

ANNEX

- A- 1 Members of the Study Team
- A- 2 Schedule of the Site Survey
- A- 3 List of Person Contacted
- A- 4 List of Collected Data and Information
- A- 5 Minutes of Discussions (Field Survey Period)
- A- 6 Department Order No. 185 "Creation of MPR-PMO
- A- 7 Department Order No. 186 "Designation of Program Director of MPR-PMO"
- A- 8 Letter to JICA Manila Office (Transfer of the Excuting Agency)
- A- 9 Technical Notes
- A-10 Minutes of Discussions (Explanation of Draft Final Report)
- A-11 Population Density Map
- A-12 Climate in Luzon & Visayas Area
- A-13 Mudflow Hazard Map
- A-14 Hydrologeological Map
- A-15 Conditions of Reconstruction in High Resettlement Area
- A-16 Detail of Conditions of Existing Water Supply Facilities
- A-17 Budget for DPWH Infrastructure Component of Master Plan
- A-18 Project of Foreign Organization Assistance Plan for Recovery
- A-19 Organization Chart of MPR-PMO
- A-20 Project Sites and Requiered Quantities of Water Supply Program in Affected Area of Mt. Pinatubo Eruption
- A-21 Hydraulic Calculation Results of Pipeline
- A-22 Pipe Excavation Standard Section Dwg

A- 1 MEMBERS OF THE STUDY TEAM

This Basic Design Study will be carried out with following members;

Field Survey

<u>Duty</u>	<u>Name</u>	
Team Leader	Mr. Shigeru OKAMOTO	Deputy Director 1st Basic Design Study Div. Grant Aid Study & Design Dept., JICA
Water Supply Planner	Mr. Osamu YOSHIDA	Assist. Director Waterworks Facilities Div., Public Enterprise Bureau, Saitama Prefectural Government
Chief Engineer/ Ground Water Planner	Mr. Yukio HOSHINO	Pacific Consultants International. (PCI)
Water Supply Facilities Planner	Mr. Osamu YAMAMOTO	ditto.
Material & Equipment Planner	Mr. Hisashi KOBAYASHI	ditto.
Cost Estimator	Mr. Ryuuji YANAI	ditto. (in home office work)

Explanation of Draft Final Report

<u>Duty</u>	<u>Name</u>	
Team Leader	Mr. Hisashi Ohno	Grant Aid Division, Bureau of Economic Cooperation Dept., Ministry of Foreign Affairs
Member	Mr. Hisatoshi Okubo	1st Basic Design Study Div., Grant Aid Study & Design Dept., JICA
Member Chief Engineer	Mr. Yukio Hoshino	Pacific Consultants International (PCI)
Member Materials & Equipment Planner	Mr. Hisashi Kobayashi	- ditto -

A- 2 Schedule of the Site Survey

No.	Date	Weather	Brief of Work
1	Nov. 16 (Mon)	Rain	Departure(NRT--JL741-) Arrival at MNL Courtesy call(Japanese Embassy & JICA Office)
2	17 (Tue)	Cloudy	Courtesy call(PMO-RWS & MPR-PMO, DPWH) - explanation of inception report - confirmation of field study schedule
3	18 (Wed)	Fine	Hearing(Region III-DPWH, DSWD) Site survey at NABUKLOD
4	19 (Thu)	-do-	Hearing(Zambales District Office-DPWH) Site survey at DAMPAY SALASA, LOOB BUNGA & BAQUILAN
5	20 (Fri)	-do-	Site survey in Pamoanga and movement to MNL Mr. YOSHIDA arrived at MNL
6	21 (Sat)	Rain	Meeting with JICA Officer and Expert
7	22 (Sun)	Cloudy	Brief survey at IRAM and CAWAG
8	23 (Mon)	Fine	Brief survey at KALANGITAN and movement to MNL
9	24 (Tue)	-do-	Courtesy call the Under-Secretary(DPWH) Discussion, JICA Office
10	25 (Wed)	Cloudy	Meeting with MPR-PMO, DPWH(Discussion on M/D)
11	26 (Thu)	-do-	Signing the Minutes of Discussion Data collection
12	27 (Fri)	-do-	Mr. HOSHINO & YAMAMOTO moved to San Fernando Hearing from Region III Equipment Service Data collection and arrangement
13	28 (Sat)	Fine	Preparation of site survey and data analysis Mr. OKAMOTO and Mr. YOSHIDA left for Japan JL742
14	29 (Sun)	-do-	Data arrangement
15	30 (Mon)	Cloudy	Preparation of site survey and data analysis
16	Dec. 1 (Tue)	-do-	Hearing survey(RDCC) Site survey at DAMPAY SALASA, LOOB BUNGA & BAQUILAN (including electric prospecting)
17	2 (Wed)	Fine	Site survey at CAWAG and IRAM (including electric prospecting)
18	3 (Thu)	Cloudy	Data collection (RDCC) Site survey at VILLA MARIA and CAMIAS
19	4 (Fri)	-do-	Site survey at DUEG (including electric prospecting)
20	5 (Sat)	-do-	Site survey at KALANGITAN (including electric prospecting)

21	6 (Sun)	Fine	Data arrangement	
22	7 (Mon)	Rain	Meeting with MPR-PMO Data collection(TLRC, NHA, DSWD)	
23	8 (Tue)	Cloudy	Mr. KOBAYASHI moved to Pampanga and Tarlac Data collection(DENR-MNL & Region III) Hearing from Region III Equipment Service & Pampanga 2 District Office, DPWH	
24	9 (Wed)	Fine	Data collection(DENR & DSDW Tarlac) Hearing from Tarlac Provincial Government & Tarlac District Office, DPWH	
25	10 (Thu)	-do-	Data collection(TLRC) Technical Discussion with MPR-PMO, DPWH	
26	11 (Fri)	Cloudy	Technical Discussion with MPR-PMO, DPWH	
27	12 (Sat)	-do-	Data collection(PMO-RWS)	
28	13 (Sun)	Fine	Data arrangement	
29	14 (Mon)	-do-	Signing of Technical Notes Data collection(NHA)	
30	15 (Tue)	Cloudy	Report to Japanese Embassy Movement from MNL to Tokyo	JL742

Explanation of Draft Final Report

1	Feb. 14 (Sun)	Fine	Departure(NRT--JL741-), Arrival at MNL Courtesy call & discussion(JICA Office)	
2	15 (Mon)	-do-	Meeting with MPR-PMO, DPWH(Explanation of D/F Report) Courtesy call(Japanese Embassy & JICA Office)	
3	16 (Tue)	-do-	Meeting with MPR-PMO, DPWH(Discussion on D/F Report)	
4	17 (Wed)	-do-	Meeting with MPR-PMO, DPWH(Discussion on M/D)	
5	18 (Thu)	-do-	Signing the Minutes of Discussion Report to Japanese Embassy	
6	19 (Fri)	-do-	Site survey(Mr. Ohno & Mr. Ohkubo) Technical discussion with DPWH engineer(Mr. Kobayashi) Mr. Hoshino moved from MNL to Tokyo	JL742
7	20 (Sat)	-do-	Discussion with MPR-PMO engineer(Mr. Kobayashi) Mr. Ohno and Okubo moved from MNL to Tokyo	JL742
8	21 (Sun)	-do-	Mr. Kobayashi moved from MNL to Tokyo	JL742

A- 3 LIST OF PERSON CONTACTED

Department of Public Works and Highways(DPWH)

- Mr. Teodoro T. Encarnacion Under-Secretary
Mr. Manuel M. Bonoda Asst. Secretary for Planning
- Mt. Pinatubo Rehabilitation Project Management Office(MPR-PMO)
Mr. Fiorante Soriquez Project Director
Mr. Mario E. Bandelaria Engineer V
Ms. Elsie B. Monsanto Project Coordinator(Engr. IV)
Mr. Ramon Cacatian Engineer III
Mr. Moreno A. Navarro Engineer IV
Mr. Lucio T. Honorio Equip. Engr. Region III, Equipment Maint.
- Project Management Office for Rural Water Supply(PMO-RWS)
Mr. Rgelio A. Flores Project Director
Mr. Helen G. Marvilla Project Manager
Mr. Emil K. Sadain Engineer III
Mr. Makota Shibazaki JICA Expert
- Regional III Office
Mr. Pacifico G. Mendoza JR Regional Director
Mr. Adolfo M. Flores Chief, Construction Div.
Mr. Daniel G. Domingo Chief, Mat. Ql'ty Control & Hydro. Div.
Mr. Filemon C. Yutuc Chief, Administration Div.
Mr. Jacinto E. Reyes Asst. Chief, Construction Div.
- Zambales District Engineering Office
Mr. Celetino R. Contreras Officer in Charge, District Engineer
Mr. Godofredo T. Velasco Officer in Charge, Assit. District Engr.
Mr. Delfin D. Esposo Well Supervisor
- 2nd Pampanga District Engineering Office
Mr. Angelito M. Twano District Engineer
- Tarlac District Engineering Office
Mr. Oscar Z. Vergara Assit. District Engineer
- Others
Dr. Z. B. Haman Chief Tech. Adviser, LUWA-UNDP
Mr. Pastor T. Tabale Asst. Project Manager, RIF-PMO
Mr. Avery S. Fullerton Chief of Party, MPE-PMO

Department of Social Welfare and Development(DSWD)

- Regional III Office
Ms. Evilia F. Fernandy Social Welfer Officer V
- Pampanga Branch
Ms. Lucia R. Gutierrez Provincial Social Welfer Officer

Technology and Livelihood Resource Center(TLRC)

Mr. Roberto Almoneda Strategic Tech. & Live. Dev. Group
Ms. Lina M. Sanque Settlement Manager, Baquilan
Mr. Jose Ma. F. Serrano JR. Settlement Manager, Iram

Philippines National Police(PNP)-Regional Commander III

Mr. Jose Pecical Adiong RDCC Chairman, Super'tend. of RECOM III
Mr. Edgar B. Aquipay Chief Directorial Staff
Mr. Fernando S. Villauneva OARDO, RECOM III

Tarlac Provincial Government Office

Mr. Nereco C. Mendoza Provincial Admonistrator
Mr. Roberto C. Millanes Executive Asst.
Mr. Nelson S. Manaloto OIC, Mainang Resettlement Project

Department Environment and Natural Resources(DENR)

Mr. Velma Lim Community Development Officer
- Regional III Office
Ms. Ariel Dwagca Chief, Integrated Soci. Forest Div.
Ms. Nida Navakat Officer, Integrated Soci. Forest Div.

Local Water Utilities Administration(LWUA)

Mr. Antonio V. dela Fuente Manager Area I, Insti. Dev. Service
Mr. Mike S. Cuaderes Prof. Engr. C, Planning Div. Area I

National Housing Authority(NHA)

Mr. Andres Lingan Team Head, Northern & Central Luzon Off.
Mr. Sawake JICA Expert

Philippines Atmosphere Geophysical and Astronomical Services Adm.
(PASAGA)

Mr. Araceli L. Fontano Chief, Climate Data S., Climat. Branch
Mr. Hiroaki Ota JICA Expert

Non-Governmental Organization(NGO)

Mr. Eleazer C. Demayo Project Officer, Child & Family Service
Ms. Elsa E. Herrero Nurse, JVO-FI, Dampay Salasa
Mr. Jhun Isip Sanitary Inspector, JVO-FI, Cawag

Embassy of Japan

Dr. Etsuro Kashiwagi First Secretary

JICA Philippine Office

Mr. Hirofumi Yohikawa Deputy Resident Representative
Mr. Kenji Matsumoto Asst. Resident Representative
Ms. Eika Yamada Mt. Pinatubo JOCV Mission
Ms. Masayo Suzuki Mt. Pinatubo JOCV Mission

Explanation of Draft Final Report

Department of Public Works and Highways

Mr. Teodoro T. Encarnacion Undersecretary
Mr. Florante Soriquez Program Director (MPR-PMO)
Ms. Linda Temple Engineer V (Planning)
Ms. Elisie B. Monsanto Engineer IV (Project Coordinator)
Mr. Angel C. Uy Engineer IV
Mr. Rogelio A. Flores Project Director (PMO-RWS)
Mr. Emil K. Sadain Engineer III (PMO-RWS)
Mr. Lucio T. Honorio Regional Equipment Engineer,
3rd Regional Equipment Services
JICA Expert
Mr. Makoto Shibasaki

Iram Resettlement site

Ms. Elisite Batinga Woman Welfare Worker

Embassy of Japan

Dr. Etsuro Kashiwagi First Secretary
Mr. Yuugo Matsuda First Secretary

JICA Philippine Office

Mr. Masataka Iijima Resident Representative
Mr. Kenji Matsumoto Asst. Resident Representative
Mr. Katsumi Yoshida Asst. Resident Representative

A- 4 LIST OF COLLECTED DATA AND INFORMATION

Mt. Pinatubo Rehabilitation & Reconstruction Program 1992-97,
Presidential Task Force, Sept. 1992

- ditto - . Annex 1-a "Technical Description of Resettlement Sites
1992-97"

- ditto - . Annex 3 "Infrastructure rehabilitation Program 1992-97"

Assessment of Damages to Infrastructure Caused by the June 1991
Eruption of Mt. Pinatubo, DPWH, Sept. 1991

Outline of the Resettlement Program 1992-97, Strategic Technical &
Livelihood Development Group-TLRC, 1992

The New Resettlement Program 1992-97, Strategic Technical and
Livelihood Development Group-TLRC, 1992

RDCC Information of Reconstruction Program, Activities and Present
Conditions Reported by DPWH, DSWD and DOH, PNP Regional Command III,
Dec. 1992

Five Year Development Plan CY 1992-96 Resettlement Project - Baquilan
& Loob Bunga, Botolan, Zambales, DENR, 1992

- ditto - Dampay Salasa, Palauig, Zambales, DENR 1992

- ditto - Cawag, Subic, Zambales, DENR 1992

- ditto - Iram, New Cabalan, Olongapo City, DENR 1992

- ditto - Pasbul, Porac, Pampanga, DENR 1992

- ditto - Carangitan, Capas, Tarlac, DENR 1992

- ditto - Dueg, San Clemente, Tarlac, DENR 1992

Highlight of Mt. Pinatubo Infrastructure Plan and Program, DPWH,
Sept. 1992

Highlight of Mt. Pinatubo Infrastructure Accomplishments, DPWH,
Sept. 1992

Zone of Potential Hazard from Lahar Impact and Deposition, Back
Flooding of Tributary Stream, and Long-Term Excess Sediment
Deposition around Mt. Pinatubo Volcano, PIVS & USAID, 1991

Groundwater Map, NWRC

The PVO/NGO/Private Sector/people's Organization's Response -
Documentation Report, JVO-FI, May 1992

Report of Resettlement Site - Baquilan, Botolan, Zambales, TLRC, 1992

- ditto - Iram, New Cabalan, Olongapo, TLRC, 1992
 - ditto - Cawag, Subic, Zambales, TLRC, 1992
 - ditto - Dampay Salasa, Paluing, Zambales, TLRC, 1992
 - ditto - Kalangitan, Capas, TILCO/TLRC, 1992
 - ditto - Dueg, San Clemente, TILCO/TLRC, 1992
- Monitoring Report on Mt. Pinatubo, ONCC, Oct. 1992
- Proclamation of the Parcel Land for Resettlement Areas(Baquilan, Iram, kalangitan and Villia Maria), MALACANANG, 1991-92
- Development Work Plan for Zambales Upland Sites, TLRC, Jun. 1992
- Organization Chart of MPR-PMO, DPWH, Nov. 1992
- Boundary Map of Proposed Resettlement Site, DENR, 1991-92
- Village Layout Plan of Settlement Area, NHA, 1991
- Profile Report of Resettlement Areas(Dampay Salasa, Loob Bunga, Baquilan, Cawag, Iram, Kalangitan and Dueg), Dev. DOH-(Partners Inc.), 1992
- Report on Water Resources Investigation for the Proposed Lowland Resettlement Area, DPWH-WATICON Inc., 1991-92
- Drilling Data of Upland Resettlement Area, Zambales, DPWH Zambales District Office-F.B. Sioson, 1992
- Disaster Monitoring Report Data, DSWD, May 1992
- Report on Evacuation Centers and Resettlement Sites Affected by Mt. Pinatubo Eruption(in Japanese), JOCV-JICA, Dec. 1991 & Apr. 1992
- Meeting Data of JICA Mt. Pinatubo Calamity Study Group(in Japanese), JICA Philippine Office, Jun. and Oct. 1992
- Drawings of The Rural Environmental Sanitation Project(Phase II), DPWH, 1990

MPR-PMO Map Database(Mudflow Hazard Map-PHIVOLCS, Mudflow Hazard Map-JICA/BSWM, Riversystem & Sub-basin Boundaries, Administration Boundary Map, Population Density Map and Rehabili. & Reconstruct. Plan), MPR-PMO, DPWH, 1992

Mt. Pinatubo Rehabilitation Plan and Program, DPWH, Sept. 1992

My. Pinatubo Eruption Presentation of the Calamity and Compilation of Foreign Assistance, MPE-PMO, Sept. 1992

Geological Map(1:1,000,000), Bureau of Mine, DENR, 1963

Hydrogeology of Central Luzon, Mario P. Sandoval and Francisco B. Mamarial JR, 1970

Hydrogeology(Zambales, Pampanga and Tarlac Provinces), Natural Water Resources Council

Level I Basic Features, PMO-RWS, DPWH

Level I Operation and Maintenance Manual of Deep well, PMO-RWS, DPWH

Rural Water Supply Design Manual Vol.1, NWRC, 1980

Basic Design Study Report on The Rural Environment Sanitation Project (Phase II), JICA, 1990

Water Supply , Sewage and Sanitation Master Plan Of Philippines (1988-2000), Office of President

A- 5 MINUTES OF DISCUSSIONS (Field Survey Period)
ON
THE URGENT WATER SUPPLY PROJECT FOR
RESETTLEMENT AREAS AND BARANGAYS
AFFECTED BY MT. PINATUBO ERUPTION
IN
THE REPUBLIC OF THE PHILIPPINES

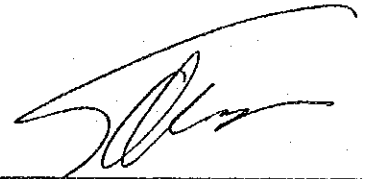
In response to the request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a Basic Design Study on the Urgent Water Supply Project for Resettlement Areas and Barangays Affected by Mt. Pinatubo Eruption (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr. Sigeru Okamoto, Deputy Director, 1st Basic Design Study Division, Grant Aid Study and Design Department, JICA, from 16th November to 15th December, 1992.



The team had a series of discussions with the officials concerned of the Government of the Philippines and conducted a field survey at the study area.

As a result of discussions and field survey, both sides have confirmed the main items described in the attached sheets. The team will proceed to further work and prepare the Basic Design Study Report.

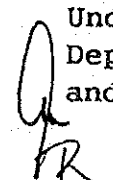
Manila, 26th November, 1992



Mr. Sigeru Okamoto
Leader
Basic Design Study Team
JICA



Mr. Teodoro T. Encarnacion
Undersecretary
Department of Public Works
and Highways, Philippines



ATTACHMENT

1. Objectives

The objectives of the Project are to construct point water sources in the upland resettlement areas which are suffering from lack of water and to procure equipment and machineries for drilling wells in barangays affected by Mt. Pinatubo eruption.

2. Project sites

The sites of the Project for construction of point sources are upland resettlement areas which are indicated in Annex I .

3. Executing Agency

The Department of Public Works and Highways (DPWH) is the responsible and executing agency for the implementation of the Project. The Mount Pinatubo Rehabilitation -Project Management Office (MPR-PMO) in the Department is responsible for supervision as well as operation and maintenance of facilities and equipment provided under the Project.

4. Items requested by the Government of the Philippines

- 1) After discussions with the Basic Design Study Team, the items described in Annex II were finally requested by the Philippine side as the Project components.
- 2) In case deep well is found nonfeasible as a water source, spring water developement shall be considered as an alternative water source.
- 3) However, the final components, both specifications and quantity, will be decided after a further study in Japan, based on in principle the criteria described in Annex III.

5. Japan's Grant Aid system

- 1) The Philippine side has understood the system of Japan's Grant Aid explained by the team.
- 2) The Philippine side will take necessary measures, as described in Annex IV, for the smooth implementation of the

Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

6. Other relevant issues

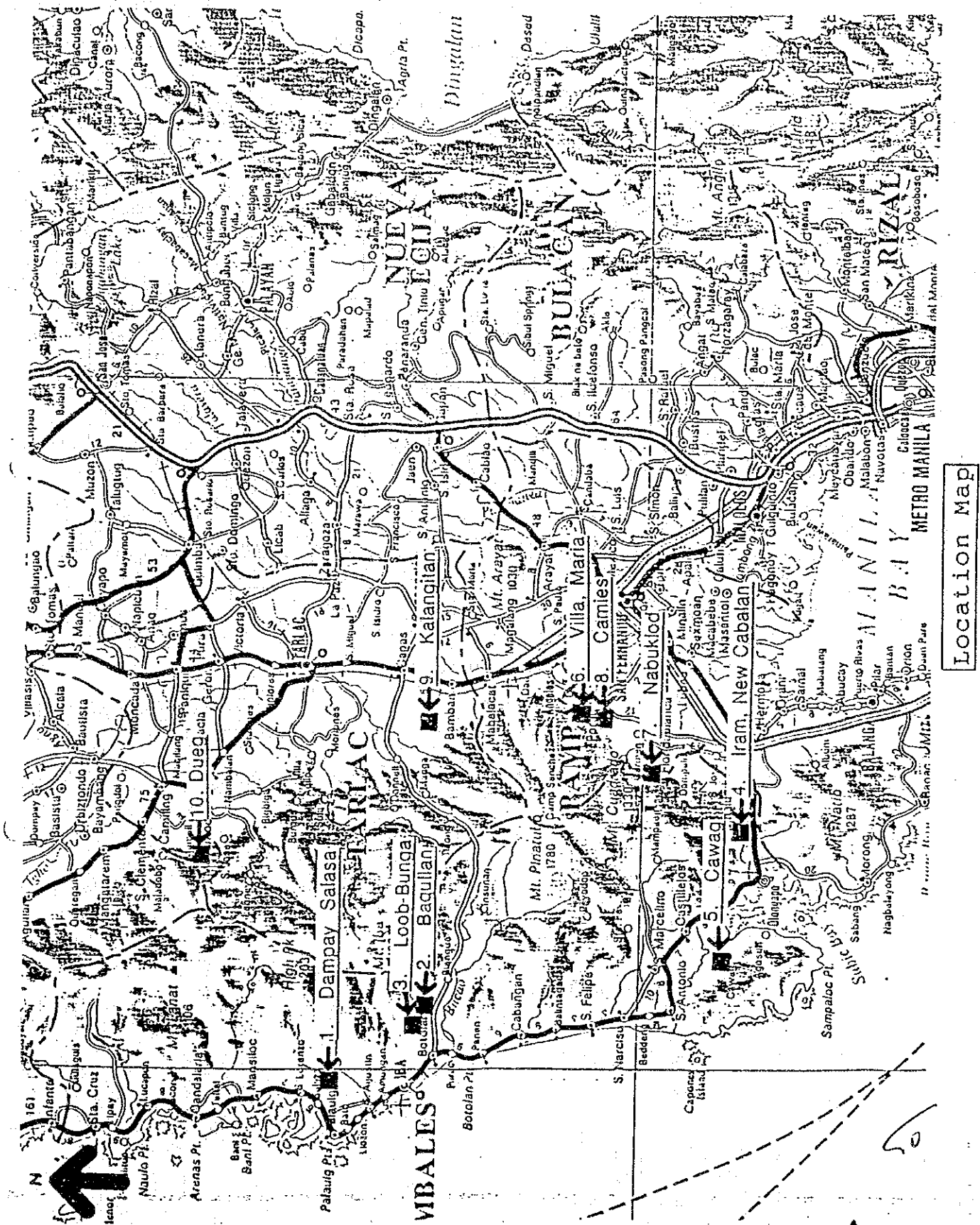
In case that Japan's Grant Aid is extended to the Project, the following conditions will be applied:

- 1) the Government of the Philippines will allocate necessary budget for operation and maintenance of the facilities and equipment provided by the Project.
- 2) DPWH will assign the necessary personnel for operation and maintenance of the facilities and equipment provided by the Project.
- 3) after the point sources are constructed by the Project, Barangay Waterworks and Sanitation Association(BWSA) will be formed for operation and maintenance of the facilities, and DPWH will undertake trainings for the personnel of BWSA.
- 4) DPWH will monitor the situation of operation and maintenance by BWSA, and support them to keep the facilities in good condition.

7. Tentative Schedule of the Study

- 1) The consultant members will proceed to further studies in the Philippines until 15th December, 1992.
- 2) Based on the Minutes of Discussions and the results of the study, JICA will compile a draft report and dispatch a team to the Philippines to explain its contents around February 1993.

Project sites



Location Map

[Handwritten signature]

Annex II

Items requested by the Government of the Philippines

- Water Supply facilities

A.1 Deep Well (80m depth)

SITE	AREA (ha)	No. of Family		No. of Well Required
		Target	Actual	
ZAMBALES				
1. Dampay Salasa, Palauig	652	700	279	10
2. Baquilan, Botolan	393	775	850	12
3. Loob-Bunga, Botolan	298	540	1,506	22
4. Iram, New Cabalan	100	700	513	10
5. Cawag, Subic	824	1,600	214	23
PAMPANGA				
6. Villa Maria, Porac	10	531	-	8
7. Nabuklod, Floridablanca	403	650	300	10
8. Camies, Porac	12	640	-	9
TARLAC				
9. Kalangitan, Capas	123	1,000	424	15
10. Ducg, San Clemente	1,100	2,000	716	29
TOTAL				148

- Well puming rate : 15 l/min.
- Operation hour : 12 hours
- Well yield : $15 \times 60 \times 12 = 10,800$ l/day
- Design water demand : 30 l/cap/day
- Persons/family : 5 - 6
- Design family/well : 70 families

Quantity

- Equipment and Vehicles

- B.1 Truck Mounted Rotary Drilling Machine 5
- B.2 Maintenance Servicing Truck 5
- B.3 Pick-up 5
- B.4 Pumping Test Equipment 5
- B.5 Water Analysis Kit 5
- B.6 Water Level Indicator 5
- B.7 Workshop Equipment for Maintenance of Drilling Equipment and Machinery 1

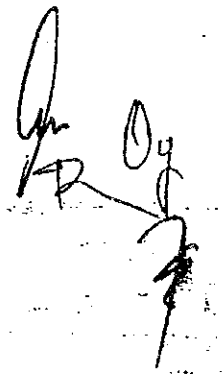
Annex III

Criteria to finalize the Project Components

The following criteria will be applied to decide the final components of the Project.

- 1) Financial and technical viability of the Project
- 2) Hydrogeological and topographical conditions of the Project sites
- 3) Demographical and infrastructural conditions of the resettlement areas
- 4) Technical and managerial capacity of the authorities concerned with the Project
- 5) Safety from possible secondary disasters (future eruption, mud flows, etc.)
- 6) Capacity and quality of existing water sources

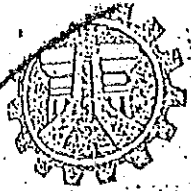
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Undertakings by the Government of Republic of the Philippines

- 1) To secure the land necessary for the implementation of the Project facilities.
- 2) To clear, level and reclaim the construction sites prior to the commencement of the Project.
- 3) To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site, if necessary.
- 4) To ensure speedy unloading, tax exemption, custom clearance of the products under the Grant Aid at the port of disembarkation.
- 5) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified Contracts such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
- 6) To exempt Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines with respect to the supply of the equipment/machineries and services under the verified Contracts.
- 7) To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
- 8) To bear all expenses, other than those to be covered by the Grant Aid, necessary for the execution of the Project.
- 9) To assign exclusive counterpart engineers/technicians for the Project.
- 10) To use and maintain properly and effectively the facilities constructed and equipment purchased under the Grant Aid.

A- 6 Department Order No. 185 "Creation of
MPR-PMO"



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

SER # 185
11/10

06 November 1992

DEPARTMENT ORDER
NO. 185^{7m}
Series of 1992 11/10

SUBJECT: CREATION OF MT. PINATUBO REHABILITATION-PMO
ABSORBING THE TASK FORCE FOR MT. PINATUBO
REHABILITATION PROJECTS


In the interest of the service, the Mount Pinatubo Rehabilitation-Project Management Office (MPR-PMO) is hereby created and shall henceforth assume the over-all responsibility in the implementation and supervision on the rehabilitation projects in the Mt. Pinatubo affected areas. Director Florante Soriquez shall be the Program Director under the supervision of Undersecretary Teodoro T. Encarnacion. This PMO shall operate as an independent Office. The Program Director can avail himself of the resources and facilities within the Department with the approval of the Secretary/Undersecretary.

An inventory of accomplishment and delineation of previous accomplishment shall be established and proper turn-over of functions and responsibilities from concerned implementors shall be completed on or before 16 November 1992 to avoid disruption of the on-going activities. This inventory of accomplishment shall form part of the future evaluation of the projects.

All previous Department orders, circulars and memoranda inconsistent to this order are hereby superceded and modified accordingly.

This Department Order shall take effect immediately.

For compliance.


JOSE P. DE JESUS
Secretary

A- 7 Department Order No. 186 "Designation of
Program Director of MPR-PMO"



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

SER. # 1493
D. 427

06 November 1992

DEPARTMENT ORDER
No. 186 TH 1110
Series of 1992

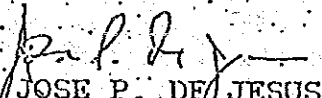
SUBJECT: Designation of Mr. Florante Soriquez as the Program Director of the Newly created Mt. Pinatubo Rehabilitation-Project Management Office.

In the interest of the service and in order to effect a smooth implementation of Mt. Pinatubo Rehabilitation Program and turn over of responsibilities of the DEWH Task Force for Mt. Pinatubo Rehabilitation Projects, Mr. Florante Soriquez is hereby designated as Program Director of the newly created Mt. Pinatubo Rehabilitation-Project Management Office (MPR-PMO).

As such, Director Vicente R. Lopez shall turn over all his present duties, responsibilities and resources associated with the implementation of the said projects.

The Program Director shall exercise the duties and responsibilities enumerated under Department Order No. 186 TH 1110 creating the MPR-PMO.

This Order shall take effect immediately.


JOSE P. DE JESUS
Secretary

A- 8 Letter to JICA Manila Office(Transfer of the
Excuting Agency)



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

November 24, 1992

PMO #559
P. 104

Mr. Masataka Iijima
Resident Representative
Japanese International Coordinating Agency
12 F Pacific Star Bldg.,
Corner Sen. Gil J. Puyat Avenue
Makati, Metro Manila

Sir,

The Department of Public Works and Highways (DPWH) recently created the Mount Pinatubo Rehabilitation - Project Management Office (MPR-PMO) under Program Director Florante Soriquez with objective to integrate and place the management and control of all Mount Pinatubo Rehabilitation efforts into one responsible organization. The PMO shall plan and program locally-funded and foreign assisted projects, supervise design works, bid, implement, monitor, and maintain infrastructure projects. The PMO is also tasked with coordinating all related efforts in the Department, including those by other government agencies.

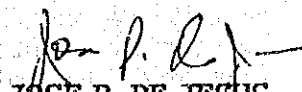
We have directed all offices within DPWH which are implementing all Mount Pinatubo related projects, whether locally or foreign funded, to effect immediate turn-over to the MPR-PMO.

In line with this, we wish to inform you that the JICA- assisted "Urgent Water Supply Project for Resettlement Areas and Barangays Affected by Mount Pinatubo" is being transferred from the RWS-PMO to the MPR-PMO. For the time being that the MPR-PMO is in the process of organizing and until such time that it has been fully staffed, RWS-PMO shall continue to provide the PMO with the necessary support. The MPR-PMO shall, however be responsible for all aspects of the projects.

We shall highly appreciate therefore if you would course all communications related to the project to Director Soriquez.

We look forward to the realization of this project. Thank you and warm regards.

Very truly yours,


JOSE P. DE JESUS
Secretary

ON

THE URGENT WATER SUPPLY PROJECT FOR RESETTLEMENT AREA
AND BARANGAYS AFFECTED BY MT. PINATUBO ERUPTION

The Minutes of Discussions on the Basic Design Study on the Urgent Water Supply Project for Resettlement Area and Barangays affected by Mt. Pinatubo Eruption (hereinafter referred as "the Project") was concluded between the JICA Basic Design Study Team (hereinafter referred as "the JICA Team") and Department of Public Works and Highways (hereinafter referred as "the DPWH") of the Government of the Republic of the Philippines on November 27, 1992.

Following the conclusion of Minutes of Discussions of the Project, the JICA Technical Team continued technical discussions and field survey in Philippines up to December 15, 1992.

The JICA Technical Team and the Mt. Pinatubo Rehabilitation Project Management Office (hereinafter referred to as "the MPR-PMO"), DPWH, made several discussions as described hereinafter.

These discussion results will be studied and final components will be decided in Japan by the JICA Team. The results of the study will be concluded in the Draft Final Report of Basic Design Study which will be presented to Philippine side by the end of February, 1993.

(1) Project Implementation System of DPWH

Organizational system of DPWH for the Project Operation was presented by DPWH as shown in ATTACHMENT I.

The system was basically acceptable, though following considerations should be made for the Project Implementation.

- i) Staff assignment for the Project shall be completed up to the end of 1993.
- ii) Operation and management facilities: i.e. Area Office and work shop, will be prepared within 1993/1994.
- iii) Project program shall be confirmed within 1993/1994 through the coordination activities and technical studies.

(2) Formulation and Site Selection for the Urgent Water Supply Project

The Philippine side explained that the final project formulation and site selection for the Project were in progress due to the difficulty of determining the appropriate well sites caused by the damage of "lahar" expanding.

Through discussions with JICA Technical Team, the basic consideration of the project formulation and site selection procedure were explained by the Philippine side, as part of Mt. Pinatubo Rehabilitation and Reconstruction Project under project operation of the MPR-PMO, DPWH. The priority of the site for the Project was basically concluded in ATTACHMENT II.

However, as the proposed scheme of the Project was not considered to be concreateed, the DPWH is required to report to the Japanese side in written form as soon as possible with regards to the Project Programme and the list of the Project sites and facilities.

(3) Construction Works Under Japanese Grant Aid

Both parties confirmed that the JICA Technical Team examined the basic component of the construction works under the Grant Aid as a result of the field survey and which the Philippine side understood.

i) Project Site

Based upon the technical studies and discussions between the JICA Team and MPR-PMO, it is amended that a component of the works for the Project is to construct water supply facilities at following sites; DAMPAY SALASA - Palauig, LOOB BUNGA-Botolan, BAQUILAN-Botolan, CAWAG-Subic, IRAM-New Cabalan, CAMIAS-Porac, KALANGITAN-Capas and DUEG-San Clemente (refer to ATTACHMENT III).

NABUKLOD-Floridablanca and VILLA MARIA-Porac are excluded from the construction component of the Project due to the bad accessibility conditions which has been considered as a hindrance from development of the settlement area.

ii) Quantity of Water Supply Facilities Required

Quantity of water supply facilities within each project site under the Grant Aid was tentatively examined and estimated as shown in ATTACHMENT IV, mainly considering existing facilities and demographic conditions of the site.

iii) Possibility of Spring Development

As a result of field survey, the groundwater development of a new water source seemed not to prevail at the following sites due to topographic and hydrogeological conditions of the site as presented in ATTACHMENT V.

- DAMPAY SALASA, Palauig
- IRAM, New Cabalan
- DUEG, San Clemente

Accordingly, the original scheme of hand-pump well construction needs to be altered. Considering the possibility of water resources development in the sites listed above, a spring water development scheme was recommended.

In connection with the scheme recommendation, the DPWH is being required to be directly responsible for the land acquisition, water rights, implementation and operation and maintenance of the Project.

(4) Procurement of Support Equipment and Machineries

The equipment and machineries requested by the Philippine side was stated in Annex II, Minutes of Discussions.

With the present condition of underground geology and the organizational system of the Project Operation, the basic frame to decide the specifications and quantity of equipment and machineries were confirmed by both JICA Team and MPR-PMO, DPWH as stated in ATTACHMENT VI.

(5) Others

The Philippine side expressed their wish to make request for water supply facilities' construction of the two resettlement sites in Palayan, Nueva Ecija in place of the two sites excluded from the Project; Villa Maria, Porac and Nabuklod, Floridablanca, by the JICA Team as a result of field survey. The Philippine side also explained that they could prepare necessary documents and materials for the project within the two resettlement sites of Palayan, Nueva Ecija.

The JICA Team explained that the request needs to be informed to Japanese side by formal procedure.

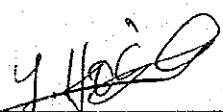
Manila, 14th December, 1992

For JICA Team

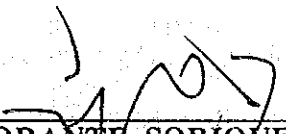
For the Government of the
Republic of the Philippines

By:

By:




MR. YUKIO HOSHINO
Chief Engineer,
Basic Design Study Team, JICA



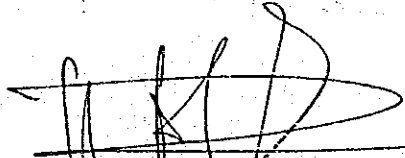
MR. FLORANTE SORIQUEZ
Project Director,
Mt. Pinatubo Rehabilitation
Project Management Office (MPR-PMO),
Department of Public Works and Highways

WITNESS:

WITNESS:



MR. MAKAMOTO SHIBAZAKI
JICA, WATER SUPPLY EXPERT



MR. ROGELIO FLORES
Director, RWS - PMO, DPWH

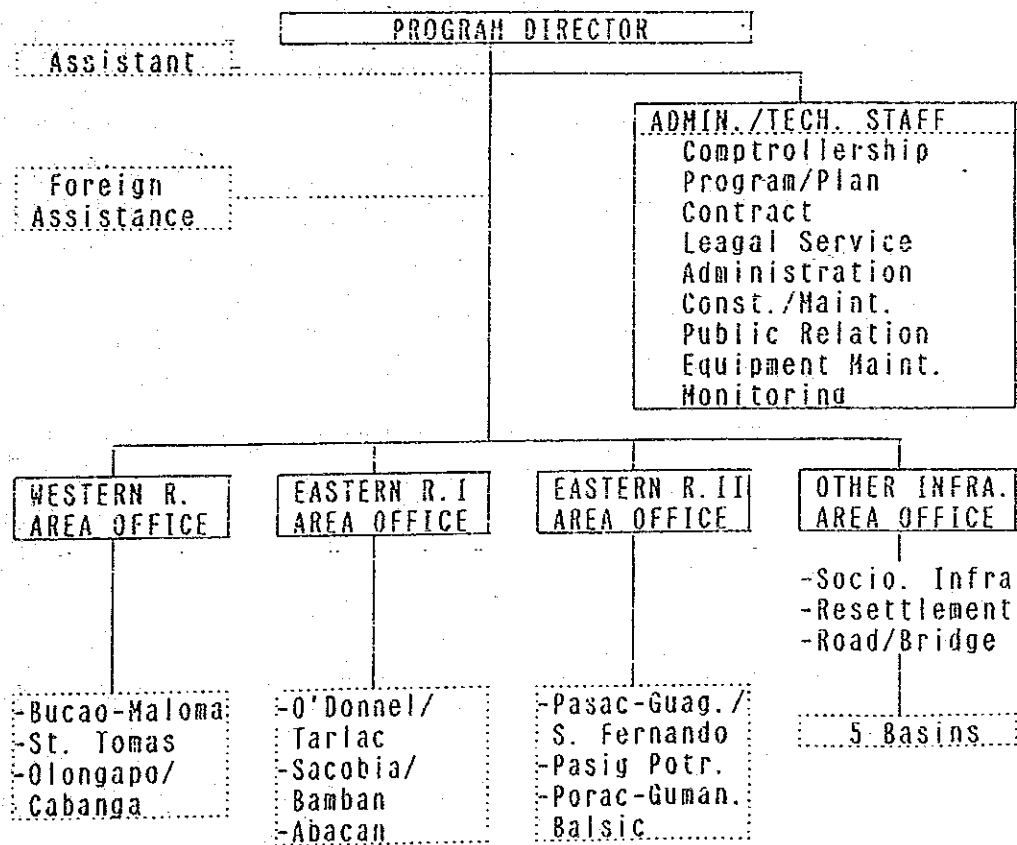
ATTACHMENT - I

PROPOSED PROJECT OPERATION SYSTEM OF MPR-PMO, DPWH

(1) Organization Structure of MPR-PMO, DPWH

On November 6, 1992, the Mount Pinatubo Rehabilitation Project Management Office (MPR-PMO) was created by virtue of Department Orders Nos. 185 and 186 to assume the overall responsibility in the implementation and supervision of rehabilitation projects in the Mount Pinatubo area. The aim is to integrate and place the responsibility for all related works into one responsible organization.

An organizational structure of the MPR-PMO which has Comptrollership, Planning, Programming, Equipment and Maintenance, Monitoring and Construction/Maintenance Units, is similar to that of a Regional Office, DPWH as shown below:



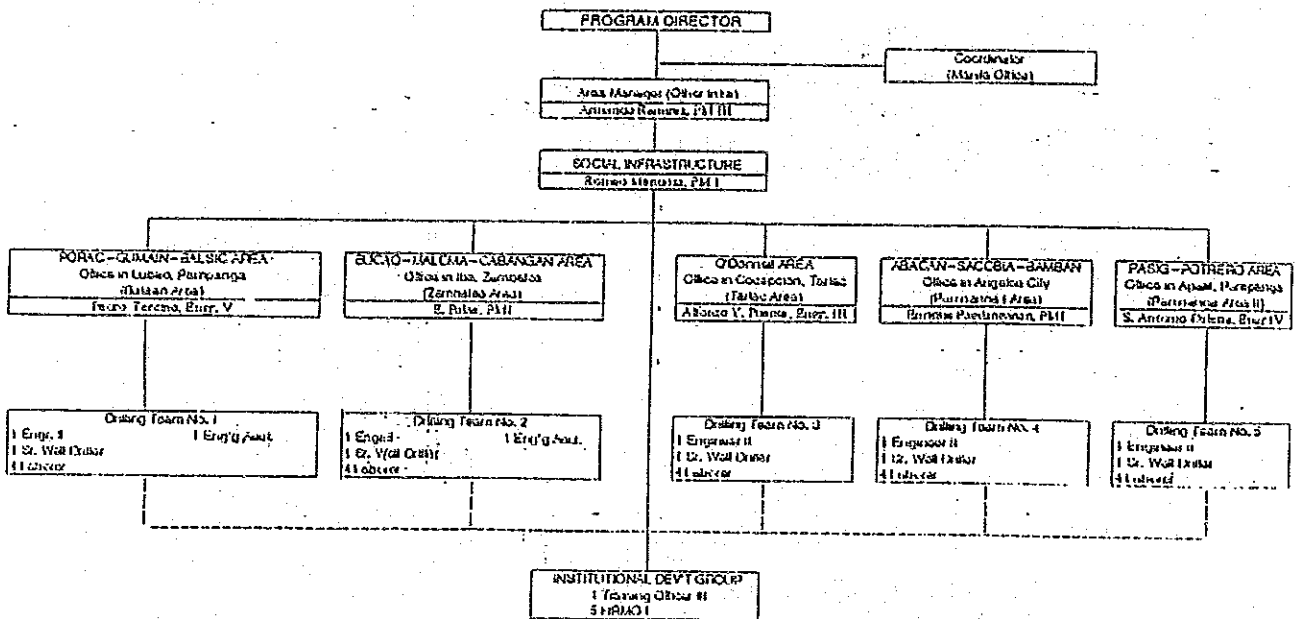
MPR-PMO ORGANIZATIONAL STRUCTURE

(2) Proposed Organizational System of the Project

While the area for river control works under 3 Area Offices divided into nine (9) basins, the area for construction and improvement works under the "Other Infrastructure Area Office"; such as roads and bridge, water supply facilities and buildings, is separated into five (5) basins.

The water supply projects are proposed to be implemented within the respective separated five basins by the "Social Infrastructural Division" of the "Other Infrastructure Area Office". And the organizational system for the water supply projects is planned as below:

PROPOSED ORGANIZATIONAL STRUCTURE
(Water Supply Projects/Social Infra)



ATTACHMENT - II

PRIORITY OF THE PROJECT SITES CONSTRUCTED BY MPR-PMO, DPWH

The MPR-PMO has received several requests for the water supply projects in affected area. Identification works of the project is in progress, mainly using following criteria.

- i) Safety from present and future lahar flow
- ii) Accessibility
- iii) Service area and Population covered

Although, the proposed programme for the Urgent Water Supply Project of the MPR-PMO is not concreated, Priority of the Sites is basically formulated as below;

1st Priority

- Resettlement Areas

- ZAMBALES

Dampay Salasa, Palauing
Baquilan, Botolan
Loob Bunga, Botolan
Iram, New Cabalan
Cawag, Subic

- PAMPANGA

Villa Maria, Porac
Nabuklod, Floridablanca
Camias, Porac

- TARLAC

Kalangitan, Capas
Dueg, San Clemente

- NUEVA ECIJA

Dona Joseja, Palayan
Pinaltakan, Palayan
Dos Sientous, Palayan

- Additional Identified Resettlement Sites by DSWD and/or Presidential Commission

2nd Priority

- Schools in Affected Municipalities

3rd Priority

- Affected Municipalities

* Preliminary examination results for Bataan and Pampanga provinces were presented to the JICA Team. The quantity of water supply facilities required was estimated as 231 units in Pampanga Province and 60 units in Bataan Province.

ATTACHMENT - III

ACCESSIBILITY AND SITE CONDITIONS

Site	Accessibility			Secondary Disaster Risk	Infrastructure in the Site	Agency to Authorize the Site ^{*1}	Priority Works of Reconstruction Required
	Distance from Main Road		Road Condition				
	Distance (km)	Time by Vehicle (min.)					
ZAMBALES							
1. Dampay Salasa, Palauig	8	30	Mostly good	Low	Inadequate	P.C. DSWD	Basic infrastructure
2. Baquilan, Botolan	0.5	1	- do -	Low-medium	Acceptable	- do -	- do -
3. Loob-Bunga, Botolan	4	15	- do -	Low	- do -	- do -	- do -
4. Iram, New Cabalan	2	5	Mostly bad	Low	- do -	- do -	• Access road improvement ^{*2} • Basic infrastructure
5. Cawag, Subic	12	30	- do -	Low	Inadequate	- do -	- do -
PAMPANGA							
6. Villa Maria, Porac	12	50	Bad	Medium-high	- do -	P.C.	• Access road improvement ^{*3} • Mud flow control
7. Nabuklod, Floridablanca ^{*4}	11	45	Bad	High	Partly acceptable	P.C. DSWD	• Mud flow control ^{*3}
8. Camias, Porac	10	50	Bad	Medium	Inadequate	P.C.	• Access road improvement ^{*2} • Basic infrastructure
TARLAC							
9. Kalangitan, Capan	8	25	Partly bad	Low-medium	Acceptable	P.C. DSWD	Basic infrastructure
10. Dueg, San Clemente	18	60	Bad	Low	Inadequate	- do -	• Access road improvement ^{*2} • Basic infrastructure

Note: *1 P.C.; Presidential Commission, DSWD; Department of Social Welfare Development.

*2 Improvement programs of access road are under processing by district and provincial offices, though the infrastructural conditions are inadequate.

*3 It is considered that the settlement development will be limited due to low accessibility. Mud flow control and improvement of access road will be strongly proposed before construction of basic infrastructure as first priority.

*4 Settlement development will be restricted since the mud flow risk of access road.

**QUANTITY OF WATER SUPPLY FACILITIES
TO BE CONSTRUCTED UNDER THE GRANT AID
(Preliminary Estimation)**

Water Supply Facilities

Site	Area (ha.)	No. of Family		No. of Barangay/Sitio	Total No. of Well Required	Existing Facilities *1		Quantity of Water *3 Supply Facilities Required Under the Project
		Target	Actual			No Function *2	Function	
ZAMBALES								
1. Dampay Salasa, Palauig	652	700	279	13	10	DW(4)	SD(1)	SD
2. Baquilan, Botolan	393	775	850	16	12	S-DW(7)	SD(9)	DW (8)
3. - Loob-Bunga, Botolan	328	1,695	1,506	14	25	SW(12), DW(1)	DW(3), SD(9)	DW (13)
4. Iran, New Cabalan	100	700	513	12	10	SW(4), SD(1)	SD(1), S(1)	SD
5. Cawag, Subic	824	1,600	350	9	23	SD(2), SW(2)	DW(3)	DW (20)
PAMPANGA								
6. Villa Maria, Porac	10	530	350	.	8	.	S(2)	Excluded from the Project
7. Nabuklod, Floridablanca	403	650	320	3	10	SW(3)	SW(3), S(5)	Excluded from the Project
8. Camies, Porac	12	640	300	3	9	SW(5)	SD(1)	DW (8)
TARLAC								
9. Kalangitan, Capas	123	1,000	424	9	15	SW(8)	SW(17)	DW (15)
10. Dug, San Clemente	1,100	2,000	550	18	29	SD(2)	.	SD
TOTAL					148			DW 64 wells SD 3 sites

NOTE: *1 DW - Deep Well; SW - Shallow Well; SD - Spring Development; S - Spring, number in the bracket shows point sources and faucets

*2 Contaminated water sources fall into the category of "No Function"

*3 Quantity required for each site is estimated based on the following factors:

- Quantity of existing facilities; both deep wells and public faucets of spring development is deducted from the total number of wells required to get the quantity of additional facilities needed.
- However, when the quantity required is smaller than the number (N) below, the number (N) is considered as the required quantity for the water supply facilities.
N = number of Barangays or sitios + 1 (for official building)
- The number (N) may be equivalent to the number of faucets required for spring development.

ATTACHMENT - V

PRELIMINARY EVALUATION OF
GROUNDWATER DEVELOPMENT POTENTIALITY

Site	Topography	Geology	Aquifer	Dev't. Potentiality
ZAMBALES				
1. Dampay Salasa, Palauig	Hilly Areas	Plutonic Rock (Meso-Paleozoic)	Fissure Zone	Low
2. Baquilan, Botolan	Rolling Land	Plutonic Rock (Meso-Paleozoic)	- do -	Medium
3. Loob-Bunga, Botolan	Rolling Land	Plutonic Rock (Meso-Paleozoic)	- do -	Medium
4. Iram, New Cabalan	Isolated Hill	Volcanic Rock (Tertiary)	- do -	Low
5. Cawag, Subic	Rolling Land	Plutonic Rock (Meso-Paleozoic)	- do -	Medium
PAMPANGA				
6. Villa Maria, Porac	Hilly Areas	Volcanic Sediment (Quaternary)	Porous Layer	Low-medium
7. Nobuklod, Floridablanca	Hilly Areas	Volcanic Sediment (Quaternary)	- do -	Low-medium
8. Camies, Porac	Hilly Areas	Volcanic Sediment (Quaternary)	- do -	Low-medium
TARLAC				
9. Kalangitan, Capas	Undulating Lowland	Volcanic Sediment (Quaternary)	Porous Layer	High
10. Dueg, San Clemente	Mountainous Land	Plutonic Rock (Meso-Paleozoic)	Fissure Zone	Very Low

Note: Sites which fall into the category of "Low Development Potentiality", are considered to be unsuitable for groundwater development. Alternative scheme of water resource development, such as spring development, should be established at the sites.

ATTACHMENT - VI

BASIC FRAME TO DECIDE THE SPECIFICATIONS AND QUANTITY OF EQUIPMENT AND MACHINERIES

The following factors will be considered to decide the final components, both the specifications and quantity of equipment and machineries to procure.

- (1) Drilling Rig will be required to have capacities and considering the following factors in selecting:
 - Sufficient capacity to drill the hard rock formations which are widely found in the Project Area.
 - Sufficient capacity to drill at the Project sites of elevated hilly lands.
 - Technical and managerial capacity of the executing agency for operation and maintenance.

- (2) Vehicle and supporting equipment and machineries of drilling works will be selected taking into consideration the following factors:
 - Smooth implementation of the Project considering the broad project areas, scattered sites and hilly topography.
 - Appropriate implementation plan based on the organizational system of the Project operation.

- (3) Investigation and monitoring equipment will be selected based on the following capacity and operation conditions:
 - Sufficient capacity to investigate the deep well which will be constructed by the Project.
 - Handling capacities of both technical and organizational conditions for the investigation, monitoring and maintenance.

MINUTES OF DISCUSSION
ON
THE URGENT WATER SUPPLY PROJECT
FOR
RESETTLEMENT AREAS AND BARANGAYS
AFFECTED BY MT. PINATUBO ERUPTION
IN
THE REPUBLIC OF THE PHILIPPINES
(CONSULTATION ON DRAFT REPORT)

From November through December, 1992, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Urgent Water Supply Project for Resettlement Areas and Barangays Affected by the Mt. Pinatubo Eruption (hereinafter referred to as "the Project"), to the Republic of the Philippines. Through discussions, field surveys, and technical examination of the results in Japan, the team has prepared the draft report of the study.

In order to explain and to consult the Philippine side on the components of the draft report, JICA sent to the Philippines as Study Team (hereinafter referred to as "the Team"), headed by Mr. Hisashi Ohno, Official, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, from 14th to 20th February, 1993.

As result of discussions, both parties have confirmed the main items described on the attached sheets.

Manila, 18th February, 1993

H Ohno

HISASHI OHNO
Leader
Draft Report Explanation Team
JICA

Teodoro T. Encarnacion

TEODORO T. ENCARNACION
Undersecretary
Department of Public Works and Highways
Manila, Philippines

Florante Soriquez

FLORANTE SORIQUEZ
Program Director
MPR-PMO
Department of Public Works and Highways
Manila, Philippines

ATTACHMENT

1. Components of Draft Report

The Government of the Philippines has agreed and accepted in principle the components of the Draft Report proposed by the Team.

2. Responsible and Executing Agencies

- 1) The Department of Public Works and Highways (DPWH) is the responsible executing agency for the implementation of the project. The Mt. Pinatubo Rehabilitation Project Management Office (MPR-PMO) of the DPWH is responsible for the supervision as well as operation and maintenance of facilities and equipment provided under the Project.
- 2) The Philippine side should inform the Japanese side if there are any changes concerning the management structure of the Project in the future.

3. Japan's Grant Aid System

- 1) The Government of the Philippines has understood the system of Japanese Grant Aid Program which was explained by the Team.
- 2) The Government of the Philippines will take necessary measures described in Annex for smooth implementation of the Project on condition that the Grant aid by the Japanese Government is extended to the Project.

4. Further Schedule

- 1) The Government of the Philippines will send further comments on the Draft Report, if any, through the diplomatic channels to JICA, not later than 28th February, 1993.
- 2) The Team will prepare the final report in accordance with the confirmed items, considering the comments and suggestions by the Philippine side on the Draft Final Report. The Final Report will be sent to the Government of the Philippines around May, 1993.

5. Other Important Issues Related to the Project

- 1) Both sides have confirmed all the items appearing in the Minutes of Discussions signed on 26th November 1992, a copy of which has been reproduced in the Draft Report.
- 2) The Government of the Philippines will make internal arrangements, such as securing of clearance from the Investment Coordination Committee (ICC), which are essential to facilitate the prompt implementation of the Project.
- 3) The equipment and vehicles procured under the Japan's Grant Aid should be properly maintained and be exclusively used for the Project during the whole implementation period.

ANNEX : Necessary measures to be taken by the Government of the Philippine in case Japan's Grant Aid is extended.

1. To secure the site for the Project.
2. To undertake any related works which may become necessary in and around the site during the construction.
3. To provide land as sites for temporary offices and stockyard for the equipment and machinery during the implementation period.
4. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
5. To exempt taxes and to take necessary measures for customs clearance of the materials, vehicles and equipment brought for the project at the port of disembarkation in the Philippines.
6. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
7. To maintain and use properly and effectively the facilities constructed and equipment and vehicles purchased under the Grant.
8. To bear all the expenses, other than those to be borne by the Grant, necessary for the construction of the facilities as well as for the transportation of the equipment and vehicles.








2

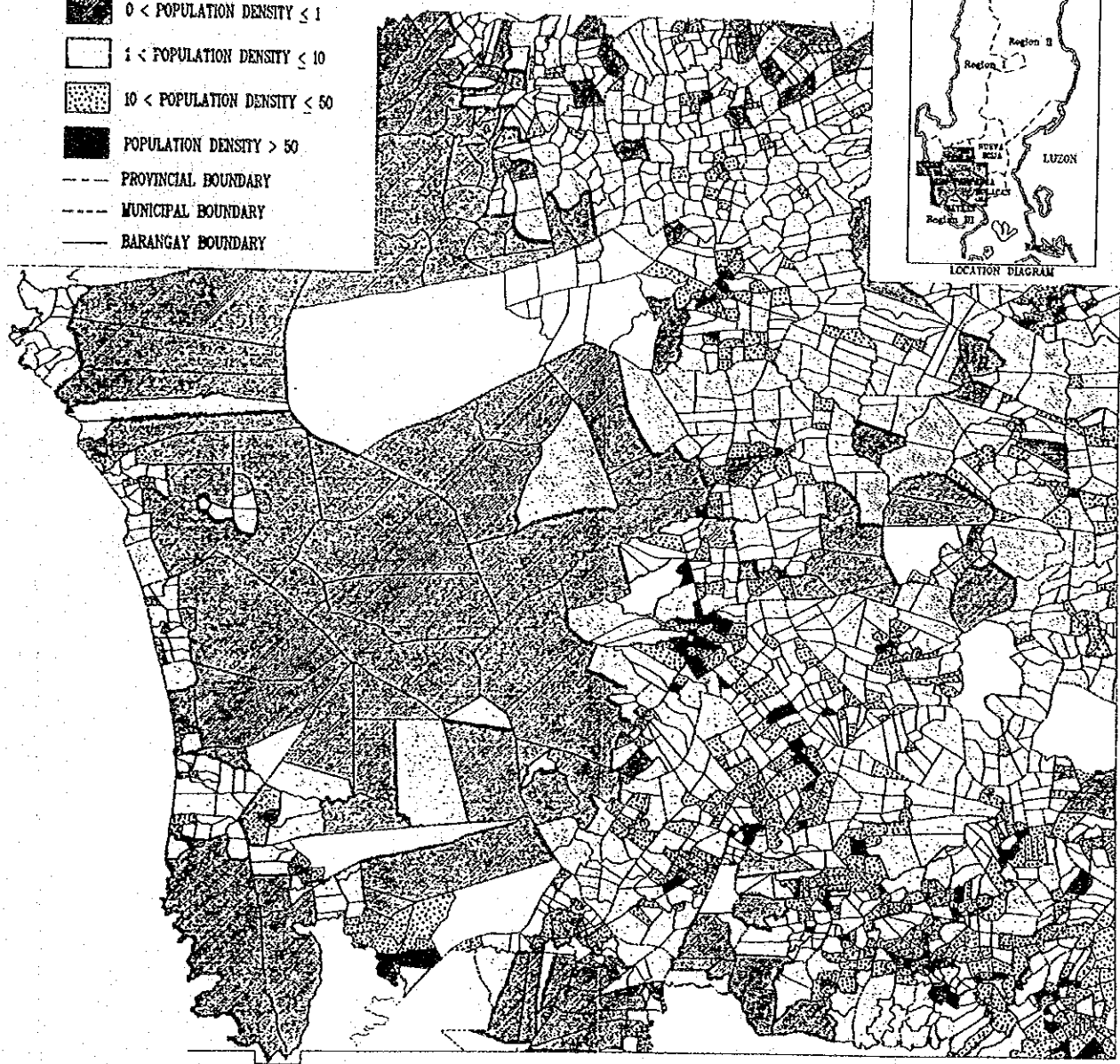
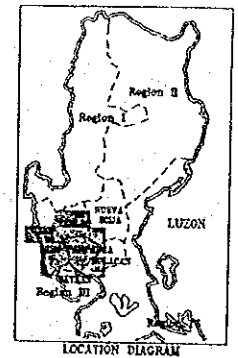
190



A-1.1 Population Density Map (Pinatubo Volcano and Vicinity)

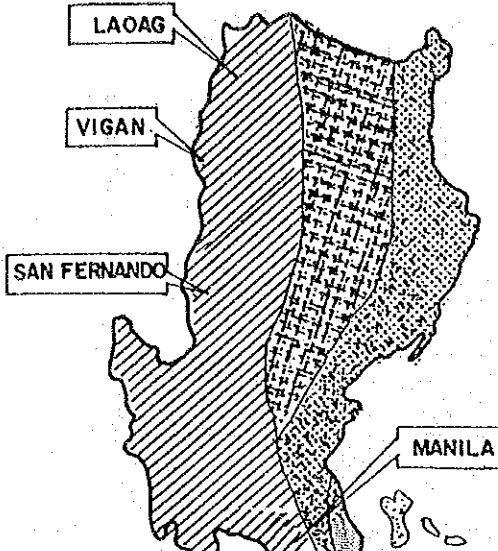
LEGEND

-  0 < POPULATION DENSITY ≤ 1
-  1 < POPULATION DENSITY ≤ 10
-  10 < POPULATION DENSITY ≤ 50
-  POPULATION DENSITY > 50
-  PROVINCIAL BOUNDARY
-  MUNICIPAL BOUNDARY
-  BARANGAY BOUNDARY

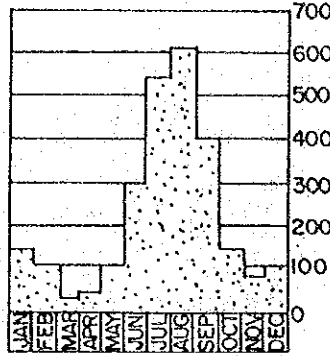


0 5 10 (km)

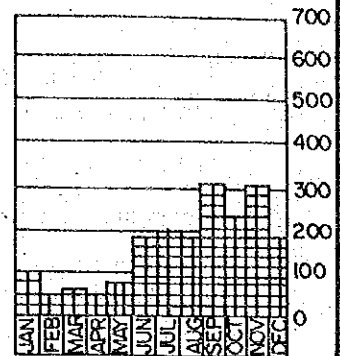
A-12 CLIMATE IN LUZON & VISAYAS AREAS



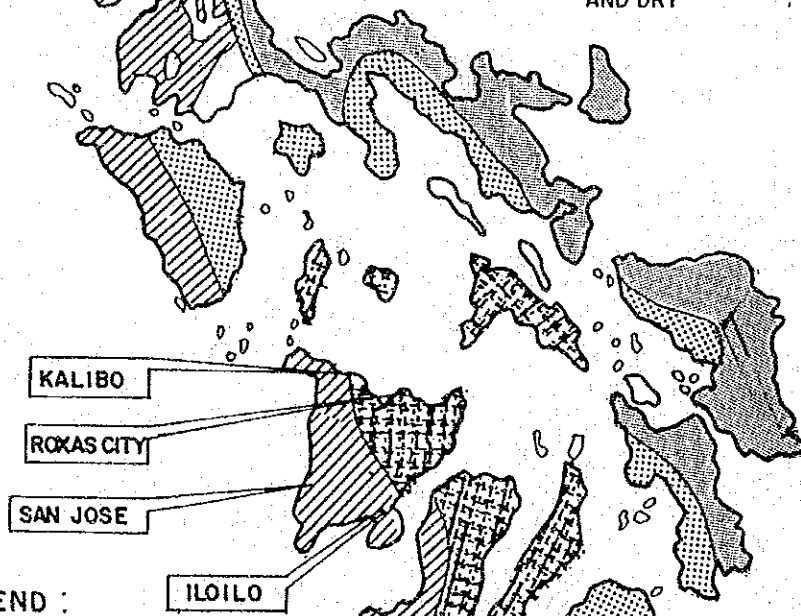
MONTHLY RAINFALL (mm)



TYPE 1 - PRONOUNCED SEASON'S WET AND DRY



TYPE 3 - NO VERY PRONOUNCED MAX. RAIN PERIOD W/ SHORT DRY SEASON LASTING FROM ONE TO THREE MONTHS



LEGEND :



1st TYPE : TWO PRONOUNCED SEASONS DRY FROM NOV. TO APRIL. WET THE REST OF THE YEAR.



2nd TYPE : NO DRY SEASON W/A VERY PRONOUNCED RAINY SEASON FROM MAY TO JANUARY.



3rd TYPE : SEASONS NOT VERY PRONOUNCED, RELATIVELY DRY FROM NOV. TO APR. WET THE REST OF THE YEAR.



4th TYPE : RAINFALL MORE OR LESS EVENLY DISTRIBUTED THROUGHOUT THE YEAR.

SOURCE : 1972 NATIONAL ECONOMIC ATLAS

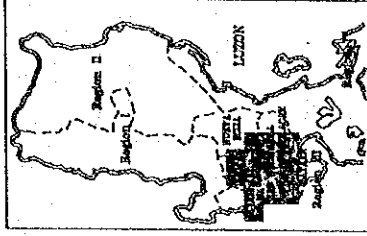
**MUDFLOW HAZARD MAP
PINATUBO VOLCANO AND VICINITY**

Province of Pampanga and Portions of Tarlac,
Zambales, Nueva Ecija, Bulacan and Bataan

Mudflow hazard delineations are based upon field studies
conducted by the Philippine Institute of Volcanology and
Seismology (PHIVOLCS), Version 5.

Time Horizon of Mudflow: 1982 - 94

Date of this Thematic Map: August, 1992



SOURCE: Base Maps consist of US Quadangles
compiled in 1955 and updated in 1977.

1000 0	1000 1	1000 2	1000 3
1000 4	1000 5	1000 6	1000 7
1000 8	1000 9	1000 10	1000 11
1000 12	1000 13	1000 14	1000 15

Drawing Details

Plotting Software: ArcView Version 3.0
 GIS Interceptor: ArcView Version 3.0
 Scale of Maps: Base Maps - 1:50,000
 Digitized: Mudflow Map - 1:25,000

This Quality: Base maps were not reprints and
 joined together.
 Mudflow data was contoured on
 two unrelated sheets.



MPE-PMO
 MOUNT PINATUBO EMERGENCY
 PROJECT MANAGEMENT OFFICE
 DEPT. OF PUBLIC WORKS & HIGHWAYS
 REPUBLIC OF THE PHILIPPINES



LEGEND

- 100% PYROCLASTIC FLOW DEPOSIT
- AREAS PRONE PRIMARILY TO LAHAR DEPOSITION
- AREAS PRONE PRIMARILY TO SILTATION & FLOODING
- ASHFALL PRONE TO BANK EROSION (VERTICAL & LATERAL)
- REHABILITATED ASHFALL
- LAKE
- PROVINCIAL BOUNDARY
- MUNICIPAL BOUNDARY
- ROADS

PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
 100118 DENR-118/1992/10/21/131C

MUDFLOW HAZARD MAP MT. PINATUBO AND VICINITY

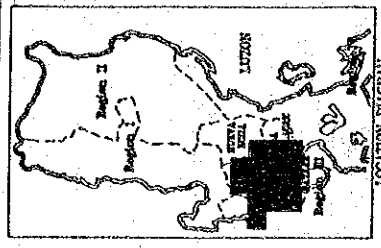
Provinces of Pampanga and Portions of Tarlac,
Zambales, Nueva Ecija, Bulacan and Bataan

Mudflow delineations are based upon findings of the
Japanese International Cooperation Agency (JICA) and
the Bureau of Soils and Water Management (BSWM)

Study Completion Date April 1982

Date of this Thematic Map July 1982

MPE-PMO
MOUNT PINATUBO EMERGENCY
PROJECT MANAGEMENT OFFICE
DEPT. OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES



SOURCE: Base Maps compiled of 19 Contourmaps
completed in 1956 and updated in 1977.

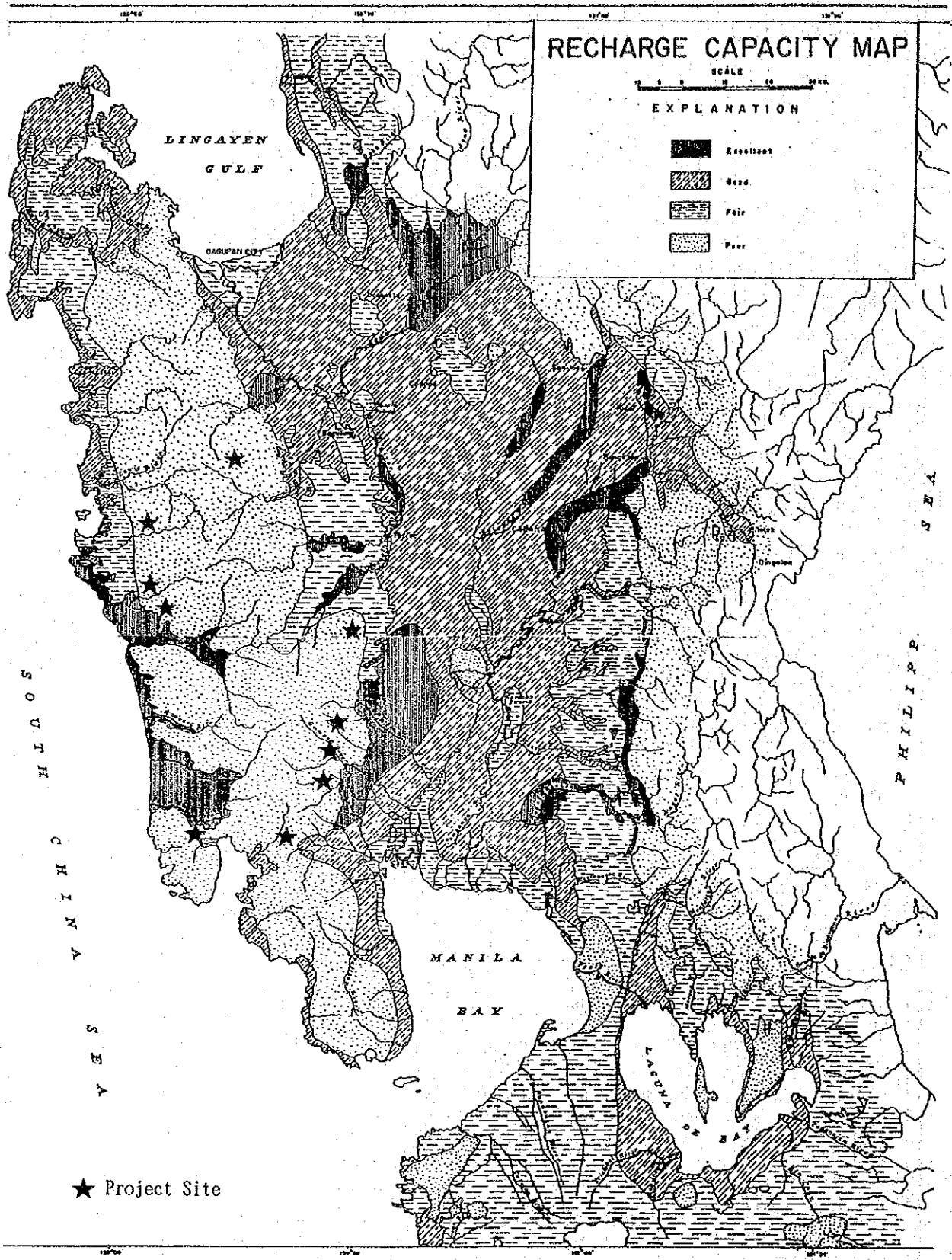
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120E 2	120E 30	120E 32	120E 34	120E 36

Drawing Details

Plotting Software: Archibut Version 3.0
GIS Formatted: Archibut Version 3.0
Scale of Map: 1:50,000
Projection: UTM
Data Quality: Base maps were very accurate and
not fused together
Mudflow delineations contained no
data contained herein.



- LEGEND**
- VERY HIGH RISK
 - HIGH RISK
 - LOW RISK
 - NON - RISK
 - RIVER WASH
 - PROVINCIAL BOUNDARY
 - MUNICIPAL BOUNDARY
 - ROADS



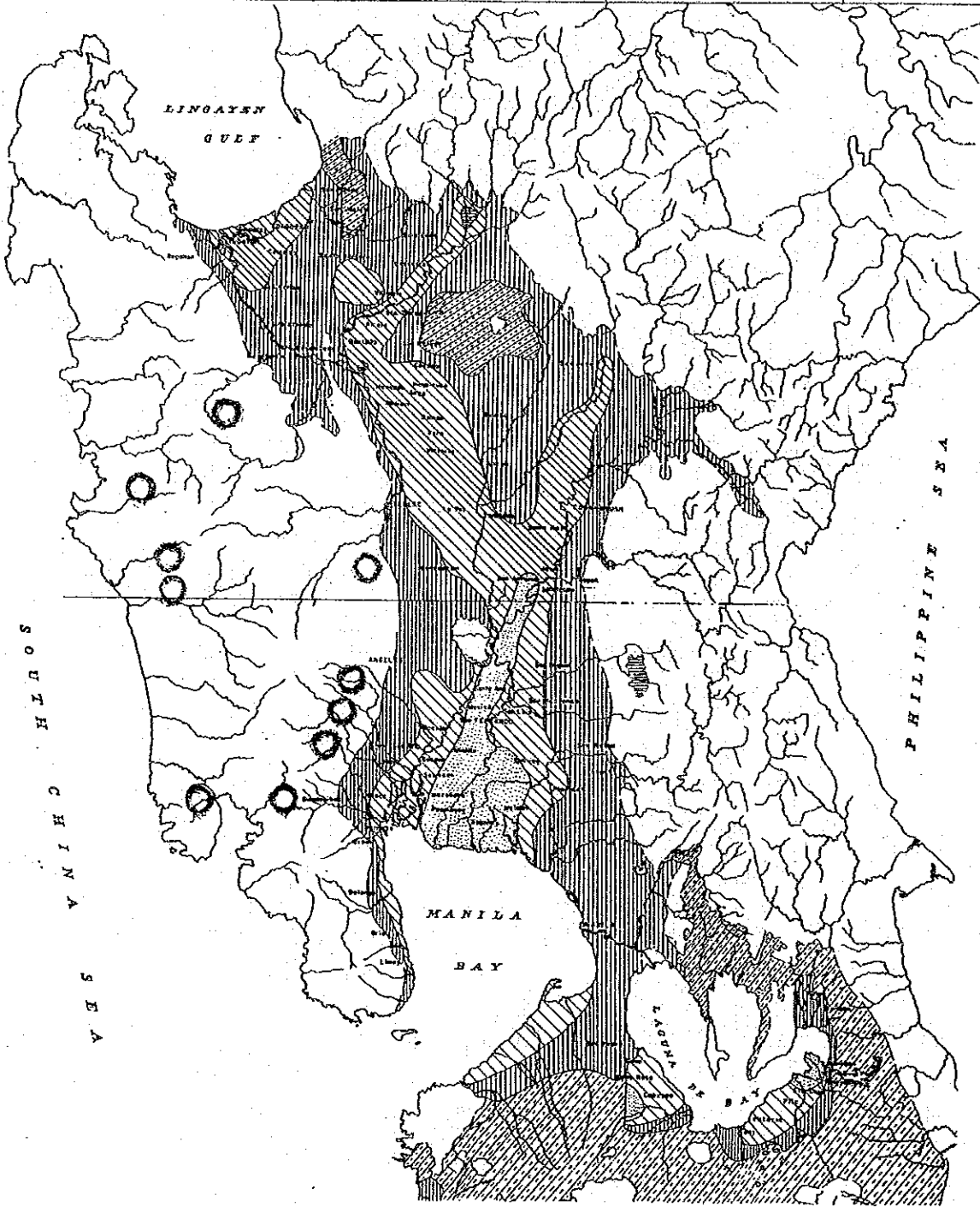
Source : Hydrogeology of Central Luzon

ISO-TRANSMISSIVITY MAP






SCALE
0 1 2 3 4 5 6 7 8 9 10

EAU OF MINES

PLATE 3-1



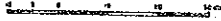
EXPLANATION

- site
-  > 100,000 gallons per day per foot (gpd/ft)
-  50,000 to 100,000 gpd/ft.
-  25,000 to 50,000 gpd/ft.
-  5,000 to 25,000 gpd/ft.
-  < 5,000 gpd/ft.

Source: *Hydrogeology of Manila Bay, 1964*

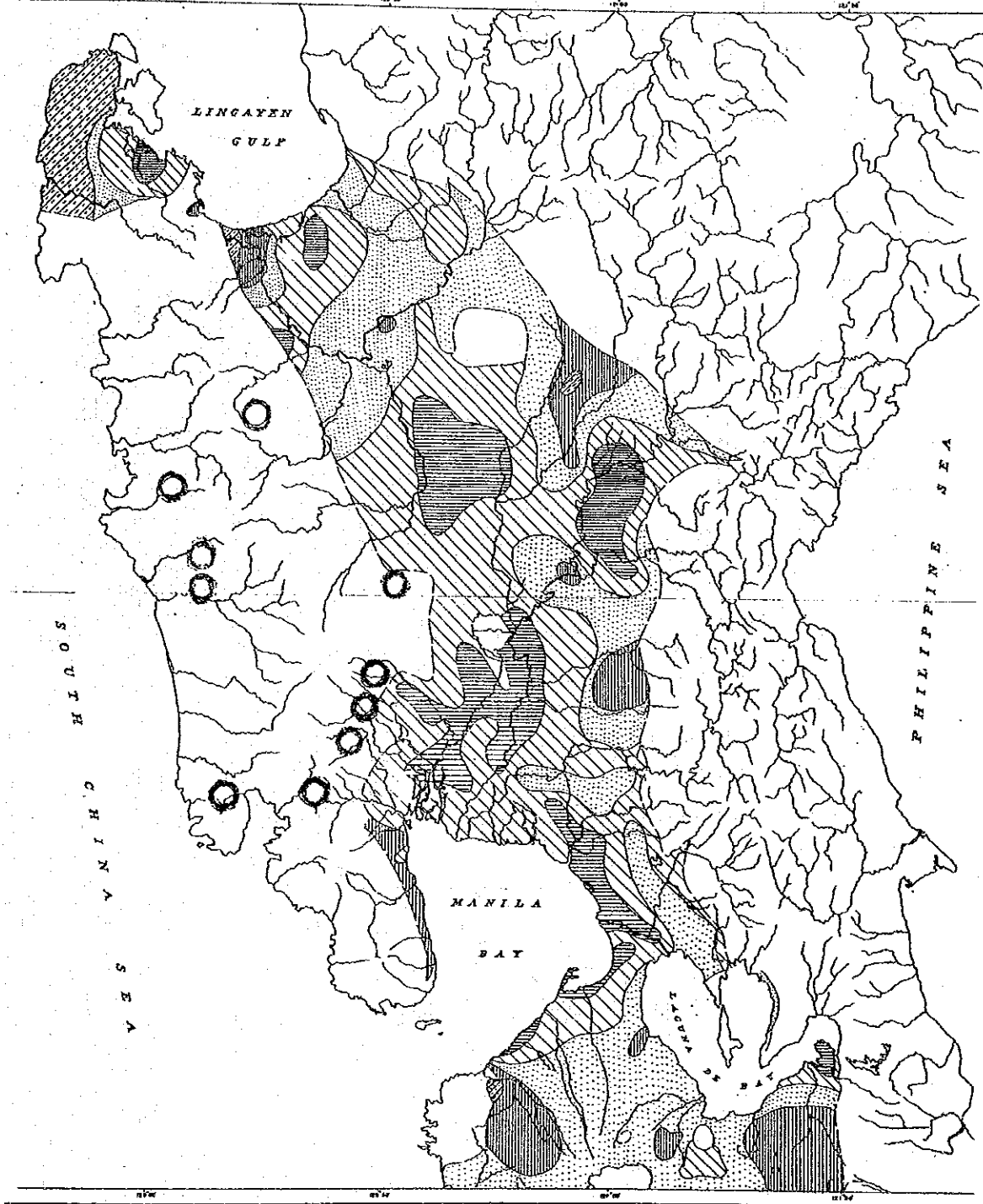
TOTAL HARDNESS* MAP

SCALE








BUREAU OF MINES

PLATE 5.



EXPLANATION

○ site

-  Less than 60 parts per million (ppm)
-  60 to 120 ppm
-  120 to 180 ppm
-  180 to 240 ppm
-  More than 240 ppm

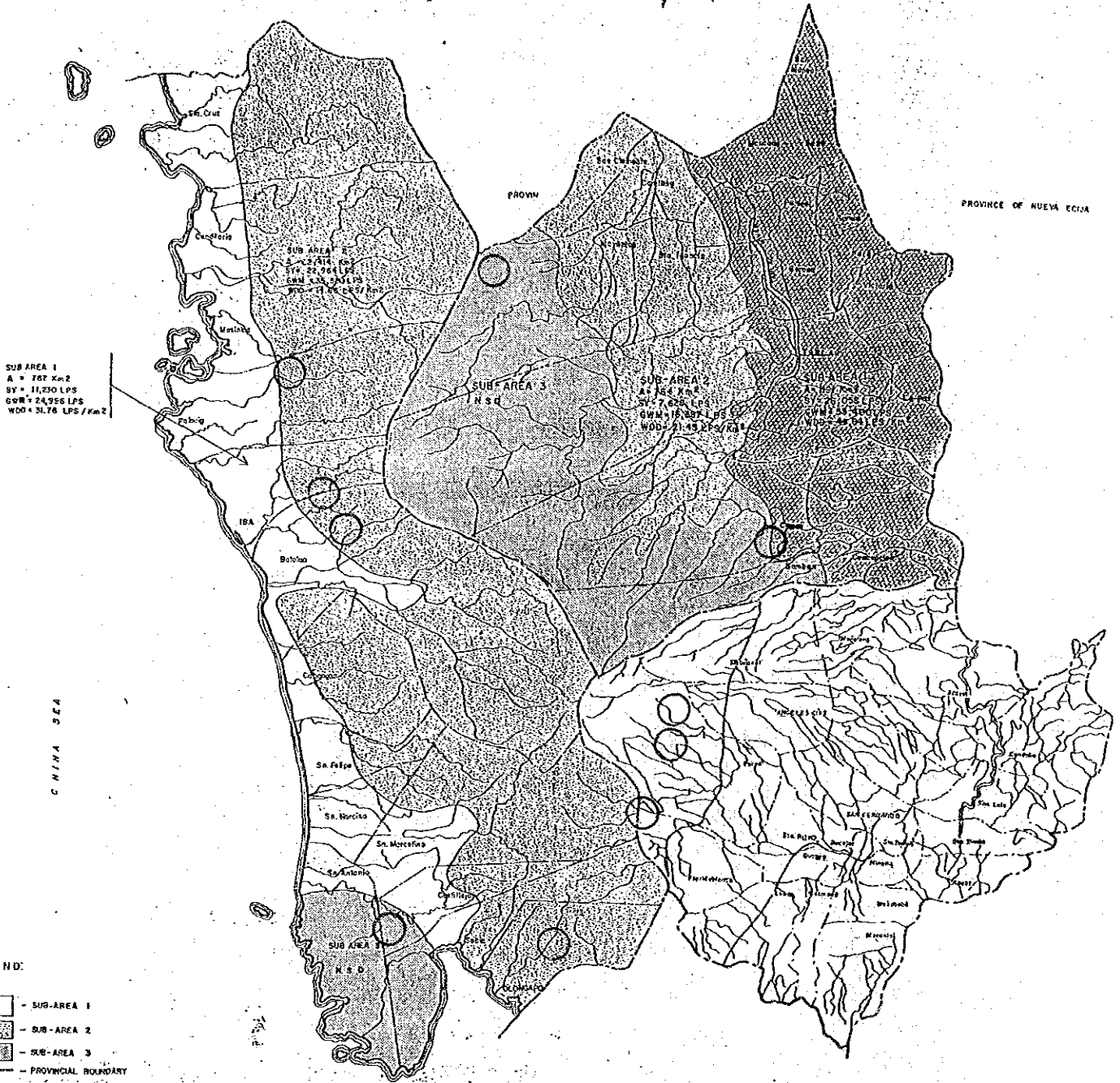
*

Expressed in ppm of neutralized calcium carbonate (CaCO₃)

Source : Hydrogeology of Central Luzon
1970



REPUBLIC OF THE PHILIPPINES
NATIONAL WATER RESOURCES COUNCIL
 8TH FLOOR, NIA BUILDING, E. DELOS SANTOS AVE., D.C.

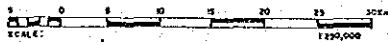


SUB-AREA 1
 A = 787 Km²
 SY = 11,230 LPS
 GWM = 24,966 LPS
 WDD = 31.76 LPS / Km²

LEGEND:

- SUB-AREA 1
- SUB-AREA 2
- SUB-AREA 3
- PROVINCIAL BOUNDARY
- MUNICIPAL BOUNDARY
- RIVER
- A - AREA
- SY - SAFE YIELD
- GWM - GROUNDWATER MINING YIELD
- WDD - WITHDRAWAL DISCHARGE DENSITY
- N.S.D. - NO SUFFICIENT DATA

GROUNDWATER AVAILABILITY MAP



120° 15' 30'

A-15 Conditions of Reconstruction in High Resettlement Area

CATEGORY	Units	1. Naguilan, Botolan	2. Loob Bunga, Botolan	3. Dampay Salasa, Palauig	4. Iram, New Cabalan, Olongapo	5. Cawag, Subic	6. Durg, San Clemente	7. Kalangitan, Capas	8. Pasbut, Porac	9. Maharkind, Floridablanca
1. Target	families	720	540	1,200	700	1,600	2,000	1,000	2,400	780
2. Residential	has.	33	28	52	30	24	100	23	100	13
3. Farmland	has.	360	270	600	70	800	1,000	100	1,200	350
4. Infrastructure										
a. Access Road	km									
Concrete Rd.	km		1	1	1			1		
Macadam Rd.	km	0.5	3	2	3	6	6	8	9	12
Bailey Bridge	unit		1		1					
b. Road Network	km	3.6	2.35	6.5	10	10	10	8	2	2
c. Deepwell	units	2	2	3	2	2	2	2	2	2
d. Housing Kit	sets	720	540	1,200	700	500	2,000	1,000	750	780
e. Household Implements	sets	720	540	1,200	700	500	2,000	1,000	750	780
f. Gov'l Center	buildings	2	2	2	2	2	2	3	2	2
g. Health Clinic	building	1	2	1	1	1	1	1	1	1
h. Tribal Market	building	1	1	1	1	1	1	1	1	1
i. Productivity Center	buildings	3	1	1	1	1	1	1	1	1
j. Communal Facilities	modules	7	12	7	7	7	20	10		
k. Playground	basketballcourt & stage pocket parks	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
l. School	classrooms	4	4	4	4	4	4	4	4	4
m. Spring Development	distribution line, 2 reservoir	1	1	1	1	1	1	1	1	1
n. Progress (Dec. 1991)	%	90	90	85	85	40	50	85	30	30

A-16 Detail of Conditions of Existing Water Supply Facilities

Site	Water Supply Facilities					
	Type		Q'nty	Const. Org.	Note	for Drink
Dampay Salasa	Deep Well	D=40m, dia.=65mm	2	DPWH	Very small yeild	not-fit
	Spring Dev.	Diversion=5x8x1m PE pipe(700-1000m)	1	NHA	High Fe content Surface water intake Contami. by waste-w water	not-fit
Baquilan	Deep Well	D=60m, dia.=65mm	3	TSF (NGO)	Low W-table Muddiness	mostly fit
	Shallow Well	D=20m, dia.=65mm	2	DPWH		
	Spring Dev.	Diversion=5x5x3.6m PVC & PE pipe	1	NHA	Surface water intake	fit
Loob Bunga	Deep Well	D=60m, dia.=65mm	4	--	Bad instration	partly fit
	Shallow Well	D=10m, dia.=65mm	12	NGO+ private	Contami. by waste-w	not-fit
	Spring Dev.	Diversion=4x1x1m PVC & PE pipe R-Tank=3x3x4m(2) & 6x6x3m(1)	1	CFS (NGO)	Surface water intake	fit
			2	Private	Small production Bad instration	partly fit
Iram	Deep Well	-	1	NHA	Low W-table	fit
	Shallow Well	-	4	Private	Low W-table	fit
	Spring Dev.	Diversion=3x2x1.5m PE pipe(1500m)	1	NHA	Surface water intake High pressure Bad instration & Bad pipe mat.	fit
	Spring		1	--		fit
	Cawag	Deep Well	D=30m, dia.=65mm	3	NHA	Medium yield
Shallow Well		D=10-15m, dia.=65m	2	NGO	Bad instration	fit
Spring Dev.		Diversion=2x1.5x2m R-Tank=8m3 PVC & PE pipe (1500m)	2	NHA	Contami. by waste-w Surface water intake Bad instration Not-function	fit
Villa Maria	Spring		2	--		fit
Nabuklod	Shallow Well	D=30m, dia.=100mm	6	NHA	Low W-table	partly fit
	Spring		2	--		
Camies	Shallow Well	D=1-3m, dia.=0.5-1m	5	private	Small production Bad instration	mostly not-fit
	Spring Dev.		1	NHA	Small production	fit
Kalangitan	Shallow Well	D=20-30m	25	TSTF (NGO)	Bad instration Contami. by waste-w	partly fit
Dueg	Spring Dev.	Diversion=1x1x1m R-Tank=6x6x1.2m GI, PVC & PE pipe (3000m)	2	DENR	Surface water intake Bad inst. (open type) Contamination	mostly not-fit

A-17 Budget for DPWH Infrastructure Component of Master Plan(1/2)

PARTICULARS	TOTAL COST (P1.0M)	REST OF 1992	1993	1994	1995	LATER YEARS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. PLANS AND PROGRAMS FOR EACH RIVER SYSTEM	5,174.823	230.500	1,110.000	1,923.680	1,886.643	24.000
1. Bucao	686.600	0.000	200.000	165.600	321.000	0.000
2. Cabangan	59.500	2.500	57.000	0.000	0.000	0.000
3. Maloma	88.800	2.000	34.000	13.700	39.100	0.000
4. Sto. Tomas	709.000	8.000	164.000	327.500	209.500	0.000
5. Porac-Gumain	218.000	18.000	200.000	0.000	0.000	0.000
6. Pasig-Potrero	531.960	44.000	40.000	217.960	230.000	0.000
7. San Fernando-Pasac-Guagua	864.000	25.000	180.000	386.000	293.000	0.000
8. Abacan, Angeles/Pampanga	264.000	5.000	30.000	109.000	120.000	0.000
9. Olongapo City	85.320	6.000	14.000	12.320	53.000	0.000
10. Bataan	221.200	5.000	10.000	95.000	111.200	0.000
11. Sacobia-Bamban-Parua	864.443	110.000	140.000	359.600	254.843	0.000
12. O'Donnel	452.000	5.000	40.000	192.000	215.000	0.000
13. Agno	10.000	0.000	10.000	0.000	0.000	0.000
14. Other Related Works	120.000	0.000	11.000	45.000	40.000	24.000
B. PLANS AND PROGRAMS FOR MAJOR ROADS AND BRIDGES	7,025.017	29.553	409.032	1,692.380	1,455.052	3,439.000
1. Foreign-assisted - ADB Packages	387.017	9.553	289.032	88.380	0.052	0.000
a) Porac-Angeles	26.600	0.000	26.600	0.000	0.000	0.000
b) Dinalupihan-Carmencita	35.500	0.000	35.500	0.000	0.000	0.000
c) Carmencita-Porac and San Jose-Floridablanca	32.000	0.000	32.000	0.000	0.000	0.000
d) Angeles-Magalang and Salapunga-Capaya	40.000	0.000	40.000	0.000	0.000	0.000
e) Magalang-Arayat-San Simon	30.000	0.000	21.500	8.500	0.000	0.000
f) Dinalupihan-Guagua-Floridablanca	107.000	0.000	51.500	55.500	0.000	0.000
g) Magalang-Capas	43.900	0.000	25.300	18.600	0.000	0.000
h) Bridges	35.000	0.000	35.000	0.000	0.000	0.000
- Mancanán	25.000	0.000	25.000	0.000	0.000	0.000
- San Francisco Bridge	10.000	0.000	10.000	0.000	0.000	0.000
i) Consultancy Services	37.017	9.553	21.632	5.780	0.052	0.000
- Remuneration of Personnel, etc.	15.440	5.553	6.090	3.797	0.000	0.000
- Roads & Bridges Component	21.577	4.000	15.542	1.983	0.052	0.000
2. Locally Funded	6,638.000	20.000	120.000	1,604.000	1,455.000	3,439.000
a) Gumain Bridge	100.000	0.000	0.000	80.000	20.000	0.000
b) Pandan Bridge	60.000	0.000	0.000	60.000	0.000	0.000

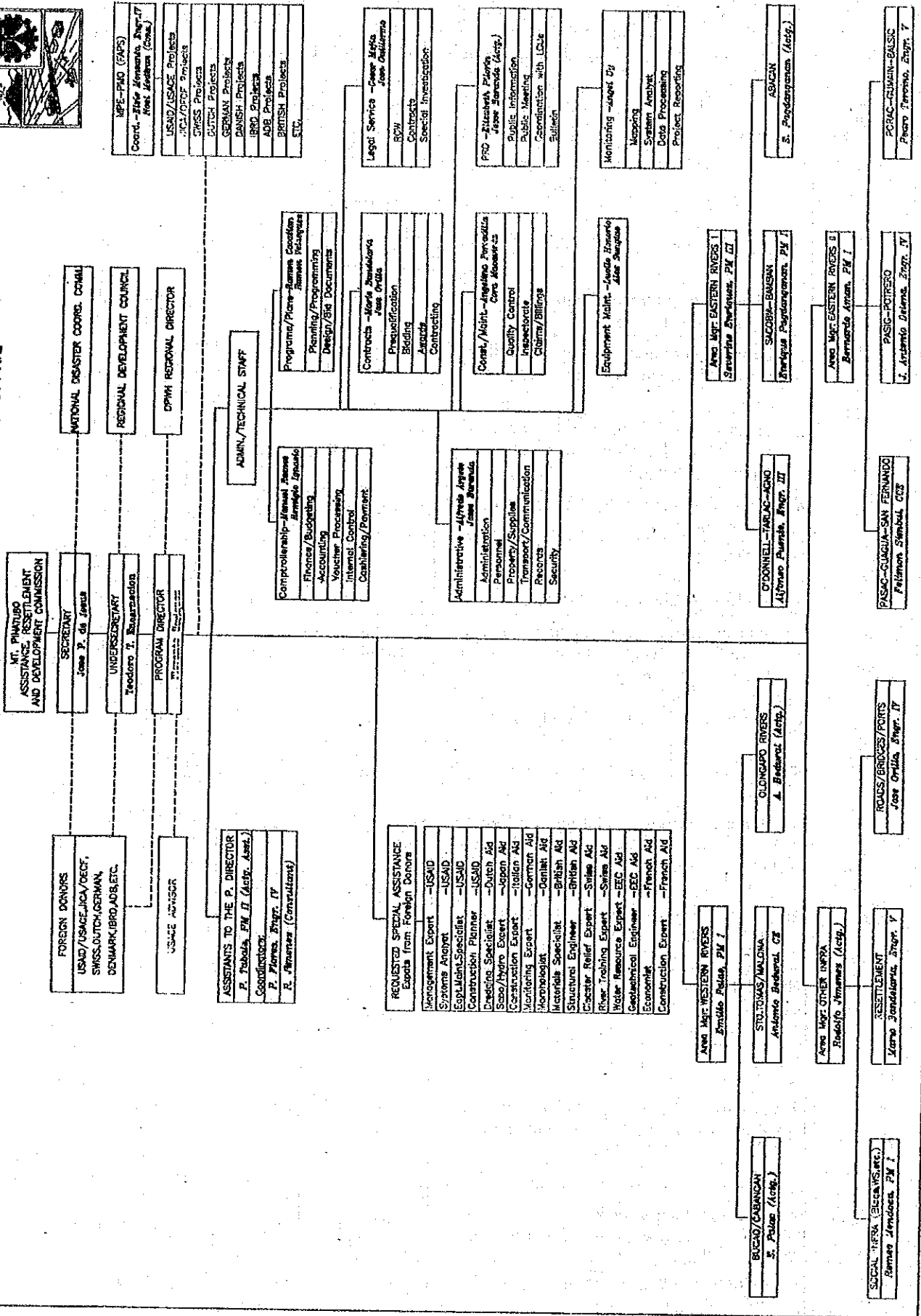
Budget for DPWH Infrastructure Component of Master Plan(2/2)

PARTICULARS	TOTAL COST (P1.0M)	REST OF 1992	1993	1994	1995	LATER YEARS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
c) McArthur Highway, Sto. Tomas-- San Fernando and Bamban--Capas	60.000	0.000	40.000	20.000	0.000	0.000
d) Zambales National Road	60.000	0.000	15.000	45.000	0.000	0.000
e) Iba (Zambales)--Tarlac Road	704.000	0.000	0.000	100.000	200.000	404.000
f) Mabalacat--Bamban Viaduct along McArthur Highway	400.000	0.000	0.000	200.000	200.000	0.000
g) Manila--Bataan Coastal Road	1,125.000	0.000	20.000	450.000	475.000	180.000
h) New North Expressway	3,935.000	0.000	0.000	550.000	530.000	2,855.000
i) San Fernando--Guagua--Olongapo Road, Bacolor--Guagua Section	20.000	20.000	0.000	0.000	0.000	0.000
j) Dinalupihan--Orani Road	44.000	0.000	0.000	44.000	0.000	0.000
k) Paniqui--Camiling Road and Bridge	10.000	0.000	0.000	10.000	0.000	0.000
k) Other Roads and Bridges	120.000	0.000	45.000	45.000	30.000	0.000
C. PLANS AND PROGRAMS FOR MINOR PROJECTS (includes drainage, roads, schools, wells, markets, etc.)	5,768.257	202.380	1,565.725	1,437.369	1,380.799	1,181.984
-- FOREIGN--ASSISTED	3,669.605	123.880	1,295.725	750.000	750.000	750.000
1. Mt. Pinatubo Emergency -- PMO	2,669.605	123.880	1,045.725	500.000	500.000	500.000
-- ADB ; Schools, Markets & Health Centers	98.215	58.220	39.995	0.000	0.000	0.000
-- KFW : Schools & Water Supply	112.060	53.660	58.400	0.000	0.000	0.000
-- USAID--Grant : Hospital	74.330	12.000	62.330	0.000	0.000	0.000
-- USAID/PCIS-- Grant : Eqpt./O & M	965.000	0.000	215.000	250.000	250.000	250.000
-- JICA -- Grant : Eqpt. / O&M	1,000.000	0.000	250.000	250.000	250.000	250.000
-- JICA -- Grant : Urgent Water Supply	200.000	0.000	200.000	0.000	0.000	0.000
-- DUTCH -- Grant / Loan : Eqpt./O&M	220.000	0.000	220.000	0.000	0.000	0.000
-- LOCALLY FUNDED	2,098.652	78.500	270.000	687.369	630.799	431.984
2. Tarlac Eng'g. Dist.	92.000	0.000	10.000	37.000	45.000	0.000
3. Pampanga 1st Eng'g. Dist.	927.552	0.000	15.000	168.569	291.999	431.984
4. Pampanga 2nd Eng'g. Dist.	84.150	2.750	10.000	46.400	25.000	0.000
5. Angeles City Eng'g. Office	0.000	0.000	0.000	0.000	0.000	0.000
6. Bataan Eng'g. Dist.	74.100	0.000	10.000	34.100	30.000	0.000
7. Olongapo City Eng'g. Office	145.500	0.000	10.000	95.500	40.000	0.000
8. Zambales Eng'g. Dist.	208.600	0.000	15.000	85.800	107.800	0.000
9. Central Office (including equipments/spare parts, consultancy services, surveys and other related activities)	566.750	75.750	200.000	200.000	91.000	0.000
D. TOTAL , A+B+C	17,968.097	462.433	3,084.757	5,053.429	4,472.494	4,394.984

A-18 Project of Foreign Organization Assistance Plan for Recovery

Project	AGENCY	STATUS
JAPAN		
1. Acquisition of Various Heavy Equipment and Spare parts	DPWH	Under evaluation by donor
2. Supply of Portable Pumps and Drilling Rigs for Shallow Groundwater Irrigation	NIA	Under evaluation by donor
3. Study on Flood and Sediment/Debris Control for the River Systems Draining from Mt. Pinatubo	DPWH	Under evaluation by donor
4. Urgent Water Supply Project-Affected Barangays	DPWH	Under evaluation by NEDA
WORLD BANK		
1. Highway Management Project	DPWH	Project ongoing
2. Acquisition of Survey Aperture Radar Data for Gechazard Classification and Land Use Planning	NAHRIA	Under evaluation by NEDA
3. Communal Irrigation Dev. Project II	NIA	Reprogramming under consideration by PHO
4. Reprogramming of Earthquake Funds	DPWH, NHA	Detailed proposal to be prepared by GOP
5. Second Elementary Education Project	DEDEG, DPWH	Reprogramming under consideration by PMO
GERMANY		
1. Rehabilitation of School Buildings and Water Supply Systems	DPWH	Proposed to be finalized and cleared through the Task Force
NETHERLANDS		
1. Acquisition of Dredging Equipment	DPWH	Under evaluation by NEDA
USAID		
1. Technical Assistance for Damage Assessment and Contract Processing	DPWH/CHPE	Short term services for damage assessment completed ; contracts processing ongoing
2. Technical Assistance for Comprehensive Drainage Study	DPWH	MCA between U.S.State Department and the Corps under processing
3. Repair/Reconstruction of Damaged Infrastructure	DPWH/CHPE	Contracts processing ongoing

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
MOUNT PINATUBO REHABILITATION-PROJECT MANAGEMENT OFFICE



A-20

Project Sites and Required Quantities
of Water Supply Programme
in Affected Area of Mt. Pinatubo Eruption

SUMMARY

NAME OF PROVINCE	No. of Wells Requested	LEVEL	
		(I)	(II)
1. BATAAN	92	87	5
2. ZAMBALES	202	202	
3. TARLAC/NUEVA ECIJA	135	135	
4. PAMPANGA I	129	129	
5. PAMPANGA II	249	249	
TOTAL	807	802	5

SUMMARY

PROVINCE: DATAAN

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
ABUCAY	8	6	2
SAMAL	11	10	1
HERMOSA	15	14	1
DINALUPIHAN	30	29	1
MORONG	17	17	0
ORANI	11	11	0
TOTAL	92	87	5

PROVINCE: ZAMBALES

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
SUBIC	9	9	
CASTELLEJOS	19	19	
SAN MARCELINO	37	37	
SAN ANTONIO	41	41	
SAN NARCISO	26	26	
SAN FELIPE	16	16	
CABANGAN	25	25	
BOTOLAN	29	30	
TOTAL	202	203	

PROVINCE: TARLAC/NUEVA ECija

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
TARLAC	35	35	
BAMBAN	2	2	
CAPAS	27	27	
CONCEPCION	48	48	
LA PAZ	16	16	
Pinaltakan Resettlement, Palayan, Nueva Ecija	3	3	
Dos Sientos, Palayan Resettlement, Nueva Ecija	4	4	
TOTAL	135	135	

SUMMARY

PROVINCE : PAMPANGA I

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(i)	(ii)
ARAYAT	16	16	
BACOLOR *	37	37	
MEXICO	21	21	
MABALACAT *	5	5	
MAGALANG	5	4	
SANTA ANA	20	20	
CANDABA	7	7	
APALIT	6	6	
SAN LUIS	7	7	
SAN SIMON	3	3	
ANGELES CITY	2	2	
TOTAL	129	128	

PROVINCE : PAMPANGA II

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(i)	(ii)
GUAGUA	20	20	
STA. RITA *	25	25	
LUBAO	25	25	
MINALIN	18	18	
MACABEBE	10	10	
MASANTOL	10	10	
PORAC *	24	24	
FLORIDABLANCA *	27	27	
SASMOAN	20	20	
STO. TOMAS	7	7	
SAN FERNANDO	41	41	
NABUKLOD, FLORIDABLANCA RESETTLEMENT AREA	9	9	
VILLA MARIA, PORAC RESETTLEMENT AREA	8	8	
CONSUELO EVACUATION CENTER	5	5	
TOTAL	249	249	

PROPOSED SITE FOR WATER SUPPLY PROJECT

PROVINCE: BATAAN

MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(i)	(ii)
1. ABUCAY			
Salian	1		1
Orinboy	1	1	
Calaylayan	1		1
Capitangan	1	1	
Mabatang	1	1	
Bangkal	1	1	
Laon	1	1	
Wawa Las	1	1	
Sub Total	8	6	2
2. SAMAL			
Sta. Lucia	1		1
Daang Bago West	1		
San Roque	1	1	
Caleguiman West	1	1	
Caleguiman East	1	1	
Tabing Ilog	1	1	
San Juan	1	1	
Sapa	1	1	
Irnalda	1	1	
ibaba	1	1	
Daang Bago East	1	1	
Sub Total	11	10	1
3. HERMOSA			
Balsik	2	1	1
Mambog	1	1	
Mandama	2	2	
Saba	1	1	
Sumalo	1	1	
Cataming	1	1	
Culis	1	1	
Bariban	1	1	
San Pedro	1	1	
Almacan	1	1	
Pallihan	1	1	
Brgy. J.R.C.	2	2	
Sub Total	15	14	1
4. DINALUPIHAN			
Tucop	2	2	
San Simon	1	1	
Bayan-bayanan	1	1	
Pita	1	1	
Daleo	5	5	
Tubo-tubo	3	3	
Payangan	3	3	
Bangal	3	3	
Sapang Balas	1	1	
Sta. Isabel	1	1	

PROVINCE: ZAMBALES

MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(i)	(ii)
1. SUBIC			
Arlingway Sacathan	2		2
Cawag	5		5
Bulawin, Palawig (Evac)	2		2
Sub Total	9		9
2. CASTELLEROS			
San Agustin	4		4
San Jose (Pob)	2		2
San Juan (Pob)	1		1
San Nicolas	4		4
San Pablo (Pob)	5		5
San Roque	1		1
Sta. Maria	2		2
Sub Total	19		19
3. SAN MARCELINO			
Burgos (Pob)	5		5
Consuelo Sur (Pob)	4		4
La Paz (Pob)	3		3
Leong	2		2
Linasin	2		2
Lucero	4		4
Magbunga	3		3
Rizal (Pob)	3		3
San Guillermo (Pob)	2		2
San Isidro (Pob)	5		5
San Rafael (Pob)	2		2
Vega Hill Evac. Center	2		2
Sub Total	37		37
4. SAN ANTONIO			
Angeles	2		2
Antipolo (Pob)	2		2
Burgos (Pob)	5		5
East Dirita	3		3
Luna (Pob)	4		4
Pundaquit	4		4
Rizal	2		2
San Estaban	1		1
San Gregorio (Pob)	2		2
San Juan (Pob)	2		2
San Miguel	3		3
San Nicolas (Pob)	4		4
Santiago	3		3
West Dirita	3		3
Sub Total	47		47
5. SAN NARCISO			
Bedding	3		3
Candelaria (Pob)	2		2
Dalepavien	2		2

PROPOSED SITE FOR WATER SUPPLY PROJECT

PROVINCE: TARLAC/ NUEVA ECIJA

MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(i)	(ii)
1. TARLAC			
Amucao	2	2	
Armenia	2	2	
Afloc	1	1	
Balete	2	1	
Balinganaway	3	2	
Batang-batang	2	3	
Buena Vista	1	2	
Burot	2	1	
Calingcuan	2	2	
Capehan	1	2	
David	1	1	
De la Paz	1	1	
San Francisco	2	1	
San Manuel	2	2	
San Pablo	2	2	
Sapang Tagalog	3	2	
Suizo	2	3	
Tibagan	2	2	
Ungot	2	2	
Sub Total	35	35	
2. BAMBAN			
Pacatcal	1	1	
San Rafael	1	1	
Sub Total	2	2	
3. CAPAS			
Cubcub (Pop.)	2	2	
Cutcut 1st	3	3	
Cutcut 2nd	2	2	
Dolores	2	2	
Estrada (Calingcuan)	2	2	
Lawy	4	4	
Manga	1	1	
Sta. Lucia	4	4	
Sta. Rita	1	1	
Sto. Domingo 1st	1	1	
Sto. Domingo 2nd	2	2	
Sto. Rosario	2	2	
Talaga	1	1	
Sub Total	27	27	
4. CONCEPCION			
Alfonso	3	3	
Callius Gueco	1	1	
Caluluan	5	5	
Corazon De Jesus	5	5	
Dungan	3	3	

PROVINCE: TARLAC/ NUEVA ECIJA

MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(i)	(ii)
5. LA PAZ			
Dutlog-a-matas	1	1	
Mabilog	2	2	
Pando	2	2	
Parang	2	2	
Parulung	1	1	
Pitabunan	1	1	
San Agustin (Murcia)	2	2	
San Bartolome	1	1	
San Juan (Castro)	2	2	
Santiago	2	2	
Sta. Cruz	2	2	
Sta. Maria	1	1	
Sta. Monica	3	3	
Sta. Rosa	2	2	
Sto. Cristo	1	1	
Sto. Niño	1	1	
Sto. Rosario (Magunting)	1	1	
Talimunduc San Miguel	1	1	
Tinang	3	3	
Sub Total	48	48	
6. NUEVA ECIJA			
Batfnoy	1	1	
Bantog-Caricutan	2	2	
Caut	2	2	
Lara	1	1	
Laungcupang	1	1	
Macaiong	2	2	
Motrico	2	2	
Paludpud	1	1	
Rizal	1	1	
San Roque (Pop.)	3	3	
Sub Total	16	16	
7. DOS SIENOS, PALAYAN RESSETLEMENT, NUEVA ECIJA			
Pinalatikan Resettlement, Palayan, NUEVA ECIJA	3	3	
Sub Total	3	3	
Dos Sientos, Palayan Resettlement, NUEVA ECIJA	4	4	
Sub Total	4	4	

PROPOSED SITE FOR WATER SUPPLY PROJECT

PROVINCE: PAMPANGAI

MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
1. ARAYAT			
Lacmit	3	3	
San Antonio	2	2	
Batasán	2	2	
Sta Lucia Cupang	2	2	
Sto. Niño Tabuan	1	1	
San Agustin Norte	1	1	
Piasang Luma	1	1	
Buensacoco	1	1	
Baliti	1	1	
Arenas	1	1	
San Roque	1	1	
Sub Total	16	16	
2. BACOLOR*			
Parulog	5	5	
Sta. Barbara	5	5	
Talba	3	3	
Tinajero	3	3	
Balaswan	1	1	
Potrero	5	5	
Duat	1	1	
San Vicente	5	5	
Cabatican	1	1	
Cabangbangan	1	1	
San Antonio	5	5	
Concepcion	1	1	
Sta. Ines	1	1	
Sub Total	37	37	
3. MEXICO			
San Juan	5	5	
San Carlos	1	1	
San Patricio	5	5	
Kulubasa	5	5	
Balas	1	1	
Sto. Rosario	1	1	
Laput	1	1	
San Lorenzo	1	1	
San Pablo	1	1	
Sub Total	21	21	
4. MABALACAT*			
Bundagui	2	2	
Dapdap	1	1	
Mangalit	1	1	
Paralayunan	1	1	
Sub Total	5	5	

* Least Priority (Hazard Area)

PROVINCE: PAMPANGAI

MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
5. MAGALANG			
San Ildefonso	2	2	
San Roque	2	1	
San Agustin	1	1	
Sub Total	5	4	
6. SANTA ANA			
San Agustin	5	5	
San Roque	5	5	
San Pablo	5	5	
San Joaquin	5	5	
Sub Total	20	20	
7. CANDABA			
Vizal San Pablo	1	1	
Vizal Sto. Cristo	1	1	
Vizal Sto. Niño	1	1	
Paligui	1	1	
Dalayap	1	1	
Tenejero	1	1	
Dulong Ilog	1	1	
Sub Total	7	7	
8. APALIT			
Palligui	1	1	
Sampaloc	1	1	
San Vicente	4	4	
Sub Total	6	6	
9. SAN LUIS			
San Carlos	2	2	
Sta. Rita	2	2	
San Nicolas	1	1	
San Juan	2	2	
Sub Total	7	7	
10. SAN SIMON			
San Miguel	1	1	
San Agustin	1	1	
Sta. Monica	1	1	
Sub Total	3	3	
11. ANGELES CITY			
Timog Tent City	2	2	
Sub Total	2	2	

PROPOSED SITE FOR WATER SUPPLY PROJECT

PROVINCE : PAMPANGA II

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(1)	(2)
1. GUAGUA			
Sto. Cristo	1	1	
San Pedro	1	1	
San Antonio	1	1	
Sta. Ursula	1	1	
San Pablo	1	1	
Pulong Masie	1	1	
Natividad	1	1	
San Matias	1	1	
San Isidro	1	1	
San Juan Nepo	1	1	
Maquiapo	1	1	
San Roque	1	1	
San Jose	1	1	
Magsaysay	1	1	
San Juan Guandara	1	1	
San Miguel	1	1	
San Vicente	1	1	
Lamra	1	1	
Sta. Ines	1	1	
Sto. Niño	1	1	
Sub Total	20	20	
2. STA. RITA *			
San Basilio	2	2	
Sta. Monica	2	2	
San Isidro	2	2	
Becuran	2	2	
Dita-dila	2	2	
San Agustin	2	2	
San Jose	2	2	
San Juan	2	2	
San Matias	2	2	
San Vicente	2	2	
Sta. Monica	1	1	
San Basilio	2	2	
Gasak	2	2	
Sub Total	25	25	
3. LUBAO			
Sta. Maria	1	1	
San Antonio	1	1	
Sto. Domingo	1	1	
San Francisco	1	1	
Concepcion	1	1	
Sto. Cristo	1	1	
Sto. Niño	1	1	
Sub Total (Hazard Area)	7	7	

* Least Priority (Hazard Area)

PROVINCE : PAMPANGA II

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(1)	(2)
Prado Siongco	1	1	
San Jose Apunan	1	1	
San Miguel	1	1	
San Nicolas 1st	1	1	
San Vicente 1st	1	1	
Santiago	1	1	
Sta. Monica	1	1	
San Matias	1	1	
San Roque 1st	1	1	
San Roque 2nd	1	1	
San Roque Arbol	1	1	
Calangin	1	1	
San Agustin (Sapang Bayu)	1	1	
San Pablo 1st	1	1	
Prado Saba	1	1	
Sta. Teresa 1st	1	1	
Balantacan	1	1	
Louides	1	1	
Sub Total	25	25	
4. MINALIN			
San Francisco	2	2	
Sto. Rosario	1	1	
Saplud David	3	3	
Dawe	5	5	
Maniango	5	5	
Sta. Rita	1	1	
Sta. Catalina	1	1	
Sub Total	18	18	
5. MACABEBE			
Sta. Maria	2	2	
Consuelo	1	1	
Dalayap	1	1	
San Esteban	2	2	
Sto. Niño	2	2	
San Roque	1	1	
San Gabriel	1	1	
Sub Total	10	10	
6. MASANTOL			
San Isidro Anac	1	1	
Bulacus	2	2	
San Pedro	1	1	
Malarile	1	1	
Baibago	1	1	
Sagrada	1	1	
Sta. Lucia	2	2	
Sta. Monica	1	1	
Sub Total	10	10	

PROPOSED SITE FOR WATER SUPPLY PROJECT

PROVINCE: PAMPANGA II

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
7. PORAC *			
Jaling	1	1	
Pias	1	1	
Sangatba	1	1	
Pulong Santol	1	1	
Sinura	2	2	
Manibang Pasig	1	1	
Manibang Paralaya	1	1	
Mita, San Jose	1	1	
Poblacion	1	1	
Sipung Bulaon	2	2	
Palat	2	2	
Dotores	2	2	
Balubad	2	2	
Babosacan	1	1	
Salu	2	2	
Pulong Mababa Sta Cruz	1	1	
Balubad Bonifacio	1	1	
Pulong Mababa Sta Cruz, Malabne	1	1	
<i>Sub Total</i>	24	24	
8. FLORIDABLANCA *			
Mabical	2	2	
San Jose Park	3	3	
Sulib	2	2	
Dampe	2	2	
Pulong Siongco	1	1	
Fortuna	1	1	
San Antonio	1	1	
Gabangcalan	1	1	
Sta. Monica	1	1	
San Pedro	1	1	
Calantias	1	1	
Gutad	1	1	
Bodega	1	1	
Valdes Talang	1	1	
Valdes Gasak	1	1	
Carmencita	1	1	
Del Carmen	1	1	
Malligaya	1	1	
Consuelo	1	1	
Pulong Dagul	1	1	
San Nicolas	1	1	
Anon	1	1	
<i>Sub Total</i>	27	27	

* Least Priority (Hazard Area)

PROVINCE: PAMPANGA II

NAME OF MUNICIPALITY/BARANGAY	No. of Wells Requested	LEVEL	
		(I)	(II)
9. SASMOAN			
Sto. Tomas	3	3	
San Nicolas 1st	3	3	
San Nicolas 2nd	2	2	
Sta. Lucia	2	2	
San Pedro	2	2	
Sta. Monica	3	3	
Malusac	1	1	
Sebitanan	1	1	
Batang Juan	1	1	
Mabuanbuan	1	1	
San Antonio	1	1	
<i>Sub Total</i>	20	20	
10. STO. TOMAS			
Moraz de la Paz	2	2	
San Bartolome	2	2	
San Matias	1	1	
San Vicente	1	1	
Sto. Rosario	1	1	
<i>Sub Total</i>	7	7	
11. SAN FERNANDO			
Baliti	1	1	
Lara	1	1	
Maimpis (Evac)	20	20	
Del Carmen	1	1	
Queriawan	3	3	
San Isidro (Evac)	2	2	
Saguin (Evac)	10	10	
Sta. Lucia	3	3	
<i>Sub Total</i>	41	41	
12. NABUKLOD, FLORIDABLANCA RESETTLEMENT AREA			
<i>Sub Total</i>	9	9	
13. VILLA MARIA, PORAC RESETTLEMENT AREA			
<i>Sub Total</i>	8	8	
14. CONSUELO EVACUATION CENTER			
<i>Sub Total</i>	5	5	

A-21 Hydraulic Calculation Results of Pipeline

D a m p a y S a l a s a

Point No.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
Elevation (m)	300	180	155	145	130	125	135	145	150	135	125	125	105	95	130	120
Used Pipe Dia. D: (mm)	65		100	75	50	40	30	25		40	25	25	40	30	25	25
Calc. Pipe Dia. D: (mm)	31		38	32	23	31	16	13		23	11	11	16	16	15	14
Length L: (m)	1,350		350	140	120	500	75	100		120	100	200	100	150	200	150
Flow Rate. Q: (ℓ/min)	50		83	54	30	18	12	6		18	6	6	18	12	6	6
Slope I =h/L	0.089		0.071	0.071	0.125	0.01	0.13	0.1		0.042	0.15	0.178	0.2	0.13	0.05	0.067
Velocity v: (m/s)	1.30		1.27	1.17	1.28	0.4	1.05	0.8		0.72	0.9	0.98	1.3	1.04	0.6	0.67
Water Head h: (m)	120		25	10	15	5	-10	-10		5	15	25	20	20	10	10

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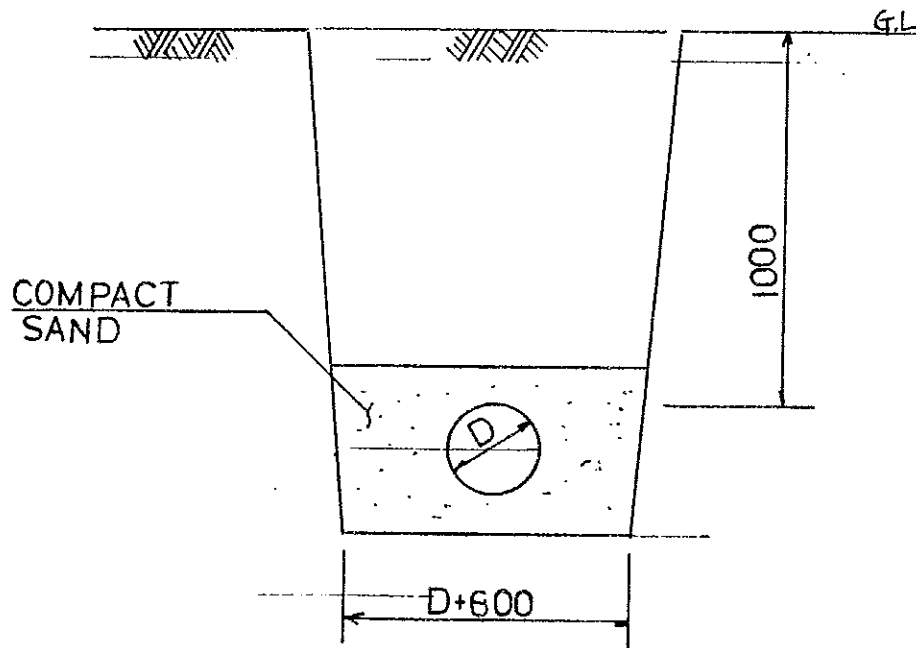
Point No.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
Elevation (m)	280	130	220	200	100	150	160	170	140	130	200	140	180	170	120	180
Used Pipe Dia. D: (mm)	100	100		100	100	100	75	65	40	40		40	40	40	40	40
Calc. Pipe Dia. D: (mm)	43	42		38	36	48	35	21	20	14		14	18	13	15	15
Length L: (m)	2,300	1,150		75	200	200	150	150	150	150		150	150	75	175	150
Flow Rate. Q: (ℓ/min)	120	120		187	153	136	68	34	17	17		17	17	17	17	17
Slope I =h/L	0.065	0.078		0.27	0.25	0.05	0.067	0.2	0.067	0.4		0.2	0.13	0.67	0.32	0.27
Velocity v: (m/s)	1.34	1.45		2.67	2.47	1.24	1.2	1.56	0.84	1.76		1.75	1.12	2.22	1.63	1.49
Water Head h: (m)	150	-90		20	50	-10	-10	30	10	60		-30	20	50	60	40

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Point No.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮						
Elevation(m)	870	850	800	800	790	660	550	510	660	660	550	510	550	510	600	560	560	800	760	740	
Used Pipe Dia. D: (mm)	100	100		75	65	50	25		25			25		25	50	25			25	75	40
Calc. Pipe Dia. D: (mm)	51	43		36	23	19	15		14			13		12	21	12			12	29	20
Length L: (m)	1,200	1,150		175	650	600	500		250			250		1,200	300				450	180	1,100
Flow Rate. Q: (ℓ/min)	90	90		72	40	24	8		8			8		24	8				8	80	8
Slope I =h/L	0.017	0.043		0.067	0.2	0.18	0.08		0			0.16		0.108	0.2				0.22	0.22	0.018
Velocity v: (m/s)	0.72	1.07		1.21	1.65	1.38	0.78		0.9			1.02		1.12	1.10				1.16	2.02	0.08
Water Head h: (m)	20	50		10	130	110	40		0			40		130	60				100	40	20

Point No.	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙
Elevation(m)	760	650	580	500	500	500	650	600	580	530	580	530	500	480	
Used Pipe Dia. D: (mm)	75	65	40	30	25		25		25		25		25		25
Calc. Pipe Dia. D: (mm)	29	23	16	19	14		16		16		16		11		
Length L: (m)	700	250	250	500	500		900		900		900		600		
Flow Rate. Q: (ℓ/min)	64	48	32	16	8		8		8		8		8		
Slope I =h/L	0.157	0.28	0.68	0	0		0.056		0.056		0.056		0.34		
Velocity v: (m/s)	1.68	1.98	2.55	0.9	0.9		0.66		0.66		0.66		1.38		
Water Head h: (m)	110	70	80	0	0		50		50		50		20		

A-22 PIPE EXCAVATION STANDARD SECTION DWG.



PIPE EXCAVATION STANDARD SECTION DWG.

