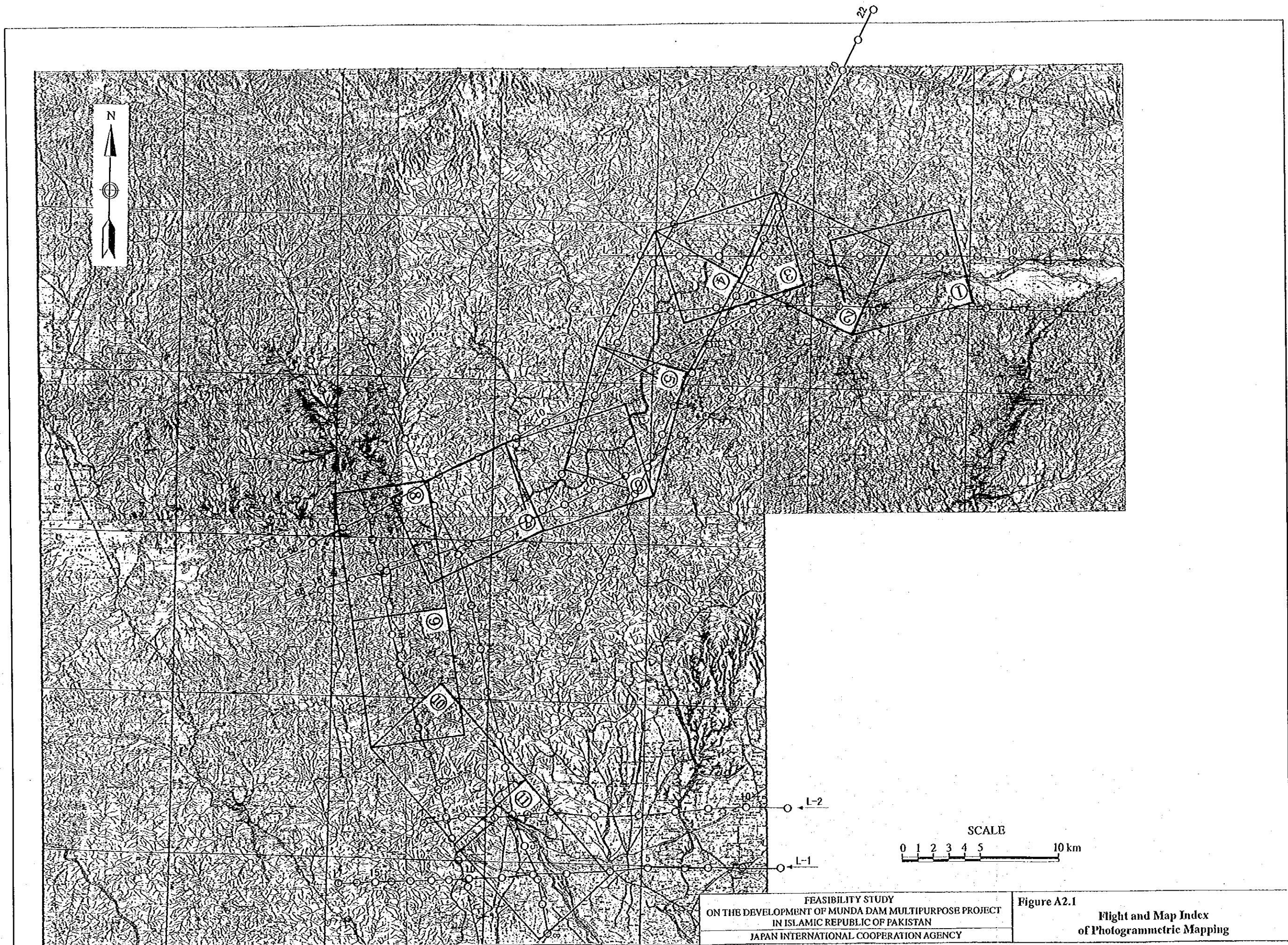


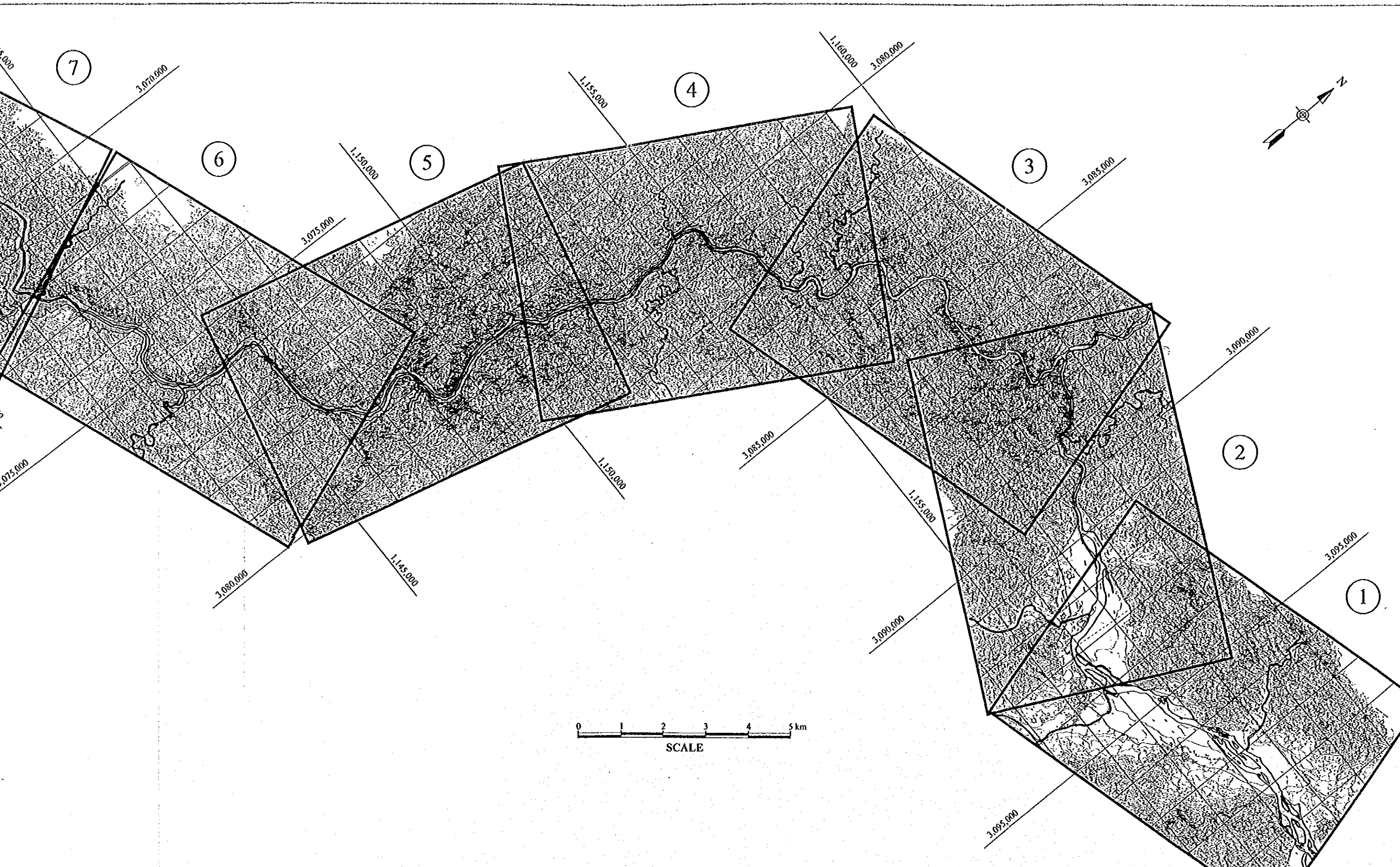
FIGURES



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

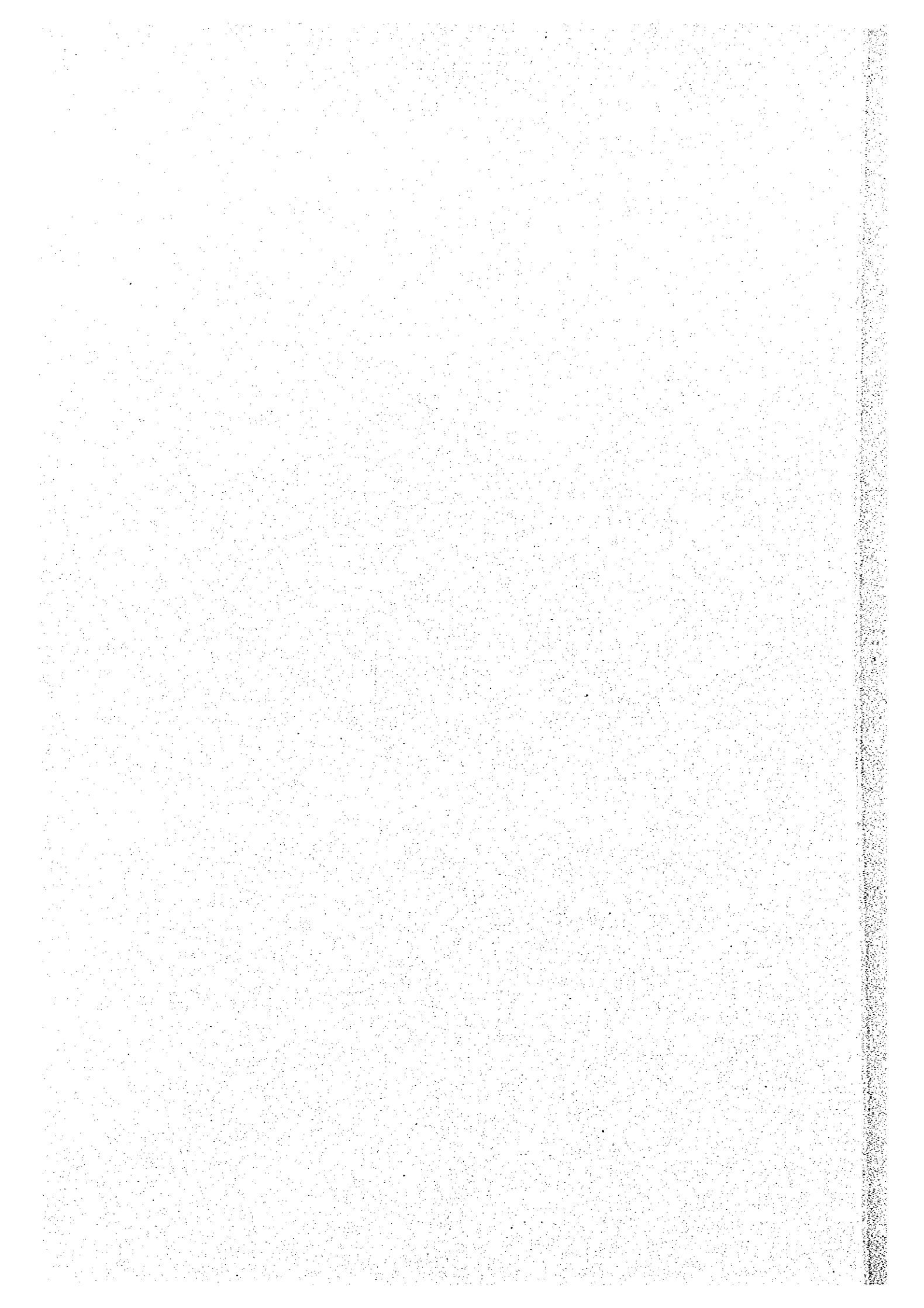
Figure A2.1
 Flight and Map Index
 of Photogrammetric Mapping

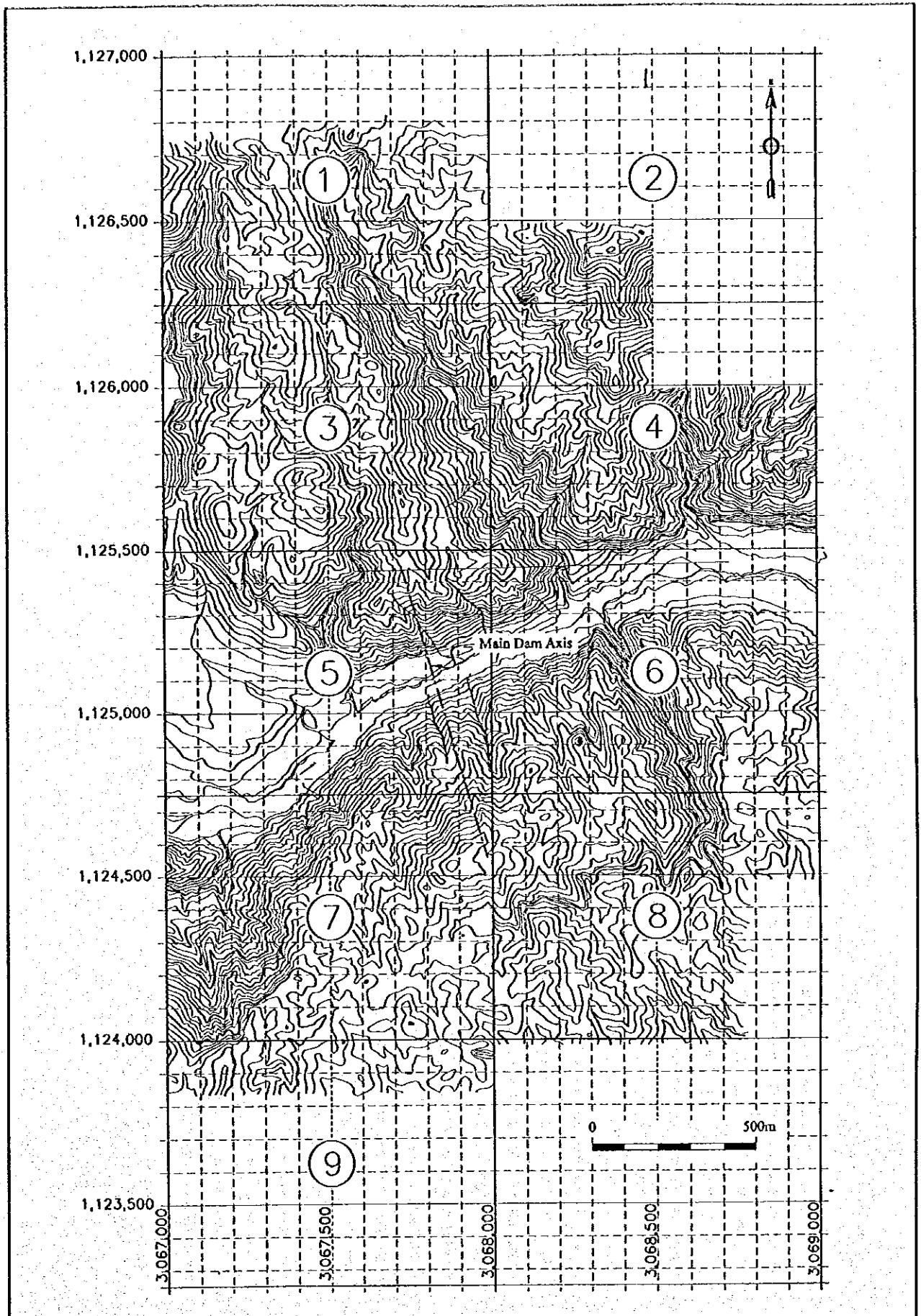




FEASIBILITY STUDY
 ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
 IN ISLAMIC REPUBLIC OF PAKISTAN
 JAPAN INTERNATIONAL COOPERATION AGENCY

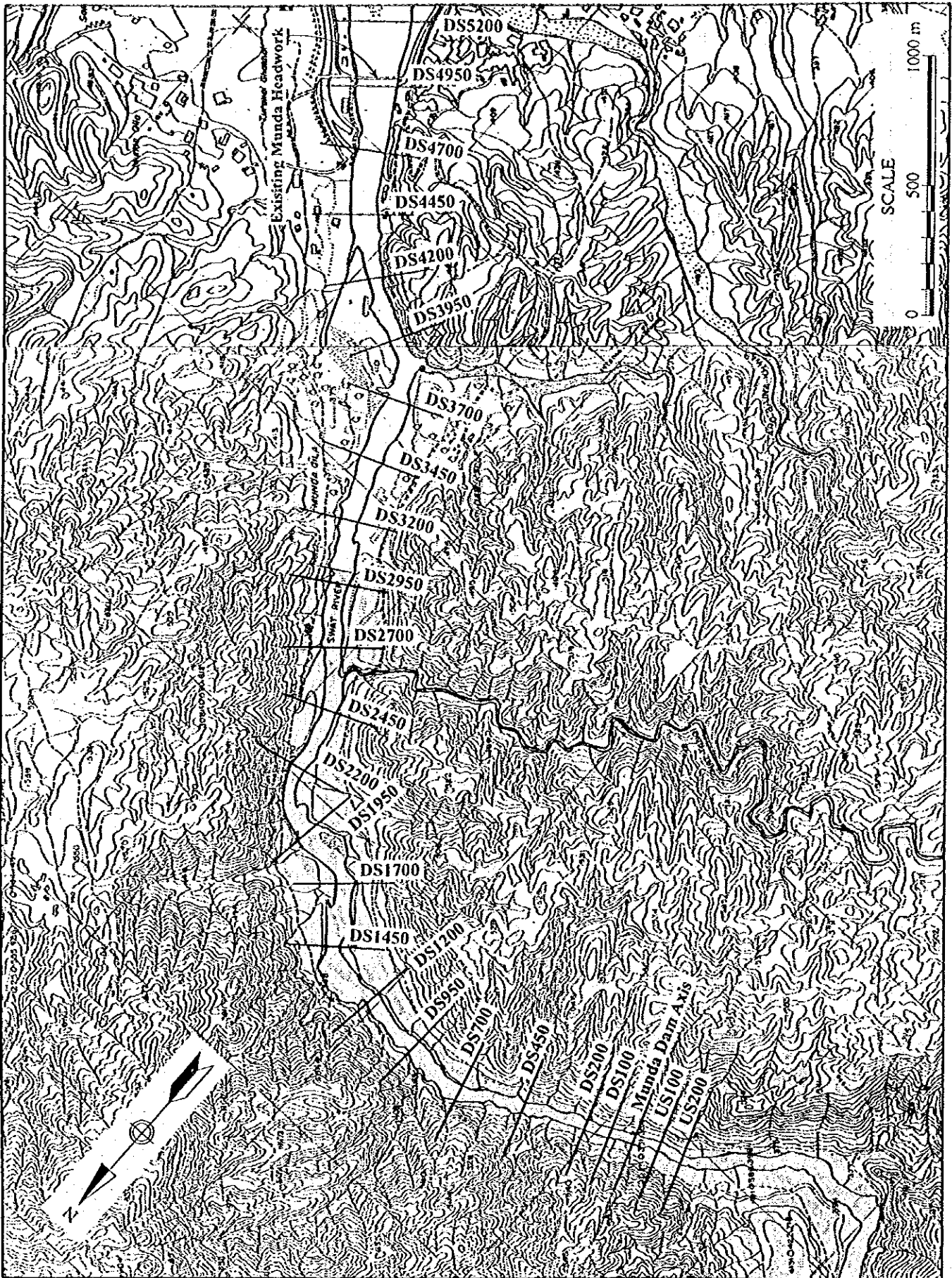
Figure A2.2
 Photogrammetric Maps of Reservoir Area





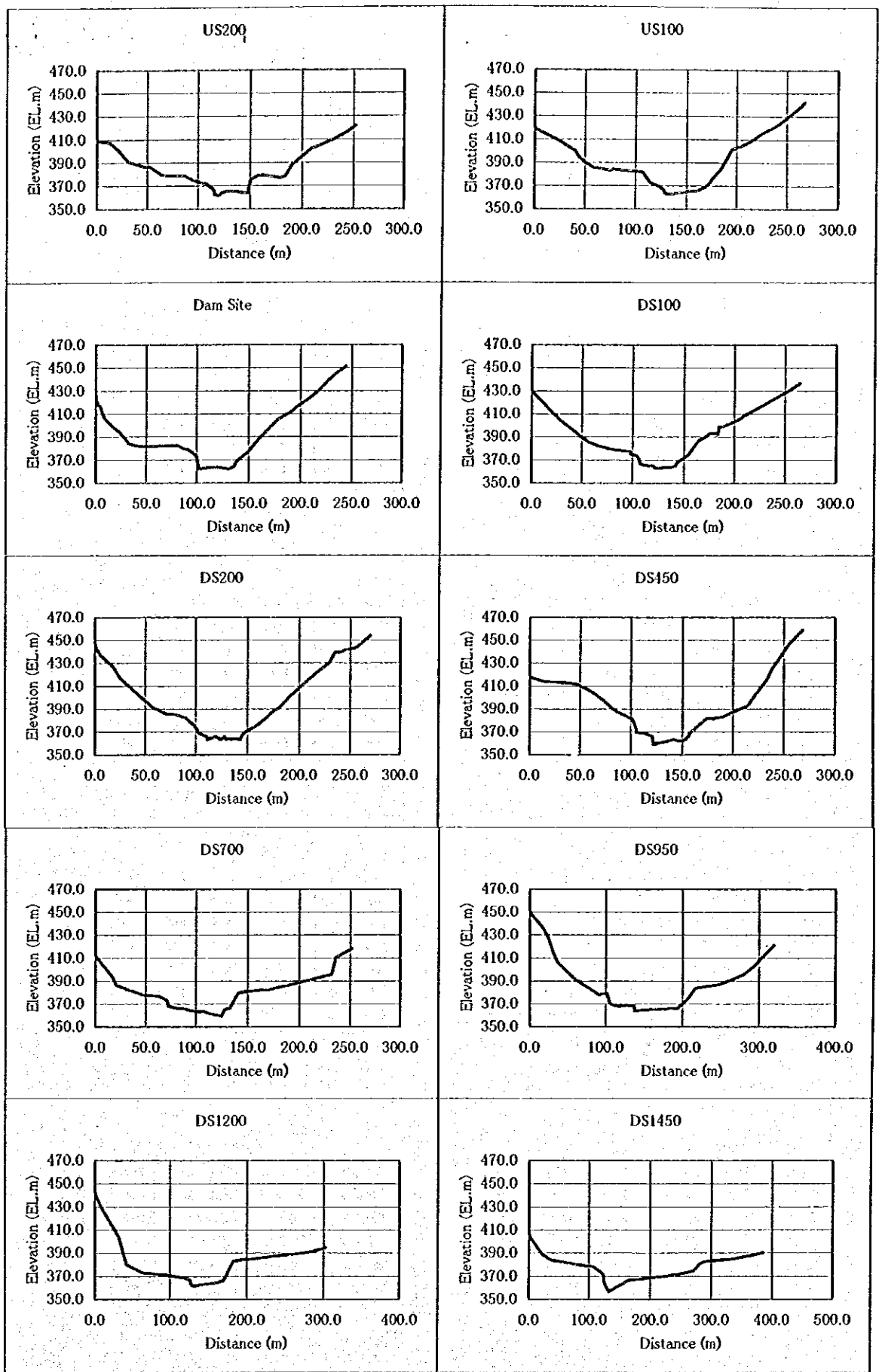
FEASIBILITY STUDY
 ON THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
 IN ISLAMIC REPUBLIC OF PAKISTAN
 JAPAN INTERNATIONAL COOPERATION AGENCY

Figure A3.1
 Index of Topographic Maps of Dam Site



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

Figure A3.2
 Location Map of River Cross Section Survey



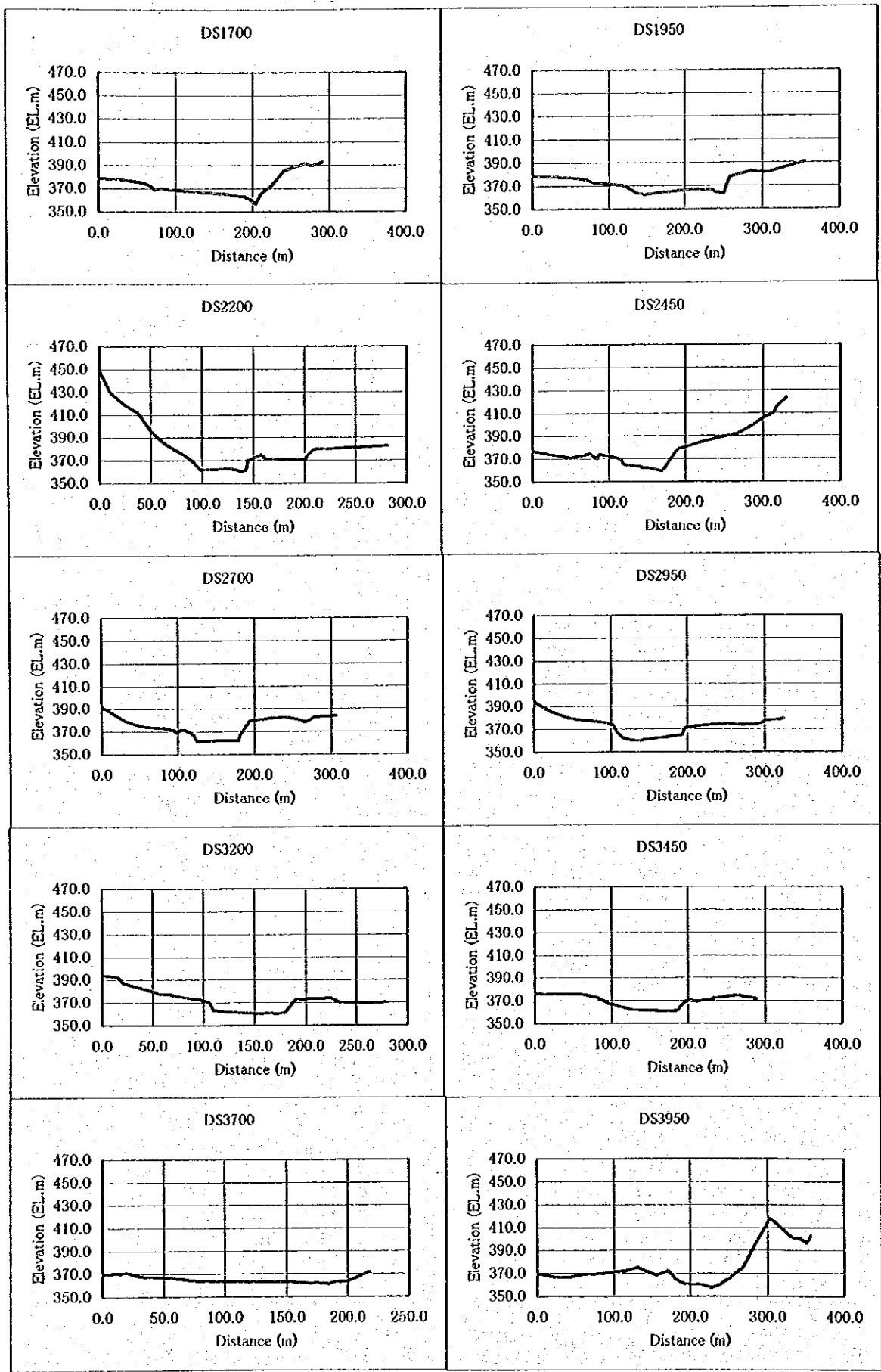


Figure A3.3
 Surveyed River Cross Sections (2/3)

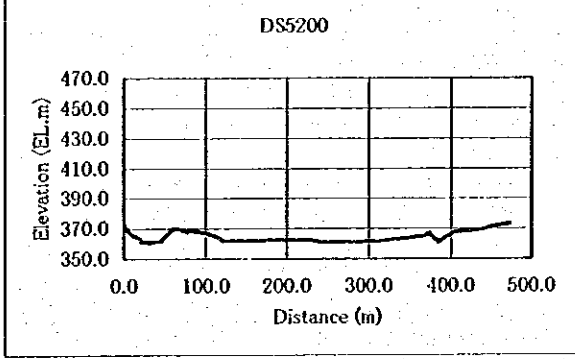
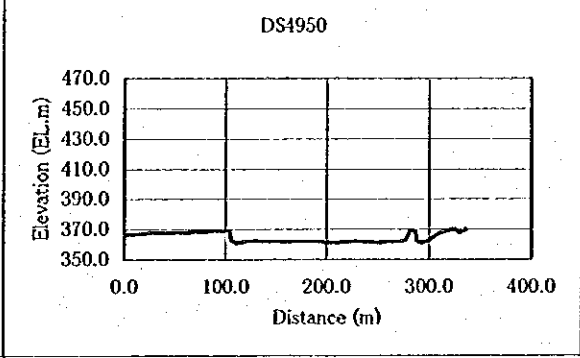
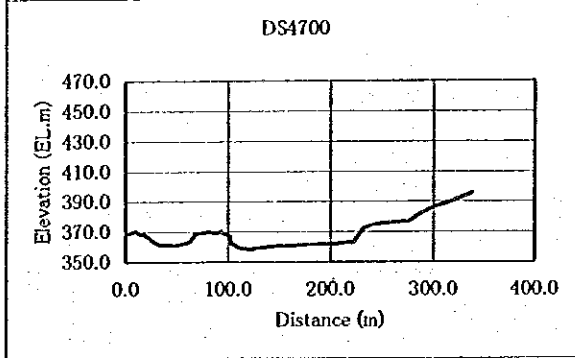
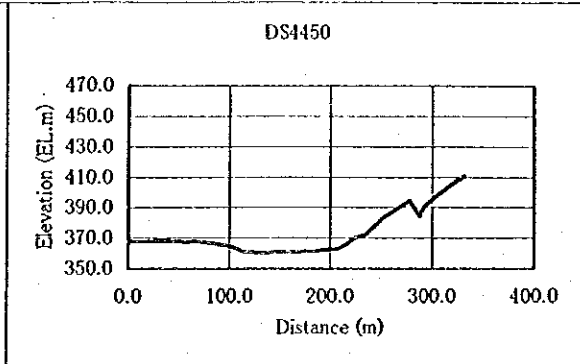
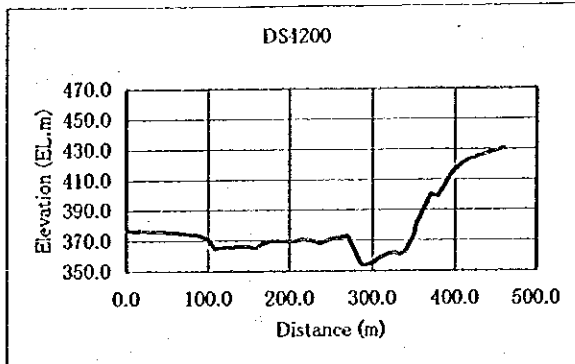


Figure A3.3

Surveyed River Cross Sections (3/3)



Appendix B

Geology



**FEASIBILITY STUDY
ON
THE DEVELOPMENT OF MUNDA DAM MULTIPURPOSE PROJECT
IN
ISLAMIC REPUBLIC OF PAKISTAN**

**FINAL REPORT
VOLUME III
SUPPORTING REPORT**

Appendix B : Geology

Table of Contents

	Page
B1 Regional Geology.....	B1
B2 Geological Investigation.....	B2
B2.1 Previous Geological Investigation	B2
B2.2 Geological Investigation for the Feasibility Study.....	B2
B2.3 Method of Geological Investigation.....	B3
B3 Site Geology.....	B5
B3.1 Geology of Dam Site.....	B5
B3.2 Geology of Powerhouse Site	B9
B3.3 Geology of Diversion/Power Tunnel.....	B9
B3.4 Geology of Spillway Site.....	B10
B4 Geology of Reservoir.....	B10
B5 Construction Material.....	B11
B5.1 Earth Core Material.....	B11
B5.2 Concrete Aggregates and Filter Material.....	B14
B5.3 Rock Material.....	B15
B6 Seismicity.....	B16
B7 Future Investigation.....	B19

List of Tables

		Page
Table B1.1	List of Drill Holes	BT1
Table B2.1	List of Exploratory Adits.....	BT1
Table B3.1	List of Pits.....	BT2
Table B4.1	List of Seismic Prospecting Lines.....	BT2
Table B5.1	Summary of Laboratory Test Results on Earth Material.....	BT3
Table B6.1	Summary of Laboratory Test Results on Sand and Gravel	BT3
Table B7.1	Summary of Laboratory Test Results on Rock Material.....	BT4
Table B8.1	Factors of Rock Classification.....	BT5
Table B8.2	Combination of Factors for Rock Classification	BT5
Table B8.3	Expectable Physic-mechanical Properties.....	BT5

List of Figures

		Page
Figure B1.1	Tectonic Sketchmap of Project Site	BF1
Figure B2.1	Location Map of Project Area.....	BF2
Figure B3.1	Geological Map of Dam Site.....	BF3
Figure B3.2	Geological Investigation of Dam Site, Location Map	BF4
Figure B3.3-1	Geological Profile on the Dam Axis	BF5
Figure B3.3-2	Lugeon Map on the Dam Axis.....	BF6
Figure B3.3-3	Geological Profile on the Spillway (Seismic Prospecting Line S-4).....	BF7
Figure B3.3-4	Geological Profile on the Power Tunnel (Lines S-6, S-7)	BF8
Figure B3.3-5	Geological Profile on the Upstream Edge (Plinth) of Dam.....	BF9
Figure B3.3-6	Lugeon Map of the Upstream Edge (Plinth) of Dam.....	BF10
Figure B3.4-1	Summarized Drill Logs, Dam Site (1)	BF11
Figure B3.4-2	Summarized Drill Logs, Dam Site (2)	BF12
Figure B3.4-3	Summarized Drill Logs, Dam Site (3)	BF13
Figure B3.4-4	Summarized Drill Logs, Dam Site (4)	BF14
Figure B3.5-1	Geological Map of Exploratory Adits (1)	BF15
Figure B3.5-2	Geological Map of Exploratory Adits (2)	BF16
Figure B3.6-1	Seismic Prospecting, Wave Velocity Profile S-1, Dam Site.....	BF17
Figure B3.6-2	Seismic Prospecting, Wave Velocity Profile S-2 & S-3, Dam Site.....	BF18
Figure B3.6-3	Seismic Prospecting, Wave Velocity Profile S-4, Dam Site	BF19
Figure B3.6-4	Seismic Prospecting, Wave Velocity Profile S-5, Dam Site.....	BF20
Figure B3.6-5	Seismic Prospecting, Wave Velocity Profile S-6, Dam Site.....	BF21
Figure B3.6-6	Seismic Prospecting, Wave Velocity Profile S-7, Dam Site.....	BF22

Figure B3.6-7	Seismic Prospecting, Wave Velocity Profile S-8, Dam Site.....	BF23
Figure B4.1	Geological Map of Dam and Reservoir Area	BF24
Figure B5.1	Location and Geological Map of Earth and Aggregate Borrow Areas	BF25
Figure B5.2-1	Investigation Location and Geological Map of Sappare Quarry	BF26
Figure B5.2-2	Investigation Location and Geological Map of Todobo Banda Quarry ..	BF27
Figure B5.3-1	Geological Profile of Sappare Quarry Site	BF28
Figure B5.3-2	Geological Profile of Todobo Banda Quarry (1).....	BF29
Figure B5.3-3	Geological Profile of Todobo Banda Quarry (2).....	BF30
Figure B5.4	Summarized Drill Logs, Quarry Sites.....	BF31
Figure B5.5-1	Seismic Prospecting, Wave Velocity Profile Ls-1, Sappare Quarry	BF32
Figure B5.5-2	Seismic Prospecting, Wave Velocity Profile Lt-1, T. Banda Quarry	BF33
Figure B5.5-3	Seismic Prospecting, Wave Velocity Profile Lt-2, T. Banda Quarry	BF34
Figure B6.1	Earthquake Intensity and Frequency.....	BF35

