

付 表

表1 図上検討より確認された発電計画

No.	計画名	河川名	方式	流域面積 (km ²)	年雨量 (mm)
1	Salto Pilao (1)	Itajai	ROR ¹	5,597	1,530
2	Salto Pilao (2)	Itajai	ROR	5,597	1,530
3	Ibirama	Itajai	ROR	9,041	1,510
4	Subida	Itajai	ROR	9,147	1,510
5	Ascurra	Itajai	ROR	9,586	1,510
6	Indaial	Itajai	ROR	11,493	1,500
7	Dalbergia	Itajai do Norte	ROR	3,212	1,520
8	Barra da Pratinha	Itajai do Norte	RES ²	1,405	1,620
9	Barra das Pombas	Itajai do Norte	RES	979	1,670
10	Timbo	Benedito	RES	765	1,510
11	Benedito Novo	Benedito	ROR	586	1,510
12	Alto Benedito Novo	Benedito	ROR	473	1,520
13	Doutor Pedrinho	Benedito	RES	161	1,550
14	Trombudo Central (1)	Trombudo	RES	293	1,550
15	Trombudo Central (2)	Trombudo	RES	117	1,550
16	Botuvera	Itajai Mirim	RES	625	1,560

注:

¹: RORは流れ込み式

²: RESは貯水池式

表2 地質評估基準

No.	Name of Scheme	Name of River	*1 Type	*2 Lithology	*3 Assessment				
					Dam Site	Waterway	Powerhouse	Reservoir	Material
1	Salto Pilao (1)	Itajai	1	Gr, Ss	A/B	B/C	B	A/B	B
2	Salto Pilao (2)	Itajai	1	Gr, Ss	A/B	B/C	C	A/B	B
3	Ibirama	Itajai	1	Ry, Ss	A/B	B/C	A	A/B	B
4	Subida	Itajai	1	Ry, Ss	A	A/B	A	A	B
5	Ascurra	Itajai	1	Ry, Ss	A/B	B/C	C	A/B	B
6	Indaial	Itajai	1	Gr	B	C/D	C/D	B	C
7	Dalbergia	Itajai do Norte	1	Gs, Gr	A	B	B	A	B
8	Barra da Pratinha	Itajai do Norte	2	Ss	A	-	B	A	B/C
9	Barra das Pombas	Itajai do Norte	2	Ss, Md	B	-	B	B	C/D
10	Timbo	Benedito	2	Gs	A/B	-	B	A/B	B/C
11	Benedito Novo	Benedito	1	Gr, Di	A/B	B/C	B	A/B	B
12	Alto Benedito Novo	Benedito	1	Gr, Di	A/B	B/C	C/D	A/B	B
13	Doutor Pedrinho	Benedito	2	Ss, Md	C	-	C	B/C	C/D
14	Trombudo Central (1)	Trombudo	2	Ss, Sh	C	-	C	C	C/D
15	Trombudo Central (2)	Trombudo	2	Ss, Sh	C	-	C	C	C/D
16	Botuvera	Itajai Mirim	2	Ph	C	-	C	C	C

*1 Type 1: Run-of river

Type 2: Reservoir

*2 Lithology;

Gr: Granite

Ss: Sandstone

Ry: Rhyolite

Gs: Gneiss

Md: Mudstone

Di: Diorite

Sh: Shale

Ph: Phyllite

*3 A: Excellent

B: Good

C: Acceptable

D: Poor

表3 環境影響評価

調査事項	確認された計画に対する評価																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Natural Environment	Sedimentation and its downstream effect	x	x	x	x	x	x	A	A	B	x	x	A	A	A	A	
	Impact on soil erosion	C	C	C	C	B	C	C	B	C	C	C	C	A	A	C	
	Impact on river environment	x	x	x	x	x	x	C	B	B	x	x	C	A	A	C	
	Impact on vegetation	C	C	C	C	B	C	A	A	C	C	C	C	B	B	B	
	Impact on wildlife	x	x	x	x	x	x	D	D	x	x	x	D	x	x	D	
Social Environment	Effect on population	C	C	C	C	B	C	C	C	C	C	C	C	B	B	C	
	Effect on agriculture	C	C	C	C	B	C	C	B	C	C	C	C	A	A	C	
	Effect on inland fishery	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	Effect on secondary industry	x	x	x	x	x	x	x	x	x	C	x	x	A	A	x	
	Effect on use of water resources	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	Effect on traffic	C	C	B	B	B	B	C	A	A	B	C	x	B	A	A	B
	Effect on landscape	x	x	x	x	x	x	x	x	x	x	x	x	x	C	C	x
Effect on historical and archaeological assets	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Note: A : Degree of impact is significant.
 B : Degree of impact is moderate.
 C : Degree of impact is relatively small.
 D : Impact is unknown but study is needed.
 x : There are no influence

表4 地質調査の結果

- (1) Content of investigation
 (i) Core boring; 285 m in total length
 (ii) Permeability test; 15 times for damsites
 (iii) Construction material survey

- (2) Breakdown of the core boring

	Schemes sites			(Unit: m)
	Salto Pilão (1)	Dalbergia	Benedito Novo	
Damsite	20	30	20	
Headrace tunnel	60	75		
Powerhouse site	30	25	25	
Total	110	130	45	

- (3) Geological features for major project facilities of 3 hydropower schemes

	River width (m)	Geological feature	Assumed quantity of water leakage	Geological problem
<u>Salto Pilão (1)</u>				
Damsite				
Dam axis-A	315	Hard granite	0.1 l/min/m	Faults in left side
Dam axis-B	265	Hard granite	0.1 l/min/m	No problem
Dam axis-C	220	Hard granite	0.1 l/min/m	Cracks in river bed
Headrace tunnel		Hard granite		110 m long fault zone
Surge tank site		Hard rhyolite		No problem
Penstock route		Hard rhyolite		No problem
Powerhouse site		Hard rhyolite in 12 m below ground surface		No problem
<u>Dalbergia</u>				
Damsite				
Dam axis-A	310	Hard gneiss	3 l/min/m	Cracks in river bed
Dam axis-B	240	Hard gneiss	3 l/min/m	Cracks in river bed
Dam axis-C	250	Hard gneiss	3 l/min/m	Cracks in river bed
Headrace tunnel		Hard gneiss		110 m long fault zone
Surge tank site		Hard gneiss		No problem
Penstock route		Hard gneiss		No problem
Powerhouse site		Hard gneiss in 11 m below ground surface		No problem
<u>Benedito Novo</u>				
Damsite				
Dam axis-A	130	Hard gneiss	23 l/min/m	No problem
Dam axis-B	170	Hard gneiss	23 l/min/m	No problem
Dam axis-C	130	Hard gneiss	23 l/min/m	Fault in left side
Headrace tunnel		Hard gneiss		280 m long fault zone
Surge tank site		Hard gneiss		No problem
Penstock route		Hard gneiss		No problem
Powerhouse site		Hard gneiss in 5 m below ground surface		No problem

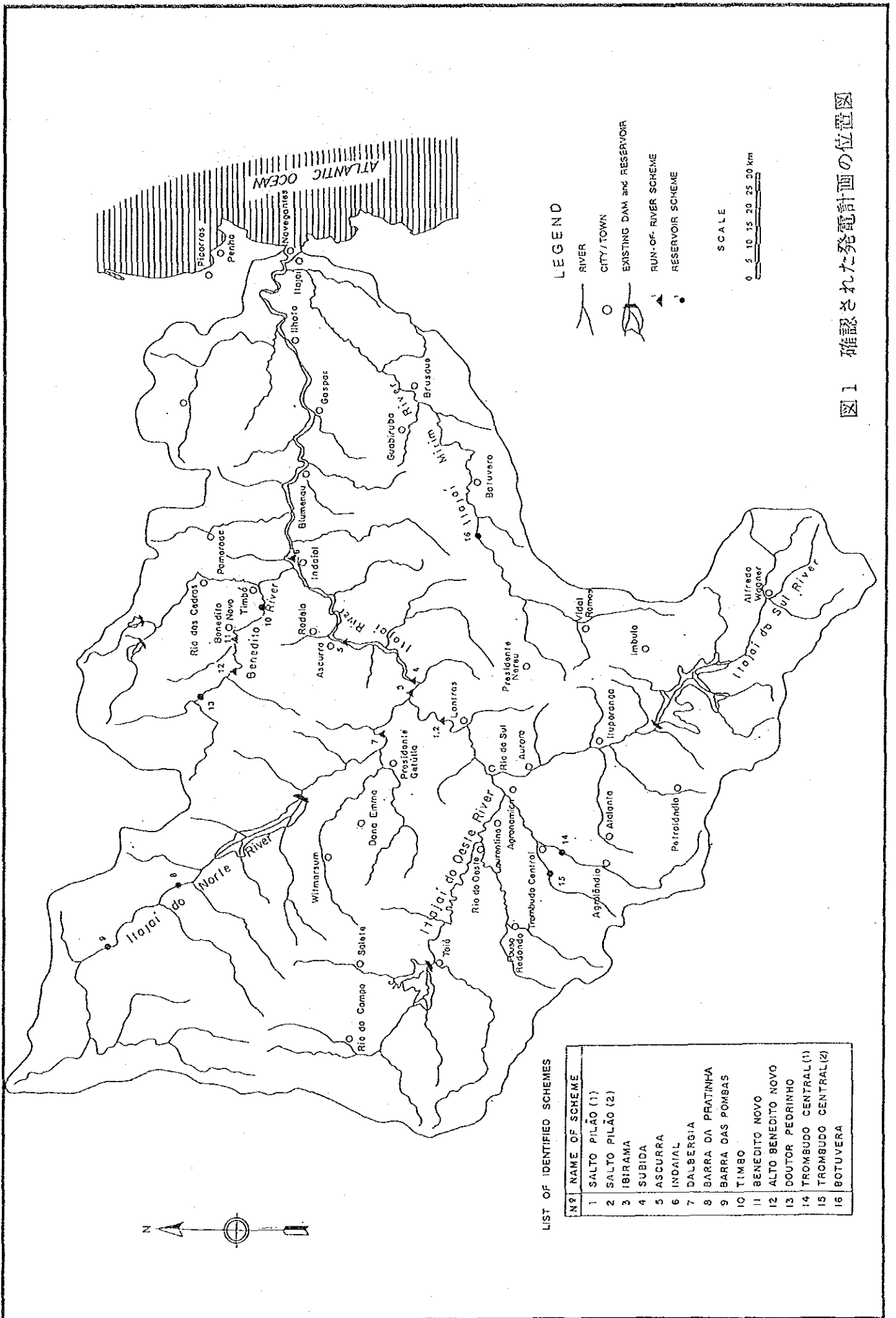
- (4) Construction materials

Name of scheme	Location of quarry site for concrete aggregates	Assumed rock volume (m ³)
Salto Pilão (1)	Hilly mountain at about 1 km upstream of right bank of damsite	400,000
Dalbergia	Hilly mountain at about 0.5 km upstream of right bank of damsite	500,000
Benedito Novo	Hilly mountain at 3 km upstream of left bank of damsite	200,000

表 5 水没面積及び補償面積

計画名	水位 (m)	水没面積 (km ²)	補償面積 (km ²)	移転家屋数				貯水池内の道路建設			
				Reservoir Area	Construction Areas	Realignment (m)	New Bridge (s) (m)	New Road (m)	Culvert(s) (unit)	Submerged Road (m)	
Salto Pilão											
Axis A	330	4.43	2.590	87	0	590	40	1900	2	630	
Axis B	330	4.59	2.880	87	0	590	40	1900	2	630	
Axis C	319	0.40	0.334	9	0	-	-	-	-	-	
Dalbergia											
Axis A	232	0.28	0.193	5	12	-	-	-	-	950	
Axis B	227	0.37	0.248	5	12	-	-	-	-	1250	
Axis C	215	0.29	0.156	8	12	-	-	-	-	-	
Benedito Novo											
Axis A	290	0.229	0.307	93	19	440	50	980	3	490	
Axis B	287	0.092	0.166	15	13	440	50	980	3	490	
Axis C	277	0.029	0.028	13	10	200	50	-	0	250	

付 図



LIST OF IDENTIFIED SCHEMES

NR	NAME OF SCHEME
1	SALTO PILÃO (1)
2	SALTO PILÃO (2)
3	IBIRAMA
4	SUBIDA
5	ASCURRA
6	INDAIAL
7	DALBERGIA
8	BARRA DA PRATINHA
9	BARRA DAS POMBAS
10	TIMBO
11	BENEDITO NOVO
12	ALTO BENEDITO NOVO
13	DOCTOR PEDRINHO
14	TROMBUDO CENTRAL (1)
15	TROMBUDO CENTRAL (2)
16	BOTUVERA

LEGEND

- RIVER
- CITY/TOWN
- EXISTING DAM and RESERVOIR
- RUN-OF-RIVER SCHEME
- RESERVOIR SCHEME

SCALE

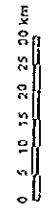


図1 確認された発電計画の位置図

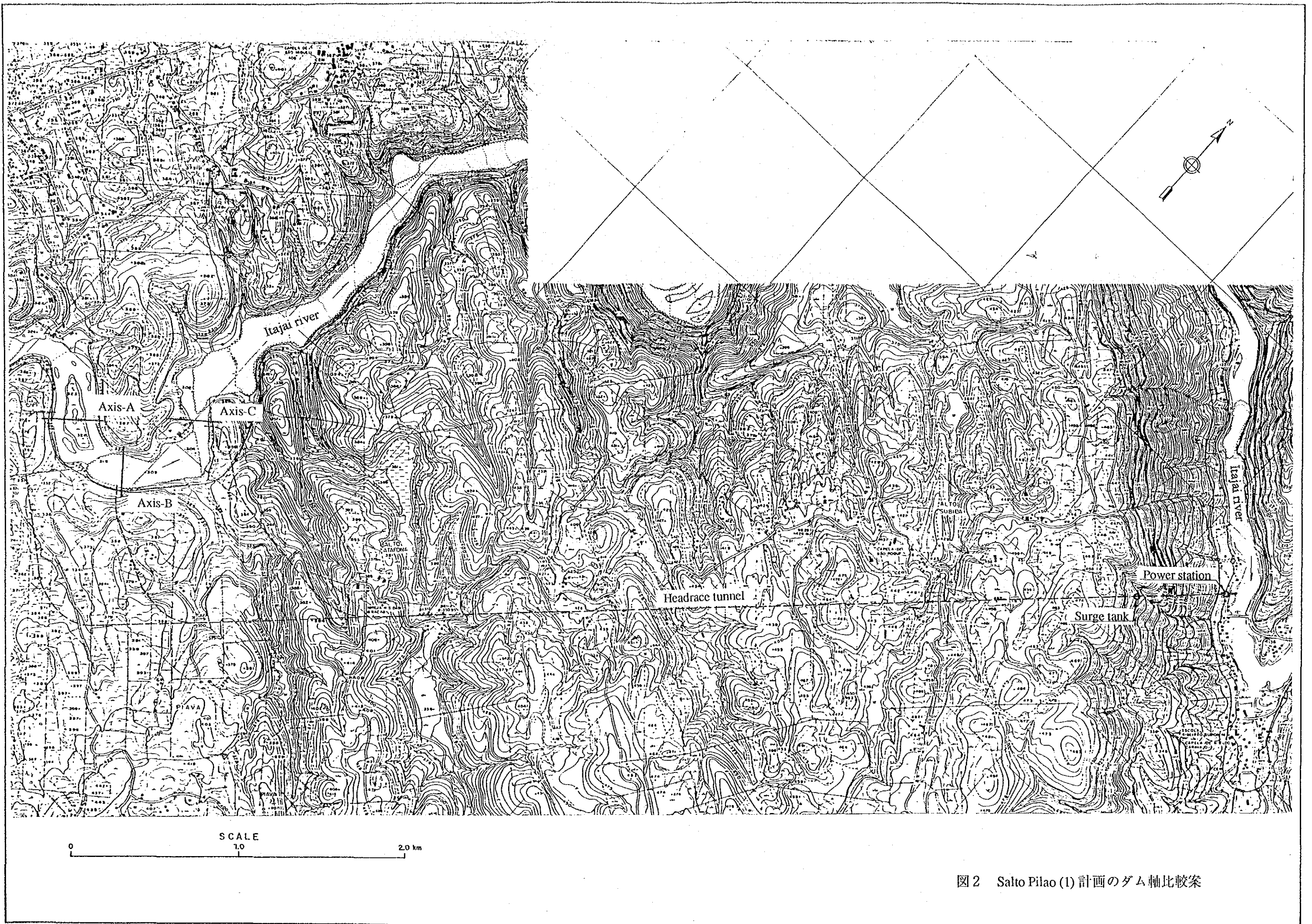


図2 Salto Pilao (1) 計画のダム軸比較案



図3 Dalbergia 計画のダム軸比較案

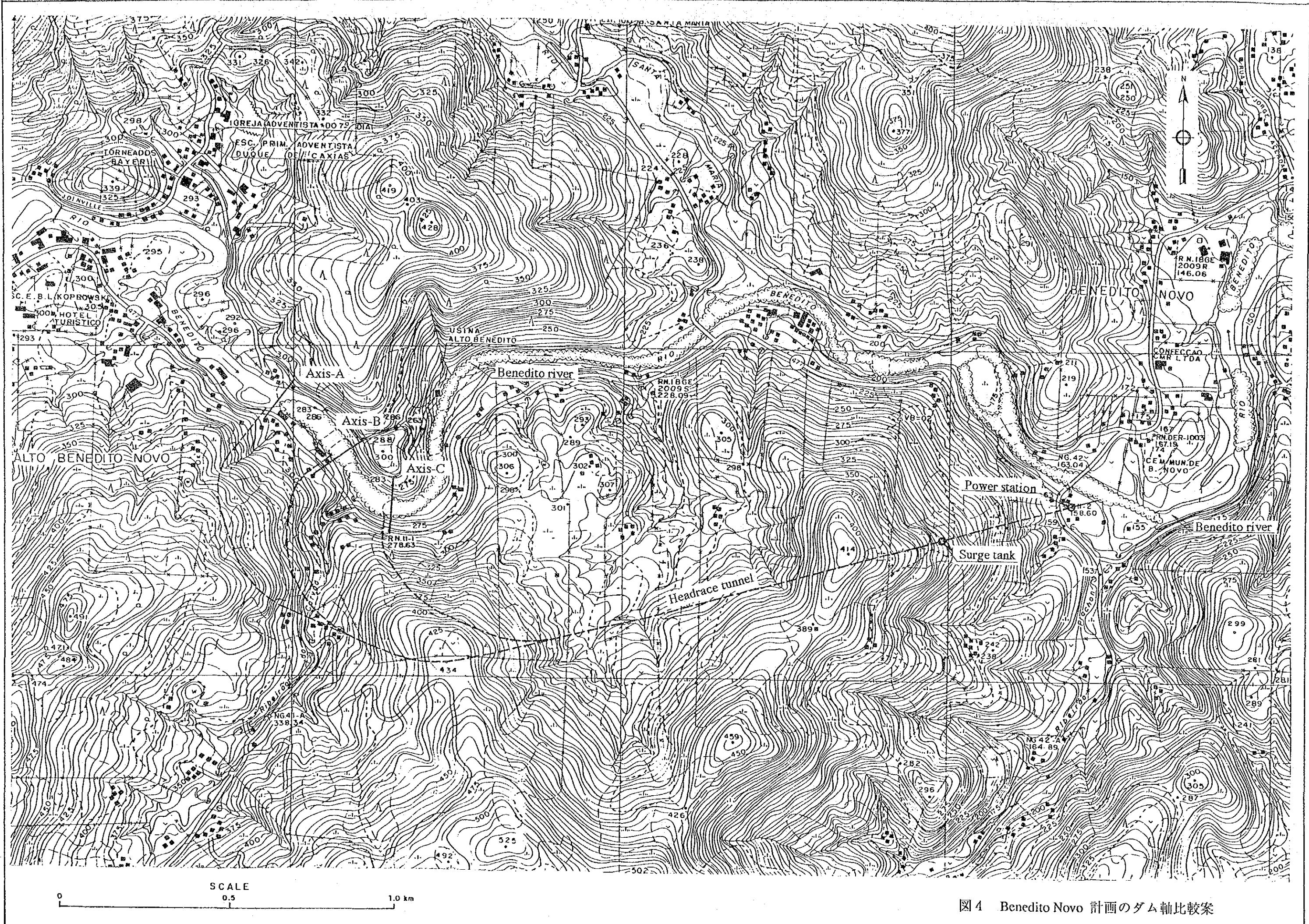


図4 Benedito Novo 計画のダム軸比較案

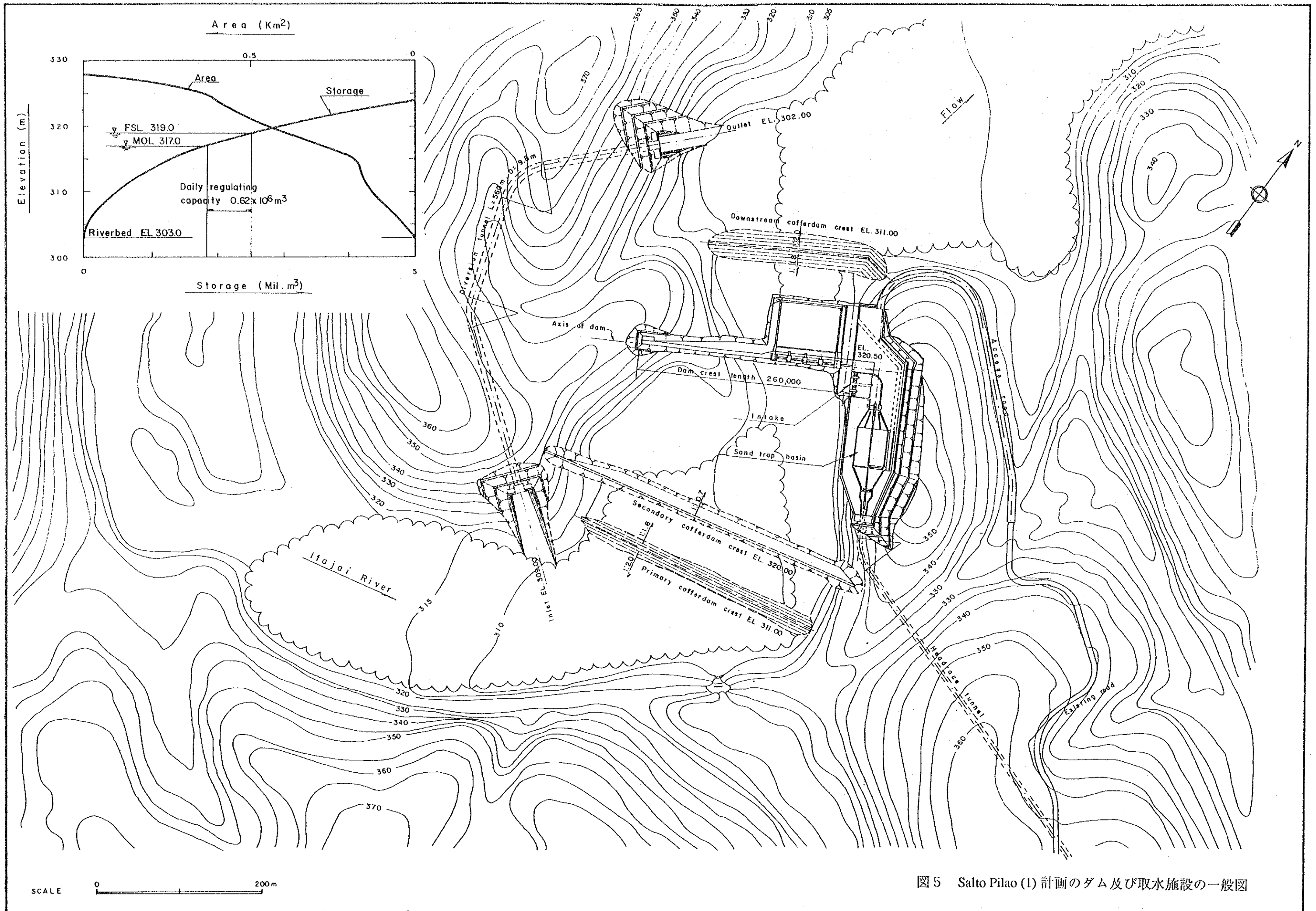
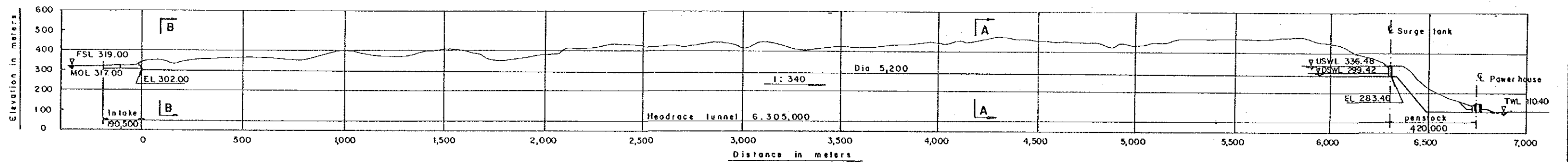


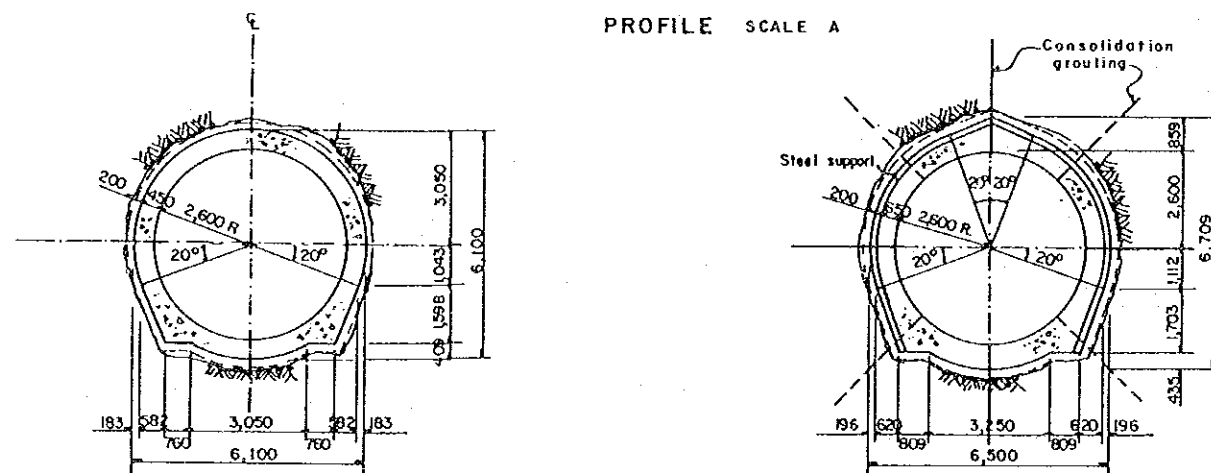
図5 Salto Pilao (I) 計画のダム及び取水施設の一般図



PLAN SCALE A



PROFILE SCALE A



SECTION A-A

SECTION B-B

TYPICAL SECTION OF HEADRACE TUNNEL SCALE B

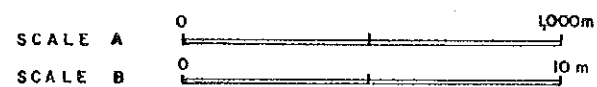
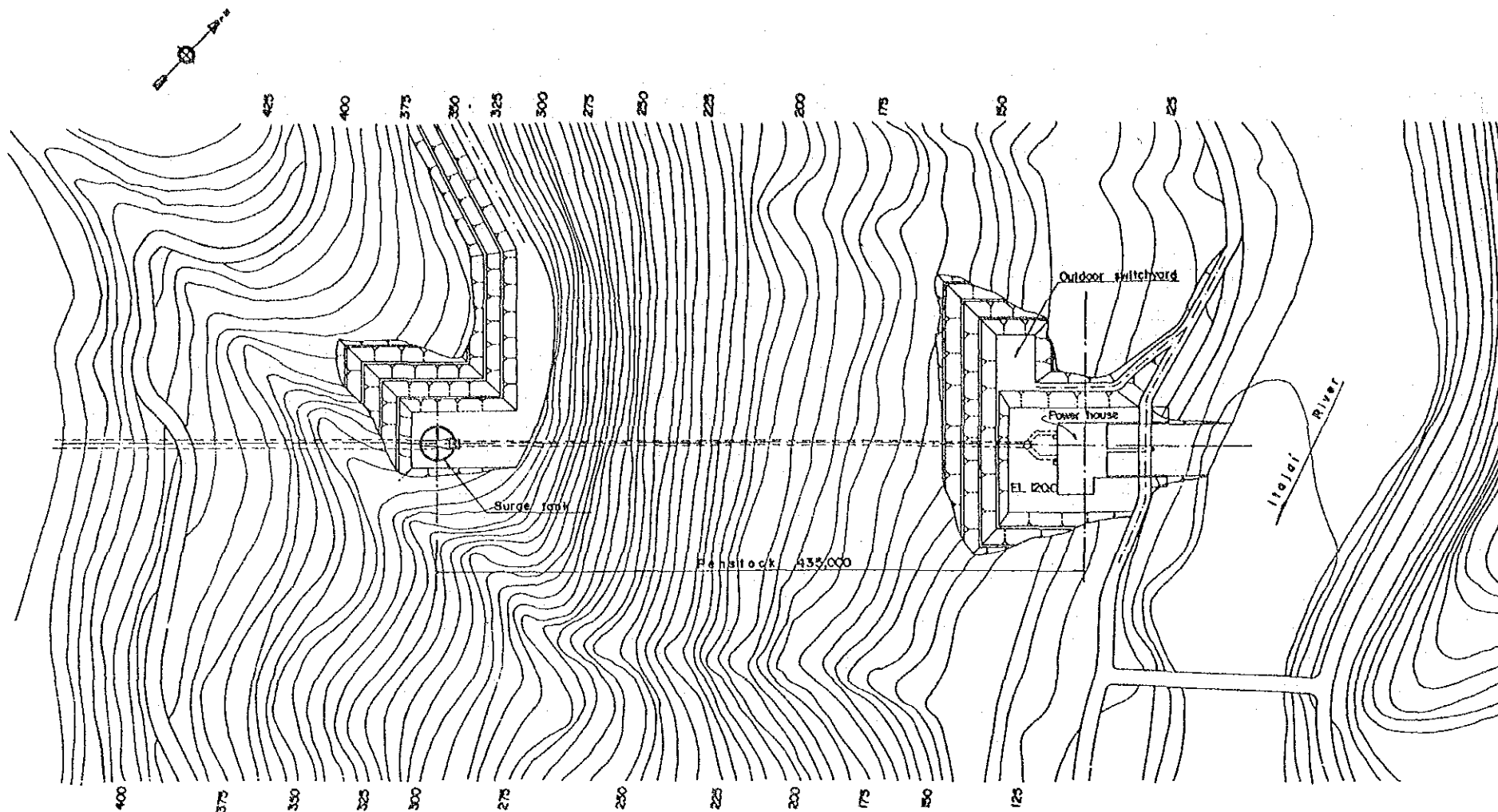
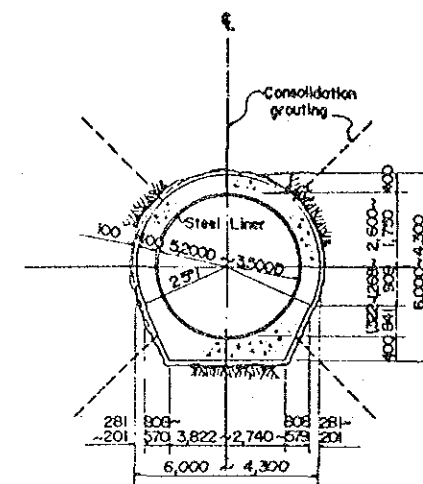


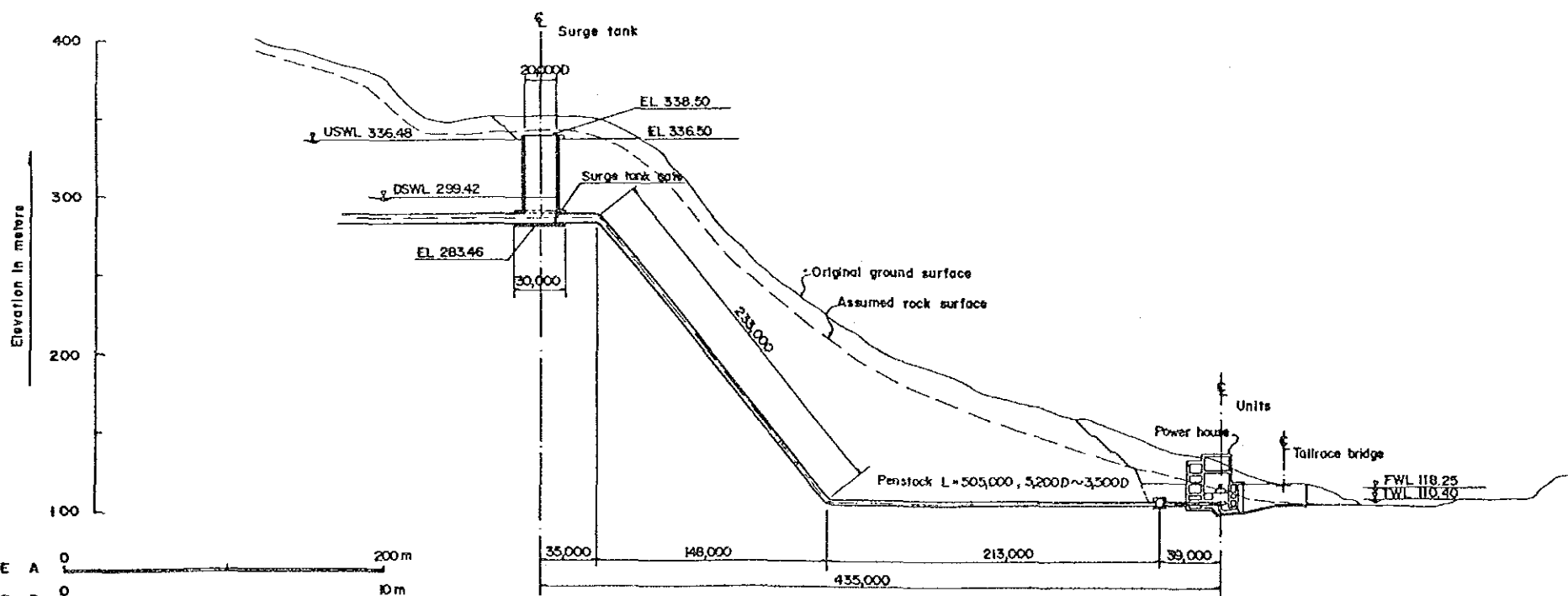
図6 Salto Pilao (1) 計画の水路の平面図及び縦断図



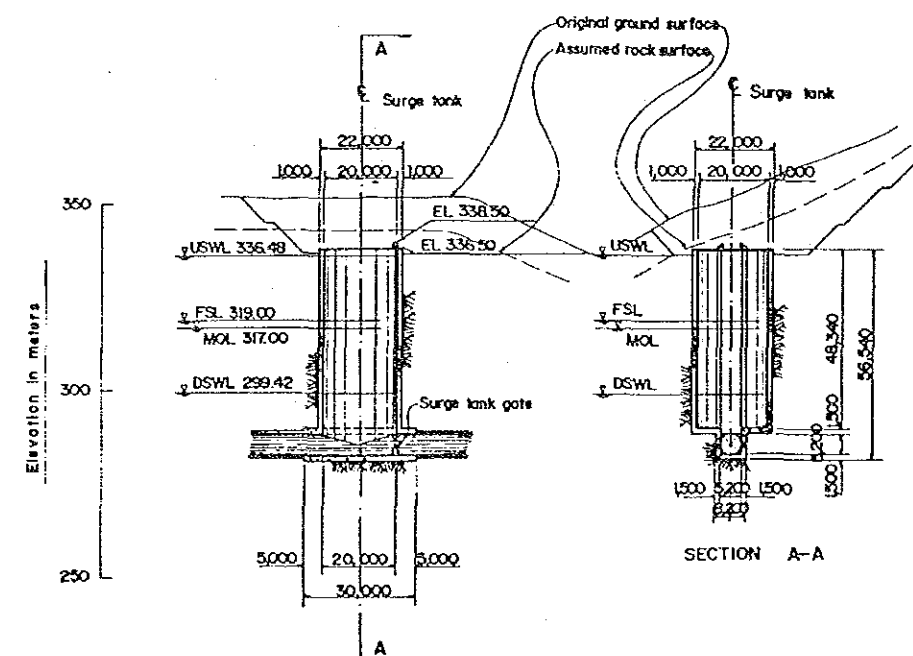
PLAN SCALE



TYPICAL SECTION OF PENSTOCK TUNNEL SCALE B



PROFILE SCALE A



SURGE TANK SCALE C



図7 Salto Pilao (1) 計画の調圧水槽及び水圧鉄管路の平面図及び縦断図

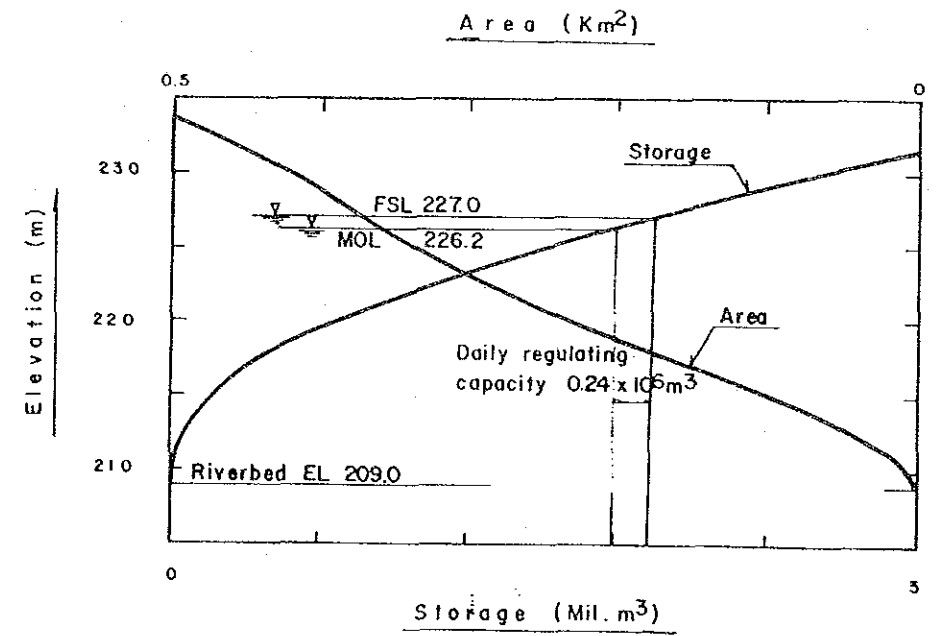
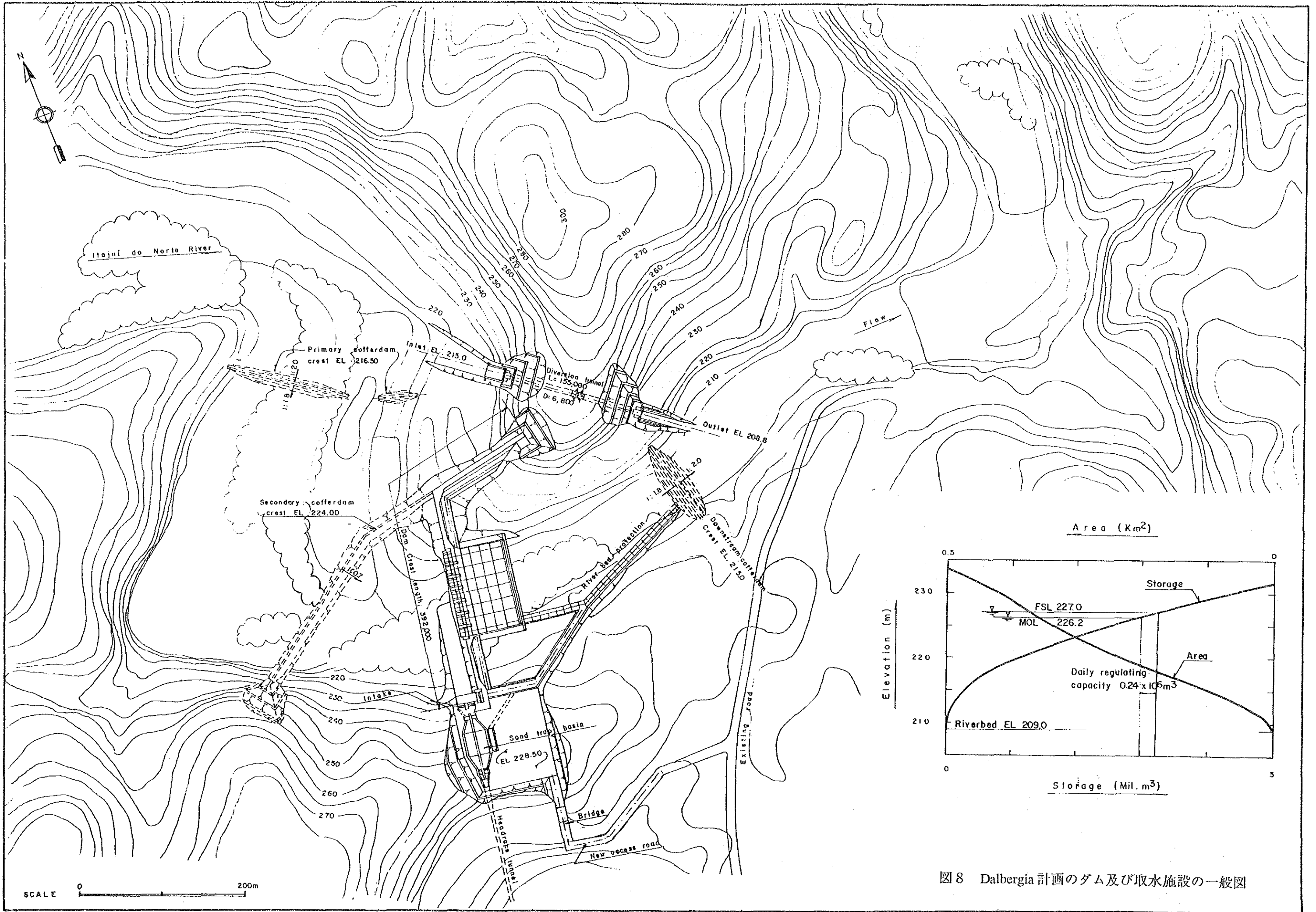
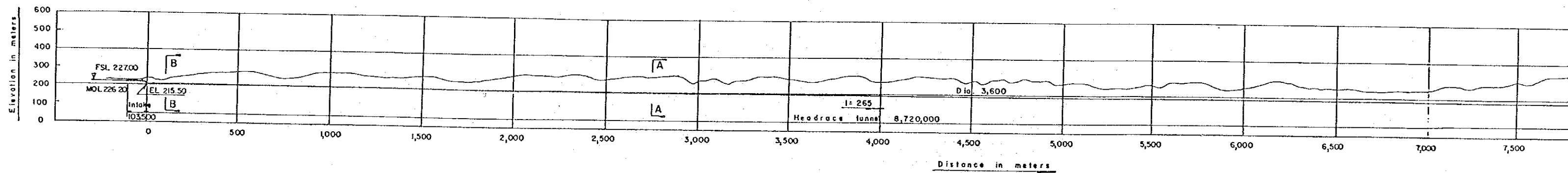


図8 Dalbergia計画のダム及び取水施設の一般図



PLAN SCALE A



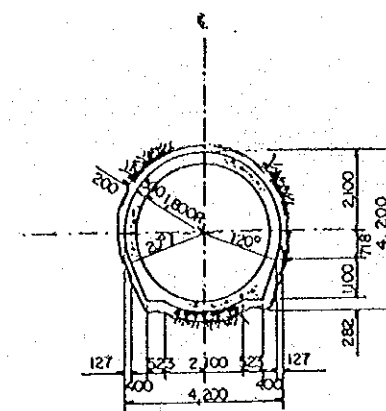
Distance in meters

PROFILE SCALE A

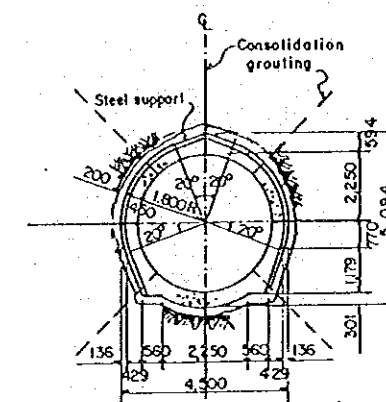




PLAN SCALE A

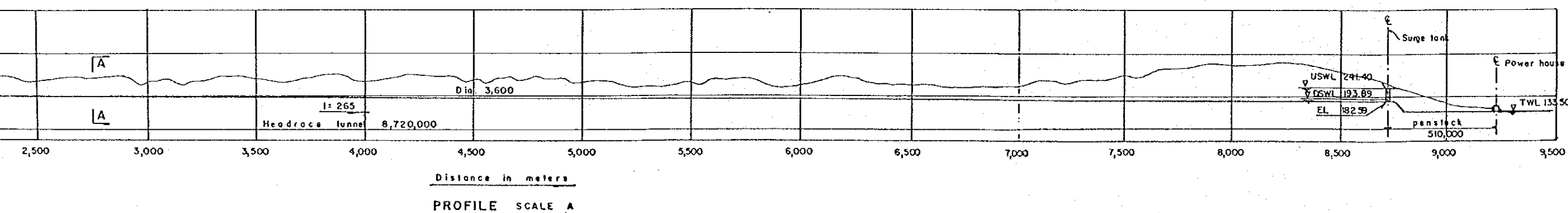


SECTION A-A



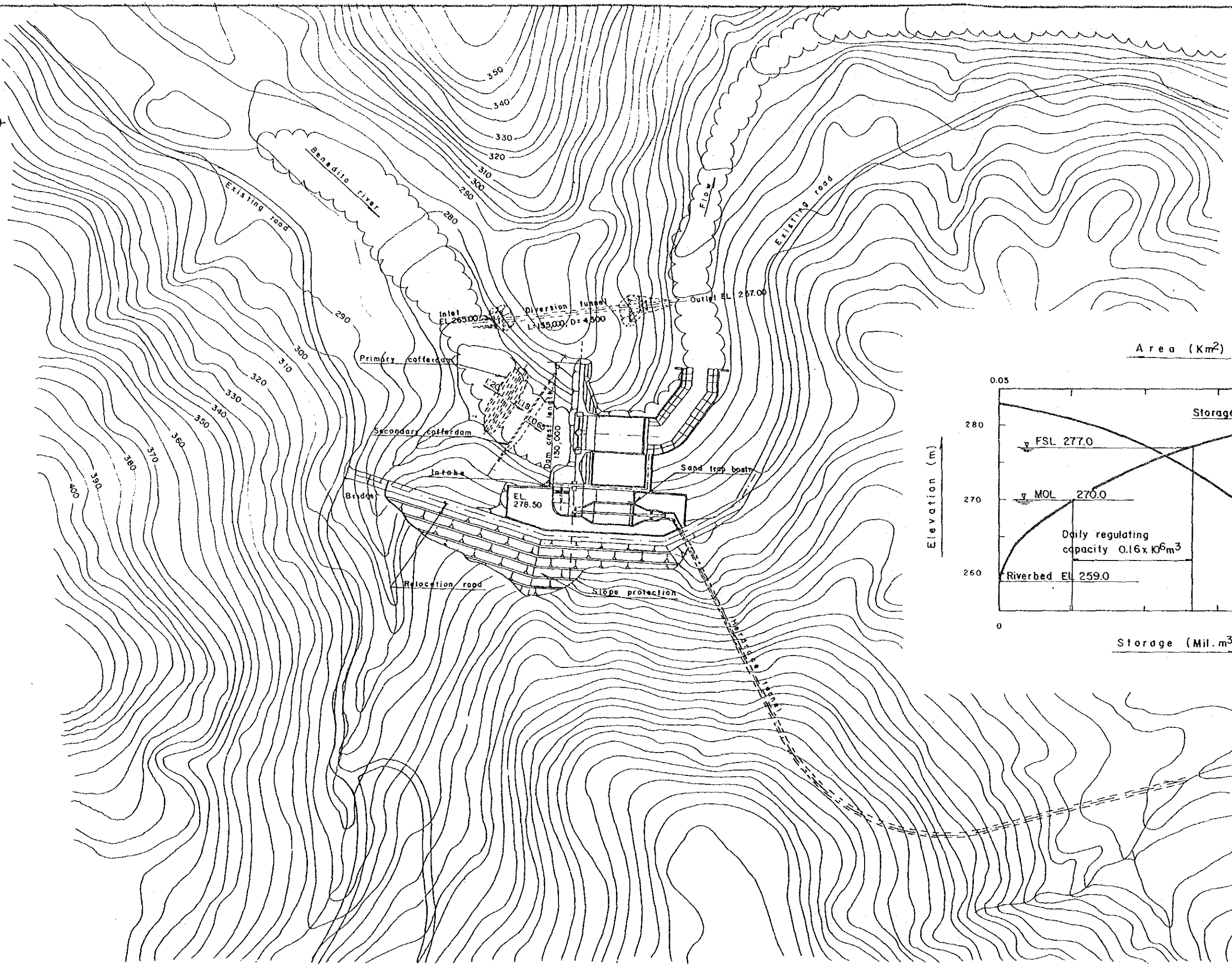
SECTION B-B

TYPICAL SECTION OF HEADRACE TUNNEL SCALE B

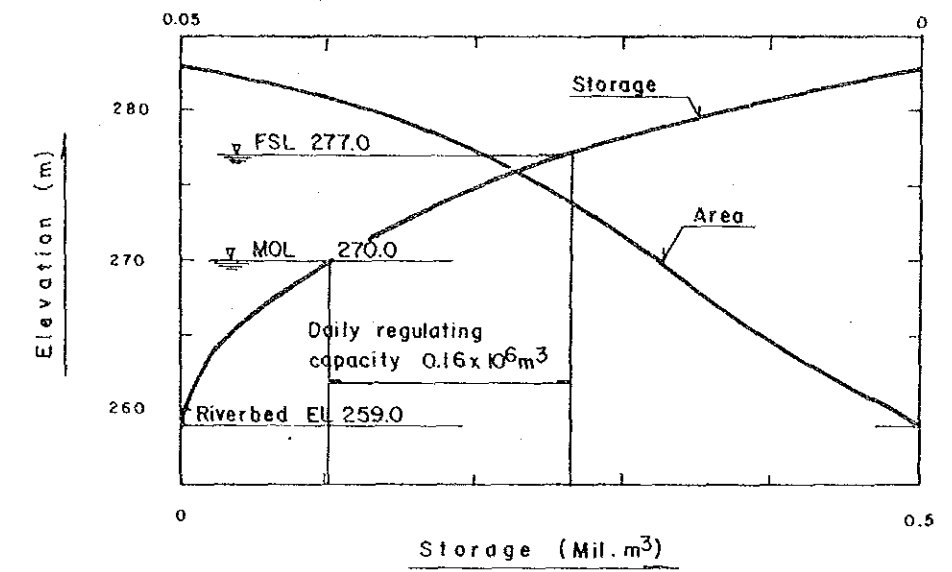


PROFILE SCALE A

図9 Dalbergia 計画の水路の平面図及び縦断面図

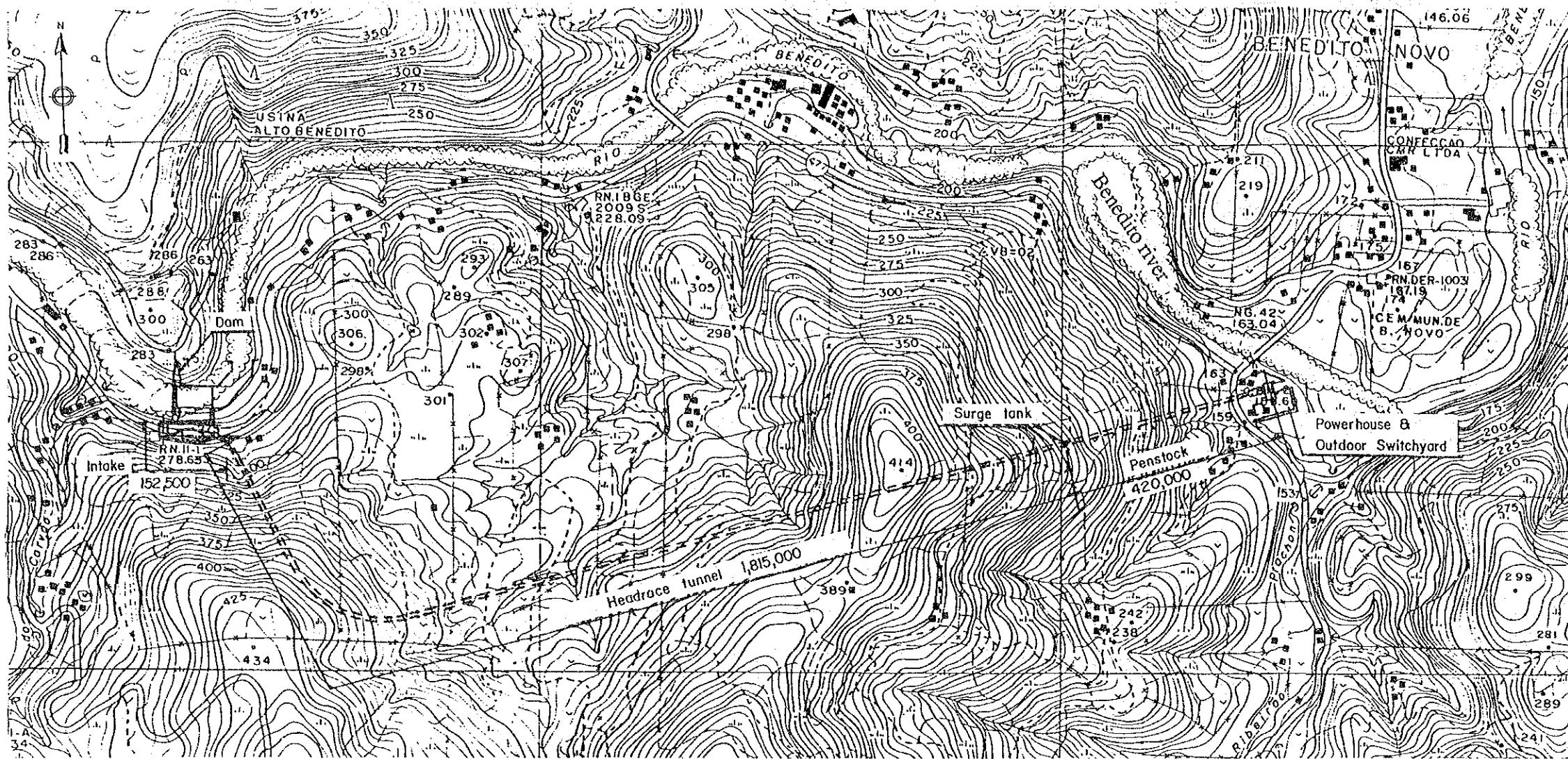


Area (Km²)

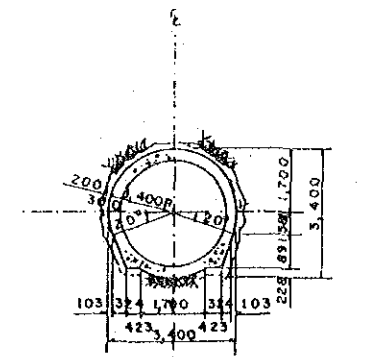


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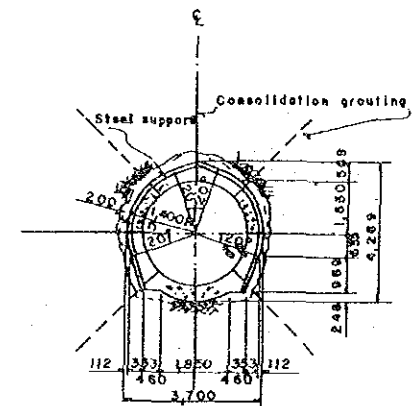
図 1 1 Benedito Novo 計画のダム及び取水施設の一般図



PLAN SCALE A

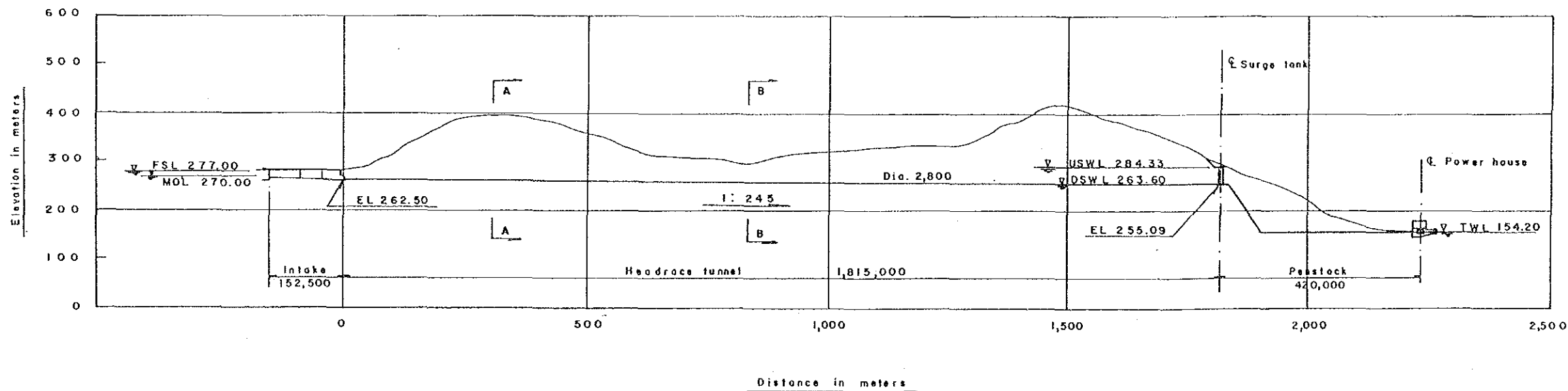


SECTION A-A



SECTION B-B

TYPICAL SECTION OF HEADRACE TUNNEL
SCALE B



Distance in meters

PROFILE SCALE A

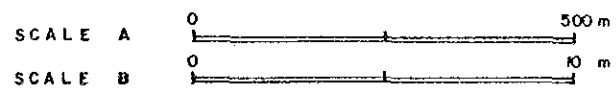
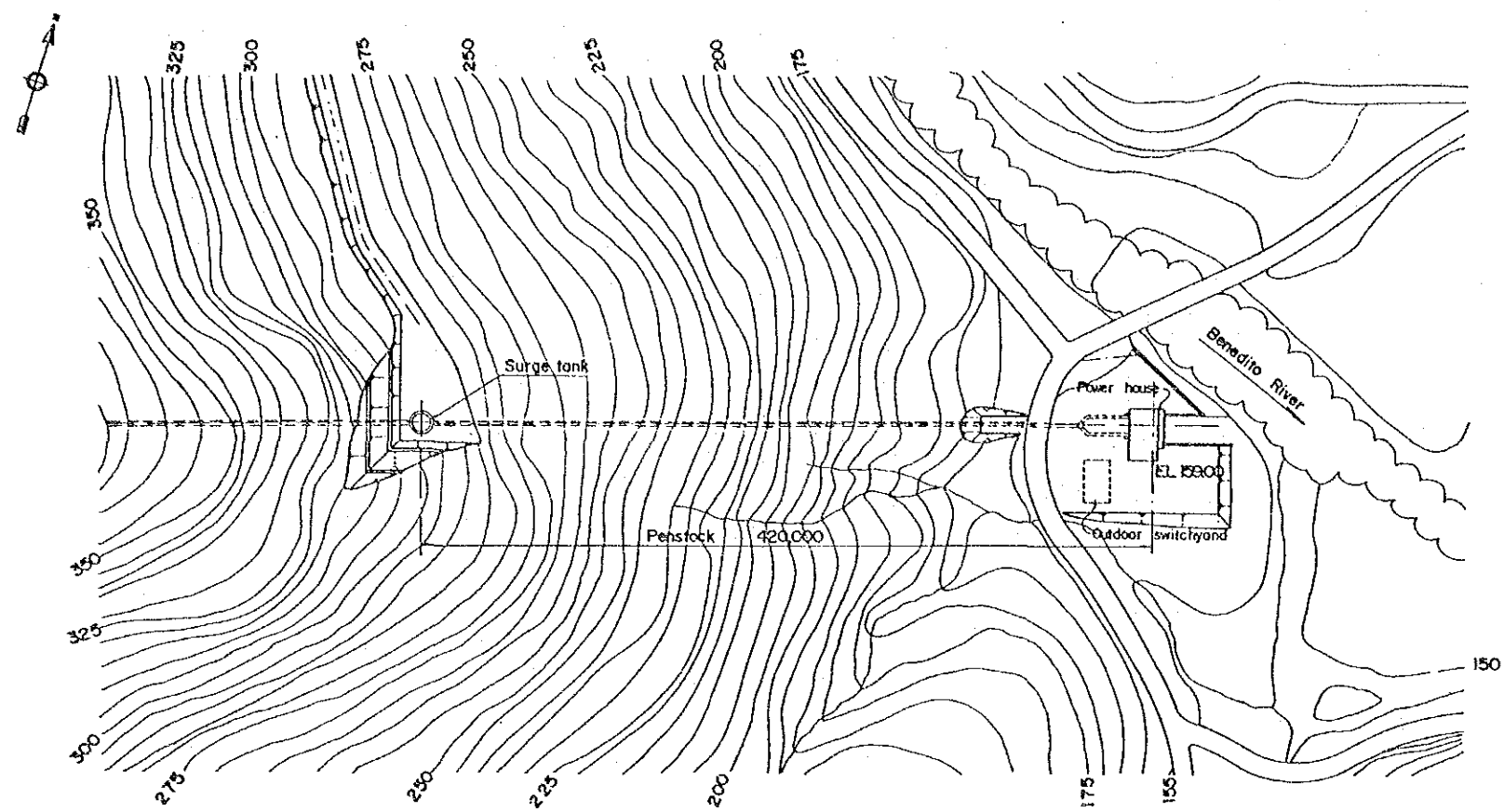
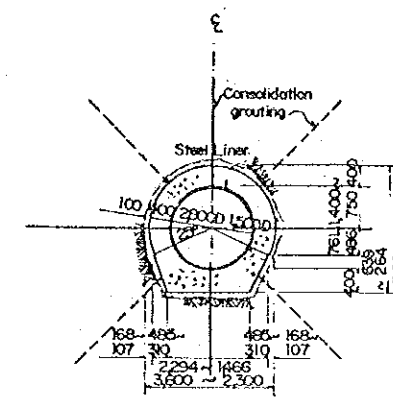


图 1 2 Benedito Novo 計画の水路の平面図及び縦断図

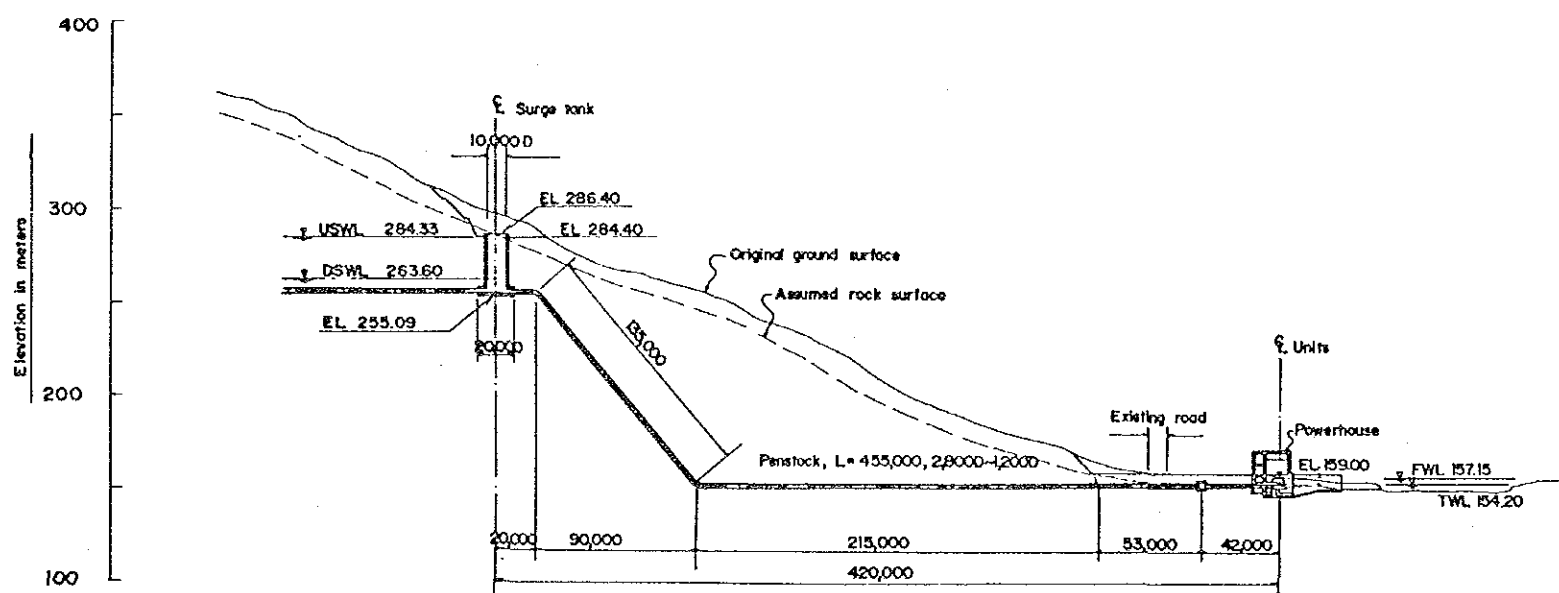


PLAN SCALE A

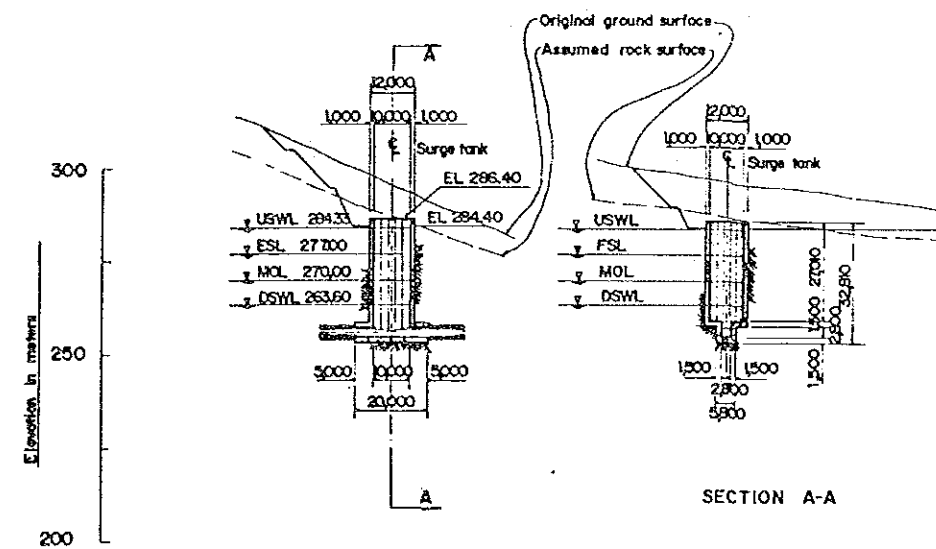


TYPICAL SECTION OF PENSTOCK TUNNEL

SCALE B



PROFILE SCALE A



SURGE TANK SCALE C

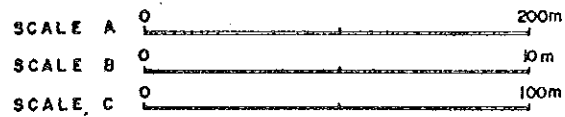


図 1 3 Benedito Novo 計画の調圧水槽及び水圧鉄管路の平面図及び縦断面図

ACTION	YEAR	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Feasibility Study		■								
B. Detailed design										
(1) Financing			■							
(2) Detailed design				■						
C. Construction										
(1) Land acquisition						■				
(2) Financing					■					
(3) P/Q & tendering						■				
(4) Construction									■	■

Commencement of
Power Generation

図 1 4 Salto Pilao (1) 計画の実施工程計画

ACTION	YEAR	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th
A. Feasibility Study		■								
B. Detailed design										
(1) Financing			■							
(2) Detailed design				■						
C. Construction						■				
(1) Land acquisition										
(2) Financing					■					
(3) P/Q & tendering						■				
(4) Construction									■	

Commencement of
Power Generation

図 1 5 Dalbergia 計画の実施工程計画

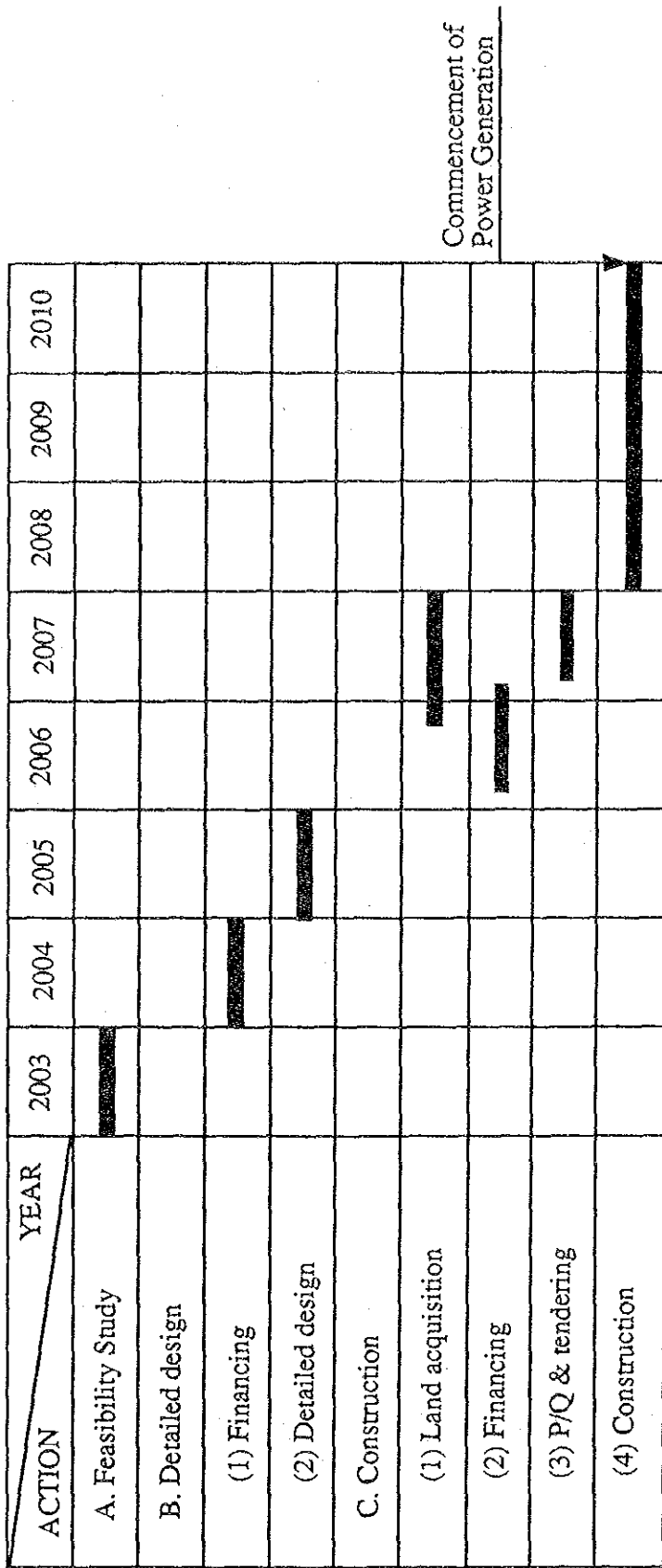


図 1 6 Benedito Novo 計画の実施工程計画

1/2