DEPARTMENT OF EDUCATION
PAPUA NEW GUINEA

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR DEVELOPMENT OF THE FACILITIES
FOR EDUCATION MEDIA PROGRAMMES
IN
PAPUA NEW GUINEA

OCTOBER, 1999

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
KUME SEKKEI CO., LTD.
NHK INTEGRATED TECHNOLOGY INC.

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PREFACE

In response to a request from the Government of Papua New Guinea, the Government of Japan decided to conduct a basic design study on the Project for Development of the Facilities for Education Media Programmes and entrusted the study to the Japan International Cooperation Agency (JICA).

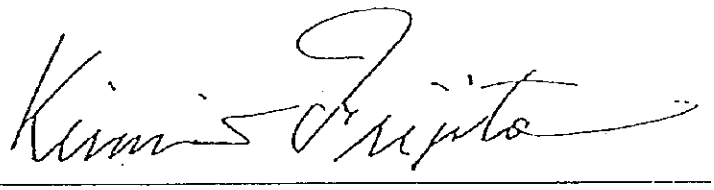
JICA sent to Papua New Guinea a study team from April 10 to May 9, 1999.

The team held discussions with the officials concerned of the Government of Papua New Guinea, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Papua New Guinea in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Papua New Guinea for their close cooperation extended to the teams.

October, 1999



Kimio Fujita
President
Japan International Cooperation Agency

October, 1999

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Development of the Facilities for Education Media Programmes in Papua New Guinea.

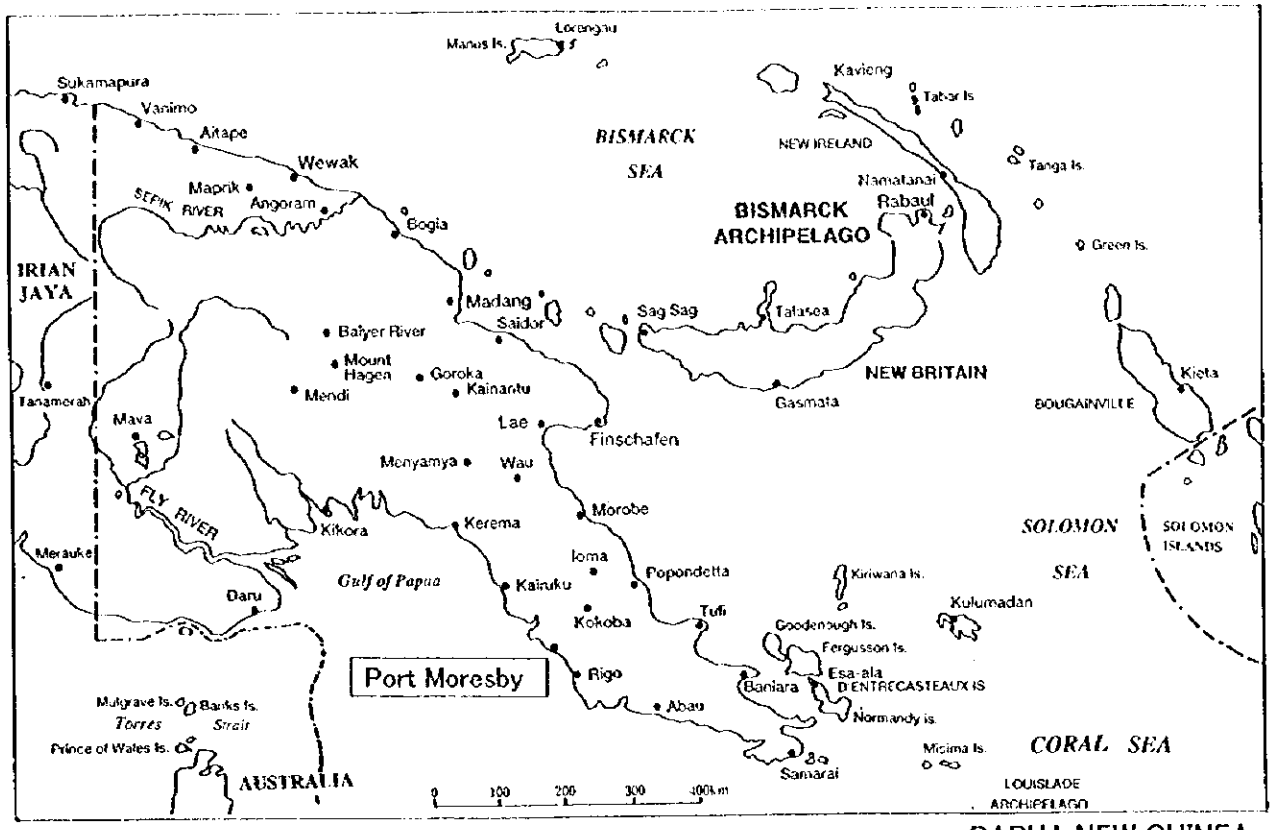
This study was conducted by Kume Sekkei Co., Ltd., and NHK Integrated Technology Inc. Consortium, under a contract to JICA, during the period from March 25, 1999 to October 8, 1999. In conducting the study, we have examined the feasibility and rational of the project with due consideration to the present situation of Papua New Guinea and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

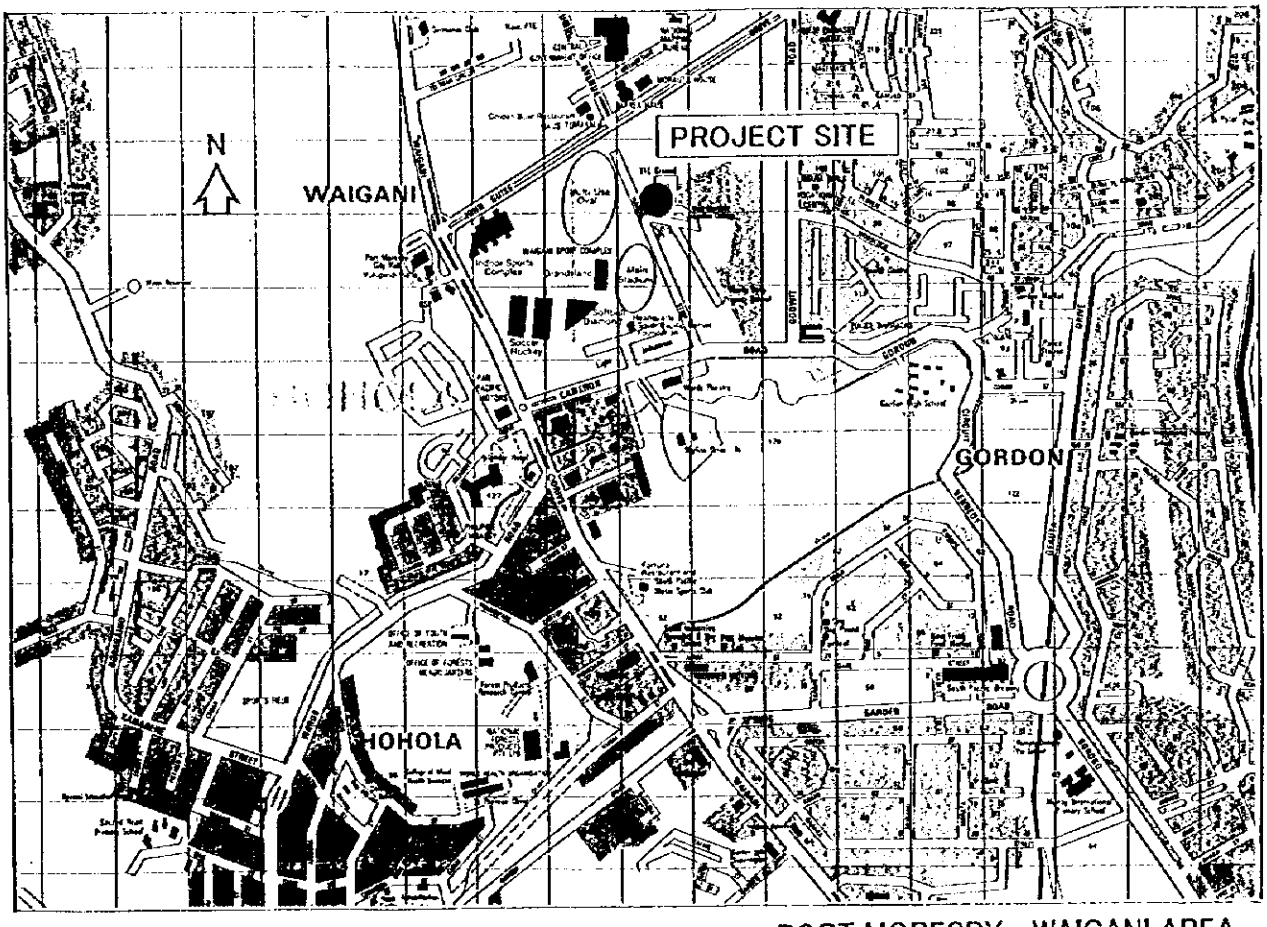
Very truly yours,

Shigeru Yasumatsu
Project Manager,
Basic Design Study Team on
The Project for Development of the
Facilities for Education Media Programmes
Kume Sekkei Co., Ltd.
NHK Integrated Technology Inc.
Consortium

◆ PROJECT SITE



PAPUA NEW GUINEA



PORT MORESBY WAIGANI AREA

FACILITIES FOR EDUCATION MEDIA PROGRAMMES IN PAPUA NEW GUINEA

LIST OF ABBREVIATIONS

AusAID	Australian Agency for International Development
CDD	Curriculum Development Division
CODE	College of Distance Education
CRIP	Curriculum Reform Implementation Programme
CRO	Curriculum Reform Office
DAT	Digital Audio Tape
DOE	Department of Education
ELCOM	Electricity Commission of Papua New Guinea
IMF	International Monetary Fund
MSU	Measurement Service Unit
NBC	National Broadcast Corporation
NHS	National High School
TELIKOM	Telicom PNG Ltd.
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFPA	United Nations Population Fund
PHS	Provincial High School
PNG	Papua New Guinea

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CHAPTER 1 BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

Teaching material used in primary and secondary high schools in Papua New Guinea (hereinafter referred to as PNG) includes radio and video education programmes. English lessons over the radio for schools were produced in 1966, and their use was continued after PNG independence in 1975. The use of these radio programmes has been made compulsory in primary schools. Video programmes have been used in secondary schools since 1994. The main reasons for using radio and video in schools are as follows.

- Shortage of teaching material.
- Effective in teaching English as the official language.
- Make up for the shortage of skilled teachers.
- Provide standard education through uniform teaching material.

(1) Use of radio education programmes

1) Radio education broadcasting

Since PNG independence, radio education programmes have been broadcast by the National Broadcasting Corporation (NBC). In fiscal 1999, NBC is scheduled to broadcast 16 programmes — 14 subjects and an additional two programmes — every week Monday to Friday during each school term. Schools in areas with poor radio reception are provided with cassette tapes of the programmes.

Table 1-1 Fiscal 1999 broadcasting schedule

No.	Grade	Subject·Programme	Term 1	Term 2	Term 3	Term 4	Total
1	E-1	Radio Time	27	30	29	27	113
2	E-2	Listening Time	27	27	26	27	107
3	G-3	Radio Magazine	27	27	26	27	107
4	G-4	Let's use English	35	36	34	36	141
5	G-4	Science	14	16	16	14	60
6	G-4	Community Life	8	7	7	7	29
7	G-5	Let's use English	27	27	26	22	102
8	G-5	Science	14	16	16	14	60
9	G-5	Community Life	8	7	7	7	29
10	G-5	Papa Mai	7	7	7	7	28
11	G-6	Radio Magazine	27	30	29	19	105
12	G-6	Science	14	16	16	4	50
13	G-6	Community Life	7	7	9	4	27
14	G-6	Kipa the Dreamer	8	10	9	5	32
		Sub Total	250	263	257	220	990
15	G-5,6	Currents Events	9	9	9	9	36
16	Teacher	Education News	10	10	10	10	40
		Total	269	282	276	239	1066

Source: CDD

2) Need for renewal

A 1993 survey by the Evaluation Division of the PNG Department of Education (hereinafter referred to as DOE) of 140 metropolitan, regional and remote area primary schools on the use of radio education programmes revealed the following.

- 97.2% of schools have at least one radio.
- While about 80% of schools use the programmes, about 20% do not, even though their use is compulsory.
- Most radio programmes were produced about 30 years ago and are now showing their age, and more than 80% of primary schools wanted the programmes to be renewed or updated so they more accurately reflect the curriculum and modern PNG life and conditions.
- About 80% of schools consider the programmes to be effective.

From the survey, the widespread perception among schools is that provided radio education programmes are in tune with the current curriculum and conditions in PNG, they are an extremely effective means of supporting and giving variety to normal school lessons. Moreover, a survey on the use of radio education programmes at regional primary schools and teacher-training schools conducted at the time of the basic design survey also revealed that most teachers believe the educational effect of these programmes would be heightened if their content was updated to reflect the curriculum and PNG conditions.

The DOE confirmed that even after the current reform of the curriculum has been completed, radio education programmes would continue to be a part of the teaching material for basic education, and would still be compulsory. Teaching guidelines for language (vernacular and English) and regional society lessons in the lower years of primary school include the use of radio education programmes, so there is a need to develop material that is in line with the PNG curriculum and conditions.

(2) Practical use of video programmes

1) Televising of educational video programmes

EMTV, a commercial television station in Port Moresby, has televised every new series of the educational programme KISIM SAVE on mondays and wednesdays each week. Secondary schools do not try to organise lessons around the period when these programmes are broadcast on TV, rather they either tape the programmes themselves, or purchase videos of the programmes for the sake of supplement of the lack of tools for scientific experiment or social studies.. The following table shows the KISIM SAVE series televised to date.

Table 1-2 Televised KISIM SAVE series

Series	Production year	Duration(minutes)	Number of tapes
Science-1	1994	30	9
Science-2	1995	30	10
Social Scienc-1	1996	19~34	10
Science-3	1997	25~30	12

2) March 1999 survey on video use

A questionnaire on video use was given to 161 schools at a conference attended by secondary school principals from all parts of PNG on March 17, 1999; responses were received from 125 schools. The following table shows the results of the survey.

Table 1-3 Survey on the use of educational video programmes

No.	Item	Answering Ratio
1	Do you have a VCR and TV:	88.0%
2	Do you use KISIM SAVE:	32.0%
3	Do you use other video programmes in class (including KISIM SAVE):	54.4%
4	Do you receive television signal (cable / broadcast):	52.0%
5	Does teacher need in service of Audio Visual Education:	85.6%
6	Other video programmes produced by CDD:	43.2%

As mentioned above, there is a need to renew or update radio education programmes so they are more in tune with the school curriculum, which is currently being restructured. This has been clearly expressed by the schools that use these programmes.

Educational radio and video programmes have been produced by the radio and television units of the Curriculum Development Division (herein after referred to as CDD) in the Division of Education, but to update or renew this material, the PNG government planned the establishment of a national media unit around the radio and television units, and to this end, it requested grant aid from Japan for facilities construction and equipment, and cooperation from AusAID in personnel and programme production. On receiving this request, Japan International Cooperation Agency (JICA) conducted a preliminary survey in December 1998, and confirmed that while there is a need and urgency to update radio education material, there is comparatively less urgency for educational video material.

The CDD radio unit has a shortage of production equipment, and the facilities and equipment they do have are indeed quite antiquated, so having judged that they would face considerable difficulties in trying to update current programmes

or produce new programmes so they conform to the new reformed curriculum with existing facilities and equipment, PNG prepared a plan for building and equipping facilities that would enable the unit to update or produce the required programmes.

In March 1999 CDD was restructured, and as a part of this process, the radio and television units were combined to form a media section in the curriculum unit to develop and improve educational media material. So to facilitate its smooth operation, an office for the media section, including the video personnel, and a facility to house the video production equipment was added to the plan for the radio material production facilities and equipment.

CHAPTER 2 CONTENTS OF THE PROJECT

CHPTER 2 CONTENTS OF THE PROJECT

2-1 Objectives of the Project

In 1990/91 the government of PNG has executed the Education Sector Review with the support of UNDP and UNESCO in order to improve particular problems of educational policy of PNG.

As the result of this review in 1995, the DOE of PNG Government formulated a National Education Plan. This plan aims at an educational system and curriculum reform by 2004. Execution of a educational system reform to reduce educational costs could provide everybody with nine years of Basic Education. This plan is currently in process and it has following two major policies.

① Educational System Reformation

Extension of Basic Education from 6 years to 9 years.

- Establishment of 3 years of elementary school.
- Admittance to primary school for G-7 and G-8 students (i.e. 6 years of primary education).

② Curriculum Reform

- Development of a government curriculum syllabus, teaching materials, etc. which meet the standards of PNG.

PNG teaching materials, include radio programmes, video materials as well as texts. The use of radio began before 1975, the year of independence, and has been officially used in primary school. As for the video materials it has been used in secondary school since 1994.

It is judged that it would be difficult to renew and produce the necessary materials without changing existing equipment and facilities for the Radio Unit in the CDD.

Since the current facilities are too old, they planned a new development of facilities and equipment to produce educational materials in accordance with a reformed curriculum.

Therefore, the development of facilities and equipment for the school radio programme is needed in order to execute their jobs smoothly.

According to the details mentioned above, the purpose of this project is, (in a education reform which PNG government is now proceeding with) to be able to renew and produce radio programmes by construction of facilities and procurement of equipment for producing those which are necessary in primary education.

2-2 Basic Concept of the Project

(1) Actual results in the past and a scheme for the future for producing radio programmes.

The production of radio programmes was restarted from 1997 and 64 programmes were produced in 1997, and 105 programmes in 1998.

The expected quantity for 1999 is 258 programmes, assuming that production is done by 2 groups separately. But considering lower ability of old existing equipment, a delay of a scripts due to a delay of the reform of curriculum, and lead time for ensuring the expense of production, actual programmes will be around 160.

Table 2-1 The estimated production for 1999

Plan	Estimation		
Name of programme	No.of production	Possibility	No.of production
Papa Mai	37	×	0
Radio Time	24	○	24
Community Life	29	50%	15
Current Event	36	○	36
English for Teacher	45	○	45
English	47	×	0
Education News	40	○	40
Total	258		160

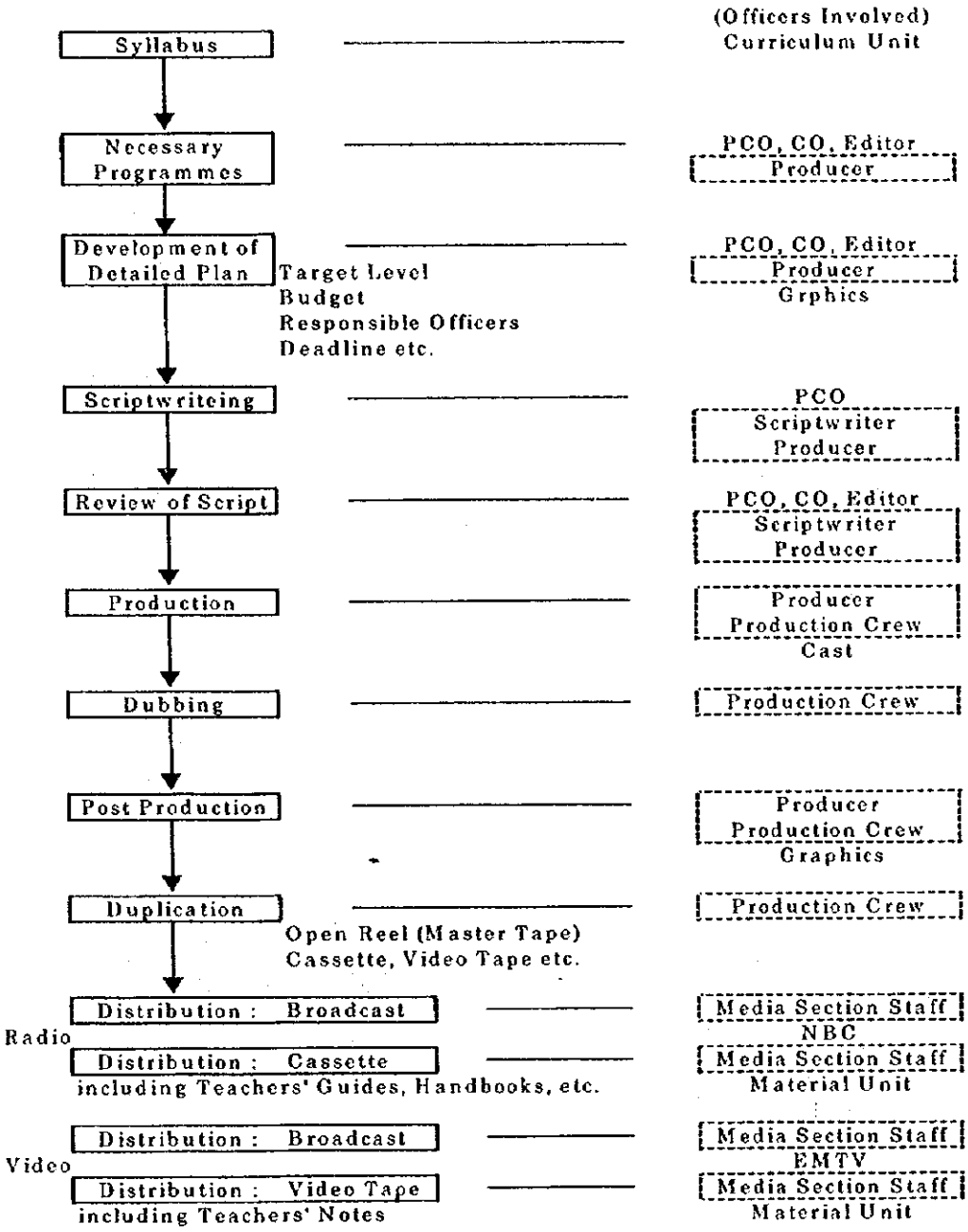
Note: Production of Radio Time for Grade3 has been done. However it has to be made again because the contents is not suitable for the reformed curriculum. Therefore it is out of count.

The upcoming production plan requests 1,089 programmes, which need to be renewed in accordance with the curriculum reform (the quantity will be changed in accordance with the contents of the current curriculum reform) and the production of 100 programmes yearly. If the project can prepare facilities and equipment together with enough production expense, it is judged that by operating these 2 groups, it will be possible to renew 180 existing programmes as well as produce 100 programmes which are requested in a year (i.e. 280 programmes in total for each year). Considering these quantities, existing programmes will be fully renewed in 6 years. In addition, if the technical cooperation is given through dispatch of either experts by the Japanese government or a scriptwriter expert by AusAID (for languages programmes), the achievement of this production plan will be more definite, due to the development of producing technique and script writing.

(2) Radio and Video Material Production Process

The process from producing radio and video materials to their procurement is as follows.

After the plan of materials is decided, the media section will be in charge of production, but each section in the CDD will cooperate in several stages of production.



Note: [ ] : Staff of Media Section
PCO: Principal Curriculum Officer, CO: Curriculum Officer

(3) Contents of Planned Facilities and Equipment

The contents of the request also contain preparations of facilities for video materials, including a production studio. However, considering that this project is to put emphasis on the support for primary education, the subject of the plan is providing facilities for producing radio programmes. Though, considering that executing their job (which is requested in this newly integrated section) is too inconvenient for the video staff to work in the existing radio staff work facilities. Thus, these facilities are planned to include both offices for video staff and rooms for accommodating existing equipment for producing video programmes.

Planned facilities and equipment are as follows.

1) Facilities for producing radio programmes :

Audio Studio (including Control Room), Post Production Room (including announcing booth), Duplication Room, Dubbing Room, Maintenance Room, Equipment Storage (including Field Recording equipment), Library, Office etc.

2) Facilities for producing video materials :

Office (shared with radio staff), On-line Room (putting down existing equipment), Off-line Room (putting down existing equipment), Equipment Storage (keeping existing equipment), Library (shared with radio programmes)

3) Equipment for producing radio programmes (system) :

Equipment for Audio Studio (including Control Room equipment), Post Production (including announce booth equipment), Duplication, Dubbing, Field Recording, Maintenance, Sound Effect, Office, Library, Portable Announcing etc.

(4) The main rooms and equipment quantity

We classified 4 sections to decide the facilities area, which are including sections of educational media materials production and other rooms.

- Radio programmes production section : rooms for renewal and additional equipment to be installed for producing materials.
- Video materials production section : rooms for existing equipment to be installed.

・Common rooms : rooms to use for both the management section and the radio/video staff

・Others : Generator room

1) Radio programmes production section

In order for it to be possible to produce 280 radio programmes in a year, we have 2 producing teams. When one team is recording in the Audio studio, the other team can use the Post Production Room and Dubbing Room, do other producing work, or out door recording (2-3 days, twice a three monthly).

Also, after clearing production process for each room together with the area of production, so that planned equipment are to be used functionally and efficiently, the area of each room was decided by considering equipment layout plan in which main equipment are put.

① Audio Studio (estimated area : 40㎡)

This studio will have the ability to perform the following recording:

・Programmes, such as English, will be recorded by 4 or 5 cast sittings.

・As for producing programmes which contain mini-drama, floor stand microphones, and table microphones will be used, and these programmes will be recorded by playing certain drama.

・The programmes will be recorded while approximately 10 studentsattend (this is a Papa Mai, etc.programme which is held about 25-30 times a year)

In addition to the above mentioned, certain room is needed for an electric piano in order to record live music, and have effective sound.

② Control Room (estimated area : 30㎡)

About 2 persons per one team will record by controlling sound which is played in the studio. One person will be a programme director and producer who serves as script writer concurrently, and the other will work as mixer in charge of operating equipment.

Control systems will be located so that it is compact and easy for 2 persons

to operate them.

The console table will be located on the same line generated by both the Studio and a double-glass window so that the staff can operate by watching the cast in the studio. The mixer on the console will be located to make an equilateral triangle with 2 speakers so to be able to hear all the sound.

③ Post Production Room (estimated area : 30㎡)

Complete materials will be produced by about 2 persons using a recorded source or other materials. Equipment for editing are the same as those of the control room (in the audio studio). Also, an announcing booth (for one person) is needed in order to record narrations, etc, so the layout of the equipment is different from that of the control room.

④ Duplication Room (estimated area : 40㎡)

Cassette tapes of programmes are recorded for the purpose of using them in the area where the radio broadcasting wave is difficult to receive.

In 1998, approximately 6,300 cassette tapes were distributed, and the same quantity will be estimated per year after 1999, therefore the quantity will be 6,300.

Equipment which can duplicate 22 cassette tapes maximum will be procured, and about 300 times of duplication will be done in a year. In addition, a work such as checking the sound of cassette tapes being duplicated will be needed, both writing and sticking the title label, and packing and dispatching them.

This room also contains space to store blank and dubbed cassette tapes.

Table 2-2 The sum of tapes to be kept in the Duplication Room

Kind of tapes	Bases of estimation	Total
Blank cassette tapes	In 1998, 6,300 tapes were distributed. Referring to this quantity, 3 months of stocks of tapes are to be kept. 6,300/12 x 3 →1,575 tapes	1,575 tapes
Dubbed cassette tapes		1,575 tapes
subtotal		3,150 tapes

⑤ Dubbing Room (estimated area : 20㎡)

The main purpose of this room is to convert one recording method into another, such as from tapes recorded by several methods into DAT format, or from completed one into a 6 mm tape format serving as a master copy, etc.

⑥ Radio Equipment Storage (estimated area : 15㎡)

In this room field recording equipment will be kept for producing radio programmes.

2) Video materials production section

① Video On-line Room (estimated area : 30㎡)

This room is used for making completed tapes of Betacam-SP by editing recorded materials. The space will be planned for existing equipment for easy use.

② Video Off-line Room(estimated area : 30㎡)

This room is used for making completed tapes of U-Matic by editing recorded materials. The space will be planned for existing equipment for easy use. And also, like the existing facilities, existing duplication equipment will be included. The sum of quantity in a year is estimated using the following bases:

Table 2-3 The sum of the quantity of video tapes for duplication

Kind of tapes	Bases of estimation	Total
Blank video tapes	In March 1999, Kisim Save tapes were already distributed to secondary schools nationwide. So the copy sales quantity will be decreased. 4 schools maximum monthly 4 schools x 41 tapes	164 tapes
Dubbed video tapes		164 tapes
Subtotal		328 tapes

③ Video Equipment Storage (estimated area : 15㎡)

In this room, existing field recording equipment for producing video

materials will be kept.

3) Common rooms

① Maintenance Room (estimated area : 30㎡)

The minimum measurement apparatuses will be equipped in order to check the calibration of production equipment, etc. Periodical inspection of production equipment in the studio and also those in other rooms will be executed once a month, and this room can provide enough space for this periodical inspection. In addition, this room is also used for preparing location recording of both radio and video materials.

② Library (estimated area : 40㎡)

Incumbent teachers who are training in PNG Educational Institute will visit this Library for the purpose of study and research of radio and video materials to see if they can use these materials in their classes, and audit these radio and video materials produced by the media section. In this library, one set of all the radio and video materials produced by the media section are kept together with teacher's notes which indicate how to use the said materials.

The quantity was estimated according to the table 2-4 shown below.

Table 2-4 The sum of the quantity of materials in the Library

Kind of materials	Nature of materials	Quantity at the end of 1999	Quantity at the end of 2004
Radio materials	Cassette tape	2,140 tapes	3,540 tapes
	DAT	0 tapes	1,400 tapes
	Teacher's Notes Teachers Handbook Children's Book	(17 programmes x 3 books / set) → 51 sets	51 sets
Video materials	Video tape (Produced by CDD)	72 tapes	672 tapes + (10subjects x 10programmes x 10 tapes /2) → 1,172 tapes
	Other video tape	600 tapes	
		Total 672 tapes	
	Teacher's Notes	5 subjects x 10 programmes × 1 book / set → 50 books	10 subjects × 10 programmes × 1 book / set → 100 books

③ Office (estimated area : office-1: 121㎡, office-2: 18㎡)

This room consists of an office, which will accommodate 11 staffs in the Media Section(i.e. 6 radio staffs, and 5 video staffs) and a Director room. Along with normal business work,the work in this office is making and checking scripts, reviewing programmes in process, and auditing the completed materials.

Master tapes of radio and video materials will be kept in this office at an adequate keeping temperature in the viewpoint of security. They will be kept in racks in the office. If technical cooperation experts are dispatched from Japan and Australia, their working space will be in this office. The occupied area for one person who uses computer in the existing Measurement Service Unit (hereinafter refereed to as the MSU Building) is 9.7 ㎡. For the planned facilities another area for auditing radio programmes and an area for keeping master tapes in addition to computers are needed, so that the area for one staff will be 11㎡. The area of the Director Room will be 18㎡referring to the existing radio Director room (19.44㎡) and director room of the MSU Building (21.55㎡)

Table 2-5 The sum of the quantity of master tape

Kind of materials	Nature of materials	Quantity at the end of 1999	Quantity at the end of 2004
Radio materials	Open reel	2,140 tapes	3,540 tapes
	DAT	0 tape	1,400 tapes
Video materials	Video tape	72 tapes	72 tapes + (10subjects × 10programmes × 10 tapes) → 1,072tapes

4) Others

① Generator Room

This area depends on the layout of the emergency generator.

2-3 Basic Design

2-3-1 Design Concept

(1) Natural Conditions

1) Countermeasures against temperature and humidity

The season in Port Moresby where the planned building is located is divided into a dry season (from May to November) and a rainy season (from December to April). The annual mean temperature is about 27℃, while the annual mean humidity is about 76%. In order to provide comfortable and hygienic indoor surroundings, enough ventilation is secured by setting up an air layer behind a roof hut. This may be considered sufficient insulation against the heat. The facilities use a radio studio that request to secure insulation against noise as well as operability of equipment for production. Air conditioner is needed for production rooms.

2) Countermeasures against rainfall and sunlight

Though PNG is a tropical rain forest climate, and is hot and humid year-round, the annual rainfall in Port Moresby is from 1000 to 1300 mm half of the nationwide average. Because 70% of the rainfall falls between December and March, we need a countermeasure against rainwater draining into the facilities. Also, the sunlight is strong during the dry season, therefore roofing and wall materials must have efficient insulating against heat. To provide protection against the rise of indoor temperature by strong sunlight, eaves are needed.

3) Countermeasures against earthquake and vibration

Port Moresby belongs to Earthquake Zone 4, a zone with the least earthquake activity, and facilities are designed according to the PNG Earthquake Resistance Standard. Since there is no special earthquake-proof, no anti-earthquake measure will be taken into consideration.

4) Countermeasures against the ground and drainage

The base is designed on a silt clay diluvial formation that lies 1.7m-2.7m deep from the surface of the ground. The silt clay (which lies in a depth of 1.7m from the surface) has a tendency to swell with water, but the base and floor structure

will not be damaged-even with this kind of swelling. In addition, drainage will be equipped around the light court in the centre of the building. The surroundings of it will be equipped to drain water immediately so that no rainwater will remain.

5) Site shape and landscape

The building site is near the front gate of the CDD, located in the left side of main street. It is adjacent to both MSU and CDD, which were constructed by the aid of AusAID. After considering these circumstances, placement and number of floors may be associated and harmonized with both MSU and CDD. The placement is also considered to fit future CCD facilities.

Since large trees grow abundantly in the building site and neighborhood, a minimum amount of tree felling will be necessary to build the planned facilities. Area for re-planting the trees will be planned.

(2) Social Condition

1) A functional facilities plan

In this facility plan, locations of production rooms and equipment are not considered to prevent continuity and functionality for producing programmes.

2) A System against voltage change and power failure

Voltage change occurs so frequently in Port Moresby that an Auto Voltage Regulator (AVR) will be needed to protect the equipment. Emergency power supplies (generated by emergency power) are provided to all electric loads in the existing CDD and MSU, and the planned facilities are also provided with emergency power to all electric loads.

3) Facilities with easy security control

A large number of visitors such as incumbent teachers studying at PNG Educational Institute next to the building are supposed to visit for study, research, radio and video materials auditing. The Visitors Library will be located near the entrance for easy security control.

To protect the equipment from burglaries, facilities have high level anti-burglary functions, such as strong doors, shutters, and iron-bars.

4) Facilities considered for handicapped persons

A toilet for handicapped is located on the ground floor of MSU. Like MSU, the Library will be located on the ground floor for easy wheelchair access.

(3) Local Construction Industry and Use of Local Materials

Priority shall be given to local materials and pay special attention to strength and easy maintenance control. And local construction method will be selected so that maintenance will be easily done by local companies.

(4) Operation and Maintenance by the Executing Agency

1) Facilities with Easy Operation

The easiest equipment and electric apparatus system shall be used, depending on which system is used locally in Port Moresby.

2) Decrease in running and maintenance cost

Maintenance costs will be decreased by using materials that have a longer durability against aging and climate. A air conditioner for each room will be planned for low running cost of operation. Making a light court for more natural light will thus decrease lightening equipment.

3) Facilities and systems with easy inspection and repairing

The Operations (general affairs section) in CDD is in charge of maintenance control for the existing facilities. This section will order outside repair companies in the case of disorder. So facilities and equipment of apparatus systems are to be general systems easy for operation and maintenance so that the outside companies can easily handle disorders. An operation training and inspection / repairing will be arranged before taking the systems over.

(5) Facility Grade

The planned facilities are to be used for the purpose of producing radio programmes which are broadcast via broadcast station. The performance of absorbing and

insulating noises is defined in NC30. The NC30 is lower grade compared to the broadcasting station (considering the difference between the studio in the facilities and the studio in the mentioned station). Sound quality necessary for radio programmes is determined by whether the recorded explanation and conversation can be heard, and whether the studio with NC30 can guarantee this required quality satisfactory.

(6) Selection of Equipment and Equipment Grade

Radio programmes produced in the planned facilities is broadcast through NBC and will be used in primary school classes. And depending on usage, we are going to procure equipment with the necessary grade. The quantity of planned equipment is decided by referring to the following basic idea.

- Contents of equipment are in correspondence with activity and technical level.
- Equipment that are easy for operation, maintenance, and quick procurement
- Equipment that have enough durability against the local climate.

(7) Construction Period

After analyzing the size of facilities and the number of floors, it is estimated that it will take about 10 months for complete construction if we use local materials and equipment for constructing. Also procurement and installation of equipment can be done within the same period. This project will be implemented within a single fiscal year.

2-3-2 Basic Design

(1) Site and Layout Plan

A building plot of the facilities is located on the south corner of CDD site. This plot is a rectangular land surrounded by Word's Strip of Access Road to CDD from the outside, Main Road in CDD site, MSU, and CDD existing buildings. A building plot is flat, and this includes a CDD parking area, and it will require cutting down trees for construction, but scrapping and removing existing facilities is not needed.

To layout the building following points are considered.

- Access road to existing facilities should be ensured.
- Active lines between the planned facilities and existing ones are ensured in the closest position.
- Existing trees should remain as much as possible.
- Spaces for existing parking should remain as much as possible.

A building plot is located on the opposite side of the access road, facing MSU, in order to have uniformity between the planned facilities and the existing ones. The axis line of the planned facilities will also be the same as that of MSU.

(2) Building Plan

1) Floor plan

For easy access, the front entrance, like MSU, faces the access road leading to CDD existing facilities.

- There is a side entrance to carry location equipment in and out. The total number of entrances will be two: front and side.
- The front entrance will have a double door and security shutters for checking visitors and securing facilities strictly.
- In order to control visitors easily, the Library, where incumbent teachers visit frequently, is located at the side of the front entrance.
- Light court is planned in the centre of the building. This natural light will provide brightness and an open- air environment.
- The floor will be made of tile rather than plant material, for easier maintenance, drainage against rain.
- Generator room is located in another building for a decrease in noise and vibration transmission.

2) Cross section plan

- The planned facilities will be two-stories considering the harmony of two-stories of MSU and existing buildings of CDD and to make use of the site.
- The height of the ground floor will be higher than ground surface in order to prevent rain water from invading.

- The roof will be a bent metallic pitched roof, the same as that of MSU general to Port Moresby. And the air layer behind the hut is set up in order to ensure ventilation and heat insulation.
- A light court is prepared in the centre of the building for receiving sunlight in the passage.
- The Library and a toilet for handicapped are located on the ground floor for easy wheelchair access.
- The ceiling in the audio studio will be 4 m high for sufficient sound expansion.
- Burglar proof bars will be installed at the opening of metal-framed glass sliding windows at ground floor as a countermeasure against security.

(3) Structure Plan

A framework and structural section for a structure plan, those that will satisfy the safety, performance, and durability required for facilities shall be applied. The budget and constructional ability in the nation will also be taken into consideration.

1) Design concept

The structural design will be in conformity with laws, standards, and criteria of PNG. A Strength Method for construction are going to be applied, which is a reasonable and international design method. The major building standard is as follows

(Australian building standard for construction will be referred to if necessary).

- Papua New Guinea Building Act
- Papua New Guinea Standard (PNGS)
- (PNGS 1001 – 1982) Code of practice for general structural design & design loading for Buildings part 1 – 4
- (PNG 1002 – 1982) Code of practice for the design of reinforced concrete structures
- (PNG 1004 – 1982) Code of practice for the design of bearing concrete block structures
- (PNG 1003 – 1982) Code of practice for the design of steel structures

In PNG 4 earthquake zones are designated in accordance with the criteria for anti-earthquake zones. The earthquake load is defined in each of these 4 zones.

Table 2-6 Floor area of planned rooms

Room name	Persons	Reason of area planning	Planned area (㎡)
Ground floor			
Audio Studio	4~5 Max10	Use for recording of 4~5 persons sitting (English progrmme) For recording of maximum of 10 persons standing Place electronic piano, etc. Equipment layout	41
Control Room	2	Place speakers and control desk appropriately Equipment layout	31
Post Production Room	2	Including anounce booth for naration (1person) Equipment layout	30
Duplication Room	1~2	Including packing and dispatching space Stock blank tape:Maximum for 3 months (1,575 tape) Stock copied tape:Maximum for 3 months (1,575 tape) Equipment layout	41
Dubbing Room	1~2	Equipment layout	20
Maintenance Room	1~3	Preparation for locations other than maintenance of equipment Equipment layout	28
Storage (Radio)		Equipment layout	12
Storage (Video)		Volume of existing equipment (8.5㎡)	12
Library		Radio : 3,540 cassette tapes、DAT1,400 tapes Operation manual 51 sets Video : 1,172 video tapes、Opertion manual 100 sets Including 1 audition booth Equipment layout	41
Ground foor(Sub total)			256
First Floor			
Office-1	11+	For 11 staff ×11㎡、including space for experts Serve both as office and custody of master tape of radio・video Office space of existing MSU building is 9.75㎡	123
Office-2 (Director)	1	Director room of radio unit : 19.4㎡、Director room of MSU unit : 21.6㎡	18
Video On-Line Room	1~2	Layout of existing equipment	26
Video Off-Line Room	1~2	Place existing equipment for editing and existing duplication equipment Stock blank tape・copied tape : each164 tapes Layout of existing equipment	26
Meeting Room	15~18	Staff, experts, CDD suporting staff Layout of table	41
Machine Room		Layout of mechanical equipment	12
First floor (Sub total)			246
Others		Hall, corridor, stairs, storage, WC, etc.	300
Total			802

Generator Room		Layout of generator equipment. Due to capacity limit of existing generator (250KVA),install an exclusive generator.	31

Grand total 833

The building plot belongs to earthquake zone 4, which has the lowest earthquake activity for earthquake designed load. Since the base condition zone is classified, as "hard", standard shearing force modulus is 0.05, which corresponds to 1/4 of that of Japan.

2) Soil condition and foundation design

According to the soil research, the soil structure in Port Moresby is covered with silt clay from the surface to the depth of GL-1.7 m, and beneath this layer, silt clay diluvial formation lies approximately GL-2.7 m deep. In addition, a gravel layer with silt clay lies GL-5 m deep. The soil reaches to the base rock formation at the depth of GL-9 m. The ground water is observed at GL-7 m deep and is not seen as an obstacle to excavating work. Also, the possibility of becoming liquid may be low.

The basic model of the planned facilities applies the direct foundation, which uses a diluvial formation deeper than GL-1.7 m as a supporting layer. The allowable support force of the foundation is expected to be about 10ton /㎡. After we execute a plate loading test when construction starts, we are going to check whether the expected support force is permissive.

3) Frame design

Since this method belongs to the most general structure category, the planned facilities will be constructed using bearing concrete block (t=190mm). Loading capacity for designing is as follows:

Table 2-7 Loading capacity for designing

	Room name	Load (Kpa)
Ground floor	Audio Studio, Control Room etc.	5.0 (500Kg/㎡)
	Entrance	4.0 (400)
	Library	3.3 (330)
	Corridor	3.0 (300)
First floor	Office	3.0 (300)
	Storage	5.0 (500)
Roof	Roof	1.0 (100)

4) Materials for structure

Basic principle for procurement of structural material will be local. Designing strength of 25 Mpa (25 N/mm²) concrete will be applied.

・Cement : Portrand cement

・Gravel : Crushed stone

・Sand : River sand

・Reinforcement steel bar : Deformed bar JIS・SD395 (made in Japan)

Round bar JIS・SD235 (made in Japan)

・Structural steel : Light guage steel GRADE 250 – 350 (made in Australia)

(1) Building Service System Plan

1) Air Conditioning Work

The planned facilities consist of radio programmes production rooms, video materials production rooms, an library, offices, and a meeting room etc. Sound insulation from outdoors as well as the quietness of the audio studio and indoors are important. Considering the characteristics of this facilities, air conditioning will be installed according to the basic policy shown below.

・This system plan may be adequate for the purpose and the rooms which are used in a different time zone.

・A air conditioner for each room is planned in consideration of reduction of running cost of operation.

・Indoor quietness and insulation from outdoors are possible with this plan in accordance with conditions of each room.

・As a rule, we use local equipment used widely for quick repair and renewal.

According to a plan mentioned above, we plan the following:

The outdoor atmosphere in Port Moresby and aimed indoor temperature are as follows:

Outdoor Atmosphere :	Summer Dry-Bulb Temperature	Wet-Bulb Temp
	33℃	27℃

[the source : ASHRAE HANDBOOK FUNDAMENTALS 1993]

Indoor Temperature : 26℃

An adequate air conditioning method will be selected according to the purpose of the room's use. Time of usage and direction will also be taken into account.

① Ceiling mounted air-cooling package system.

Applied Room: Office, Library, Meeting room, Maintenance room etc.

Installation purpose: An air conditioning package will be installed in each room to cool it down individually, which has different usage times

② Ceiling hidden air-cooling package air-conditioning system.

Applied Room : Post production room, Dubbing room, Duplication room, On·Off-Line rooms

Installation purpose : This packaged type is installed in the ceiling above a passage in order to decrease indoor noises.

Conditioned air is sent by this passage to the indoors through a silencer. Fresh air is brought through package indoor equipment.

③ Floor mounted air-cooling package system.

Applied Room : Audio studio, Cotrole room

InstallationPurpose : This package type is installed in the room so that noises generated by the air conditioner are cut and thus provide quiet circumstances for recording in the condition of about NC30. Fresh air is brought through this package.

The concept figures of ①, ②, ③mentioned above are shown in figure 2-1.

2) Ventilation system

- Ventilation is done using a ventilator for the lavatories and storages.
- Ventilation is done through a wall fan (pressured fan) for the generator room.

3) Supplying/Draining water, and sanitary system

① Water supplying system

A 25 mm diameter water pipe is lead into the building from the 100mm diameter water pipe. This pipe branches from the main pipe under the Wards Strip Road. Considering that the building is low layered, a direct supplying method for water supply to each building portion. Using water pressure of the main pipe will be used.

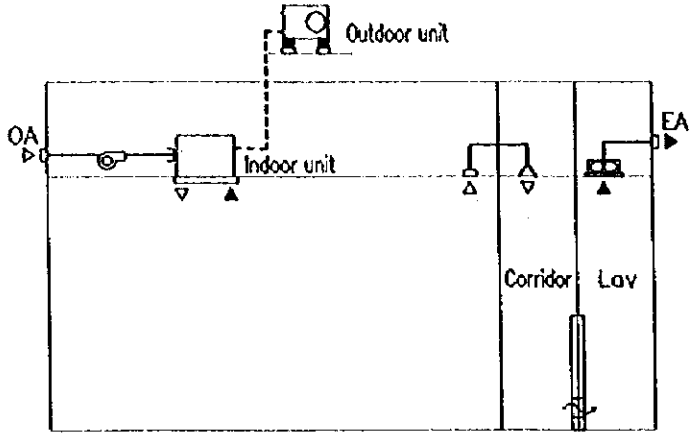
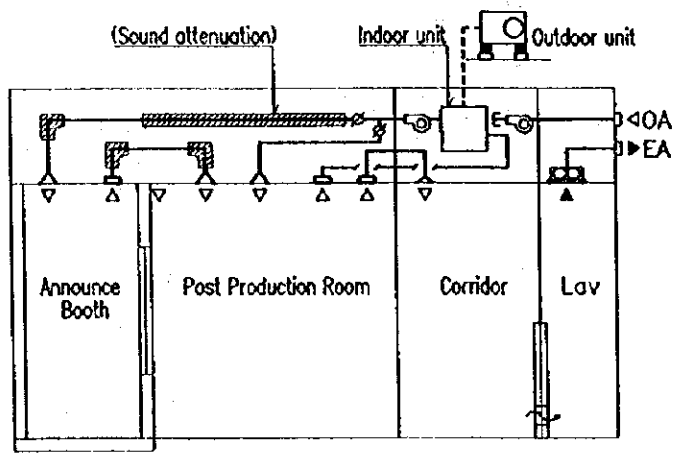
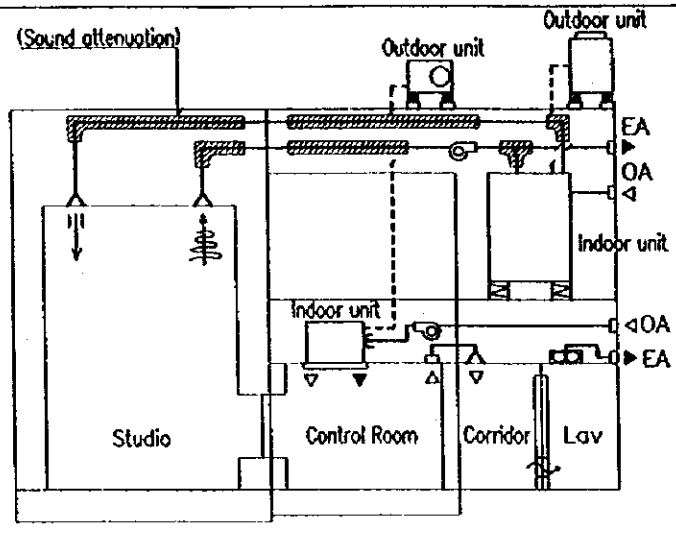
①	System : Ceiling mounted air-cooling package system Room : Office1,2 Meeting Room On-Line Room Off-Line Room Library Duplication Room Dubbing Room Maintenance Room	
②	System : Ceiling hidden air-cooling package system Room : Post Production Room	
③	System : Floor mounted air-cooling package system Room : Studio,Control Room	

Figure 2-1 Concept of air conditioning system

② Pantry

An electric hot-water heater is equipped in a pantry to serve teas and other hot drinks.

③ Drainage system

Waters are divided into two groups: a rain water group and a sewage / drainage group. Rain water is discharged to the side gutter on the east road (on the CDD site) through the boxes installed by the building. Sewage / drainage is gathered on the CDD site and discharged directly to the main sewer pipe on the CDD site.

④ Sanitary equipment

A low tank is used for the feces pot, and high tank is used for the urinals. In addition, a washbowl and sink for cleaning are equipped in lavatory. A sink will be installed in the pantry.

⑤ Fire extinguishing equipment

Outdoor hoses, and extinguishers are put at required position (such as the corridor).

4) Electrical work

① Receiving and transformation system

At first, electric power is lead to the transformer (ELCOM is in charge of installation) near the planned generator room through underground wires from a special high voltage wire located along the Wards Strip Road. Then it is lead to inside of the building after voltage is lowered. The distribution panel will be installed in the planned generator room and power is distributed to the receiving panel of the existing facilities through the underground wire. ELCOM is in charge of upward installation to the branch fuse of the secondary winding of the transformer. The latter portion will be considered for the mentioned construction. Voltage fractuation rate in Port Moresby is from 10% to 15%. Because this rate is rather high, we need a much consider on Auto Voltage Regulator (AVR) and stabilized power-supply for the necessary.

- Electric power supply specification

  Receiving/Distributing panel : to be installed newly in the generator room

Stabilized power-supply :AVR 125kVA corresponds to a ±15% voltage fluctuation.

Protective relay : voltage sensors are installed in three phases and changes automatically from the commercial base power supply to the generator power supply in the case of voltage fluctuation over ±15%.

② Generator

Power failure often occurs in the dry season when the dum water level decreases and this occurs about 2 times weekly for 12 hours each time, so a power generator needs to be equipped. The existing 250kVA power generator covers all the existing CDD facilities (including MSU), however the capacity has its limit. The planned facilities will accordingly need a new power generator, which covers the entire load of the planned facilities and can supply power in emergency.

Specification of generator is af follows:

- Type : Floor mounted type of air-cooling disel generator (Continuous opertion type)
- Type of power : 3phases 4wires 415/240V 50Hz
- Capacity : 125 KVA
- Fuel : Disel
- Oil tank capacity : 2,400 litter (48 hours)

③ Main power system

Electrical energy is distributed from the receiving/distributing Panel (MSB) to receiving panel in the existing facilities,and to the distributing panel for lights as well as to power control panel in the planned facilities. As the conduit tube are used for the main distribution and power line. the power control panel controls the fans. A primary alarm for emergency alarm of each facility is displayed in the alarm panel located in office 1. The ground for each equipment for producing educational materials will be ensured individually.

Electrical system of main power distribution circuit is as follows:

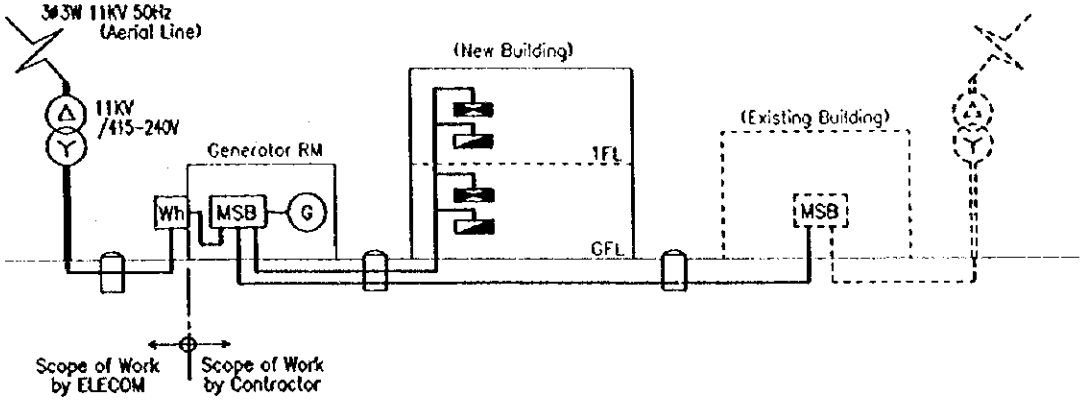


Figure 2-2 System diagram of electric power supply

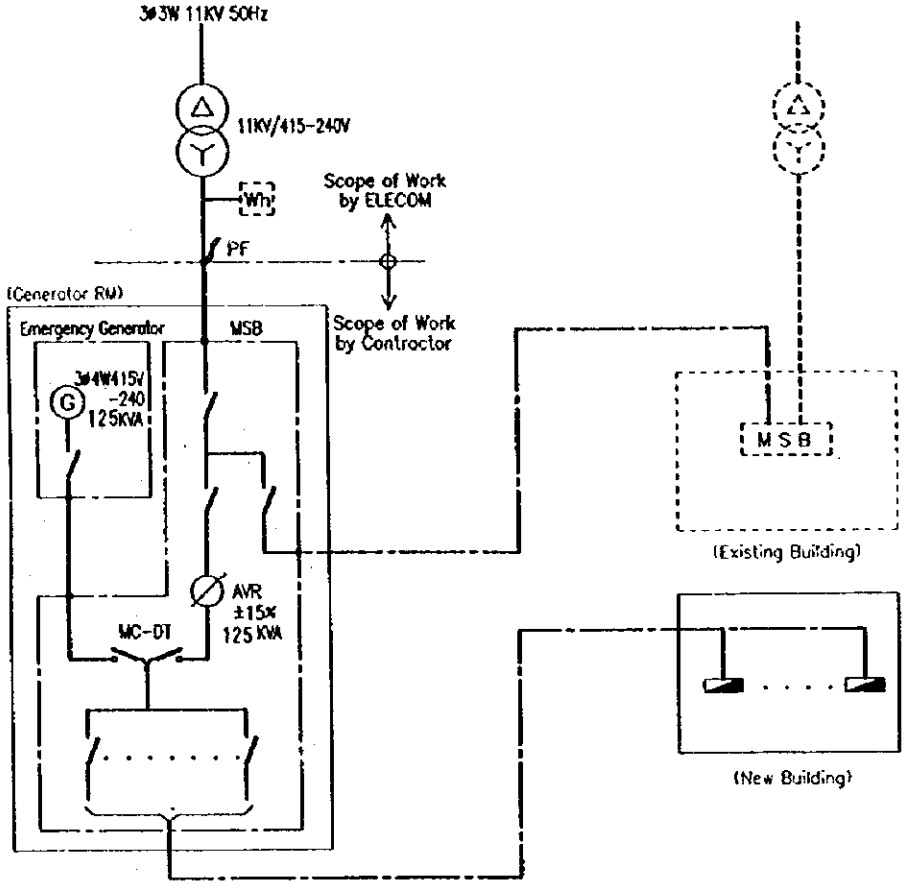


Figure 2-3 Skeleton diagram of power supply system

- Main power line : 3 phases 4 wires 415/240 V
- Light and Outlet : Single phase 2 wires 240 V
- Power for air-conditioning and ventilation : 3 phases 3 wires 415 V

④ Wiring plan for lighting and outlet

Light on/off operation is subdivided for energy conservation on the site. OA sockets, apparatuses sockets in the audio studio etc. are considered as well as sockets for general purpose. Those kinds are decided considering location and capacity of equipment.

⑤ Lighting fixtures

For lighting fixtures, fluorescent lumps will be used in various sizes which considering running cost it can be obtained locally. In each room, lighting fixtures with batterys are installed in the case of power failure. Guide light is also installed at corridor for escaping in case of emergency time.

The intensity of illumination of main rooms are as follows.

Office etc.	: 500 Lx
Audio Studio etc.	: 500 Lx
Entrance Hall	: 250 Lx
Corridor	: 150 Lx

⑥ Telephones system

The telephone line will be lead to the building through an underground pipe from Wards Strip Road. TELICOM is in charge of this pipe construction and wiring. During construction, excavating and backfilling will be done. A leading-in terminal panel and telephone switching terminal panel will be installed inside the building, and wires will be lead to the telephone outlet in main rooms. Telephone main unit will be installed in Library, and telephones are equipped in rooms so that both inside and outside communication can be done.

⑦ TV Auditing system

Pipe for Cable TV line is lead through from the front road, and VHF antennas are installed to receive EMTV.

⑧ Fire alarms

We will install fire detectors and push button fire alarms at the necessary

locations when the alarm sounds and the alarm will be displayed on the panel in office 1 so that we can inform people of the fire and help them to escape safely.

(1) Construction Material Plan

The basic concept for the selection of construction materials is to realize the facilities of easy maintenance. Therefore, materials which will be locally procured and the localized finishing method shall be adopted in view of local climate and the natural features. Since maximum procurement of materials shall be locally, the facilities can be maintained without any particular difficulties, even if equipment and materials suffer damage, they can be easily repaired.

Table 2-8 Comparison of Construction Method

		Local method	Adopted method	Reasons for adoption
Exterior	Roof	Folded metal sheet (sloped roof)	Folded metal sheet (Sloped roof)	Weather proof, Commonly used in local
	Wall	Concrete block Mortar·Paint	Concrete block Paint	Commonly used in local
	Fitting	Aluminum Wooden	Aluminum	Weather proof, Commonly used in local
Interior	Floor	Carpet tile PVC tile Wooden parquet Mortar trowel	Carpet tile PVC tile	Sound absorption, Commonly used in local PVC tile also common
	Wall	Mortar·Paint Conc. Block·Paint Wooden rib	Mortar·Paint Conc.block·Paint Perforated gypsum board + Glass wool board	Commonly used in local High sound absorption for studio
	Ceiling	Rock-Wool Acoustic Soft boad Mortar·Paint	Rock-Wool acoustic CSA board	Sound absorption, Commonly used in local, CSA board shall be used in utility

Explanation of main finishing materials are as follows.

① Roofing material

Sloped roof of coloured galvanized steel sheet is common in local. It also has good effect for weather proof.

② Doors and windows

Sliding windows of aluminum sash will be used which is common in local. Burglar proof of metal bar will be installed to all the windows in ground floor. Wooden doors for interior of building will be used which is common in local.

③ Interior finishing materials

Floor slab shall be reinforcement concrete in consideration of durability and soil condition of the planned site.

In the Audio Studio the ceiling will be 4 m high for sufficient sound expansion and for the wall and ceiling perforated gypsum board + glass wool board shall be applied to keep the sound absorption and insulation efficiency ratio of NC30. For walls of related production rooms such as Post Production where the less necessity of sound absorption and insulation efficiency than Audio Studio, perforated gypsum board + glass wool board shall be applied. For ceilings of those rooms rock-wool acoustic board shall be applied. For floors of material production rooms Access Floor (OA floor) and tile carpet tile finishing shall be applied to keep away the wiring of equipment under the floor it is also the countermeasures for future expansion of audio visual material production equipment.

Table 2-9 Main finishing materials

Room name	Floor	Wall	Ceiling	Reason for selection
Audio Studio	PVC tile	Perforated Gypsum board + Glass wool board	Perforated Gypsum board + Glass wool board	Sound absorption · Proof (NC30)
Control Room, Post Production,	Carpet tile (OA Floor)	Perforated Gypsum board + Glass wool board	Rock-Wool Acoustic board	Equipment wiring, Sound absorption · Proof
Duplication, Maintenance Rm.	PVC tile	Mortar paint	Rock-Wool Acoustic board	Durability, Easy to clean
Library, Meeting Room	Carpet tile	Mortar paint	Rock-Wool Acoustic board	Sound absorption
On-Line Room, Off-Line Room	Carpet tile (OA Floor)	Perforated Gypsum board + Glass wool Board	Rock-Wool Acoustic board	Equipment wiring, Sound absorption · Proof
Office	Carpet tile	Mortar paint	Rock-Wool Acoustic board	Sound absorption
Storage	PVC tile	Mortar paint	CSA board	Economic
WC	Porcelain tile	Semi-Porcelain tile	CSA board	Cleanliness, Easy to clean, Water resist
Corridor	PVC tile	Mortar paint	Rock-Wool Acoustic board	Durability, Easy to clean
Entrance Hall	Porcelain tile	Mortar paint	Rock-Wool Acoustic board	Weather proof, Cleanliness

(6) Equipment Plan

1) Existing equipment status

① An analysis of the contents of the existing equipment

a. Equipment for radio programmes production

Most of the existing equipment are the old fashioned analog type, purchased in 1986, and they need to be changed. The main recording and editing equipment in the Control room are also used for post production and dubbing.

The existing equipment system contents are as follows:

- ·Audio Studio : Various type of Microphones
- ·Controle Room : Digital Console, various type of Recorders (Open Reel, Cassette, MD), Amplifires
- ·Field Recording : Recorders and Microphones
- ·Duplication : Cassette Copy Machine
- ·Others : Amplifires, Loud Speakers, Recorders

b. Equipment for video materials production

The system consists of the following equipment :

- · On-line System Betacam-Sp procured under the Japanese cultural grant aid in 1997.
- · Off-line System U-Matic procured under the Japanese cultural grant aid in 1986.
- · Field location equipment
- · Duplication equipment

② Research for operating condition of existing equipment

As a result of survey for operation of existing equipment for radio programmes production, equipment which can be used in the planned facilities are as follows:

Table 2-10 Usable existing equipment

Equipment name	Model	Nos	Introduction
YAMAHA Digital Console	O2R	1	1997
YAMAHA Cassette Deck	KX-380	1	1998
SONY Mini Disk Recorder	MDS-E55	1	1998
SONY Portable Mini Disk Recorder	MZ-B3	1	1998
SONY Condenser Microphone	ECM-MS907	1	1998
SONY CD Cassette Recorder	MHC-EX5	1	1998
SONY Stereo CD Cassette Recorder		1	1998
SONY Stereo Cassette Recorder		1	1997

2) Drawing up a equipment plan

① The criteria of selecting equipment

1. Coordination between equipment and contents of activity

Necessary equipment are chosen to renew and produce planned radio programmes in the organization of two production teams.

2. Coordination between equipment and technical level

Equipment will be chosen by considering the technical skill level of Media Section radio staff.

3. Maintenance control conformity

Equipment will be selected, whose necessary consumables can be obtained locally.

4. Aid principle coordination

Such equipment are included systems list in Minutes of Discussions.

5. Quality reasonability

Adequate quantity will be selected, which meets the production quantity plan and operating program in two production teams. We avoid waste by making the most use of the existing systems.

② Consideration for requested equipment

Evaluation for each equipment was done regarding the criteria mentioned above and equipment were excluded if they did not satisfy even one of the above 4 items. We reconsidered the quantity,deciding it as planned quantity for equipment on the item 5 "Reasonability of Quantity". The results of evaluation and consideration were summed in the table of "Planned Equipment List".

Basic Design Drawings (Drawing List)

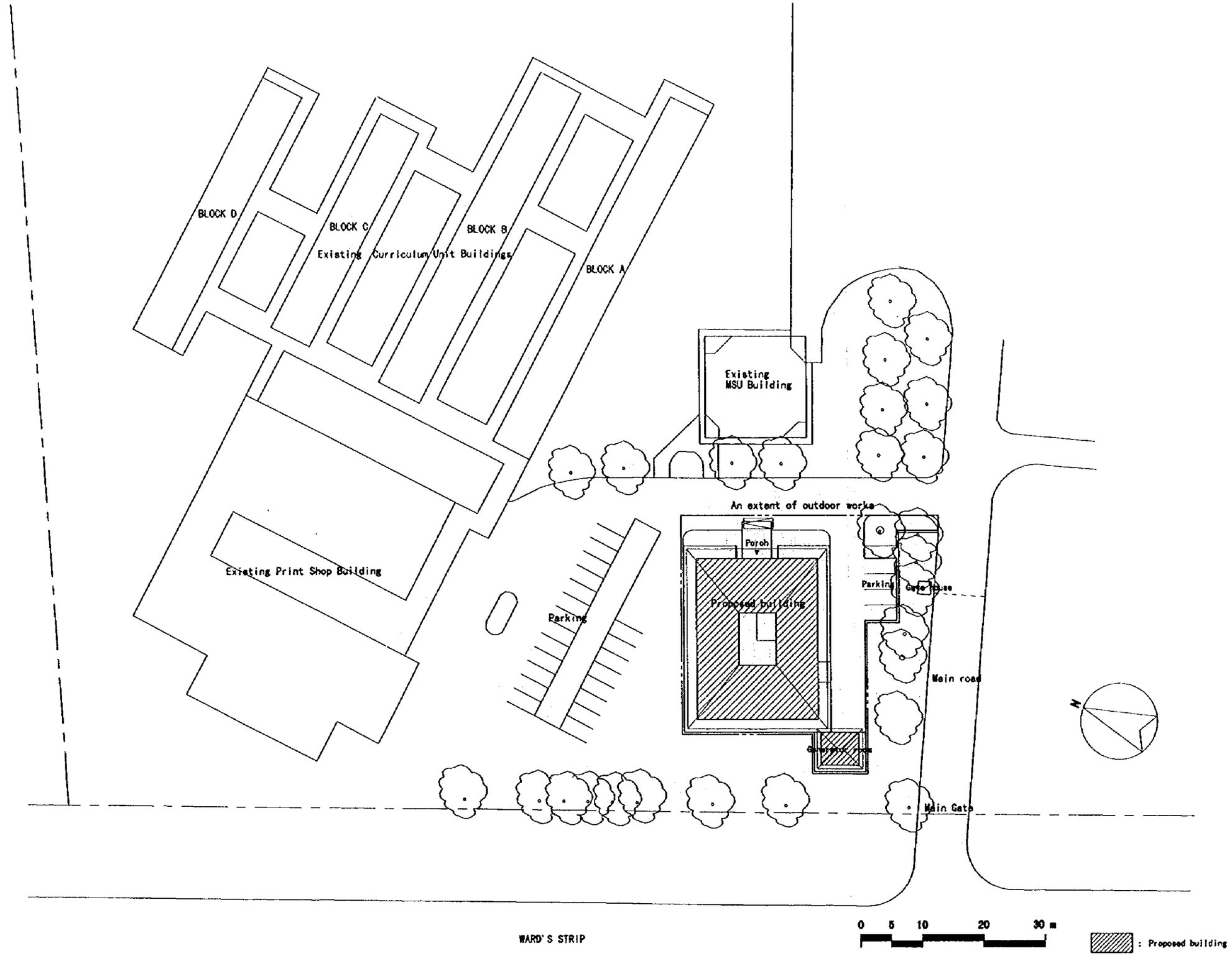
I. Facility

1. Site Plan
2-1. Floor Plan
2-2. Roof Plan, Plan for Generator Room
3. Elevation
4. Section
5. Infrastructure Connection

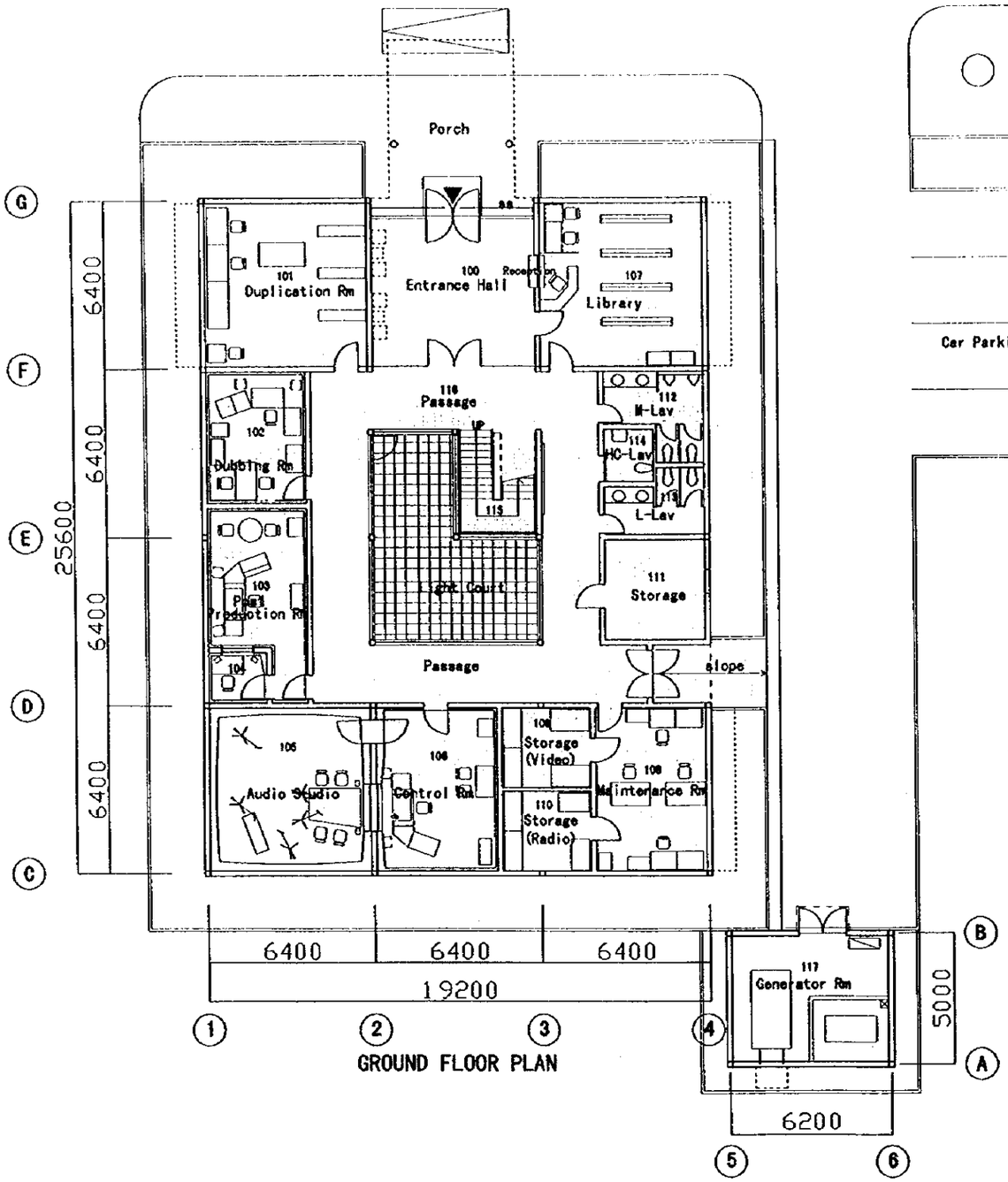
II. Equipment Layout Plan

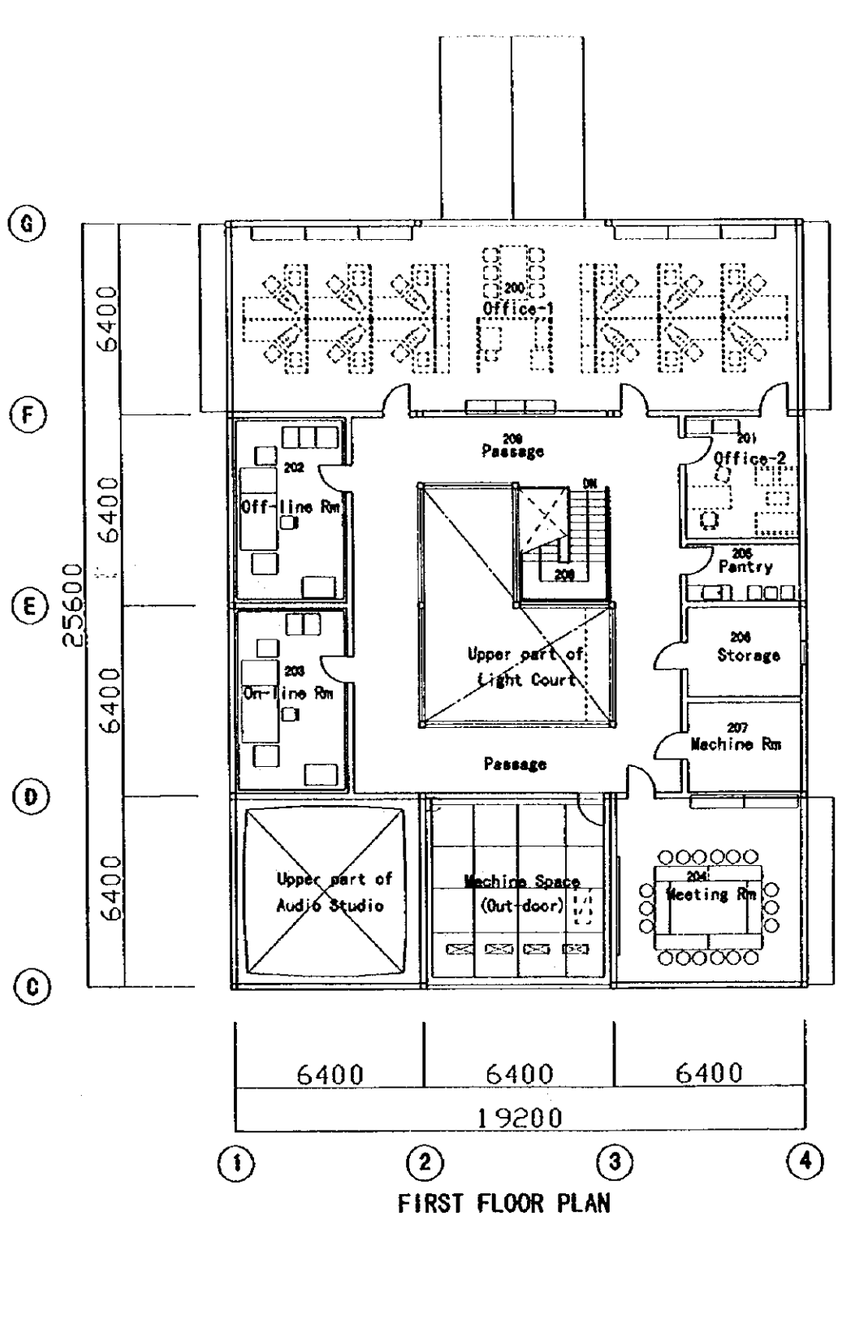
E01. Production Studio, Control Room
E02. Post Production Room
E03. Dubbing Room
E04. Duplication Room
E05. Maintenance Room / Radio Storage / Video Storage
E06. Library
E07. Office-1

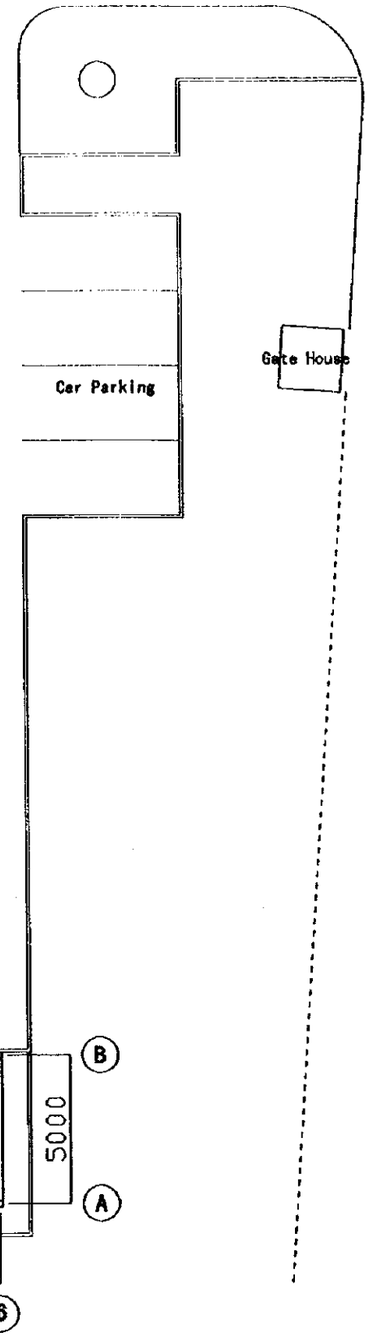
III. Planned Equipment List



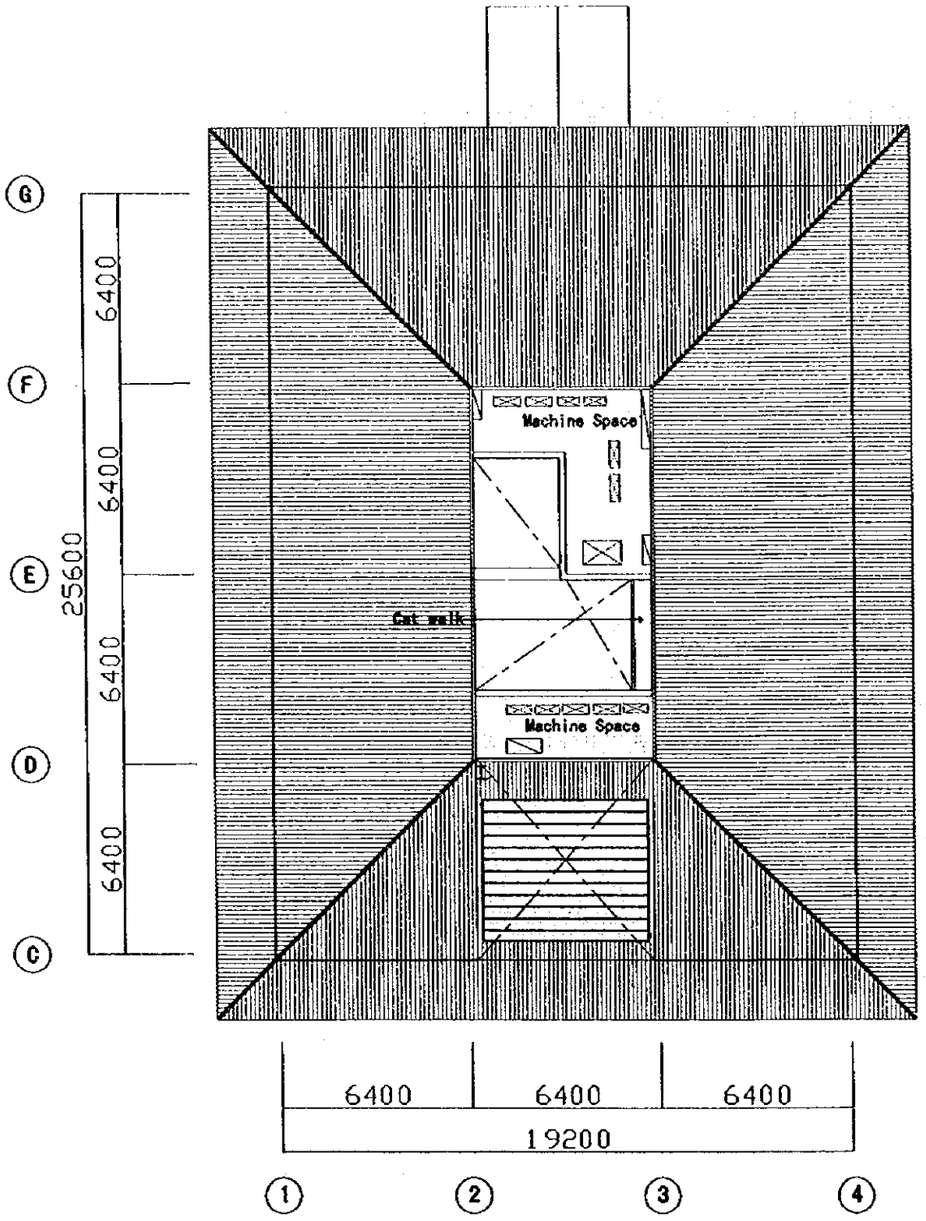
SITE PLAN 1:600 1



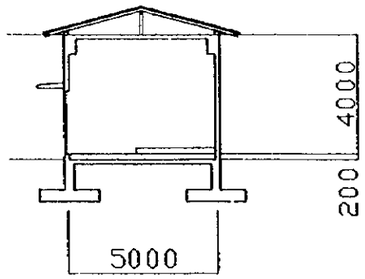




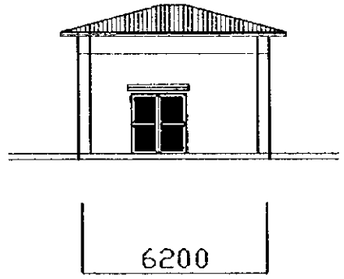
FLOOR PLAN 1:200 2-1



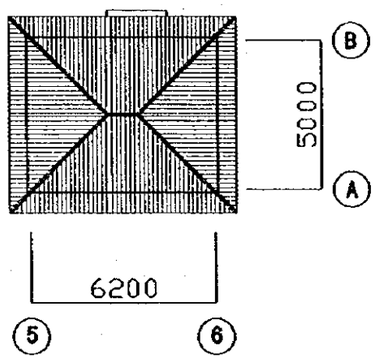
ROOF PLAN



Generator room Section

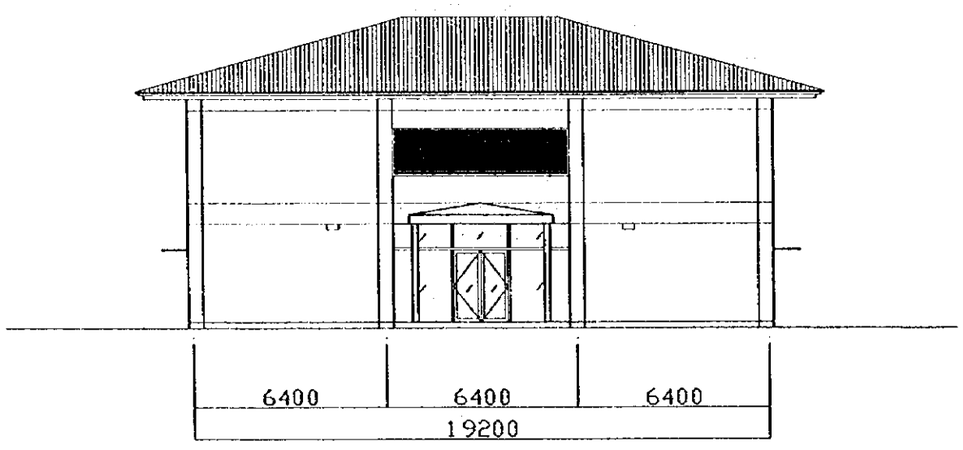


Generator room East Elevation

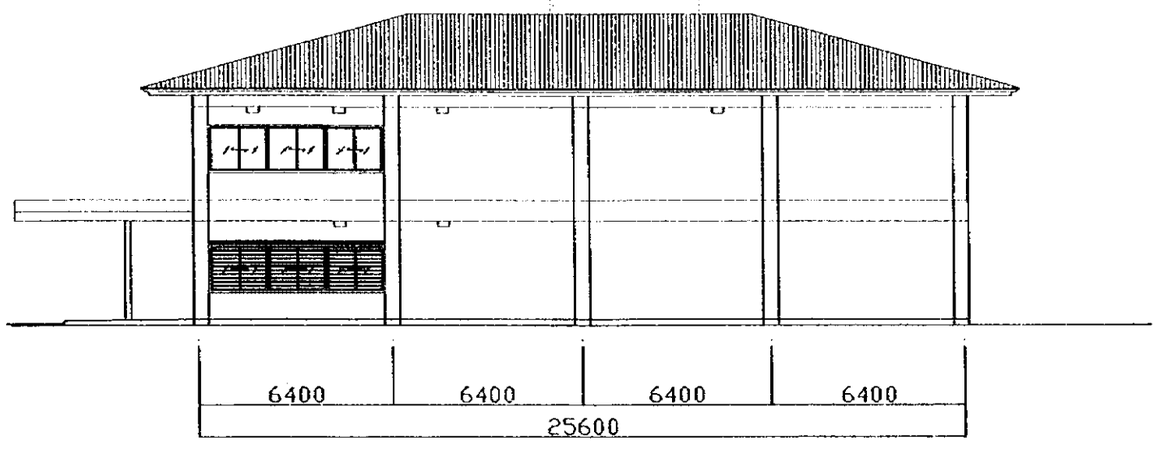


Generator room Roof Plan

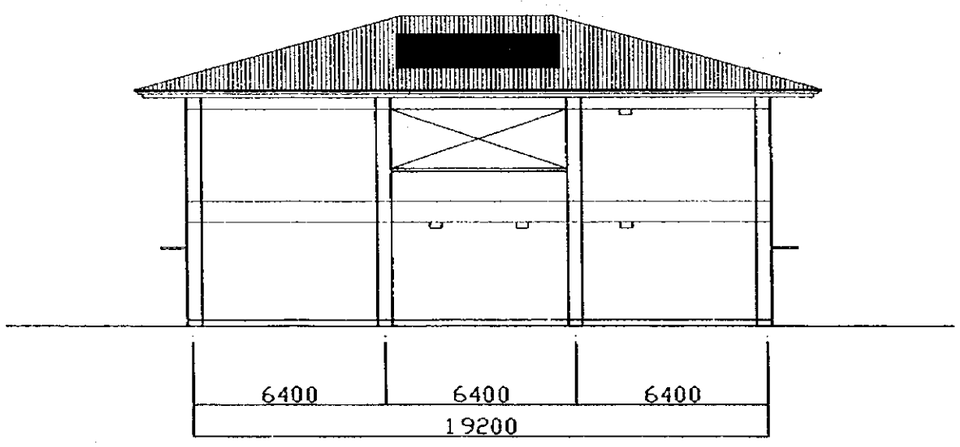
ROOF PLAN . GENERATOR ROOM 1:200 2-2



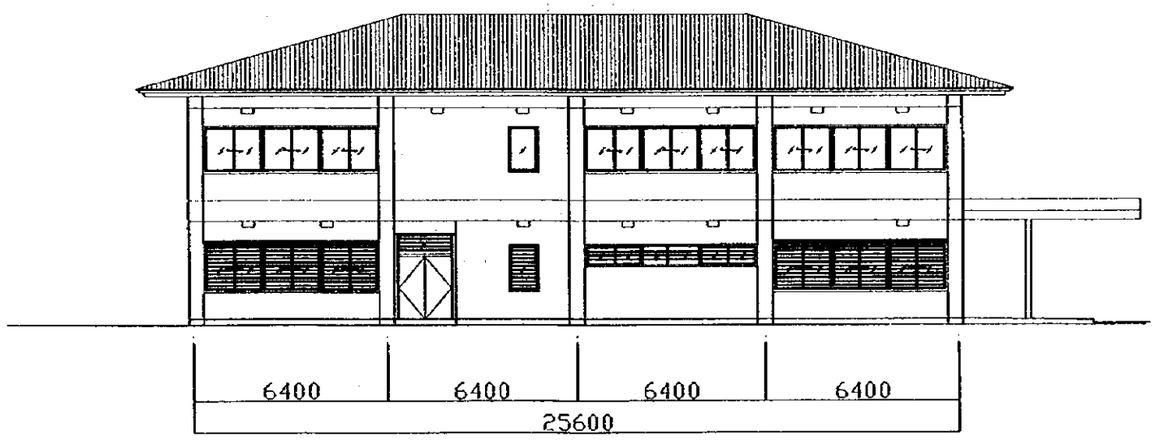
East Elevation



North Elevation

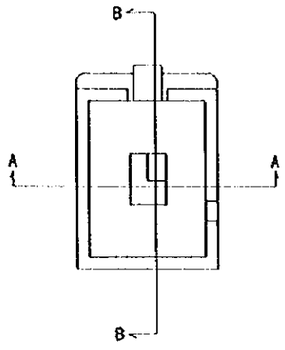


West Elevation

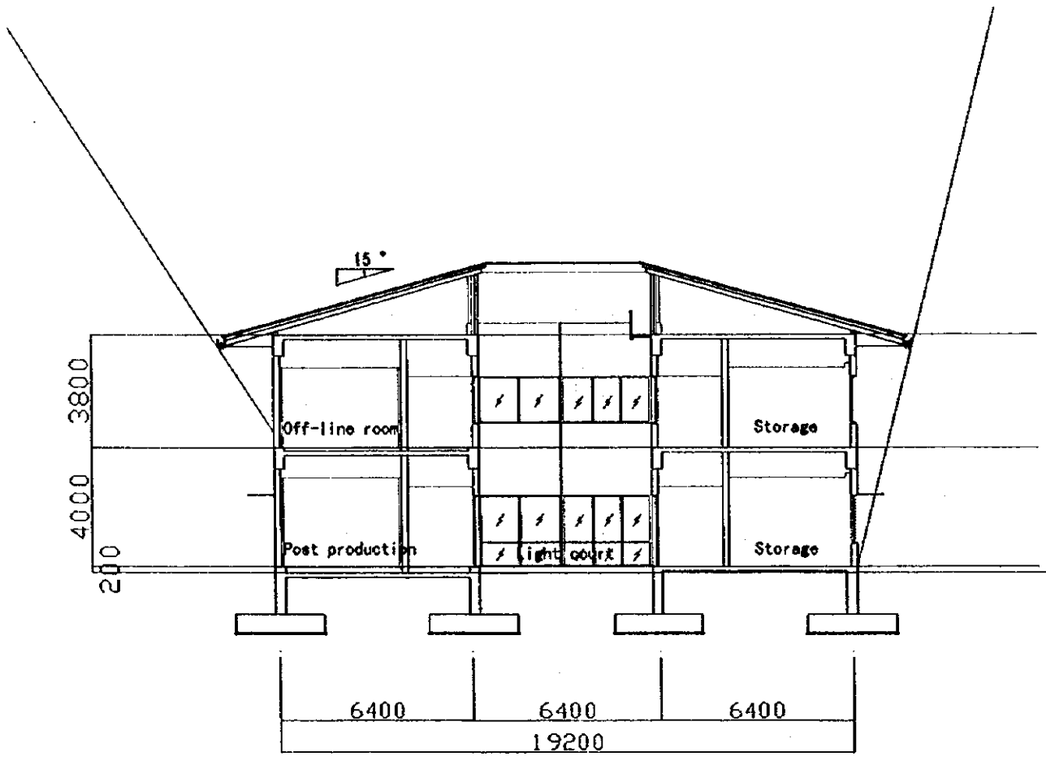


South Elevation

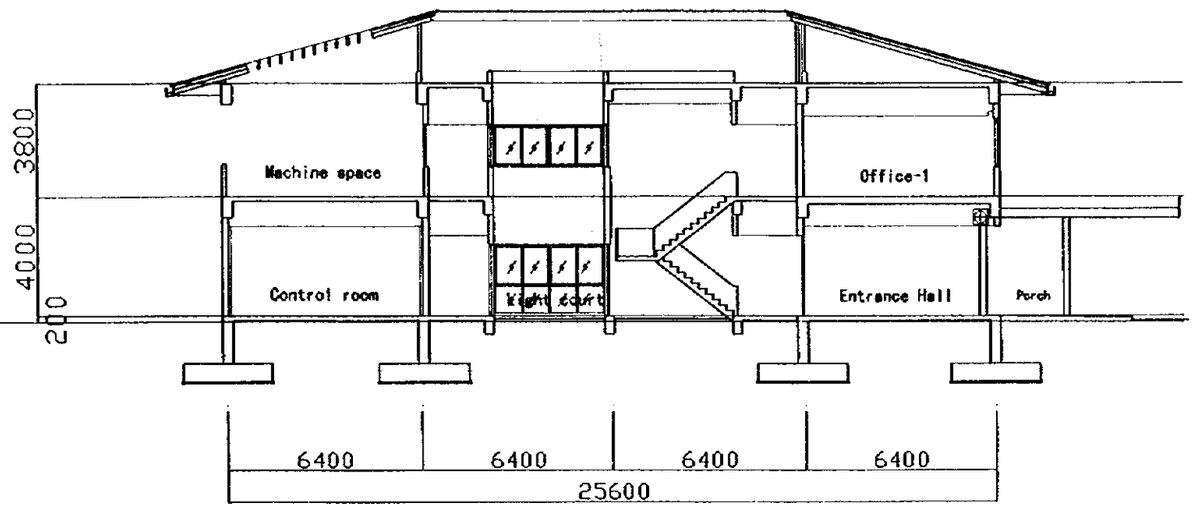
ELEVATION 1:200 3



KEY PLAN

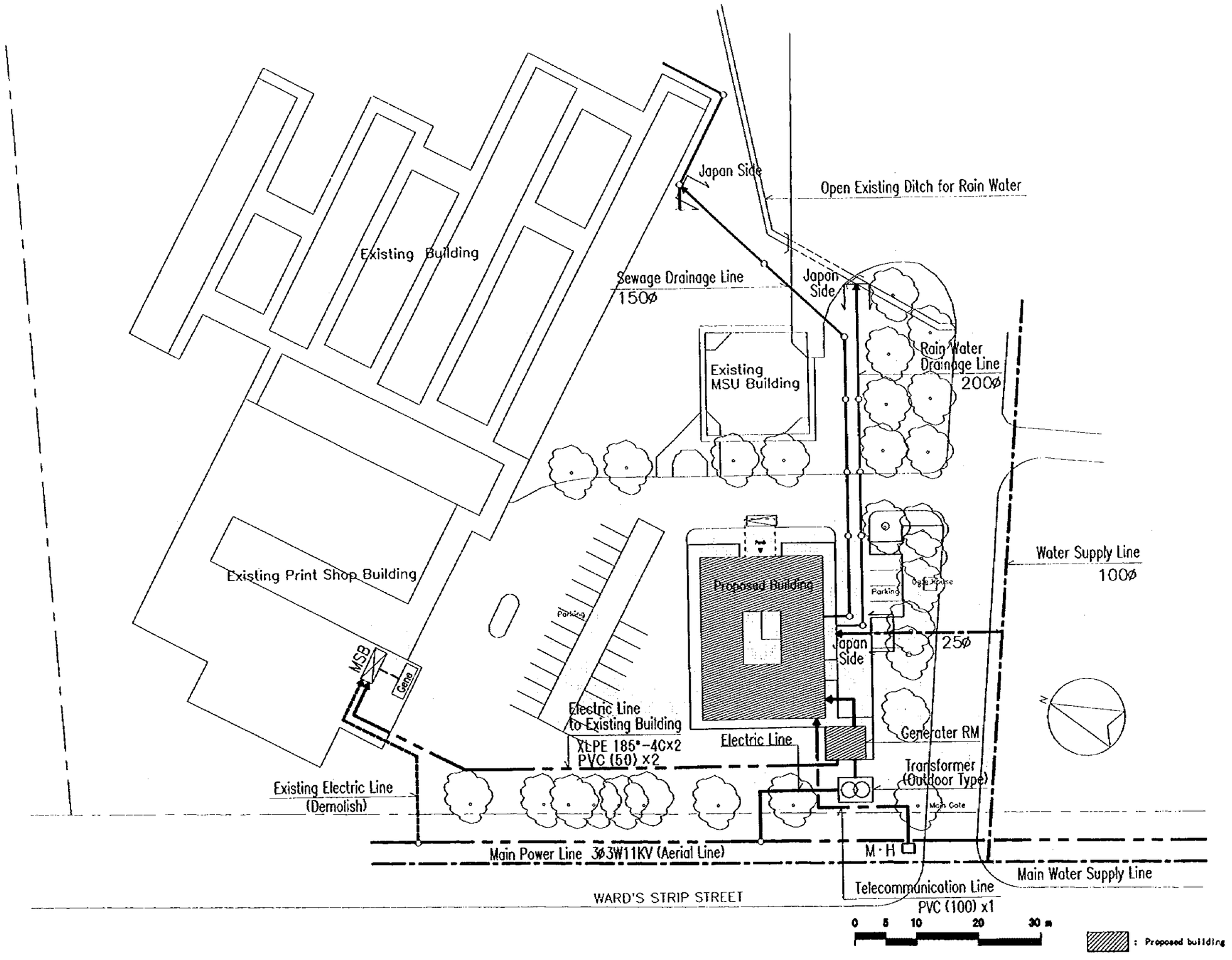


A-A Section

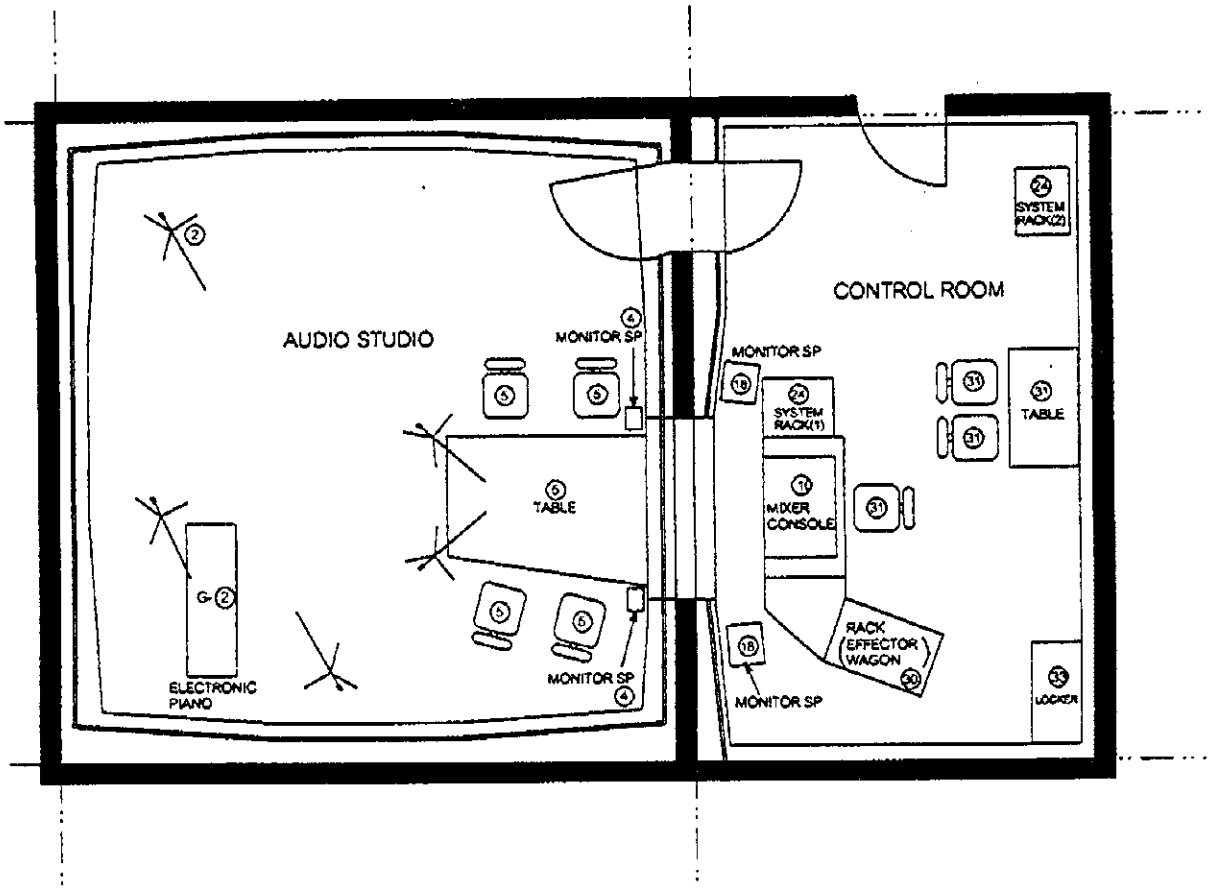


B-B Section

SECTION 1:200 4



INFRASTRUCTURE CONNECTION 1:600



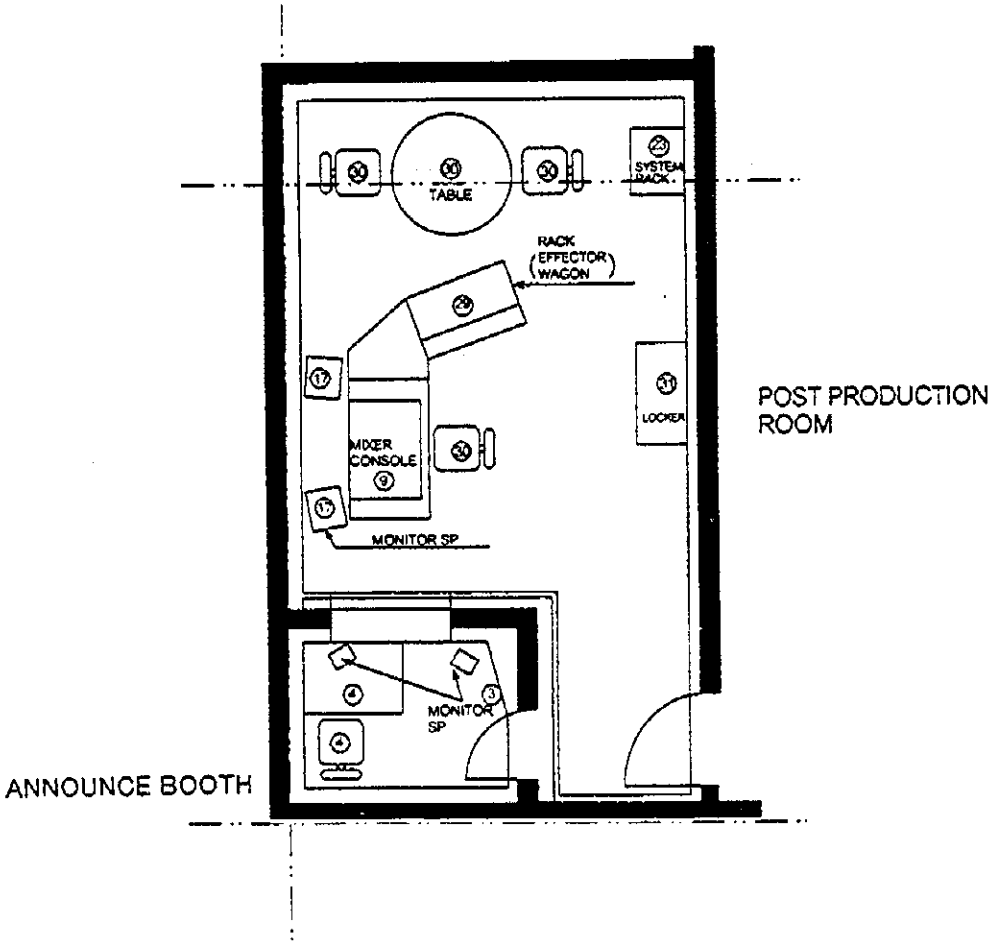
INSIDE EQUIPMENT LIST

AUDIO STUDIO / CONTROL ROOM

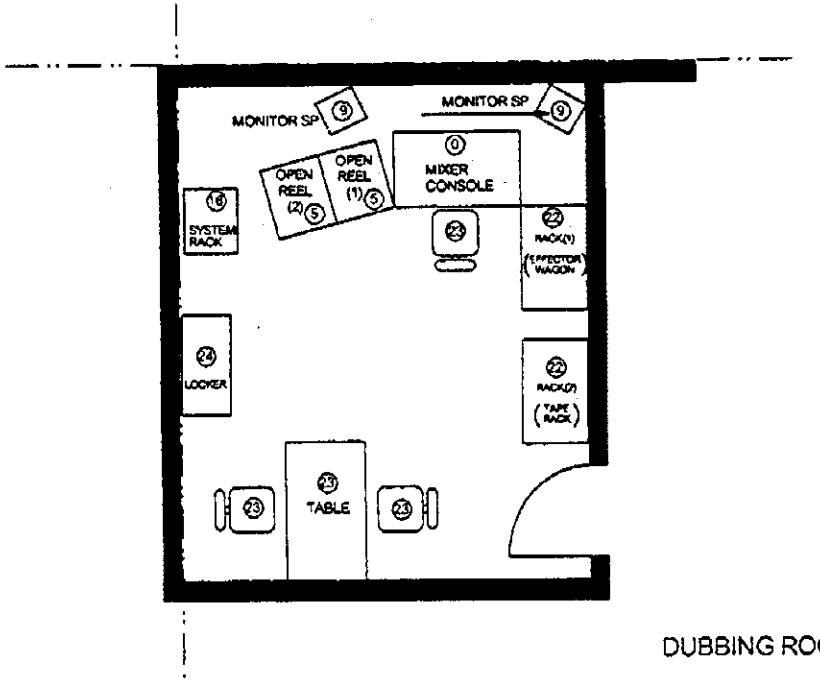
ITEM	DISCRIPTION		INSIDE EQUIPMENT
②	MICROPHONE BOOM STAND x 5SETS		
④	SPEAKER SYSTEM x 1PAIR		
⑤	ANNOUNCE TABLE x 1SET CHAIR x 4SETS		
⑩	DIGITAL AUDIO MIXER (CONSOLE)		
⑱	LOUD SPEAKER x 1PAIR		
㉔	SYSTEM RACK(1)	ITEM11 ITEM12 ITEM13 ITEM21	DIGITAL AUDIO RECORDER MINIDISC RECORDER COMPACT DISC PLAYER MLUTI AUDIO RECORDER
㉔	SYSTEM RACK(2)	ITEM10 ITEM17 ITEM20 ITEM22 ITEM22	DIGITAL AUDIO MIXER (PROCESSOR) POWER AMPLIFIER POWER AMPLIFIER A/D CONVERTER D/A CONVERTER
㉚	RACK (EFFECTOR WAGON)	ITEM15 ITEM16 ITEM23 ITEM26	AUDIO PROCESSOR GRAPHIC EQUALIZER AUDIO PATCH PANEL AUDIO CONNECTION PANEL
㉛	TABLE x 1SET CHAIR x 4SETS		
㉝	LOCKER		
G-②	ELECTRONIC PIANO		

Production Studio, Control Room

E01



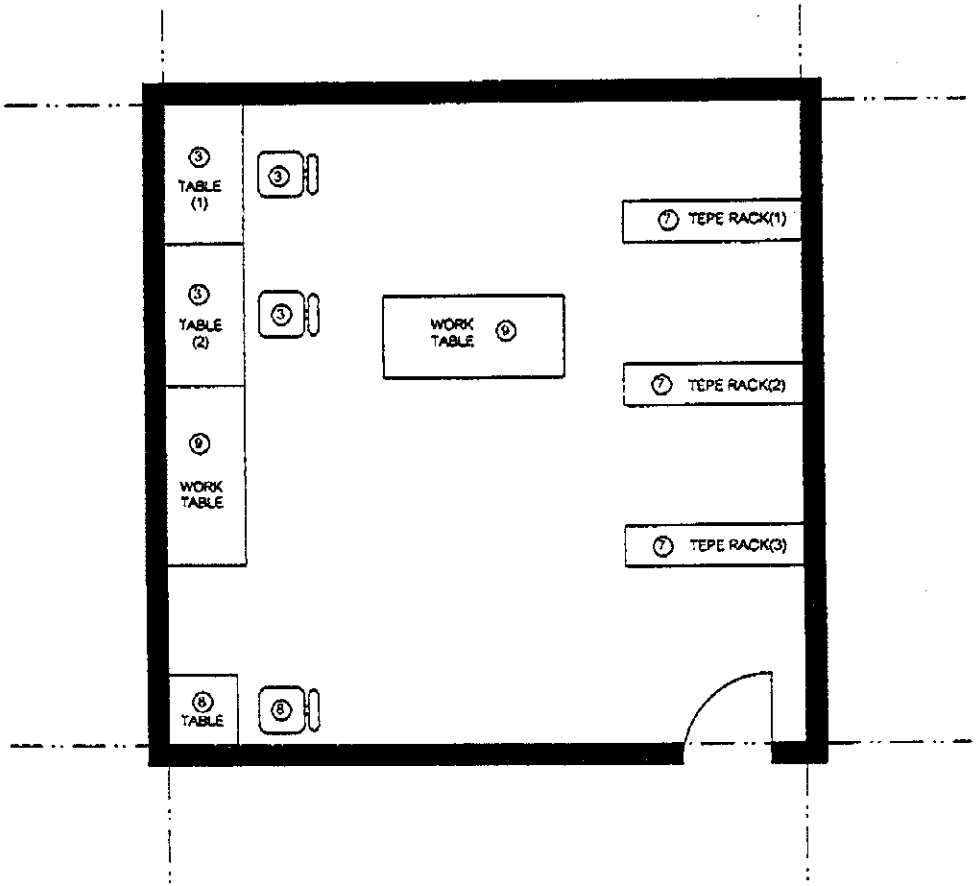
INSIDE EQUIPMENT LIST			
POST PRODUCTION ROOM			
ITEM	DISCRIPTION		INSIDE EQUIPMENT
③	SPEAKER SYSTEM x 1PAIR		
④	ANNOUNCER TABLE x 1SET CHAIR x 1SET		
⑨	DIGITAL AUDIO MIXER (CONSOLE)		
⑰	LOUD SPEAKER x 1PAIR		
㉓	SYSTEM RACK	ITEM9 ITEM14 ITEM16 ITEM19 ITEM21 ITEM21	DIGITAL AUDIO MIXER(PROCESSOR) AUDIO PROCESSOR POWER AMPLIFIER POWER AMPLIFIER A/D CONVERTER D/A CONVERTER
㉙	RACK (EFFECTOR WAGON)	ITEM10 ITEM11 ITEM12 ITEM15 ITEM20 ITEM22 ITEM25	DIGITAL AUDIO TAPE DECK MINIDISC RECORDER COMPACT DISC PLAYER GRAPHIC EQUALIZER MULTI AUDIO RECORDER AUDIO PATCH PANEL AUDIO CONNECTING PANEL
㉚	TABLE x 1SET CHAIR x 3SETS		
㉛	LOCKER		



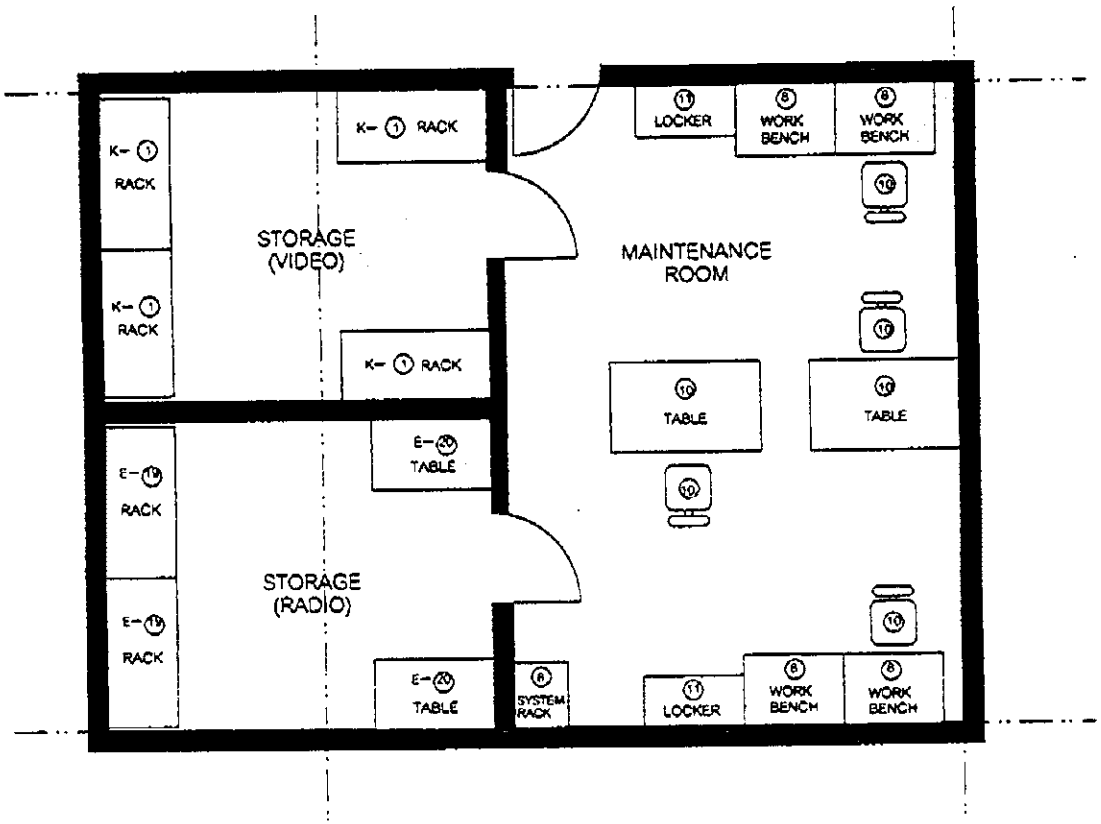
DUBBING ROOM

INSIDE EQUIPMENT LIST			
DUBBING ROOM			
ITEM	DISCRIPTION	INSIDE EQUIPMENT	
⓪	DIGITAL CONSOLE		
⑤	OPEN REEL RECORDER x 2SETS		
⑨	LOUD SPEAKER x 1PAIR		
⑯	SYSTEM RACK	ITEM6 ITEM11 ITEM14	AUDIO PROCESSOR POWER AMPLIFIER AUDIO DISTRIBUTOR
㉒	RACK(1)	ITEM1 ITEM2 ITEM3 ITEM4 ITEM7 ITEM15 ITEM16	DIGITAL AUDIO TAPE DECK MINIDISC RECORDER COMPACT DISC PLAYER CASSETTE TAPE RECORDER GRAPHIC EQUALIZER AUDIO PATCH PANEL & CABLE AUDIO CONNECTING PANEL
㉒	TAPE(2)	ITEM20 ITEM21	DAT TAPE MINI DISC
㉓	TABLE x 1SET CHAIR x 3SETS		
㉔	LOCKER		

INSIDE EQUIPMENT LIST			
DUPLICATION ROOM			
ITEM	DISCRIPTION	INSIDE EQUIPMENT	
③	TABLE(1) x 1SET CHAIR x 1SET	ITEM1 ITEM2	AUDIO CASSETTE DUPLICATOR x1SET AUDIO CASSETTE PRINTER x2SETS
③	TABLE(2) x 1SET CHAIR x 1SET	ITEM1 ITEM2	AUDIO CASSETTE DUPLICATOR x1SET AUDIO CASSETTE PRINTER x2SETS
⑦	TEPE RACK x 3SETS		
⑧	TABLE x 1SET CHAIR x 1SET	ITEM5 ITEM6	CASSETTE TAPE PLAYER HEADPHONE
⑨	WORKING TABLE x 2SETS		

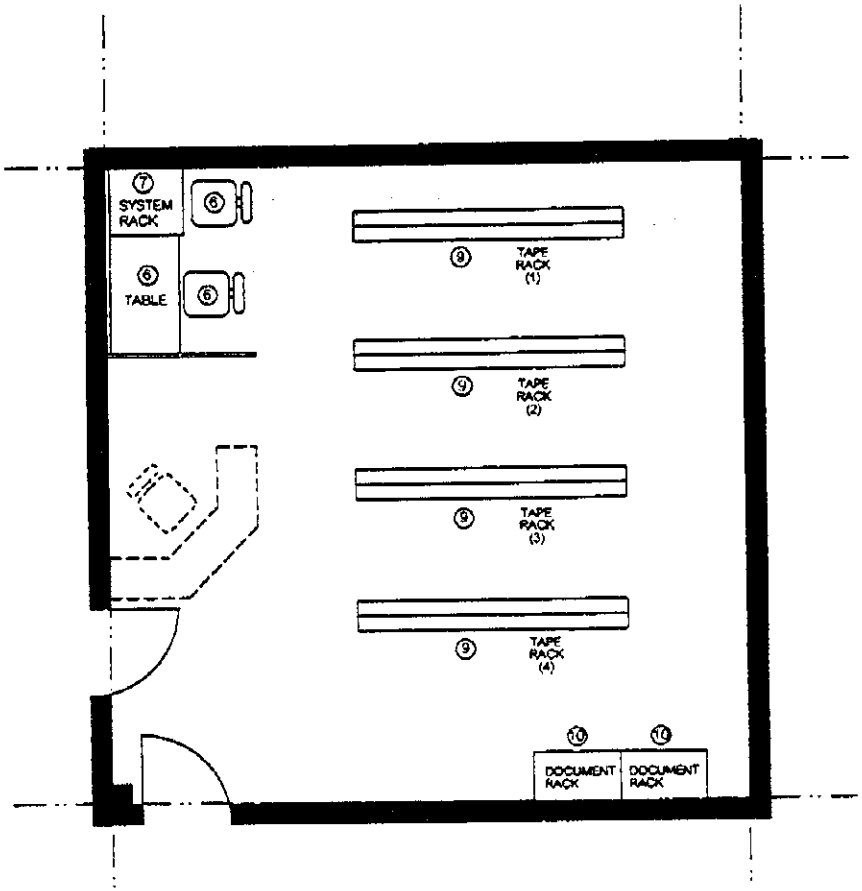


DUPLICATION ROOM



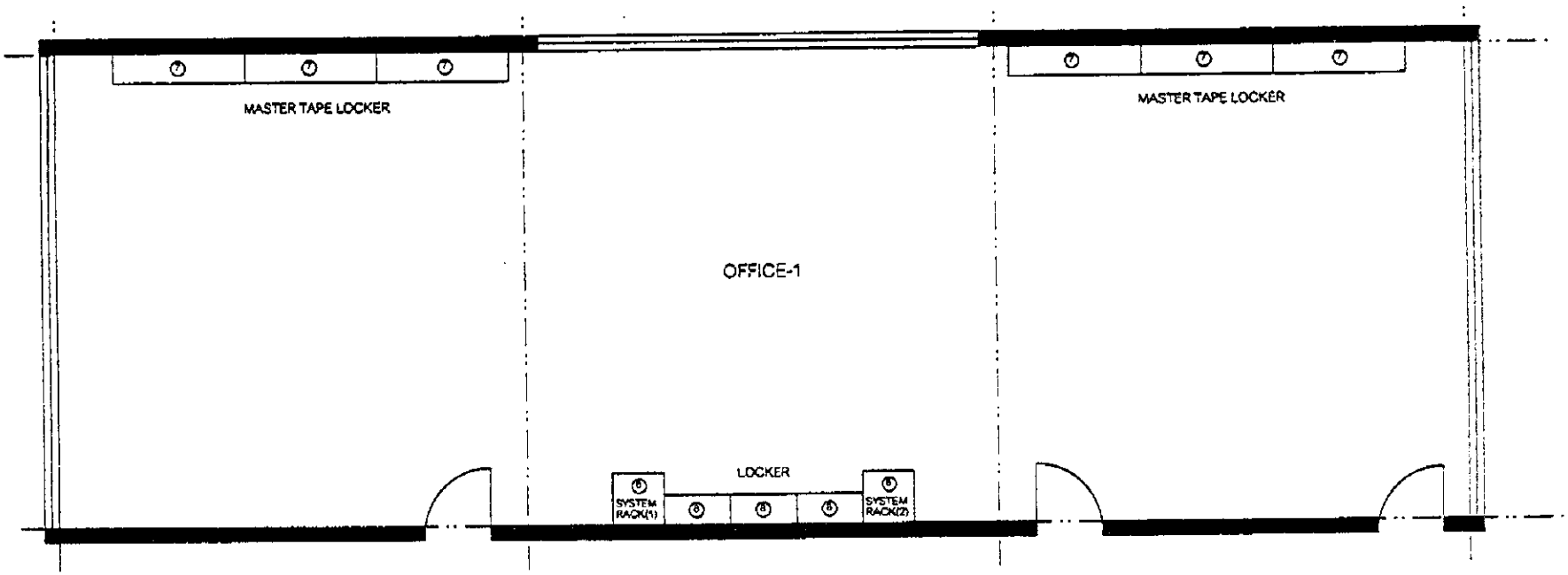
INSIDE EQUIPMENT LIST			
MAINTENANCE ROOM			
ITEM	DISCRIPTION	INSIDE EQUIPMENT	
⑧	WORK BENCH x 4SETS		
⑨	SYSTEM RACK		
⑩	TABLE x 2SETS CHAIR x 4SETS		
⑪	LOCKER x 2SETS	ITEM1 ITEM2 ITEM3 ITEM4 ITEM5 ITEM6	OSCILLO SCOPE AUDIO ANALYZER FREQUENCY COUNTER MULTI METER HAND TOOL SET STANDARD TAPE
RADIO STORAGE / VIDEO STORAGE			
ITEM	DISCRIPTION	INSIDE EQUIPMENT	
E-⑲	RACK x 2SETS	EQUIPMENT FOR AUDIO	
E-⑳	TABLE x 2SETS		
K-①	RACK x 4SETS	EQUIPMENT FOR VIDEO	

INSIDE EQUIPMENT LIST			
LIBRARY ROOM			
ITEM	DISCRIPTION	INSIDE EQUIPMENT	
⑥	TABLE x 1SET CHIAR x 2SETS		
⑦	SYSTEM RACK	ITEM1 ITEM2 ITEM3 ITEM4 ITEM5	CASSETTE TAPE RECORDER COMPACT DISC PLAYER MINI DISC PLAYER DIGITAL AUDIO TAPE RECORDER STEREO HEADPHONE
⑨	TAPE RACK x 4SETS		
⑩	DOCUMENT RACK x 2SETS		



LIBRARY

INSIDE EQUIPMENT LIST			
OFFICE-1			
ITEM	DISCRIPTION	INSIDE EQUIPMENT	
⑥	SYSTEM RACK (1)	2	CASSETTE TAPE RECORDER
		3	DIGITAL AUDIO RECORDER
		4	MINIDISC RECORDER
		5	SETEREO HEADPHONE
⑥	SYSTEM RACK (2)	2	CASSETTE TAPE RECORDER
		3	DIGITAL AUDIO RECORDER
		4	MINIDISC RECORDER
		5	SETEREO HEADPHONE
⑦	MASTER TAPE & LOCKER x 6SETS		
⑧	LOCKER X 3SETS	ITEM1	CASSETTE TAPE RECORDER



Office-1

The Project for Development of the Facilities for Education Media Programmes in PNG

E07

PLANNED EQUIPMENT LIST

	Item	Equipment name	Requested quantity	Evaluation 1	2	3	4	5	Overall	Planned quantity	Remarks	Using purpose
A	AUDIO STUDIO										Recording materials	
	1	CONDENSER MICROPHONE	6 SETS	O	O	O	O	×	×	5	Standard studio microphone of digital age, Possible to operate with 5sets	Use in Audio Studio. Microphone to record sounds clearly, etc.
	2	MICROPHONE BOOM STAND	6 SETS	O	O	O	O	×	×	5	Possible to operate with 5 sets	
	3	MICROPHONE TABLE STAND	6 SETS	O	O	O	O	×	×	5	Possible to operate with 5 sets	
	4	SPEAKER SYSTEM	1 PAIR	O	O	O	O	O	O	1	Contact to Control Room, Use for sound playback	
	5	ANNOUNCER TABLE & CHAIR	1 SET	O	O	O	O	O	O	1	1 Table, 4 Chairs, Use for narration and conversation recording	
	6	CUE & COUGH BOX	1 SET	O	O	O	O	O	O	1	On the announce table	
	7	AUDIO CONNECTING PANEL	1 SET	O	O	O	O	O	O	1	Floor XLR type	
	8	CONNECTING CABLE	1 LOT	O	O	O	O	O	O	1	Possible to operate with 5 sets	
	9	STEREO HEADPHONE	6 SETS	O	O	O	O	×	×	5	Possible to operate with 5 sets	
	10	DIGITAL AUDIO MIXER(CONSOLE)	1 SET	O	O	O	O	O	O	1	Digital mixer: A5 grade	Main audio mixing digital console
	10-2	WIRED REMOTE CONTROL UNIT	1 SET	O	O	O	O	O	O	1	Attached to mixer, Remote-controller	
	10-3	STEEL STAND	1 SET	O	O	O	O	O	O	1	Attached to mixer, stand for mixer	
	10-4	VU METER PANEL	1 SET	O	O	O	O	O	O	1	Attached to mixer, front side of the console	
	10-5	SIDE PANEL	1 SET	O	O	O	O	O	O	1	Attached to mixer	
	10-6	POWER SUPPLY UNIT	1 SET	O	O	O	O	O	O	1	Attached to mixer, exclusive power supply unit	
	10-7	EXPANSION BOARD	1 PC	O	O	O	O	O	O	1	Attached to mixer	
	10-8	A/D CONVERTER BOARD	4 PCS	O	O	O	O	O	O	4	Attached to mixer, Optional accessary	
	11	DIGITAL AUDIO TAPE DECK	2 SETS	O	O	O	O	O	O	2	In the system rack, for recording and playback	Digital recording and playback, surrounding equipment in console include sound effector and speakers exchange with mixing console
	12	MINI DISK RECORDER	1 SET	O	O	O	O	O	O	1	In the system rack, for recording and playback	
	13	COMPACT DISK PLAYER	1 SET	O	O	O	O	O	O	1	In the system rack, for playback	
	14	CONTROL UNIT	1 SET	O	O	O	O	O	O	1	In the system rack, distributor of DAT for recording and playback	
	15	AUDIO PROCESSOR	2 SETS	O	O	O	O	O	O	2	In the system rack, distributor for convert digital to analogue	
	16	GRAPHIC EQUALIZER	2 SETS	O	O	O	O	O	O	2	In the system rack, equalizer for voice composing	
	17	POWER AMPLIFIER	1 SET	O	O	O	O	O	O	1	In the system rack, for power supply	
	18	LOUD SPEAKER	2 SETS	O	O	O	O	O	O	2	Monitor speaker in Control Room	
	19	TRIPOD FOR SPEAKER	2 SETS	O	O	O	O	O	O	2	For monitor speaker in Control Room	
	20	POWER AMPLIFIER	1 SET	O	O	O	O	O	O	1	For monitor speaker in Control Room	
	21	DIGITAL AUDIO RECORDER	1 SET	O	O	O	O	O	O	1	For recording, Digital multi 8CH DAT	
	22	AUDIO DISTRIBUTOR	1 LOT	O	O	O	O	O	O	1	Mixer distributor	Rack and sound connecting panel
	23	AUDIO PATCH PANEL & CABLE	1 LOT	O	O	O	O	O	O	1	Audio patch board	
	24	19-INCH SYSTEM RACK	1 LOT	O	O	O	O	O	O	1	2 sets	
	25	INSTALLATION MATERIALS	1 LOT	O	O	O	O	O	O	1		
	26	AUDIO CONNECTING PANEL	1 SET	O	O	O	O	O	O	1	Audio connection panel	
	27	CONNECTING CABLE	1 LOT	O	O	O	O	O	O	1		

	Item	Equipment name	Requested quantity	Evaluation 1	2	3	4	5	Overall	Planned quantity	Remarks	Using purpose
	28	DAT TAPE	100 PCS	○	○	○	○	×	×	50		only for initial preparation
	29	MINI DISK	100 PCS	○	○	○	○	×	×	50		
	30	RACK	1 SET	○	○	○	○	○	○	1	Effector Wagon	Necessary furniture in Controle Room
	31	TABLE & CHAIR	1 SET	○	○	○	○	○	○	1	1 Table, 3 Chairs	
	32	OPEN REEL RECORDER	1 SET	×	○	○	○	○	×	–	Not necessary for recording and playback	
	33	TAPE & MIC ETC. LOCKER	1 SET	○	○	○	○	○	○	1		
B	POST PRODUCTION										Second Audio Studio function	
	1	CONDENSER MICROPHONE	2 SETS	○	○	○	○	○	○	2	In announce booth	In Announce booth, microphone, attached equipment and furniture
	2	MICROPHONE TABLE STAND	2 SETS	○	○	○	○	○	○	2	In announce booth	
	3	SPEAKER SYSTEM	1 PAIR	○	○	○	○	○	○	1	In announce booth	
	4	ANNOUNCER TABLE& CHAIR	1 SET	○	○	○	○	○	○	1	1 Table, 1 Chair in announce booth	
	5	CUE & COUGH BOX	1 SET	○	○	○	○	○	○	1	In announce booth	
	6	AUDIO CONNECTING PANEL	1 SET	○	○	○	○	○	○	1	In announce booth	
	7	CONNECTING CABLE	1 LOT	○	○	○	○	○	○	1	In announce booth	
	8	STEREO HEADPHONE	2 SETS	○	○	○	○	○	○	2	In announce booth	
	9	DIGITAL AUDIO MIXER (CONSOLE)	1 SET	○	○	○	○	○	○	1	Digital mixer	Main audio mixing digital console
	9-2	WIRED REMOTE CONTROL UNIT	1 SET	○	○	○	○	○	○	1	Same function as Audio Studio	
	9-3	STEEL STAND	1 SET	○	○	○	○	○	○	1	Same function as Audio Studio	
	9-4	VU METER PANEL	1 SET	○	○	○	○	○	○	1	Same function as Audio Studio	
	9-5	SIDE PANEL	1 SET	○	○	○	○	○	○	1	Same function as Audio Studio	
	9-6	POWER SUPPLY UNIT	1 SET	○	○	○	○	○	○	1	Same function as Audio Studio	
	9-7	EXPANSION BOARD	1 PC	○	○	○	○	○	○	1	Same function as Audio Studio	
	9-8	A/D CONVERTER BOARD	4 PCS	○	○	○	○	○	○	4	Same function as Audio Studio	
	10	DIGITAL AUDIO TAPE DECK	2 SETS	○	○	○	○	○	○	2	In the system rack	Digital recording and playback, surrounding equipment in console include sound effector and speakers exchange with mixing console
	11	MINIDISK RECORDER	2 SETS	○	○	○	○	○	○	2	In the system rack	
	12	COMPACT DISKPLAYER	2 SETS	○	○	○	○	○	○	2	In the system rack	
	13	CONTROL UNIT	2 SETS	○	○	○	○	○	○	2	In the system rack	
	14	AUDIO PROCESSOR	2 SETS	○	○	○	○	○	○	2	In the system rack	
	15	GRAPHIC EQUALIZER	2 SETS	○	○	○	○	○	○	2	In the system rack	
	16	POWER AMPLIFIER	1 SET	○	○	○	○	○	○	1	In the system rack	
	17	LOUD SPEAKER	2 SETS	○	○	○	○	○	○	2	Monitor speaker	
	18	TRIPOD FOR SPEAKER	2 SETS	○	○	○	○	○	○	2	For monitor speaker	
	19	POWER AMPLIFIER	1 SET	○	○	○	○	○	○	1	For monitor speaker	
	20	DIGITAL AUDIO RECORDER	1 SET	○	○	○	○	○	○	1	For recording, Digital Multi 8CH DAT	
	21	AUDIO DISTRIBUTOR	1 LOT	○	○	○	○	○	○	1	Mixer distributor	
	22	AUDIO PATCH PANEL & CABLE	1 LOT	○	○	○	○	○	○	1	Audio patch board	Rack and sound connecting panel
	23	SYSTEM RACK	1 LOT	○	○	○	○	○	○	1		
	24	INSTALLATION MATERIALS	1 LOT	○	○	○	○	○	○	1		
	25	AUDIO CONNECTING PANEL	1 SET	○	○	○	○	○	○	1	Audio connection panel	
	26	CONNECTING CABLE	1 LOT	○	○	○	○	○	○	1		
	27	DAT TAPE	200 PCS	○	○	○	○	×	×	50		only for initial preparation
	28	MINI DISK	200 PCS	○	○	○	○	×	×	50		
	29	RACK	1 SET	○	○	○	○	○	○	1	Effector Wagon	Necessary furniture
	30	TABLE & CHAIR	1 SET	○	○	○	○	○	○	1	1 Round table, 3 Chairs	
	31	TAPE & MIC ETC. LOCKER	1 SET	○	○	○	○	○	○	1		

	Item	Equipment name	Requested quantity	Evaluation 1	2	3	4	5	Overall	Planned quantity	Remarks	Using purpose
C	DUPLICATION SYSTEM										Cassette tape copy making	
	1	AUDIO CASSETTE DUPLICATOR	3 SETS	O	O	O	O	×	×	2	Possible to operate with 2 sets, on the table	16 times speed copy for cassette
	2	AUDIO CASSETTE PRINTER	6 SETS	O	O	O	O	×	×	4	Possible to operate with 4 sets, on the table	
	3	TABLE FOR PRINTER & CHAIR	2 PCS	O	O	O	O	O	O	2	For duplicator and printer	Equipment for copied cassette checking and furniture
	4	INSTALLATION MATERIALS	1 LOT	O	O	O	O	O	O	1		
	5	CASSETTE DECK PLAYER	1 SET	O	O	O	O	O	O	1	Use for copied cassette checking	
	6	HEADPHONE	1 SET	O	O	O	O	O	O	1	Use for copied cassette checking	
	7	RACK	3 SETS	O	O	O	O	O	O	3	For cassette tape	
	8	TABLE & CHAIR	1 SET	O	O	O	O	O	O	1	1 Table, 1 Chair	
	9	WORKING TABLE	1 SET	O	O	O	O	O	O	2		

D	DUBBING SYSTEM										Dubbing for another format	
	0	DIGITAL CONSOLE	1 SET	O	O	O	O	×	×	1	Existing mixing console, YAMAHA O2R	Digital recording and playback, surrounding equipment in console include sound effector and speakers exchange with mixing console
	1	DIGITAL AUDIO TAPE DECK	2 SETS	O	O	O	O	O	O	1	In the system rack	
	2	MINIDISK RECORDER	2 SETS	O	O	O	O	O	O	1	In the system rack	
	3	COMPACT DISKPLAYER	1 SET	O	O	O	O	O	O	1	In the system rack	
	4	CASSETTE TAPE RECORDER	2 SETS	O	O	O	O	O	O	2	In the system rack	
	5	2 TRACK OPEN REEL RECORDER	2 SETS	O	O	O	O	O	O	2	6mm Open tape reel, floor type	
	6	AUDIO PROCESSOR	2 SETS	O	O	O	O	O	O	1	In the system rack	
	7	GRAPHIC EQUALIZER	2 SETS	O	O	O	O	O	O	1	In the system rack	
	8	POWER AMPLIFIER	1 SET	O	O	O	O	O	O	1	In the system rack	
	9	LOUD SPEAKER	2 SETS	O	O	O	O	O	O	2	Monitor speaker	
	10	TRIPOD FOR SPEAKER	2 SETS	O	O	O	O	O	O	2	For monitor speaker	
	11	POWER AMPLIFIER	1 SET	O	O	O	O	O	O	1	For monitor speaker	
	12	DIGITAL AUDIO RECORDER	1 SET	O	O	O	O	×	×	—	Not necessary	
	13	AUDIO DISTRIBUTOR	1 LOT	O	O	O	O	O	O	1	Mixer distributor	
	14	AUDIO PATCH PANEL & CABLE	1 LOT	O	O	O	O	O	O	1	Audio patch board	
	15	DIGITAL AUDIO PATCH PANEL &	1 LOT	O	O	O	O	O	O	1		
	16	SYSTEM RACK	1 LOT	O	O	O	O	O	O	1		
	17	INSTALLATION MATERIALS	1 LOT	O	O	O	O	O	O	1		
	18	AUDIO CONNECTING PANEL	1 SET	O	O	O	O	O	O	1	Audio connection panel	
	19	CONNECTING CABLE	1 LOT	O	O	O	O	O	O	1		
	20	DAT TAPE	100 PCS	O	O	O	O	×	×	50		only for initial preparation
	21	MINI DISK	300 PCS	O	O	O	O	×	×	50		
	22	RACK	2 SETS	O	O	O	O	O	O	2	2 Racks	Necessary furniture
	23	TABLE & CHAIR	1 SET	O	O	O	O	O	O	1	1 Table, 3 Chairs	
	24	LOCKER								1	For tape etc.	

	Item	Equipment name	Requested quantity	Evaluation 1	2	3	4	5	Overall	Planned quantity	Remarks	Using purpose
E	FIELD RECORDING										Field recording equipment	
	1	PORTABLE DIGITAL AUDIO RECORDER	6 SETS	O	O	O	O	×	×	2	2 sets for 1 team	Microphone and recording equipment
	2	CARRYING CASE	6 SETS	O	O	O	O	×	×	2	Duralumin case	
	3	PORTABLE MINI DISK RECORDER	6 SETS	O	O	O	O	×	×	1	Possible to operate with 1 set	
	4	ELECTRIC CONDENSER MICROPHONE	6 SETS	O	O	O	O	×	×	2	Indoor use, possible to operate with 2 sets	
	5	DYNAMIC MICROPHONE	5 SETS	O	O	O	O	×	×	2	Outdoor use, possible to operate with 2 sets	
	6	GUN MICROPHONE	3 SETS	O	O	O	O	×	×	1	Ultra directional microphone, possible to operate with 1 set	
	7	CAGE TYPE WIND SCREEN	3 SETS	O	O	O	O	×	×	1	For Gun microphone	
	8	HIGH WIND COVER	3 SETS	O	O	O	O	×	×	1	For Gun microphone	
	9	HORSESHOE SUSPENSION HAND GRIP	3 SETS	O	O	O	O	×	×	1	For Gun microphone	
	10	SHOCK MOUNT HAND GRIP	3 SETS	O	O	O	O	×	×	1	For Gun microphone	Directional microphone system and attachment
	11	CARRYING CASE	3 SETS	O	O	O	O	×	×	1	For Gun microphone	
	12	MICROPHONE BOOM POLE	3 SETS	O	O	O	O	×	×	1	For Gun microphone	
	13	MICROPHONE CABLE	1 LOT	O	O	O	O	O	O	1		
	14	WIRELESS MICROPHONE SYSTEM	1 LOT	O	O	O	O	O	O	1	Small codeless microphone system	
	15	CASSETTE TAPE RECORDER	1 SET	O	O	O	O	×	×	–	Not necessary	
	16	DAT TAPE	300 PCS	O	O	O	O	×	×	50		only for initial preparation
	17	MINI DISK	100 PCS	O	O	O	O	×	×	50		
	18	BATTERY CHARGER	1 SET	O	O	O	O	O	O	1	For location	Necessary furniture and charger
	19	RACK	2 SETS	O	O	O	O	O	O	2	For equipment storing	
	20	TABLE	2 SETS	O	O	O	O	O	O	2	For preparation	

F	MAINTENANCE EQUIPMENT										Audio maintenance equipment	
	1	OSCILLOSCOPE	2 SET	O	O	O	O	×	×	1	Voltage and Ampere measuring, possible to operate with 1 set	Necessary equipment for audio maintenance
	2	AUDIO ANALYZER	2 SET	O	O	O	O	×	×	1	Possible to operate with 1 set	
	3	FREQUENCY COUNTER	2 SET	O	O	O	O	×	×	1	Frequency measuring, possible to operate with 1 set	
	4	MULTI METER	3 SET	O	O	O	O	O	O	3	Tester	
	5	HAND TOOL SET	3 SET	O	O	O	O	O	O	3	Set of tools	
	6	SPARE PARTS	1 LOT	O	O	O	O	×	×	–	Not necessary	
	7	STANDARD TAPE	1 LOT	O	O	O	O	O	O	1	Set of standard tapes	
	8	WORK BENCH WITH CASTER	2 SET	O	O	O	O	O	O	4	4 sets are necessary	Necessary furniture
	9	SYSTEM RACK	1 SET	O	O	O	O	O	O	1	For equipment	
	10	TABLE & CHAIR	1 SET	O	O	O	O	O	O	2	2 Tables, 4 Chairs	
	11	LOCKER	1 SET	O	O	O	O	O	O	1	For equipment storing	

G	SOUND EFFECT											
	1	SOUND EFFECT GENERATOR	2 SETS	O	O	O	O	O	O	2	Each 1 set for Studio and Post production	Sound effecter equipment in Studio
	2	ELECTRONIC PIANO	1 SET	O	O	O	O	O	O	1	Set of electrical piano	
	3	SOUND EFFECT COMPACT DISK	2 SETS	O	O	O	O	O	O	2		
	4	GUITER	2 SETS	O	O	O	×	×	×	–	Prepare by CDD	

	Item	Equipment name	Requested quantity	Evaluation 1	2	3	4	5	Overall	Planned quantity	Remarks	Using purpose
H	OFFICE											
	1	CD PLAYER	5 SETS	O	O	O	O	×	×	2	For audition, 2 sets of existing equipment	For audition by script writer
	2	CASSETTE TAPE RECORDER	5 SETS	O	O	O	O	×	×	2	For audition, 1 set of new, 1 set of existing equipment	
	3	DIGITAL AUDIO TAPE RECORDER	5 SETS	O	O	O	O	×	×	2	For audition (new 2 sets)	
	4	MINI DISK PLAYER	5 SETS	O	O	O	O	×	×	2	For audition, 1 set of new, 1 set of existing equipment	
	5	STEREO HEAD PHONE	5 SETS	O	O	O	O	×	×	2	For audition (new 2 sets)	
	6	19 INCH RACK(Small)	5 SETS	O	O	O	O	×	×	2	For audition equipment, movable	
	7	MASTER TAPE RACK	6 SETS	O	O	O	O	O	O	6	For master tapes keeping	For master tapes keeping
	8	ROCKER	3 SETS	O	O	O	O	O	O	3	For master tapes keeping	
I	LIBRARY											
	1	CASSETTE TAPE RECORDER	3 SETS	O	O	O	O	×	×	1	For audition, 1 set of existing equipment	For guest use
	2	CD PLAYER	3 SETS	O	O	O	O	×	×	1	For audition, 1 set of existing equipment	
	3	MINI DISK PLAYER	3 SETS	O	O	O	O	×	×	1	For audition, 1 set of existing equipment	
	4	DIGITAL AUDIO TAPE RECORDER	3 SETS	O	O	O	O	×	×	1	For audition, 1 set of existing equipment	
	5	STEREO HEAD PHONE	3 SETS	O	O	O	O	×	×	1	For audition, 1 set of existing equipment	
	6	TABLE & CHAIR	3 SETS	O	O	O	O	×	×	1	1 Table, 2 Chairs	Necessary furniture
	7	SYSTEM RACK	3 SETS	O	O	O	O	×	×	1	For audition equipment	
	8	CONNECTING CABLE	1 LOT	O	O	O	O	O	O	1		
	9	TAPE RACK	2 LOT	O	O	O	O	O	O	4	For tapes	
	10	DOCUMENT RACK	2 SETS	O	O	O	O	O	O	2	For texts	
J	PORTABLE ANNOUNCE SYSTEM											
	1	PORTABLE ANNOUNCE SYSTEM	2 SETS	O	O	O	O	O	O	1	Store in storage, 1set	Small scale use
	2	CASETTE DECK	1 SET	O	O	O	×	×	×	–	Not necessary	
	3	MINI DISK RECORDER	1 SET	O	O	O	×	×	×	–	Not necessary	
	4	MICROPHONE	2 SETS	O	O	O	×	×	×	–	Not necessary	
	5	MICROPHONE STAND	2 SETS	O	O	O	×	×	×	–	Not necessary	
	6	PORTABLE MIXER	1 SET	O	O	O	×	×	×	–	Not necessary	
	7	SPEAKER	1 SET	O	O	O	×	×	×	–	Not necessary	
	8	SPEAKER STAND	1 SET	O	O	O	×	×	×	–	Not necessary	
K	Store Rack											
	1	STORE RACK	4 SETS	O	O	O	O	O	O	4	Store existing equipment	Necessary furniture

CHAPTER 3 IMPLEMENTATION PLAN

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3-1 Implementation Plan

3-1-1 Concept for Implementation

The Project will be implemented in accordance with the framework of the grant aid scheme of the Government of Japan after the conclusion of the Exchange of Notes (E/N) by both Governments of Japan and PNG following a cabinet decision on the implementation of the Project by the Government of Japan. The Government of PNG will then select a Japanese consultant firm as the Consultant for the Project to proceed with the detailed design work on the facilities and equipment. Following finalization of the detailed design documents, selected a Japanese construction company and a Japanese equipment supplier, selected on a tender basis respectively, will conduct the construction work and the equipment supply and installation. All of the consultancy, construction and equipment supply / installation contracts will become valid once they have been verified by the Government of Japan.

The work management system will be established by the Project Implementation Body, the Consultant, the Contractor and the Equipment Supplier under the control of the related organizations of the two governments involved. The basic issues and points to note for the implementation of the Project are described below.

(1) Project Implementation Body

The DOE will be PNG side responsibility body overseeing the implementation of the Project and Department of Treasury & Planning and PNG ambassador in Tokyo will act as PNG side signer on the official contracts. The CDD of DOE will act as the front office for project implementation and will be responsible for general coordination during the project implementation period. The construction site of the Project is located at National Capitol District (NCD), therefore the Physical Planning should be applied with Basic Design drawings also the Building Permit should be applied with Detailed Design Drawings to the Building Authority of NCD by CDD and necessary permit shall be obtained .

In view of the above division of work, the establishment of the Project Implementation Committee is desirable to act as the project implementation body on PNG side to manage all processes from the detailed design to the handing-over of the various

facilities and equipment. The members of this Committee should preferably include representatives of the DOE, CDD, National Planning Office and the JICA PNG Office.

(2) Consultant

Following the conclusion of the above-mentioned E/N, the Government of PNG will sign a consultancy agreement on the detailed design for the Project with a Japanese consultant firm and this agreement must be verified by the Government of Japan. For the smooth progress of the detailed design stage, the prompt sign of the consultant agreement after the conclusion of the E/N is crucial.

After verification of the agreement, the Consultant will prepare the detailed design documents based on the present basic design study report through consultations with the CDD and will have the documents approved by the Government of PNG.

At the tender and construction stages, the Consultant will conduct the tender and construction supervision based on the detailed design documents/drawings. The Consultant will also supervise the equipment-related work, ranging from the tender for equipment to supply and installation, test operation and final handing-over.

(3) Contractor

The Contractor will be selected through tender to open among Japanese construction companies which satisfy certain qualifications, will construct the planned facilities within the contracted period in accordance with the detailed design documents prepared by the Consultant and will hand them over to PNG side.

The main components of the construction work will comprise building construction, water supply and sanitation, air-conditioning & ventilation, electrical installation and external work, all of which will be conducted by the Contractor using subcontractors, engineers and workers from PNG and/or Japan.

(4) Equipment Supplier

The equipment supplier will be selected through tender to open among Japanese trading companies which satisfy certain qualifications and will procure and install the equipment which will meet the specifications set forth by the Consultant and approved by the project implementation body within the contracted period. At the installation stage, the Equipment Supplier will dispatch engineers specializing in the

procured equipment to PNG to supervise the work and to also explain how to operate the equipment to PNG side.

3-1-2 Implementation Conditions

(1) Local Construction Industry

The general conditions of the local construction industry in the Port Moresby are described below.

- Main construction companies of Australian origin will have their local office around Port Moresby. Most of large constructions will be done by these Australian companies and many skilled craftsman belong to these Australian construction companies. On the contrary, native Construction companies are not specialized for each category, and there are many small companies who are in charge of building such size of houses, and the number of the integrated construction company is small. As a result the order itself also becomes small.
- After averaging the job efficiency, carpenters, plasters, craftsmen of reinforcing bar, and finishers, it requires 2.5 - 3 times of labor in the case of Japan.
- There are many price fluctuations. In the case of such key materials as concrete and reinforcing bars for example, the price has risen by 10 - 15% in the last 12 months. Especially after reduction of the exchange rate of PNG kina, some construction material has increased by some 50 - 75% (on a local currency basis).
- A value-added tax is was introduced from July 1, 1999. Price escalation of materials can be foreseen after the introduction of VAT.

(2) Important Points for Project Implementation

- The rainy season in Port Moresby is from December to April, however, because the difference between the rainy season and the dry season is small, there are few risks in earth-moving work and foundation work regarding these seasons.
- Generation of electric power in Port Moresby is by hydraulic. Recently frequency of power failure is quite often caused of lack of water. Generators are required to keep the continuous power for the construction work.
- The planned facility is two-storey with bearing concrete block structure and it is common method in PNG. Meanwhile, the quality and construction schedule are

dominated by skills of local labors, the quality and the construction schedule must, therefore, be carefully controlled to avoid any unnecessary repetition or waiting.

- As river sand frequently contains salt or mud is commonly used because of collection points are located near coast side in Port Moresby, strict quality control for the concrete will be required on the construction site.
- As the project site is within the compound of existing facilities, protection and safety measures to ensure the users of the existing facilities will be required for the planning of temporary structures.
- At the stage of installation and trial operation of mechanical and electrical equipment it is necessary to conduct a sufficient operational instruction such as periodical inspection and way of replacement of spare parts.

(3) Work Staff

For the efficient construction work of the facilities meeting the specifications set forth in the detailed drawings / documents within the planned construction period, the Japanese Contractor must be capable of smoothly conducting the joint work with local construction companies while providing appropriate technical guidance and implementing strict schedule control. It is, therefore, desirable that the Contractor appoints work staff conversant with the local conditions to achieve high quality facilities based on a precise understanding of the nature of the planned facilities.

Given the contents and scale of the facilities planned under the Project, the following full-time work staff will be required.

< Building Work >

- Field Representative: 1 person

  General management, total coordination, others.

- Architectural Engineer: 1 person

  Guidance on construction works, schedules control, guidance on working drawing preparation, etc.

- Services Engineer: (partial) 1 person

  Guidance on mechanical/electrical equipment installation and test operation, technical guidance, schedule control, others.

- Administrator: 1 person

  Administrative work, labor control, import procedure, others.

< Equipment Work >

As required installation and test operation of equipment, technical guidance and instructions on operation manuals.

Major maintenance item list which be occurred trouble often should be prepared and deliver at handing over the work.

3-1-3 Scope of Works

The following scope of works between the two governments for implementation of the Project appears reasonable.

(1) Works to be undertaken by the Government of Japan

1)Facilities

a) Rooms for production of school radio programme :

Audio-Studio, Control Room, others.

b) Rooms for production of school video programme :

On-Line Editing Room, Off-Line Editing Room, others.

c) Common Rooms : Maintenance Room, Library, Offices, others.

d) Other Rooms : Machine Room, WC, others.

2)Equipment (System)

a) Audio-Studio Equipment (including Control Room)

b) Post Production Equipment

c) Duplication Equipment

d) Dubbing Equipment

e) Field Recording Equipment

f) Maintenance Equipment

g) Other Equipment

(2) Works to be undertaken by the Government of PNG

1) To remove trees and containers within a planned construction site.

2) To supply electric power, water, and drainage facilities, etc. to the construction site.

3) Procurement of common office furniture, fixtures and fittings.

4) To supply consumable and spare parts required for facility and equipment maintenance.

5) To move existing radio and video production equipment to the new building.

6) Other appurtenant works not included in the scope of works of Japanese side.

3-1-4 Consultant Supervision

In accordance with the policy on Grant Aid laid down by the Government of Japan, an appointed Consultant will organize a project implementation team to carry out detailed design and supervising services that are in line with the basic design policies. This will ensure appropriate coordination among concerned parties and the smooth construction of the Project facilities.

At the construction stage, the Consultant will dispatch a resident supervisor with ample technical capabilities to issue instructions to contractors and to communicate with them. Also, the Consultant will assign technical experts in each construction stage on a short-term basis in accordance with the progress of the work, in order to carry out inspection, attendance and guidance on execution.

(1) Basic Policies of Supervision

Punctual completion of the facilities based on the construction schedule will be aimed at through close communication with and reporting to the related organizations and those in charge in Japan and PNG.

- Prompt and appropriate guidance and advice will be provided for those involved in the work to ensure that the constructed facilities meet the specifications set forth by the design documents.
- Priority will be given to the use of local construction methods using local materials as much as possible.
- Sufficient instruction of operation and maintenance for mechanical and electrical equipment.

- Appropriate guidance and advice will be provided in regard to post-handing-over maintenance and economical operation to facilitate the smooth operation of the facilities.

(2) Contents of Work Supervision

- Assistance to sign the construction contract:

  Selection of the Contractor through tender (determination of the contracting method, preparation of the draft contract, confirmation of the contents of the specifications and witnessing of the work contract, etc.).

- Inspection and approval of shop drawings, etc.:

  Inspection and approval of the shop drawings, samples and materials, etc. submitted by the Contractor and their checking if necessary.

- Work guidance:

  Examination of the schedule plan and work outline, etc., provision of guidance for the Contractor and reporting of the work progress to the Owner.

- Assistance in the payment authorization procedure:

  Assistance in the payment authorization procedure through examination of the contents of invoices and the work progress in regard to the construction cost to be paid during the construction work and upon completion of the said work.

- Inspection and approval:

  According to necessity, to conduct inspections on each work in terms of quality and workmanship and provide guidance to the contractor during the construction period.

  The Consultant shall confirm the completion of the work in accordance with the conditions of the contract, attend the handing over of the completed work, and

obtain acceptance from the owner. Also, it shall report to the Government of Japan any important matters related to the progress of the construction work, payment procedures and handing over of the completed work.

The construction supervision system and related agencies described above are shown in the following diagram.(Figure 3-1)

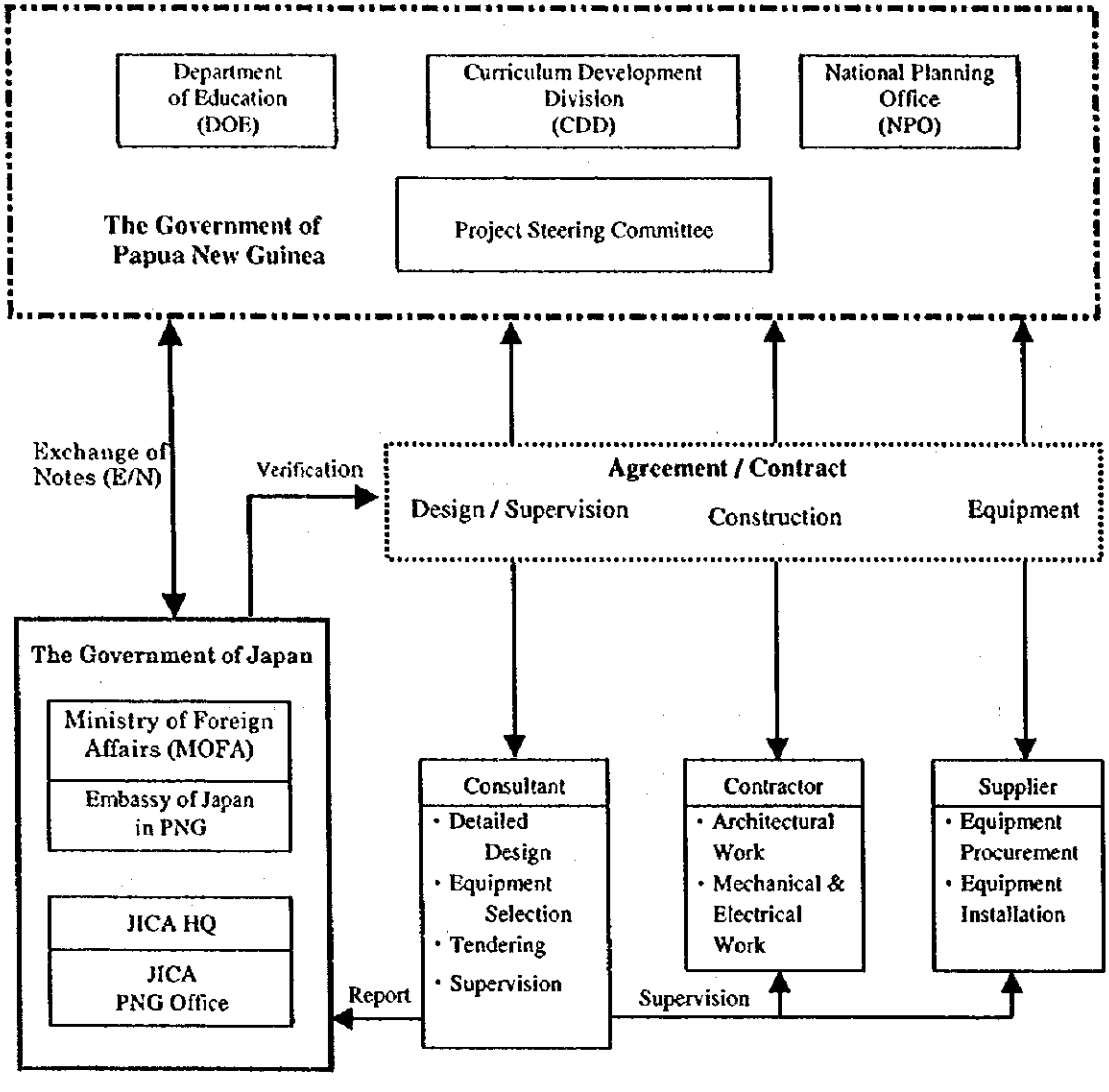


Figure 3-1 Construction supervision plan

3-1-5 Procurement Plan

The following items should be taken to consideration when procuring construction materials and equipment to be used in construction of the Project facilities.

(1) Procurement Policy

Most of the construction materials can be procured locally. Hence, the procurement policy is to procure materials in a reasonable manner by considering supply capabilities and quality vis-à-vis local manufacturers and supplies.

Materials to be procured from Japan should be kept to minimum, and should be restricted to items which cannot be procured locally due to reasonable cost, special specifications, poor performance or simply an insufficient local supply capacity.

(2) Procurement in Japan

In the case of equipment and materials of which local procurement is difficult, their procurement in Japan will be considered. In the case of mechanical equipment and electrical equipment which will require special ordering, timely orders in accordance with the work progress will be required as a long time is required to complete the process from initial order placement to design approval, manufacture and shipment from the manufacturer.

(3) Local Procurement

Since almost all the construction materials of high quality imported from Australia or New Zealand can be locally procured, the facilities can be maintained without any particular difficulties and, even if equipment and materials suffer damage, they can be easily repaired. Therefore, practical use of these materials shall be considered even if the procurement cost is comparatively high.

(4) Cost

Upon comparing materials that can be procured both locally and in Japan, Japanese material with a big lower costs will be employed. Procurement from Japan requires additional packing, transportation and insurance expenses on top of the market prices, but import duties are exempt.

(5) Procurement Schedule

Based on the above-mentioned factors, materials and equipment to be used in construction of the Project facilities will be procured in the manner described below.

1) Construction of building frames

Almost all the materials required in the construction of building frames, namely sand, gravel, cement, concrete, reinforcing bars, structural steel, and concrete blocks are locally available in PNG. However, proper care should be taken with regard to the procurement of reinforcing bars and cement because such items can sometimes be difficult to obtain as a result of the boom in the construction sector and high cost.

2) Interior and exterior finishing work and external work

Including imported materials almost all the materials required in the buildings, namely timber, aluminum fittings, tiles, metal roofing materials, paints, and glass are locally available in PNG.

3) Air-conditioning and sanitary work

Regarding the air-conditioning and sanitary work, high quality level of materials are locally available. Priority shall be given to local procurement as much as possible in view of maintenance.

4) Electrical work

Imported electrical work materials such as illumination lamps, power transformers, electric wires and cables, and PVC pipes are available at the local market. These materials shall be locally procured in view of maintenance. Procurement country of power distribution boards, low-voltage electrical apparatus, etc., for which order-made items are suitable, are to be decided, after first comparing costs including the third country procurement.

5) Equipment work

Most of the equipment and instruments to be installed in the Project facilities are difficult to procure in local. Therefore, they shall basically be procured from Japan or Australia.

6) Transportation plan

In principle, maritime transportation will be used for the transportation of equipment and materials from Japan to Port Moresby port. This Maritime transportation usually takes 2 weeks and custom clearance at Port Moresby port takes usually 3 to 7 days although the actual time depends on the balk of containers. The Contractor and Equipment Supplier must ensure that all the required documents for customs clearance are in order. Meanwhile PNG side DOE should provide the necessary measures to ensure the prompt customs clearance of the materials and equipment imported to PNG.

Estimating 10 days for ex-factory to loading in Japan, there should need at least one month time by maritime and inland transportation to the site.

According to procurement policy mentioned above, the result of study of major construction materials and procurement plan is shown in table 3-1.

Table 3-1 Study of Major Construction Materials and Procurement Plan

(1) Building materials

Works	Materials	Place of procurement			Remarks
		Local	Japan	Others	
Concrete work	Portland Cement	○			
	Sand/Crushed Stone	○			
	Reinforcement bars		○		Deformed bars are also available, but expensive
	Wooden forms	○			Veneer is available at local market.
Steel work	Structural Steel	○			Time is required for manufacture.
	Sheet Metal	○			Ditto
Masonry work	Concrete block	○			190mm×190mm×390mm are commonly used.
Water-proof Work	Asphalt W/Proofing	○			Imported material is available at local market.
	Cement W/Proofing	○			
Tile work	Ceramic tile	○			Imported material is available at local market.
	Semi-Porcelain tile	○			
Wooden work	Wood	○			Imported finishing wood is available.
	Plywood	○			Plywood is available at local market.
Roof work	Color metal sheet	○			Local material is widely used.
	Galvarium sheet	○			Highly weather proofed.
Metal work	Light steel ceiling frame	○			Delivery time is unstable.
	Aluminum Louvers	○			Imported material is available.
Plaster work	Terrazzo in situ	○			Many kinds are widely used.
	Stone	○			Local stone is available.
Metal Sash Work	Alum window frame	○			Imported material is available.
	Alum louver window	○			Widely used locally.
	Steel door	○			
Wooden Sash Work	Wooden door	○			Local material is widely used.
	Wooden door frame	○			Ditto.
Ironmongery	Door handle, lock	○			Imported material is available at local market.
	Door closer	○			
Grass work	Plane grass	○			Local material is widely used.
	Pane grass	○			Ditto
Paint work	Interior paint	○			Imported material is available.
	Exterior paint	○			Ditto.
Interior work	Rockwool Acc. Board	○			Local material is widely used.
	CSA Board	○			Ditto.
	Form Polystyrene	○			Use styrene form board.
Furniture work	Kitchen sink	○			
	Table/Chairs(wooden)	○			Local material widely used.
	Table/Chairs(steel)	○			Ditto.
External work	Pavement block	○			Local material is available.

(2) Mechanical work

Works	Materials/Equipment	Place of procurement			Remarks
		Local	Japan	Others	
A/C & Fan work	Separate type A/C	○			Procure from local agent of Japanese.
	Exhaust Fan	○			Locally available.
	Insulation Material	○			Ditto
Sanitary work	Pump & Tank	○			Locally available.
	Sanitary Ware	○			Ditto
	Pipe (PVC)	○			Ditto
	Pipe (Steel)	○			Ditto

(3) Electric equipment work

Works	Materials/Equipment	Place of procurement			Remarks
		Local	Japan	Others	
Lighting & Cabling work	Lighting Fixtures	○			Locally available.
	Panel	○			Ditto
	Wire/Cables	○			Ditto
Equipment work	Telephone set	○			Small quantities are available.
	Fire alarm	○			Maintenance by local agent is important.

(4) Equipment work

Equipment	Place of procurement			Remarks
	Local	Japan	Others	
Mixing Console		○		It is not possible to procure in local.
DAT Deck		○		All equipment shall be imported.
MD Recorder		○		
CD Player		○		
Audio Processor		○		
Graphic Equalizer		○		
Multi Track (8ch) DAT		○		
Microphones		○		
Electronic Piano (Synthesizer)				
Audio Cassette Duplicator		○		
Audio Cassette Printer		○		
Cassette Deck Player		○		
6mm Recorder Player		○		
Portable DAT Deck		○		
Portable MD Recorder		○		
Oscilloscope		○		
Audio Analyzer		○		
Frequency Counter		○		
System Lack		○		

3-1-6 Implementation Schedule

When this project is implemented under the Japan's Grant Aid System, the following procedures are to be taken :

a) Conclusion of an Exchange of Notes (E/N) between the two governments,

b) Recommendation of a Japanese consulting company for design and supervision by the Government of Japan,

c) Signing of a design and supervision agreement between the Government of PNG and the recommended consulting company,

d) Three preparatory steps including preparation of detail design documents, tendering, and signing of a contracts (facilities and equipment) with the successful tenderers,

e) Construction of the facilities.

After the E/N is concluded, DOE will act as the implementation agency of PNG Government for Consultant Agreement, Construction Contract, Equipment Contract, Certificates for Payments, etc..

1) Detailed design stage

Tender documents will be prepared based on the basic design, and these will consist of detailed design drawings, specifications, estimations and budget statements, etc. Close discussion are held with related agencies of the Government of PNG in the initial, middle and final stages of the detailed design preparation stage. After the final results are approved by the agencies concerned, tendering procedures will be undertaken.

2) Tendering stage

Tendering for the construction work and for the equipment work will be held separately. After the detailed design work is completed, prequalification (PQ: preliminary review for qualification of applying contractors) is announced and carried out in Japan only for the construction work. In accordance with the review, the DOE, as the implementing agency, will invite tenderers for the Project, and the tendering will be done in Japan under the supervision of the concerned parties. The tenderer which offer the lowest price will become the successful one if the contents of its tender are judged to be appropriate, and it will sign a construction contract with the DOE.

3) Construction and procurement stage

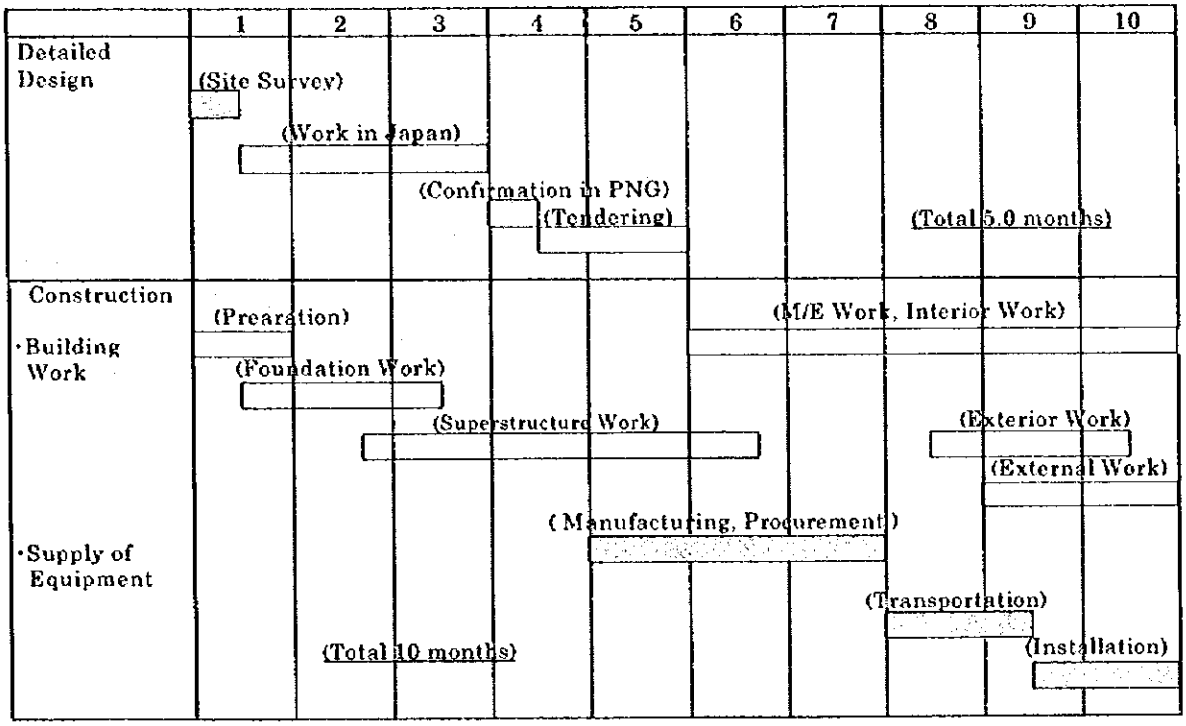
After the construction contract is signed, the construction work will be commenced following verification by the Government of Japan. Judging from the scale and contents of the Project facilities, the construction period is expected to be roughly 10 months. This, however, is condition on the following:

a) construction materials and equipment are smoothly procured,

b) smooth progress is seen in PNG administrative procedures and reviews, and preliminary work within the scope of responsibility of PNG side, in special tax exemption and customs clearance procedures,

c)the one-year budgetary system of the Government of Japan is applied correctly.

Table 3-2 Implementation schedule



3-1-7 Obligations of Recipient Country

(1) Items to be done by PNG side

In the case where the Project is implemented in accordance with the guidelines of Japan's Grant Aid System, the necessary measures to be taken by the Government of PNG are as follows.

1) To remove trees within a planned construction site.

2) Provision of sites for temporary facilities and material storage for construction work within CDD compound.

3) To supply electric power, water, and drainage facilities, etc. to the constructed new building.

4) Procurement of common office furniture, fixtures and fittings.

5) Supply of consumable and spare parts required for facility and equipment maintenance.

6) Banking arrangement and payment of bank commission for Authorization to Pay.

7) Applications for physical planning and building permit and payment of various fees, if necessary.

8) Swift arrangement of landing, tax exemption facilities and customs clearance of the equipment and materials to be procured within the scope of the grant aid.

9) Exemption of Japanese companies and Japanese nationals involved in the Project from customs duty, domestic taxes and any other levies imposed in PNG.

10) Provision of all conveniences for the Japanese nationals referred to in 9) above in relation to their entry to and stay in PNG to perform their assignments under the Project.

11) Appropriate and effective use and maintenance of the facilities constructed and equipment procured under the Project.

12) Smooth move of existing radio and video materials production equipment to the new building.

13) Payment of all expenses required for the implementation of the Project which are not covered by the grant aid.

(2) Cost estimates of Works to be done by PNG side

In addition to the items to be addressed by the Government of PNG in relation to the construction work under the Project, the related items during the construction works are refer to "APPENDICES 5. Cost Estimation Borne by the Recipient Country". While these items directly affect the commencement of the construction of the Project, timely arrangements are essential and effective for project implementation.