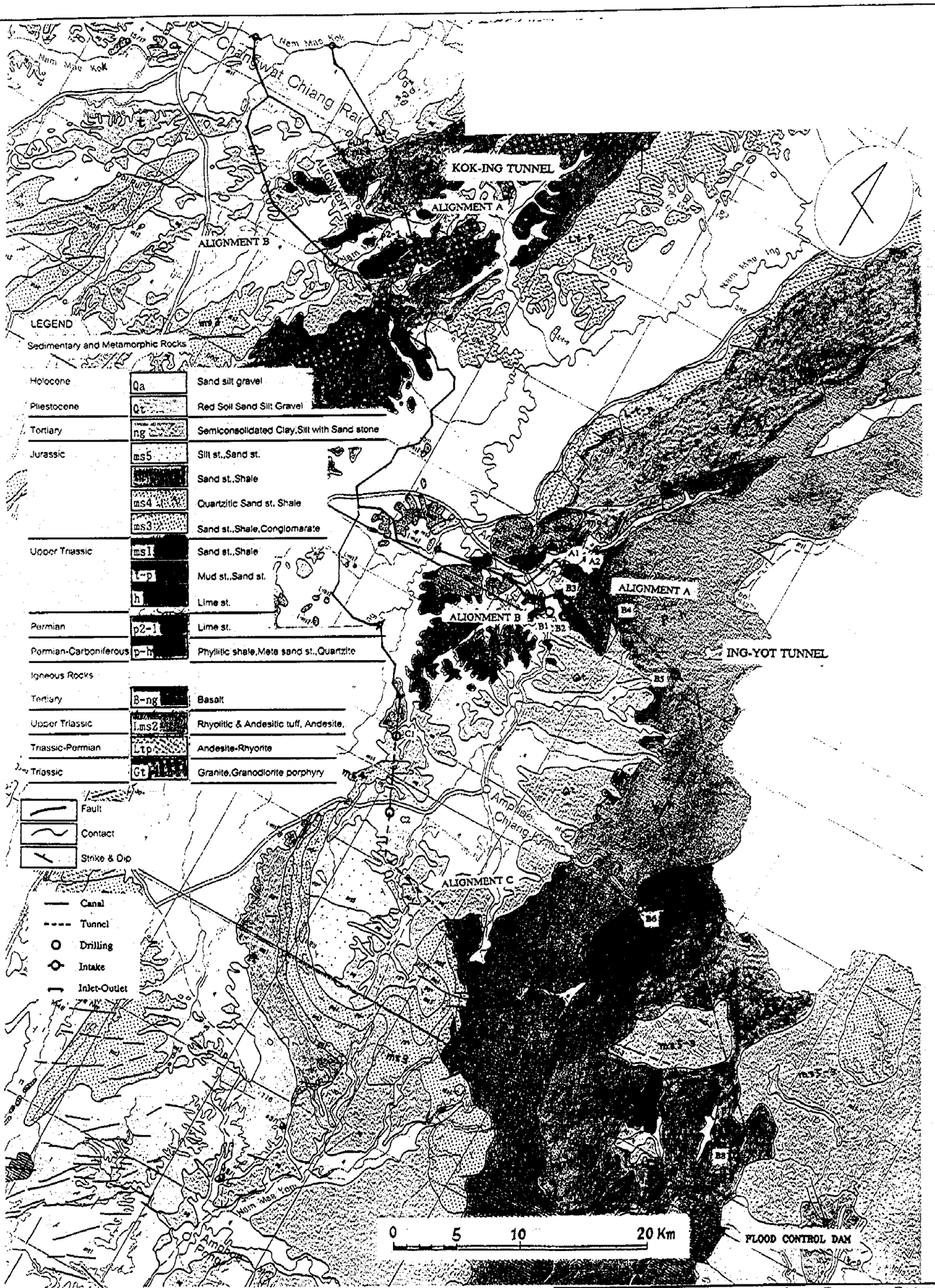
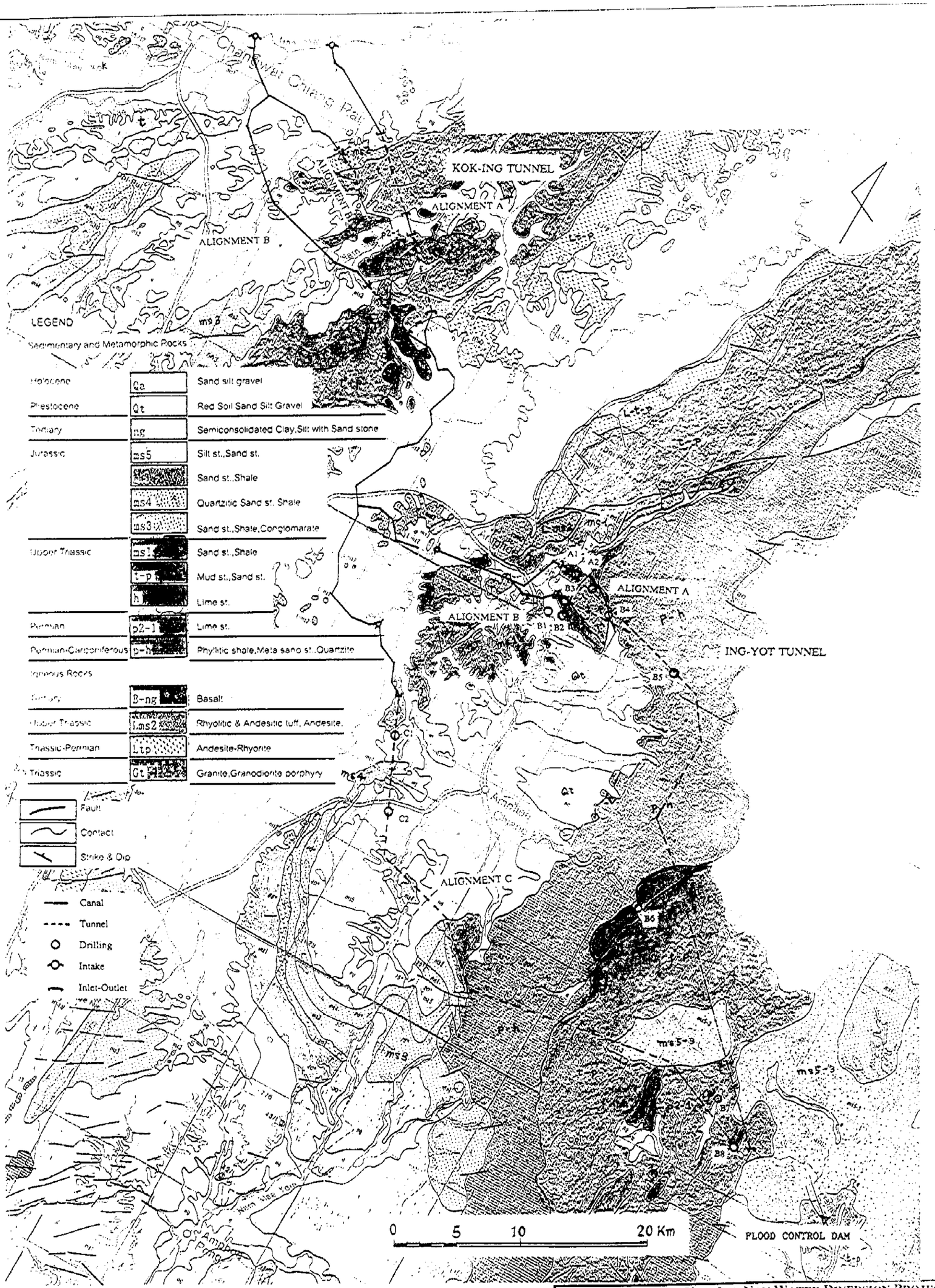
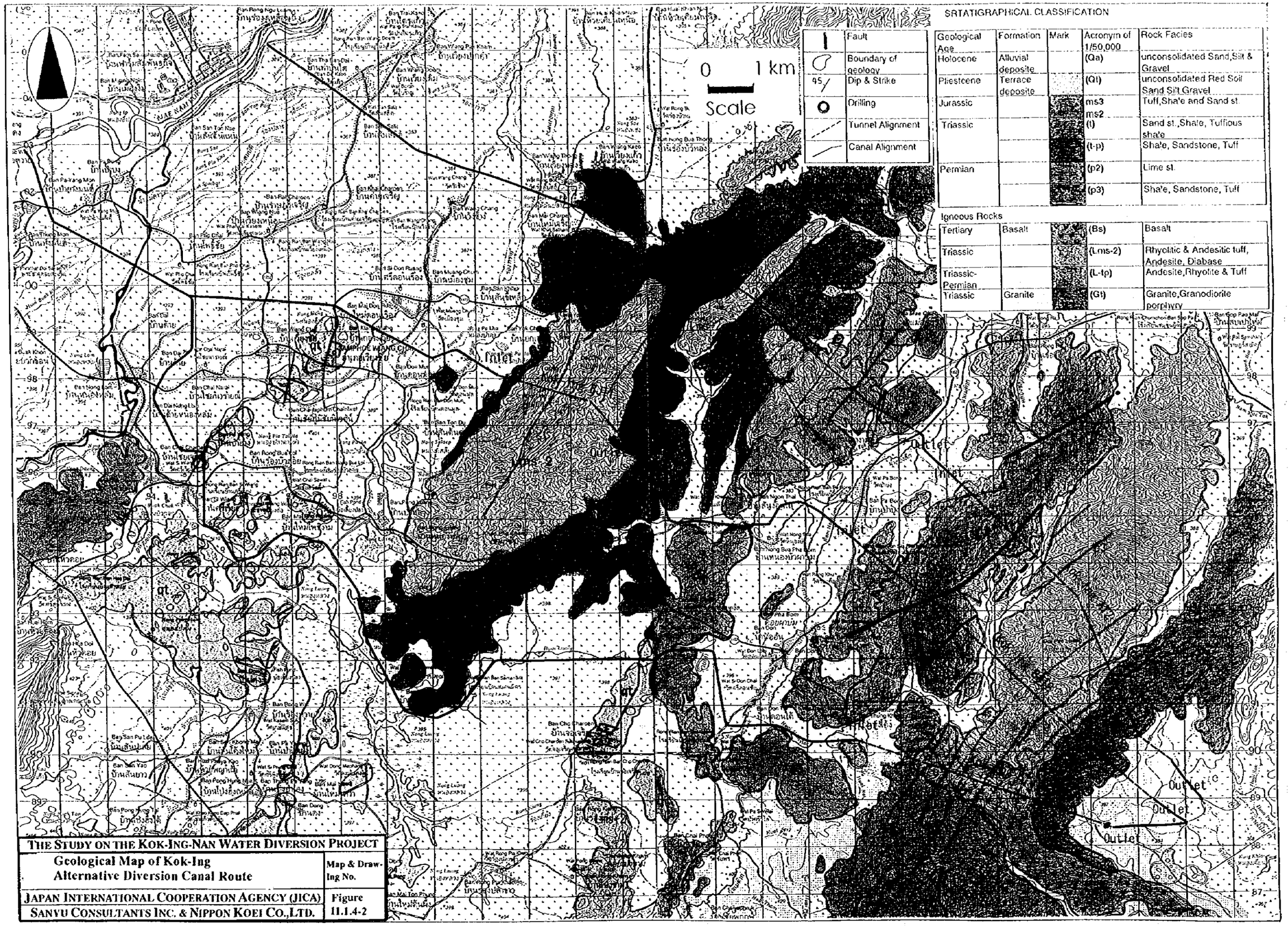


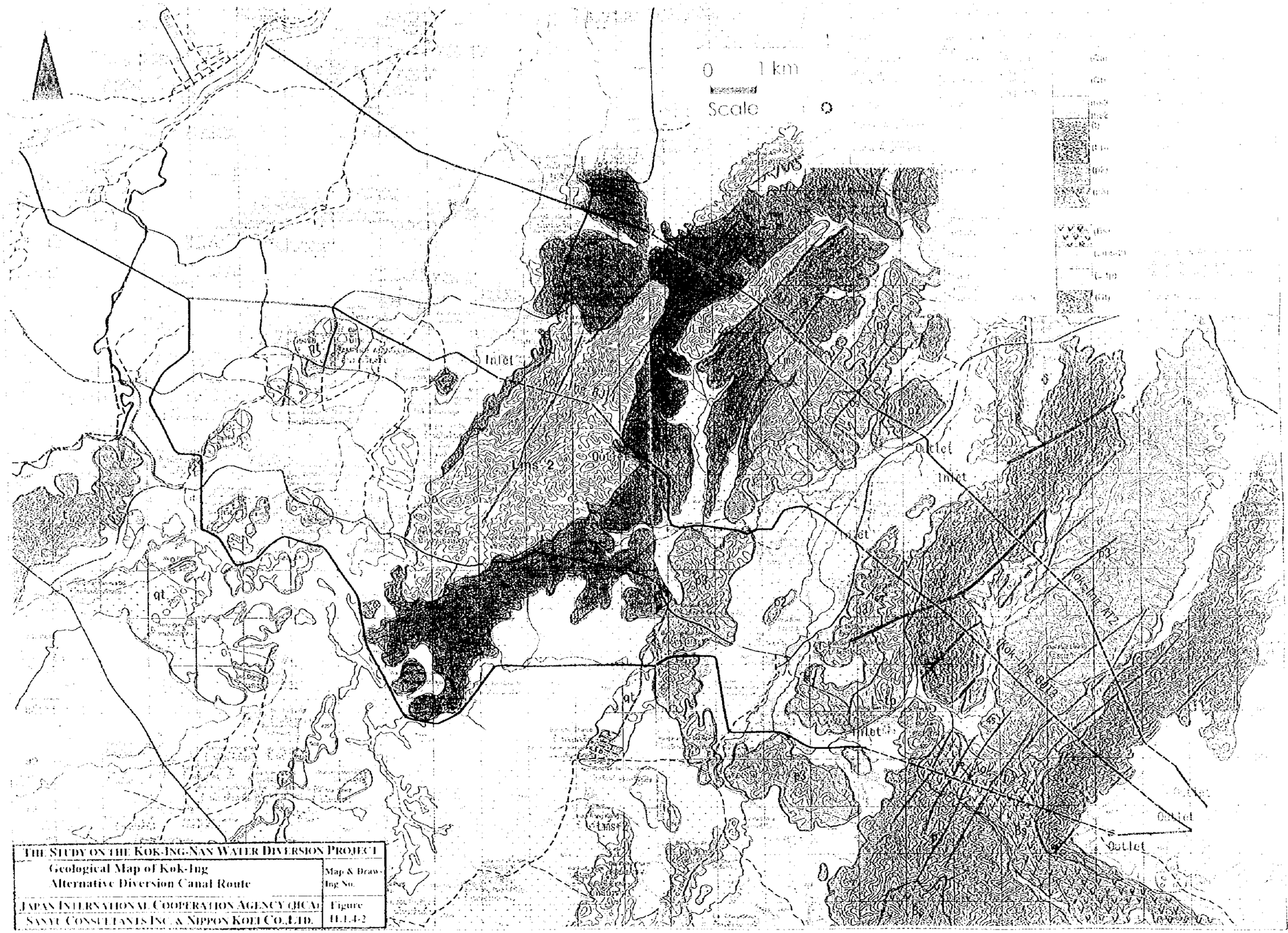
THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
Geological Map of Alternative Water Diversion Plan	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	Figure 11.1.4-1



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
Geological Map of Alternative Water Diversion Plan	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure II.1.4-1
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	



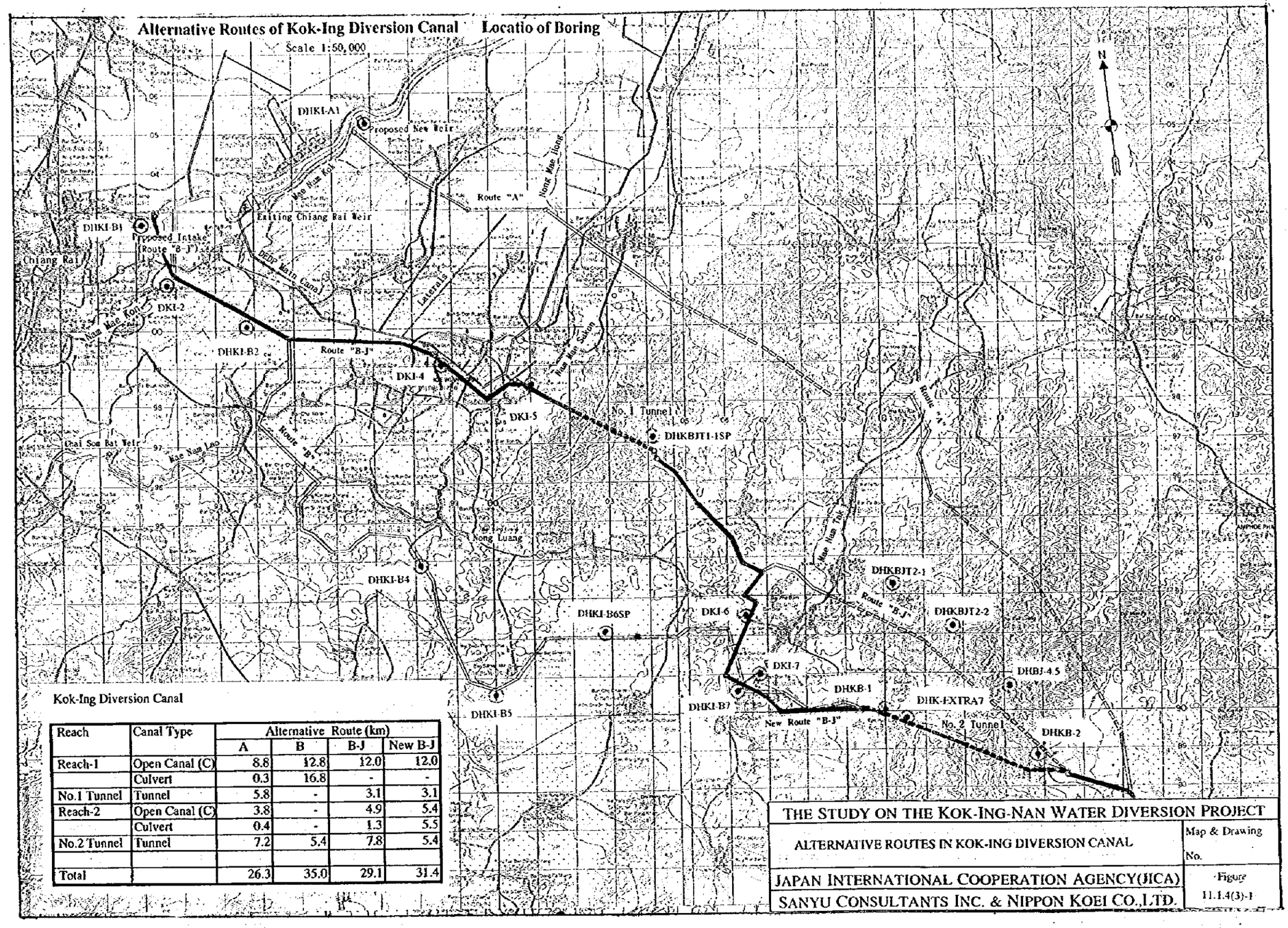
THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
Geological Map of Kok-Ing Alternative Diversion Canal Route	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	11.1.4-2



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
Geological Map of Kok-Ing Alternative Diversion Canal Route	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	II.1.4-2

Alternative Routes of Kok-Ing Diversion Canal Locatio of Boring

Scale 1:50,000



Kok-Ing Diversion Canal

Reach	Canal Type	Alternative Route (km)			
		A	B	B-J	New B-J
Reach-1	Open Canal (C)	8.8	12.8	12.0	12.0
	Culvert	0.3	16.8	-	-
No.1 Tunnel	Tunnel	5.8	-	3.1	3.1
Reach-2	Open Canal (C)	3.8	-	4.9	5.4
	Culvert	0.4	-	1.3	5.5
No.2 Tunnel	Tunnel	7.2	5.4	7.8	5.4
Total		26.3	35.0	29.1	31.4

Scale

0 1 2 3 4 5 km

THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT

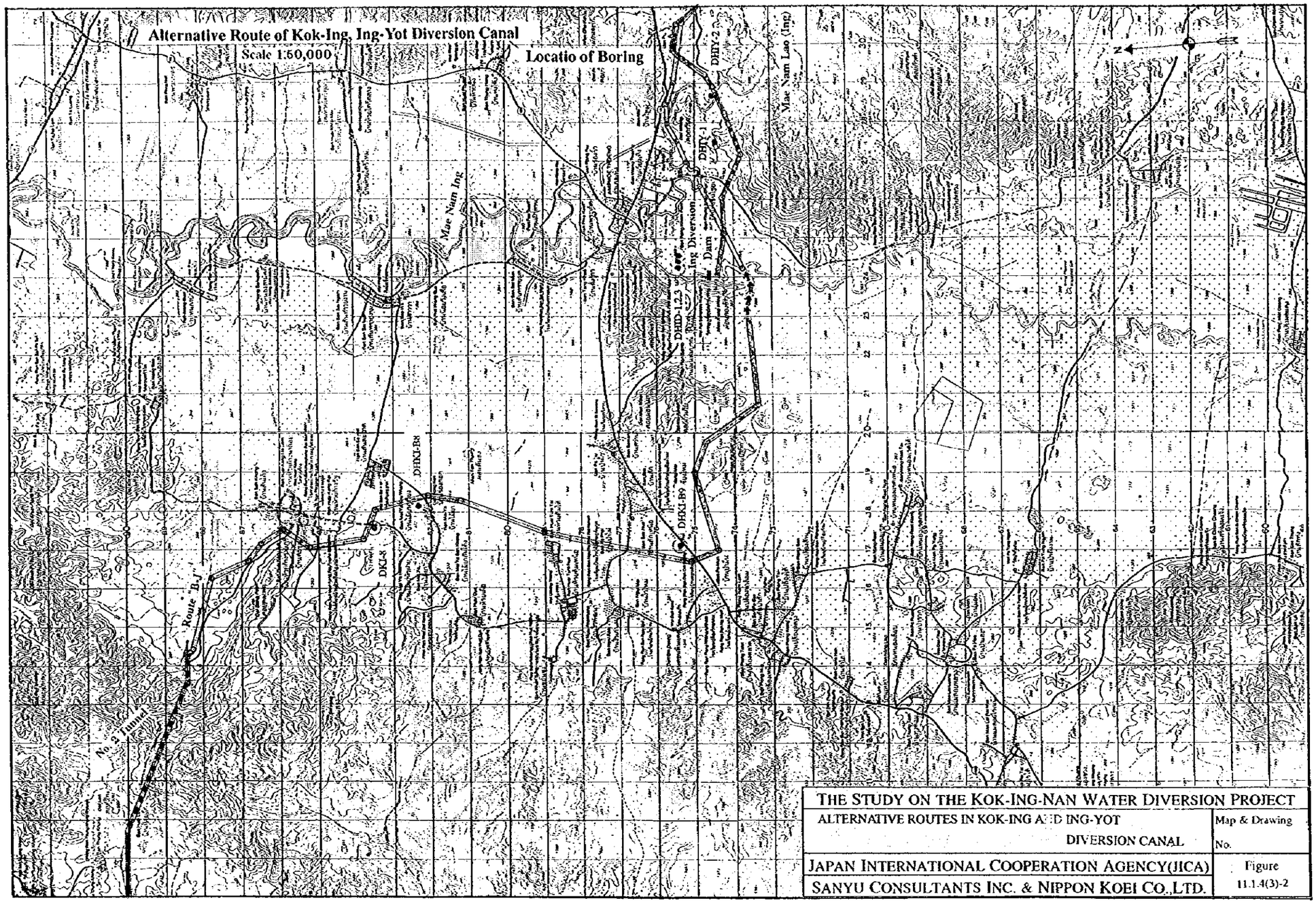
ALTERNATIVE ROUTES IN KOK-ING DIVERSION CANAL

Map & Drawing No.

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

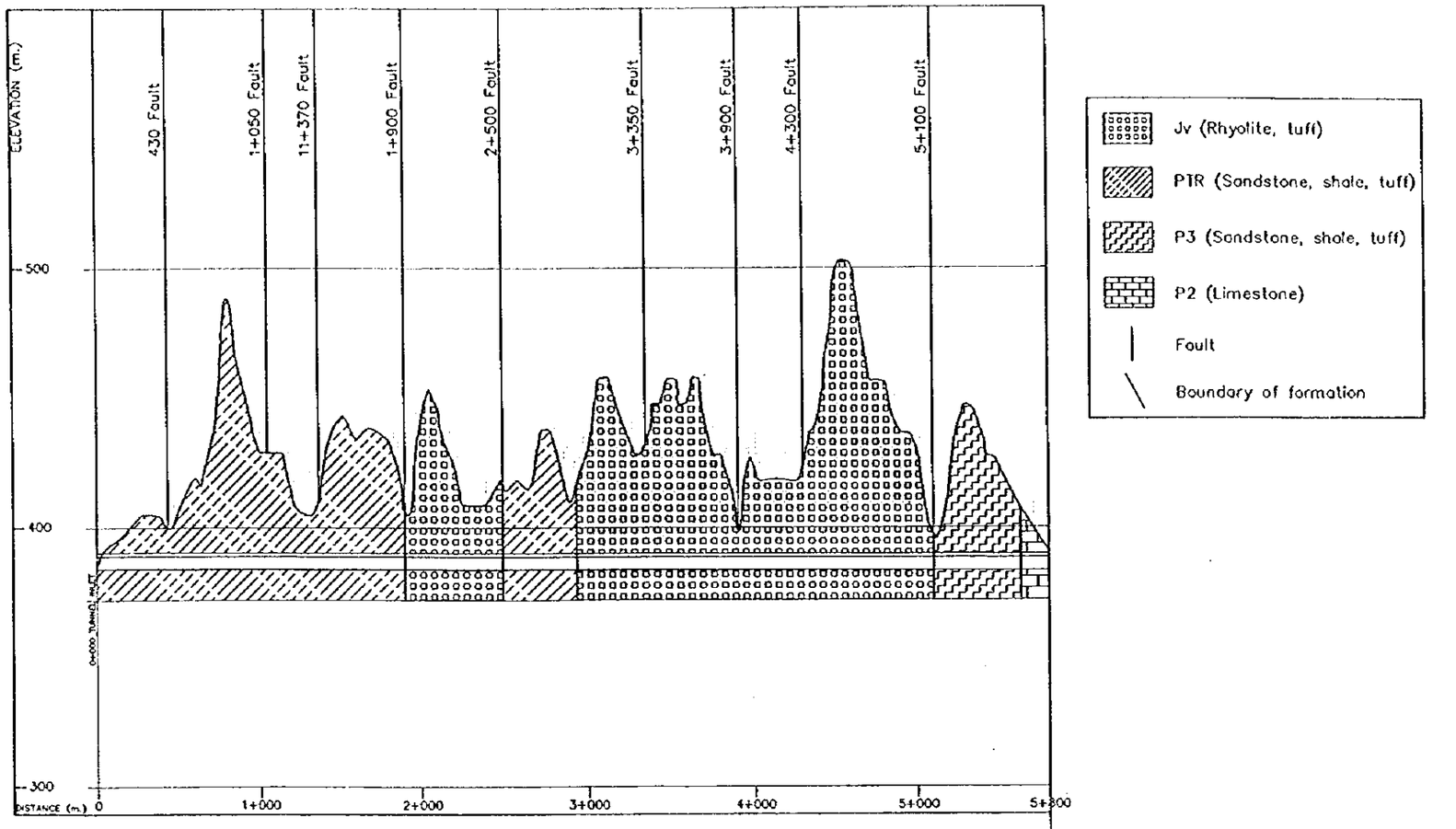
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.

Figure 11.1.4(3)-1



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
ALTERNATIVE ROUTES IN KOK-ING AND ING-YOT DIVERSION CANAL	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY(JICA) SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	Figure 11.1.4(3)-2

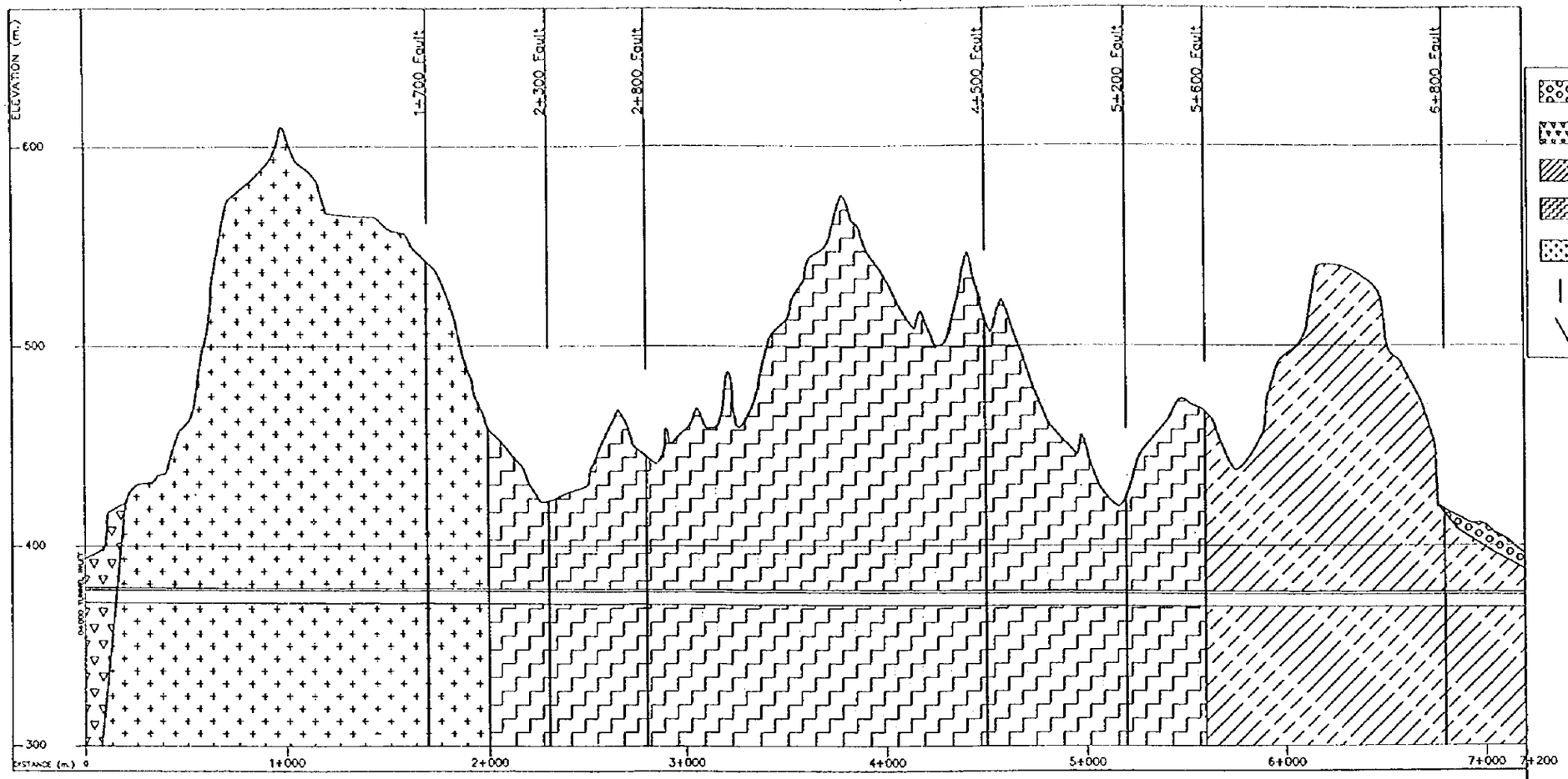
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE
KOK-ING NO.1 TUNNEL (A ROUTE)



Geological Condition	Shale, tuff highly weathered condition		Shale, tuff weathered, crocky and clayey along the fault zone		Rhyolitic tuff highly weathered	Shale, tuff highly weathered	Rhyolitic tuff, weathered breakable along bedding plane, crocky and clayey along the fault zone						Sandstone, shale highly weathered		
Rock mass classification	D	D-CL	CL	CL	D	D-CL	D	D-CL	D	CL	CM	CL	D	D-CL	D
Tunnel type	E2	E1	D2	E1(30%), E2(70%)						D2	D1	D2	E1(30%) E2(70%)		

THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE KOK-ING NO.1 TUNNEL (A ROUTE)	MAP & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure 11.1.4. (3)-3
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	

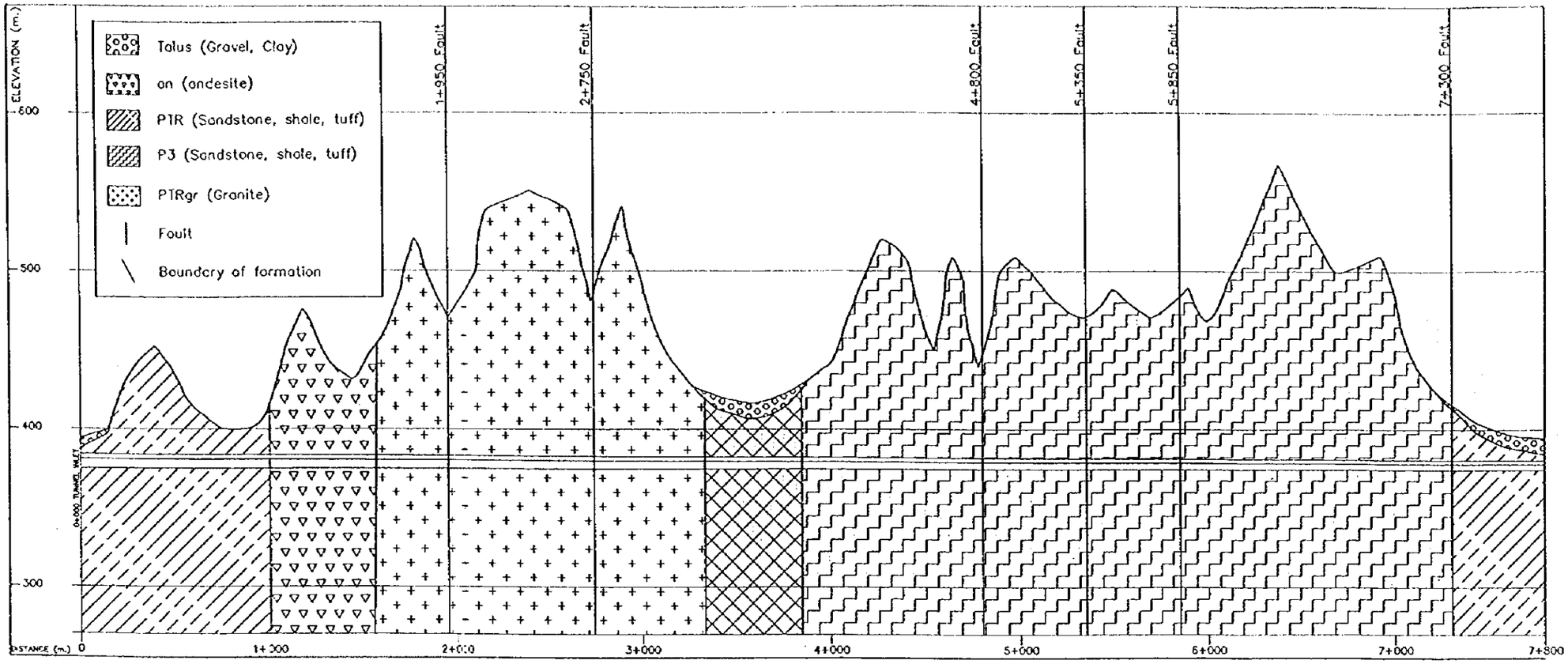
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE
KOK-ING NO.2 TUNNEL (A ROUTE)



Geological Condition	Andesite highly weathered (clayey)	Granite, hard, cracky along joint highly weathered around inlet	Sandstone, shale, tuff fractured zone (fault zone) clayey	Sandstone, shale, tuff cracky, easily breakable along bedding plane	Sandstone, shale, tuff, cracky, easily breakable along fault
Rock mass classification	D / CL / CM / CL / D / CL	D / CL / D / CL / CM / CL / D / CL / D / CL / D / CL	CM / CL / D	CL	D
Tunnel type	E1(30%) E2(70%) / D2 / C2(50%) D1(50%) / E1(50%) E2(50%)	E2 / D2 / C2(50%) D1(50%) / E1(70%) E2(30%) / D2(30%), E1(40%), E2(30%)	C2(50%) D1(50%) / D2 / E1(30%) E2(70%)		

THE STUDY ON KOK--ING--NAN WATER DIVERSION PROJECT	
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE KOK-ING NO.2 TUNNEL (A ROUTE)	MAP & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure 11.1.4. (3)-4
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	

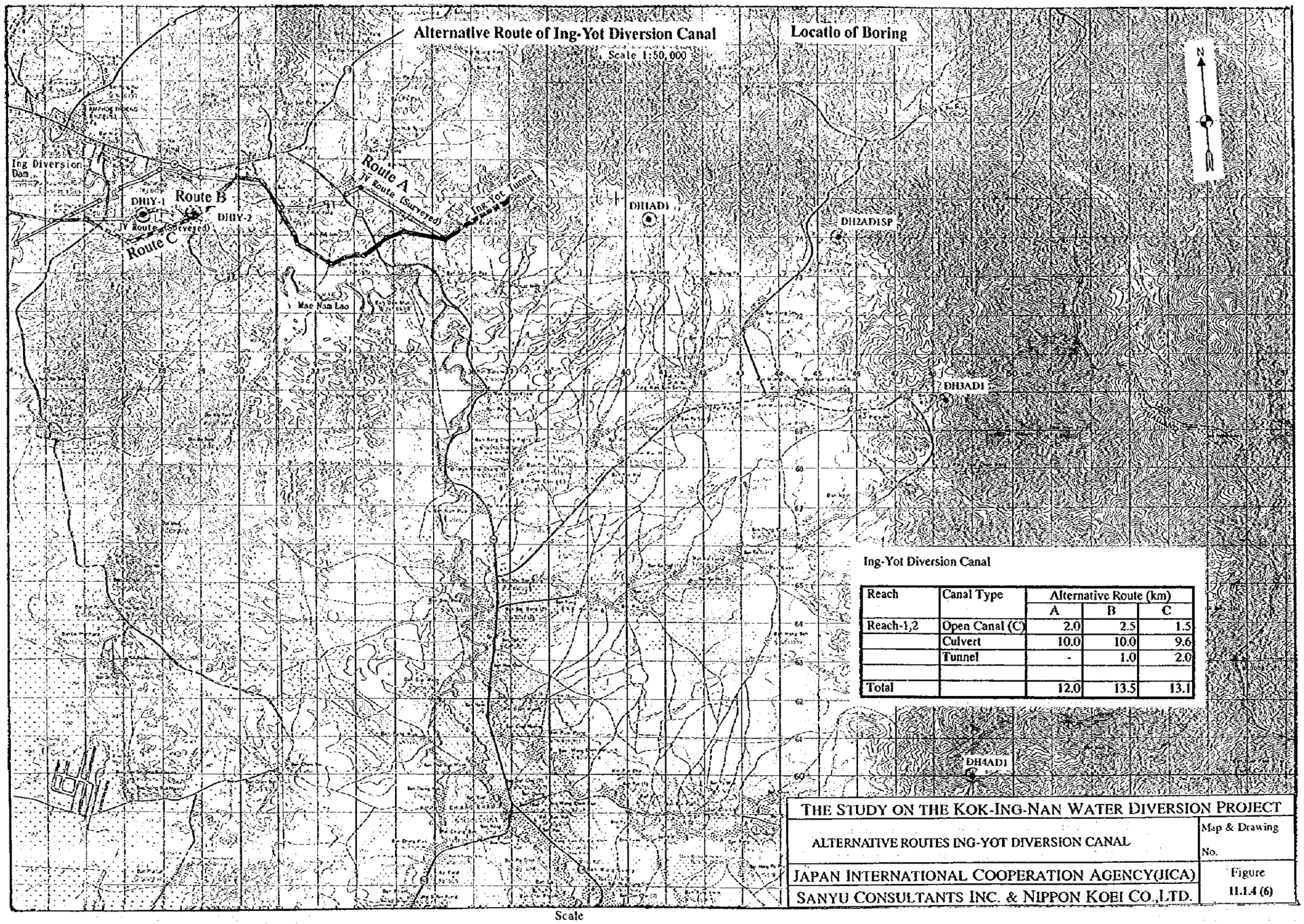
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE
KOK-ING NO.2 TUNNEL (B-J ROUTE)



Geological Condition	Sandstone, shale, tuff highly weathered (clayey)		Andesite highly weathered		Granite, hard, cracky along joint								Fractured zone (fault zone) clayey. Special attention should be paid to the occurrence of water discharge				Sandstone, shale, tuff cracky, easily breakable along bedding plane									Sandstone, shale, tuff cracky (clayey)	
Rock mass classification	D	CL	D	CL	D	CL	D	CL	CM	CL	D	CL	D-CL	D	D-CL	CL	CM	D-CL	CM	CL	D	CL	D	CL	CM	CL	D
Tunnel type	E2	D2(30%) E1(70%)	E2	D2(50%) E1(50%)	E2	D2(50%) E1(50%)	E2	D2(50%) E1(50%)	D1	D2(50%) E1(50%)			E2			D1	D2(50%) E1(50%)	D1	D2(20%), E1(30%), E2(50%)				D1	D2	E1	E2

D2(50%), E1(50%)

THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE KOK-ING NO.2 TUNNEL (B-J ROUTE)	MAP & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure 11.1.4. (3)-5
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	



Ing-Yot Diversion Canal

Reach	Canal Type	Alternative Route (km)		
		A	B	C
Reach-1,2	Open Canal (C)	2.0	2.5	1.5
	Culvert	10.0	10.0	9.6
	Tunnel	-	1.0	2.0
Total		12.0	13.5	13.1

THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT

ALTERNATIVE ROUTES ING-YOT DIVERSION CANAL

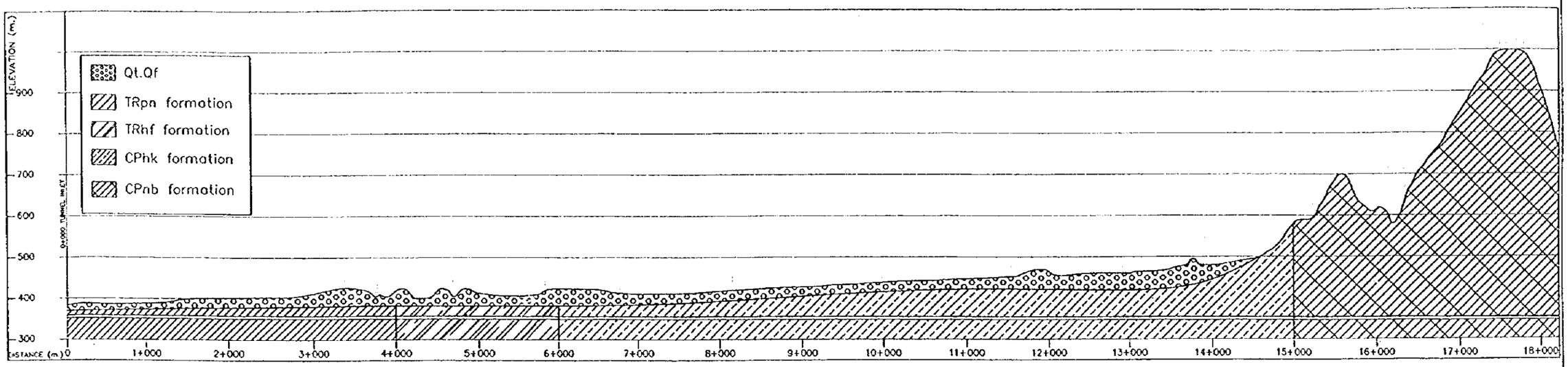
Map & Drawing No.

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.

Figure 11.1.4 (6)

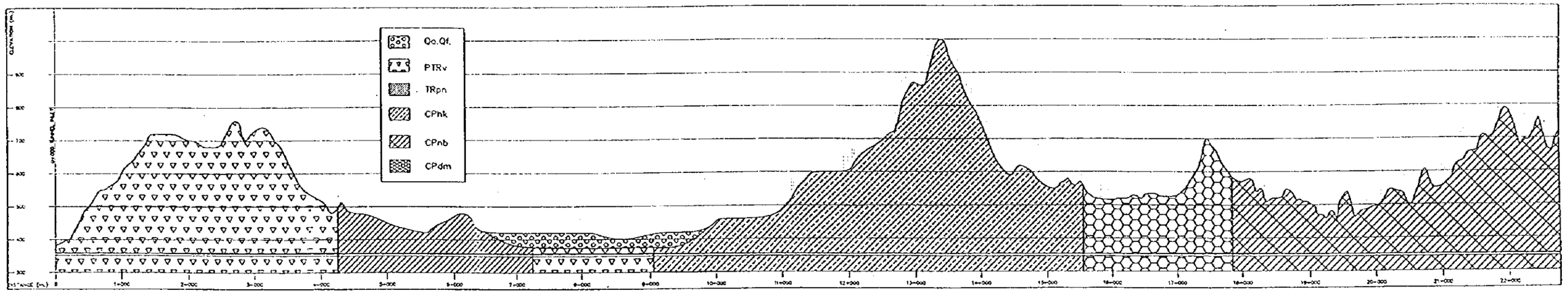
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE
ING-YOT NO.2 TUNNEL (A ROUTE)



Geological Condition	Alluvial deposits, unconsolidated gravel, sand, silt and clay			
	Slate, sandstone and conglomerate reddish brown, reddish purple, fine grained	Shale (slate) greenish-gray, grayish brown interbedded with sandstone and tuffaceous sandstone	Meta-sandstone interbedded with meta-shale, brown and grayish brown	Slate, quartzite, phyllite gray and grayish black, brown, folding, recrystalline limestone lens
	Basement rocks are associated with thick weathered rock zone at the surface part. It is noticed that the most significant problem in the tunnel construction is removal of groundwater which might be encountered at many places.			

THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE ING-YOT NO.2 TUNNEL (A ROUTE)	MAP & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure 11.1.4. (7)-1
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	

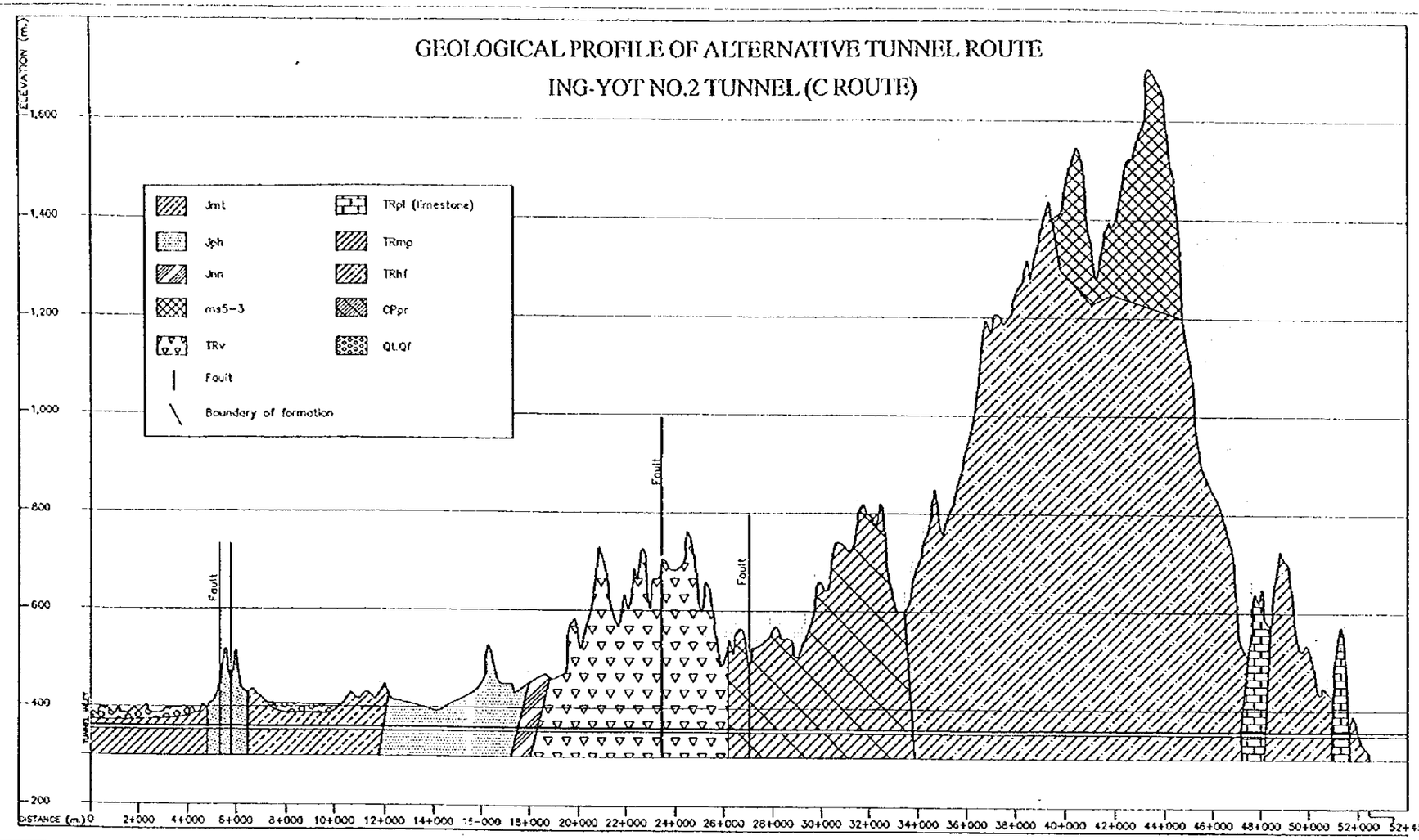
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE
ING-YOT NO.2 TUNNEL (LOWER B ROUTE)



Geological Condition	Volcanic rocks, rhyolite, andesite, tuff, agglomerate light purple to brownish-purple and white	Shale, sandstone and conglomerate reddish brown, reddish purple, fine grained	Alluvial deposits, unconsolidated gravel sand, silt and clay Tuff and agglomerate. There is a large possibility that this valley was eroded along the fault on a large scale. And it is judged that this area is rich in groundwater which is existing in a relatively shallow subsurface.	Meta-sandstone interbedded with meta-shale brown and grayish-brown	Schist, phyllite and meta-volcanic rocks	Slate, quartzite, phyllite, gray and grayish black, brown, folding, recrystalline limestone lens

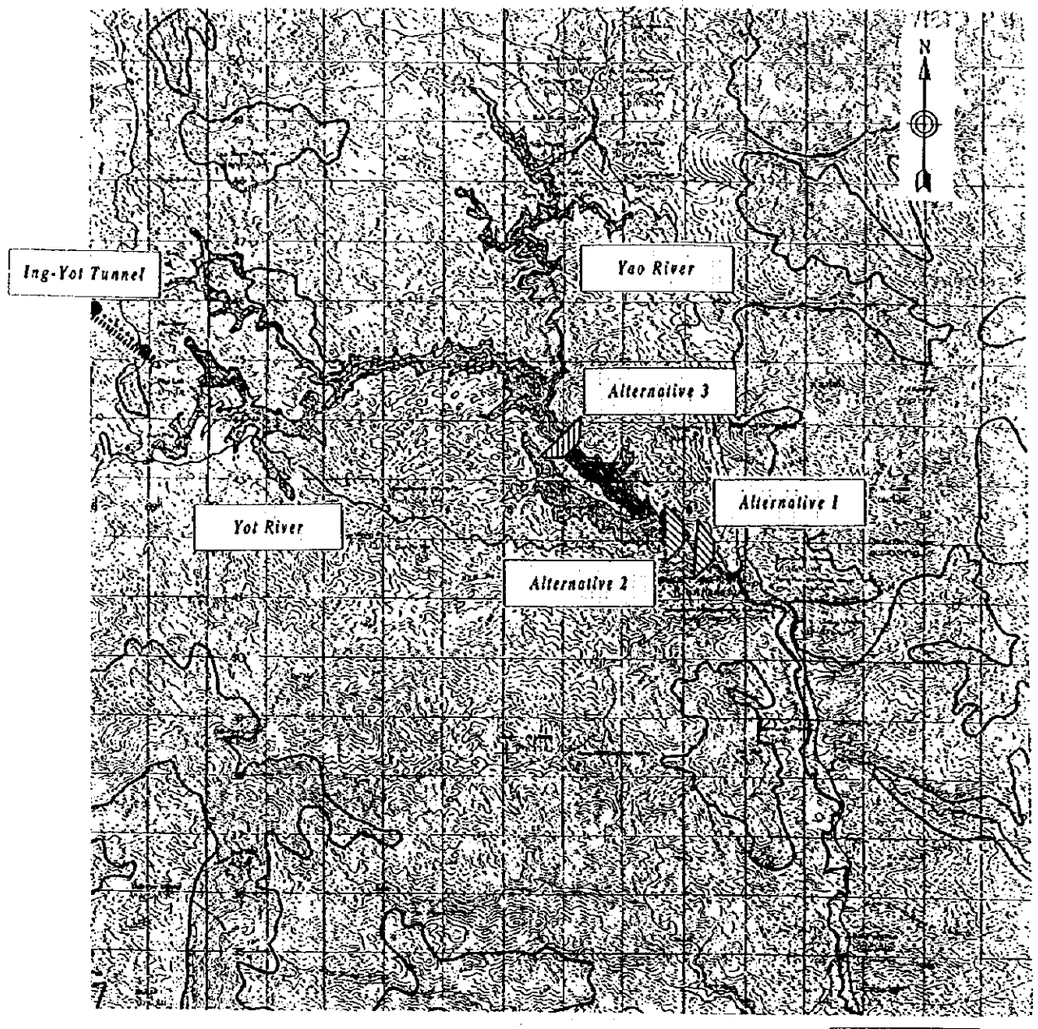
THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE ING-YOT NO.2 TUNNEL (LOWER B ROUTE)	MAP & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure 11.1.4. (7)-2
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	

GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE
ING-YOT NO.2 TUNNEL (C ROUTE)

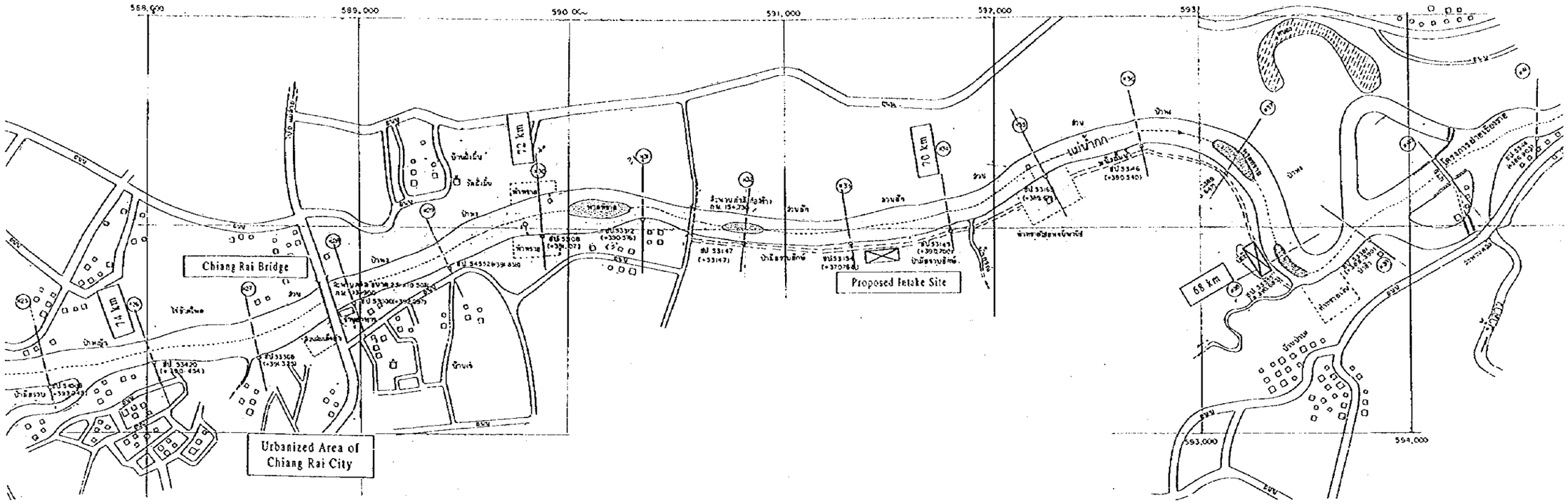


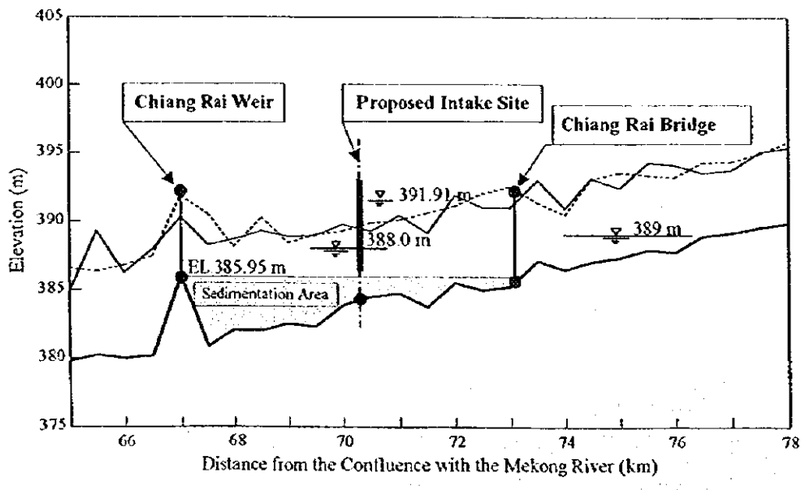
Geological Condition	Pelitic shale interbedded with meta-sandstone weathered. (cracky)	Sandstone interbedded with shale and conglomerate cracky along fault	Slate (shale) interbedded with sandstone weathered (cracky)	Sandstone interbedded with shale and conglomerate weathered (cracky)	Rhyolitic and andesitic tuff, rhyolite, andesite hard and massive	Pelitic shale interbedded with meta-sandstone hard, breakable bedding plane	Sandstone, tuff, interbedded with shale hard and massive	Limestone, sandstone and tuff interbedded with shale hard, breakable, cracky along bedding plane
Rock mass classification	D	D-CL	D		CL-CM	CL-CM	CL-CM	CL-CM / CL / D
Tunnel type	E2	E1(30%) E2(70%)	E1(10%), E2(90%)		E2(10%),E1(30%),D2(60%)	E2(10%),E1(20%),D2(70%)	C2(50%) D1(50%) / B(10%), C1(40%), C2(50%) / C2(50%) D1(50%)	C2(30%) D1(70%) / D2(50%) E1(50%) / E2

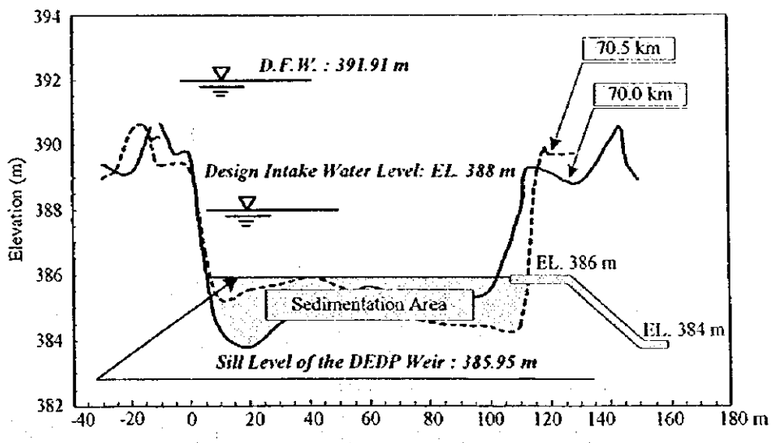
THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
GEOLOGICAL PROFILE OF ALTERNATIVE TUNNEL ROUTE ING-YOT NO.2 TUNNEL (C ROUTE)	MAP & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure 11.1.4. (7)-3
SANYU CONSULTANTS INC. & NIPPON KOEI CO.,LTD.	



THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
Alternative Dam Sites for Yao Flood Control Dam	MAP & Drawings No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	11.1.4 (8)-1

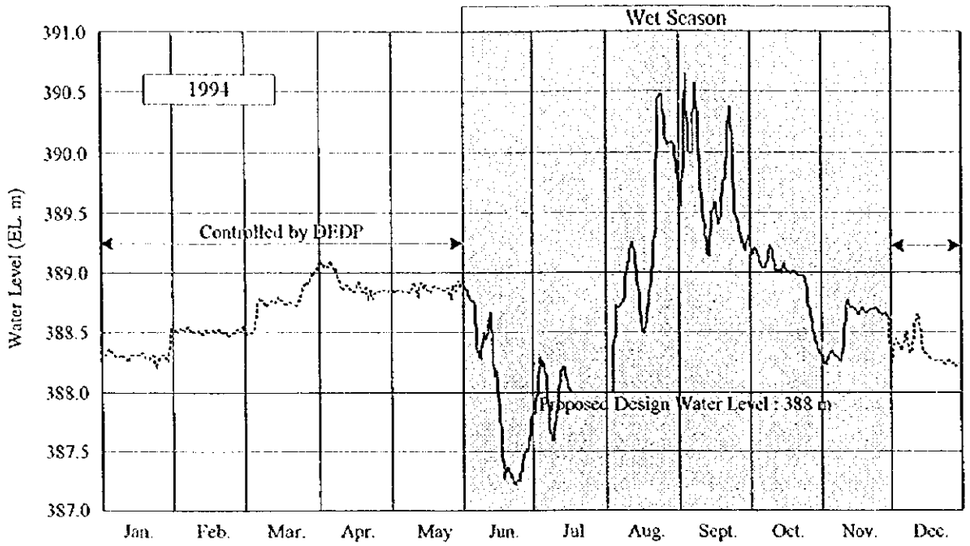


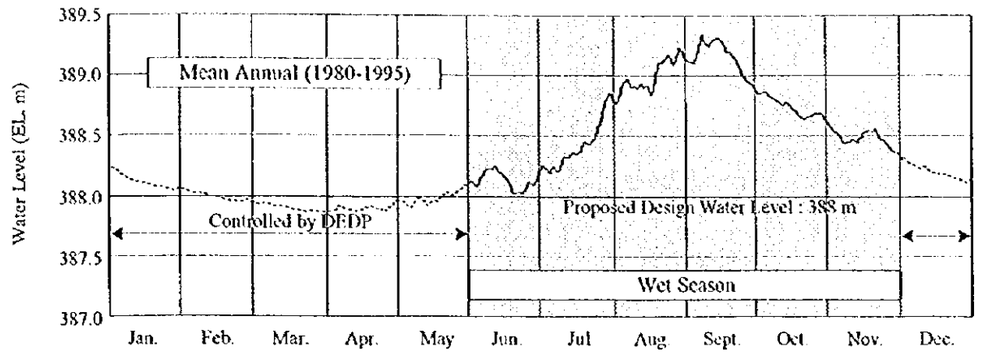


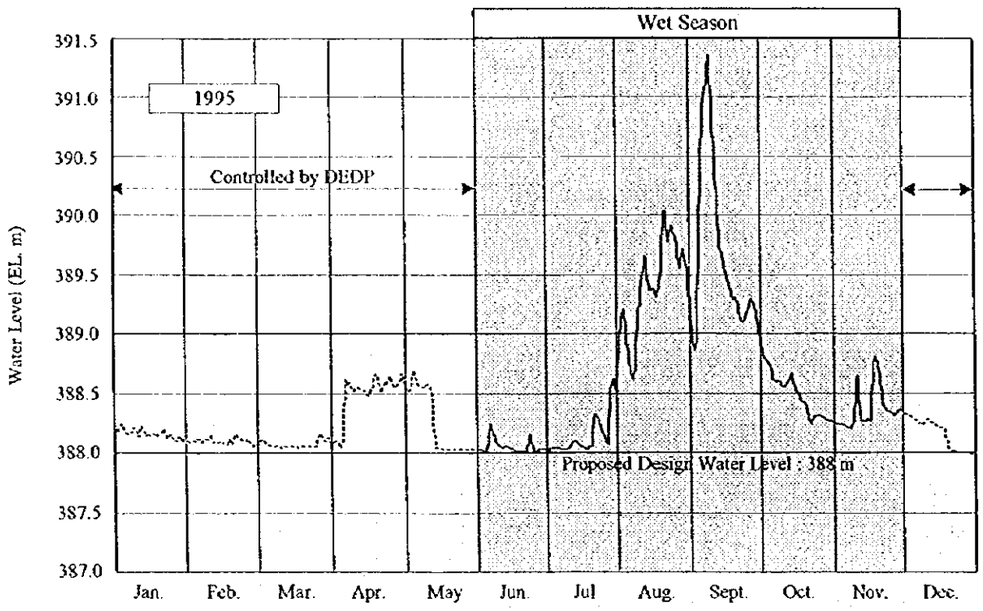


River Cross Section near the Proposed Intake Sites

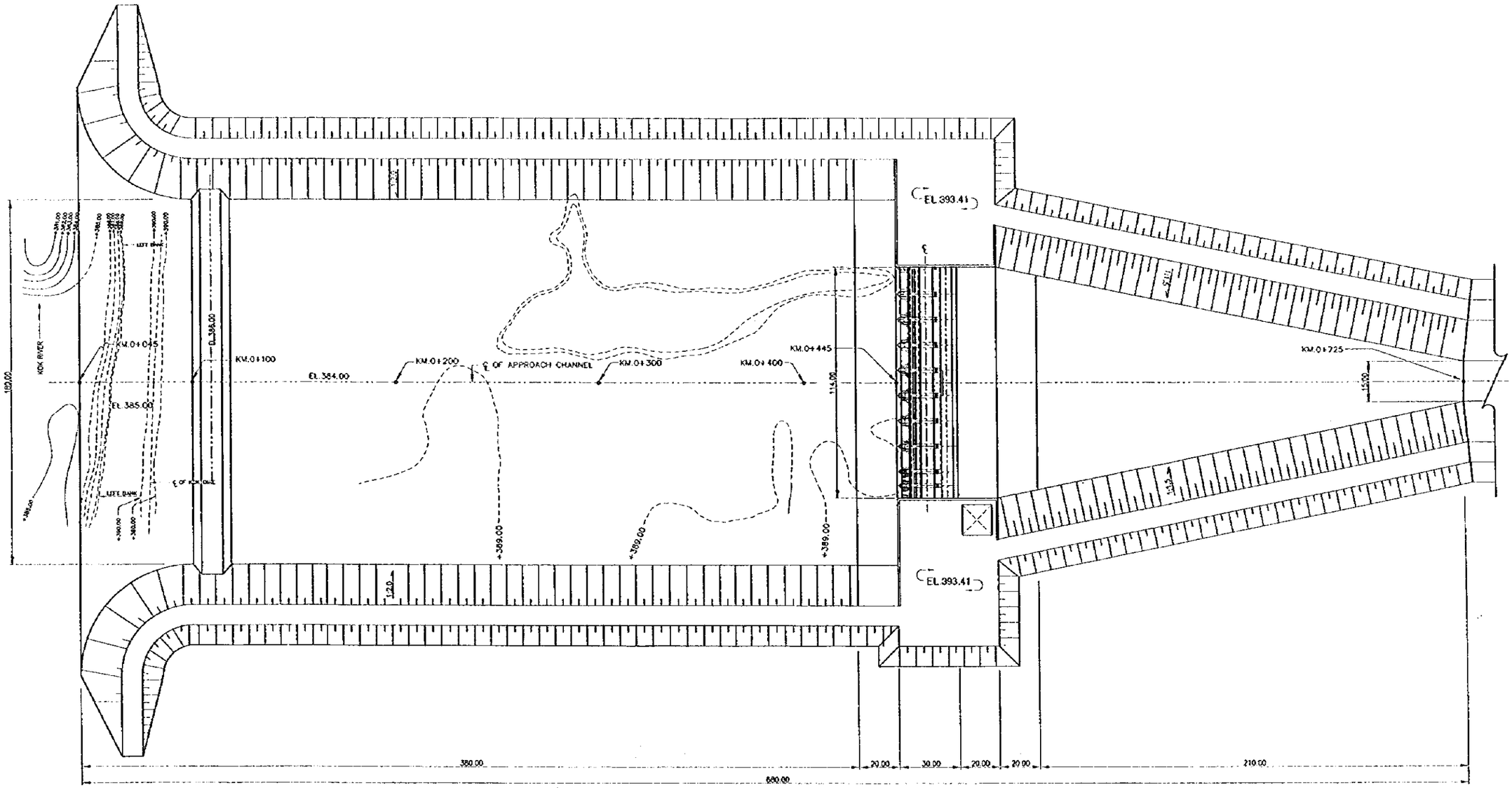
THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
General Location Map of the Proposed Kok Diversion Weir and Intake	MAP & Drawings No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	11.2.1-2





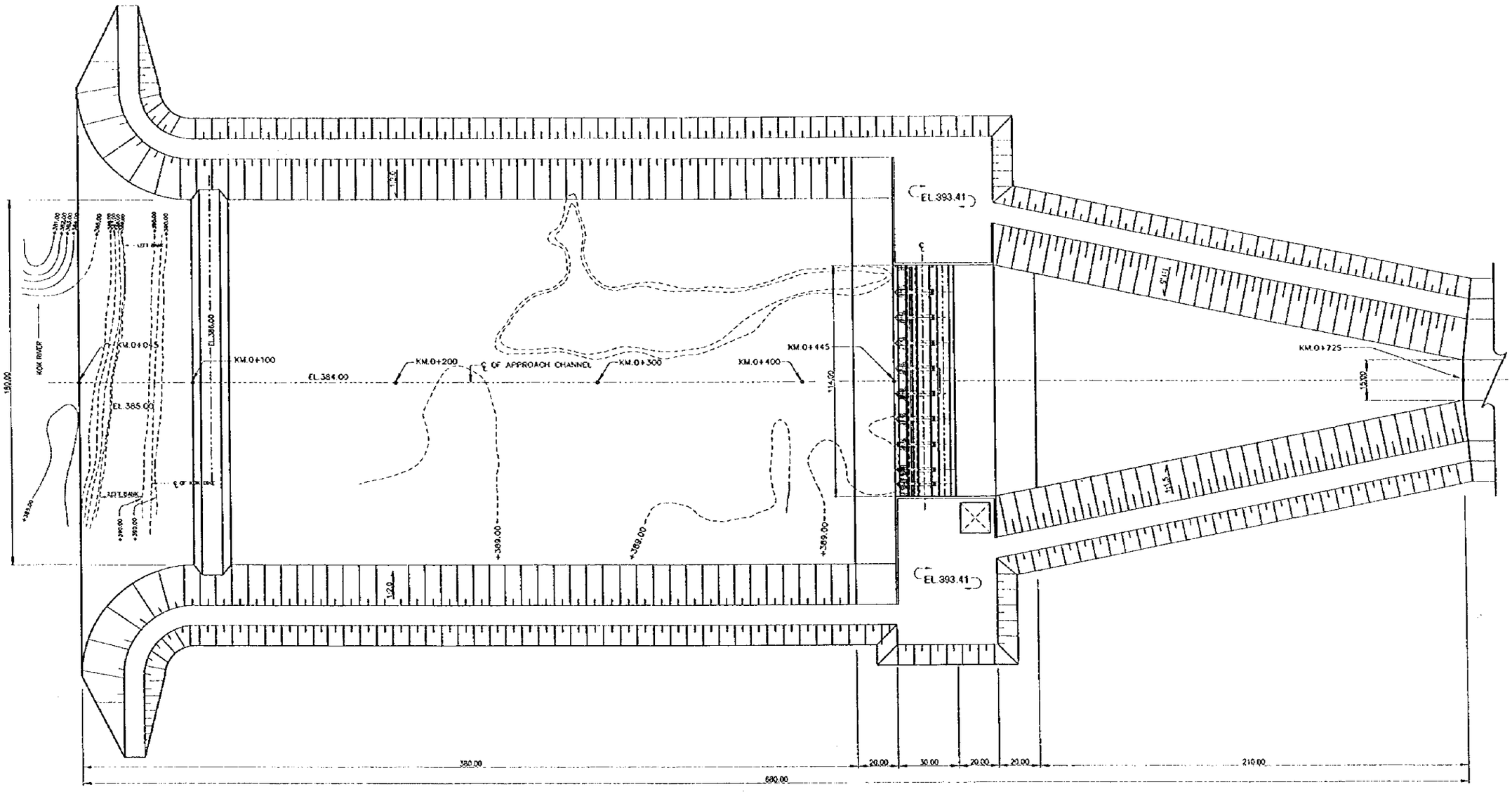


THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
Water Level Hydrograph at Kok Intake Site	MAP & Drawings No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	11.2.1-3



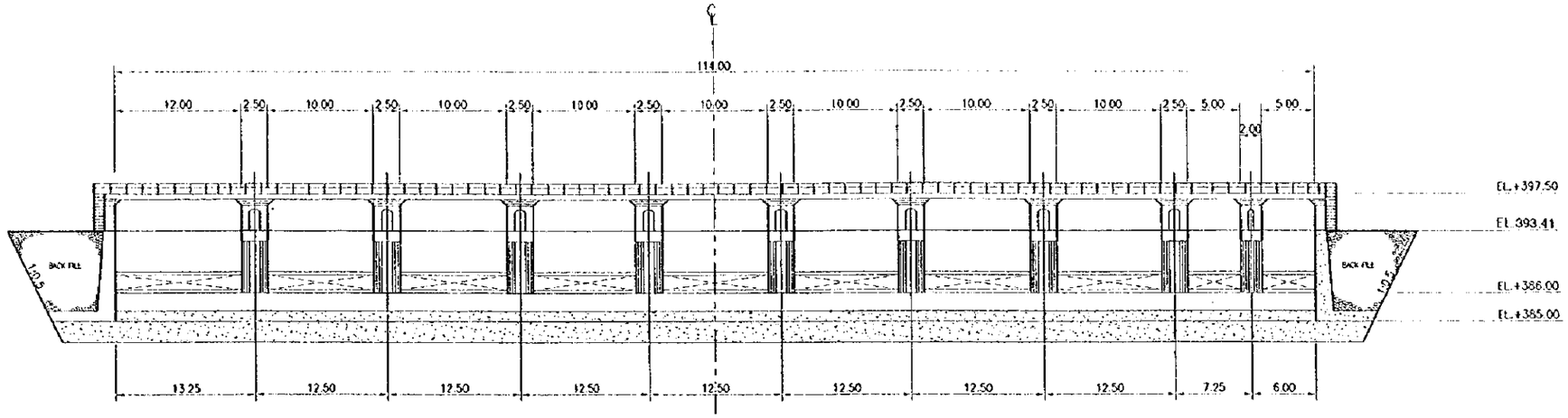
GENERAL LAYOUT

THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
Plan of Kok Intake	MAP & Drawings No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	11.2.1-5

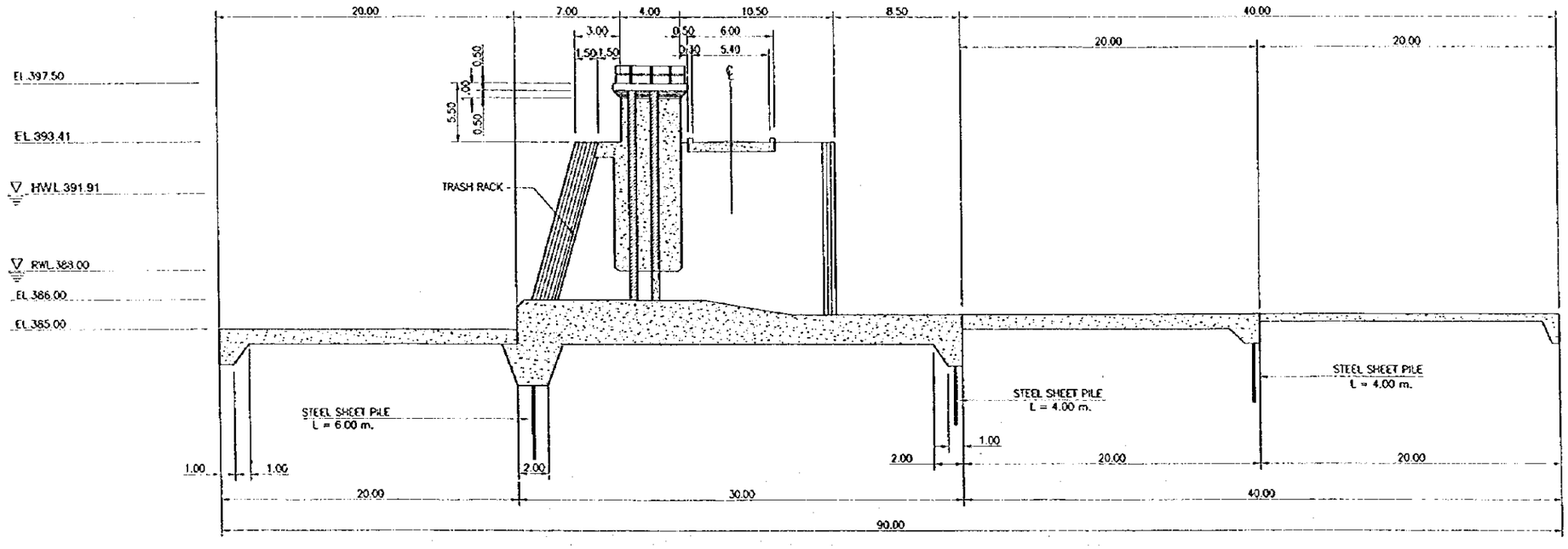


GENERAL LAYOUT

THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
Plan of Kok Intake	MAP & Drawings No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	II.2.1-5



UPSTREAM VIEW



PROFILE
KOK INTAKE

THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
Profile of Kok Intake	MAP & Drawings No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	11.2.1-6