

### Main Transformer

Type	Outdoor, oil filled, single phase
Number of units	2 set ( 6 units)
Capacity	39,500 kVA
Voltage primary :	11.0 kV
secondary :	230 kV

### Outdoor Switchyard

Bus system	Single bus + transfer bus
Bus	Aluminum line
Number of transmission lines connected	230 kV × 1 cct

### 14.4.3 Transmission Line

#### (1) Xe Namnoy (Midstream)

Power plant has 238 MW output and 230 kV transformers, and the transmission line for this generating power will be planned for 230 kV steel towers with one circuit using single conductor 1,272 MCM ACSR up to Ban Houaykong.

The proposed line route was based on the topographical maps and reconnaissance by car on the existing roads and helicopter at site. The line route from power station climbs over the mountainous terrain covered with tropical jungle along the Xe Namnoy River and passes the flat area in high hills.

And the route of lines reaches Ban Houaykong substation site. This line route length is approximately 10 km.

As stated in 12.2.2(3), following case studies were carried out.

For the Case-1 allocation transmission lines, after the transmitted power from power plant by a 140 km long 230 kV one circuit transmission line is connected to the Ban Houaykong substation, the power is step up to 500 kV, and the 500 kV transmission line of two circuits to the Thai border is about 100 km long.

For the Case-2 independent transmission line, the 230 kV transmission line with two circuits using twin conductors 795 MCM ACSR up to the Thai border is required. This line route length is about 110 km.

**(2) Xe Namnoy (Midstream + Downstream)**

Power plant has 305 MW (238 MW + 67 MW) output and 230 kV transformers, and the transmission line for the down stream Xe Namnoy plant (output 67 MW) will be planned for 230 kV steel towers with one circuit using single conductor 795 MCM ACSR up to the Xe Namnoy Midstream plant.

The proposed line route was based on the topographical maps and reconnaissance by car on the existing roads and helicopter at site. The line route from power station crosses the mountainous terrain covered with tropical jungle along the Xe Namnoy River and reaches the mid stream Xe Namnoy Plant at a distance of 10 km. The power will be transmitted to Ban Houaykong by the Xe Namnoy Midstream plant transmission line.

**Table 14.4-1 Project Outline of Xe Namnoy Midstream**

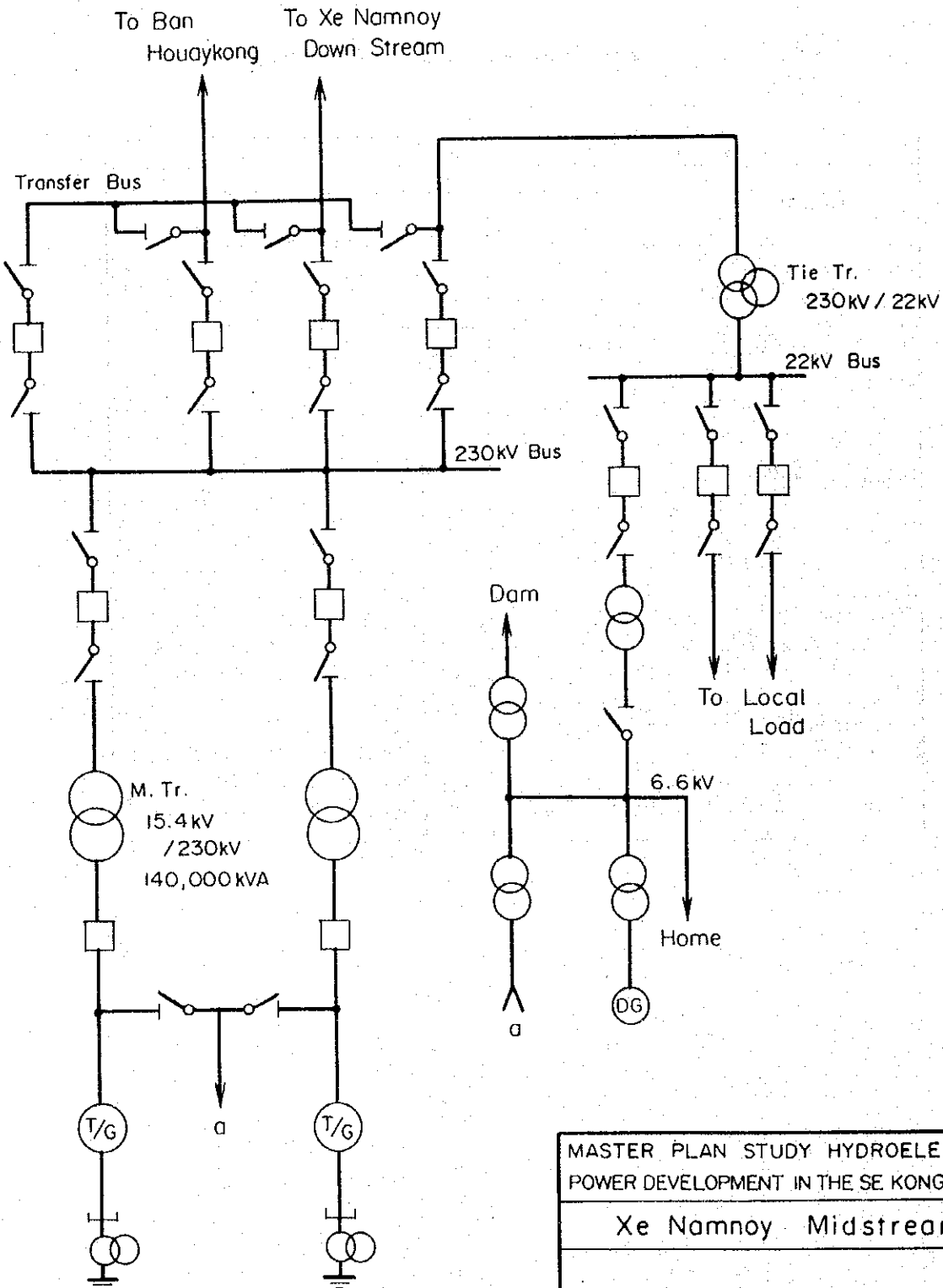
Item	Unit	Description
<b>Reservoir</b>		
Catchment Area	km <sup>2</sup>	749
Annual Inflow Volume	10 <sup>6</sup> m <sup>3</sup>	1,151
Average Inflow	m <sup>3</sup> /s	24
High Water Level	m	765.00
Low Water Level	m	747.20
Gross Storage Capacity	10 <sup>6</sup> m <sup>3</sup>	323
Effective Storage Capacity	10 <sup>6</sup> m <sup>3</sup>	250
Diversion Tunnel	Type	Circular Tunnel
	Internal Diameter	m
	Length	m
Dam	Type	Center Core Rockfill Dam
	Height	m
	Crest Length	m
	Width of Dm Crest	m
	Dam Volume	10 <sup>3</sup> m <sup>3</sup>
Spillway	Type	Chute spillway
	Width x Length	m
	Discharge Capacity	m <sup>3</sup> /s
Intake	Inlet Capacity	m <sup>3</sup> /s
Headrace Tunnel	Type	Circular Pressure Tunnel
	Diameter	m
	Length	m
Surge Tank	Type	Underground, Circular Section
	Diameter	m
	Height	m
	Number	1
Penstock	Type	Underground & Exposed Type
	Diameter x Length x Number	m
Powerhouse	Type	Semi-underground Type
	Width x Length x Height	m

**Table 14.4-2 Project Outline of Xe Namnoy Downstream**

Item	Unit	Description
<b>Reservoir</b>		
Catchment Area	km <sup>2</sup>	1,273
Annual Inflow Volume	10 <sup>6</sup> m <sup>3</sup>	2,209
Average Inflow	m <sup>3</sup> /s	70
High Water Level	m	270.00
Low Water Level	m	266.70
Gross Storage Capacity	10 <sup>6</sup> m <sup>3</sup>	16
Effective Storage Capacity	10 <sup>6</sup> m <sup>3</sup>	2
<b>Diversion Tunnel</b>		
Type		Circular Tunnel
Internal Diameter	m	11
Length	m	570
<b>Dam</b>		
Type		Concrete Gravity Dam
Height	m	33
Crest Length	m	350
Width of Dam Crest	m	5
Dam Volume	10 <sup>3</sup> m <sup>3</sup>	133
<b>Spillway</b>		
Type		Overflow Spillway
Width x Length	m	154 x 100
Discharge Capacity	m <sup>3</sup> /s	9,602
<b>Intake</b>		
Inlet Capacity	m <sup>3</sup> /s	96
<b>Headrace Tunnel</b>		
Type		Circular Pressure Tunnel
Diameter	m	5.8
Length	m	3,670
<b>Surge Tank</b>		
Type		Underground, Circular section
Diameter	m	16
Height	m	42
Number		1
<b>Penstock</b>		
Type		Underground Type
Diameter x Length x Number	m	5.6 - 5.4 x 470 x 1
<b>Powerhouse</b>		
Type		Semi-underground Type
Width x Length x Height	m	18 x 36 x 50

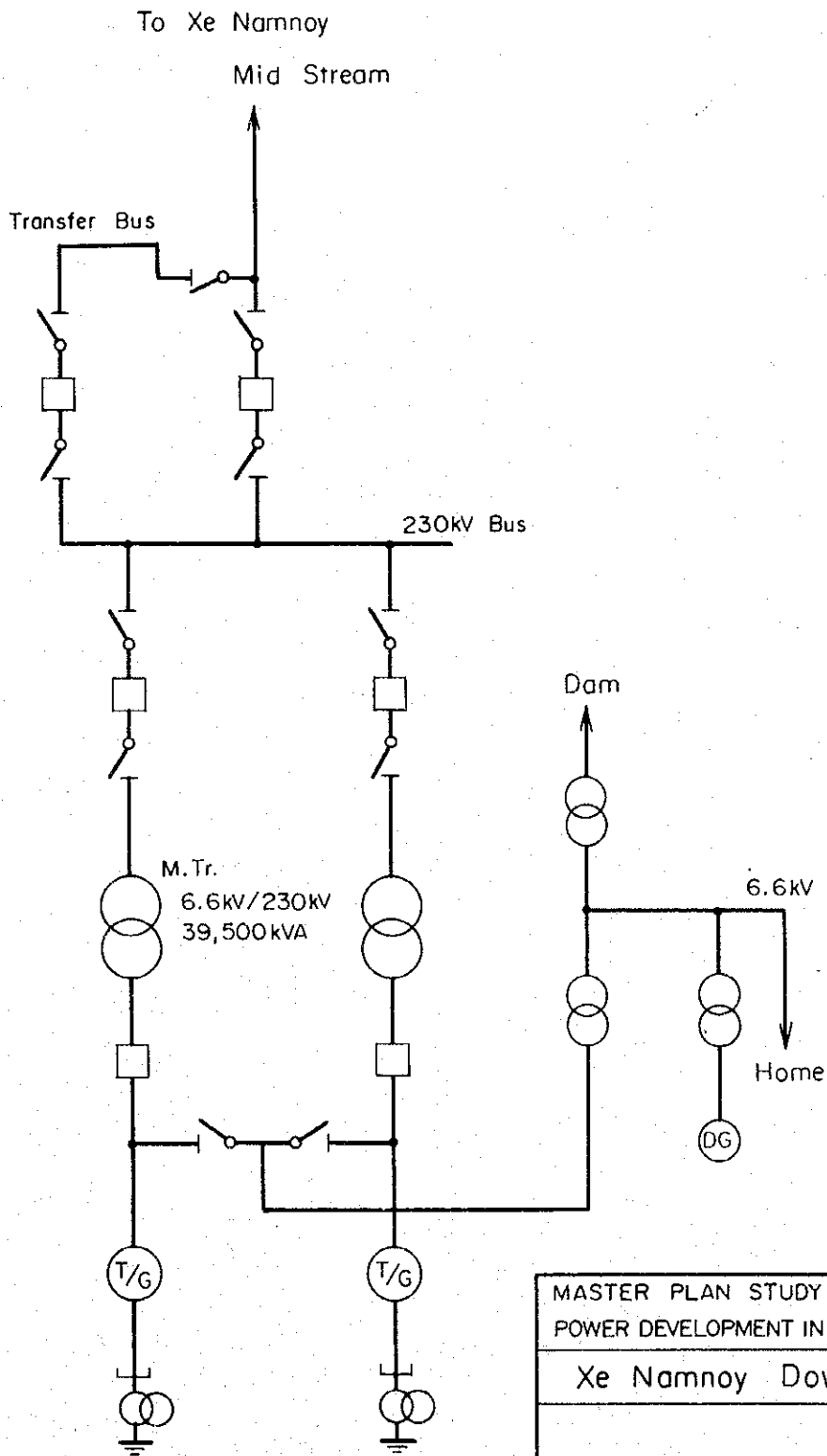
**Table 14.4-3 Project Outline of Xe Pian River Diversion**

Item	Unit	Description
<b>Xe Pian Intake Weir</b>		
Type		Concrete Gravity Type
Height	m	17
Length	m	120
<b>Diversion Channel(Xe Pian - H. Lieng)</b>		
Type		Box Culvert
Width x Height x Length	m	5 x 2.5 x 530
<b>H. Lieng Intake Weir</b>		
Type		Concrete Gravity Type
Height	m	10
Length	m	500
<b>Open Channel Portion(H. Lieng - Xe Namnoy)</b>		
Type		Open Channel, Concrete
Width x Height x Length	m	5 x 2.5 x 4,100
<b>Tunnel Portion(H. Lieng - Xe Namnoy )</b>		
Type		Upper Portion : Half Circular Lower Portion : Rectangle
Width x Height x Length	m	4 x 4 x 900



Turbine : 119,000 kW  
 Generator : 140,000 kVA

MASTER PLAN STUDY HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN	
Xe Namnoy Midstream	
Single Line Diagram	
Fig. 14.4 - 1	Feb. 1995



Turbine : 33,500kW  
Generator : 39,500kVA

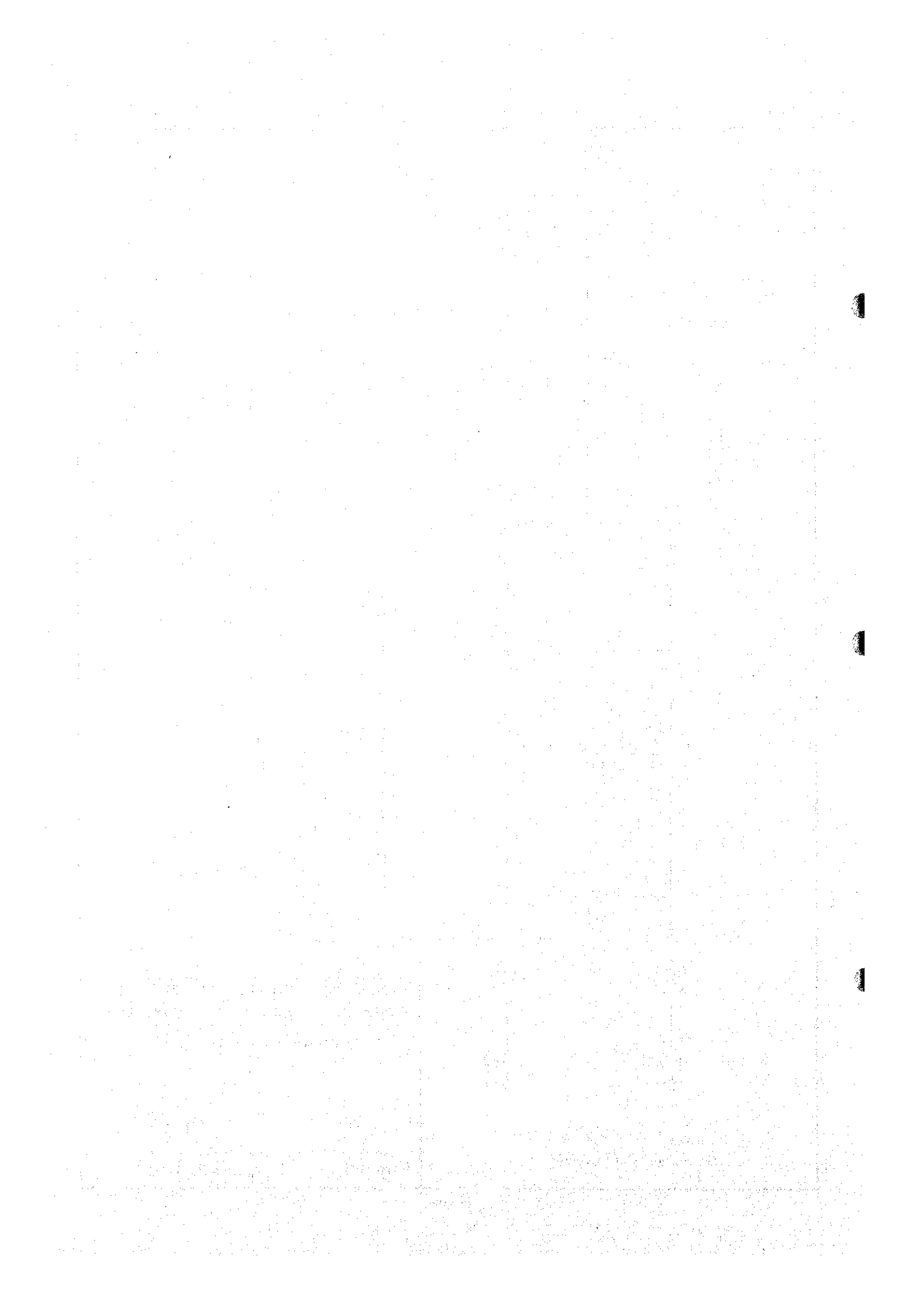
MASTER PLAN STUDY HYDROELECTRIC  
POWER DEVELOPMENT IN THE SE KONG BASIN

Xe Namnoy Downstream

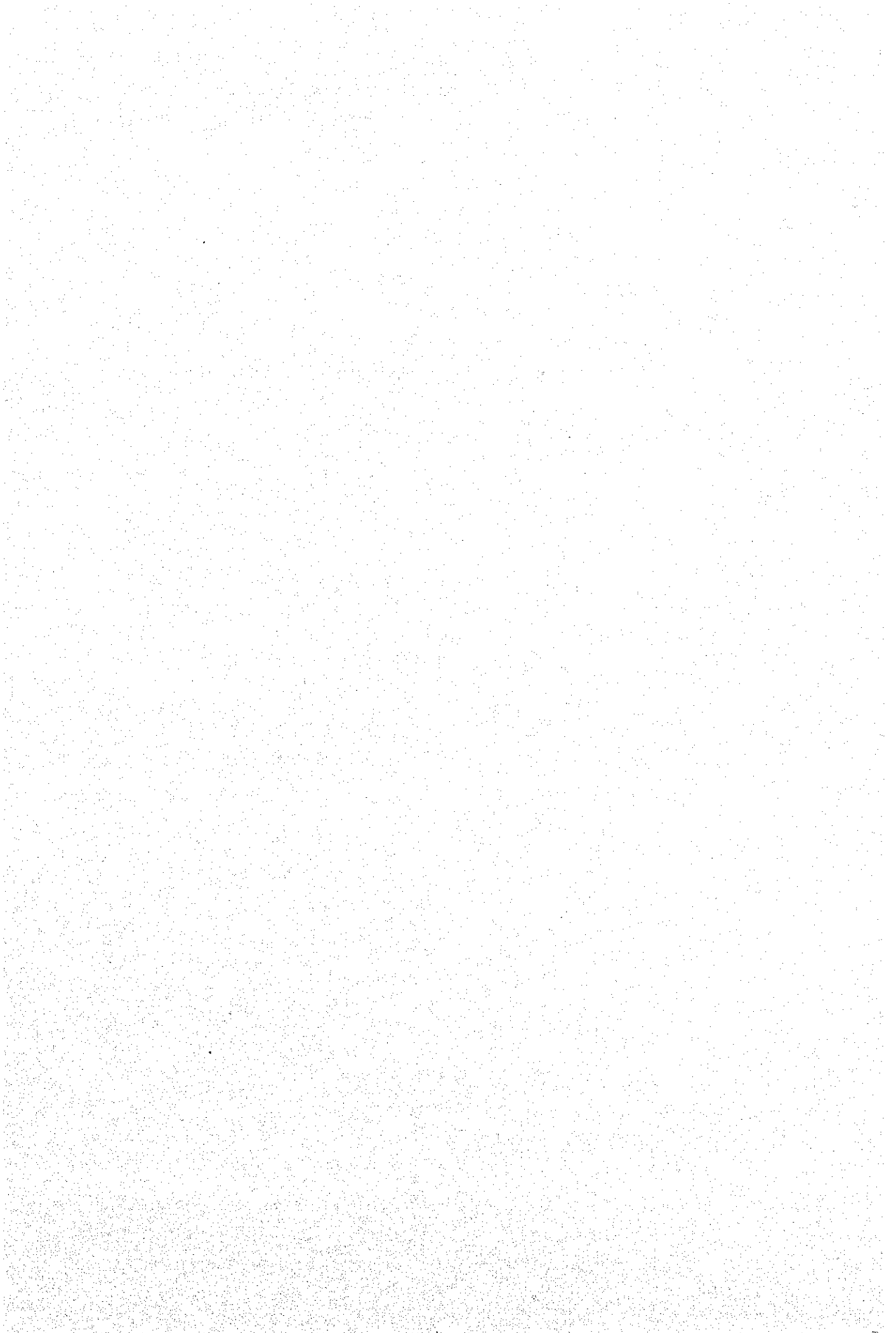
Single Line Diagram

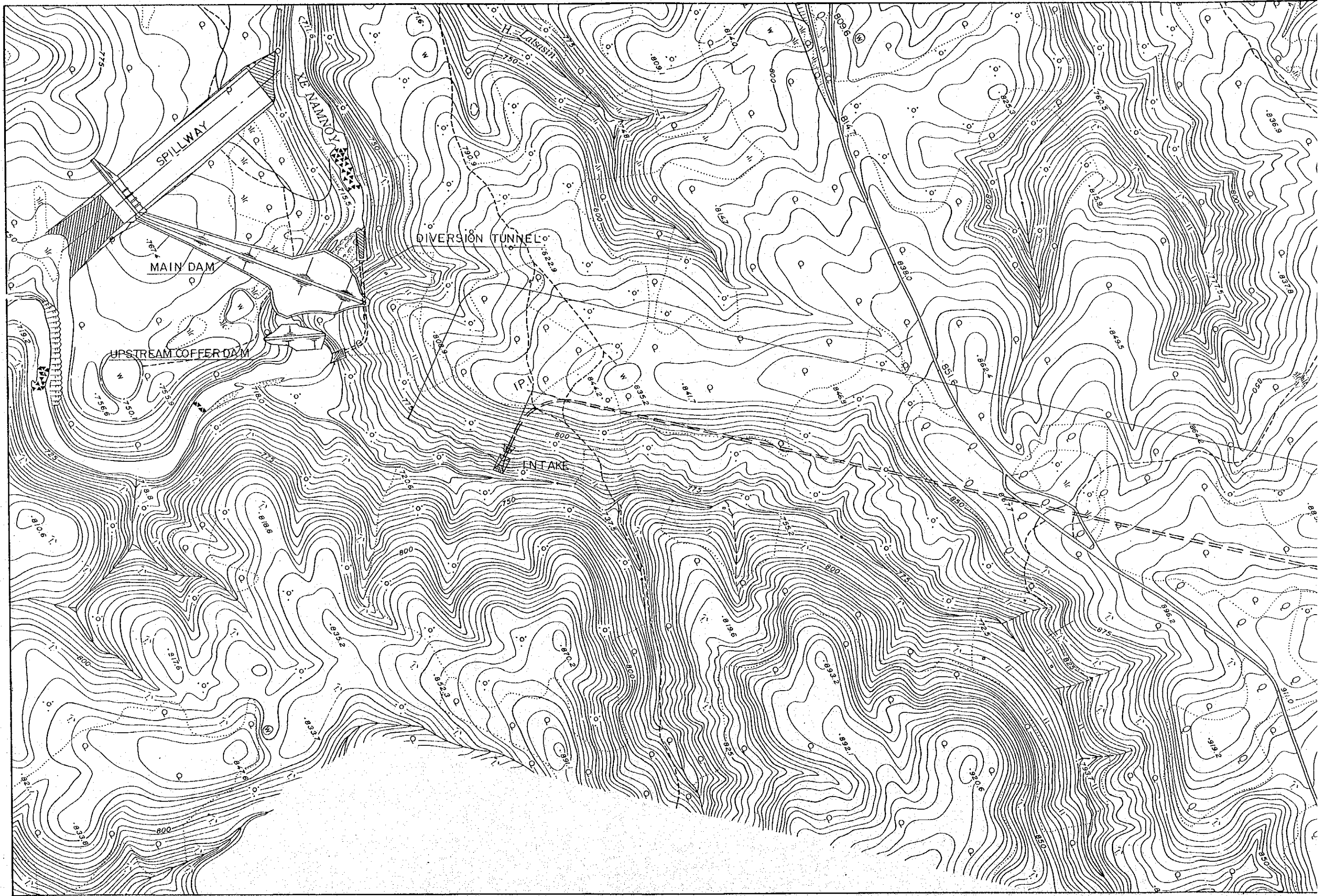
Fig. 14.4 - 2

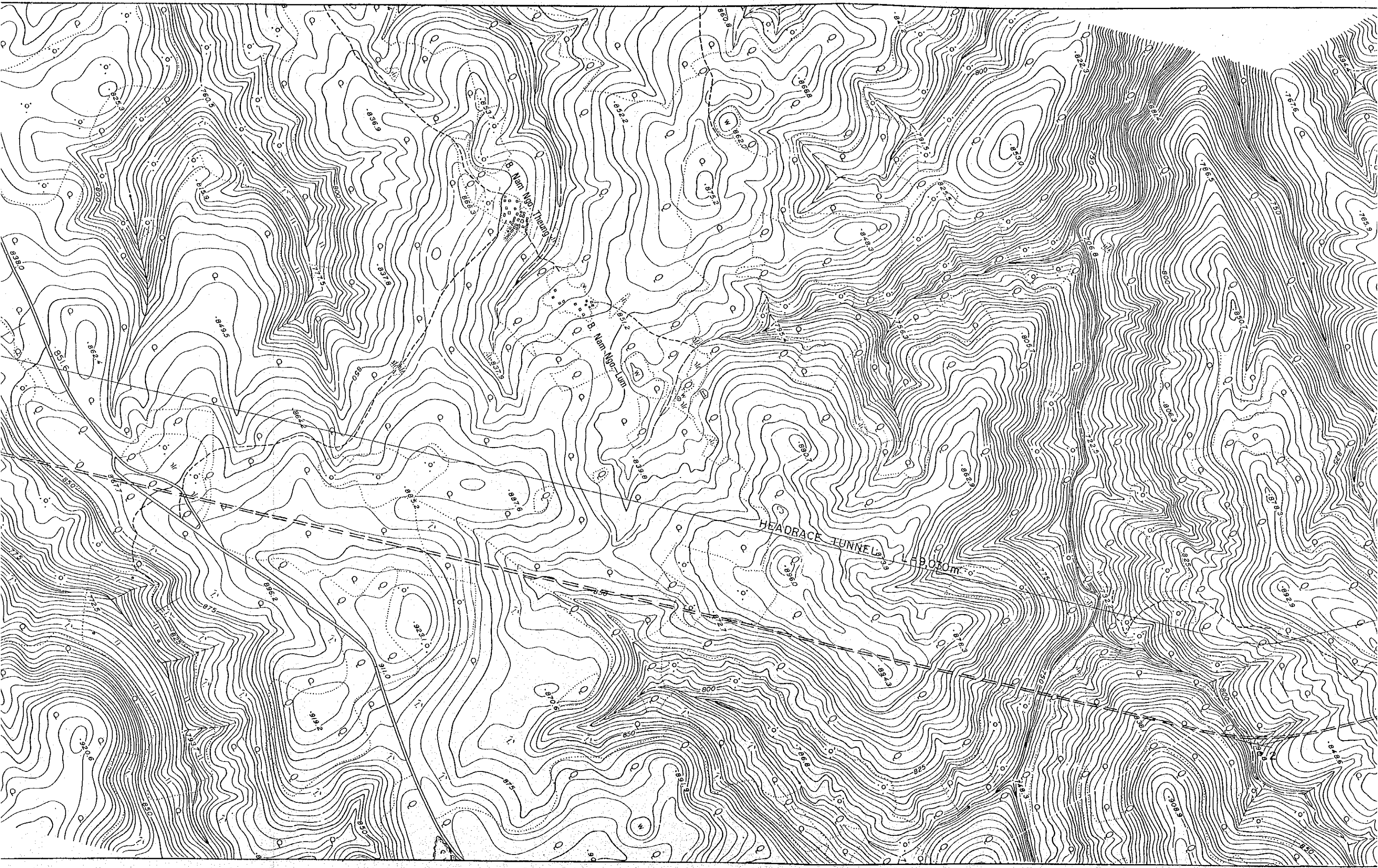
Feb. 1995



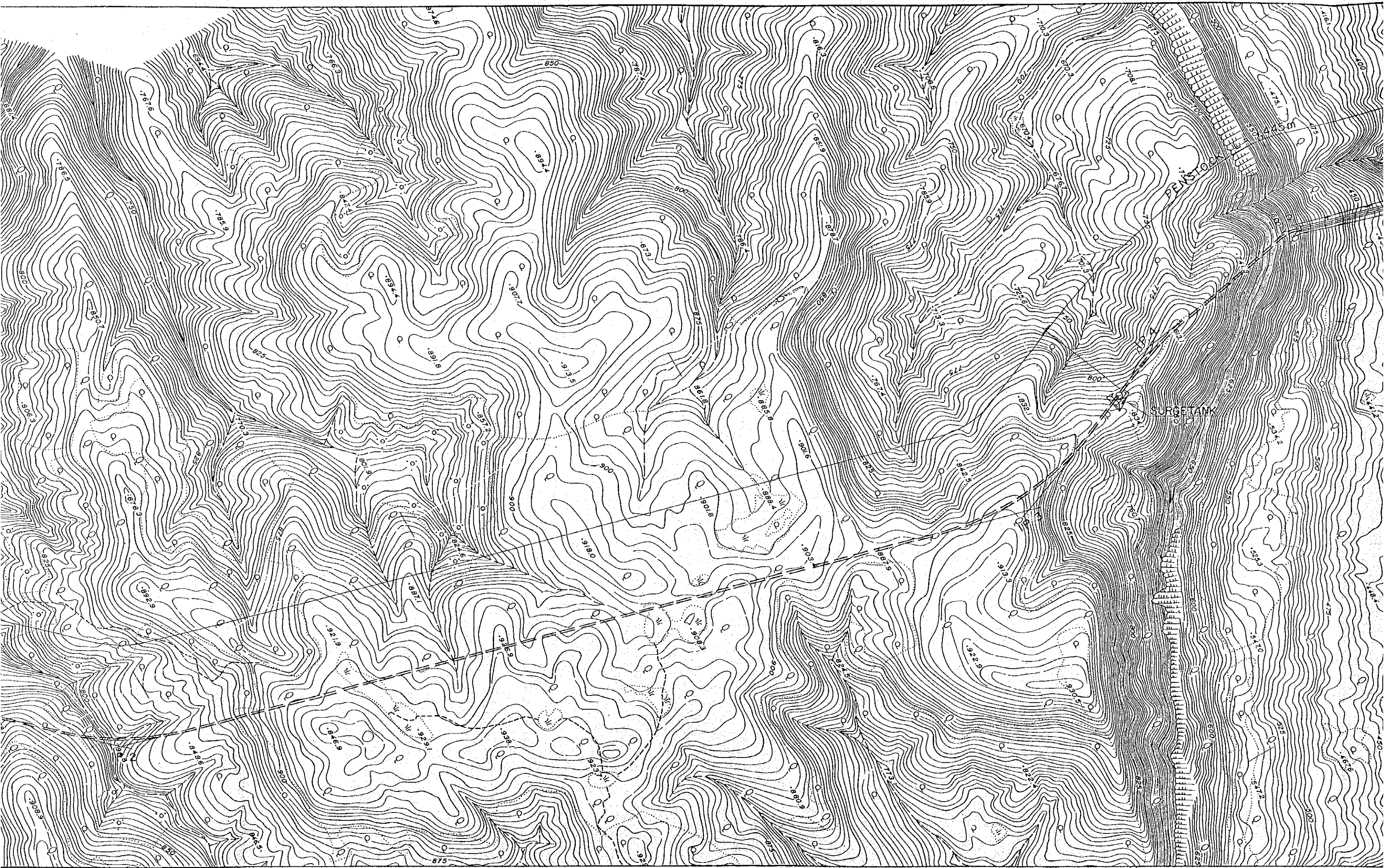


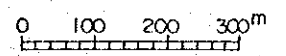
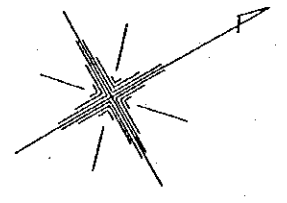
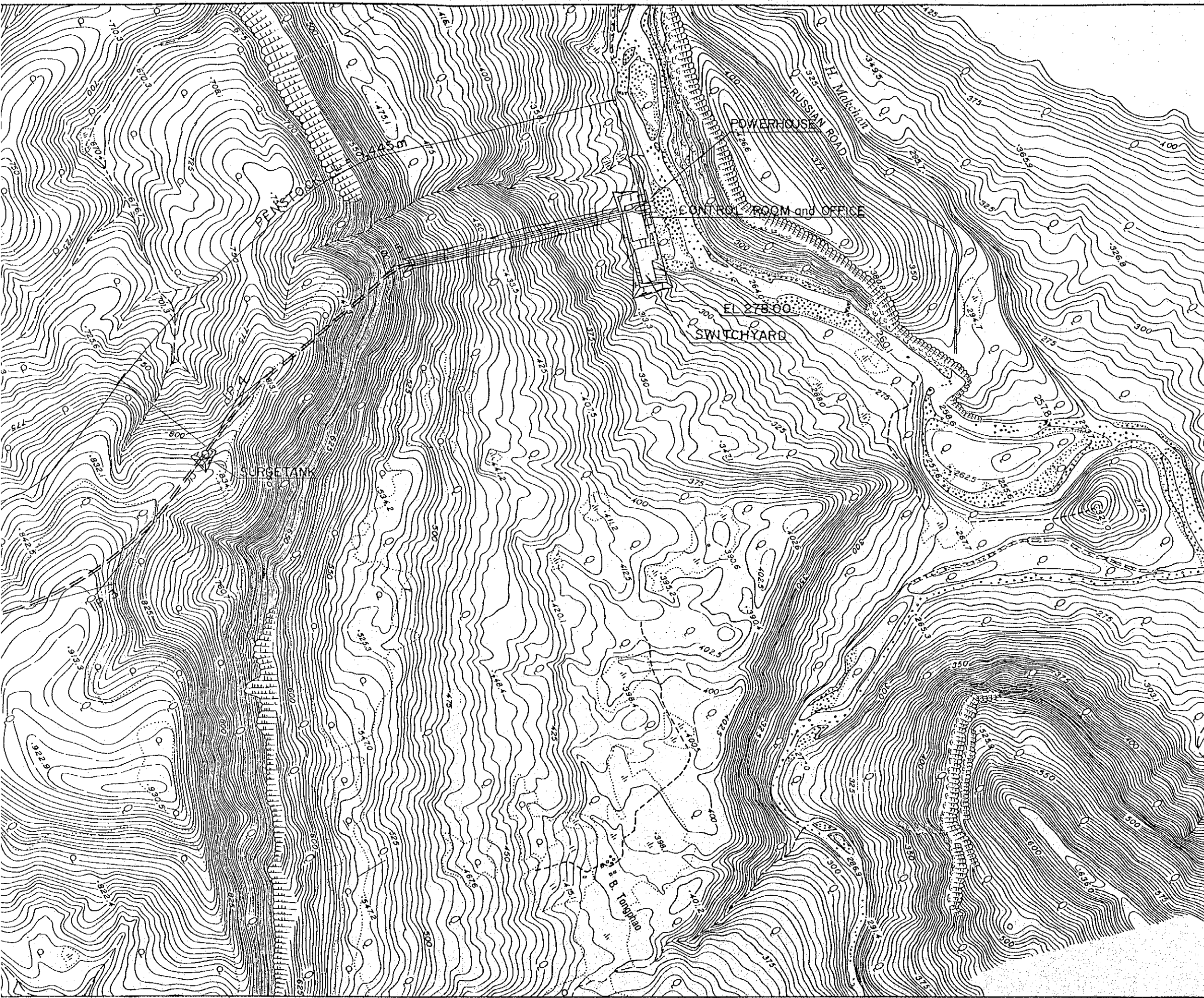




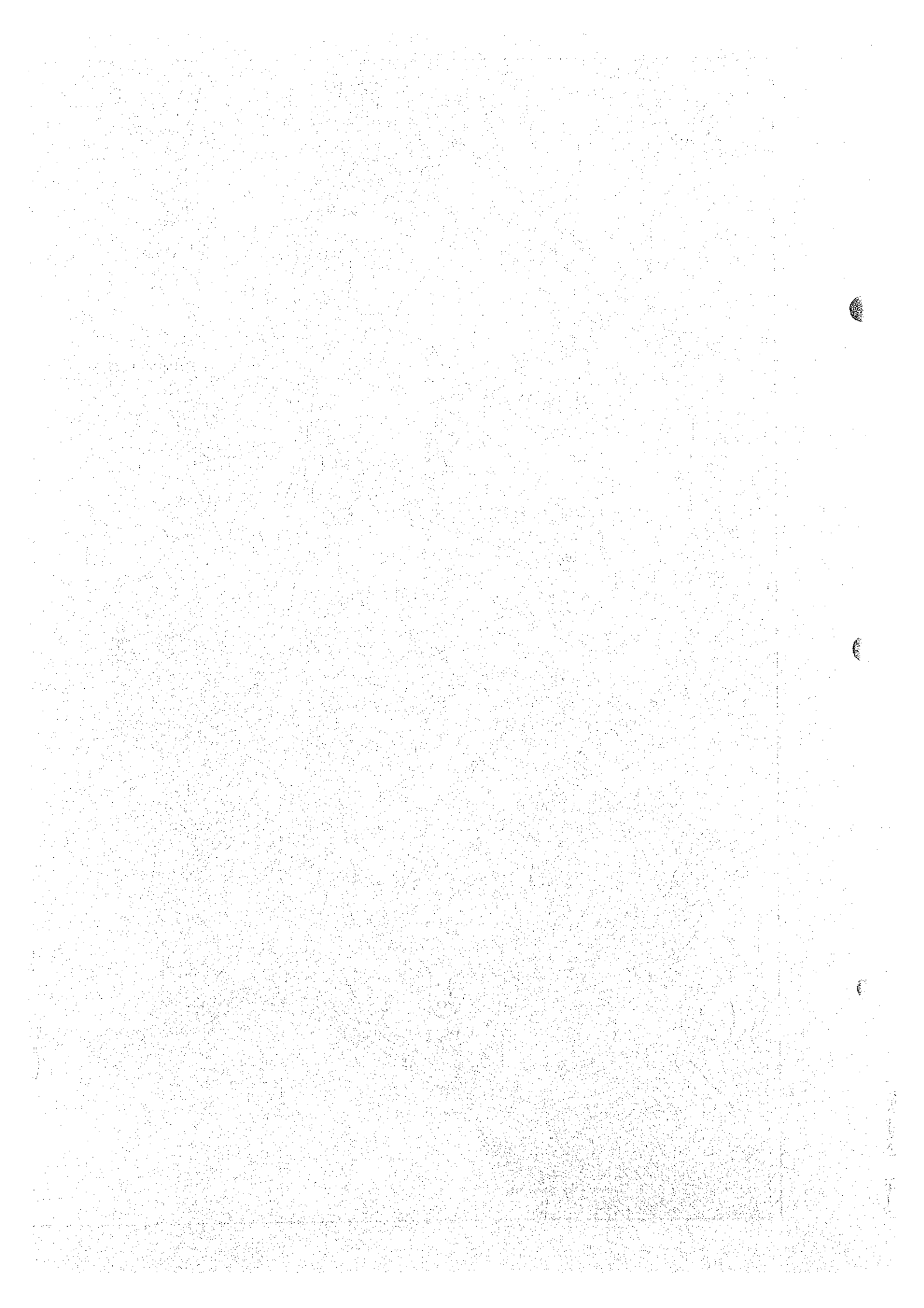




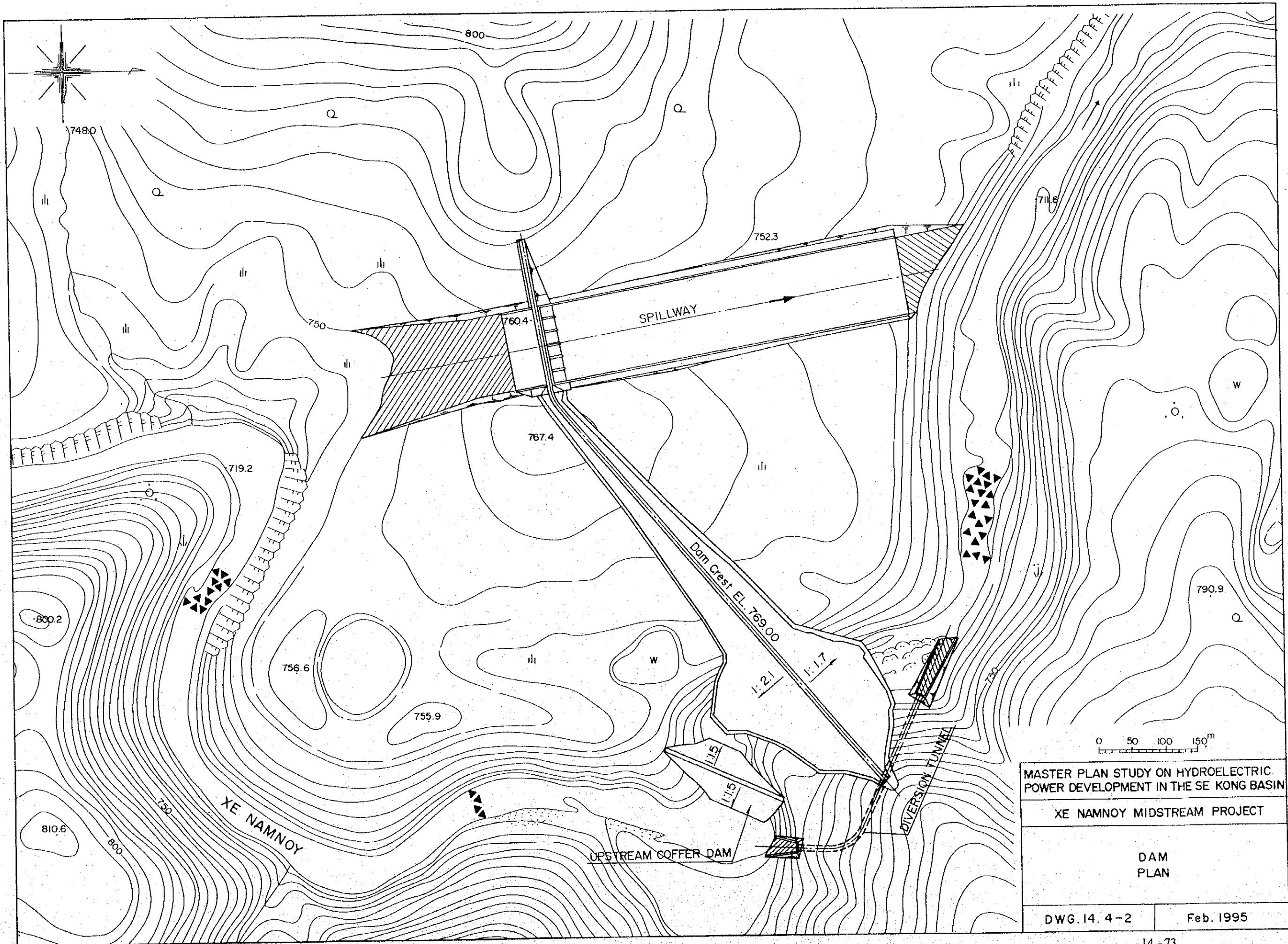




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XE NAMNOY MIDSTREAM PROJECT	
GENERAL PLAN	
DWG.14.4-1	Feb.1995







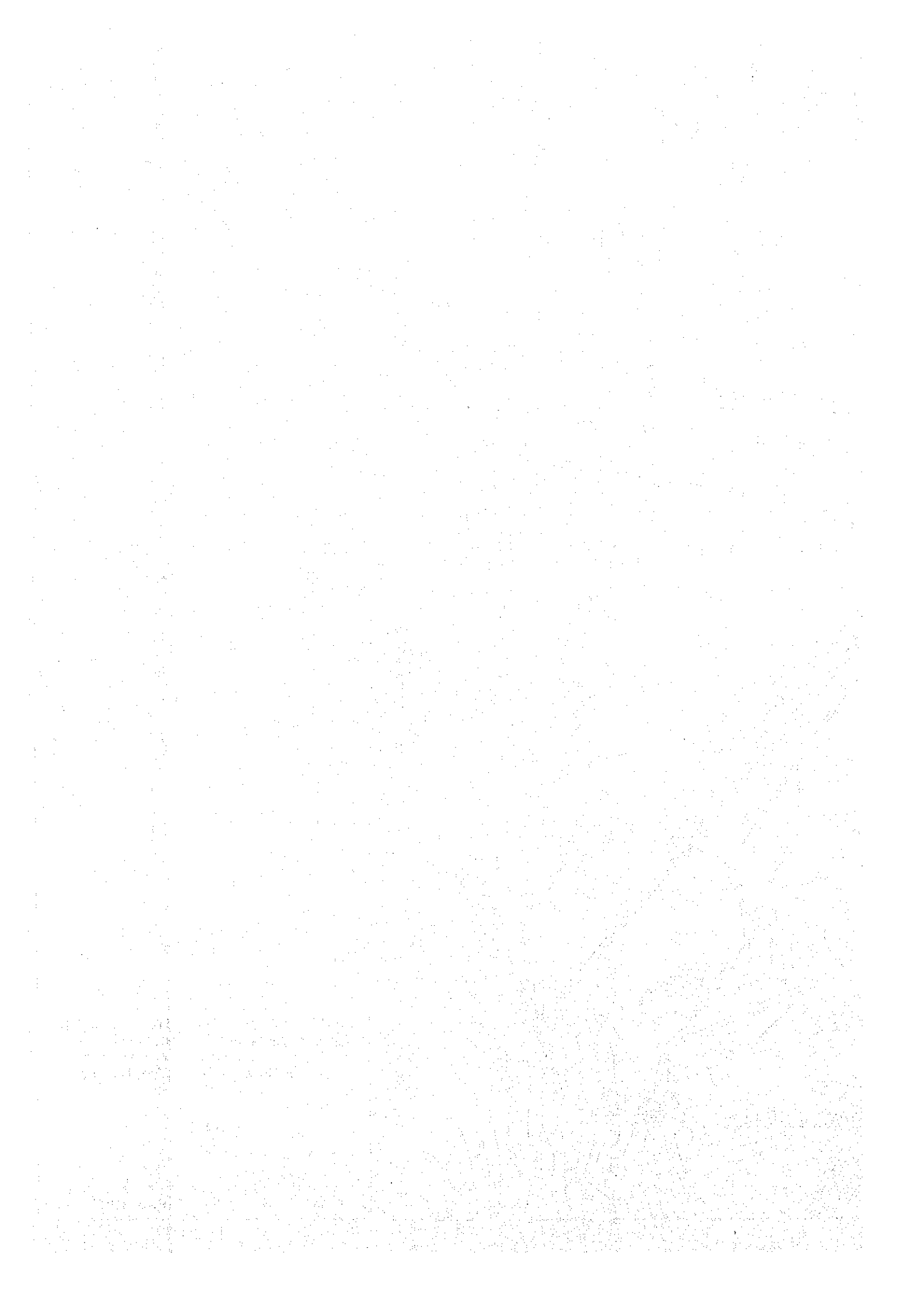
MASTER PLAN STUDY ON HYDROELECTRIC  
POWER DEVELOPMENT IN THE SE KONG BASIN

XE NAMNOY MIDSTREAM PROJECT

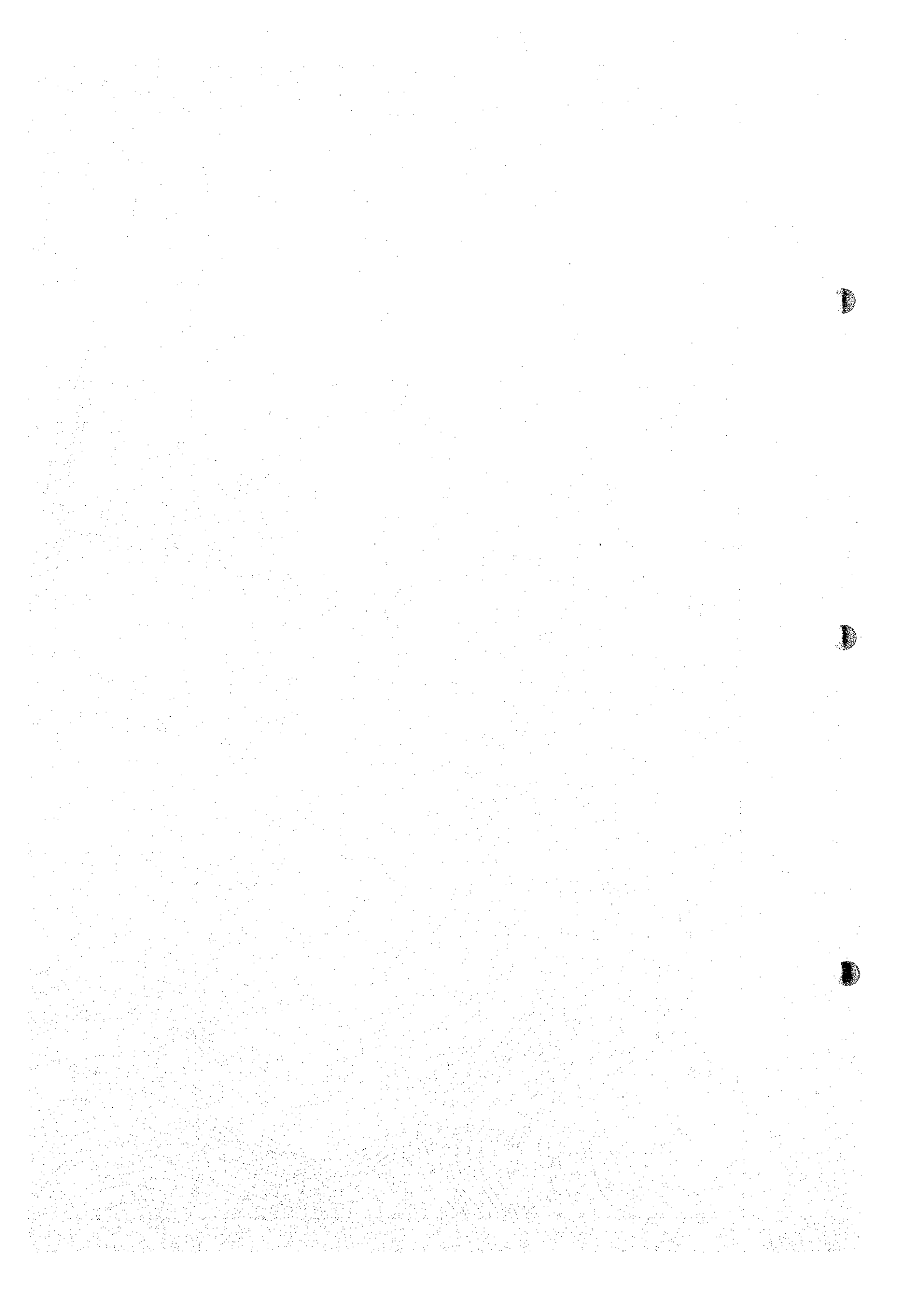
DAM  
PLAN

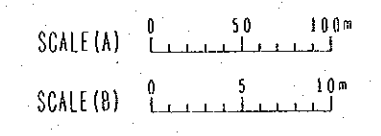
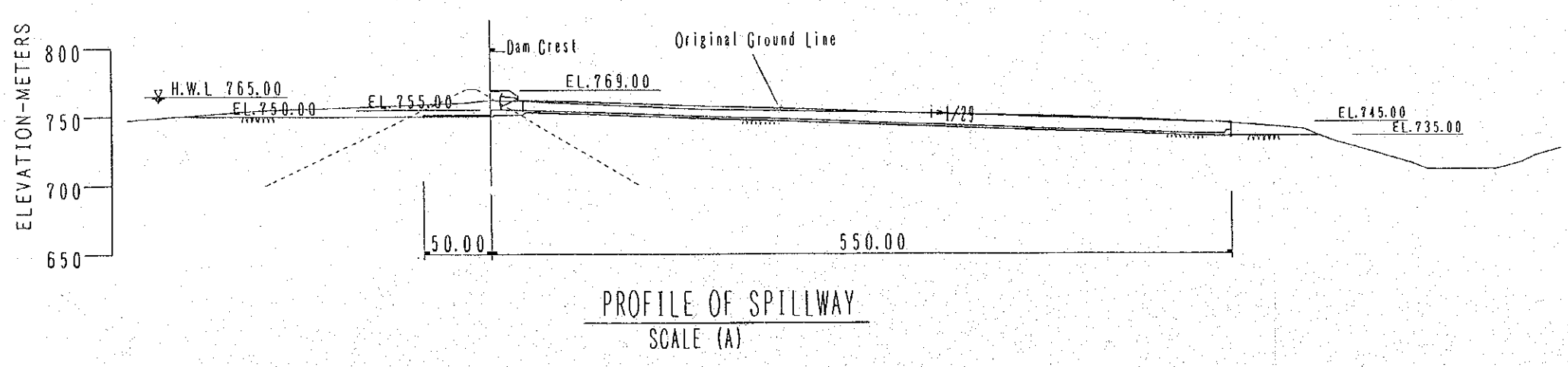
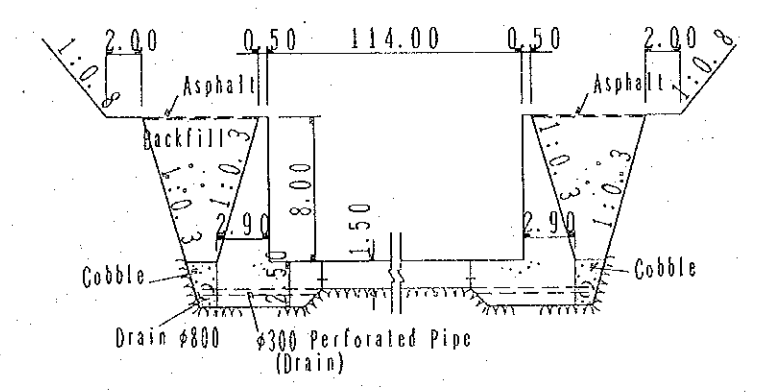
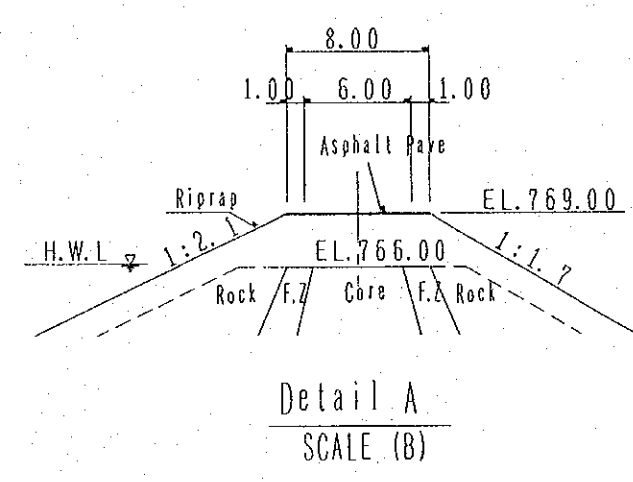
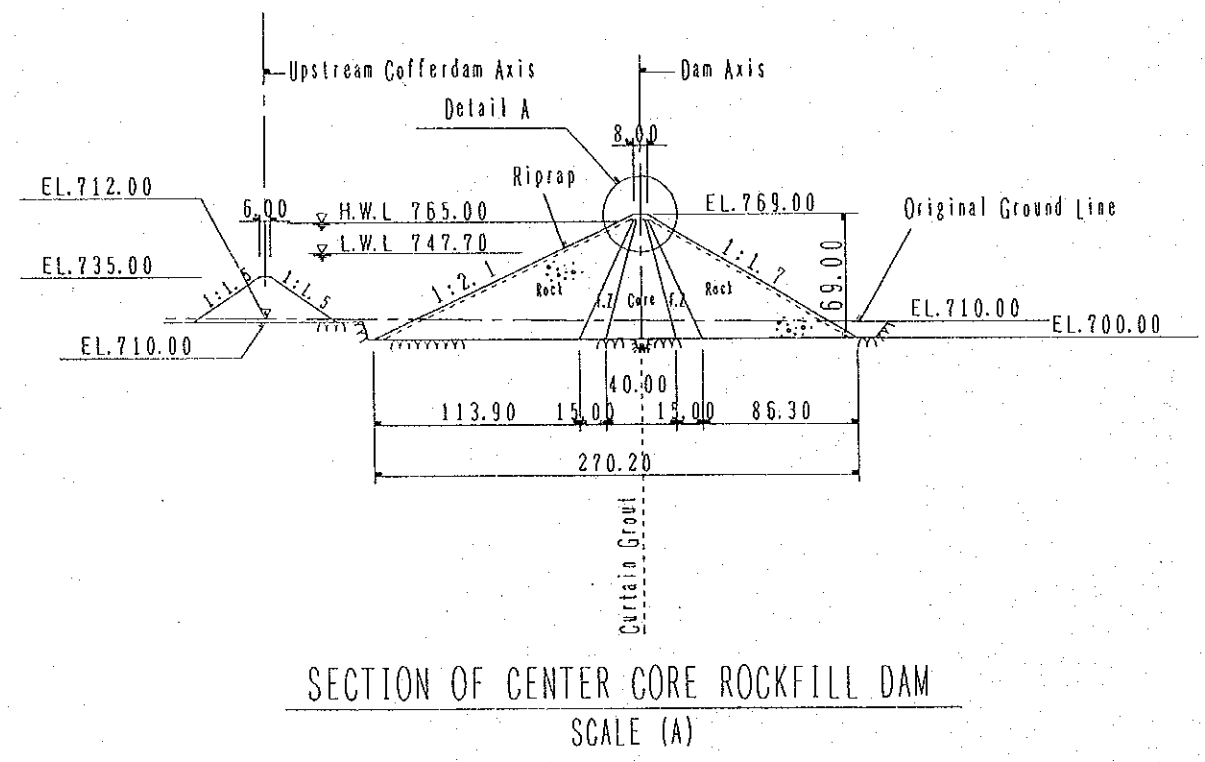
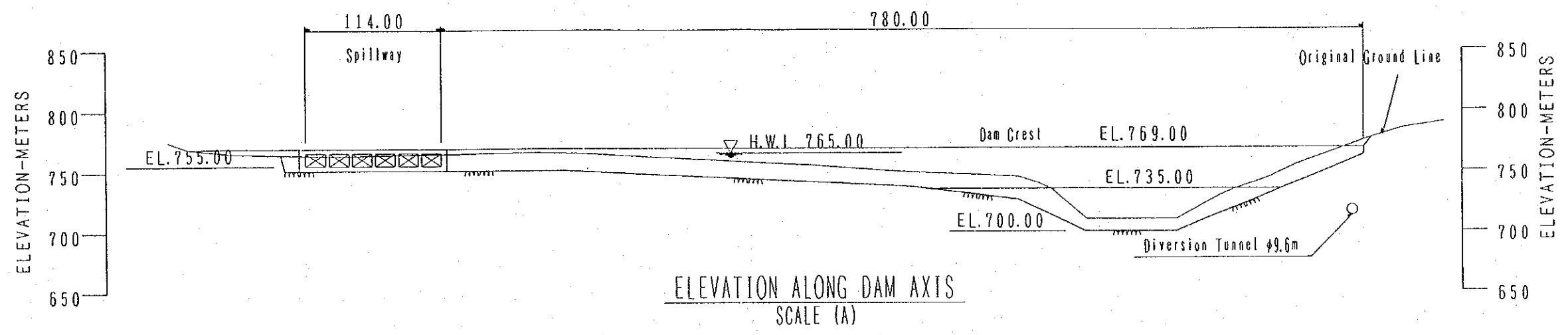
DWG. 14. 4-2

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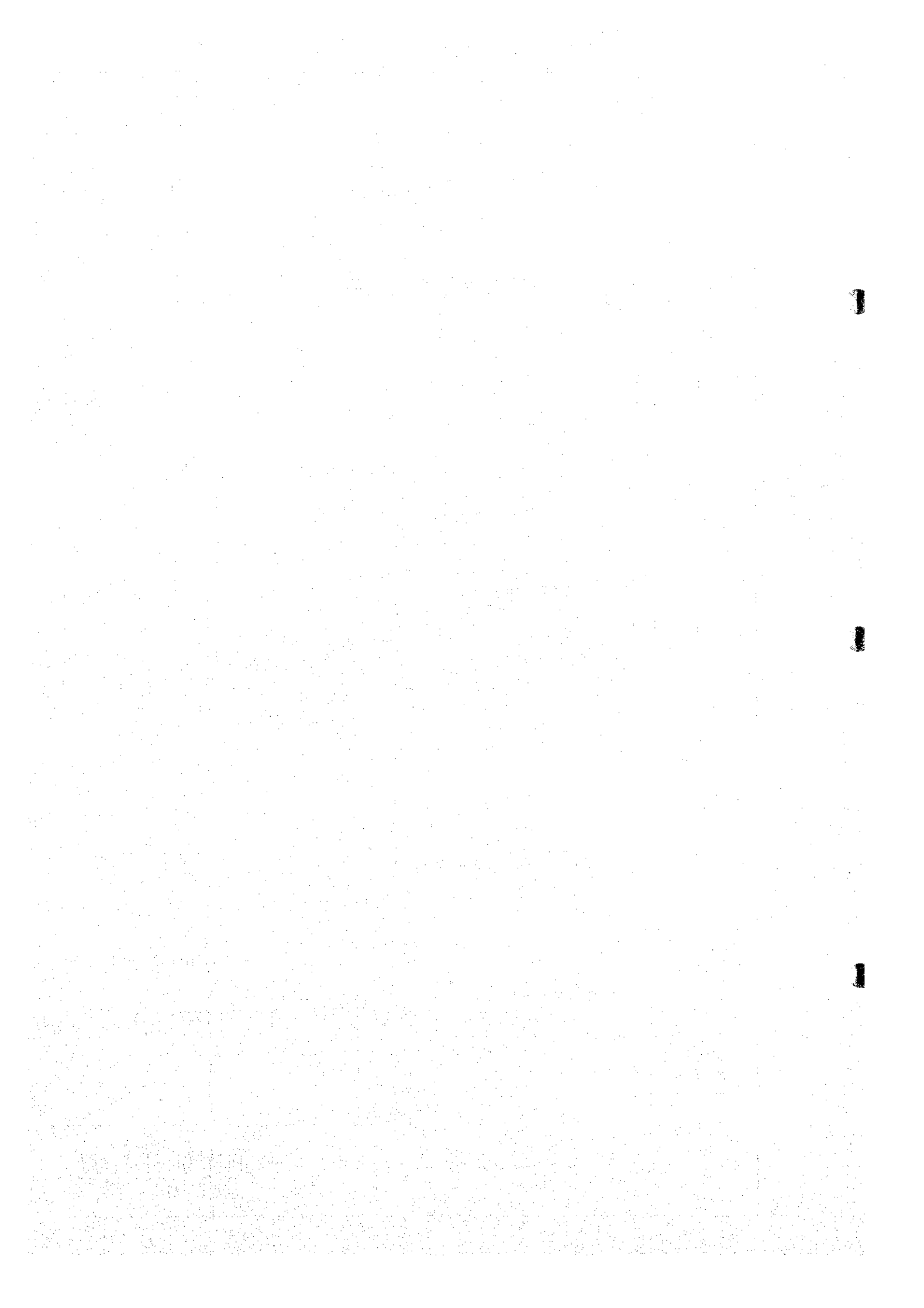




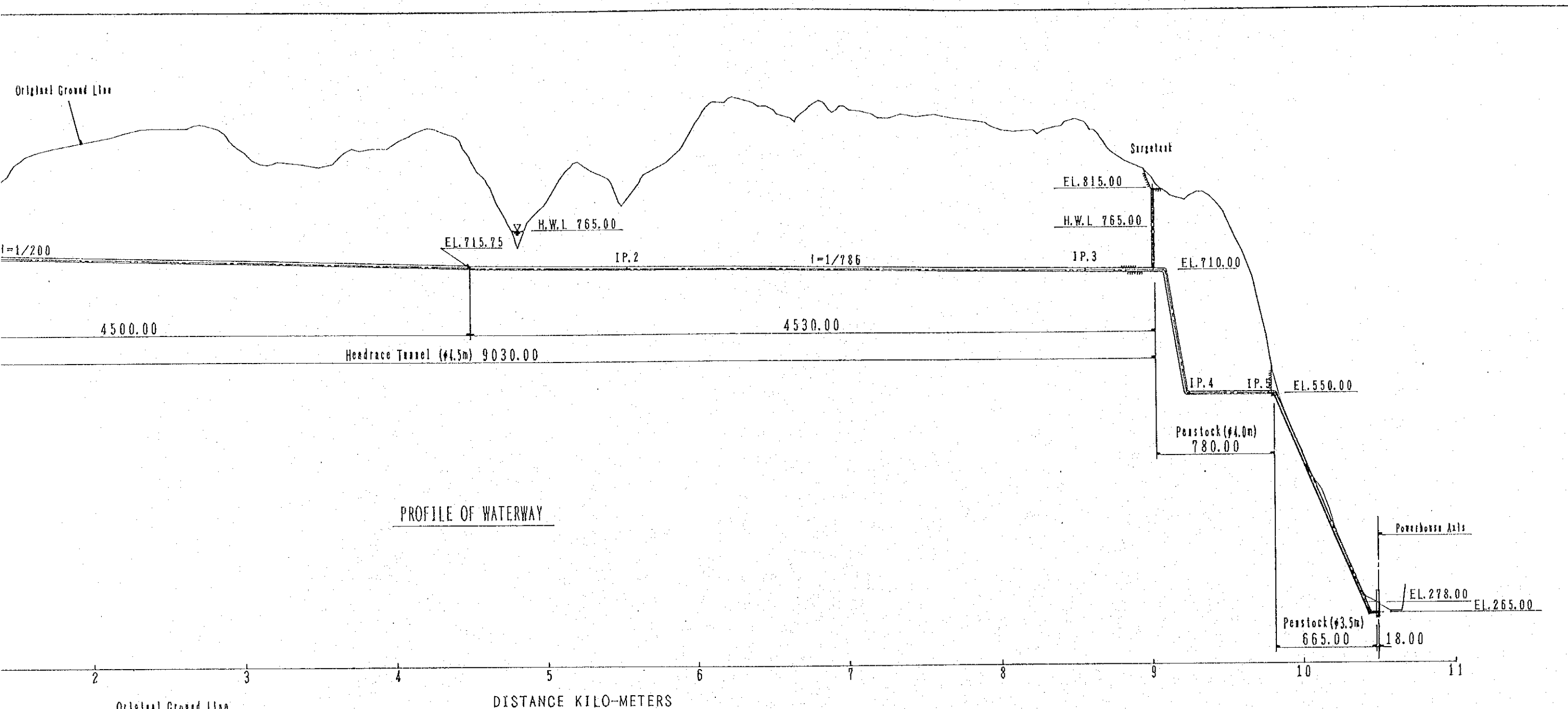


MASTER PLAN STUDY ON HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN	
XE NAMNOY MIDSTREAM PROJECT	
DAM AND SPILLWAY	
ELEVATION, PROFILE AND SECTIONS	
DWG. 14.4-3	Feb. 1995

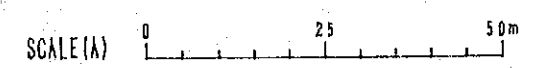
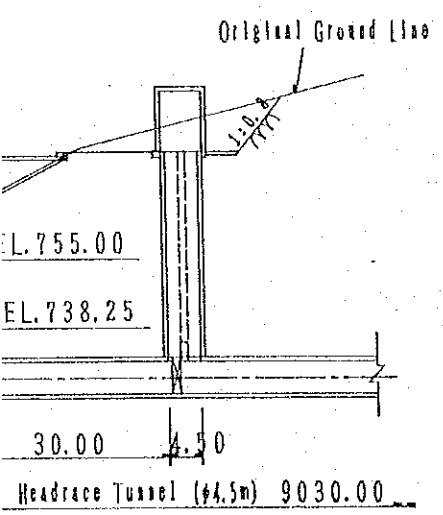








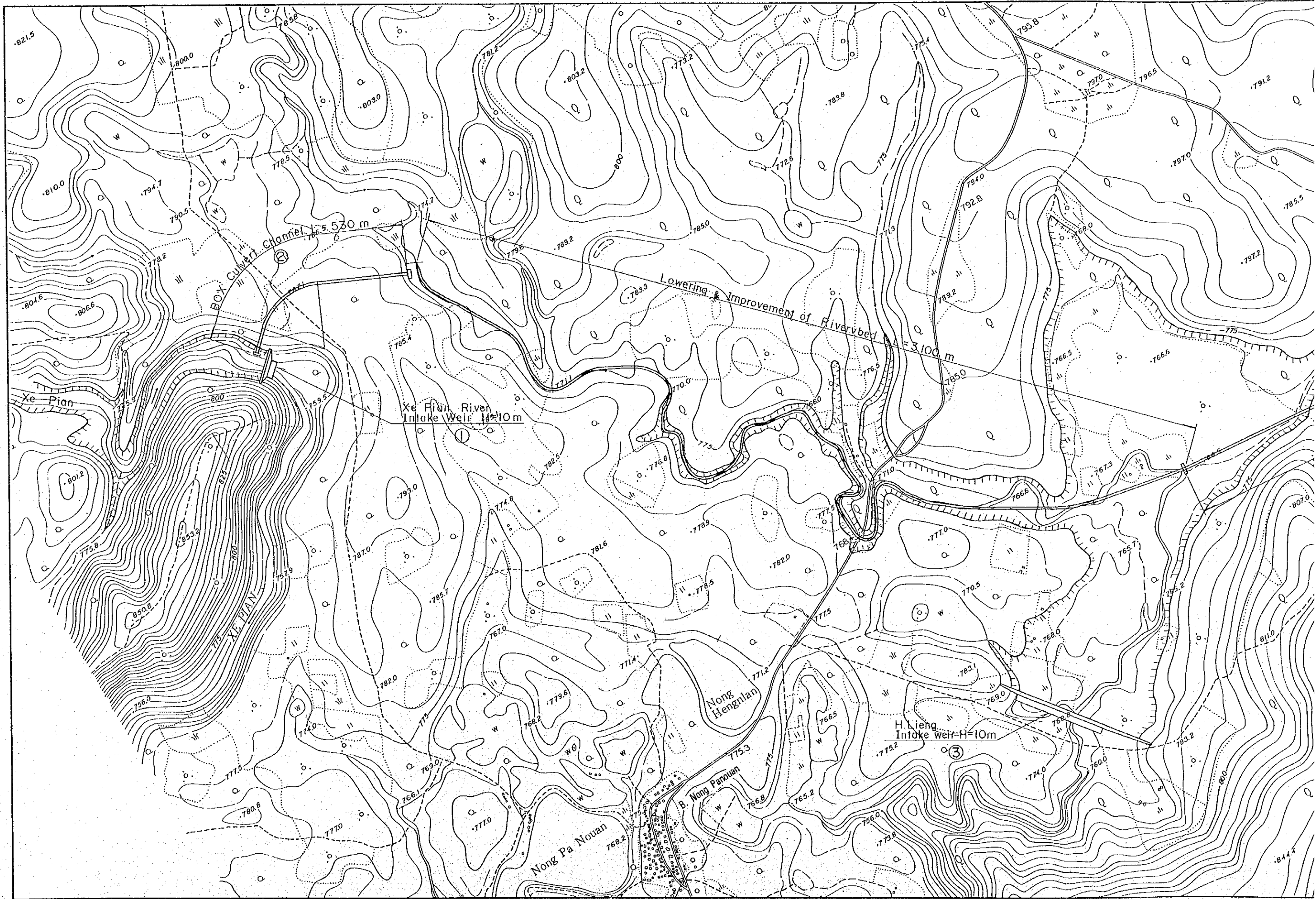
PROFILE OF WATERWAY



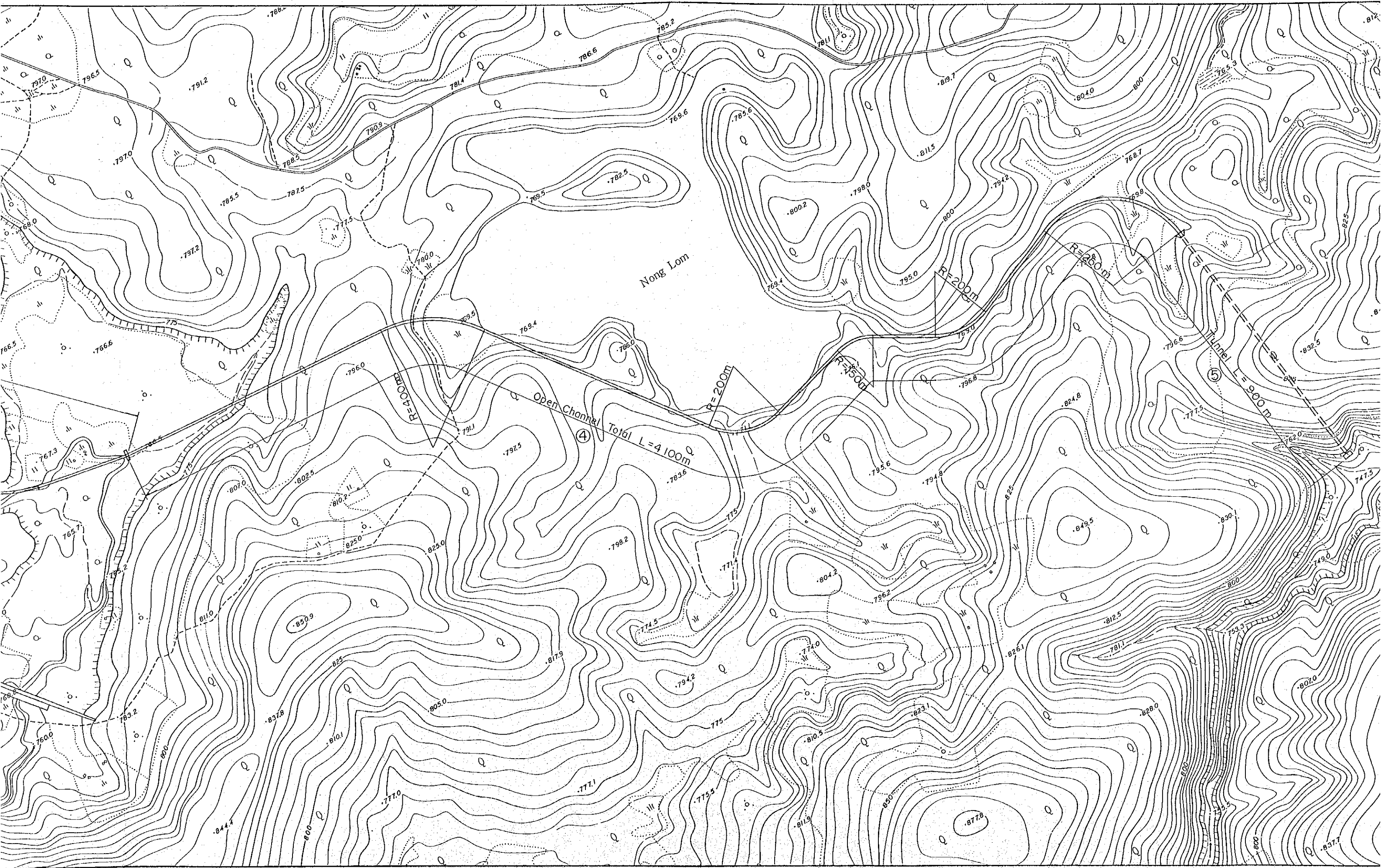
MASTER PLAN STUDY ON HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN	
XE NAMNOY MIDSTREAM PROJECT	
WATERWAY	
PROFILE AND SECTION	
DWG. 14.4-4	Feb. 1995

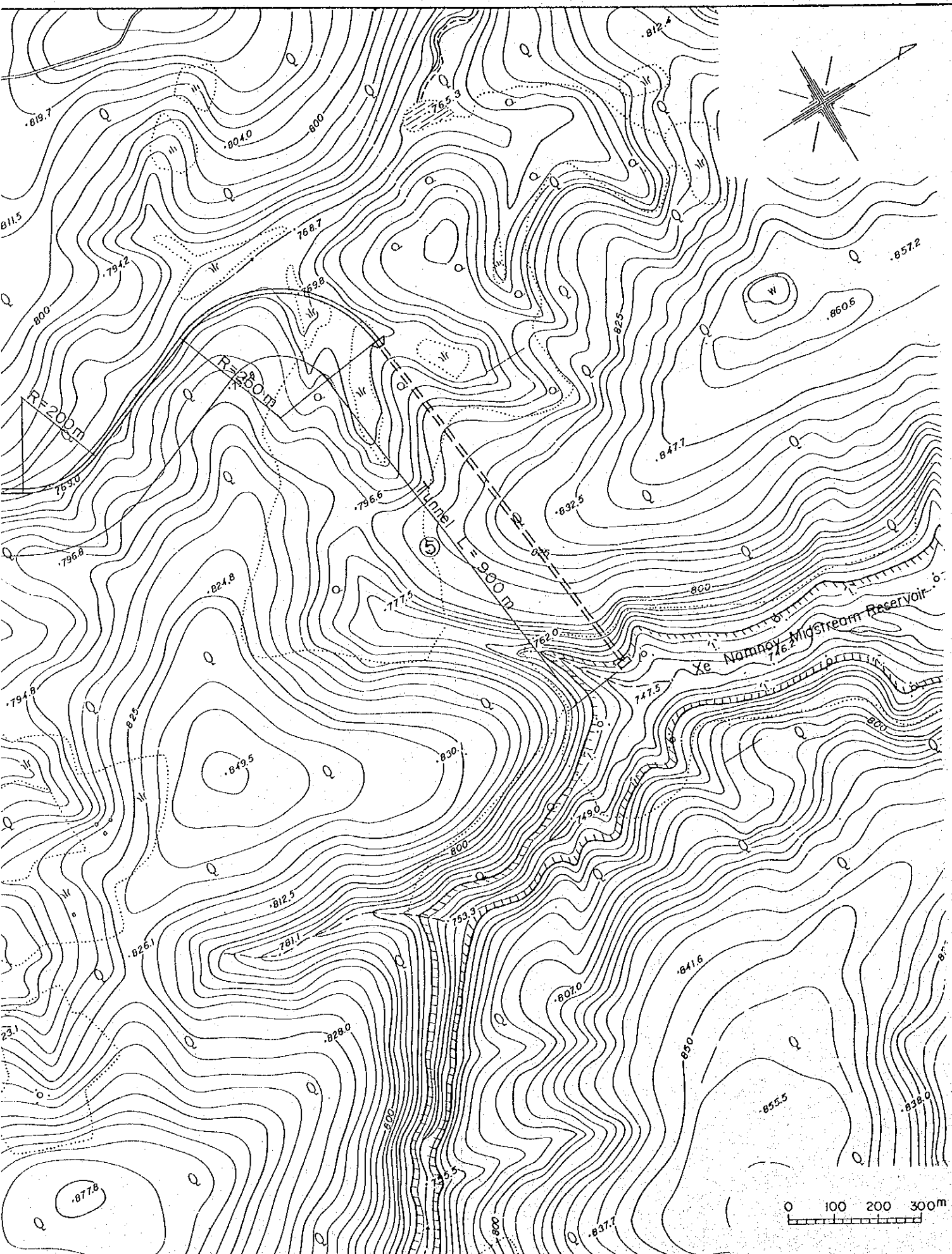
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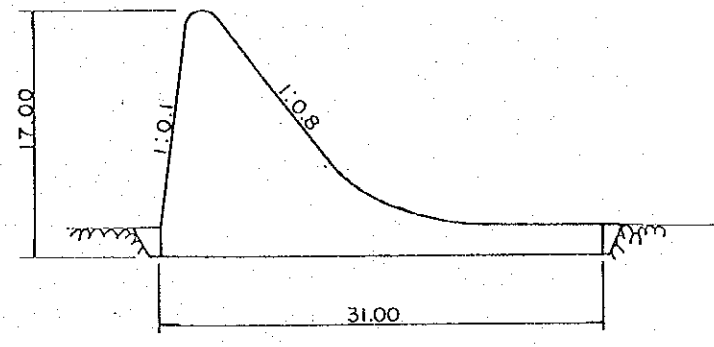




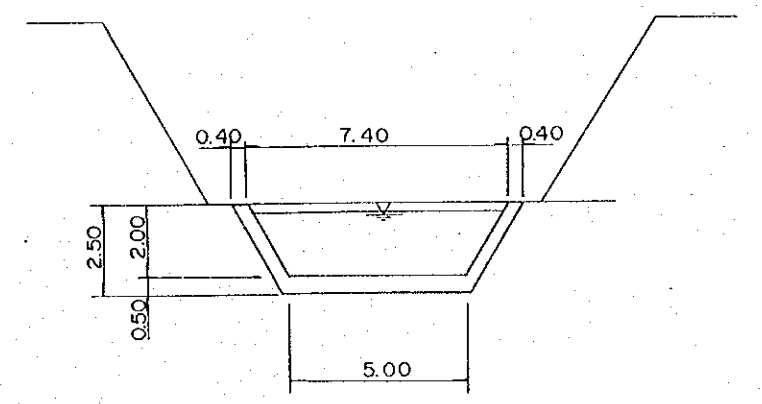




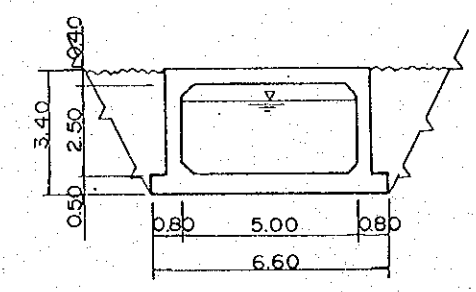
① Xe Pian River Intake Dam  
TYPICAL SECTION



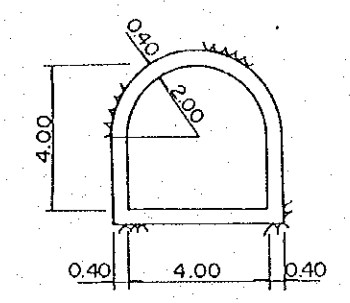
④ Open Channel Portion  
TYPICAL SECTION



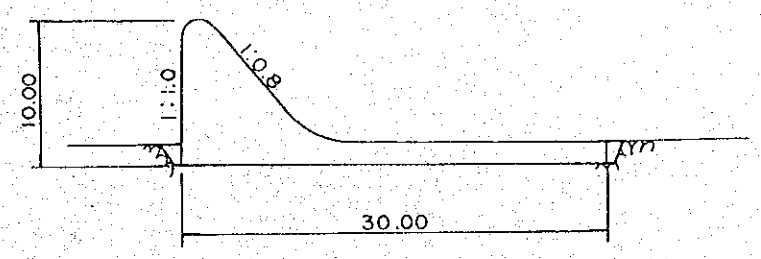
② Box Culvert Channel  
TYPICAL SECTION



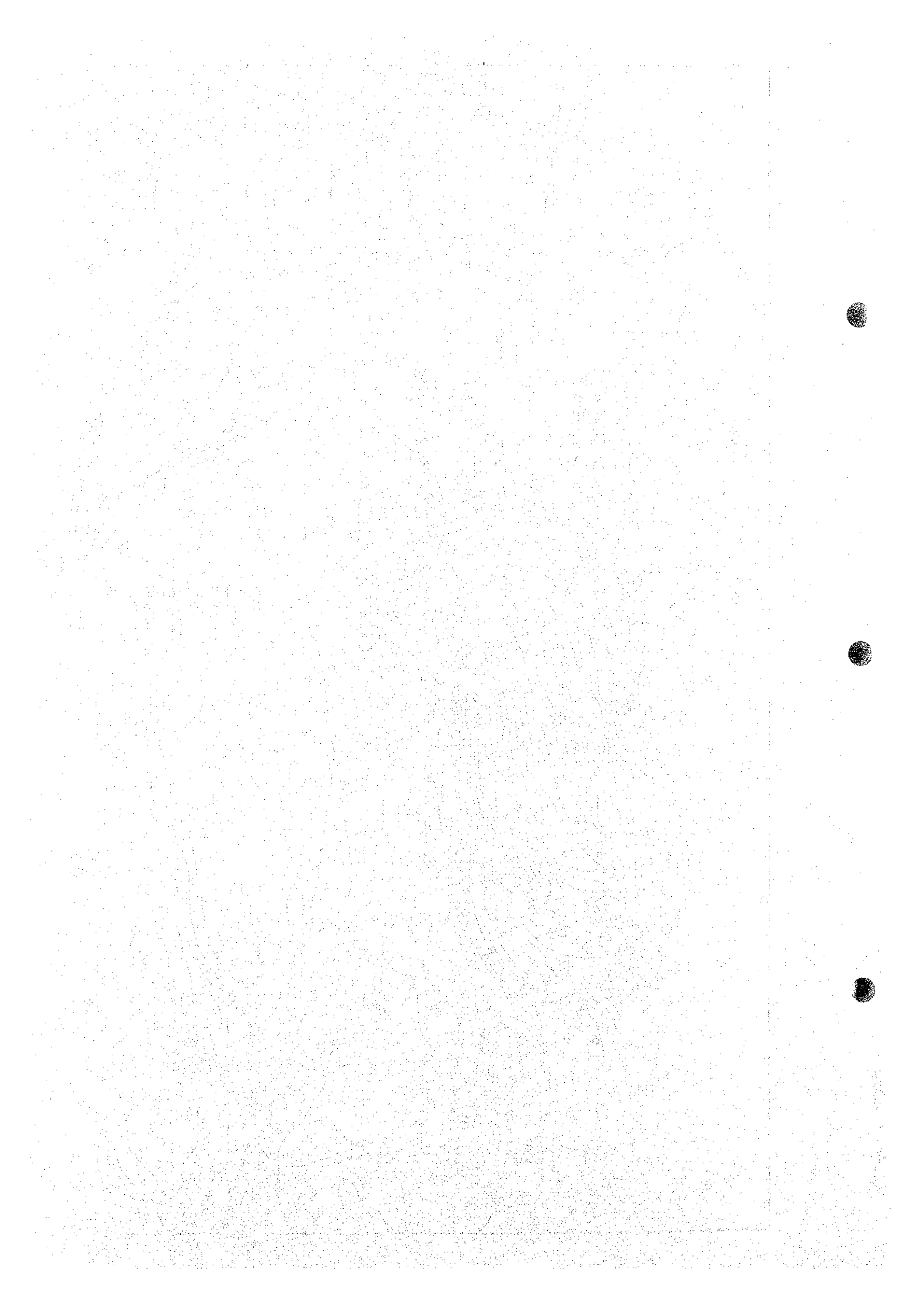
⑤ Tunnel Portion  
TYPICAL SECTION



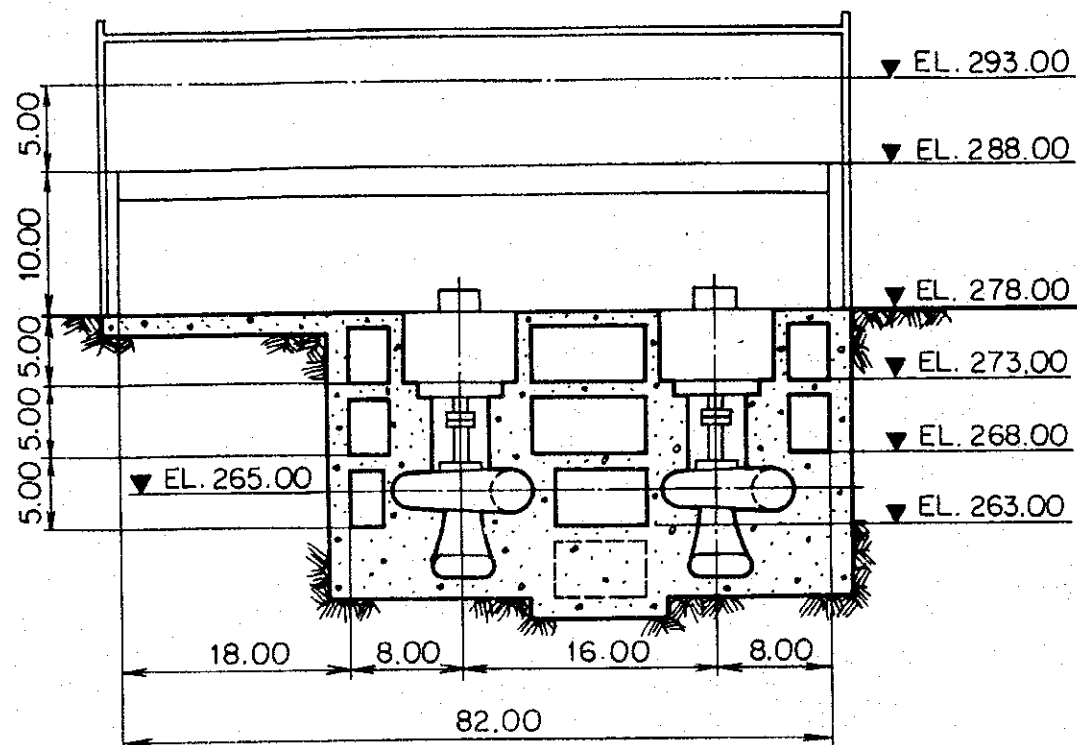
③ H. Lieng Intake Dam  
TYPICAL SECTION



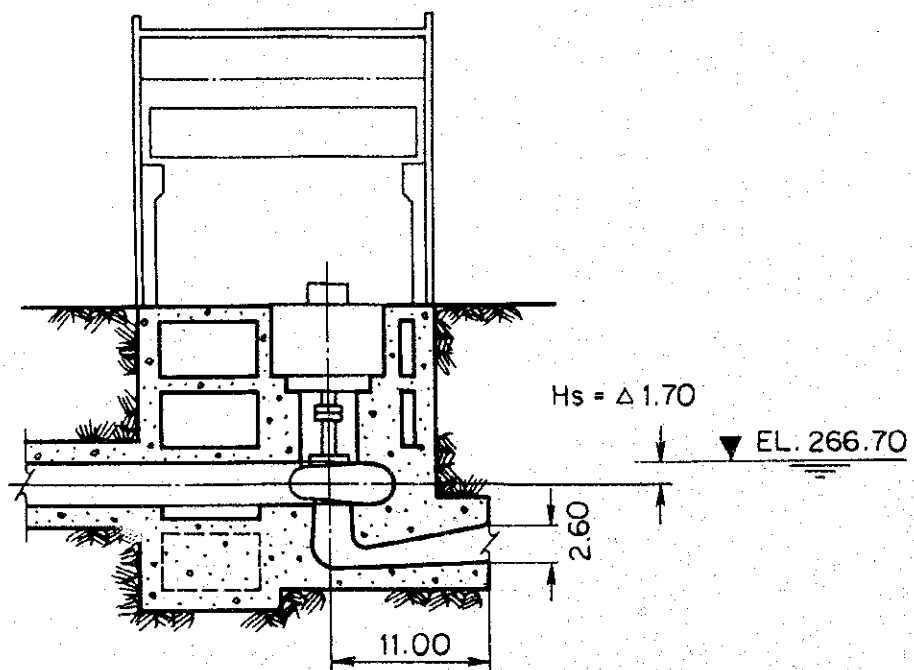
MASTER PLAN STUDY ON HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN	
XE NAMNOY MIDSTREAM PROJECT	
XE PIAN RIVER DIVERSION GENERAL PLAN & TYPICAL SECTION	
DWG. 14.4-5	Feb. 1995



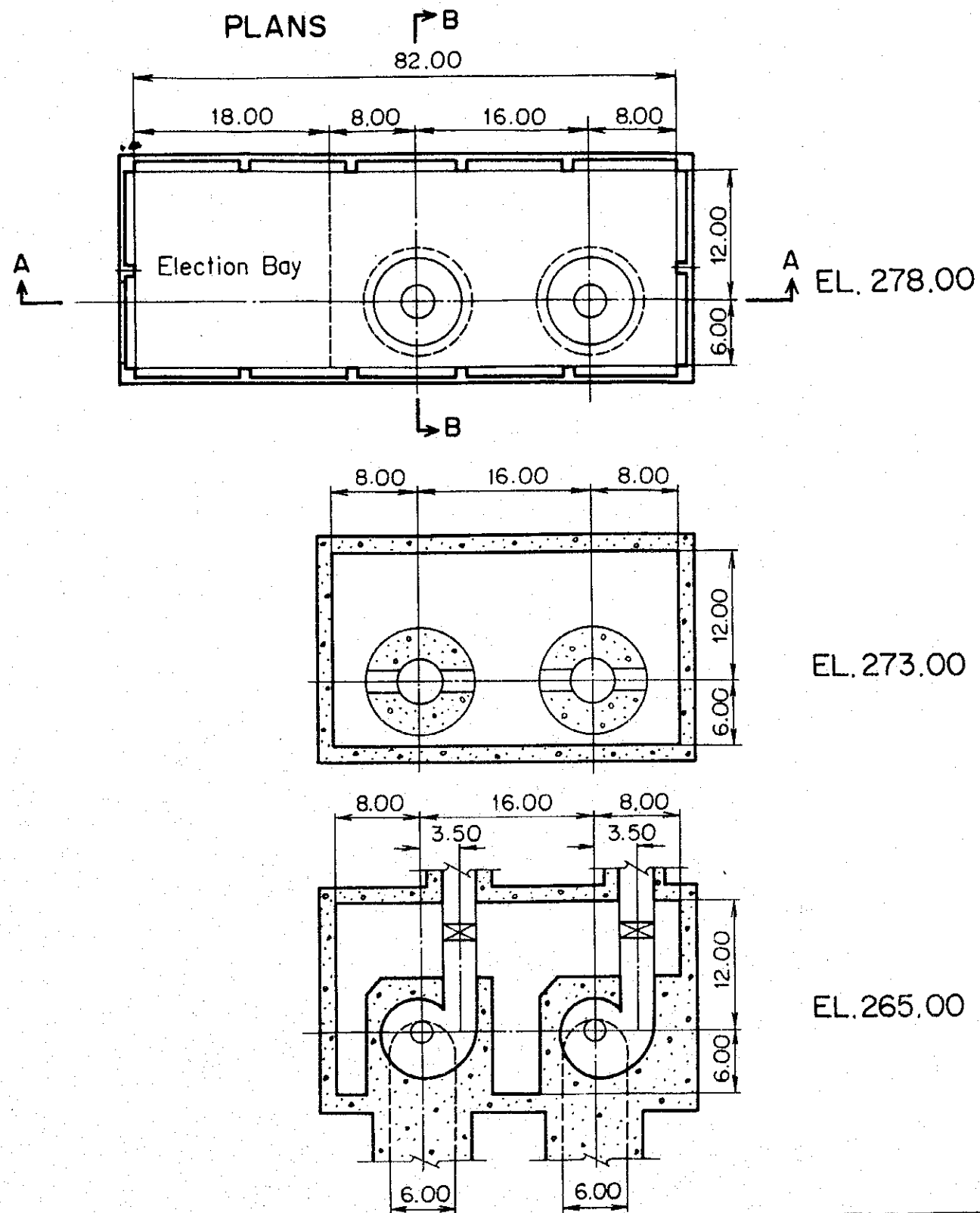
LONGITUDINAL SECTION  
(A - A)



TRANSVERSE SECTION  
(B - B)



PLANS

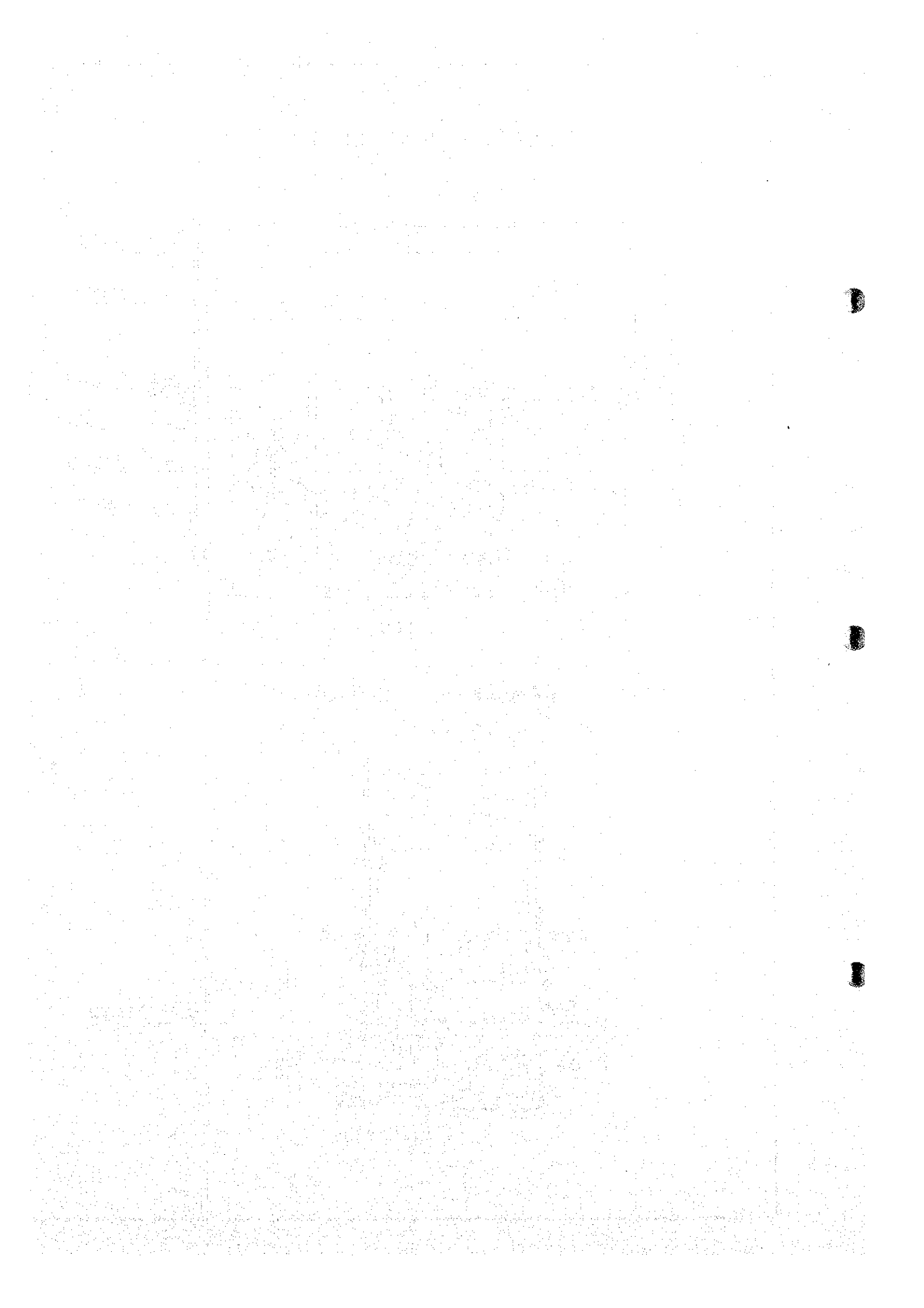


MASTER PLAN STUDY ON HYDROELECTRIC  
POWER DEVELOPMENT IN THE SE KONG BASIN

XE NAMNOY MIDSTREAM  
POWERHOUSE  
TRANSVERSE AND  
LONGITUDINAL SECTIONS  
AND PLANS

DWG. 14.4-6 Feb. 1995

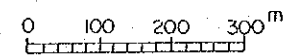
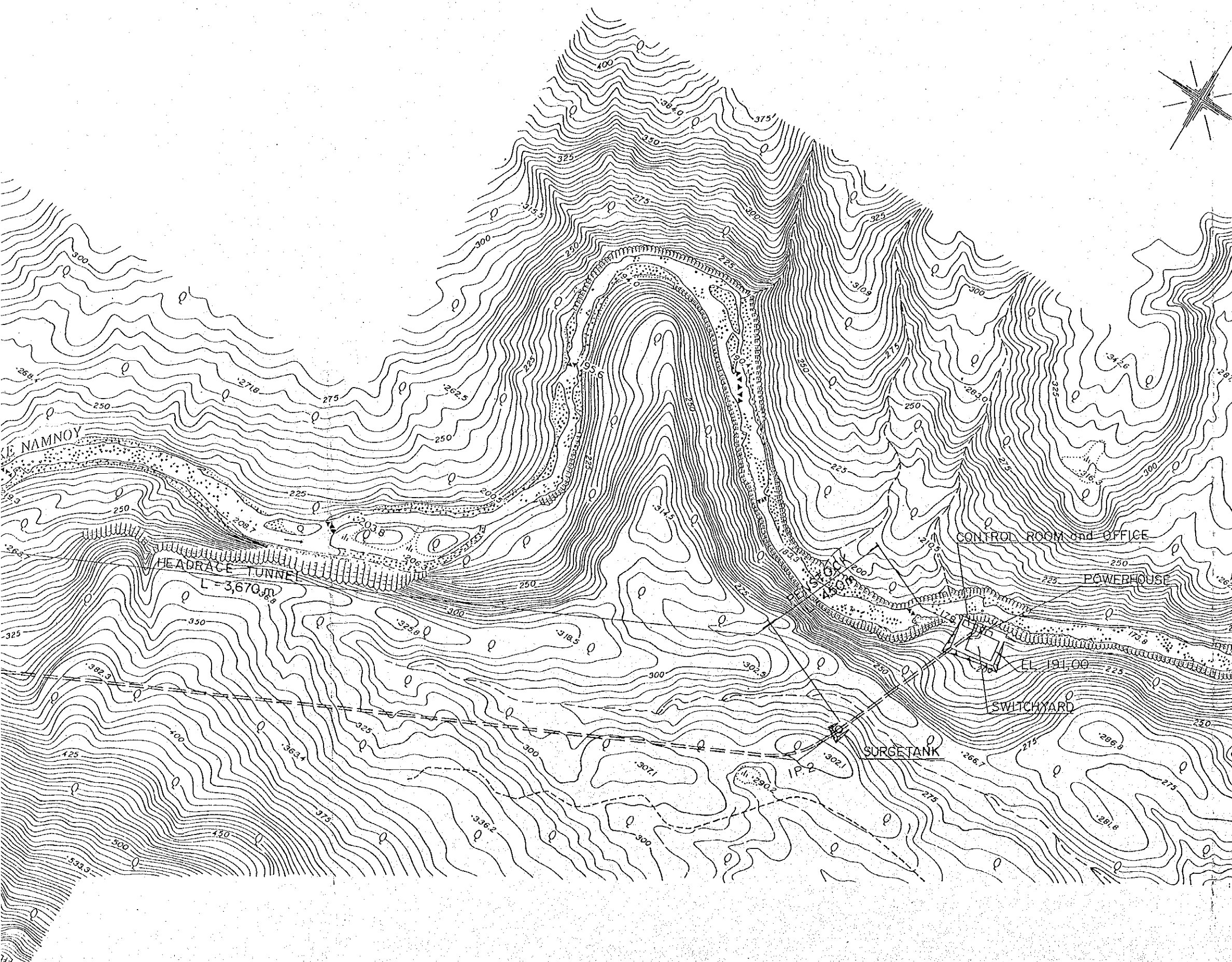




38-111 (MAP) 784



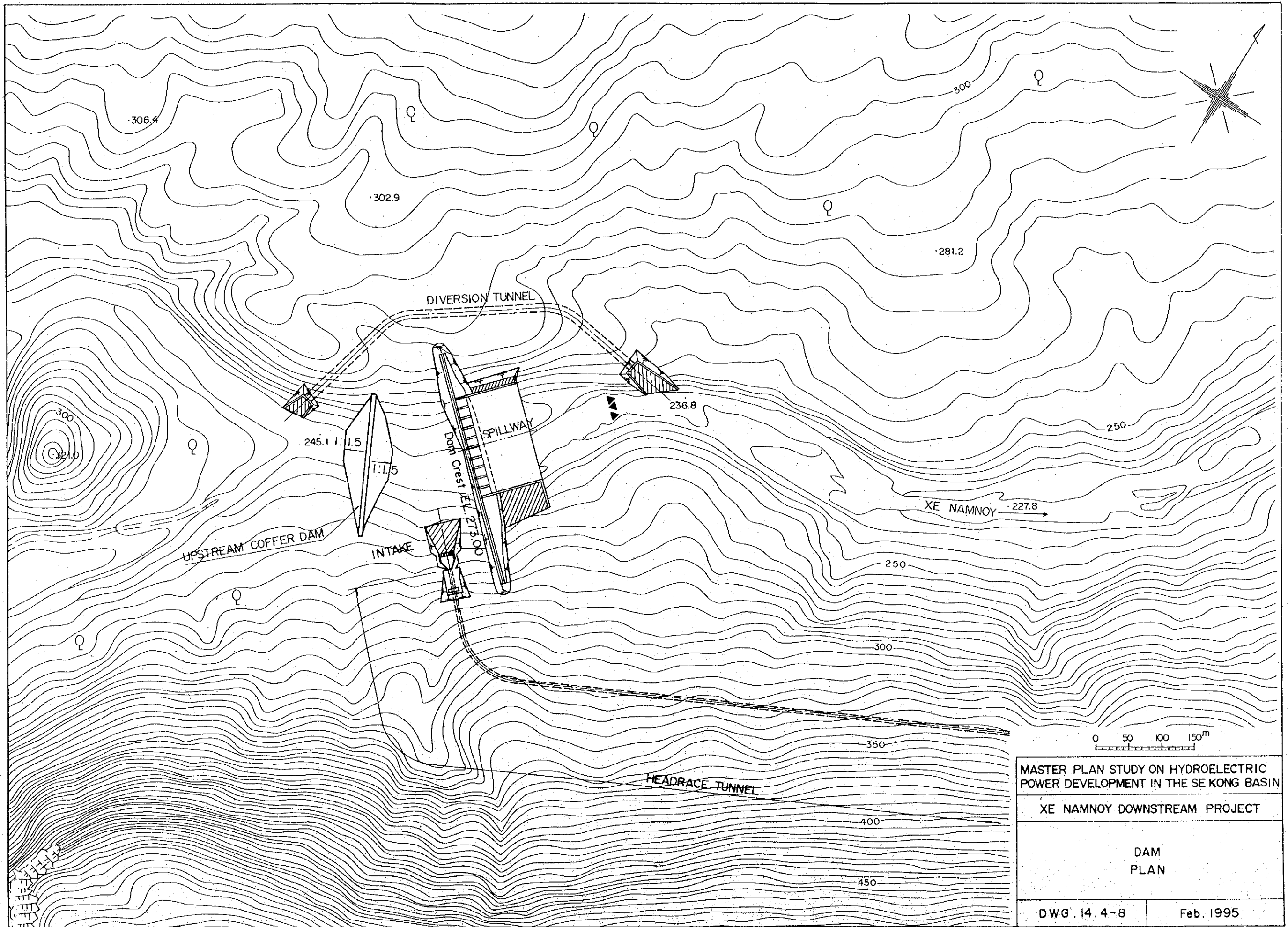




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XE NAMNOY DOWNSTREAM PROJECT	
GENERAL PLAN	
DWG.14.4-7	Feb.1995

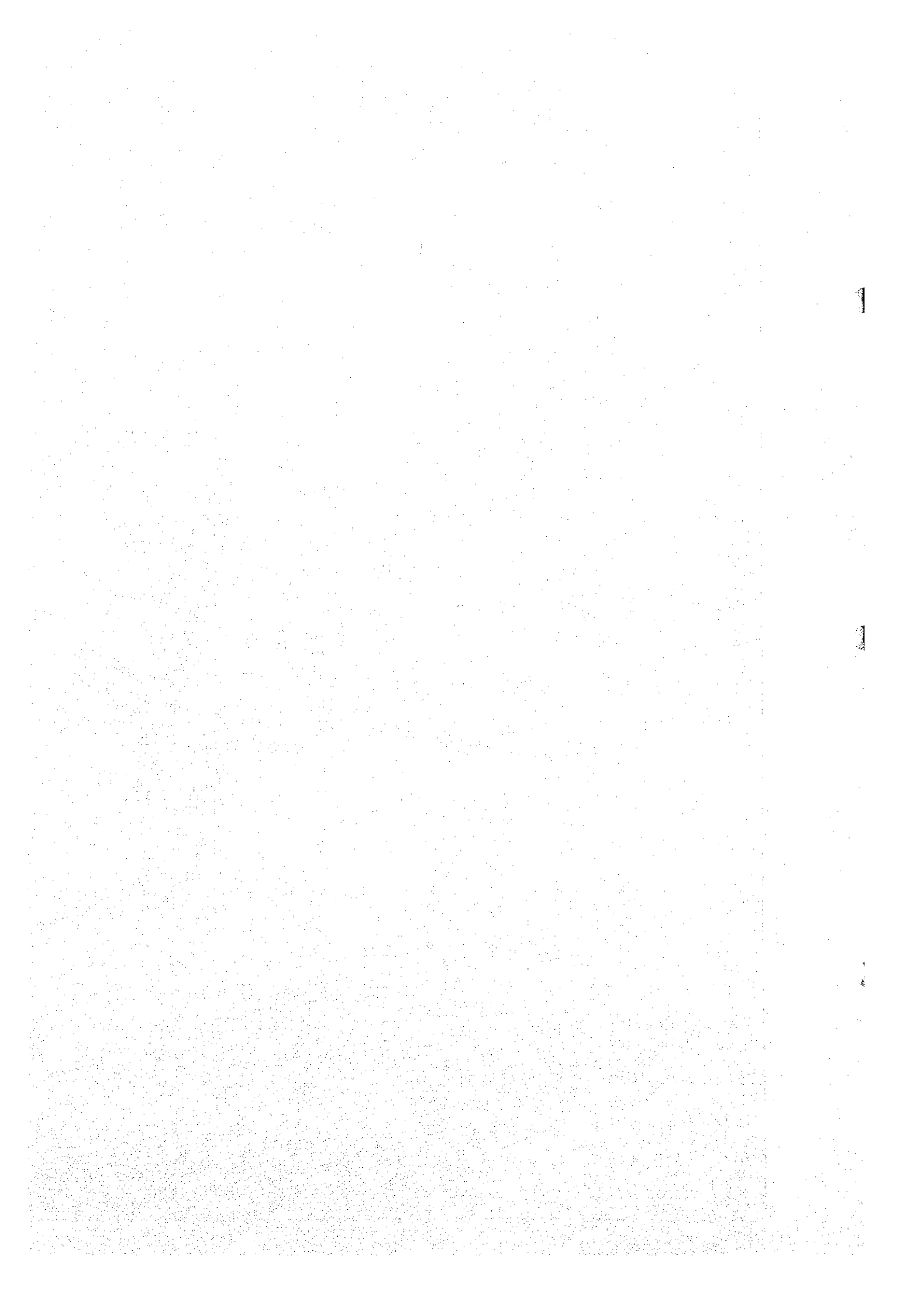


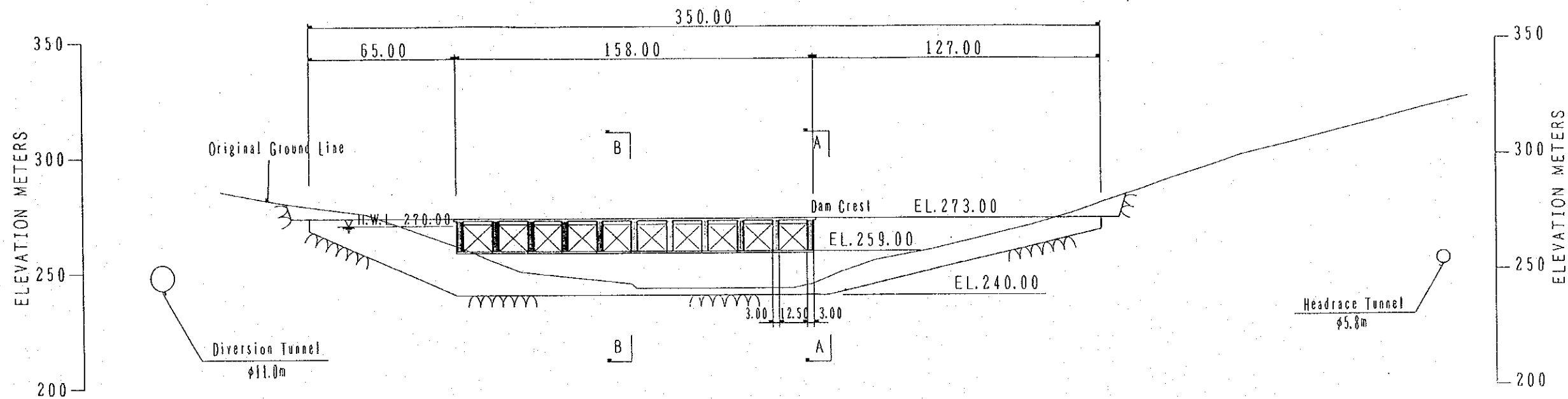




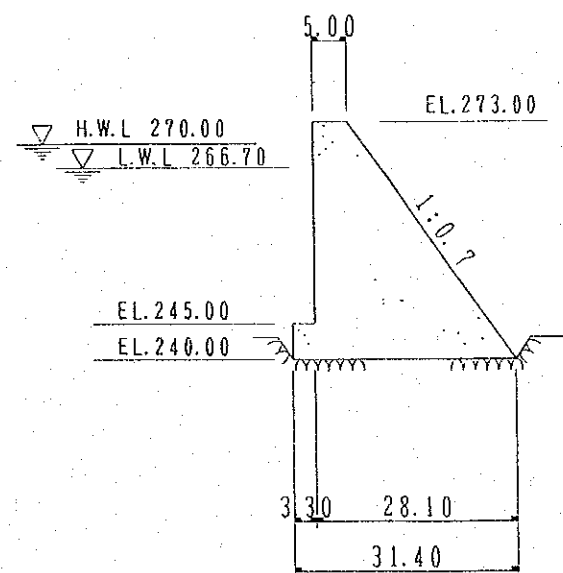
MASTER PLAN STUDY ON HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN	
XE NAMNOY DOWNSTREAM PROJECT	
DAM PLAN	
DWG. 14.4-8	Feb. 1995



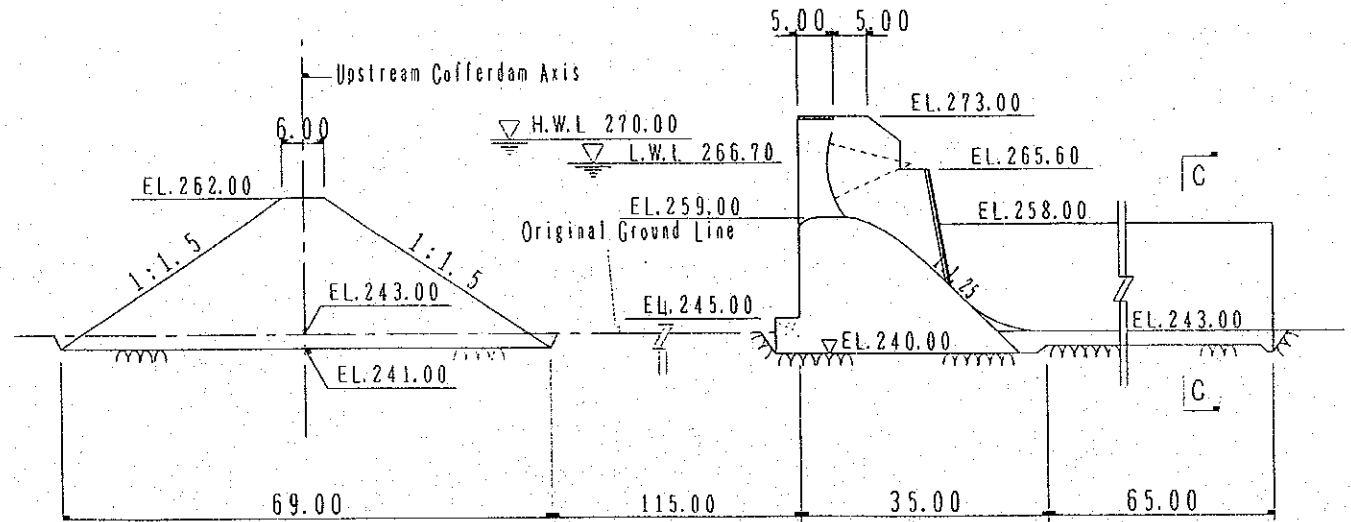




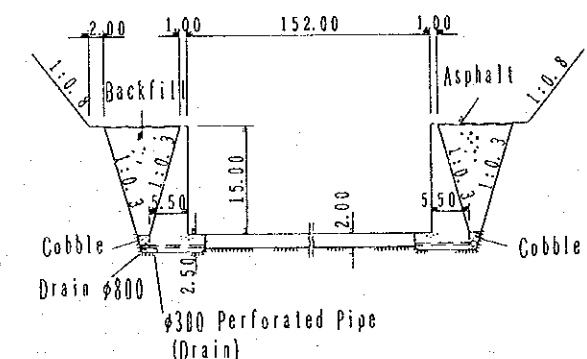
ELEVATION ALONG DAM AXIS SCALE (A)  
(Upstream View)



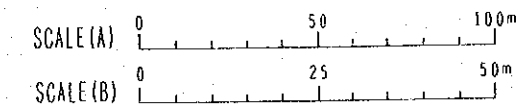
SECTION A-A SCALE (B)  
(Non-Overflow Section)



SECTION B-B SCALE (B)  
(Overflow Section)



SECTION C-C SCALE (B)



MASTER PLAN STUDY ON HYDROELECTRIC  
POWER DEVELOPMENT IN THE SE KONG BASIN

XE NAMNOY DOWNSTREAM PROJECT

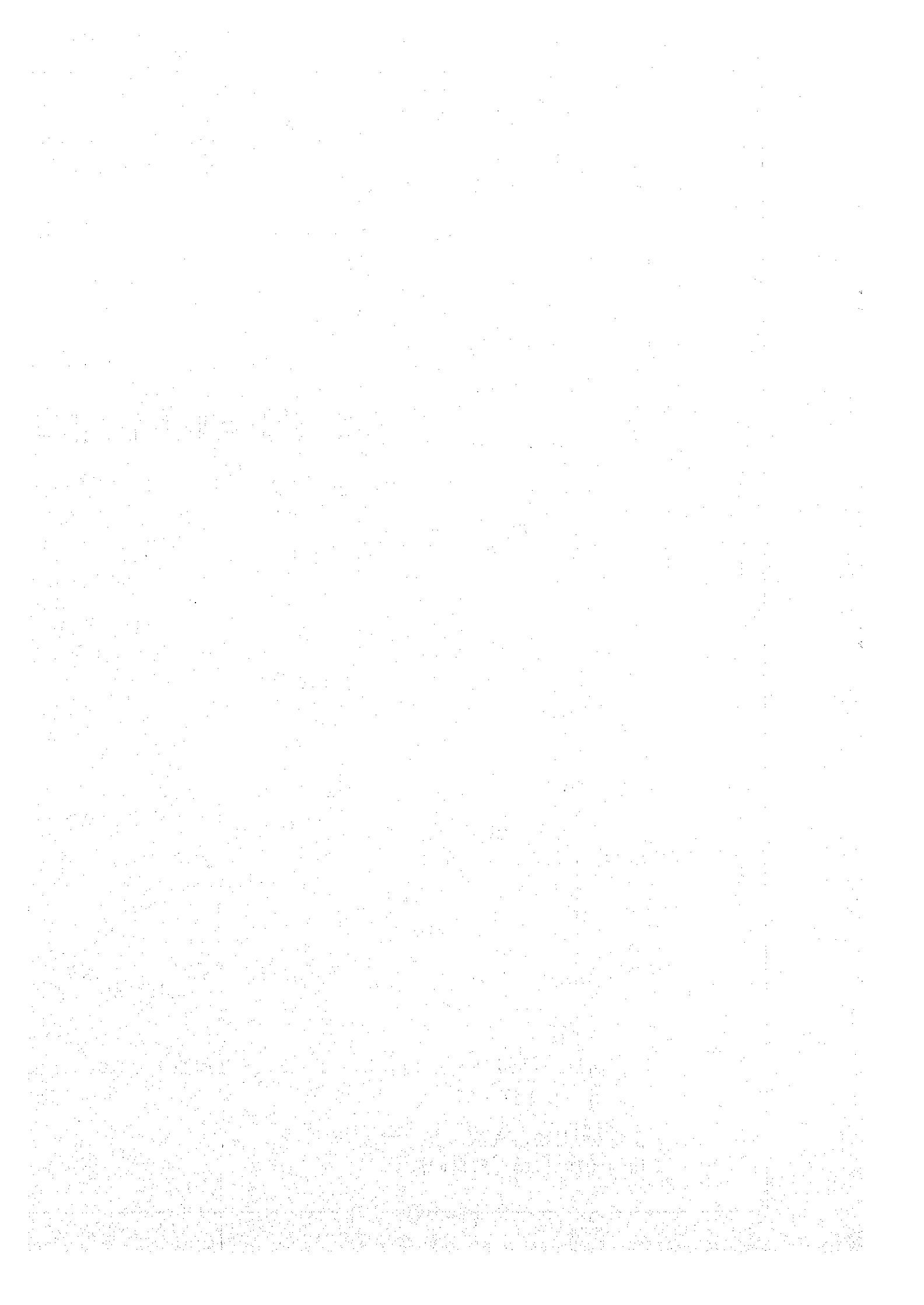
DAM

ELEVATION AND SECTIONS

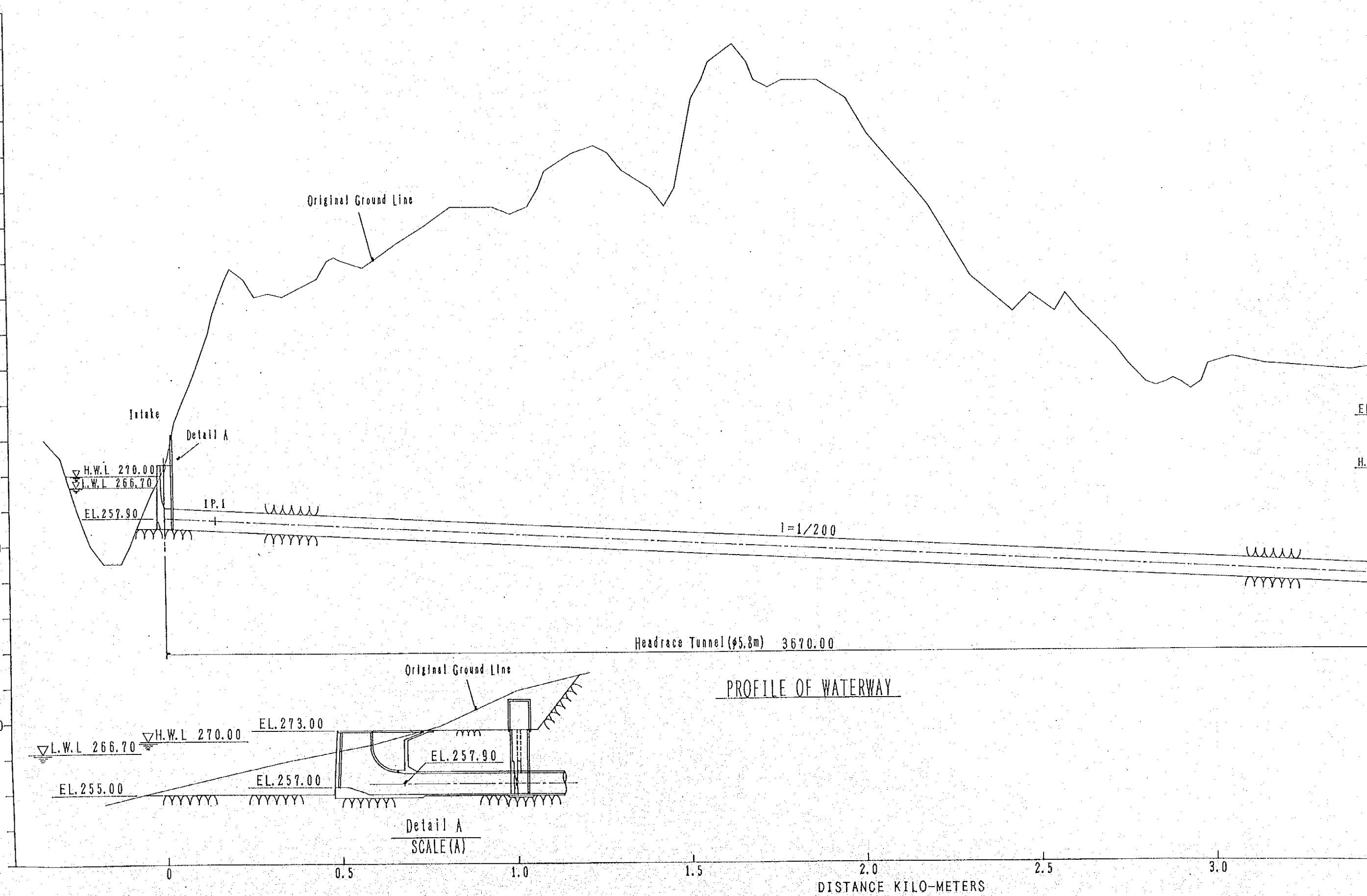
DWG. 14.4-9

Feb. 1995



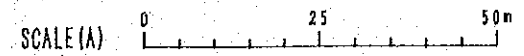
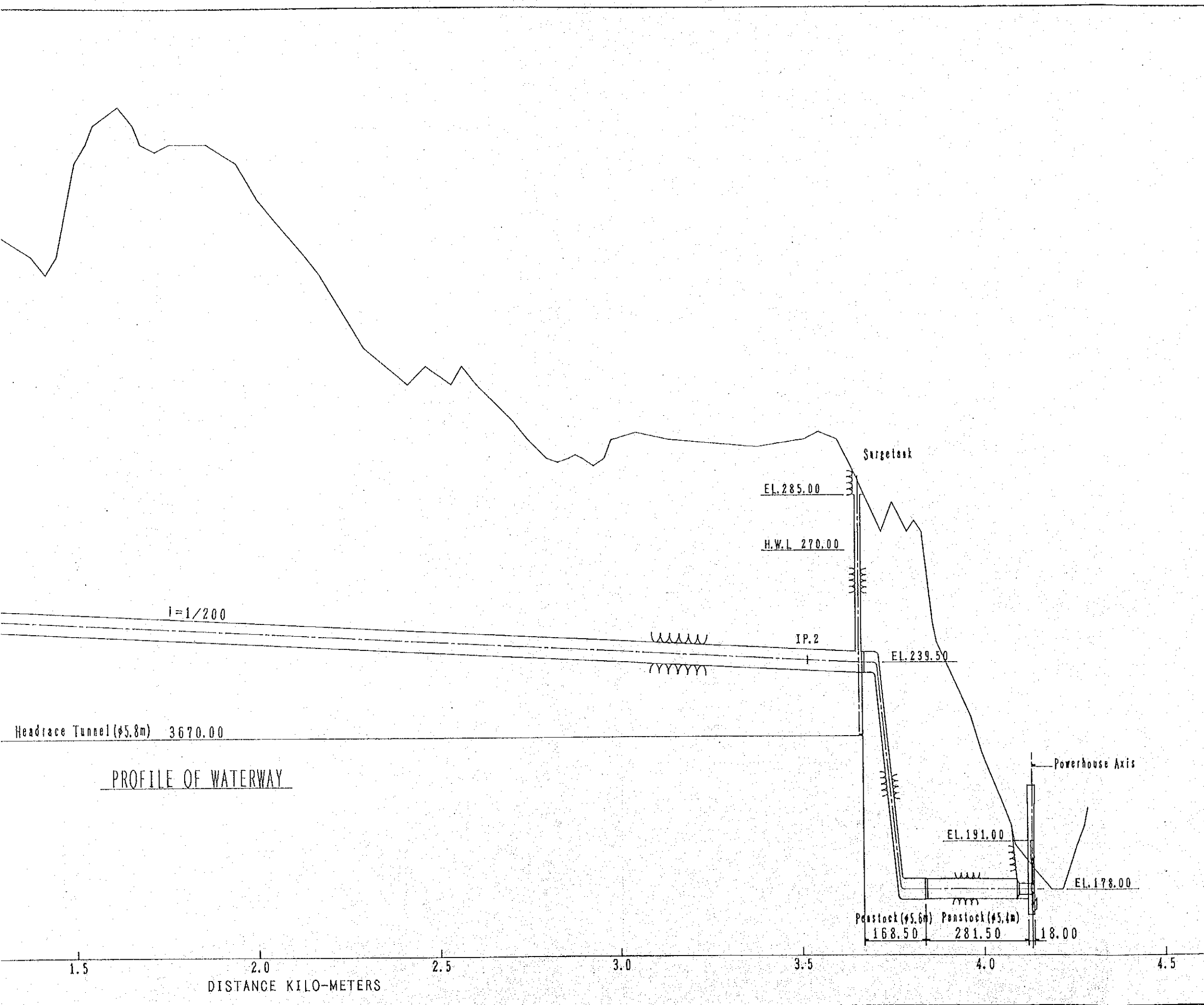


ELEVATION METERS



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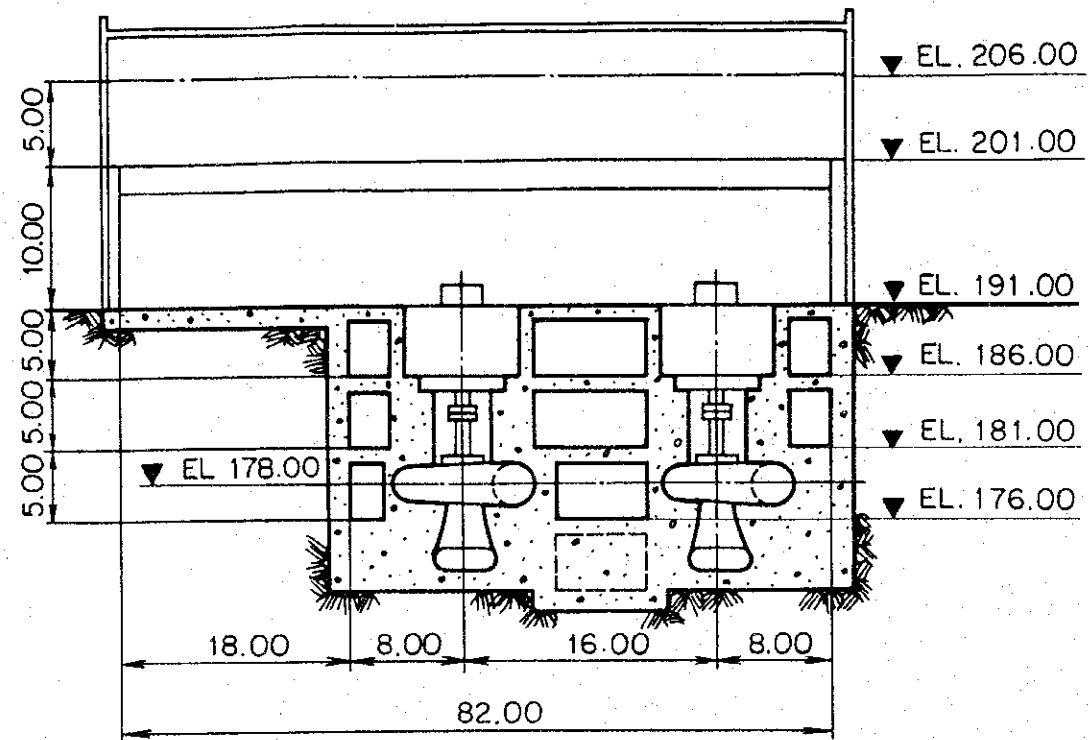


MASTER PLAN STUDY ON HYDROELECTRIC POWER DEVELOPMENT IN THE SE KONG BASIN	
XE NAMNOY DOWNSTREAM PROJECT	
WATERWAY	
PROFILE AND SECTION	
DWG. 14.4-10	Feb. 1995



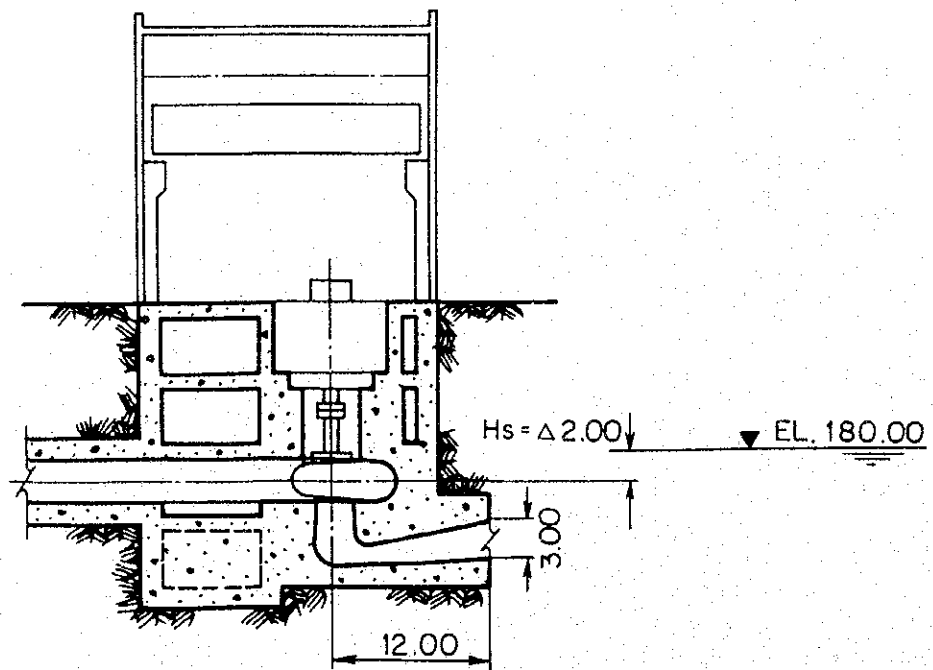
LONGITUDINAL SECTION

(A - A)



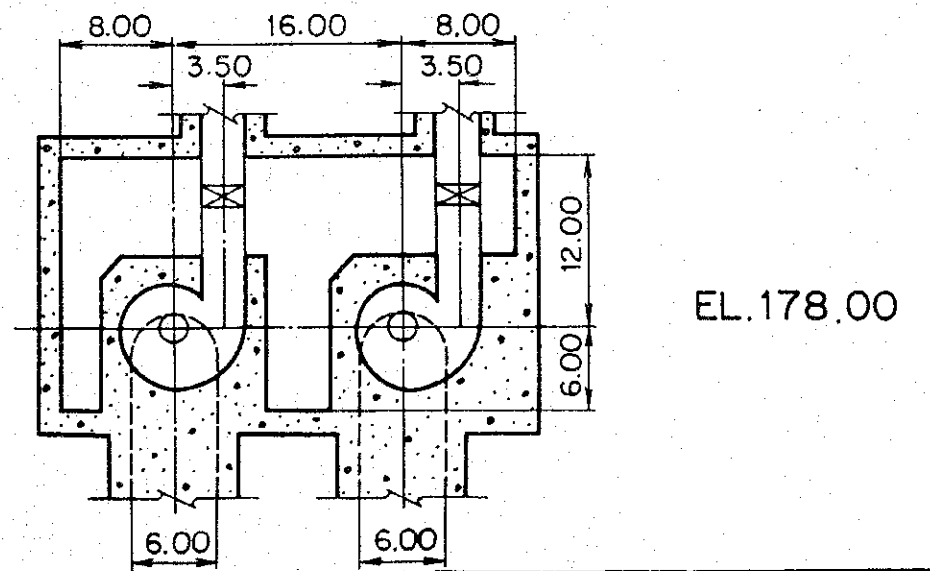
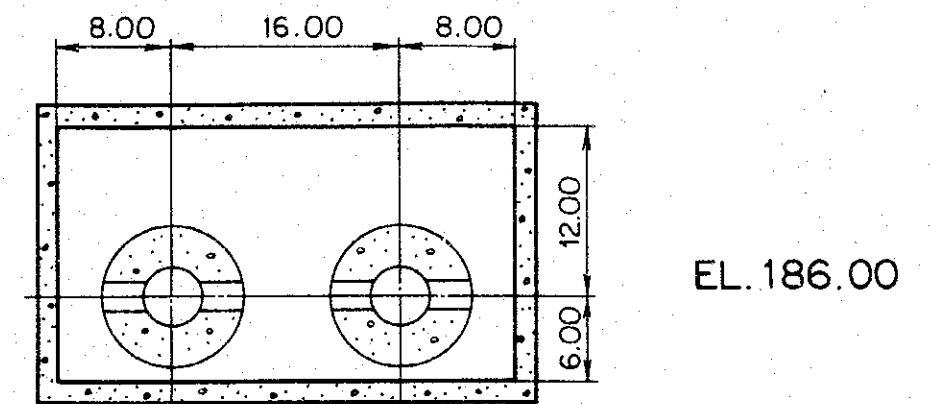
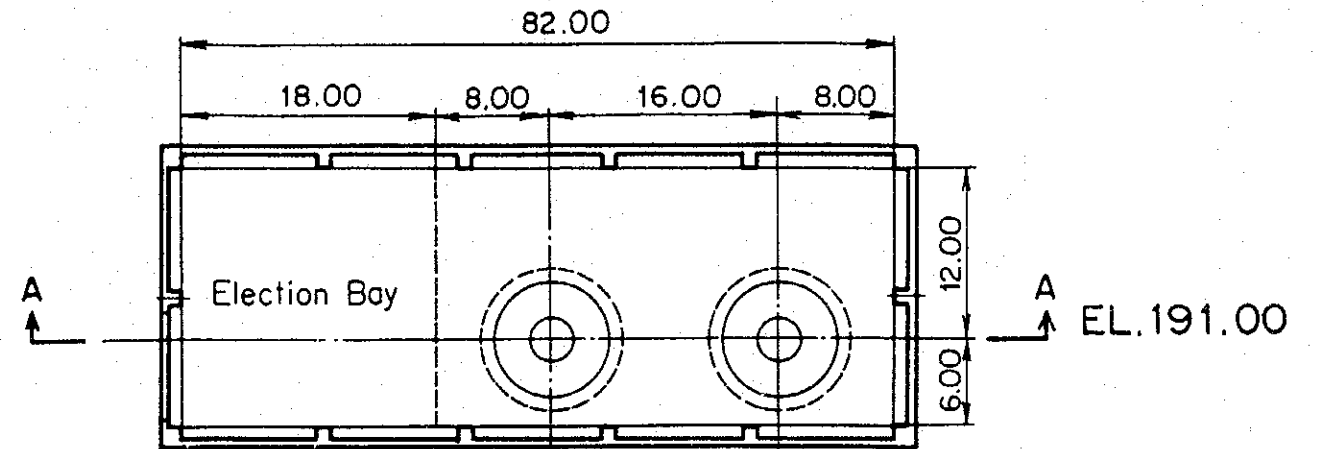
TRANSVERSE SECTION

(B - B)



PLANS

↗ B



MASTER PLAN STUDY ON HYDROELECTRIC  
POWER DEVELOPMENT IN THE SE KONG BASIN

XE NAMNOY DOWNSTREAM

POWERHOUSE  
TRANSVERSE AND  
LONGITUDINAL SECTIONS  
AND PLANS

DWG. 14.4 - 11

Feb. 1995