II *GEOLOGICAL SURVEY*

1 INTRODUCTION

1.1 This report presents the soil investigation results for Small Hydro Study In Sarawak – Core Drilling Material Investigation For Medamit - 2, Limbang.

1.2 Its scope is limited to the presentation of factual data obtained from site boring and in-situ testing results.

1.3 All site operations and testing were carried out in accordance with the specification as stated in the Contract or under Clients' Site Engineers direct superivsion.

2 WORK PROGRAM

Site work commenced on 17 June 1987 and completed on 10 August 1987. The total of seven numbers of borehole and nine water pressure tests were carried out. Their borehole locations are shown on Location Plan, see Appendix .

3 FIELD EXPLORATION

3.1 Method of boring

Boreholes were advanced with rotary wash boring method by using water as the drilling fluid. NW size of 76mm inter diameter casings were used to line the borehole walls where encountered soft overburden and other unstable soil formation. During boring work in progress, standard penetration tests were carried out including collected disturbed samples. Detailed boring records and standard penetration test results were also furnished in this report.

3.2 Standard Penetration Test (SPT)

The standard penetration tests were performed in accordance with the specification or as directed by SESCo Engineer on site. This test is to determines the relative density of cohesionless soil and to some extent the consistency cohesive soil. The apparatus consists of a 65 kg hammer with a tripping device that release the hammer at a height of 760mm. The falling energy is then transmitted via an anvil and

drill rod to a standard spoon of 5.08cm outer diameter and 3.49cm inter diameter at the bottom of the cleaned-out borehole. The number of blows to penetrate 450mm into the soil is recorded and the numbers of blow required to penetrate the final 300mm is recorded as 'N' value of SPT. (Excluding first 150mm seating drive).

4 SAMPLING

4.1 Disturbed Soil Samples

Disturbed soil samples were taken from standard penetration test spoon sampler. These representative soil samples were then well labelled and sealed in plastic beg for laboratory test.

5 LABORATORY TEST

All disturbed samples collected from SPT spoon tube were used for soil identification. No specific laboratory test been carried out on the collected soil samples.

LKS/Gg

SUMMARY OF FIELD EXPLORATION AND TEST

(Medamit - 2)

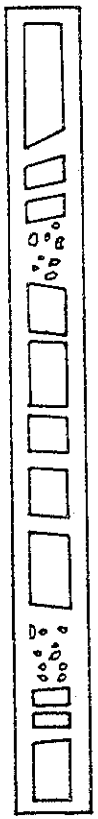
Section A - Table 1

Borehole No.	Reduced Level (m)	Borehole Depth (m)	Boring in Soil (m)	Rock Coring (m)	Standard Penetration Test (No.)	Water Pressure Test (No.)	Date of Boring
BME - 1		21.10	1.60	19.50	1	3	31.7 to 5.8.1987
BME - 2		20.95	10.55	10.40	7	2	7.8 to 10.8.1987
BME - 3		25.30	5.10	20.20	4	-	9.7 to 13.7.1987
BME - 4		22.30	-	22.30	-	3	15.7 to 29.7.1987
BME - 5		30.06	26.06	4.00	18	-	26.6 to 28.6.1987
BME - 6		20.305	20.305	-	13	-	22.6 to 24.6.1987
BME - 7		10.40	7.15	3.25	4	-	17.6 to 19.6.1987

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.
LOT 87 JALAN TAN SRI ONG KEE HUI
KUCHING SARAWAK MALAYSIA

Section A - Table 2

Core Recovery	Modified Core Recovery
10"	10"
2"	
2"	
3"	
4"	4"
5"	5"
3"	
4"	4"
6"	6"
4"	
2"	
5"	5"
50"	34"



Core Run = 60"

Core Recov. = 50/60 = 83%

RQD = 34/60 = 57%

RQD (Rock Quality Designation)	Description of Rock Quality
0 — 25	V. Poor
25 — 50	Poor
50 — 75	Fair
75 — 90	Good
90 — 100	Excellent

Note: If the core is broken by handling or by the drilling process (i.e. the fracture surfaces are fresh irregular breaks rather than natural joint surface), the fresh broken pieces are fitted together and counted as one piece.

Section A - Table 3

WEATHERING CLASSIFICATION TABLE

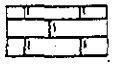
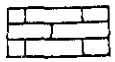
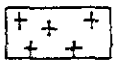
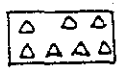
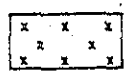
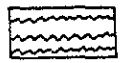
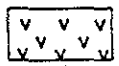
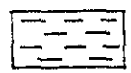
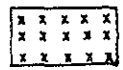
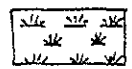
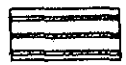
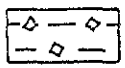
GRADE	TERM	SANDSTONE DESCRIPTION	ARGILLACEOUS DESCRIPTION
I	Fresh	No visible sign of weathering.	No visible sign of weathering.
I	Faintly Weathered	Discolouration only on major discontinuities.	(Term not used).
II	Slightly Weathered	Discolouration may be continuous throughout rock material and on discontinuity surfaces. Rock maybe slightly diminished in strength.	Some indications of chemical discolouration on fracture surfaces.
III	Moderately Weathered	Weathering may extend throughout rock mass, usually totally discoloured. Rock strength diminished. Less than 50% rock decomposed/disintegrated to sand. Rock present either as continuous framework or as corestones. Rock strength diminished.	Rock diminished in in strength with zones or partings of silty clay/clayey silt. Discolouration of fracture surfaces and possibly rock mass.
IV	Highly Weathered	Weathering extends throughout Rock mass. Greater than 50% rock decomposed/disintegrated to sand. Rock strength generally greatly diminished. Rock present as discontinuous framework or as corestones.	Weathered to stiff/very stiff silty clay/clayey silt. May contain gradations to very weak rock or lithorelicts.
V	Completely Weathered	Rock material decomposed to sand with possible minor fragments of weak rock. Structure intact.	Weathered to firm silty clay/clayey silt. Essential mass structure intact.
VI	Residual Soil	As above but structure destroyed. (Generally indistinguishable from Colluvium C).	No structure. (Generally indistinguishable from Colluvium C).

Section A - Table 4 : Colour description

1	2	3
light	pinkish	pink
dark	reddish	red
	yellowish	yellow
	brownish	brown
	olive	olive
	greenish	green
	bluish	blue
		white
	greyish	grey
		black

Section A - Table 5

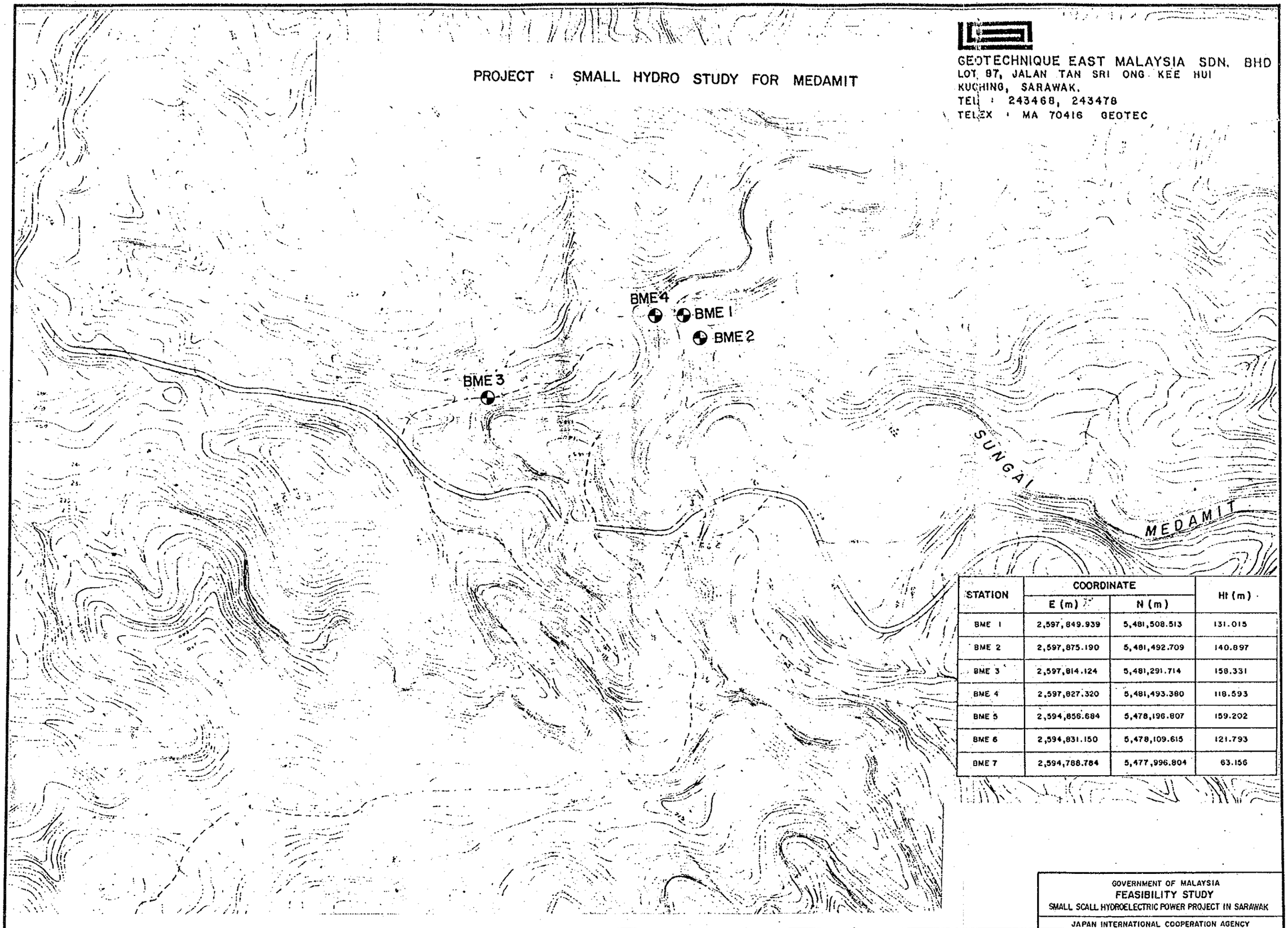
Recommended symbols for soils and rocks

Soil	Rock		
	Sedimentary	Metamorphic	Igneous
 Made ground	 Chalk		
 Boulders and cobbles	 Limestone	 Coarse – grained	 Coarsed – grained
 Gravel	 Conglomerate	 Medium – grained	 Medium – grained
 Sand	 Breccia		
 Silt	 Sandstone	 Fine – grained	 Fine – grained
 Clay	 Siltstone		
 Peat	 Mudstone		
NOTE: Composite soil types will be signified by combined symbols, e.g.	 Shale		
 Silty sand	 Coal		
	 Pyroclastic (Volcanic ash)		
	 Gypsum, Rocksalt etc.		

Argillaceous

PROJECT : SMALL HYDRO STUDY FOR MEDAMIT

GEOTECHNIQUE EAST MALAYSIA SDN. BHD
LOT 87, JALAN TAN SRI ONG KEE HUI
KUCHING, SARAWAK.
TEL : 243468, 243478
TELEX : MA 70416 GEOTEC



STATION	COORDINATE		Ht (m)
	E (m)	N (m)	
BME 1	2,597,849.939	5,481,508.513	131.015
BME 2	2,597,875.190	5,481,492.709	140.897
BME 3	2,597,814.124	5,481,291.714	158.331
BME 4	2,597,827.320	5,481,493.380	118.593
BME 5	2,594,856.684	5,478,196.807	159.202
BME 6	2,594,831.150	5,478,109.615	121.793
BME 7	2,594,788.784	5,477,996.804	63.156

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

PROJECT : SMALL HYDRO STUDY FOR MEDAMIT

GEOTECHNIQUE EAST MALAYSIA SDN. BHD
LOT 87, JALAN TAN SRI ONG KEE HUI
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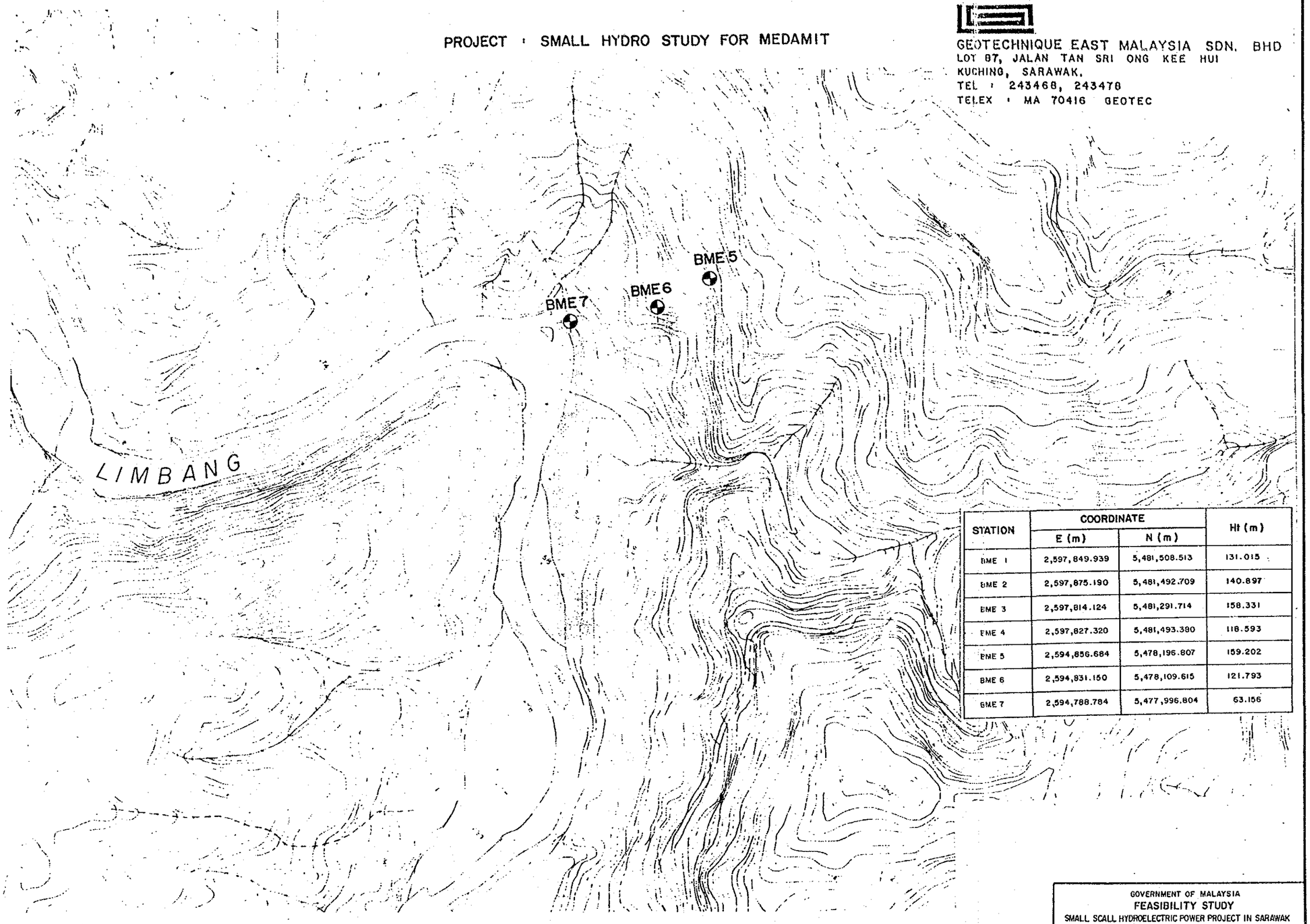

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BME 7	2,594,788.784	5,477,996.804	63.156

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

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No BMe 1

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Diversion Weir
LOCATION Intake

CO-ORDINATES E 2597 849.94 m, N 5481 508.51 m
SYSTEM S'wak Survey Grid

SURFACE ELEVATION 131.02 m
ANGLE FROM HORIZONTAL 90°
DIRECTION —

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition) | SPT | DEGREE OF WEATHERING (Fr, Fr Si, SW, MW, HW, CW) | CORE SIZE | metres: ELEVATION, DEPTH | SYMBOLIC LOG | RQD (CASING, CORE LOSS % PER LIFT) | STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, fillings; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES) | FRACTURE LOG | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST LUGEON VALUE / EFFECTIVE PRESSURE (BAR) / LUGEON PATTERN

Overburden
no coring
1.6 m

Sandstone, fine to medium grained light grey, very fractured, some quartz veins could be seen.

- 70° Joint planar intersected 40° Joint at right angle
- 40° Joint rough
- 70° Joint planar
- 30° Joint planar
- 45° Joint planar
- 35° Joint planar

(70°, 40°, 30°, 45° Joints: limonite stained)

- 35° Joint planar intersected 80° Joint planar at oblique angle both limonite stained
- 45° Joint planar limonite stained
- 30° Joint intersected 75° Joint at right angle both limonite stained
- 3 45° Joints planar.
- Crushed rock with 45° – 75° Joint planar predominant.
- Subvertical Joint rough limonite stained
- 35° Joint planar
- 35°, 35°, 35° Joints planar brown to black coated
- Set of 35° Joints planar mostly stained
- 45° Joint planar limonite stained
- Set of 45° Joint planar brown to black coated
- Subvertical Joint slightly warped brown to black coated
- 5 15° Joints, 3–9 cm spacing planar limonite stained
- Subvertical Joint planar limonite stained.
- 60° Joint intersected 15° Joint at right angle, both planar with limonite stained
- 70° Joint rough limonite stained
- Subvertical Joint warped brown to black coated
- Set of 60° Joint warped black coated
- Set of 35° Joint limonite stained

DRILL Make Rotary, Type YBM-05
Date Commenced 7.8.87, Completed 10.8.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
Casing
Water Pressure
Soil section

WEATHERING
CW – Completely weathered
HW – Highly weathered
MW – Moderately weathered
SW – Slightly weathered
Fr Si – Fresh, with Limonite stained joints
Fr – Fresh

Logged VNT
Drawn VNT
Checked VNT
Sheet 1 of 3

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 1

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Diversion Weir
LOCATION Intake

CO-ORDINATES E 2597 849.94 m, N 5481 508.51 m
SYSTEM S'wak Survey Grid

SURFACE ELEVATION 131.02 m
ANGLE FROM HORIZONTAL 90°
DIRECTION –

DESCRIPTION OF CORE — ROCK TYPE — colour, grain size, texture, mineral composition

SPT | DEGREE OF WEATHERING (Fr, Fr Sl, SW, MW, HW, CW) | CORE SIZE | metres: ELEVATION / DEPTH | SYMBOLIC LOG | CASING | RQD (%) | CORE LOSS % PER LIFT | STRUCTURES — JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, lining; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES | FRACTURE LOG (N) | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST — LUGEON VALUE, EFFECTIVE PRESSURE (BAR), LUGEON PATTERN

Sandstone, fine to medium grained light grey with thin quartz vein intercolated common.

11
- 45° Joint planar limonite stained
- 45° Joint planar brown to black coated
- Set of 50° Joints planar brown to black coated
- Set of 15° Joints brown to black coated
- 25° Joints planar rusty coated
- 55° Joints planar limonite coated
- 60° Joint planar

12
- subvertical Joint planar brown coated
- Set of 35° Joints rusty coated
- 45° Joint limonite coated

13

Crushed rock with 25°-50° Joint planar brown to black coated predominant.

14

15

SAMPLE

16
- Set of 30° Joint planar
- subvertical Joint warped

17
- 30° Joint planar
- 70° Joint planar

70° Joint planar quartz crystal patches

18

75° Joint rough quartz crystal patches
crushed rock

19
- 50° Joint rough

20
- 20° Joint planar

DRILL: Rotary, YBM-05
Commenced 31.7.87
Completed 5.8.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
bit
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
FrSt — Fresh, with Limonite stained joints
Fr — Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 2 of 3

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 1

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Diversion Weir
LOCATION Intake

CO-ORDINATES E 2597 849.94 m, N 5481 508.51 m
SYSTEM S'wak Survey Grid

SURFACE ELEVATION 131.02 m
ANGLE FROM HORIZONTAL 90°
DIRECTION –

DESCRIPTION OF CORE (ROCK TYPE – colour, grain size, texture, mineral composition)	DEPTH (metres)	STRUCTURES (JOINTS – spacing, attitude, smoothness, aperture, cementing, coating, filling; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES)
Sandstone, fine to medium grained light grey.	21	25° Joint planar; 25° Joint rough; 40° Joint intersected 20° Joint at right angle, both planar
21.10 m. End of Core.	2, 3, 4, 5, 6, 7, 8, 9, 0	

Other columns: SPT; DEGREE OF WEATHERING (Fr, Fr St, SW, MW, HW, CW); CORE SIZE; ELEVATN; SYMBOLIC LOG; LIFTS / CASING; RQD (20 40 60 80) / CORE LOSS % PER LIFT; FRACTURE LOG (2 6 10 20 … 60 100 200); DRILL WATER LOSS; GROUNDWATER LEVEL DATE; WATER PRESSURE TEST – LUGEON VALUE (l/m/min), EFFECTIVE PRESSURE (BAR), LUGEON PATTERN.

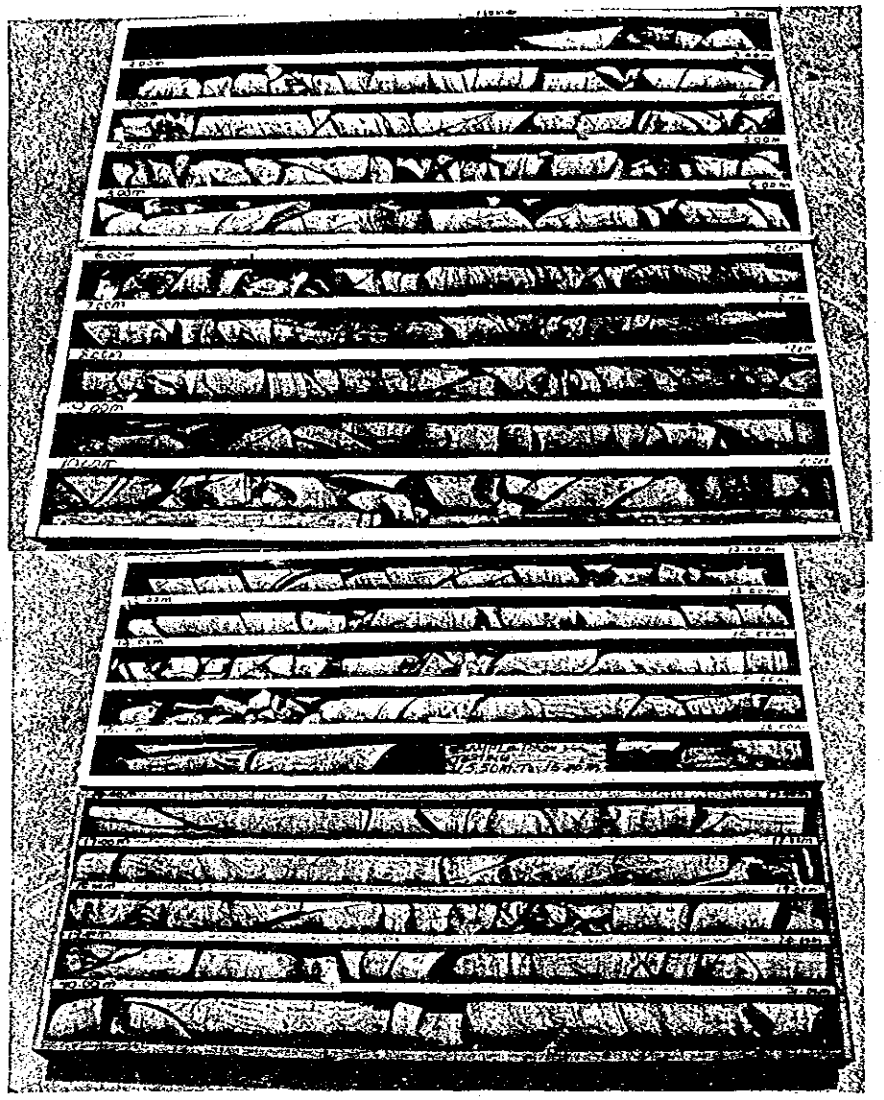
DRILL: Make Rotary; Type YBM-05
Date: Commenced 31.7.87; Completed 5.8.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
lift
Water Pressure
test section

WEATHERING
CW – Completely weathered
HW – Highly weathered
MW – Moderately weathered
SW – Slightly weathered
F/St – Fresh, with limonite stained joints
Fr – Fresh

Logged VNT
Drawn VNT
Checked VNT
Sheet 3 of 3



MEDAMIT-2 SMALL HYDRO-ELECTRIC PROJECT

DIAMOND DRILL HOLE BMe 1

1.60 m - 21.00 m

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 2

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Diversion Weir
LOCATION Intake

CO-ORDINATES E 2597 875.19 m, N 5481 492.71 m
SYSTEM S'wak Survey Grid

SURFACE ELEVATION 140.90 m
ANGLE FROM HORIZONTAL 90°
DIRECTION --

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition) | SPT | DEGREE OF WEATHERING (Ft, Ft Sl, SW, MW, HW, CW) | CORE SIZE | ELEVATION | DEPTH | SYMBOLIC LOG | LIFTS / CASING | RQD / CORE LOSS % PER LIFT (80, 60, 40, 20) | STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, fining; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES) | FRACTURE LOG (2, 6, 10, 20, 60, 100, 200) | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST LUGEON VALUE / EFFECTIVE PRESSURE (BAR) / LUGEON PATTERN

Overburden
no coring
10.55m

Laminated shale
dark grey, very
fine grained.
Some thin quartz
veins interbedded

Very fractured rock, common fractures along the bedding plane dipping at 45°, slickensided on bedding planes common

SAMPLE

11 12 13 14 15 16 17 18 19 20

DRILL: Rotary
RIG: YBM-05
START: 7.8.87
FINISH: 10.8.87

FRACTURE LOG

EXPLANATION
Natural breaks in core on mark
Equivalent lengths of core pieces in centimetres
casing
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
Ft/Sl — Fresh, with Extra slightly stained joints
Ft — Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 1 of 2

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 2

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Diversion Weir
LOCATION: Intake

CO-ORDINATES: E 2597 875.19 m, N 5481 492.71 m
SYSTEM: S'wak Survey Grid

SURFACE ELEVATION: 140.90 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: –

DESCRIPTION OF CORE (ROCK TYPE – colour, grain size, texture, mineral components) | SPT | DEGREE OF WEATHERING (Fr, FrSt, SW, MW, HW, CW) | CORE SIZE | ELEVATION | DEPTH (metres) | SYMBOLIC LOG | CASING | RQD (CORE LOSS % PER LIFT: 20, 40, 60, 80) | STRUCTURES (JOINTS – spacing, attitude, smoothness, aperture, cementing, coating, infilling; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES) | FRACTURE LOG (2, 6, 20, 60, 200) | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST LUGEON VALUE (Litre/min) / EFFECTIVE PRESSURE (BAR) / LUGEON PATTERN

– do –

45° Joint planar.
½ set of 45° bedding planar.
crushed rock.

20.95m END OF CORE

0 1 2 3 4 5 6 7 8 9

DRILL: Make Rotary; Type YBM-05
Started 7.8.87
Completed 10.8.87

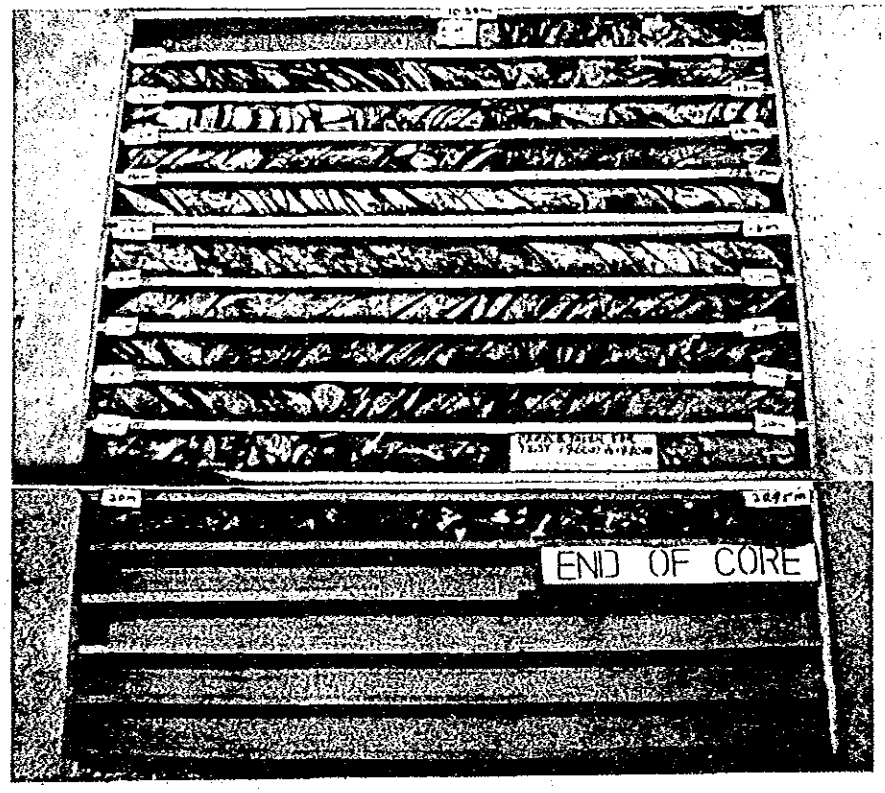
FRACTURE LOG (Fr, FrSt, SW, MW, HW, CW)

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core metres in centimetres
Casing
Nil
Water Pressure
Test section

WEATHERING
CW – Completely weathered
HW – Highly weathered
MW – Moderately weathered
SW – Slightly weathered
FrSt – Fresh, with Limonite stained joints
Fr – Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 2 of 2



MEDAMIT-2 SMALL HYDRO-ELECTRIC PROJECT

DIAMOND DRILL HOLE BMe 2

11.50 m - 20.95 m

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 3

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Headrace Tunnel
LOCATION Intake

CO-ORDINATES E 2597 814.12 m, N 5481 291.71 m
SYSTEM S'wak Survey Grid

SURFACE ELEVATION 158.33 m
ANGLE FROM HORIZONTAL 90°
DIRECTION —

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, mineral composition) | SPT | DEGREE OF WEATHERING (Fr, Fr.S, SW, MW, HW, CW) | CORE SIZE | ELEVATION / DEPTH (metres) | SYMBOLIC LOG | U.T.S. CASING | RQD / CORE LOSS % PER LIFT | STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, lining; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES) | FRACTURE LOG | DRILL WATER LOSS | GROUNDWATER LEVEL, DATE | WATER PRESSURE TEST LUGEON VALUE / EFFECTIVE PRESSURE (BAR) | LUGEON PATTERN

Overburden

no coring

5.10m

Shale, dark grey fine grained thinly laminated form.

Subvertical Joint.

Fairly cracked rock, lightly sheared with steep angle Joints, quartz patches and slickensided features predominant.

80° Joint smooth, slickensided.

75° Joint warped slightly sheared

60° Joint smooth, slickensided.

DRILL Make Rotary Type YBM-05
Driller
Commenced 9.7.87
Completed 13.7.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
coring
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
FrSt — Fresh, with Limonite stained joints
Fr — Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 1 of 3

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No BMe 3

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Headrace Tunnel
LOCATION Intake

CO-ORDINATES E 2597 814.12 m, N 5481 291.71 m
SYSTEM

SURFACE ELEVATION 158.33 m
ANGLE FROM HORIZONTAL 90°
DIRECTION –

DESCRIPTION OF CORE
ROCK TYPE – colour, grain size, texture, mineral composition

SPT

DEGREE OF WEATHERING
Fr | Fr.St | SW | MW | HW | CW

CORE SIZE

metres
ELEVATION
DEPTH

SYMBOLIC LOG

CASING

RQD
CORE LOSS % PER LIFT
20 | 40 | 60 | 80

STRUCTURES
JOINTS – spacing, attitude, smoothness, aperture, cementing, coating, infilling. BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES

FRACTURE LOG
2 | 10 | 20 | 50 | 100 | 200

DRILL WATER LOSS

GROUNDWATER LEVEL DATE

WATER PRESSURE TEST
LUGEON VALUE
5 m/min
EFFECTIVE PRESSURE (BAR)
LUGEON PATTERN

Shale, dark grey fine grained, in laminated form, highly sheared.

11
12
13
14
15
16
17
18
19
20

85° Joint slickensided (smooth)
-65° Joint planar, slickensided in patches
Highly sheared rock, steep angle joint with slickensided features common.
-65° Joint planar slickensided patches
75° Joint slickensided quartz patches
80° Joint slickensided quartz patches
70° Joint slightly warped highly sheared
crushed rock highly sheared
65° Joint slickensided
75° Joint smooth & warped
75° Joint intersected by Joint warped and sheared
few 70° bedding parallel to each other about 5cm spacing
75° Joint planar slickensided
Subvertical Joint warped

Rock are highly fractured with slickensided features on steep joints predominant.

DRILL
Make Rotary
Type YBM-05
Order
Commenced 9.7.87
Completed 13.7.87

FRACTURE LOG
Fr | 2 | 10 | 20 | 50 | 100 | 200
100% | 10 | 2 | 0.5

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
bit
Water Pressure
test section

WEATHERING
CW – Completely weathered
HW – Highly weathered
MW – Moderately weathered
SW – Slightly weathered
Fr.St – Fresh, with Limonite stained joints
Fr – Fresh

Logged VNT
Drawn VNT
Checked VNT
Sheet 2 of 3

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 3

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Headrace Tunnel
LOCATION: Intake

CO-ORDINATES E 2597 814.12 m, N 5481 291.71 m
SYSTEM: Sarawak Survey Grid

SURFACE ELEVATION: 158.33 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: –

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition) | SPT | DEGREE OF WEATHERING (Fr, Fr Si, SW, MW, HW, CW) | CORE SIZE | metres ELEVATION / DEPTH | SYMBOLIC LOG | RQD (% per 1st casing) | CORE LOSS (% per lift) | STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, filling; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES) | FRACTURE LOG | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST: LUGEON VALUE, EFFECTIVE PRESSURE (BAR), LUGEON PATTERN

Shale, dark grey very fine grained in laminated form, highly fractured. (highly sheared)

- Subvertical Joint warped
- 65° Joint slickensided
- 65° Joint warped and rough
- 70° Joint smooth and slickensided
- subvertical Joint warped sheared, slickensided
- Subvertical Joint warped
- 70° Joint slickensided
- 75° Joint warped and slickensided (sheared)

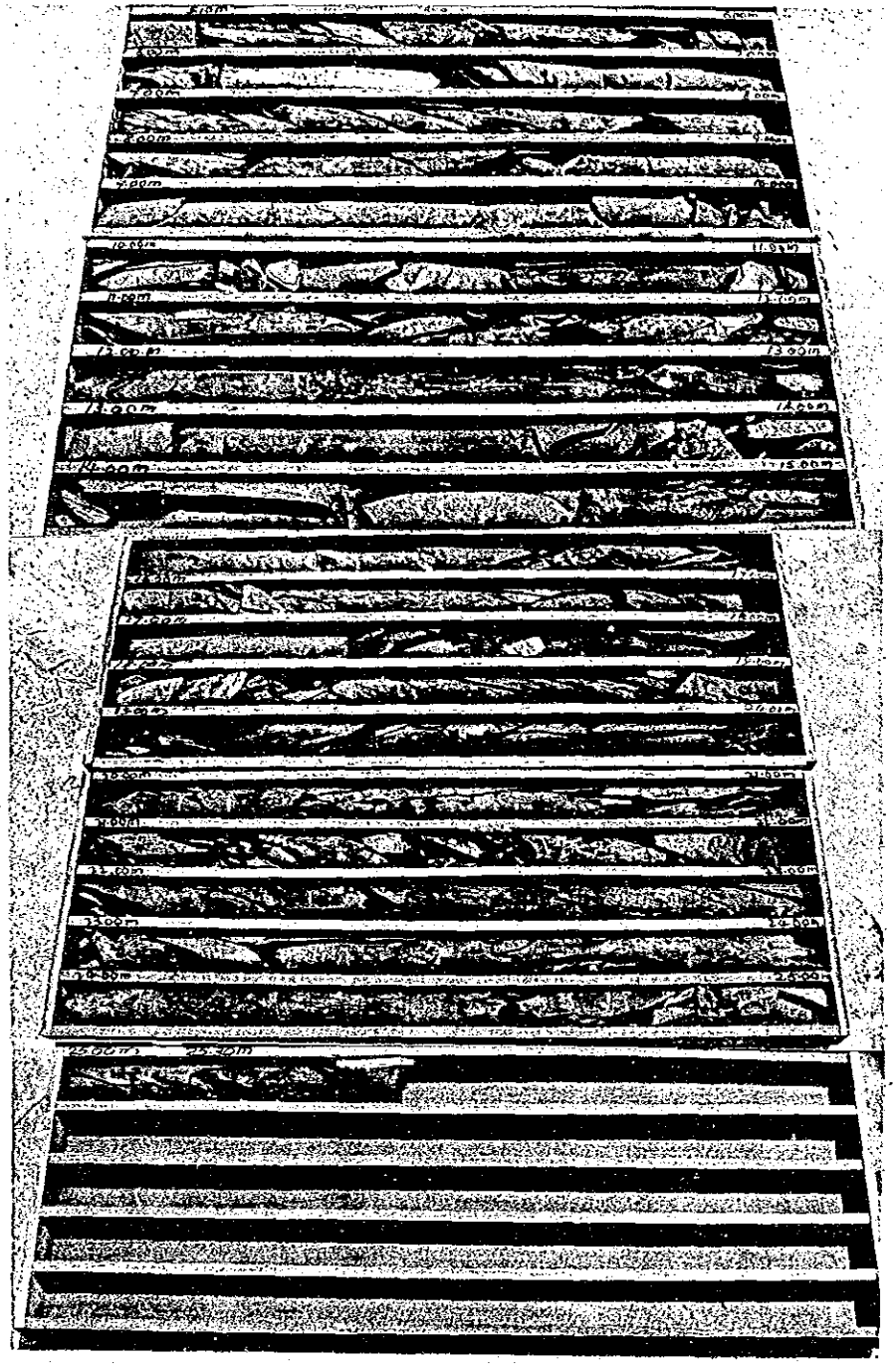
25.30m END OF CORE

Drill Make	Rotary	Logged	VNT
Type	YBM-05	Drawn	VNT
Dates Commenced	9.7.87	Checked	VNT
Completed	13.7.87	Sheet	3 of 3

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
bit
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
FrSi — Fresh, with Limonite stained joints
Fr — Fresh



MEDAMIT-2 SMALL HYDRO-ELECTRIC PROJECT

DIAMOND DRILL HOLE BMe 3

5.10 m - 25.30 m

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 4

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Diversion Weir
LOCATION: Intake

CO-ORDINATES: E 2597 827.32 m, N 5481 493.38 m
SYSTEM: S'wak Survey Grid

SURFACE ELEVATION: 118.59 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: --

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition) | SPT | DEGREE OF WEATHERING (Fr, Fr-Sl, SW, MW, HW, CW) | CORE SIZE | metres ELEVATION / DEPTH | SYMBOLIC LOG | LET'S CASING | RQD % | CORE LOSS % PER LIFT (20, 40, 60, 80) | STRUCTURES — JOINTS (spacing, attitude, smoothness, aperture, cementing, coating, filling), BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES | FRACTURE LOG (0, 10, 20, 50, 100, 200) | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST: LUGEON VALUE, EFFECTIVE PRESSURE (BAR), LUGEON PATTERN

Sandstone, fine to medium grained, light grey.

Subvertical Joint, rough with limonite stained

30° Joint intersected 85° Joint at right angle, limonite stained Cavity, shale infill.
50° Joint rough.
70° Joint planar

crushed rock.
50° Joint planar

65° Joint planar.
60° Joint Quartz crystal patched
65° Joint. Quartz crystal patched intersected with 80° Joint planar at oblique angle
Fractured rock with some quartz crystal patched.

Fractured rock with shallow Joint angle 10° - 40°. quartz patched common.

15° Joint rough
40° Joint planar

25° Joint rough
65° Joint planar.

DRILL
Make: Rotary
Type: YPM-05

Order:
Commenced: 15.7.87
Completed: 29.7.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
bit
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
Fr-Sl — Fresh, with Limonite stained joints
Fr — Fresh

Logged: VNT
Drawn: VNT
Checked: VNT

Sheet 1 of 3

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 4

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Diversion Weir
LOCATION: Intake

CO-ORDINATES E 2597 827.32 m, N 5481 493.38 m
SYSTEM: S'wak Survey Grid

SURFACE ELEVATION: 118.59 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: –

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition) | SPT | DEGREE OF WEATHERING (Ft, Fr-Sl, SW, MW, HW, CW) | CORE SIZE | ELEVATION / DEPTH (metres) | SYMBOLIC LOG | LOST CASING | RQD / CORE LOSS % PER LIFT | STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, lining; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES) | FRACTURE LOG | DRILL WATER LOSS | GROUNDWATER LEVEL DATE | WATER PRESSURE TEST LUGEON VALUE / EFFECTIVE PRESSURE (BAR) / LUGEON PATTERN

Sandstone, fine to medium grained light grey

- Crushed rock.
- 25° Joint rough
- 50° Joint warped
- 20° Joint planar
- Three 20° Joints planar, parallel to each other
- 55° Joint warped and rough
- 50° Joint planar
- Quartz crystal vein at 60° angle
- Set of 40° Joint rough
- 30° Joint planar.
- 30° Joint, slickensided thin shale patched
- 20° Joint planar.
- 50° Joint warped.
- crushed rock.
- Three 25° Joints planar
- Set of 60° Joint planar
- 50° Joint warped slightly sheared
- Quartz vein irregular shape
- 75° Joint planar
- 20° Joint planar
- Sample 17.15 – 17.35m
- 20° Joint planar
- 25° Joint warped.
- 15° Joint slightly slickensided dark grey coated
- 50° Joint rough.
- sheared zone
- Set of 30° Joints slickensided
- 15° Joint rough are Common

DRILL: Make Rotary, Type YBM-05
Order
Commenced 15.7.87
Completed 29.7.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Continuous lengths of core pieces in centimetres
casing
Water Pressure
test section

WEATHERING
CW – Completely weathered
HW – Highly weathered
MW – Moderately weathered
SW – Slightly weathered
Fr St – Fresh, with Limonite stained joints
Fr – Fresh

Logged VNT
Drawn VNT
Checked VNT
Sheet 2 of 3

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 4

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Diversion Weir
LOCATION: Intake

CO-ORDINATES: E 2597 827.32 m, N 5481 493.38 m
SYSTEM: S'wak Survey Grid

SURFACE ELEVATION: 118.59 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: –

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition)	SPT	DEGREE OF WEATHERING (Fr, Fr.Sh, SW, HW, MW, CW)	CORE SIZE	ELEVATN / DEPTH (metres)	SYMBOLIC LOG	CASING (DEPTH)	RQD / CORE LOSS % PER LIFT	STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, filling; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES)	FRACTURE LOG	DRILL WATER LOSS	GROUNDWATER LEVEL DATE	WATER PRESSURE TEST: LUGEON VALUE / EFFECTIVE PRESSURE (BAR) / LUGEON PATTERN
Sandstone, fine to medium grained light grey.				21				Set of 20° Joint, slickensided (highly sheared)				
								20° Joint warped				
								Set of 20° Joint slickensided.				
				22				Three 20° Joints slickensided, dark brown coated				
								Set of 20° Joints rough				
22.30 m END OF CORE												
				3								
				4								
				5								
				6								
				7								
				8								
				9								
				0								

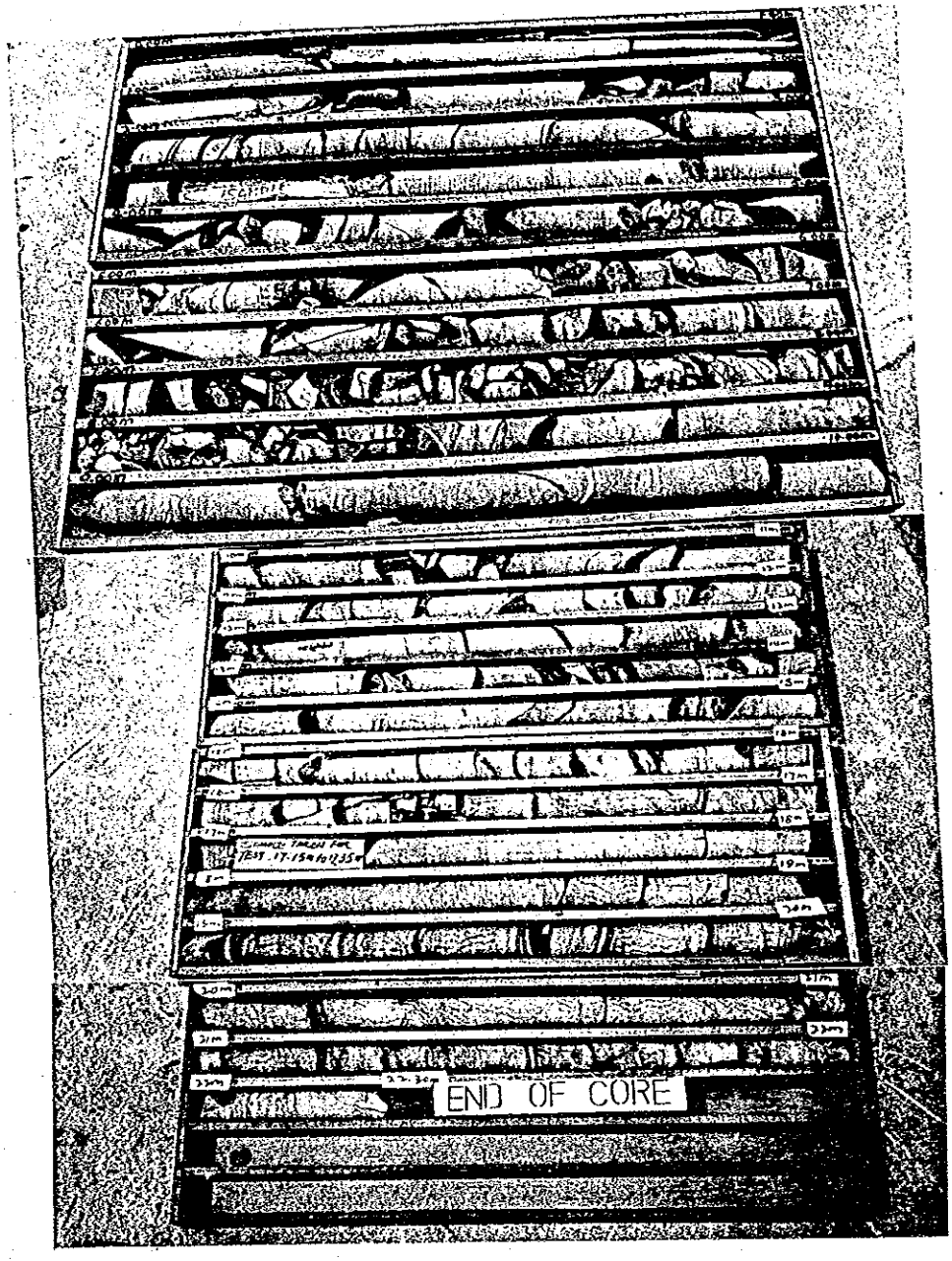
DRILL: Make Rotary; Type YBM-05
Driller:
Commenced 15.7.87
Completed 29.7.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
FrSh — Fresh, with Limonite stained joints
Fr — Fresh

Logged VNT
Drawn VNT
Checked VNT
Sheet 3 of 3



MEDAMIT-2 SMALL HYDRO-ELECTRIC PROJECT

DIAMOND DRILL HOLE BMe 4

0.00 m - 22.30 m

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No BMe 5

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Surge Tank
LOCATION Power House

CO-ORDINATES E 2,594,856.684 m
N 5,478,196.807 m
SYSTEM S'wak Survey Grid

SURFACE ELEVATION 159.20 m
ANGLE FROM HORIZONTAL 90°
DIRECTION —

DESCRIPTION OF CORE
ROCK TYPE — colour, grain size, texture, mineral composition

SPT

DEGREE OF WEATHERING
Fr | Fr-Sl | SW | MW | HW | CW

CORE SIZE

metres
ELEVATN
DEPTH

SYMBOLIC LOG

RQD
CORE LOSS % PER LIFT

STRUCTURES
JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, infilling
BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES

FRACTURE LOG

DRILL WATER LOSS

GROUNDWATER LEVEL DATE

WATER PRESSURE TEST
LUGEON VALUE
EFFECTIVE PRESSURE (BAR)
LUGEON PATTERN

Overburden
no coring
26.06 m

Shale, very fine grained, dark grey.

- set of 55° Joint rough
- SAMPLE
- 60° Joint rough
- crushed & fractured rock.
- 70° Joint rough
- set of 70° Joint rough.
- slightly fractured rock

30.06m END OF CORE

DRILL
Make Rotary
Type YBM-05

Date
Commenced 26.6.87
Completed 28.6.87

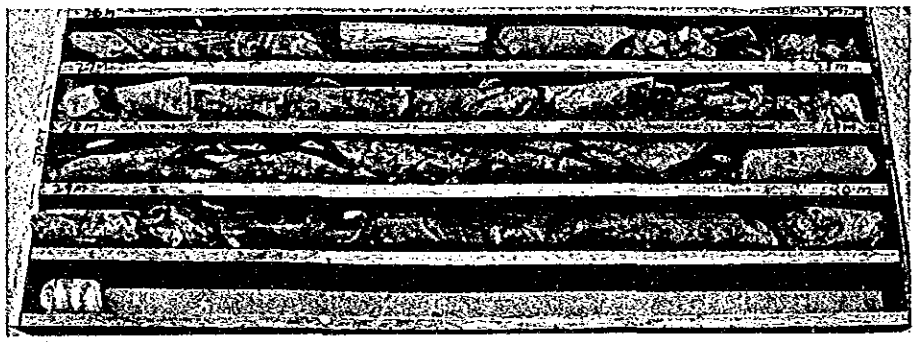
FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres.
coring
bit
Water Pressure
end section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
F/Sr — Fresh, with Clay ... stained joints
Fr — Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 1 of 1



MEDAMIT-2 SMALL HYDRO-ELECTRIC PROJECT

DIAMOND DRILL HOLE BMe 5

26.00 m - 30.06 m

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 6

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Penstock Line
LOCATION: Power House

CO-ORDINATES: E 2594 831.15 m, N 5478 109.62 m
SYSTEM: S'wak Survey Grid

SURFACE ELEVATION: 121.79 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: –

DESCRIPTION OF CORE (ROCK TYPE – colour, grain size, texture, mineral composition)	SPT	DEGREE OF WEATHERING (Fr, Fr/St, SW, MW, HW, CW)	CORE SIZE	ELEVATION / DEPTH (metres)	SYMBOLIC LOG	LIFT & CASING	RQD / CORE LOSS % PER LIFT	STRUCTURES (JOINTS – spacing, attitude, smoothness, aperture, cementing, coating, infilling; BEDDING, FOLIATION, VEINS, SEAMS; FAULTS, CRUSHED ZONES)	FRACTURE LOG	DRILL WATER LOSS	GROUNDWATER LEVEL, DATE	WATER PRESSURE TEST: LUGEON VALUE / EFFECTIVE PRESSURE (BAR); LUGEON PATTERN
NO CORE RECOVERY TILL 20.30m				0 1 2 3 4 5 6 7 8 9								

DRILL: Make Rotary; Type YBM-05
Commenced 22.6.87
Completed 24.6.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
casing
bit
Water Pressure
test section

WEATHERING
CW – Completely weathered
HW – Highly weathered
MW – Moderately weathered
SW – Slightly weathered
Fr/St – Fresh, with iron-stained joints
Fr – Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 1 of 1

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No BMe 7

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT Medamit-2 Small Hydro Project
FEATURE Power Station
LOCATION Power House

CO-ORDINATES E 2,594,788,784 m
N 5,477,996,804 m
SYSTEM S'wak Survey Grid

SURFACE 63.16 m
ELEVATION
ANGLE FROM 90°
HORIZONTAL
DIRECTION —

DESCRIPTION OF CORE
ROCK TYPE — colour, grain size, texture, mineral composition

SPT

DEGREE OF WEATHERING
Fr | Fr.Sl | SW | MW | HW | CW

CORE SIZE

metres
ELEVATION
DEPTH

SYMBOLIC LOG

CASING

RQD
CORE LOSS % PER LIFT

STRUCTURES
JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, infilling
BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES

FRACTURE LOG

DRILL WATER LOSS

GROUNDWATER LEVEL DATE

WATER PRESSURE TEST
LUGEON VALUE
l/m/min
EFFECTIVE PRESSURE (BAR)
LUGEON PATTERN

Overburden
no coring
7.15 m

Limestone, very grained, light grey with thin (mm to cm thick) quartz veins interdolated predominant

- 40° Joint warped
- 80° Joint rough
- 25° Joint warped
- 35° Joint warped
- 20° Joint rough
- 28° Joint rough
- 25° Joint rough
- 30° Joint planar
- 30° Joint rough
- 15° Joint rough .

DRILL
Make Rotary
Type YBM-05

Driller
Commenced 17.6.87
Completed 19.7.87

FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres

casing
Water Pressure
test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
Fr.Sl — Fresh, with Limonite stained joints
Fr — Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 1 of 2

SARAWAK ELECTRICITY SUPPLY CORPORATION

HOLE No. BMe 7

DIAMOND DRILL HOLE — GEOLOGICAL LOG

PROJECT: Medamit-2 Small Hydro Project
FEATURE: Power Station
LOCATION: Power House

CO-ORDINATES E 2,594,788,784 m, N 547,996,804 m
SYSTEM: S'wak Survey Grid

SURFACE ELEVATION: 63.16 m
ANGLE FROM HORIZONTAL: 90°
DIRECTION: –

DESCRIPTION OF CORE (ROCK TYPE — colour, grain size, texture, mineral composition)	SPT	DEGREE OF WEATHERING (Fr, Fr Si, SW, MW, CW)	CORE SIZE	metres ELEVATN / DEPTH	SYMBOLIC LOG	CASING DEPTH	RQD % / CORE LOSS % PER LIFT	STRUCTURES (JOINTS — spacing, attitude, smoothness, aperture, cementing, coating, infilling; BEDDING, FOLIATION, VEINS, SEAMS, FAULTS, CRUSHED ZONES)	FRACTURE LOG	DRILL WATER LOSS	GROUNDWATER LEVEL, DATE	WATER PRESSURE TEST: LUGEON VALUE / EFFECTIVE PRESSURE (BAR) / LUGEON PATTERN
– do –								15° Joint rough in cavity form.				
10.40 m End of Core				1 2 3 4 5 6 7 8 9 0								

DRILL: Make Rotary; Type YBM-05
Driller:
Commenced 17.6.87
Completed 19.7.87

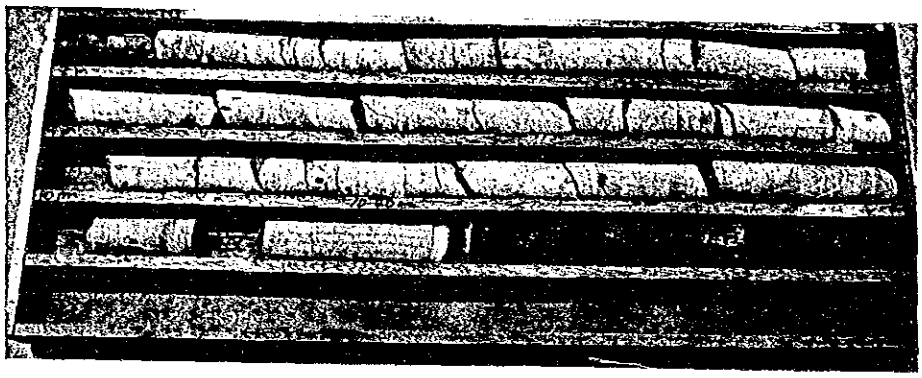
FRACTURE LOG

EXPLANATION
Natural breaks in core per metre
Equivalent lengths of core pieces in centimetres
coating
bit
Water Pressure test section

WEATHERING
CW — Completely weathered
HW — Highly weathered
MW — Moderately weathered
SW — Slightly weathered
FrSi — Fresh, with Limonite stained joints
Fr — Fresh

Logged VNT
Drawn VNT
Checked VNT

Sheet 2 of 2



MEDAMIT-2 SMALL HYDRO-ELECTRIC PROJECT

DIAMOND DRILL HOLE BMe 7

7.15 m - 10.40 m

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.
Foundation & Soil Specialists

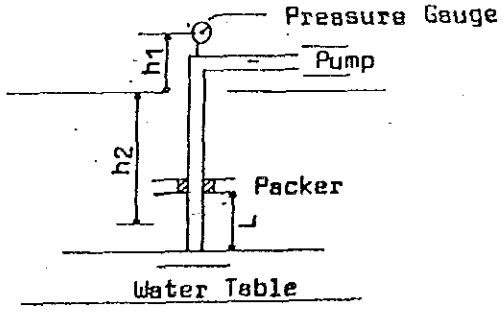
Sheet 1 of 1

WATER PRESSURE TEST IN DRILL HOLE				HOLE NO.: BME-1 (Test 1)
Project: Small Hydro Study For Medamit				Coordinates:
Location: Medamit				Date of Test: 1.8.1987
Job No : KSI/87(J18)				Reporter: B.J.O.
Borehole	Elevation C. D. (m):			Diameter (mm): 75
	Dip Angle (o): 90°			Bearing (o):
Test Section	Stage No:			GEOLOGY: Moderately weathered grey strong fine-grained SANDSTONE (Greywacke) with iron stained weak joints
	Depth	Packer (m)	5.60	
		Hole Bottom (m)	10.60	
	Elev.	Packer (m)		
		Hole Bottom (m)		
	Length, L (m): 5.00			
Height of Gauge (m): 0.40				
Water Head (m): 3.20				Temp. of Injected Water °C: 26
Pump	Model, Type: SP 408		Flow Meter	Type:
	Max. Discharge (l/min): 105			Min. Precision (l): 1 Litre
	Max. Pressure (g/cm²): 40,000		Pressure Gauge	Min. Reading (g/cm²): 500
Type of Packer	Hydraulically inflated single packer			Max. Reading (g/cm²): 20,000

*Effective Pressure (Kg/cm²) $P = Pa + 1/10\ (h - ht)$
where, $h = h1 + h2$ ht = head loss

** Lugeon Value (l/min/m/10kg/cm²) = Lu = 100/PL

Unsaturated Strata:



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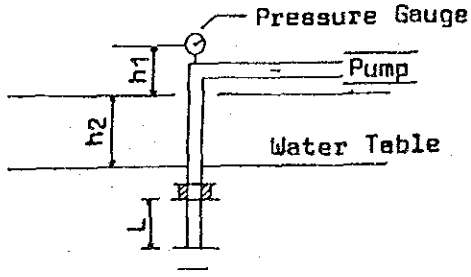
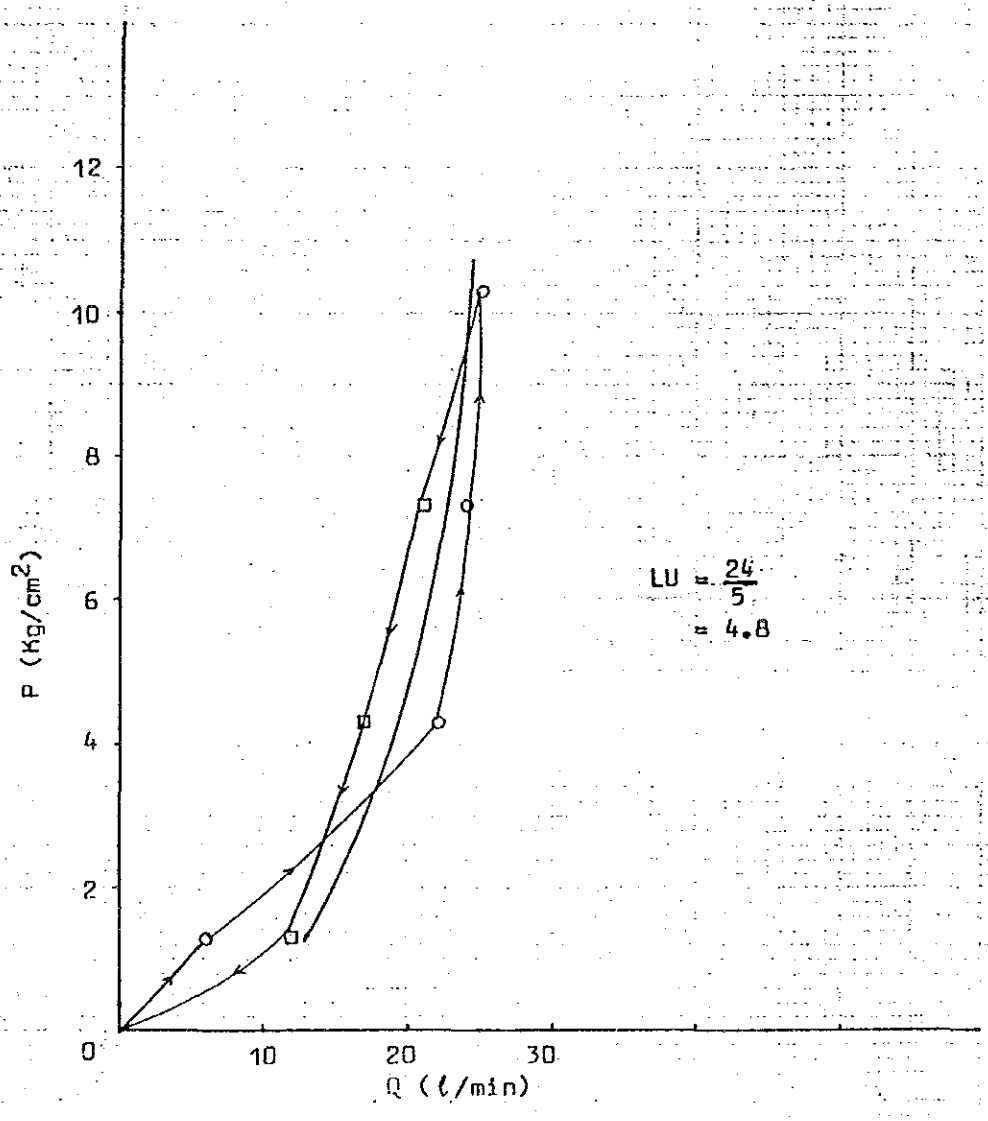


Project: Small Hydro Study For Medamit

Job No: KSI/87(J18)

Type of Test: Water Pressure Test in drill hole

Test No: BME-1/Test 1 (5.60 - 10.60m)



Remarks:-

→○→ Discharge of increasing pressure

←□← Discharge of decreasing pressure

——— Average

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.
Foundation & Soil Specialists

WATER PRESSURE TEST IN DRILL HOLE									Hole No: BME-1 (Test 1)	
Project: Small Hydro Study For Medamit									Date of Test: 1.8.1987	
Job No: KSI/87(J18)									Reporter: B.J.O.	
Stage No:				Depth of Packer (m): 5.60					Test Length (m): 5.00	
				Depth of hole bottom (m): 10.60						
Time			Gauge Pressure	Effective Pressure	Integrated	Water pumped-in				Remarks
Hr.	Min	Elapsed (min)	Kg/cm^2	Kg/cm^2	ℓ/min	Sectional ℓ/min	Constant rate ℓ/min	Lugeon Value		(Average)
		1	1	1.36		0	0	8.82		6
		1	1			0	0			
		1	1			5	5			
		1	1			6	6			
		1	1			10	10			
		1	1			8	8			
		1	1			8	8			
		1	1			9	9			
		1	1			7	7			
		1	1			11	11			
		1	4	4.36		22	22	10.09		22
		1	4			25	25			
		1	4			10	10			
		1	4			28	28			
		1	4			31	31			
		1	4			31	31			
		1	4			18	18			
		1	4			17	17			
		1	4			18	18			
		1	4			19	19			
		1	7	7.36		32	32	6.52		24
		1	7			24	24			
		1	7			21	21			
		1	7			24	24			
		1	7			20	20			
		1	7			26	26			
		1	7			34	34			
		1	7			20	20			
		1	7			18	18			
		1	7			18	18			

WATER PRESSURE TEST IN DRILL HOLE								Hole No: BME-1 (Test 1)
Project: Small Hydro Study For Medamit								Date of Test: 1.8.1987
Job No: KSI/87(J18)								Reporter: B.J.O.
Stage No:			Depth of Packer (m): 5.60					Test Length (m): 5.00
			Depth of hole bottom (m): 10.60					

Time			Gauge Pressure	Effective Pressure	Integrated	Water pumped-in		Lugeon Value	Remarks (Average)
Hr.	Min	Elapsed (min)	Kg/cm^2	Kg/cm^2	ℓ/min	Sectional ℓ/min	Constant rate ℓ/min		
		1	10	10.36		26	26	4.83	25
		1	10			31	31		
		1	10			29	29		
		1	10			31	31		
		1	10			18	18		
		1	10			22	22		
		1	10			21	21		
		1	10			22	22		
		1	10			24	24		
		1	10			22	22		
		1	7	7.36		14	14	5.71	21
		1	7			21	21		
		1	7			20	20		
		1	7			19	19		
		1	7			13	13		
		1	7			13	13		
		1	7			25	25		
		1	7			27	27		
		1	7			29	29		
		1	7			29	29		
		1	4	4.36		18	18	7.80	17
		1	4			16	16		
		1	4			16	16		
		1	4			18	18		
		1	4			15	15		
		1	4			18	18		
		1	4			15	15		
		1	4			17	17		
		1	4			17	17		
		1	4			16	16		

WATER PRESSURE TEST IN DRILL HOLE

Hole No: BME-1 (Test 1)

Project: Small Hydro Study For Medamit

Date of Test: 1.8.1987

Reporter: B.J.O.

Job No: KSI/87(J18)

Stage No:

Depth of Packer (m): 5.60

Depth of hole bottom (m): 10.60

Test Length (m): 5.00

Time			Gauge Pressure	Effective Pressure	Integrated	Water pumped-in		Lugeon Value	Remarks (Average)
Hr.	Min	Elapsed (min)	Kg/cm^2	Kg/cm^2	ℓ/min	Sectional ℓ/min	Constant rate ℓ/min		
		1	1	1.36		11	11	17.65	12
		1	1			14	14		
		1	1			13	13		
		1	1			11	11		
		1	1			10	10		
		1	1			16	16		
		1	1			9	9		
		1	1			10	10		
		1	1			11	11		
		1	1			10	10		

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Sheet 1 of 1

WATER PRESSURE TEST IN DRILL HOLE	HOLE NO.: BME-1 (Test 2)

Project: Small Hydro Study For Medamit
Coordinates:

Location: Medamit
Date of Test: 3.8.1987

Job No : KSI/87(J18)
Reporter: B.J.O.

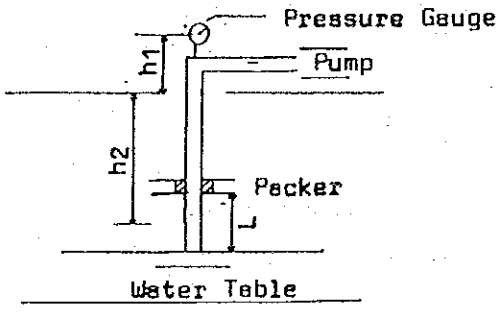
Borehole	Elevation C. D. (m):			Diameter (mm): 75
	Dip Angle (o): 90°			Bearing (o):
Test Section	Stage No:			GEOLOGY: Moderately weathered grey strong fine-grained SANDSTONE (Greywacke, probably metamorphic)
	Depth	Packer (m)	10.60	
		Hole Bottom (m)	15.60	
	Elev.	Packer (m)		
		Hole Bottom (m)		
	Length, L (m): 5.00			
Height of Gauge (m): 0.40				
Water Head (m): 8.00				Temp. of Injected Water °C: 26

Pump	Model, Type: SP 408	Flow Meter	Type:
	Max. Discharge (l/min): 105		Min. Precision (l): 1 Litre
	Max. Pressure (g/cm²): 40,000	Pressure Gauge	Min. Reading (g/cm²): 500
Type of Packer	Hydraulically inflated single packer		Max. Reading (g/cm²): 20,000

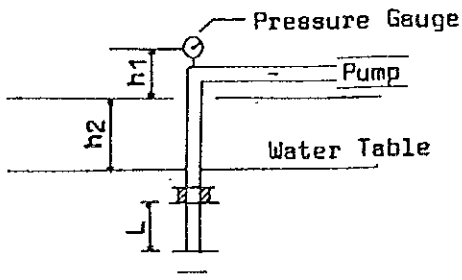
*Effective Pressure (Kg/cm²) P = Pa + 1/10 (h-hl)
where, h = h1+h2 hl = head loss

** Lugeon Value (l/min/m/10kg/cm²) = Lu = 10Q/PL

Unsaturated Strata:



Saturated Strata:



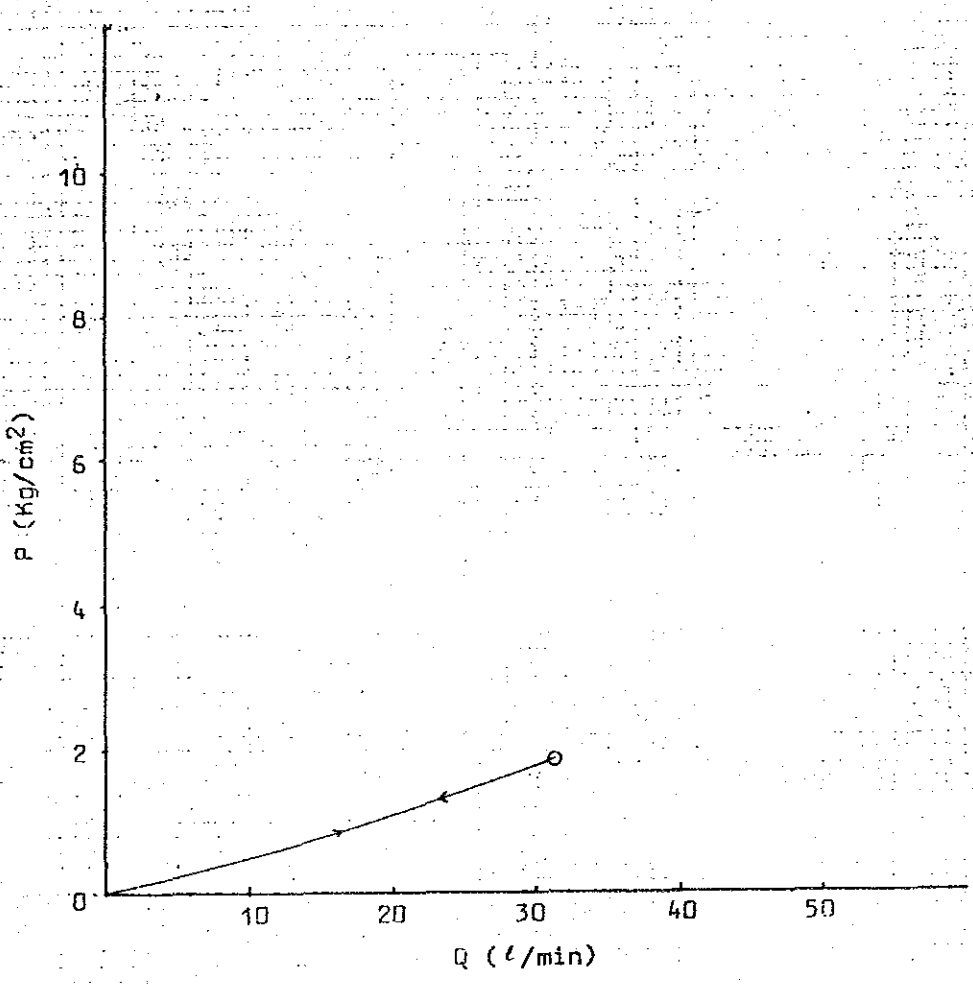
Project: Small Hydro Study For Medamit

Job No: KSI/87(J18)

Type of Test: Water Pressure Test in drill hole

Test No: BME-1/Test 2 (10.60 - 15.60m)

(Test Failed)



Remarks:-

→○→ Discharge of increasing pressure

←□← Discharge of decreasing pressure

——— Average

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WATER PRESSURE TEST IN DRILL HOLE									Hole No: BME-1 (Test 2)
Project: Small Hydro Study For Medamit									Date of Test: 3.8.1987
Job No: KSI/87(J18)									Reporter: B.J.O.
Stage No:				Depth of Packer (m): 10.60					Test Length (m): 5.00
				Depth of hole bottom (m): 15.60					
Time			Gauge Pressure	Effective Pressure	Integrated	Water pumped-in		Lugeon Value	Remarks
Hr.	Min	Elapsed (min)	Kg/cm^2	Kg/cm^2	ℓ/min	Sectional ℓ/min	Constant rate ℓ/min		(Average)
16	30	1	1	1.84		35	35	33.7	31
		1	1			32	32		
		1	1			31	31		
		1	1			32	32		
		1	1			32	32		
		1	1			32	32		
		1	1			34	34		
		1	1			28	28		
		1	1			28	28		
		1	1			26	26		

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WATER PRESSURE TEST IN DRILL HOLE	HOLE NO.: BME-1 (Test 3)

Project: Small Hydro Study For Medamit
Coordinates:

Location: Medamit
Date of Test: 5.8.1987

Job No : KSI/87(J18)
Reporter: B.J.O.

Borehole	Elevation G. D. (m):			Diameter (mm): 75
	Dip Angle (o): 90°			Bearing (o):
Test Section	Stage No:			GEOLOGY: Moderately weathered grey strong fine-grained SANDSTONE (Greywacke, probably metamorphic)
	Depth	Packer (m)	16.00	
		Hole Bottom (m)	21.10	
	Elev.	Packer (m)		
		Hole Bottom (m)		
	Length, L (m): 5.10			
Height of Gauge (m): 0.40				

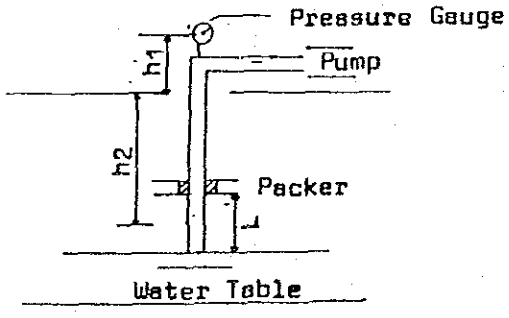
Water Head (m): 13.80
Temp. of Injected Water °C: 26

Pump	Model, Type: SP 408	Flow Meter	Type:
	Max. Discharge (l/min): 105		Min. Precision (l): 1 Litre
	Max. Pressure (g/cm²): 40,000	Pressure Gauge	Min. Reading (g/cm²): 500
Type of Packer	Hydraulically inflated single packer		Max. Reading (g/cm²): 20,000

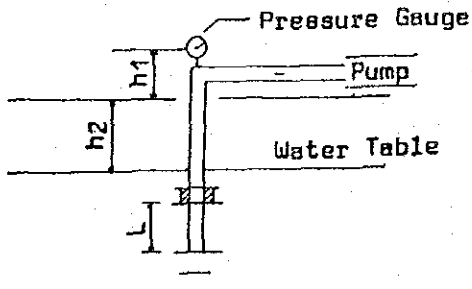
*Effective Pressure (Kg/cm²) $P = Pa + 1/10 (h-h\ell)$
where, $h = h_1+h_2$ $h\ell$ = head loss

** Lugeon Value (ℓ/min/m/10kg/cm²) = Lu = 100/PL

Unsaturated Strata:



Saturated Strata:



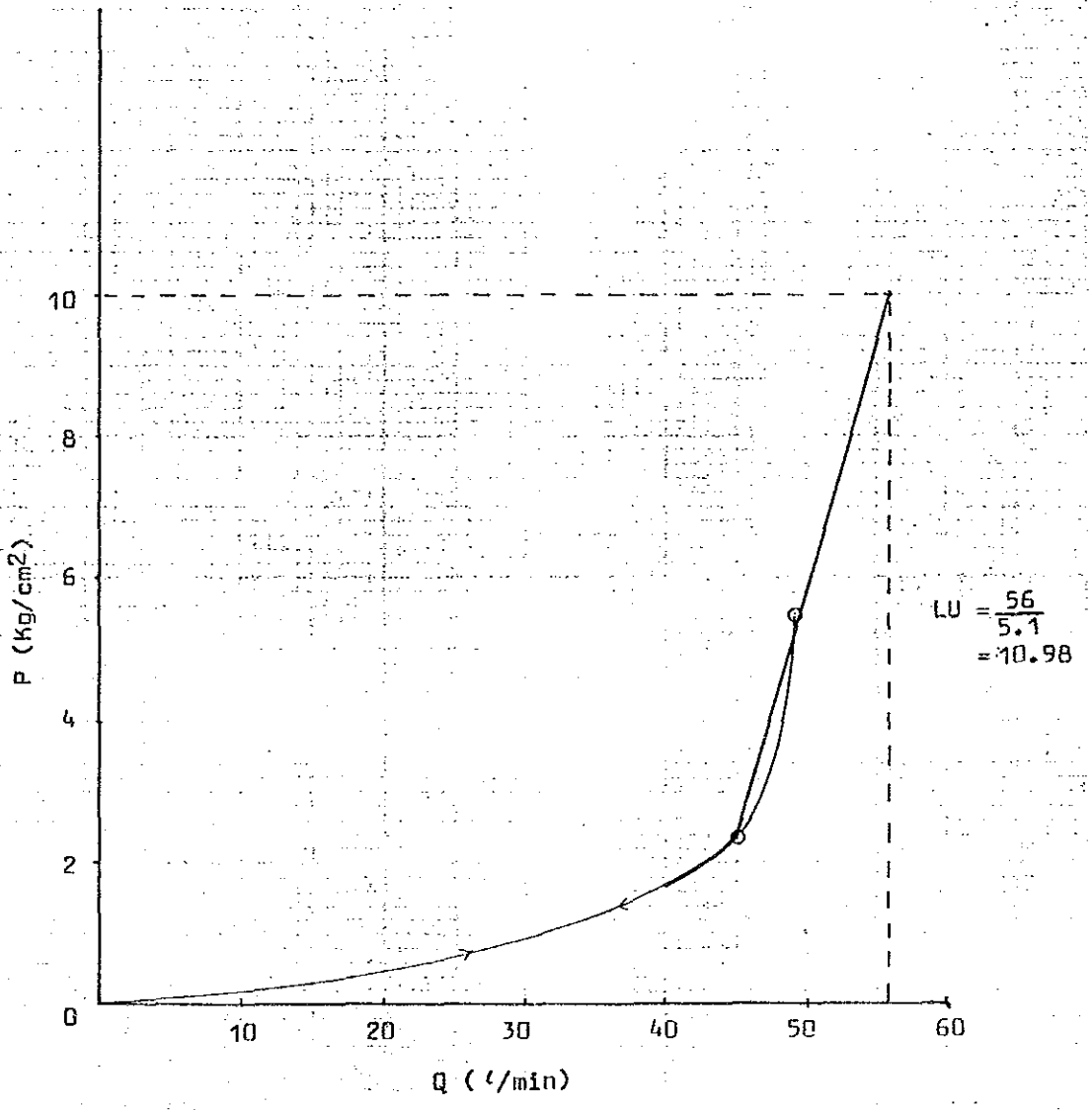
Project: Small Hydro Study For Medamit

Job No : KSI/87(J18)

Type of Test: Water Pressure Test in drill hole

Test No: BME-1/Test 3 (16.00 - 21.10m)

(Test Failed)



Remarks:-

→O→ Discharge of increasing pressure

←□← Discharge of decreasing pressure

——— Average