

REPUBLIKA NG PILIPINAS
PAMBANSANG KORPORASYON SA ELEKTRISIDAD
(NATIONAL POWER CORPORATION)

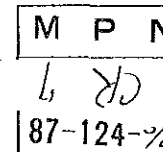
REPORT
FOR
STUDY ON HYDROPOWER POTENTIALS
IN LUZON ISLAND

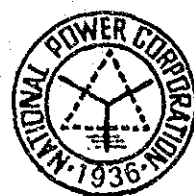
APPENDIX - B

AUGUST 1987



JAPAN INTERNATIONAL COOPERATION AGENCY





REPUBLIKA NG PILIPINAS
PAMBANSANG KORPORASYON SA ELEKTRISIDAD
(NATIONAL POWER CORPORATION)

REPORT
FOR
STUDY ON HYDROPOWER POTENTIALS
IN LUZON ISLAND

APPENDIX - B

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AUGUST 1987



JAPAN INTERNATIONAL COOPERATION AGENCY

国際協力事業団		
受入 月日	'87.9.29	L11B
登録 No.	16747	61.7 MPN

C O N T E N T S

GENERAL AND RIVER BASIN DEVELOPMENT

TITLE	DRWG. NO.	REMARKS
STUDIED SITE LOCATION MAP	00-01	
ABRA RIVER BASIN DEVELOPMENT	00-02	
ABULOG RIVER BASIN DEVELOPMENT	00-03/04	
CHICO RIVER BASIN DEVELOPMENT	00-05/06	
AGNO RIVER BASIN DEVELOPMENT	00-07	
AGOS RIVER BASIN DEVELOPMENT	00-08	

LOCATION MAP AND GENERAL LAYOUT

SCHEME ID. NO.	SCHEME NAME	TYPE	DRWG. NO.	REMARKS
1-003-00-02-0-2	NAGUILIAN	ROR	01/02	
1-010-00-01-1-2	LUYA	ROR	03/04	
1-010-00-02-0-2	BAKUM	ROR	05/06	
1-010-01-04-0-2	AMBURAYAN	ROR	07/08	
1-022-00-05-0-1	SUP0	RES	09/10	
1-022-00-05-4-1	SUP0	RES	11/12	Combined with ETEB
1-022-00-06-0-1	ETEB	RES	13/14	
1-022-00-10-0-2	ABRA	ROR	15/16	
2-006-00-01-0-1	SISIRITAN	RES	17/18	
2-006-00-01-0-1	SISIRITAN	RES	17/19	Combined with AGBULU
2-006-00-01-2-1	SISIRITAN	RES	20/21	Combined with AGBULU and BULU
2-006-00-03-0-1	BULU	RES	22/23	
2-006-00-03-1-1	BULU	RES	24/25	Combined with AGBULU
2-006-01-04-0-1	NABABARAYAN	RES	26/27	
2-006-01-05-0-1	DIBAGAT	RES	28/29	
2-006-01-06-0-1	AGBULU	RES	30/31	
2-006-01-08-0-2	APAYAO	ROR	32/33	

SCHEME ID. NO.	SCHEME NAME	TYPE	DRWG. NO.	REMARKS
2-008-03-03-1-1	BASAO	RES	34 / 35	Combined with SADANGA
2-008-03-04-0-2	CHICO - IR	ROR	36 / 37	
2-008-03-04-1-2	CHICO - IR	ROR	36 / 37	Combined with SADANGA Same with Indepen. CHICO-IR
2-008-03-05-0-1	SADANGA	RES	38 / 39	
2-008-03-05-1-1	SADANGA	RES	38 / 40	Combined with CHICO-IR
2-008-03-06-0-1	CHICO - 2R	ROR	36 / 41	
2-008-03-07-0-2	CHICO - 3R	ROR	36 / 42	
2-008-03-09-0-2	CHICO - 4R	ROR	36 / 43	
2-008-05-15-0-2	SALTAN	ROR	44 / 45	
2-008-06-22-0-2	PASIL	ROR	46 / 47	
2-008-06-23-0-2	TANUDAN	ROR	48 / 49	
2-008-07-24-0-1	BANTAY	RES	50 / 51	
2-008-14-34-0-1	MALIANO	RES	52 / 53	
2-008-20-46-0-2	IBULAO	ROR	54 / 55	
2-008-29-58-0-2	CASECNAN	ROR	56 / 57	
2-008-29-59-0-2	UPPER CASECNAN	ROR	56 / 58	
3-077-00-04-1-1	TABU	RES	59 / 60	Combined with BINGA
3-077-00-06-0-2	AGNO - 2	ROR	61 / 62	
3-077-00-07-0-2	AGNO - 3	ROR	61 / 63	
4-007-00-01-0-1	KANAN	RES	64 / 65	
4-007-00-01-1-1	KANAN	RES	66 / 67	Combined with UPPER AGOS - 2
4-007-00-05-0-1	UPPER AGOS - 2	RES	68 / 69	
4-115-01-01-0-1	WAWA	RES	70 / 71	
5-014-01-01-0-1	BOSIGON	RES	72 / 73	

(ROR = Run-Of-River Type : RES = Reservoir Type)

C O N T E N T S

GENERAL DEVELOPMENT PLAN

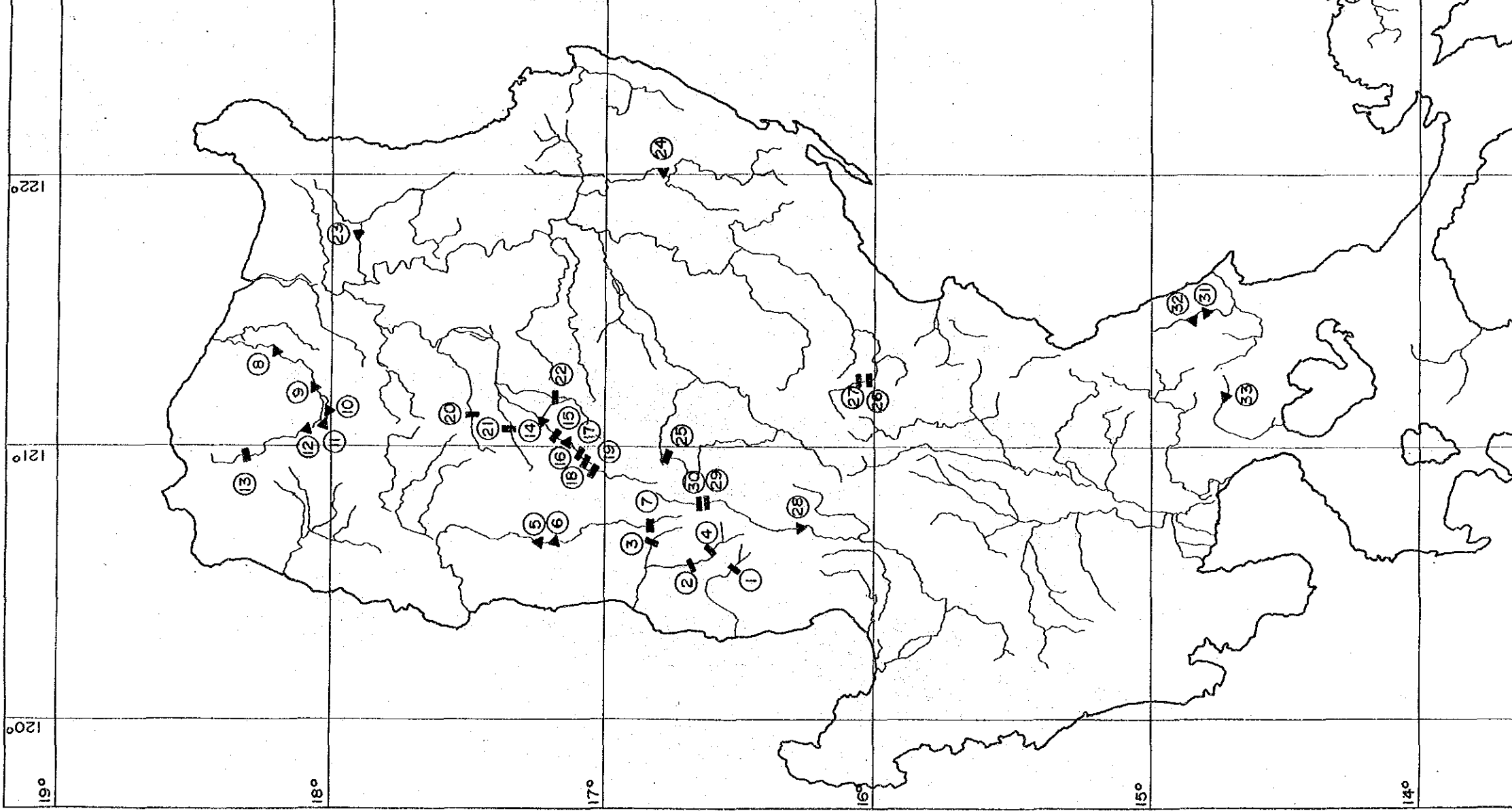
SCHEME ID. NO.	SCHEME NAME	TYPE	REMARKS
1-003-00-01-0-1	BAGULIN	RES	
1-010-00-01-0-1	LUYA	RES	Alternative of LUYA (ROR)
2-005-00-02-0-1	ZIMIGUI	RES	
2-008-04-01-0-1	MATALAG	RES	
2-008-06-19-0-1	NANENG	RES	
2-008-08-26-0-1	DALAYA	RES	
2-008-13-32-0-1	TABUK	RES	
2-008-14-35-0-1	ILAGAN - 1	RES	
2-008-15-38-0-1	BALLASANG	RES	
2-008-15-39-0-1	ABUAN - 1	RES	
2-008-26-50-0-1	PINARIPAD	RES	
2-008-29-60-0-1	UPPER CASECNAN-2	RES	
2-032-00-01-0-1	TABOAN	RES	
2-039-00-01-0-1	DIKATAYAN	RES	
2-047-00-01-0-1	PALANAN	RES	
3-023-00-01-0-1	UMIRAY - 3	RES	
3-023-00-02-0-1	UPPER UMIRAY	RES	

SCHEME ID. NO.	SCHEME NAME	TYPE	REMARKS
1-022-02-15-0-2	BINONGAN - R	ROR	
1-022-06-27-0-2	DAMANIT	ROR	
1-022-05-23-0-2	IKMIN	ROR	
1-022-06-29-0-2	UTIP	ROR	
1-047-00-02-0-2	BULU - 2	ROR	
2-008-05-18-0-2	BABACA	ROR	
2-008-08-27-0-2	TUGUEGARAO	ROR	
2-008-22-47-0-2	MATUNO - 1R	ROR	
2-008-22-48-0-2	MATUNO - 2R	ROR	
2-008-28-53-0-2	GANIP	ROR	
3-077-04-10-0-2	PAMPANG	ROR	

(ROR = Run - of - River Type ; RES = Reservoir Type)

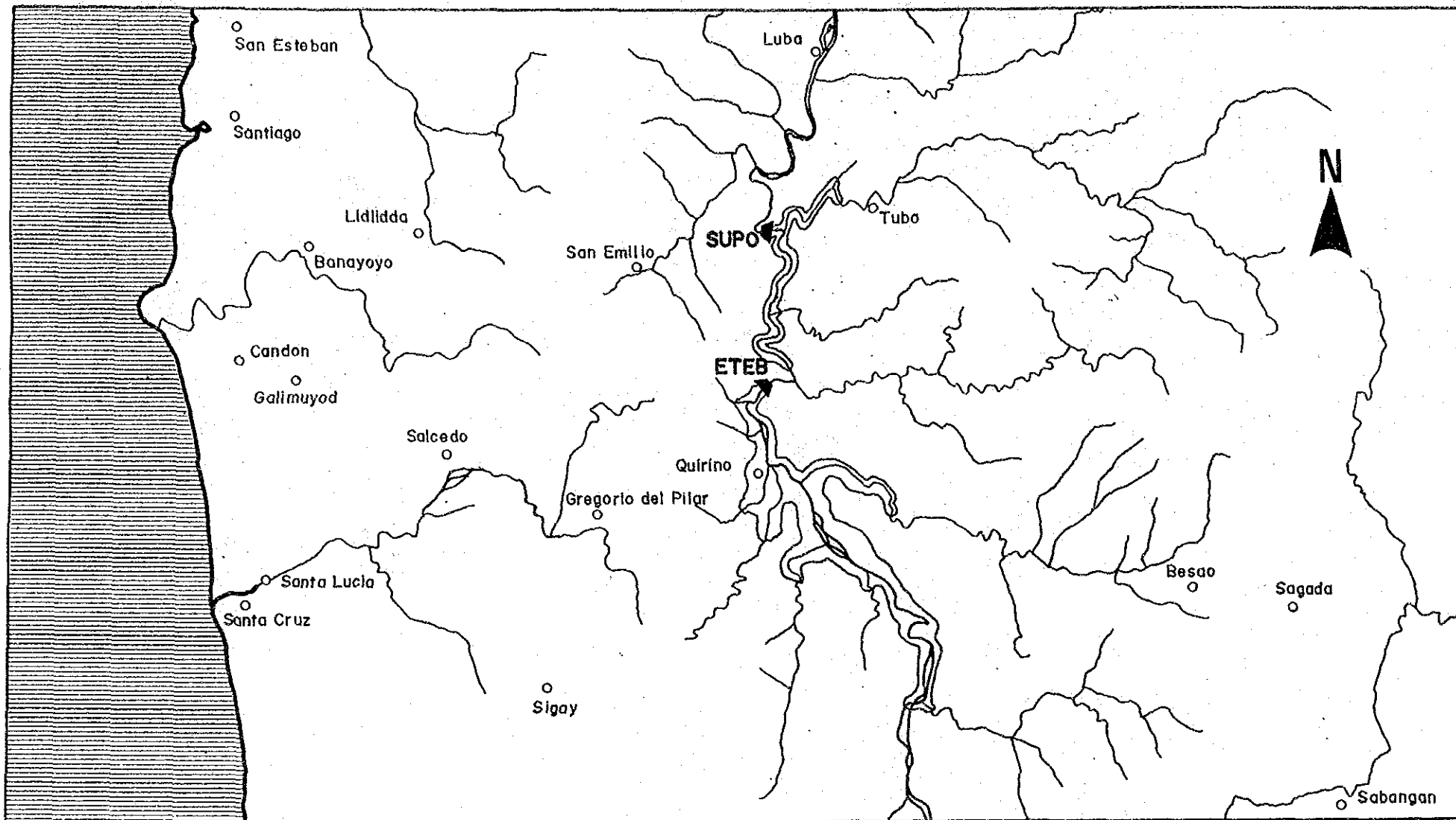
GENERAL AND RIVER BASIN DEVELOPMENT

SCHEME ID. NO.	SCHEME NAME	TYPE	DRWG. NO.
1	1-003-00-02-0-2 NAGUILIAN	ROR	01 / 02
2	1-010-00-01-1-2 LUYA	ROR	03 / 04
3	1-010-00-02-0-2 BAKUM	ROR	05 / 06
4	1-010-01-04-0-2 AMBURAYAN	ROR	07 / 08
5	1-022-00-05-0-1 SUPO	RES	09 - 12
6	1-022-00-06-0-1 ETEB	RES	13 / 14
7	1-022-00-01-0-2 ABRA	ROR	15 / 16
8	2-006-00-01-0-1 SISIRITAN	RES	17 - 21
9	2-006-00-03-0-1 BULU	RES	22 - 25
10	2-006-01-04-0-1 NABABARAYAN	RES	26 - 27
11	2-006-01-05-0-1 DIBAGAT	RES	28 / 29
12	2-006-01-06-0-1 AGBULU	RES	30 / 31
13	2-006-01-08-0-2 APAYAO	ROR	32 / 33
14	2-008-03-03-1-1 BASAO	RES	34 / 35
15	2-008-03-04-0-2 CHICO-1R	ROR	36 / 37
16	2-008-03-05-0-1 SADANGA	RES	38 / 39
17	2-008-03-06-0-2 CHICO-2R	ROR	36 / 41
18	2-008-03-07-0-2 CHICO-3R	ROR	36 / 42
19	2-006-03-09-0-2 CHICO-4R	ROR	36 / 43
20	2-008-05-15-0-2 SALTAN	ROR	44 / 45
21	2-008-06-22-0-2 PASIL	ROR	46 / 47
22	2-008-06-23-0-2 TANUDAN	ROR	48 / 49
23	2-008-07-24-0-1 BANTAY	RES	50 / 51
24	2-008-14-34-0-1 MALIANO	RES	52 / 53
25	2-008-20-46-0-2 IBULAO	ROR	54 / 55
26	2-008-29-58-0-2 CASECNAN	ROR	56 / 57
27	2-008-29-59-0-2 UPPER CASECNAN	ROR	56 / 58
28	3-077-00-04-1-1 TABU	RES	59 / 60
29	3-077-00-06-0-2 AGNO-2	ROR	61 / 62
30	3-077-00-07-0-2 AGNO-3	ROR	61 / 63
31	4-077-00-01-0-1 KANAN	RES	64 - 67
32	4-077-00-05-0-1 UPPER AGOS-2	RES	68 / 69
33	4-115-01-01-0-1 WAWA	RES	70 / 71
34	5-014-01-01-0-1 BOSIGON	RES	72 / 73



LEGEND:
 ▼ Reservoir Type Scheme
 ■ Run-Of-River Type Scheme

NATIONAL POWER CORPORATION	
SCHEME ID. NO.	
STUDIED SITE LOCATION MAP	
DATE	AUG. 1987
DRWG. NO.	00-01
JAPAN INTERNATIONAL COOPERATION AGENCY	



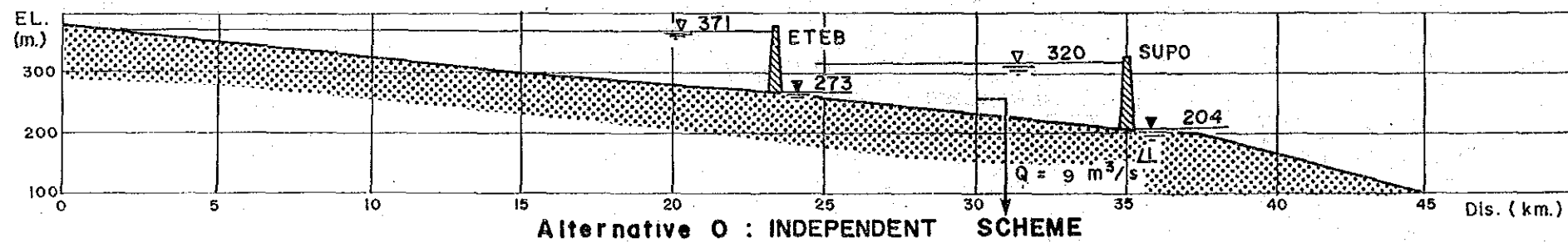
RIVER MAP scale 1:250,000

Notes :

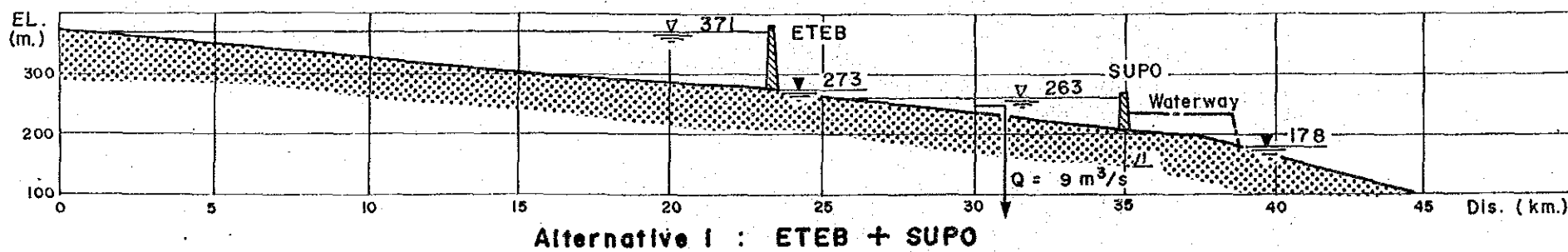
1. Ilocos Sur Transbasin Project for irrigation supply water.
2. ∇ FSL (Full Supply Level)
 ∇ TWL (Tall Water Level)

Reference Drwg. Nos.

SUPO	09 / 10
SUPO combined with ETEB	11 / 12
ETEB	13 / 14

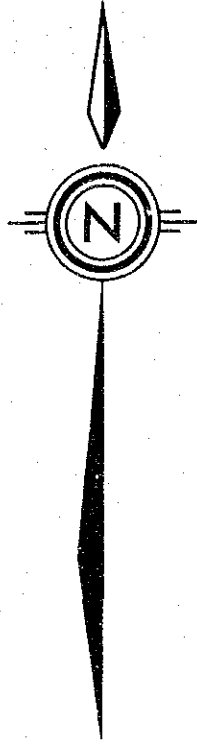


Alternative 0 : INDEPENDENT SCHEME

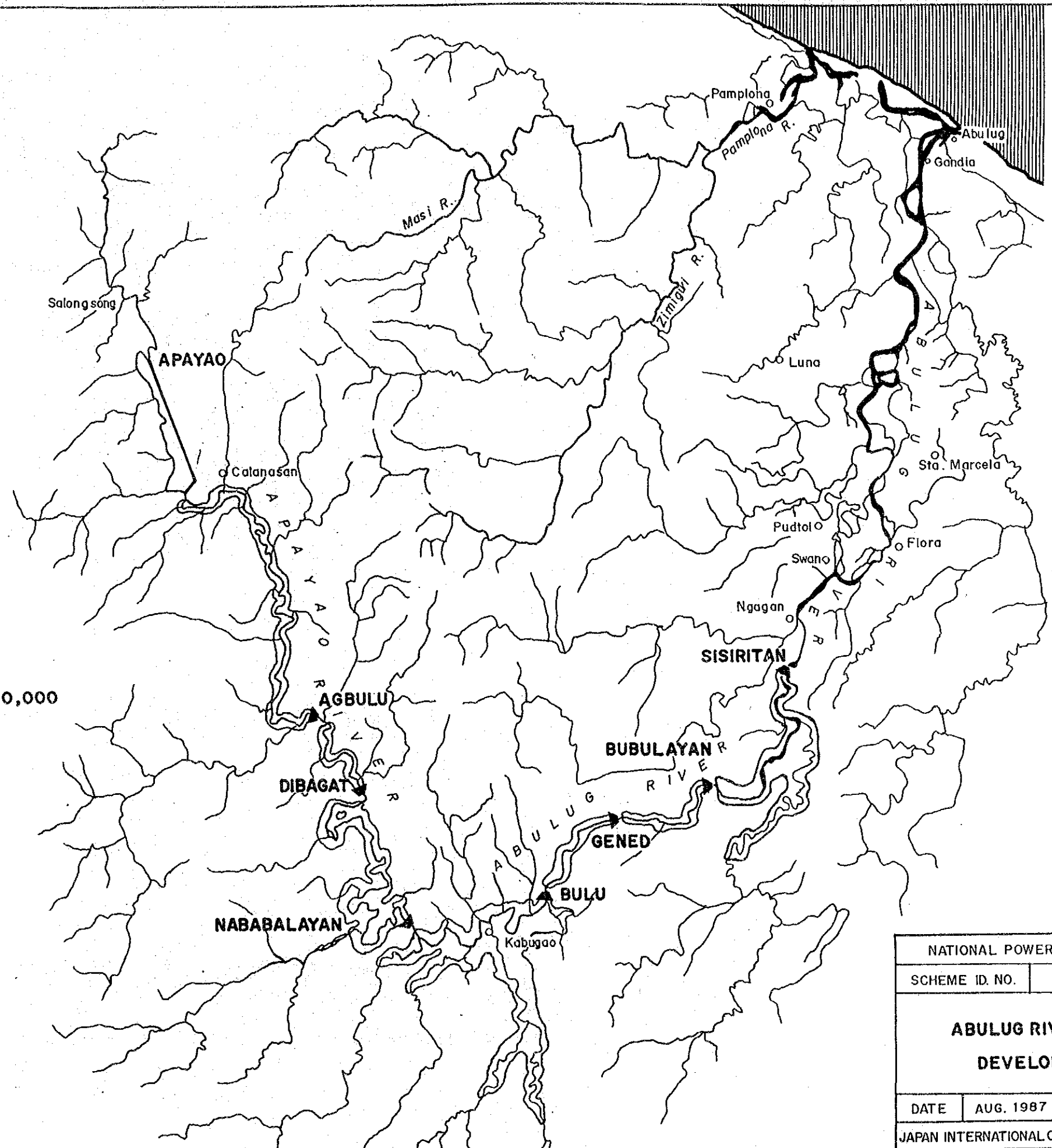


Alternative 1 : ETEB + SUPO

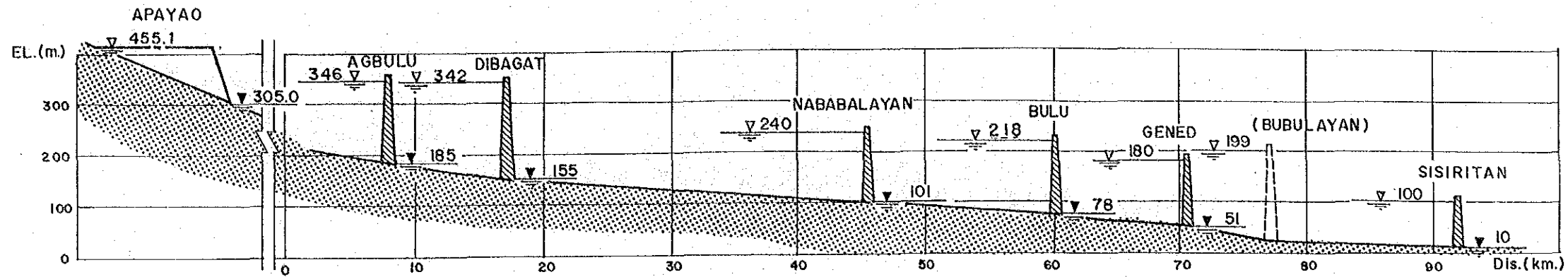
NATIONAL POWER CORPORATION			
SCHEME ID. NO.			
ABRA RIVER BASIN DEVELOPMENT			
DATE	AUG. 1987	DRWG. NO.	00-02
JAPAN INTERNATIONAL COOPERATION AGENCY			



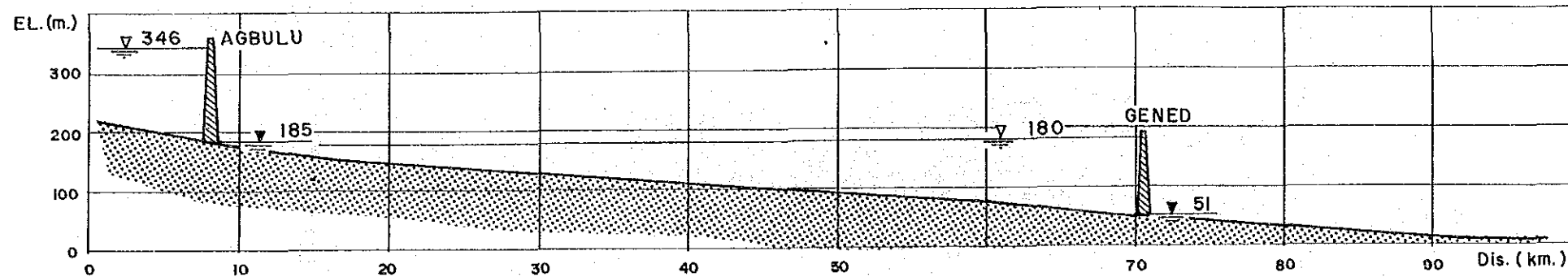
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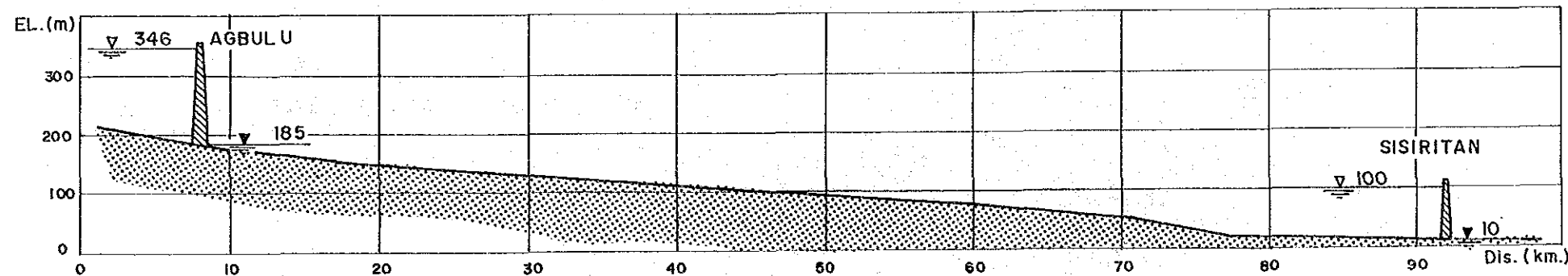
NATIONAL POWER CORPORATION			
SCHEME ID. NO.			
ABULUG RIVER BASIN DEVELOPMENT			
DATE	AUG. 1987	DRWG. NO.	00-03
JAPAN INTERNATIONAL COOPERATION AGENCY			



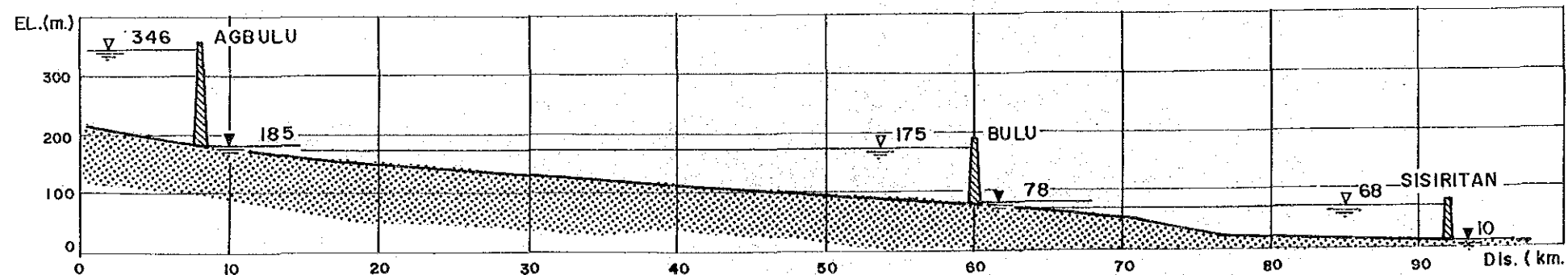
Alternative 0 : Independent Schemes



Alternative 1 : AGBULU + GENED



Alternative 2 : AGBULU + SISIRITAN



Alternative 3 : AGBULU + BULU + SISIRITAN

Notes :

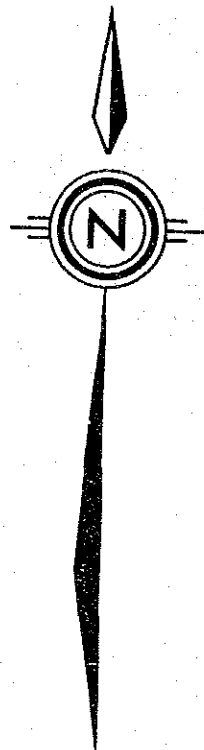
1. BUBULAYAN site is judged to be unsuitable for dam construction because of geological condition there.
2. GENED project feasibility study was done in 1979.
3. ∇ FSL (Full supply level)
 ∇ TWL (Tall water level)

Reference Drwg. No.

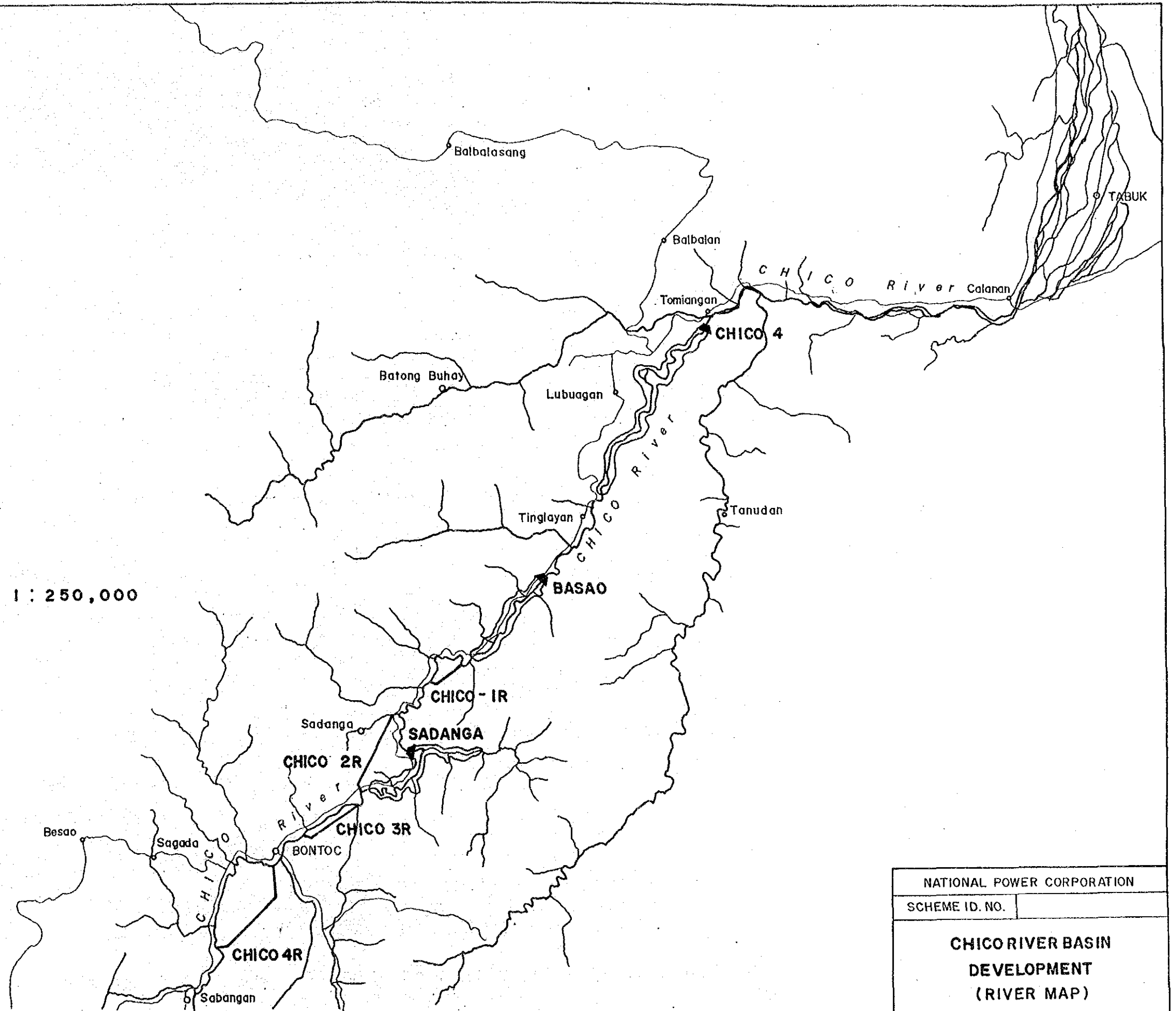
Drwg. No.

SISIRITAN	17 / 18
SISIRITAN with AGBULU	17 / 19
SISIRITAN with BULU and AGBULU	20 / 21
BULU	22 / 23
BULU with AGBULU	24 / 25
NABABALAYAN	26 / 27
DIBAGAT	28 / 29
AGBULU	30 / 31

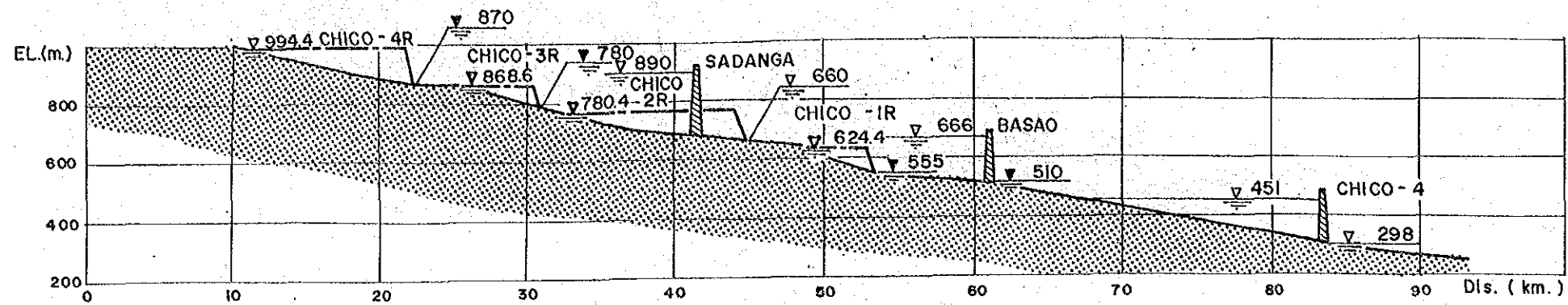
NATIONAL POWER CORPORATION			
SCHEME ID. NO.			
ABULOG RIVER BASIN DEVELOPMENT			
DATE	AUG. 1987	DRWG NO	00-04
JAPAN INTERNATIONAL COOPERATION AGENCY			



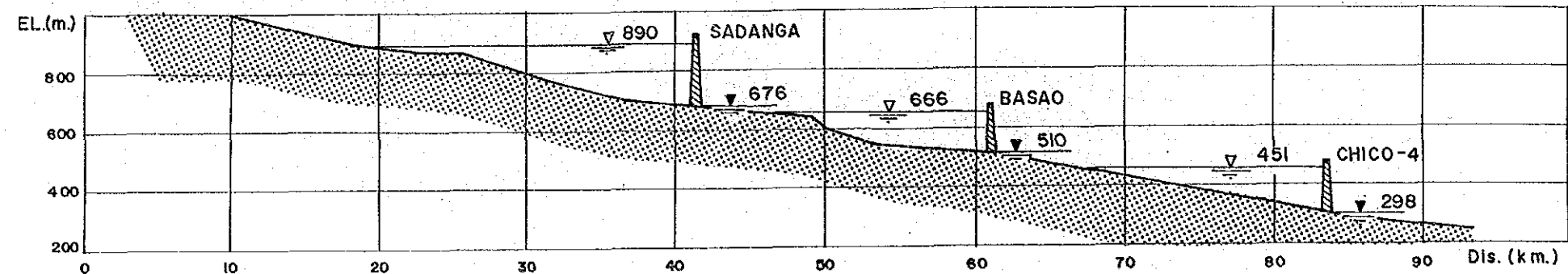
RIVER MAP scale 1 : 250,000



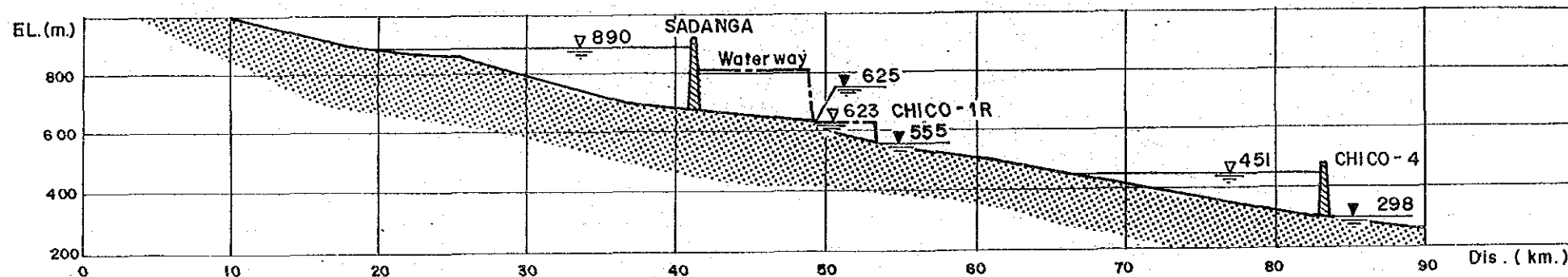
NATIONAL POWER CORPORATION			
SCHEME ID. NO.			
CHICO RIVER BASIN DEVELOPMENT (RIVER MAP)			
DATE	AUG. 1987	DRWG. NO.	00-05
JAPAN INTERNATIONAL COOPERATION AGENCY			



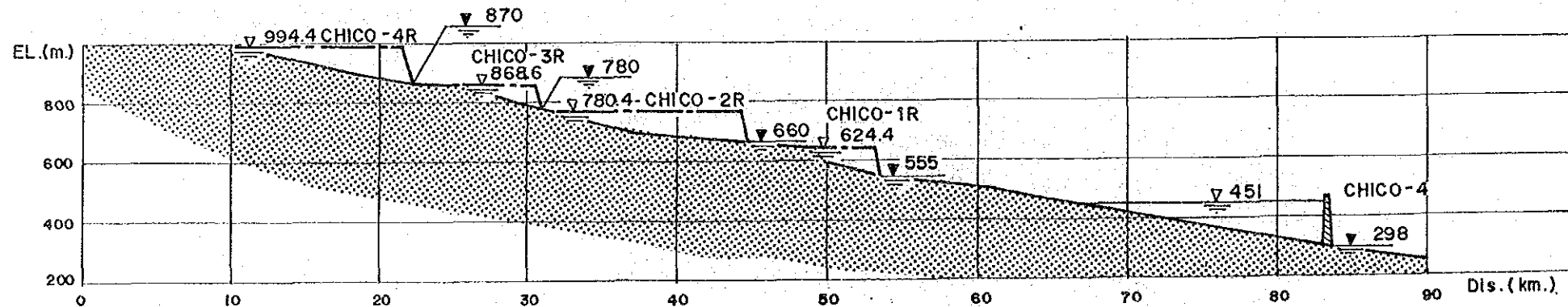
Alternative 0 : INDEPENDENT SCHEMES



Alternative 1 : SADANGA + BASAO + CHICO-4



Alternative 2 : SADANGA with waterway + CHICO-1R + CHICO-4



Alternative 3 : CHICO-4R + CHICO-3R + CHICO-2R + CHICO-1R + CHICO-4

Notes :

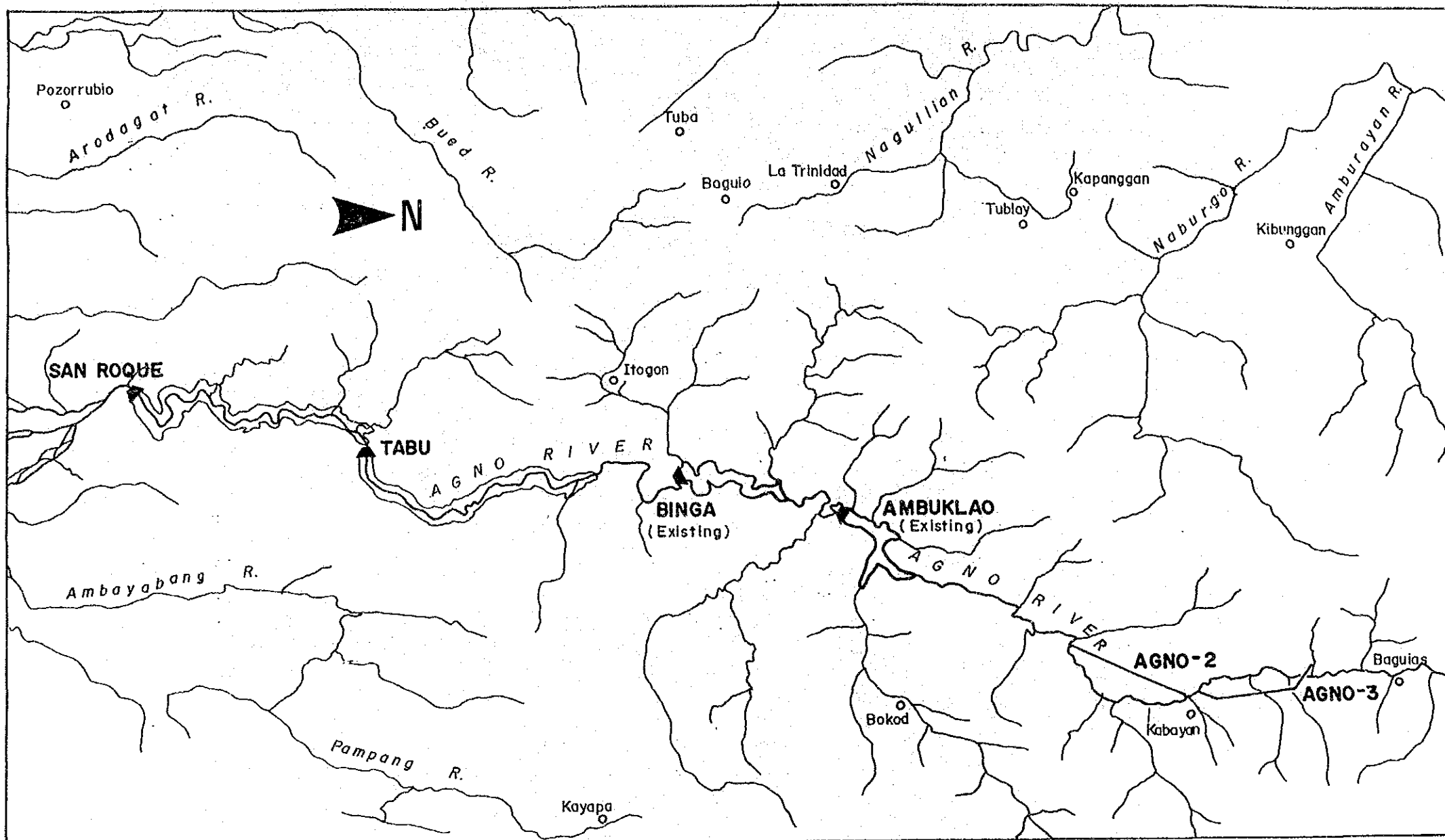
1. CHICO-4 project feasibility study was done in 1980.
2. ∇ FSL (Full supply level)
 ∇ TWL (Tail water level)

Reference Drwg. No.

Drwg. No.

BASAO combined with SADANGA	34 / 35
CHICO-1R	36 / 37
SADANGA	38 / 39
SADANGA combined with CHICO-1R	38 / 40
CHICO-2R	36 / 41
CHICO-3R	36 / 42
CHICO-4R	36 / 43

NATIONAL POWER CORPORATION		
SCHEME ID. NO.		
CHICO RIVER BASIN DEVELOPMENT (RIVER PROFILE)		
DATE	AUG. 1987	DRWG. NO. 00-06
JAPAN INTERNATIONAL COOPERATION AGENCY		



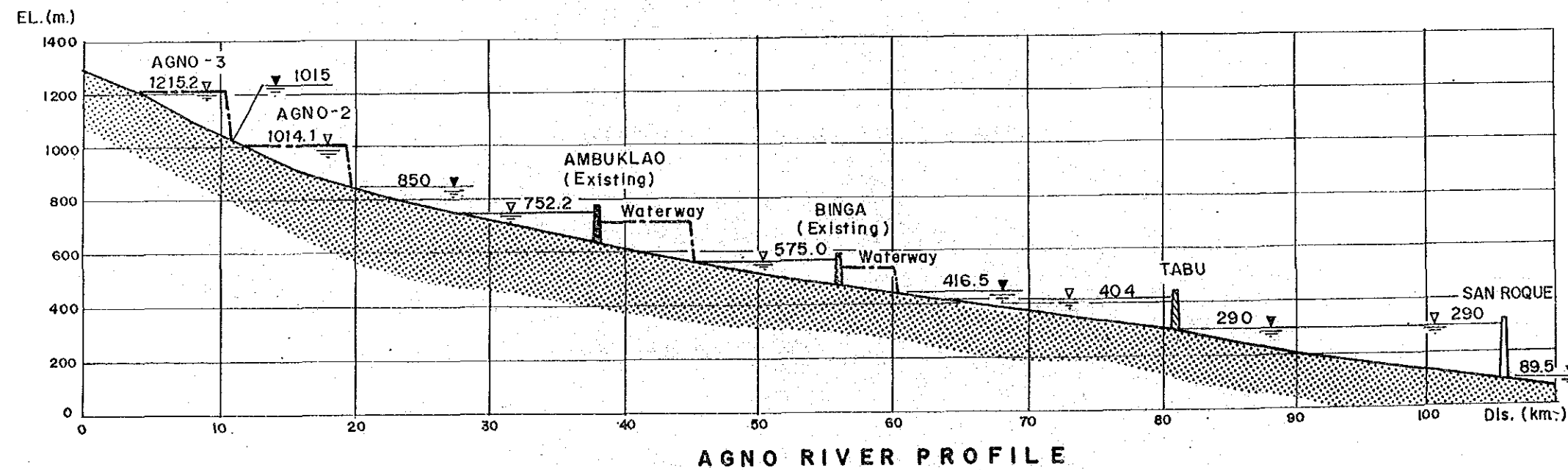
RIVER MAP scale 1:250,000.

Note :

1. SAN ROQUE project feasibility study was done in 1979.
2. ▽ FSL (Full supply level)
 ▽ TWL (Tail water level)

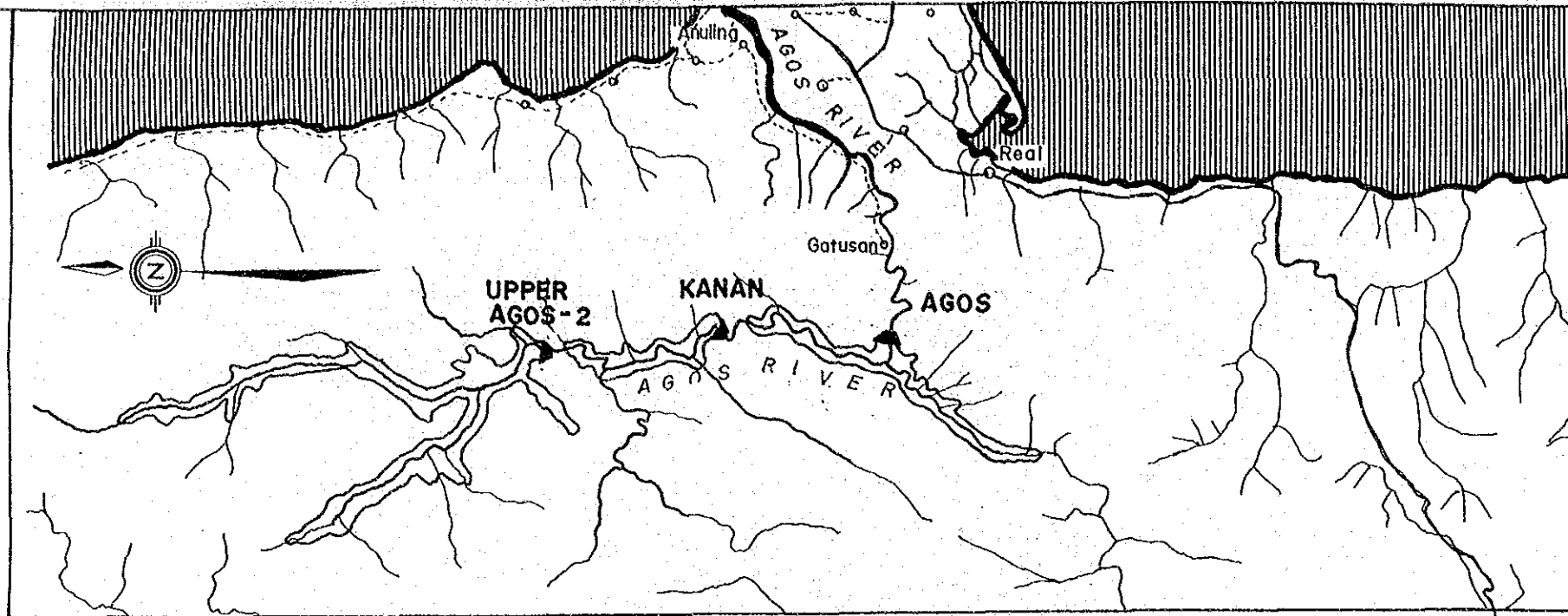
Reference Drwg. Nos. Drwg.No.

TABU	59 / 60
AGNO - 2	61 / 62
AGNO - 3	61 / 63

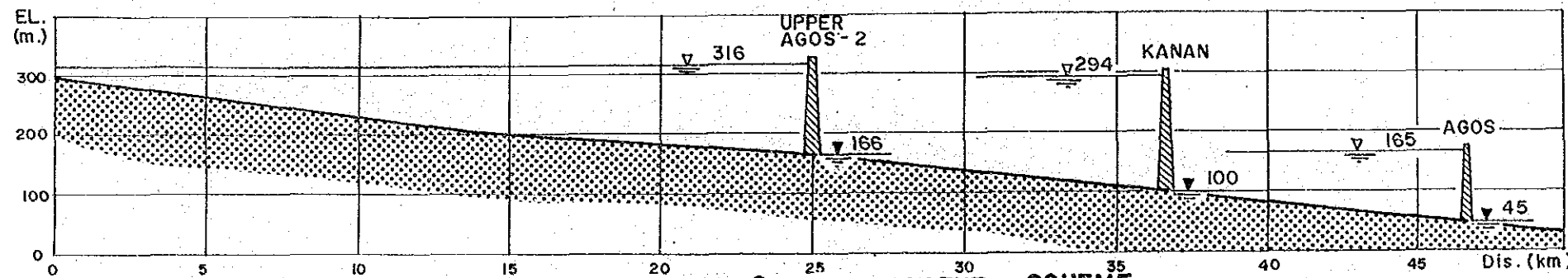


AGNO RIVER PROFILE

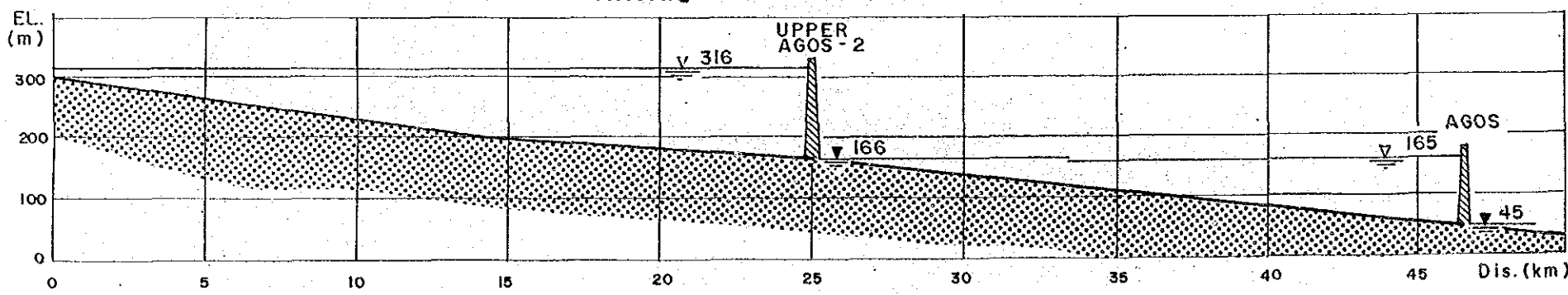
NATIONAL POWER CORPORATION			
SCHEME ID. NO.			
AGNO RIVER BASIN DEVELOPMENT			
DATE.	AUG. 1987	DRWG. NO.	00-07
JAPAN INTERNATIONAL COOPERATION AGENCY			



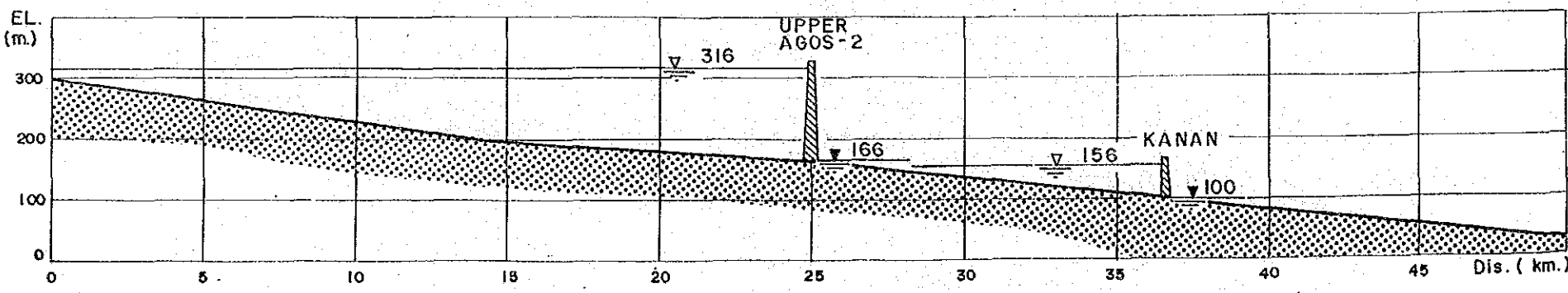
RIVER MAP scale 1:250,000



Alternative 0 : INDEPENDENT SCHEME



Alternative 1 : UPPER AGOS-2 + AGOS



Alternative 2 : UPPER AGOS-2 + KANAN

Note :

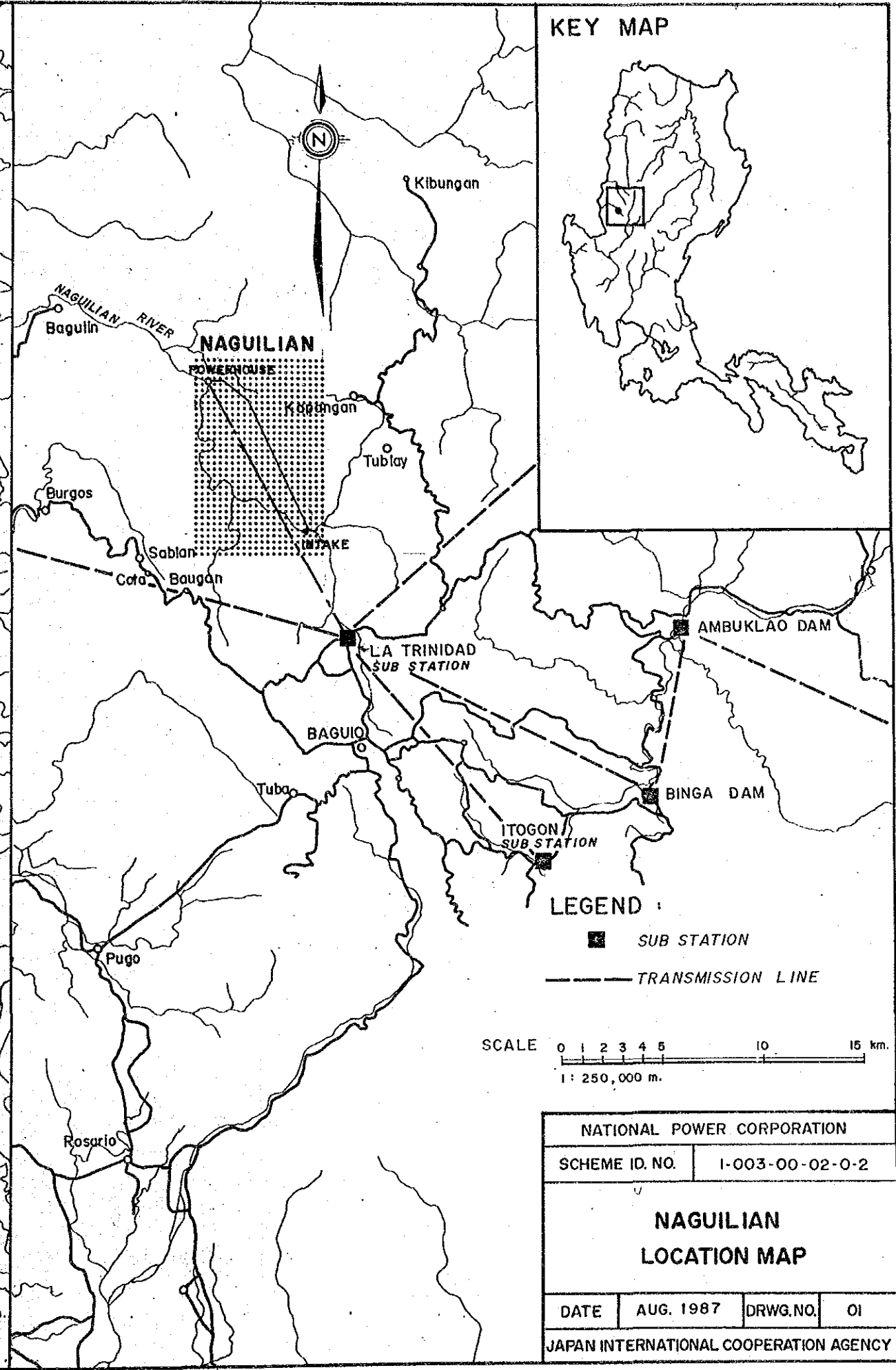
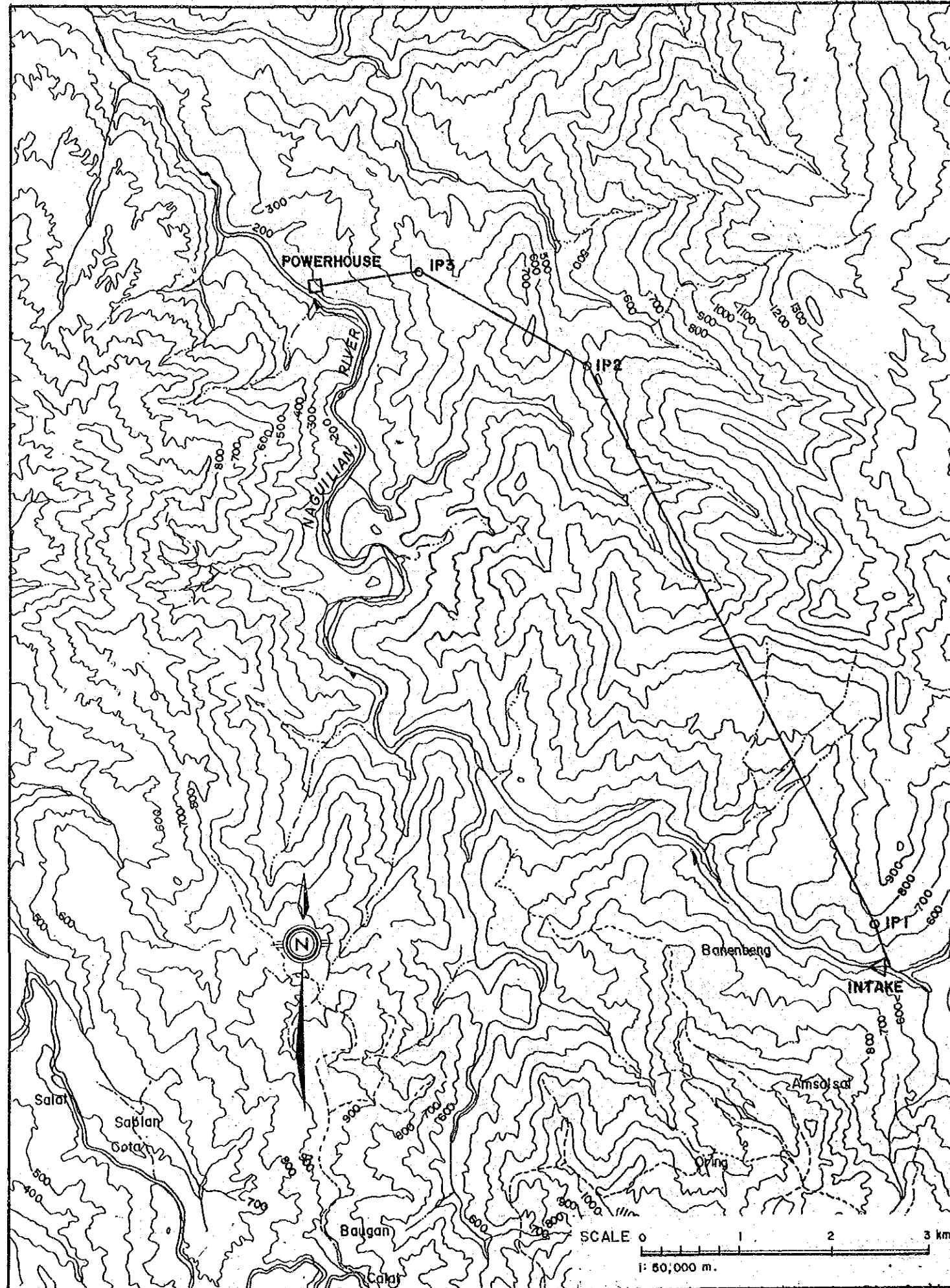
1. AGOS project feasibility study was done in 1980.
2. ∇ FSL (Full supply level) or Inlet Elev.
 ∇ TWL (Tail water level)

Reference Drwg. No.

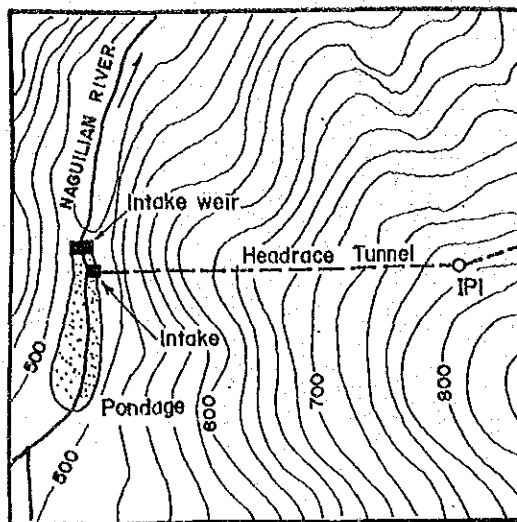
KANAN	64 / 65
KANAN combined with UPP. AGOS-2	66 / 67
UPPER AGOS-2	68 / 69

NATIONAL POWER CORPORATION			
SCHEME ID. NO.			
AGOS RIVER BASIN DEVELOPMENT			
DATE	AUG. 1987	DRWG. NO.	00-08
JAPAN INTERNATIONAL COOPERATION AGENCY			

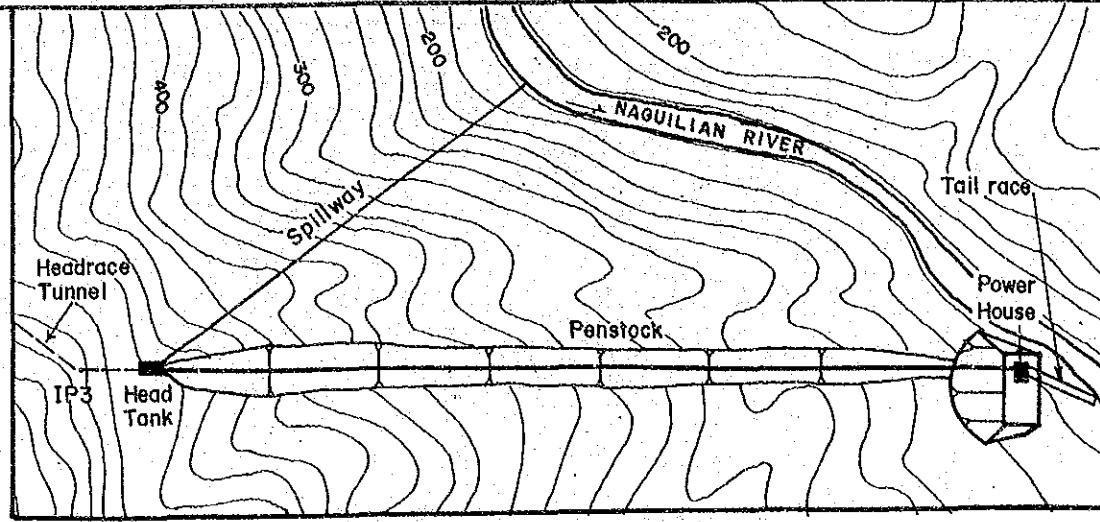
LOCATION MAP AND GENERAL LAYOUT



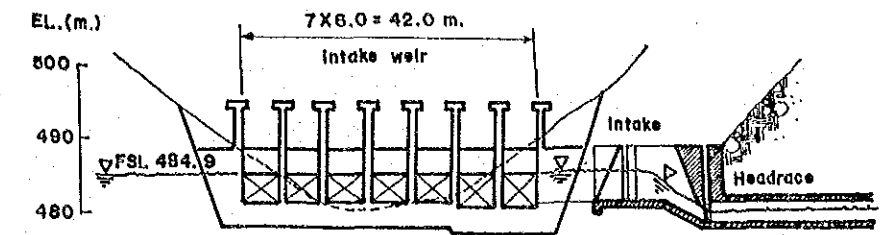
NATIONAL POWER CORPORATION			
SCHEME ID. NO.		I-003-00-02-0-2	
NAGUILIAN LOCATION MAP			
DATE	AUG. 1987	DRWG. NO.	01
JAPAN INTERNATIONAL COOPERATION AGENCY			



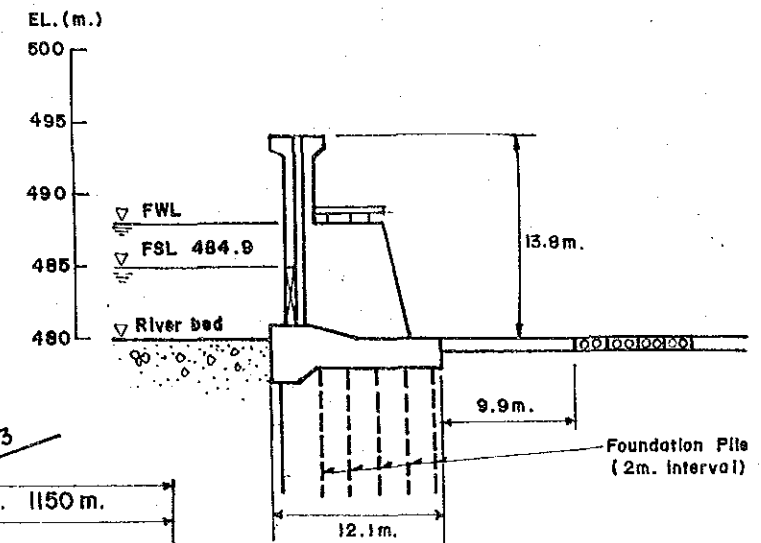
INTAKE PLAN S=1:10,000



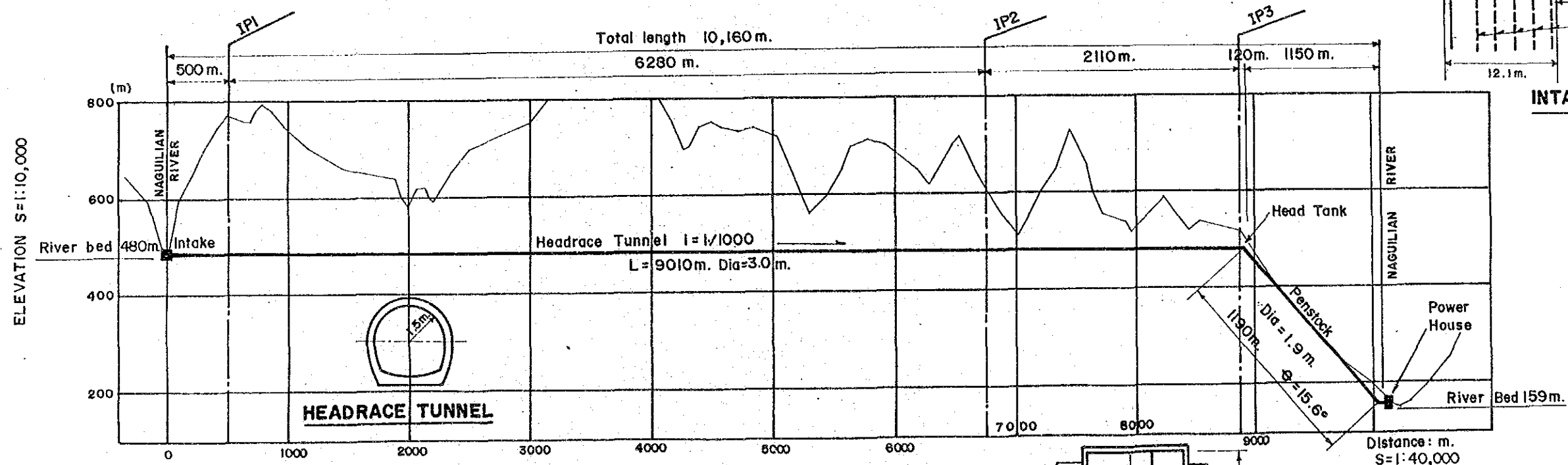
POWER HOUSE PLAN S=1:10,000



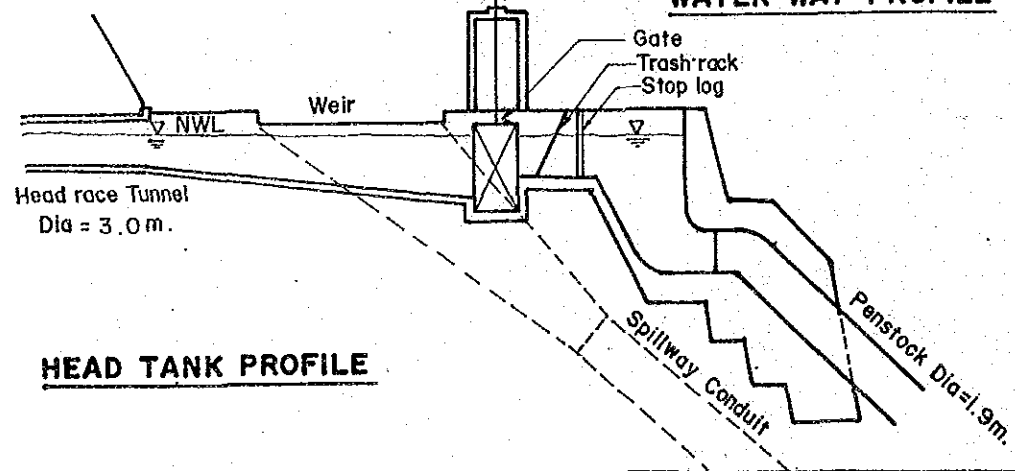
WEIR and INTAKE S=1:1000



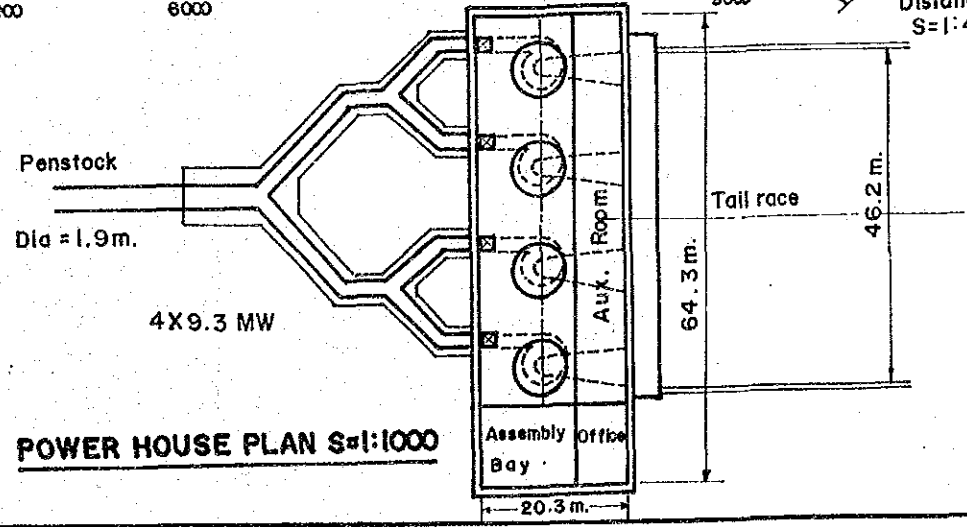
INTAKE WEIR SECTION S=1:500



WATER WAY PROFILE

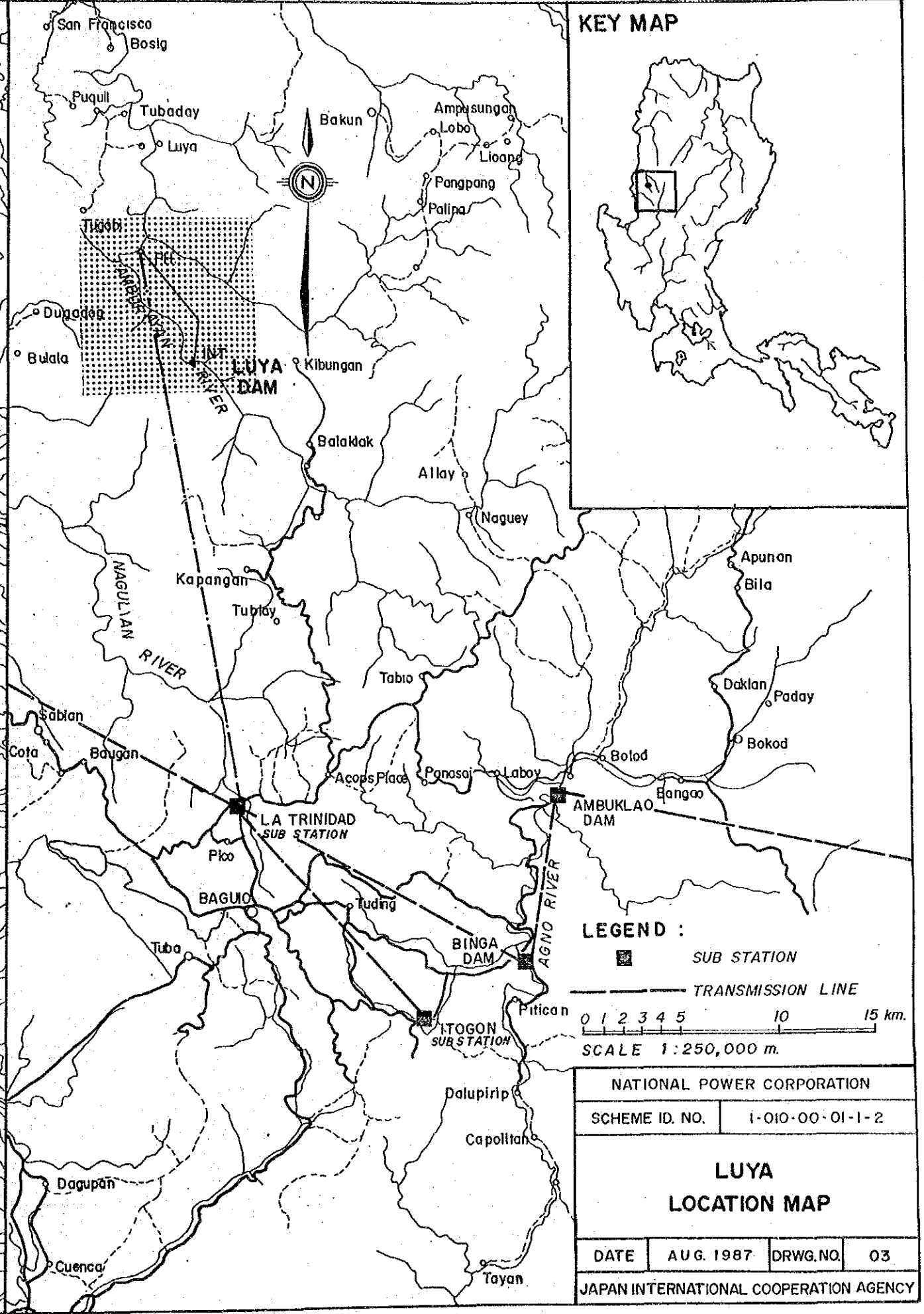
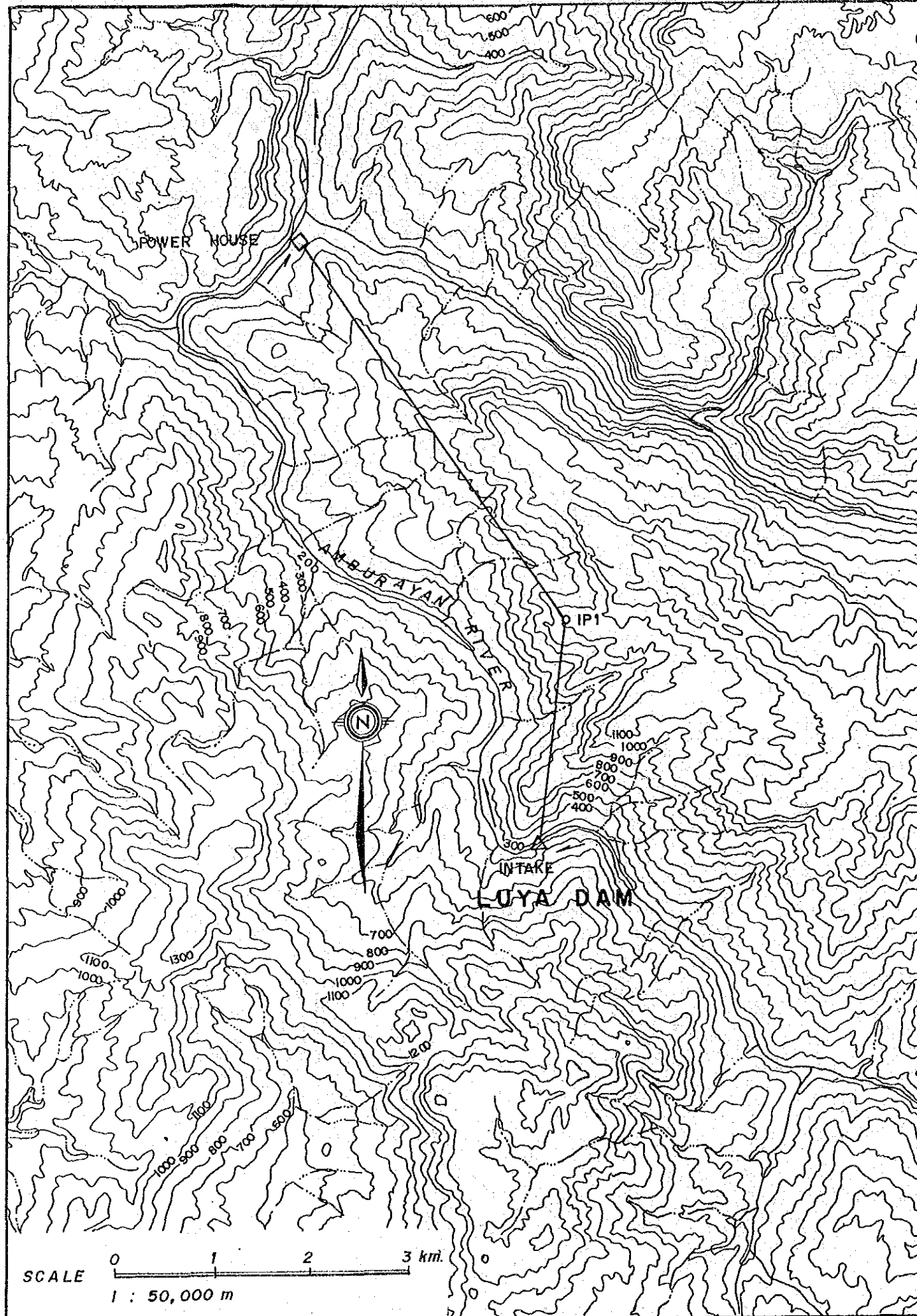


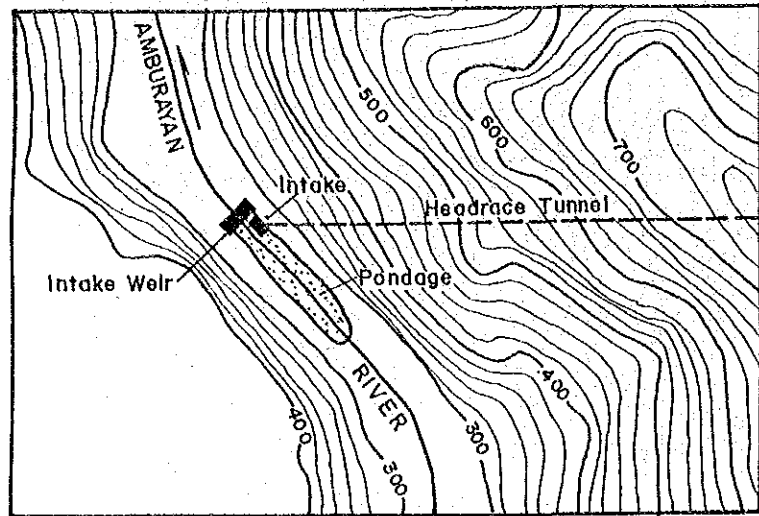
HEAD TANK PROFILE



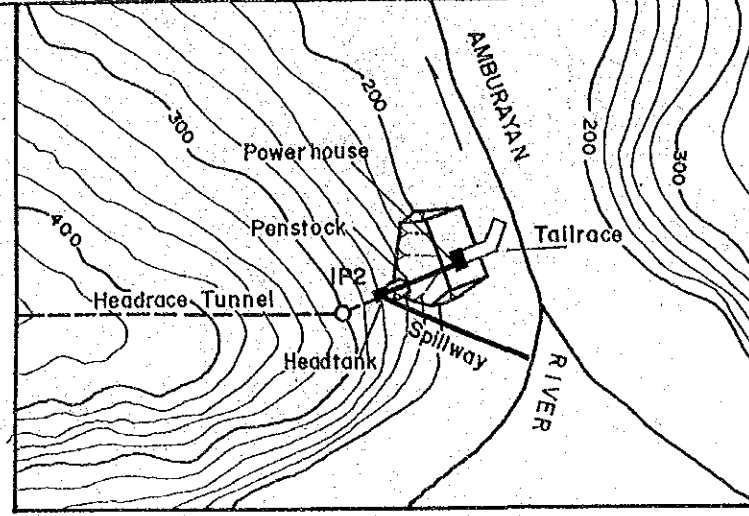
POWER HOUSE PLAN S=1:1000

NATIONAL POWER CORPORATION			
SCHEME ID. NO.		1-003-00-02-0-2	
NAGUILIAN GENERAL LAYOUT			
DATE	AUG. 1987	DRWG. NO.	02
JAPAN INTERNATIONAL COOPERATION AGENCY			

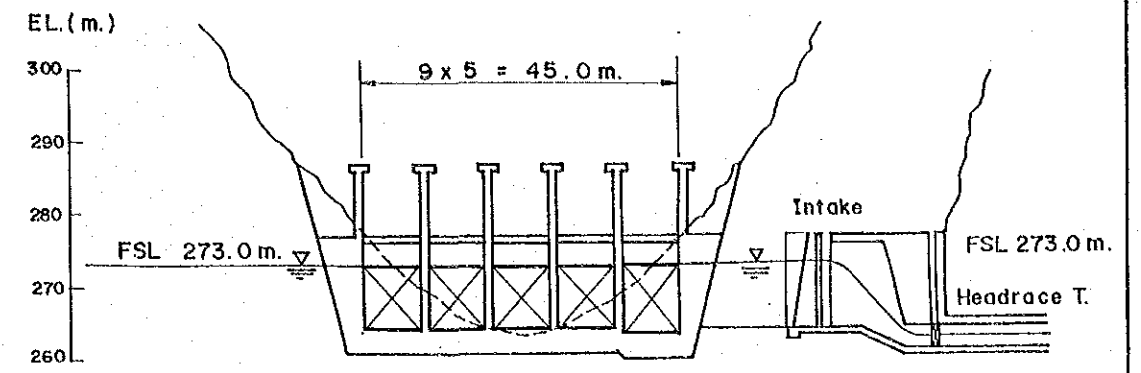




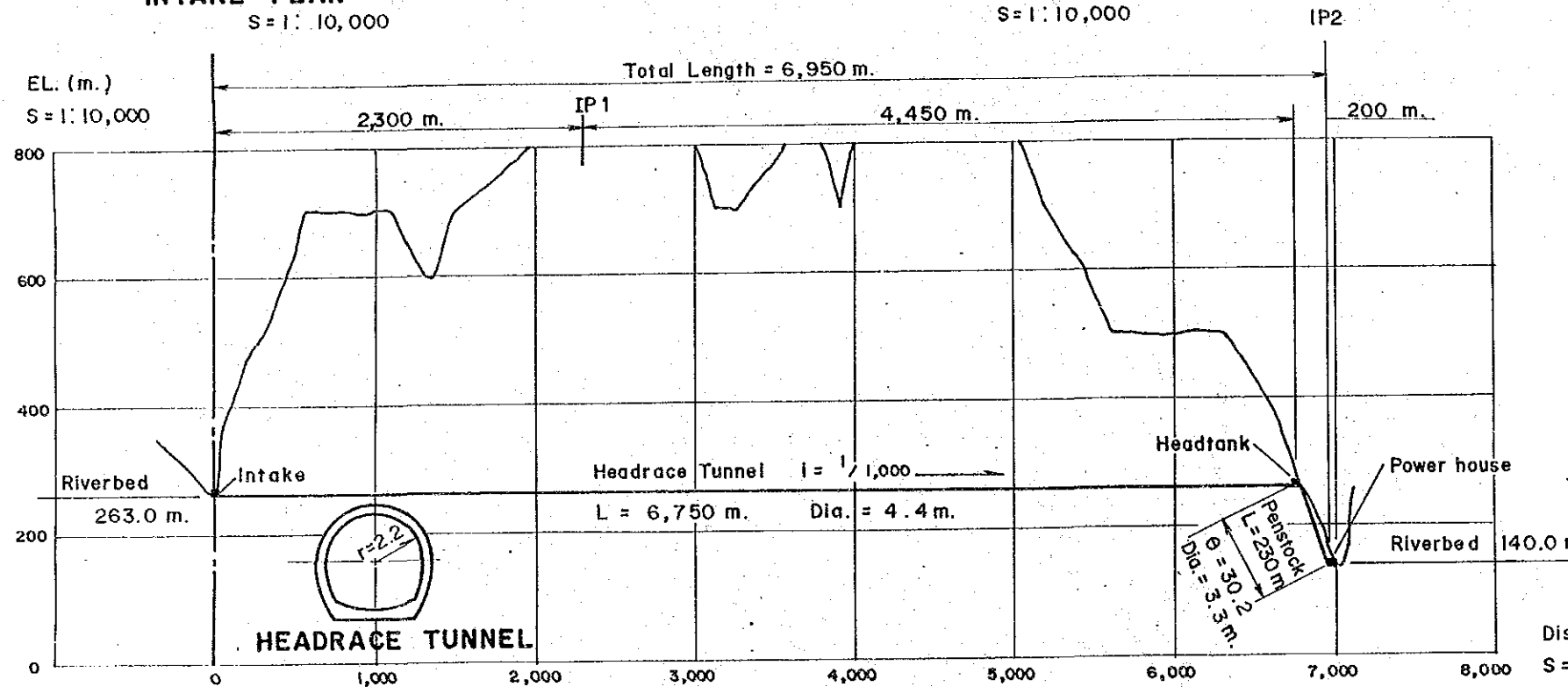
INTAKE PLAN
S = 1 : 10,000



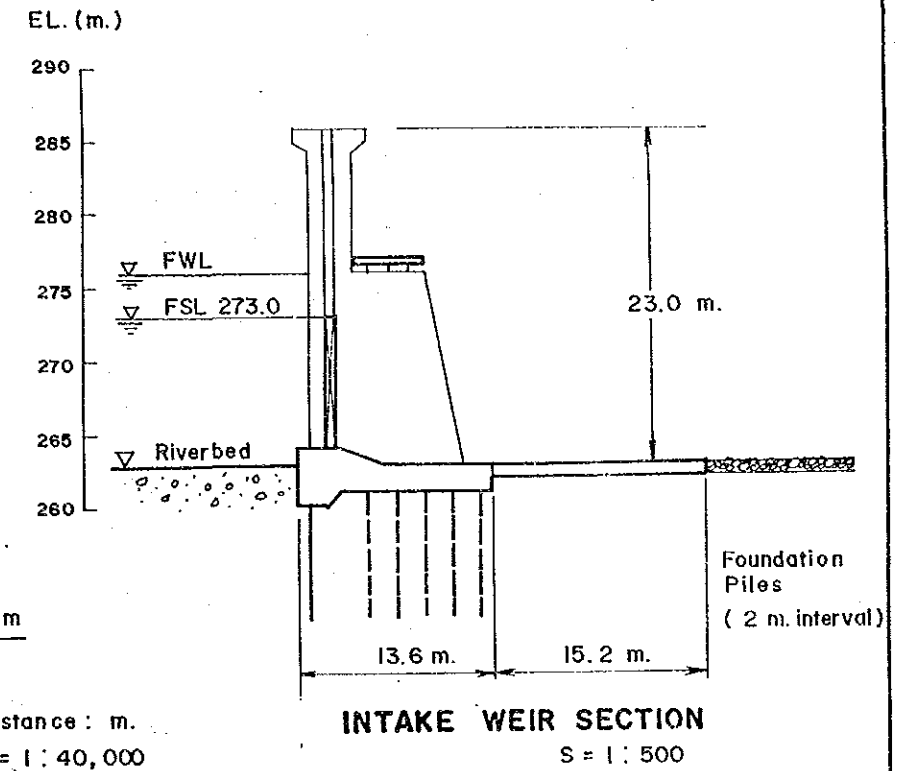
POWER HOUSE PLAN
S = 1 : 10,000



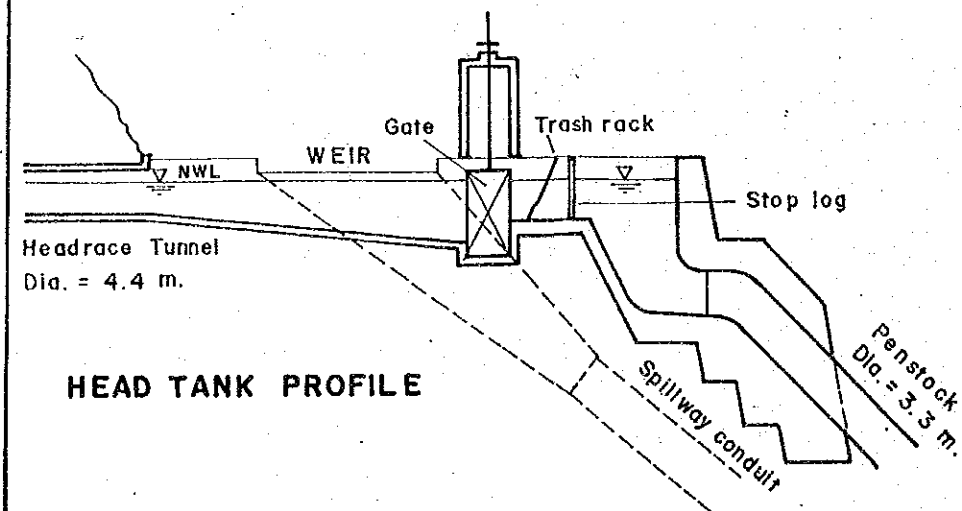
WEIR & INTAKE
S = 1 : 1000



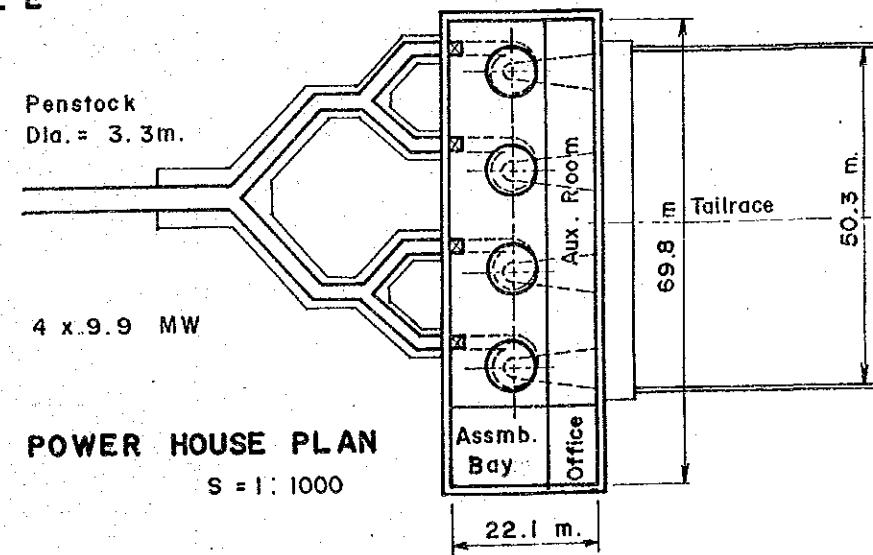
WATERWAY PROFILE



INTAKE WEIR SECTION
S = 1 : 500

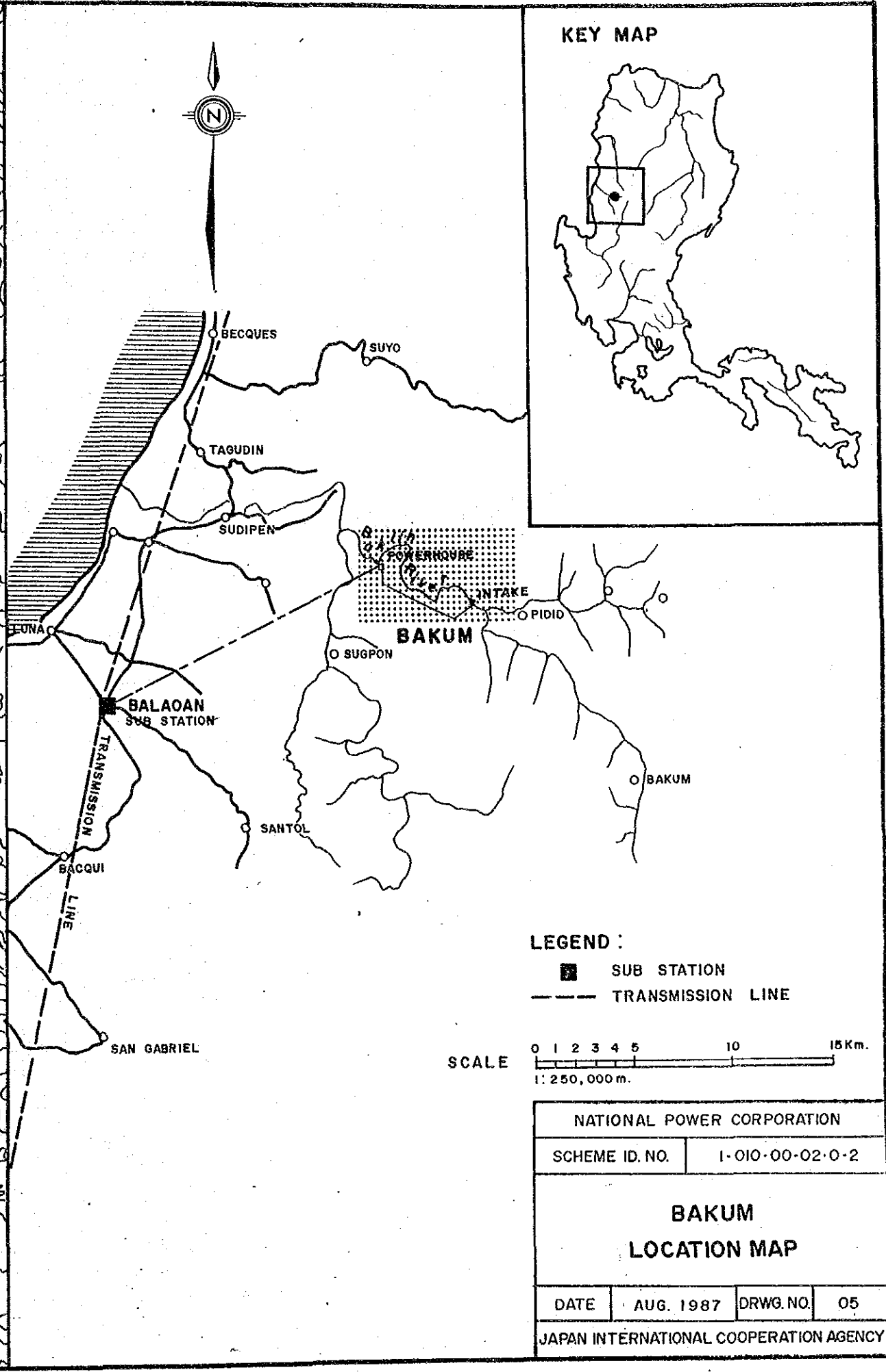
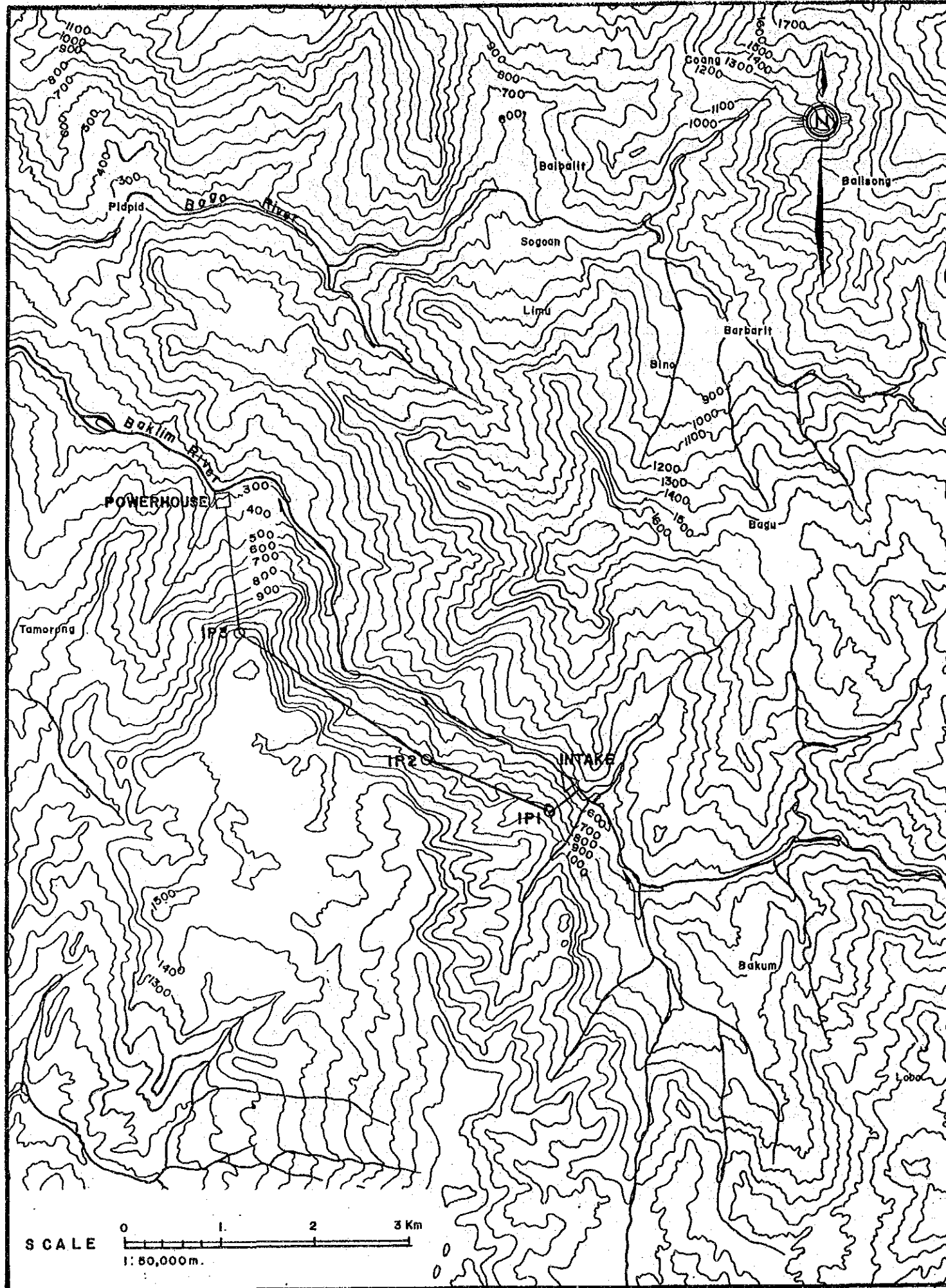


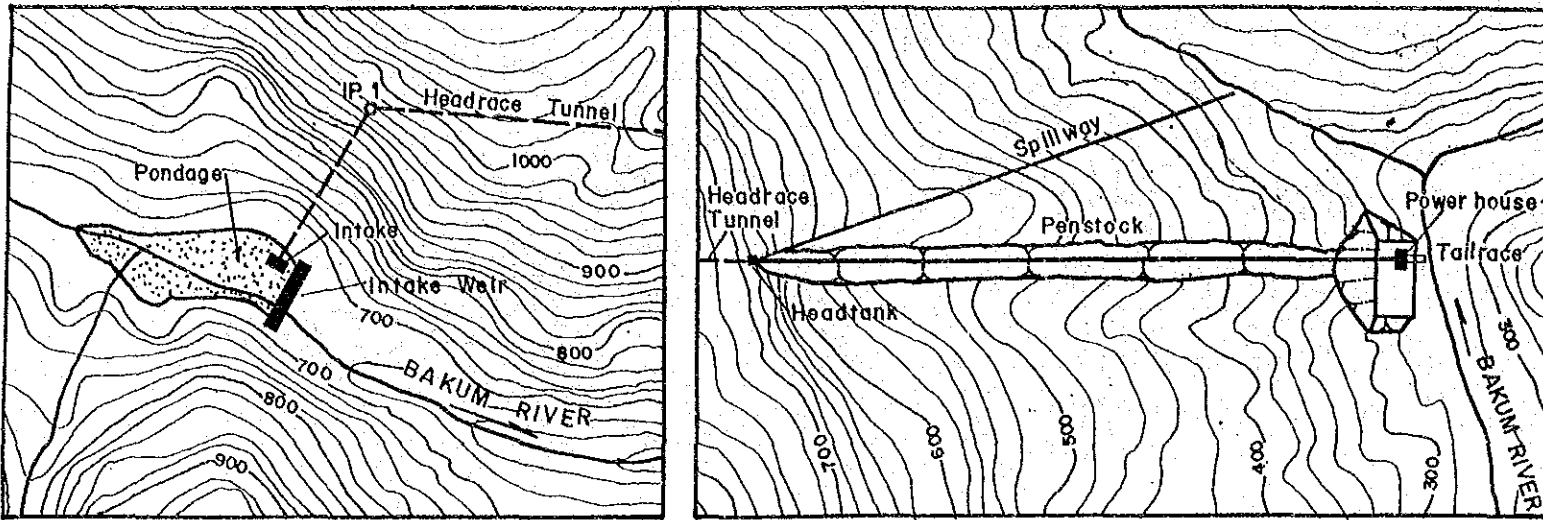
HEAD TANK PROFILE



POWER HOUSE PLAN
S = 1 : 1000

NATIONAL POWER CORPORATION			
SCHEME ID. NO.		I-010-00-01-1-2	
LUYA			
GENERAL LAYOUT			
DATE	AUG. 1987	DRWG. NO.	04
JAPAN INTERNATIONAL COOPERATION AGENCY			



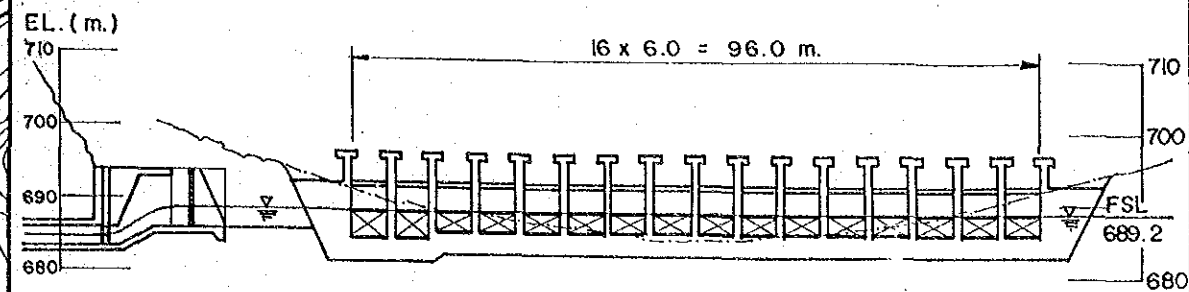


INTAKE PLAN

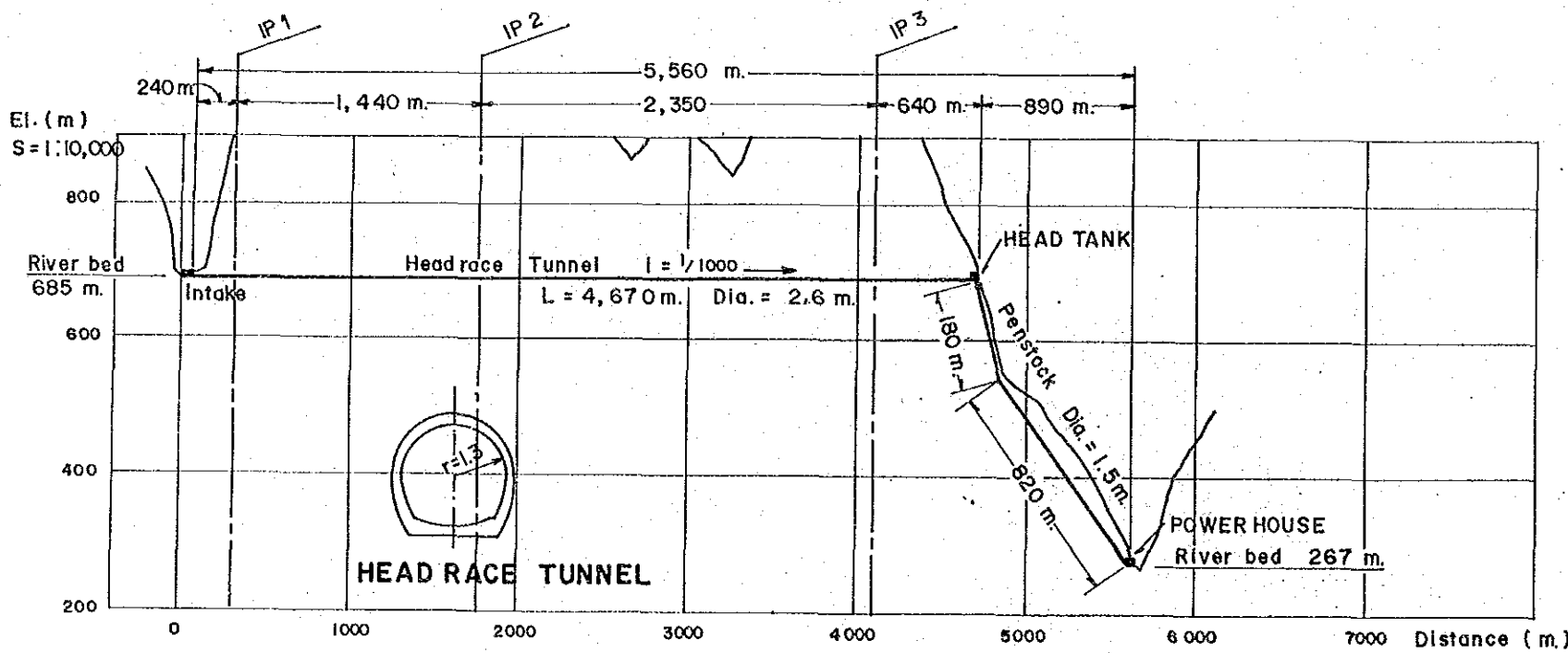
S = 1 : 10,000

POWER HOUSE PLAN

S = 1 : 10,000

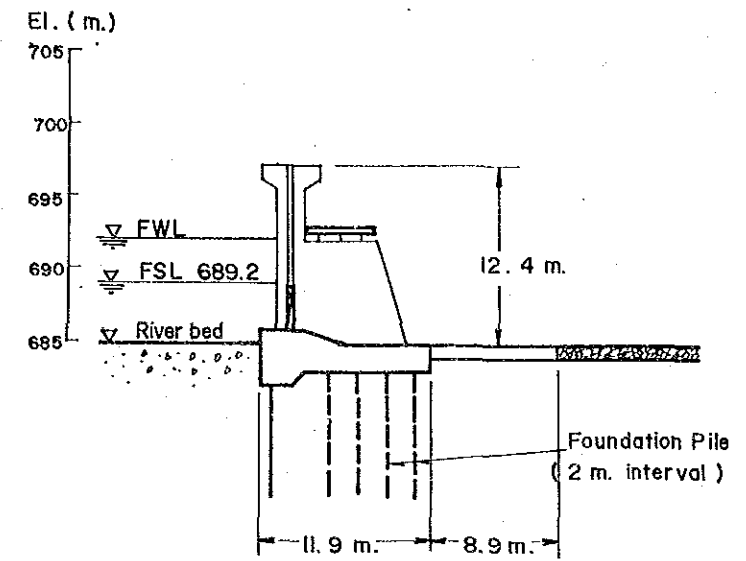


WEIR & INTAKE S=1:1000



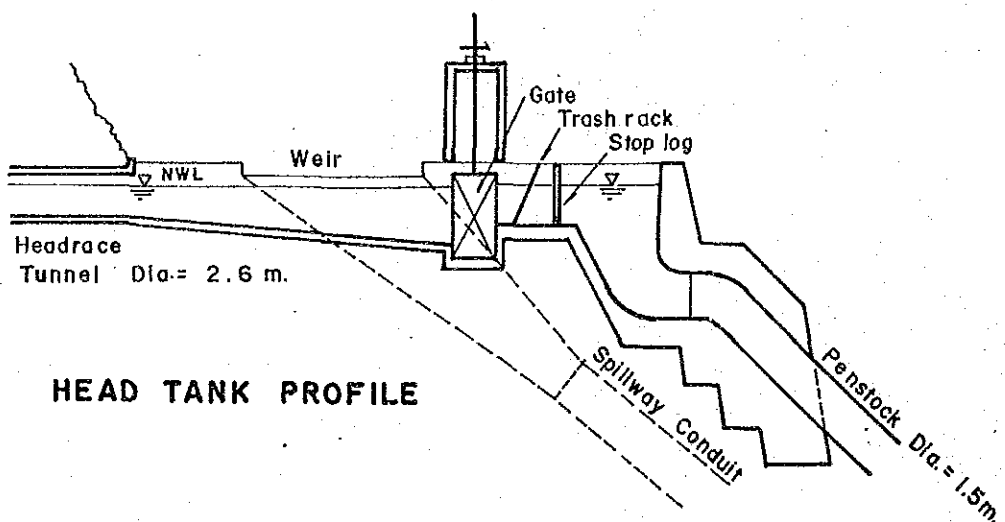
WATER WAY PROFILE

S = 1 : 40,000

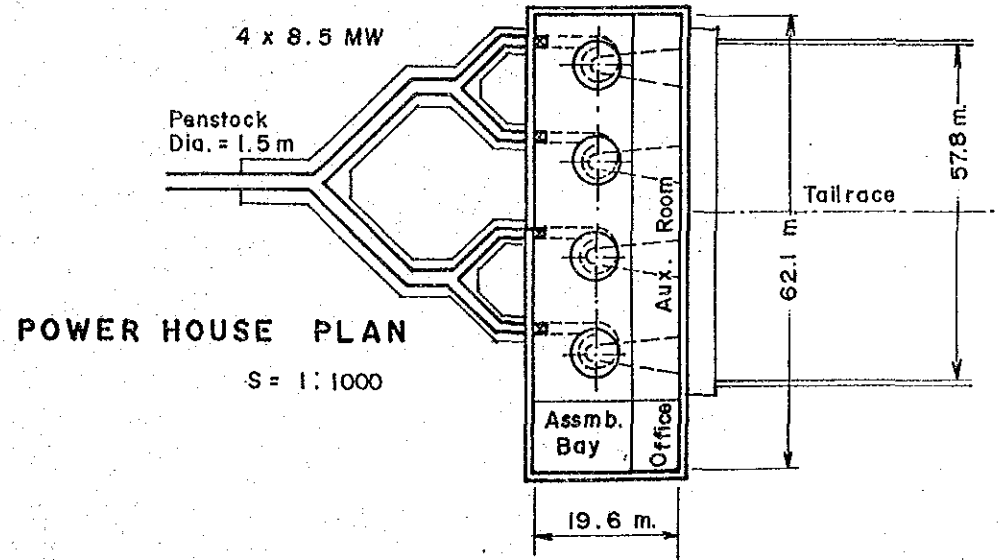


INTAKE WEIR SECTION

S = 1 : 500



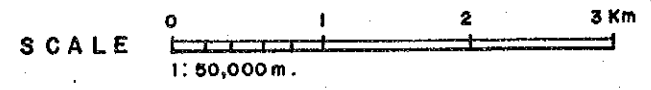
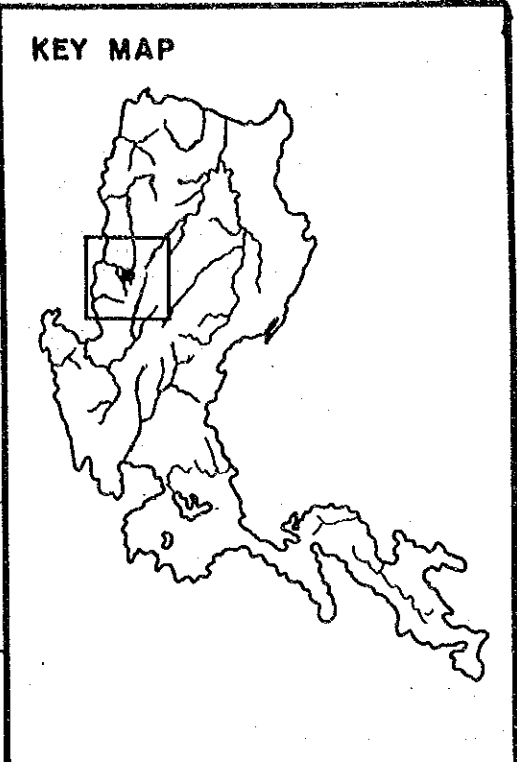
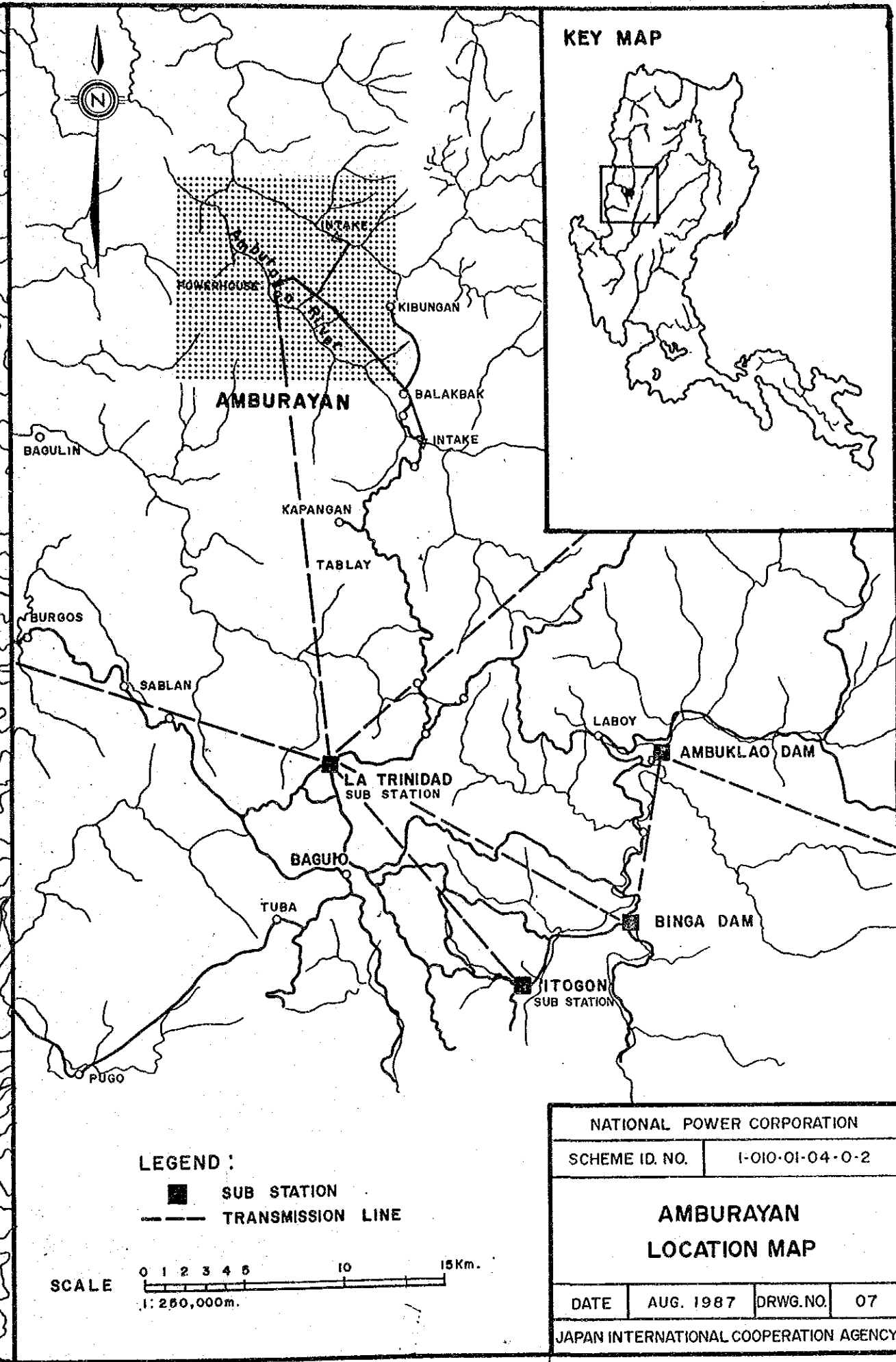
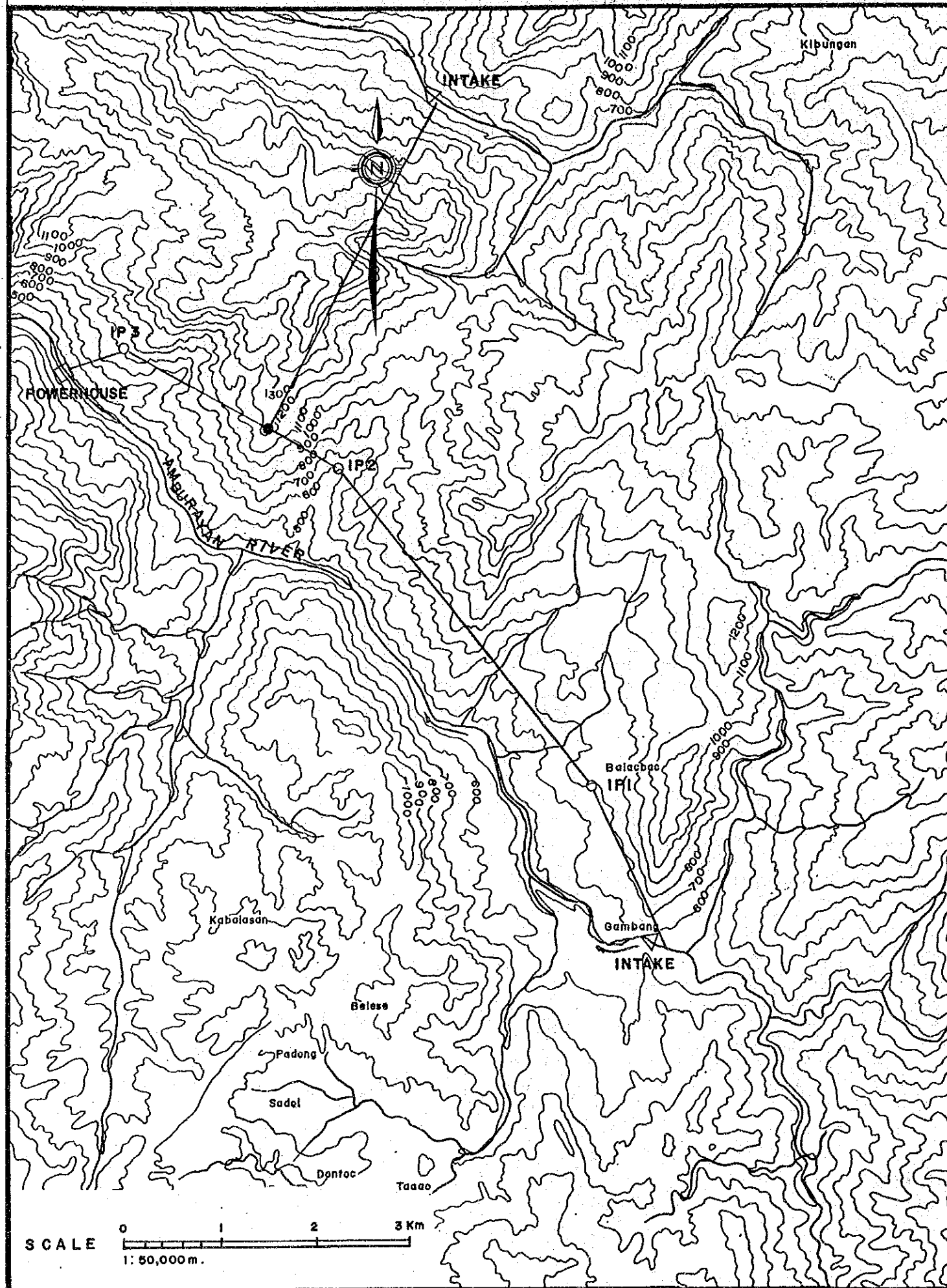
HEAD TANK PROFILE

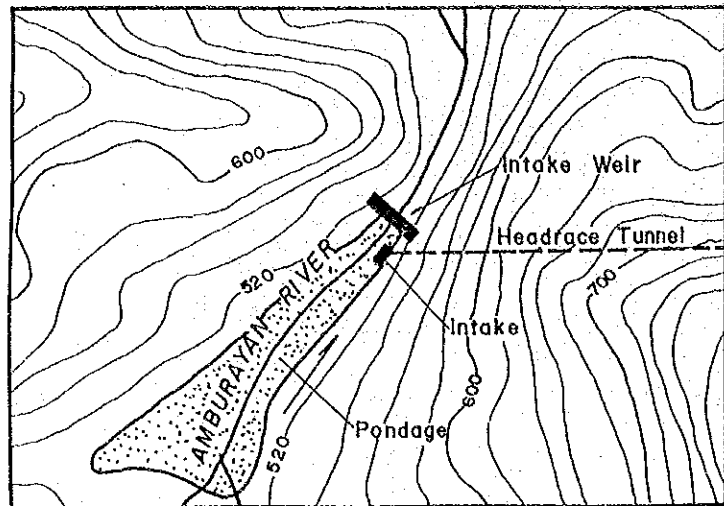


POWER HOUSE PLAN

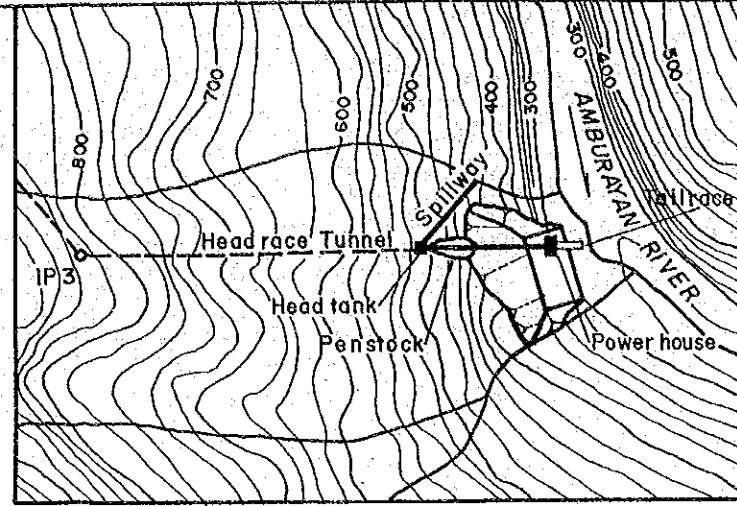
S = 1 : 1000

NATIONAL POWER CORPORATION			
SCHEME ID. NO.		1-010-00-02-0-2	
BAKUM GENERAL LAYOUT			
DATE	AUG. 1987	DRWG. NO.	06
JAPAN INTERNATIONAL COOPERATION AGENCY			

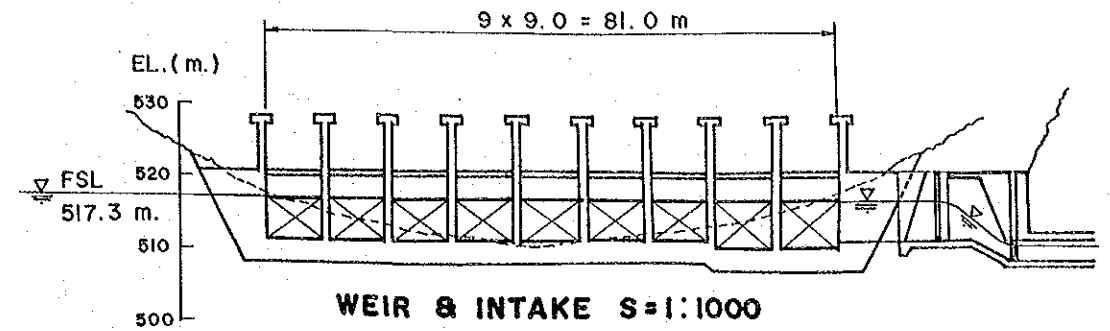




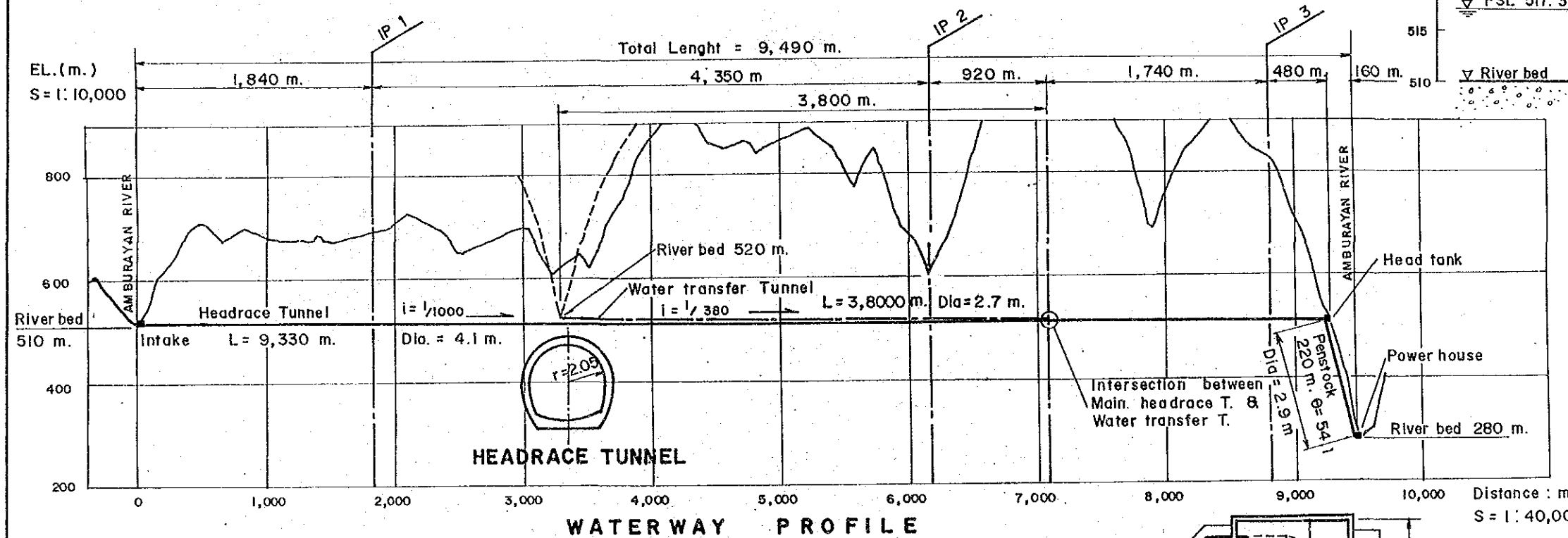
INTAKE PLAN
S=1:10,000



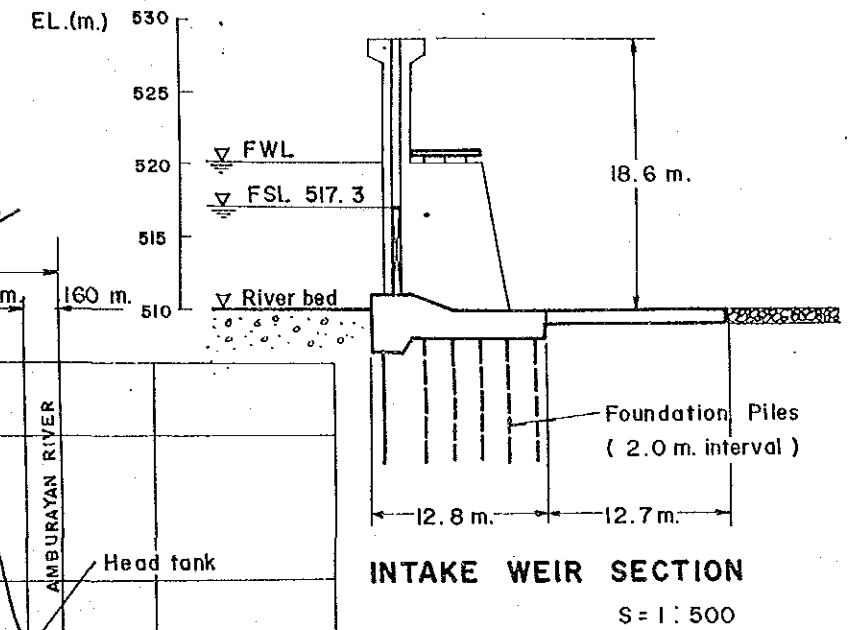
POWER HOUSE PLAN
S=1:10,000



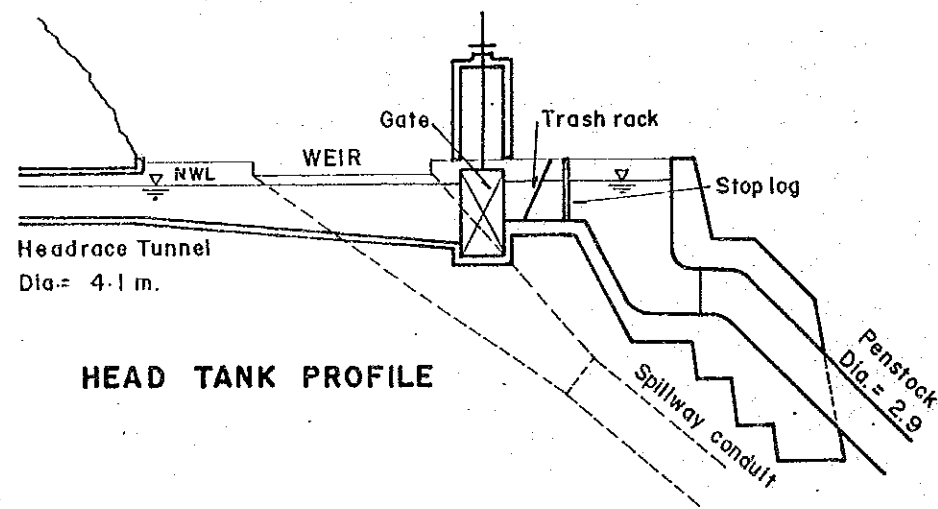
WEIR & INTAKE S=1:1000



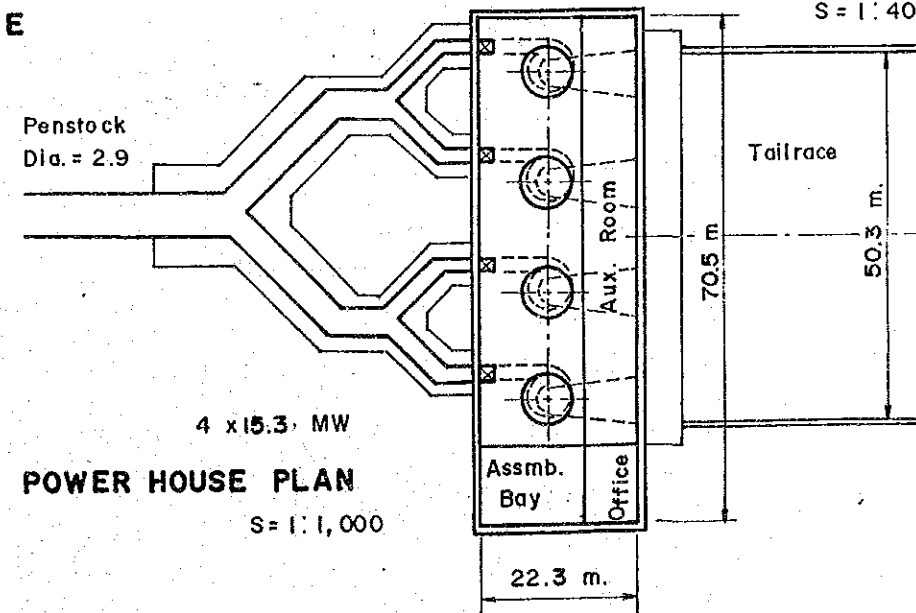
WATERWAY PROFILE
S=1:40,000



INTAKE WEIR SECTION
S=1:500

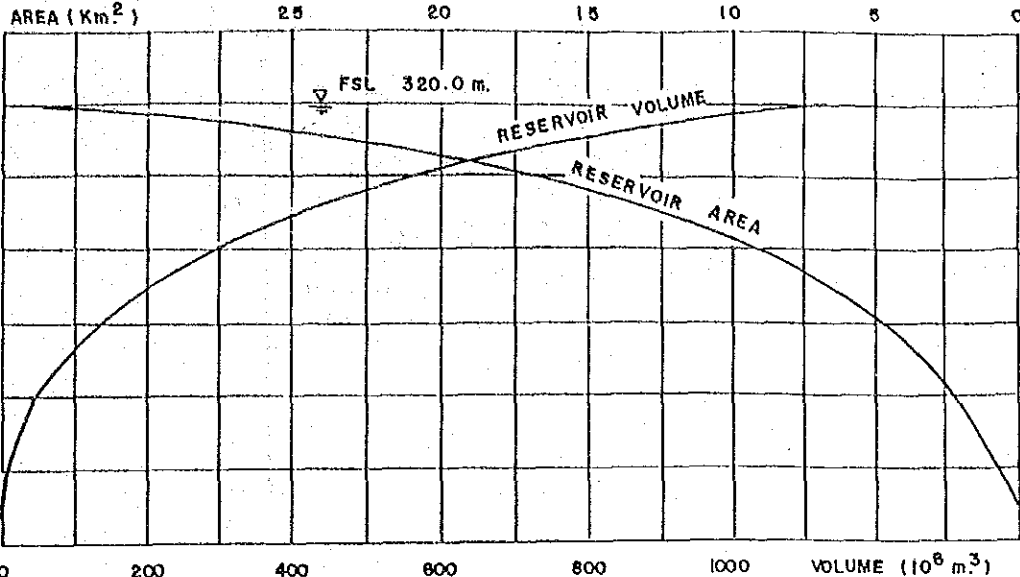
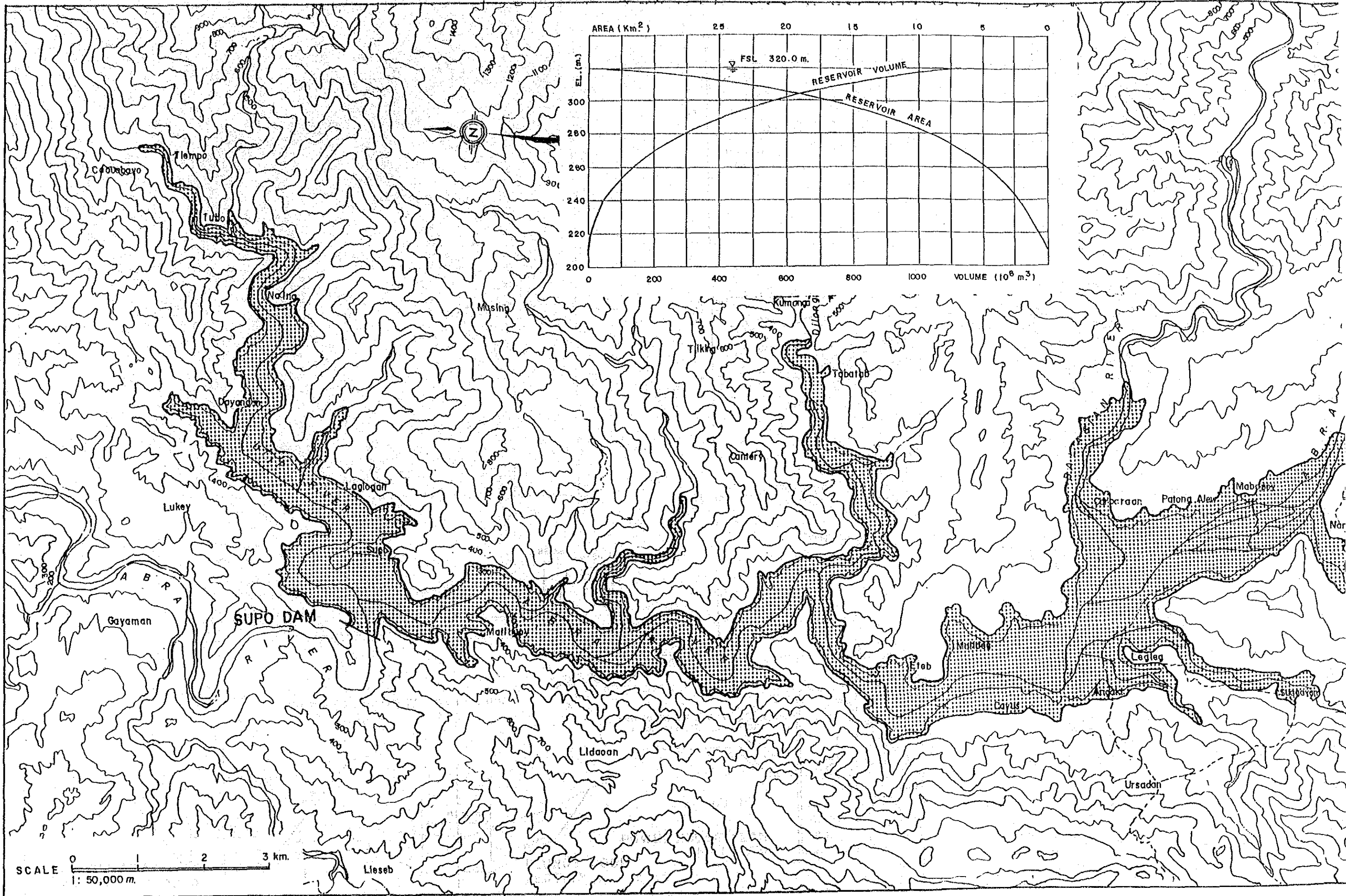


HEAD TANK PROFILE

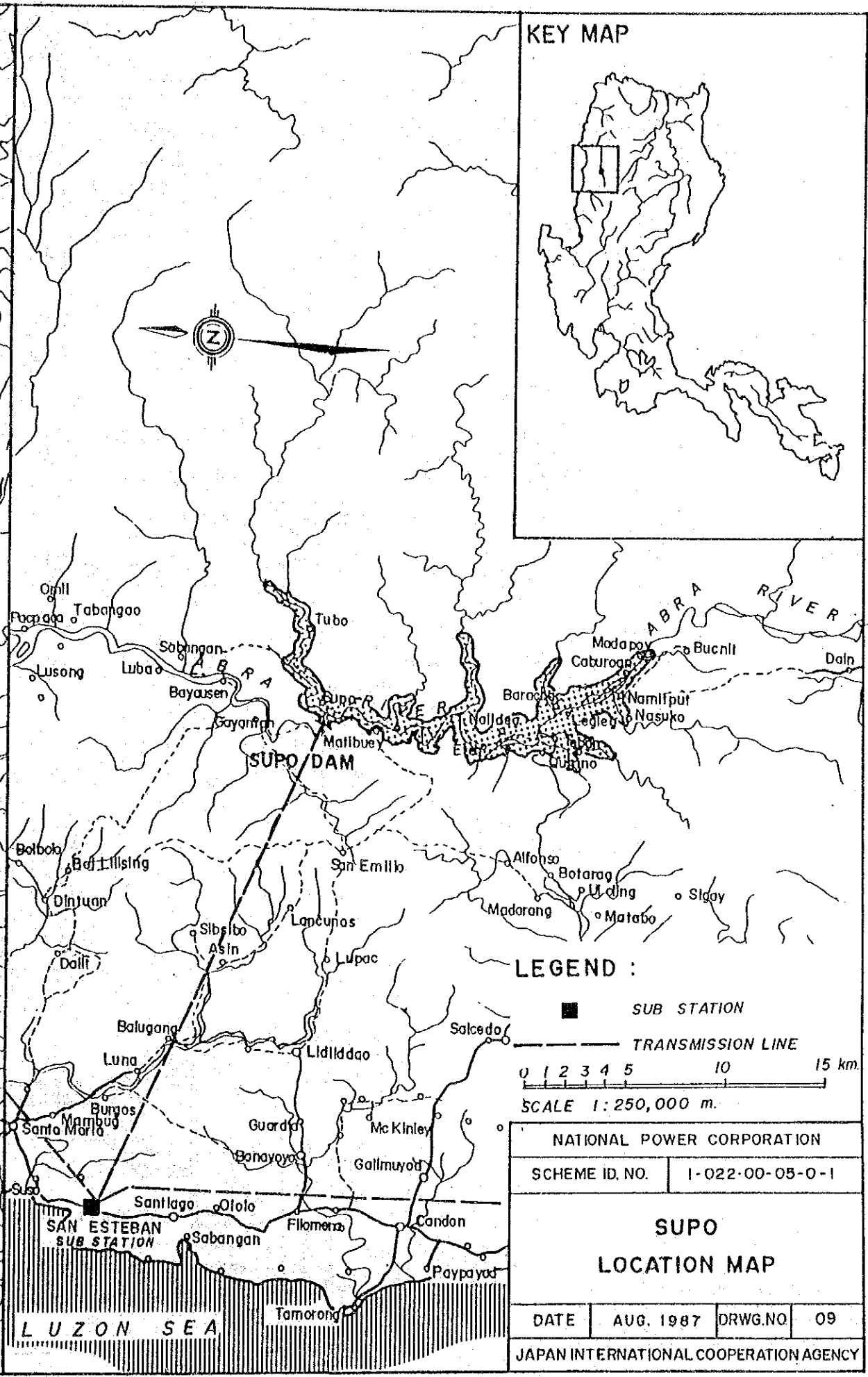
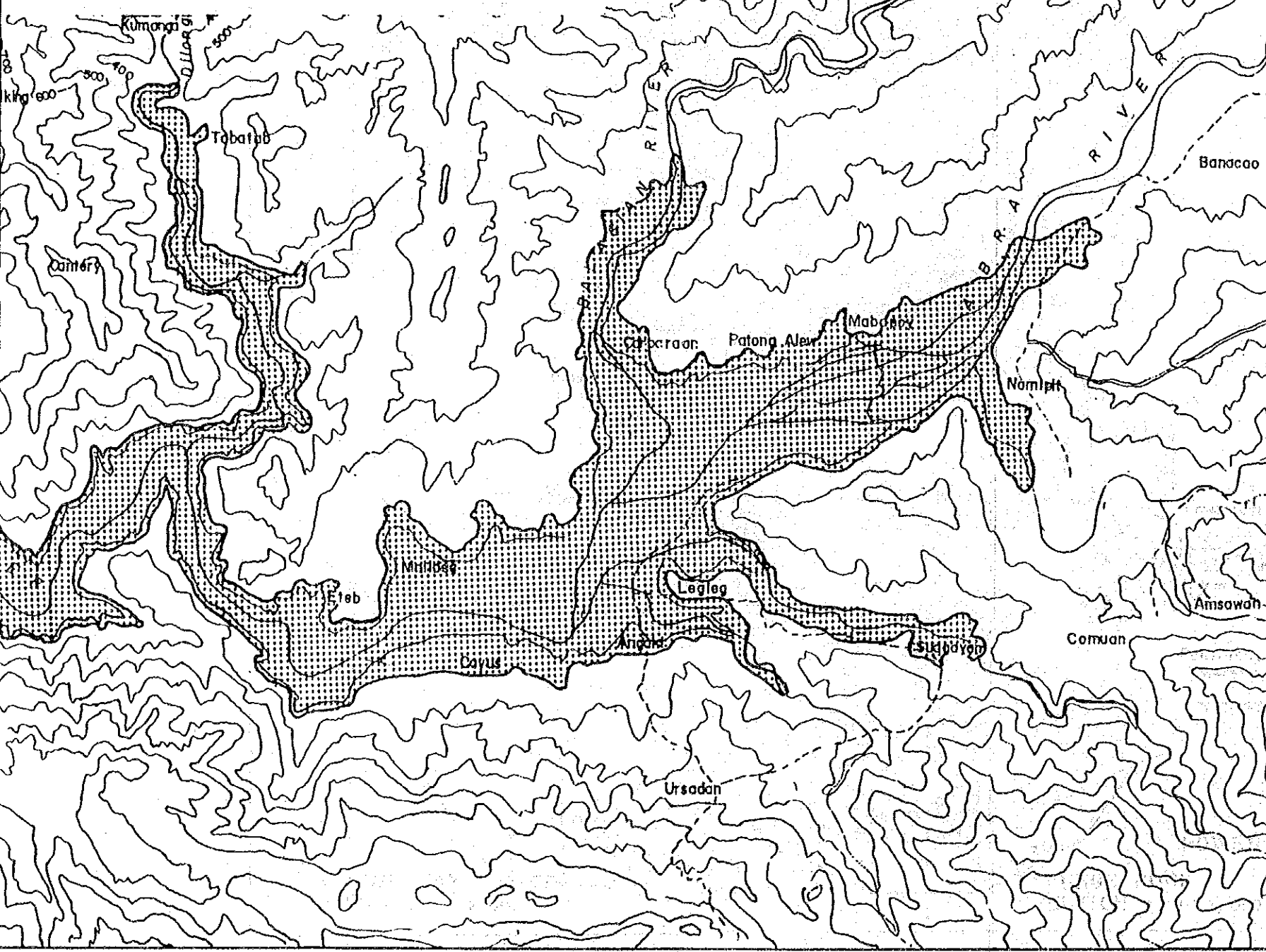
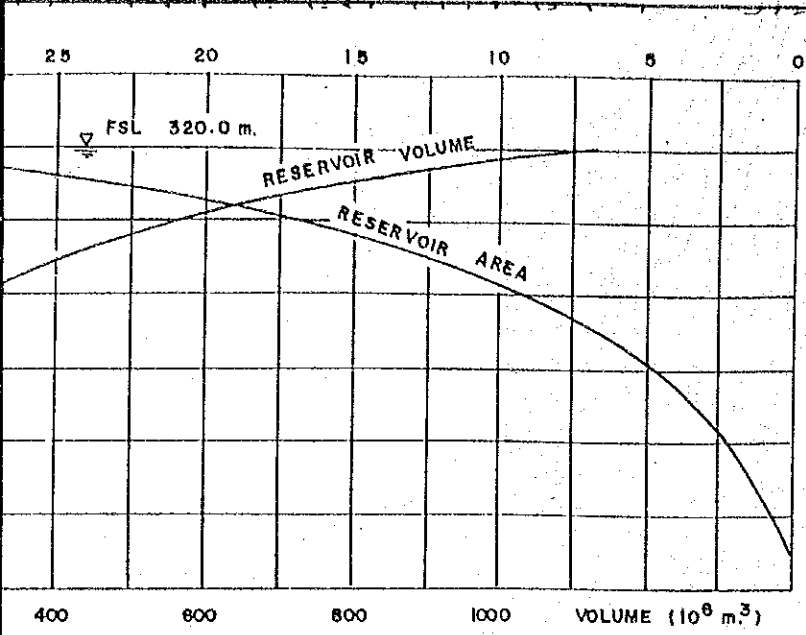


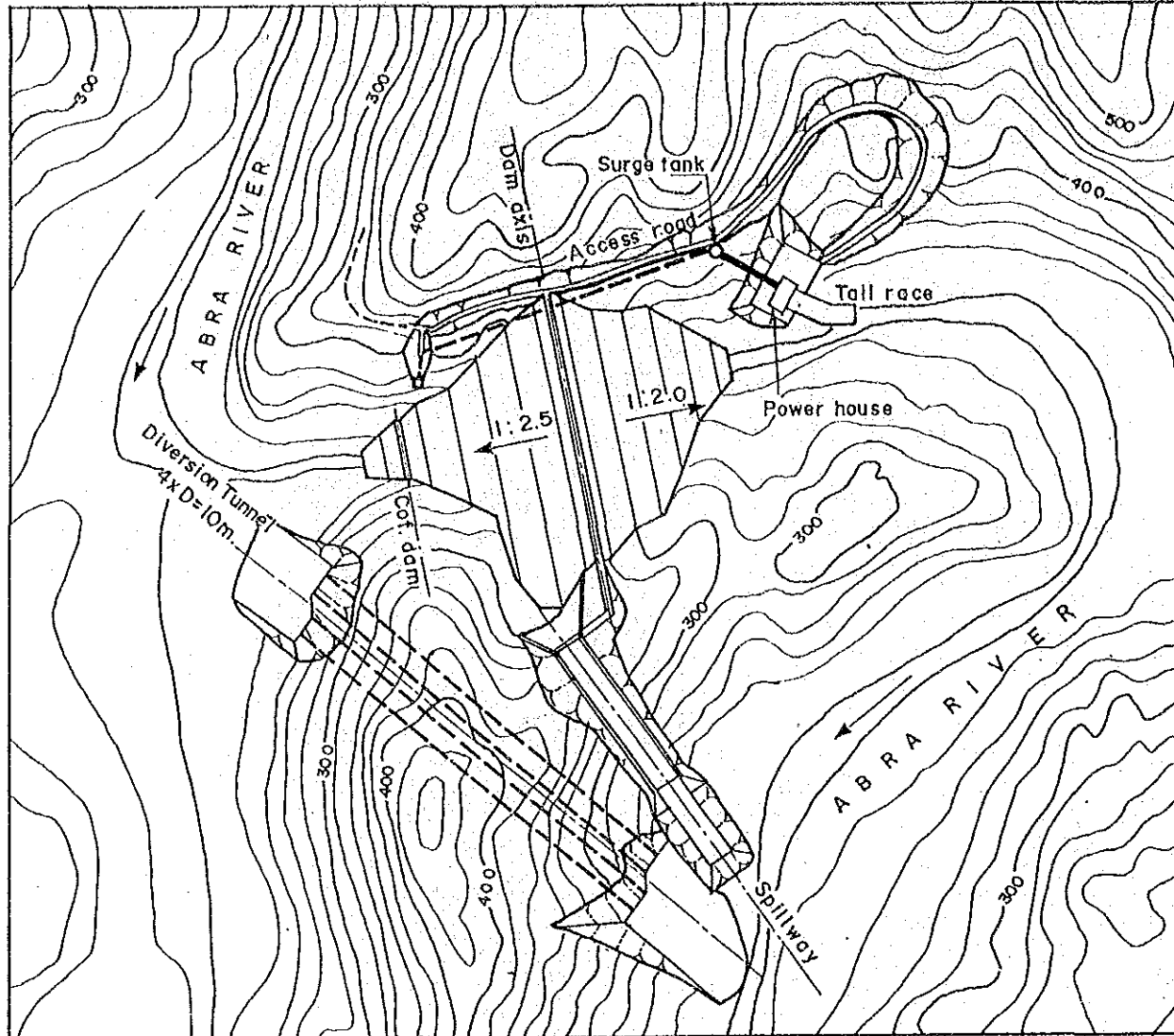
POWER HOUSE PLAN
S=1:1,000

NATIONAL POWER CORPORATION			
SCHEME ID. NO.	1-010-01-04-0-2		
AMBURAYAN GENERAL LAYOUT			
DATE	AUG. 1987	DRWG. NO.	08
JAPAN INTERNATIONAL COOPERATION AGENCY			

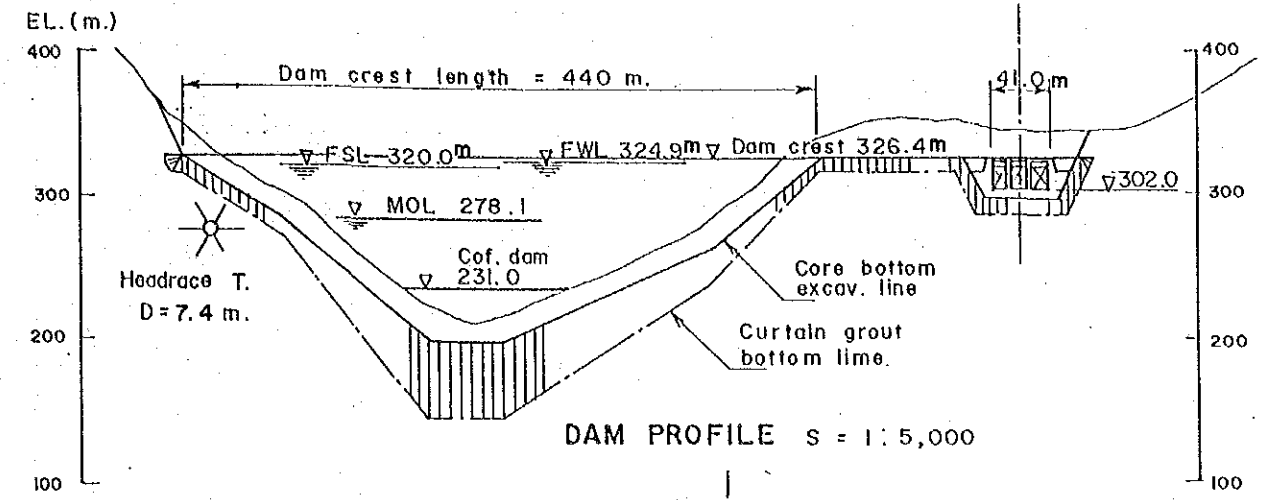


SCALE 1: 50,000 m.

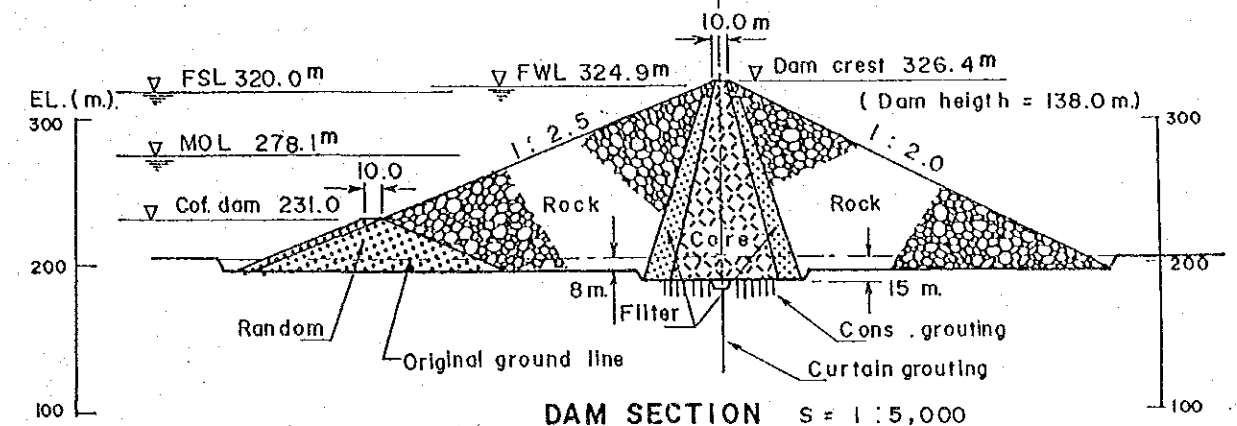




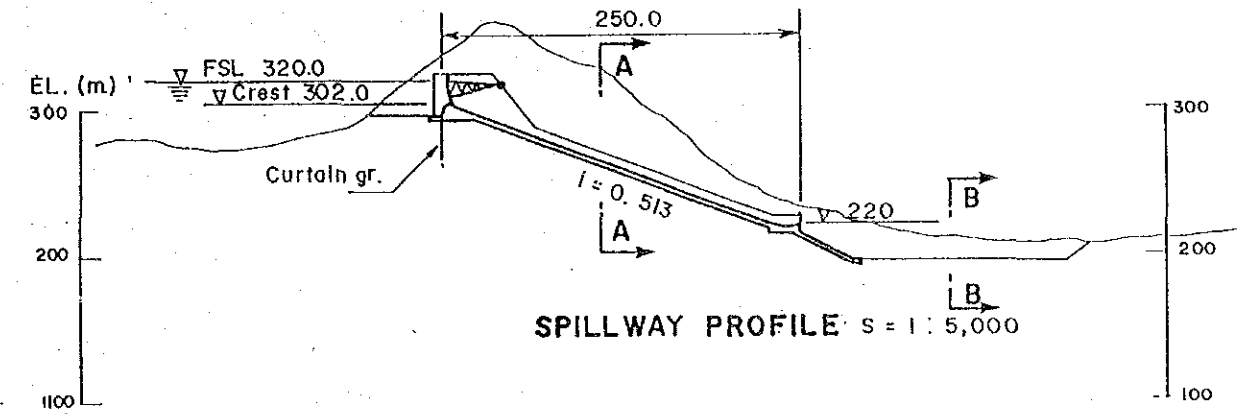
DAM PLAN S = 1 : 10,000



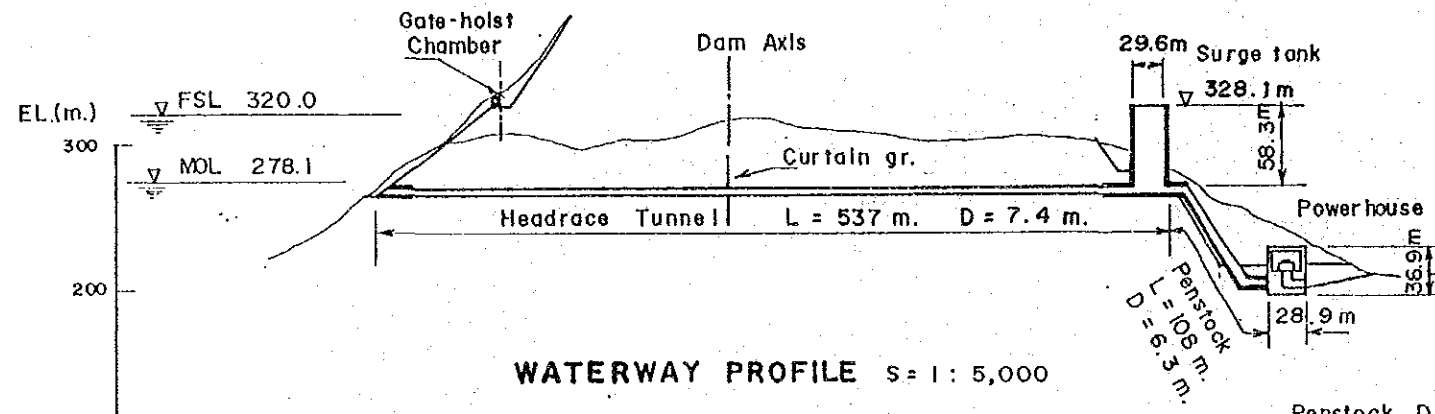
DAM PROFILE S = 1 : 5,000



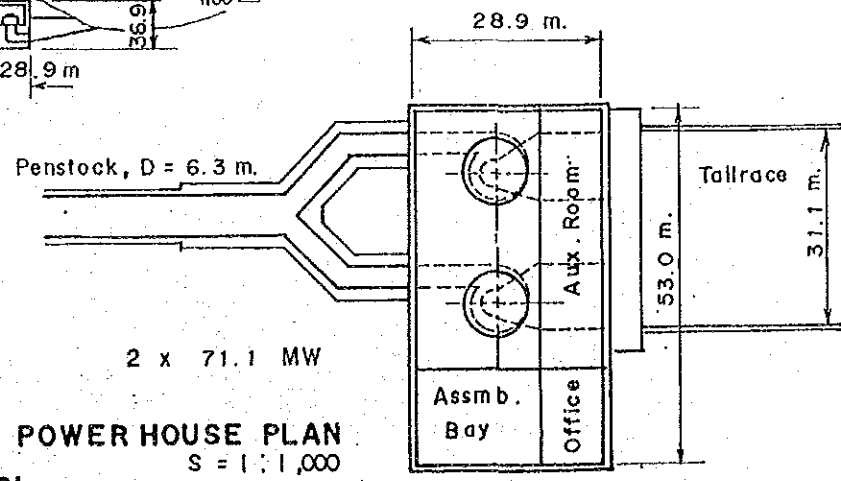
DAM SECTION S = 1 : 5,000



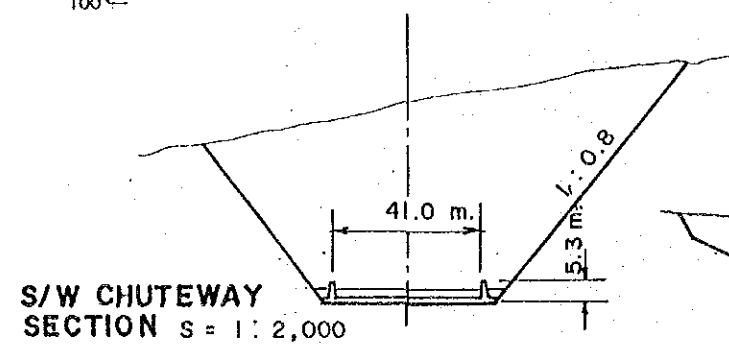
SPILLWAY PROFILE S = 1 : 5,000



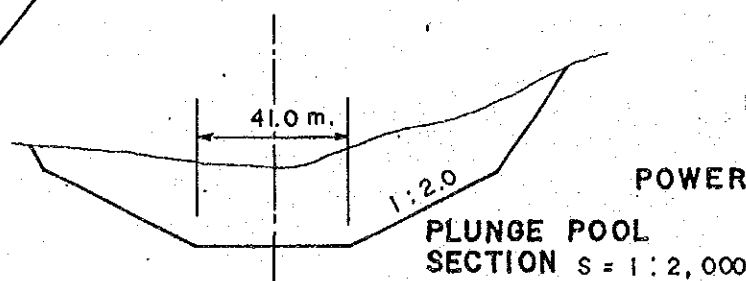
WATERWAY PROFILE S = 1 : 5,000



POWER HOUSE PLAN S = 1 : 1,000

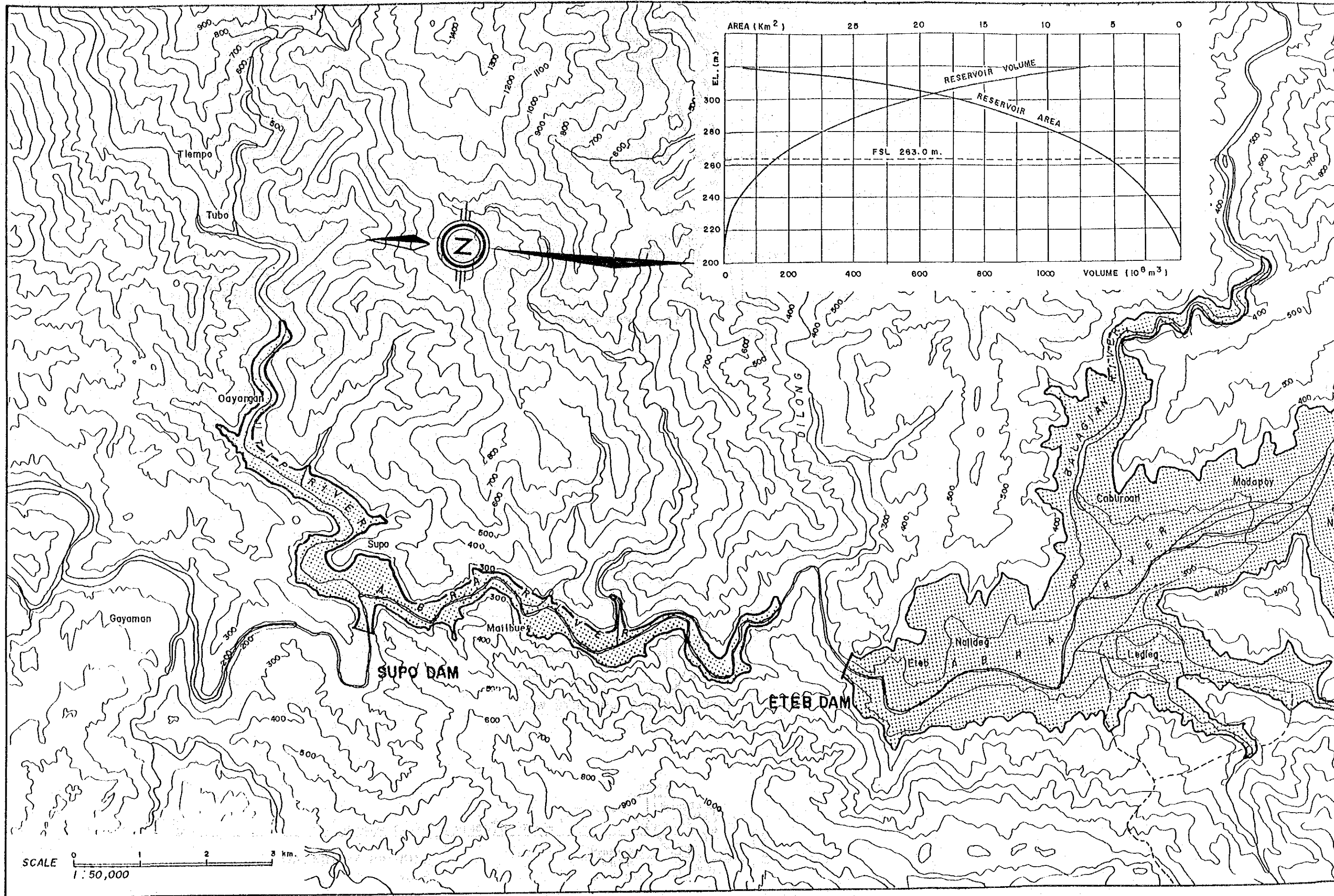


S/W CHUTEWAY SECTION S = 1 : 2,000



PLUNGE POOL SECTION S = 1 : 2,000

NATIONAL POWER CORPORATION			
SCHEME ID. NO.	I-022-00-05-0-1		
SUPO			
GENERAL LAYOUT			
DATE	AUG. 1987	DRWG. NO.	10
JAPAN INTERNATIONAL COOPERATION AGENCY			



SCALE 0 1 2 3 km.
1:50,000

SUPO DAM

ETEB DAM

Tiempo

Tubo

Oayangan

Supo

Mailbueg

Gayaman

Eteb

Nalldag

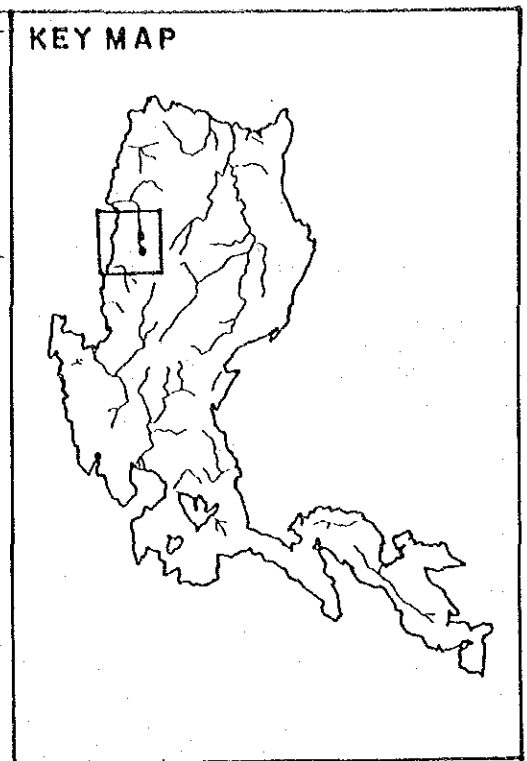
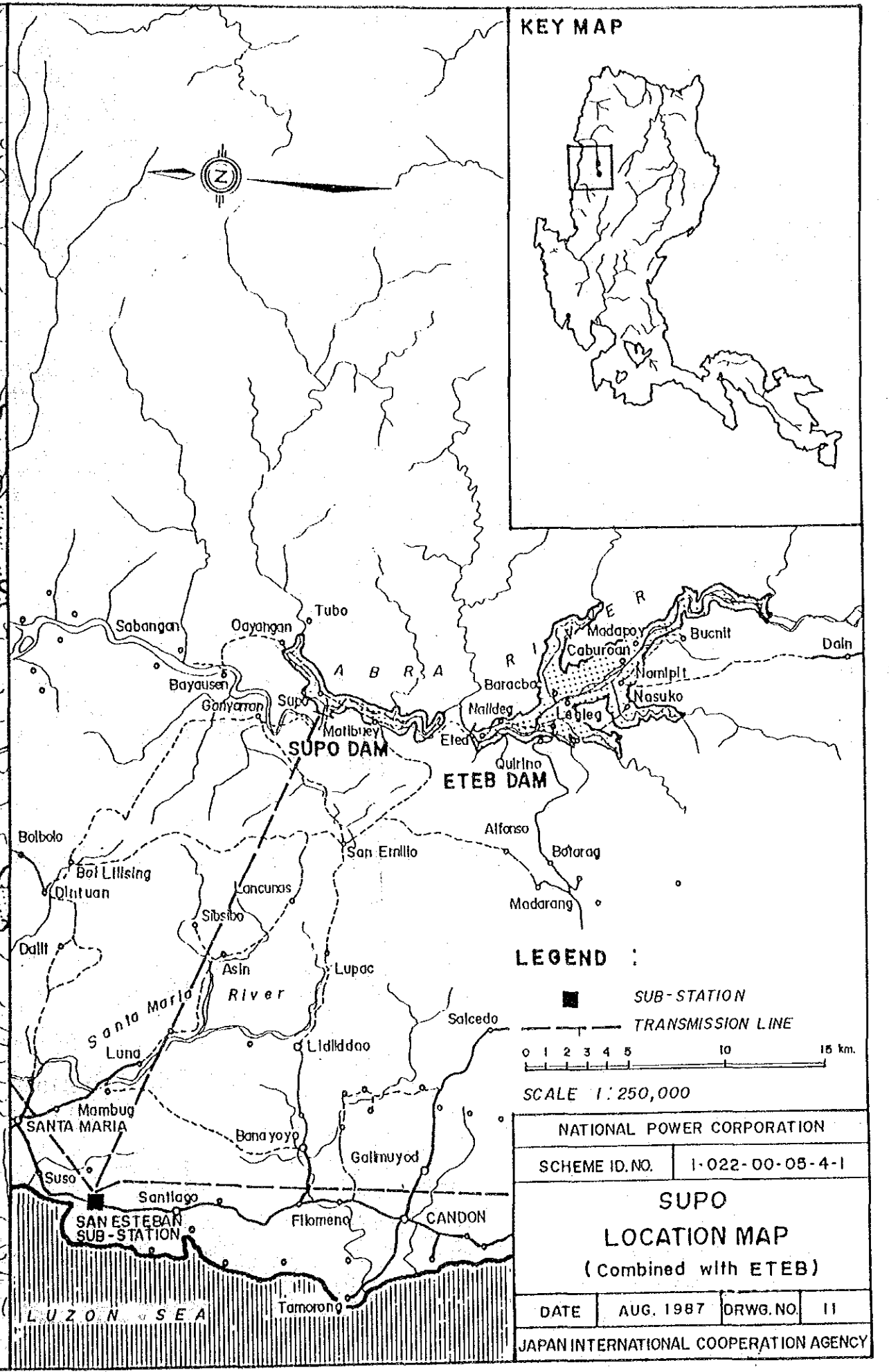
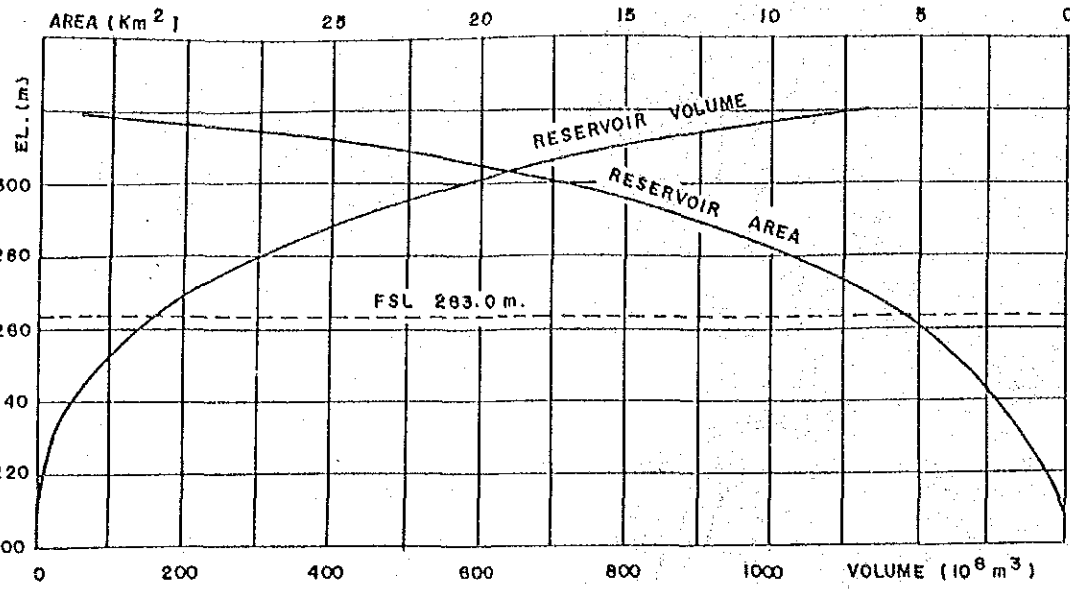
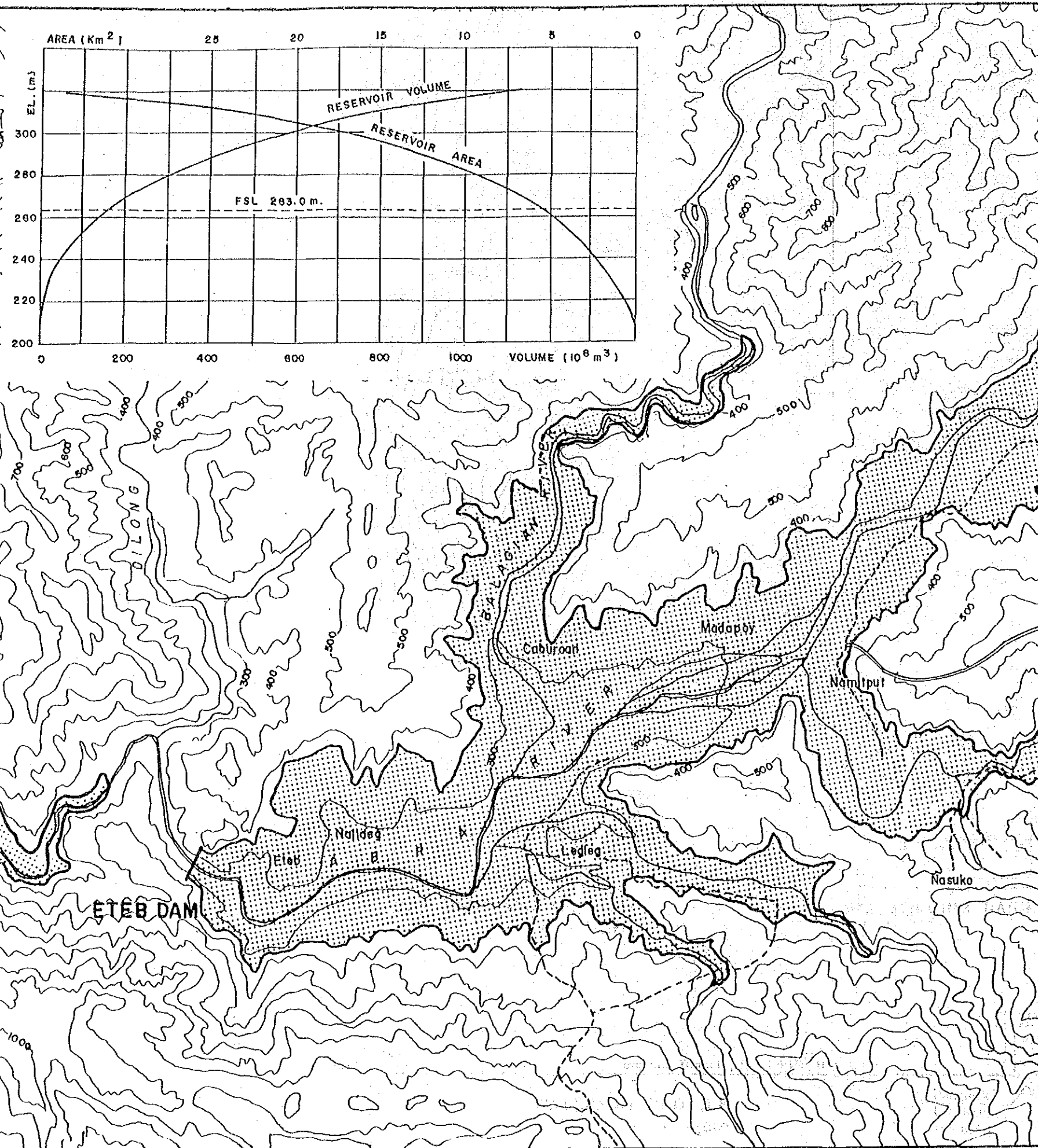
Leddeg

Caburoan

Madapby

DILONG





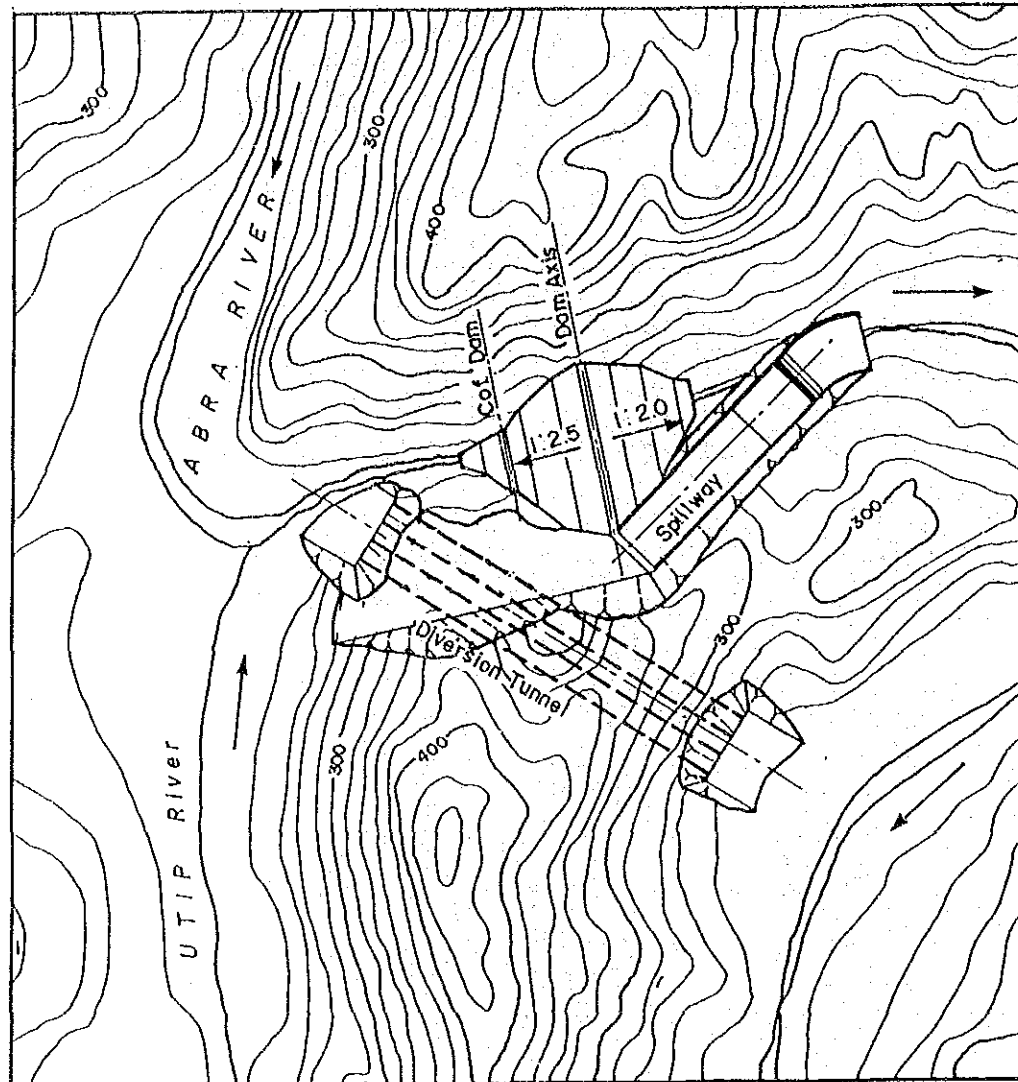
LEGEND :

- SUB-STATION
- TRANSMISSION LINE

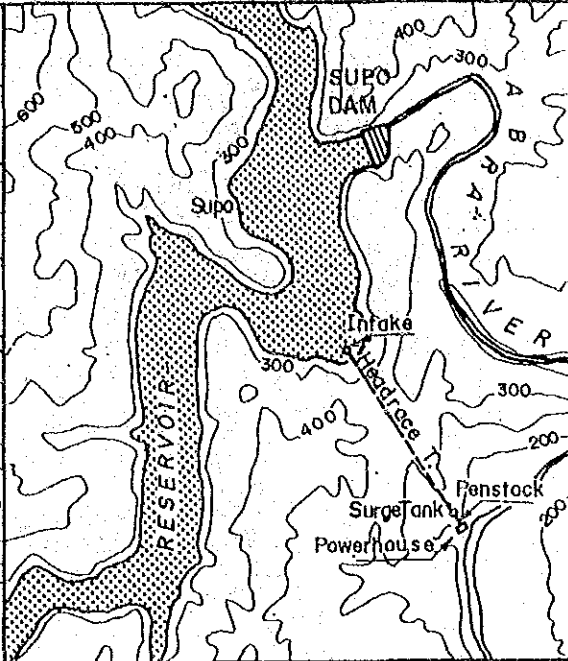
0 1 2 3 4 5 10 15 km.

SCALE 1:250,000

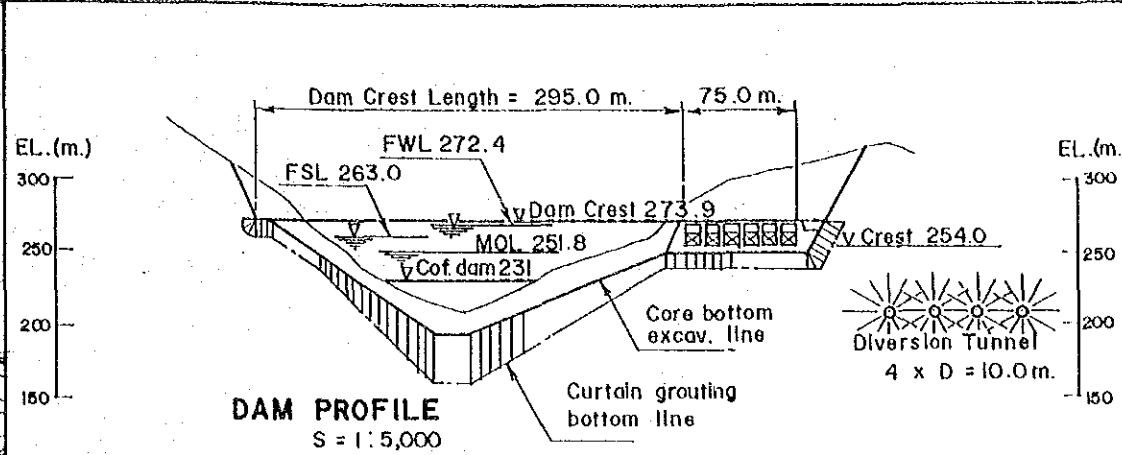
NATIONAL POWER CORPORATION	
SCHEME ID. NO.	1-022-00-05-4-1
SUPO	
LOCATION MAP	
(Combined with ETEB)	
DATE	AUG. 1987
DRWG. NO.	11
JAPAN INTERNATIONAL COOPERATION AGENCY	



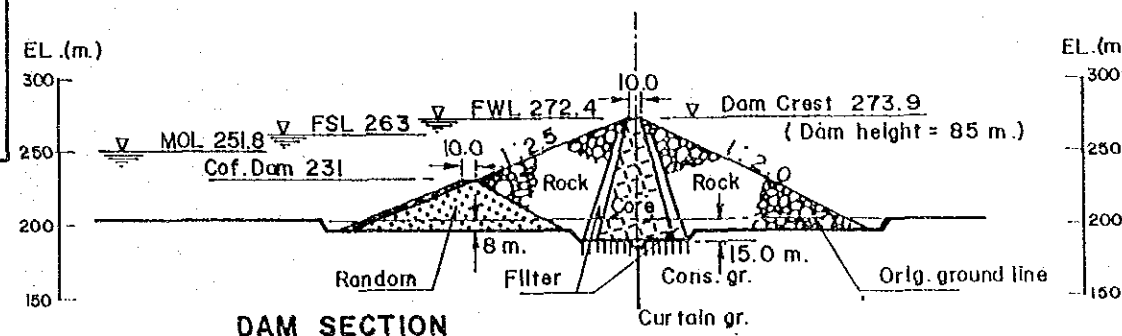
DAM PLAN S = 1 : 10,000



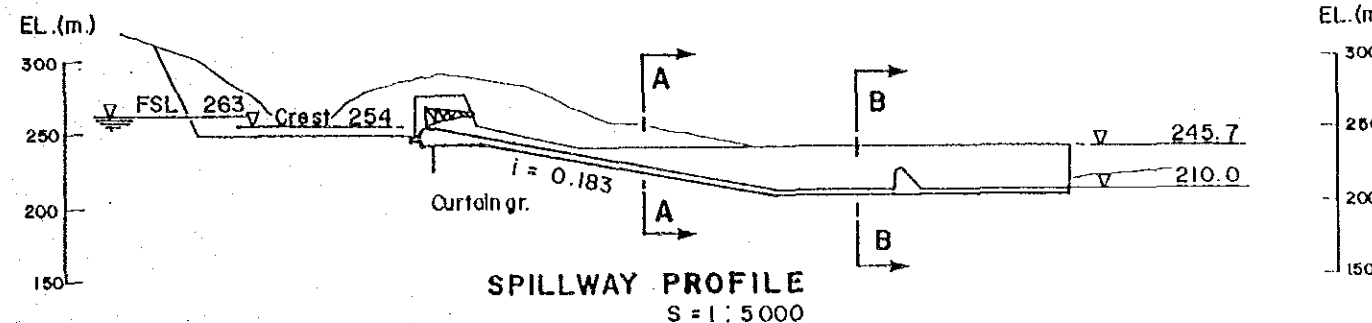
WATERWAY PLAN
S = 1 : 50,000



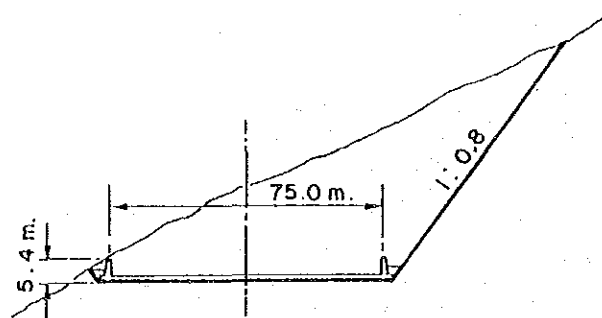
DAM PROFILE
S = 1 : 5,000



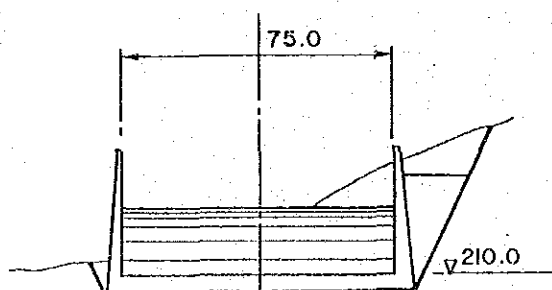
DAM SECTION
S = 1 : 5,000



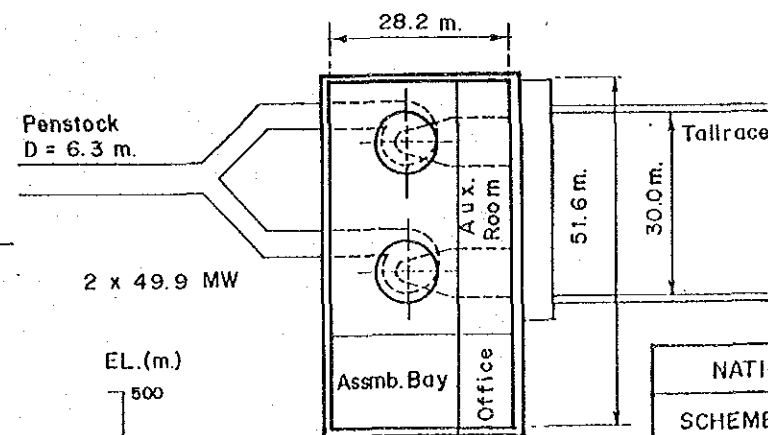
SPILLWAY PROFILE
S = 1 : 5,000



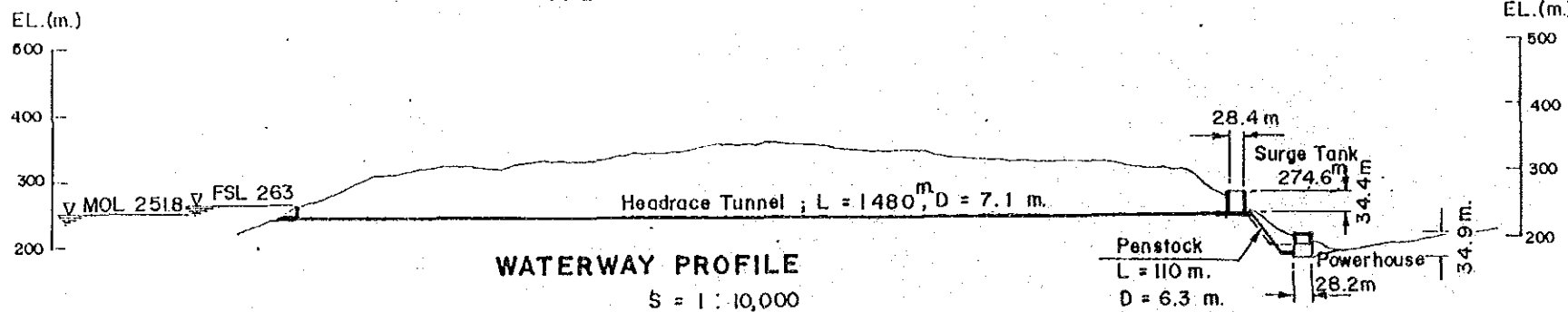
S/W CHUTEWAY SECTION
S = 1 : 2,000



S/W STILLING BASIN SECTION
S = 1 : 2,000



POWERHOUSE PLAN
S = 1 : 1,000



WATERWAY PROFILE
S = 1 : 10,000

NATIONAL POWER CORPORATION			
SCHEME ID. NO.	I-002-00-05-4-1		
SUPO			
GENERAL LAYOUT			
Combined with ETEB			
DATE	AUG. 1987	DRWG. NO.	12
JAPAN INTERNATIONAL COOPERATION AGENCY			