マレイシア国

レビルダム計画

調查報告書

**APPENDIX** 

1989年3月

国際協力事業団

鉱計資

C R(3)

89-89(2/2)

マレイシア国レビルダム計画

調查報告書 APPENDIX

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1-2	MOM of Steering Committee Meeting (08/3/1988) March 11, 1988
1-3	Notes of Discussions for Technical Committee Meeting
	(February 25, 1989)
1-4	MOM on Draft Final Report for the Feasibility Study of the
	Lebir Dam Project (March 1, 1989)
4-1	Technical Specification for Topographic Survey
4-2	Technical Specification for Core Drilling
11-0-1	CHECK LIST OF JICA STUDY TEAM'S REACTION RE DOE'S COMMENT
	ON EIS FEB. 1988
11-0-2	DATA ON MEDICAL-ECOLOGY STUDIED BY IMR
	(at briefing in March 1988)
13-1	Explanatory Demonstration of Project Cost Allocation
14-1	Explanatory Note on Economic Evaluation Method
14-2	Economic Evaluation of the Lebir Dam Project
	with Updated Parameters for Alternarive Plants

# FIGURES

FIG. 1-1

SCHEDULE FOR FEASIBILITY STUDY OF LEBIR DAM PROJECT

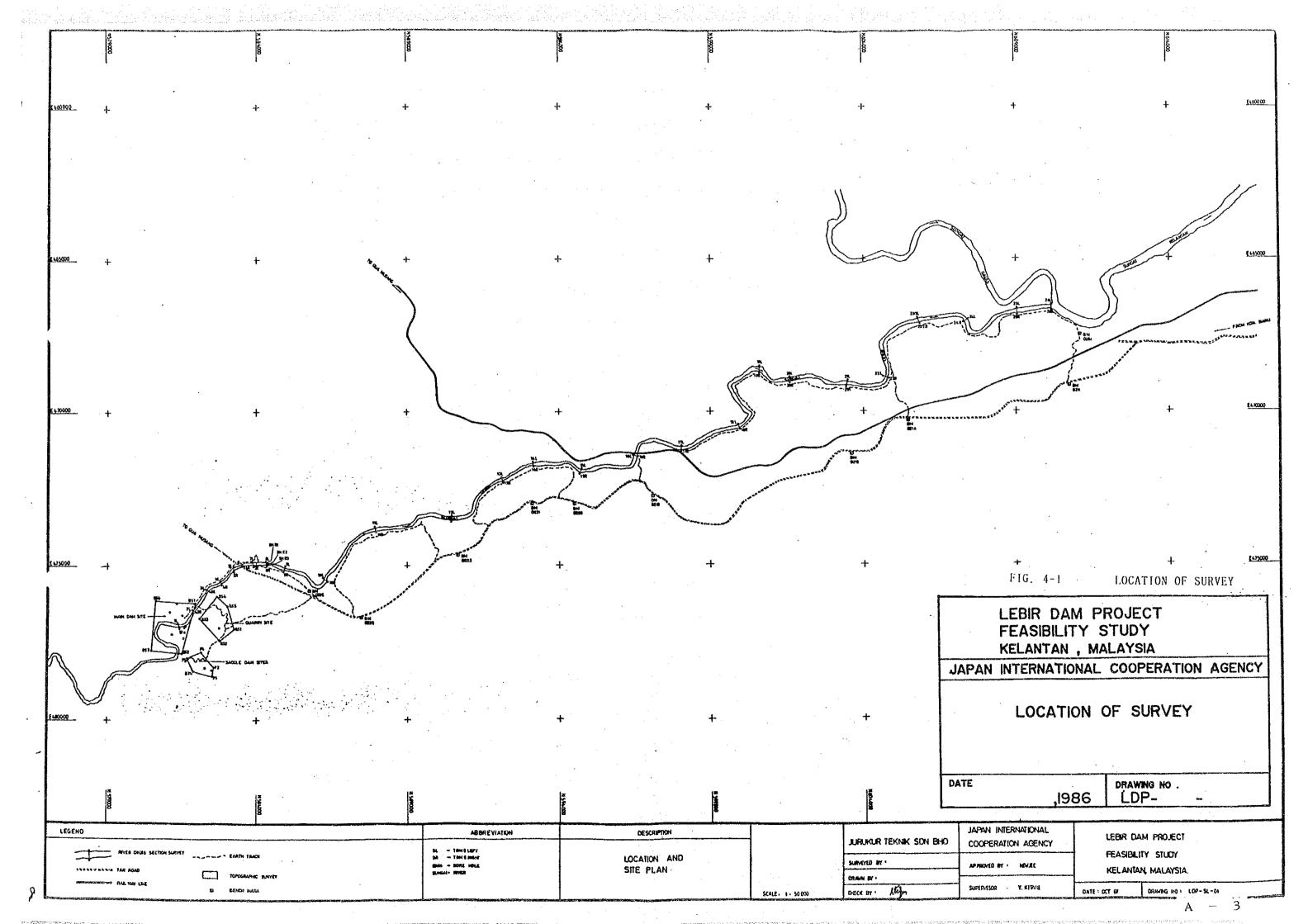
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Note : \* Shifted backward by 0.5 months from the agreed schedule in  $\mathrm{S/W}$ 

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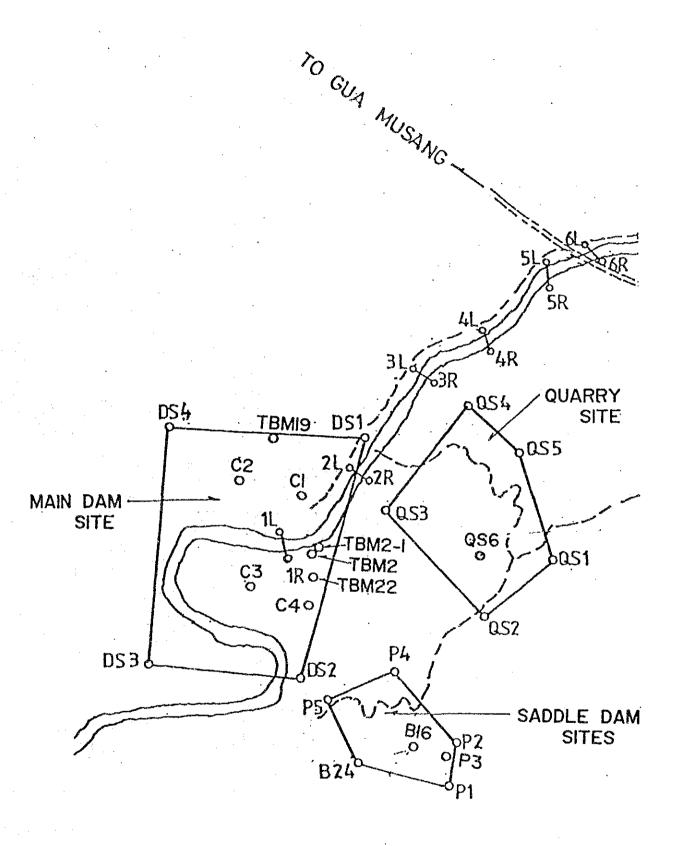


FIG. 4-2 LOCATION MAP OF TBM AND BM

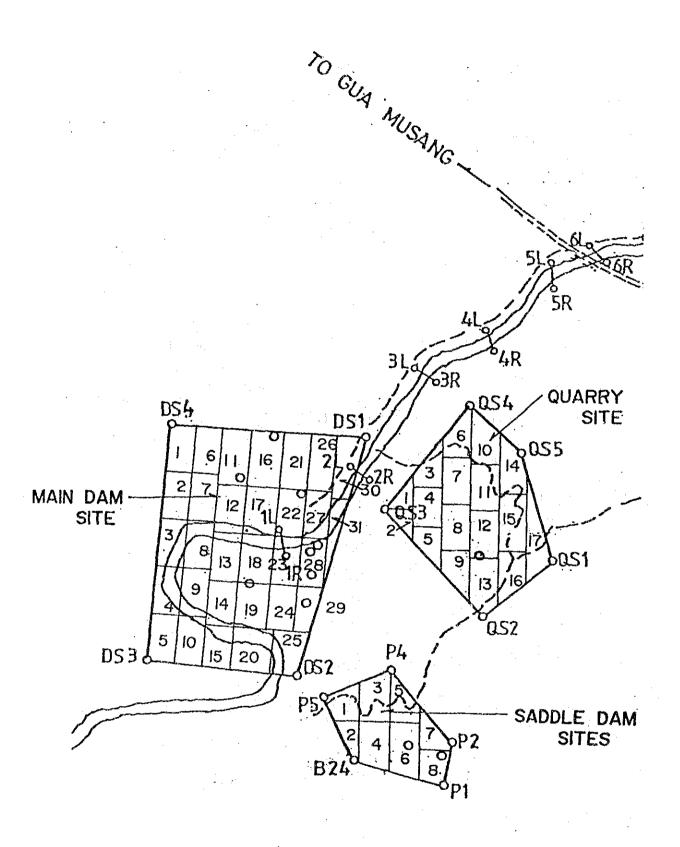
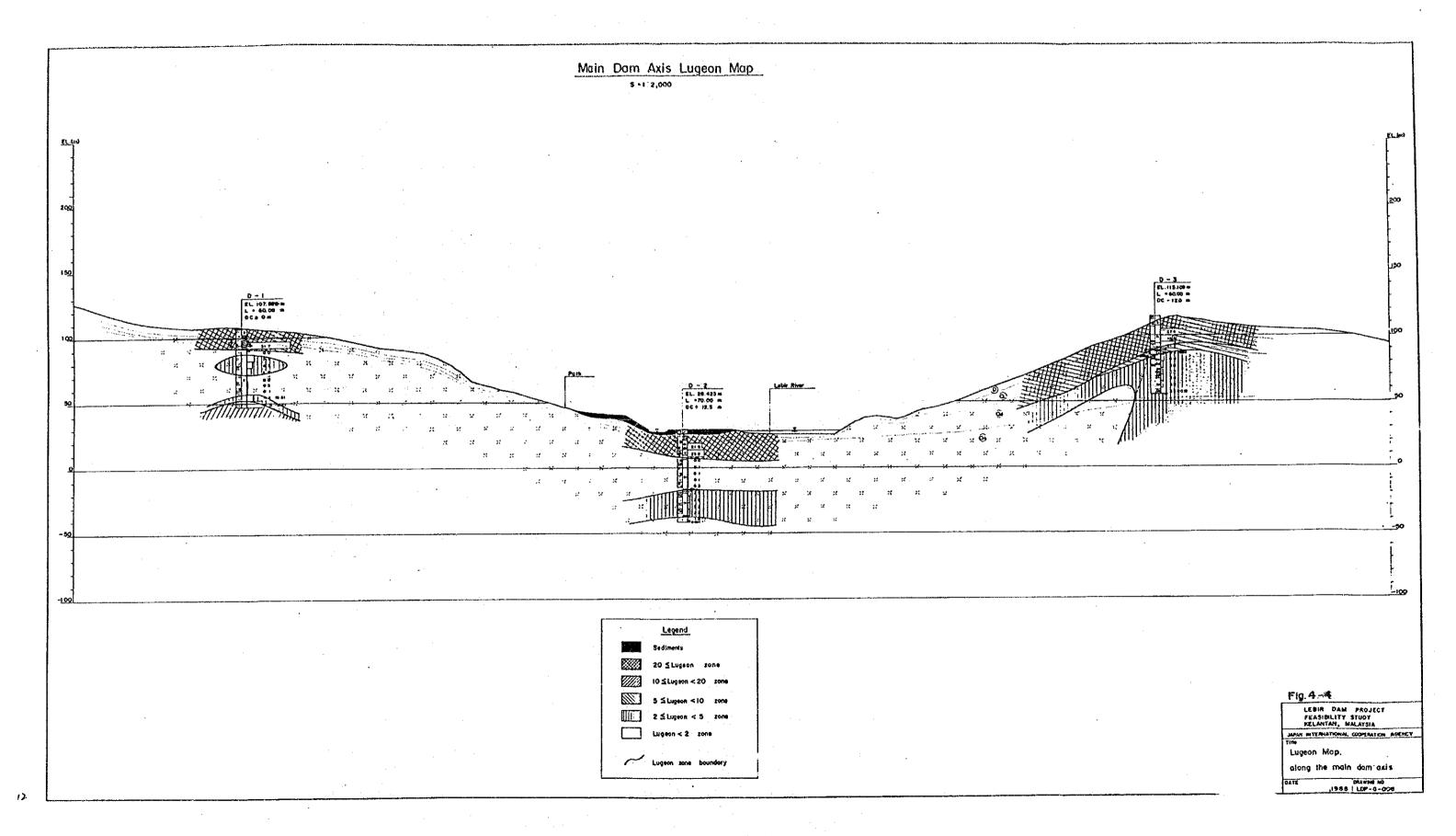
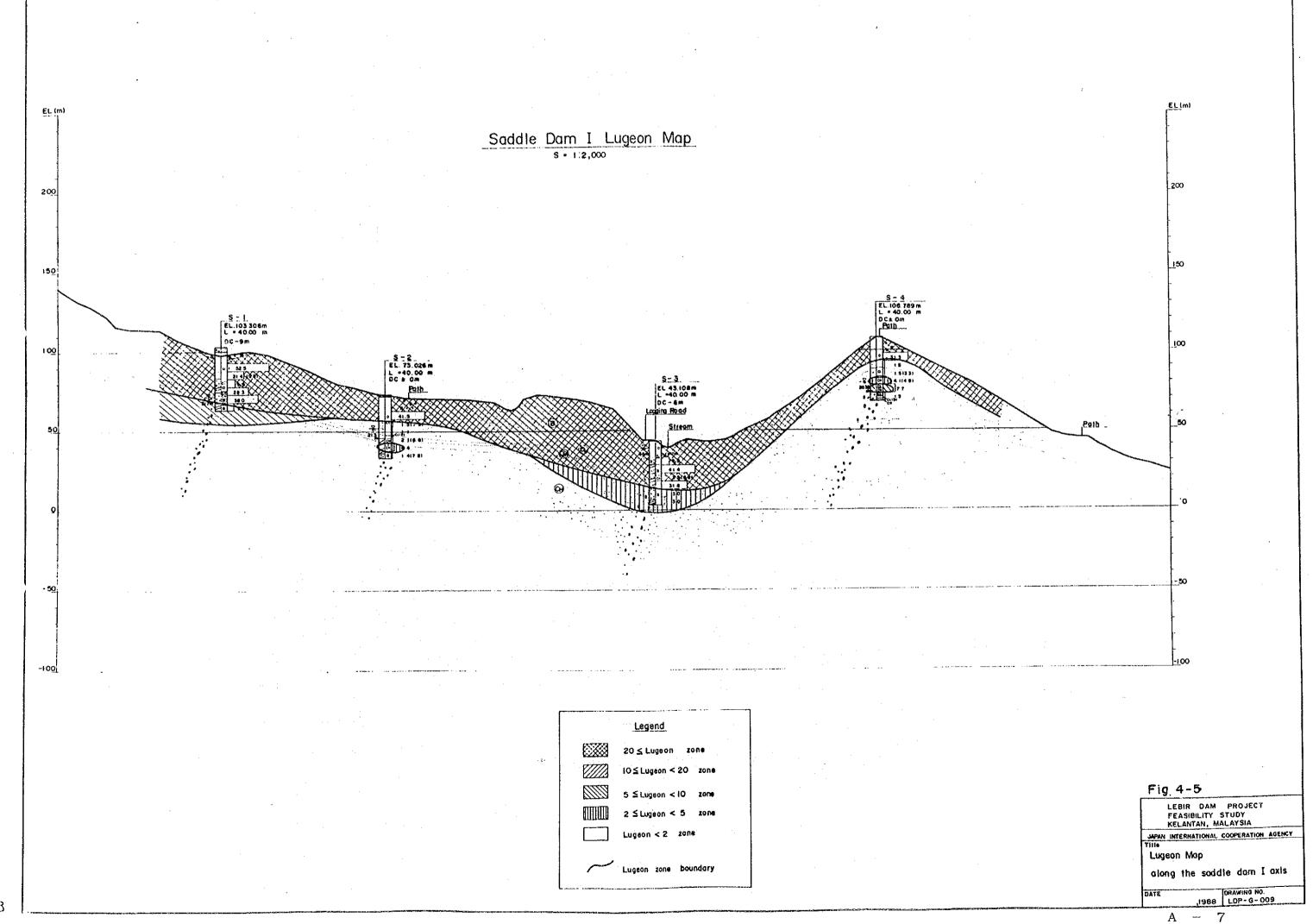


Fig4-3 INDEX MAP OF TOPOGRAPHIC MAP





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Description	0.00~3.00m Very weak, pale brown and gray, sediment of sand, granule and pebble gravels. Grayels consist of chert, green rock and shale.	3.00~5.45m Weak, partly fractured. Gracks are filled with limonite partly.	5.45~8.00m Moderately strong partly fractured. Gracks are filled with limonite slightly.			25.20~27.00m Moderately weak.	27.00~35.00m Moderately strong.	35.00~40.00m Strong.	40.00 -44.00m Hoderately weak to very strong.	44.00~57.10m Hoderately strong to strong.	57.10~60.00m Very strong, fractured slightly.	60.00~63.70m Very strong to moderately strong, partly fractured.	63.70~66.35m Roderately weak.	65.35~70.00m Strong.						•		
Drilling Method  Casing III (July) 200 (July	26t 10 100 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0		100   21   1   1   1   1   1   1   1   1	30	83 100 47 83 100 24 73 100 34				100   121   101   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111   111	94 100 30 30 10 10 10 10 10 10 10 10 10 10 10 10 10		17	100 23 110 110 110 110 110 110 110 110 110 11	45 100 23	100   123							
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Wain Dem Bottom Of River rection | Vertical F18.4-7 H===>5 Hardness
Hard & dull sornd or a slightly dull sound
is emitted when homerfed.

Hode Rock fragments cannot be broken by finnings, but it's easy to be broken by harmer.

Soft Rock fragments can be taken to pieces
by finger

A - 9

	Description	0.00~0.20m Soft, brown, sandy silty clay.	0.20~6.00m loose to dense, pale brown, clayey silty fine sand.	6.00 ~ 8.75 pale brown, highly fractured and partly decomposed.	8.75-19.53m Yery weak to weak pale brown to gray, highly fractured and slightly decomposed, tuffaceous sandstone.	19.53 ~20.50m Weak, black, shale.	20.50~22.00m Weak, pale greenish blue, tuffaceous sandstone.	22.00 ~ 25.50m Yeak to moderately weak, black, partly fractured, shale.	22.20~22.35m quartz vein(70° inclina- tion).	25.50~30.00m to strong pale greenish blue, partly fractured, tuffaceous sandstone.	30.00-33.60m fractured, shale.	33.60 - 37.85m Freenish blue, partly fractured, tuffaceous sandstone.	37.85~39.00m	39.00 ~48.00m freenish blue, gravelly fractured, tuffaceous sandstone.	48.00 ~ 56.30m   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00   48.00	56.30 ~ 60.00m k to moderately strong, Moderately Weak to moderately strong, pale greenish blue, partly fractured, tuffaceous sandstone.		
Dril	ling Method Casing			***************************************	2 													
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I Unweathered rock II Slightly Weathered rock III Moderately Weathered rock	IV Highly weathered rock V Completely weathered rock VI Residual soil	Fig. 4-8		Location Dan Site Right-Upper Renk	Length T = 0 m	Tevel E. II. 109	
HI WEST DOWN THE WHITE HE WISH HE WISH HE WAS THE WAS	TITE PROPERTY STANDARD STANDAR	The property of the property of the process of the	The wasterns extends throughout forthings in the second state of the second sec		H.Vr.   1861]   meterial   with complete distriction   1861   1862   1864   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   1865   186		
Geological Log	A A	二二 CLsy		Hardness Hard A dull sound or a slightly dull sound	Node Nock fragments carnot be broken by fin- ger, but li's easy to be broken by harmer.	Soft Rock fragments can be taken to pieces	

Bellow 32.40m Moderalely strong to very strong, partly fractured tuffaceous conglomerate. Cracks are filled with calcite material which is dissolved partly (32.30m, 34.60m). 35.40~36.10m, 37.80~39.30m Greenish blue tuff. sand 27.40~29.70m Weak to moderately strong highly fractured, tuffaceous conglomerate. Cracks are narrow with thin material. 21.60~27.40m
Weak, tuffaceous conglomerate.
fragment cores recovered
20.55~21.25m,22.00~23.20m,23.45~
24.00m no core recovery.
24.30~25.00m purple tuff. brown silty clay and rootlets. fine fractured, Vertical  $7.75 \sim 7.95$ m reddish brown  $10.50 \sim 11.00$ m reddish brown  $13.10 \sim 13.40$ m yellowish brown Another section reddish purple (pink) silty Description 29.70~32.40m
Maderately strong, highly tuffaceous conglomerate. crack from 30.90~31.40m.  $2.80 \sim 21.60m$  Dense-Very dense clayey with a little gravels. dark sand 0.00~2.80m Firm, light to With a little Drilling Method Casing አ ... 38:0) 21.4 6 9 G.W.L 46 27 16 Max Core 8 Core Recovery R.Q.D Hardness Pur-Yello Brown Brown Red-dish Gree nish Blue Colour Pa Weather-Λ Þ ing : O: O::: 4 0 Core Shape **:**4: 0 1 0::2 **O**:::: .0 δ Rock М μ. Ω Classification 8 8083.3 88 3...6 의 77 22 22 23 Depth :: 8.8 35.40 36.10 <u>ಬ</u>ಟ ನಿಜ ß 8 (m) 8 8 Geological Log

Bank -Upper Left Unweathered rock Slightly weathered rock Moderately weathered rock Highly weathered rock Completely weathered rock Residual soil 8 j-i Saddle Dam ٠a. Vertical 103 3 Н ìi. Œ . ഗ ٦, 9 Direction Drilling Number Tocation ---Length Leve1 20 エロ田川 マンド بـــر. ستأ | Penetrative weathering developed on a continuous sufface but only state weathering of rock material biscontinuity sufface but only state weathering of rock material and discolouration extends | through the greater part of the rock mass. The rock material is not | friable except in the case of poorly computed sedimentary rocks. Discontinuities are stained and/or contain a filling comprising and/or contain a filling comprising altered materials.

| Westhering extends throughout rock was and/or contain a filling comprising and/or contain a filling comprising first and waterials are stained and or contain a filling comprising first sexept quartz is discologist spick. Nock is totally discoloured and decomposed and in a friable condition with conjy fragments of the rock texture and structure preserved. The rock textural appraisance is that of a soil.

Soil material with complete disintegration of texture, structure and minerallogy of the parent rock. to pieces sound Sound Sound Sound a slightly dull s thamered. cannot be broken b s easy to be broke Cylindric portion A dull sound or a sligh is emitted when hamered Rock fragments cannot be finger, but it's easy to harmer.

Rock fragments can be to by finger. 8 Talus Cylindric Core recovery 0 p Top Soil and Tal Tuff (Rurple) Tuff (Greenish I Tuffaceous Sands Short (

Clay Sar Fragment Rhomb. - S

Hardness
Hard —

Soft

	Description		1.000	Soft. Silty clay with a little sand.		.10~10.00m	Se	•	$.00\!\sim\!20.10$ m	bense to very dense, silty sand. 16.10~16.80m.17.80~18.00m purple tuff.		.10~23.80m	Very dense, clayey silty sand.	~25.50m	Weak, highly fractured, tuffaceous	sandstone.	L.	ou~z/.sum ak to moderately strong,highly fractured	uffaceous sandstone, cracks are	, 	.30~40.00m	Moderately strong to strong	uriaceous sanos cone-congion 1.00 ~36.10m short alternal	onsists of tuff (purple), tuffaceous	andstone and turiaceous cor								3,000								
	ing Method asing	Z	77	$Z_{1}$	77	<u>//</u>	7	7	7	Z	Ż	//	$\langle Z \rangle$	7/	//	//	<i></i>	<i>]]</i>	//	<i>//</i>	<i>[</i> ]	//	// :=		$\overline{Z}$	<u> </u>		-1-1					n	=+		ı L		:_ a)		= 1 <b>1</b>	+
ermiability	Lugeon Value														ا ا				O. P.									2											(2.8)		
Pe	G.W.L			I	1 - 2 - 1									21		n:::	<b>}</b>					Þ	2ľ.3	(10/10				75.11					1								11.1
Q	Max Core	/		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ö	O	80			0	6	6	ĸ	61	21	53	12	೫	3	12	92	45	72	3	7
Core Siz	Core Recovery	18	100	18	100	100	18	81	8	18	81	130	81	1::::	81	81	81	81	100	100	8	8	8	8	8	Q-	8	8	==+		8	18	- 1		3				3 8	3	3
-8:-	R.Q.D		: ::::::	0	0	0	0	ö	0	1.::	0	0	0		o	0	0	0	0	0	0	0	0	0	0	0	0	0	አ	31	φ <sub>4</sub>	8	12	77	2				45	2,4	g
v	Hardness											Soft										Mode			% #		Mode							Pag.							
T	Colour												Brown													1	Brown		-	Gray			Pale	Į,					eray Sy		- <del></del>
e Part	Weather-	ΙΛ													*: 7.											N	Ė		11.			<del>'''</del>	A		Ė				7.1		
8	Weather— ing Core Shape	7	}		7		?		7		?		7		7		<u> </u>		?			γ		7	?	<b>X</b>			7.T.C		00		0.	O	0	0 0 c	5	Ō		C	Ç
Rock Classi	ification	\											· ·	1::::								벙		Ą		101	b	16	3	1.:1:			8	- 6	:::	S B	-:1		80		
		0.110									0										Ç.	21:82				}	78 78	8.60			2	<b>8</b>	3 8			34.65					·
	Depth (m)	1.10																9.5 2.5 2.5 2.5 3.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5	8	3.8	170								27.60	28 88	ည် ည	8					₩ 10-	% % %			<b>.</b>
	gical Log	Q		Cara					3			) 	)   		1			X			11 1 1 1	3.00	, y		1		. 1 . 2 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1			ij			N.	17.	3	V.,	S	ΚÏ			

I Unweathered rock II Slightly weathered rock III Moderately weathered rock IV Highly weathered rock V Completely weathered rock VI Residual soil	F18.4-10	Drilling Number		T = 70 m	Level	Direction
Weathering		IV Weathering extends throughout rock mass and the rock material is partly friable Rock has no lock meterial except	geologist's pic ly discoloured a friable condit	only fragment of the rock texture and structure preserved. The external applearance is that of a soil.	VI Soil material with complete disintegra- tion of texture, structure and mine- ralogy of the parent rock	

Curl Rhomb. - Short Pole
CO Pole
CO Rose recovery 0 portion

Geological Log

A.4 Top Soiland Talus Deposit

XXX Tuff (purple)

YXX Tuffaceous Sandstone

YXX Tuffaceous Conglomerate

Core Shape

Bank

	Description	$0.00\sim2.50m$ Loose, pale brown, clayey silty sand.	7 12.50~8.70m Wedium dense, pale purple, clayey silt sand With a little rock fragments.	Very weak, gravelly and highly decomposed the tuffaceous sandstone-conglomerate, cracks are narrow with fine grained material.	10.85~14.00m  Moderately weak to moderately strong, a tuffaceous conglomerate. Lamina is remarkable(50° ~60° inclination).	14.00 $\sim$ 21.60m Moderately strong to very strong, tuffaceous and stone-conglomerate.	21.60~25.00m F Moderately strong, tuffaceous sandstone- conglomerate.	25.00~40.00m Very strong, alternation which consists of tuffaceous sandstone, tuffaceous conglomerate and tuff.			
Permiability	Lugeon Value		\$\frac{1}{2}\$		9.2	$\left( \begin{array}{c} \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \right) \left( \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$		(8.6)	31.8	5.0	0.8
Size	Max Core		0000	2 2 0	0 23 0 34 0 23	3 0 0		3 0 7 0	20 32 20 54 38 28		00 60 00 45 00 57 00 60
Core Si	Core Recovery R.Q.D	0 0 0 0		0000	45     100       70     100       60     100       56     100	96 84 100 53 100		75 100 66 100 32 100 62 100			96 100 90 100 93 100 88 100
S)	Hardness		Soft	Mode							
noniar	Colour	Pale Brown	Pale Pur- ple		Pale Grav						
Ore Farticulars	Weather- ing Core Shape	Þ	; E			0 0	н. Ој	i i	0	O	) O
	ification	(: !:	A	\	- 8 B	*****	e P		0	O;	
	Depth (m)	0		9.40 10	13.50 14.60 14.69	15.40 16.00	18.30 19.00 20.50 20.50	22 22 22 22 22 22 22 22 22 22 22 22 22	22. 22. 22. 23. 24. 25. 25. 25. 25. 25. 25. 25. 25. 25. 25	2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	85.987.5 27.7.388
	gical Log										

I Unweathered rock
II Slightly weathered rock
III Moderately weathered rock
IV Highly weathered rock
V Completely weathered rock

Weathering	Meathering extends throughout rock mass and the rock material is partly friable Rock has no lustre. All material except quartz 1s discoloured, Rock can be excapt quartz 1s discoloured, Rock can be excapt acted wit scoloured, Rock is totally discoloured and decommodally fragment of the rock texture and only fragment of the rock texture and structure preserved. The external appearments is that of a soil.
Geological Log	Hard-A dull sound or a slightly dull sound Hard-A dull sound or a slightly dull sound is emitted when hammered.  Wode-Rock fragments cannot be broken by fin- mer, but it's easy to be broken by ham- mer.  Soft-Rock fragments can be taken to pieces

Consemidativy  Conseminativy  Consem	
Drilling Method	
Permiability	
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Max Core	88
E e Recovery E P P P P P P P P P P P P P P P P P P	
	0 0 q 41
Hardness	-11
A A A A	9 <u>1</u> d.
Weathering Weathering Weathering Weathering Weathering Weathering	IV.
Rock United No. 1	В
	33.00 403.00
Geological Log	

I Right-Upper 789 Vertical Saddle Dam 日 - 13 . 64 Direction ムル田ガン ٦,۲ . 00 4504 L manifermation of the feature of th Slight discolouration extends through the greater part of the rock mass. The rock material is not friable(except in the case of poorly compared sed mental state of poorly compared and for contain a filling are stained and for contain a filling comprising altered materials. This part weathering extends throughout rock mass and the rock material is partly friable. Rock has no lustre. All material except quartz is discoloured friable excavated with geologists prock can be excavated with geologists prock is totally discoloured and decomposed and in a frable condition posed and in a frable condition posed and structure preserved. The excurre and structure preserved. The external appearance is that of a soil. VI Soil material with complete dissection of rexture, structure at the parent rock. Hardness

Hard - A dull sound or a slightly dull sound
is emitted when hamered.

Mode - Rock fragments cannot be broken by
hammer.

Soft - Rock fragments can be taken to pieces Geological Log

AIA Top Soil

Sill Tuffaceous Sandstone

Core Shape

Core Shape

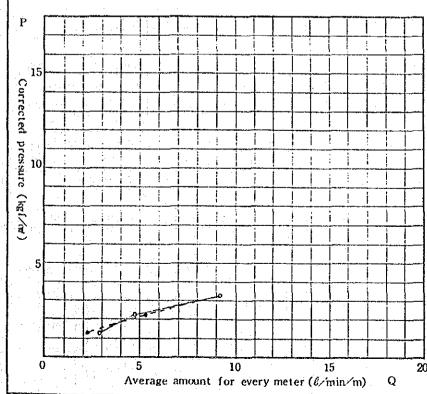
Clay - Sand Shape
Clay - Sand
Reagnent - Rhomb.
Bole
Core recovery 0 portion

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#### No. 1 Stage

Location	Main Dem	Name of hole	D - 1	Depth (m)	10.0~15.0	Length of test section (m)	5.0
Water Level	Nothing	Hight of gauge (m)	1.0	Length of rod (m)	11.0	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion			Date	15/8

Reading of gauge	1	Corrected pressure	Am	ount of in	ection per	minutes (	€)	Average amount	Average amount for every
Po	h <sub>3</sub>	P	1	2	3	4	5	Qo	meter 1
(kg [∕œ')	(m)	(kgi/cm)	6	7	8	9	10	(l/min)	(C/min/m)
2.0	0.0		14	15	6	22	15		
0.0	0.2	1.3	14	15	14	14	14	14.3	2.9
		1.	23	25	22	26	23		į
1.0	0.5	2.3	28	21	25	23	26	24.2	4.8
2.0	1 4	3.2	42	49	51	46	46	1,50	0.0
2.0	1.6	3.2	41	46	45	45	: 48	45.9	9.2
1.0	0.5	2.3	25	23	29	28	26	26.6	
1.0	0.5	12.3	28	27	26	28	26	26.6	5.3
0.0	0.1	1.3	12 11	12 11	12 10	11 9	12 10	11.0	2.2
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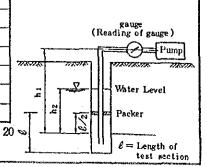


Lugeon value (Lu)	-
Calculated Lugeon Value (Lu')	31.7
Maximum pressure (kgl/cr)	3.2
Critical pressure (kgt/or)	_

 $P = P_0 + \gamma_w (h_1 - h_2 - h_3) (kgt/\varpi)$   $P : Corrected pressure (kgt/\varpi)$   $P_0 : Reading of gauge (kgt/\varpi)$   $\gamma_w : Unitweight of water$ 

 $h_3 = \alpha Q_0^2 L$ 

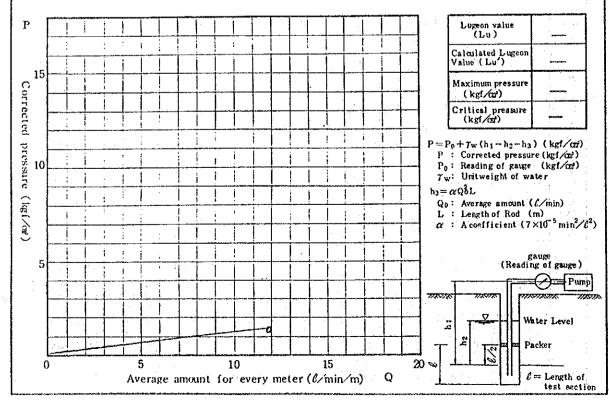
Qo: Average amount ( $\ell$ /min) L: Length of Rod (m)  $\alpha$ : A coefficient  $(7 \times 10^{-5} \text{min}^2/\ell^2)$ 



Stage No. 2

				Description of the last of the	The second of th		and the same of th
Location	Main Dam	Name of hole	D - 1	Depth (m)	15.0~ 20.0	Length of test section (m)	5.0
Water Level	Nothing	Hight of gauge (m)	0.5	Length of rod (m)	15.5	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion		-	Date	16/8

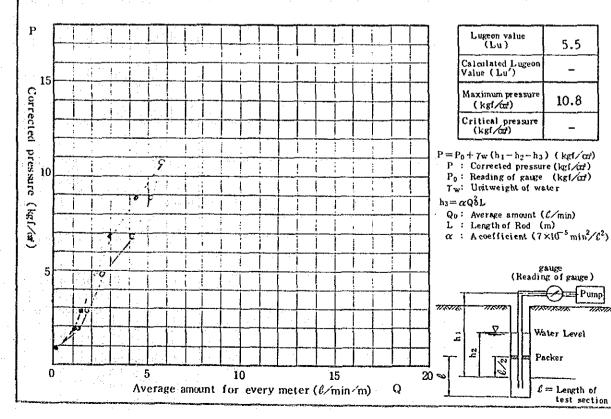
Reading of gauge	Head loss	Corrected pressure	Ame	ount of in	ection per	minutes	100 A 4 A 4 A 4 A 4 A 4 A 4 A 4 A 4 A 4 A	Average amount	Average amount for every meter
Po	h <sub>3</sub>	P	1	2	3	4	5	$Q_0$	
(kgi∕o⊒)	(m)	(kgf/ar)	6	7	8	9	10	(&min)	(C/min/m)
- Andrews			61	- 60	59	57	65		
0.0	3.8	1.4	61	60	59	57	55	59.4	11.9
									i .
							<u> </u>		
	Open cra	ack exist	in 15.50	- 16.00m	in depth	. The wa	ter injec	ted	
	leak thi	rough thes	se cracks			1. 1			
	There wa	s not wal	er retur	from th	e mouth o	f the hol	e.		
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Stage No. 3

Location	Main Dam	Name of hole	D - 1	Depth (m)	20.0~ 25.0	Length of test section (m)	5.0
Water Level (m)	8.0	Hight of gauge (m)	1.5	Length of rod (m)	21.5	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion	i		Date	17/8

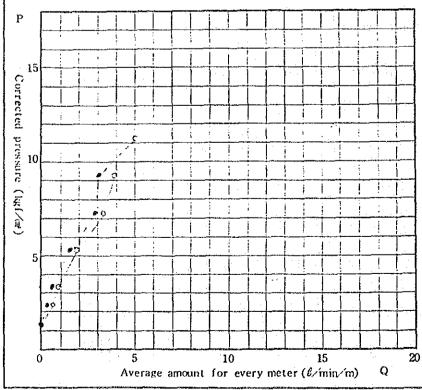
	Reading of gauge	Head loss	Corrected pressure	Amo		jection per	minutes (		Average amount	Average amount for every
-1	Po	h <sub>a</sub>	P [	. 1	2	3	4	- 5	Qo	meter Q
L	(kgí∕cd)	(m)	(kgf/or)	6	7	8	9	10	(l/min)	(C/min/m)
-	0.0	~ ~	0.0	0	1	0	1	0	0,	0.1
_	0.0	0.0	0.9	0	11	0	1	0	0.4	0.1
1	1.0	0.1	1.9	6	7	5	66	6	6.1	1.2
L				5	7	7	6	6	J	1.2
1	2.0	0.1	2.9	9	10	11	8	9	9.2	1.8
-  -		V.1		10	9	8	9	9	7.2	1.0
1	4.0		4.9	12	13	13	12	11	10.0	0.6
L	4.0	0.2	4.9	11	11	12	11	22	12.8	2.6
	6.0	0.6	6.9	18	20	19	37	18	00.7	, ,
L	0.0	0.0	0.9	18	18	20	20	19	20.7	4.1
	8.0	1.0	8.9	25	24	25	26	27	25.3	5.1
1.	0.0			25	25	26	26	24		3.5
1	10.0	1 3	10.0	30	28	29	29	29	20.0	- 0
	10.0	1.2	10.8	30	28	29	28	28	28.8	5.8
Т	8.0	0.7	8.9	22	21	23	22	23	22.1	4.4
	0.0	0.7	0.5	22	21	22	22	23	22.1	4.4
	<i>-</i>		( 0	16	15	15	15	15		
-	6.0	0.3	6.9	14	15	15	16	_ 16	15.2	3.0
Γ				10	11	12	11	11		
١	4.0	0.2	4.9	11	10	10	_11	11	10.8	2.2
	2.0	Λ 1	20	9	8	8	8	9	7 - 0	
L	2.0	0.1	2.9	_ 8	9	8	7	5	7.9	1.6
				6	5	5	4	4	1	1
	1.0	0.0	1.9	6	6	6	6	<u>4</u> 5	5.3	1.1
Г	0.0	0.0	0.9	l	0	1	0	1	0.5	0.1
	0.0	0.0	0.7	. 0	0	1	0	1	0.5	0.1



Stage No. 4

					Control of the last of the las		
Location		Name of hole	D - 1	Depth (m)	25.0 ~ 30.0	Length of test section (m)	5.0
Water Level		Hight of gauge (m)	5.0	Length of rod (m)	25.5	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion			Date	20/8

Reading of gauge	Head loss	Corrected pressure	Am	ount of in	ection per	minutes (		Average amount	Average amount for every
Po	hз	P	1	2	3	4	5	Qo	me ter O
(kgí∕œi)	(m)	(kgf/or)	6	7	8	9	10	(&min)	(6/min/m)
			0	1	0	0			1
0.0	0.0	1.3	0	0	1	Q	0	0.3	0.1
			4	4	4	2	2		
1.0	0.0	2.3	3	4	3	1	1	2.8	0.6
			5	6	6	5	44	, ,	0.0
2.0	0.0	3.3	5	3	5	3	3	4.5	0.9
			4	11	11	11	11		
4.0	0.2	5.3	10	11	9	9	10	9.7	1.9
			17	16	15	16	17		
6.0	0.5	7.3	17	16	16	16	16	16.2	3.2
		0.5	19	20	20	20	19	19.3	3.9
8.0	0.7	9.2	20	19	18	19	19	19.5	1 3.9
10.0		71 0	26	49	24	24	15	25.1	5.0
10.0	1.1	11.2	24	25	25	14	25	22.1	J
0.0	0.1		17	17	16	16	10	15.6	3.1
8.0	0.4	9.3	14	17	16	16	17	13.0	"
	~ /	7.0	14	13	23	14	14	14.7	2.9
6.0	0.4	7.3	13	14	14	14	14	144.1	2.9
		]	8	8	8	7		7.	١, و
4.0	0.1	5.3	6	8	8	8	8	7.6	1.5
			3	3	4	- 3	2	1	
2.0	0.0	3.3	4	3	3	3	3	3.1	0.6
			1	2	2	11	11		0.0
1.0	0.0	2.3	1	3	2	2	2	1.7	0.3
~ ~	0.0	1.2	0	0	0		0	0.3	0.1
0.0	0.0	1.3	0	1	0	0	1	0.5	0.1

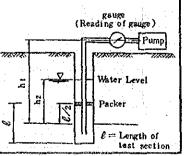


Lugeon value (Lu)	4.3
Calculated Lugeon Value (Lu')	1
Maximum pressure (kgi/m/)	11.2
Critical pressure (kgf/m/)	-

 $P = P_0 + \gamma_w (h_1 - h_2 - h_3)$  (kgt/cx) P : Corrected pressure (kgt/cx)  $P_0 : Reading of gauge (kgt/cxt)$   $\gamma_w : Unitweight of water$ 

 $h_3 = \alpha Q_b^2 L$ 

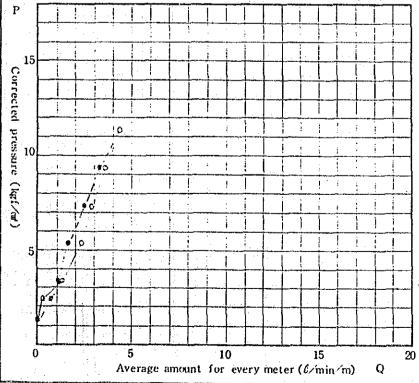
Qo: Average amount ( $\ell$ /min) L: Length of Rod (m)  $\alpha$ : A coefficient ( $7 \times 10^{-5} \text{min}^2/\ell^2$ )



Stage No. 5

Location	Main Dam	Name of hole	D - 1	Depth (m)	30.0 35.0	Length of test section (m)	5.0
Water Level (m)	9.2	Hight of gauge (m)	5.0	Length of rod (m)	30.5	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion			Date	22/8

Reading of gauge	1	Corrected pressure	Amo		jection per	minutes (	1.11	Average amount	Average amount for every
Po	lıs	P	1	2	3	4	5	Qo	me ter
(kg [∕or)	(m)	(kg1/∞)	6	7	8	9	10	(lémin)	(C/min/m)
			0	0	0	1	0		
0.0	0.0	1.4	0	0	11	0	0	0.2	0.0
	0.0		1	1	1	2	11		
1.0	0.0	2.4	Ž	2	2	2	2	1.6	0.3
2.0	0.1	3.4	5	6	- 6	6	6	- 0	1.0
2.0	0.1	3,4	6	6	. 6	6	5	5.8	1.2
4.0	0.3	5.4	10	11	11	- 11	12	11.0	2.2
4.0	0.5	J4	11	11	11	11	11	11.0	2.2
6.0	0.5	7,	14	15	14	15	15	11.7	
0.0	0.5	7.4	15	16	15	14	13	14.6	2.9
8.0	0.7	9.4	19	17	18	17	16	17.0	3.6
0.0	0.7	2.4	18	17	19	18	19	17.8	3.6
10.0	1.0	11.3	20	21	26	21	21	21 2	4.0
10.0	1.0	11.5	22	21	20	21	20	21.3	4.3
8.0	0.6	9.4	_ 18	17	18	17	18		0 (
0.0	0.0	7.4	17	17	18	16	.16	17.2	3.4
6.0	0.4	7.4	12	13	14	13.	12	12.0	0.6
0.0	0.4	7.4	11	14	13	13	14	12.9	2.6
4.0	0.2	5.4	- 10	9	8	10	_10		
4.0	0.2	3.4	9	9	-8	8	8	8.7	1.7
2.0	0.1	3.4	5	7	6	6	5		
2.0	0.1	5.4	5	6	5	5	6	5.6	1.1
1.0	0.0	2.4	3	- 3	3	3	12		20
1.0	U.U	2,4	3	3	1 3	3	2	3.8	0.8
0.0	0.0	1.4	0	0	0_	0	Ô	0.1	0.0
	0.0	4.7	0	1	0	0	0	1 0.1	0.0

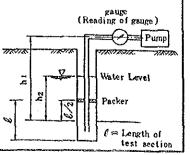


Lugeon value (Lu)	3.8
Calculated Lugeon Value (Lu')	-
Maximum pressure ( kgl/c#)	11.3
Critical pressure (kgf/cm²)	-

 $P = P_0 + \gamma_w (h_1 - h_2 - h_3) (kgl/cg')$  P : Corrected pressure (kgl/cg')  $P_0 : Reading of gauge (kgl/cg')$   $\gamma_w : Unit weight of water$ 

h3=αQåL

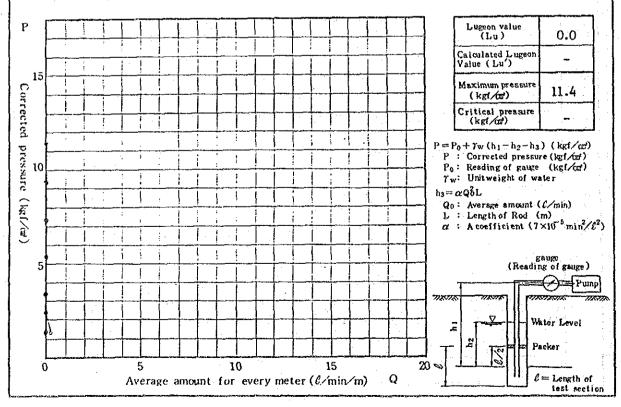
Qo: Average amount ( $\ell$ /min) L: Length of Rod (m)  $\alpha$ : A coefficient ( $7 \times 10^{-5} \text{min}^2/\ell^2$ )



Stage No. 6

						CARLO CONTRACTOR CONTR	COLUMN STATE OF THE PARTY OF TH
Location	Main Dam	Name of hole	D - 1	Depth (m)	35.0~40.0	Length of test section (m)	5.0
Water Level	8.7	Hight of gauge (m)	5.0	Length of rod (m)	36.5	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion			Date	23/8

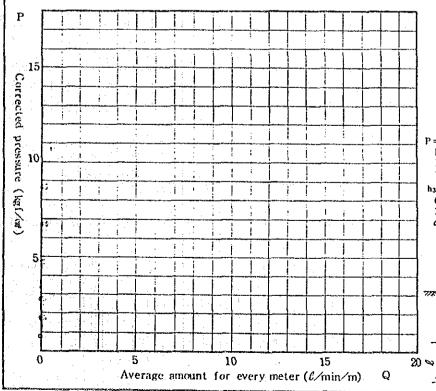
Reading	Head loss	Corrected	Ame	ount of in	ection per	minutes (	l)	Average amount	Average amount for every meter
of gauge Po	h <sub>3</sub>	P	1	2	3	4	5	Qo	Į Q
(kg[/æ])	(m)	(kgf/or)	6	7	8	9	10	(Cmin)	(C/min/m)
		1	0	1	2	1	1		
0.0	0.0	1.4	1	11	2	1		1.1	0.2
	<u> </u>		1	0	11	. 0	0		0.0
1.0	0.0	2.4	0	0	0	0	0	0.2	0.0
	<u> </u>		0	0	0	0	0	1,	
2.0	0.0	3.4	1	0	0	0	0	0.1	0.0
	i	- ,	0	0_	0	0	0	0.1	0.0
4.0	0.0	5.4	0	11	0	0	0	U.1	0.0
· · ·	0.0	7.4	0	0	0	0	0	0.1	0.0
6.0	0.0	7.4	0	1	0	0	0		
			0	0	0	0	0	0.0	0.0
8.0	0.0	9.4	0	0	0	. 0	0	0.0	
			0	0	0	0	. 0	1 00	0.0
10.0	0.0	11.4	0	0	0	Q	O	0.0	0.0
			0	0	0	0	0	0.0	0.0
8.0	0.0	9.4	0	0	0	0	0	0.0	0.0
	0.0	7.4	0	0	0	0	0	0.0	0.0
6.0	0.0	7.4	0	0	0	0	0		
	0.0	5.4	0	0_	0	0	0	0.0	0.0
4.0	0.0	3.4	0	0	0	0	00		
			0	0	1	0	0		0.0
2.0	0.0	3.4	Q	00	0	1 0	0	0.1	1 0.0
		1	0	0	0	0	0	1 00	0.0
1.0	0.0	2.4	<u> </u>	0_	<u> </u>	<u> </u>	0	0.0	1 0.0
		,	0	0	0	0	0	0.0	0.0
0.0	0.0	1.4	0	0		0	0	1 0.0	1 0.0



Stage No. 7

Location	Main Dam	Name of hole		Depth (m)		Length of test section (m)	5.0
Water Level (m)	8.0	Hight of gauge (m)	0.5	Length of rod (m)	40.5	Direction, Dip	Vertical
Diamiter of pipe (mm)	35	Type of packer	Expansion			Date	24/8

Reading of gauge		Corrected pressure	Am		jection per	minutes (		Average amount	Average amount for every meter
Po	h <sub>3</sub>	P	l	2	3	4	5	Qo	1 W 1
(kg1∕or)	(m)	(kg (∕œ;)	6	7	8	9	10	(lémin)	(¢/min/m)
	2.2		0	0	0	2	0		
0.0	0.0	0.8	0	0	0	0	0	0.2	0.0
1.0	0.0	1.8	1	0	0	0	1	1 0 2	1 01
1.0	0.0	1.0	0	0	0	0	1	0.3	0.1
2.0	0.0	0.0	1	0	1	0	ì		
2.0	0.0	2.8	1	1	0	1	1	0.7	0.1
4.0	0.0	, 0	1	0	0	1	0		
4.0	0.0	4.8	00	0	1	1	. 0	0.4	0.1
6.0	0.0	6.8	<u>3</u>	11	2	2	22		
0.0	0.0	0.0		1	1	2	1	1.7	0.3
		0.0	4	2	2	2	2		
8.0	0.0	8.8	0	1	1	<u>0</u> 3	0	1.4	0.3
10.0	0.0	10.0	2	3	2	3	3		
10.0	0.0	10.8	3	3	3	4	3	2.9	0.6
ا موا	^ ^		0	1	0	0	0		
8.0	0.0	8.8	0	2	0	1	0	0.4	0.1
6.0	0.0	6.8	1	l 0	0	0	1		
0.0	0.0	0.0	1	0	1	Ŏ	0	0.4	0.1
			0	0	0	0	1		
4.0	0.0	4.8	0	0	0	0	0	0.1	0.0
2.0	- 0	2.0	0	0	0	0	0		
2.0	0.0	2.9	0	0	0	0	0	0.0	0.0
1 ,	0.0		0	0	1	0			
1.0	0.0	1.8	Q	<u> </u>	0	0		0.1	0.0
0.0	0.0	0.9	0	0	0	0	Ŏ O	0.0	0.0

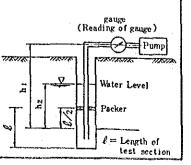


Lugeon value (Lu)	0.5
Calculated Lugeon Value (Lu')	-
Maximum pressure (kgl/cg/)	10.8
Critical pressure (kgt/cg/)	-

 $P = P_0 + \gamma_w (h_1 - h_2 - h_3) (kgt/cr)$  P : Corrected pressure (kgt/cr)  $P_0 : Reading of gauge (kgt/cr)$   $\gamma_w : Unitweight of water$ 

 $h_3 = \alpha Q \hat{\delta} L$ 

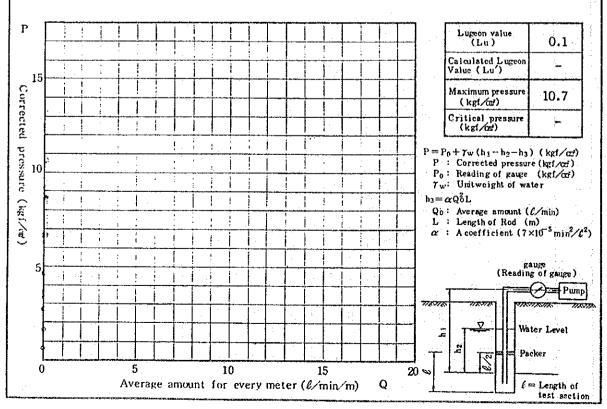
Q<sub>0</sub>: Average amount ( $\ell$ /min) L: Length of Rod (m)  $\alpha$ : A coefficient  $(7 \times 10^{-5} \text{min}^2/\ell^2)$ 



Stage No. 8

			A PART OF THE PART	A THE REAL PROPERTY AND ADDRESS OF THE PARTY A	-	<u> </u>	
Location	Main Dam	Name of hole	D - 1	Depth (m)	45.0~50.0	Length of test section (m)	5.0
Water Level	6.9	Hight of gauge (m)	0.5	Length of rod (m)		Direction, Dip	
Diamiter of pipe (mm)	35	Type of packer	Expansion			Date	25/8

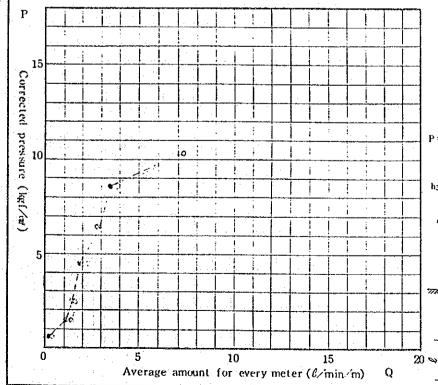
Reading of gauge	1	Corrected pressure	Am	ount of in	jection per	r minutes (	(l)	Average amount	Average amount for ever
Po	h <sub>3</sub>	P	1	2	3	4	5	Qo	meter Q
(kgſ∕œr)	(m)	(kgſ∕od)	.6	7	8	9	10	(ℓ∕min)	(€/min/m
			0	0	11	0	0		
0.0	0.0	0.7	0	0 .	11	0	0	0.2	0.0
1.0	0.0	1.7	0	0	0	11	0	0.2	0.0
1.0	0.0	1.,	<u> </u>	0	1	0	0	0.2	0.0
2.0	0.0	2.7	0	0	0	0	0 0	0.2	0.0
			0		0	0	1		
4.0	0.0	4.7	0	0	1	0	0	0.2	0.0
			0	0	Ω	1	0		
6.0	0.0	6.7	1	0	0	1	0	0.3	0.1
8.0	0.0	8.7	0	1	0	1	0	0.4	0.1
0.0	0.0	0.7	1	0	0	1	0	U.4	0.1
10.0	0.0	10.7	<u> </u>	0	1	1	1	0.6	0.1
10.0	0.0	10.7	1	1	0	<u> </u>	0	0.6	U.1
8.0	0.0	8.7	0	1	0	0	1	0.3	0.1
	0.0	<del></del>	0	0		0	0	0.5	0.1
6.0	0.0	6.7	0	0	1	0	<u>o</u>	0.2	0.0
				1	0	0	0		
4.0	0.0	4.7	0	0	1	0	0	0.2	0.0
			0	0	0	0	1		
2.0	0.0	2.7	<u> </u>	0	0	0	0	0.1	0.0
		<del></del>	<del>_</del>				0	· · ·	
1.0	0.0	1.7	0	0	0	0	0	0.1	0.0
0.0	00	0 7	0	0	n	0	0		
0.0	0.0	0.7	0	0	0		0	0.1	0.0



Stage No. 9

Location	Main Dam	Name of hole	D - 1	Depth (m)	50.0~55.0	Length of test section (m)	5.0
Water Level (m)	7.1	Hight of gauge (m)	0.5	Length of rod (m)	50.5	Direction, Dip	Vertical
Diamiter of pipe ( ma)	35	Type of packer	Expansion			Date	26/8

Reading of gauge	Head loss	Corrected pressure			jection per			Average amount	Average amount for every meter
Po (kgi/cor)		P	1	7	3	9	5 10	Qo (&min)	l Q
(KRIN (T)	(m)	(kg1/or)	6 2	2			10	(Omin)	(ℓ∕min∕m
0.0	0.0	0.8	$\frac{2}{2}$	$\frac{2}{2}$	4	<u>1</u> 3	$-\frac{1}{2}$	2.0	0.4
1.0	0 0	, ,	1	6	8	6	7		
1.0	0.2	1.7	8	8	9	7	8	6.8	1.4
2.0	0.2	2.7	9	9	8	9	8	8.2	1.6
	0.2		8	<u> </u>	9	8	7	0.2	1.0
4.0	0.5	4.7	12	12	12	11	11	11.3	2.3
			11	12	11	11	10	11.7	4.5
6.0	0.7	6.7	16 14	15 13	14 14	14 15	14 13	14.2	2.8
			16	20	20	20	20	<u> </u>	ļ
8.0	1.4	8.6	20	21	ŽÕ	21	19	19.7	3.9
10.0	4.5	10.2	38	37	36	37	36	A- A	
10.0	4.5	10.3	37	38	27	36	36	35.8	7.2
8.0	1.2	8.6	16	21	18	17	17	18.2	3.6
			19	19	19	19	17	10.2	3.0
( )	0.0	2 -	14	15	15	15	14		
6.0	0.8	6.7	14	15	15	15	15	14.7	2.9
4.0	0.3	4.7	10	10	11	11	10	9.6	1.9
710	0.5		9 .	9	9	9	- 8	2.0	1.9
2.0	0.2	2.7	8	8	8	8	8	7.3	1.5
	~		7	7	7	6	66	'	1.,
1.0	0.1	1.7	6	6	6	5	5	5.4	1.1
	<u> </u>	!	6	5	5	5	5	1	
0.0	0.0	0.8	<u> </u>	0	2	1	0	1.0	0.2

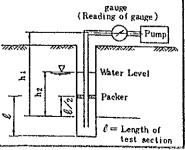


Lugeon value (Lu)	-
Calculated Lugeon Value (Lu')	4.4
Maximum pressure (kgi/m)	10.3
Critical pressure (kgi/cr)	8.6

 $\begin{array}{l} P=P_0+\gamma_w \; (h_1-h_2-h_3) \; (\; kgt/ct') \\ P\; : \; Corrected \; pressure \; (kgt/ct') \\ P_0 : \; Reading \; of \; gauge \; \; (kgt/ct') \\ \gamma_w : \; Uritweight \; of \; water \end{array}$ 

 $h_3 = \alpha Q \delta L$ 

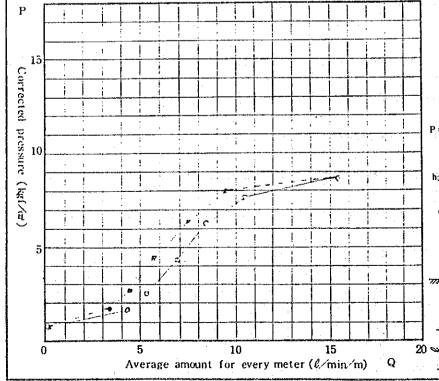
Q<sub>0</sub>: Average amount ( $\ell$ /min) L: Length of Rod (m)  $\alpha$ : A coefficient ( $7 \times 10^{-5} \min^2/\ell^2$ )



Stage NO. 10

						NAME OF TAXABLE PARTY OF TAXABLE PARTY.		And were the second sec
١	Location	Main Dam	Name of hole	D - 1	Depth (m)	55.0~60.0	Length of test section (m)	5.0
İ	Water Level	8.2	Hight of gauge (m)	0.5	Length of rod (m)	55.5	Direction, Dip	Vertical
	Diamiter of pipe (mm)	35	Type of packer	Expansion	المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع المراقع		Date	27/8

Reading of gauge	Head loss	Corrected	Amo	ount of inj	ection per	minutes (		Average amount	Average amount for every
Po	h <sub>3</sub>	P	1	2	3	4	5	Qo	meter
(kgf/cs²)	(m)	(kgf/m)	6	7	8	9	10	(Emin)	(ℓ/min/m
	<u></u>		1	0	1	0	11	0.6	0.1
0.0	0.0	0.9	1	0	1	1	0	0.0	0.1
			20	26	22	23	23	21.8	4.4
1.0	1.8	1.7	22	21	20	22	19	21.0	
2.0	2.9	2.6	28	29	26	27	29	27.2	5.4
2.0	2.9	2.0	28	26	27	26	26		ļ
4.0	4.6	4.4	35	35	33	- 36	34	34.3	6.9
4.0	4.0	4.4	26	44	35	34	31		
6.0	6.6	6.2	45	43	44	43	40	41.3	8.3
0.0	0.0	0.2	40	40	41	38	39	ļ	ļ
8.0	10.4	7.8	52	52	49	52	52	51.7	10.3
0.0	10.4	7.0	51	53	52	52	52		
10.0	23.0	8.6	67	76	66	164	66	77.0	15.4
10.0	2.7.0	0.0	65	67	66	.67	66	ļ	<b></b>
8.0	8.8	8.0	50	48	48	48	48	47.7	9.5
0.0	0.0	0.0	47	47	47	47	47	<del> </del>	-
6.0	5.3	6.3	39	38	38	37	37	36.9	7.4
0.0	0.5	0.5	36	36	36	36	36	<b></b>	
4.0	3.3	4.5	30	30	30	29	29	29.0	5.8
4.0	3.5	113	29	29	28	28	28	<u> </u>	<u> </u>
0.0	1 2 1	7 7	25	25	23	23	23	23.0	4.6
2.0	2.1	2.7	23	22	22	22	22	22.0	1.0
1.0	1.1	1.8	19	18	17	17	17	16.9	3.4
1.0	1.1	1.0	17	16	16	16	16	+	-
0.0	0.0	0.9	<u>2</u> 0	2 1	0	0	1	0.9	0.2



Lugeon value (Lu)	-
Calculated Lugeon Value (Lu')	11.6
Maximum pressure (kgi/cs)	8.6
Critical pressure (kgl/cgl)	6.2

 $P = P_0 + \gamma_w (h_1 - h_2 - h_3) (kgt/\alpha t)$   $P : Corrected pressure (kgt/\alpha t)$   $P_0 : Reading of gauge (kgt/\alpha t)$   $\gamma_w : Unit weight of water$ 

 $h_3 = \alpha Q_0^2 L$ 

Q<sub>0</sub>: Average amount ( $\ell$ /min) L: Length of Rod (m)  $\alpha$ : A coefficient (7×10<sup>-5</sup> min<sup>2</sup>/ $\ell$ <sup>2</sup>)

