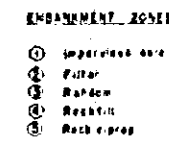


Longitudinal section of the proposed dam and spillway. The diagram shows the dam crest at elevation 105.00, the spillway crest at elevation 90.40, and the original ground line. Key features include a concrete gate 65 x 72 x 2, a spillway width of 435.30, and a total length of 1,830.50. The diagram also shows the dam crest length of 1,830.50 and the spillway width of 435.30. The original ground line is shown as a dashed line, and the proposed dam and spillway are shown as solid lines. The diagram includes a scale bar from 50 to 150 feet and a north arrow.



ELEVATION (m)







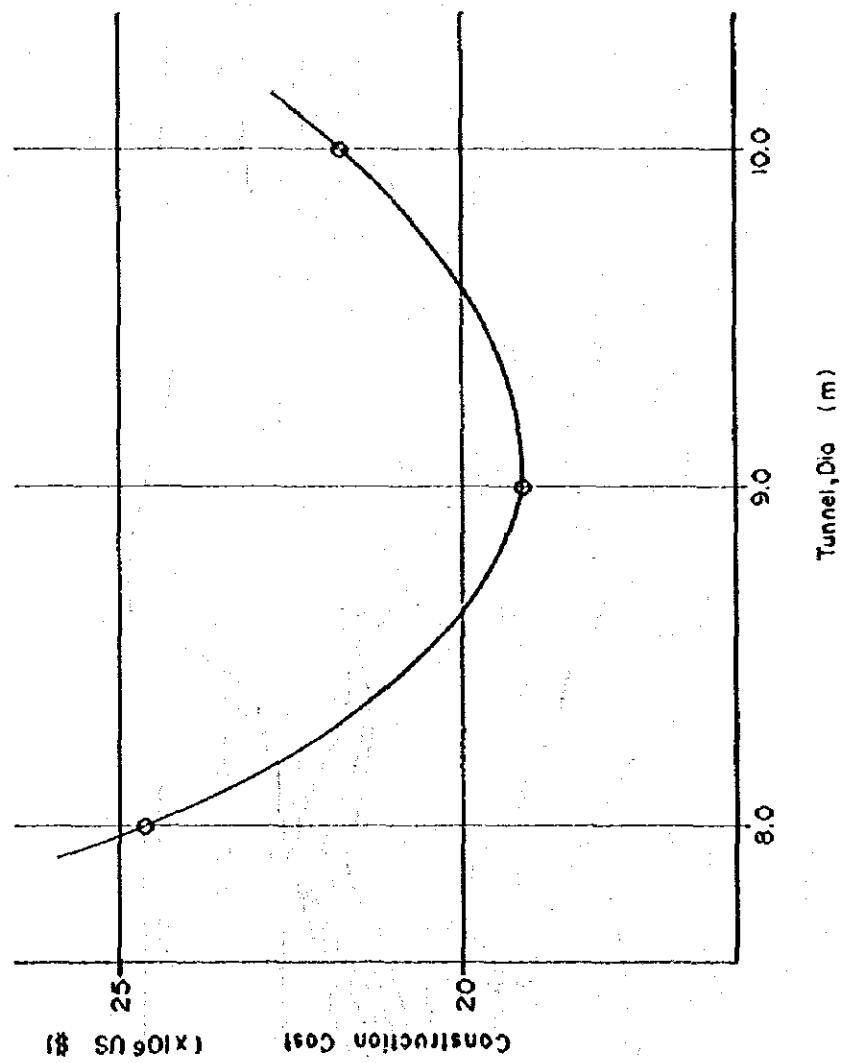


Fig. 5-4

ECONOMICAL COMPARISON  
OF DIVERSION TUNNELS

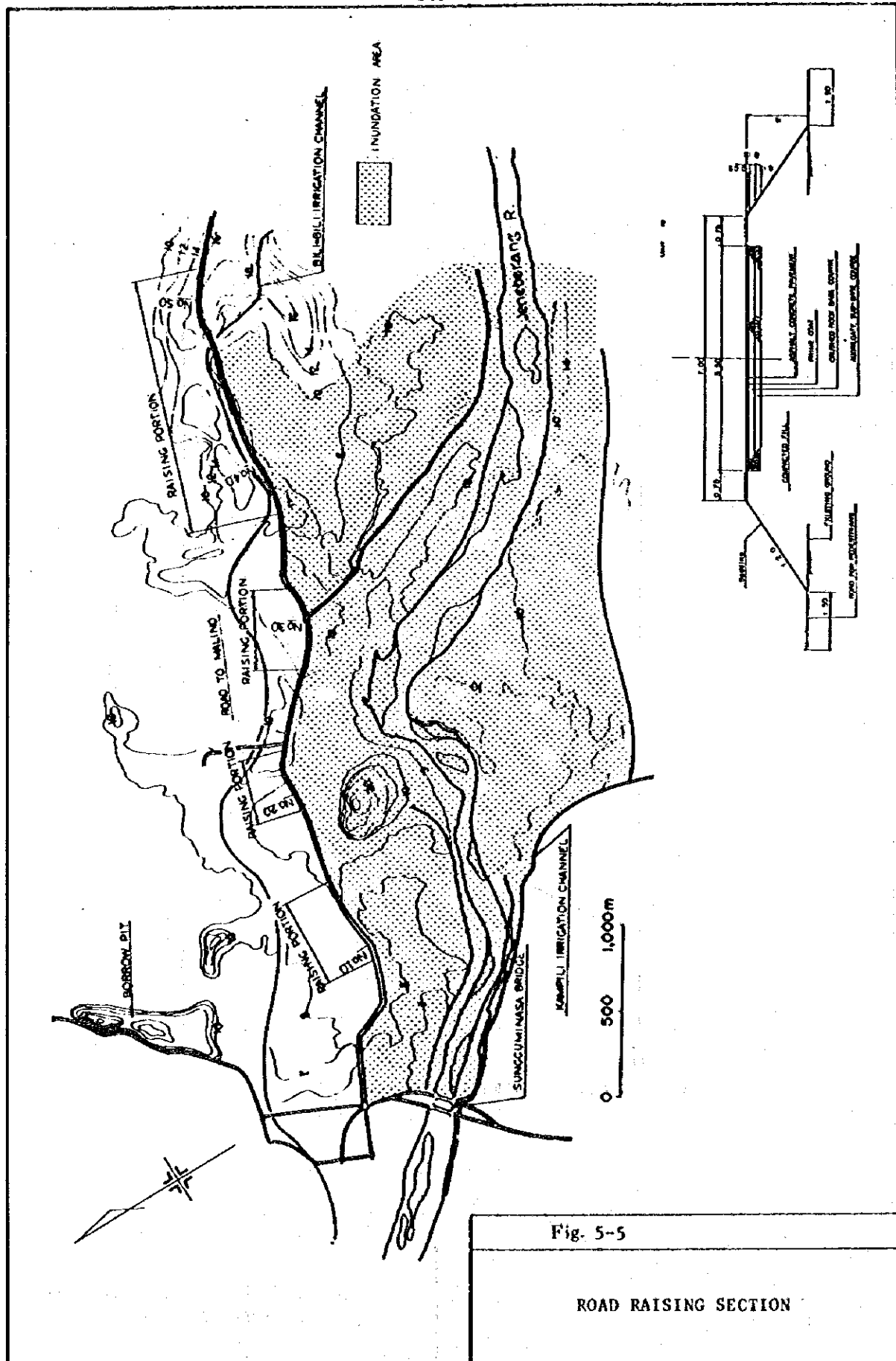


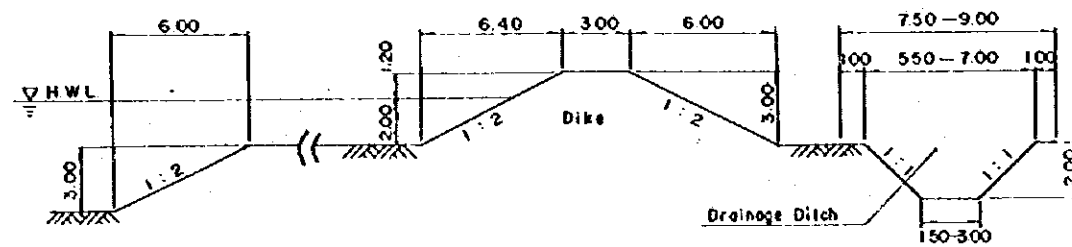
Fig- 5-5

ROAD RAISING SECTION

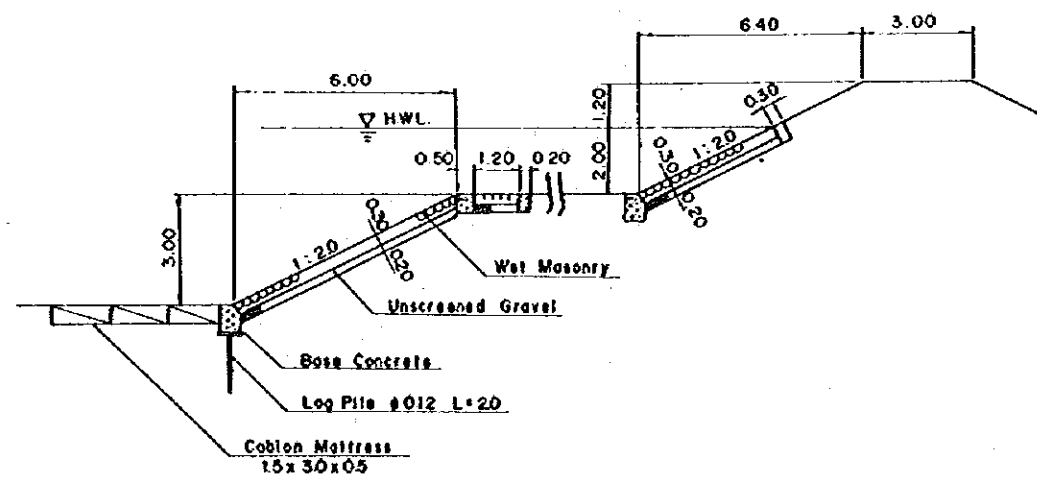




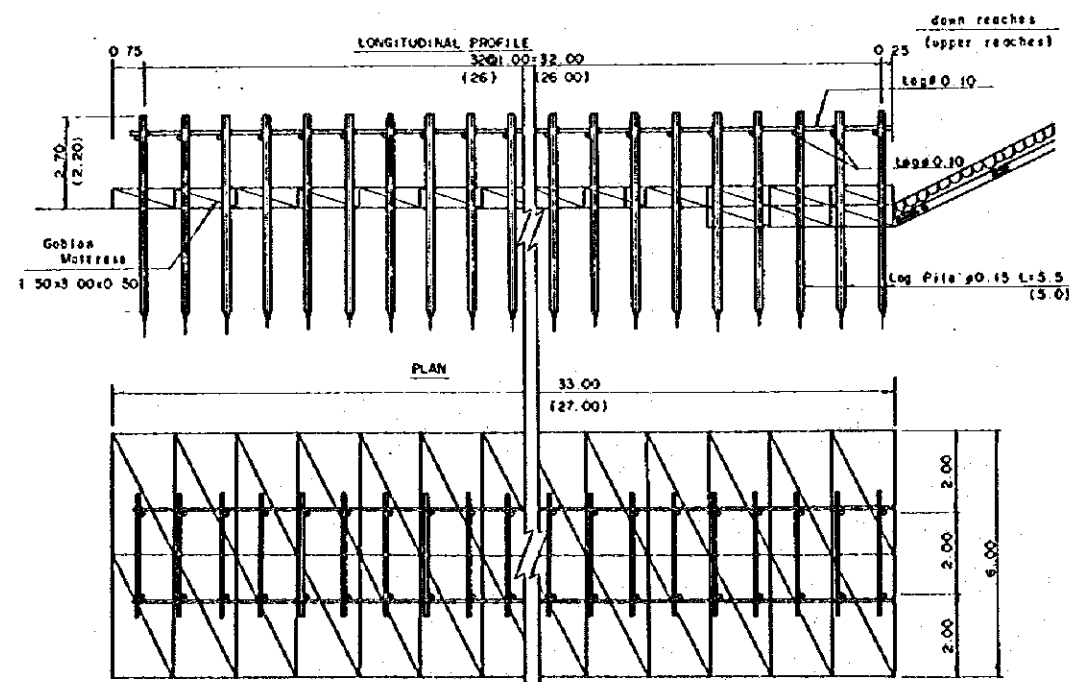
STANDARD CROSS-SECTION OF DIKE



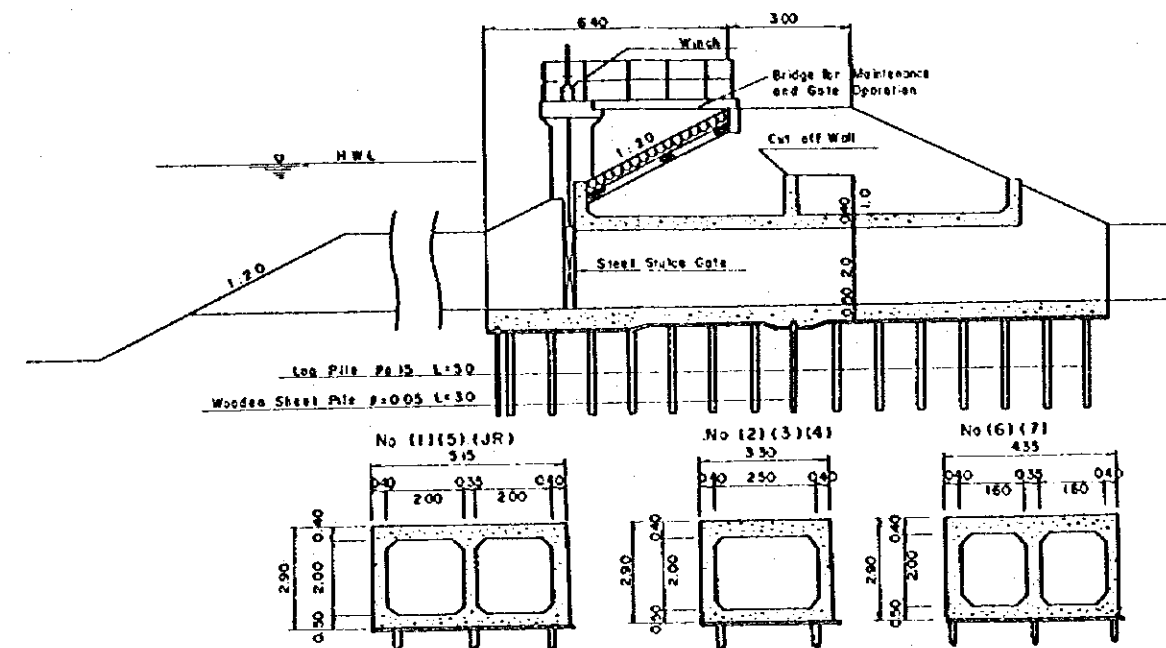
STANDARD CROSS-SECTION OF REVETMENT



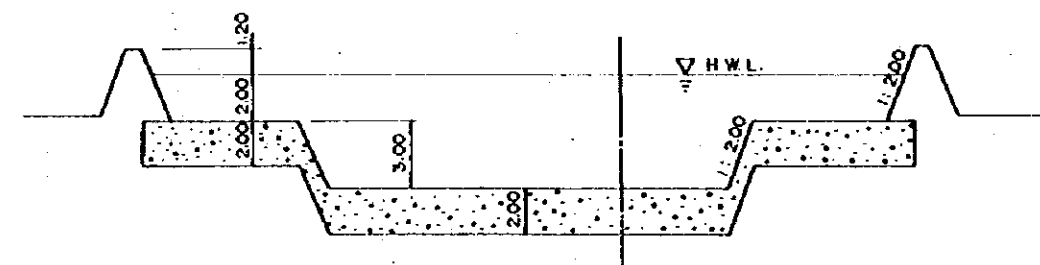
PROFILE AND PLAN OF GROUYNE



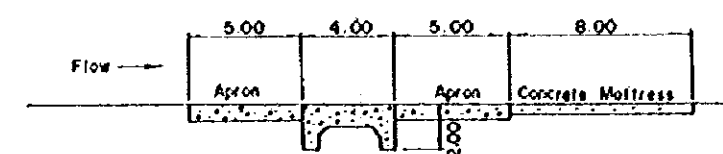
STANDARD DESIGN OF SLUICE



CROSS-SECTION OF GROUND SILL



A-A Section



Unit:m

Fig. 5-6

FEATURE OF THE RIPARIAN STRUCTURES



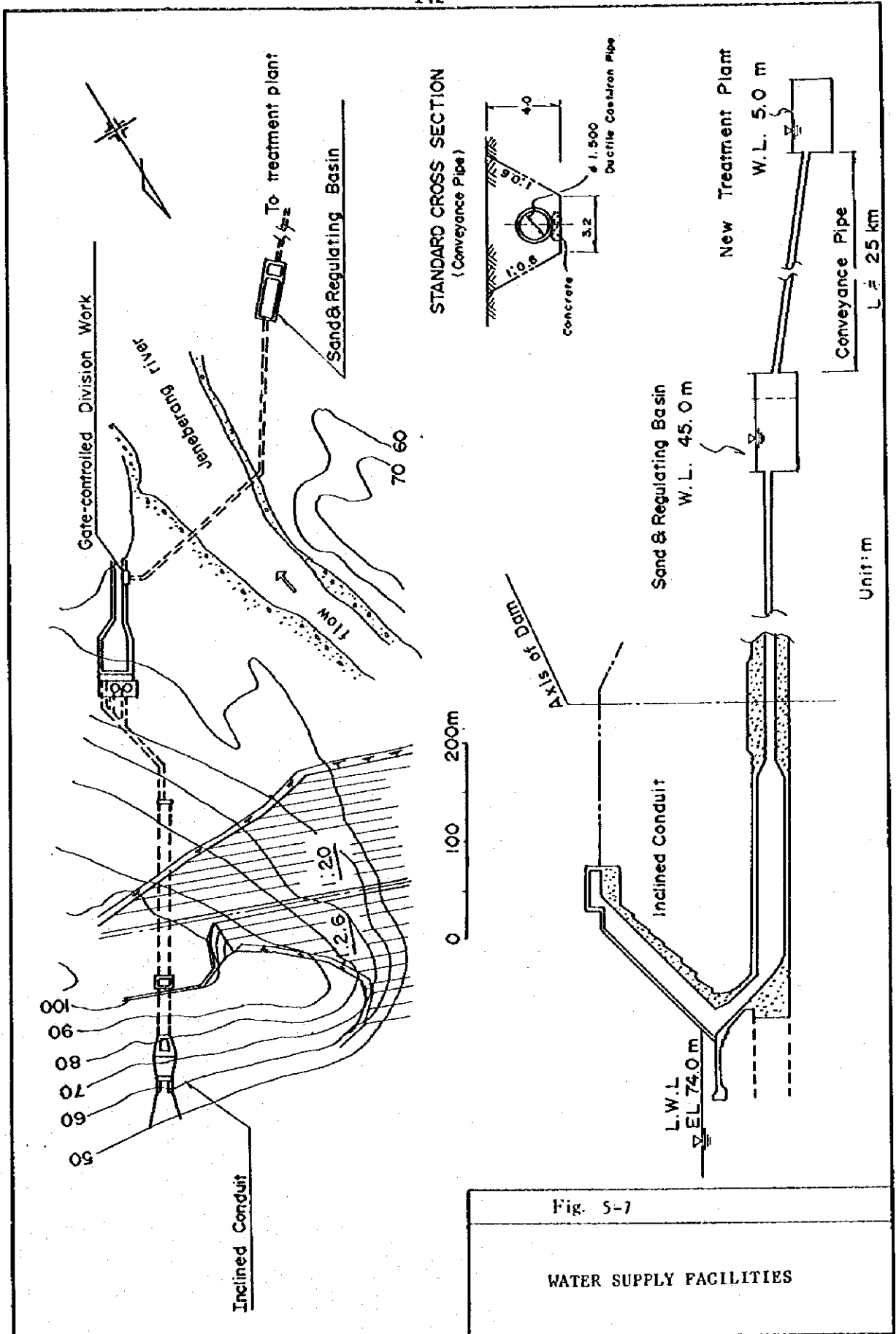
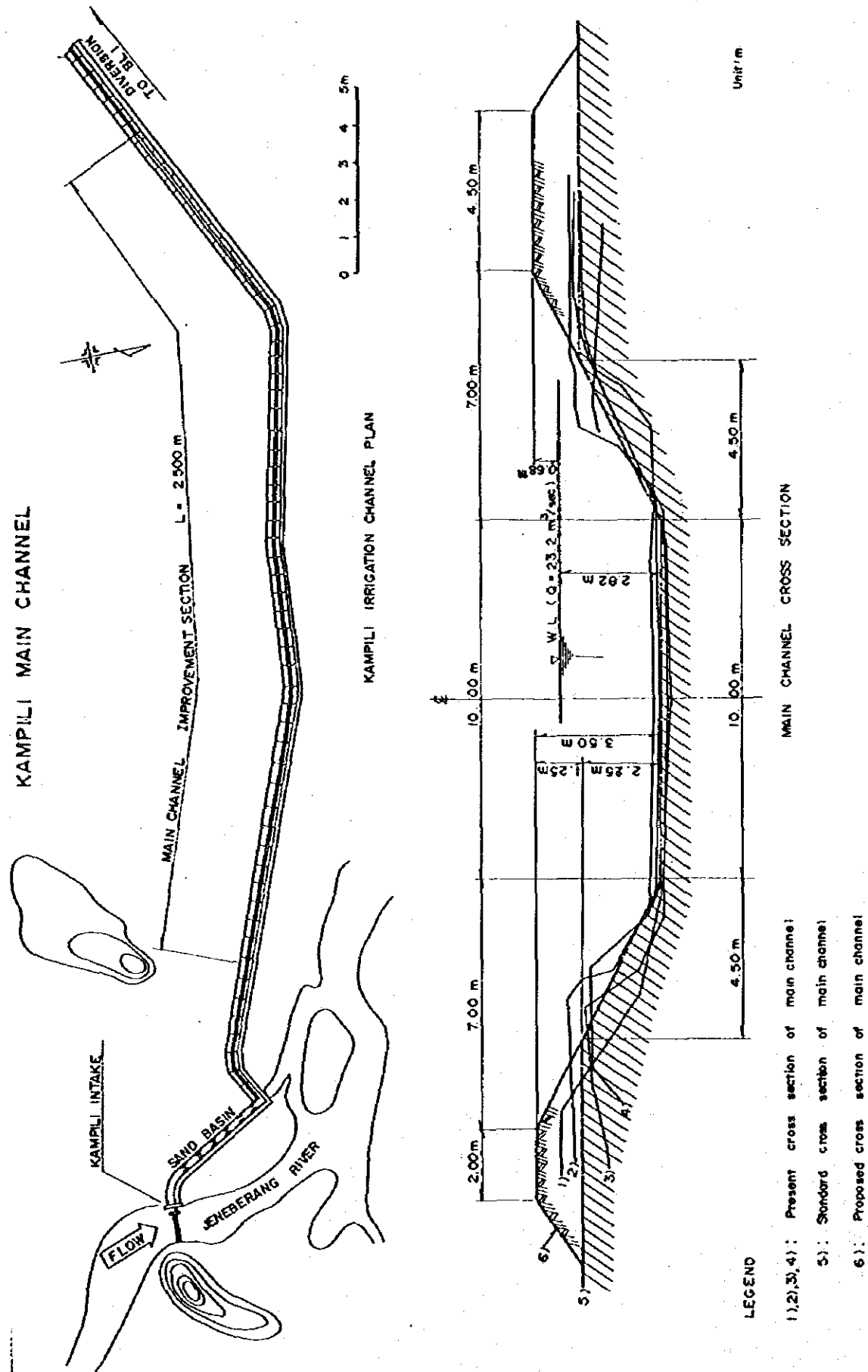


Fig. 5-7

WATER SUPPLY FACILITIES



### BILI - BILI CONNECTION CHANNEL

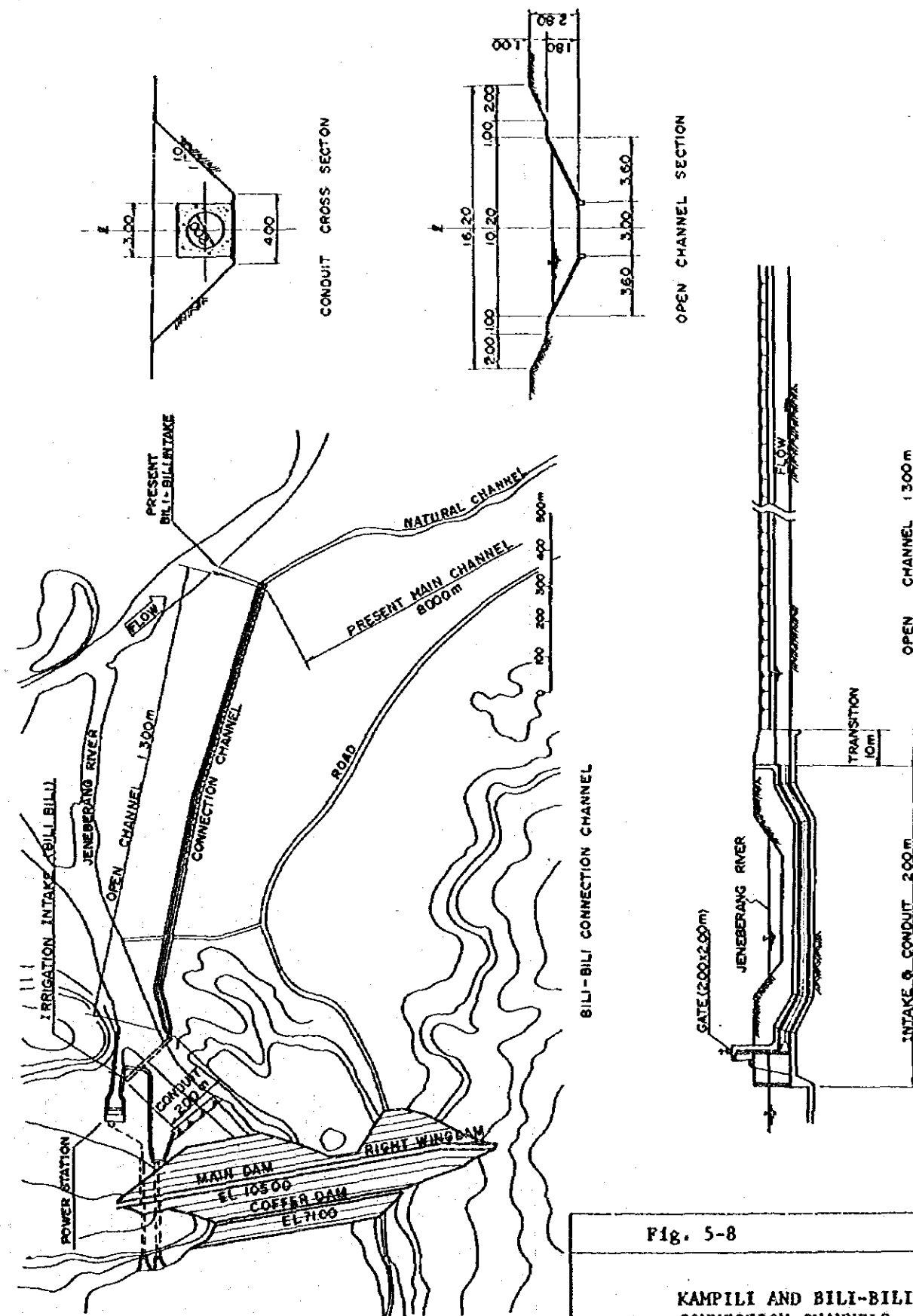
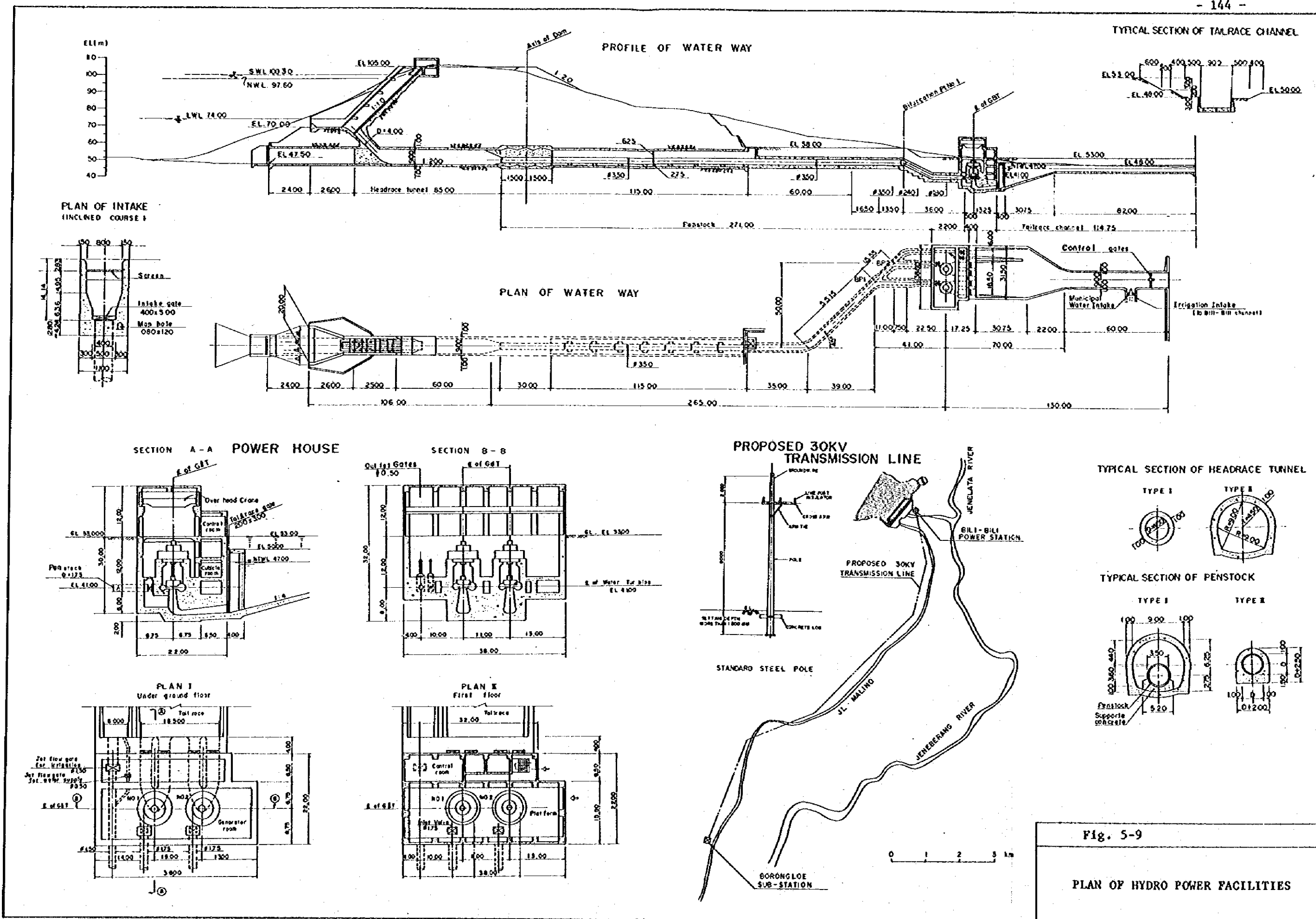


Fig. 5-8

KAMPILI AND BILI-BILI  
CONNECTION CHANNELS







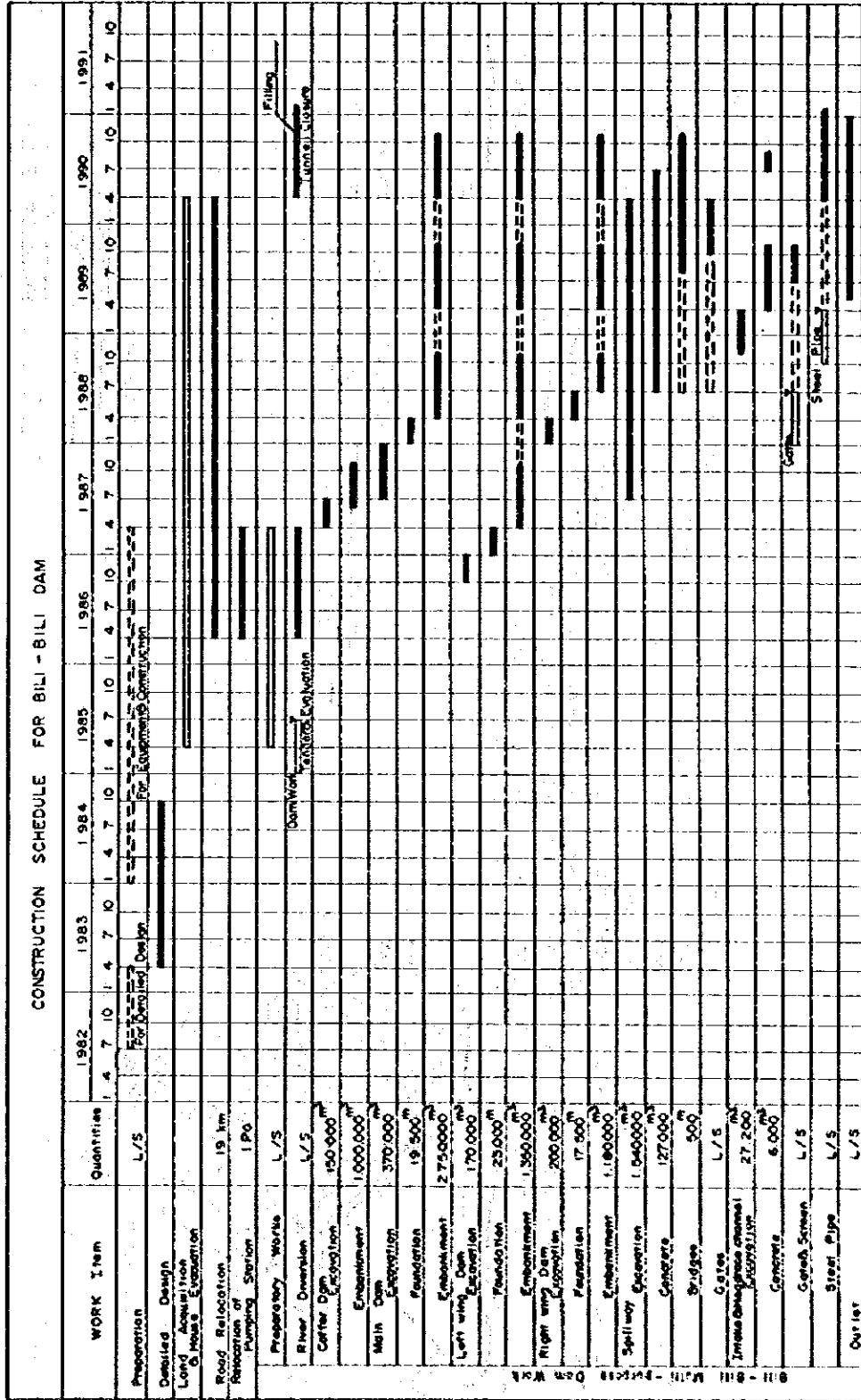
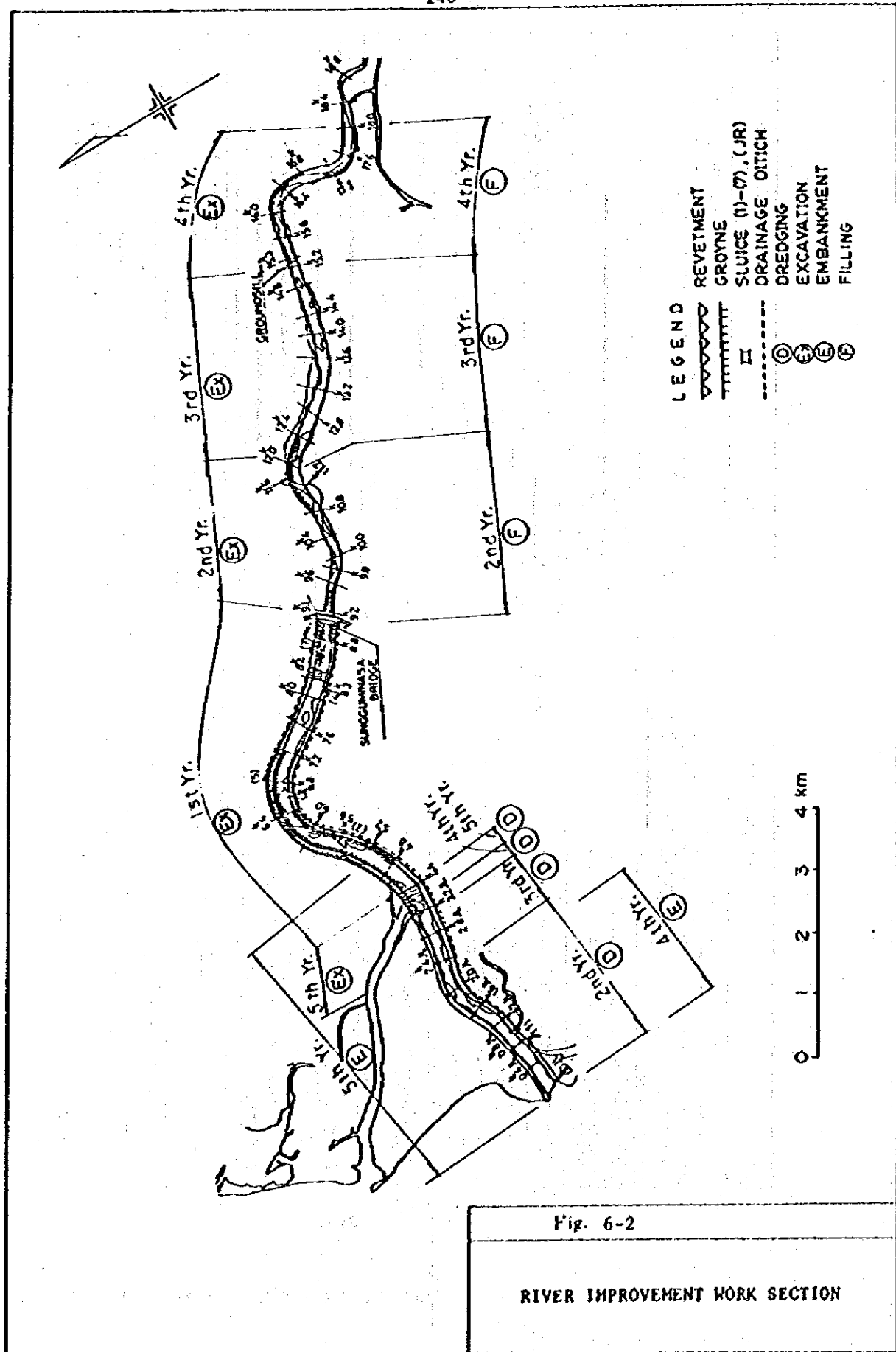


Fig. 6-1

CONSTRUCTION SCHEDULE FOR BILI-BILI DAM



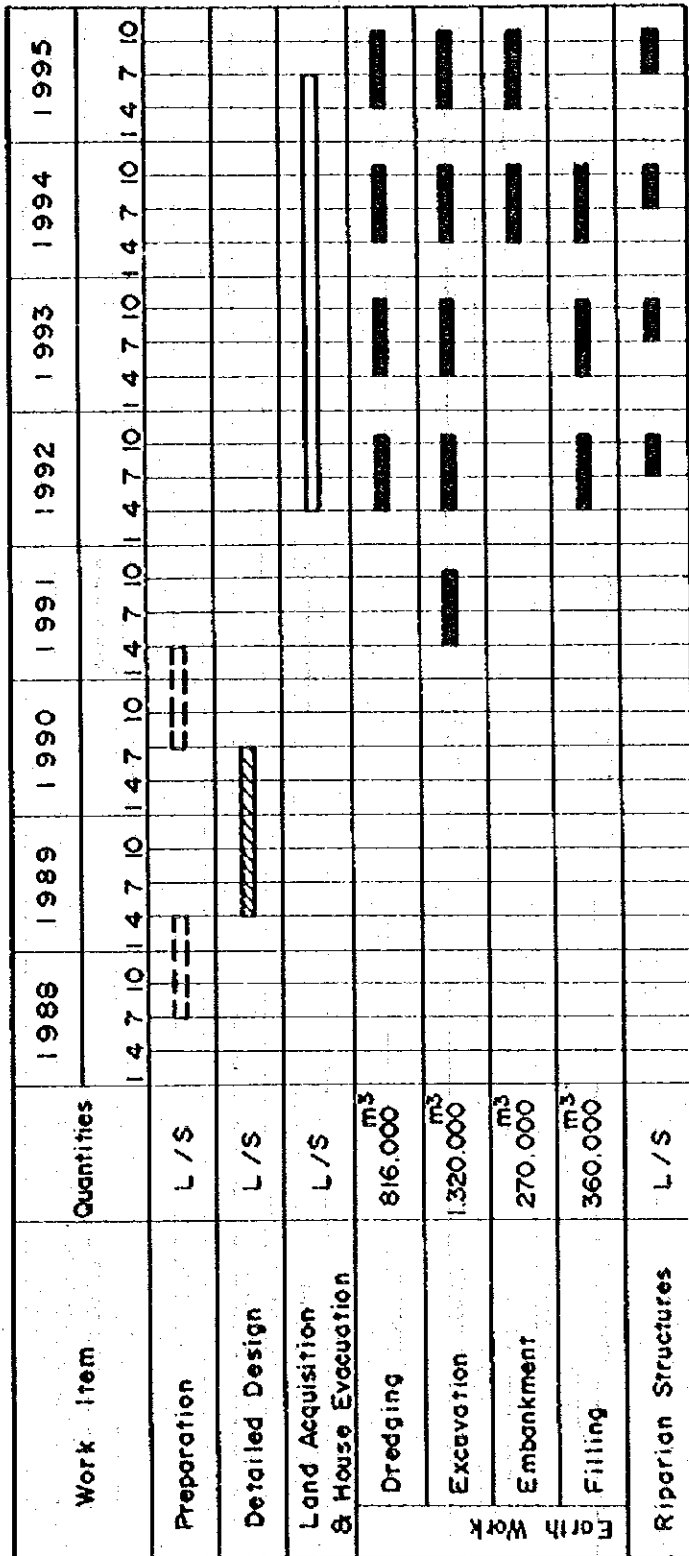


Fig. 6-3

CONSTRUCTION SCHEDULE FOR  
RIVER IMPROVEMENT



Sector Item	Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
① Urgent River Improvement	Preparation																				
	D/D		=====																		
	Construction				=====																
② Dam	Preparation																				
	D/D			=====																	
	Construction						=====														
③ Irrigation	Preparation																				
	F/S				=====																
	D/D					=====															
④ Water Supply	Construction																				
	Preparation																				
	F/S				=====																
⑤ Hydro Power	D/D						=====														
	Construction																				
	( Purification plant ) ( Distribution )																				
⑥ Over all River Improvement	Preparation																				
	F/S																				
	D/D																				
⑦ Construction	Preparation																				
	F/S																				
	D/D																				

Fig. 6-4

CONSTRUCTION TIME SCHEDULE

0

0

0



**A T T A C H M E N T 1**  
=====





MEMBER OF SURVEY TEAM, COUNTERPART  
AND ADVISORY COMMITTEE

Survey Team and Counterparts

Team Leader	Mr. Katsuhisa Abe	Ir. Abd. Yantahin Dipl. HE Ir. Syamsul Arida Mr. A.P. Ridwan
Assistant Team Leader (Dan)	Mr. Akio Yoshino	Ir. Sutopo Kristanto Ir. Sunaryo
Agronomist	Mr. Yoshimi Uchiyama	Ir. Djoko Santosa
Geologist	Mr. Takuji Murakami	Mr. Sriyatno BE. Mr. Harry Witanto
Hydrologist	Mr. Masahiro Asada	Ir. Purwoko Mr. Singkir Alam
Seismic Prospector	Mr. Minoru Nakazawa	Ir. Djoko Santosa Ir. Purwoko
Sabo and Environmental (Engr.)	Mr. Makihiro Otagawa	Mr. Hasbi Tuanaya
River and Water Supply (Engr.)	Mr. Hiroshi Kimura	Ir. Supriya T. Mr. Kamrin
Agricultural Engr.	Mr. Shinichiro Matsumoto	Ir. Djoko Santosa
Hydro Power Engr.	Mr. Shigeru Motojima	Ir. Sunaryo Mr. Nur Alim
Structural Engr.	Mr. Katsuhiko Ikari	Ir. Purwoko
Project Economist	Mr. Kimio Shimomura	Drs. Syafiuddin M.
Surveying Engr.	Mr. Kiyotaka Takahashi Mr. Kinji Nakamura	Mr. Ramli M. Nur BE. Mr. Abd. Wahab Th. Mr. Abd. Rasyid M. Ar.

Advisory Committee

Head :	Mr. Takao Jinnouchi (Mr. Naohito Murata)
River :	Mr. Tetsuyoshi Kato
D a m :	Mr. Meguru Shimomura
Irrigation :	Mr. Takeshi Ishida
Agriculture :	Mr. Kanezo Takeuchi
Hydro Power :	Mr. Masatoshi Furuichi
Coordinator :	Mr. Koichi Miyoshi



ATTACHMENT 2



MINUTES OF MEETING  
ON  
INCEPTION REPORT  
OF  
JENEBERANG RIVER FLOOD CONTROL PROJECT ( PHASE II )

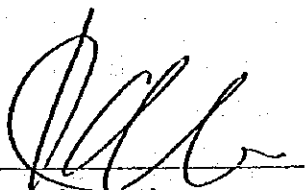
A meeting on the Inception Report of the Jeneberang River Flood Control Project ( Phase II ) was held on February 14, 1981.

Most of the contents were agreed upon by and between JICA Survey Team and Directorate General of Water Resources Development with minor modifications and some remarks as described below.

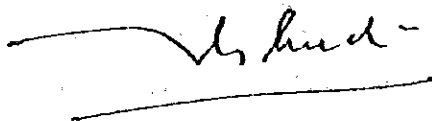
- 1) The term , "municipal water supply " in this inception report is defined as water supply for domestic and industrial uses.
- 2) Extension of irrigation system may be recommended, if any, after the detailed study in the area ( Related to 3.2.1 ) .
- 3) The second sentence in a) of 4.4.4 is revised as follows ; Study on the present and future irrigable area and water requirement for irrigation.
- 4) The sentence in a) of 4.4.7 is revised as follows ; Study on the construction method, the availability of construction materials and equipment in the project site.
- 5) Resettlement planning is not included in this study. ( Related to 4.4.8 a.) .
- 6) The sentence in 1) of b) 4.5 is revised as follows ; Rehabilitation and improvement of irrigation facilities if necessary .
- 7) The sentence in 2) of e) of 4.5 is eliminated.
- 8) Planning criteria will be included in the Interim Report, and Executive Summary will be submitted together with the Final Report (Related to 6.2. and 6.4. ) .

- 9) Four vehicles will be provided by JICA for the implementation of this study. The Government of Indonesia will provide two vehicles in the whole period of the field study along with the Scope of Work, and additional two vehicles until the above four vehicles have been delivered to the project site.

Jakarta, February 14, 1981



Kastuhisa Abe  
Team Leader of the  
Jeneberang River Flood  
Control Project (Phase II)



Mashudi Dip.R.E.  
Chief of Sub Directorate  
of River Basin Development  
Planning, Directorate of  
Planning and Programming.

ATTENDANT LIST

1. DATE : FEBRUARY 14, 1981
2. TIME : 9:00 - 11:00 a.m.
3. PLACE : R.S. P3.S.A
4. ATTENDANT :
- Mashudi ( Dit. BPP)
  - Sudiyanto ( Dit. BPP)
  - Rusbini ( Dit. BPP)
  - Asnawi Marzuki ( Dit. Sungai)
  - Edi Wahab ( Dit. BPP)
  - M. Thahir ( Dit. Sungai )
  - A. Bockings ( ABLN AIR)
  - A. Hamamori ( C.P. Expert Dit. Sungai )
  - M. Matsui ( C.P. Expert Dit. Irigasi )
  - Y. Takano ( C.P. Expert Dit. Sungai )
  - T. Kato ( Ministry of Construction, Japan)
  - K. Takeuchi ( Ministry of Agriculture & Forestry, Japan)
  - K. Miyoshi ( JICA, Tokyo )
  - R. Goto ( JICA, Jakarta )
  - K. Abe ( JICA Survey Team )
  - Y. Uchiyama ( JICA Survey Team )
  - M. Asada ( JICA Survey Team )
  - T. Murakami ( JICA Survey Team )
  - K. Shimomura ( JICA Survey Team )



## MINUTES OF THE MEETING ON THE PLANNING CRITERIA

### - THE JENEBERANG FLOOD CONTROL PROJECT -

A meeting was held between the JICA Survey Team and the Government of Indonesia on May 29, 1981 in the P3.S.A., Sulawesi Selatan to discuss the planning criteria prepared by the JICA Team.

In the meeting, the following has been discussed and agreed upon by and between the both parties.

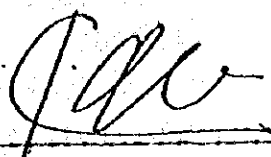
The attendants list is attached hereto. Further comments on the planning criteria should be informed the team within two weeks after this meeting


1. The upper reaches of the Sungguminasa bridge may be utilized as a natural buffer in order to reduce the flood damage in the Ujung Pandang city.  
The number of people and the area of this natural buffer will be estimated and informed later.
2. Closing of the Wright course in the down reaches of the split point (4.4 K) will bring about no social problem.  
However, this will be further in details studied from the technical viewpoint.
3. There is no comments/objection to the allocation of the reservoir capacity described in the planning criteria.
4. The demand forecast prepared by BIEG International has been authorised by the Indonesian Government. The study on the municipal water supply by the dam can be based upon this demand forecast.

The target year for the future municipal water supply plan is at the year of 2000. The surplus water before 2000 will be supplied for irrigation. The necessity of a fixed weir at the Bili-Bili irrigation intake will be recommended, if required.

5. All the water developed for irrigation by the dam will be supplied for the Kampili irrigation system, since the developed water is not sufficient for both the Bili-Bili and Kampili irrigation systems.
6. As for the power generation by the Bili-Bili dam, the study of item 3), Page 10 in the planning criteria will not be performed.
7. There is no comments on the land acquisition and compensation on the house evacuation required -- for the project.

Ujung Pandang, May 29, 1981.

  
Katsuhisa Abe  
Team Leader of the  
Jeneberang River Flood  
Control Project (Phase II)

  
Mashudi Dipl. H.E.  
Chief of Sub Directorate  
of River Basin Development  
Planning, Directorate of  
Planning and Programming.

No.	N a m a	J a b a t a n
1.	M. Djafer Parussengi	Pertanian
2.	M. Farid Suaib	BAPPEDA
3.	Drs. Thamrin Tantu	BAPPEDA
4.	Drs. Saleh Rajab	BAPPEDA
5.	Katsuhisa Abe	JICA
6.	Kanezo Takeuchi	Ministry of Agriculture Forestry and Fishery.
7.	Yoshio Ueda	JICA
8.	Akio Yoshino	JICA
9.	Minoru Nakazawa	JICA
10.	Takoji Murakami	JICA
11.	Hiroshi Kimura	JICA
12.	Kimio Shimomura	JICA
13.	Mansyur Nurhani	Cipta Karya
14.	A. Djollo M. Oddang	Ka. Sub. Dit. Perencanaan.
15.	Kenoana Lebayang	BAPPEDA
16.	Budiman Arif	Ka. Proyek Cipta Karya.
17.	G. De Jager	D.U. Sul-Sel.
18.	Rubini	Sub Dit. Pertek Bandung.
19.	Y. Takano	Colombo Plan Expert.
20.	Djoko Sasongko	Kasi Survey
21.	Edi Wahab.	P2WS.
22.	Ir. Budi Susilo	Staf Sub Dit Perencanaan
23.	A. Bockings	Ka. Bantuan Teknik
24.	Supriyo Triwiyono	Counterpart.
25.	Sunaryo	Counterpart.
26.	Syamsul Arida	P3SA. Sul-Sel.
27.	Susmaryanto	DPMA.
28.	Ir. Agus Prawoto MSo.	Seksi Geologi Teknik DPMA.
29.	Ir. Sampuly	DPMA.
30.	Ir. Moho Arief Ilyas	DPMA.
31.	Yusman	KBKIT PIN Wil VIII.
32.	M. Hasbi Tuanaya	Counterpart P3SA.
33.	Syafiuddin M.	Counterpart P3SA.

No.	N a m a	J a b a t a n
34.	Abd. Wahab	Counterpart P3SA.
35.	Sutopo Kristanto	Counterpart P3SA.
36.	Hary Witanto	Counterpart P3SA.
37.	Sriyatno	Counterpart P3SA.
38.	Purwoko	Counterpart P3SA.
39.	Djoko Santosa	Counterpart P3SA.
40.	Anwar Makmur	Staf Geologi Teknik DPMA.
41.	Yantahin	Pengairan DPU.Sul-Sel.
42.	Mashudi	Dit.Jen.Air.
43.	M. Arifin Mandja	Ka.Sub.Dit Perencanaan Bina Marga.

MINUTES OF MEETING  
FOR FEASIBILITY STUDY  
ON JENEBERANG RIVER FLOOD CONTROL PROJECT (PHASE II)

The meeting between P3SA, Directorate General of Water Resources Development and JICA Survey Team was held in Jakarta at August 11, 1981 for the purpose of making the discussion on the design flood for the proposed Bili-Bili dam and its spillway type based on the letters, Ref.No.: JFC-06/81 and Ref.No.: JFC-07/81, for which the Survey Team have been prepared.

The followings were agreed upon by and between the both parties.

Design Flood


1. The discharge of 1000-year return period is adopted for the proposed Bili-Bili dam as a design flood considering safety of the dam body.
2. The design flood of  $4300 \text{ m}^3/\text{s}$ , which corresponds to 1000 year flood, shall be re-examined by the Survey Team by using additional hydrological data such as rainfall and specific discharge in other rivers in Indonesia for which P3SA will be prepared.
3. Possible Maximum Flood (PMF) will be disregarded in this project on a ground that it is quite difficult to estimate the accurate figure due to the insufficient meteorological-hydrological data existing in and round the project area.


Spillway Type

4. The brief explanation on the unnecessary of the emergency spillway shall be made by the Survey Team, though it has been verified that the spillway type IV stipulated in the letter of Ref.No.: JFC-07/81 is the optimum for the proposed Bili-Bili dam.

5. The storage capacity for water utilization described in Table 1 of the letter with Ref.No.: JFC-07/81, which indicates benefit derived from each type of the spillway should be transferred to the indication in the monetary terms for clear comparison with the construction cost of the spillway.

Jakarta, August 11, 1981

  
Katsuhisa Abe  
Team Leader, JICA Survey  
Team for Jeneberang River  
Flood Control Project  
(Phase II)

  
for Ir. Sarbini Ronodibroto  
Director of Planning and  
Programming of the Directorate  
General of Water Resources  
Development, Ministry of  
Public Works.

List of attendants :

- |                         |                              |
|-------------------------|------------------------------|
| 1. Ir. Edi Wahab M.Sc.  | Dit. Bina Program Pengairan. |
| 2. Ir. Rusbini          | - " -                        |
| 3. Ir. Sudiyanto        | - " -                        |
| 4. Ir. Adhi Suyanto     | - " -                        |
| 5. Ir. Eddy Wahyono     | - " -                        |
| 6. Djoko Sasongko M.Sc. | Dit. Sungai                  |
| 7. Ir. Ibnu Kasiro      | Dit. P.M.A.                  |
| 8. Ir. Suherman         | - " -                        |
| 9. Ir. A. Djollo Odang  | Bag. Pengairan DPU Sul-Sel.  |
| 10. Ir. Syamsul Arida   | Sub P3SA Sulawesi Selatan    |
| 11. Ir. Djoko Santoso   | - " -                        |
| 12. Ir. Sunarno         | Proyek Brantas               |
| 13. Ir. Sukistijono     | - " -                        |
| 14. Ir. David S.        | Prosida                      |
| 15. Mr. K. ABE          | JICA Survey Team             |



**MINUTES OF MEETING  
ON  
THE INTERIM REPORT  
OF  
THE JENERBERANG RIVER FLOOD CONTROL PROJECT (PHASE II)**

An explanatory meeting on the Interim Report of the Jeneberang River Flood Control Project (Phase II) was held in D.P.U., Jakarta on August 27, 1981 between the Indonesian Government and the JICA Survey Team with an attendance of the Advisory Committee. All the contents in the Interim Report have been generally agreed.

The following items were discussed and agreed upon by and between both parties.

1. A further study will be conducted for the effectiveness derived from closing the right river course such as prevention from sedimentation in the harbor and development in the delts area.
2. In the previous study, overall flood control study had been conducted covering the Jeneberang river basin including the Jenelata river. The study results will be presented in the Draft Final Report.
3. Contents of the previous study will be described in the appendix of the draft final report.
4. Resettlement which will be required for the implementation of this project will be planned by the Indonesian Government, as agreed in the Planning Criteria.
5. The location and number of new rainfall stations in the upper reaches of the Bili-Bili dam site will be recommended.
6. The construction cost and schedule for Sabo dams will be estimated.
7. Potential of new irrigable area will be described and a further study will be recommended.

8. The crop evapotranspiration will be examined by the Hargreave method.

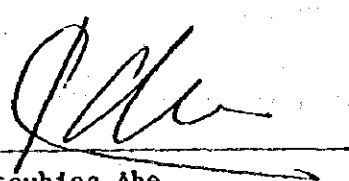
9. Diversion requirement for the irrigation channel will be calculated by using a water conveyance efficiency of 0.72.

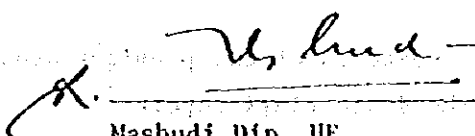
10. Hydro power generation plan will be studied on the basis of up-to-date data including power demand forecast which is planned by PLN.

11. Questions in writing regarding the geological aspects will be answered by the geologist assigned to this project.

12. In response to the comments from the Strengthening Project of Directorate of Planning and Programming, a further study will be made in Japan.

12. Comments on the Iterim Report should be informed within one month after the meeting.

  
Katsuhisa Abe  
Team Leader  
JICA Survey Team for Jeneberang  
River Flood Control Project (Phase II)

  
Mashudi Dip. IIE  
Kasubdit Perencanaan  
Pengembangan Wilayah  
Sungai (P2WS)

# LIST OF ATTENDANTS

## 1. The Indonesian Government

Ir. Mashudi	Directorate of Planning and Programming, DGWRD
Ir. Rusbini	- " -
Ir. Sudiyanto	- " -
Ir. Suhjto	- " -
Ir. Danamihardja	- " -
Drs. Subandiya	- " -
Ir. Thahir	Directorate of Irrigation
Mr. Busio BLE	- " -
Mr. Djoko Sasongko MSe	Directorate of Hydrolic Engineering
Mr. Anwar Nakmur	- " -
Ir. Syamsul Arida	P3SA South Sulawesi
Ir. Supriya	Counterpart of Jeneberang River Project
Ir. Sunarya	- " -
Ir. Sriyatno	- " -
Ir. Nobel	PROSIDA
Ir. Sukistiyono	Brantas Project
Ir. Kusumarini	- " -
Mr. Umar Lakunnu	Bappeda of South Sulawesi Province
Mr. Kencana Sebayang	Bappeda of Kotamadya Ujung Pandang
Ir. F. Parapat	P.L.N.
Ir. Azwani	- " -
Mr. M. Yuasa	Colombo Plan Expert, Dit of Irrigation
Mr. M. Matsui	- " -
Mr. Y. Takano	- " - Dit of River
Mr. West	Strengthening expert of Dit. of Planning and Programming, DGWR
Mr. Paterson	- " -
Mr. Youngman	- " -

## 2. The Japanese Government and Survey Team

Mr. N. Murata	JICA / Advisory Committee
Mr. K. Takeuchi	- " -
Mr. H. Yaoi	JICA, Tokyo
Mr. Goto	JICA, Jakarta
Mr. K. Abe	Leader of the Survey Team
Mr. A. Yoshino	Survey Team
Mr. H. Kimura	- " -
Mr. K. Ikari	- " -
Mr. M. Otagawa	- " -
Mr. K. Shimomura	- " -

MINUTES OF MEETING  
ON  
DRAFT FINAL REPORT  
OF  
THE JENERBERANG RIVER FLOOD CONTROL PROJECT (PHASE II)

**I. INTRODUCTION**

An explanatory meeting on the draft final report of the said project was held between Directorate General of Water Resources Development and the JICA Team/Advisory Committee in Jakarta on January 9, 1982. A list of attendants is attached hereto.

The meeting was started with the opening address of Mr. Sarbini, Director of Planning and Programming, DGWRD and followed by introductory speech on the background of the project of Mr. Mashudi and Mr. Murata, which is summarized as follows;

- 1) Countermeasures against flood damage in and around Ujung Pandang city were studied by JICA team in 1979 through providing river improvement works below Sungguminasa and the drainage system improvement works in the city.
- 2) To grade up flood control efficiency, a further study was conducted by JICA Team in 1981 in consideration of providing a reservoir.
- 3) The proposed reservoir could develop, in addition to flood control capacity, water resources for public water, irrigation and hydro-power.
- 4) On the above-mentioned study process, the flood control plan was studied on feasibility study levels, while a study on other sectors were carried out on pre-feasibility levels to justify the dam construction plan.

**II. DISCUSSION ITEMS**

After the introductory speech, the team leader, Mr. Katsuhisa Abe, explained broadly the contents of the draft final report. Most of the contents have been agreed upon between both parties. The following are the items which have been discussed and newly decided during the meeting.


1. It will be proved more in details in the final report that crest height of 105 m is the optimum size of Bili-Bili dam from technical and economic view-points.
2. Sites of borrow pit and quarry which will be required for dam construction will be indicated precisely in the final report.
3. Power generation benefit would be re-calculated by using the method of Saguling dam project, if it is suitable for the study level of the project.

4. With regard to Fig. 4-21 on Page 132 of the main report, determination of annual generated energy will be examined by calculating IRR.
5. Monthly discharge at both Bili-Bili and Kampili will be incorporated in the final report.
6. Economic price of "Gaba" will be applied to calculation of irrigation benefit.
7. More detailed description on irrigation and flood control benefits will be incorporated in the final report.
8. The JICA Team considers that price increase of commodities including oil is covered by price contingency.
9. Further comments in writing which will be informed the JICA Team within one month after the meeting will be answered in writing and incorporated in the final report if appropriate.

Jakarta, January 9, 1982



Katsuhisa Abe  
Team Leader of the Jeneberang  
River Flood Control Project  
(Phase II)



Ir. Mashudi Dipl. HE.  
Chief of Sub Directorate of River  
Basin Development Planning,  
Directorate of Planning and Programming

## LIST OF ATTENDANTS

### 1. The Indonesian Government

Ir. Sarbini Ronodibroto	Directorate Planning and Programming, DGWRD.
Ir. Mashudi	- " -
Ir. Edi A. Wahab	- " -
Ir. Rusbini	- " -
Ir. Sudiyanto	- " -
Ir. Ferry Putuhena	- " -
Ir. Suharto	- " -
Ir. Nurtantomo	- " -
Ir. Paridjo	- " -
Drs. Syamsul Nasution	- " -
Drs. Ch. Nasri	- " -
Ir. Ngadiyono	- " -
Mr. A. Marzuki	Directorate of Rivers, DGWRD
Ir. Sampudjo	Directorate of Hydrolic Engineering, DGWRD
Ir. Petrus	- " -
Ir. Yanthahin	P3SA South Sulawesi
Ir. Syamsul Areda	- " -
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## 2. The Japanese Government and Survey Team

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Mr. N. Murata	JICA/ Advisory Committee
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Mr. K. Miyoshi	JICA Coordinator
Mr. K. Abe	Leader of the Survey Team
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