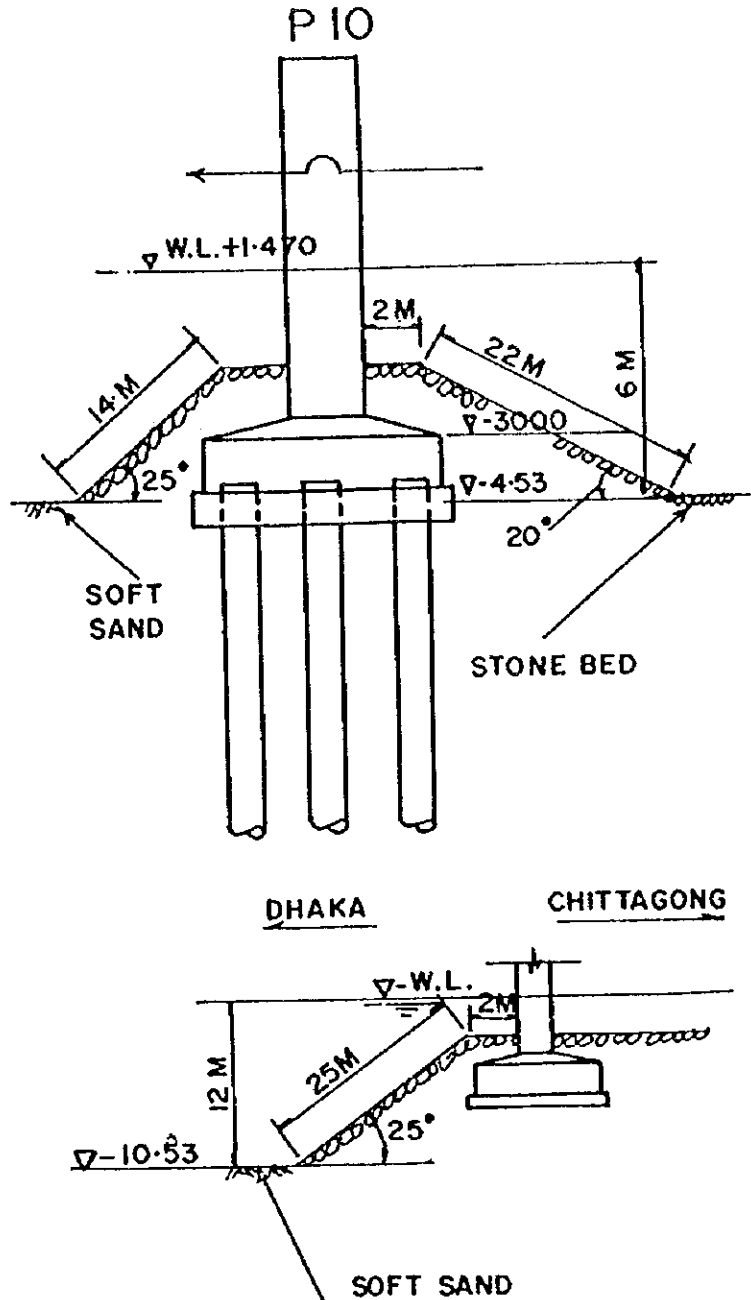
SOFT SAND (BED)

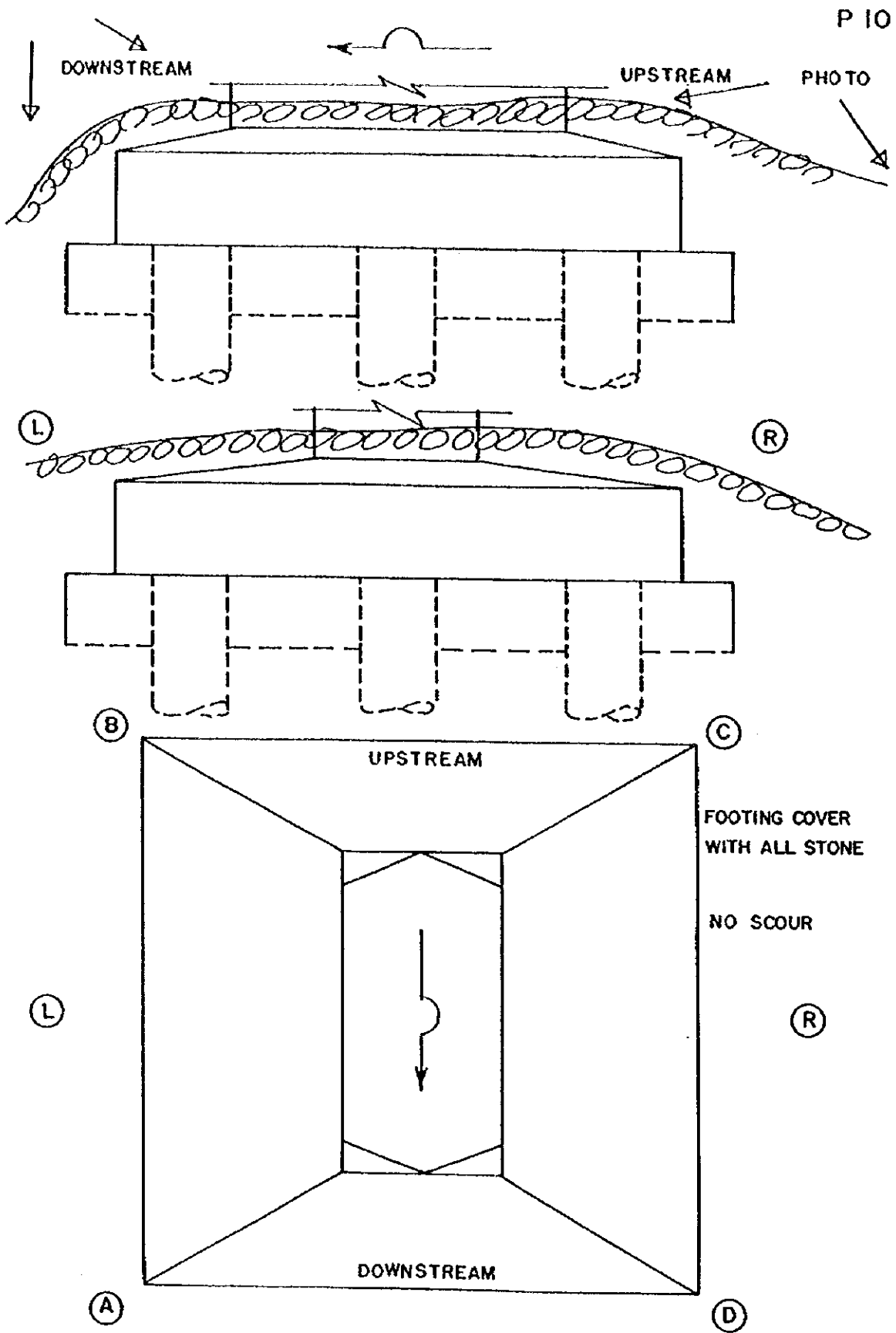
4. Photographs

(bed, piles, footing)

5. Note

\* measure (50m, camera, light, level)







## Scouring Survey for Left Bund (3-3)

### Diver's Information

#### 1. Locations for scouring survey by divers

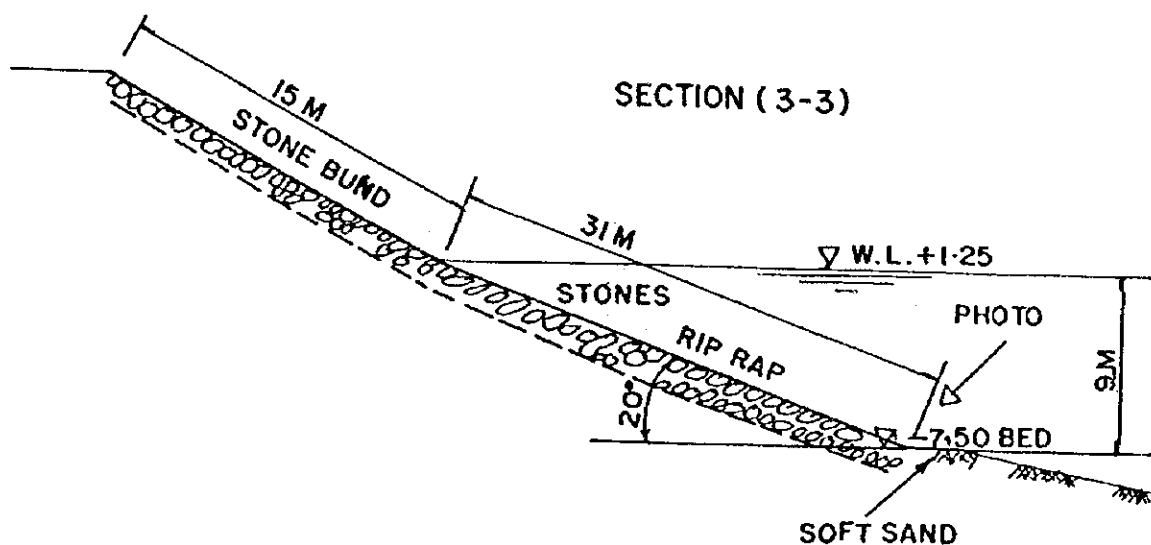
\*3/3 REVETMENT

#### 2. Conditions of revetment to river bed

- Bed line (undulation)
  - to draw in cross sections
  - \*WAVE PATTERN, SOFT SAND
- protected stone, rip rap
  - \*SEMI COVER WITH SOFT SAND ON RIP RAP
- Others

#### 3. Photographs

rip rap, protected stone, river bed



## Scouring Survey for Left Bund (7-7)

### Diver's Information

#### 1. Locations for scouring survey by divers

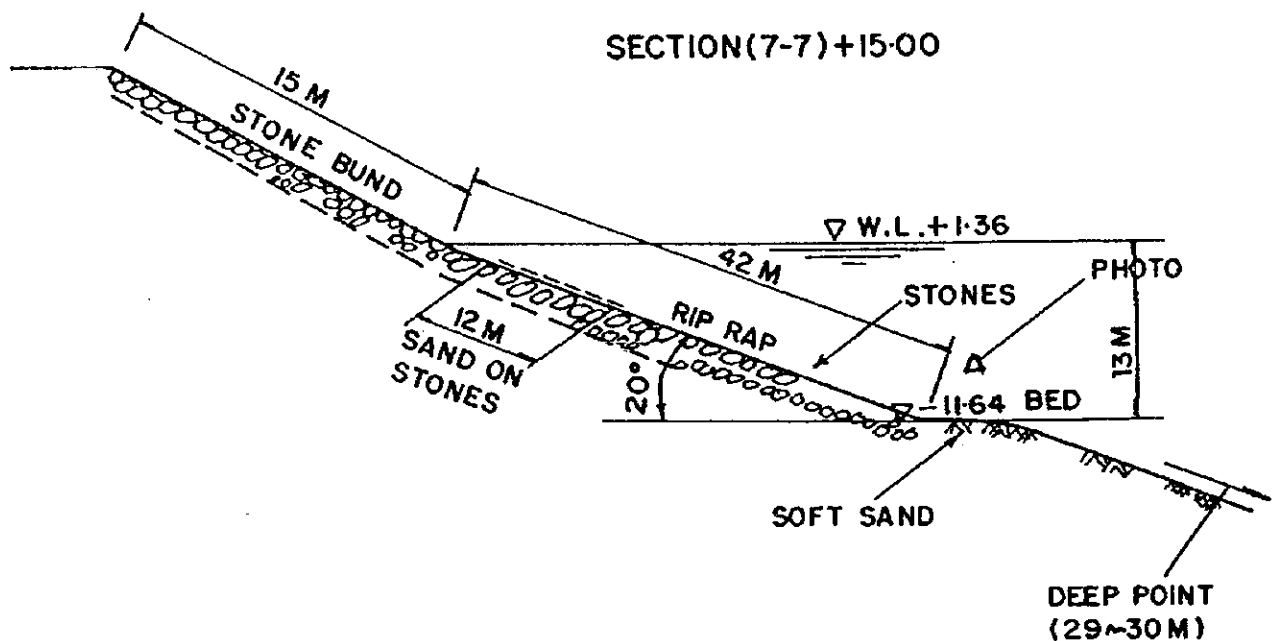
\*7/7 REVETMENT

#### 2. Conditions of revetment to river bed

- Bed line (undulation)
  - to draw in cross sections
  - \*WAVE PATTERN, SOFT SAND
- protected stone, rip rap
  - \*SEMI COVER WITH SOFT SAND ON RIP RAP
- Others

#### 3. Photographs

rip rap, protected stone, river bed



## Scouring Survey for Left Bund (10-10)

### Diver's Information

#### 1. Locations for scouring survey by divers

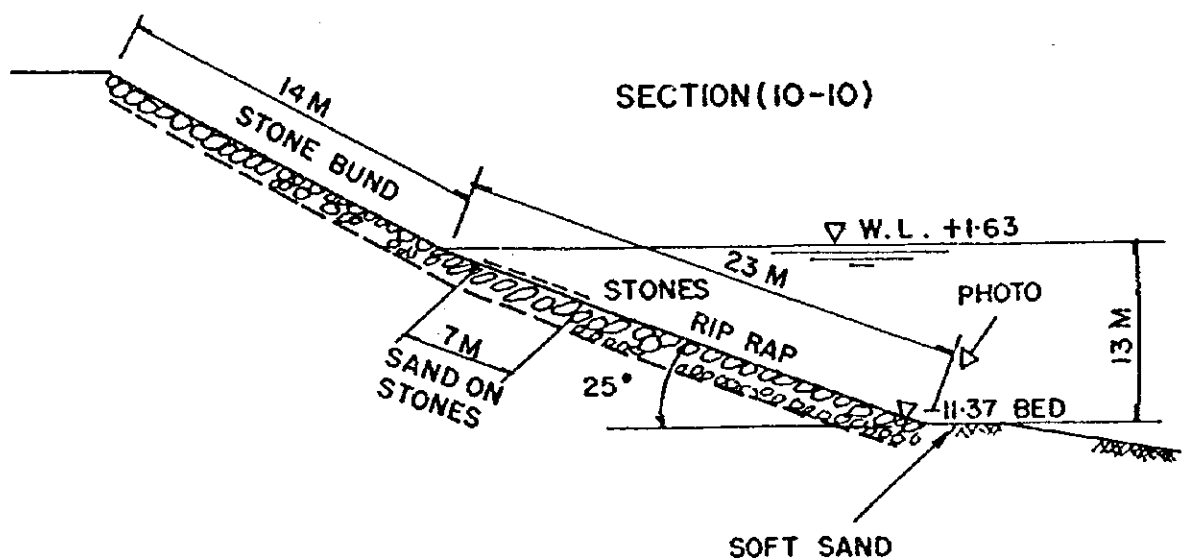
\*10/10 REVETMENT

#### 2. Conditions of revetment to river bed

- Bed line (undulation)
  - to draw in cross sections
  - \*WAVE PATTERN, SOFT SAND
- protected stone, rip rap
  - \*SEMI COVER WITH SOFT SAND ON RIP RAP
- Others

#### 3. Photographs

rip rap, protected stone, river bed



## Scouring Survey for Left Bund (15--15)

### Diver's Information

#### 1. Locations for scouring survey by divers

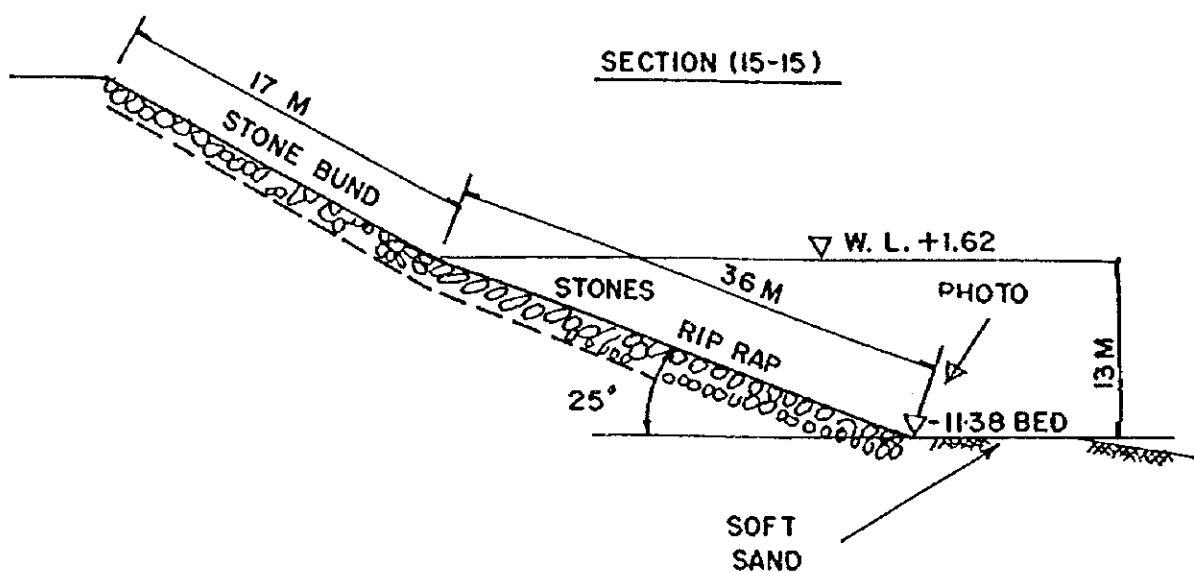
\*15/15 REVETMENT

#### 2. Conditions of revetment to river bed

- Bed line (undulation)
  - to draw in cross sections
  - \*FLAT RIVER BED, SOFT SAND
- protected stone, rip rap
  - \*SEMI COVER WITH SAND ON RIP RAP
- Others

#### 3. Photographs

rip rap, protected stone, river bed



## Scouring Survey for Left Bund (17-17)

### Diver's Information

#### 1. Locations for scouring survey by divers

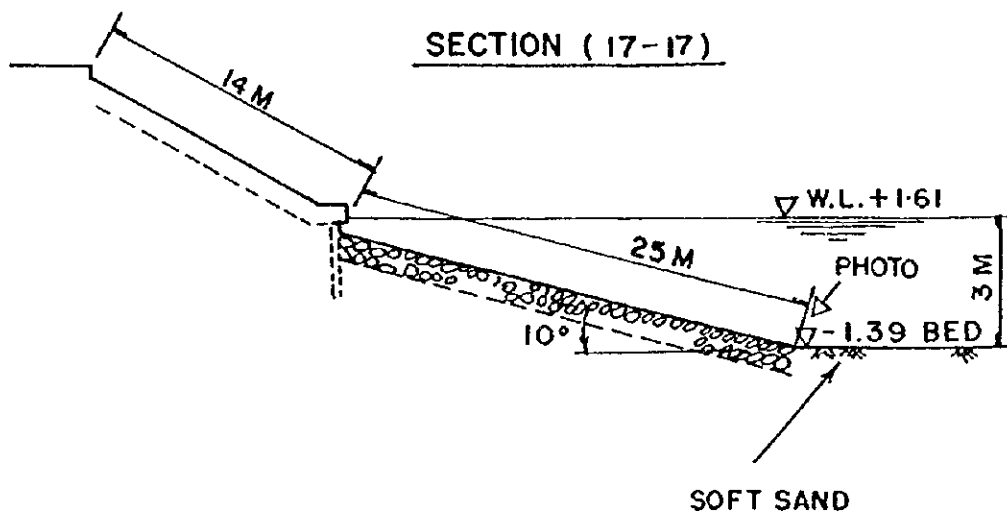
\*17/17 REVETMENT

#### 2. Conditions of revetment to river bed

- Bed line (undulation)
  - to draw in cross sections
  - \*FLAT RIVER BED, SOFT SAND
- protected stone, rip rap
  - \*SEMI COVER WITH SAND ON RIP RAP
- Others

#### 3. Photographs

rip rap, protected stone, river bed













JICA