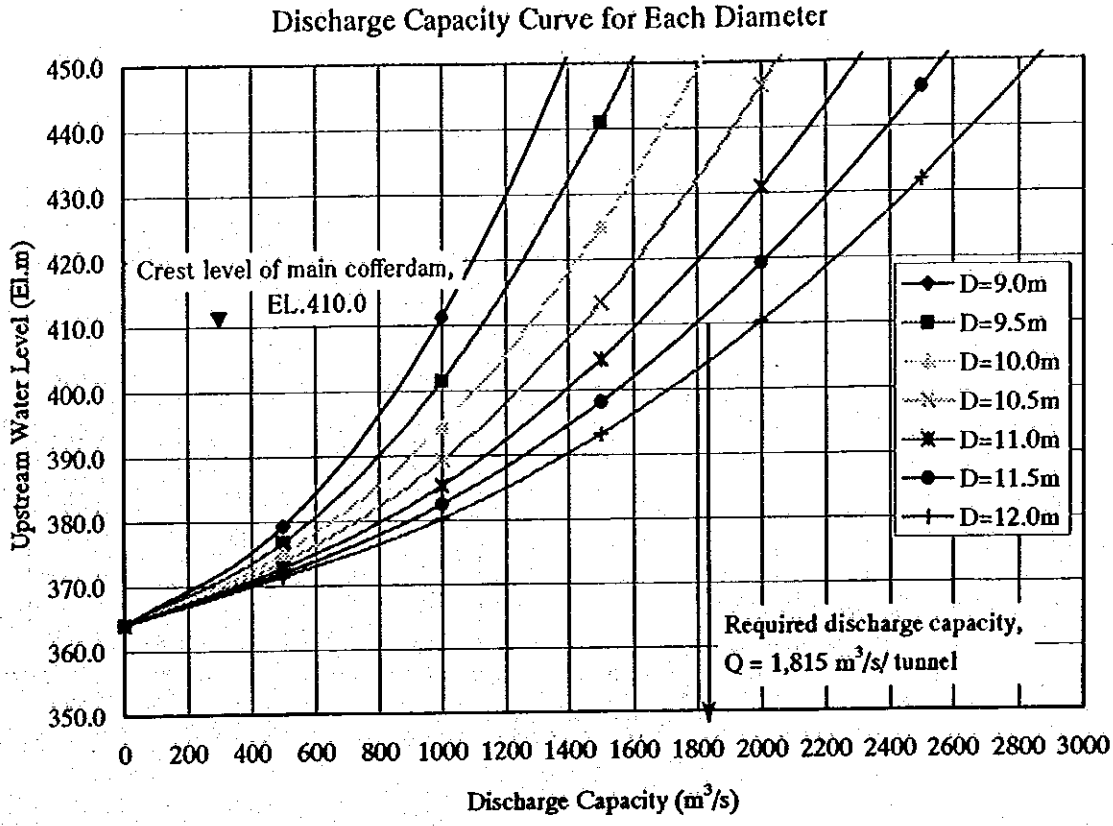
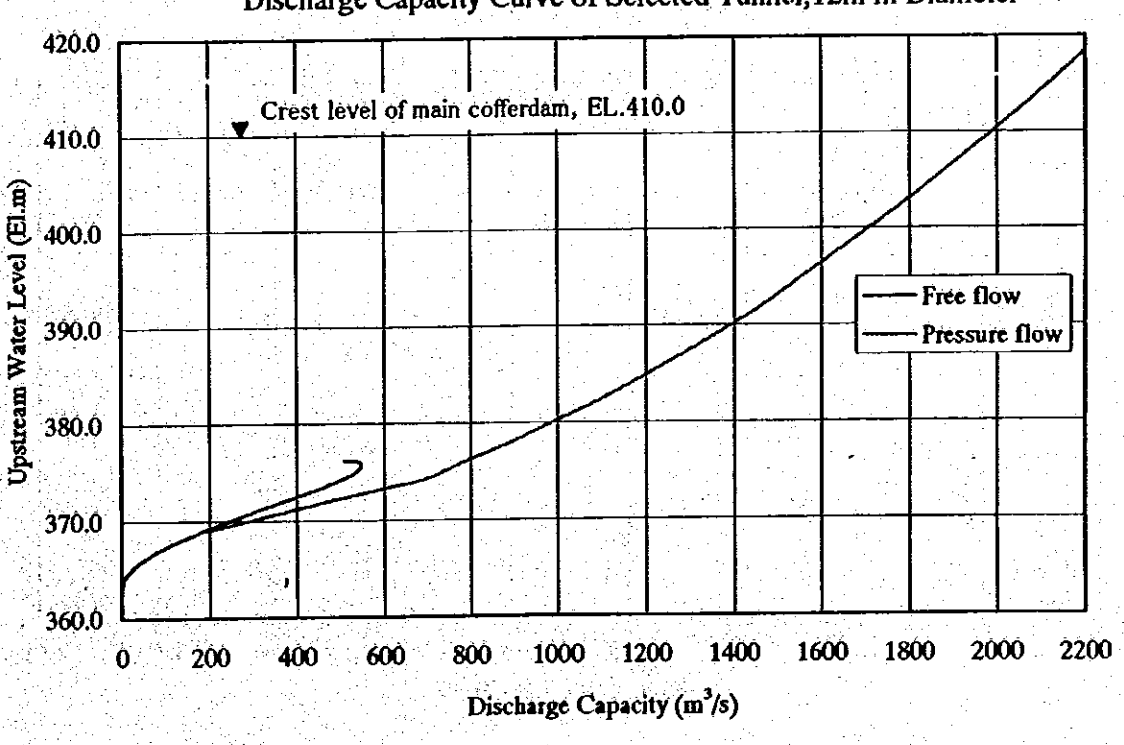
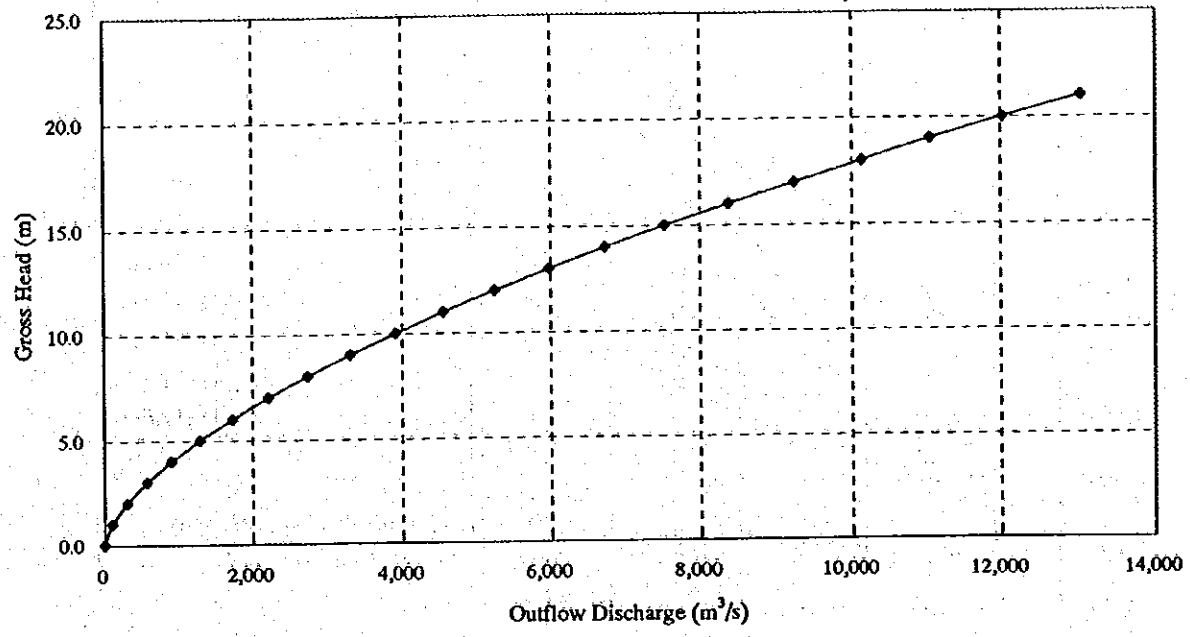
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 7.4.1 最適投入計画



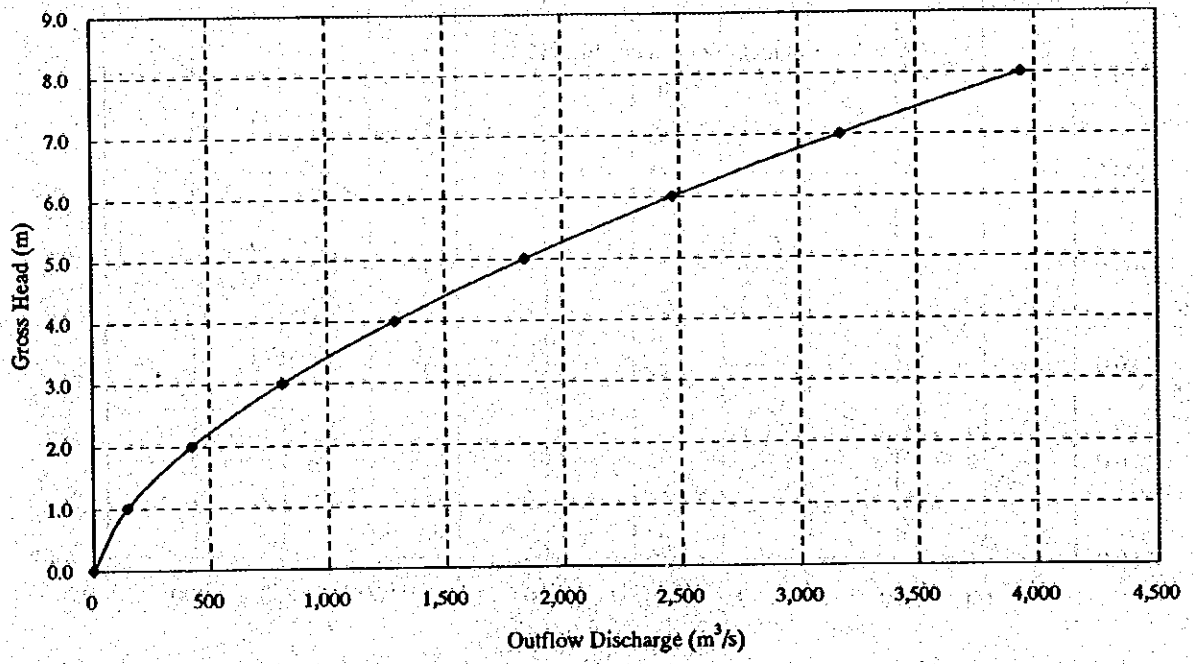


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.1 ダイバージョントンネルの通水能力曲線

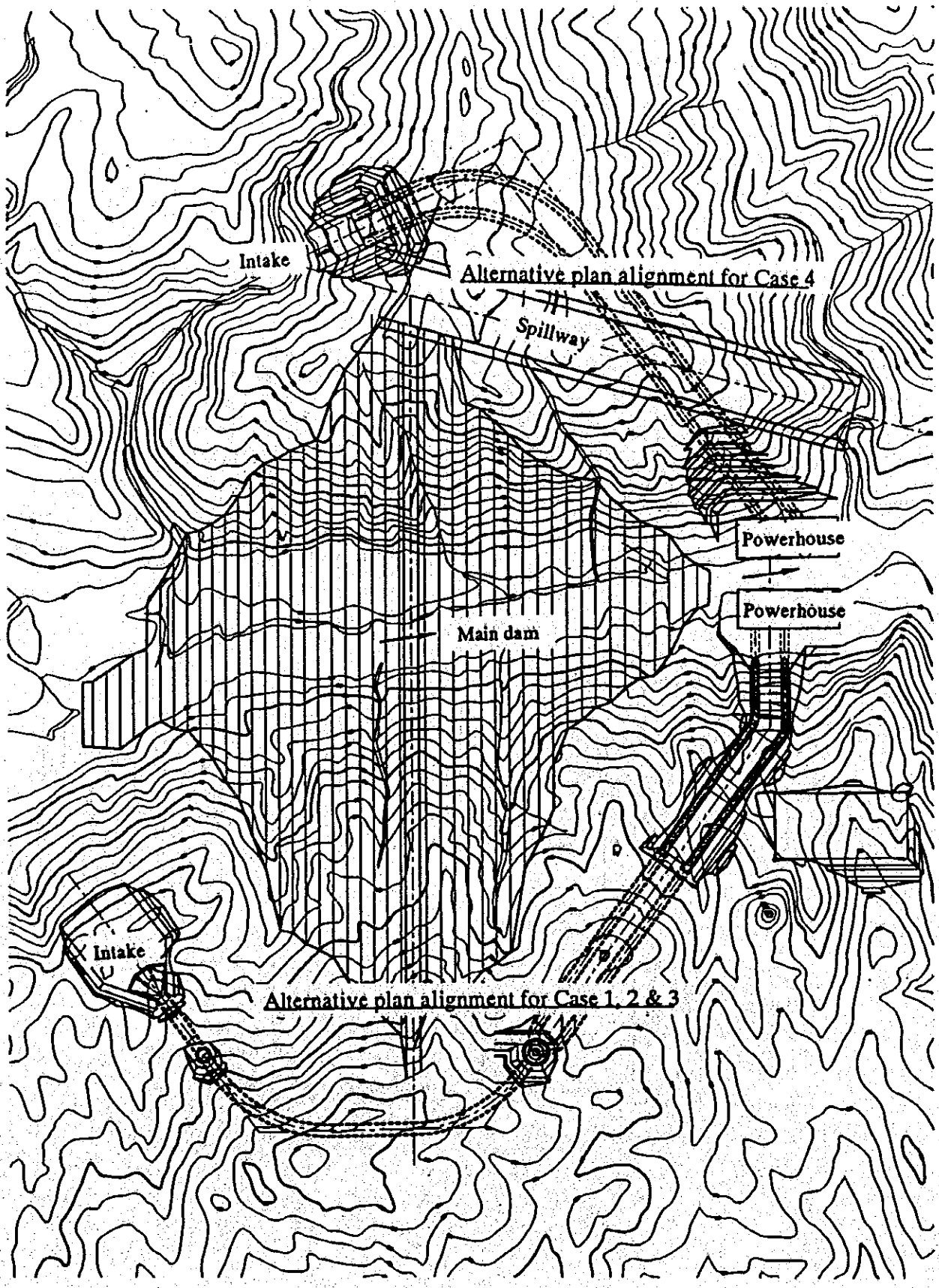
Gated Spillway
(Gates fully opened)



Non-gated Overflow Spillway

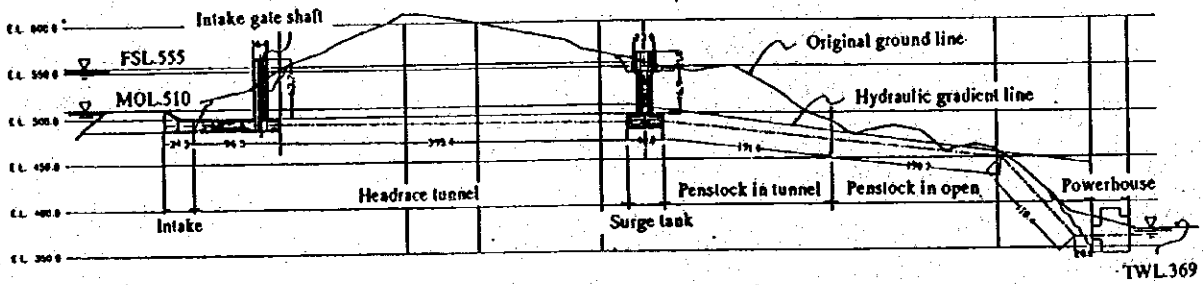


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.2 スピルウェイの通水能力曲線

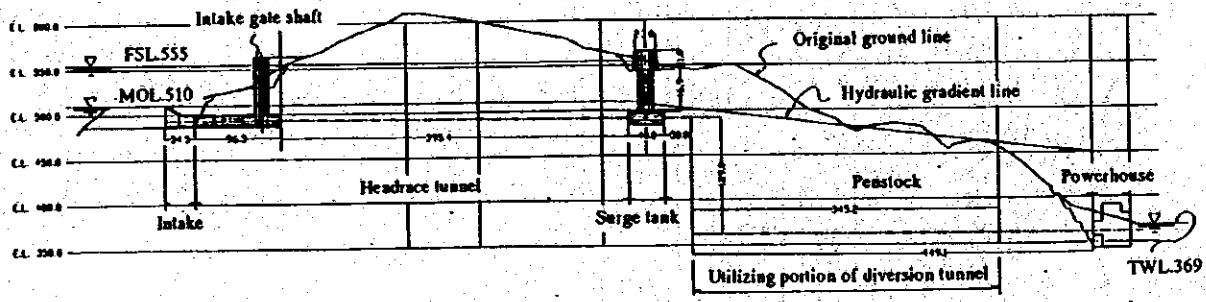


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.3 発電水路の代替レイアウト(1/2)

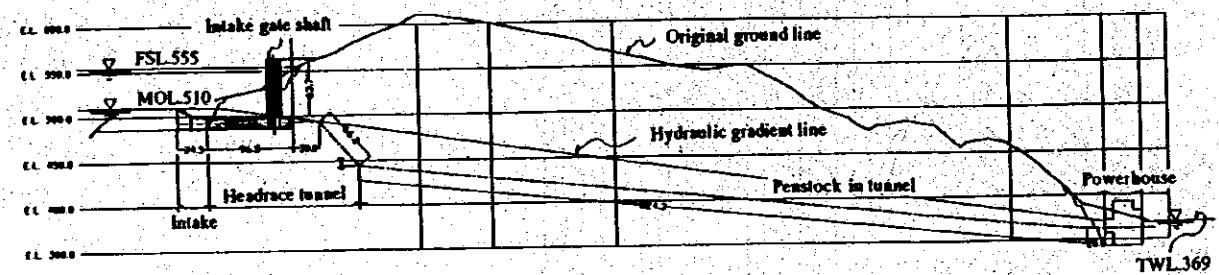
Case 1: Waterway with surge tank on right bank



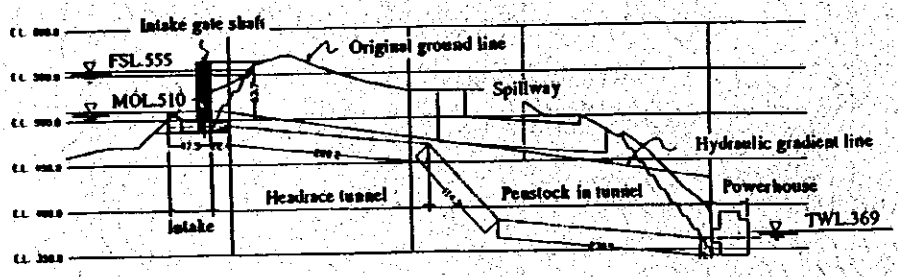
Case 2: Waterway with surge tank on right bank with utilizing diversion tunnel



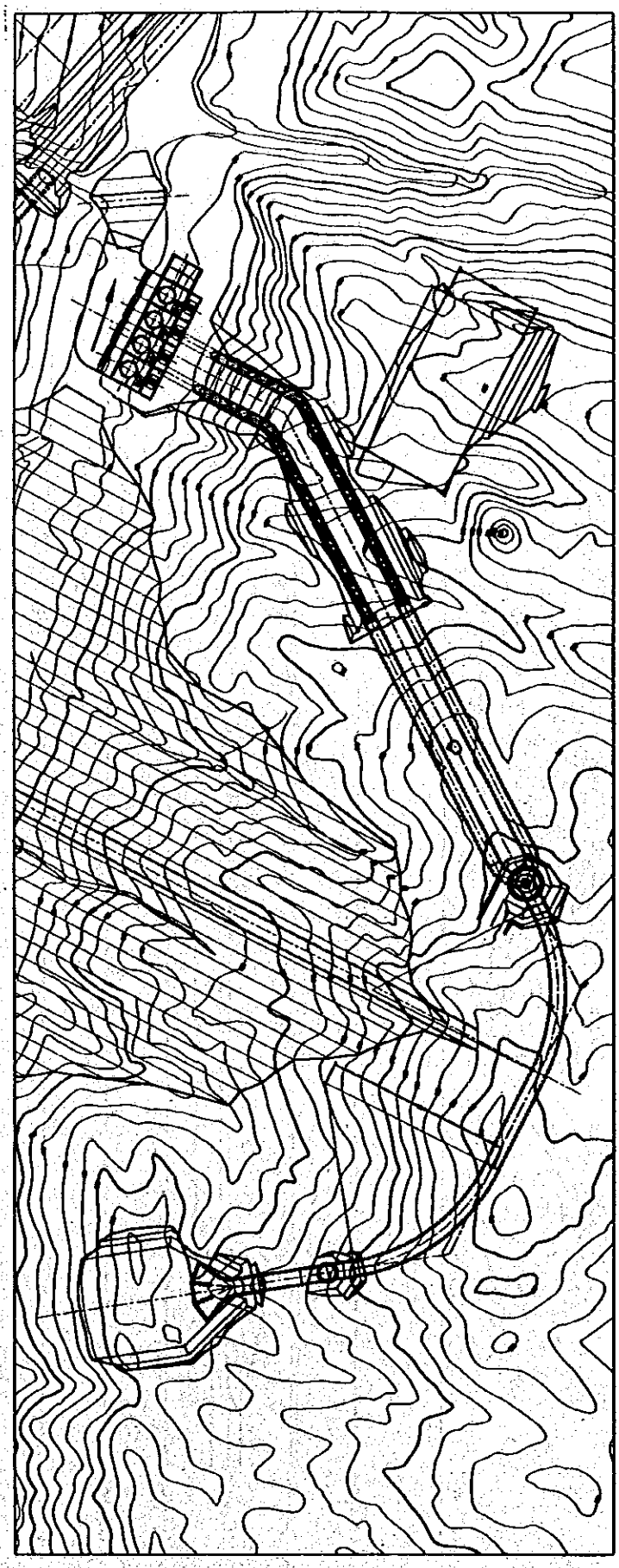
Case-3: Waterway without surge tank on right bank

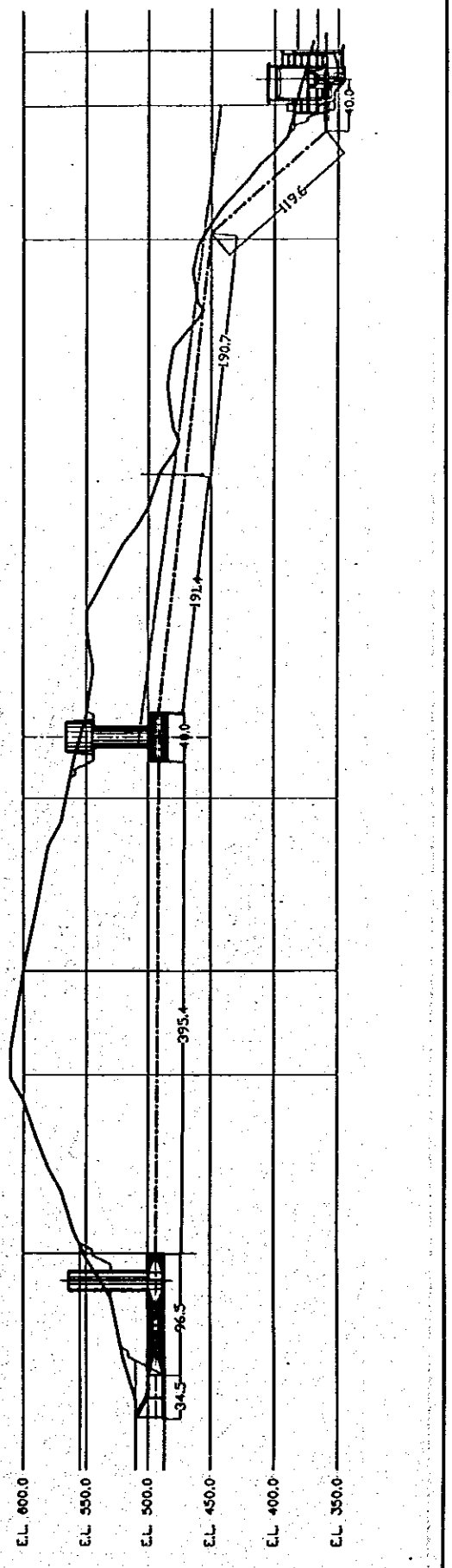


Case-4: Waterway without surge tank on left bank



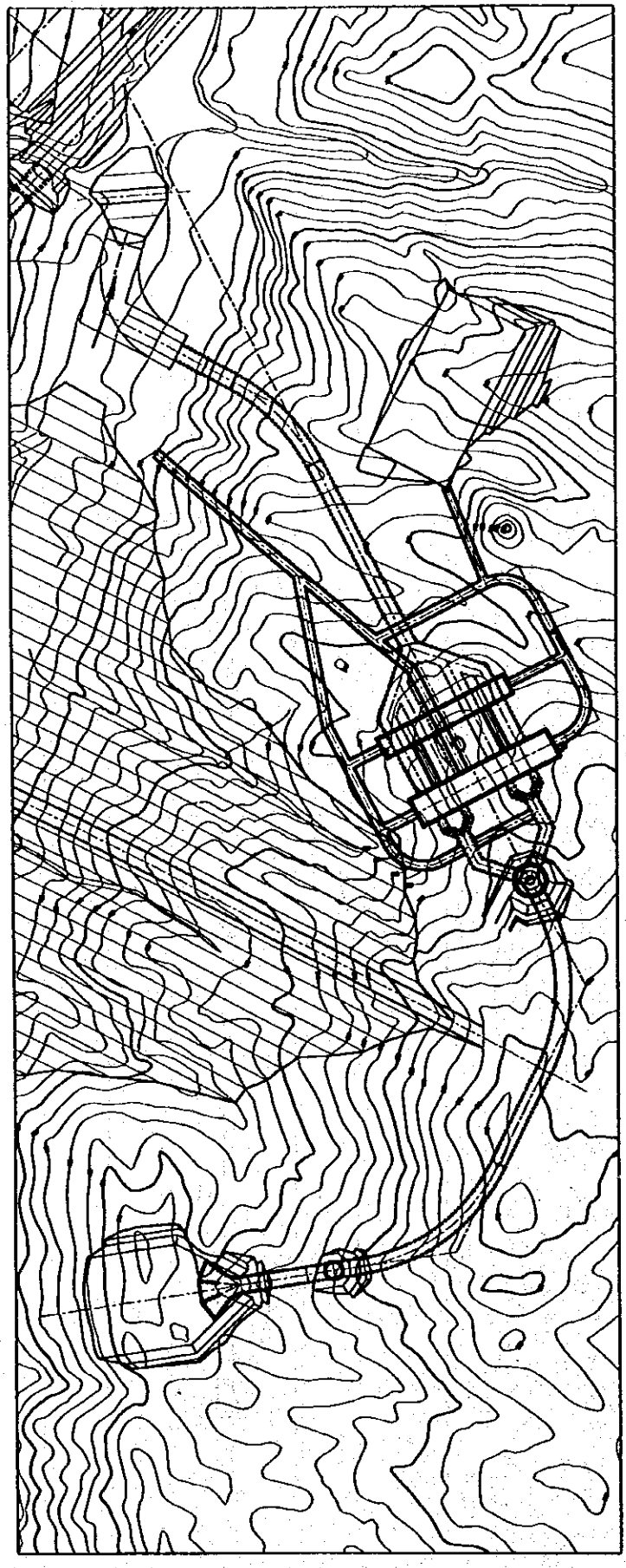
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.3 発電水路の代替レイアウト(2/2)

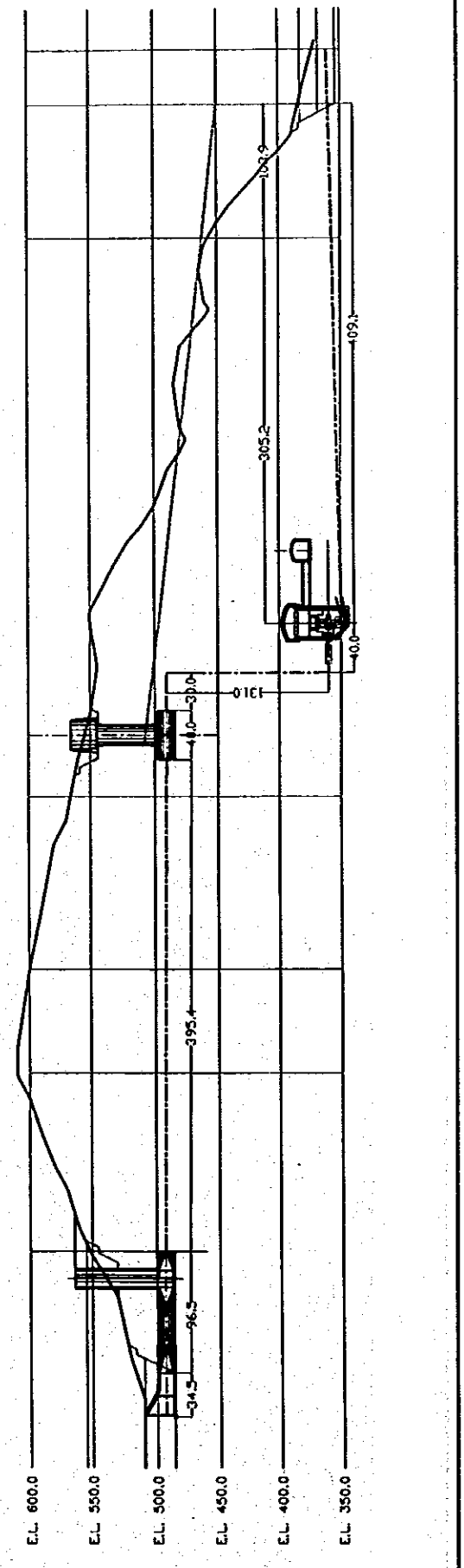




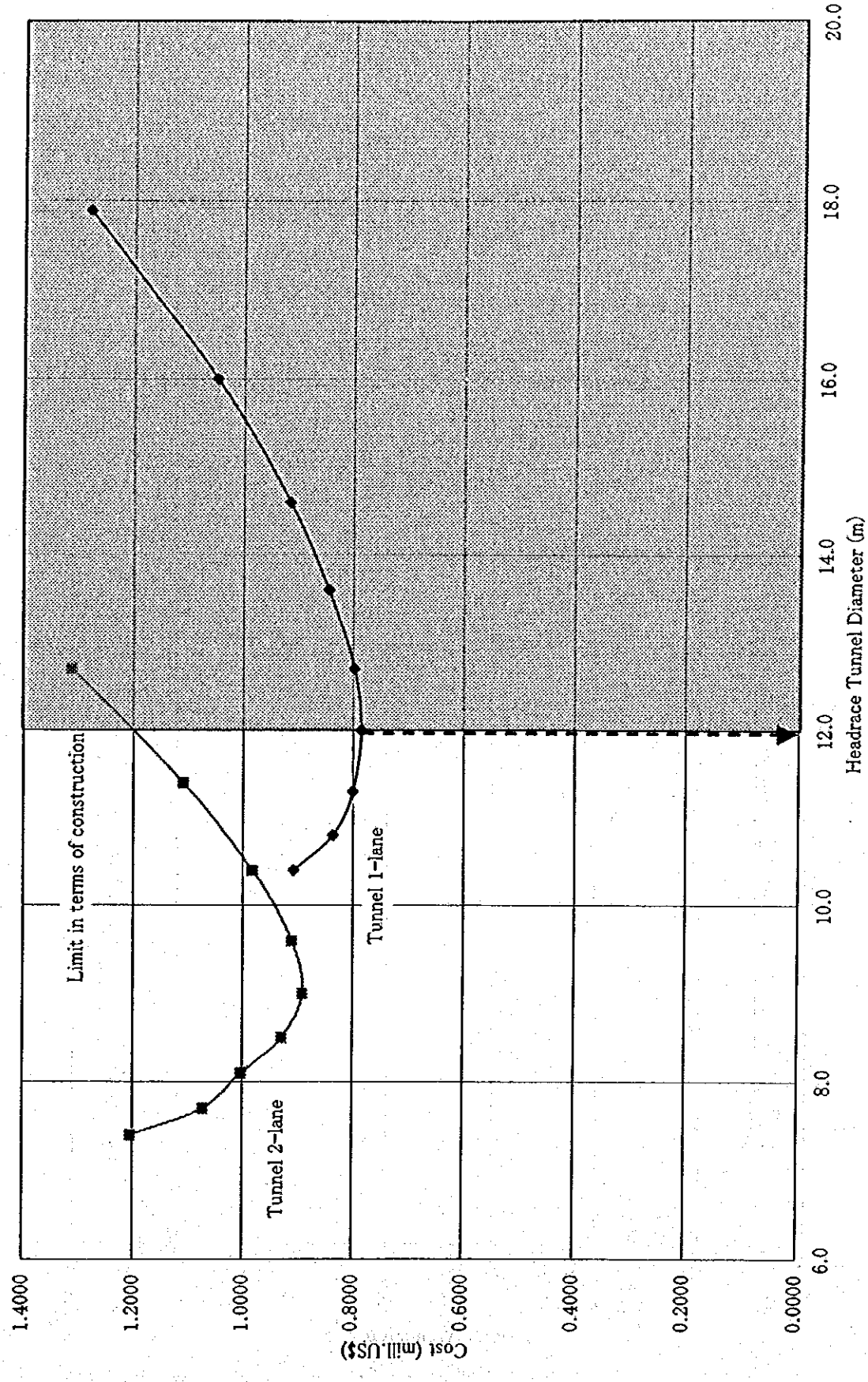
FEASIBILITY STUDY
ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
IN ISLAMIC REPUBLIC OF PAKISTAN
JAPAN INTERNATIONAL COOPERATION AGENCY

図 8.2.4
右岸発電水路の代替案(1/2)

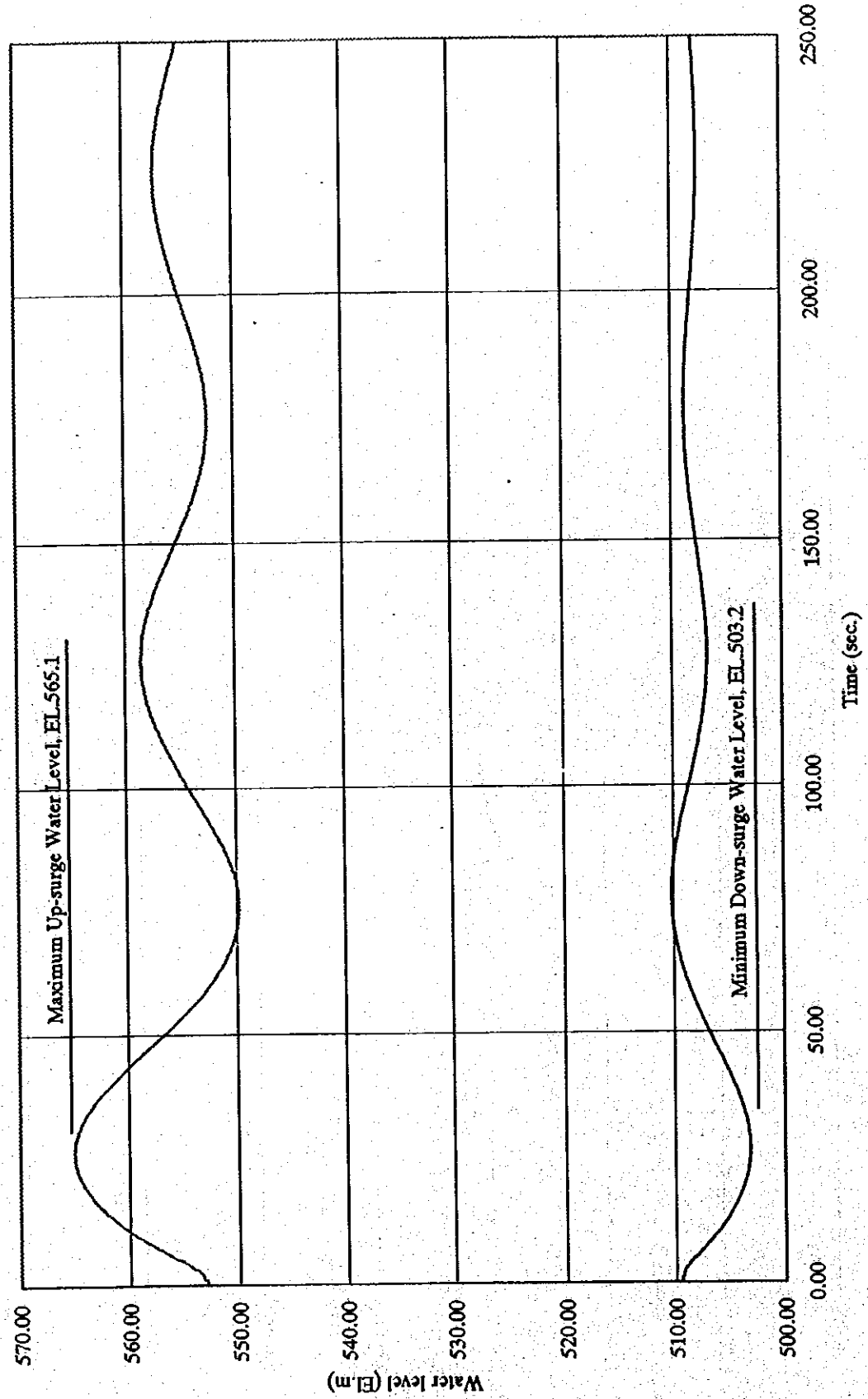




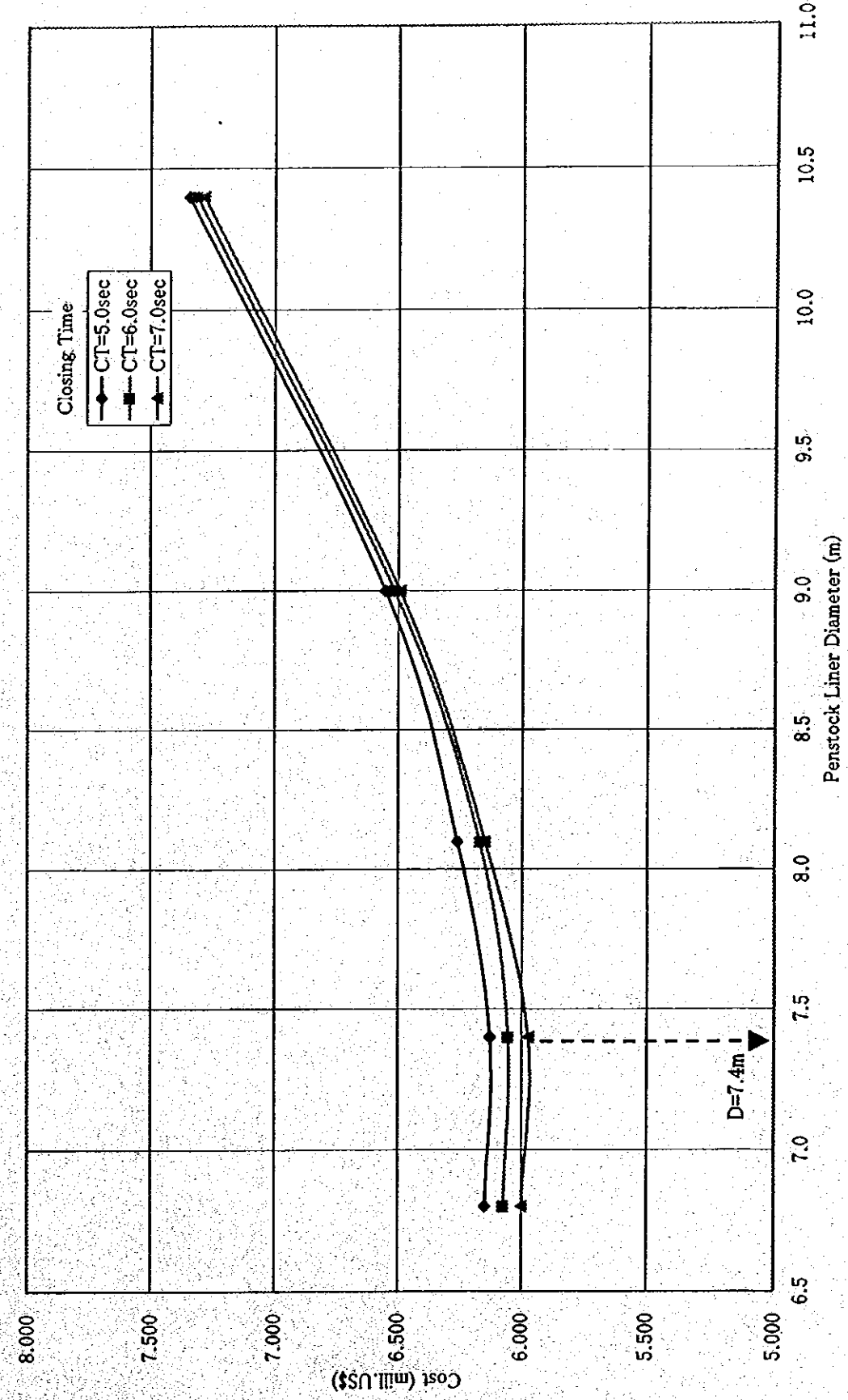
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.4 右岸発電水路の代替案(2/2)



FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.5 導水路トンネルの最適径



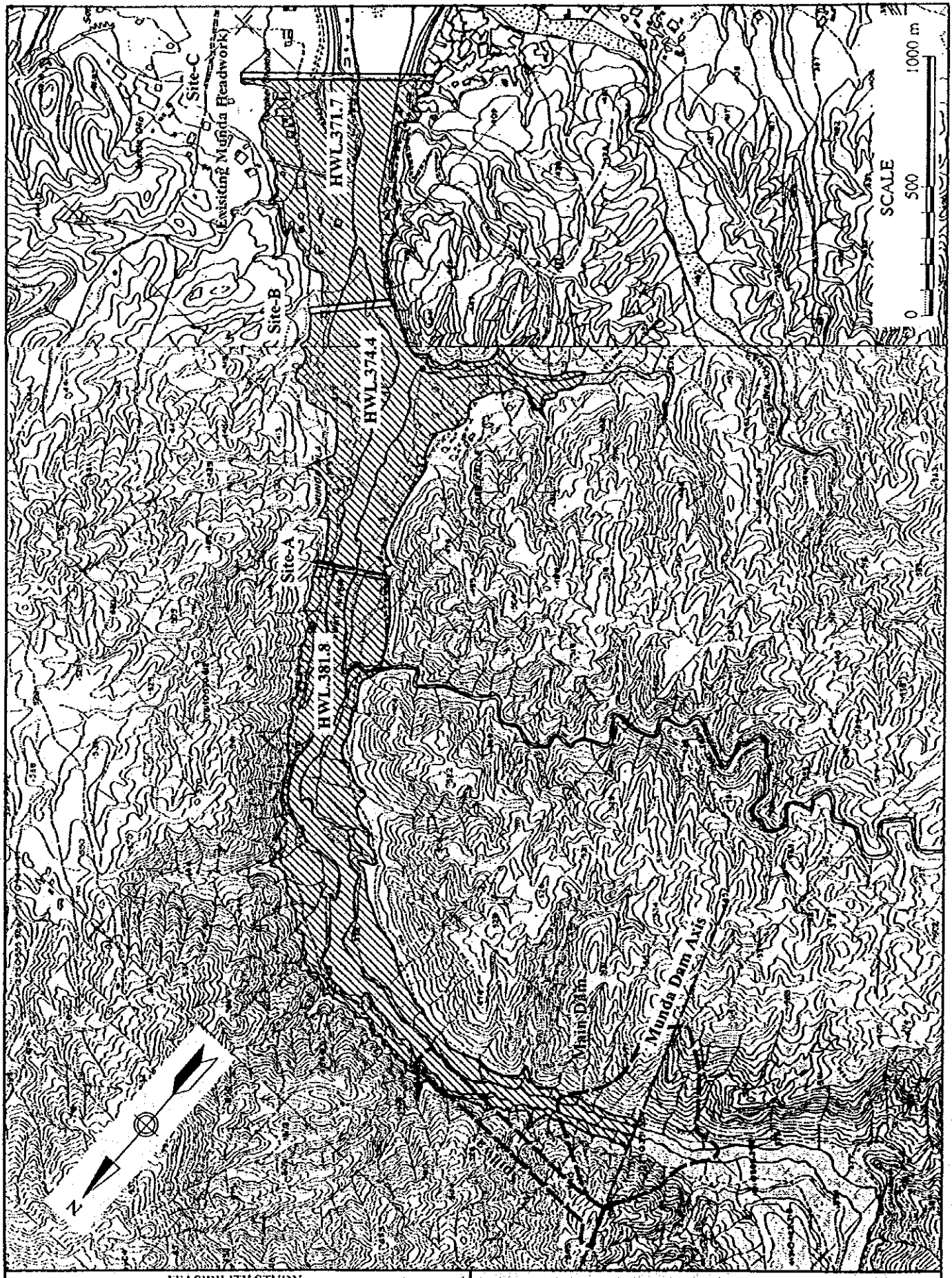
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.6 サージング計算



FEASIBILITY STUDY
ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
IN ISLAMIC REPUBLIC OF PAKISTAN
JAPAN INTERNATIONAL COOPERATION AGENCY

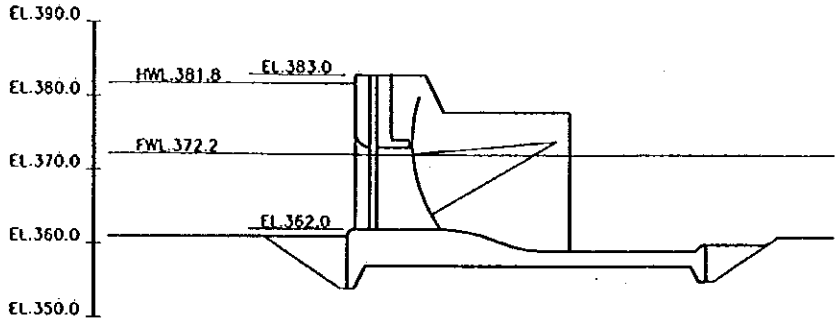
図 8.2.7

水圧鉄管路の最適径

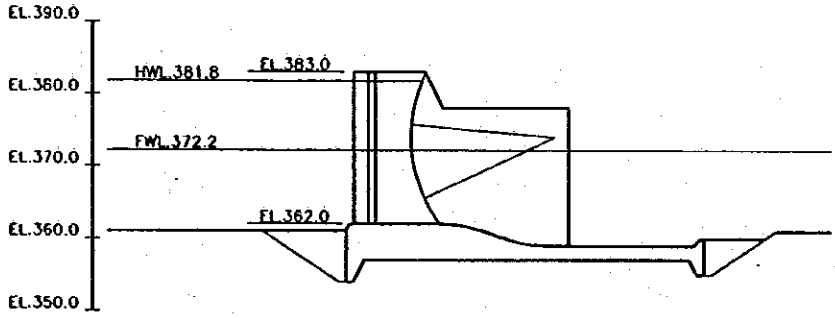


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.8 逆調整堰サイトの代替案

Alternative–1: Curtain Wall Type



Alternative–2: Full Gate Type



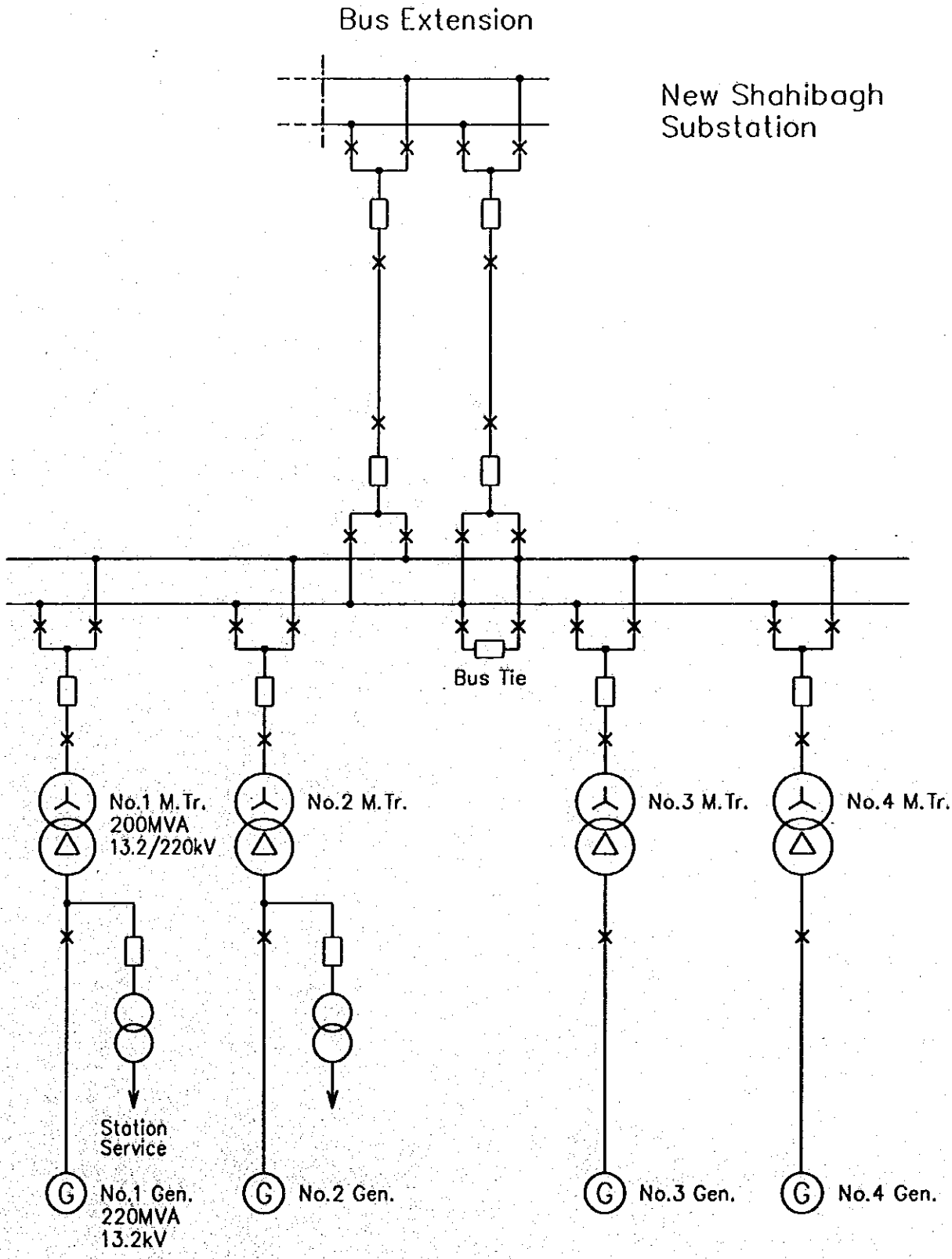
N (nos.)	B (m)	H1 (m)	H2 (m)
2	19.4	11.7	20.8
3	14.4	11.7	20.8
4	11.8	11.7	20.8
5	10.1	11.7	20.8
6	8.9	11.7	20.8
7	8.0	11.7	20.8
8	7.3	11.7	20.8
9	6.8	11.7	20.8
10	6.3	11.7	20.8

N: Gate numbers
B: Gate span
H1: Gate height for Alternative-1
H2: Gate height for Alternative-2

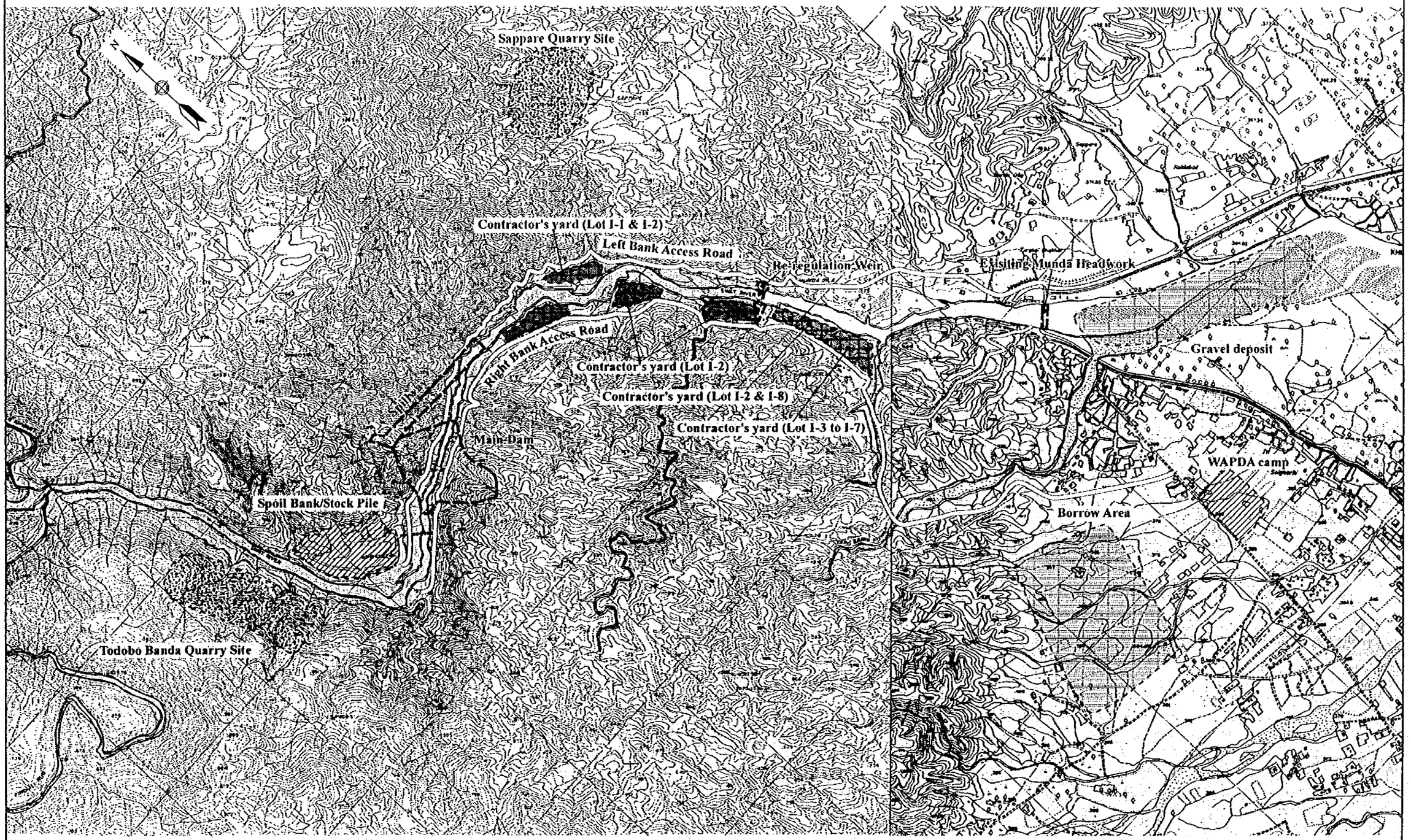
FEASIBILITY STUDY
ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
IN ISLAMIC REPUBLIC OF PAKISTAN
JAPAN INTERNATIONAL COOPERATION AGENCY

図 8.2.9
逆調整堰形式の代替案

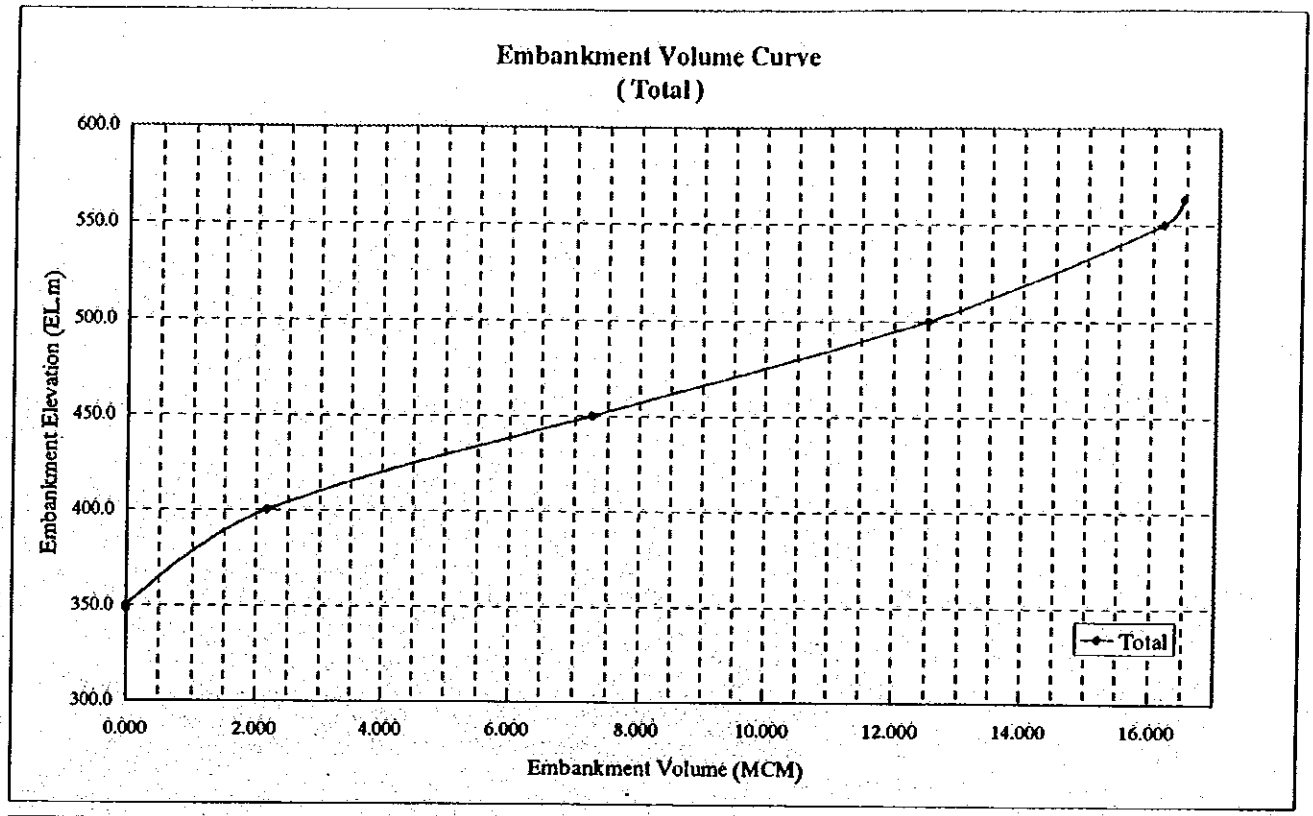
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.2.10 逆調整堰の最適ゲート門数

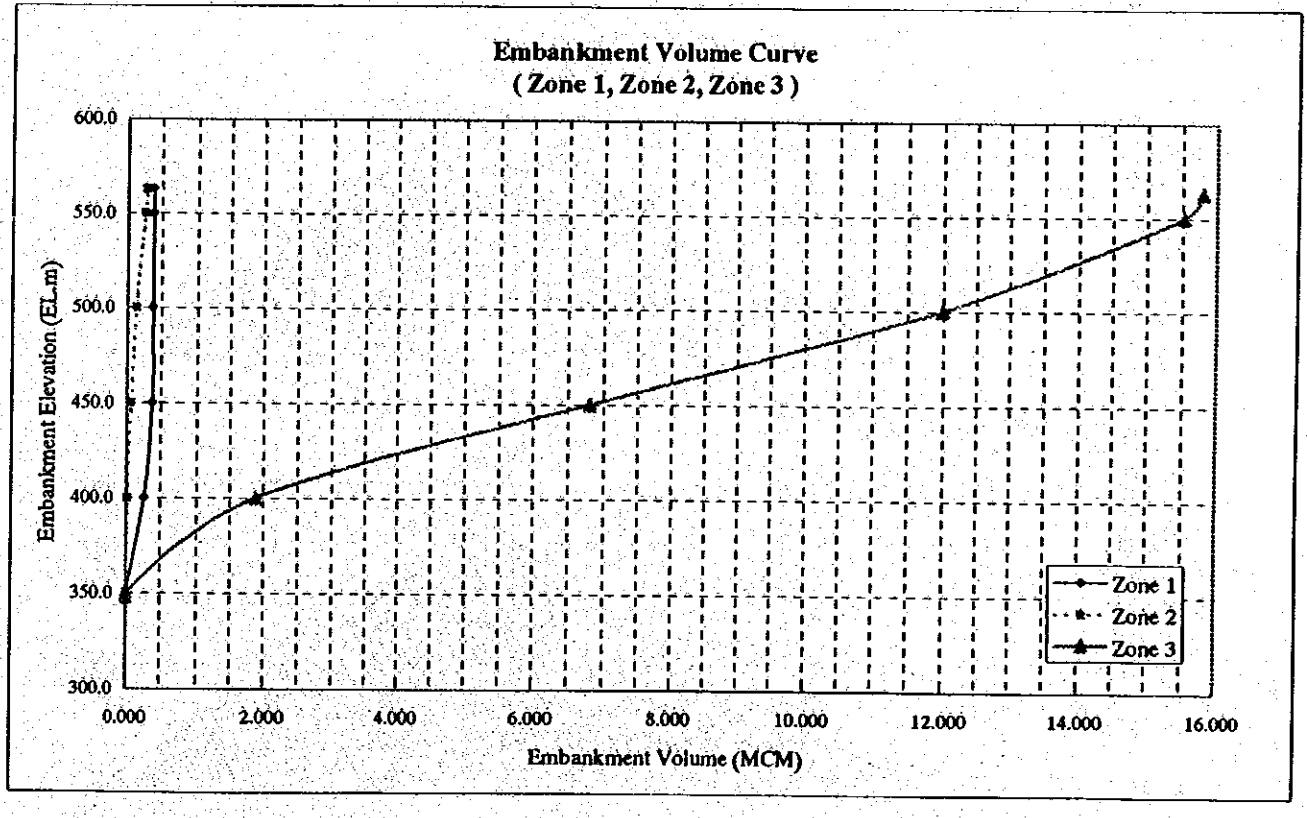


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 8.4.1 発電所結線図



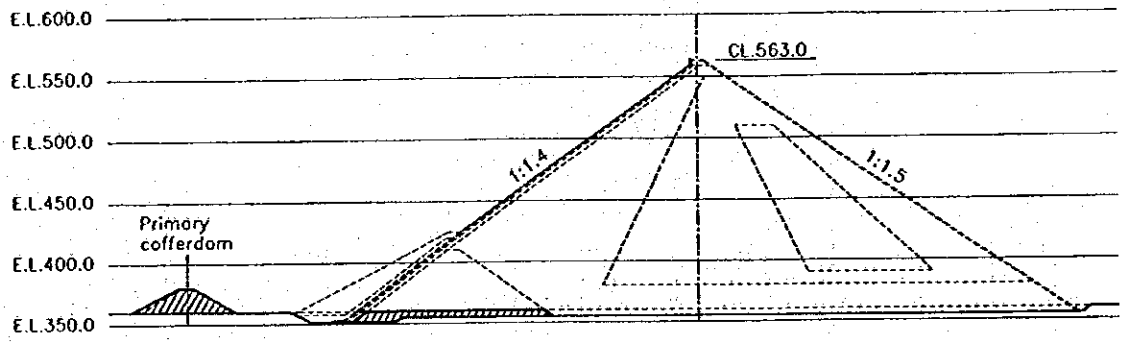
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 9.1.1 建設設備配置図



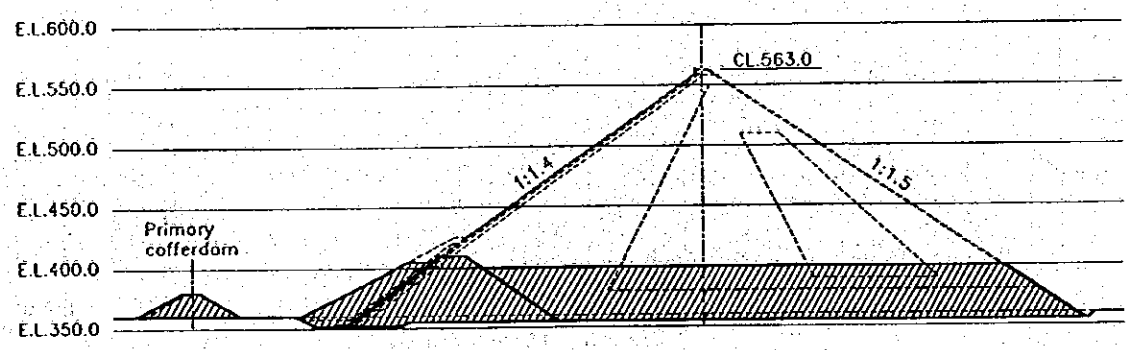


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 9.1.2 ダム盛立曲線

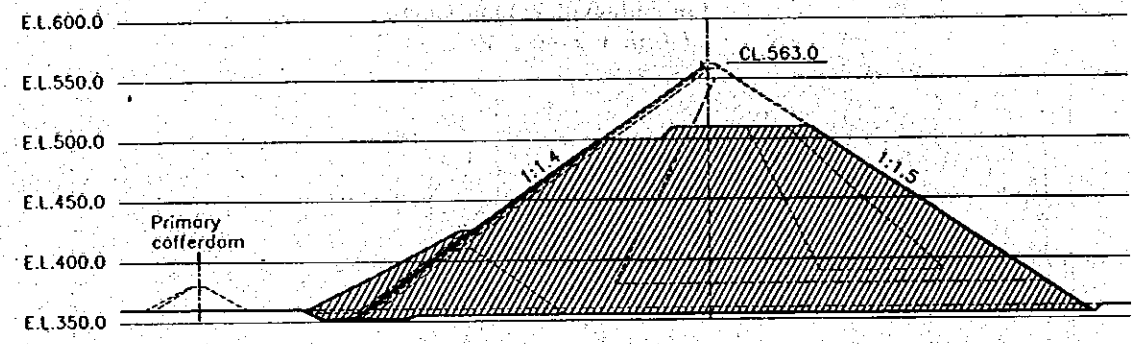
End of May 2005



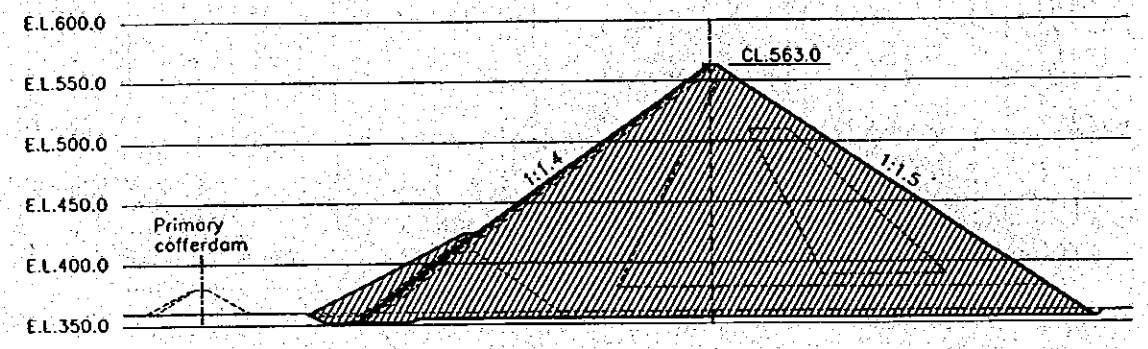
End of April 2006



End of December 2007



End of March 2009

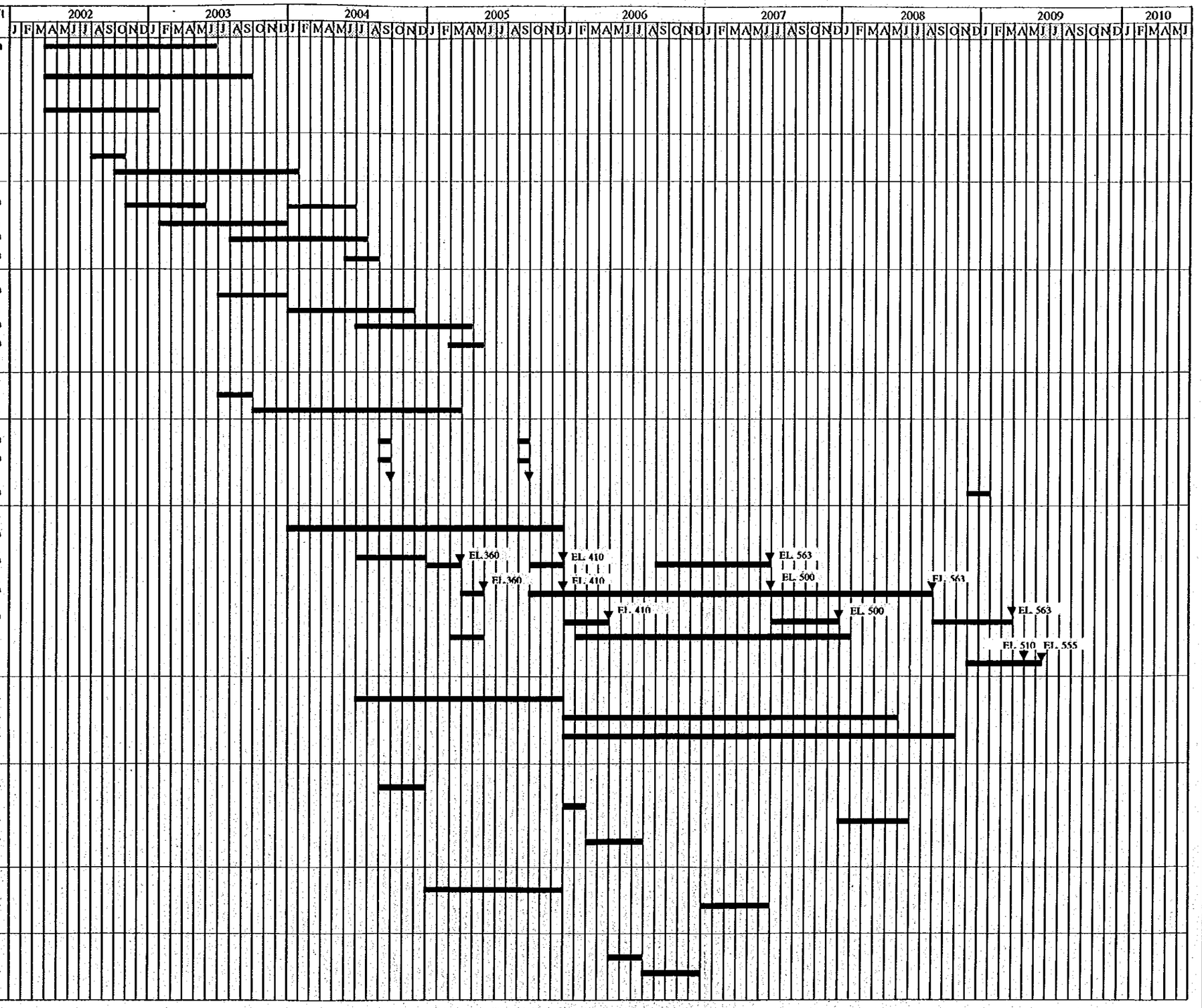


FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN	図 9.1.3
JAPAN INTERNATIONAL COOPERATION AGENCY	ダム施工手順

FEASIBILITY STUDY
ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
IN ISLAMIC REPUBLIC OF PAKISTAN
JAPAN INTERNATIONAL COOPERATION AGENCY

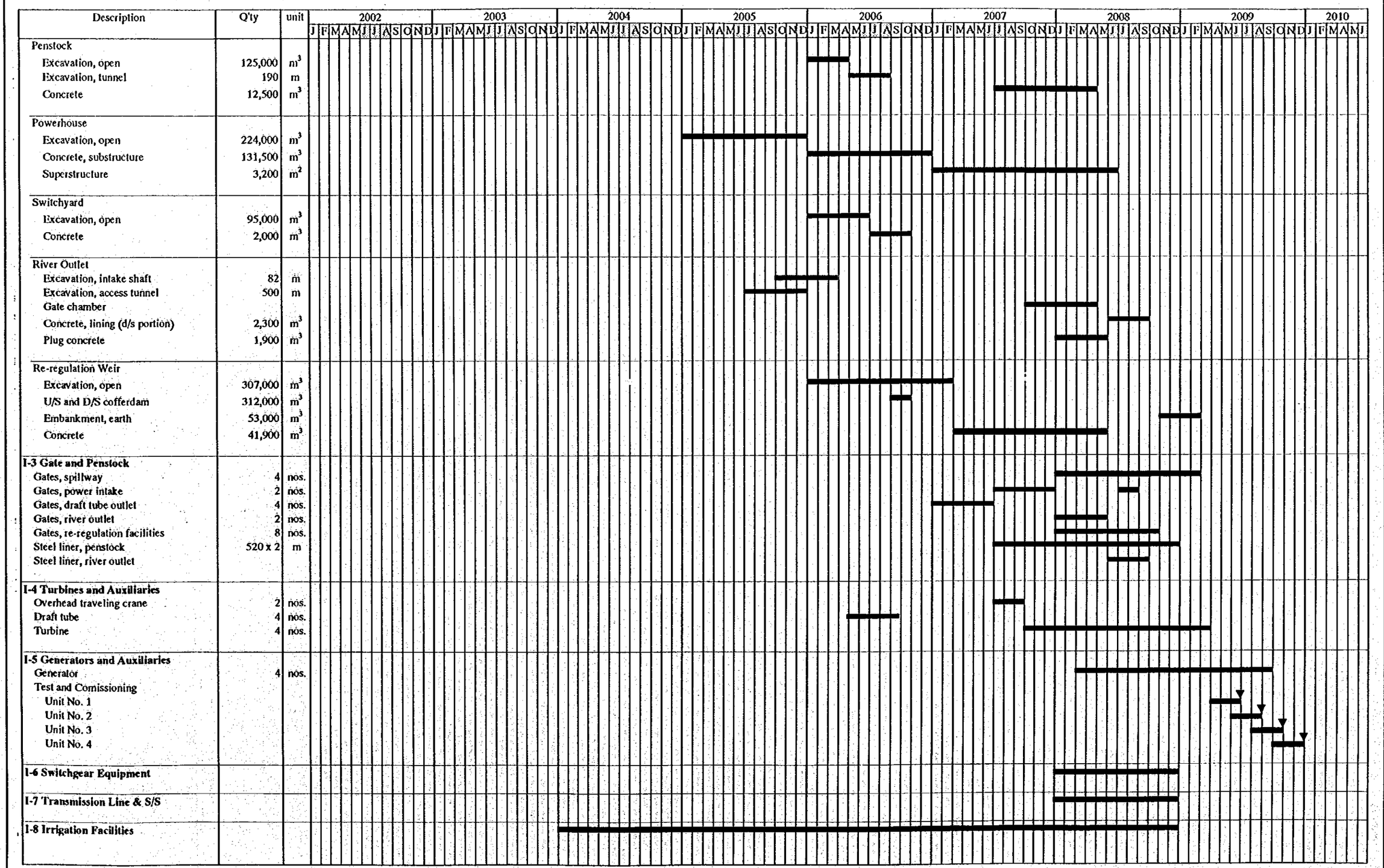
図 9.1.4
事業工程表

Description	Q'ty	unit
L-1 Access Road	11	km
L-2 WAPDA Camp		
L-3 Power Supply System		
I-1 Diversion Tunnel		
Mobilization		
Site instalation		
Diversion tunnel No.1		
Excavation, open	1,057,000	m^3
Excavation, tunnel	940	m
Concrete, lining	53,200	m^3
Concrete, portal	5,200	m^3
Diversion tunnel No.2 (River Outlet Tunnel)		
Excavation, open	388,000	m^3
Excavation, tunnel	950	m
Concrete, lining	53,800	m^3
Concrete, portal	5,200	m^3
I-2 Main Civil Works		
Mobilization		
Site instalation		
River Diversion Work		
U/S primary cofferdam (EL. 380)	88,000	m^3
D/S cofferdam (EL. 376)	57,000	m^3
River closure/diversion		
Plug concrete	2,150	m^3
Main Dam		
Excavation, open	1,042,000	m^3
Concrete, plinth	8,200	m^3
Dam embankment	16,470,000	m^3
Concrete, face slab	100,800	m^3
Grouting, consolidation and curtain	31,700	m
Reservoir impounding		
Spillway		
Excavation, chuteway	1,029,000	m^3
Excavation, plunge pool	1,050,000	m^3
Concrete	228,500	m^3
Power intake		
Excavation, open	150,000	m^3
Excavation, gate shaft	30	m
Concrete, intake structure	9,630	m^3
Concrete, gate shaft	5,000	m^3
Headrace tunnel		
Excavation, tunnel	490	m
Concrete, lining	28,900	m^3
Surge tank		
Excavation, shaft	47	m
Concrete	8,400	m^3



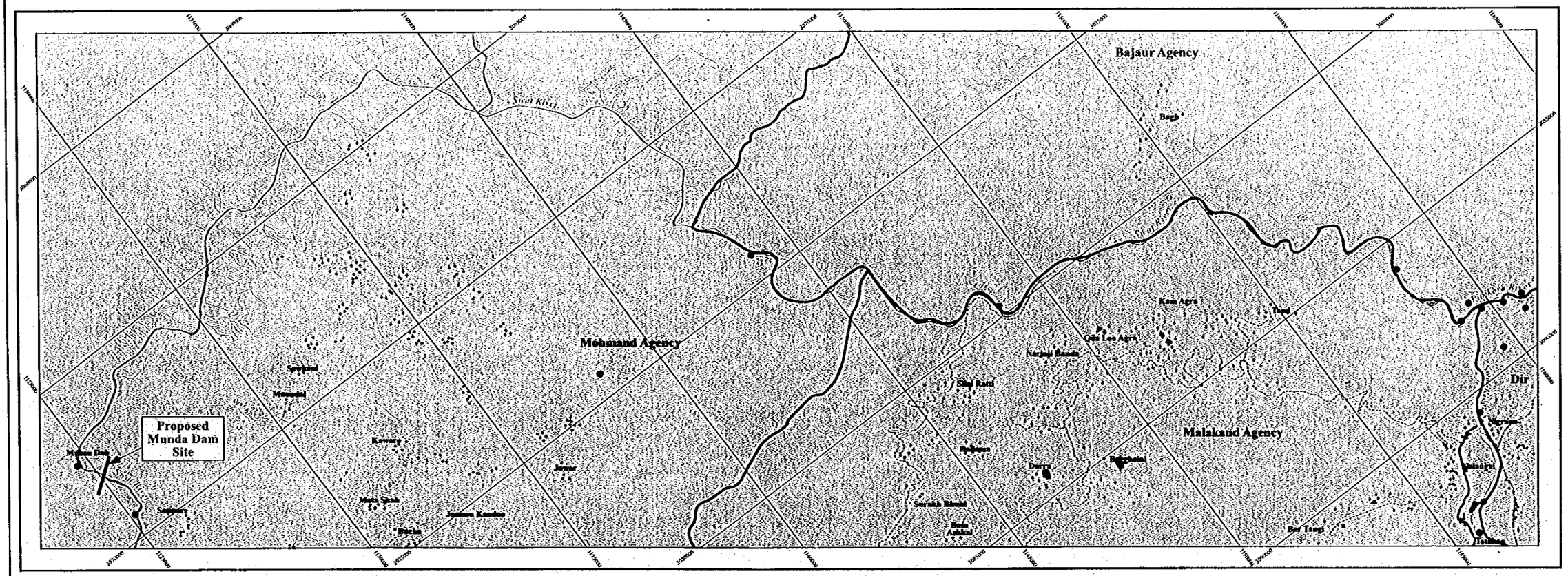
FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 9.1.5 建設工程表 (1/2)

Description	Q'ty	unit
Penstock		
Excavation, open	125,000	m^3
Excavation, tunnel	190	m
Concrete	12,500	m^3
Powerhouse		
Excavation, open	224,000	m^3
Concrete, substructure	131,500	m^3
Superstructure	3,200	m^2
Switchyard		
Excavation, open	95,000	m^3
Concrete	2,000	m^3
River Outlet		
Excavation, intake shaft	82	m
Excavation, access tunnel	500	m
Gate chamber		
Concrete, lining (d/s portion)	2,300	m^3
Plug concrete	1,900	m^3
Re-regulation Weir		
Excavation, open	307,000	m^3
U/S and D/S cofferdam	312,000	m^3
Embankment, earth	53,000	m^3
Concrete	41,900	m^3
I-3 Gate and Penstock		
Gates, spillway	4	nos.
Gates, power intake	2	nos.
Gates, draft tube outlet	4	nos.
Gates, river outlet	2	nos.
Gates, re-regulation facilities	8	nos.
Steel liner, penstock	520 x 2	m
Steel liner, river outlet		
I-4 Turbines and Auxiliaries		
Overhead traveling crane	2	nos.
Draft tube	4	nos.
Turbine	4	nos.
I-5 Generators and Auxiliaries		
Generator	4	nos.
Test and Comissioning		
Unit No. 1		
Unit No. 2		
Unit No. 3		
Unit No. 4		
I-6 Switchgear Equipment		
I-7 Transmission Line & S/S		
I-8 Irrigation Facilities		



FEASIBILITY STUDY
ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
IN ISLAMIC REPUBLIC OF PAKISTAN
JAPAN INTERNATIONAL COOPERATION AGENCY

図 9.1.5
建設工程表 (2/2)



FEASIBILITY STUDY ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT IN ISLAMIC REPUBLIC OF PAKISTAN JAPAN INTERNATIONAL COOPERATION AGENCY	図 11.2.1 ダム貯水地域