

ESTABLISHMENT OF
GRAPHIC INFORMATION BASE PROJECT OF
NATIONAL CAPITAL REGION
REPUBLIC OF THE PHILIPPINES

GENERAL REPORT

MARCH 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

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89-038



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GRAPHIC INFORMATION BASE PROJECT OF
NATIONAL CAPITAL REGION
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JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request from the Government of Philippines, the Government of Japan decided to conduct the Graphic Information Base Project of National Capital Region and entrusted the project to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr. Masayoshi Takasaki, International Engineering Consultants Association, from July, 1985 to December, 1987. The team conducted field surveys in close cooperation with the authorities concerned of the Philippines. After the team returned to Japan, such works as aerial triangulation, stereo plating, compilation and drafting were carried out and contoured, planimetric, land use and land condition maps were prepared, together with the present report.

I hope that this report, together with the above maps, will be used effectively for formulating development plans of the region and will contribute to the promotion of the friendly relations between our two countries.

I wish to express my sincere appreciation to officials concerned of the Government of Philippines for their close cooperation extended to the team.

March, 1989

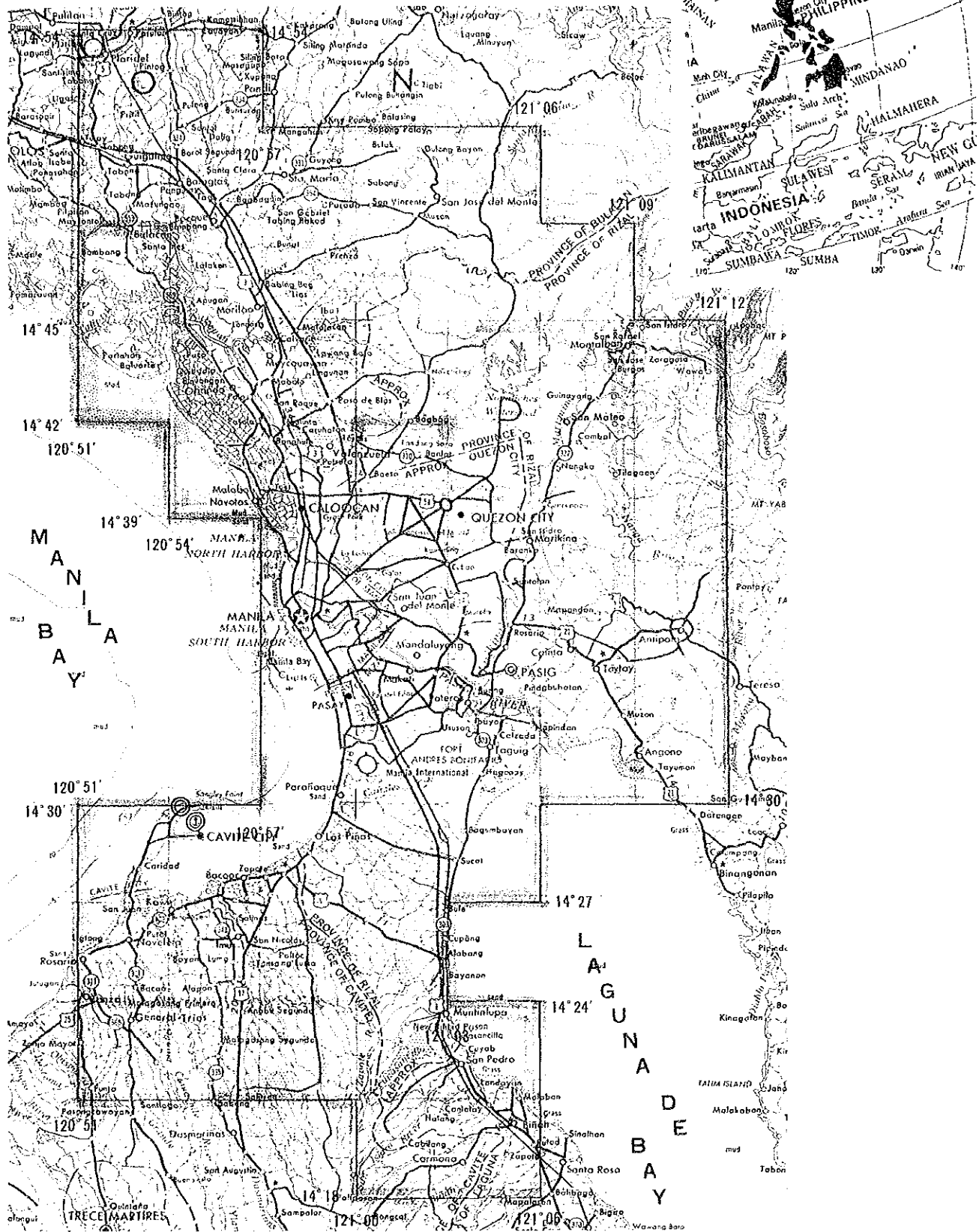


Kensuke Yanagiya

President

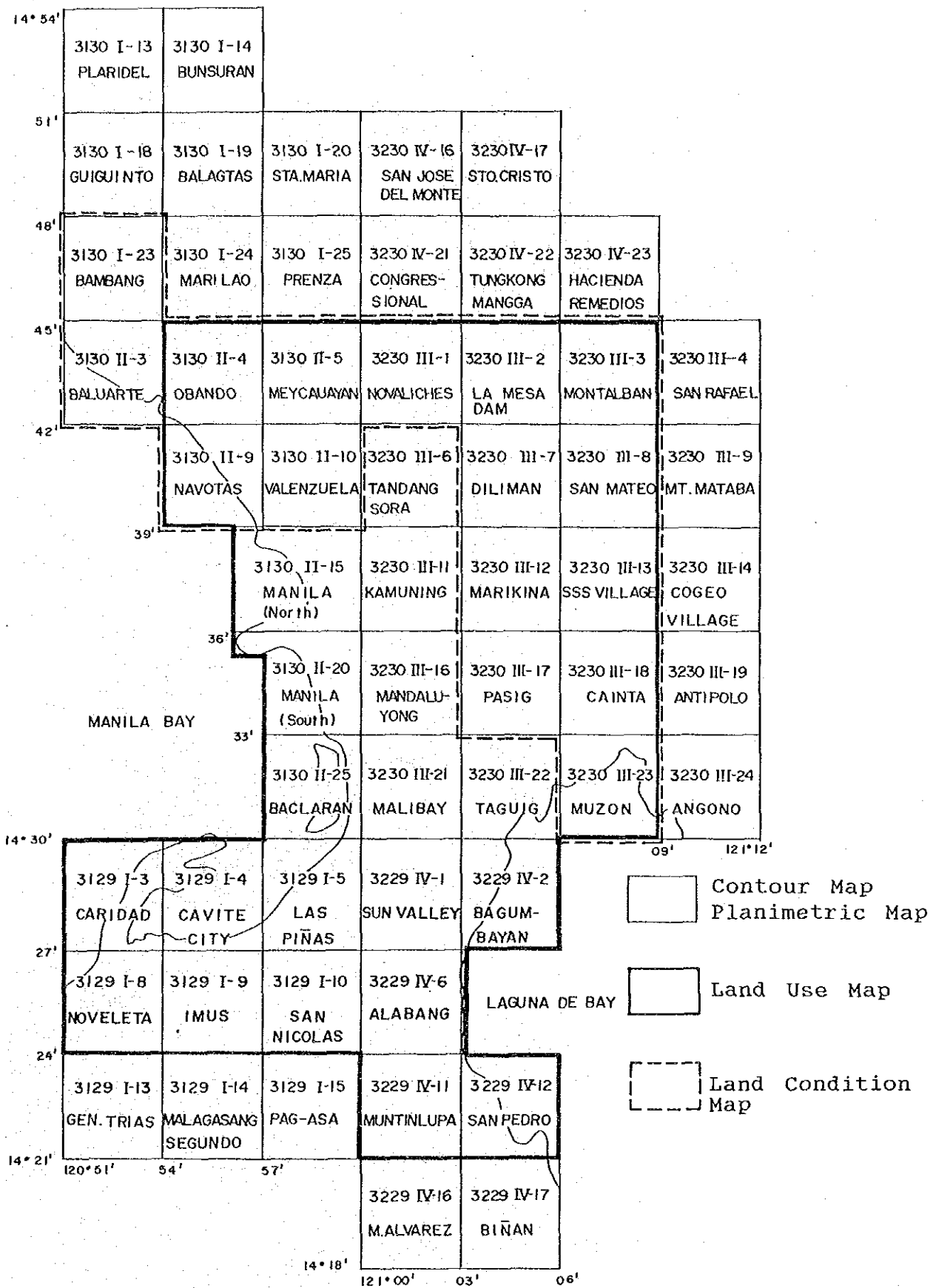
Japan International Cooperation Agency

Location Map for Establishment of Graphic Information Base Project of National Capital Region



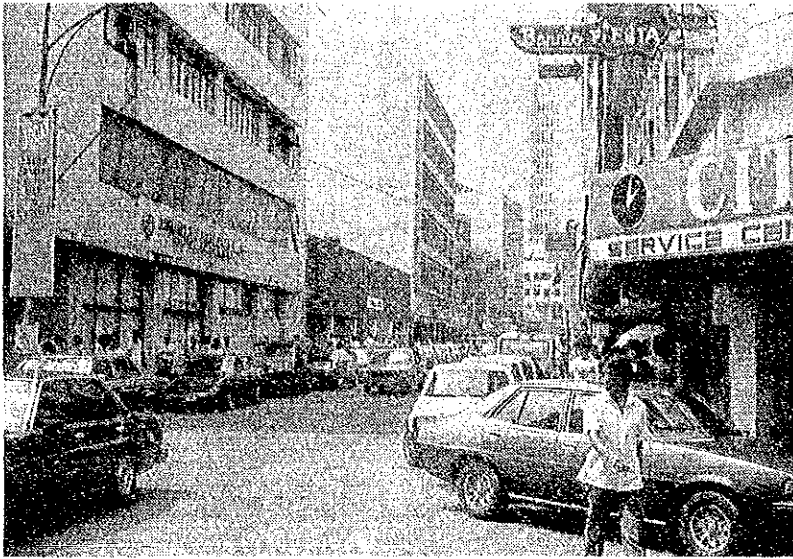
0 5 10 15 km

- Contoured map : [Symbol]
- Planimetric map : [Symbol]
- Land use map : [Symbol]
- Land Condition map : [Symbol]



Sheet Name and Number Index

Metro Manila



City of Manila
(Business areas)

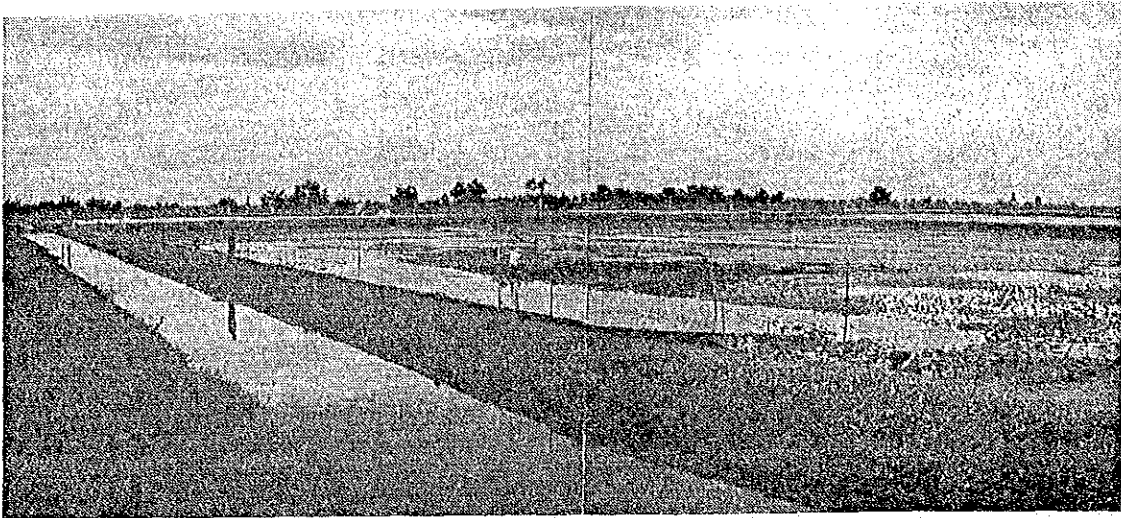


Modernized Business Area
(Makati)



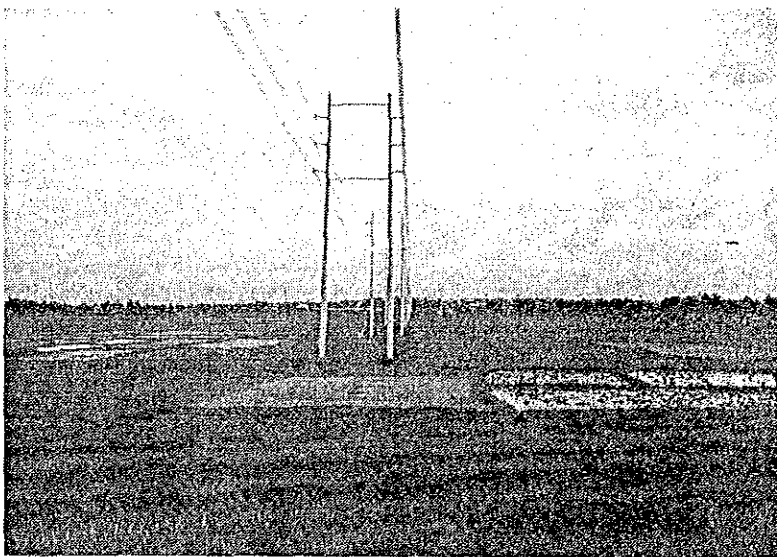
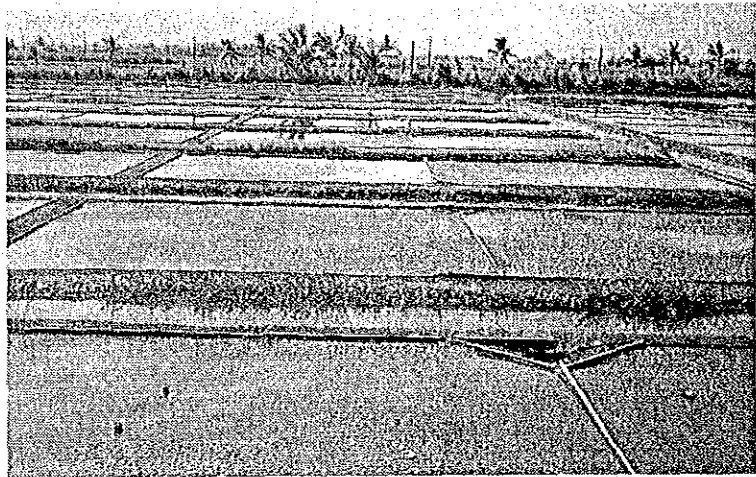
Congested Housing Area

Outside of Metro Manila



Marine Pond Where Water is being Refreshed (BAMBANG)

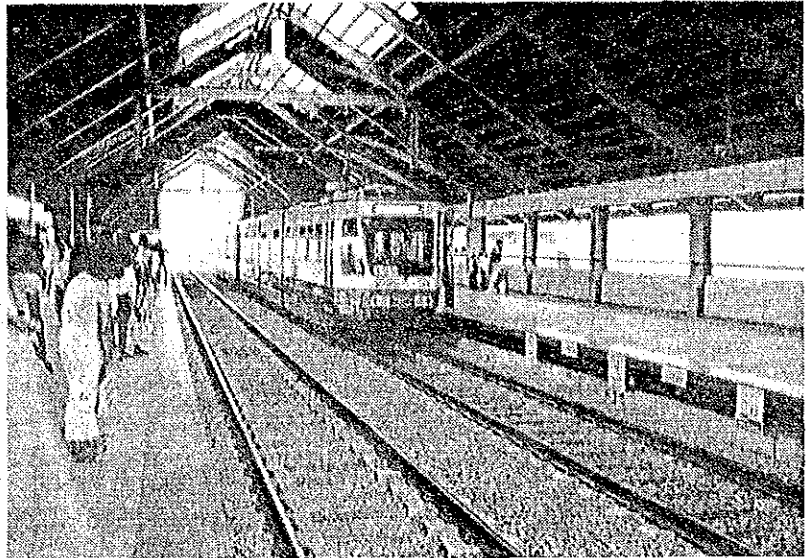
Salt Bed (CAVITE)



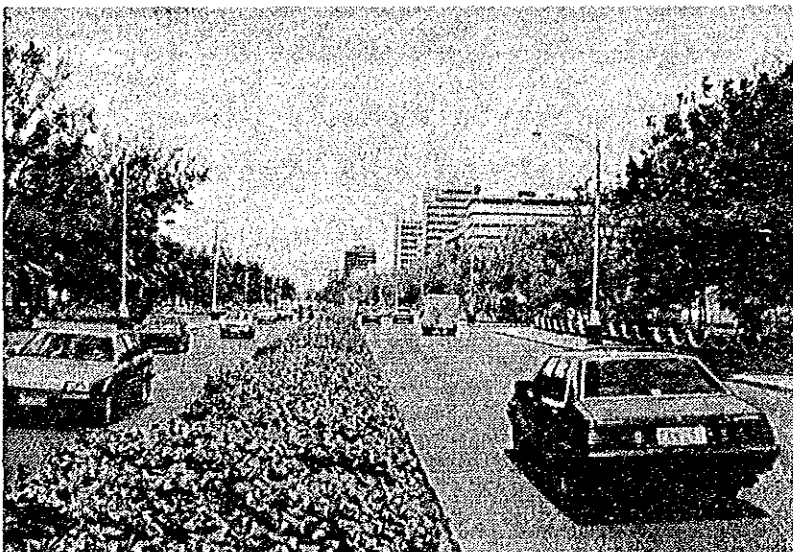
Flat rural Area (Around
CAVITE CITY)

Transportation in Metro Manila

Light Rail Transit
Running Through Western
District of Metro Manila

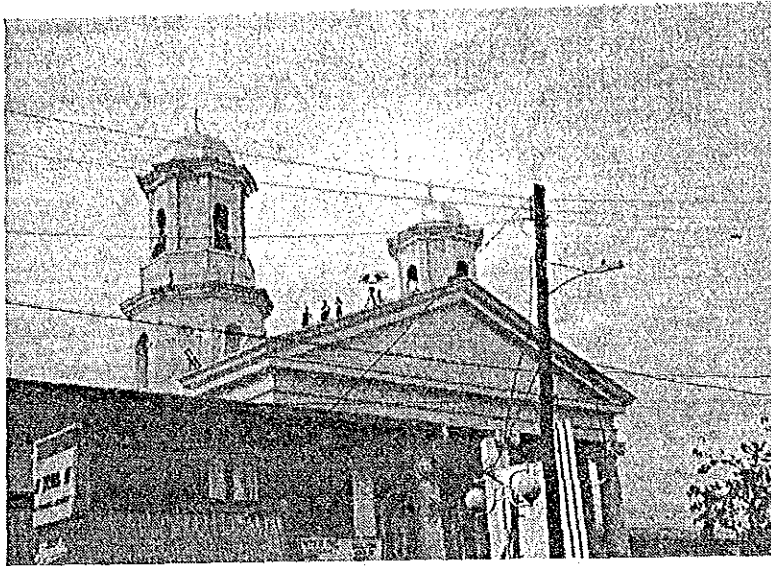


National Railway in
Southern Area of Metro
Manila

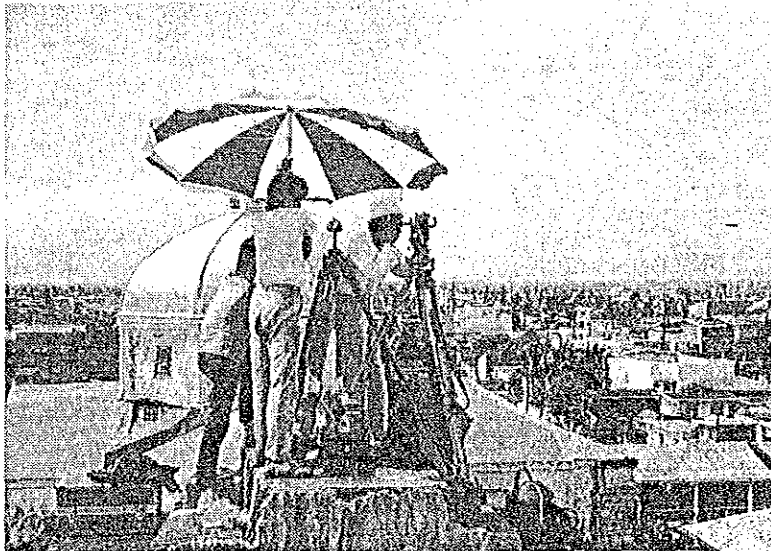


Roxas Boulevard
Manila

Ground Control Point Survey
(Contoured and Planimetric mapping)



Observation at Newly
Established Control
Point (Malabon Church)

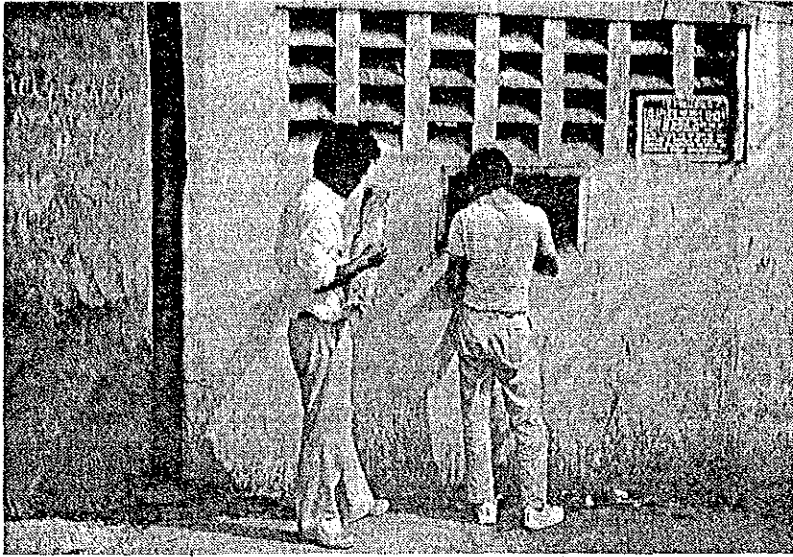


Observation of
Horizontal Angle (Roof
Top)



Observation of Vertical
Angle (BROWN
Triangulation Point)

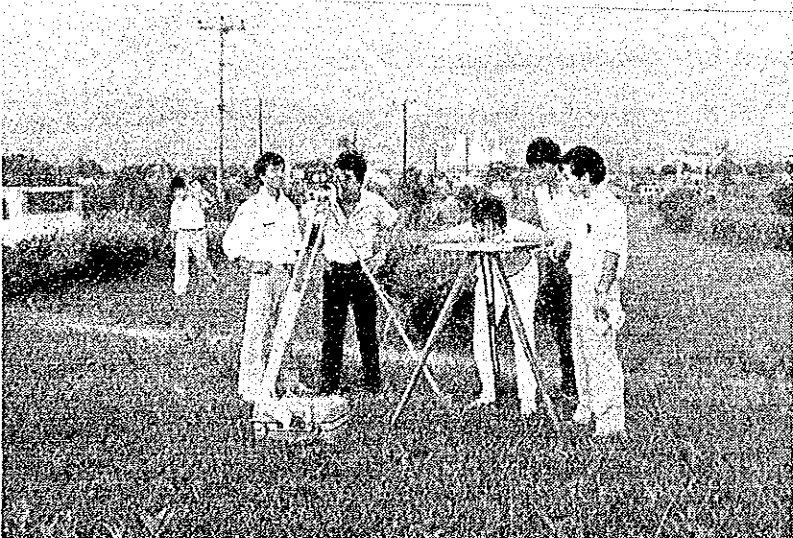
Field Identification (Contoured Mapping)



Survey on Building Names



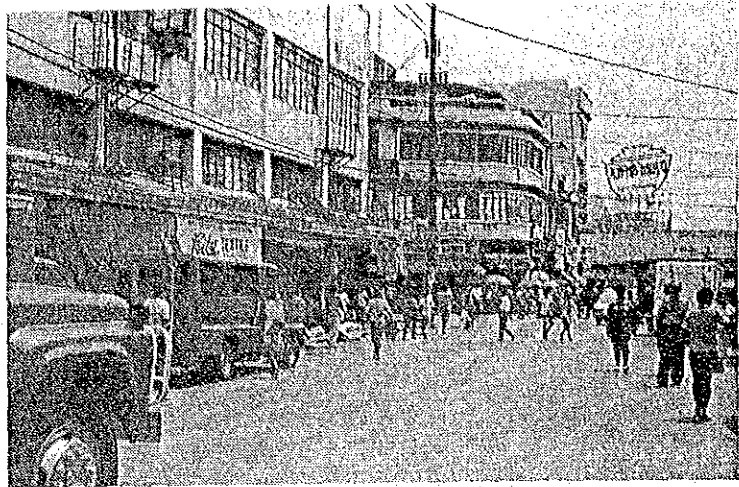
Measuring Road Width in Residential Area of Manila City



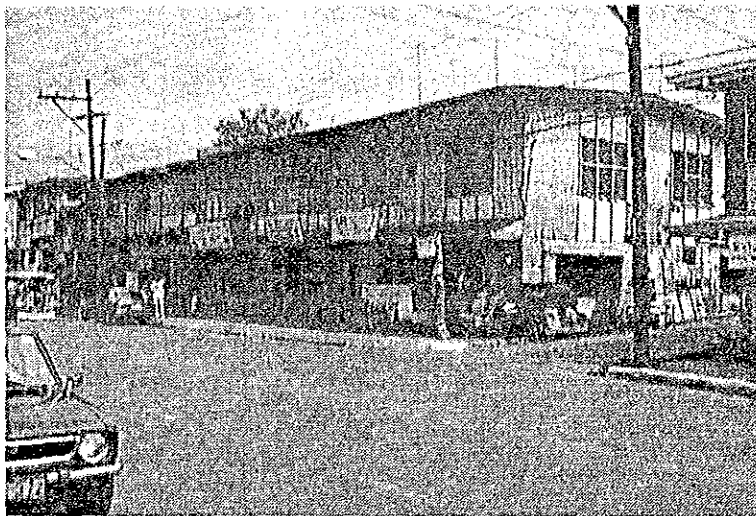
Field Completion (Contoured Mapping)

Land Use Mapping (1) (Field Identification)

Commercial Area
(3-story) (SAN PALOC)



Mixed Business-
Commercial Area
(2-story) (QUIAPO)



Small scale industry
(2-storey)

Land Use Mapping (2) (Field Identification)



Housing Fixed on Water
and Revetment (NAVOTAS)

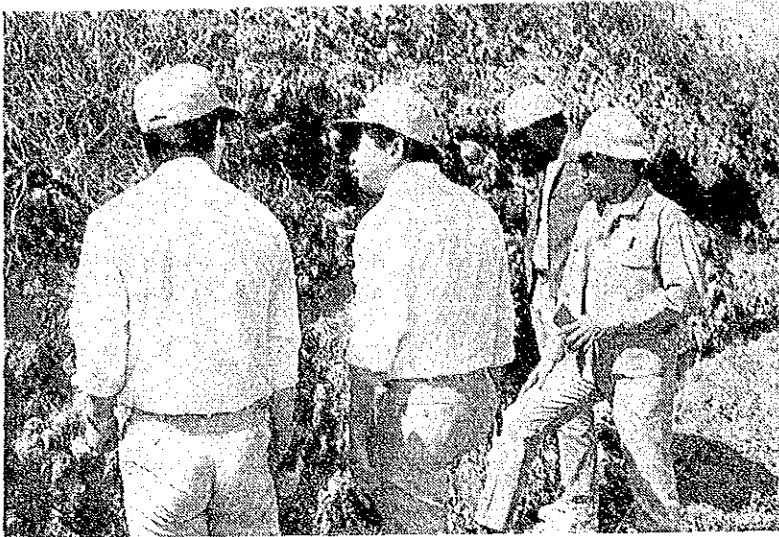


Subdivison (MAKATI)



Artificially Deformed
Land (Under Construc-
tion)

Land Condition Mapping (Field Identification)



Investigation of Outcrop
(Near by QUEZON)



Hand Augering (Near by
Laguna de Bay)

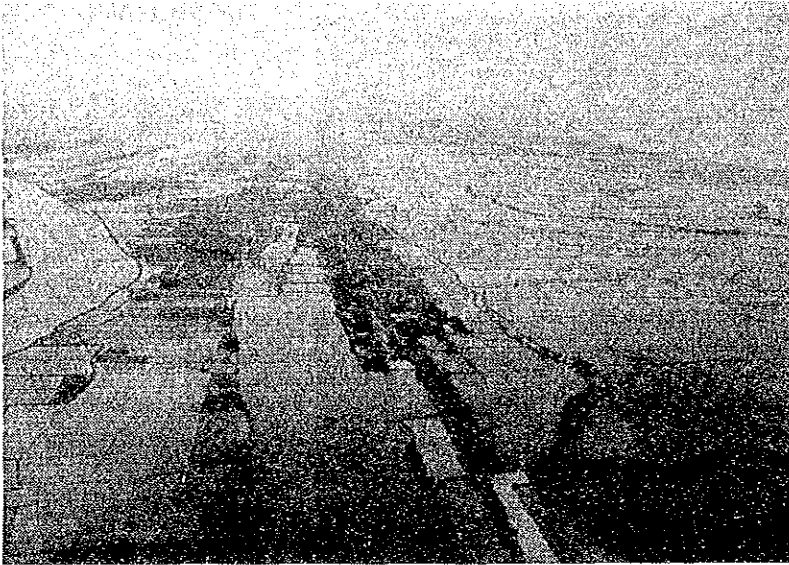


Minor Order Leveling
(MAYCAUAYAN)

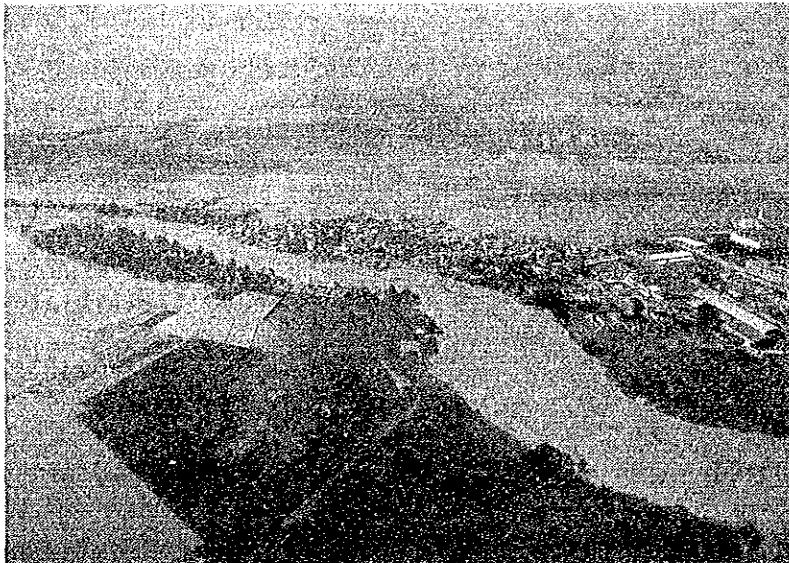
Floods in Metro Manila by Heavy Rain Fall



Manila City area
(Oct. 6, 1986)



Rice Field North-West
of Manila



Area Along the Northern
Bank of Laguna de Bay
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Signing on Minutes and Turnover Ceremony



Signing on Minutes at
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INTRODUCTION

The 1:10,000 urban base mapping Project for Metro Manila Region was implemented by JICA under 4-year program starting 1985 in response to the request of the Philippine Government, and completed in March 1989.

The project area (1,500 km²), extending around Manila, borders in the east on the Southern end of the Sierra Madre mountain range which runs from the northeast of Luzon and on Manila Bay in the west. It is adjacent to the central plain of Luzon in the northeast and to the river delta area. The Laguna de Bay lies in the south-east. The area adjacent to the foot of the Tàal Volcanic Mountains.

The National Capital Region, the project area, includes 4 cities and 13 municipalities and faces with many urban problems caused by drastic urbanization.

The general report describes the whole aspects of the 1:10,000 urban base mapping project incorporating its background, mapping method, information and usage of maps and related data concerning geology, flooding, collected data and materials, symbol and specifications, etc.

It is therefore expected not only that the contoured, planimetric, land use and land condition maps would be used as the basic materials for development and preservation planning for the region but also that the general report would be useful help for the use of these maps.

1. OUTLINE OF PROJECT

1-1 Request of the Philippine Government and Formation of Project

1-1-1 Request of the Philippine Government

The metro Manila Region, which is the political, economic and cultural center of the Philippines, has become overcrowded due to a drastic influx of population into the present inadequate urban infrastructures such as road system and housing facilities. The circumstances of the Region have therefore become rapidly worse, as observed in the increase of temporarily inhabited areas and the chronic inundation caused by heavy rainfalls.

In order to bring about proper and reasonable solutions of such urban problems, it goes without saying that urban base maps will be firstly necessary for ascertain the existing conditions in the Region and its environs.

The Philippine Government requested the Japanese Government in March 1984 for technical cooperation in urban base mapping (contoured, plane-metric, land use and land condition maps) of the Metro Manila Region.

In response to the request for technical cooperation, the Japanese Government sent a contact mission in January 1985 and a preliminary survey team in March the same year to the Philippines for discussions with the Bureau of Coast and Geodetic Survey (BCGS)*, the surveying organization of the Philippine Government, about the proposed technical cooperation as well as to conduct field survey and data collection.

Based on the Implementing Arrangement (I/A) which was consequently agreed between the two Governments, it was concluded that the technical cooperation be carried out under a 4-year program starting in 1985 for the establishment of graphic information base project of the National Capital Region.

* BCGS, the surveying organization of the Ministry of National Defense, has now been merged to the National Mapping and Resource Information Authority (NAMRIA) under the Department of Environment and Natural Resources (DENR) according to the President Executive Order No. 129 issued on June 9, 1987.

1-1-2 Contents of the Request

The contents of the request of the Philippine Government was as follows:

- (1) Project area: Metro Manila Region (4 cities and 13 Municipalities)
- (2) Coverage: 1,500 km²
- (3) Urban base map: 1:10,000 Contoured map
1:10,000 Planimetric map
1:10,000 Land use map
1:10,000 Land condition map
- (4) Specifications: Projection: UTM
Specs.: JICA Specification for Geodetic and
Photogrammetric Surveying for Oversea
(JICA Specs.)
Neat line: 3'x3' (64 sheets each)
- (5) Period: 3 years

1-1-3 Conclusion of Scope of Work

(1) Contact mission

The Japanese Government despatched contact mission in January 1985 to the Philippines for negotiating with the Philippine Government as for the coverage, specifications, map scale of the Metro Manila urban base map which was requested by the Philippine Government.

The contact mission had meetings with BCGS, the Philippine surveying organization, and conducted field reconnaissance in the project area. The mission established the following plan and reported to the Japanese Government:

- a) Aerial photographs: The aerial photographs (1:32,000) taken by the Philippines in 1982 will be used.
- b) Contoured map: 1:10,000 map covering about 1,500 km²

- c) Planimetric map: 1:10,000 map covering about 1,500 km²
- d) Land use map: 1:10,000 map covering about 823 km²
- e) Land condition map: 1:10,000 map covering about 476 km²

(2) S/W mission

Based on reports of the contact mission, the S/W mission was despatched in March 1985 to the Philippines in order to finalize a Implementing Arrangement for the mapping project.

After a series of discussions with the Philippine side, the S/W mission agreed as follows:

a) Results

- o Contoured map: 1:10,000, 1,500 km², 57 sheets, 1,000 copies
- o Planimetric map: 1:10,000, 1,500 km², 57 sheets, 1,000 copies
- o Land use map: 1:10,000, 823 km², 33 sheets, 1,000 copies
- o Land condition map: 1:10,000, 476 km², 16 sheets, 1,000 copies

b) Aerial photographs

The 1:32,000 aerial photos taken by the Philippines shall be used.

c) Symbol specifications

Metro Manila map symbol specifications agreed between both sides shall be used.

d) Specifications

- Reference ellipsoid: Clarke 1866
- Projection: UTM
- Neat line: 3' x 3'
- Scale: 1:10,000
- Specifications: JICA Specs. (for base map)
- Contour line: Flat area 2 m, mountain area 4 m

e) Accuracy

The accuracy shall be those specified in JICA specs.

- Accuracy: Planimetry B class
- Vertical A class

Ground control

- point survey: 3rd order, relative accuracy 1:25,000
- Leveling: 4th order, 20 mm \sqrt{s} (s: distance)

- Monumentation: Newly established control points (ground control points, bench marks) shall be monumented according to the Philippine specifications.
- Planimetry: ± 1.0 mm
- Spot heights: $\Delta h/3$ Δh : contour interval (intermediate contour line)
- Contour line: $\Delta h/2$
- f) Participation of both sides
- o Ground control points: about 3 points by the Philippine side
 - o Leveling: about 400 km by the Philippine side
 - o Pricking (ground control points, bench marks): by Japanese side
 - o Minor order leveling: about 100 km by Japanese side
- g) Period: 4 years from 1985
- h) Correction regarding the changes after aerial photography shall be made as to the major changes which were brought about after the 1982 aerial photography.

1-2 Description of Project

Many urban problems are observed not only in Metro Manila Region but also in its environs. Through the project, the following urban base maps (contoured, planimetric, land use and land condition maps) were prepared to be used as the basic materials which accurately clarify the existing conditions of the Region and are useful for planning urban development, flood control measures, etc. along with technical transfer:

(1) Contoured map (1:10,000)

Coverage: 1,500 km²

Neat line: 3' x 3' (57 sheets)

Printing (5 colors): 57 sheets, 1,000 copies each

(2) Planimetric map (1:10,000)

Coverage: 1,500 km²
Neat line: 3' x 3' (57 sheets)
Printing (2 colors): 57 sheets, 1,000 copies each

(3) Land use map (1:10,000)

Coverage: 823 km²
Neat line: 3' x 3' (33 sheets)
Printing (Surface: 7 colors, back: 1 color):
33 sheets, 1,000 copies each

(4) Land condition map (1:10,000)

Coverage: 476 km²
Neat line: 3' x 3' (16 sheets)
Printing (Surface: 12 colors, back: 1 color):
66 sheets, 1,000 copies each

(5) Through the project, the technical transfer was made by way of JICA training in Japan and technical discussions and field work in the Philippines.

1-3 Process of Project

The process of Metro Manila urban base mapping is outlined as follows:

1-3-1 Work Flow

The work flow of Metro Manila urban base mapping is shown in Fig. 1-1 and Fig. 1-2.

(1) The 1st year:

For the preparation of contoured and planimetric maps, the ground control point survey, pricking and field identification were carried out.

Concurrently, the field identification for land use map was conducted with emphasis on the functional classification in Metro Manila Region. The aerial triangulation and stereo plotting were conducted in Japan based on the field survey data.

(2) The 2nd Year:

The compilation manuscripts were prepared from the plotting manuscripts. Uncertain items found in the compilation were verified in the field and re-survey was conducted on the changes after aerial photography in the field completion. After the field work, original manuscripts were prepared for drafting and printing of the contoured map (5 colors) and planimetric map (2 colors).

For land condition mapping, the preliminary photo interpretation for landform classification and the minor order leveling were also conducted.

(3) The 3rd year:

The compilation of land use and land condition maps was conducted using the 1:10,000 contoured map as the base.

Uncertain items found in the compilation were verified in the field completion for correction.

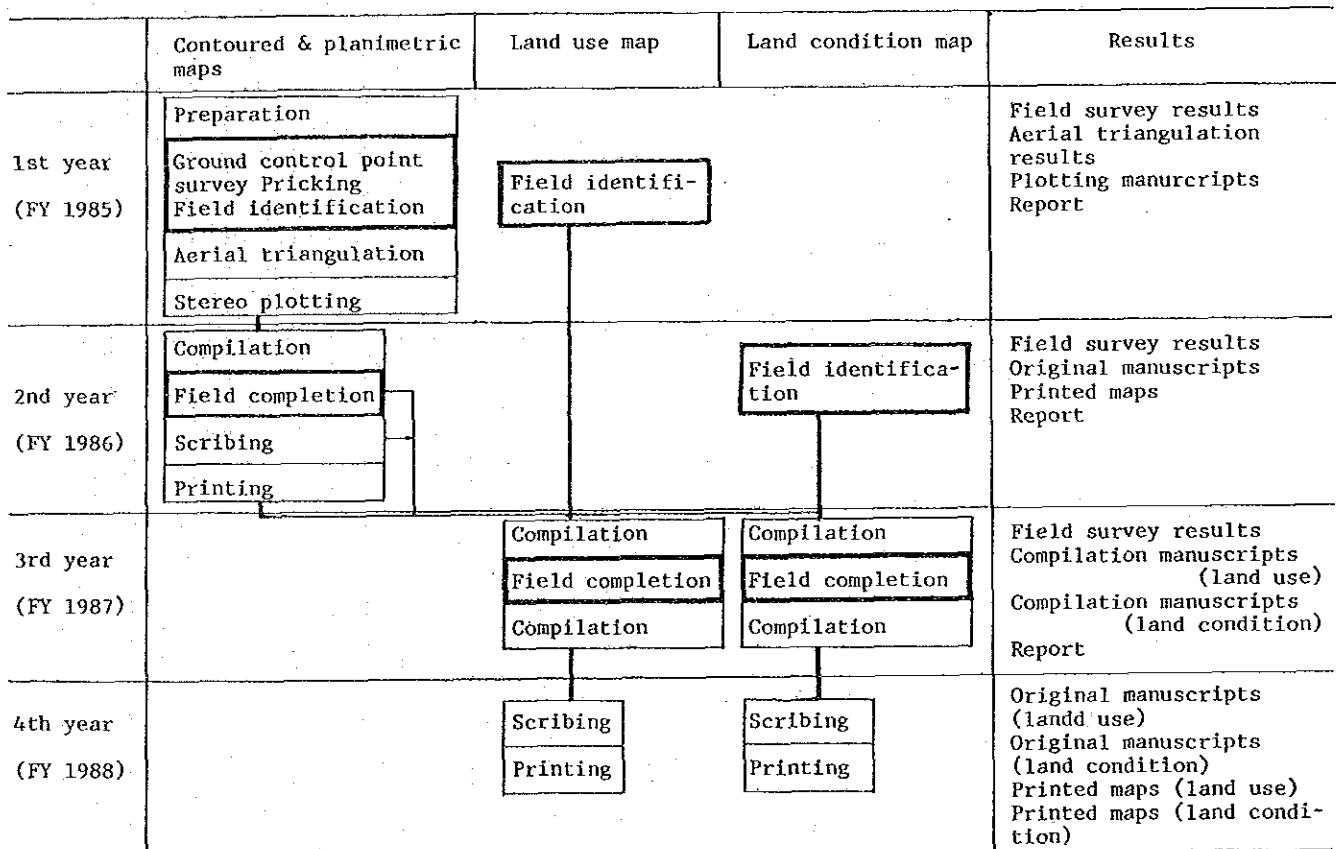
Particularly, the aerial photo maps prepared in 1986 were used for the land use map, and the landform before artificial deformation were surveyed using old aerial photos taken about in 1968.

As for the land use and land condition maps, the symbol specifications were finally agreed on the basis of the results of a series of field surveys and technical discussions.

(4) The 4th year:

After the drafting and printing, the land use map (7 colors) and land condition map (12 colors) were completed. On the back of each sheet of the land use and land condition map, "Information and Usage" were printed for map users.

Upon the completion of the project, the general report which describes the whole aspects of the project was prepared.



: Field work

: Indoor work

Fig. 1-1 Work Flow of Metro Manila Urban Base Mapping

Period	FY 1985 (1st)												FY 1986 (2nd)												FY 1987 (3rd)												FY 1988 (4th)											
	1985												1986												1987												1988											
	4	5	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
Items of work	[Gantt chart showing work bars for 1985-1988]																																															
Contoured map	[Gantt chart showing work bars for 1985-1988]																																															
Ground control point survey	[Gantt chart showing work bars for 1985-1988]																																															
Leveling	[Gantt chart showing work bars for 1985-1988]																																															
Pricking	[Gantt chart showing work bars for 1985-1988]																																															
Field identification	[Gantt chart showing work bars for 1985-1988]																																															
Aerial triangulation	[Gantt chart showing work bars for 1985-1988]																																															
Stereo plotting	[Gantt chart showing work bars for 1985-1988]																																															
Compilation	[Gantt chart showing work bars for 1985-1988]																																															
Field completion	[Gantt chart showing work bars for 1985-1988]																																															
Preparation of original manuscript	[Gantt chart showing work bars for 1985-1988]																																															
Scribing	[Gantt chart showing work bars for 1985-1988]																																															
Printing (5 colors)	[Gantt chart showing work bars for 1985-1988]																																															
Technical meeting	[Gantt chart showing work bars for 1985-1988]																																															
Planimetric map	[Gantt chart showing work bars for 1985-1988]																																															
Compilation	[Gantt chart showing work bars for 1985-1988]																																															
Field completion	[Gantt chart showing work bars for 1985-1988]																																															
Printing (2 colors)	[Gantt chart showing work bars for 1985-1988]																																															
Technical meeting	[Gantt chart showing work bars for 1985-1988]																																															
Land use map	[Gantt chart showing work bars for 1985-1988]																																															
Field identification	[Gantt chart showing work bars for 1985-1988]																																															
Compilation	[Gantt chart showing work bars for 1985-1988]																																															
Field completion	[Gantt chart showing work bars for 1985-1988]																																															
Scribing	[Gantt chart showing work bars for 1985-1988]																																															
Printing (7 colors)	[Gantt chart showing work bars for 1985-1988]																																															
Technical meeting	[Gantt chart showing work bars for 1985-1988]																																															
Land condition map	[Gantt chart showing work bars for 1985-1988]																																															
Field identification	[Gantt chart showing work bars for 1985-1988]																																															
Minor order leveling	[Gantt chart showing work bars for 1985-1988]																																															
Compilation	[Gantt chart showing work bars for 1985-1988]																																															
Field completion	[Gantt chart showing work bars for 1985-1988]																																															
Scribing	[Gantt chart showing work bars for 1985-1988]																																															
Printing (12 colors)	[Gantt chart showing work bars for 1985-1988]																																															
Technical meeting	[Gantt chart showing work bars for 1985-1988]																																															
Report	[Gantt chart showing work bars for 1985-1988]																																															

■ Field work □ Indoor work

Fig. 1-2 Work Schedule

1-3-2 Process of Project

Request and formation of project

Period	Item	Description
March 27 '84	Request	Request for technical cooperation to Japanese Government in mapping of NCR
Jan. 16 - 25 '85	Contact mission	Contact Mission for preliminary survey
March 5 - 29 '85	S/W mission	Discussion of I/A Field survey

The 1st Year Work

Period	Item	Description
July 18 - Oct. 19 '85	Field work	Grand control point survey, pricking, field identification (contoured and planimetric maps)
Oct. 20 '85 - March 30 '86	Indoor work	Aerial triangulation, stereo plotting, reporting
Oct. 15 - Dec. 12 '85	JICA training	Mr. Ponciano C. Ciceron (counterpart) for aerial triangulation
Nov. 25 '85 - Feb. 28 '86	JICA training	Mr. Rolando L. Alpajora (counterpart) for stereo plotting
Jan. 12 - March 23 '86	JICA training	Mr. Manuel M. Calibo (counterpart) for stereo plotting

The 2nd year work

Period	Item	Description
June 6 - Aug. 17 '86	Indoor work	Compilation (contoured and planimetric maps)
May 1 - July 31 '86	JICA training	Mr. Gavino C. Angeles, Jr. (Counterpart) for compilation
June 16 - June 25 '86	Field work	Field survey (general aspect)
Aug. 18 - Oct. 7 '86	Field work	Field completion (contoured and planimetric maps)
Oct. 8 '86 - March 30 '87	Indoor work	Drafting and printing (contoured and planimetric maps), and reporting

Period	Item	Description
Oct. 10 - Dec. 23 '86	JICA training	Mr. Rodorigo R. Pascua (counterpart) for drafting and printing
Dec. 10 - Dec. 23 '86	JICA training	Capt. Renato B. Feir (counterpart) for authorization for printing
Jan. 11 - March 14 '87	Field work	Field completion (land condition map)
March 14 - May 30 '87	JICA training	Engr. Felisa M. Nepomuceno (counterpart) for land condition map
March 30 '87	Completion of contoured and planimetric maps	Contoured map (57 sheets) 1,000 copies each Planimetric map (57 sheets) 1,000 copies each

The 3rd year work

Period	Item	Description
June 8 - Sep. 30 '87	JICA training	Lcdr. Rodolfo A. Agaton (counterpart) for land condition map Mr. Pastor A. Estrada (counterpart) for land use map)
July 30 '87 - March 30 '88	Indoor work	Compilation (land use and land condition map), reporting
Oct. 5 - Dec. 4 '87	Indoor work	Field completion (land use and land condition maps)
Oct. 22 '87	Presentation of contoured and planimetric maps	Presentation to the Philippine Government
Jan. 7 - March 16 '88	JICA training	Mr. Dante M. Lopez (counterpart) for land condition map

The 4th year work

Period	Item	Description
Aug. 18 '88 - March 14 '89	Indoor work	Drafting, printing (land use and land condition maps) General report
Sep. 18 - Oct. 31 '88	JICA training	Mr. Petronio A. Culala (counterpart) for land use and land condition maps
Nov. 23 - Dec. 23 '88	JICA training	Mr. Ponciano C. Ciceron (counterpart) for land use and land condition maps

Period	Item	Description
Jan. 12 - Jan. 16 '89	Meeting (in Japan)	Capt. Renato B. Feir (counterpart) for authorization for printing (land use and land condition maps)
March 15 '89	Completion of land use and land condition maps	Land use map (33 sheets) 1,000 copies each Land condition map (16 sheets) 1,000 copies each

1-4 Technical Advisors, Team Members and Counterparts

The technical advisors, team members and the Philippine counterparts for each year are listed as follows:

FY 1985 (1st year)

Technical advisor	Tadao Dohi	Geographical Survey Institute (GSI)
Advisor	Yoshikazu Yamada	JICA
Team leader	Masayoshi Takasaki	General
Team member	Kenzo Motojima	Deputy General
Team member	Hiroshi Kimura	Coordinator
Team member	Masashi Koyama	Chief Surveyor
Team member	Isao Furukawa	Chief Surveyor
Counterpart	Capt. Renato B. Feir	BCGS
Counterpart	Mr. Ponciano C. Ciceron	BCGS
Counterpart	Mr. Gavino C. Angeles, Jr.	BCGS
Counterpart	Mr. Conrado Santos	BCGS

FY 1986 (2nd year)

Technical advisor	Tadao Dohi	Geographical Survey Institute (GSI)
	Masatoshi Nagaoka	Geographical Survey Institute (GSI)
Advisor	Yoshikazu Yamada	JICA
Team leader	Masayoshi Takasaki	General
Team member	Kenzo Motojima	Deputy General

Team member	Hiroshi Kimura	Coordinator
Team member	Isao Furukawa	Chief Surveyor
Team member	Keikichi Yoshida	Chief surveyor
Counterpart	Capt. Renato B. Feir	BCGS
Counterpart	Mr. Manuel M. Calibo	BCGS
Counterpart	Mr. Rodrigo R. Pascua	BCGS
Counterpart	Mr. Ponciano C. Ciceron	BCGS
Counterpart	Mr. Gavino C. Angeles, Jr.	BCGS
Counterpart	Engr. Felisa M. Nepomuceno	BCGS

FY 1987 (3rd year)

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Advisor	Koji Mori	JICA
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Team member	Tokihiko Kaminishi	Deputy General
Team member	Hiroshi Kimura	Coordinator
Team member	Keikichi Yoshida	Chief Surveyor
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Counterpart	Mr. Ponciano C. Ciceron	BCGS
Counterpart	Mr. Gavino C. Angeles, Jr.	BCGS
Counterpart	Lcdr. Rodolfo A. Agaton	BCGS
Counterpart	Mr. Pastor A. Estrada	BCGS

FY 1988 (4th year)

Technical advisor	Masatoshi Nagaoka	Geographical Survey Institute (GSI)
Advisor	Rei Endo	JICA
Team leader	Masayoshi Takasaki	General
Team member	Keikichi Yoshida	Chief Surveyor
Counterpart	Capt. Renato B. Feir	NAMRIA
Counterpart	Mr. Ponciano C. Ciceron	NAMRIA