

4. Operational Facilities

(1) Design Criteria

The basic design concept should be basically based on the ICAO Standards. If there are no criteria in ICAO Standards, Japanese Standards as well as USA FAA Standards will be applied.

- a. AERONAUTICAL TELECOMMUNICATIONS, ANNEX 10
- b. AERODROME, ANNEX 14
- c. AIR TRAFFIC SERVICES, AIR TRAFFIC CONTROL SERVICE
- d. AIR TRAFFIC SERVICES, FLIGHT INFORMATION SERVICE
- e. AIRPORT SERVICE MANUAL, RESCUE AND FIRE
- f. METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

Almost all navigational facilities are correlated with each other and specified in ICAO standards.

In the case of the adoption of non-ICAO criteria, it will conform as much as possible with the practices prevailing in PNG.

The pre-requisite of the design for Tokua is to resume the operational function of the old Rabaul Airport at minimum, and further, to have the operations capability for ADC, instrument flight rules and night time operations.

(2) Navigational Facilities

The principles to implement the improvement of navigational facilities at Tokua Airport are as follows :

- 1) The development project is to urgently upgrade the function of the existing Airport to the same level as that of the old Rabaul Airport, especially on the configuration of Air Traffic Services.
- 2) To minimize the construction costs and shorten the construction period, the introduction of equipments should be adaptable to the Airport operational level.
- 3) Navigational facilities should allow for future improvements to correspond with probable future expansion of airport to cater to international flights.
- 4) Navigational aids and ATC radio equipments, which are made in the-state-of-the-art technology, should not be a mix of different specifications. On the other hand lighting equipments can be from different sources. Electrical auxiliary generators should also not be a mix of different specifications.
- 5) The implementation should take into account the financial capabilities of the recipient side. That is, after the facilities are commissioned, sufficient funds must be available for the proper maintenance of the newly provided facilities.

(3) Air Traffic Control Facilities

The following equipments will be provided for the Aerodrome Control (ADC) in VFR room of a Control Tower to be newly built.

1) Provisions of ATC Consoles

- Aerodrome Control Console
- Ground Control Console
- Coordinator Console

A communication control system will be provided in an equipment room in the Control Tower to control the consoles mentioned above.

ATC Consoles should have the following equipment:

- Microphones
- Interphones
- Headsets
- Wind Direction and Speed Instruments
- Altimeter Instruments
- Clock (Greenwich Standard)
- ATC Direct Speech System
- Other as required

NOTE: Number of Air Traffic Controller

9 plus 1 Air Traffic Controllers assigned at the old Rabaul Airport have moved to the station at the Nazab Airport after the volcanic disaster. They are planned to be assigned at the New Rabaul Airport.

Hence, 3 swing shifts can be organized by 3 controllers for 1 shift, with 1 chief controller.

2) Question on Installation of Flight Information Services (FIS)

The old Rabaul Airport used to have Aerodrome Flight Information Services (AFIS). In conjunction with providing ATC at New Rabaul Airport, it was suggested if or not a new Flight Information Services (FIS) should be provided. The PNG Government, however, has decided to continue the present FIS at the Nazab Airport, but to provide only ADC Services at the New Rabaul Airport.

3) ATC Tape Recorder

A set of Tape Recorder should be provided in a room of Tower to record ATC communications to be used for analysing an incident, etc.

It will be managed by the chief controller. The recorder will be dual system of 10 channels, including a reproducer.

4) Light Guns

A pair of Light Gun should be provided in VFR room, hanging from the ceiling. The light gun is the most fundamental equipment for ATC, since it is the only measure to indicate ATC instructions to an aircraft and/ or a vehicle of by a combination of colours of green/red/white, in case of communication failure caused by telecommunication system of either ground or airborne.

One light gun is driven by commercial electrical supply, and the another by battery.

5) Occulters (Up-Down Type)

Up-Down type mesh-screens should be provided by window glass in the VFR room to protect a controller's eyes from lights.

If the sun beam, specially at the times of sun-rise and sun-set, and other brilliant lights strike an ATC's eyes, he loose his sight, causing to be hamperous for an operational services.

6) Height of ATC Tower

ATC's eyes level in VFR rooms is calculated as minimum 10m according to the FAA criteria. However, taking into account that the trees around the Airport are about 15m high and that an elevator is not provided in the construction of this time, ATC's eyes level is supposed to be 17m.

The height of the Tower will be accordingly decided.

(4) Installation of Navigation Aids

1) Doppler VOR/DME

In order to provide a more precise radio navigational function for aircraft navigation, a D/VOR co-located with DME should be installed. There are three (3) proposed sites as the following :

Site A: At a site 70m north from the landing strip edge (75m from the runway center line)

Site B: Approx. 430m shifted to the west from Site A and 170m from the runway center line (20m from the landing strip of 150m for a precision approach to be introduced in future).

Site C: On a hilltop 29.5m high, located at 1,240m from the runway 28 end on the extended runway center line about 90m off to the south.

2) VOR Siting

The discussion was focused on the question that MORESBY DVOR/DME had some limitations due to siting, and as such PNG did not want similar problems recurring in Tokua, and concluded as follows :

- * The guidance of ICAO Annex 10, which states that the site of VOR should be graded flat to a radius of at least 45m, need not be applied to the VOR site for Tokua. ICAO specifies the conditions that "in mountainous terrain, a mountain-top site will be often be preferable. The site should be on the highest accessible hilltop or mountain".
- * A modern Doppler VOR of the-state-of-the-art technology will be introduced.

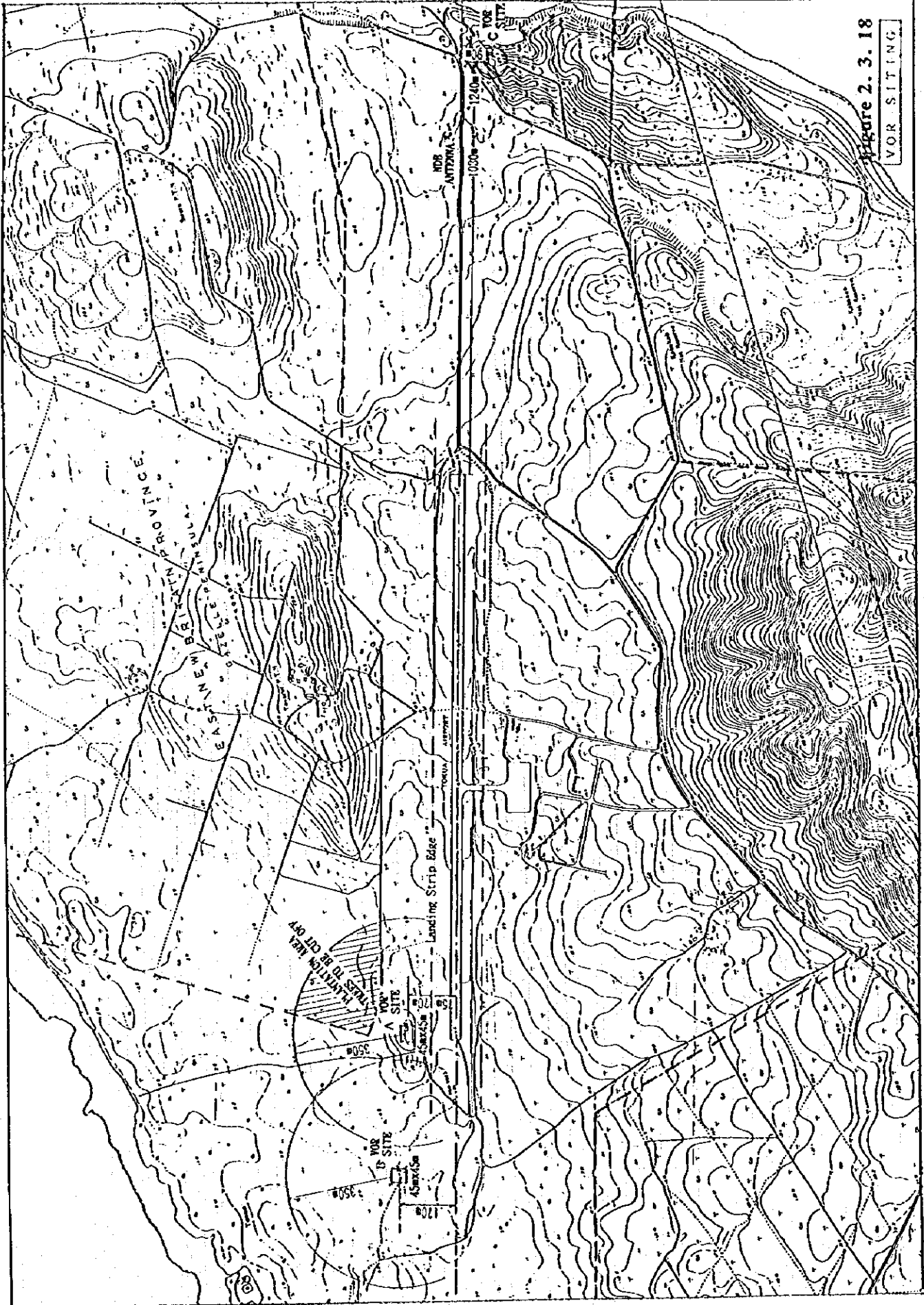


Figure 2.3.18
VOR SITING

The primary location for D/VOR/DME is site A. However, a number of coconut trees in the proximity to the Airport would hamper its installation, because those trees would obstruct VOR radio signal and must be cut.

Purchasing the plantation area is better than just cutting the trees. However this might face the problem that land-owners, though they are allegedly said to be cooperative, might become reluctant to sell the above area at the critical time phase when the VOR site construction must start.

Three (3) options for the VOR site are analyzed as described in Table 2.3.3 Comparative Evaluation in Selecting VOR Site below.

As the result, the site C was selected as the most favorable.

Table 2.3.3 Comparative Evaluation in Selecting VOR Site

SITE	LOCATION	NATURE OF PROBLEM	COUNTER-MEASURE	EVAL.
A	Near to RWY end & plantation area, 75m from landing strip edge	* Need tree-cut within 334m radius of VOR/DME 5m high * Yield VOR wave disturbance landing strip edge	* DME + Counterpoise 8m high reduce cut tree area to 165m * Good for establishing VOR approach procedures	Δ
B	430m west from A, and 170m from landing strip edge	* No tree-cut needed * Too swampy to make platform	Construction cost will be highest	O X
C	By sea coast, 30m high hill. Future coral borrow pit	*Narrow site, but a graded flat of 40m x 40m can be acquired. Trees around the site do not hamper VOR wave * Functionality of VOR can cater for necessity	* Counterpoise of 30m dia. can be installed	O O

Note : O : No serious problems Δ : Problems to be solved by measures X : High cost problem involved

3) NDB

According to the data presented by PNG government and a statement from a pilot of New Guinea Air Line, existing NDB (100W) has actual coverage of 40NM to 50NM which is extremely short. However we will use it until new installation of VOR for the time being.

(5) Communication Facilities

- Existing 120.9MHz VHF receiver, memory unit, and HF receiver have already obsoleted since manufacturing date of about 30 years. For that reason, those become trouble due to supply or spare parts and all communication equipment are almost no longer on the production lines. Up to date equipment made with technologies will be required, such as 120.9MHz ATC VHF Ground to Air Radio and 121.5MHz Emergency Radio equipment (ICAO recommended in 1976).

2. HF AF SSB will be provided as the communications back up to communicate to Lae, Port Moresby, and so on, in case of cutting PTC M/C circuit.

3. VHF FM Radio equipment

VHF FM will be installed for Aerodrome Communication System. Proposed equipment will be installed in the control tower and the fire fighting truck, and 5 walkie-talkie radio will be provided to Navigational aids and communication staff control facilities for maintenance purposes.

(6) Weather Observatory System

At present, only a ventilated case for meteorological instruments which is not functioning adequately, is installed at the field of the Aerodrome. On the Project, a set of Automatic Meteorological Observation Data Collection System, which is indispensable for aircraft operation and managed by computer shown in the Fig.3.3.21, will be proposed.

List of equipments are shown as follows;

- * Wind Direction Indicator
- * Wind Speed Indicator
- * QNH (Its data derived from the value of Anemometer transformed into the aircraft altitude form)
- * Temperature gauge
- * AWS, Including temperature gauge, rainfall gauge, and so on, will be installed in the field of the Aerodrome.
- * Variety of equipment for the observation of wind speed, wind direction, temperature, and so on, will be installed at the top of the tower.
- * Weather Satellite Receiver for delivering the picture of the circumstance of high altitude cumulonimbus upper weather.

All of the data obtained by the equipment mentioned above are fed to the Meteorological Office.

Remark: When pilot submits a flight plan to the Aeronautical authority, it is necessary to have the data of upper air weather enroute. Especially, it is very efficient to know the position of the cumulonimbus, which follows up-and down-current of air and thunder, before flight.

Remark: CEILOMETER provides the data of the altitude of clouds. It is recommended to be installed for Instrument Flight Procedure. However, because eye observation is generally conducted, CEILOMETER will not be installed in the project.

(7) Lighting System

No Lighting System without PAPI is installed at present. Installation of the system will have to be mandatory provided for the night or IFR operation (under poor visibility condition of atmosphere).

Minimum requirement are as follows;

1. Runway Edge Light (REDL) : Except the center line light
2. Runway Threshold Light (RTHL)/(RENL)
3. Runway End Identification Light (RENL)
4. Taxiway Edge Lights (TEDL)
5. Apron Flood Lights (AFL) : 2set installed on the roof of the terminal building
6. Aerodrome Beacon (ABN) : installed on the roof of the ATC Tower
7. Wind Direction Indicator Lights (WDIL)
8. Light Gun : One pair of light guns to be provided in the ATC Tower cabin, the one taken from commercial power, the another to be from battery.

Remark: REIL (Flashes white lights with the frequency of 60 to 120 times/sec), installation of which is very efficient support facility when an aircraft is to land.

(8) Power Supply

At present, commercial power is not available to any of the facilities. However, administrative building, operational building, and PAPI are electrically supplied by an engine generator (15KVA 3 Phase). Drawing of Fig.3.3.33 and 3.3.34 are shown as the system of the power supply. In order to operate the facilities with efficiency, intake of commercial power becomes very important. According to the survey report and the consultational report of JICA, intake of commercial power is recommended and from the meeting with PNG and OCA, following factors were concluded;

- a. PNG will extend the electrical cable (3 phase 3 wires) in Ulaveo, where 3km away from Tokua Airport, to the boundary point of terminal building.
- b. Extension work will be handled by PNG Electrical Power Agency and the cost of intake of commercial power will be borne by PNG as is shown in the Minutes.
- c. After OCA requests the demand of power supply to PNG Electric Power Agency, Extension work will be completed within 6 months.
- d. The project includes the design of the Power Supply Facilities. But its maintenance is under OCA control. Fig.3.3.34 show the system of the power supply.
- e. The task of responsibility between PNG Electric Power Agency and facility of this project will be until at junctioned point of receiving electrical power transformer.

2 engine generator, cable, and accessories which will be provided by Australian government, to Tokua Airport. However, actual purpose are still unknown at present.

Remark: 2 engine generator which will be provided by aids of Australian government would not be diverted into the project because of the followong reasons.

- * Generator with different characteristics can not be used in parallel control.
- * Generator with capacities as small as 100KVA amd 50KVA, are inadequate as a full power load to the all facilities.
- * Complex wiring system has high cost.
- * Simultaneous use of the former generator and new one together will decrease the performance of subsidiary power source system.

Remark: The request of PNG includes installation of SALS. But, it is commonly installed with ILS, and ILS will not be installed in the project. Therefore, installation of SALS would not be come.

EQUIPMENT PROJECT LIST (1)

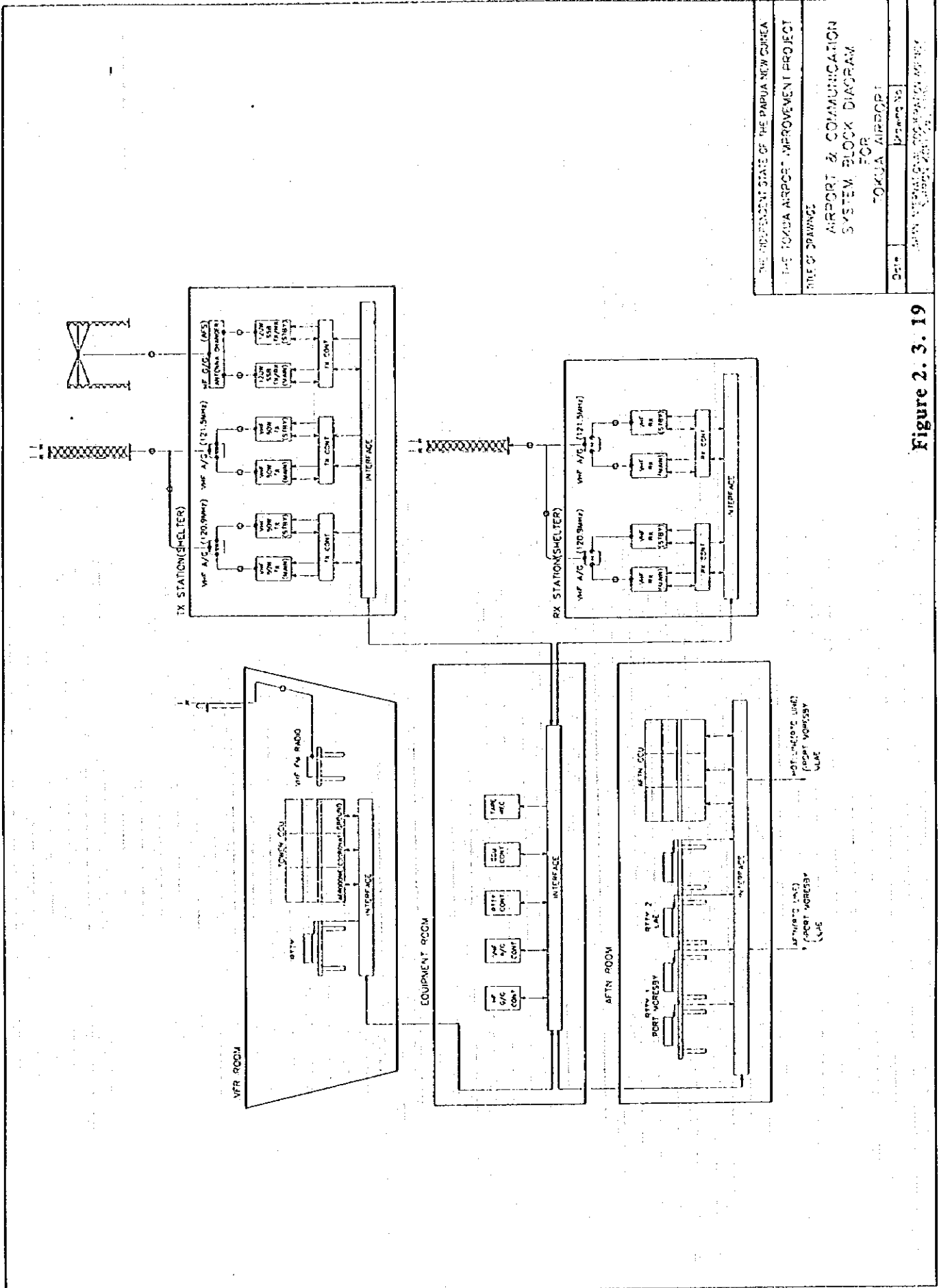
No.	FACILITY	EQUIPMENT	TYPE	FREQUENCY	POWER	COVERAGE	ACCURACY	STRUCTURE	OTHERS	QTY	PURPOSE OF USE	
1	Navigation Aids	(1) D-VOR	Doppler	111.95 MHz - 117.975 MHz	100W	Specified by ICAO ANNEX	Direction Error $\pm 2^\circ$	Dual	Remote Control	1 set	En-route, Arrival & Departure Procedures	
		1) VOR							Distance Measuring			
		2) DME	DME/N	1X - 48X	1KW	ditto	Distance Error $\pm 370m$	Dual				
		3) Power Supply	Commerc./UPS			Constant Supply, 20min.						
		(2) COMM. Console										
		1) TWR Console							3 Consoles for Aerodrome, Ground & Coordinator	Microphone, Headphone Interphone, Directspeech Indicator, Altimeter Greenwitch Cloch, etc.	1 set	Air Traffic Control for Aircraft & Ground Movement Control
		2) AFTN Console							3 Consoles	Teletype & Telephone Communications		
		(3) ATC Tape Recorder		Magnetic Head	10 ch.				Dual	Including Player Continuous	1 set	Reproduce Recorded ATC Communications
		(4) VHF AMS								AFS Communications Point to Point		
		1) Transmitter & Receiver	A3E, Simplex	120.9 MHz	50W	more than 27 km	Frequency Stability $\pm 0.002\%$	Dual		Remote control Function	1 set	Communications btw ATC & Pilots
		2) Emerg Transmt & Recvr	A3E, Simplex	121.5 MHz	50W							
		3) Power Supply	Commerc./UPS									
2	Meteorology	(5) HF AFS SSB Simplex	USB or LSB	2.8 MHz - 22 MHz, 6 ch.	120W (peak)	270 km		Dual	Remote Communications	1 set	Back-up system for PTC MW Radio Link	
		(6) VHF FM										
		1) Fixed	FM Simplex	145 MHz - 150 MHz	10W	more than 3.6 km		Single			2 sets	Communications btw ATC & Fire Trucks, other cars & Persons
		2) Walkie-Talkie	FM Simplex		1 - 3W	more than 1.8 km		Single			5 sets	
		(1) Surface Weather Observatory System	Computer Processing						*Wind Speed & Direction *Temperature *Barometer		1 set	Digital Display on panel in ATC & Met. Briefing Rooms
		(2) Auto Weather Station	Analog Read						*Temperature *Hygrometer *Rainfall Gauge		1 set	Manual Read & Supply Weather Data
		(3) Weather Satellite	GMC Receive						*Parabola Antenna *WX Satellite Receiver *Image Printer		1 set	

EQUIPMENT PROJECT LIST (2)

No.	FACILITY	EQUIPMENT	TYPE	FREQUENCY	POWER	COVERAGE	ACCURACY	STRUCTURE	OTHERS	QTY	PURPOSE OF USE	
3	Lightings	(1) Runway Edge	H Intensity					150W/45 lights, in case above-surface type 185W/24 lights, in case buried type 45W/6 lights/turning pad portion/above surface	Along both sides RWY	2 rows	For final landing	
		(2) Runway Threshold	H Intensity					200W/4 lights 200W/12 lights, in case buried type	Both sides RWY28/10 ends	2 sets	For final landing	
		(3) Taxiway Edge						45W/26 lights	Along both sides TWY	2 rows	For taxiing/before Take-off or landing	
		(4) Runway End Indicator						2 Flashings	Both sides RWY28/10 ends	2 sets	For final landing	
		(5) Wind Direction Indicator						2 Lights	Both sides RWY28/10 ends	2 sets	To indicate wind direction to air	
		(6) Aerodrome Beacon	More than 37 km					1000W/2 lights Dual	On ATC Tower top	1 set	To indicate airport location to air	
		(7) Apron Flood						1000W x 2/ 4 spots	On terminal Bldg. roof	1 set	To give light around parking aircraft	
		(8) Lights Control Panel	1) Light Control 2) Power Supply								1 set	
		(9) Light Gun										
4	Power Supplies	(1) Commercial Power Receiving Station	22KV cubical 11KV cubical					1 commerc. power/100W another: Battery	In the ATC Cabin/hang from ceiling	1 pair	Emergency indication in case Radio Comm. Failure	
		(2) Aux. Generator System		50 Hz 3 Φ				415V 3 Φ/350KVA 1500 RPM x 1	Convert 22KV to 11KV & 415V Provide fuel tank capable to run 48hrs	1 set	To supply Commercial power to facilities In case commercial power failure, supply to ATC & NAV/AIDS, etc	
		(3) Aerodrome Power Line						11K & 415KV underground cabling	Provide 11KV substations	1 set	To supply commercial power to facilities	

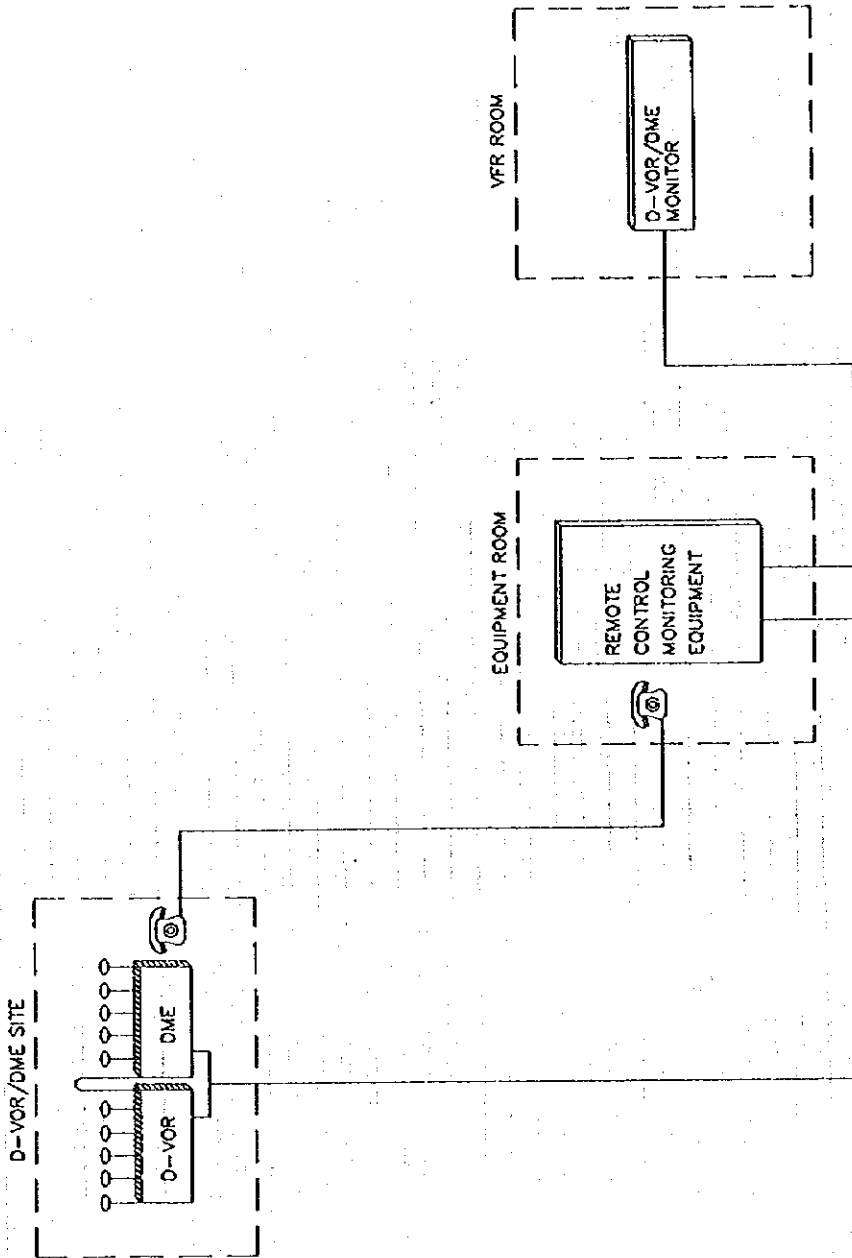
EQUIPMENT PROJECT LIST (3)

ELEMENT	NAME OF INSTRUMENTS		MAJOR SPECIFICATION					OTHERS	QTY	PURPOSE OF USE for	
	(1) ATC Telecommunication & Weather Systems	(2) Oscilloscope	TYPE	FREQUENCY	OUTPUT	STRUCTURE	Electric Supply: Commercial				
5 Instruments	1) High Frequency Generator 2) High Frequency Generator 3) High Frequency Generator 4) Frequency Counter	1) Oscilloscope 2) High Frequency Generator 3) High Frequency Generator 4) Frequency Counter	SS7635	0 - 350 MHz	-133 - +13 dbm	1) Dual Probe ; 2) Table 3) Accessories	Electric Supply: Commercial	1 set	D-VOR/DME, VHF AMS, Meteorological Equipments		
			MC3601A	0.1 MHz - 1040 MHz	-133 - +7 dbm	1) Accessories 2) Various Coaxial Connectors	same as the above	1 set	VHF AMS, HF AFS & VHF FM		
			MC3602A	0.1 - 2.080 GHz	-133 - +7 dbm	same as the above	same as the above	1 set	DME		
			MF1600A	0 - 3 GHz		1) Frequency Plug in head 2) Accessories	same as the above	1 set	D-VOR/DME, VHF AMS HF AFS, VHF FM & Meteorological Equipments		
			HP8508A	100 KHz - 1 GHz		Accessories	same as the above	1 set	D-VOR Antenna & Flight Calibration		
			MS2621B	9 KHz - 2.2 GHz		Accessories	same as the above	1 set	VHF AMS, HF AFS & D-VOR/DME		
	(2) Other System	7) Digital Multimeter 8) Insulation Register 9) Insulation Register 10) Earth Register 11) Clamp Tester 12) High Voltage Tester 13) High Voltage Tester	DC/AC 1000V/2000MΩ 500V/100MΩ AC, 0 - 10/100/1000A AC, 3KV - 34.5KV - 7KV							All Facilities & Equipments	
							Input Probe		5 sets	Insulation Resistance of Cables	
										2 sets	Same as the above
										2 sets	Earth Resistance
										2 sets	Load current
										2 sets	Voltage Check
										1 set	Voltage Check



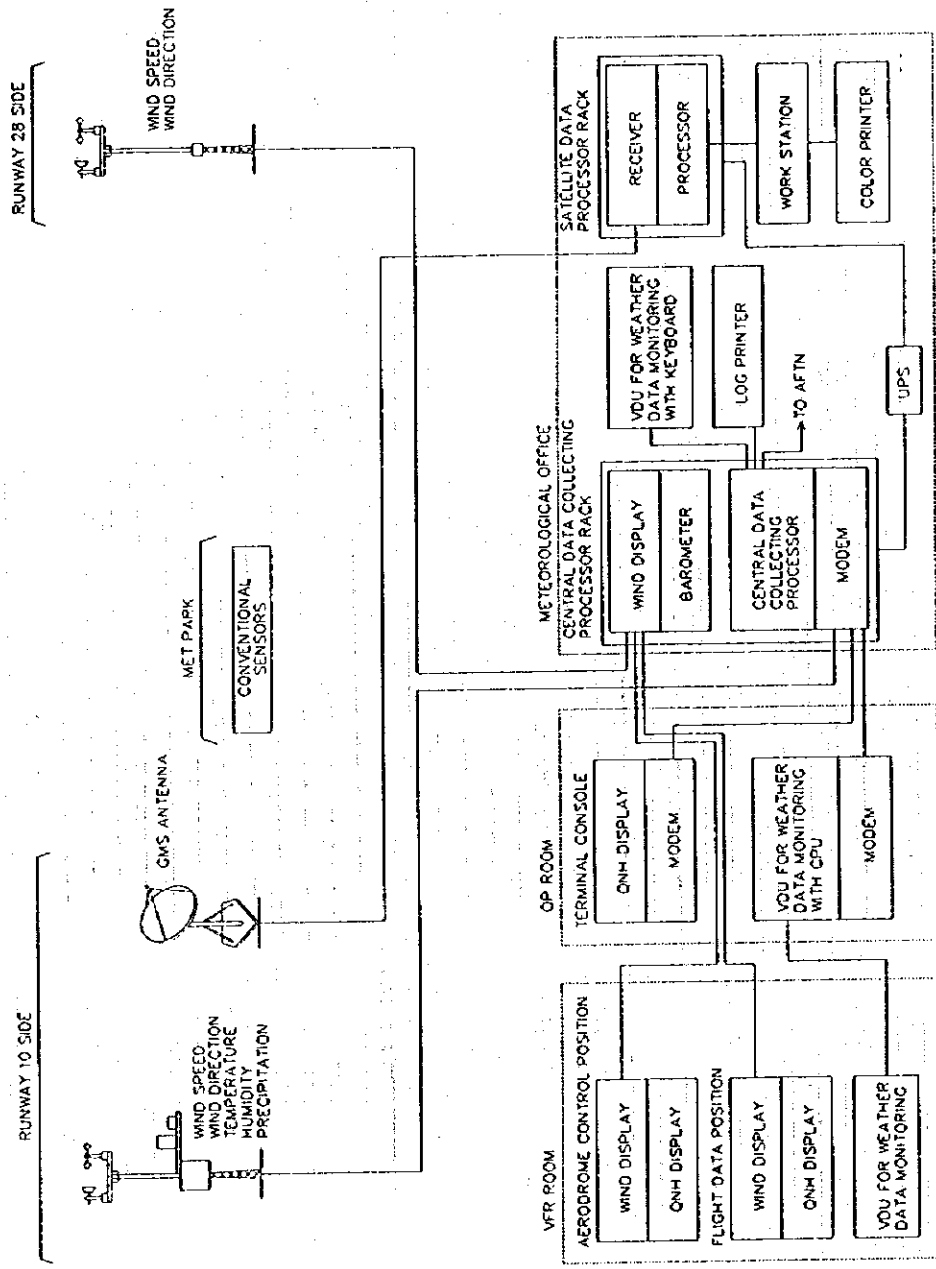
THE INDEPENDENT STATE OF THE PAPUA NEW GUINEA
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 AIRPORT & COMMUNICATION
 SYSTEM BLOCK DIAGRAM
 FOR
 TOKUA AIRPORT
 Date _____ Drawing No. _____
 DRAWN BY: [Name] CHECKED BY: [Name]

Figure 2.3.19



THE INDEPENDENT STATE OF THE PAPUA NEW GUINEA	
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TITLE OF DRAWINGS	
NAVAID SYSTEM BLOCK DIAGRAM TOKUA AIRPORT	
Date	Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOEI Co., LTD.	

Figure 2. 3. 20

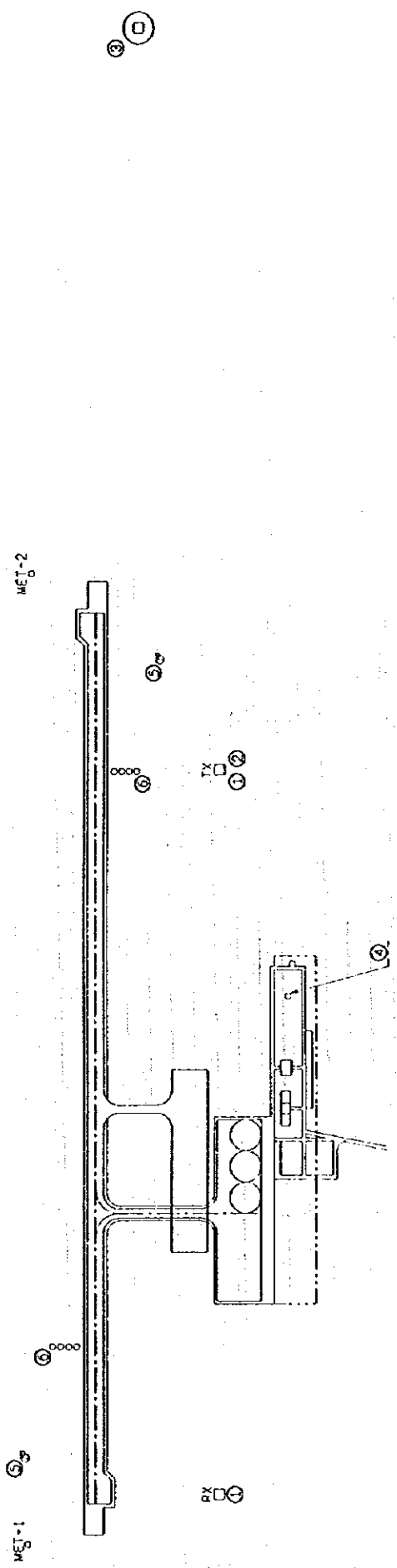


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TITLE OF DRAWINGS	
METEOROLOGICAL SYSTEM BLOCK DIAGRAM TOKUA AIRPORT	
Date:	Drawing No:
JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOGAKU CO., LTD.	

Figure 2.3.21

①	VHF SITE
②	HF SITE
③	VOR/DME
④	INSTRUMENT SHELTER
⑤	ILLUMINATED WIND DIRECTION INDICATOR
⑥	PRECISION APPROACH PATH INDICATOR

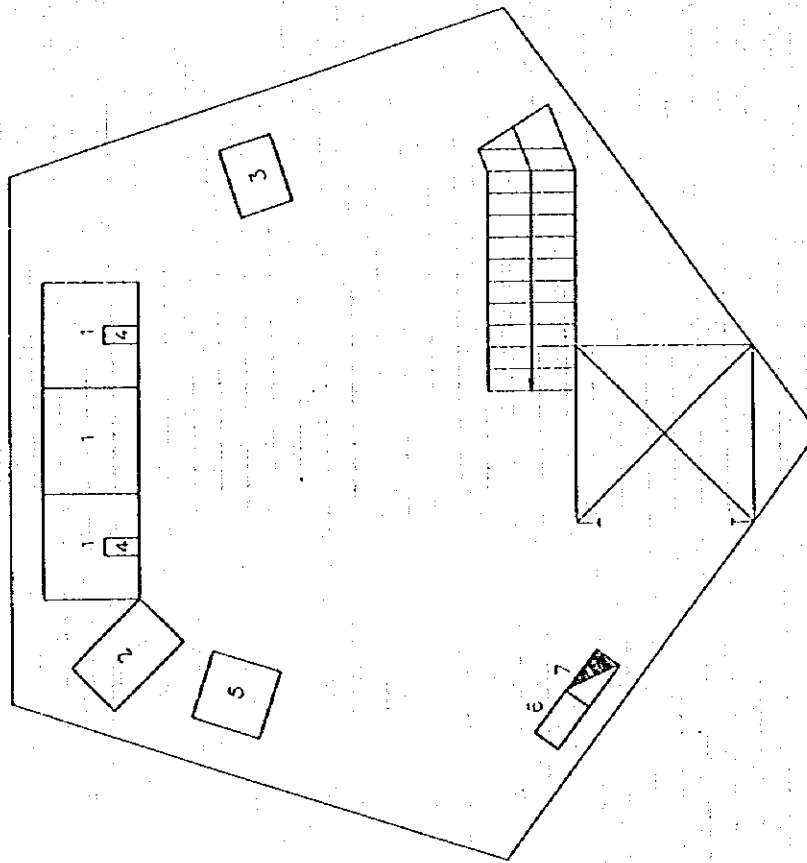
VOR/DME : VME OMNIDIRECTIONAL RADIO RANGE / DISTANCE MEASURING EQUIPMENT



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SITE LAYOUT PLAN OF NAJ/COMM/NET.	
Date:	Drawing No.:
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Figure 2. 3. 22

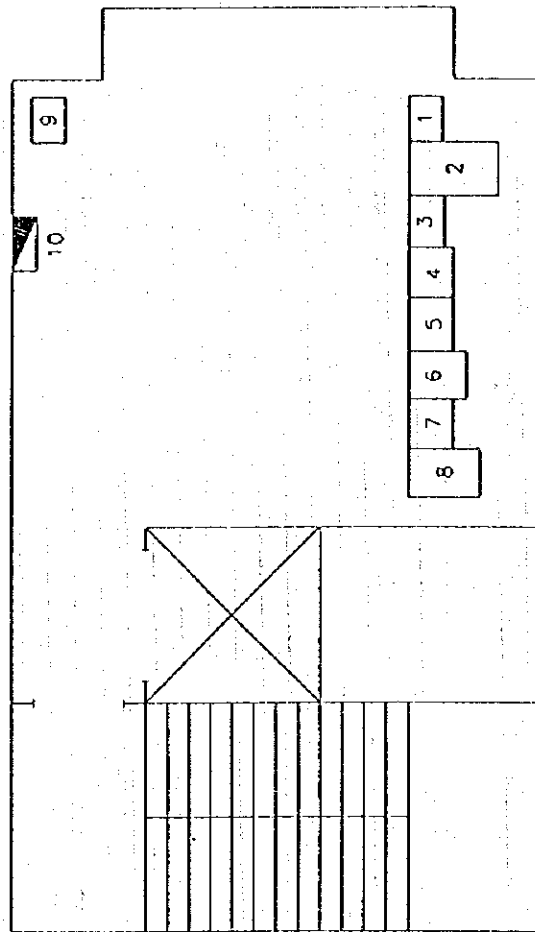
EQUIPMENT LIST	
No.	DESCRIPTION
1	TOWER CCU
2	LIGHTING CONTROL PANNEL
3	VHF FM RADIO
4	LIGHT GUN
5	RTTY
6	MDF (MAIN DISTRIBUTION FRAME)
7	AC PDB (POWER DISTRIBUTION BOARD)



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TITLE OF DRAWINGS	
EQUIPMENT RAYOUT OF VFR ROOM	
Date	Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY NIPPON KOGYOKU CO., LTD.	

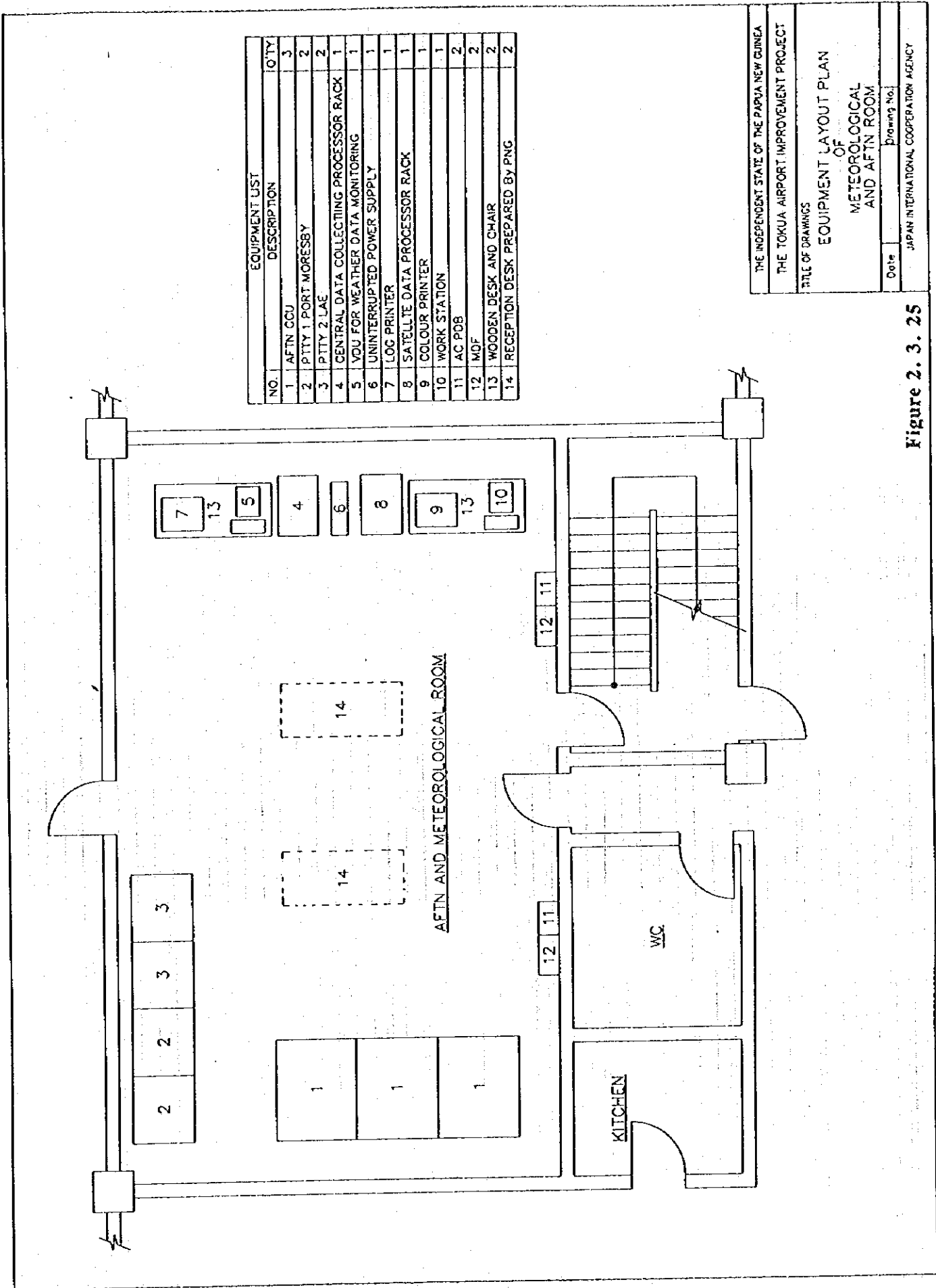
Figure 2. 3. 23

EQUIPMENT LIST	
No.	DESCRIPTION
1	TAPE REC.
2	REPRODUCER
3	CCU CONT
4	RTTY CONT
5	VHF A/G CONT
6	HF G/C CONT
7	VOR/DME REMOTE CONT
8	PBX
9	MDF
10	AC PDB



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TITLE OF DRAWINGS	
EQUIPMENT LAYOUT OF EQUIPMENT ROOM	
Date	Drawing No.
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Figure 2. 3. 24

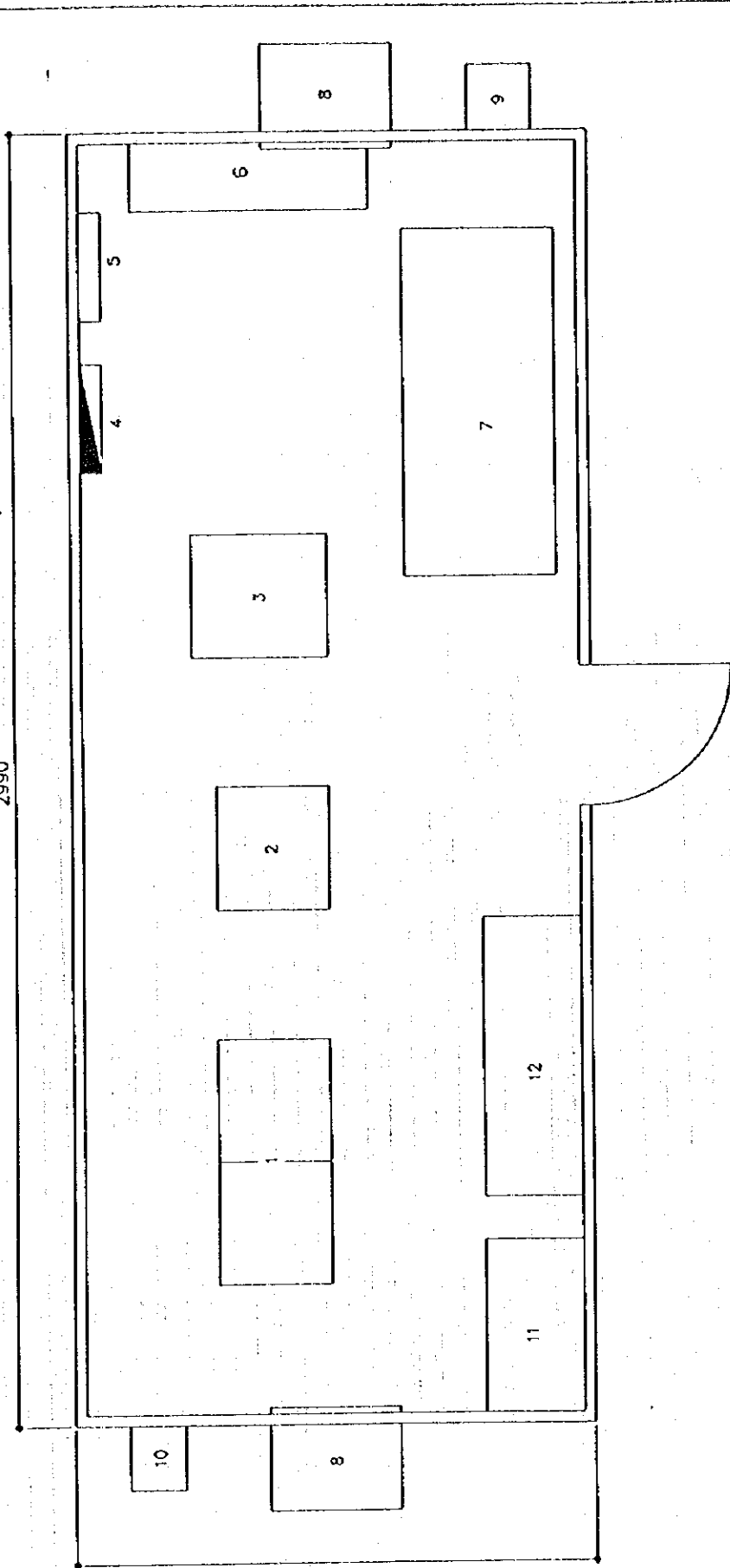


EQUIPMENT LIST		
NO.	DESCRIPTION	QTY
1	AFTN CGU	3
2	PTY 1 PORT MORESBY	2
3	PTY 2 LAE	2
4	CENTRAL DATA COLLECTING PROCESSOR RACK	1
5	YOU FOR WEATHER DATA MONITORING	1
6	UNINTERRUPTED POWER SUPPLY	1
7	LOG PRINTER	1
8	SATELLITE DATA PROCESSOR RACK	1
9	COLOUR PRINTER	1
10	WORK STATION	1
11	AC POB	2
12	MOF	2
13	WOODEN DESK AND CHAIR	2
14	RECEPTION DESK PREPARED BY PNG	2

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 TITLE OF DRAWINGS
 EQUIPMENT LAYOUT PLAN
 OF
 METEOROLOGICAL
 AND AFTN ROOM
 Date _____ Drawing No. _____
 JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 2.3.25

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1195

EQUIPMENT LIST		
NO.	DESCRIPTION	QTY
1	DVOR EQUIPMENT RACK	2
2	DME RACK	1
3	DC POWER SUPPLY RACK	1
4	AC PDB	1
5	MOF	1
6	DISTRIBUTION UNIT	1
7	BATTERY	1
8	AIR CONDITIONER	2
9	VENTILATION FAN	1
10	VENT	1
11	SPARE PARTS STORAGE CABINET	1
12	WORK BENCH	1

THE INDEPENDENT STATE OF THE PAPUA NEW GUINEA

THE TOKUA AIRPORT IMPROVEMENT PROJECT

TITLE OF DRAWINGS

EQUIPMENT LAYOUT PLAN

OF

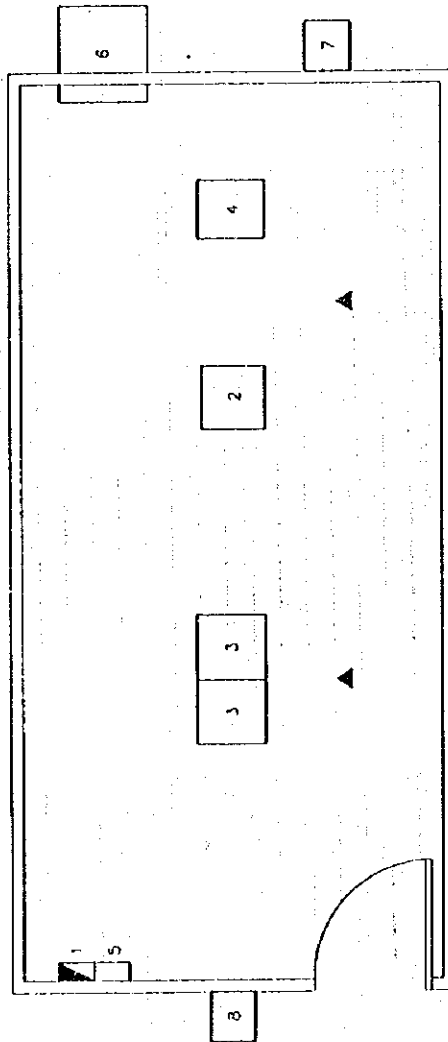
DVOR/DME SHELTER

Date _____ Drawing No. _____

JAPAN INTERNATIONAL COOPERATION AGENCY
NIPPON KOGI CO., LTD.

Figure 2. 3. 26

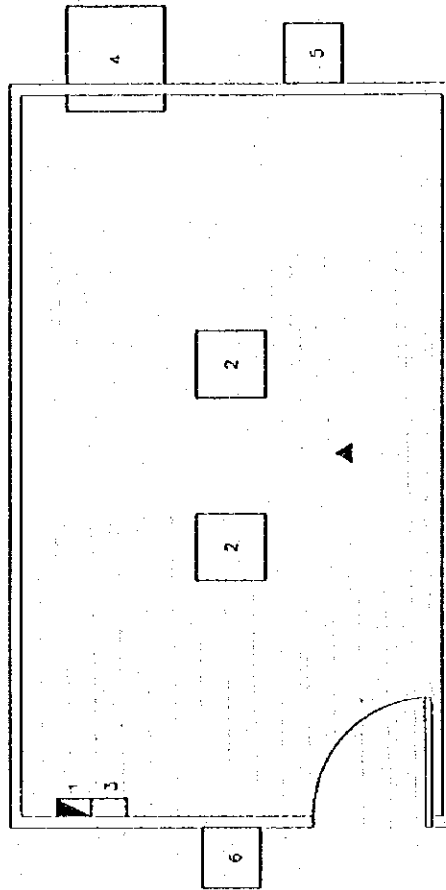
EQUIPMENT LIST		
No.	DESCRIPTION	QTY
1	AC PDB	1
2	HF TRANCEIVER 100W (HF APS)	1
3	VHF TRANSMITTER EQUIPMENT	2
4	ANTENNA CHANGER RACK	1
5	MDF	1
6	AIR CONDITIONER	1
7	AIR DUCT	1
8	VENTILATION FAN	1



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EQUIPMENT LAYOUT OF TX STATION	
Date	Drawing No.
DRAWN BY: [Name]	
CHECKED BY: [Name]	

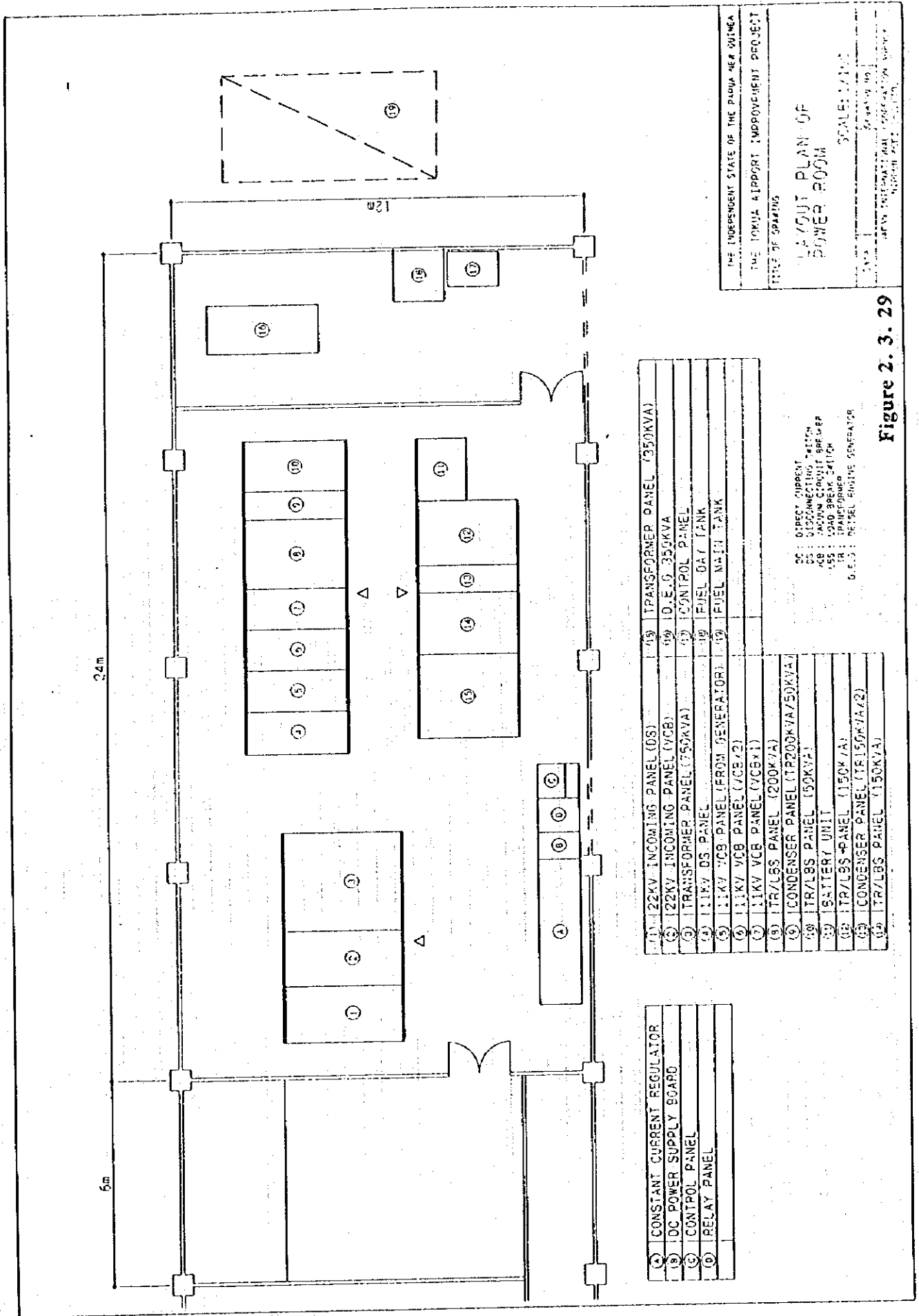
Figure 2. 3. 27

EQUIPMENT LIST		
No.	DESCRIPTION	QTY
1	AC PDB	1
2	VHF RECEIVER EQUIPMENT	2
3	MDF	1
4	AIR CONDITIONER	1
5	AIR DUCT	1
6	VENTILATION FAN	1



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THE GULKA AIRPORT IMPROVEMENT PROJECT	
TITLE OF DRAWINGS	
EQUIPMENT LAYOUT OF RX STATION	
Date	Drawing No.
DRAWN BY: [Name]	
CHECKED BY: [Name]	

Figure 2. 3. 28



THE INDEPENDENT STATE OF THE PHOENIX AIR ROUTE
 THE TOLUCA AIRPORT IMPROVEMENT PROJECT
 TITLE OF DRAWING
 LAYOUT PLAN OF POWER ROOM
 SCALE: 1/100
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

(1) 22KV INCOMING PANEL (DS)	(19) TRANSFORMER PANEL (350KVA)
(2) 22KV INCOMING PANEL (VCB)	(20) D.E.O. 350KVA
(3) TRANSFORMER PANEL (50KVA)	(21) CONTROL PANEL
(4) 11KV DS PANEL	(22) FUEL OIL TANK
(5) 11KV VCB PANEL (FROM GENERATOR)	(23) FUEL MAIN TANK
(6) 11KV VCB PANEL (VCB/2)	
(7) 11KV VCB PANEL (VCB/1)	
(8) TR/LSS PANEL (200KVA)	
(9) CONDENSER PANEL (1200KVA/50KVA)	
(10) TR/LSS PANEL (50KVA)	
(11) BATTERY UNIT	
(12) TR/LSS PANEL (150KVA)	
(13) CONDENSER PANEL (150KVA/2)	
(14) TR/LSS PANEL (150KVA)	

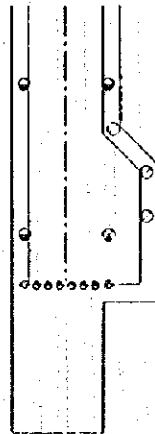
(A) CONSTANT CURRENT REGULATOR
(B) DC POWER SUPPLY BOARD
(C) CONTROL PANEL
(D) RELAY PANEL

DC : DIRECT CURRENT
 DS : DISCONNECTING SWITCH
 VCB : VACUUM CIRCUIT BREAKER
 LSS : LOAD BREAK SWITCH
 TR : TRANSFORMER
 G.E.S : DIESEL ENGINE GENERATOR

Figure 2.3.29

DESCRIPTION	SIGNAL	LAMP	QTY	REMARKS
RUNWAY EDGE LIGHTS	5	5.0A 150W WHITE/WHITE	17	
	6	5.0A 150W WHITE/YELLOW	37	
	7	5.0A 150W WHITE/WHITE	3	SURFACE MARK
	8	5.0A 150W WHITE/YELLOW	3	SURFACE MARK
RUNWAY END AND THRESHOLD LIGHTS	9	3.0A 200W GREEN	13	SURFACE MARK
	10	3.0A 200W GREEN/RED	56	
	11	3.0A 15W BLUE	6	
	12	3.0A 25W BLUE	6	
ILLUMINATED WIND DIRECTION INDICATOR	13	AC 220V 200W/3	2	
APRON FLOOD LIGHTS	14		2	

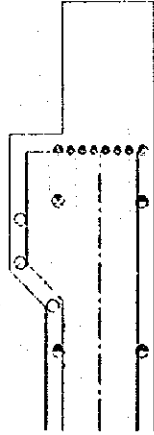
RUNWAY END LIGHTS AND THRESHOLD LIGHTS



TURNING PAD EDGE LIGHT

DET.1

TURNING PAD EDGE LIGHT



RUNWAY END LIGHTS AND THRESHOLD LIGHTS

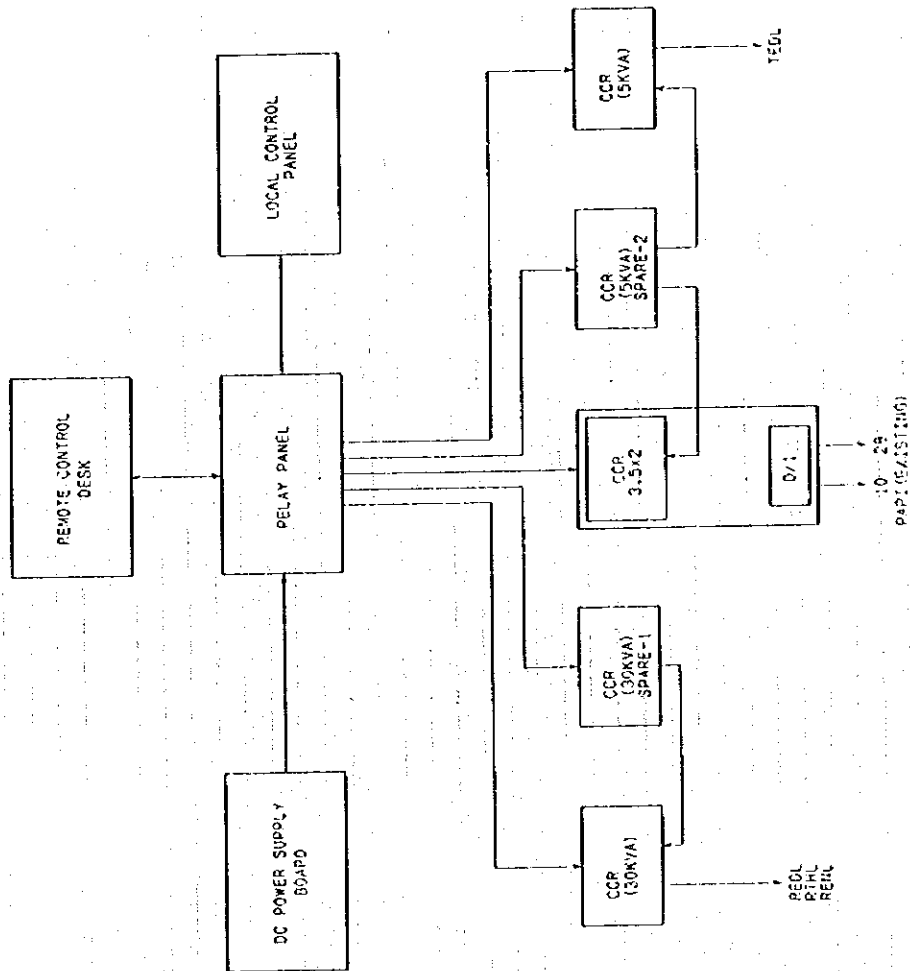
DET.2

THE INDEPENDENT STATE OF THE PAPUA NEW GUINEA
THE USUJA AIRPORT IMPROVEMENT PROJECT
TITLE OF DRAWING

LAYOUT OF AERONAUTICAL
GROUND LIGHTS (S)

DATE: 2012
DRAWING NO.:
ISSUED FOR: INTERNATIONAL COORDINATION WORK
DESIGNED BY: [Name]

Figure 2. 3. 32



THE INDEPENDENT STATE OF THE PAPUA NEW GUINEA
 THE TOKUA AIRPORT IMPROVEMENT PROJECT
 TITLE OF DRAWING
**CONNECTION DIAGRAM FOR
 POWER SUPPLY AND
 REMOTE CONTROL**
 Date: _____ Drawing No.: _____
 PROJECT INTERNATIONAL OPERATIONS DIVISION
 AIRPORT AUTHORITY

Figure 2. 3. 33

CHAPTER 3 . IMPLEMENTATION PLAN

3-1 Implementation Plan

1. Construction Period

The period of the Grant Aid is usually within the Japanese fiscal year(April to March). Within the fiscal year, all procedure such as E/N, concluding contracts by PNG with the consultant and contractors, and the final payment to them should be completed.

In case of a Project which requires net construction period of more than 12 months, the period of the Grant Aid is divided into terms for each fiscal year depending on the Basic Design Study Report.

This Project provides that if the construction works are started in September, 1996, the entire construction period will be divided into two terms for a total construction period of 19 months.

2. Construction Conditions

The construction work items are limited to those which can be executed with the safe commercial operation of the airport.

Special attention will be paid for night construction work, some imported equipment and sophisticated electronic apparatuses. To complete the Project within the scheduled time, a proper management organization must be provided with personnel assigned from Japan.

3-1-1 Implementation Concept

1. Civil Work

(1) Basic Conditions of Project Implementation

Tokua Airport, the subject of this project, has replaced Rabaul Airport, which with the city of Rabaul was damaged by a volcanic eruption. Tokua Airport requires an urgent improvement.

Civil engineering work contemplated herein is to improve runway, taxiway, etc.. Factors which may influence construction schedule would include:

- Work is to be executed in a location remote from the capital city.
- Work is to be executed while the airport is commercially operational.
- Stability of pavement materials supply.
- Ability to meet intermediate work goals
(Handing over to the operational equipment contractor)

In order to meet these conditions and to ensure that the work will be carried out smoothly, it will be necessary to procure a stone crushing plant and asphalt plant from overseas sources. The time required to arrange delivery and installation of these plants and then to produce the necessary quantity of aggregate and asphalt mixture will be the critical path of the construction work.

Construction work will be tentatively classified, in the order of work schedule, into preparation work, construction of temporary plants, ground preparation work, pavement work, marking work and clearance work. In consideration of those conditions mentioned above, the civil engineering work schedule will be established so as not to exceed 16.5 months.

(2) Execution Method

A site will have to be secured adjacent to the work site in order to allow construction of temporary facilities including office, accommodation for personnel, warehouse, water supply and drainage facilities, motor pool and so forth in order to ensure comfortable living and working environment for Japanese nationals and local work force.

In parallel to the construction of temporary facilities a stone crushing plant will be installed in the location adjacent to Warrangoi River quarry where river gravel is available and about 30km away from the work site in order to ensure stable supply of aggregate with satisfactory quality and quantity.

Also, in order to ensure satisfactory quality of pavement materials and to shorten transport time thereof as much as possible, an asphalt plant will be installed at a location close to the work site.

Earth work will be executed in the order of embankment for the overrun portion at the runway 28 end, banking for runway and taxiway and excavation and banking in front of apron portion in conjunction with the works of overrun, runway and taxiway and apron themselves. Overlay of runway will be commenced from the runway 10 end in conjunction with the operation of the asphalt plant. The runway overlay work will be carried out during hours when no aircraft are operating.

Pavement will be finished in sections on a daily basis with transfer slope to existing pavement in order not to interfere with the safe operation of aircraft during the day.

After the completion of the runway work, the works for taxiway, apron and marking will be executed in the said order. Those works will be executed during day time work hours and by using unoccupied space in the site area.

(3) Points of Attention for Implementation

Special care shall be given to the following points when the above works herein are to be executed.

- 1) Because the work site is located remotely from the capital city, special care shall be taken with regard to the planning of the requirement of work force and procurement of materials.
- 2) Because the work must be executed while the airport continues to operate commercially, a close liaison will have to be maintained with the authorities at all times in order to ensure safe operation of aircraft.
- 3) In case night time work is required, sufficient safety precautions such as lighting will be implemented.

- 4) In order to ensure a prompt and stable supply of crushed stone and asphalt, installation of temporary plants and trial run thereof shall be supervised by the engineers dispatched from Japan.
- 5) Intermediate work schedule and completion work schedule shall be strictly observed in order to hand over to operational equipment contractor and to allow flight calibration test.

2. Architecture

1-1 Construction Planning

(1) Determination of Construction Schedule

Tokua Airport, which is to be improved under this project, is located about 40 km from Rabaul city area. The Administration Building/Control Tower is critical for determining the total construction schedule. The basic policy will be to give priority to commencement of installation of equipment, and construction of this facility will be given precedent. The total construction period will be 18 months from commencement, including other buildings.

(2) Construction Methods

Basically, locally available materials will be selected and local construction conditions will be considered in determining construction methods. All buildings will be reinforced concrete structure, truss roofs and non-bearing reinforced masonry wall construction. A usable material stockyard will be maintained by coordination with civil construction. Effective use of lifting equipment will be executed by an network construction schedule coordinating construction of all facilities. A lightweight wooden truss system is proposed for some facilities in order to shorten construction time.

1-2 Considerations concerning Construction

Basic policy concerning the project implementation as a grant-aid project is as follows;

1) Strict adherence to construction schedule

All construction schedules will be set out under the condition that construction will be under the technical guidance of a supervising Japanese engineer.

- 2) **Maintaining quality and quantity**
The quality and quantities stipulated in the construction documents will be maintained for all construction items.
- 3) **Safety during construction**
Safety during construction shall be a high priority. Temporary construction will be planned with due consideration for safety.

Based on the basic policies given above, items requiring particular care are as follows:

- 1) Sub-contractors in the construction industry lack sufficient project volume and skilled labor. Small to medium sized contractors with multi-skilled workers undertake many types of sub-contracting work at one time. Special care will be taken in hiring and securing sufficient workers in order to maintain construction schedule.
- 2) Australians and/or New Zealanders are managers or foremen in many construction firms with local labor working under their supervision. Therefore, care must be taken in communication concerning construction drawings and construction technologies.
- 3) There are few local firms with lifting cranes capable of constructing the roof trusses of various facilities. Due care must be taken in the procurement of heavy machinery.
- 4) Building regulations are based mainly on Australian practice. There is a tendency to require excess time for permits and certificates at every stage of construction including inspections at completion and intermediate inspection, etc.. Therefore all applications for permits, etc. must be submitted with sufficient lead time to allow the smooth execution of construction.
- 5) Except for concrete and concrete masonry blocks, locally made products are rare while imported articles suffer from lack of sufficient stock. Therefore, materials to be procured must be ordered expediently and due investigation of quality, quantity and period for delivery is required.

6) Administration system concerning construction

(a) Regulation for buildings

The basic regulatory law concerning building equivalent to Japan's Standard Building Law is Independent State of Papua New Guinea, Chapter 301, Building. This law is composed of 3 main sections, Namely, 1. Building Act. 2. Building Regulation, 3. Subsidiary Legislation.

(b) Subsidiary Legislation

Especially concerning structural design calculations, detailed rules are set out under the PNG standards and it is required by law to base structural calculations and details on the standards.

There are standards or regulations concerning design of electrical, air-conditioning, mechanical and plumbing systems. Local Design codes and Regulations, and Australian Standards and relevant British Standards adopted by PNG Institute of Standards and Industry applicable for the mechanical, electrical, air-conditioning and plumbing systems will be used.

7) Restrictions on skilled construction labor

Employment conditions and labor relations in Papua New Guinea are governed by several labor and employment related laws.

The main related laws are the following;

Employment Act(1978).....work conditions and wages

Employer-Employee Relations Law(1962).....arbitration of labor disputes, labor agreements and mediation

Unionization Law(1968).....Labor unions and collective bodies

Apprentice Law(1967)

Labor Compensation Law

Expatriate Employment Law(1978)

Industrial Safety, Health and Welfare Act(1961)

(a) General labor conditions

According to the current Common Rules and the 1978 Employment Act, the minimum employment conditions are set out for all employees and employers of both urban and rural areas. The items set out include employment hour, rest days, sick days, special rest days and long term paid leave days, dismissal, overtime, housing and repatriation.

(b) Compensation for labor accidents

Based on the 1978 Laborer Compensation Act, it is required to place insurance coverage on all employees. Accidents leading to death of laborers, accidents leading to loss of works time to laborer or accidents deemed to cause permanent invalidity must be reported to the Department of Labor. This law requires compensation payment to the injured laborers or to the family of the injured or dead laborer, especially if the injuries were the result of the employment or were incurred during working hours.

(c) Localization of employment

The creation of employment opportunities and raising the technical competence of PNG are important national objectives. The Government encourages industrial training intended to raise technical skills especially of the intermediate class level. The main measure by which the Government proposes to achieve these objectives is vocational training and the localization of employment status. The Government recognizes the need of foreign firms to recruit overseas personnel for management, administrative and technical positions, but foreign firms employing expatriate technical staff are required under Government policy to submit plans for localization.

3. Operational Equipment

(1) Quality, Delivery, Installation and Inspection

The design and quality of the equipment which are made by manufacturers should conform with ICAO standards. The delivery and installation of equipment will be done by the manufacturers pertinent to each equipment at the time of delivery and installation. After installing equipment, inspections are conducted by the manufacturers.

(2) Maintenance and Inspection

- 1) The types of maintenance and inspection of the equipment are classified as a normal maintenance and inspection carried out by the inspectors having technical knowledge of airport engineering.
- 2) Periodical inspections are recommended in principle and special inspections should be obligatory. The inspected items should be based on a check-list which includes the items that have been stated as needing maintenance in the previous inspections.
- 3) The data should be analyzed and abnormal results should be pointed out for further inspection.
- 4) The budget for the airport maintenance will be covered by PNG Government with assistance of Office of Civil Aviation, Department of Transport.

(3) Drawings

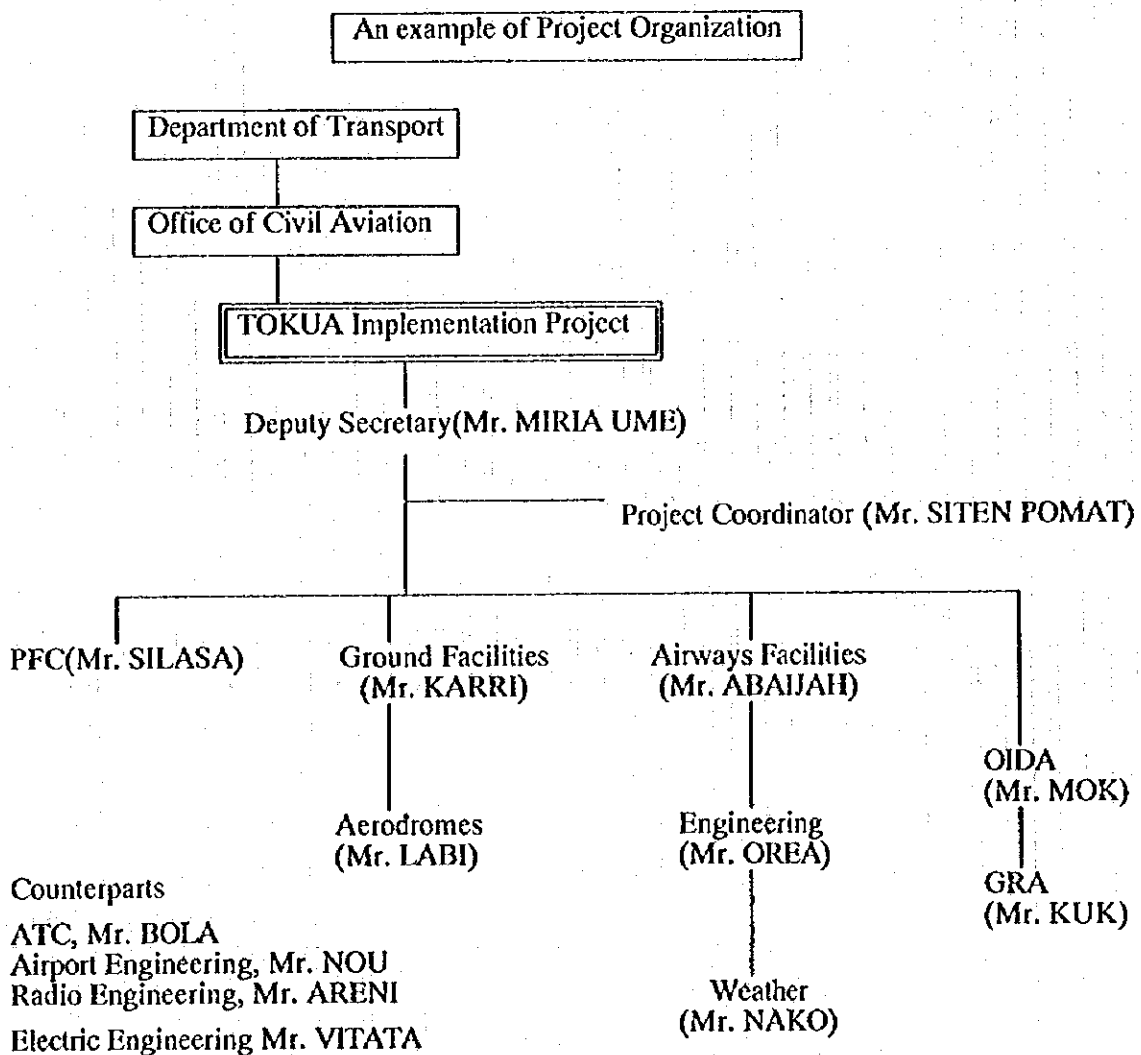
The drawings for the implementation works will be attached in the Appendix.

3-1-2 Implementation Conditions

It will be necessary for OCA to provide a project manager with capable staff to act as the principal interface between the project organization, OCA and other governmental authorities.

The liaison, administrative functions and responsibilities of OCA will encompass many disciplines as detailed in the following;

1. Policy matters of respective services
2. Financial liaison (tax exemption etc.)
3. Labor liaison (for overseas workers)
4. Legal applications
5. Staff recruitment and training



3-1-3 Scope of Works

Division of construction work into respective responsibilities of Japanese and PNG government work under grant-aid rules is as shown in the following table;

1. Civil Engineering

Table 3.1.1 Division of Construction Responsibilities

Item	Japan	PNG Government
1. Temporary Work	<ul style="list-style-type: none"> • Crusher plant installation & operation • Asphalt plant installation & operation 	<ul style="list-style-type: none"> • Aquisition of land
2. Pavement	<ul style="list-style-type: none"> • Runway, overrun, taxiway, apron, GSE road, each shoulder 	<ul style="list-style-type: none"> • Terminal area roads, parking
3. Markings	<ul style="list-style-type: none"> • Runway and taxiway 	<ul style="list-style-type: none"> • Apron
4. Grading Work	<ul style="list-style-type: none"> • Runway • Overrun • Apron • VOR/DME site 	<ul style="list-style-type: none"> • All terminal area site • Cutting down trees
5. Drainage	None	<ul style="list-style-type: none"> • Terminal area drain ditch
6. Others	None	<ul style="list-style-type: none"> • Fence, gate

2. Architecture

Table 3.1.2 Division of Construction Responsibilities

Item	Japan	PNG Government
General	<ul style="list-style-type: none"> • Application for building permit 	<ul style="list-style-type: none"> • cooperation
Architectural Construction	<ul style="list-style-type: none"> • Construction of passenger terminal, administration/control tower, C.F.R • Workshop building 	<ul style="list-style-type: none"> • Removal of topsoil under each new construction • Installation of utensils and furniture • Installation of curtains, blinds and carpets
Electrical Equipment	<ul style="list-style-type: none"> • Installation of electrical equipment for above facilities 	<ul style="list-style-type: none"> • Installation of PABX unit • Internal wiring and installation of telephone and facsimile receivers
Mechanical Equipment	<ul style="list-style-type: none"> • Installation of mechanical equipment for above facilities 	<ul style="list-style-type: none"> • Water supply piping up to site boundary • Provision of water source(well)
Landscaping	<ul style="list-style-type: none"> • Construction work around each building 	<ul style="list-style-type: none"> • Planting

3. Operational Equipment

The division of the Scope of Works for operational support equipment borne by Japan and PNG Government is described as the following Table 3.1.3

Table3.1.3 Division of Scope of Works

No.	Facilities	Japan (New Installation)	PNG
1.	ATC Tele-communication	<ul style="list-style-type: none"> • D-VOR/DME • ATC Consoles & AFTN Consoles W/RTTY • ATC Tape Recorder • VHF AMS Receiver & Transmitter • VHF AFS SSB Receiver & Transmitter • VHF FM Receiver & Transmitter 	<ul style="list-style-type: none"> • Acquisition of land • Cutting trees • Application for Flight Calibration • Feed PTC Line Circuit into Aerodrome • Assignment of using Channel & Mode • Application for Flight Calibration • Assignment of using channel • Adjustment w/Local Airports • Assignment of using channel • Installation on Fire Truck
2.	Meteorology	<ul style="list-style-type: none"> • Surface Weather Observatory System including AWS • Weather Satellite 	<ul style="list-style-type: none"> • Application & Approval • Adjustment w/Local Weather Station
3.	Aeronautical Lightings	<ul style="list-style-type: none"> • Runway Edge Lights • Runway Threshold Lights & Runway End Lights • Stopway Lights • Taxiway Edge Lights • Runway End Lights • Wind Direction Lights • Aerodrome Beacon • Apron Flood Lights • Light Control Panel <ul style="list-style-type: none"> 1) Light Control 2) Power Supply • Light Gun 	<ul style="list-style-type: none"> • Application for Flight Calibration
4.	Electric Power Supply	<ul style="list-style-type: none"> • Commercial Power Supply Receiving Station • Auxiliary Generator System • Aerodrome Power Line 	<ul style="list-style-type: none"> • Application to Elcon • Feed into Aerodrome
5.	Instruments	<ul style="list-style-type: none"> • Maintenance Check 	

3-1-4 Consultant Supervision

At the first step Japanese experts will be assigned in the course of Consultant Supervision as follows:

Position	Job description
1. Project Manager	Fully responsible for the entire construction supervision
2. Resident Engineer	Establish the managing system of the Project and cooperate with the construction agency
3. Respective Engineers	1) Civil Engineer 2) Architect 3) Electricity 4) Navigation system 5) Communication system 6) Weather and ATC system

1. Civil Engineering

The consultant will dispatch resident Japanese engineer/s to supervise the execution of main works during entire construction work period. Responsibilities to be shared by principal staff members shall be as follows:

(1) Project Manager

He shall supervise comprehensively matters concerning execution, design, tendering and construction work as a whole.

(2) Civil engineer

He shall supervise design of civil engineering facilities such as runway, taxiway and apron during detail design phase. During construction work phase, he shall supervise and take command of confirmation of soil conditions, quality of embankment and pavement and so forth.

(3) Planning and estimation engineer

During detail design phase, he shall examine detailed execution planning as well as review construction cost and project cost based on the cost of basic design.

- (4) **Person in charge of tendering/contracting**
He shall prepare tender documents and draft contract documents during detail design phase.
- (5) **Resident engineer**
He shall be resident at the work site and supervise execution and arrangement of the work as a whole during construction work phase.

2. **Architecture**

The contract activities of the consultant during the construction period is given below:

- (1) **Cooperation for Construction Contract**
Choosing of contractor, determination of contract system, preparation of draft contract documents, inspection of particulars of bill of qualities, witnessing of contract signing.
- (2) **Inspection and Approval of Shop Drawings**
Inspection of shop drawings, materials and finish samples, and electrical and mechanical equipment submitted by contractor.
- (3) **Instruction on Construction**
Instruction to contractors on construction schedule, scrutiny of contents of invoice, etc.
- (4) **Cooperation on Payment Approval Procedures**
Completion inspection at each stage of construction and scrutiny of contents of invoice, etc.
- (5) **Completion Inspection**
Inspection for each piecework section, issuing of certificates of completion.

The consultant will confirm that the work has been completed and all contractual responsibilities met. He will then witness the handover procedures, receive the employer's certificate of acceptance and terminate his service. He will also report to the relevant Japanese government authorities on construction progress, payment procedures and handing over of completed facilities.

3. Operational Equipment

As described in 2-1-3, before implementing works a careful and detailed coordination organization has to be made between PNG and the Consultant.

During the implementation a relevant officer has to be clearly assigned so that a necessary NOTAM can be promptly issued as to the works at the airport, for safe operation of aircraft and to avoid hampering the works being conducted.

It is also conceivable that an implementation supervisor should be stationed at the work sites. He or his deputy, before starting daily works, takes the lead in conducting TBM-KY and opening a periodical and obligatory safety meeting of contractors and let them record daily check lists.

Taking into account the importance of aeronautical equipment, technical specialists will be dispatched from Japan for assembling, installing, test running and adjusting and attending at flight calibration test. They will also make the Implementation Control Plan so that the work quality control and securing the reliability of equipment can be kept and that the equipment can be smoothly delivered to the PNG side.

3-1-5 Procurement Plan

1. Civil Engineering

(1) Labor conditions

While ordinary labor can be acquired in and around Tokua, skilled labors such as foremen, mechanics, heavy equipment operators must be recruited in Port Moresby. Engineer/s and/or supervisor/s to assist Japanese engineer/s can be recruited in New Zealand and Australia. Also, it will be necessary for engineer/s to be dispatched from Japan by manufacturers in order to supervise assembly/adjustment of asphalt plant and stone crushing plant.

Although minimum wage is mandatory under the current PNG laws, actual wage level is much higher than the mandatory minimum wage. Therefore, actual wage level will be established base on an estimate submitted by local contractors.

With regard to labor conditions, basic work hours are 8 hours per day, 44 hours per week. Overtime will be subject to overtime bonus. Overtime bonus for work on holidays is 2.0 times of regular wage. In addition, paid holidays, workmen's accident compensation insurance, employment pension and so forth are mandatory. However, no wage system is firmly established for night time work, and therefore runway work will be subject to the same wage level as day time work.

(2) Construction materials

Procurement of construction materials for use in the construction work contemplated herein will be as shown in Table 3.1.4. Principal items are soil for embankment, crushed stone and asphalt for use in pavement.

Excavated soil during site preparation will be used as the soil for embankment and shortage of embankment material will be supplemented by sound soil excavated from soil collecting lot located within the work site.

Crushed stone will be produced from river gravel collected from Warangoi River and crushing plant will be installed there in order to ensure satisfactory quality and required quantity.

As asphalt is not locally available, imported asphalt will be used.

(3) Plant Facilities and Construction Machineries

Stone crushing plant will be procured from overseas source in order to ensure stable supply in terms of satisfactory quality and sufficient quantity. An asphalt plant will also be procured from overseas source because no asphalt plant is currently available at the work site.

Compared with the lease price of construction machinery, the price for procurement from Japan is cheaper than the price of local sources. Local lease rate is 2-3 times higher, in general, and could be as high as twenty or thirty times higher for certain items than the lease rate from Japan.

Accordingly, principal items of construction machinery will be procured from Japan as shown in Table 3.1.5.

Table 3.1.4 Plan to Procure Principal Items of Construction Materials

No.	Name of Material	Availability		Country of Origin			Remarks
		Good	Not Good	PNG	Japan	Others	
1	Sand	○		○			Original brand is available. Quality is stable.
2	Gravel	○		○			Qualities such as grading stone quality and so forth are stable. Washing plan is existing.
3	Crushed stone	○		○			This items will be produced by a new stone crusing plant in order to ensure stable supply in terms of quality and quantity.
4	Portland cement	○		○			
5	Reinforcing steel bar	○				○	Import from Australia
6	Asphalt	○				○	Import from either Australia or Singapore
7	Asphalt emulsion					○	Import from either Australia or Singapore
8	Base course	○		○			This item willbe produced by a new stone crushing plant in order to ensure stable supply in terms of quality and quantity.
9	Paint	○				○	Import from Australia

Table 3.1.5 Source of Procurement for Principal Items of Construction Machinery

NO.	Name of Machinery	Specification	PNG	Japan	Remarks
1	Stone crushing plant	60 t/h		○	
2	Asphalt plant	60 t/h		○	
3	Bulldozer	15 t - 21 t		○	
4	Backhoe	0.35 - 1.0 m ³		○	
5	Tire shovel	1.60 - 3/1 m ³		○	
6	Dump truck	4 - 11 t		○	
7	Cargo truck	2 - 8 t		○	
8	Motor grader	3.7 - 3.1 m		○	
9	Macadam roller	10 t		○	
10	Watering cart	5 - 8 kl		○	
11	Distributor	4.0 kl		○	
12	Finisher	7.5 m		○	
13	Tire roller	8 - 20 t		○	
14	Vibration roller	2.5 - 0.6 t		○	
15	Generator	350 - 15 kva		○	
16	Crawler crane	40 t		○	
17	Truck crane	165, 25t		○	
18	Tamper	60 - 100 kg		○	
19	Rammer	60 - 100 kg		○	
20	Compressor	5 m ³ , 17 m ³		○	
21	Concrete cutter 30 cm	30 cm		○	
22	Line marker	Standard, welding type		○	
23	Submerged pump	6" - 2"		○	

2. Architecture

Procurement of all materials and equipment used in this project should be done with consideration for ease of maintenance of the facility, and in case of breakage or failure of equipment, ease of replacement and repair.

Locally available material will be used in this project as far as possible. A list of procurement for this project is given in Table 3.1.6 below.

Table 3.1.6 Procurement Plan of Materials and Equipment

Item	Supply Condition		Country of Procurement			Notes
	good	bad	PNG	Japan	Others	
Sand	○		○			some established brands quality is stable
Gravel	○		○			quality is stable, washing facilities available
Crushed rock	○		○			
Portland cement	○		○			
Ready-mixed concrete		○				
Plywood	○		○			
Reinforcement bars	○				○	Australian imports
Structural steel	○				○	Australian imports
Concrete blocks	○		○			made locally both structural and decorative blocks manufactured
Normal bricks		○			○	Australian, New Zealand imports
Metal windows and doors	○				○	Australian, New Zealand imports. Not used often in PNG
Wooden windows and doors	○		○			locally made and fitted
Galvanized steel sheets	○		○			
Glass	○				○	Australian imports
Tile	○				○	Australian imports
Vinyl tile	○				○	Australian imports
Ceiling boards	○				○	Australian imports
Furniture	○		○		○	Australian standards are well adhered to and products are good, locally made products available
Paints	○		○			Australian imports
Lighting fixtures	○				○	Australian imports
Distribution panels	○				○	Australian imports
Electrical wiring					○	Australian imports
Transformers	○				○	Australian imports
PVC pipes	○				○	Australian imports
Sanitary fixtures	○				○	Australian imports
Pumps	○				○	Australian imports
Watertanks	○				○	Australian imports

3. Operational Equipment

It is not necessary to define the nationality of manufacturer, either Japanese or otherwise for the procurement of aeronautical equipment, if the equipment conform to the specifications of ICAO. However, it is necessary to bear in mind that manufacturers familiar with Japanese grant aid procedures should be carefully selected.

The procured equipment, though each of them has a different function, are co-related to each other as the systems of airport operation. Hence, they must be those designed as an integrated system, since each aeronautical equipment has an interface function with each other.

Therefore, the manufacturers capable of handling the system integration for airport operation are required to have high technology and installation quality control ability. Furthermore, the selected manufacturer is required to have high maintenance and technical service capability to cope with supplying spare parts and maintenance for a long period after delivering the equipment to the PNG side.

Table 3.1.7 Procurement plan

Equipments	Countries to Supply		
	PNG	Japan	Third Countries
Navigation Aids		○	△
Telecommunications		○	
Meteorological			○
Aeronautical Lightings		△	○
Power Supply		△	○
Instruments		○	△

Note: ○: Main
△: Partial

3-1-6 Implementation Schedule

From Exchange of Note to completion of the Project, the implementation schedule can be separated in to three stages: Consultant contract and detailed design, tendering and construction contract, and construction.(Refer to Implementation Schedule Table 3.1.7)

(1) Consultant Contract and Detailed Design

First, PNG will sign a contract with the selected consultant. After the consultant's contract has been signed, detailed engineering, pre-qualification documents, cost estimate and related reports will be prepared.

(2) Tendering and Construction Contract

Pre-qualification of contractors who wish to apply for tendering is to be carried out under the JICA guidelines. Pre-qualification should be executed by the consultant on behalf of the executing agency of PNG. Tender opening, tender evaluation and the decision on the contractor are carried out by the Consultant and staff of PNG in the presence of the bidders and JICA staff, and then the construction contract award is made.

(3) Construction

In the first stage of construction, a well thought out preparatory work schedule should be planned for the construction implementation schedule.

Table 3.1.7 Implementation Schedule(D/D, Tender Contract)

Item	Total Month	1	2	3	4	5	6	7	8	9	10	11	12
Approval by the Cabinet				Δ									
Exchange of Notes (E/N) for D/D				Δ									
Consultant Contract				Δ									
Detail Design (D/D)					████████████████████								
Approval by the Cabinet										Δ			
E/N for S/V & Construction										Δ			
Pre-Qualification										████████████████			
Tender										████████████████			
Construction Contract													████

Table 3.1.7 Implementation Schedule (Construction)

Item	Total Month	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Preparatory Civil Work			█	█	█															
Site Preparation						█	█	█	█	█	█	█	█	█	█	█	█			
Pavement Works																				
Runway						█	█	█	█	█	█	█	█	█	█	█	█			
Taxiway & Apron																				
Index Marking																				
Crushed Stone Plant			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█		
Asphalt Plant			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█		
Temporary Facilities		█	█	█	█															
Administration & Control Tower																				
Excavate Ground Beams			█	█	█															
Frame				█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Block & Plaster Internal Finishes																				
Passenger Terminal																				
Excavate Ground Beams				█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Frame																				
Block & Plaster Internal Finishes																				
Maintenance Workshop & C.F.R. Building																				
Excavate Ground Beams				█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Frame																				
Block & Plaster Internal Finishes																				
Testing																				
Side Ditch																				
Power Supply (by OCA)																				
Water Supply (by OCA)																				
Preparation Works		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Radio Comm, ATC, MET Facility																				
Production, inspection, Packing																				
Transportation																				
EQ Installation																				
Field Adjust, Test, Commissioning																				
Aeronautical Ground Lights System																				
Production, Inspection, Packing																				
Transportation																				
EQ Installation																				
Field Adjust, Test, Commissioning																				
Electric Power Facility																				
Production, Inspection, Packing																				
Transportation																				
EQ Installation																				
Field Adjust, Test, Commissioning																				
Hight Check																				

3-1-7 Obligation of Recipient Country

The following necessary measures should be taken by Papua New Guinea on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To clear the sites prior to the commencement of the construction;
2. To undertake incidental external works such as planting, fencing, gates and outdoor lighting;
3. To provide the following incidental facilities for the Project;
 - 1) Electricity distributing line to the site(to bring necessary commercial electric supply into the airport)
 - 2) Water supply to the site
 - 3) Drainage main to the site
 - 4) Telephone trunk line to the site and subscribers in the buildings
 - 5) General furniture such as carpets, curtains and other utensils and furnishings.
4. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the banking Arrangement, namely the advising commission of the "Authorization to Pay" and "payment commission";
5. To ensure prompt unloading, tax exemption, and customs clearance at the port of disembarkation in Papua New Guinea and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grand Aid;
6. To exempt Japanese juridical and physical nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Papua New Guinea with respect to the supply of the products and services under the verified contracts;
7. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into Papua New Guinea and stay therein for the performance of their work;
8. To provide permissions, licenses and other authorizations for the Project, as necessary;
9. To maintain and use properly and effectively the facilities constructed and the equipment provided under the Project; and
10. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.

11. It is the Basic Design Study Team's understanding that PNG will take prompt actions to cooperate with foreign agencies for the procurement of:
 - 1) A mobile control tower from KfW
 - 2) Temporary pavements of runway, commercial electric supply lines to the site and staff housing
 - 3) Diesel electric generators and fire-fighting equipment
12. After the completion of the New Rabaul Airport Project, the Facilities and Equipment provided under Japanese Grant Aid should not be used for Military purposes but only for commercial use.

3-2 Operation and Maintenance Plan

The operation and maintenance costs borne by the PNG side after the completion of this project is estimated as follows;

Table -3.2.1 Annual Operation and Maintenance Cost (thousand Kina)

Subject	Amount
Personnel Expenses	800
Electricity Charge	160
Consumables	30
Equipment Maintenance	100
Total	1,090

The main expense will be for personnel expenses. There will be about 50 personnel, of whom 39 people, such as air traffic controllers, will work in shifts while the remainder will work during normal daytime hours. The air traffic controllers, etc. will require retraining to operate the new state-of-the-art operational equipment.

Revenues, such as navigation equipment charge, landing charge, parking charge, facilities rental charge, can be utilized to offset expenses.

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4-1 Project Effect

The urgent development of New Rabaul Airport through implementing the Project will have the following expected effects.

(1) Operational Effect

- 1) Pavement of the runway, the taxiway and the apron will promote safe, efficient and comfortable movement for landing and take-off operational activity on the surface movement area.
- 2) Installation of Navigation Aid and Meteorological installations will provide Aerodrome Control and IFR procedures to promote a safer operation of aircraft than the present VFR operation.
- 3) Provisions for Aeronautical Lightings make landing and take-off available in IMC and at night which will upgrade operation capability more than 10%.
- 6) Provision of commercial electric supply and diesel emergency generator will promote stability of airport operations.
- 5) Provision of ATC Tower and Administration Building will enable collective control of aerodrome management, promote administrative capability and increase capability to counter emergencies such as aircraft accidents, etc.
- 6) Provision of CFR /Workshop building will allow adequacy of fire-fighting capability in line with ICAO standards and the maintenance and repair of various equipment in the airport.

(2) Effect to Passengers

- 1) Reliability of air traffic will be enhanced for the 167,000 passengers estimated from the passenger traffic demand forecast for the year 2003.
- 2) Comfort, convenience and safe use of the passenger terminal building will be upgraded.

Moreover, the Project implementation will induce an indirect effect as the following;

- 1) Securing the reliability of air transport will stabilize public welfare in East New Britain and activate the socio-economy in the region.
- 2) Infrastructural industries will be promoted in the area surrounding the Airport in conjunction with implementation of the Project, which will encourage human activities and commodity circulation.
- 3) During the 2 year period of the construction stage, employment for more than 1000 workers will be generated.
- 4) The project will contribute to the development of the air traffic system in PNG and will be a step toward the future expansion as an international airport and will thus promote the opening of PNG to international affairs and enhance the international status of PNG.

(3) Verification of Appropriateness

1) Verification of Operational Effect

a. For pilots who operate aircraft while constantly assuming the possibility of accidents in the airport area and air traffic controllers who instruct the aircraft, it is a prerequisite that the basic airport facilities be paved. The upgrading of the present unpaved facilities will promote immeasurable increase in safety and the confidence derived from the safety factor will further enhance operational capabilities and safety. For the users, namely the passengers, they will be relieved from anxious ness due to heavy shaking during taxing and runway use, which will encourage a feeling of safety in using aircraft and increase comfort.

b) For pilots who are flying, it is of primary importance to know the present position during flight. Thus, positioning data using aircraft radio communications facilities and information provided by ground traffic control is a particular advantage of Instrument Flight Rules. Compared with operations using only pilot VFR, the adoption of IFR relieves the pilot from immense mental and physical responsibility.

c) Under VFR, if the runway cannot be visually confirmed at a certain preset altitude, landing must be aborted according to flight rules. Thus during conditions when the cloud ceiling is low, service efficiency suffers. There are no observational data of cloud height and visual range for Tokua Airport, but judging from past performance, a 10% increase in operational efficiency is expected by the introduction of navigation aids, airport lighting and meteorological information system.

d) During flight, instructions from air traffic controllers is extremely important to pilots to make flight operation decisions. Thus, air traffic controllers must have an integrated and functional grasp of the present condition of the whole airport control area. A control tower with concentrated facilities for radio transmissions, airport lighting facilities, and meteorological data system is indispensable for safety of aircraft operations.

2) Verification of Passenger Effect

a) Operational safety and punctuality are essential conditions to secure passenger confidence in airflight. After the upgrading, boarding rates are expected to be almost always be 100% compared to the present 90% and the need to increase flight numbers is anticipated.

b) The passenger terminal building is the entrance way for the airport and has some urban functions making it an essential facility for air transportation systems. The passenger terminal is vital to insure amenity and comfort for passengers boarding and alighting and for well-wishers, and provide security and convenience.

Table 4.1.1 Direct Effects

Present Conditions	Upgrading by the Project	Effect
1.Unpaved facilities All basic facilities including runway are unpaved.	All basic airport facilities will be paved.	Secure safety, movability of surface traffic, and comfort.
2.Inadequacy of data acquisition facilities Airport data and meteorological data needed for aircraft flight operations cannot be obtained.	Meteorological facilities and control room will be newly constructed.	Acquisition and classification of data Pilots and air traffic controllers will have access to essential data.
3.Inadequacy of data communications Essential data transmissions cannot be carried out due to lack of controllers and communication facilities.	A complete communication system will be newly set-up.	Implementation of air traffic control Data transmissions between pilots and controllers will become possible and controllers will be able to grasp the entire traffic at and around the airport.
4.Lack of air traffic control Operations are carried out under pilots discretion.	Air traffic control will be introduced.	Instruction by controllers Timely and appropriate instructions from controllers to aircraft will become possible.
5.Inadequacy of navigation facilities There is only a low -function NDB and navigation facilities are not reliable.	VOR/DME will be introduced.	Adoption of high precision navigation system The direction and distance of aircraft will be precisely grasped and reliability of air traffic operations will improve.
6.Visual flight rules Operations are possible only when pilots have good visibility.	Instrument flight rules will be introduced.	Adoption of VFR and IFR Operations will become possible even in inclement weather conditions, and operation rate will rise.
7.Inadequacy of electric power supply Only a small output generator is available .	Commercial power will be distributed to the site and an emergency diesel generator will be furnished.	Stable supply of electric power All airport facilities will be able to operate at full capability and reliability of airport operations will improve.
8.Inadequacy of airport lighting There are no airport lighting facilities.	New lighting facilities will be installed for runway, taxiway, and apron.	Expansion of aircraft type and operation time Landing and take-off in inclement weather and at night time will become possible.
9.Inadequacy of administration facilities There is only a temporary building for administration and necessary office space is not available.	A new administration building will be constructed and essential equipment will be functionally arranged	Improvement of airport administration and maintenance Airport administration and maintenance capability will be improved.
10.Lack of fire engine garage etc. There is a temporary fire engine garage, but essential repairs cannot be carried out.	A new CFR / Workshop building will be constructed.	Bolstering of crash, fire and rescue facilities Fire fighting capabilities in accordance with ICAO standards will be implemented and maintenance of various airport equipment will become possible.
11.Inadequacy of passenger terminal Each airline operates its own temporary passenger facility.	A new Passenger Terminal building to meet forecast demand will be constructed.	Improvement of Passenger Terminal Congestion will be relieved and security will be improved. Furthermore, it will fulfill its function as the gateway to East New Britain.

4-2 Recommendation

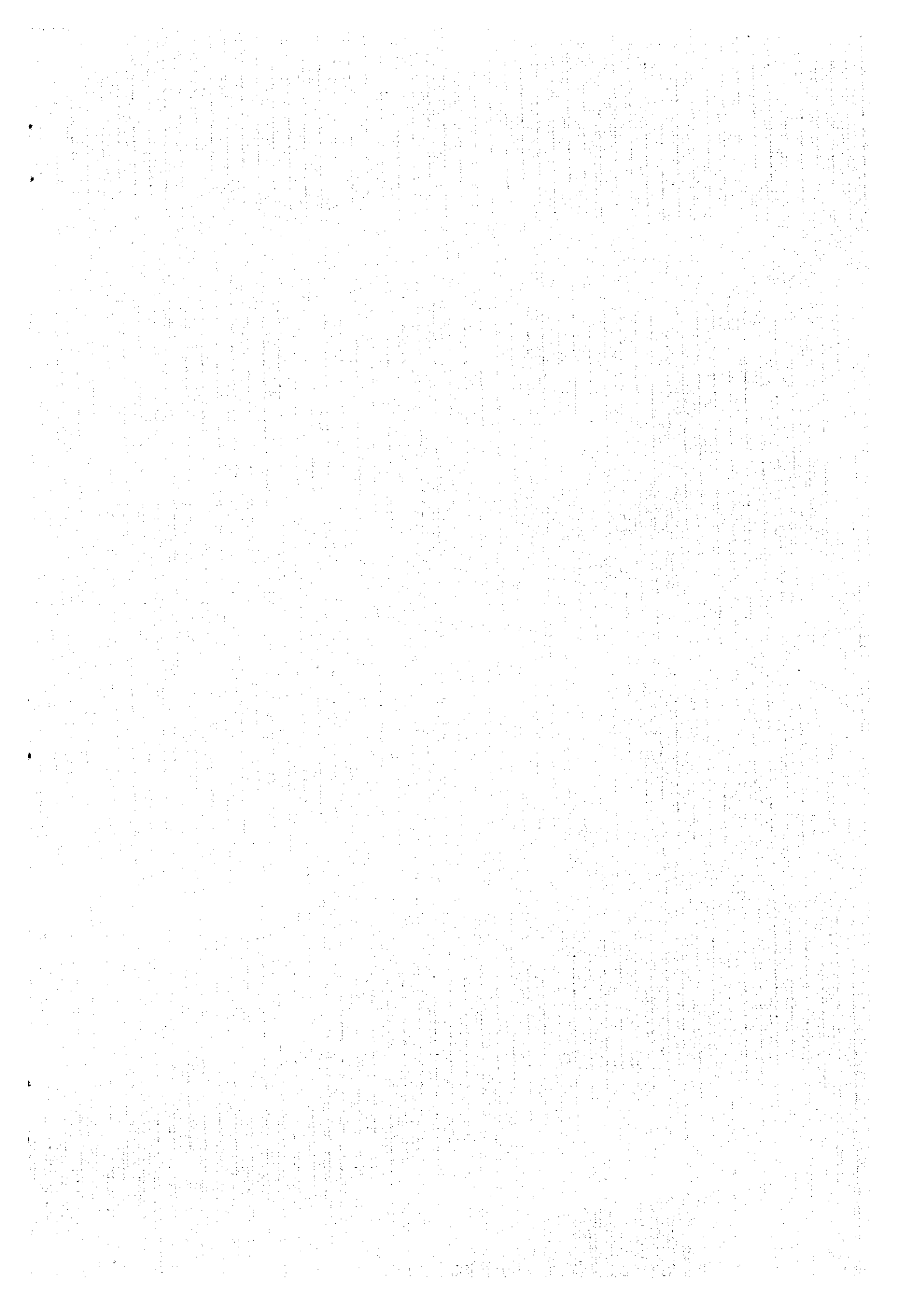
The Project, as fore-mentioned, is expected to have immense benefits. At the same time, it will contribute to upgrading the Basic Human Needs of the people throughout PNG. Thus, the execution of the Project is deemed to be significant.

There are, however, some problems involved in executing the Project. Should these problems not be settled, it is judged that the execution of the Project would be difficult. The problems involved are as the following:

- 1) As a fundamental premise, the implementation of the Project is based on the assumption that electric power will be supplied to the Airport compound. Consequently commercial power supply must be provided in advance before the construction starts.
- 2) Due to the monetary ceiling of the Project, the pavement and leveling of the ground in the Airport are to be limited to the portions directly related to aircraft operations. Therefore PNG must adequately provide a drainage system and a parking area, etc.
- 3) Since the aeronautical equipment are of a high grade of technology, an appropriate acquaintance with the systems and maintenance control must be provided in handling these equipment. Especially the newly provided equipment utilizing state-of-the-art technology will require a training program in Japan.

The captioned airport project has been called "THE DEVELOPMENT OF THE TOKUA AIRPORT", however, this was changed to "THE UPGRADING OF NEW RABAU AIRPORT" before submitting the Final Report.

This is very effective because the project aims to inherit the functions of the old Rabaul airport, and the name of Rabaul which is well known to the public will attract tourism.



APPENDICES

Appendix -1, Member List of the Survey Team

(1) First Site Survey (August 22nd, 1995 to September 20th., 1995)

Leader / Advisory Team	KAIHO Seiji	Senior Assistant to the Director Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Member	ARAO Kazuhito	Director Office for Airport Constuction Market Access, Aerodrome Department, Civil Aviation Bureau, Ministry of Transport
Member	ISHII Masaki	Special Assistant to the Director Construction Division, Aerodrome Department, Civil Aviation Bureau, Ministry of Transport
Member	OTSUBO Mamoru	Chief of Aeronautical Radio Facilities Section, Radio Engineering Division, Air Traffic Services Department, Civil Aviation Bureau, Ministry of Transport
Member / JICA Coordinator	MATSUI Hisashi	Study Programme Officer Second Basic Design Study Division, Grant Aid Study and Design Department, Japan International Cooperation Agency
Project Manger / Airport Planner	TAMURA Fumishige	Nippon Koei Co. Ltd.
Architect	ISHII Yoshiji	Nippon Koei Co. Ltd.
Civil Engineer	HATAYAMA Satoshi	Nippon Koei Co. Ltd.
Telecommunication / ATC Planner	MAEDA Shoichiro	Nippon Koei Co. Ltd.
Equipment Planner	TANIGUCHI Tomotaka	Nippon Koei Co. Ltd.
Installation Planner / Cost Analyst	SEKIYA Takashi	Nippon Koei Co. Ltd.

(2) Second Site Survey (October 21st, 1995 to October 29th, 1995)

Leader	HORIGOME Shoshiro	Development Specialist Institute for International Cooperation Japan International Cooperation Agency
Member	KIDA Takafumi	Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Member	ARAO Kazuhito	Director Office for Airport Constuction Market Access Aerodrome Department, Civil Aviation Bureau, Ministry of Transport
Project Manager / Airport Planner	TAMURA Fumishige	Nippon Koei Co. Ltd.
Architect	ISHII Yoshiji	Nippon Koei Co. Ltd.
Telecommunication /	MAEDA Shoichiro	Nippon Koei Co. Ltd.

Appendix -2. Survey Schedule
(1) Itinerary of Basic Design Survey

Seq. No.	Date	Movements	Station	Activities
1	August 22(Tue)	Members of survey team leave Tokyo	(in flight)	
2	23(Wed)	Members of survey team arrive at Port Moresby	Port Moresby (POM)	Courtesy Call: EOJ & JICA
3	24(Thu)		ditto	Courtesy Call: OIDA, DOF, DCA Discussion with relevant Authorities
4	25(Fri)	Leave for Tokua	Tokua	Courtesy Call:Governer ENB,GRA
5	26(Sat)		ditto	Trip to Tokua for Field Survey
6	27(Sun)	Return back to Port Moresby	POM	Trip to Tokua for Field Survey Analysis of Survey Results
7	28(Mon)		ditto	Discussion with OCA
8	29(Tue)		ditto	Discussion with OCA, Visit Embassy of Germany ,AUSAID
9	30(Wed)		ditto	Discussion on Minutes of Discussion (MD)
10	31(Thu)		ditto	Discussion on MD
11	Setember 1(Fri)		ditto	Signing of MD
12	2(Sat)	Advisory Team return back to Tokyo	ditto	Preliminary Study of Proposed Measures
13	3(Sun)		ditto	Analysis of Data and Survey Results
14	4(Mon)		ditto	Discussion with OCA and OIDA
15	5(Tue)	Taniguchi leaves POM	ditto	Discussion with OCA
16	6(Wed)		ditto	Discussion with OCA
17	7(Thu)		ditto	Discussion with OCA
18	8(Fri)		ditto	Discussion with OCA
19	9(Sat)	Ishii & Hatayama revisit Tokua	POM & Tokua	Prepare Draft Drawings for Basic Design Field Survey of Tokua Airport
20	10(Sun)		ditto	
21	11(Mon)	Ishii & Hatayama return to POM	ditto	Field Survey of Tokua Airport
22	12(Tue)		POM	Preparation of Draft Basic Design Drawings
23	13(Wed)		ditto	Preparation of Draft Basic Design Drawings
24	14(Thu)		ditto	Discussion with OCA on Draft Basic Drawings
25	15(Fri)		ditto	Collection and preparation of Survey results
26	16(Sat)	Hatayama, Maeda leave POM	ditto	Collection and preparation of Survey results
27	17(Sun)		ditto	Collection and preparation of Survey results
28	18(Mon)		ditto	Collection of Survey results. Preparation of Report
29	19(Tue)	Tamura, Sekiya, Ishii leave POM	Cairns	Visit EOJ & JICA for Report
30	20(Wed)	Return to Tokyo		

(2) Itinerary of Draft Basic Design Explanation Survey

Seq. No.	Date	Movements	Station	Activities
1	October 21(Sat)	Members of Survey Team leave Tokyo	(in flight)	
2	22(Sun)	Members of Survey Team arrive at Port Moresby	POM	Discussion with JICA
3	23(Mon)		ditto	Courtesy Call on RADMB and explanation of Draft Courtesy Call on EOJ and explanation of Draft Courtesy Call on DOT and explanation of Draft Mr.G.K.Zurenuoc, Secretary, DOT Mr.San Geno, Director, OCA Sir Herry Torobert, Chairman, GRA OCA;Explanation of Draft to Project counterparts
4	24(Tue)		ditto	Discussion on PNG bome parts of Project
5	25(Wed)		ditto	Discussion and Confirmation of Project List
6	26(Thu)		ditto	Discussion on MD Discussion with Air Niugini
7	27(Fri)		ditto	Signing of MD
8	28(Sat)	Members of Survey Team leave POM	Cairns	
9	29(Sun)	Arrive in Tokyo		

Appendix -3. List of Party Concerned In the Recipient Country

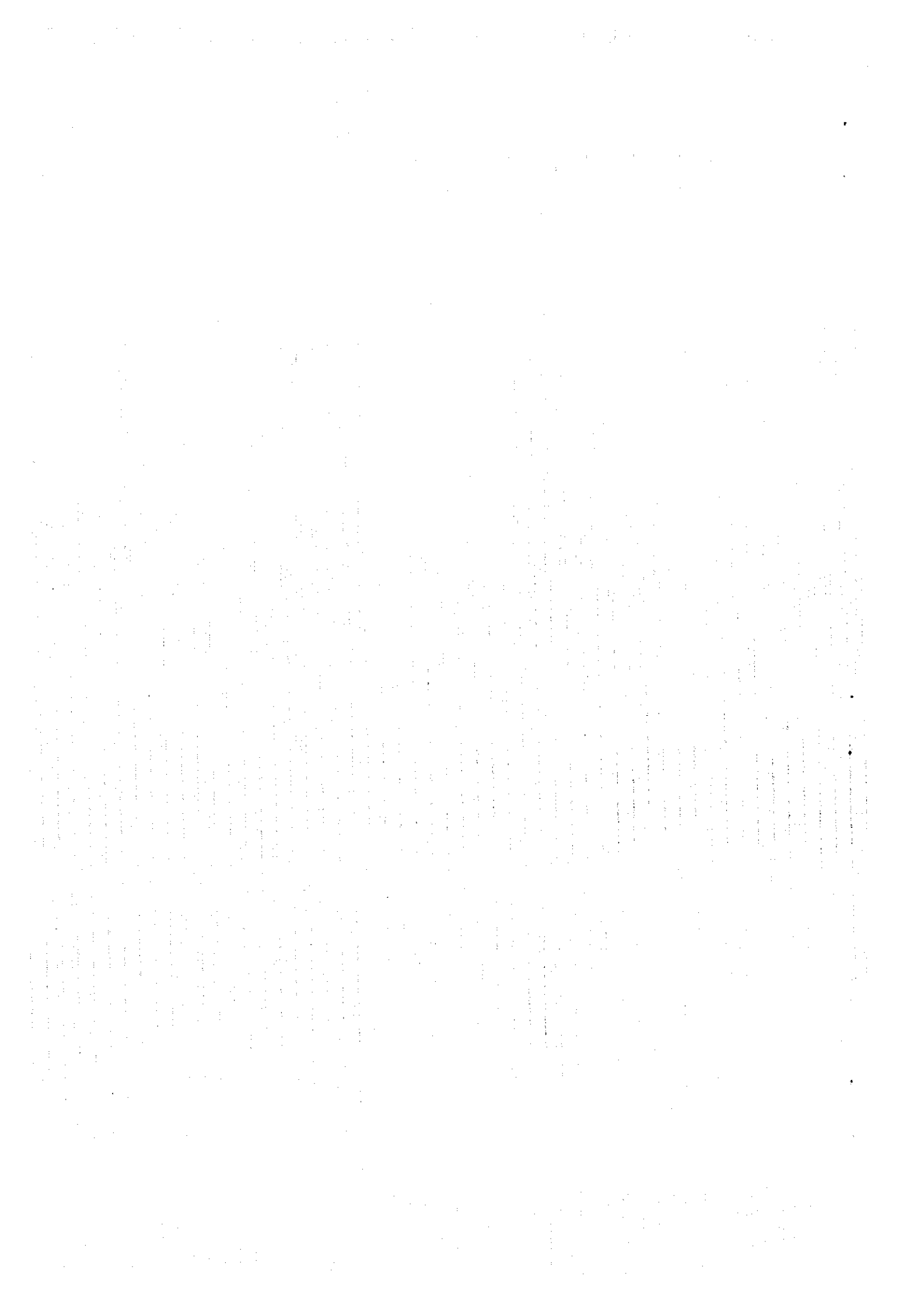
(1) Principal Ministry

- | | |
|---|-------------------|
| 1. Minister of Culture, Tourism and Civil Aviation | : H. Michael Nari |
| 2. Secretary, Office of Civil Aviation, Department of Transport | : S. Geno |
| 3. First Assistant Secretary, Finance and Personnel | : H. Sailasa |
| 4. Assistant Secretary, Air Transport, Licensing | : K. Delowa |
| 5. Assistant Secretary, Policy, Planning & Progress | : S. Pomat |
| 6. Assistant Secretary, Program Monitoring and Evaluation | : J. Bokuik |
| 7. First Assistant Secretary, Ground Facilities | : G. Karri |
| 8. Assistant Secretary, Aerodromes | : E. Labi |
| 9. Chief, Aviation Security | : R. Maleva |
| 10. First Assistant Secretary, Airways Facilities | : R. Abaijah |
| 11. Assistant Secretary, Airways Engineering | : J. Knox |
| 12. Assistant Secretary, Operations | : J. Nako |

(2) Implementing Agency

- | | |
|---|------------------|
| 1. Secretary of Transport | : G. K. Zurenuoc |
| 2. Secretary, Office of Civil Aviation, Department of Transport | : S. Geno |
| 3. First Assistant Secretary, Ground Facilities | : G. Karri |
| 4. Assistant Secretary, Policy, Planning & Progress | : S. Pomat |
| 5. Civil Engineer | : T. Nou |
| 6. Electric Engineer | : J. Vitata |
| 7. Communication Engineer | : X. Areni |
| 8. Weather Officer | : P. Penua |
| 9. Operation Officer | : T. Bola |
| 10. Officer of RADM | : J. Mok |
| 11. Officer of Gazelle Peninsula Restoration Agency | : R. Kuk |

Appendix -4. Minutes of Discussion



Minutes of Discussions
on
the Basic Design Study
on
the Project for Restoration of Civil Aviation Services at Tokua Airport
in
the Independent State of Papua New Guinea

In the response to a request from the Government of the Independent State of Papua New Guinea, the Government of Japan has decided to conduct a Basic Design Study on the Project to improve Civil Aviation Services at Tokua Airport (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Independent State of Papua New Guinea a Basic Design Study Team headed by Mr. Seiji KAIHO, Senior Assistant for Grant Aid, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, which is scheduled to stay in the country from August 23 to September 19, 1995.

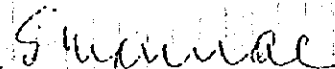
The team held a series of discussions with the concerned officials of the Government of Papua New Guinea, and conducted a field survey at the study area.

In the course of discussions and field survey, both parties have confirmed the main items described in the attached sheets. The team will proceed to further works and prepare the Basic Design Study Report.

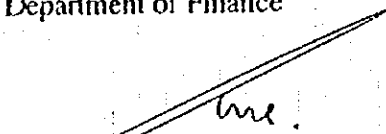
Port Moresby, September 1, 1995



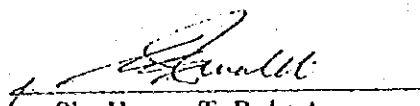
Mr. Seiji KAIHO
Leader
Basic Design Study Team
JICA



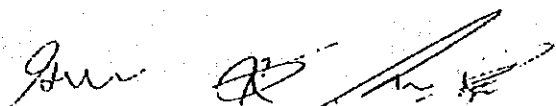
Mr. Gago Mamae
Acting Director, Office of International
Development Assistance,
Department of Finance



Mr. Miria Ume
Acting Secretary, Office of Civil Aviation,
Department of Transport



Sir Henry ToRobert
Chairman, Gazelle Restraltion Authority



ATTACHMENT

1. OBJECTIVE

On 19th September 1994, the historical volcanic eruptions seriously destroyed the Rabaul Airport as well as the Rabaul town ship, while the Rabaul Airport had not only served the hub of the East New Britain Province but functioned as the key station of the PNG whole air transport.

Accordingly, the objective of the Project is to construct Airport facilities and ground equipment that will secure Civil Aviation Services there by improving Tokua Airport.

2. PROJECT IMPLEMENTING AGENCY

Office of Civil Aviation, Department of Transport

3. PROJECT SITE

The proposed site of the Project is Tokua Airport shown in Annex-1

4. MAJOR ITEMS REQUESTED BY PAPUA NEW GUINEA

As a result of the series of discussions, the following items are requested from Papua New Guinea for the Project contents as shown in Annex-2 for the Japan's Grant Aid.

However, the contents of the Project will be decided after further study by the Team in Japan.

5. JAPAN'S GRANT AID PROGRAMME

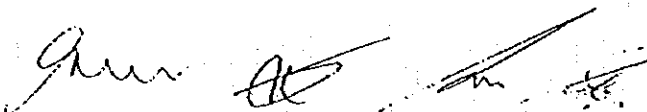
The Papua New Guinea side has understood the system of Japan's Grant Aid programme explained in Annex-3.

6. NECESSARY MEASURES TO BE TAKEN BY PAPUA NEW GUINEA

Papua New Guinea will take necessary measures described in Annex-4 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

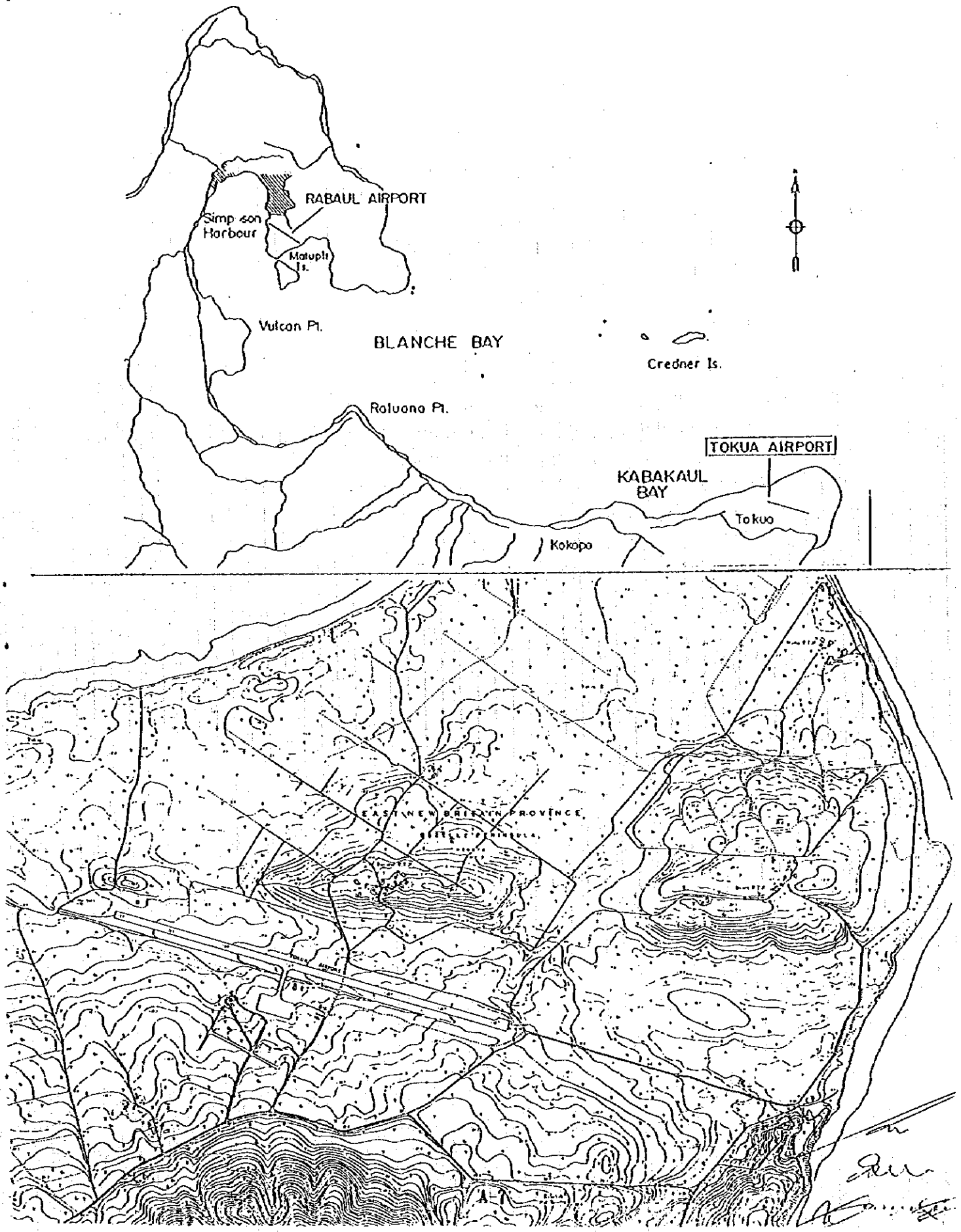
7. FURTHER SCHEDULE OF THE STUDY

- 1) The team will proceed with further studies in the Independent States of Papua New Guinea until September 18, 1995.
- 2) JICA will prepare a Draft Basic Design Report and dispatch a Draft Report Explanation Team in November, 1995 in order to explain and to confirm the contents of the Draft Study Report.
- 3) In case that the Draft Basic Design Report is accepted by Papua New Guinea, JICA will complete the Study Report and send it to Papua New Guinea February, 1996.

 A-6

ANNEX-1

LOCATION OF THE SITE



The contents of the Project to be covered under Japan's Grant Aid are finally requested by Papua New Guinea as follows;

1. Facilities

Airport facilities of necessary scales and locations with consideration to future expansion in Tokua.

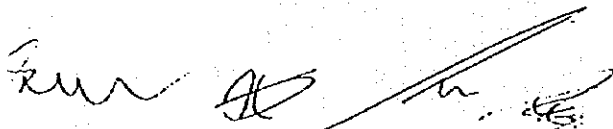
- 1) Pavements to cater for the FK-28 standard operation for Runway, Over-run, Taxiway and Apron.
- 2) Sewerage and Drainage
- 3) Control Tower
- 4) Terminal Building
- 5) Administration Building
- 6) Maintenance and Power house
- 7) Fire station

Note 1. Terminal Building was added by OCA through discussions of both parties, though it was not included in the original PNG request.

Note 2. The selection of night construction works or stoppage of aircraft operation during runway pavement work should be decided through the close coordination of OCA and aircraft operators by the end of September. The results will be notified to JICA.

2. Equipment of Airport

- 1) VOR/DME
- 2) A set of communication equipment
- 3) A set of airport lighting
- 4) A set of meteorological equipment
- 5) A set of electricity within the airport



ANNEX-3 JAPAN'S GRANT AID PROGRAMME

1. Japan's Grant Aid Procedures

Japan's Grant Aid Programme is extended in the following procedures.

- Application : A request made by the recipient country
- Study : Basic Design Study conducted by JICA.
- Appraisal & Approval : Appraisal by the Government of Japan and approval by the Cabinet of Japan
- Determination of Implementation : Exchange of Notes between both Governments
- Implementation : Implementation of the Project

At the first step (Application), a request made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs), whether or not it is suitable for the Grant Aid. If the request is confirmed that it has a high priority as the project for the Grant Aid, the Government of Japan instructs JICA to conduct the Study.

At the second step (Study), the Basic Design Study is conducted by JICA basically under contracts with a Japanese consulting firm to carry it out.

At the third step (Appraisal & Approval), the Government of Japan appraises whether or not the Project is suitable for Japan's Grant Aid Programme based on the Basic Design Study Report prepared by JICA and then submitted for approval by the Cabinet.

At the fourth step (Determination of Implementation), the Project approved by the Cabinet is officially determined to implement by signing the Exchange of Notes between both Governments.

In the course of implementation of the Project, JICA will take charge of expediting the execution by assisting the recipient country in terms of the procedures of tender, contract and others.

2. Contents of the Study

(1) Contents of the Study

The purpose of the Study conducted by JICA is to provide basic documents necessary for the appraisal by the Government of Japan whether or not the Project is viable for Japan's Grant Aid Programme.

The contents of the Study are as follows;

- a) to confirm the background of the request, objectives and effects of Project and maintenance ability of the recipient country necessary for the implementation,
- b) to evaluate the appropriateness of the Grant Aid from the technological, social and economical points of views,
- c) to confirm the basic concept of the plan mutually agreed upon through discussion between both sides,
- d) to prepare a basic design of the Project,
- e) to estimate the rough cost of the Project.

The contents of the original request are not necessarily approved as the contents of the Grant Aid as it is. The Basic Design of the Project is confirmed considering Japan's Grant Aid Scheme.

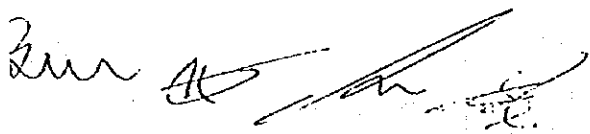
In the implementation of the Project, the Government of Japan requests the recipient country to take necessary measures in order to promote its self-reliance, those undertakings shall be guaranteed even if the recipient implementing entity does not have jurisdiction. Therefore, the implementation of the Project is confirmed by all relevant organizations in the recipient country in the Minutes of Discussions.

(2) Selection of Consultants

For the smooth implementation of the Study, JICA selects a consultant among those consultants registered to JICA by evaluating proposals submitted by those consultants.

The selected consultant carries out the Basic Design Study and prepares a report based upon the terms of reference made by JICA.

At the stage of implementation after the Exchange of Notes, for concluding the contract regarding the Detail Design and Construction Supervision of the Project between a consultant and the recipient country, JICA recommends the same consultant which participated in the Basic Design Study to the recipient country in order to maintain the technical consistency between the Basic Design Study and the Detail Design as well as to avoid undue delay caused by the selection of a new consultant.



3. Japan's Grant Aid Scheme

(1) What is Grant Aid ?

The Grant Aid Programme provides the recipient country with non-reimbursable funds needed to procure facilities, equipment and services (labour, transportation, etc.) for the economic and social development in the country under the following principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not a form of donation in kind of the recipient country.

(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Exchange of Notes between both Governments, in which the objectives of the Project, period, conditions, amount of the grant, etc. are confirmed.

(3) Period

The period of the Grant Aid is within the Japanese fiscal year (April to March) in which the Cabinet approved the Project. Within the fiscal year, all procedure such as Exchange of Notes, concluding contracts by the recipient country with the consultant and contractors, and the final payment to them shall be completed.

In case of a big project which requires net construction period more than 12 months, the period of the Grant Aid is designated covering more than one fiscal year depending on the Basic Design Study Report.

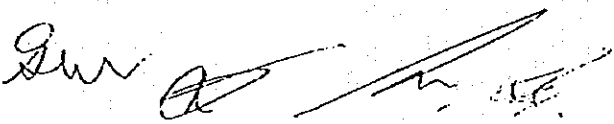
However, in case of the delay of delivery, installation or construction due to events such as weather, the period of the Grant Aid can be further extended for one fiscal year at most by mutual agreement between both Government.

(4) Purchase of the Products and /or Services

The Grant Aid is used properly and exclusively for the purchase of the products, in principle, of Japan or the recipient country and of the services of the Japanese or the recipient country's nationals. The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.

When both Governments deem it necessary, the Grant Aid may be used for the purchase of the products and/or services of the third country (other than Japan or the recipient country).

However, in terms of the principle of the Grant Aid, the prime contractors, that is the consultant, contractor and procurement firm necessary for the implementation of the Grant Aid, are limited to "Japanese nationals".



(5) Verification

The Government of the recipient country or its designated authority will conclude the contracts in Japanese Yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The " Verification" is necessary because the source of the Grant Aid is the taxes of Japanese nationals.

(6) Undertakings required to the Recipient Country
(As described in Annex-4)

(7) Proper Use

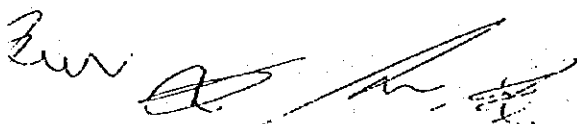
The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those to be borne by the Grant Aid.

(8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(9) Banking Arrangement(B/A)

- a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese Yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the contracts verified.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.



**ANNEX-4 NECESSARY MEASURES TO BE TAKEN BY PAPUA NEW
GUINEA**

Following necessary measures should be taken by Papua New Guinea on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To clear the sites prior to the commencement of the construction.
3. To undertake incidental external works such as gardening, fencing, gate and outdoor lighting.
4. To provide the following incidental facilities for the Project.
 - 1) Electricity distributing line to the site (to bring necessary commercial electric supply into the airport)
 - 2) Water supply to the site
 - 3) Drainage main to the site
 - 4) Telephone trunk line to the site and subscribers in the buildings.
 - 5) General furniture such as carpet, curtain and other consumables
5. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the banking Arrangement, namely the advising commission of the "Authorization to Pay" and "payment commission";
6. To ensure prompt unloading, tax exemption customs clearance at the port of disembarkation in Papua New Guinea and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid;
7. To exempt Japanese juridical and physical nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Papua New Guinea with respect to the supply of the products and services under the verified contracts;
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into Papua New Guinea and stay therein for the performance of their work;
9. To provide necessary permissions, licenses and other authorizations for the Project, if necessary;
10. To maintain and use properly and effectively the facilities constructed and the equipment provided under the Project; and
11. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.
12. It is Basic Design Study Team's understanding that PNG will take prompt actions to cooperate with foreign agencies for the procurement of :
 - 1) A mobile control tower from KfW
 - 2) Temporary pavements of runway, commercial electric supply lines to the site and staff housing
 - 3) Generators and a fire-fighting equipment

Minutes of Discussions
on
Basic Design Study
on
the Project for Implementation of Civil Aviation Services at Tokua Airport
in
the Independent State of Papua New Guinea

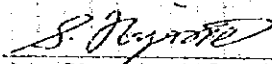
(Explanation on Draft Basic Design)

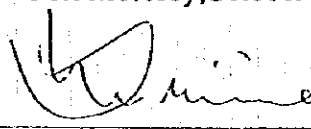
In August to September 1995, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Improvement of Civil Aviation Services at Tokua Airport in the Independent State of Papua New Guinea (hereinafter referred to as "the Project"), to the Independent State of Papua New Guinea, and through discussions, field survey and technical examination of the results in Japan, JICA has prepared the Draft Basic Design on the study.

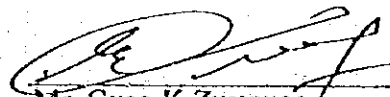
In order to explain and to consult PNG side on the components of the draft report, JICA sent to PNG a study team, which is headed by Mr. Shoshiro Horigome, Development Specialist Institute for International Cooperation, JICA, which is scheduled to stay in the country from 22th to 28th of October, 1995.

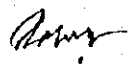
In the course of discussions, both parties have confirmed the main items described on the attached sheets.

Port Moresby, October 27, 1995


Mr. Shoshiro Horigome
Leader
Japan International
Cooperation Agency (JICA)


Ms. Fiu Williame-Igara
First Assistant Secretary
Revenue, Aid and Debt Management
Division, Department of Finance


Mr. Guao K Zurenuoc
Secretary - Department of Transport,
Office of Civil Aviation


Sir. Henry ToRobert
Chairman - Gazelle Restoration Authority

ATTACHMENT

1. Objective

The objective of the Project is to construct Airport facilities and to provide ground equipment to secure Civil Aviation Services at the Tokua Airport which shall take over the function of the destructed Rabaul Airport by the volcanic eruption, 1994.

2. Project Implementing Agency

Project Management Unit, Office of Civil Aviation, Department of Transport

3. Components of Draft Basic Design

The Government of PNG has agreed and accepted in principle the components of the Draft Basic Design proposed by the Team, with some changes agreed during the meeting. These amendments ~~and~~ shown in ANNEX-1, and will be ^{are} incorporated in the Basic Design.

4. Japan's Grant Aid System

The Government of PNG has understood the system of Japanese Grant Aid explained by the Team as attached in ANNEX 2.

5. Necessary Measures to be Taken by the PNG side

The Government of PNG will take the necessary measures, described in ANNEX 3, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

6. Future Schedule

JICA will complete the Basic Design Report and forward it to the Government of PNG by the end of January 1996.

S. Byrnie

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ANNEX-1 CONTENTS OF THE PROJECT

The contents of the Project to be covered under Japan's Grant Aid are shown in the followings.

(1) Project List; as attached

(2) Scope of Woorks

1) Civil

Item	Japanese	PNG Government
1. Temporary Work	<ul style="list-style-type: none"> Crusher plant installation & operation Asphalt plant installation & operation 	<ul style="list-style-type: none"> Providing of land
2. Pavement	<ul style="list-style-type: none"> Runway, overrun, taxiway, apron, GSE road, each shoulder 	<ul style="list-style-type: none"> Terminal area roads, parking
3. Markings	<ul style="list-style-type: none"> Runway and taxiway 	<ul style="list-style-type: none"> Apron
4. Grading Work	<ul style="list-style-type: none"> Runway Overrun Apron VOR/DME site 	<ul style="list-style-type: none"> All terminal area site Cutting down trees
5. Drainage	None	<ul style="list-style-type: none"> Terminal area drain ditch
6. Others	None	<ul style="list-style-type: none"> Fence, gate

2) Architecture

Item	Japanese	PNG Government
General	Application for building permit	cooperation
Architectural Construction	Construction of passenger terminal, administration/control tower, C.F.R • Workshop building	<ul style="list-style-type: none"> Removal of topsoil under each new construction Installation of utensils and furniture Installation of curtains, blinds and carpets
Electrical Equipment	Installation of electrical equipment for above facilities	<ul style="list-style-type: none"> Installation of PABX unit Internal wiring and installation of telephone and facsimile receivers
Mechanical Equipment	Installation of mechanical equipment for above facilities	<ul style="list-style-type: none"> Water supply piping upto site boundary Provision of water source (well)
Landscaping	Construction work around each building	Planting

3) Equipment

No.	Facilities	Japan (New Installation)	PNG
1.	ATC Tele-communication	1) D-VOR/DME 2) ATC Consoles & AFTN Consoles W/RTTY 3) ATC Tape Recorder 4) VHF AMS Receiver & Transmitter 5) VHF AFS SSB Receiver & Transmitter 6) VHF FM Receiver & Transmitter	<ul style="list-style-type: none"> • Acquire land to install • Cutting trees • Application for Flight Calibration • Feed PTC Line Circuit into Aerodrome • Assignment of using Channel & Mode • Application for Flight Calibration • Assignment of using channel • Adjustment w/Local Airports • Assignment of using channel • Installation on Fire Truck
2.	Meteorology	1) Surface Weather Observatory System including AWS 2) Weather Satellite	<ul style="list-style-type: none"> • Application & Approval • Adjustment w/Local Weather Station
3.	Aeronautical Lightings	1) Runway Edge Lights 2) Runway Threshold Lights & Runway End Lights 3) Stopway Lights 4) Taxiway Edge Lights 5) Runway End Lights 6) Wind Direction Lights 7) Aerodrome Beacon 8) Apron Flood Lights 9) Light Control Panel 1) Light Control 2) Power Supply 10) Light Gun	<ul style="list-style-type: none"> • Application for Flight Calibration
4.		1) Commercial Power Supply Receiving Station 2) Aux. Generator System 3) Aerodrome Power Line	<ul style="list-style-type: none"> • Application • Feed into Aerodrome
5.	Instruments	1) Maintenance Check	

(3) Mutual understandings

✓ 1) After the completion of Tokua Airport Project, the Facilities and Equipments provided under Japanese Grant Aid should not be used for Military purposes but only for commercial use.

2) Japanese Government offered to change the name from TOKUA AIRPORT to NEW RABAUL AIRPORT (TOKUA). PNG official ✓ agreed to the change with subject to the confirmation by the Government of PNG.
Japanese Government would appreciate confirmation on the change of the name by end of November 1995.

3) PNG request ✓ Japanese Government to dispatch operational staffs for training in Japan.

4) PNG request ✓ Japanese Government to install PABX equipment.

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CIVIL PROJECT LUSI

FACILITIES	SCALE	AREA	CONSTRUCTION ITEMS	REMARKS
1 RUNWAY				
1) Runway	Length 1,720 m, Width 30 m	53,175 m ²	Asphalt pavement. Surface course: 4 cm, Binder course: 4 cm, Leveling course: Average 4 cm	Include turning pads Use bituminous stabilization for leveling course
2) Over Run	Length 60 m, Width 30 m RWY 10 and RWY 28	2,600 m ²	Asphalt pavement and bituminous surfacing RWY 10 Surface course: 4 cm, Binder course: 4 cm, Base course: 20 cm, Sub base: 10 cm RWY 28 Chip seal: 1.7 cm, Base course: 20 cm	Use gravel or crushed stone for base course and sub base Use coronous for base course
3) Shoulder	Width 7.5 m	27,356 m ²	Bituminous surfacing Chip seal: 1.7 cm, Base course: 20 cm	Use coronous for base course
4) Runway Markings		1 lot	Runway centerline marking, Runway side strip marking, Fixed distance marking, Touchdown zone marking, Designation marking, Runway threshold marking, Runway middle marking, Over run marking	
2 TAXIWAY				
1) Taxiway	Length 222.5 m, Width 15 m	4,110 m ²	Asphalt pavement Surface course: 4 cm, Binder course: 4 cm, Base course: 20 cm	Use gravel or crushed stone for base course
2) Shoulder	Width 5 m	2,614 m ²	Bituminous surfacing Chip seal: 1.7 cm, Base course: 20 cm	Use coronous for base course
3) Taxiway Markings		1 lot	Taxiway centerline marking, Taxiway side strip marking, Taxiway holding position marking	
3 APRON				
1) Apron	Depth 85 m, Width 350 m Numbers of Parking Spot F28: 3, DH6: 2, GA: 8 Helicopter: 4	29,750 m ²	Asphalt pavement Surface course: 4 cm, Binder course: 4 cm, Base course: 20 cm, Sub base: 10 cm	
2) Shoulder	Width 5 m	2,275 m ²	Bituminous surfacing	
3) GSE Road	Width 20 m	7,200 m ²	Surface course: 1.7 cm, Base course: 20 cm	Use coronous for base course Obligation of PNG Government and airlines
4) Apron Markings				
4 GRADING WORK				
1) Beside Runway	Fill	1 lot		
2) Over Run	Fill	1 lot		
3) Apron	Cut and Fill	1 lot		
4) Area at VOR/DME	Cut	1 lot		
5. PLUMBING WORK				
		1 lot	Steel pipe plumbing for the cable with aeronautical ground light, power supply, telephone and others	

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ARCHITECTURE PROJECT LIST (1)

BUILDING AND ROOMS NAME	SCALE	FUNCTION AND PURPOSE	PLANNED PERSONS NUMBER	FACILITIES				REMARKS
				CLOCK	TEL.	FAX	AIRCON./CEILING FAN	
1. PASSENGER TERMINAL BUILDING								
Check-in Counter	35.00	Check-in space for four (4) Airline co.	42 persons (2.5 m ²)		2			
Check-in Lobby	105.00	Ditto	84 persons (2.5 m ²)	1	1	4		Weight counter provided by Airline co. incl. fixed chairs
Departure Lobby	210.00	Passenger waiting space	24 persons (2.5 m ²)	1	1			
Arrival Lobby	60.00	Ditto		1	2			
Restaurant (1), (2)	69.80	Snack and kiosk			2			Counter construction shall include this project. Tenant scope is interior finishing works and kitchen set installation. shelf
Baggage Storage	26.30	Holding baggage space						
Airline Office (1), (2), (3), (4)	140.30	Four (4) private Airline co. space	20 persons (7 m ²)		10	8		Airline co., scope is interior finishing works and kitchen set installation.
Information Counter	19.50	Reservating hotel, taxi and rental car			2	2		incl. counter construction
Tower (1)	10.20	For VIP, Airline co. and management staffs						Closet (1), urinal (2), sink (2)
Kitchen	6.00	For Airline co. and management staffs						Kitchen set, hanger shelf, hot plate
TOilet (2)	10.20	For VIP, Airline co. and management staffs						Closet (2), sink (2)
VIP Room	37.50	Waiting for VIP (Very Important Person)	7 persons (7 m ²)	1	1	1		Counter construction shall include this project. Tenant scope is interior finishing works and kitchen set installation.
Administration Office	52.20	Management staffs for Airport	7 persons (7 m ²)	1	2			
Police Office	12.30	Guardian room for Airport especially			1			
Waiting Lounge	232.50	Waiting space	160-180 persons		2	2		Counter construction and fixed chairs shall include this project. Tenant scope is interior finishing works and kitchen set installation.
Toilet (3)	14.00	For passenger						Closet (2), sink (3)
Toilet (4)	14.00	Ditto						Closet (2), urinal (2), sink (2)
Toilet (5)	14.00	Ditto						Closet (2), urinal (2), sink (2)
Toilet (6)	14.00	Ditto						Closet (2), urinal (2), sink (2)
Baggage Claim	160.00	Baggage reclaim space		1	2			
Cameras/Others	37.70							
Baggage Handling (Depot)	-							
Baggage Handling (Arrival)	-							
Pedestrian Way	-	Walkway						
Sub-Total	1,300.50			2	10	28	15	
2. ADMINISTRATIVE OFFICE AND CONTROL TOWER								
1F Meeting Room	63.00	For meeting	50 persons (1.2 m ²)	1	1			
Manager Room	27.00	incl. meeting purpose	1 person	1	1	1		
Assistant/Manager and Guest Room	20.30	Ditto	1 person	1	1	1		
Staff Room	72.00	Office work space	10 persons (7 m ²)					
Rest Room	20.00	Night stay possible						
Toilet (M)	12.00	For staff						
Kitchen	5.00	Ditto						Closet (2), urinal (2), sink (2)
Toilet (F)	7.50	Ditto						Kitchen set, hanger shelf, hot plate
								Closet (2), sink (2)

ARCHITECTURE PROJECT LIST (2)

BUILDING AND ROOM'S NAME	SCALE	FUNCTION AND PURPOSE	PLANNED PERSON'S NUMBER	FACILITIES					REMARKS	
				CLOCK	TEL.	FAX	AIR/CON/CEILING FAN	VENTI.		PLUM.
AFTN and Meteorological Room	71.50	For meteorological data and flight planning space	3 persons		1	1	0			
Maintenance Room	45.00	For repairing equipments					0			
Power Room	204.60	Low voltage transformer and power board space			1			0		
D E G Room	47.30	Emergency diesel engine generator and power board space			1			0		
Starcase, Corridor	34.60							0		
2 nd Equipment Room	25.00	For repairing equipments			1			0		
Starcase	12.50									
3 rd Equipment Room	25.00	Related flight communication equipments space	2 persons		1		0			
Starcase	12.50									
4 th Rest Room	25.00	Mental calm for flight controller		1	1		0	0		Closet (1), urinal (1) Kitchen set, hanger shelf, hot plate
Starcase	12.50									
5 th Control Cab	37.80	Flight control space	3 persons	1	2	2	0	0		The floor shall make a double floor (H=300) for cabling and wiring, double glazing window. Lighting shall be adjustable.
SUB-TOTAL	760.30			5	12	5				
3 C.F.R. WORKS-OP BUILDING										
1 st Garage, Maintenance Bay	237.60	Garage for a fire engine and equipment repairing space			1		0			
Office	19.20	General administration space	4 persons (5 mv)	1	2	1	0			Greasing pit
Workshop	53.60	Equipment repairing space					0			Shell
Tool Storage	44.10						0			Shell
Safety Changer Room	11.30	Related battery charging space					0			
Toilet, Shower Room	9.60	For stalls					0	0		Closet (1), urinal (2), sink (2), shower booth
Locker Room	7.70	Ditto					0			
Kitchen	9.60	Ditto					0			Kitchen set, hanger shelf, hot plate
Starcase	10.30									
2 nd Watching Room	19.20	Observing runway in airport	1 person	1	2	1	0			
Lecture and Training Room	29.50		24 persons (1.2 mv)	1	1		0			
Starcase	10.30									
SUB-TOTAL	462.20			3	6	2				
Total	2,543.00			18	46	22				

0 1/2
Ref. A

EQUIPMENT PROJECT LIST (1)

No.	FACILITY	EQUIPMENT	TYPE	FREQUENCY	POWER	COVERAGE	ACCURACY	STRUCTURE	OTHERS	QTY	PURPOSE OF USE	
1	Navigation Aids	(1) C-VOR	Doppler	111.95 MHz - 117.975 MHz	100W	Specified by ICAO ANNEX	Direction Error ± 2	Dual	Remote Control	1 set	Enroute, Arrival & Departure Procedures	
		(2) DME	DME/N	1X - 48X	1KW	ditto	Distance Error ± 370m	Dual	Distance Measuring			
		(3) Power Supply	Commerc./UPS			Constant Supply, 20min.						
		(2) COMM. Console										
		(1) TWR Console							3 Consoles for Aerodrome, Ground & Coordinator	Microphone, Headphone Interphone, Directspeech Wind Speed & Direction Indicator, Altimeter Greenwich Clock, etc.	1 set	Air Traffic Control for Aircraft & Ground Movement Control
		(2) AFTN Console							3 Consoles	Teletype & Telephone Communications		
		(3) ATC Tape Recorder	Magnetic Head	10 ch.					Dual	Including Player Continuous	1 set	Reproduce Recorded ATC Communications
		(4) VHF A/D								ATS Communications Point to Point		
		(1) Transmitter & Receiver	A/E Simplex	120.9 MHz	50W	more than 27 km	Frequency Stability ± 0.002%	Dual		Remote control Function	1 set	Communications b/w ATC & Pilots
		(2) Emerg Transm. & Recv	A/E Simplex	121.5 MHz	50W							
		(3) Power Supply	Commerc./UPS									
		(5) VHF A/S	Simplex	2.8 MHz - 22 MHz, 6 ch.	120W (peak)	270 km	2 x 10 ⁻⁶	Dual		Remote Communications	1 set	Switch-up system for PTC VHF Radio Unit
		(6) VHF A/W	Fixed	145 MHz - 150 MHz	10W	more than 3.6 km		Single			2 sets	Communications b/w ATC & Fire Trucks, other cars & Persons
		(1) Surface Weather Observator System	FM Simplex	1 - 3W	more than 1.8 km			Single			1 set	Digital Display on panel in ATC & Met Briefing Rooms
		(2) Auto weather Station	Computer Processing							Wind Speed & Direction Temperature Barometer		
(3) Weather Satellite	Analog Feed							Temperature Hygrometer Rainfall Gauge	1 set	Manual Read & Supply Weather Data		
								Parabolic Antenna WX Satellite Receiver Image Printer	1 set			

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EQUIPMENT PROJECT LIST (2)

No.	FACILITY	EQUIPMENT	TYPE	FREQUENCY	POWER	COVERAGE	ACCURACY	STRUCTURE	OTHERS	QTY	PURPOSE OF USE							
3	Lightings	(1) Runway Edge	H Intensity					150W/45 lights, in case above-surface type	Along both sides RWY	2 rows	For final landing							
								185W/24 lights, in case buried type		2 sets	After landing 180° turn on RWY							
								45W/6 lights/runing pad portion above surface		2 sets	For final landing							
								200W/4 lights		2 rows	For taxiing/before Take-off or landing							
								200W/12 lights, in case buried type		2 sets	For final landing							
								45W/26 lights		2 sets	To indicate wind direction to air							
								2 Flashings		1 set	To indicate airport location to air							
								2 Lights		1 set	To give light around parking aircraft							
								1000W/2 lights Dual		1 set								
								1000W x 2/ 4 spots		1 set								
								1 set		1 set								
								1 commerc. power/100W another: Battery		1 pair	Emergency indication in case Radio Comm. Failure							
								11	Commercial Power Receiving Station	22KV cubical 11KV cubical						Convert 22KV to 11KV & 415V	1 set	To supply Commercial power to facilities
								12	Aux Generator System		50 HZ 3Ø				Provide fuel tank capable to run 48hrs	Provide fuel tank capable to run 48hrs	1 set	In case commercial power failure, supply to ATC & NAV AIDS, etc
								13	Aerodrome Beacon						11K & 415KV underground cabling	Provide 11KV substations	1 set	To supply commercial power to facilities

EQUIPMENT PROJECT LIST (3)

ELEMENT		MAJOR SPECIFICATION						
NAME OF INSTRUMENTS		TYPE	FREQUENCY	OUTPUT	STRUCTURE	OTHERS	QTY	PURPOSE OF USE for
5 Instruments	(1) ATC Telecommunication & Weather Systems							
	1) Oscilloscope	SS7635	0 - 350 MHz		① Dual Probe ② Accessories	Electric Supply: Commercial	1 set	D-VOR/DME, VHF AMS, Meteorological Equipments
	2) High Frequency Generator	MG3601A	0.1 MHz - 1040 MHz	-133 - +13 dbm	① Accessories ② Various Coaxial Connectors	same as the above	1 set	VHF AMS, HF AFS & VHF FM
	3) High Frequency Generator	MG3602A	0.1 - 2.080 GHz	-133 - +7 dbm	same as the above	same as the above	1 set	DME
	4) Frequency Counter	MF1603A	0 - 3 GHz		① Frequency Plug in head ② Accessories	same as the above	1 set	D-VOR/DME, VHF AMS, HF AFS, VHF FM & Meteorological Equipments
	5) Vector Voltmeter	HP8508A	100 KHZ - 1 GHz		Accessories	same as the above	1 set	D-VOR Antenna & Flight Calibration
	6) Spectrum Analyzer	MS2621B	9 KHZ - 2.2 GHz		Accessories	same as the above	1 set	VHF AMS, HF AFS & D-VOR/DME
	(2) Other System							
	7) Digital Multimeter	DC/AC			Input Probe		5 sets	All Facilities & Equipments
	8) Insulation Register	1000V/2000MΩ					2 sets	Insulation Resistance of Cables
	9) Insulation Register	500V/100MΩ					2 sets	same as the above
	10) Earth Register						1 set	Earth Resistance
	11) Cramp Tester	AC, 0 - 10/100/1000A					2 sets	Load current
12) High Voltage Tester	AC, 3KV - 34.5KV					2 sets	Voltage Check	
13) High Voltage Tester	-7KV					1 set	Voltage Check	

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ANNEX 2 Japan's Grant Aid Scheme

1. Grant Aid Procedures

- 1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of	(The Notes exchanged between the Government; Implementation of Japan and the recipient country)

- 2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by Government of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

- 1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project
- e) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grand Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to team must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals" (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)


5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertaking required of the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.



- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) "Proper Use"


The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than covered by the Grant Aid.

(8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

(9) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.



ANNEX 3 Necessary Measures to be Taken by the PNG side

Following necessary measures should be taken by the PNG side on condition that the Japan's Grant Aid is extended to the Project:

1. To secure the sites (necessary lands) for the Project
2. To clear the sites prior to the commencement of construction
3. To undertake incidental external works such as gardening, fencing, gates and exterior lighting around site where required.
4. To provide the following incidental facilities to the Project.
 - 1) Electricity distributing line to the sites
 - 2) City water distribution main to the site
 - 3) Drainage main to the site
 - 4) Telephone trunk line to the site
 - 5) General furnitures such as carpets, curtains, tables, chairs and others
5. To bear commissions to the Japanese foreign exchange bank for the banking service based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay (A/P)" and "Payment Commission"
6. To ensure prompt unloading, tax exemption customs clearance at the port of disembarkation in Papua New Guinea and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid:
7. To exempt Japanese juridical and physical nationals involved in the project from customs duties, internal taxes and other fiscal levies which may be imposed in Papua New Guinea with respect to the supply of the products and services under the verified contracts:
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into Papua New Guinea and stay therein for the performance of their work:
9. To provide necessary permissions, licenses and other authorizations for the Project, if necessary
10. To maintain and use properly and effectively the facilities constructed and the equipment provided under the project: and
11. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.

Appendix -5. Cost Estimation Borne by the Recipient Country

The estimated cost borne by the PNG side among the total project cost is shown below:

**Table -Project Cost Borne by PNG
Kina)**

(thousand

	Subject	Agency	Amount
(1) Civil Engineering	1) Apron Marking	OCA	3
	2) Fence & Gate		240
	3) Terminal Area Drainage		20
	4) Pavement (Parking & Peri. road)		90
		Sub-total	
(2) Architecture	1) Utensils and furnitures, Curtains, carpets & blinds		150
	2) Water supply system including well construction		260
	3) Planting		60
	4) Outdoor lighting work (Access road, Parking & Peri road)		65
	5) Removal of top soil under each new construction		50
		Sub-total	
(3) Operational Equipment	1) Electric power supply		260
	2) VOR site construction		165
	3) Public telephone facilities		120
		Sub-total	
Total			1,483

The above cost estimation was done under the following conditions;

- (1) Time of cost estimate: September , 1995
- (2) Exchange Rate : 1KINA(local currency)= 0.7643 US\$
- (3) Construction Period : 18.5 months from start of Detail Design
- (4) Other conditions : This project will be constructed under the Grant- Aid scheme of the Government of Japan.

Appendix -6. Other Relevant Data

6.1 Data collection

	Name of Data	Agency
1.	Government organization 1) National Gazette 2) OCA STRUCTURE 3) TOKUA Staff	OCA
2.	1992~1995 Programme (Air)	OCA
3.	Office of Civil Aviation	OCA
4.	TOKUA AIRPORT DEVELOPMENT	OCA
5.	Cabinet decision	OCA
6.	Notam	OCA
7.	Public Investment Programme : 1995-1999	OCA
8.	FLIGHT FORECAST	National Weather Service
9.	DATA - IFR and Night Operations and Air Niugini Schedule	OCA
10.	AIR TRAFFIC SERVICES STATISTICS	OCA
11.	Aviation Statistics 1993	OCA
12.	AIRCRAFT REGISTRATION INFORMATION	OCA
13.	Aviation charge	OCA
14.	1) Environmental Contaminants Act 1978 2) Environmental Planning Act 1978	OCA OCA
15.	EAST NEW BRITAIN	OCA
16.	1) Water Resources Act 1982 2) Application For Water use permit	OCA OCA
17.	List of Consultants & Yellow Pages Summary	OCA
18.	TOKUA UPGRADING FOR F28-4000	OCA
19.	Mobile Tower	OCA
20.	Land possession	OCA
21.	1) General Prices Order 1990 2) Designation Salary Grades & Transfer 3) ADULT RATES	OCA OCA OCA
22.	Others Total Reply	OCA

6.2 REGULATIONS CONCERNING CONSTRUCTION

(a) Regulation for Buildings

The basic regulatory law concerning buildings equivalent to Japan's Standard Building Law is Independent State of Papua New Guinea, Chapter 301, Building. This law is composed of 3 main sections, namely, 1. Building Act, 2. Building Regulation, 3. Subsidiary Legislation which consist of the following articles.

a) Building Act.

Part I	Preliminary
Part II	Application of Act.
Part III	Administration
Part IV	Approvals
Part V	Requirements by Building Boards
Part VI	Appeals, etc.
Part VII	Legal Provision
Part VIII	Miscellaneous

b) Building Regulations

Part I	Preliminary
Part II	Administration
Part III	Building Classification
Part IV	Site Requirements
Part V	Projections Beyond Street Alignment
Part VI	Building Height Limitations
Part VII	Health and Amenity
Part VIII	Provisions for Fire
Part IX	Hazardous Occupancies
Part X	Design and Construction
Part XI	Building Services
Part XII	Special Class Requirements
Part XIII	Declared Area Buildings
Part XIV	Miscellaneous Provisions
Part XV	Access for Persons with Disabilities
Part XVI	Repeal
Part XVII	Savings and Transitional Provisions

c) **Subsidiary Legislation**

Especially concerning structural design calculations detailed rules are set out under the Papua New Guinea standards and it is required by law to base structural calculations and details on the standards.

The following are the major standards pertaining to structural design.

PNGS. 1001 - 1982

General Structural Design and Design Loadings for Building

Part 1; General Design Requirements

Part 2; Dead and Live Loads

Part 3; Wind Loads

Part 4; Earthquake Loadings

PNGS. 1002 - 1982 Reinforced Concrete Structures

PNGS. 1003 - 1982 Steel Structures

PNGS. 1004 - 1982 Reinforced Masonry Structures

PNGS. MPI - 1982 Design Manual

There are no standards or regulation concerning design of electrical, mechanical, air-conditioning or plumbing systems. However, Australian Standards issued by the Standards Association of Australia as referred to below are generally used.

S.A.A. Code No.	Title
1221 - 1991	Fire Hose Reels
1496 - 1983	LP Gas Code
1668.2 - 1991	The Use of Mechanical Ventilation and Air Conditioning in Buildings
1851, Part 4 - 1980	Fire Hydrant Installation
1905.1 - 1990	Fire Resistant Doorsets
1697 - 1981	Gas Pipeline Code
2118 - 1982	Automatic Fire Sprinkler Systems
2419 - 1991, 1994	Fire Hydrant Installations, Part 1, Part 2
2441 - 1988	Installation of Fire Hose Reels

(b) Regulations on Construction Labor

Employment conditions and labor relations in Papua New Guinea are governed by several labor, employment related laws.

The main related laws are the following;

Employment Law (1978)..... work conditions and wages

Employer-Employee Relations Law (1962).....arbitration of labor disputes, labor agreements and mediation

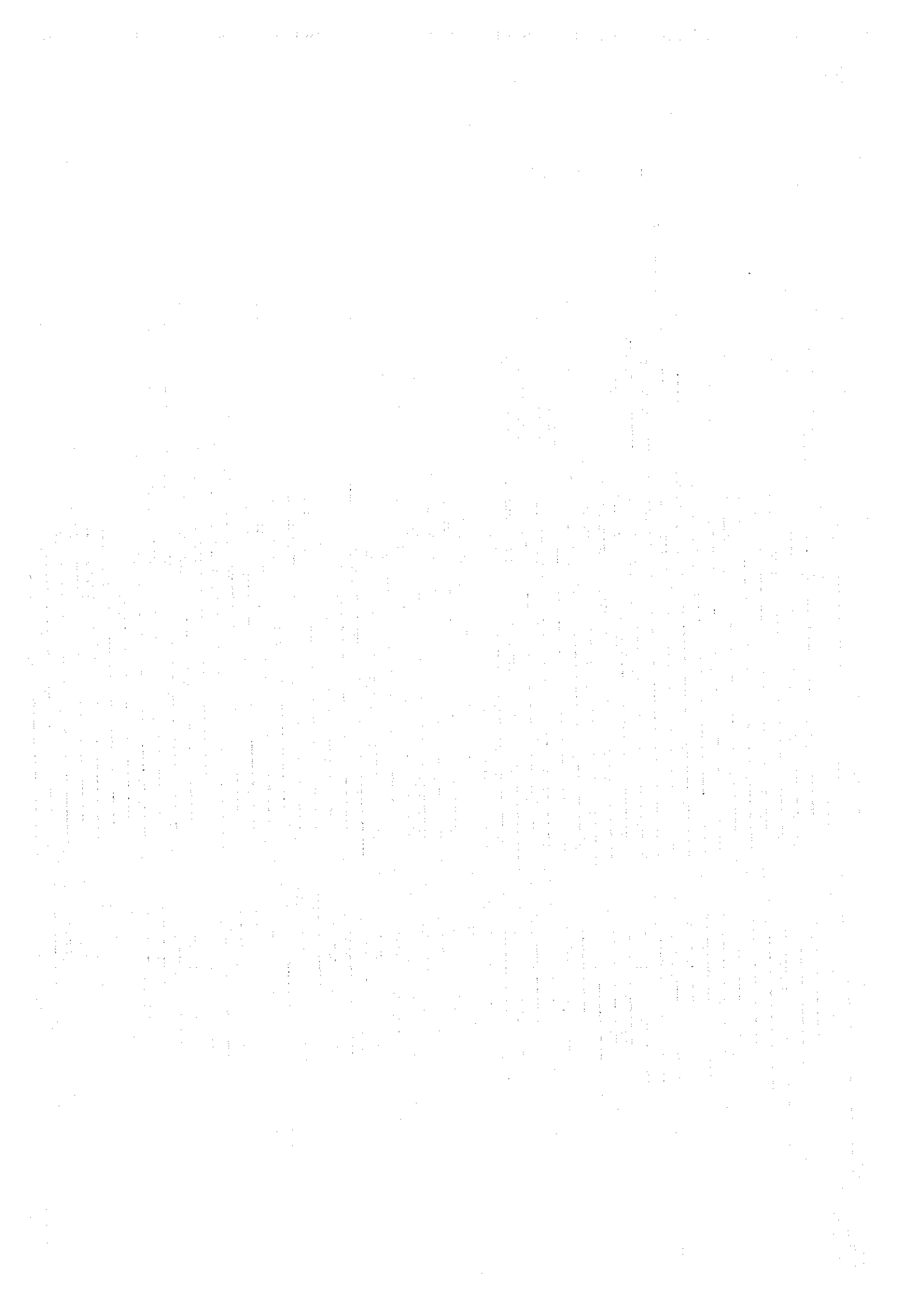
Unionization Law (1968)..... Labor unions and collective bodies

Apprentice Law (1967)

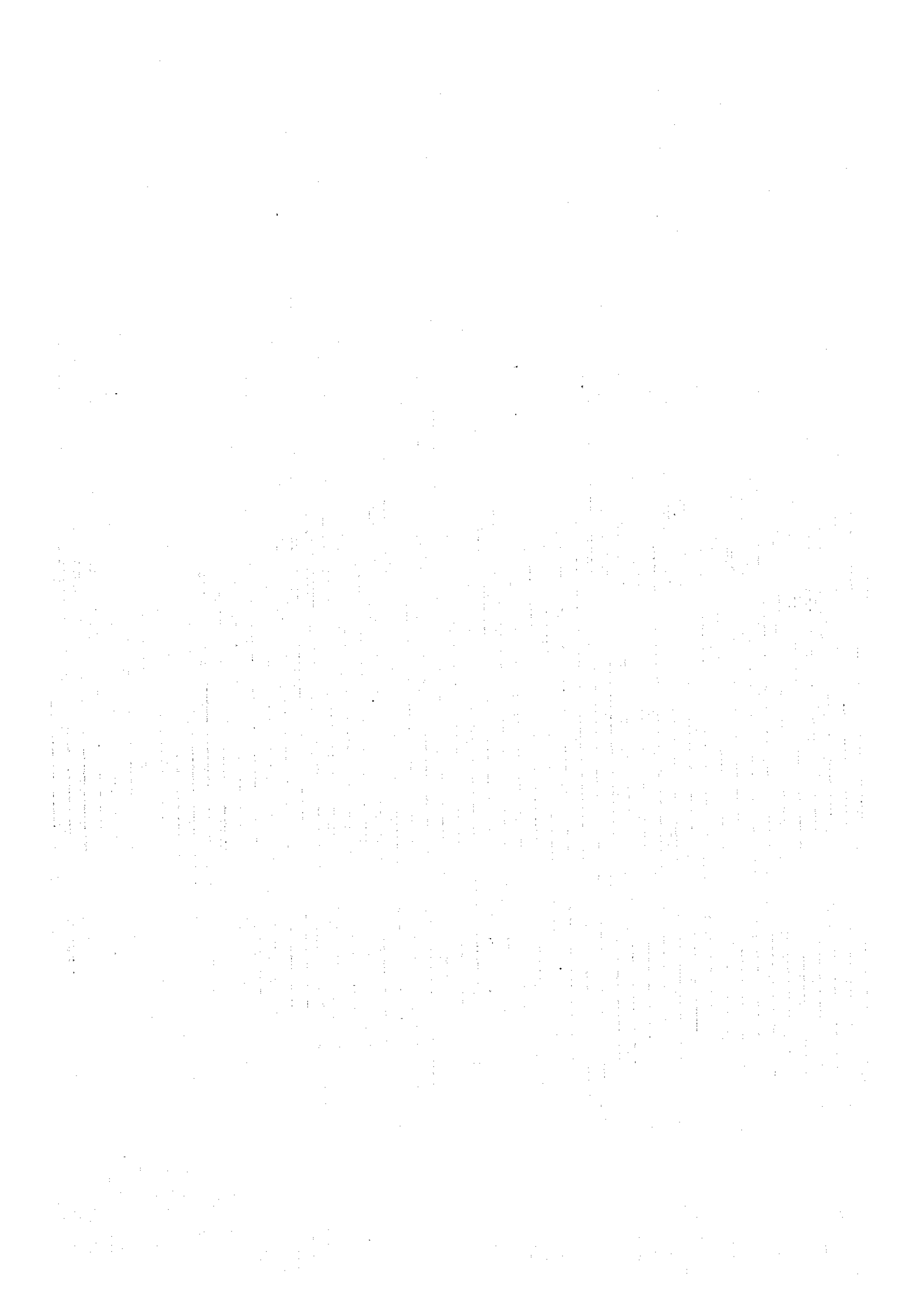
Labor Compensation Law

Expatriate Employment Law (1978)

Industrial Safety, Health and Welfare Act (1961)







JICA