マレイシア国

サラワク小水力発電開発計画

調査報告書

第六巻

ムダミット-2水力発電開発計画

資　料　集

昭和63年7月

国際協力事業団

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報告書の構成

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MEDAMIT - 2 HYDROPOWER DEVELOPMENT SCHEME

1. Introduction

The survey of Medamit-2 Hydropower Development Scheme was carried out from 1 May 1987 to 21 May 1987 and 10 June 1987 to 8 July 1987. The survey was done in accordance to the General Specification with additional topographical and borehole survey for both Intake and Powerhouse Site as instructed by SESCO engineer.

2. Location of Site

The Medamit-2 Scheme is located at about 45 km air distance south of Limbang. The Intake site which is at Sungai Medamit and the Powerhouse site at Sungai Limbang is approximately 4.5 km apart. The two sites are accessible by logging roads.

3. Access

There is an extensive network of logging roads extended from the public road from Limbang to the scheme area. The site which is about 70 km from Limbang (45 km by public road to Naga Medamit and 25 km by logging road to scheme) it takes two to two and a half hours by land crusier. It is necessary to inform the Timber Camp concerned before entering the areas around the scheme where there are logging activities for safety and security reasons.

4. Mobilisation and Manpower

One survey party is involved in the survey of the proposed scheme and the following are the personnels involved:-

a) Michael Chin (Surveyor)
b) Chong Joon Lin (Survey Assistant)
c) Abg. Ahmad Abg. Hassan (Chainman)
d) Junaidi Bujang (Chainman)
e) Diro Jitam (Cook)

Extra manpower are obtained by engaging some local labourers.

5. Instrument Used

Instrument	Model	Unit
Theodolite	Wild T2	1
EDM	AGA 210	1
Prism and Target set	AGA	1
Levels	Nikon AZ-15	2
Staves	-	3
Chain	Cont. Band(120 x 0.004m	1
Tripod	-	3
Compass	Suunto	2
Measuring Tape	-	2
Chainsaw	ST1HL	1

6. Survey

a. Topographical Mapping

The surveyor is required to provide a 1/500 topographical map of the intake and powerhouse site. The method employed was by 10 m grid levelling. However, due to the rugged terrian, grid levelling is not practicable in some areas at the intake site. Instead, spot levels are taken at places where there are changes in gradient. In the case of a steep hill or cliff, spot levels are taken on the ridge and bottom of the hill.

The original proposed area of 10 ha. to be surveyed at the Intake site was extended to 32 ha., while the proposed 15 ha. at the powerhouse site was extended to 17 ha.

b. Traverse

A main traverse control was run from the Powerhouse site at Pkt C to BM1 at the Intake site. The coordinates of Pkt C are scaled out from a 1/50,000 map and the orientation is adopted from a point mark some distance away using compass. This is done because there is no Land and Survey controls around the vicinity of the scheme.

The traverse was run along the nearest logging road linking the two sites so as to avoid heavy rentising along thick forest.

c. Levelling

A level was run from BM1 at intake site to Pkt C at Powerhouse site by means of the double run method. The distance of the backsight and foresight were kept approximately equal except on sloped ground. The distance between the instrument and the backsight or foresight staff did not in any case exceed 100 m.

An assumed datum of 122.7 m elevation was adopted for BM1 at the Intake site. The reduced level of 63.11 m for Pkt C at the Powerhouse site was transferred from BM1. All levelling and tachy survey for the two sites including boreholes and permanent Bench Marks were based on BM1 and Pkt C.

d. Tachy Survey

The river outline, valleys and some areas of rugged terrain of the Intake site were surveyed by tacheometic heighting. Traverses were run along the river side and centre of valleys to ensure that enough spot levels were taken to cover the area required for mapping.

e. River Profile and Cross-section Survey

The positions of the river profile and cross section were initially measured out along the sides of the river. Levels are then taken for these marked positions. A nylon string with 10 m interval markings are fastened to one of the markings and the other end on the opposite side of the river. The bearing was noted using a compass and the distance from the number of markings on the string. Staves are placed to the bed of the river following the markings on the string. In the case of the Powerhouse site where the river was deep, a stone tighed to a rope was dropped into the water at each markings and the length that submerged was measured. The level of the water surface along the cross section was taken to determine the reduced level of the river bed. A longboat with outboard engine was engaged during such operation.

There are 14 cross sections required, 7 at the intake site and 7 at the Powerhouse site. These cross sections are marked out from the centre line going from twice at 20 m and 40 m at both sides. A spot height is taken at 30 m from the 40 m cross section and at every 20 m towards the centre line. The cross sections were extended up to 50 m horizontal distance inland or 50 m difference in height depending on the terrain.

f. Permanent Bench Marks

Two permanent bench marks were constructed. BM100 is located at the intake site and BM200 is located at the powerhouse site.

The site for the construction of the bench marks were carefully chosen so that they would not likely to be distured in future.

A pit of approximately 0.6 m^3 was dug at the selected position and a one meter pipe of diameter 2½" was piled in at the centre. Concreting was done leaving the top 5 cm of the pipe exposed.

Independent level and traverse were taken to established the reduced level and coordinates of the bench marks.

g. Difficulties Encountered

1. Mobilisation

Extra care has to be taken while driving along logging road especially from Naga Medamit to the sites. Logging trucks usually occupy the whole width of the road and it is sometimes difficult to avoid them. It is impossible to drive after rain and you might have to abondan your vehicle and walk back.

2. Logistic

There are no dwellings around the vicinity of the Intake site so local labourers were employed from Rumah Imbing near the powerhouse site. Since they have to camp at site, naturally they demanded for higher pay and food subsistence.

3. Terrian

The terrian of the areas to be surveyed were mostly very rugged and steep at the intake site. Extreme care must be taken while crossing rapids and getting through rocky terrian which could be sharp and slippery.

4. Weather

Bad weather accounts for about 10% of the working time. The water level and current velocity would increase considerably after rain making it difficult for one to cross and do river cross sections.

7. Accuracy of work

The accuracies of the traverses and levels taken comply with that as stated in the Specifications.

a) Control Traverse

Route	Chainage	Misclosure
Npkt C to Npkt 78	19,309	1 : 63,740
BM1 to Npkt 87	486	1 : 72,387
BM1 to Npkt 85	316	1 : 17,137
Npkt C to Npkt 99	596	1 : 32,523

b) Bearing Closure

Route	Misclosure	No. of Stns.
Npkt C to Npkt 78	1' 18" less	81
BM1 to Npkt 87	12" more	7
BM1 to Npkt 85	15" more	8
Npkt C to Npkt 99	14" less	16

c) Level Closure

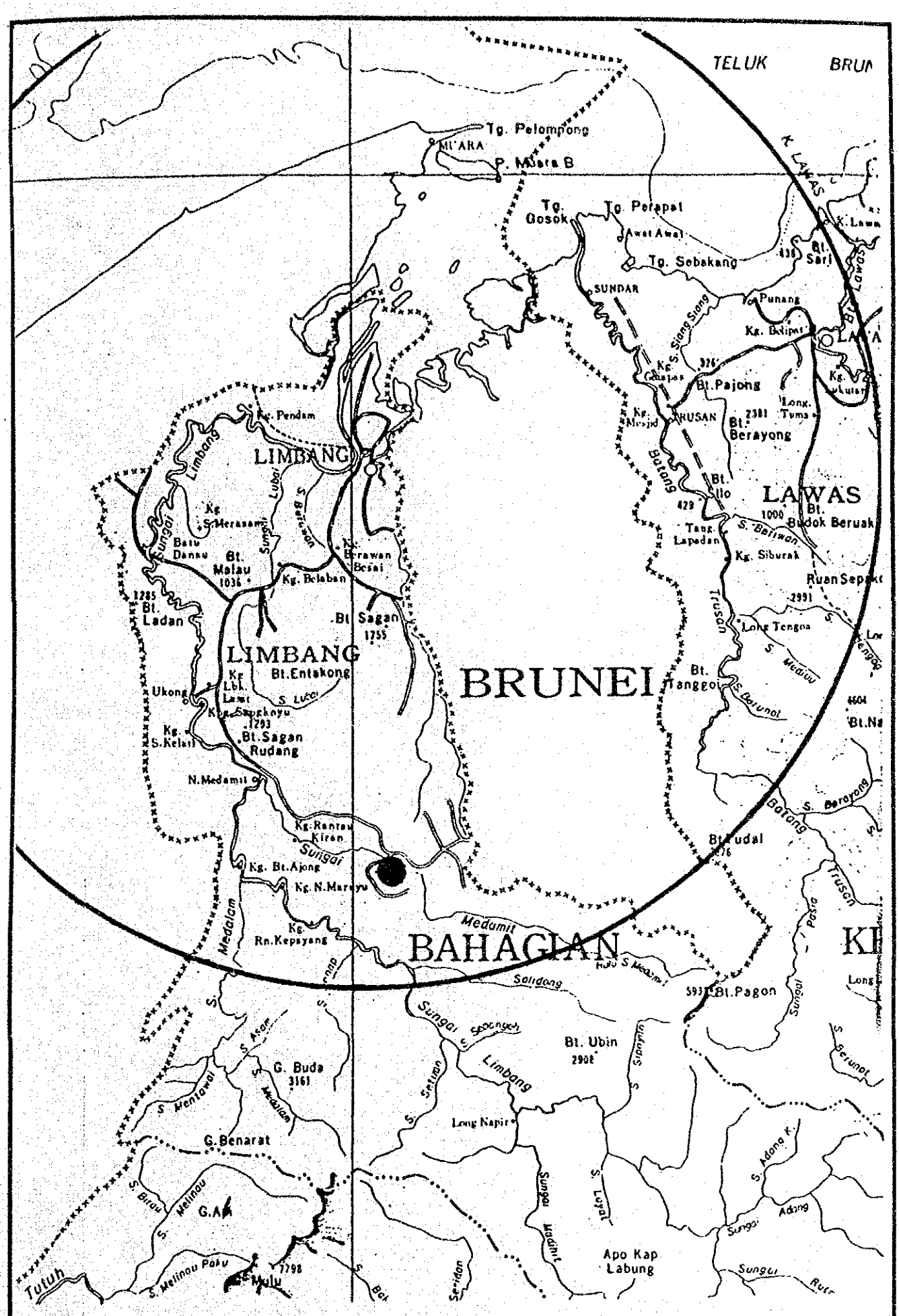
Route	Misclosure (m)
Npkt C to BM1	
Loop 1	0.011 more
" 2	0.013 less
" 3	0.010 more
" 4	0.013 more
" 5	0.014 more
" 6	0.010 less
" 7	0.017 more
BM1 to BM 100	0.003 less
BM1 to BM 200	0.001 more

8. Conclusion

Apart from some difficulties encountered as stated above the survey work was carry out smoothly and completed as scheduled.

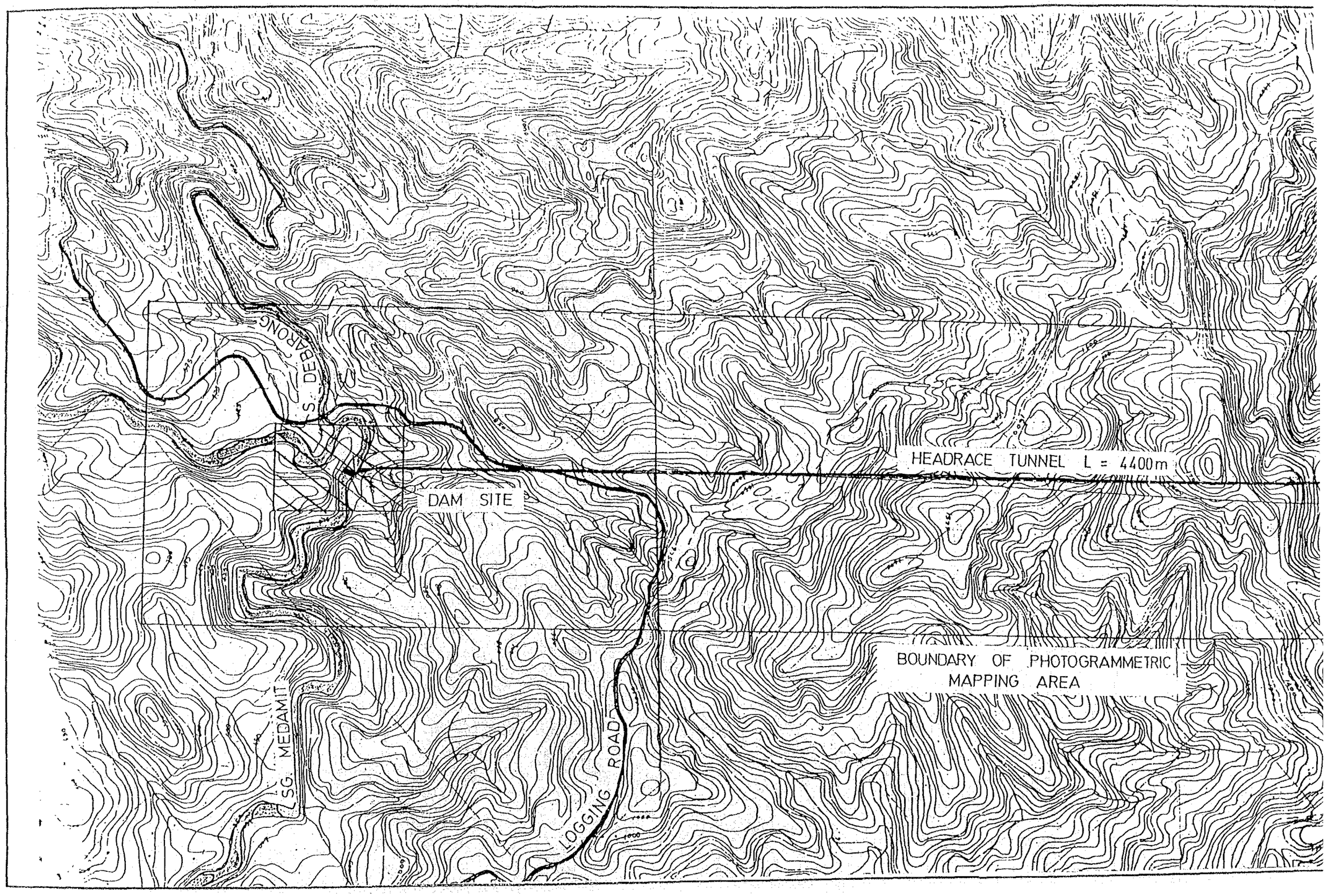
APPENDIX I

LOCALITY PLAN FOR MEDAMIT-2



LOCALITY PLAN OF MEDAMIT-2

GOVERNMENT OF MALAYSIA
FEASIBILITY STUDY
SMALL SCALL HYDROELECTRIC POWER PROJECT IN SARAWAK
JAPAN INTERNATIONAL COOPERATION AGENCY


S. DEBARONG
HEADRACE TUNNEL L = 4400m
DAM SITE
BOUNDARY OF PHOTOGRAMMETRIC MAPPING AREA
SG. MEDAMIT
LOGGING ROAD

SG. LIMBANG

PENSTOCK

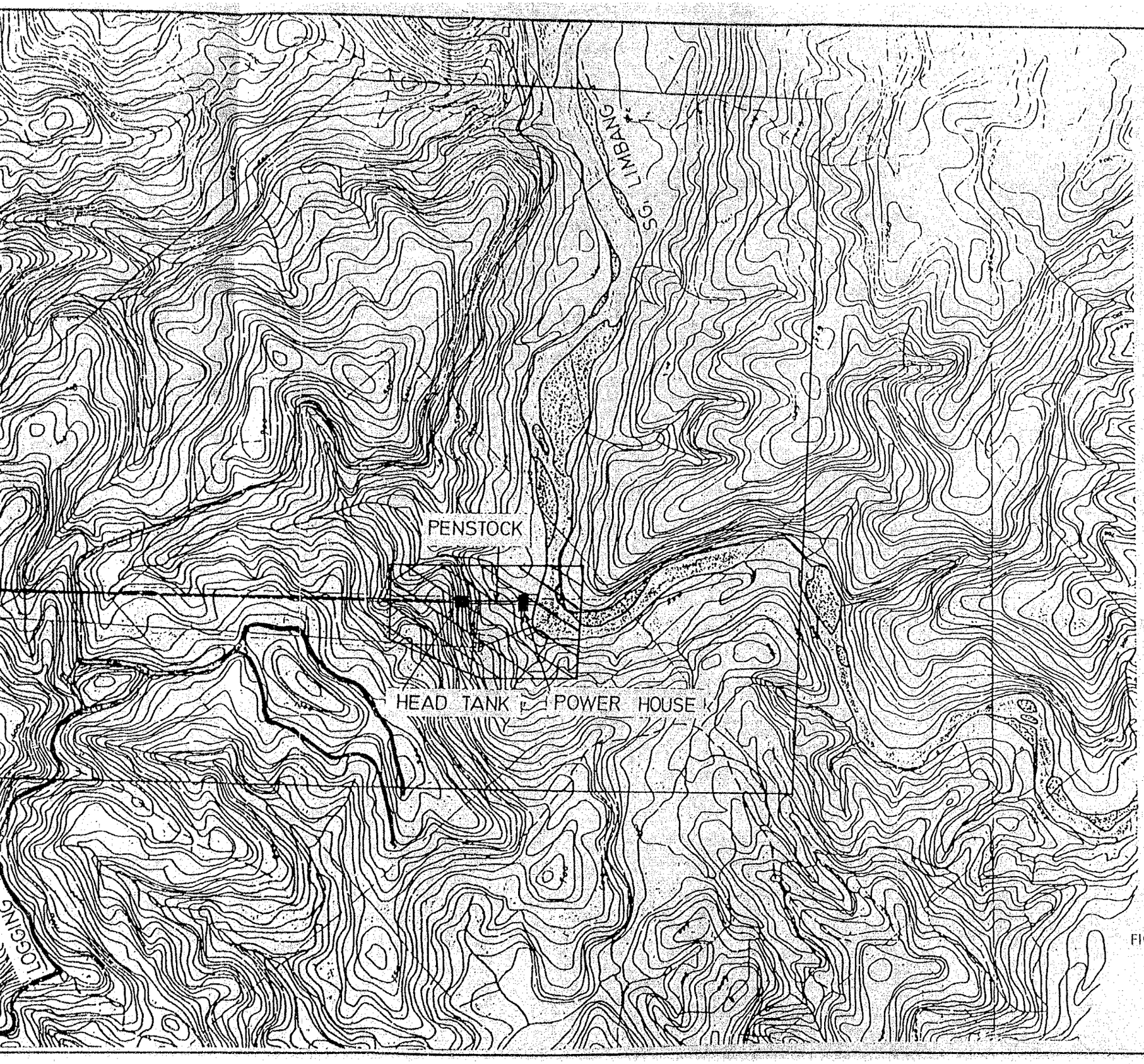
RACE TUNNEL L = 4400m

HEAD TANK

POWER HOUSE

ARY OF PHOTOGRAMMETRIC
MAPPING AREA

LOGGING ROAD



TOPO 9/218
SHEET 1B
SCALE 1:10,000

Proposed Topographic Mapping Area

FIG.A.2 Location Map of Topographic Survey Area for MEDAMIT-2

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