

APPENDIX

APPENDIX

- 1 BASIC DESIGN STUDY TEAM PERTICIPANTS
- 2 LIST OF PERSONS INTERVIEWED AND PARTICIPATED FOR BASIC DESIGN STUDY
- 3 SCHEDULE OF BASIC DESIGN STUDY TEAM IN INDONESIA
- 4 MINUTES OF DISCUSSIONS

APPENDIX 1 BASIC DESIGN STUDY TEAM PARTICIPANTS

a. BASIC DESIGN STUDY TEAM

1. Tadahiro Matsushita
(Team Leader) Chief Engineer for Debris Flow Control,
Erosion and Sediment Control Department,
Ministry of Construction
2. Naoyoshi Sasaki
(Project Coordinator) Basic Design Division Grant Aid Department
Japan International Cooperation Agency
3. Kazuo Hirukawa
(Architectural
Planning) Matsuda, Hirata & Sakamoto
Architects, Planners & Engineers, Inc.
4. Masaatsu Ozaki
(Sabo Equipment) Matsuda, Hirata & Sakamoto
Architects, Planners & Engineers, Inc.
5. Kiyoshi Kuronuma
(Facilities Planning) Matsuda, Hirata & Sakamoto
Architects, Planners & Engineers, Inc.
6. Yukio Ishikawa
(Debris Flow
Forecasting and
Warning System) Matsuda, Hirata & Sakamoto
Architects, Planners & Engineers, Inc.

b. BASIC DESIGN STUDY REPORT CONFIRMATION TEAM

1. Tadahiro Matsushita
(Team Leader) Director of Sabo Division Ooita Prefecture
2. Naoyoshi Sasaki
(Project Coordinator) Basic Design Division
Grant Aid Department
Japan International Cooperation Agency
3. Kazuo Hirukawa
(Architectural
Planning) Matsuda, Hirata & Sakamoto
Architects, Planners & Engineers, Inc.
4. Yukio Ishikawa
(Debris Flow
Forecasting and
Warning System) Matsuda, Hirata & Sakamoto
Architects, Planners & Engineers, Inc.

APPENDIX 2 LIST OF PERSONS INTERVIEWED AND PARTICIPATED
FOR BASIC DESIGN STUDY

1. Ministry of Public Works

Dr. Ir. Suyono Sosrodarsono Minister of Public Works

2. Directorate General of Water Resources Development

Ir. Y. Sudauyoko Director General
Ir. Putra Quarsa Assistant Director General for River
Development
Ir. Dartawan Sukardi Staff of Assistant Director General
for River Development
Mrs. Yulia Lontoh Staff of Training Administration Center
Mr. Robert Staff of Training Administration Center
Mr. Bambang Turyono Staff of F.F.A., Directorate of Planning &
Programming
Mr. M. Mortorom Staff of Directorate of Planning &
Programming

3. Directorate of Rivers

Ir. Hartono Pramudo Director
Ir. Amir Muryadi Head of Sub Directorate of Planning & Design
Ir. Sutrisno Darmosurono Head of Sub Directorate of Erosion
Control & Natural, Disaster Restoration
Ir. Sarwono Sukardi Chief of Erosion Control Planning Section
Ir. Soemarso Staff of Sub Directorate of Construction &
Supervision
Mr. Sukiyoto BIE Staff Erosion Control Planning
Drs. Faried Assegaf Head of Foreign Aid Administration
Section
Mr. Sutrisno Staff of F.A.A. Section

4. Agency for Research and Development

Ir. Karman Somawidjaja Head of Agency
Dr. Ir. Bambang Soemitroadi Secretary of Agency

5. Institute of Hydraulic Engineering (BANDUNG)

Ir. Sadeli Wiramihardja	Director of I.H.E.
Ir. Willy Haryono	Secretary of I.H.E.
Ir. Sandyoyo	Staff of I.H.E.
Ir. Prayogo Endardgo	"

6. VSTC (Volcanic Sabo Technical Center)

Ir. Darmadi	(Former) Project Manajer
Ir. Djoko Legowo	Project Manager
Ir. Agus Sumaryono	Acting Project Manager
Mr. H. Djatijo Djatmiko	Chief of Administration
Ir. Puspahadi	Instructor
Ir. Putu Gelgel Wisanatapa	Instructor
Drs. Biyanto	Instructor Assistant
Drs. Bambang	Staff of Technical Development Section

7. Galunggung Volcanic Debris Control Project Office

Ir. Mugiyo	Project Manager
Ir. Adhy Duriat	Assistant of Planning Division
Mr. Haposan LG, BE	Staff of Planning Division
Mr. Roni	"
Mr. Sumantri	"

8. Embassy of Japan

Mr. Koichi Uzuka	First Secretary
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9. JICA JAKARTA Office

Mr. Hideo Endo	Resident Representative
Mr. Masayoshi Enomoto	Deputy Resident Representative
Mr. Norio Matsuda	Assistant Resident Representative

10. JICA Expert

Mr. Tomio Hirozumi	VSTC Team Leader
Mr. Hidehiko Manzen	VSTC
Mr. Kazuki Koresawa	"
Mr. Hiroaki Okubo	"
Mr. Mitsuo Nakahiro	Directorate of Rivers, Ministry of Public Works
Mr. Osamu Itagaki	"
Mr. Michiaki Ito	"

APPENDIX 3 SCHEDULE OF BASIC DESIGN STUDY TEAM IN INDONESIA

a. BASIC DESIGN STUDY (MARCH 6-29, 1986)

- (1) March 6th
- . Arrival at Jakarta
 - (Team members: Matsushita, Sasaki, Hirukawa, Ozaki, Kuronuma, and Ishikawa)
 - . Discussion of the investigation schedule at JICA, and Nakahiro, Itagaki of the Technical Cooperation Team.
-

- (2) 7th
- . Visit to the Ministry of Public Works
- Courtesy calls on:
- Dr. Ir. Suyono Sosrodarsono
Minister of Public Works;
 - Ir. Y. Sudaryoko, Director General,
Directorate General of Water Resources
Development; and Director General for River
Development
- . Discussion at the Directorate of Rivers
 - . Inception Report - explanation and discussion.
 - . Questionnaire - explanation and request for replies.
 - . Confirmation of counterpart.
 - . Courtesy calls to the Embassy of Japan, and JICA Jakarta Office
-

- (3) 8th
- . Arrival at Bandung
(Accompanied by the counterpart:
Ir. Sarwono)
 - . Visit to the Institute of Hydraulics
Engineering
 - Courtesy call on Ir. Sadori Wiramihardja,
Director General
 - . Discussion and confirmation of the relative position of V.S.T.C. and its budget

-
- (4) 9th
- . Arrival at Tasikmalaya
 - . Visit to the Sabo Project Office, at Mt. Galunggung
 - Explanation of the Sabo work situation by Ir. Mugiono, the Project Manager
 - . Field survey at the Mt. Galunggung
 - . Survey of existing warning system and equipment
 - . Departure from Tasikmalaya (all the team members, except Ishikawa)
 - . Arrival at Bandung
 - Ishikawa remained in Tasikmalaya
-

- (5) 10th
- . Visit to V.S.T.C.
 - Discussion with Ir. Agus, Acting Project Manager, and other staff
 - Presentation of inception report and explanation
 - Questionnaire, request for replies
 - . Confirmation of counterpart
 - . Confirmation of requirements and background
 - . Survey of the existing facilities of the V.S.T.C.
 - . Confirmation of the construction site
 - . Discussion with the Technical Cooperation Team
 - Ishikawa continued surveying the existing warning system and equipment, and stayed in Tasikmalaya
-

- (6) 11th
- . Visit to V.S.T.C.
 - Discussions with the Technical Cooperation Team

Discussion of the Facilities Plan

Ishikawa left Tasikmalaya and arrived at Bandung.

-
- (7) 12th
- (local holiday)
- . Survey of Mt. Merapi Sabo Project, and its Warning System
 - . Inspection of the dams at Ngepos Dan, Jurang Jero, and Mraugger.
 - . Kuronuma examines the Facility Plans.
 - . Ishikawa left Bangdun and arrived at Yogyakarta, rejoining the Team.
 - . Team meeting
-
- (8) 13th
- . Overall discussion at V.S.T.C.
 - . Ir. Amir, Ir. Sutrisno and Ir. Sarwono joined the discussion.
 - . Explanation and confirmation of the survey performed so far
 - . Request for boring test
 - . Discussion of the plans of facilities and equipment
 - . Continuation of the discussion of the equipment plans
-
- (9) 14th
- . Discussion of the plans for facilities and equipment to be built
-
- (10) 15th
- . Team meeting and discussion with the Technical Cooperation Team at V.S.T.C.
 - . Overall discussion with V.S.T.C.
-
- (11) 16th
- . Group "A" (Sasaki, Hirukawa and Ozaki)
Left Yogyakarta for Jakarta
 - . Group "B" (Kuronuma and Ishikawa)
Team meeting and analysis of data collected.

(12) 17th

Group "A"

- . Visit to the Ministry of Public Works
 Courtesy call on Ir. Pramudo,
 Director of Rivers
- . Meeting for examining the Minutes
- . Preparation of the Minutes
- . Ishikawa left Yogyakarta, arrived at
 Jakarta, and rejoined Group "A".
- . Kuronuma visited the Hydraulics Laboratory
 in Solo City, and carried out investigation

(13) 18th

Group "A":

- . Visit to the Ministry of Public Works
- . Signing of the Minutes
- . Visit to the Japanese Embassy, and JICA's
 office
 Reporting of the Outline of the
 Investigation performed
- . Courtesy call to BAPPENAS (by Sasaki)
- . Visit to C.G.S.C. and investigation (by
 Hirukawa, Ozaki and Ishikawa)
- . Kuronuma continued investigation at the
 Hydraulics Laboratory and discussed with
 V.S.T.C.

(14) 19th

- . Matsushita and Sasaki left Jakarta for
 Japan.
- . Hirukawa arranged the data collected.
- . Ozaki left Jakarta for Yogyakarta and
 discussed about the Equipment Plans at
 V.S.T.C.
- . Ishikawa left Jakarta, joined with
 Dr. Bangang at V.S.T.C. Bandung, and left
 Bandung for Tasikmalaya.

- . Kuronuma continued discussing about the Project Facilities, at V.S.T.C. and investigated the related infrastructure.
-

(15) 20th

- . Matsushita and Sasaki arrived Tokyo.
 - . Hirukawa asked the Directorate of Rivers for their replies to the questionnaire already submitted, collected data relating to the budgets, and other areas, and analyzed the same.
 - . Ozaki and Kuronuma held a detailed discussion with the V.S.T.C. and the Technical Cooperation Team about the Equipment planned at the V.S.T.C. and confirmed the existing equipment.
 - . Ishikawa carried out an investigation on the current situations of the Warning System and Equipment used at Mt. Galunggung.
-

(16) 21st

- . Hirukawa investigated similar facilities related to the Project, visited the Darmaga Campus of the Bagar Agricultural College, and carried out an investigation.
 - . Ozaki and Kuronuma held a discussion about the facilities and equipment required at the V.S.T.C., investigated the related facilities, and visited the M.M.T.C. for an investigation.
 - . Ishikawa held a discussion at the Mt. Galungan Sabo Construction Site Office on the Warning Systems equipment that could be restored.
-

(17) 22nd

- . Hirukawa at the Directorate of Rivers discussed with Ir. Amir, Ir. Sarwono and other officials, regarding re-explanation of the Grant Aid System and its framework. He received information of Building Regulations, Fire Prevention Regulations and other data required for the quotations, from the relevant officials.
- . Ozaki investigated the equipment and its utilization at the Solo Hydraulics Laboratory.
- . Kuronuma collected and analyzed data at V.S.T.C.

- . Ishikawa left Bandung for Yogyakarta, investigated the purpose of installing Warning Systems at the Mt. Merapi site.
 - . Team meeting
-

(18) 23rd

- . Ozaki investigated the purpose of collecting data on the Sabo Work situations at the Mt. Merapi site.
 - . Ishikawa arranged the data being collected.
 - . Kuronuma arranged the data being collected, and left Yogyakarta for Jakarta.
 - . Team meeting
-

(19) 24th

- . Hirukawa and Kuronuma collected data at the Directorate of Rivers, and investigated the current situation of building and building materials.
 - . Ozaki left Yogyakarta for Jakarta, and analyzed data.
 - . Ishikawa held the final discussion on the Warning Systems and equipment, at the V.S.T.C., and carried out an investigation of the office equipment required.
-

(20) 25th

- . Analysis of data collected
 - . Team meeting, except Ishikawa
-

(21) 26th

- . The final discussion at the Directorate of Rivers was held with Ir. Sutrisno, Ir. Joko Legowo and others to explain the execution schedule, and to confirm the works to be undertaken by the Indonesian Government, and their execution procedures.
 - . Ishikawa left Yogyakarta for Jakarta.
-

(22) 27th

- . Courtesy call to the Embassy of Japan and JICA Jakarta office
 - . Courtesy call to the Directorate of Rivers
 - . Team meeting
-

(23) 28th . Departure from Jakarta for Japan.
(local holiday)

(24) 29th . Arrival at Tokyo

b. BASIC DESIGN STUDY REPORT CONFIRMATION
(MAY 26-JUNE 4, 1986)

- (1) May 26th
- . Arrival at Jakarta:
(Team members Matsushita, Sasaki, Hirukawa, and Ishikawa)
 - . Discussion of the Investigation Schedule with Mr. Matsuda from JICA Jakarta Office, and Nakahiro and Itagaki from the Technical Cooperation Team.
-
- (2) 27th
- . Visit to the Ministry of Public Works
- Courtesy calls on:
- Ir. Y. Sudaryoko, Director General,
Directorate General of Water Resources
Development;
- Ir. Putra Duarsa, Assistant Director
General for River Development; and
- Ir. Hartono Pramudo, Directorate of
Rivers.
- . Visit to the Agency for Research and
Development
- Courtesy call on Ir. Karman Somawidjaya,
Head of Agency
- . Courtesy call to JICA Jakarta Branch
Office (Mr. Enomoto, Deputy Branch Manager)
 - . Courtesy call to the Japanese Embassy
(Mr. Uzuka, Secretary)
-
- (3) 28th
- . Visit to the Ministry of Public Works
- Meeting for explanation of the Draft
Final Report
- (Chairman: Ir. Putra Duarsa, an
assistant to the Minister)
- Presentation, explanation and discussion
of the Draft Final Report.
- . Team meeting
-
- (4) 29th
- . Arrival at Yogyakarta

(Matsushita, Hirukawa and Ishikawa)

- . Discussion with the Technical Cooperation Team
 - . Visit to the V.S.T.C.
 - Explanation and discussion of the Draft Final Report
 - . Sasaki remained in Jakarta.
-

(5) 30th

- . Visit to V.S.T.C.
 - Detailed discussion of the Draft Final Report
 - . Discussion with the Technical Cooperation Team
-

(6) 31st

- . Visit to V.S.T.C.
 - Detailed discussion of the Draft Final Report
 - . Team meeting
 - . Analysis of data collected
-

(7) June 1st

- . Arrival at Jakarta
 - (Matsushita, Hirukawa and Ishikawa)
 - . Sasaki rejoined the Team
 - . Preparation of the Draft Minutes
-

(8) 2nd

- . Visit to the Ministry of Public Works
 - Discussion of the Draft Minutes
 - . Team meeting
-

(9) 3rd

- . Visit to the Ministry of Public Works
 - Signing and exchange of the Minutes
- . Visit to the Embassy of Japan - Reporting the results of the investigation

- . Visit to JICA Jakarta Office -
reporting the results of the investigation
-

(10) 4th

- . Arrived at Tokyo

(Hirukawa and Ishikawa)

APPENDIX 4 MINUTES OF DISCUSSIONS

MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY
ON
THE IMPROVEMENT PROJECT FOR VOLCANIC SABO TECHNICAL CENTRE
IN
THE REPUBLIC OF INDONESIA

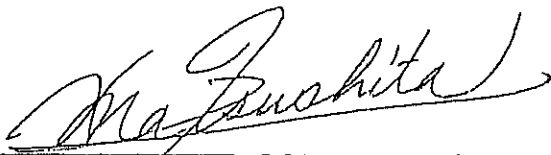
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At the request of the Government of Indonesia for Grant Aid for the improvement for Volcanic Sabo Technical Centre and Galunggung Field Laboratory (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent the Basic Design Team headed by Mr. Tadahiro MATSUSHITA, Chief Engineer for Debris Flow Control, Department of Erosion and Sediment Control, Ministry of Construction, from March 6 to March 29, 1986.

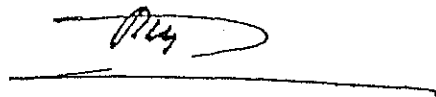
The team has carried out a field survey, held a series of discussions and exchanged views with the authorities concerned of the Government of the Republic of Indonesia.

As a result of the survey and discussions, both parties have agreed to recommend their respective governments to examine the results of the study attached herewith towards the realization of the Project.

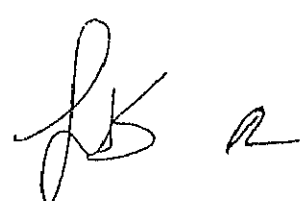
March 18, 1986
JAKARTA.



Mr. Tadahiro MATSUSHITA
Leader
JICA Basic Design Study Team



Ir. Putra DUARSA
Assistant to the Minister
for River Development
Ministry of Public Works



ATTACHMENT

=====

1. The Project description is as follows :

The objective of the Project is to provide the facilities, equipment and spare parts to initiate the further development plans of Volcanic Sabo Technical Centre and Galunggung Field Laboratory.

2. Project Sites :

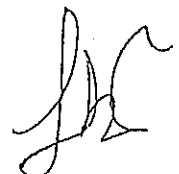
- (1). Volcanic Sabo Technical Centre, Yogyakarta
- (2). Galunggung Field Laboratory, Tasikmalaya

3. The Project includes the following :

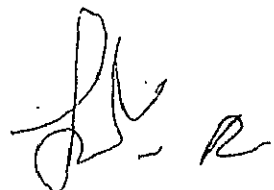
- (1). Sabo Information Centre
- (2). Training Auditorium
- (3). Lahar Laboratory
- (4). Dormitory
- (5). Machinery, Equipment and Spare parts

4. The main features of the Project are as follows :

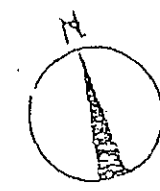
- (1). Sabo Information Centre
 - a. Proper compilation of natural disaster's records and Sabo literatures
 - b. Domestic and international information exchange
- (2). Training Auditorium
Assisting and strengthening the training activities of VSTC in terms of facilities
- (3). Lahar Laboratory
 - a. Fundamental experiment for Sabo survey and works
 - b. Promotion of technical development in appropriate Sabo construction in Indonesia
 - c. Promotion of Lahar/flood forecasting and evacuation maneuvers
- (4). Dormitory
Provision of appropriate accomodations to the short or long term training courses' participants, lecturers, instructors or experts.
- (5). Machinery, and Equipment
Further promotion of the activities of VSTC.
- (6). Spare parts
Provision of Spare parts to the existing system of Galunggung Field Laboratory.



5. The layout plan for facilities is shown in ANNEX 1.
6. The list for machinery and equipment is shown in ANNEX 2.
7. The Government of Indonesia will take necessary measures listed in ANNEX-3 on condition that the Grant Aid by the Government of Japan would be extended to the Project.
8. The Indonesia side has understood Japan's Grant Aid system explained by the Team.
9. The result of the Basic Design Study shall be presented in Draft Report of the Basic Design Study by the Japanese explanatory team in June and any modification or adjustment, if necessary, shall be made, and submitted Final Report of the Basic Design Study to the Government of Indonesia in August, 1986.

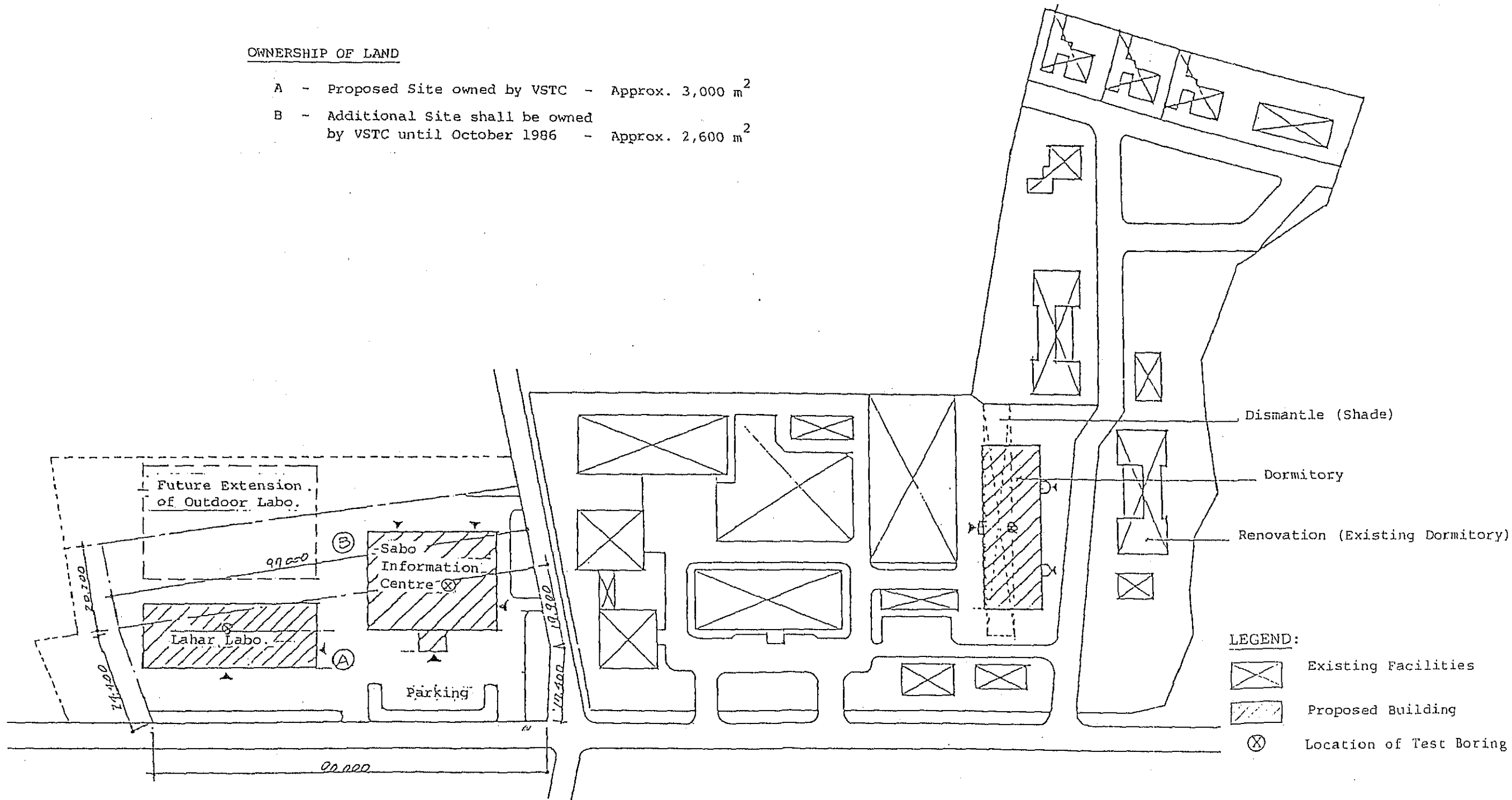
Handwritten signature or initials, possibly "J. R.", in the bottom right corner of the page.

LAYOUT FOR FACILITIES



OWNERSHIP OF LAND

- A - Proposed Site owned by VSTC - Approx. 3,000 m²
- B - Additional Site shall be owned by VSTC until October 1986 - Approx. 2,600 m²



SITE PLAN - V.S.T.C. - YOGYAKARTA

Scale 1 : 1,000

Handwritten signature/initials

LIST FOR MACHINERY & EQUIPMENT

=====

Equipments for Sabo Survey and Experiment

Artificial Rainfall Apparatus
Mudflow-model Generator
Mudflow-model Flume
Hydraulic Model Test Flume
Water Supply Equipment for Outdoor Experiment
Abrasion Test Machine
Impact Test Machine
Triaxial Test Apparatus
Ring Shear Apparatus
Echo Sounding
Natural Selection Analyzer for Suspended Load

Equipments for Mudflow Warning System

Mudflow Observation Equipment
Electric-wave Current Meter
Ultrasonic Water-level Gauge
Improvement of Radar Raingauge (Existing)

Equipments for Data Processing and Office Supplies

Word Processor
Blue Printing Machine
Offset Printing Machine
CRT Display for the Computer
Audio-visual Facilities for Sabo Information Centre
Copy Machine

Vehicles

Bus (40 persons)
Mini Bus (11 persons)
Jeep

Major undertakings to be taken by the Government of Indonesia

1. To secure land necessary for the construction of facilities
2. To clear and level the site
3. To provide facilities such as distribution of electricity, water supply, drainage and telephone lines.
4. To ensure prompt unloading and customs clearance for the goods imported by the contracted Japanese firms for the Project under the Grant.
5. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies with respect to the supply of the products and services under the Grant.
6. To accord Japanese nationals whose service may be required in connection with the supply of the products and services under the Grant such facilities as may be necessary for their entry.
7. To properly maintain and effectively use the constructed facilities under the Grant including machinery and equipment.
8. To bear all expenses inclusive of value added tax and commission fee for Banking Arrangement other than those to be borne by the Grant.
9. Other detailed items :
 - 9-1 Water supply mains to the buildings
 - 9-2 External drainage from the buildings (including sewage treatment facilities).
 - 9-3 Landscaping
 - 9-4 Exterior facilities (fence, gate).
 - 9-5 Test boring (3 point Ø)
 - 9-6 Dismantle motor pool shade.
 - 9-7 Earth filling. Site clearance.
 - 9-8 Renovation existing dormitory for female trainee.



MINUTES OF DISCUSSIONS
ON
THE DRAFT REPORT OF THE BASIC DESIGN STUDY
ON
THE IMPROVEMENT PROJECT FOR VOLCANIC SABO TECHNICAL CENTRE
IN
THE REPUBLIC OF INDONESIA

In response to the request of the Government of the Republic of Indonesia for Grant Aid for the Improvement Project of Volcanic Sabo Technical Centre and Galunggung Field Laboratory (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Indonesia the team headed by Mr. Tadahiro Matsushita, Chief Engineer for Debris Flow Control, Department of Erosion and Sediment Control, from March 6 to March 29, 1986.

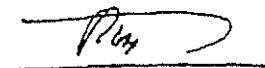
As a result of the study, JICA prepared a draft report and dispatched a mission to explain and discuss it from May 26 to June 4, 1986.

Both parties had a series of discussions on the Report and agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project,


Jakarta, June 3, 1986



Mr. TADAHIRO MATSUSHITA
Team Leader
JICA Study Team



Ir. PUTRA DUARSA
Assistant Director General
for River Development
Ministry of Public Works



Attachment

1. The draft report principally satisfies the Indonesian side and appropriate alternations or adjustments in the report agreed during the discussions will be incorporated in the Final Report.
2. The Final Report on the Project in English (20 copies) with "the amendments mutually agreed upon" shall be submitted to the Indonesian Government by the middle of September, 1985.
3. The Indonesian side has principally agreed to the basic design for the buildings, facilities and equipment proposed in the draft report.
4. Particularly, with regard to the equipment, the Indonesian side is responsible to maintain and operate it efficiently and effectively with the necessary budget and personnel which shall be obtained for the realization of the objectives of the Project.

Note: 1. The Indonesian side would like to have a Japanese electrical Engineer for the forecasting and warning system of the Project.

2. The Indonesian side is requested to have further effort in analysing the relationship between rainfall and lahar flow in order to promote the system of forecasting, warning and evacuation in the Project Area.



"The Agreed Amendments"

The agreed amendments which will be incorporated in the Final Report are :

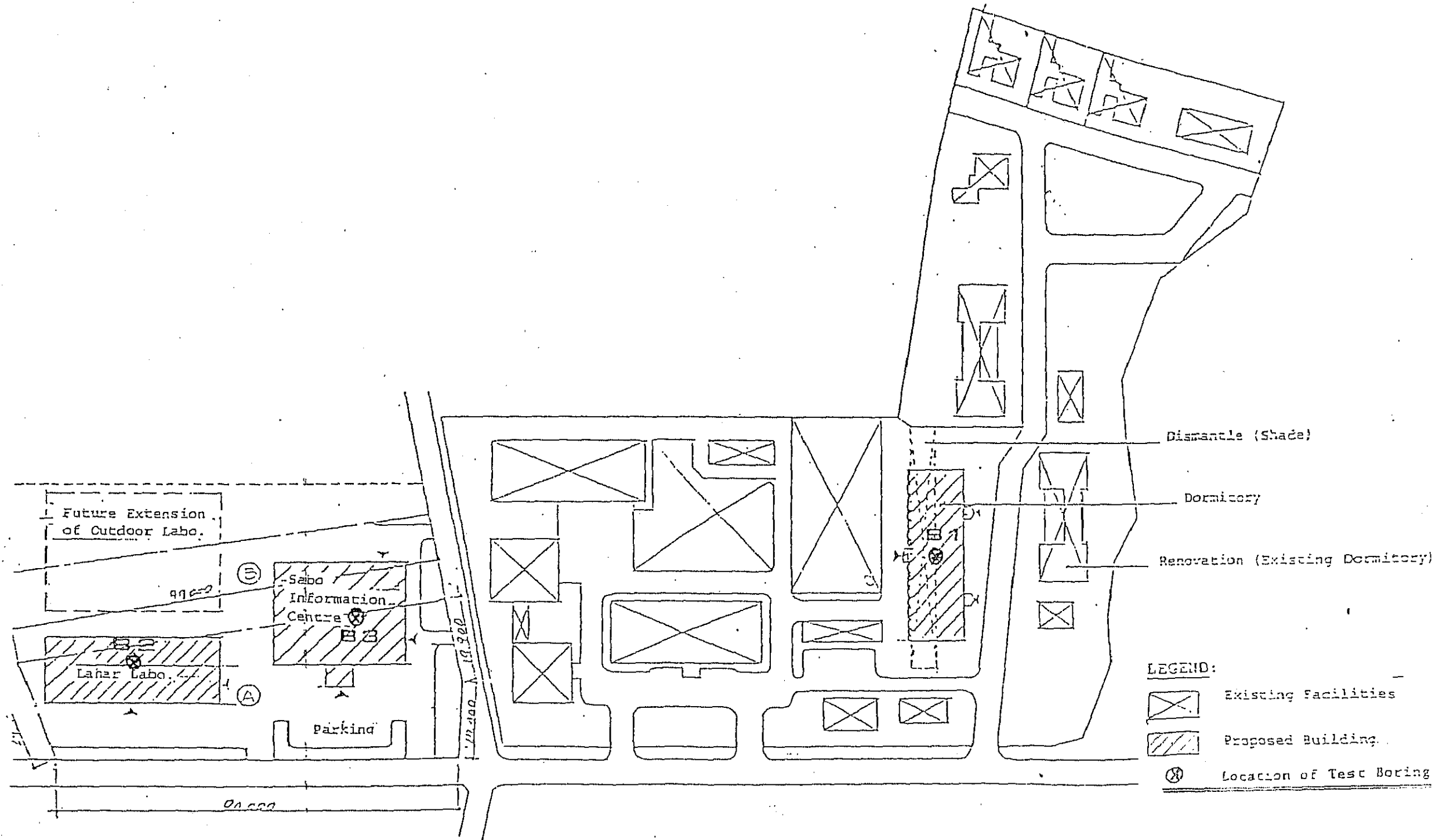
1. Building (Laundry space for dormitory, dimension, office and toilet for Lahar laboratory , piling).
2. Sabo Equipment (Ring Shear Apparatus, Echo Sounding Apparatus, Natural Selection Analyzer with less priority among the all sabo equipment).
3. Water-level Gauge (4 sets → 1 set)
4. Electric-wave equipment (3 sets → 2 sets)
5. Cathode Ray Tube (CRT) (3 sets → 2 sets)
6. Off-set Printer (with the lowest priority)
7. Audio-visual equipment (Overhead Projector, Slide Projector, Film Projector with the lowest priority)
8. Vehicle (Bus-40 seats : 1 unit, Jeep : 4 units → 2 units, Micro bus : 2 units → 0 unit)



SUPPLEMENT

SUPPLEMENT

I BORING DATA



V S T C - YOGYAKARTA

GEOLOGICAL CORE DRILLING LOG OF BORE HOLE NUMBER : B 1

PROJECT :
 LOCATION : Work Shop Merapi Project
 DATE STARTED : May, 3, 1986
 DATE FINISHED : May, 7, 1986
 VERTICAL SCALE : 1 : 100

SURFACE ELEVATION :
 DEPTH : 25 m
 HOLE INCLINATION : Vertical
 DRILLED BY : Mukharob Gs
 LOGGED BY : Anung Priyoko
 INSPECTED BY : Ir. Suharto Tjojudo. MSc

DATE	BIT & CORE BARREL TYPES	DEPTH (M)	ELEVATION (M)	LITHOLOGY						WATER PRESSURE TEST				STANDARD PENETRATION TEST		REMARKS								
				TYPE	THICKNESS (M)	SECTION	CORE RECOVERY		GRAIN OR FRAGMENT SIZE (CM)	COLOUR	WEATHERING	COMPACTNESS	HARDNESS	CONSISTENCY	RELATIVE DENSITY		GROUND WATER LEVEL (M)	DEPTH FROM - 10 (M)	TOTAL PRESSURE (KG/CM ²)	WATER LOOSE		DIAGRAM	PERMEABILITY (CM/SEC)	BLOW (N/FOOT)
							PERCENTAGE (%)	THICKNESS (CM)												WATER	LOOSE			
May 3 1986	SCB&MT	0.2		Floor	0.2		50	25	1/20	0.5	White												Mixed materials from andesite fragments, chalk powder and sand	
	O 7.3	0.6			0.4		50	45	1/20	0.5	Brown													
	SPT	1	1.45				55	45	1/20	10	Brownish grey													Found andesite gravels, grey, faintly weathered, compact, hard, rounded-sub rounded, (1-10) cm
	SPT	2	2.45		2.15		55	45	1/20	10	Grey													
	SPT	3.1	3.45		0.35		45	55	1/20	10	Grey													
	SPT	3.9	4.45		0.8		100	55	1/20	10	Brownish grey													
	SPT	5	5.3		1.4		45	55	1/20	1/40	Grey													
	SPT	5.7	5.7		0.4		45	55	1/20	1/40	Brownish grey													
	SPT	6.5	6.85		0.8		105	45	1/40	1/80	Brown													
	SPT	7.3	7.5		0.35		100	45	1/20	1/40	Grey													
	SPT	7.95	7.95		0.45		45	55	1/20	1	Grey													
	SPT	8.9	8.9		1.6		100	45	1/20	1/40	Grey													
	SPT	9.5	9.7		0.8		45	55	1/20	1/40	Brownish grey													
	SPT	10	10.45		1.6		100	45	1/80	1	Grey													
	SPT	11	11.3		0.7		45	55	1/10	1/20	Blackish grey													
SPT	12	12.45		1.9		45	55	1/20	1/40	Grey														
SPT	13.0	13.45		0.6		45	55	1/40	1/80	Blackish grey														
SPT	13.9	14.5		1.5		45	55	1/20	1/40	Blackish grey														

EXPLANATION:

SPT : STANDARD PENETRATION TEST
 SCB : SINGLE CORE BARREL
 DCB : DOUBLE CORE BARREL
 MT : METAL BIT
 TWB : THIN WALL BARREL
 THE BLOW HAS BEEN CORRECTED

WEATHERING:

F : FRESH
 FW : FAINTLY WEATHERED
 SW : SLIGHTLY WEATHERED
 MW : MODERATELY WEATHERED
 HW : HIGHLY WEATHERED
 CW : COMPLETELY WEATHERED

COMPACTNESS:

L : LOOSE
 SL : SLIGHTLY LOOSE
 SC : SLIGHTLY COMPACT
 C : COMPACT
 VC : VERY COMPACT

HARDNESS:

VS : VERY SOFT
 S : SOFT
 SH : SLIGHTLY HARD
 H : HARD
 VH : VERY HARD

CONSISTENCY:

VS : VERY SOFT
 S : SOFT
 M : MEDIUM
 SF : STIFF
 VSF : VERY STIFF
 H : HARD

RELATIVE DENSITY:

VL : VERY LOOSE
 L : LOOSE
 M : MEDIUM
 D : DENSE
 VD : VERY DENSE

**GEOLOGICAL CORE DRILLING LOG OF BORE HOLE
NUMBER : 01**

PROJECT :
LOCATION :
DATE STARTED :
DATE FINISHED :
VERTICAL SCALE : 1:100

SURFACE ELEVATION :
DEPTH :
HOLE INCLINATION :
DRILLED BY :
LOGGED BY :
INSPECTED BY :

DATE	BIT & CORE BARREL TYPES	DEPTH (M)	ELEVATION (M)	L I T H O L O G Y										WATER PRESSURE TEST					STANDARD PENETRATION TEST		REMARKS							
				TYPE	THICKNESS (M)	SECTION	CORE RECOVERY		GRAIN OR FRAGMENT SIZE (CM)	COLOUR	R O C K					GROUND WATER LEVEL (M)	DEPTH FROM - TO (M)	WATER LOOSE		DIAGRAM		PERMEABILITY (CM/SEC)	DEPTH FROM - TO (M)	BLOW (N./FOOT)				
							PERCENTAGE (%)	THICKNESS (CM)			WEATHERING	COMPACTNESS	HARDNESS	CONSISTENCY	RELATIVE DENSITY			TOTAL (L/MINUTE)	L/MINUTE (M)					LUGER UNIT (L/MINUTE (M))	5	50		
May 6 1986	SPT	16.5		Volcanic Sand	0.5		45	1/20-1/40													16.15	16.45	17					
		17			1.1		45	1/10-1/20														17.15	17.45	22				
	SPT	18	17.80		0.9		55	1/20-1/40														18.15	18.45	24				
		18.5			0.3		55	1/10-1/20															18.15	18.45	24			
	SPT	19	18.8		0.9		45	1/20-1/40															19.15	19.45	24			
		19.45					55	1/20-1/40															19.15	19.45	24			
	SPT	20	19.70			1.8		45	1/10-1/20														20.15	20.45	26		Found andesite gravels, grey, faintly weathered, compact, hard, sub rounded-sub angular ϕ (1-5)cm	
	20.45				55	1/10-1/20															20.15	20.45	26					
May 7 1986	SPT	21				45															21.15	21.45	23					
		21.5				55																21.15	21.45	23				
	SPT	22	21.5		1.7		45	1/20-1/40														22.15	22.45	24				
		22.45				55																22.15	22.45	24				
	SPT	23	22.2		0.4		45															23.15	23.45	8		Rich of organic materials, black, soft		
	23.45			0.4		55	1/160-1/2560	Black													23.15	23.45	8					
SPT	24	23.6		0.5		45		Brown													24.15	24.45	7					
	24.5					55		Black													24.15	24.45	7					
	25.0			Volcanic Sand	0.5		55	1/40-1/80	Brown																			

EXPLANATION:

SPT : STANDARD PENETRATION TEST
SCB : SINGLE CORE BARREL
DCB : DOUBLE CORE BARREL
MT : METAL BIT
TWB : THIN WALL BARREL
THE BLOW HAS BEEN CORRECTED

WEATHERING:

F : FRESH
FW : FAINTLY WEATHERED
SW : SLIGHTLY WEATHERED
MW : MODERATELY WEATHERED
HW : HIGHLY WEATHERED
CW : COMPLETELY WEATHERED

COMPACTNESS:

L : LOOSE
SL : SLIGHTLY LOOSE
SC : SLIGHTLY COMPACT
C : COMPACT
VC : VERY COMPACT

HARDNESS:

VS : VERY SOFT
S : SOFT
SH : SLIGHTLY HARD
H : HARD
VH : VERY HARD

CONSISTENCY:

VS : VERY SOFT
S : SOFT
M : MEDIUM
SF : STIFF
VSF : VERY STIFF
H : HARD

RELATIVE DENSITY:

VL : VERY LOOSE
L : LOOSE
M : MEDIUM
D : DENSE
VD : VERY DENSE

**GEOLOGICAL CORE DRILLING LOG OF BORE HOLE
NUMBER : B 2**

PROJECT :
 LOCATION :
 DATE STARTED : May, 9, 1986
 DATE FINISHED : May, 11, 1986
 VERTICAL SCALE : 1:100

SURFACE ELEVATION :
 DEPTH : 25 m
 HOLE INCLINATION : Vertical
 DRILLED BY : Mukharob Cs
 LOGGED BY : Anung
 INSPECTED BY : Ir. Suharto Tjojudo MSc

DATE	BIT & CORE BARREL TYPES	DEPTH (M)	ELEVATION (M)	LITHOLOGY										WATER PRESSURE TEST					STANDARD PENETRATION TEST			REMARKS			
				TYPE	THICKNESS (M)	SECTION	CORE RECOVERY		GRAIN OR FRAGMENT SIZE (CM)	COLOUR	ROCK					GROUND WATER LEVEL (M)	DEPTH FROM - TO (M)	TOTAL PRESSURE (KG/CM ²)	WATER LOOSE		PERMEABILITY (CM/SEC)		DEPTH FROM - TO (M)	BLOW (N/FOOT)	
							PERCENTAGE (%)	THICKNESS (CM)			WEATHERING	COMPACTNESS	HARDNESS	CONSISTENCY	RELATIVE DENSITY				TOTAL (L/MINUTE)	L/MINUTE / M					PERMEATION UNIT (L/MINUTE / M)
May, 9, 1986	SCB&MT Ø 73cm	0.09		Volcanic clayey sand	0.9		100	20-1/2560	blackish brown														At depth 0 - 0.40 m found root of plants		
	SPT	1.0		Volcanic clayey sand	2.0		45		brownish grey													1.15	7	Found andesite gravels, brown, highly weathered, compact, hard rounded, Ø (1-2)cm	
	SPT	1.45	2.15																			9			
	SPT	2.0	2.45																			9			
	SPT	2.45		Volcanic sand	1.6		55	1/20 - 1/40	brown														3.15	3	
	SPT	2.9	3.45																				3		
	SPT	3.0																					3		
	SPT	3.45		Volcanic sand	0.5		55	1/40 - 1/20	grey														4.15	11	
	SPT	4.0	4.45																				11		
	SPT	4.45																					11		
	SPT	4.5		Volcanic sand	0.7		55	1/40 - 1/80	grey														5.15	17	Found andesite gravels, grey, faintly weathered, compact, hard, sub rounded-sub angular Ø (1-5)cm
	SPT	5.0	5.45																				17		
	SPT	5.45																					17		
	SPT	5.45		Volcanic sand	0.3		55	1/40 - 1/20	blackish grey														6.15	35	
	SPT	6.0	6.45																				35		
SPT	6.45		35																						
SPT	7.0		Volcanic sand	1.2		55	1/40 - 1/80	blackish grey														7.15	19		
SPT	7.45	7.45																				19			
SPT	7.45																					19			
SPT	8.0		Volcanic sand	0.7		55	1/20 - 1/40	brown														8.15	17		
SPT	8.45	8.45																				17			
SPT	8.45																					17			
SPT	9.0		Volcanic sand	0.8		55	1/40 - 1/80	blackish grey														9.15	8		
SPT	9.45	9.45																				8			
SPT	9.45																					8			
SPT	10		Volcanic sand	2.1		55	1/40 - 1/80	blackish grey														10.15	12		
SPT	10.45	10.45																				12			
SPT	10.45																					12			
SPT	11		Volcanic silt	0.6		55	1/160 - 1/2560	brown														11.15	11		
SPT	11.45	11.45																				11			
SPT	11.45																					11			
SPT	12		Volcanic sand	1.25		55	1/20 - 1/40	grey														12.15	7	Found andesite gravels, grey, faintly weathered, compact, hard rounded-subrounded, Ø (0.5-1)cm	
SPT	12.45	12.45																				7			
SPT	12.45																					7			
SPT	13		Volcanic sand	0.7		55	1/40 - 1/80	grey														13.15	14		
SPT	13.45	13.45																				14			
SPT	13.45																					14			
SPT	14		Volcanic sand	1.8		55	1/10 - 1/20	grey														14.15	16		
SPT	14.45	14.45																				16			
SPT	14.45																					16			
SPT	15		Volcanic sand	1.8		55	1/10 - 1/20	grey														15.15	16		
SPT	15.45	15.45																				16			
SPT	15.45																					16			

**GEOLOGICAL CORE DRILLING LOG OF BORE HOLE
NUMBER : B 2**

DATE	DEPTH (m)	SPT	THICKNESS (m)	GRAIN SIZE	WEATHERING	REMARKS
May 9, 1986	7.0	SPT	1.2	1/40 - 1/80	grey	
	7.15					
	8.0	SPT	0.7	1/20 - 1/40	brown	
	8.45					
May 10, 1986	9.0	SPT	0.8		brown	
	9.45					
	10.0	SPT	2.1	1/40 - 1/80	blackish grey	
	10.45					
May 11, 1986	11.0	SPT				
	11.45					
	12.0	SPT	0.6	1/160 - 1/2560	brown	
	12.45					
	13.0	SPT	1.25	1/20 - 1/40		
	13.45					
	14.0	SPT	0.7	1/40 - 1/80		
	14.45					
	15.0	SPT	1.8	1/10 - 1/20	grey	
	15.45					
	16.0	SPT	1.2			
	16.45					
17.0	SPT					
17.20						
17.45						
18.0	SPT	2.8	1/40 - 1/20	grey		
18.45						
19.0	SPT					
19.45						
20.0	SPT					
20.45						
21.0	SPT	2.7	1/40 - 1/80			
21.45						
22.0	SPT					
22.45						
22.70						
23.0	SPT	0.3	1/160 - 1/2560	black brown		
23.45						
24.0	SPT	1.05	1/40 - 1/80	grey		
24.45						
24.80						
25.0			0.4	1/20 - 1/40		

Found andesite gravels, grey, faintly weathered, compact, hard rounded-outrounded, φ (0.5-1) cm

Found andesite gravels, grey, fresh-faintly weathered, hard, compact, subrounded-rounded, φ (1-5) cm

Risk of organic materials, black, soft

EXPLANATION :
 SPT : STANDARD PENETRATION TEST
 SCB : SINGLE CORE BARREL
 DCB : DOUBLE CORE BARREL
 MT : METAL BIT
 TWB : THIN WALL BARREL
 THE "LOW" HAS BEEN CORRECTED

WEATHERING :
 F : FRESH
 FW : FAINTLY WEATHERED
 SW : SLIGHTLY WEATHERED
 MW : MODERATELY WEATHERED
 HW : HIGHLY WEATHERED
 CW : COMPLETELY WEATHERED

COMPACTNESS :
 L : LOOSE
 SL : SLIGHTLY LOOSE
 SC : SLIGHTLY COMPACT
 C : COMPACT
 VC : VERY COMPACT

HARDNESS :
 VS : VERY SOFT
 S : SOFT
 SH : SLIGHTLY HARD
 H : HARD
 YH : VERY HARD

CONSISTENCY :
 VS : VERY SOFT
 S : SOFT
 M : MEDIUM
 SF : STIFF
 VSF : VERY STIFF
 H : HARD

RELATIVE DENSITY :
 VL : VERY LOOSE
 L : LOOSE
 M : MEDIUM
 D : DENSE
 VD : VERY DENSE

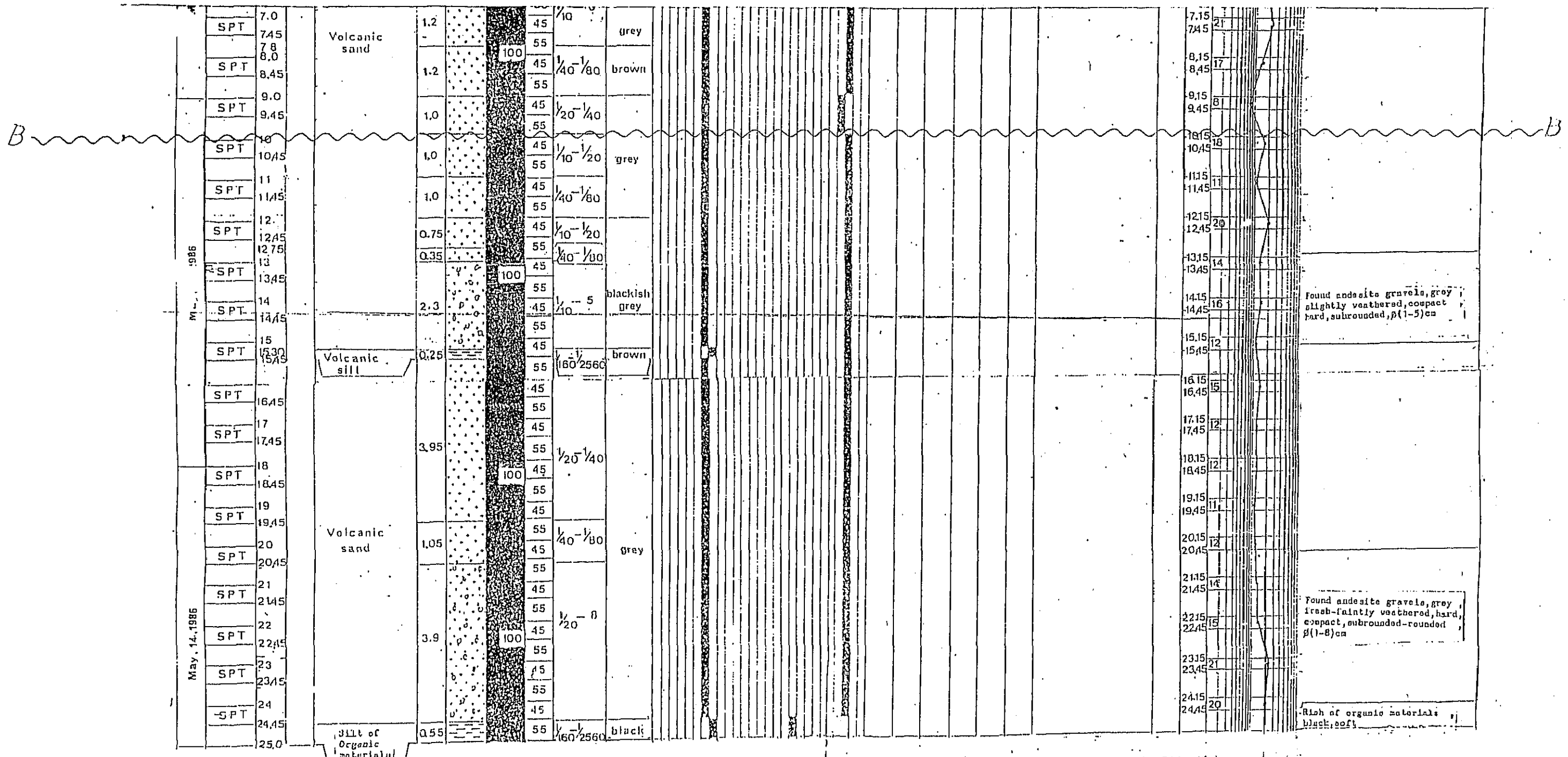
GEOLOGICAL CORE DRILLING LOG OF BORE HOLE NUMBER : B3

PROJECT :
 LOCATION :
 DATE STARTED : May, 12, 1986
 DATE FINISHED : May, 14, 1986
 VERTICAL SCALE : 1 : 100

SURFACE ELEVATION :
 DEPTH : 25 m
 HOLE INCLINATION : Vertical
 DRILLED BY : Mukharob Gs
 LOGGED BY : Anung
 INSPECTED BY : Ir. Suharto Tjojudo MSc

DATE	BIT & CORE BARREL TYPES	DEPTH (M)	ELEVATION (M)	L I T H O L O G Y										WATER PRESSURE TEST						STANDARD PENETRATION TEST		REMARKS	
				TYPE	THICKNESS (M)	SECTION	CORE RECOVERY		GRAIN OR FRAGMENT SIZE (CM)	COLOUR	R O C K					GROUND WATER LEVEL (M)	DEPTH FROM - TO (M)	TOTAL PRESSURE (KG/CM ²)	WATER LOOSE		PERMEABILITY (CM/SEC)		BLOW (N/FOOT)
							PERCENTAGE (%)	THICKNESS (CM)			WEATHERING	COMPACTNESS	HARDNESS	CONSISTENCY	RELATIVE DENSITY				TOTAL (L/MINUTE)	L/MINUTE / M			
May, 12, 1986	SCB&MT Ø 73 cm	0.4		Volcanic clayey sand	0.4		100	20-2560	brown														Found root of plants
	SPT	0.9		Volcanic sand	0.5		45	10-1/20	brownish grey														
	SPT	1.45			0.9		55	20-1/40															
	SPT	2.0		Volcanic silt	1.7		45	40-1/80	brown														
	SPT	2.45			0.9		55	1/160-1/2560															
	SPT	2.9			0.5		45	40-1/100															
	SPT	3.0		Volcanic sand	0.8		55	20-1/40															
	SPT	3.45			0.2		45	1/10-3	grey														
	SPT	4.0			0.6		55	1/40-1/80	brown														
	SPT	4.45			1.2		45	1/10-1/20	grey														
	SPT	4.5		Volcanic sand	1.2		55	1/40-1/80	brown														
	SPT	5.0			1.0		45	1/20-1/40															
	SPT	5.45			1.0		55	1/10-1/20	grey														
	SPT	5.8			0.75		45	1/10-1/20															
SPT	6.0		0.35			55	1/40-1/100																
SPT	6.45		2.3			45	1/10-5	blackish grey															
SPT	6.6		Volcanic sand	1.0		55	1/20-1/40																
SPT	7.0			1.0		45	1/10-1/20	grey															
SPT	7.45			1.0		55	1/40-1/80																
SPT	7.8			1.0		45	1/10-1/20	grey															
SPT	8.0			1.0		55	1/40-1/80																
SPT	8.45			0.75		45	1/10-1/20																
SPT	9.0			0.35		55	1/40-1/100																
SPT	9.45			2.3		45	1/10-5	blackish grey															
May, 13, 1986	SPT	10		Volcanic sand	1.0		45	1/20-1/40															
	SPT	10.45			1.0		55	1/10-1/20	grey														
	SPT	11			1.0		45	1/40-1/80															
	SPT	11.45			0.75		55	1/10-1/20															
	SPT	12			0.35		45	1/40-1/100															
	SPT	12.45			2.3		55	1/10-5	blackish grey														
SPT	12.75		Volcanic sand	1.0		45	1/20-1/40																
SPT	13			1.0		55	1/10-1/20	grey															
SPT	13.45		Volcanic sand	1.0		45	1/40-1/80																
SPT	14			1.0		55	1/10-1/20	grey															
SPT	14.45		2.3		45	1/10-5	blackish grey																

GEOLOGICAL CORE DRILLING LOG OF BORE HOLE NUMBER B3



EXPLANATION :
 SPT : STANDARD PENETRATION TEST
 SCB : SINGLE CORE BARREL
 DCB : DOUBLE CORE BARREL
 MT : METAL BIT
 TWB : THIN WALL BARREL
 THE "LOW" HAS BEEN CORRECTED

WEATHERING :
 F : FRESH
 FW : FAIRLY WEATHERED
 SW : SLIGHTLY WEATHERED
 MW : MODERATELY WEATHERED
 HW : HIGHLY WEATHERED
 CW : COMPLETELY WEATHERED

COMPACTNESS :
 L : LOOSE
 SL : SLIGHTLY LOOSE
 SC : SLIGHTLY COMPACT
 C : COMPACT
 VC : VERY COMPACT

HARDNESS :
 VS : VERY SOFT
 S : SOFT
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 H : HARD
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CONSISTENCY :
 VS : VERY SOFT
 S : SOFT
 M : MEDIUM
 SF : STIFF
 VSF : VERY STIFF
 H : HARD

RELATIVE DENSITY :
 YL : VERY LOOSE
 L : LOOSE
 M : MEDIUM
 D : DENSE
 VD : VERY DENSE

JICA