

5-5-5 Application of Land Use Classification

(1) Residential and multi-storey building

Only for exclusively residential buildings, four(4)- or more storey building was classified into multi-storey building. Buildings whose usage is other than residential was classified according to its usage without regard to storey.

(2) Enlarged presentation in commercial or mixed area

In the commercial or mixed area, consideration was given so that the building where short side being less than 1.5 mm on the map, was enlarged for presentation to 1.5 mm, if necessary.

(3) One- or two-storey building

One- or two-storey building whose usage being mixed was not classified into mixed category but classified according to the usage of the first floor. In case the first floor usage being mixed, classification was made according to main usage.

(4) Definition of mixed category

Mixed category to be presented on the map was classified into the following 4 categories; commercial and residential, business and commercial, industrial and residential, business and residential; and classification was applied only for three(3)- or more storey buildings.

Mixed building other than the above 4 categories was classified according to the main usage.

(5) Three(3)- or more storey building whose usage is mixed

In the mixed buildings, there were the following two cases; 1) usage was different by floor, and 2) usage was mixed in each floor. For such buildings, classification was made as the mixed of two different main usages.

(6) Application of the mixed category

Three(3)- or more storey building whose usage being mixed was classified into one of the 4 categories (commercial and residential, business and commercial, industrial and residential, business and

residential) according to each mixed form. With regard to the building whose site being less than the minimum area (for presentation on the map), classification was made in consideration of the land use classification of adjacent building.

(7) Minimum area for presentation

In the classification for commercial and mixed area (4 categories), building whose area being less than the minimum area but being important for map user was enlarged individually for presentation. Extremely small or temporary buildings were included in the other classification of the surrounding in principle.

5-5-6 Field Completion

Uncertain items and other items to be verified according to changes of classification criteria were marked on copies of the manuscripts prepared in Japan. Not only survey and verification on those items but also overall checks on the compilation manuscripts were conducted in the field completion.

To attain unified understanding on map symbols and uniformed accuracy of classification, the survey team members conducted field study on detailed criteria for classification at several sample areas.

Three(3)- or more storey buildings were needed to survey one by one. Therefore, survey was conducted on foot in the areas where these 3- or more storey buildings were located in such congested areas as Manila, Makati, Quezon City, etc., the central part of cities and towns in the surrounding areas, and the congested areas along the highways.

In the forest, agricultural land and subdivisions whose classification being little influenced by new addition of symbols or change of classification criteria, survey was carried out in the way of moving by vehicles.

Field work was smoothly carried out and completed with favorable weather although the survey period was around the end of rainy season.

For technological transfer, while, BCGS counterparts always accompanied with the Japanese field party carrying the symbols and specifications to help their understanding of the method and importance of the field completion.

5-5-7 Changes after Aerial Photography

In order to enhance the utility value of the land use map, it is important to correct changes after aerial photography and present the latest information on the map. Regarding changes brought about until March 1986, therefore, results of the field identification (1985) were corrected by photo interpretation of the aerial photomaps made in March 1986. Subsequent new changes in land use were surveyed and confirmed in the field completion as much as possible.

As a result, most of changes brought about during the period from the contoured mapping to the field completion (October, 1987) were corrected in respect with the central part of the city area.

5-5-8 Arrangements of Field Completion Results

Results of the field completion were filled in on copies of the compilation manuscripts. According the copies, the compilation manuscripts and the colored manuscripts were corrected and confirmed. These manuscripts were presented to and agreed with BCGS.

5-5-9 Indoor Work in Japan

After the field completion, the following work was conducted in Japan:

- (1) Compilation of the corrected items of changes after aerial photography
- (2) Correction by the aerial photomap (1986)

Due to the fact that the correction of changes brought about after the contoured mapping was made based on the aerial photo map (1986), it became necessary to correct the printing plates of contoured map for the production of base map.

Items to be corrected for the base map were arranged in consideration of conformity with the land use and land condition maps.

5-6 Field Completion of Land Condition Map

5-6-1 Outline

The field completion was conducted for clarifying uncertain items found in the course of preparation of the compilation manuscripts as well as for confirming BCGS data of organizations and facilities in the field.

Also, detailed technical discussion were made with BCGS for finalization of the symbols and specifications, confirmation of the items on drafting and printing, preparation of the information and usage (draft), etc.

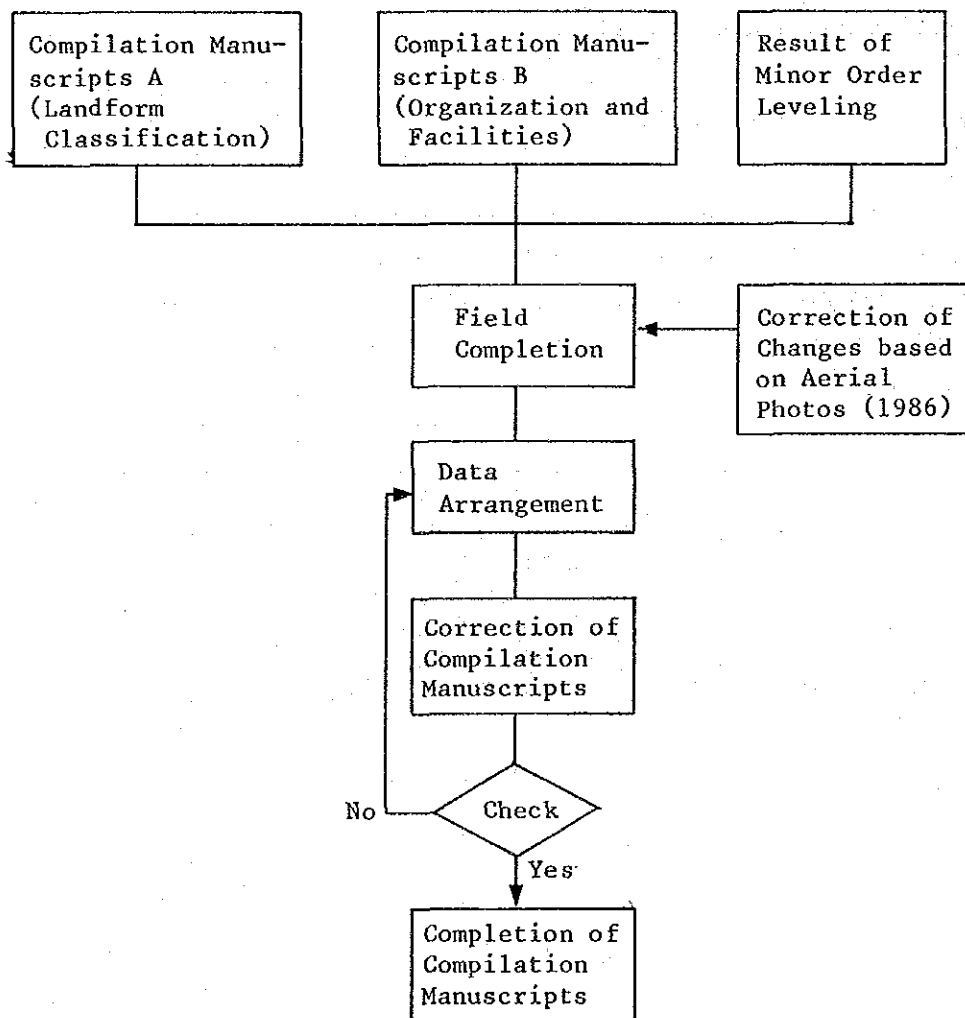


Fig. 8 Work Flow of Field Completion (Land Condition Map)

5-6-2 Reference Materials

Reference materials prepared for the field completion were as follows:

- (1) Compilation manuscripts A ----- Polyester base original
- (2) Landform classification manuscripts (colored) ----- Delmina SSP
- (3) Compilation manuscripts B
- (4) Ground elevation data map
- (5) Data and information collected
- (6) Aerial photos used for field identification
- (7) Sample maps for printing
- (8) Symbols and specifications
- (9) Information and usage (draft)

5-6-3 Symbols and Specifications

As to symbols and specifications for the land condition map, both sides discussed on the draft prepared in Japan and finalized them.

Items of changes on classification and symbols were as follows:

- (1) Changes of classification names

Draft	Final
Hill and Upland	Hill and Plateau
Ground Contour Line	Microrelief Line
Depth Curve	Bathymetric Line
Landform Unit Boundary	Landform Boundary
Breakwater/Jetty	Breakwater, Jetty and Causeway

(2) Changes of symbols

Items	Draft	Final
Port and Harbor		
Fishing Port		
Water Treatment Plant		

5-6-4 Field Completion (Landform Classification)

The compilation manuscripts A were prepared based on results of the field identification and the aerial photographs used for photo-interpretation conducted in the 2nd year. For the final confirmation of the landform classification, the following work was conducted in the field:

- (1) Supplemental outcrop survey in the hill and plateau area
- (2) Confirmation of form and distribution of the landform of the foot of mountain and the delta
- (3) Confirmation of depth of cut surface of artificially deformed land
- (4) Confirmation of depth of banked up surface of artificially deformed land
- (5) Confirmation of relative height of terrace scarp
- (6) Confirmation of drainage system in city area
- (7) Survey on general landform characteristics of each major category

5-6-5 Field Completion (Ground Elevation)

- (1) Ground elevation points and microrelief lines in low land were presented based on results of the minor order leveling conducted in the land condition mapping, the aerial photogrammetric survey

utilizing the aforementioned results, the photo-interpretation, etc. While, the minor order leveling (distance: about 8 km) was additionally conducted in the area north-west of Manila where minor order leveling had not been carried out in the 2nd year.

- (2) The route of minor order leveling is shown in the Fig. 9.
- (3) The minor order leveling was conducted according to the JICA Specification for Overseas Surveying same as the 2nd year work.
- (4) The minor order leveling was conducted according to the following specifications:

Items	Limits	Remark
Error of Closure between the Known Points	$5 \text{ cm } \sqrt{S}$	S: distance in km
Error of Circuit Closure	$5 \text{ cm} + 4 \text{ cm } \sqrt{S}$	
Distance between 2 Staffs	Max. 80 m	
Minimum Reading Unit	approx. 1.0 mm	
Sensitivity of Level	$40''/2 \text{ mm}$	
Number of Running	Single Running	
Tolerable Error of Pricking	0.2 mm	

- (5) The minor order leveling was carried out based on the results of leveling provided by BCGS and using GM-P1, BU-7 and BU-12 as the known points.
- (6) Observation results of the minor order leveling

Among the leveling points to be used as the known points, there were some erroneous points which might be caused by ground subsidence or other reasons in the area north-east of Manila. Therefore, measures were taken as follows:

- 1) Resurvey (duplicate running) was made on the leveling route connecting BU-1, BU-2, BU-4, BU-6, BU-7, BU-9, BU-10 and BU-12 for selection of the known points. (See Fig. 9 Route Map of Minor Order Leveling.)

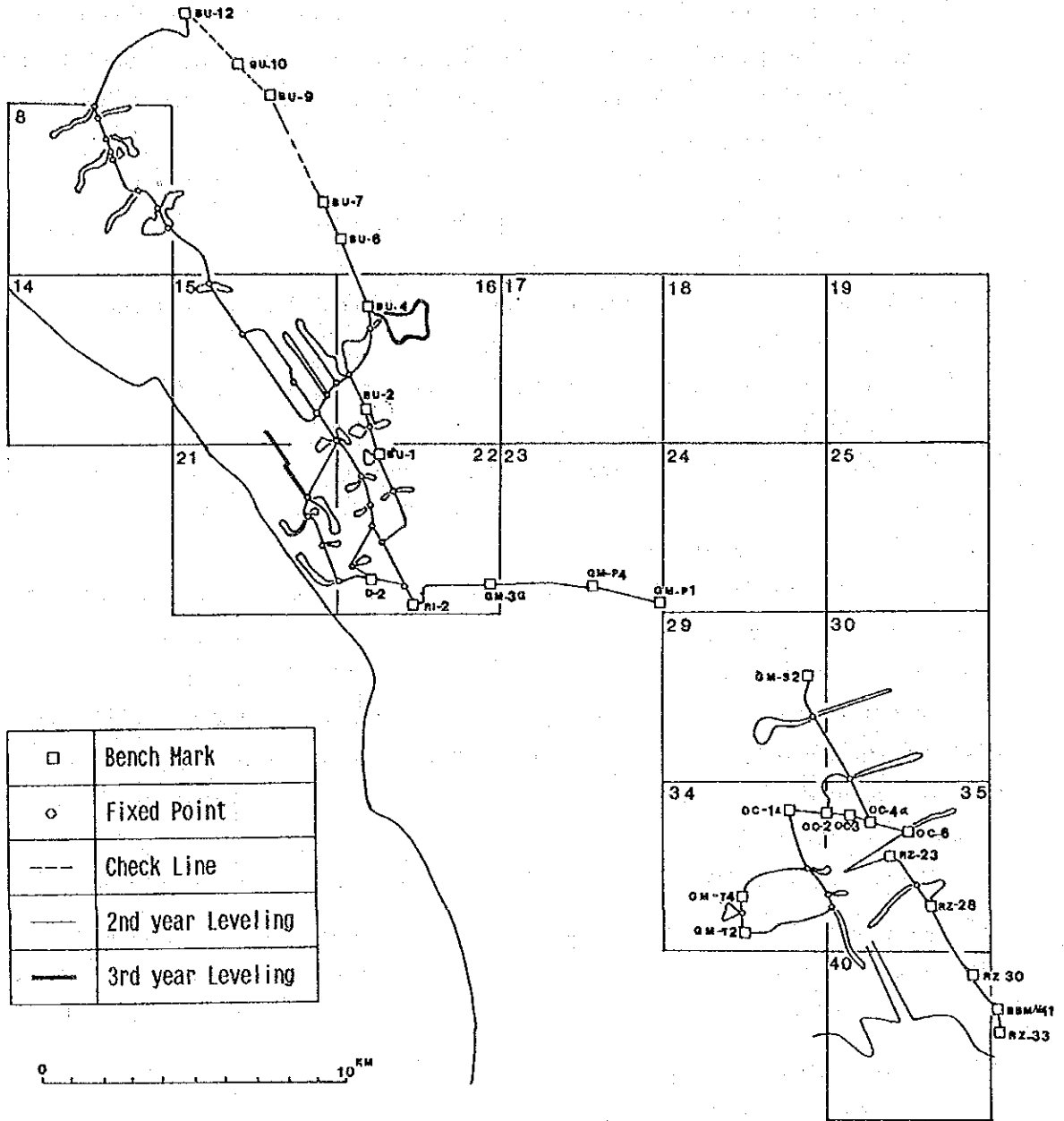


Fig. 9 Route Map of Minor Order Leveling

- 2) From the results of the resurvey, these points were considered indefinite to be used as the known points for starting and closure of the minor order leveling. Therefore, resurvey was further conducted on the route connecting RI-2, GM-3G, GM-P4 and GM-P1. As a result, 3 points (GM-P1, BU-7, BU-12) were employed as the known points for adjustment computation. (See Table 1 Comparison of Elevation of Leveling Points (the area north-east of Manila))

5-6-6 Field Completion (Organization and Facilities)

Data concerning organization and facilities for land condition map were divided as follows:

- 1) Data to be selected from the contoured map (1:10,000)
- 2) Data to be provided by BCGS

Government building, police station, hospital, church, school, dam, storage tank, etc., which can be selected from the contoured map were plotted on the compilation manuscripts.

Items to be provided by BCGS were water level gauge station, rain gauge station, earthquake observatory, river pumping station, restricted area, dumping area, etc.

The main roads, being considered important for refuge in disaster as well as for land development and conservation, were selected and compiled on the planimetric map (1:10,000) as a draft of Japanese side for discussion with BCGS.

In the field completion, emphasis was placed on the following work:

- (1) Confirmation of data provided by BCGS, and confirmation of organization and facilities as to existence and location by the way of visiting the government departments and authorities concerned.
- (2) Field confirmation of passability of the main roads which had been selected in Japan.

Table 1 Comparison of Elevation of Leveling Points
(Area north-east of Manila)

Points	Results of Minor Order Leveling			BCGS Results		① - ④	② - ③
	Dis- tance	Differ- ences	Adjusted Eleva- tion	Eleva- tion	Differ- ences		
		①	②	③	④		
GM-P1	km	m	43. ^m 988	43. ^m 988	m	m	±0. ^m 000
	1.9	-11.740			-11.710	-0.030	
GM-P4			32.228	32.278			-0.050
	3.2	-9.077			-8.855	-0.222	
GM-3G			23.118	23.423			-0.305
	3.1	-11.042			-10.416	-0.626	
RI-2			12.044	13.007			-0.963
	8.0	-4.967			-4.473	-0.494	
BU-1			6.958	8.534			-1.576
	1.4	-4.609			-5.035	-0.426	
BU-2			2.328	3.499			-1.171
	3.7	-0.019			-0.725	+0.706	
BU-4			2.214	2.774			-0.560
	3.0	+2.391			+1.936	+0.455	
BU-6			4.572	4.710			-0.138
	1.5	-1.535			-1.690	-0.155	
BU-7			3.020	3.020			±0.000
	2.8	+0.386			+0.373	+0.013	
BU-9				3.393			
	1.3	+0.390			+0.387	+0.003	
BU-10				3.780			
	2.8	-0.644			-0.566	+0.078	
BU-12			3.214	3.214			±0.000
RI-2			12.044	13.007			-0.963
	2.3	-11.556			-11.832	+0.276	
D-2			0.464	1.175			-0.711

5-6-7 Data Collection

Survey reports related to landform and geology in/around Manila, data on organization and facilities, etc. were collected in the field completion.

Among various data and information collected with regard to the landform and geology, a report on geologic hazards and preparedness system (volcanos, earthquakes, floods, etc.) is to be mentioned. As to the organization and facilities, list of deep wells and their locations, distribution map of dumping areas, etc. were collected.

5-6-8 Changes after Aerial Photography

Among the changes which was corrected in the land use map, housing development area, etc. which had been deformed from natural landform was classified to artificially deformed land in the land condition map.

5-6-9 Arrangements of Field Completion Results

As to the landform classification, correction on the aerial photographs used for photo-interpretation and the landform classification manuscripts was conducted based on results of the field completion. Collation of the aerial photographs with the manuscripts was also made so as not to make any omission.

As to organization and facilities, results of the field completion were plotted on the manuscript. These manuscripts and colored manuscripts were checked by and agreed with BCGS.

5-6-10 Indoor Work in Japan

The following work was carried out in Japan:

- (1) The landform classification manuscripts and the aerial photographs used for photo-interpretation were checked in consideration of conformity with the changes which was corrected in the land use map.
- (2) Also, regarding location and symbols, etc. of organization and facilities, final check was conducted.

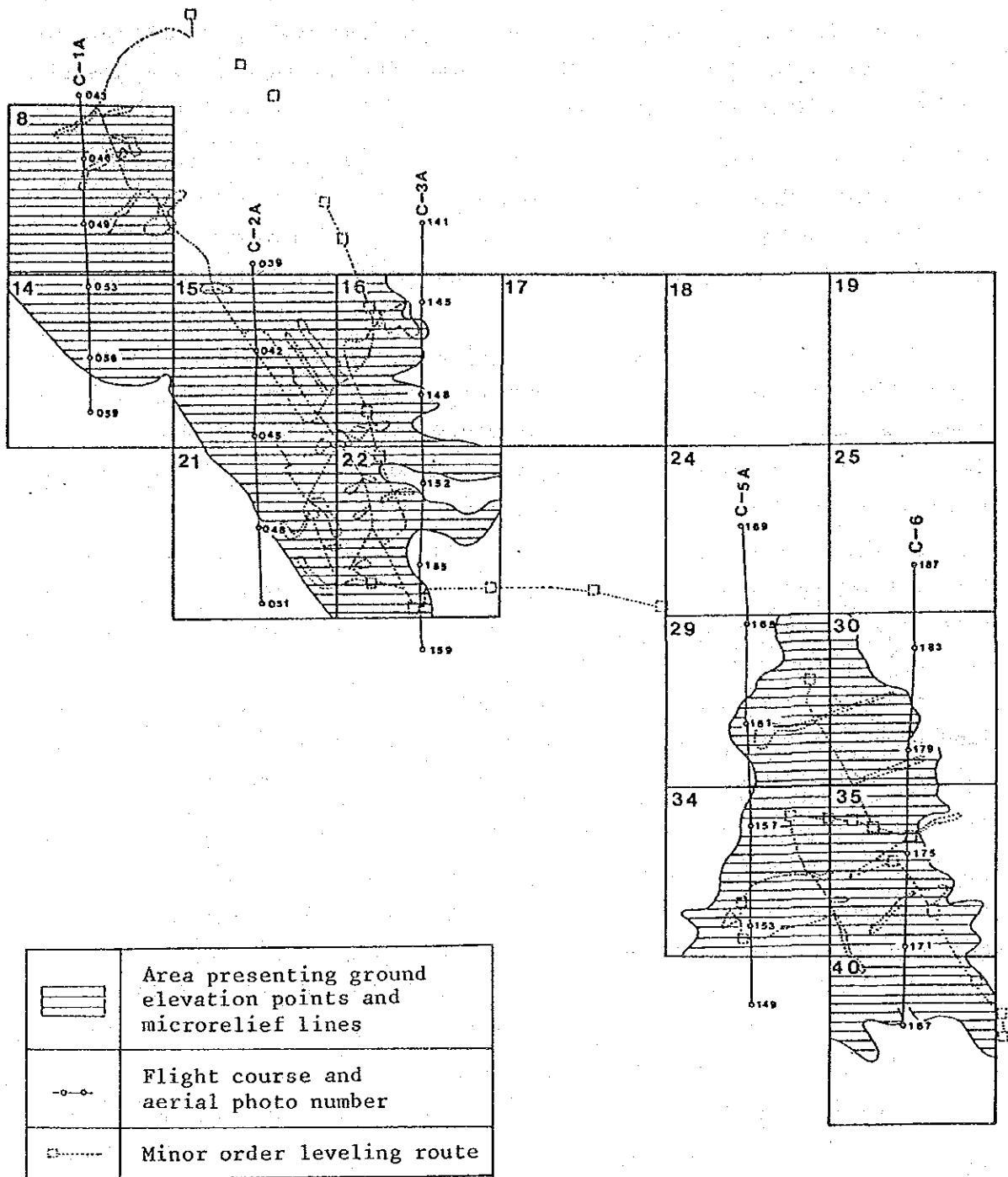


Fig. 10 Areas Presenting Ground Elevation Points and Microrelief Lines (Land Condition Map)

- (3) In low land areas, north-west and east of Manila, ground elevation points and microrelief lines (0 m and 1 m interval) were presented by reading in photo-interpretation and stereo plotting using the minor order leveling results and the aerial photographs used for the contoured mapping. (See Fig. 10 Areas presenting Ground Elevation Points and Microrelief Lines.)
- (4) The compilation manuscripts A were completed by compiling the landform classification manuscripts.

5-7 Technical Discussions with BCGS

Regarding symbols and specifications, classification, definition, application, minimum area for presentation, etc. of the land use and land condition maps had been generally agreed with BCGS through the 2nd year. In the field completion, then, the symbols and specifications were reconfirmed and finalized after partial revisions.

As to color tone, marginal information, symbols, etc. necessary for the drafting and printing to be conducted in the 4th year work, both sides discussed and agreed what was presented on the sample maps which had been prepared in Japan.

For effective usage of survey results and data collected during the land condition survey, it was requested by BCGS to analyze those results and data and incorporated the study results in a final report.

- (1) Concerning symbols and specifications for the land use map, the draft was previously prepared in Japan after some improvement on classification, definition, application, etc., which had been generally agreed with BCGS through the 2nd year.

The draft was presented to BCGS for discussion and finalized after partial revisions. The field completion was conducted based on this symbols and specifications.

- (2) As regards to symbols and specifications for the land condition map, definition and application of landform classification, organization and facilities, etc. had been drafted between both sides in the 2nd year. The draft was precisely studied in Japan and discussed further with BCGS in the field completion. The symbols and specifications were thus finalized and agreed between both sides.

- (3) As for printed maps, features to be presented, production method to be employed, color scheme, color tone, marginal information, etc. were discussed based on the sample map for printing which had been previously prepared in Japan.
Correction and modification made in relation with the contents of sample map were filled in on the sample map with signatures of both sides for confirmation.
- (4) Information and usage of the land use and land condition maps were drafted between both sides based on the preliminary manuscripts which had been prepared by the Japanese survey team.
BCGS requested to print the text on the back of each map sheet.
- (5) BCGS also requested to analyze survey results and data collected and incorporate the study results in the final report.

5-8 Cooperation of BCGS

- (1) During the field completion close cooperation was made in the following work:
 - 1) Assignment of qualified counterparts for the field completion.
 - 2) Data collection and field confirmation of data.
 - 3) Activities with good understanding of the symbols and specifications in the field survey which became necessary to carry out owing to partial revision of the land use map symbols and specifications.
 - 4) Check-up of the compilation manuscripts prepared by the Japanese side (JICA survey team paid particular attention to the opinions of Philippine side on detailed application and criteria of land use classification.)
 - 5) Technical meeting where active opinions of the Philippine side were presented on the formulation of map specifications for the land use and land condition mapping.
- (2) Prior to the commencement of field completion by the Japanese side, BCGS collected data on organization and facilities (bus terminal, government building, police station, fire station, church, school, etc.) to be presented on the land condition map, and conducted survey on the changes after aerial photography caused by the new establishment, removal, etc. of such organization and facilities.

5-9 Inspection

After the field completion, in-house check was carried out for the compilation manuscripts, and then those manuscripts were inspected by the Survey Technique Center of Japanese Association of Surveyors, which is an authorized public organization for inspection of survey results and equipment.

6. Reivew of Third Year Work

- (1) Since the field work for this project was to be completed in the 3rd year, both sides made technical discussions to finalize the map specifications, color tone, etc. so as not to leave any pending matters.
- (2) Since the land use map is to be made at the scale of 1:10,000, it is important to present the usage of individual buildings. For the mixed area (three- or more storey buildings), a 3-dimensional land use field survey was necessary due to the fact that the land use in the built-up area was unable to classify by means of photo-interpretation.
- (3) The landform classification of the land condition map was prepared in due consideration of the characteristics of landform in Metro Manila Region. Moreover, the selection of organization and facilities was made with emphasis placed on the regional characteristics and the disaster prevention measures for floods, etc. Therefore, the classification criteria cannot be commonly applied to the whole area of the Philippines.
- (4) The cooperation of BCGS at the time of field completion was excellent despite of the busiest period in the midst of reorganization. BCGS was reorganized to NAMRIA (National Mapping and Resource Information Authority) of the Department of Environment and Natural Resources from the Department of National Defence. However, as far as the present mapping project is concerned, BCGS will be functioning as the primary counterpart same as before.
- (5) The Philippine side, having great expectations for the land use and land condition maps, requested the preparation of the information and usage of land use and land condition maps.
- (6) The contoured and planimetric maps completed in the 2nd year have been on sale after the turnover to the Philippine Government, and utilized not only by the governmental and research organizations but also in many other fields.

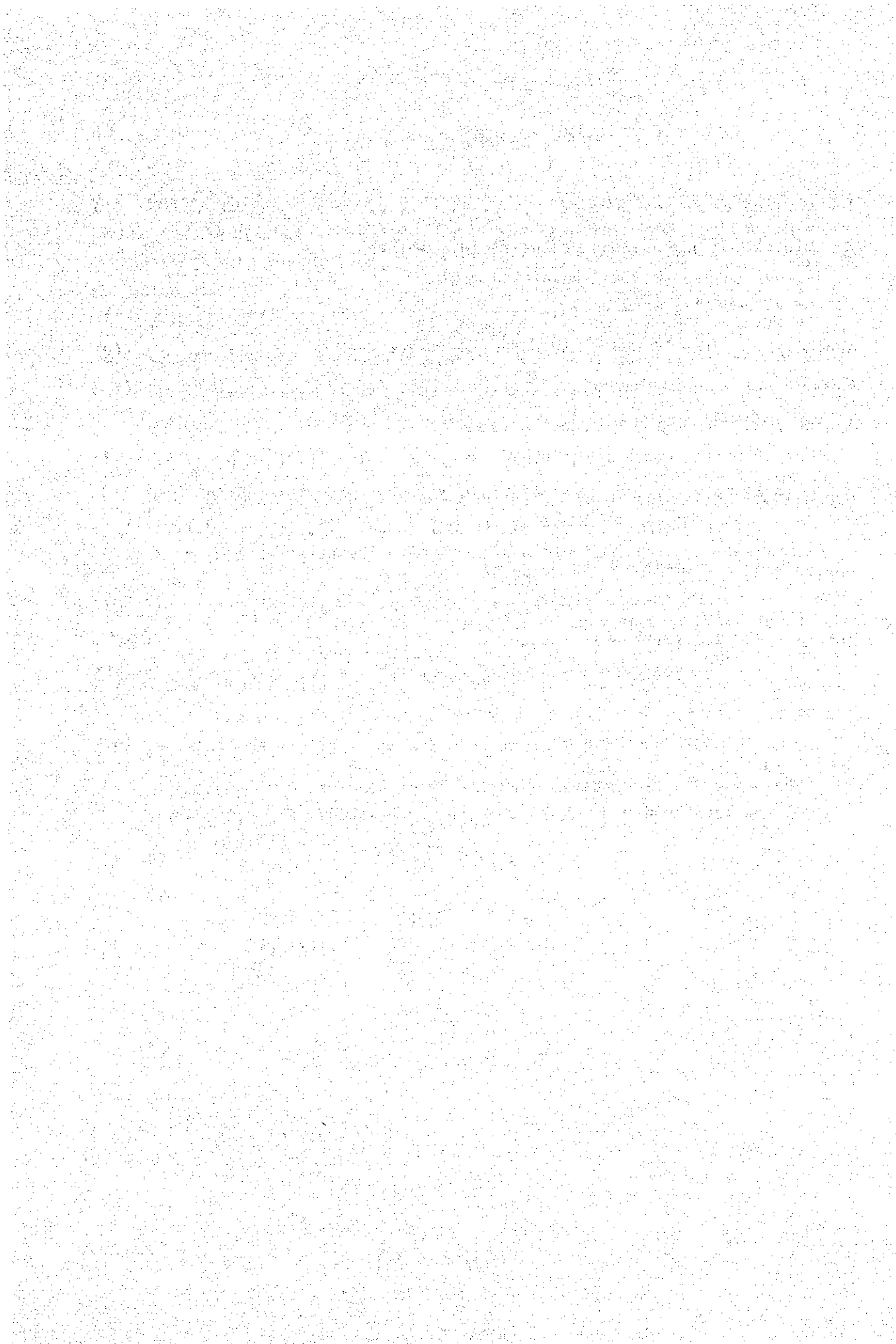
7. Views on Fourth Year Work

The 4th year work is the last phase in this project and is not field work. In the 4th year, the drafting and printing work for the land use and land condition maps and the preparation of final report are expected to be conducted.

- (1) In the field completion for the land use and land condition maps, specifications including symbols and specifications, color tone, marginal information, etc. were discussed in detail and finalized between both sides. The drafting and printing work is to be conducted in accordance with those specifications.
- (2) The information and usage of the land use and land condition maps were discussed and drafted between both sides. It is therefore considered necessary to finalize them with responsible personnel of BCGS counterparts.
- (3) At the time of proof printing of the land use and land condition maps, it is also considered necessary to have final check and approval for printing by responsible personnel of BCGS counterparts with respect to the color tone, marginal information as well as the information and usage to be printed on the back of each map sheet.
- (4) Furthermore, it is considered necessary to analyze survey results and data collected in the land condition mapping and to incorporate such study results in the final report.

APPENDICES

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1. Outline of Survey Schedule

Field Completion (Land Use Map and Land Condition Map)

October 5, -- December, 1987

<u>Date</u>	<u>Description</u>
October	
5 Mon	Arrival of Deputy Leader Kaminishi and 3 other members in Manila; Courtesy call on JICA office and Japanese Embassy
6 Tue	Courtesy call on BCGS; Preparatory work for the field completion
7 Wed	Technical meeting at BCGS (Land use map)
8 Thu	Technical meeting at BCGS; Arrival of Kamakura and 6 other members in Manila; Courtesy call on JICA office
9 Fri	Technical meeting at BCGS (Land use map); Preparatory work
10 Sat	Field reconnaissance; Preparatory work
11 Sun	Team's meeting
12 Mon	Technical meeting (Land use map) at BCGS; Field completion
13 Tue	Technical meeting (Land use map) at BCGS; Field completion
14 Wed	Technical meeting (Land use map) at BCGS; Field completion
15 Thu	Technical meeting (Land use map, Land condition map); Field Completion
16 Fri	Arrival of JICA technical advisor; Technical meeting (Land use map) at BCGS; Field completion
17 Sat	Technical meeting (Land use map, Land condition map); Field completion
18 Sun	Data arrangement and Team's meeting
19 Mon	Technical meeting at BCGS; Field completion; Field check (Land use map)
20 Tue	Field completion; Field check (Land condition map)
21 Wed	Technical meeting at BCGS; Field completion; Field check (Land condition map)
22 Thu	Turnover of the contoured map and planimetric map at DENR; Field completion
23 Fri	Departure of JICA technical advisor from Manila; Field completion
24 Sat	Field completion; Data evaluation
25 Sun	Data arrangement and Team's meeting

26 Mon Technical meeting (Land condition map) at BCGS; Field completion
 27 Tue Field completion; Field check
 28 Wed Technical meeting (Land condition map) at BCGS; Field completion
 29 Thu Technical meeting (Land condition map) at BCGS; Field completion
 30 Fri Field completion; Data collection (Land condition map)
 31 Sat Data arrangement

November

1 Sun Team's meeting
 2 Mon Field completion; Technical meeting (Land condition map) at BCGS
 3 Tue Technical meeting (Land condition map) at BCGS; Field completion;
 Data collection
 4 Wed Technical meeting; Field completion; Data collection (Land
 condition map)
 5 Thu Checkup on indoor work; Field completion; Data collection (Land
 condition map)
 6 Fri Field check; Field completion; Data collection (Land condition
 map)
 7 Sat Data evaluation
 8 Sun Team's meeting
 9 Mon Technical meeting at BCGS; Field completion; Data collection
 (Land condition map)
 10 Tue Technical meeting at BCGS; Field completion; Data collection
 (Land condition map)
 11 Wed Field check; Field completion; Data collection
 12 Thu Checkup on indoor work; Field completion; Data collection and
 field confirmation
 13 Fri Field completion; Data collection (Land condition map)
 14 Sat Data evaluation
 15 Sun Team's meeting
 16 Mon Data evaluation
 17 Tue Checkup on indoor work (Land use map); Data collection; Data
 evaluation
 18 Wed Technical meeting at BCGS; Data collection and field
 confirmation; Data evaluation
 19 Thu Data evaluation; Data collection; Checkup on indoor work

- 20 Fri Field completion (Minor order leveling); Data collection; Checkup on indoor work
- 21 Sat Data evaluation; Checkup on survey instruments
- 22 Sun Team's meeting
- 23 Mon Checkup on indoor work; Field completion; Data collection
- 24 Tue Reporting to BCGS; Data collection and field confirmation; Packing of survey instruments
- 25 Wed Arrival of Team Leader Takasaki and Member Nakano; Courtesy call on JICA office and Japanese Embassy; Departure of Moriiwa and 4 other members from Manila
- 26 Thu Courtesy call on NAMRIA (National Mapping and Resource Information Authority); Team's meeting; Arrangement of materials for technical meeting
- 27 Fri Technical meeting at BCGS; Data evaluation
- 28 Sat Arrangement of materials for technical meeting
- 29 Sun Team's meeting
- 30 Mon Technical meeting at BCGS; Arrival of technical advisor and JICA staff; Team's meeting

December

- 1 Tue Team's meeting; Technical meeting at BCGS
- 2 Wed Arrangement for Minutes of Discussion; Field reconnaissance
- 3 Thu Signing on the Minutes; Reporting to JICA office and Japanese Embassy
- 4 Fri Departure from Manila (Team Leader Takasaki and 7 other members)

2. Minutes of Discussions at the field completion
(Land use map and land condition map) on December 3, 1987


MINUTES OF DISCUSSIONS
ON
THE ESTABLISHMENT OF GRAPHIC INFORMATION BASE PROJECT
FOR THE NATIONAL CAPITAL REGION
BETWEEN
THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE BUREAU OF COAST AND GEODETIC SURVEY

Date: December 3rd 1987
in Manila, Philippines

FOR THE BUREAU OF COAST
AND GEODETIC SURVEY

FOR THE JAPAN INTERNATIONAL
COOPERATION AGENCY


Commodore ANANIAS A. BATILAPAN, Jr.
Director of BCGS


Mr. MASAYOSHI TAKASAKI
Leader of JICA Survey Team

The field completion for land use and land condition mapping of the 3rd year work has been successfully carried out jointly by the survey teams of JICA and BCGS since early October 1987 for about 2 months in Metro Manila area.

Upon completion of the field work, Mr. Masayoshi Takasaki, JICA survey team leader, mentioned that this was the final field work for the whole period of this mapping project and expressed his sincere gratitude to BCGS for its close cooperation given to JICA survey team.

In a series of meetings held between JICA and BCGS, both sides discussed about the results of field completion, the symbols and specifications as well as the color scheme presented on the sample maps. Discussions were further made on the drafting, printing of land use and land condition maps and other related work to be implemented in the succeeding 4th year, and were confirmed by both sides as follows:

I. Outline of Field Completion

1-1 Compilation

Prior to the field completion, the compilation work was carried out in Japan based on the results of field identification obtained in the 1st and 2nd year work. The coverage of compilation work was as follows:

Land use map: 823 km² (33 sheets)
Land condition map: 429 km² (16 sheets)

Based on the results of the compilation, colored sample maps of the land use and land condition were prepared.

1-2 Field Completion

The following field work was completed in cooperation with BCGS: (see Appendix-1)

By JICA Survey Team

(1) Field completion covering:

Land use map: 823 km² (33 sheets)
Land condition map: 429 km² (16 sheets)

- (2) Collection of existing data for land condition map
- (3) Verification for land use classification
- (4) Confirmation of items related to drafting and printing in relation with the sample map

By BCGS

- (1) Field confirmation of organizations and facilities to be presented on the land condition map (429 km², 16 sheets)
- (2) Assisted in data collection and verification

M
G ef

II. Technical Discussions

A. Specifications and other items related to the land use and land condition maps were discussed and agreed as follows:

- 2-1 For symbols and specifications of land use map (1:10,000) and land condition map (1:10,000), both sides discussed and agreed on some changes, and finalized as attached in the Appendices. (see Appendix-2, -3 and -4)
- 2-2 As to color scheme and marginal information, JICA survey team and BCGS discussed and agreed what was presented on the sample maps.

B. To attain better and effective usage of the land use and land condition maps, BCGS requested JICA survey team the following considerations:

- 2-3 Information and usage of the land use and land condition maps were drafted by both sides as attached in the Appendices. (see Appendix-5 and -6)

As to the above information and usage, BCGS requested JICA survey team to print the text on the back of each map sheet for the convenience of map user.

- 2-4 Regarding land condition survey, BCGS requested JICA survey team to analyze survey results and data collected during the survey period (see Appendix-7), and to incorporate such study results in a final report to be prepared in the 4th year (F.Y.1988) preferably with the following contents:

- (1) Outline of survey
- (2) Results of survey (topography, surface geology, landform, etc.)
- (3) Analysis of the collected data (flood, earthquake, etc.)
- (4) Comments for land development and conservation, disaster prevention, etc.

This request was made with the end in view that such comments would be very effective for setting up guidelines that are urgently needed for land development and conservation as well as disaster prevention and control in Metro Manila area.

- 2-5 For the above items 2-3 and 2-4, JICA survey team agreed to convey the requests to JICA, Tokyo for its consideration.

III. Outline of the 4th Year Work (Tentative)

Both sides agreed that drafting and printing of the 4th year work shall be carried out according to the following schedule:

Tentative Schedule

Item of Work	1988												1989		
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar			
Drafting(Scribing)															
Proof Printing															
Printing															

At the end of the 4th year, printing of the land use map and land condition map shall be completed as follows:

- Land use map: 33 sheets x 1,000 copies each
- Land condition map: 16 sheets x 1,000 copies each

IV. BCGS Training in Japan

With regard to the BCGS counterparts for the 4th year work to be carried out in Japan, BCGS proposed the following training schedule of 4 counterparts for attaining the most effective technological transfer:

<u>Training Course</u>	<u>No. of Counterpart</u>	<u>Tentative Schedule</u>
Land use map (Drafting)	1	mid-May - end of August '88
Land condition map (Drafting)	1	- do -
Land use map (Printing)	1	early October - end of December '88
Land condition map (Printing)	1	- do -

BCGS further proposed that one of the BCGS counterparts for each training course should be a personnel responsible for verification and review by BCGS.

JICA survey team, in response to the BCGS proposals, agreed to convey the above requirements and schedule to JICA, Tokyo.

M.
(G) f

List of Attendants

BUREAU OF COAST AND
GEODETIC SURVEY

1. Captain Renato B. Feir
Staff Officer for Planning/
Staff Officer for External
Affairs
2. Mr. Ponciano C. Ciceron
Chief, Coastal Mapping and
Special Projects Division
3. Mr. Gavino C. Angeles, Jr.
Chief, Chart and Map
Production Division
4. Lcdr. Rodolfo A. Agaton
Assistant Chief, Survey
Support Division
5. Mr. Pastor A. Estrada
Supervising Cartographic
Engineer

JICA SURVEY COMMITTEE

1. Mr. Masatoshi Nagaoka
Technical Advisor
2. Mr. Koji Mori
Advisor

JICA PHILIPPINE OFFICE

1. Mr. Tsutomu Moriya
Staff

JICA SURVEY TEAM

1. Mr. Masayoshi Takasaki
Leader
2. Mr. Tokihiko Kaminishi
Deputy Leader
3. Mr. Hiroshi Kimura
Coordinator
4. Mr. Keikichi Yoshida
Chief Surveyor
5. Mr. Tomotaka Kamakura
Surveyor
6. Mr. Toshiyuki Harada
Surveyor

Plan of Operation

of the 3rd Year Work for the Establishment of Graphic Information Base Project of National Capital Region, the Philippines

1. Outline of the 3rd Year Work

In the 3rd year work, compilation for the land use map and land condition map has already started from July 1987 in Japan, and field completion for both maps is expected to be carried out in the project area from early October for about two months.

Based on results of the field completion, original manuscripts of the land use and land condition maps shall be prepared in Japan.

The 3rd year work is summarized as follows: (see Fig.-1)

Kind of Map	Item of Work	Coverage
Land Use Map	<ul style="list-style-type: none"> •Compilation •Field Completion •Preparation of Original Manuscript 	823 sq km(33 sheets)
Land Condition Map	<ul style="list-style-type: none"> •Compilation •Field Completion •Preparation of Original Manuscript 	429 sq km(16 sheets)

2. Compilation

2-1 Outline

Based on the result of field identification obtained at the 1st and 2nd year work, the compilation shall be done in Japan.

2-2 Base Map

As for the base map to be used for the compilation, information of the 1/10,000 topographic map shall be reproduced on the polyester sheet.

2-3 Land Use Map

Survey result and related information obtained in the 1st year field identification shall be compiled on the base map in accordance with specifications.

2-4 Land Condition Map

Survey result and related information obtained in the 2nd year field identification shall be compiled on the base map in accordance with specifications.

3. Field Completion

3-1 Outline

(1) Land Use Map

Items which have been uncertain during the course of compilation shall be checked and confirmed.

Changes given on the original specifications, which were discussed and agreed between JICA and BCGS at the 2nd year work, shall be checked and confirmed.

(2) Land Condition Map

Items which have been uncertain during the course of compilation shall be confirmed.

Data on the organization and public facilities to be prepared by BCGS shall be checked and confirmed.

3-2 Work Schedule

Item of Work	1987						1988		
	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Technical Meeting				-----	-----				
Field Completion				-----	-----				
Finalization of Symbol Specifications				-----	-----				
Compilation		-----	-----			-----	-----	-----	

3-3 Formation of Survey Team

(1) Formation of JICA Team

Name & Assignment		Oct	Nov	Dec '87
(Headquarters)				
Masayoshi TAKASAKI	Leader	5	25	4
Tokihiko KAMINISHI	Deputy Leader	-----	-----	-----
Hiroshi KIMURA	Coordinator	-----	-----	-----
(Field Completion)				
Keikichi YOSHIDA	Chief Surveyor	-----	-----	-----
Tomotaka KAMAKURA	Surveyor	6	-----	-----
Toshiyuki HARADA	"	-----	25	-----
Tsutomu MORIWA	"	-----	-----	-----
Masumi IKUNO	"	-----	-----	-----
Masataka MIYAZAKI	"	-----	-----	-----
Takeshi TOYOOKA	"	8	-----	-----
Shingo NIIJIMA	"	-----	-----	-----
Naoya YUNOHARA	"	-----	-----	-----
(Specs. on Printing)				
Tomoyuki NAKANO	Cartographer		25	4

(2) Group Formation of JICA and BCGS

Item of Work	JICA	BCGS	Period
Technical Discussion & Data Confirmation	Headquarters 3	Staff 3	Oct.6 - Dec.3 '87
Field Completion	Chief Surveyor 1 Surveyors 8	Counterparts 8	Oct.9 - Nov.24 '87
Specs. on Printing	Cartographer 1	Staff 3	Nov.27 - Dec.3 '87

3-4 Data and Specifications to be confirmed during the Field Completion

(1) Data to be prepared by BCGS

- a) Field identification sheets (/10,000 topographic map) on which names and places of organizations & public facilities are plotted: to be prepared by early Oct. '87
- b) Other data: by early Nov. '87

(2) Data to be prepared by JICA Team

- a) Land use map
Sample map printed in color ink (including marginal information): to be signed by BCGS for confirmation.
- b) Land condition map
Sample map printed in color ink (including marginal information) and annotation data sheet: to be signed by BCGS for confirmation.

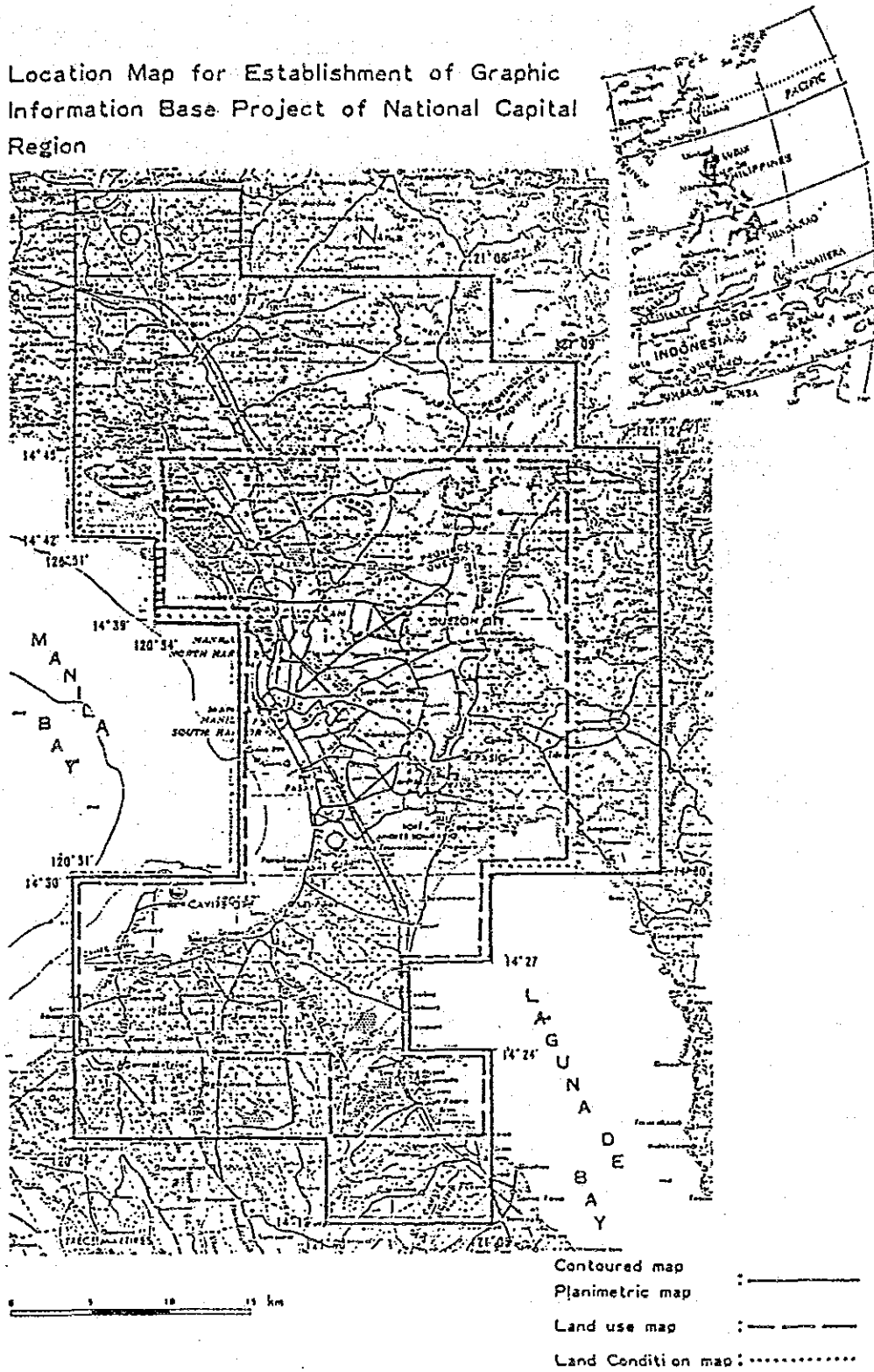
(3) Specifications to be finalized by the end of the field completion

- a) Specifications for drafting and printing on the land use map.
- b) Specifications for drafting and printing on the land condition map.

4. Undertakings by BCGS

- (1) To assign eight (8) counterparts:
 - 6 counterparts for the field completion
 - 2 counterparts for the security
- (2) To prepare necessary data for this survey including data afore-mentioned in the paragraph 3-4.

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

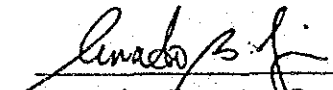


Memorandum on
"Establishment of Graphic Information Base Project
of the National Capital Region",
the Republic of the Philippines

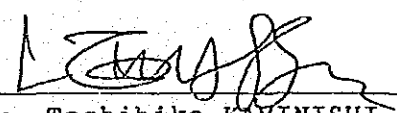
As a result of discussions made during the field completion, JICA survey team and BCGS jointly agreed on the following matters:

1. For symbols and specifications for land use and land condition maps, new addition, partial revision and deletion were made for proper classification as attached sheet.
2. Organizations and facilities which are necessary for the expression of land condition map and can not be identified on the new aerial photographs(1986), shall be presented with symbol only at its approximate position.
3. New information expressed on the land condition map shall also be presented on the land use map, if necessary.

November 18, 1987



Captain Renato B. FEIR
Staff Officer for Planning/
Staff Officer for External
Affairs, BCGS



Mr. Toshihiko KAMINISHI
Deputy Leader
JICA Survey Team

New Addition, Partial Revision and Deletion
of Symbols and Specifications of Land Use
and Land Condition Maps

1. Land Use Map

1-1 Addition of "Mixed Business-Residential" to Category III

1-2 Revision of Classification Name

Category No.	Former	New
I	Urban Area	Built-Up Area
II	Public and Official	Public and Government
III	Plantation	Plantation and Farm Land

1-3 Revision of Application

Application	Former	New
Slaughter house	Transportation	Service
TV/Radio/Telephone Station	Business	"
Newspaper establishment	"	"
Auto repair shop	Commercial	delete
Research laboratory	Education and Cultural	delete

1-4 Revision of Feature Name

Former	New
Sugar factory	Sugar mill

1-5 Deletion from Classification

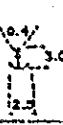
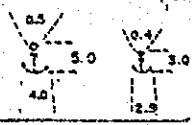
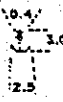
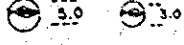
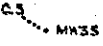

Name	Former Classification	to be placed at
Land Use Boundary	Others	Margin without No.

2. Land Condition Map

2-1 Revision of Classification Name

Former	New
Hill and Upland	Hill and Plateau
Ground Contour Line	Microrelief Line
Depth Curve	Bathymetric Line
Landform Unit Boundary	Landform Boundary
Church/Mission	Church
Breakwater/Jetty	Breakwater, Jetty and Causeway
Restricted Area for Urban Development	Restricted Area

2-2 Revision of Symbols

Classification	Former	New
Port and Harbor		
Fishing Port		
Water Treatment Plant		

Appendix-3: Symbols and specifications for land use map (1:10,000)







Appendix - 3

THE ESTABLISHMENT OF
GRAPHIC INFORMATION BASE PROJECT
FOR THE NATIONAL CAPITAL REGION







SYMBOLS AND SPECIFICATIONS FOR
LAND USE MAP (1:10,000)

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	MINIMUM AREA ON THE MAP
Multi-Storey Housing		D1330-45° 60% Red	Four(4) or more storey housing area in a compound	Condominium, etc.	3x3
Residential		D1330-45° 10% Red	One(1) to three(3) storey housing area	Residential area including rest house for group of various organizations, lodging for public servant, subdivision and village in suburb, that have existing road system but have sparse houses.	3x3 (2X2)
Temporal Housing		D1330-45° 10% Red --- L7207-42.5mins-45° Black	Congested area where one(1) storey temporal housing mainly exist.	Temporal housing fixed on water or along creek and river, and that in slum or squatter area	3x3
Business		100% Orange	Area where enterprise conducts their trade and office work.	Office of private company, bank, hotel, etc.	3x3
Commercial		50°-0' +90° 50% Orange	Area which is considered as a general shopping district including those for shop, store and repair.	Retail store, restaurant, wholesale store, department store, market, auto sales shop, etc.	3x3 (1.5)
Mixed Commercial-Residential		D1330-45° 10% Red --- 75°-90° 25% Red	Three(3) or more storey building which has mixed commercial and residential functions.	Store and residential, market and residential, etc.	3x3 (1.5)
Mixed Business-Commercial		D1330-45° 30% Orange --- 50°-0' 25% Red	Three(3) or more storey building which has mixed business and commercial functions.	Bank and retail store, office and restaurant, etc.	3x3 (1.5)
Mixed Business-Residential		D1330-45° 10% Red --- 50°-90° 25% Orange	Three(3) or more storey building which has mixed business and residential functions.	Bank and residential, office and residential, etc.	3x3 (1.5)








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CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	MINIMUM AREA ON THE MAP
9 Large-Scale Industry		D1330-45° 40% Red 500-0° 50% Blue	Area where large scale industry mainly exists.	Such industry occupies an area of at least 5mm x 5mm on the map. The area includes its own office, parking lot, sport ground, etc. Manufacturing industry like textile industry, chemical industry, shipyard, bottling company, quarry with classifying facilities, etc.	5X5
10 Small-Scale Industry		D1330-45° 40% Red D1330-75° 40% Blue	Area where small factory mainly exists.	Such industry occupies an area of less than 5mm x 5mm on the map. Cinema studio, furniture factory, auto repair shop, etc. (Factories related to agriculture are included in "Agro-Industrial".)	3X3
11 Mixed Industrial-Residential		D1330-45° 20% Red 500-0° 25% Blue	Three (3) or more storey buildings with mixed industrial and residential usage.	Various small scale factories and residential	3X3 (1.5)
12 Governmental and Quasi-Public		D1330-45° 70% Brown	Area where buildings of National, Regional, Local Government organization or corporation, etc. mainly exist for carrying on their business.	National or public building, police station, fire station, embassy or legation, consulate, trade and cooperative union building, quasi-public building, prison, etc.	3X3
13 Education and Cultural		D1330-0° 20% Orange D1330-45° 40% Yellow	Area where educational, research and cultural facilities mainly exist.	School, public hall, library, exhibition hall, museum, research institute, astronomical observatory, historical building, etc.	3X3
14 Health and Welfare		750-0° 25% Green	Area where health and welfare facilities mainly exist.	Hospital, sanitarium, medical health center, large clinics, rehabilitation center, etc.	3X3








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NO.	CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	MINIMUM AREA OR TIME PERCENTAGE
15	Park and Recreational		D133 0-45° 20% Yellow 120 0-30° 30% Green	Area where public and recreational facilities mainly exist.	Park, garden, zoological and botanical garden, picnic ground, theater, cinema, cockpit, casino, horse racing track, resort and beach, etc.	3X3
16	Religious and Cemetery		D133 0-45° 70% Green	Area where religious facilities and cemetery exist.	Church, temple, mosque, memorial park, cemetery, seminary, monastery, photo-identifiable grotto, etc.	3X3
17	Transportation		120 0-0° 25% Brown	Area where transportation and bulk fuel facilities exist.	Railway station and terminal including car shed, marshalling yard; airport, bus terminal, parking lot, pier, port facilities, fuel oil terminal; cargo shed of the above facilities, etc.	3X3
18	Service		D133 0-45° 20% Orange D133 0-0° 20% Brown	Area where supply, treatment and communication facilities exist.	Power station and substation, water treatment and filtering plant, sewerage, crematory, dumping area, LPG terminal, slaughter house, TV/radio/telephone station, newspaper establishment, etc.	3X3
19	Sports and Athletics		D133 0-45° 20% Yellow D133 0-0° 20% Brown	Area where sports facilities exist.	Sport plaza, stadium, shooting range, gymnasium, golf course, tennis and basketball court, bowling hall, billiard hall, etc.	3X3
20	Military		D133 0-45° 10% Orange D133 0-0° 20% Blue	Area where military facilities exist.	Military camp, depot and establishment	5X5

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CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	MINIMUM AREA OR TIME AMP
21 Rice Field		D1330-45° 20% Yellow	Area where irrigated paddies exist.	Rice paddy	5X5
22 Crop Land		D1330-45° 10% Brown D1330-45° 20% Yellow	Area where crops are cultivated.	Corn, upland rice, vegetables, etc.	5X5
23 Plantation and Farm Land		D1330-45° 10% Orange	Area where plantation and farm land exist.	Panana, coconut, mango, sugar cane, pineapple, calamansi and other fruit bearing trees	5X5
24 Agro-Industrial		D1330-45° 20% Yellow 500-0° 25% Red	Area where agriculture-related industrial facilities exist.	Rice mill, warehouse for agricultural products, tractor shed, food processing factory, sugar mill, animal food factory, stock house, etc.	5X5
25 Forest		D1330-45° 20% Yellow D1330-0° 20% Blue	Area covered by trees.	Broadleaf, bushes or scrub, mixed scrub and broadleaf, bamboo, etc.	5X5
26 Grass Land		D1330-45° 40% Yellow D1330-0° 20% Green	Area covered by grass.	pasture, ranch and other area where tropical grass densely grows	5X5
27 Bare Land		D1330-45° 10% Brown	Area where little or no vegetation grow.	Rock-outcropped area, barren area and steep slope such as cliff, etc. Sand and/or gravel and coastal area.	5X5

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CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	MINIMUM AREA ON THE MAP
28	Water Surface 	D1330-45° 20% Blue	Natural bodies of water.	Sea, lake, river, creek or stream, bay, tidal flat and mud	5X5 (2X2)
29	Marine Pond 	D1330-45° 10% Blue	Artificial facilities for raising fishes, shells, etc.	Fish pond, culturing pond or shelf for raising crab, oyster, shell, etc.	5X5
30	Water Related Vegetation 	D1330-45° 20% Blue Vegetation: Black	Vegetation that grows on spongy ground or shallow water.	Hangrove, nipa, marsh or swamp, etc.	5X5
	Salt Bed 	D1330-45° 10% Blue --- Blue	Field where salt is collected.		5X5
32	Open Space 	D1330-45° 10% Black	Area where land is not utilized.	Cut, rolled and reclaimed land not yet utilized including abandoned mine or quarry.	2X2
	Under Construction 	D1330-45° 10% Black	Area where artificial land development is in progress.		
33	Land Use Boundary 	Red	Boundary line of land use classification.	Land use boundary shall be shown in solid line. Indistinct land use boundary shall be shown in broken line.	
Others					
Boundary Line					









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Appendix-4: Symbols and specifications for land condition map (1:10,000)









Appendix - 4

THE ESTABLISHMENT OF
GRAPHIC INFORMATION BASE PROJECT
FOR THE NATIONAL CAPITAL REGION








SYMBOLS AND SPECIFICATIONS FOR
LAND CONDITION MAP (1:10:000)

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	SCALE AREA IN SQ. FT.
1 Top Flat and Ridge Flat		D1330-45° 30% Brown	Relatively flat surface at the top and ridge of mountain.	Flat surface on the top and ridge of mountain whose gradient is less than about 20°.	1X4
2 Gentle Slope		D1330-45° 60% Brown	Relatively gentle slope at mountain-side.	Gradient is less than about 20°.	1X4
3 Steep Slope		D1330-45° 30% Brown 75% 0° 25% Violet	Relatively steep slope at mountain-side.	Gradient is more than about 20°.	1X4
4 Knick Line		Green	The line passing points on the slope of mountain-side which divide upper gentle slope and lower steep slope.	Delineation shall be made by photo-interpretation and by analysis of contour line.	5
5 Talus		100% Yellow 20% 20% Orange	Relatively steep depositional surface formed at lower part of mountain-slope by rain wash or land slide and consisted of bigger grains of debris.	Gradient is more than about 10°.	2X5
6 Colluvial Slope		100% Yellow 20% 20% Green	Depositional landform with relatively gentle slope, formed by debris and weathered material transported and sedimented by effects of rain wash and soil creep.	Gradient is less than about 10°.	2X5
7 Small Alluvial Fan		100% Yellow 20% 20% Brown	Small depositional landform with relatively gentle slope, expanding from all points before exit of valley to lowland and being formed by small rivers whose transporting force is diminishing.	Gradient is less than about 15° around the exit of valley.	2X5
8 Top Flat		D1330-45° 30% Orange	Relatively flat surface at the top of little undulated hill and plateau.	Gradient is less than about 5°.	2X5











CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	NUMBER PLAN SCALE
9		D130-45° 60% Orange	Relatively gentle surface at the slope of little undulated hill and plateau.	Gradient is less than about 5°	2X5
10		D130-45° 30% Orange 250-45° 20% Brown	General slope not classified in the afore-mentioned top flat or gentle slope.	Gradient is between about 5° and 20°	2X5
11		D130-45° 30% Orange 250-45° +115° 20% Brown	Relatively steep slope surface at hill and plateau.	Gradient is more than about 20°	2X5
12		D130-45° 10% Orange 500-0° 25% Green	Flat surface located along river tributaries, where bed rock is partially covered by shallow fluvial deposit.		1X10
13		250-0° 30% Orange	A group of terraces lying along river but at higher elevation, which exist from mountain to lowland.		2X5
14		500-90° 25% Orange	A group of terraces lying lower than the above.		2X5
15		500-90° 25% Green	Shallow depression on the surface of terrace.	Elevation of about 0.5 to 1.0m lower than the general surface.	1X10
16		200-45° 5% Brown 1200-0° 40% Yellow	Relatively gentle and flat surface covering wide area at the section before or on the exit of valley expanding to lowland. This was formed by river whose transporting force is diminishing. (including natural levee)	Gradient is less than 15° at the exit of valley.	2X5









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CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	DIMENSION AREA IN SQ. FT.
17 Former River Bed		95°-0° 25% Blue	Former stream or river channel.	Surface is degraded about 0.5m to 1.0m below the general surface.	1X10
18 General Surface of Flood Plain and Valley Plain		D133°-45° 20% Yellow-Green	Widely extended, general surface resulting with dissecting mountain, hill and plateau and that of flood plain formed by alluviation of river.		2X5
19 Former River Bed		95°-0° 25% Blue	Former stream or river channel, which is located in the flood plain.		1X10
20 Natural Levee		D133°-45° 30% Yellow	Strip microrelief located along or around the river which is composed of sand and silt deposit made during floods.		1X10
21 Backmarsh		50°-0° +90° 20% Green	Low land relatively free from alluviation of rivers and poorly drained, because of being located behind natural levee.		2X5
22 Swamp and Marsh		LT 700 D133°-45° 10% Green	Spongy ground which is always wet and stores water during flood time.		2X5
23 Dry River Bed		30°-0° 10% Brown	River bed which is located close to water channel and inundated only during rainy season.	No vegetation and composed of outcropped rock or sand and gravel.	2X5






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CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	UNIT MEASUREMENT IN MAP
24 General Surface of Coastal Plain and Delta		D130-45° 10% Blue ----- 300-0° 10% Green	Former depositional surface in the shallow water where present flat plain was formed after regression of sea water. General surface of flat land formed in the mouth of river and consists of unconsolidated silt and clay transported by river.	2x5	MS
25 Former River Bed		950-0° 25% Blue	Former stream and/or river channel, which is located in the coastal plain and delta.	1x10	
26 Natural Levee		D130-45° 30% Yellow	Strip microrelief located along or around the river which is composed of sand and silt deposit made during floods.	1x10	
27 Upper Sand Bar		D130-45° 30% Yellow ----- Brown C C	Microrelief located along the former and present coasts being composed of sand and gravel, and formed by sedimentation and action of ocean waves and coastal current.	2x5	
28 Lower Sand Bar		D130-45° 30% Yellow ----- Brown + +	Microrelief slightly lower than the above-mentioned.	2x5	
29 Backmarsh		500-0° +90° 20% Green	Low land slightly affected by alluviation of river and poorly drained, because of being located behind natural levee.	2x5	
30 Cliff		Violet	Slope with vertical or very steep gradient.	5	
31 Landslide		Red	Vestige of radical falling of large mass of earth down a slope or cliff.	2	
Coastal Plain and Delta					
Unstable slope					




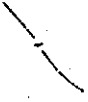
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CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	HEIGHT OR AREA OR DIST. IN FT.
32		15°-90° 10% Red	Land cut and rolled from slope of mountain, hill or plateau.	Area with more than 2m in height, of cut or rolled.	2X2
33		25°-0° 10% Red	Area built up at level or higher than the surrounding.	Area whose elevation increased more than 1m including reclamation.	2X2
34		Violet	Artificially deformed steep slope mainly in mountain, hill, terrace, etc.	Slope deformed more than 2m in height.	1X2
35		Brown	Artificially built up slopes.	Slope built up more than 2m in height.	1X2
36		M30°-45° 20% Yellow-Green 30°-0° 10% Red	Artificial land formed by filling marsh, lake or river bed at level of the surrounding surface.	Area shall be delineated by photo-interpretation as compared to old photographs.	2X2
37		Violet	Area where land development is in progress.	Area shall be delineated by photo-interpretation and field survey if possible.	2X2
38		Red	Main ridges of mountain and hill including several drainage basins which collect to a common basin.	Main river basin bounded by watershed lines of more than 5cm in length on the map.	50
39		Blue	Stream line on the surface of slope of mountain, hill and plateau, made by rainwater.	Drainage line with length of more than 2 cm on the map.	20

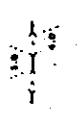


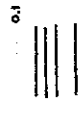
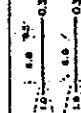
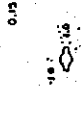
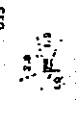
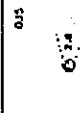
54

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	NUMBER SCALE BY DATE
40	Water Surface 	0.2 Blue D133 0-45° 20% Blue	River, lake, sea, pond, etc.	Water surface as shown on the 1:10,000 Contoured Map shall be applied.	2X2
41	Landform Boundary 	0.15 Violet	Boundary of landform classification		2X2
42	Indistinct Landform Boundary 	0.15 Violet	Boundary which is not clear on landform classification	Area where landform classification is not clearly made by photo-interpretation and analysis of the 1:10,000 Contoured Map.	2X2
43	Bar 	LT 88 Silver-Gray D133 0-45° 20% Blue	Depositional ridge of sand and mud, distributed along the coastal area.	Area which is indicated as "Sand" or "dune" on the 1:10,000 Contoured Map.	2X2
44	Tidal Flat 	LT 904 Silver-Gray D133 0-45° 20% Blue	Shallow water area whose bottom is mud.	Area which is indicated as "Mud" on the 1:10,000 Contoured Map.	2X2
Marine Area					

(5) 2/4

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	NUMBER SCALE REMARK
45 Bench Mark		Black	2nd order or higher grade leveling point identified in this survey.	Based on the 1:10,000 Contoured Map	
46 Ground Elevation Point		Black E29-24 80	Minor order leveling point established in this survey	Value to be shown to one decimal place	
47 Microrelief Line		Brown E29-24 80	Line depicting detailed landform elevation in low land.	Based on the result of minor order leveling, line shall be drawn by stereo plotting at 2m interval.	
48 Bathymetric Line		Blue E29-24 80	Line connecting points at equal depth in the sea area.	Based on BCGS data. One (1) meter interval line shall be shown.	









5

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	MAPS HEAVY SE UP
49	0.4 	Black		Based on the 1:10,000 Contoured Map	
50	0.3 	Black		Based on the 1:10,000 Contoured Map	
51	0.2 	Black		Based on the 1:10,000 Contoured Map	
52	0.1 	Black	Expressway, National and Provincial road shall be shown. Main artery which is important for disaster prevention, relief rehabilitation and development, and is more than 1km in length shall be shown.	Based on the 1:10,000 Contoured Map and verification survey.	
53	0.3 	Black		All railways including LRT, and terminals as shown on the 1:10,000 Contoured Map.	
54	0.15 	Black		Based on the 1:10,000 Contoured Map and field survey.	
55	0.15 	Black		Based on the 1:10,000 Contoured Map and BCGS new data.	
56	0.15 	Black		Based on the 1:10,000 Contoured Map	

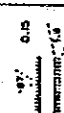
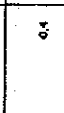

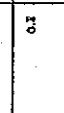
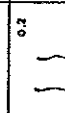



45

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	NUMERICAL SCALE REMARKS
57	Fire Station 0.15 	Black		Based on the 1:10,000 Contoured Map	
58	Hospital 0.15 	Black		- do -	
59	Health Center 0.15 	Black	Small medical establishment with limited facilities.	- do -	
60	Church 0.15 	Black		- do -	
61	School 0.15 	Black		- do -	
62	Rescue Center 0.15 	Black		Based on BCGS new data	
63	Manufacturing, storage and handling facilities of dangerous materials 0.15 	Black	Factory and facilities producing or handling dangerous materials (ammunition, petroleum, gas and chemicals)	Based on BCGS data and field confirmation	
64	Storage Tank 0.15 	Black	Oil and gas tanks	Based on the 1:10,000 Contoured Map	


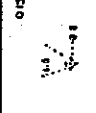
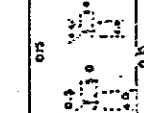
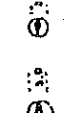

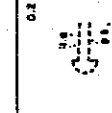


5

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	REMARKS
65	Tidal Station 	Black	Observation station for measuring sea water level and tidal movement	Based on BCGS data and field confirmation	
66	Water Level Gauge Station 	Black	Observation station for measuring river and reservoir level	- do -	
67	Rain Gauge Station 	Black	Observation station for measuring rainfall	- do -	
68	Earthquake Observatory 	Black	Observation station of earthquake activities	- do -	
69	Power Plant and Sub-station 	Black	Power generating and sub-station facilities	Based on the 1:10,000 Contoured Map	
70	Water Treatment Plant 	Black Annotation Black E08-24 90 C	Water treatment and supply facilities excluding water tank	Based on BCGS data and field confirmation	
71	River Pumping Station 	Black	Fixed pumping station utilizing river water	- do -	
77	Well 	Black Annotation Black E08-24 90 C/L	Large deep well for commercial and industrial use	- do -	



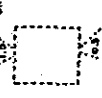


CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	UNREEL NO. IN REEL
73	 0.1 0.2	Brown	Structure constructed for preventing effect of flood and unusual high tide, etc.	Based on the 1:10,000 Contoured Map. Embankment whose width is more than 7.5m and length is more than 50m shall be shown. Furthermore those with more than 1.5m height shall also be shown.	
74	 0.4	Red	Structure constructed for impounding water and flood control	Dam with more than 7.5m in width shall be shown.	
75	 0.2	Red	Structure constructed crossing the river for irrigation	- do -	
76	 0.3	Red	Structure constructed for preventing erosion of embankment, etc.	Revetment with more than 50m in length shall be shown.	
77	 0.2	Red Annotation Black	Structure affording passage across river	Bridge with more than 7.5m in width and its clearance shall be shown.	
78	 0.2 0.3	Red	Structure constructed out into the water for protecting port, harbor and coastal area and for approaching offshore facility.	- do -	
79	 0.2	Red	Structure constructed on the river for controlling water level and flow	Based on the 1:10,000 Contoured Map and field survey	
80	 0.2	Black	Fixed pumping station to drain inland-water	Based on field investigation	

⑤ 4

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	USAGES AGAIN THE MAP
81 Wharf and Pier River and Coastal Structure		Red	Landing structure for ship constructed along the river bank and harbor.	Based on the 1:10,000 Contoured Map and field confirmation	
82 Lighthouse		Black	Lighted structure used for safety navigation.	- do -	
83 Port and Harbor		Black		Based on BCGS data. Symbol size varies according to scale.	
84 Fishing Port		Black		- do -	
85 Pipe Line and Cable on Sea Bottom		Black	Pipe line for water and oil or cable for communication laid down on sea bottom.	Based on BCGS data.	
86 Fishpen		Blue	Drift-net or bamboo pen used for catching fish located at sea, lake or river.	Based on the 1:10,000 Contoured Map	
87 Rock Avash. or Reef		Black	Rock not totally submerged during high water.	- do -	
88 Wreck		Black	Sunken structure showing any portion of it at high water.	- do -	

54

CLASSIFICATION	SYMBOL	COLOR	DEFINITION	APPLICATION	UNRESERVED REAR M. MAP
89 Marine Pond and Salt Bed		Blue	Enclosed area for raising marine species or salt making.	Based on the 1:10,000 Contoured Map	
90 Restricted Area		Red	Area covered under zoning law and regulation, restricted for urban development including military camp.	Based on ECGS data	
91 Dumping Area		Brown	Disposal area.	- do -	
Others					

5A

Information and Usage of Land Use Map (Draft)

This land use map is a multi-color map showing detailed classification of the existing land use, presented on the 1:10,000 base map. This will be used as a basic information of survey and planning for upgrading and future development of land use in Metro Manila area.

1. Utilization of Land Use Map

This land use map is prepared using the contoured map as a base map on which the existing land use is emphasized in 7 colors.

Therefore, it is possible to recognize the existing land use from various features (roads, railways, urban areas, contour lines, coastal lines, annotations, etc.) which are shown on the base map.

Further, it is possible to project future expansion and upgrading from the state of land use in the environs of Metro Manila area. This will be based on interrelation between urban transportation, land cover, topography and existing land use.

It is expected that the land use map will be utilized as follows:

- 1-1 Administrative organizations shall use this map for city planning related to services such as transportation, water supply and drainage system, disaster prevention, housing development, etc..
- 1-2 Survey and research organizations (universities, research institutes, etc.) shall use this for academic research on social and political geography, education, etc..
- 1-3 Private enterprises shall use this for proper selection and development of sites for their activities.
- 1-4 Together with the land condition map, this will be used for verifying the suitability of present land use and planning as well as selecting proper land development.
- 1-5 This will be used to grasp the process of changes in land use, provided that series of revision be made.

2. Main Area Classification

Classification of land use fall under 3 major areas: Built-Up Area; Forest and Farm Area; and Others. These are subdivided into 33 land usages.

- 2-1 Built-Up area is mainly classified into Residential, Commercial and Business, Industrial, Public and Government, and Facilities based on the main usage of building or area.

- 2-2 Forest and Farm area is classified into Agricultural Land and Forest.
Warehouse for agricultural products and food processing factory are classified as Agro-Industrial.
- 2-3 In the classification of Others, water-related features (such as Marine Pond and Salt Bed) and Open Space are included.

3. Criteria for Presentation of Land Use

Criteria for presentation of classification on the 1:10,000 land use map are as follows:

3-1 In built-up area, where buildings and their facilities occupy a common compound, land use classification is presented by the main business of the company or owner. In case the area is used for various purposes, each is shown separately.

3-2 Minimum area for presentation in the built-up area is generally 3mm x 3mm on the map.

In the classification for commercial and mixed area, however, consideration is given to feature whose minimum side is 1.5mm on the map.

An important feature for map user, whose short side is less than 1.5mm on the map is enlarged to 1.5mm for presentation.

Minimum area considered for presentation of large scale industry, military facilities, agricultural land, forest area, water sphere is generally 5mm x 5mm on the map.

Area not considered in the above criteria follows the other classification of the surrounding.

3-3 Two (2) storey building where usage is divided for residential and other category (commercial, industrial, etc), classification is of the latter.

3-4 In three (3) or more storey tenanted building, where usage in each floor is different from each other, classification is mixed category. The classification is the following 4 categories:

Commercial and Residential
Business and Commercial
Industrial and Residential
Business and Residential

3-5 Land use limit is presented in red colored line. In case this boundary line coincides with other topographic and planimetric features, the latter prevail.

3-6 Printing was done using 7 colors and their combinations to make land use features easily identifiable.

Red:	Residential
Orange:	Commercial and Business
Red-blue:	Industrial
Yellow:	Agricultural Land
Green:	Forest
Blue:	Water Sphere
Black:	Open Space and Base Map features

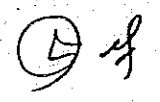
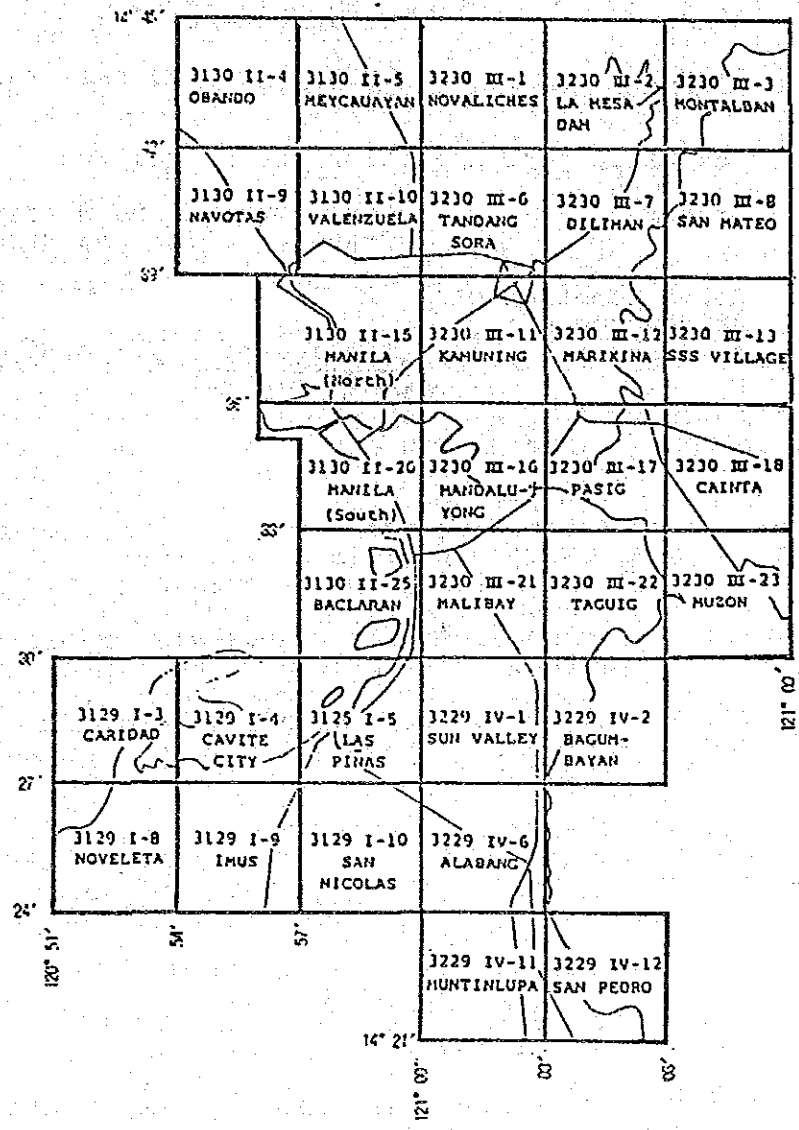
Features given separate color are as follows:

Brown:	Governmental and Quasi-Public; Transportation and Bare Land
--------	--

Color combination/ percentage of the above:	Public and Government; Facilities
---	--------------------------------------



Sheet Name and Number Index
of Land Use Map (1:10,000)



Information and Usage of Land Condition Map(Draft)

This land condition map is a multi-color map that classify and show on the 1:10,000 base map detailed information concerning landform classification and ground elevation as well as agencies, organizations and facilities that have to do with disaster prediction, control, relief and rehabilitation. Visual presentation of the basic condition of land is necessary for planning and development to control and minimize the effect of calamities.

1. Utilization of Land Condition Map

1-1 Effective usage of the map

The land condition map presents landform, formative process, ground elevation, coverage of filled up area and facilities. With proper knowledge of land condition, it is possible to predict location and what damage would take place with considerable accuracy at the time of floods, high tide and other disasters.

It is further possible, by reading the land condition map, to identify:

- the area where ground subsidence is likely to take place due to excessive pumping up of ground water;
- the housing development area in low or marshy land where flood or earthquake damages are expected;
- the artificially deformed and unstable land in mountainous, hilly and plateau areas where earthquake and land slide are expected;
- the location of suitable land for development together with adequate disaster prevention measures for the area; and
- the most appropriate type of land use for the area.

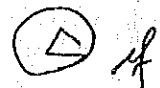
Therefore, the land condition map can be utilized as a basic information for planning not only for disaster prevention but also land development.

For planning regional or urban development, disaster prevention, site selection of large scale housing, etc., the existing land use and other thematic maps are needed in addition to the land condition map.

1-2 Matters to be considered

For effective use of the land condition map, attention is invited to the following:

- (1) Landform boundary line was delineated mainly based upon photo interpretation. It is advisable, therefore, to consider this line as approximate and of less accuracy than one plotted by photogrametric method.



- (2) Landform classification was not made based on soil engineering analysis but by morphological method. At the time of classification, however, surface material (down to 1.5m depth) was considered. This was made by auger boring.
- (3) The land condition map is very useful for preparation of master plan regarding disaster prevention and control, urban development, etc.. For planning and designing of construction projects, however, it is necessary to make additional field investigation and study on various other data according to the purpose and type of the project.

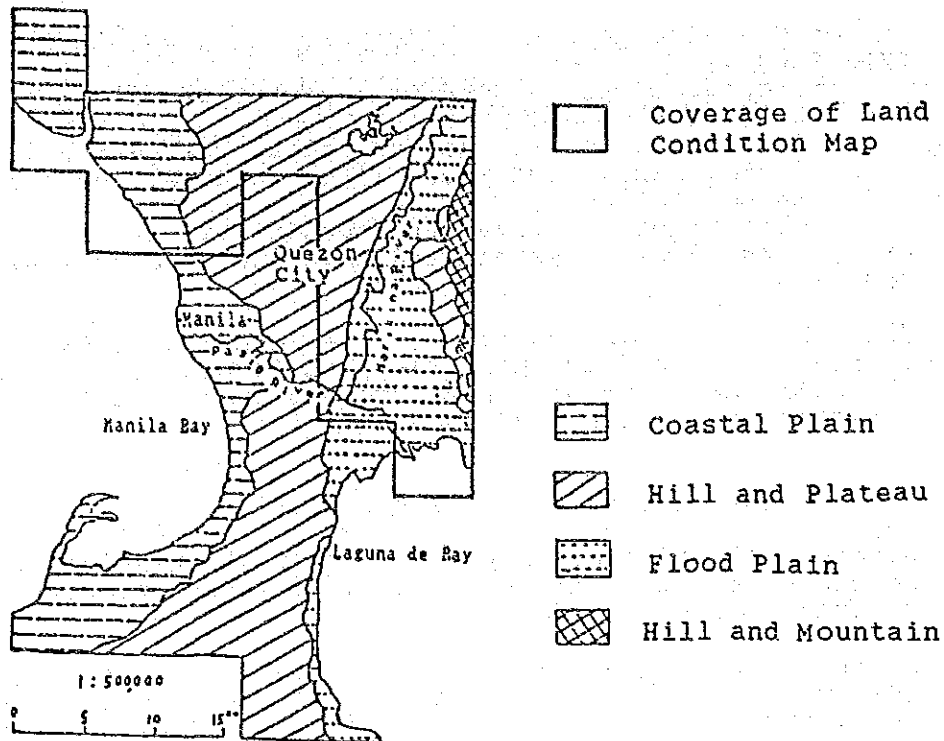
2. General description of Landform and Contents of Land Condition Map

2-1 General description of landform

Landform in the project area is generally classified as follows:

- (1) Coastal plain:
Narrow coastal low land extending north to south along Manila Bay.
- (2) Hill and plateau:
Hills and plateaus extending north to south in Manila and Quezon City areas.
Across the hill and plateau area, ground elevation is 20m to 30m around Pasig river and gradually increases northward from 80m to 100m.
South of the project area which is part of the foot of Taal volcano, elevation is gradually increasing southward from 40m to 80m.
- (3) Flood Plain
Land around the Marikina river basin and environs of Laguna de Bay are low lying flat areas with elevation of 1m to 20m.
- (4) Hill and mountain:
The mountain area in the eastern part has elevation of 200m to 300m. The western side of the mountain area which is hilly, of 50m to 100m elevation. In the mountains where top flats still remain, gentle slopes are generally prevailing although there are steep slopes along river valleys.

Outline of Landform



2-2 Contents of the land condition map

The map presents the following 3 major items superimposed on a base map:

(1) Landform classification

Land is classified as to form, formative process and materials. The classification of land condition is differentiated by combination of colors and symbols on the map.

(2) Ground elevation

As for low land area susceptible to floods, ground elevation is presented in more detail. Ground elevation points observed by minor order leveling are presented and the points connected as microrelief line of 2m interval are delineated.

This information shall enable user to recognize ground elevation, slope gradient, relative height, etc. of land, and to make effective estimate of the extent of possible damage by floods, land subsidence and abnormal high tide.

(3) Organization and facilities

As for organization and facilities, the location and type such as:

- organizations related to disaster prevention and land development;
 - facilities for rescue and relief, dangerous materials, supply and processing, refugee, and those in coastal area;
 - observatories, river and coastal structures
- are presented with symbols and important features are annotated.

From the interrelation between the location of facilities and the landform condition, it is possible to grasp the existing state of and future regional planning for disaster prevention, refuge and relief.

3. Criteria for Expression of Land Condition

3-1 Landform classification provide information which has homogeneous component as to form, formative process and materials of the surface.

At the time of land assessment, it is important to grasp comprehensive characteristics of the area, together with individual landform unit. This is done by studying relative surrounding area with regard to height and location: e.g. upstream or downstream area, in-between mountains or in open plain, how far from river or sea coast, height from sea level.

3-2 Ground elevation

In order to determine ground elevation mainly in the low land area, minor order leveling was carried out in the north-western part of Manila and the down stream area of Marikina river. Values of ground elevation points are shown in black. Microrelief lines of 2m interval are shown for easier identification even in low lying flat land.

3-3 Organization and facilities

Emphasis is placed on organization and facilities closely related to disaster prevention and control, relief and land development.

These are presented based on the features shown on the 1:10,000 contoured map as well as data provided by BCGS and other agencies, together with results of verification in the field.

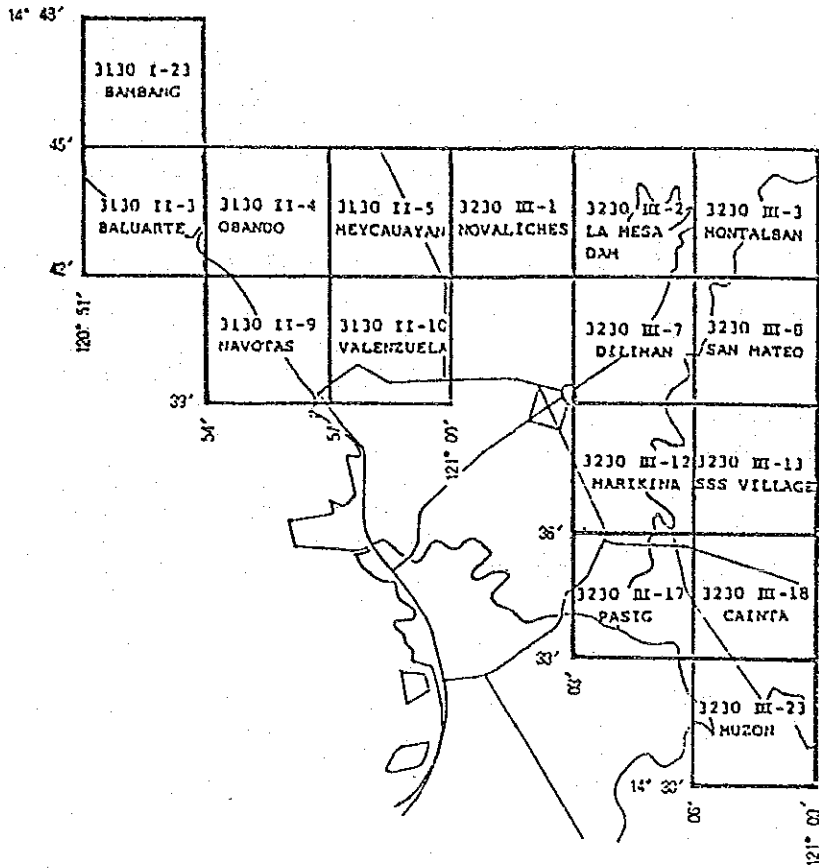
3-4 Marine area

Marine area, bar, tidal flat and bathymetric line are presented based on BCGS data.

3-5 .Color scheme

The land condition map is done using 6 basic colors and in multiple combination. Mountains are presented in dark color going lighter toward low land in the coastal area. (see Legend for different colors used for particular features.)

Sheet Name and Number Index of
Land Condition Map (1:10,000)



⑤

List of Data gathered for Land Condition Map

1. Boring data: Boring data of Table land of Metro Manila;
Boring data of low land(along Manila Bay);
Boring Data of Low Land(North Metro Manila)
2. Ground Water: Metropolitan Waterworks and Sewerage System,
Interim Report and Plates, Aug. 31 1981;
Ground Water Situation in Pasig and Marikina
3. Flooded area: 1985 Flooded Areas of Metro Manila;
1985 Flooded Areas of Quezon City(partial
area)
4. Soil: Soil and Land Resources Evaluation Project of
Metro Manila and Maps(Report, 1/125,000)
5. Geological map: Manila and Quezon City Quadrangle(1/50,000);
Montalban Quadrangle(1/50,000);
Cavite Quadrangle(1/50,000)
6. Geology: Geological Map of the Philippines(1/4,000,000);
Geology and Mineral Resources of Philippines
(Report);
Philippine Geochronology(Report);
Geologic Mapping of Active Faults for Land Use
Policy Generation(Report);
Annual Report 1984(Philippine Institute
of Volcanology and Seismology);
Geology and Facies of Part of Laguna Forma-
tion(Report);
Geologic Hazards and Preparedness System
7. Earthquake: Luzon Earthquake of 1 August 1968(Report);
Luzon Earthquake of 2 August 1968(Report);
1966-1985 Lists of Earthquake Events
8. Aerial Photos: Old Aerial Photos of Metro Manila Region
in 1966 - 68

3. Sample sheet for Marginal Information
of Land Condition Map

N.C.R. PROJECT (SBNS 17 6mm C)
1:10,000 (SBNS 17 4.5mm)

(SA 302 9mm C)

MANILA (NORTH)

14° 02' 00"

14° 02' 00"

MARGINAL INFORMATION

(TH)

SBNS 17 6mm C/L

Land Condition Map No.3130-II-15







12mm

(SBNS 17 4mm C.L.) Edition 1 1988

5mm

(SB 60213.5mm C)

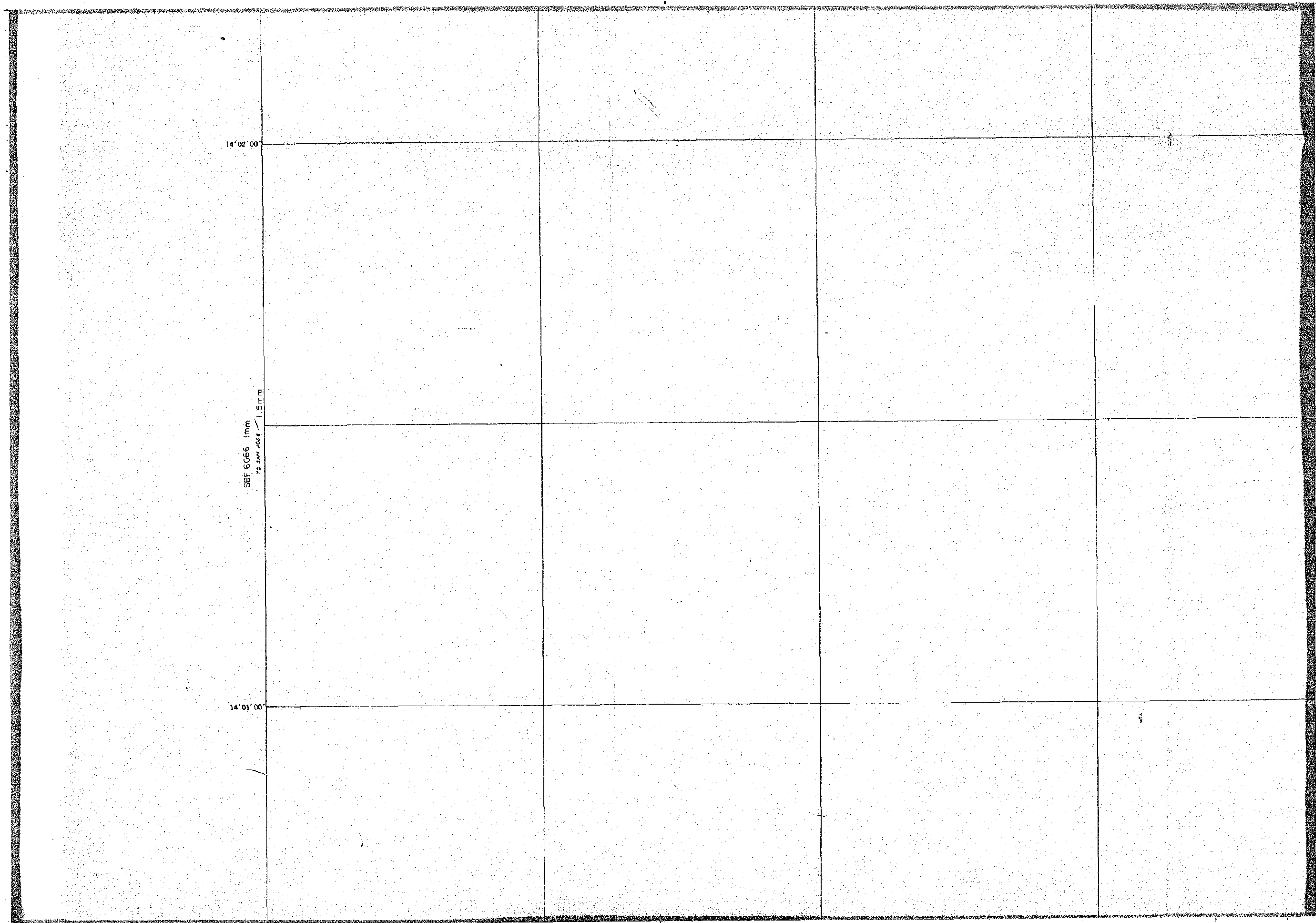
LEGEND

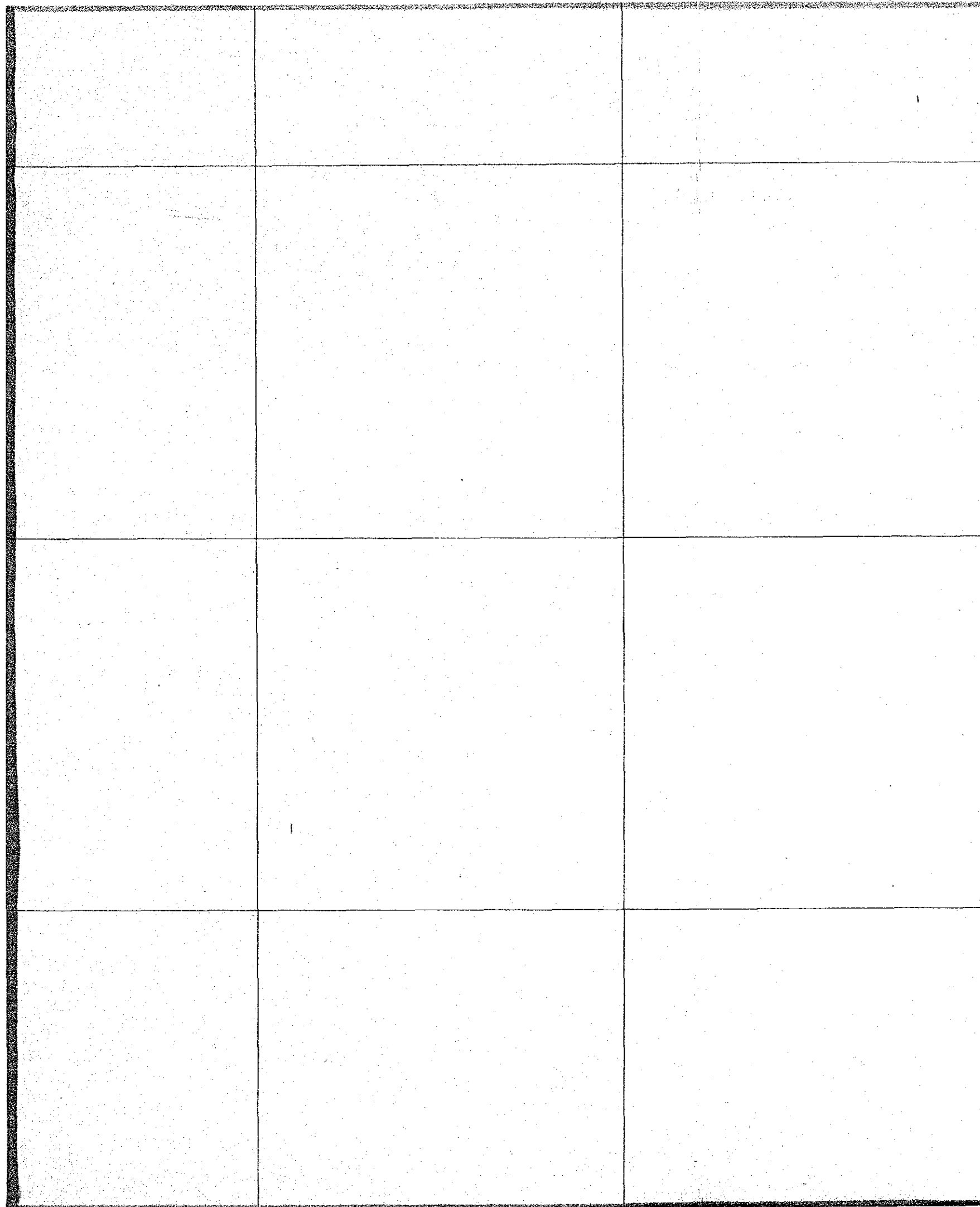
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MOUNTAIN	Top Flat and Ridge Flat	<input type="checkbox"/>	General Surface of Coastal Plain and Delta	<input type="checkbox"/>
	Gentle Slope (Less Than About 20')	<input type="checkbox"/>	Former River Bed	<input type="checkbox"/>
	Steep Slope (More Than About 20')	<input type="checkbox"/>	Natural Levee	<input type="checkbox"/>
PIEDMONT LANDFORM	Knick Line		Upper Sand Bar	<input type="checkbox"/>
	Talus	<input type="checkbox"/>	Lower Sand Bar	<input type="checkbox"/>
	Colluvial Slope	<input type="checkbox"/>	Backmarsh	<input type="checkbox"/>
HILL AND PLATEAU	Small Alluvial Fan	<input type="checkbox"/>	Cut	
	Top Flat	<input type="checkbox"/>	Landslide	
	Gentle Slope (Less Than About 5')	<input type="checkbox"/>	Cut and Rolled Surface	<input type="checkbox"/>
TERRACE	Moderate Slope (Between About 5' and 20')	<input type="checkbox"/>	Banked Up Surface	<input type="checkbox"/>
	Steep Slope (More Than About 20')	<input type="checkbox"/>	Cut Slope	<input type="checkbox"/>
	Valley Flat	<input type="checkbox"/>	Banked Up Slope	<input type="checkbox"/>
ALLUVIAL FAN	Low Terrace	<input type="checkbox"/>	Filled Up Surface	<input type="checkbox"/>
	General Surface of Alluvial Fan	<input type="checkbox"/>	Under Construction Area	<input type="checkbox"/>
	Former River Bed	<input type="checkbox"/>	Main Watershed	
FLOOD PLAIN AND VALLEY PLAIN	Dent and Shallow Valley	<input type="checkbox"/>	Drainage	
	General Surface of Flood Plain and Valley Plain	<input type="checkbox"/>	Water Surface	
	Former River Bed	<input type="checkbox"/>	Landform Boundary	<input type="checkbox"/>
MARINE AREA	Natural Levee	<input type="checkbox"/>	Indistinct Landform Boundary	<input type="checkbox"/>
	Backmarsh	<input type="checkbox"/>	Bar	<input type="checkbox"/>
	Swamp and Marsh	<input type="checkbox"/>	Tidal Flat	<input type="checkbox"/> Mud
	Dry River Bed	<input type="checkbox"/>		
2. GROUND SURFACE HEIGHT				

14°02'00"

14°01'00"

SBF 6066 1mm
TO SAN JOSE 1.5mm



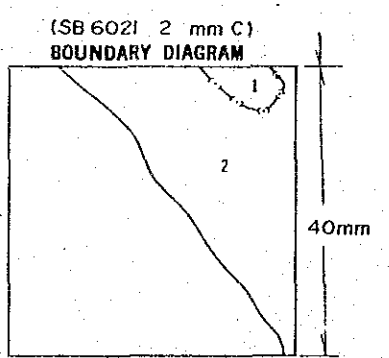


FLOOD PLAIN AND VALLEY PLAIN	Former Water Bed		MARINE AREA	Boundary	
	Natural Levee			Bar	
	Beckmarsh			Tidal Flat	Mod
	Swamp and Marsh				
	Dry River Bed				
2. GROUND SURFACE HEIGHT					
GROUND ELEVATION POINT	Bench Mark	⊙ 3.21	MICROGRAPHIC LINE AND BATHYMETRIC LINE	Micro Relief Line	↗ ↘
	Ground Elevation Point	• 1.2		Bathymetric Line	↗ ↘
3. ORGANIZATION AND PUBLIC FACILITIES					
ADMINISTRATIVE BOUNDARY	Regional Boundary	-----	RIVER AND COASTAL STRUCTURE	Embankment	▬▬▬▬
	Provincial Boundary	-----		Dam	∩
	City and Municipal Boundary	-----		Wak	∩
TRANSPORTATION	Main Road	▬▬▬▬		Ravement	▬▬▬▬
	Railway	▬▬▬▬		Bridge	▬▬▬▬
	Bus Terminal	⊕		Breakwater Jetty and Causeway	∩
ORGANIZATION RELATED TO DISASTER AND LAND DEVELOPMENT	Government Building	⊕		Flood Gate	∩
	Police Station	⊕		Drainage Station	⊕
	Fire Station	⊕		Wharf and Pier	∩
FACILITY FOR RESCUE AND RELIEF	Hospital	⊕		Lighthouse	⊕
	Health Center	⊕	Port and Harbor	∩	
	Church	⊕	Fishing Port	∩	
	School	⊕	Pipe Line and Cable on Sea Bottom	▬▬▬▬	
FACILITY FOR DANGEROUS MATERIAL	Manufacturing Storage and Handling Facilities of Dangerous Materials	⊕	FACILITY AND OTHER FEATURE IN COASTAL AREA	Fishpen	∩
	Storage Tank	⊕		Rock Awash or Reef	*
OBSERVATORY	Tidal Station	⊕	OTHERS	Wreck	∩
	Water Level Gauge Station	∩		Marine Pond and Salt Bed	MP Salt Bed
	Rain Gauge Station	∩		Restricted Area	▬▬▬▬
	Earthquake Observatory	⊕		Dumping Area	▬▬▬▬
FACILITY FOR SUPPLY AND PROCESSING	Power Plant and Sub-Station	∩			
	Water Treatment Plant	∩			
	River Pumping Station	⊕			
	Well	• Well			

(SB 6021 2 mm C/L)

20mm

1.5mm



REGION III (SB 6023 1.8mm C)
1. Bulacan Province (SB 6023 1.8mm C/L)

14°01'00"

14°00'00"

120°57'00"

120°58'00"

This map was produced under a cooperative undertaking between the Government of the Republic of the Philippines and the Government of Japan. (SB6021 2mm C/L)

Base Map: Contoured map 1987 (BCGS, JICA)
Aerial Photography: 1986-1988, 1982 & 1986
Field surveys by BCGS & JICA 1987.
Other sources of information: MGSB, BSWM, OPWH, SCD, KPCC, MWSS, PHIVOLCS, NWRB & IGS of RP
Distributed by Bureau of Coast & Geodetic Survey
421 Barraca St., San Nicolas, Manila
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45mm

1.2mm

500 400 300 200 100 0

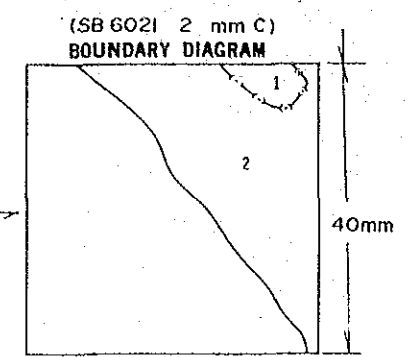
4mm (SBNS 17 2.5mm C)
SCALE 1:10,000

8mm (SB 6023 2.5mm C)

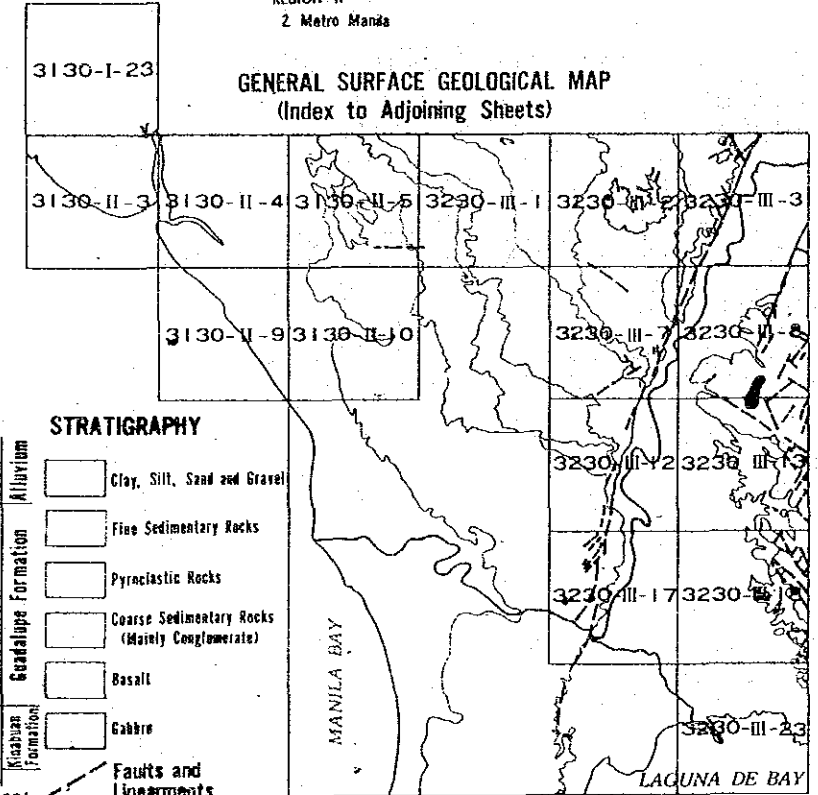
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
ZONE 51 CLARKE SPHEROID 1866 LUZON DATUM
VERTICAL DATUM: MSL FOR HEIGHTS MLLW FOR DEPTHS
CONTOUR INTERVAL 4 METERS

OBSERVATORY	Water Level Usage Station	OTHER	Dumping Area
	Rain Gauge Station		(Dumong)
	Earthquake Observatory		
FACILITY FOR SUPPLY AND PROCESSING	Power Plant and Sub-Station		
	Water Treatment Plant		
	River Pumping Station		
	Well	• Well	

1.5mm

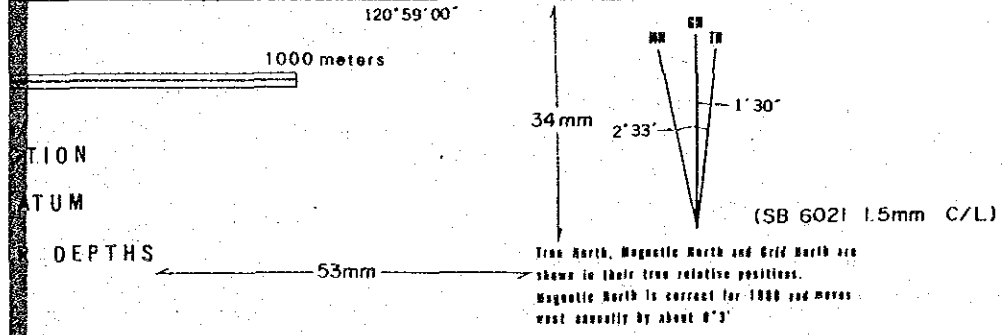


(SB 6021 2 mm C)
BOUNDARY DIAGRAM
 REGION III (SB 6023 1.8mm C)
 1 Bulacan Province (SB 6023 1.8mm C/L)
 REGION IV
 2 Metro Manila



STRATIGRAPHY

Holocene	Alluvium	Clay, Silt, Sand and Gravel
		Fine Sedimentary Rocks
Pleistocene	Bundalige Formation	Pyroclastic Rocks
		Coarse Sedimentary Rocks (Mainly Conglomerate)
Cretaceous	Basalt	
	Gabbro	
		Faults and Lineaments



45mm 35mm

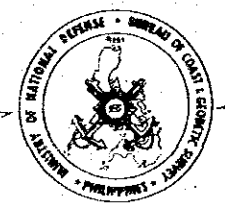
(SA 6007 6mm C) (C/L)

MANILA (North)

14mm

Sheet No. 3130-II - 15

(SA 6007 4mm C/L)



3. Sample Sheet for Marginal Information
of Land Use Map

N.C.R. PROJECT (SBNS 17 6mm C)
1:10,000 (SBNS 17 4.5mm)

(SA 302 9mm C)

MANILA (NORTH)

MARGINAL INFORMATION

IRTH)

(SBNS 17 6mm C/L) Land Use Map No.3130-II-15

12mm

(SBNS 17 4mm CL) Edition 1 1988

5mm

(SB 6021 45mm C)

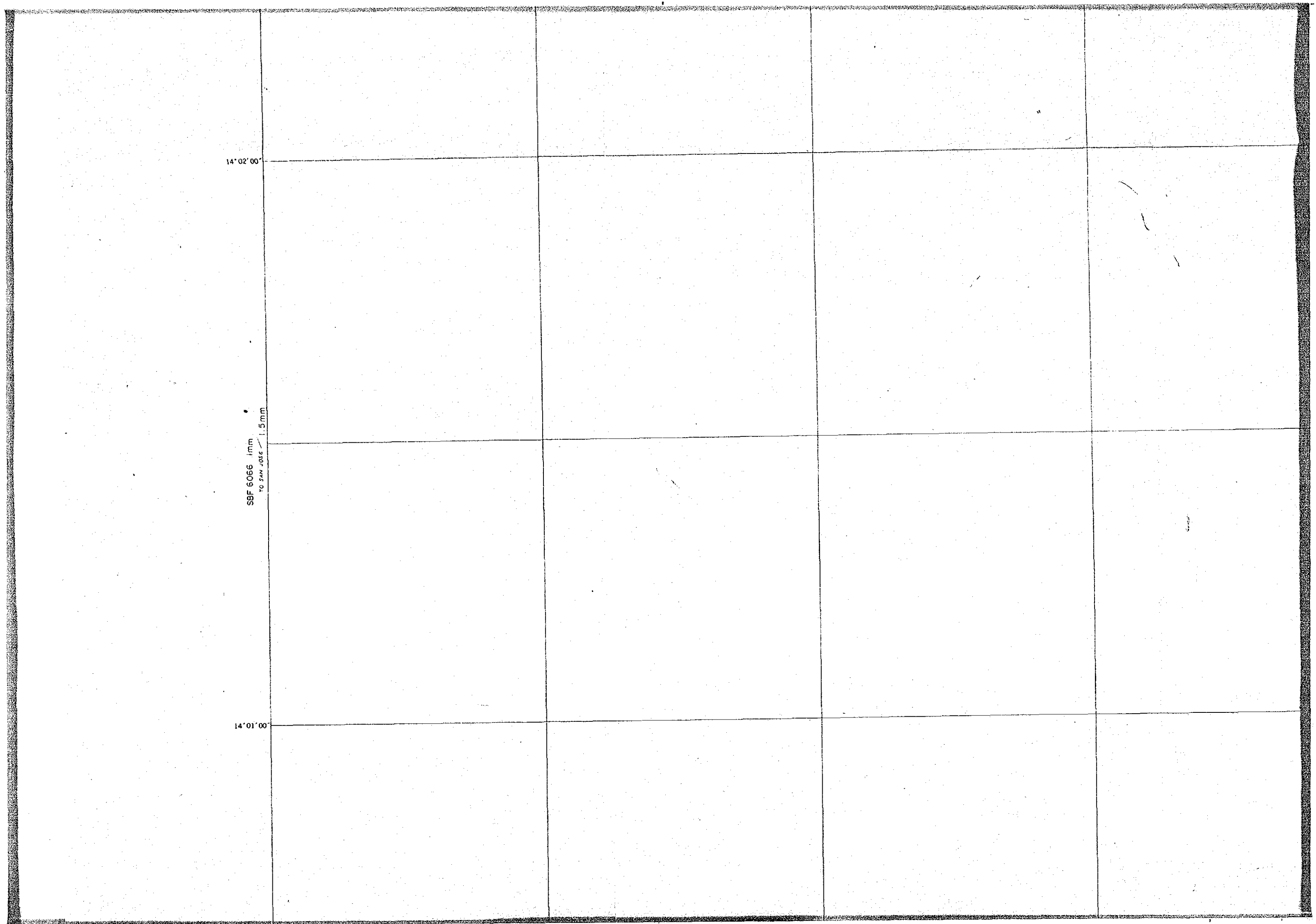
LEGEND

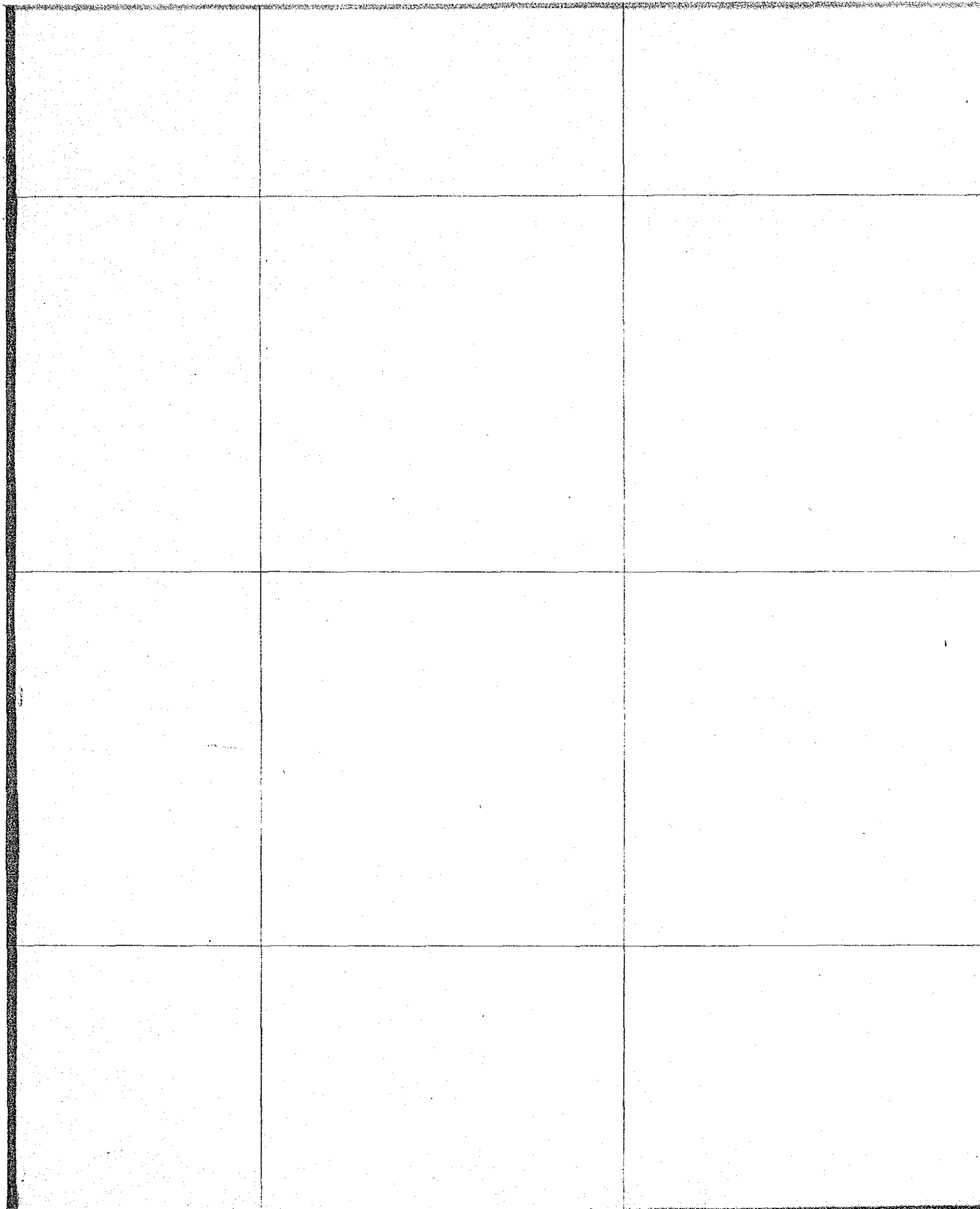
1. BUILT-UP AREA				
RESIDENTIAL	Multi-Storey Housing	<input type="checkbox"/>	Governmental and Quasi-Public	<input type="checkbox"/>
	Residential	<input type="checkbox"/>	Education and Cultural	<input type="checkbox"/>
	Temporal Housing	<input type="checkbox"/>	Health and Welfare	<input type="checkbox"/>
COMMERCIAL AND BUSINESS	Business	<input type="checkbox"/>	Park and Recreational	<input type="checkbox"/>
	Commercial	<input type="checkbox"/>	Religious and Cemetery	<input type="checkbox"/>
	Mixed Commercial-Residential	<input type="checkbox"/>	Transportation	<input type="checkbox"/>
	Mixed Business-Commercial	<input type="checkbox"/>	Service	<input type="checkbox"/>
	Mixed Business-Residential	<input type="checkbox"/>	Sport and Athletics	<input type="checkbox"/>
INDUSTRIAL	Large-Scale Industry	<input type="checkbox"/>	Military	<input type="checkbox"/>
	Small-Scale Industry	<input type="checkbox"/>		
	Mixed Industrial-Residential	<input type="checkbox"/>		
2. FOREST and FARM AREA				
AGRICULTURAL LAND	Rice Field	<input type="checkbox"/>	Forest	<input type="checkbox"/>
	Crop Land	<input type="checkbox"/>	Bamboo / Scrub	<input type="checkbox"/>
	Plantation and Farm Land	<input type="checkbox"/>	Mixed Scrub and Woodland	<input type="checkbox"/>
	Rubber	<input type="checkbox"/>	Rubber	<input type="checkbox"/>
	Sugar cane	<input type="checkbox"/>	Grass Land	<input type="checkbox"/>
	Pineapple	<input type="checkbox"/>	Rare Land	<input type="checkbox"/>
	Cassava	<input type="checkbox"/>	Sand, Sand Barren	<input type="checkbox"/>
	Others	<input type="checkbox"/>		
	Agro Industrial	<input type="checkbox"/>		
	3. OTHERS			
WATER SPHERE	Water Surface	<input type="checkbox"/>	Water Related Vegetation	<input type="checkbox"/>
	Tidal Flat	<input type="checkbox"/>	Mangrove	<input type="checkbox"/>
	Tidal Flat Sand	<input type="checkbox"/>	Sandy / Marsh	<input type="checkbox"/>
	Soft Coral	<input type="checkbox"/>	Salt Bed	<input type="checkbox"/>

14° 02' 00"

SBF 6066 1mm
TO SAN JOSE 1.5mm

14° 01' 00"





3. OTHERS Water Surface Lake / pond Tidal Flat Mud Tidal Flat Sand Reef Coral Marine Pond Water Related Vegetation Mangrove Swamp / Marsh Salt Bed Open Space Under Construction LAND USE BOUNDARY		WATER SPHERE WATER SPHERE OPEN SPACE	
4. TOPOGRAPHIC FEATURES			
Slipway Rock Aweeh Pier-Jetty Wharf, Revetment River / Stream Flow Arrow Dam, Falls (Single Line) Falls (Double Line) Regional Boundary City and Municipal Boundary Fort Prominent Building Ruins Divided Highway Expressway National / Provincial Road Alley Trail Sidewalk Crossing Pedestrian Underpass Rope Way Ditch Siphon Ferry / Ford National Railway Light Rail Crossing Transit Railway Station	 	Fishpen Wreck Breakwater Intermittent Indefinite Channel, Causeway Flood Gate, Weir Provincial Boundary Wall / Fence Antiquity Independent Building Building Minimum Route Marker National / Provincial City / Municipal Road Grade Separation Pedestrian Overpass Toll Gate Trees Lined Road Power Transmission Line Pipeline / Water Pipeline Pipeline Sewerage Outfall Sewerage Outfall Private Railway Level Crossing Underpass Turnpike	
Government Building Post Office Hospital Spring Hot Spring Pump Plant Sub-Station Market Prominent Store Theater, Cinema (Prominent) Radio Tower, TV Tower Stack, Flagpole, Telephones Mine Windpump Aera Beacon	 Radio Water Tank Stand Pipe Well	Public Station Water Supply Sewerage Embassy Church / Mosque Health Center Bank Factory Sports Center Lighthouse WT SP Well	Gas Station Fire Station School Mosque Temple Hotel / Motel Hospital Storage Tank Oil Cave Monument Bus Terminal
Cutting Slope Depression Index Contour Supplementary Contour	 	Embankment Quarry Cliff, Stockoutcrop Area Depth Curve	

(SB 6021 1.6mm C/L)

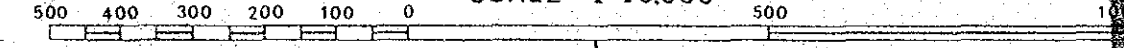
14°01'00"

14°00'00"
120°57'00"

120°58'00"

9mm (SB 6021 2.0mm C/L)

4mm (SBNS 17 2.5mm C)
SCALE 1:10,000



8mm (SB 6023 2.3mm C)

This map was produced under a cooperative undertaking between the Government of the Republic of the Philippines and the Government of Japan.
Base Map: Contoured map 1987 (BCGS, JICA)
Aerial Photography: 1982 & 1986
Field classification by BCGS & JICA 1985
Field completion by BCGS & JICA 1987
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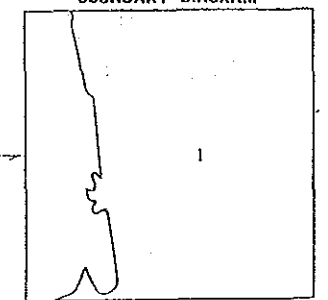
45mm

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
ZONE 51 CLARKE SPHEROID 1866 LUZON DATUM
VERTICAL DATUM: MSL FOR HEIGHTS MLLW FOR DEPTHS
CONTOUR INTERVAL 4 METERS

Light Rail Crossing Transit		Underpass	
Railway Station		Turnpike	
Government Building		Police Station	
Post Office		Water Supply Sewerage	
Hospital		Embassy	
Spring Hot Spring		Church / Mosque	
Power Plant Sub-Station		Health Center	
Market Fruit/veget. Store		Bank	
Theater, Cinema (Prominent)		Factory	
Radio Tower, IV Tower Stack, Flagpole, Telephons		Sports Center	
Mine		Lighthouse	
Windpump		Water Tank	
Aero Beacon		Stair Pipe	
		Well	
		Gas Station	
		Fire Station	
		School	
		Mosque	
		Temple	
		Hotel / Motel	
		Heliport	
		Storage Tank	
		Cave	
		Monument	
		Bus Terminal	

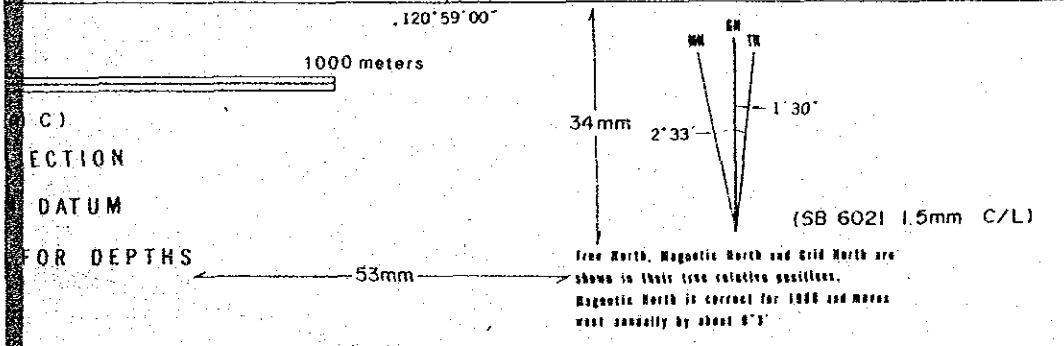
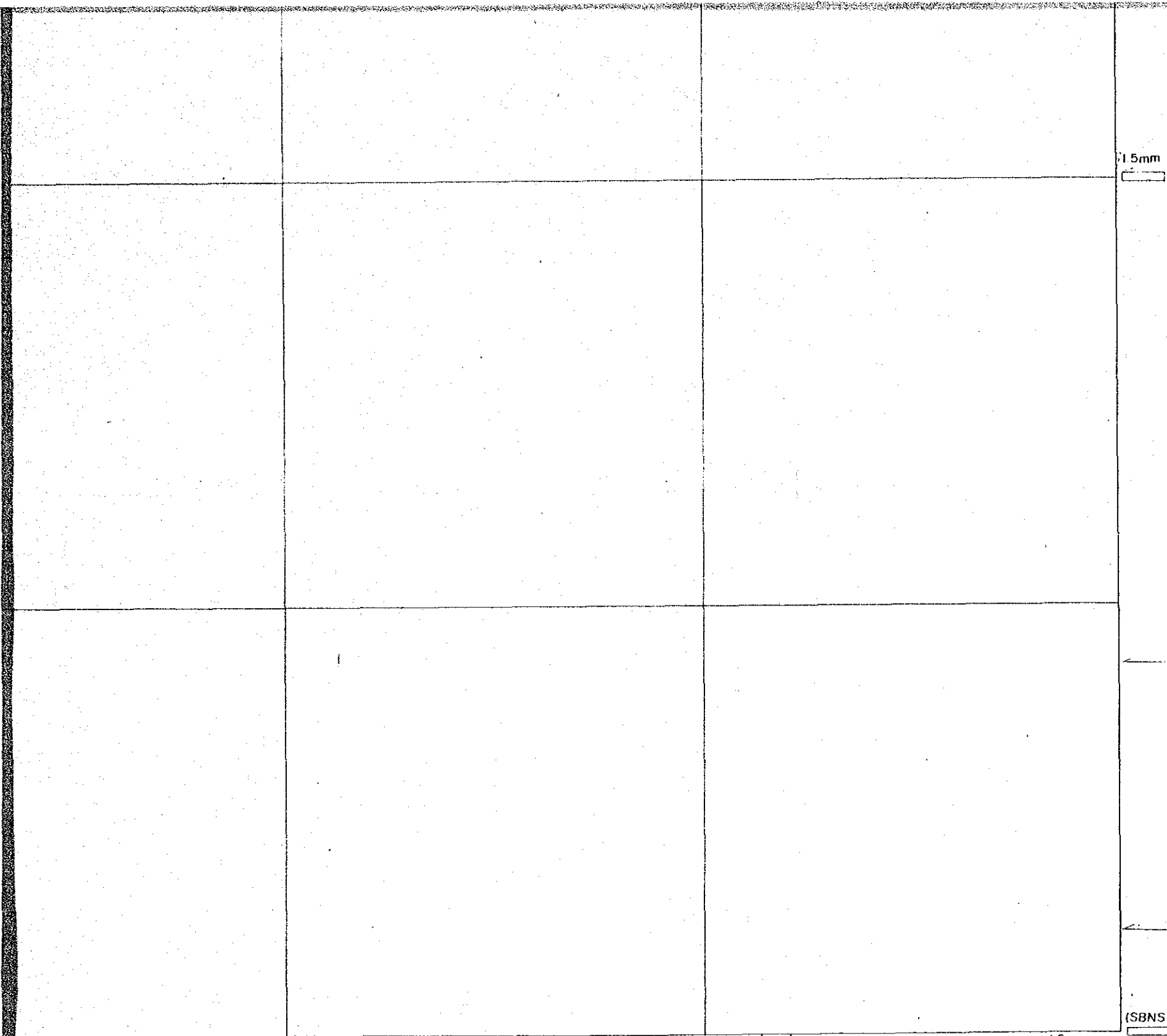
Cutting		Embankment	
Slope		Quarry	
Depression		Cliff, Rockoutcrop Area	
Index Contour		Depth Curve	
Supplementary Contour		Contour Value	20
Intermediate Contour			
Horizontal Control Station	$\Delta 123.4$	Vertical Control Station (Height Above)	$\odot 567.89$
Spot Height	- 456	Direct Leveling Point	- 917.45

BOUNDARY DIAGRAM (SB 6021 2mm)
REGION IV
I. Metro Manila



(SB 6021 1.5 mm C)
INDEX TO ADJOINING SHEETS

3130-II-9	SB 45 1.5mm 3130-II-10	3230-III-8
	3130-II-15 MANILA (NORTH) SBC 1091 1.8C	3230-III-11
	3130-II-20	3230-III-16



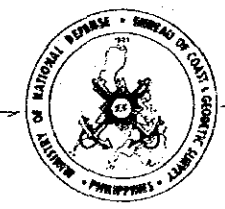
45mm 35mm

(SA 6007 6mm C) (C/L)

MANILA (North)

Sheet No. 3130-II - 15

(SA 6007 4mm C/L)



JICA