

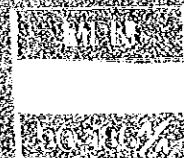
THE REPUBLIC OF TURKEY
ELEKTRIK ISLETME VE IDARESİ
GENEL MÜDÜRLÜĞÜ

FEASIBILITY STUDY
ON
ERMI NEK HYDROELECTRIC POWER
DEVELOPMENT PROJECTS

VOLUME 0
DRAWINGS

DECEMBER 1980

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO, JAPAN



THE REPUBLIC OF TURKEY
ELEKTRİK İŞLERİ ETÜD İDARESİ
GENEL MÜDÜRLÜĞÜ

FEASIBILITY STUDY
ON
ERMENEK HYDROELECTRIC POWER
DEVELOPMENT PROJECT

VOLUME 5
DRAWINGS

JICA LIBRARY



1088195(1)

22113

DECEMBER 1990

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO, JAPAN



LIST OF PLATES

PART-1 Plates of Proposed Development Plan

Overall Scheme

- P1 Location Map
- P2 The Göksu Basin and Isohyet of Mean Annual Precipitation
- P3 Overall Development Plan of Göksu River Basin, Plan
- P4 Overall Development Plan of Göksu River Basin, Profile
- P5 General Plan of Ermenek Project
- P6 The Ermenek Reservoir Area and Present Landuse
- P7 Access Roads and Construction Facilities
- P8 Construction Time Schedule

Ermenek Scheme

- P9 General Plan of Dam
- P10 Details of Dam
- P11 Dam Stresses and Lines of Necessary Fresh Rock
- P12 Diversion Tunnel
- P13 Tunnel Spillway
- P14 Grout Curtain
- P15 Waterway (1/3): Plan and Profile
- P16 Waterway (2/3): Intake
- P17 Waterway (3/3): Surge Tanks
- P18 Power House, Pressure Shaft, Tailrace Outlet
- P19 Power House, Details

Erik Diversion Scheme

- P20 General Plan of Erik Diversion Scheme
- P21 Erik Intake Weir and Desilting Basin
- P22 Erik Diversion Tunnel
- P23 Erik Head Tank and Side Overflow Spillway
- P24 Erik Penstock and Spillway
- P25 Erik Power Station
- P26 Erik Inlet Shaft and Air Trap Chamber

Electrical Works

- P27 Single Line Connection Diagram
- P28 Outdoor Switchyard
- P29 Location Map of Proposed Power Facilities Around Ermenek Project
- P30 Transmission System Around Ermenek Project (2010)
- P31 Transmission Route Map (1/2)
- P32 Transmission Route Map (2/2)

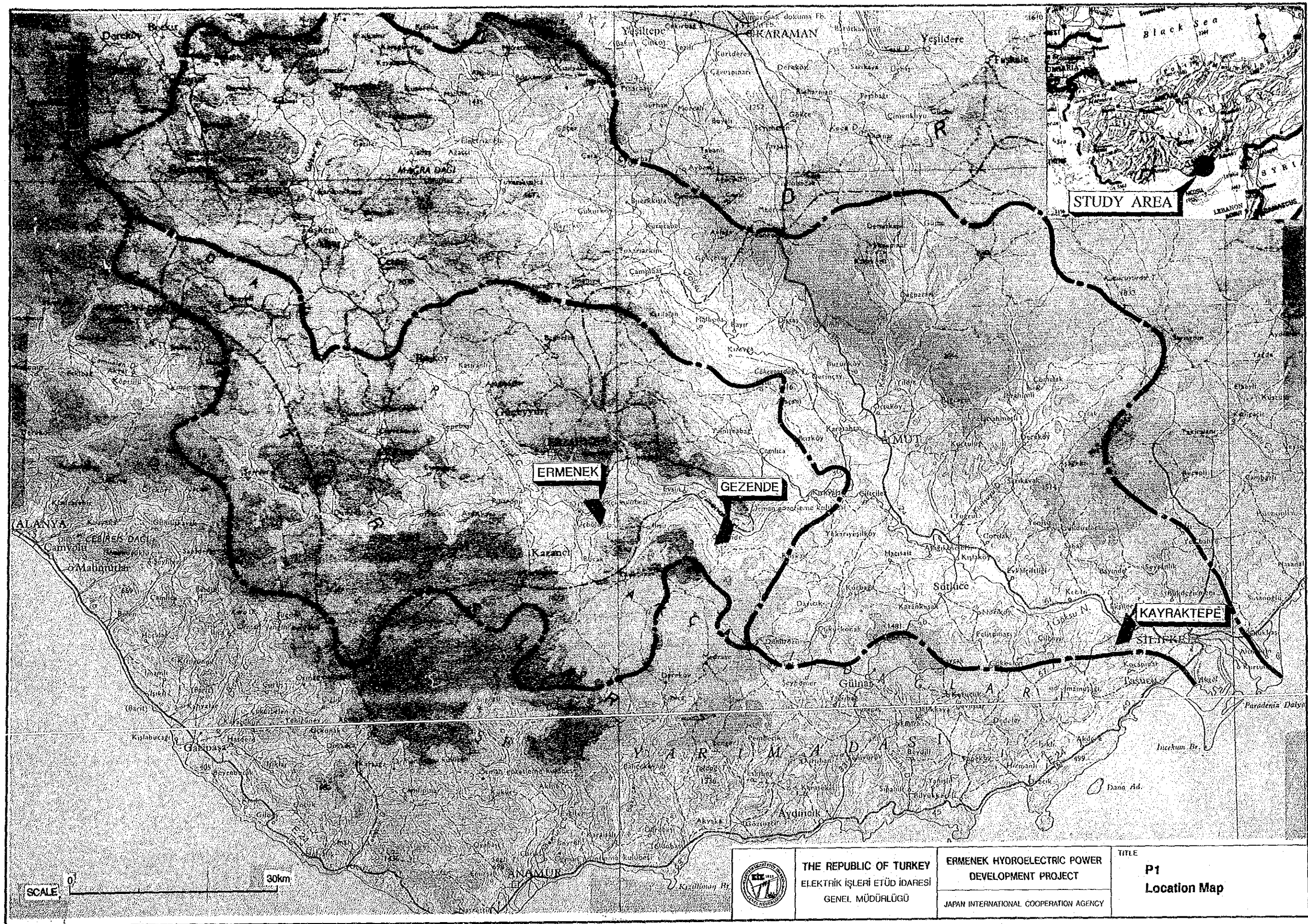
PART-2 Plates of Alternative Study

- A1 General Plan of Alternative Development Schemes
- A2 Location Map of Alternative Dam Sites
- A3 General Profile of Ermenek River and Location of Dam Sites
- A4 I-B Dam, Crest El. 600 m, General Plan
- A5 I-B Dam, Crest El. 600 m, Profile and Section
- A6 I-B Dam, Crest El. 600 m, Spillway
- A7 Schematic Profile of I-C 650 + II-A 400 Scheme
- A8 II-A Dam, Crest El. 400 m, General Plan
- A9 II-A Dam, Crest El. 400 m, Profile and Section
- A10 II-A Dam, Crest El. 400 m, Spillway
- A11 Schematic Profile of I-C 650 + II-A 450 Scheme
- A12 II-A Dam, Crest El. 450 m, General Plan
- A13 II-A Dam, Crest El. 450 m, Profile and Section
- A14 II-A Dam, Crest El. 450 m, Spillway
- A15 Schematic Profile of I-C 650 + II-B 400 Scheme
- A16 II-B Dam, Crest El. 400 m, General Plan
- A17 II-B Dam, Crest El. 400 m, Profile and Section
- A18 II-B Dam, Crest El. 400 m, Spillway
- A19 Schematic Profile of I-C 650 + II-B 450 Scheme
- A20 II-B Dam, Crest El. 450 m, General Plan
- A21 II-B Dam, Crest El. 450 m, Profile and Section
- A22 II-B Dam, Crest El. 450 m, Spillway
- A23 Schematic Profile of I-C 600 + Lower Nadire Scheme
- A24 Lower Nadire Dam, General Plan
- A25 Lower Nadire Dam, Profile and Section
- A26 Schematic Profile of I-C 600 + Upper Nadire Scheme
- A27 Upper Nadire Dam, General Plan
- A28 Upper Nadire Dam, Profile and Section
- A29 Aboveground Type Penstock and Power Station, Plan and Profile
- A30 Alternative Route-A of Headrace Tunnel
- A31 Alternative Routes-Ba, Bb, Bc of Headrace Tunnel
- A32 Alternative Route-C of Headrace Tunnel
- A33 Alternative Routes and Outlets of Tailrace Tunnel
- A34 Location Map of Dam Axes in the Görmel Gorge
- A35 Plan of Alternative Arch Dams
- A36 Crown Cantilever of Alternative Arch Dams
- A37 Developed Profiles of Alternative Arch Dams
- A38 A Development Idea of Upper Ermenek River


PART-3 Plates of Geology

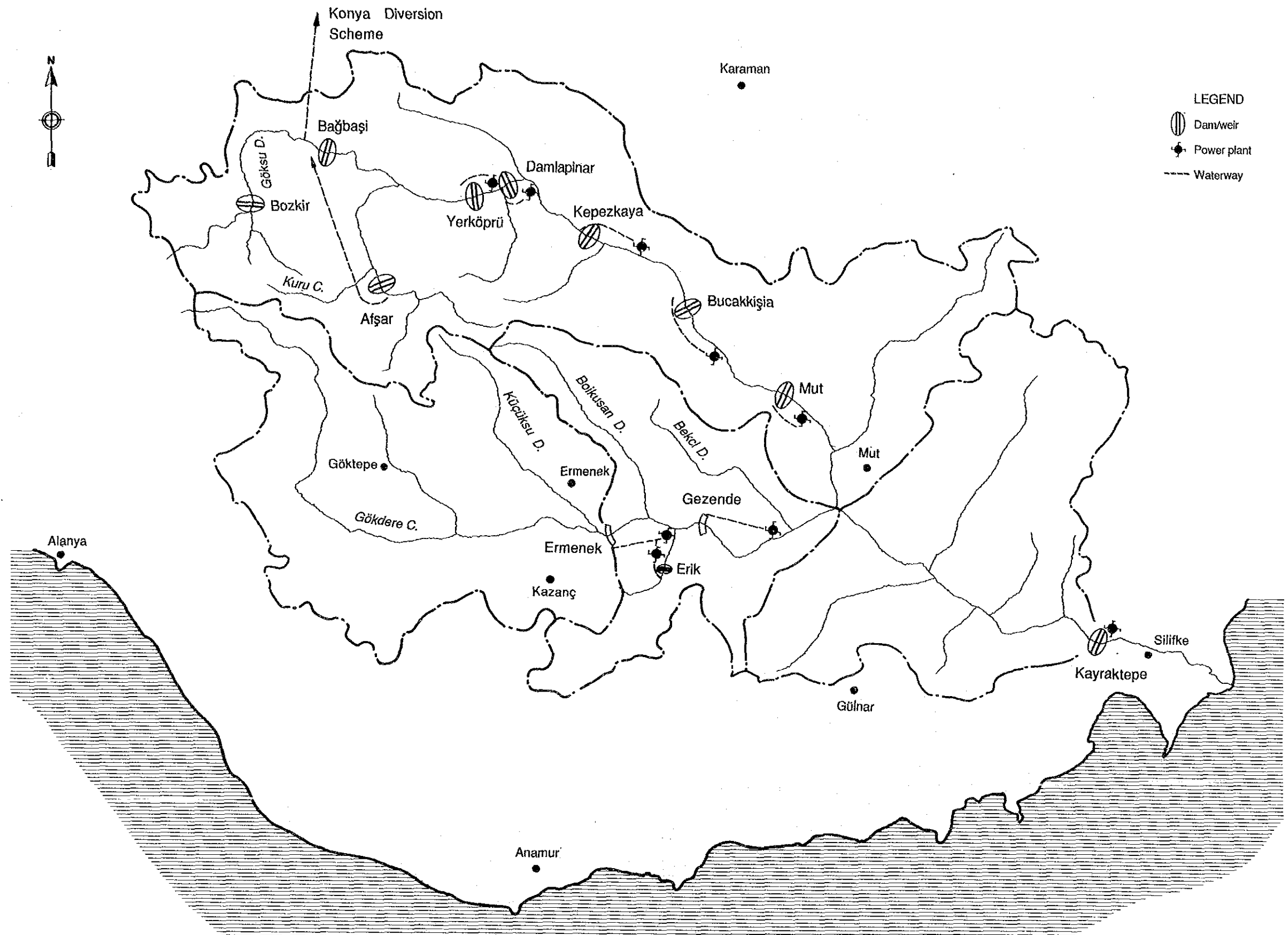
- G1 Geological Map of Reservoir Area
- G2 Geological Map of Project Area and Location of Geological Investigation
- G3 Geological Map of Damsite I-C
- G4 Geological Profile of Damsite I-B (Section IB-IB')
- G5 Geological Profile of Damsite I-Ca (Section ICa-ICa')
- G6 Geological Profile of Damsite I-Cb (Section ICb-ICb')
- G7 Geological Profile of Damsite I-Cc (Section ICc-ICc')
- G8 Geological Profile along Seismic Line DA
- G9 Geological Profile along Seismic Line DB
- G10 Geological Profile along Seismic Line DC
- G11 Geological Profile along Seismic Line DD
- G12 Geological Profile along Proposed Grouting Line for I-C Damsite
- G13 Permeability Condition in Right Bank of I-C Damsite
- G14 Geological Profile along Headrace Tunnel (Section ICR1-ICR6)
- G15 Geological Profile of Power House Area (Section PP-PP')
- G16 Geological Profile along Seismic Line PB
- G17 Geological Profile along Seismic Line PC
- G18 Geological Profile of Tailrace Tunnel Outlet (Section PT-PT')
- G19 Geological Profile of Landslide Area Seismic Line LA
- G20 Geological Profile of Landslide Area Seismic Line LB
- G21 Geological Profile of Landslide Area Seismic Line LC
- G22 Geological Map of Erik Intake Weir Site
- G23 Geological Profile of Erik Diversion Tunnel (Section)
- G24 Geological Map of Backwater Area
- G25 Geological Profiles of Backwater Area
- G26 Sampling Location for Micropaleontological and Mineralogical Study
- G27 Location Map of Borrow Area and Quarry Site
- G28 Geological Map of Quarry Site
- G29 Geological Profiles of Quarry Site

PART-1 Plates of Proposed Development Plan




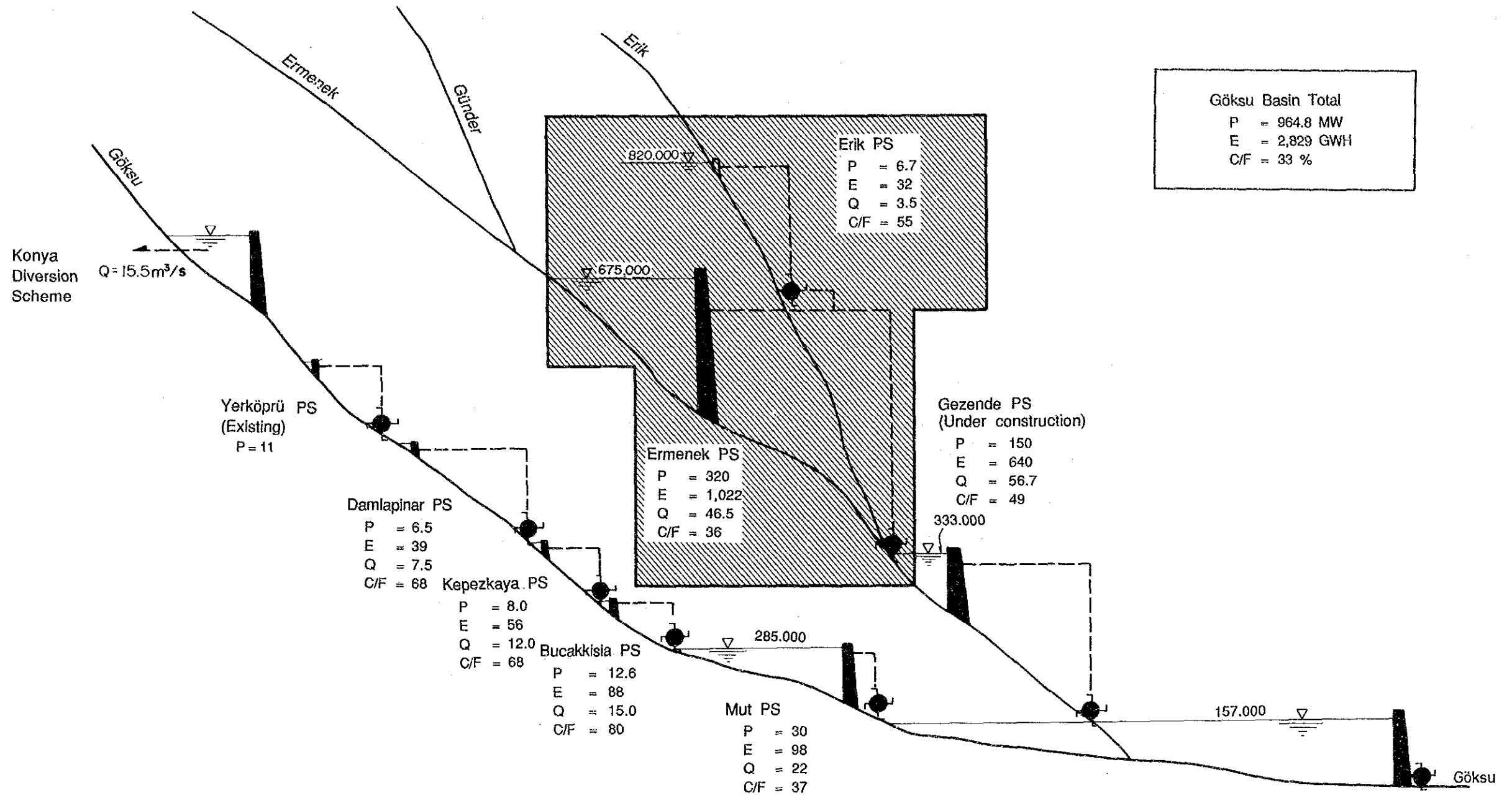
SCALE 0 30km

	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P1 Location Map
			JAPAN INTERNATIONAL COOPERATION AGENCY



SCALE 0 40Km

	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P3 Overall Development Plan of Göksu River Basin, Plan
		JAPAN INTERNATIONAL COOPERATION AGENCY	



LEGEND

- Dam/weir
- Power station (PS)
- Waterway
- P Installed capacity (MW)
- C/F Annual capacity factor (%)
- Q Annual inflow (m³/s)

	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P4 Overall Development Plan of Göksu River Basin, Profile
		JAPAN INTERNATIONAL COOPERATION AGENCY	

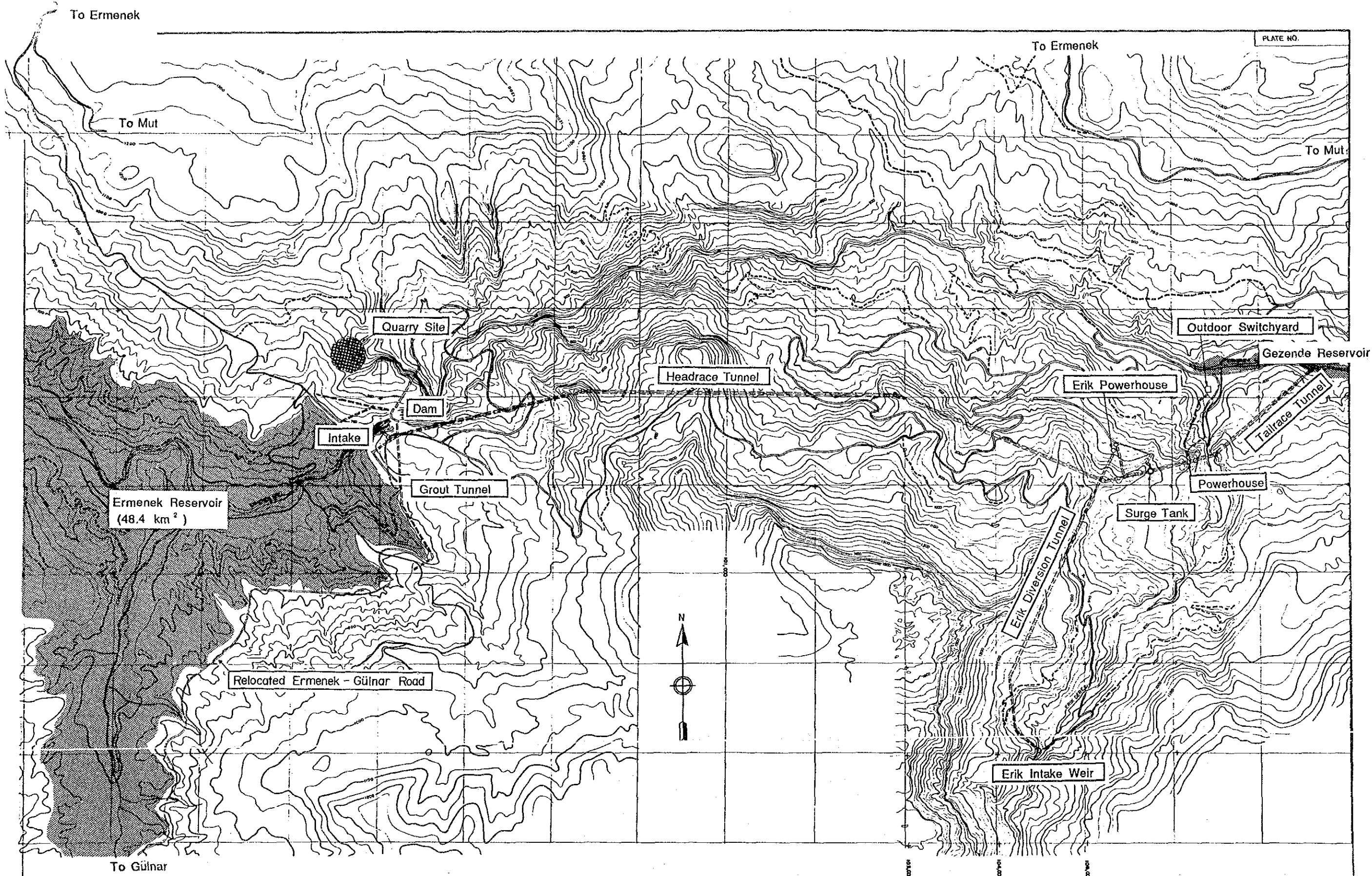

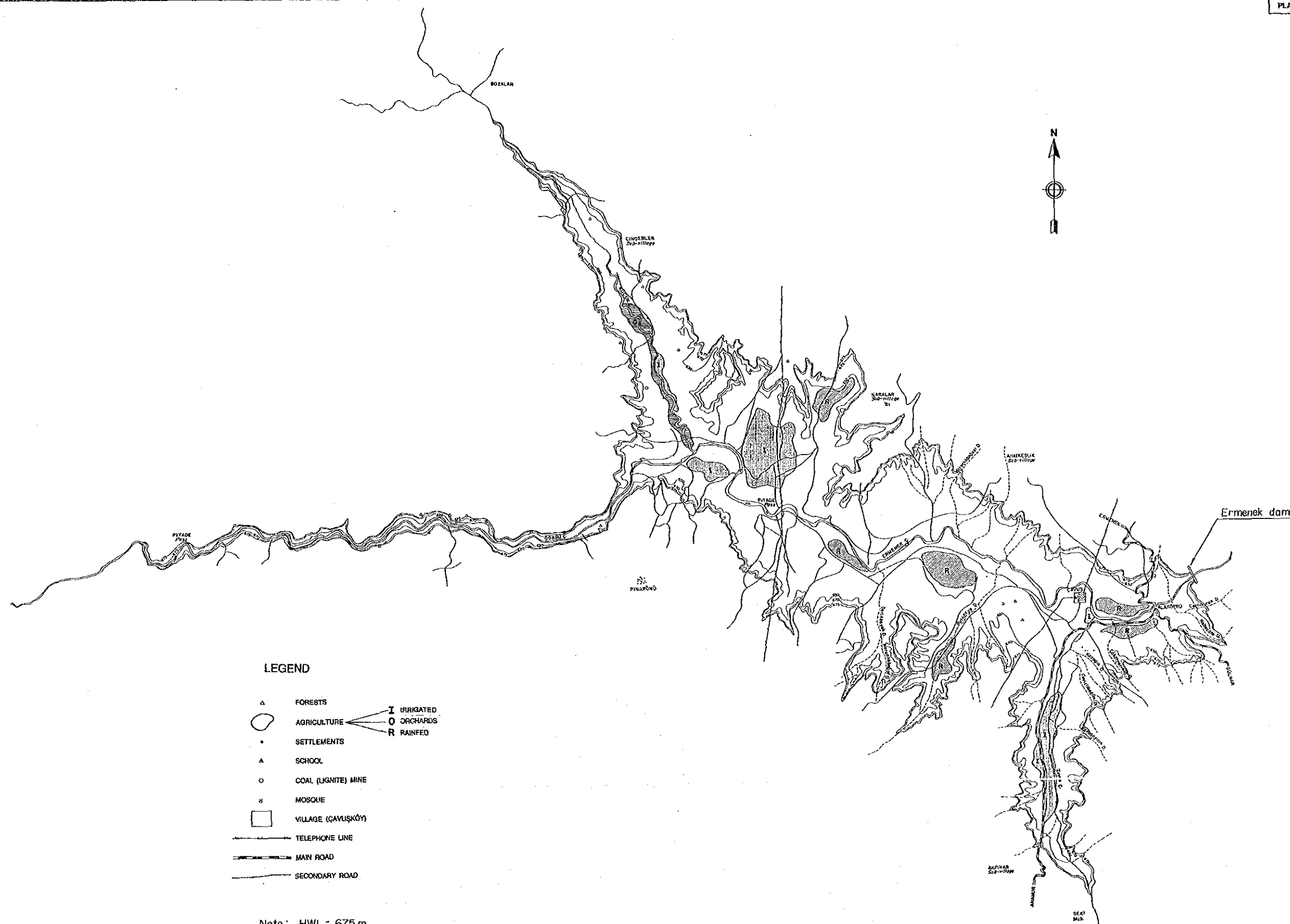


PLATE NO.

Ermenek Reservoir
(48.4 km²)

SCALE 0 1 2km

	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P5 General Plan of Ermenek Project
		JAPAN INTERNATIONAL COOPERATION AGENCY	




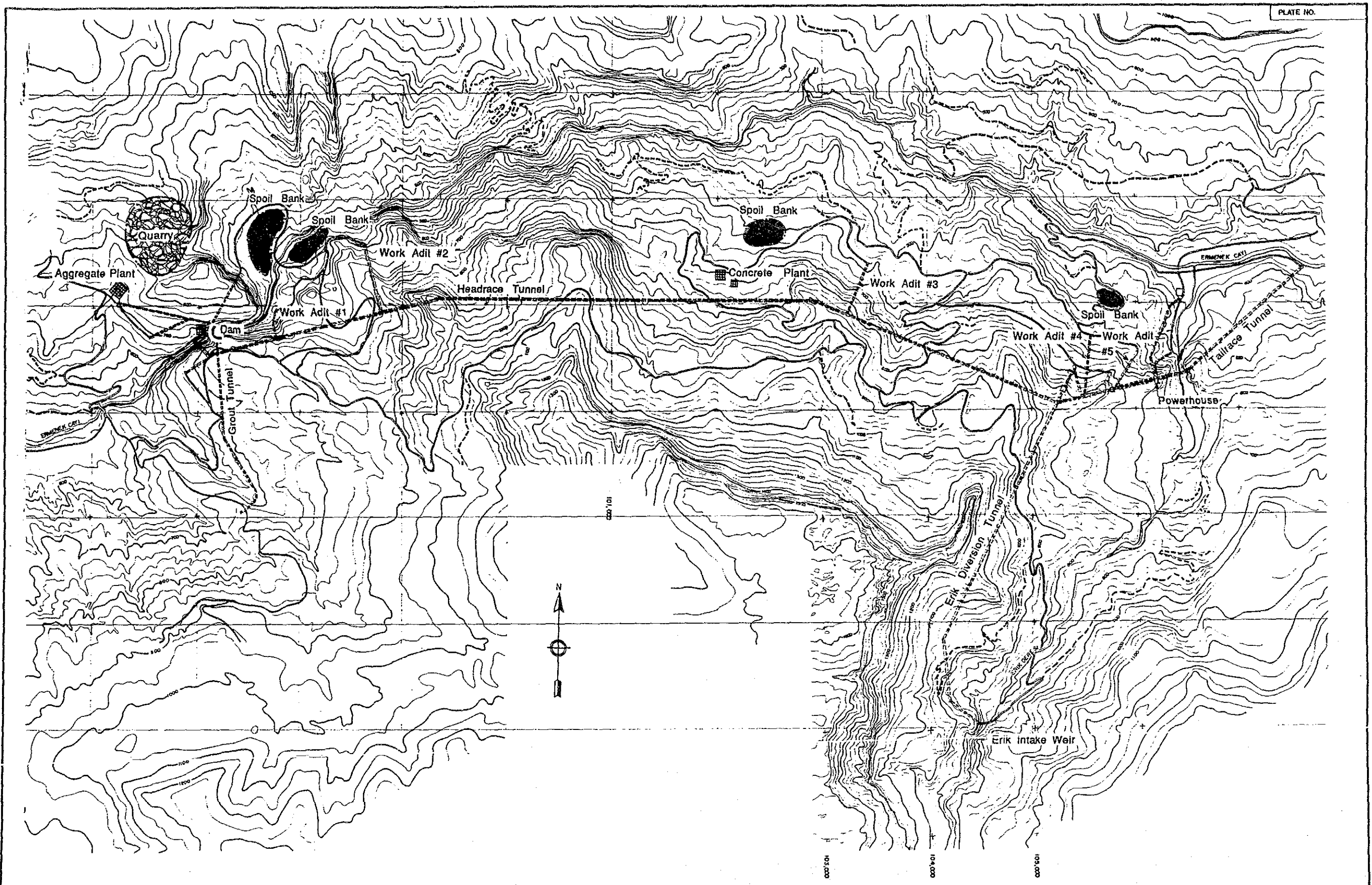
LEGEND

- △ FORESTS
- AGRICULTURE
 - I IRRIGATED
 - O ORCHARDS
 - R RAINFED
- SETTLEMENTS
- △ SCHOOL
- COAL (LIGNITE) MINE
- ⊕ MOSQUE
- VILLAGE (ÇAVUŞKÖY)
- TELEPHONE LINE
- MAIN ROAD
- SECONDARY ROAD


Note: HWL = 675 m

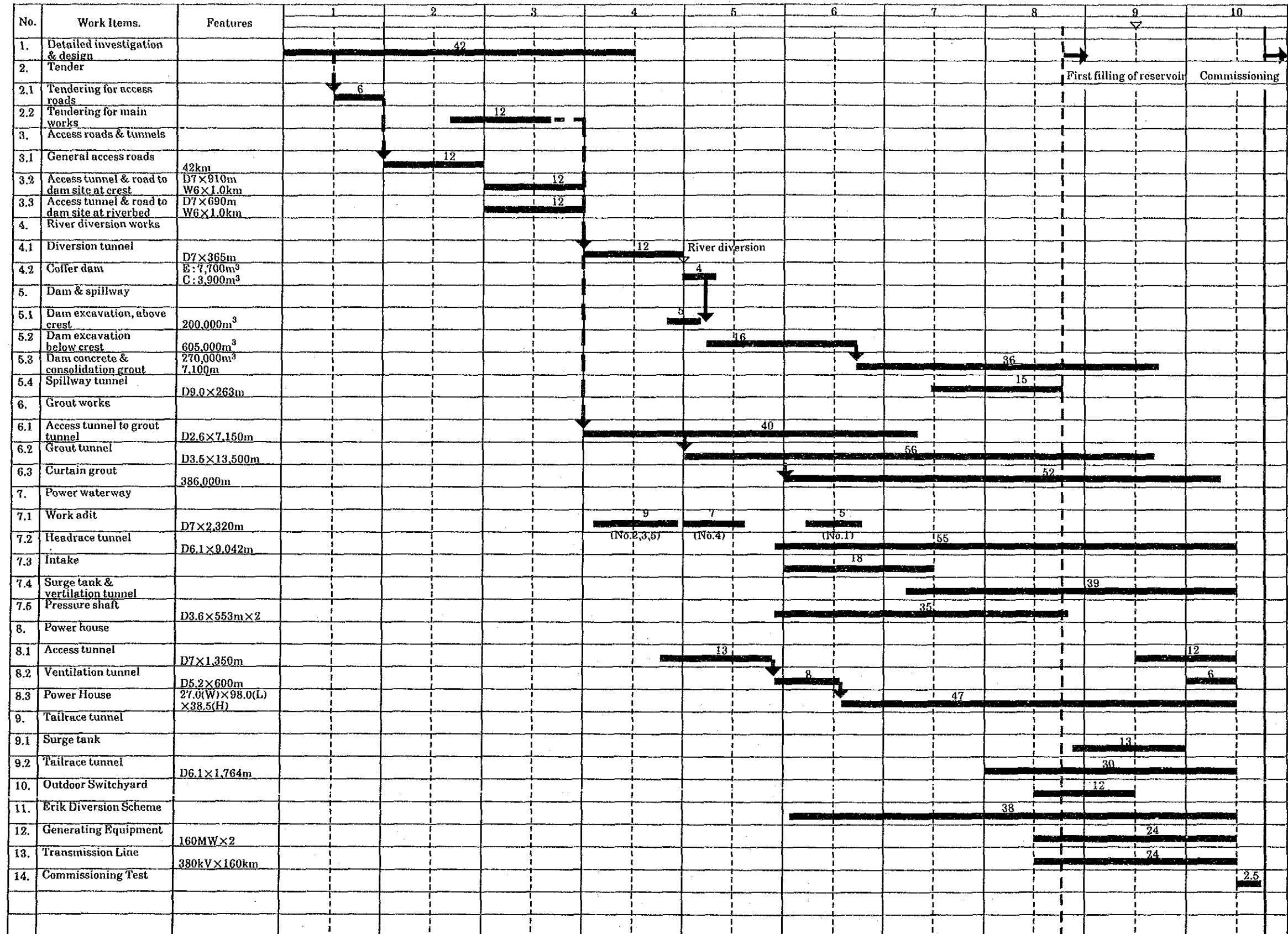


	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P6 The Ermenek Reservoir Area and Present Landuse
		JAPAN INTERNATIONAL COOPERATION AGENCY	



SCALE 0 2km

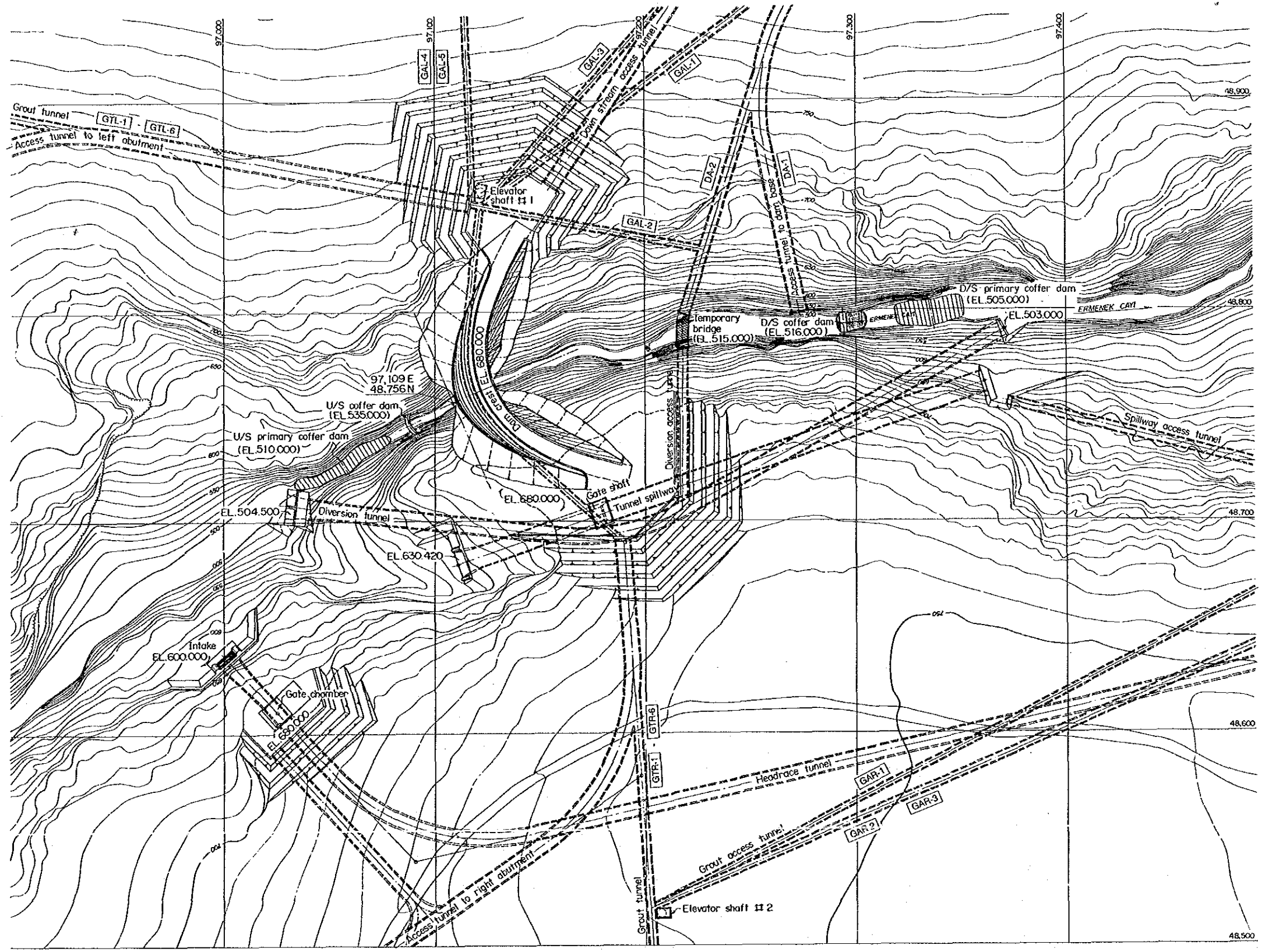
	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P7 Access Roads and Construction Facilities
		JAPAN INTERNATIONAL COOPERATION AGENCY	




THE REPUBLIC OF TURKEY
ELEKTRİK İŞLERİ ETÜD İDARESİ
GENEL MÜDÜRLÜĞÜ

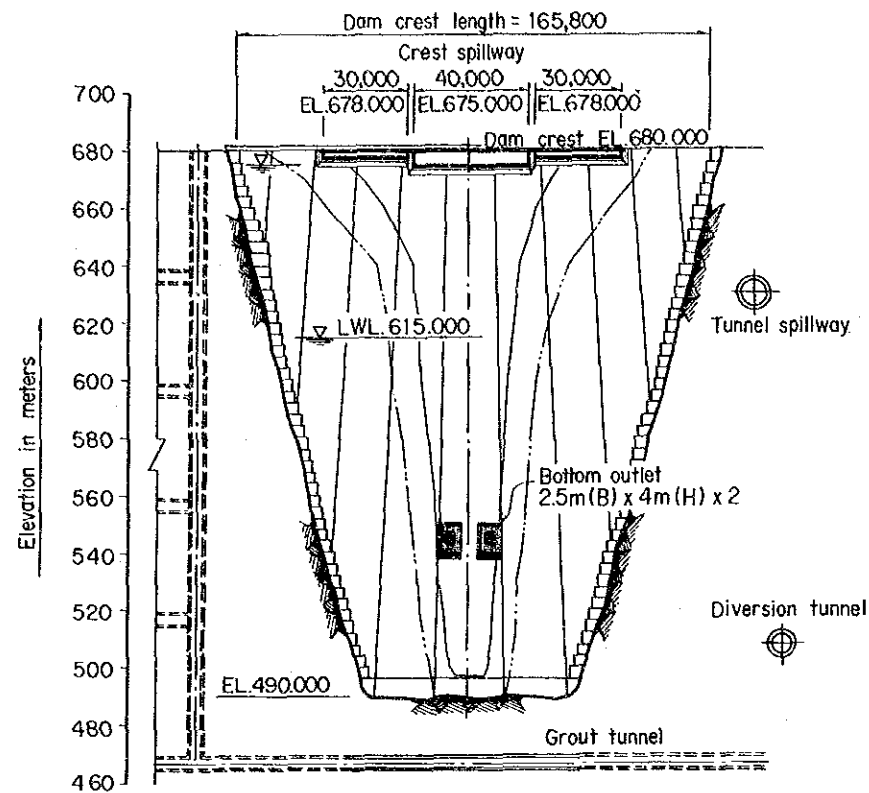
ERMENEK HYDROELECTRIC POWER
DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

TITLE
P8
Construction Time Schedule

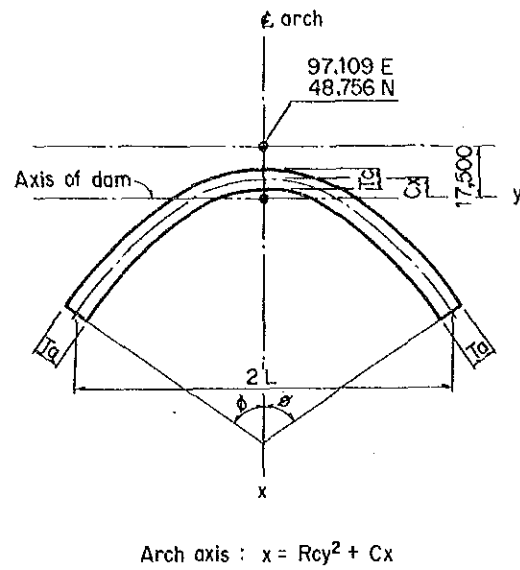


SCALE 0 100m

	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMENEK HYDROELECTRIC POWER DEVELOPMENT PROJECT	TITLE P9 General Plan of Dam
		JAPAN INTERNATIONAL COOPERATION AGENCY	

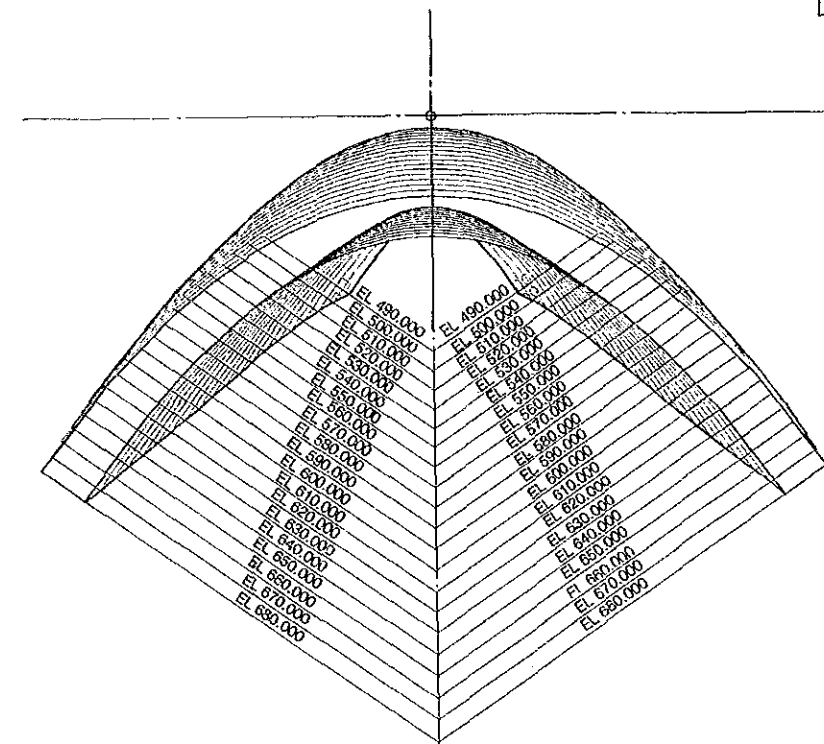


UPSTREAM DEVELOPMENT SCALE A



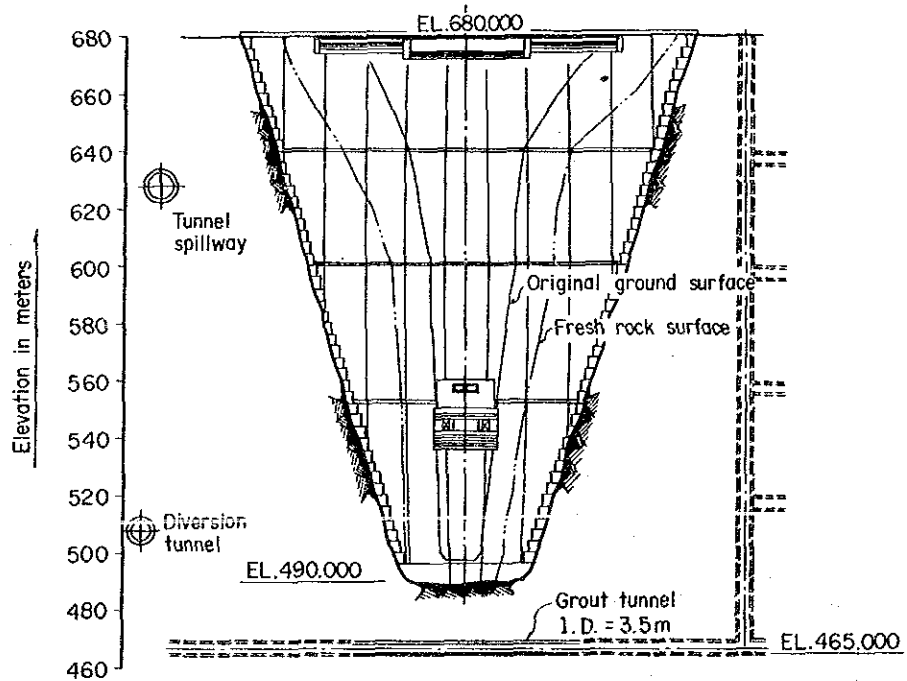
DAM GEOMETRY

SCALE B

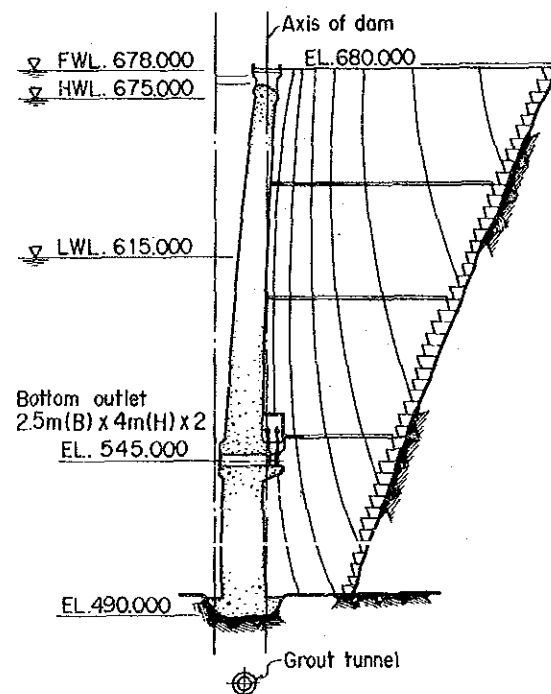


EL. (m)	Rc	Cx (m)	Tc (m)	Ta (m)	2L (m)	φ (°)
680	45.50	0.00	7.00	9.00	129.96	55.00
670	44.00	-0.80	7.42	10.09	125.68	55.00
660	42.50	-1.56	7.84	11.13	121.39	55.00
650	41.00	-2.30	8.26	12.09	117.11	55.00
640	39.50	-3.00	8.68	13.00	112.82	55.00
630	38.00	-3.67	9.11	13.84	108.54	55.00
620	36.50	-4.31	9.53	14.63	104.25	55.00
610	35.00	-4.92	9.95	15.34	99.97	55.00
600	33.50	-5.50	10.37	16.00	95.69	55.00
590	31.94	-6.09	10.79	16.34	91.23	55.00
580	30.38	-6.62	11.21	16.65	86.77	55.00
570	28.81	-7.09	11.63	16.94	82.29	55.00
560	27.25	-7.50	12.05	17.20	77.83	55.00
550	25.69	-7.84	12.47	17.44	73.38	55.00
540	24.13	-8.12	12.89	17.65	68.92	55.00
530	22.56	-8.34	13.32	17.84	64.44	55.00
520	21.00	-8.50	13.74	18.00	59.98	55.00
510	19.23	-8.33	14.16	18.00	54.93	55.00
500	17.40	-8.00	14.58	18.00	49.70	55.00
490	15.50	-7.50	15.00	18.00	44.27	55.00

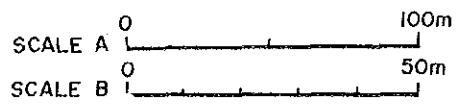
DAM DIMENSION




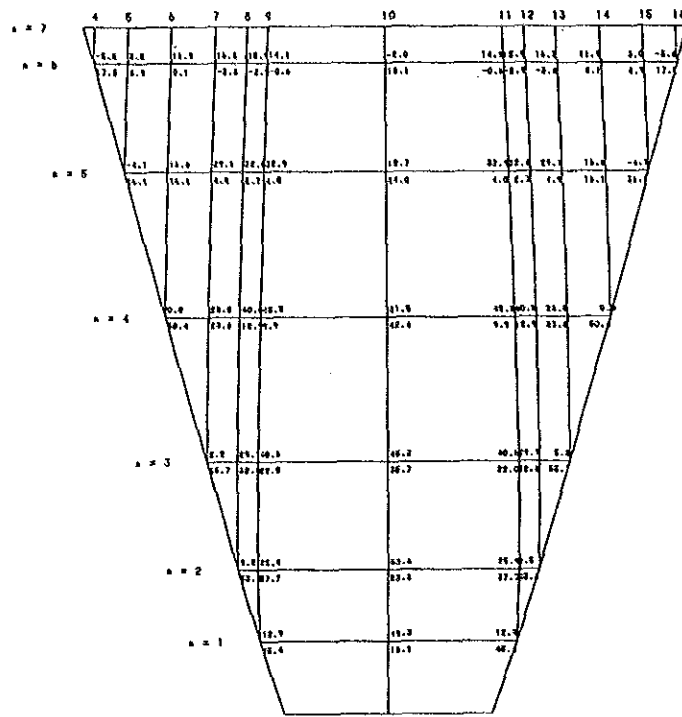
DOWNSTREAM DEVELOPMENT SCALE A



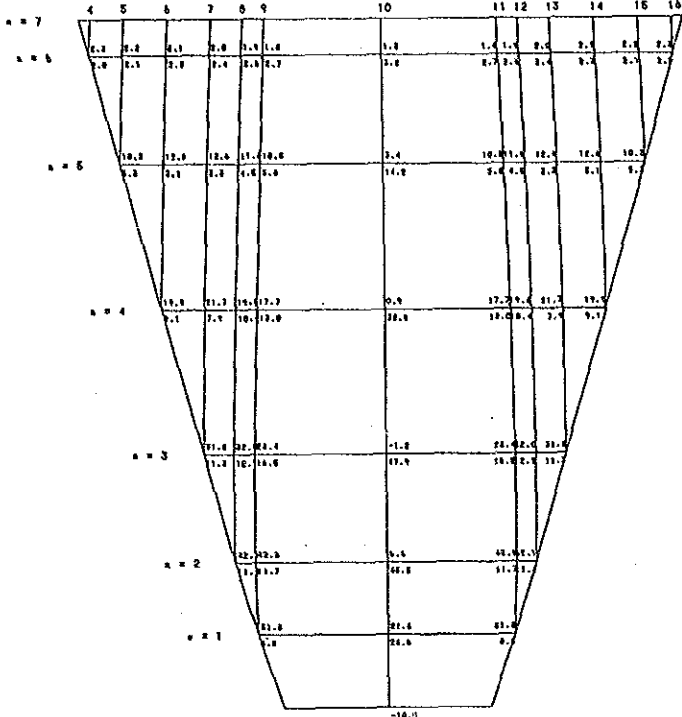
LATERAL VIEW SCALE A



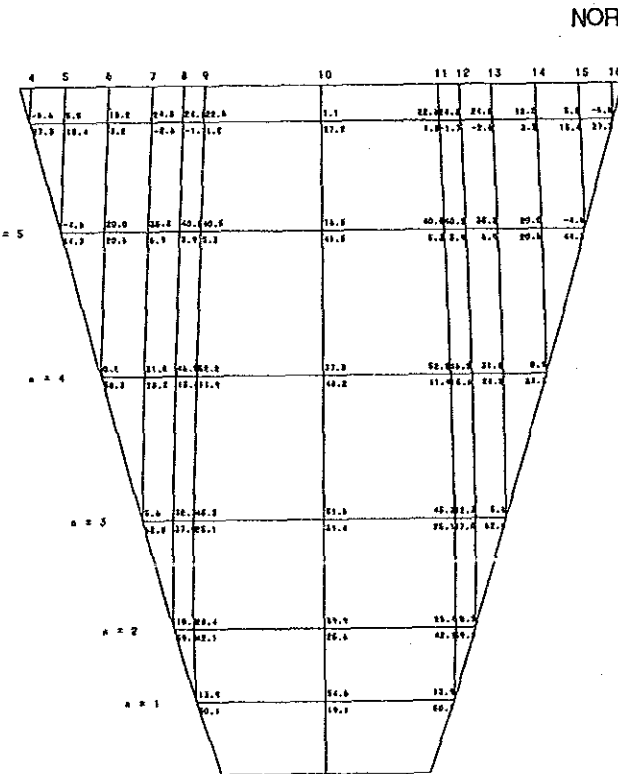
	THE REPUBLIC OF TURKEY ELEKTRİK İŞLERİ ETÜD İDARESİ GENEL MÜDÜRLÜĞÜ	ERMEK HYDROELECTRIC POWER DEVELOPMENT PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	TITLE P10 Details of Dam
---	---	--	---------------------------------------



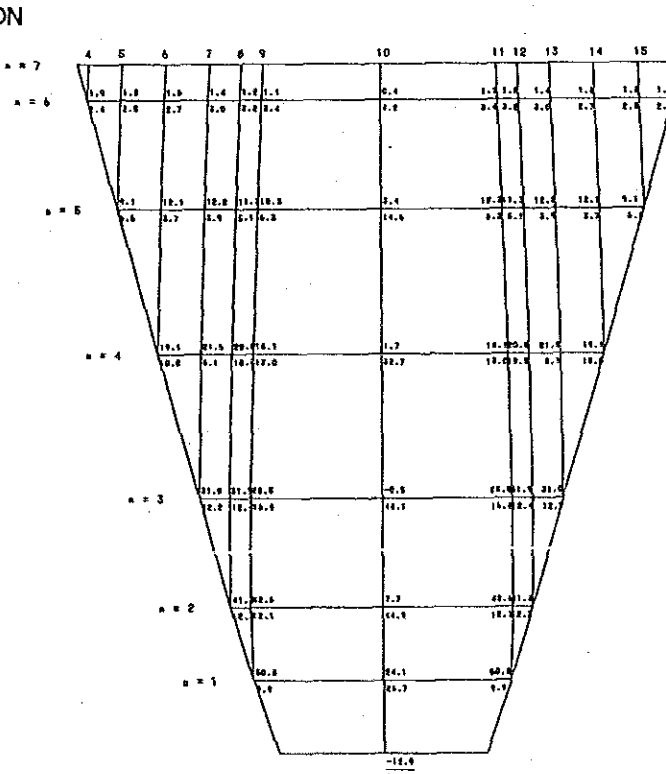
HORIZONTAL STRESSES



VERTICAL STRESSES



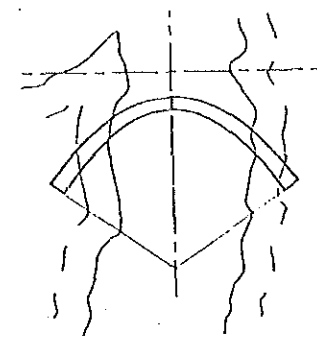
HORIZONTAL STRESSES



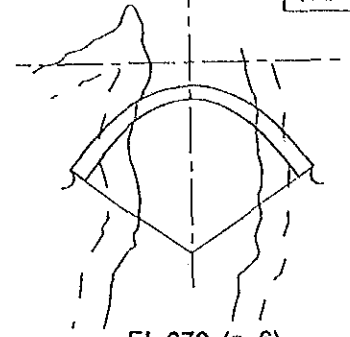
VERTICAL STRESSES

NORMAL CONDITION

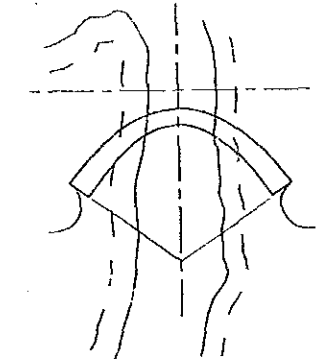
SEISMIC CONDITION



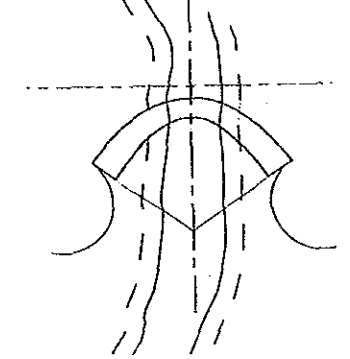
EL.680 (n=7)



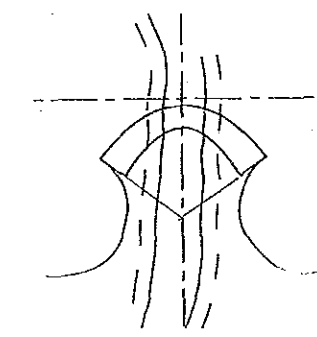
EL.670 (n=6)



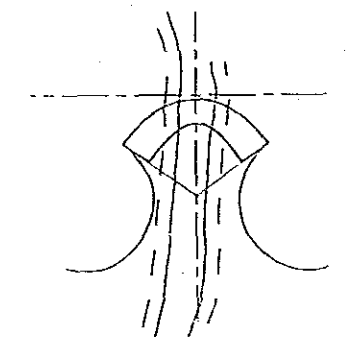
EL.640 (n=5)



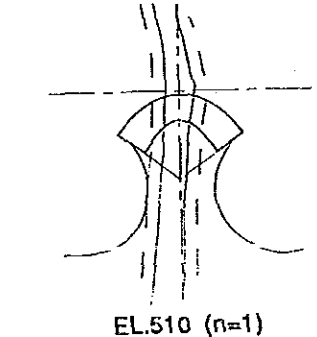
EL.600 (n=4)



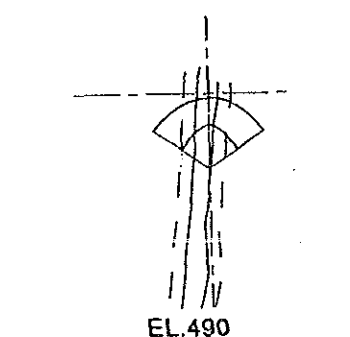
EL.560 (n=3)



EL.530 (n=2)

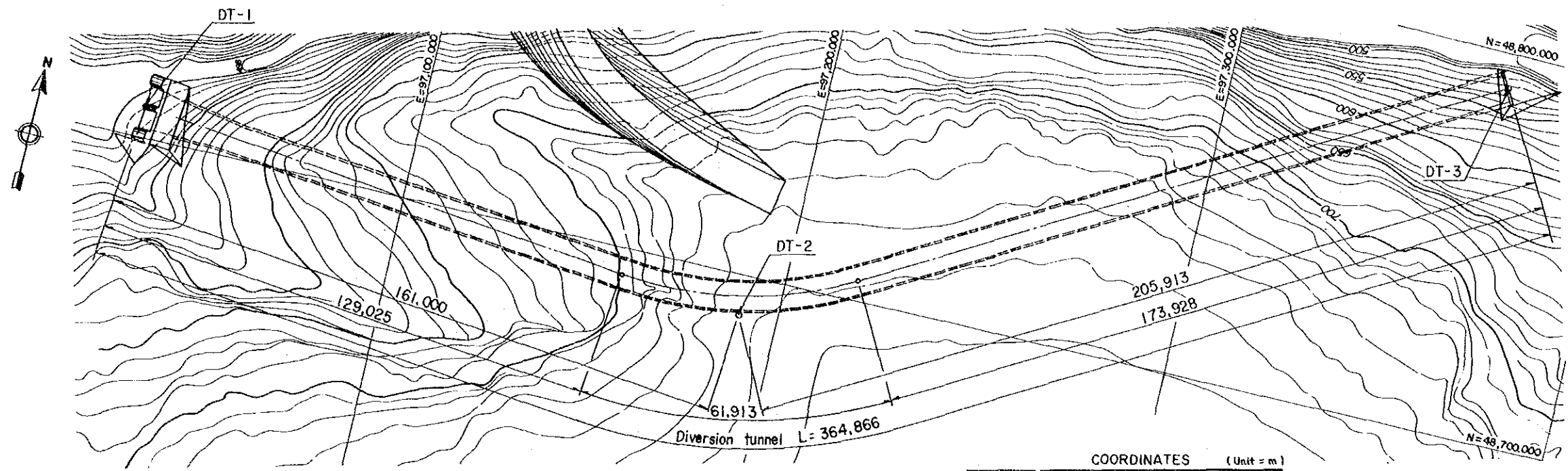


EL.510 (n=1)



EL.490

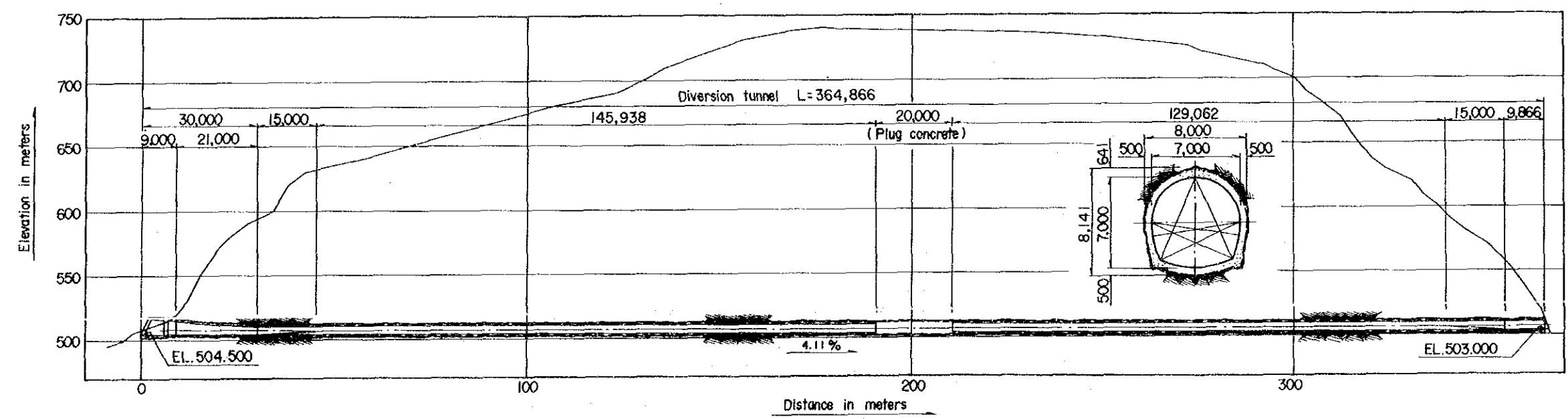
LINES OF NECESSARY FRESH ROCK
(NORMAL CONDITION, SAFETY FACTOR = 4)



PLAN SCALE A

COORDINATES (Unit = m)

Points	North	East
DT-1	48,708.000	97,030.000
DT-2	48,690.000	97,190.000
DT-3	48,790.000	97,370.000



PROFILE SCALE H=1:1,000 V=1:3,000

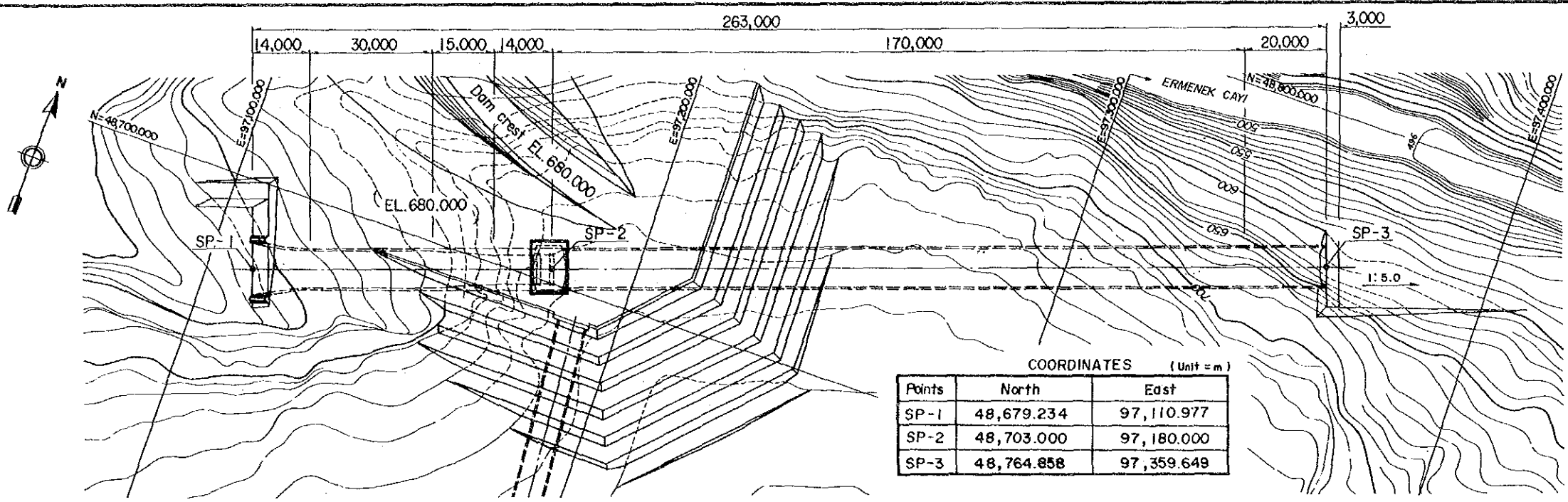
SCALE A 0 50m



THE REPUBLIC OF TURKEY
ELEKTRİK İŞLERİ ETÜD İDARESİ
GENEL MÜDÜRLÜĞÜ

EMNEK HYDROELECTRIC POWER
DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

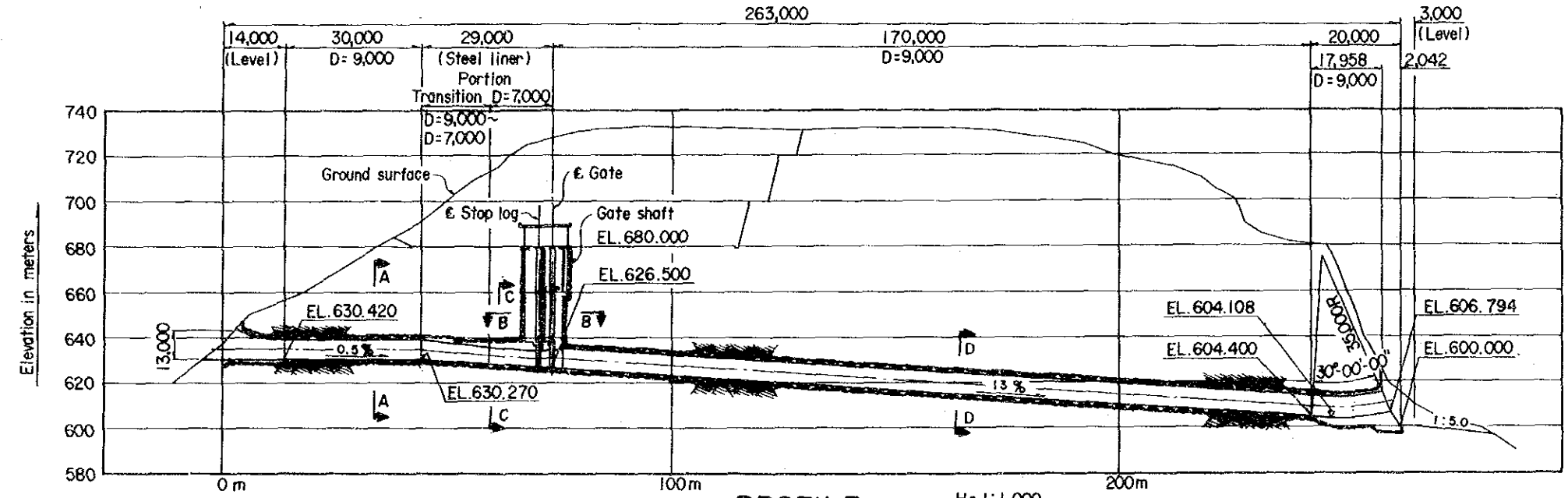
TITLE
P12
Diversion Tunnel



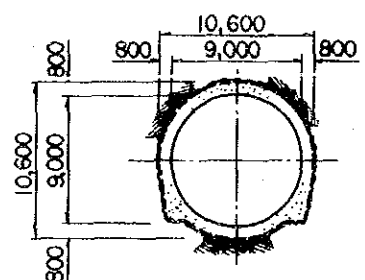
COORDINATES (Unit = m)

Points	North	East
SP-1	48,679.234	97,110.977
SP-2	48,703.000	97,180.000
SP-3	48,764.858	97,359.649

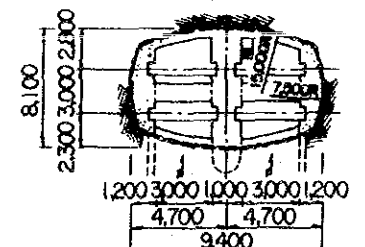
PLAN SCALE A



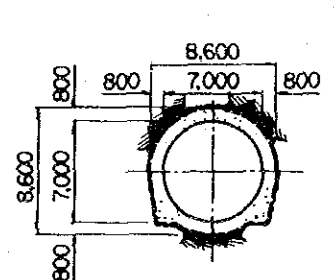
PROFILE SCALE H=1:1,000 V=1:2,000



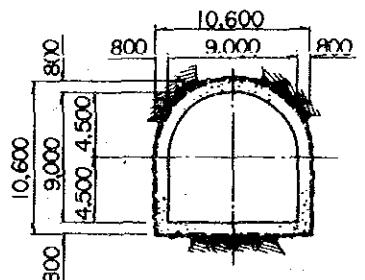
SECTION A-A SCALE B



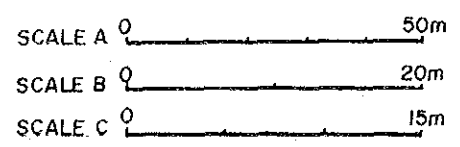
SECTION B-B SCALE C



SECTION C-C SCALE B



SECTION D-D SCALE B



THE REPUBLIC OF TURKEY
ELEKTRİK İŞLERİ ETÜD İDARESİ
GENEL MÜDÜRLÜĞÜ

ERMENEK HYDROELECTRIC POWER
DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

TITLE
**P13
Tunnel Spillway**