

CHAPTER 6 BENEFITS OF THE PROJECT, AND CONCLUSIONS

CHAPTER 6 BENEFITS OF THE PROJECT, AND CONCLUSIONS

6-1 Benefits from Project Implementation

The Kingdom of Swaziland is a landlocked country surrounded by the Republic of South Africa on three sides, and its main industry is agriculture. The western part of the country is a highland area with an elevation of 1,000 - 1,400m and its eastern part is a lowlying grassland area, and a hill belt rising to a height of a few hundred meters extends between the two areas. The roads in Swaziland are fairly well developed, with all arterial national highways paved and maintained in good repairs except in few limited sections. As for communication services, in urban areas the introduction of digital switches is now going on, and it is expected that a smooth progress of network development will be followed there. In rural areas, however, the development of telecommunications services is greatly delayed owing to the shortage of funds, and the main means of communication is the postal service using PO boxes installed at some post offices, although it has long been recognized that improved communication services are indispensable for socio-economic development of rural areas. The resultant absence of telecommunications services has lowered the efficiency of capital investment in rural areas, inducing potential investors to shy away from rural investment. As an inevitable consequence of this, there arose an economic gap between urban and rural areas, which led to a marked drift of rural population to cities.

The situation being such, it is expected that the following benefits will be derived, if the rural telecommunications network is developed under the project to conquer the time and distance separating urban and rural areas.

Benefits of the Project

Actual Situation and Problems	Contents of the Project	Benefits of the Project
<p>In the rural areas, where 80% of total population live, telephone network is not still well developed because of its high installation cost due to distant locations.</p> <p>To develop a telephone network using cable systems is technically and economically unfavorable by a reason of geographical conditions of the mountainous country.</p> <p>Lack of communication service impedes sound progress of agriculture, cattle breeding and other businesses in rural areas, and promotes migration from rural to urban area.</p> <p>In some places telephone service is provided using open wire carrier system or magnet multiparty system, but its service quality is very poor, for example, low voice level and frequent failures, and maintenance work costs very much.</p>	<p>Using TDMA subscriber radio system, 447 ordinary telephones, 87 public coin telephones and 22 Telex will be installed in rural areas.</p> <p>This system is favorable to places where telephone demand is distributed wide and sparsely, and cable installation is difficult due to mountains.</p>	<ol style="list-style-type: none"> (1) Agriculture and public/private businesses will be activated, and economical development can be expected, so employment in rural areas will be promoted. (2) It can be expected that investment in rural areas will be encouraged and higher efficiency of such investment will be gained. (3) Emergency call to hospital and urgent notice in case of disasters will be possible, so, social welfare may be promoted. (4) Rapid contact to police in case of crime and incident will be possible, so stable security and higher efficiency of administrative activities may be realized. (5) Reduction of wire cables will lead to low failure rate, so maintenance work and cost will be saved. (6) Urban-rural relations will be consolidated.

In addition to the qualitative benefits listed above, the project will also realize the minimum required target of telecommunications network development envisaged by Swaziland, i.e., availability of telephone service at a distance of 10 km from any place in the country. Specifically, about 500 thousand persons, or 70% of total rural population, will be directly benefited from the project, as shown in Figure 6-1. Furthermore, with the basis of rural subscriber radio systems built under the project, the country will be able to expand and develop its rural telecommunications network in the future simply by laying new subscriber cables and installing new subscriber terminal stations.

6-2 Conclusions

Considering the importance of rural development which is an urgent national demand of Swaziland, the project can be fully justified especially because it is intended for the development of rural telecommunications infrastructure. However, judging from the existing financial status of the Swaziland government and SPTC, it will be difficult for the country to execute the project with its own funds or loans for the development of the rural telecommunications network which incurs a huge cost but promises low rentability (the government now has outstanding foreign debts amounting to 75% of its annual revenues, while SPTC is now well off but will soon be brought into financial constraint because of its plans for installing 28,000 new switch terminals and digitalizing transmission lines). It is therefore considered that the project, which is indispensable for the rural infrastructure development in Swaziland, should be implemented with Japan's grant aid.

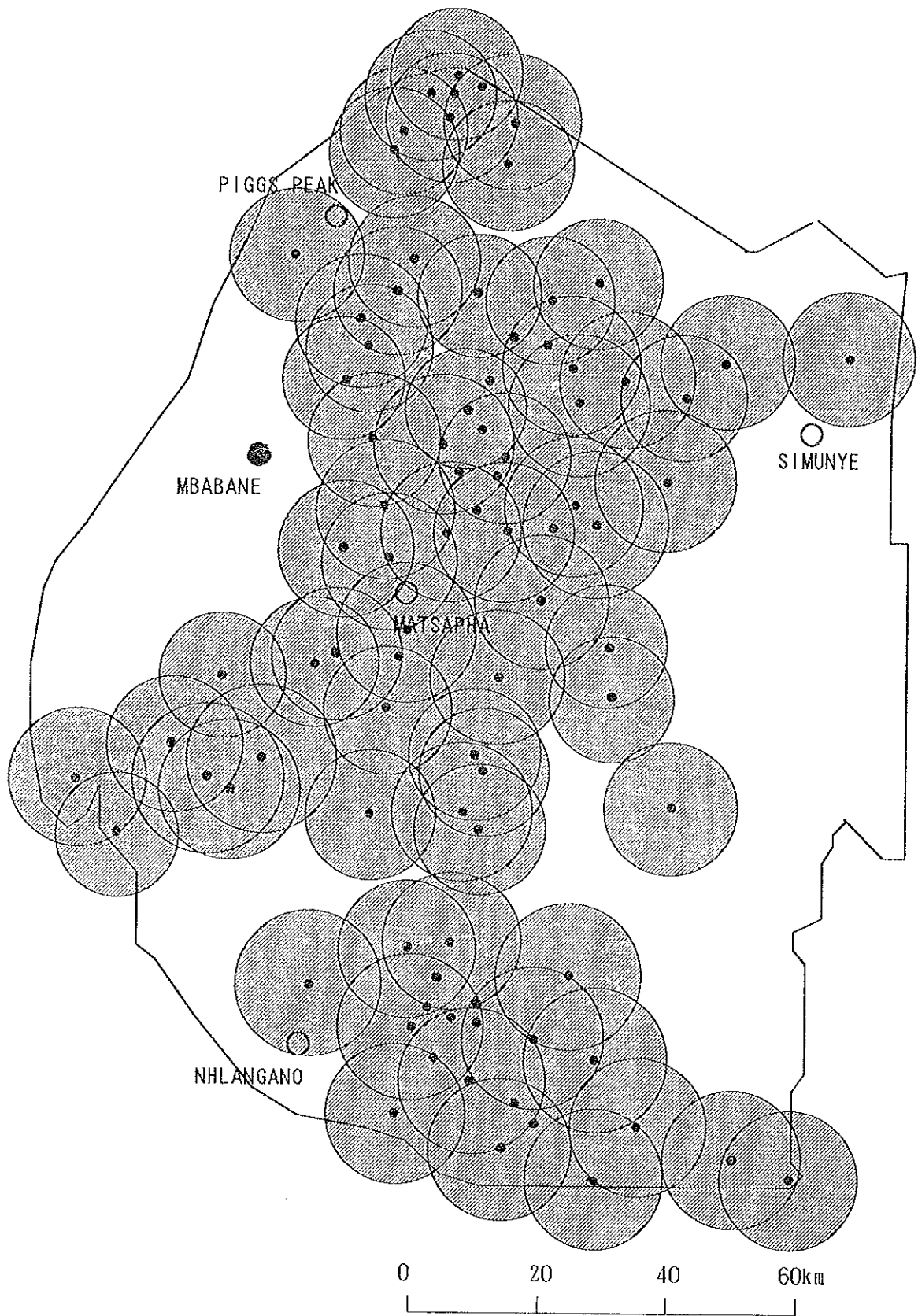


Figure 6-1 Benefited Area

ANNEX

Annex-1

Members of the Basic Design Study Team

Minoru TAKAHARA	Leader Training Manager & Instructor Technical Training Division Training Institute of Telecommunications Administration Ministry of Posts and Telecommunications
Toshiyuki IWAMA	Planning and Coordination Second Basic Design Study Division Grant Aid Study & Design Department Japan International Cooperation Agency (JICA)
Jiro KOKAN	Telecommunication Network Planner Japan Telecommunications Engineering and Consulting Service (JTEC)
Nobuyasu HOSAKA	Transmission Facilities Planner Japan Telecommunications Engineering and Consulting Service (JTEC)
Kiyoshi MUSHU	Switching Facilities Planner Japan Telecommunications Engineering and Consulting Service (JTEC)
Masaya KIRA	Civil Engineering/Cost Estimation Japan Telecommunications Engineering and Consulting Service (JTEC)
Yasuyuki Izumi	Outside Plant Facilities Planner Japan Telecommunications Engineering and Consulting Service (JTEC)

Members of the Draft Explanation Team

Minoru TAKAHARA	Leader Training Manager & Instructor Technical Training Division Training Institute of Telecommunications Administration Ministry of Posts and Telecommunications
Tomohiro SEKI	Planning and Coordination Second Project Management Division Grant Aid Project Management Department Japan International Cooperation Agency (JICA)
Jiro KOKAN	Telecommunication Network Planner Japan Telecommunications Engineering and Consulting Service (JTEC)
Kiyoshi MUSHU	Switching Facilities Planner Japan Telecommunications Engineering and Consulting Service (JTEC)

Annex-2 (1) Survey Schedule of Basic Design Study Team in 1992

- 25 Oct. (Sun) Left NARITA, arrived in LONDON
- 26 Oct. (Mon) Left LONDON
- 27 Oct. (Tue) Arrived in LUSAKA, meeting with staff of JICA ZAMBIA Office,
- 28 Oct. (Wed) Call on Embassy of JAPAN in ZAMBIA, meeting with staff of JICA ZAMBIA Office, left LUSAKA, arrived in MANZINI
- 29 Oct. (Thu) Curtsy call to General Manager and Executives of SPTC, explanation on Inception Report, discussion on survey schedule and etc.
- 30 Oct. (Fri) Confirmation and adjustment of Scope of Work
- 31 Oct. (Sat) Preliminary survey of project sites, team meeting
- 1 Nov. (Sun) Team meeting, data filing/analysis
- 2 Nov. (Mon) Detailed adjustment of Scope of Work, courtesy call to Minister and Principal Secretary of Transport & Telecommunications
- 3 Nov. (Tue) Detailed adjustment and summarization of Scope of Work, discussion on draft of Minutes of Discussions, Mr. Iwama (team member) left MANZINI, preliminary survey of project sites (Area 1)
- 4 Nov. (Wed) Signing of Minutes of Discussions, preliminary survey of project sites (Area 1)
- 5 Nov. (Thu) Mr. Takahara (team leader) left MANZINI, Mr. Kira and Mr. Izumi (team members) arrived in MANZINI, field survey of MATSAPHA Telephone Office
- 6 Nov. (Fri) Field survey of UTONDOZI Radio Station, proposed LAPANDA Radio Relay Station and proposed terminal station sites in the area
- 7 Nov. (Sat) Field survey of proposed radio relay station (Fire Watch Tower) in PIGGS PEAK Area, team meeting
- 8 Nov. (Sun) Team meeting, data filing/analysis
- 9 Nov. (Mon) Field survey of proposed LIBETS Radio Relay Station and proposed terminal station sites in Area 1.
- 10 Nov. (Tue) Field survey of PIGGS PEAK Telephone Office, proposed radio relay station site (Fire Watch Tower) in Area 3 and proposed terminal station sites in Area 3
- 11 Nov. (Wed) Field survey of proposed radio relay station site (Fire Watch Tower and etc.) and proposed terminal station sites in Area 3
- 12 Nov. (Wed) Field survey of proposed radio relay station site (LUQOLWENI HILL) in Area 2
- 13 Nov. (Fri) Field survey of HLATHIKULU Telephone Office, NHLANGANO Telephone Office, proposed radio relay station sites (NKONDOLO, NKONDWENE) and terminal station sites in Area 2

- 14 Nov. (Sat) Team meeting, data filing/analysis
- 15 Nov. (Sun) Team meeting, data filing/analysis
- 16 Nov. (Mon) Field survey of proposed radio relay station site (MLIBA) and terminal station sites in Area 4
- 17 Nov. (Tue) Data filing/analysis, courtesy call to Principal Secretary of Economic Planning & Development
- 18 Nov. (Wed) Field survey of proposed radio relay stations in Area 2, visit to UNDP
- 19 Nov. (Thu) Explanation to STPC on the progress of field survey
- 20 Nov. (Fri) Left MANZINI via JOHANNESBURG
- 21 Nov. (Sat) Arrived in LONDON
- 22 Nov. (Sun) Left LONDON
- 23 Nov. (Mon) Arrived at NARITA

(2) Schedule of Draft Explanation Team

- 31 Jan. (Sun) Left NARITA, via Kuala Lumpur
- 1 Feb. (Mon) Arrived in JOHANNESBURG, left JOHANNESBURG, arrived in MANZINI, meeting with expert in SWAZILAND, team meeting.
- 2 Feb. (Tue) Explanation of draft of final report and consultation with SPTC staff, study on procurement of materials, visit to SPTC training center.
- 3 Feb (Wed) Data collection, project sites survey
- 4 Feb (Thu) Data collection, elaboration of a draft of Minutes of Discussion, consultation with SPTC staff on the draft of the final report and the draft of Minutes of Discussion.
- 5 Feb (Fri) Courtesy call to the Ministry of Economic Planning and Development (Under Secretary, Ms. Isabel Katamzi), final consultation on the draft, signing of Minutes of Discussion.
- 6 Feb (Sat) Project sites survey, team meeting
- 7 Feb (Sun) Team meeting, data filing
- 8 Feb (Mon) Left MANZINI, arrived in JOHANNESBURG, meeting with staff of Japanese Embassy in the Republic of South Africa, study on procurement of materials
- 9 Feb (Tue) Left JOHANNESBURG
- 10 Feb (Wed) Arrived in LONDON
- 11 Feb (Thu) Left LONDON
- 12 Feb (Fri) Arrived at NARITA

Annex-3 List of Persons Interviewed

(Basic Design Study)

Ministry of Transport and Communications

Mr. Albert Shabangu Minister
Mr. Richard Shabalala Principal Secretary

Ministry of Economic Planning and Development

Ms. A.P. Mkhonza Principal Secretary
Ms. Isabel Katamzi Under Secretary

UNDP

Ms. Trine L. Jensen Junior Professional Officer

Posts and Telecommunications Corporation

Mr. Dennis Punt Managing Director
Mr. Nicholas R. Manana Deputy Managing Director
Mr. Richard Mabuza Director Telecommunications
Mr. Ray Thomas Director Finance
Mr. W. M. Jele Director Postal
Ms. Tebogo Fruwirth Corporate Secretary
Mr. K.S.E. Khumalo Personnel Manager
Mr. Titus M. Nzima Corporate Finance Manager
Mr. E. Zwane Senior Engineer Planning and Works
Mr. Basilio Manana Senior Manager, Traffic Operation
Mr. S.T. Nhlabatsi Engineer Switching
Mr. Lymon Dlamini Training Manager
Mr. W.M. Shongwe Manager Transmission

(Counterparts for Field Survey)

Mr. Petros M. Mkhonta Engineer Frequency Management
Mr. Edward Ntshangase Acting Engineer Radio & Transmission
Ms. Nozipho Simelane Cadet Engineer

(Draft Explanation)

Posts and Telecommunications Corporation

Mr. Richard Mabuza	Director Telecommunications
Mr. Ray Thomas	Director Finance
Mr. Cyril Hlanze	Senior Engineer Construction
Mr. Killy Dlamini	Senior Engineer Planning
Mr. Wilmoth Shongwe	Senior Engineer Operations & Maintenance
Mr. D.J. Dlamini	Manager Supplies & Transport
Mr. Adam Matsebula	Manager Sales
Mr. Stanlay Hlope	Engineer External Plant
Mr. Petros M. Mkhonta	Engineer Frequency Management
Mr. Jabu Sifundza	Engineer Radio & Transmission Planning
Mr. Edward Tshagase	Acting Engineer Radio & Transmission
Ms. Nozipho Simelane	Cadet Engineer
Mr. Bheki Zwane	Cadet Engineer

Ministry of Economic Planning and Development

Ms. Isabel Katamzi	Under Secretary
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MINUTES OF DISCUSSION

BASIC DESIGN STUDY
ON
THE PROJECT FOR RURAL TELECOMMUNICATIONS
IN
THE KINGDOM OF SWAZILAND

In response to a Request from the Kingdom of Swaziland, the Government of Japan decided to conduct a Basic Design Study on the Project for Rural Telecommunications (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Swaziland a study team, which is headed by Mr. Minoru Takahara, Training Manager & Instructor, Training Institute of Telecommunications Administration of the Ministry of Posts and Telecommunications, and is scheduled to stay in the country from October 28 to November 20, 1992.

The team held discussions with the officials concerned of the government of Swaziland and conducted field survey at study areas.

In the course of discussions and field survey, both parties have confirmed the main items described on the annexes 1 and 2. The team will proceed to further works and prepare the Basic Design Study report.

Mbabane, November 4, 1992



Minoru TAKAHARA
Leader
Basic Design Study Team
JICA



Dennis PUNT
Managing Director
Swaziland Posts & Telecommunications
Corporation

Annex 1

1. Objective

The objective of the Project is to develop a rural telecommunication network by installing TDMA subscriber radio systems with a purpose of socioeconomic development of the rural areas in the Kingdom.

2. Project Sites

The Project sites are the following four areas:

Manzini area
Hlatikulu area
Piggs Peak area
Maphiveni area

3. Executing Agency

Swaziland Posts and Telecommunications Corporation (SPTC) is responsible for administration and execution of the Project.

4. Items Requested by the Government of Swaziland

After discussions with the Basic Design Study Team, the following items were finally agreed by the Swaziland side:

1) Areas and sites provided with telephone service are as follows:

Manzini Area 124 lines

Project sites: Suburbs of Manzini, Sidvokodvo, Ntondozi Village, Nqabaneni, Cana, Sicunusa Mahlangatsha, Sigambeni, St.Philomeni, Siphofaneni, Lushikishini,

Hlatikulu Area 207 lines

Project sites: Suburbs of Hlatikulu, Mbelebeleni, New Haven, Ntjanini, Kapunga, Kubuta, Mhlosheni, Nsalitje, Nkwene, Lavumisa, St.Philips, Maloma, Mooihoek

Piggs Peak Area 106 lines

Project sites: Suburbs of Piggs Peak, Matsamo, Ntfonjeni, Mashobeni, Mvembili, Piggs Peak Mine, Bulandzeni, St.Peregerines

M.T.

Maphiveni Area 119 lines

Project sites: Suburbs of Maphiveni, Luve, Bekinkosi, Bhalekane,
St. Florence, Kukhanyeni, Nkiliji, Mkhiweni,
Nsingweni, Mliba Village, Dvakolwako

- 2) Provision of equipment/materials for constructing a rural telecommunication network to offer telephone service to above sites.
- 3) Provision of services for the implementation of the Project

However, the final components of the Project will be decided after further studies.

5. Japan's Grant Aid System

- (1) The Government of Swaziland has understood the system of Japanese Grant Aid explained by the team.
- (2) The Government of Swaziland will take necessary measures, described in Annex 2 for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the Study

- (1) The Consultants will proceed to further studies in Swaziland until November 20.
- (2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare a draft report and dispatch a mission to Swaziland in order to explain its contents on last days of January, 1993.
- (3) In case that the contents of the report is accepted in principle by the Swaziland side, JICA will complete the final report and send it to the Government of Swaziland by April, 1993.

Annex 2

Measures to be Taken by the Government of Swaziland:

- 1) To provide and secure land and equipment rooms necessary for execution of the Project.
- 2) To secure necessary switching capacity to accommodate the requested number of subscribers for the Project.
- 3) To eliminate unnecessary or obstructive existing installations for execution of the Project and to prepare and condition land before the initiation of construction.
- 4) To arrange fences and access roads necessary for construction of the facilities.
- 5) To install connection cables between MDF and existing switching equipment.
- 6) To construct foundations for antenna towers/poles and solar panel supporting parts in cooperation with Japanese supervisors.
- 7) To install cables to connect terminal equipment to subscriber premises, and the installation of telephone apparatus.
- 8) To provide documents and informations necessary for the construction works of Japanese contractors.
- 9) To bear the following commissions to Japanese foreign exchange bank for a banking services based on the Banking Arrangement.
 - 1) Advising commission of A/P
 - 2) Payment commission
- 10) To ensure unloading, tax exemption and customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
- 11) To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under verified contract such facilities as may be necessary for their entry into the Kingdom of Swaziland and stay therein for the performance of their work.

- 12) To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed to them in the Kingdom of Swaziland with respect to the supply of the products and services under the verified contract.
- 13) To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid.
- 14) To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as the transportation and installation of the equipment.

M.T.

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MINUTES OF DISCUSSION

Annex-5

BASIC DESIGN STUDY
ON
THE PROJECT
FOR
RURAL TELECOMMUNICATIONS NETWORK DEVELOPMENT
IN
THE KINGDOM OF SWAZILAND

(CONSULTATION ON DRAFT REPORT)

In October 1992, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Rural Telecommunications Network Development (hereinafter referred to as "the Project") to the Kingdom of Swaziland, and through discussions, field survey and technical examination of the results in Japan, has prepared the draft report of the study.

In order to explain and to consult the Swaziland side on the components of the draft report, JICA sent to Swaziland a study team, which is headed by Mr. Minoru Takahara, Training Manager & Instructor, Training Institute of Telecommunications Administration of the Ministry of Posts and Telecommunications, and is scheduled to stay in the country from February 1 to 8, 1993.


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

Mbabane, February 5, 1993



Minoru TAKAHARA
Leader

Draft Report Explanation Team
JICA



Ray THOMAS
Director of Finance

Swaziland Posts & Telecommunications
Corporation

ATTACHMENT

1. Components of Draft Report

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

2. Japan's Grant Aid System

(1) The Government of Swaziland has understood the system of Japanese Grant Aid explained by the team.


(2) The Government of Swaziland will take the necessary measures, described in Annex 1, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Technical Cooperation in Connection of the Project

The study team explained the Japanese technical cooperation system and pointed out that OJT would be extended to personnel of the Swaziland Posts and Telecommunications Corporation for maintenance and operation of the system during the installation works and when further training in Japan is needed in connection with the Project, a new proposal of the Government of Swaziland would be necessary.

4. Further Schedule

The team will make the Final Report in accordance with the confirmed items, and send it to the Government of Swaziland by April, 1993.

M. T. 

Annex 1

Necessary measures to be taken by the Government of the Kingdom of Swaziland in case Japan's Grant Aid is extended.

- (1) To provide and secure land and equipment rooms necessary for execution of the Project, and to construct huts for accommodation of equipment, where such accommodation facilities are not available.
- (2) To secure necessary switching capacity to accommodate the requested number of subscribers for the Project.
- (3) To eliminate unnecessary or obstructive existing installations for execution of the Project and to prepare and condition land before the initiation of construction.
- (4) To arrange fences and access roads necessary for construction of the facilities.
- (5) To arrange commercial AC 220V power supply in project sites, where such power supply is available.
- (6) To install connection cables between MDF and existing switching equipment.
- (7) To construct foundations for antenna towers/poles and solar panel supporting parts in cooperation with Japanese supervisors.
- (8) To install cables to connect terminal equipment to subscriber premises, and the installation of telephone apparatus.
- (9) To install terminal station equipment to be provided in the second period of the Project in cooperation with Japanese supervisors, when the Project implementation is divided into two periods.
- (10) To transport equipment and materials of tower/pole to the project sites from warehouse of the Swaziland Posts and Telecommunications Corporation.
- (11) To provide documents and informations necessary for the construction works of Japanese contractors.

M T.

(12) To bear the following commissions to Japanese foreign exchange bank for a banking services based on the Banking Arrangement.

- 1) Advising commission of A/P
- 2) Payment commission

(13) To ensure unloading, tax exemption and customs clearance of the materials and equipment brought for the Project at the port of disembarkation.

(14) To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under verified contract such facilities as may be necessary for their entry into the Kingdom of Swaziland and stay therein for the performance of their work.

(15) To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed to them in the Kingdom of Swaziland with respect to the supply of the products and services under the verified contract.

(16) To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid.

(17) To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as the transportation and installation of the equipment.

M.T.

14

Demand Distribution Pattern at Project Sites

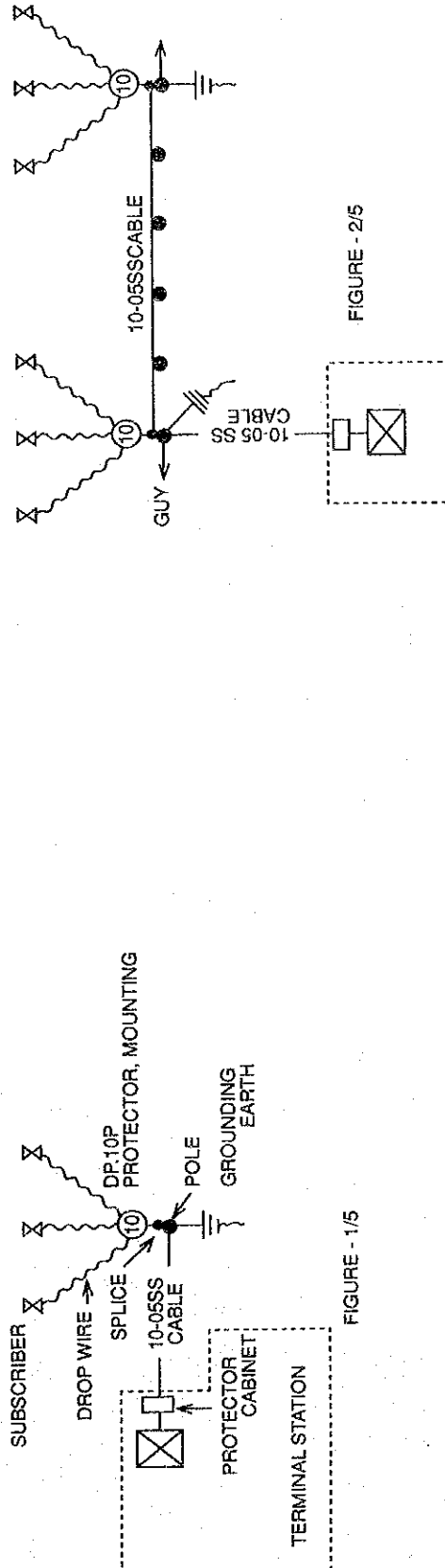


FIGURE - 1/5

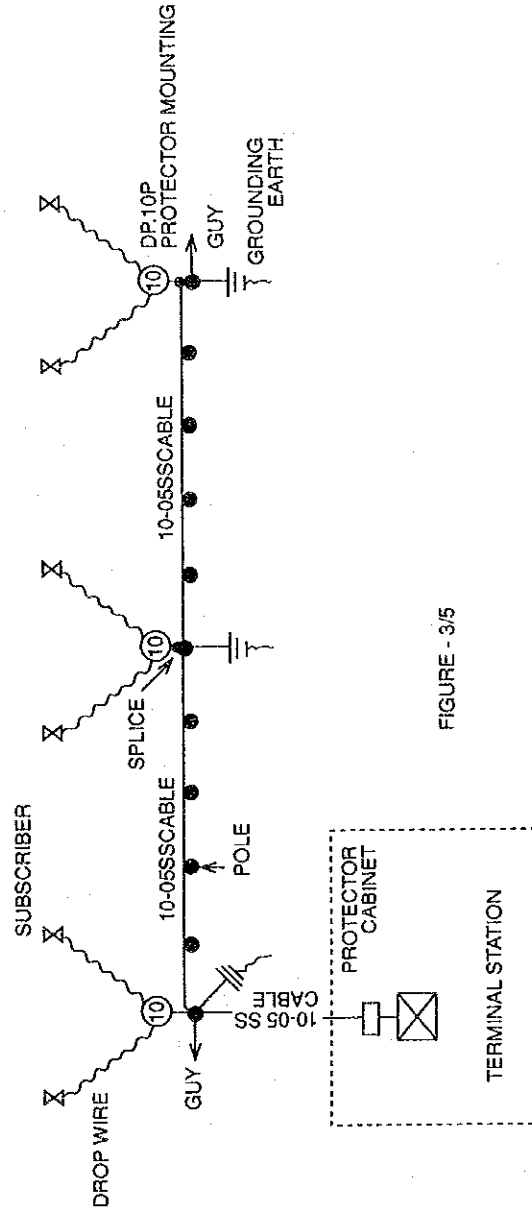


FIGURE - 3/5

FIGURE - 2/5

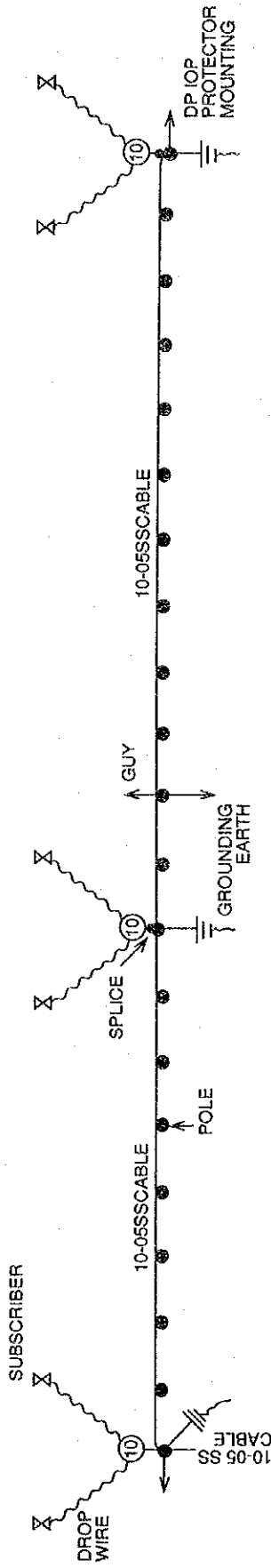


FIGURE - 4/5

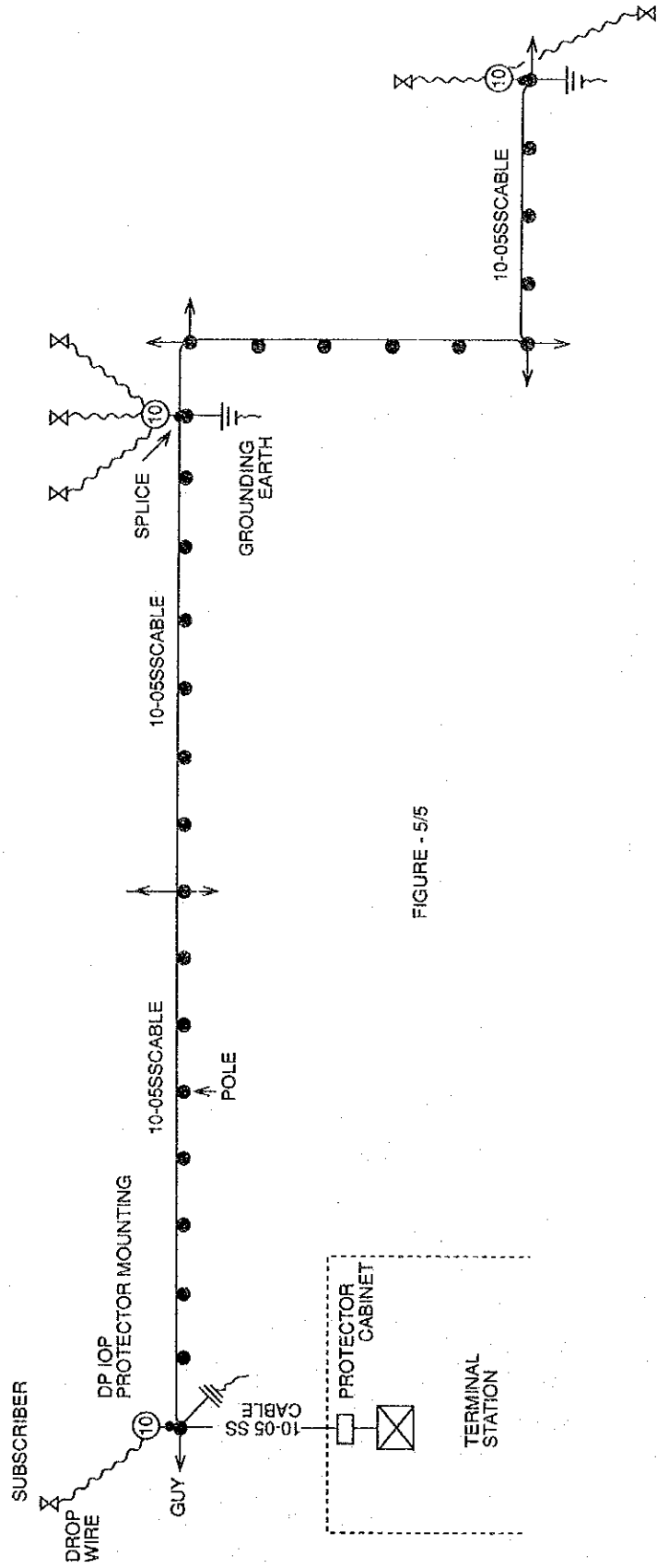


FIGURE - 5/5

Annex-7

List of Collected Data

- (1) Fourth National Development Plan
- (2) Development Plan 19092/93 – 1994/95
- (3) Financial Statements for the Year Ended 31 March 1992
- (4) Role of the Swaziland PTC
- (5) Development Cooperation Swaziland 1990 Report (UNDP)
- (6) UNDP Country Programme for Swaziland 1993-1996
- (7) A Long Term Plan for Development of the Telephone Network in Swaziland
- (8) Tender No. 2 of 1991/1992
- (9) Swaziland Telephone Directory
- (10) Posts and Telecommunications Act No. 11 of 1983
- (11) Public Enterprises (Control and Monitoring) Act No. 8
- (12) Annual Report of PTC 1990/1991, 1989/1990, 1988/1989, 1987/1988, 1986/1987
- (13) Annual Statistical Bulletin 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990
- (14) 1986 Swaziland Population Census Vol 1 – Vol 4
- (15) Report on the Census of Industries 1985 – 1988
- (16) The National Accounts for Swaziland 1980 – 1988
- (17) Timber Statistics for 1990
- (18) Education Statistics 1991
- (19) Swaziland Census of Individual Tenure Farms 1988 – 1989
- (20) National Income and Expenditure Survey 1985
- (21) Employment & Wages 1988
- (22) Annual Survey on Swazi Nation Land 1988 – 1985
- (23) Annual report 1991-92 (Central Bank of Swaziland)
- (24) Geological Maps
- (25) Swaziland Business Year Book

Annex-8 Breakdown of Cost to be Borne by the Swaziland Side

Total E 1,233,000

- | | |
|--|-------------------------------|
| (a) Foundation construction for towers/poles | E 129,000 |
| Tower foundation | 9(sites) x E 9,500 = E 85,500 |
| Pole foundations | 87(sites) x E 500 = E 43,500 |
| (b) Construction of huts | E 712,000 |
| 89(sites) x E 8,000 = E 712,000 | |
| (c) Construction of fences for the repeater stations | E 14,000 |
| 9(sites) x E 1,559 = E 14,000 | |
| (d) Installation of subscriber cables and telephone sets | E 378,000 |
| 87(sites) x E 4,345 = E 378,000 | |

Annex-9 Equipment Layout Plans

- Figure-1 Equipment Layout Plan in MATSAPHA Exchange Office
- Figure-2 Equipment Layout Plan in NTONDOZI Repeater Station
- Figure-3 Equipment Layout Plan in NHLANGANO Exchange Office
- Figure-4 Equipment Layout Plan in PIGGS PEAK Exchange Office
- Figure-5 Equipment Layout Plan in SIMUNYE Exchange Office
- Figure-6 Equipment Layout Plan in MLIBA Repeater Station

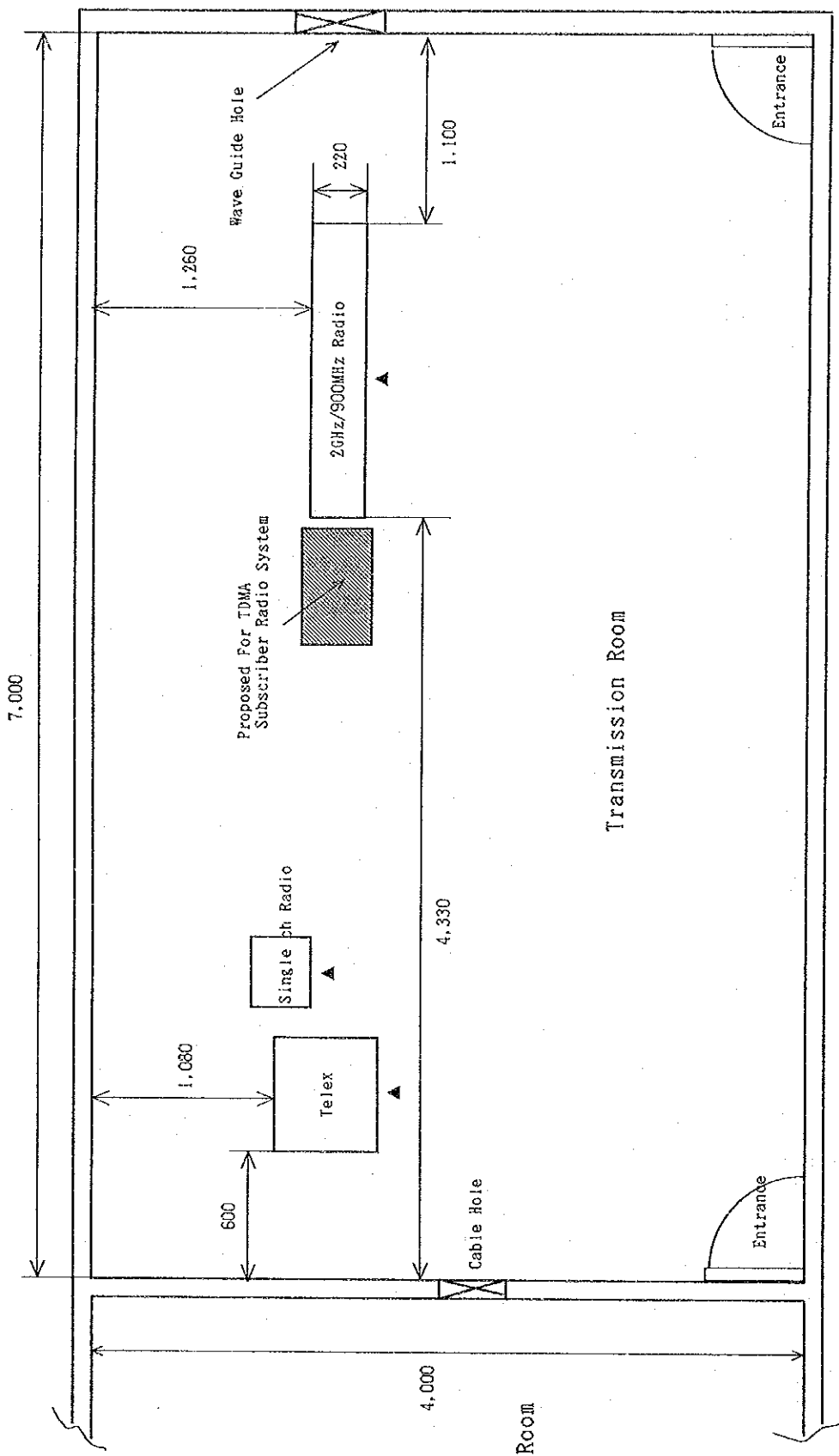


Figure 1 Equipment Layout Plan for MATSAPHA Exchange Office

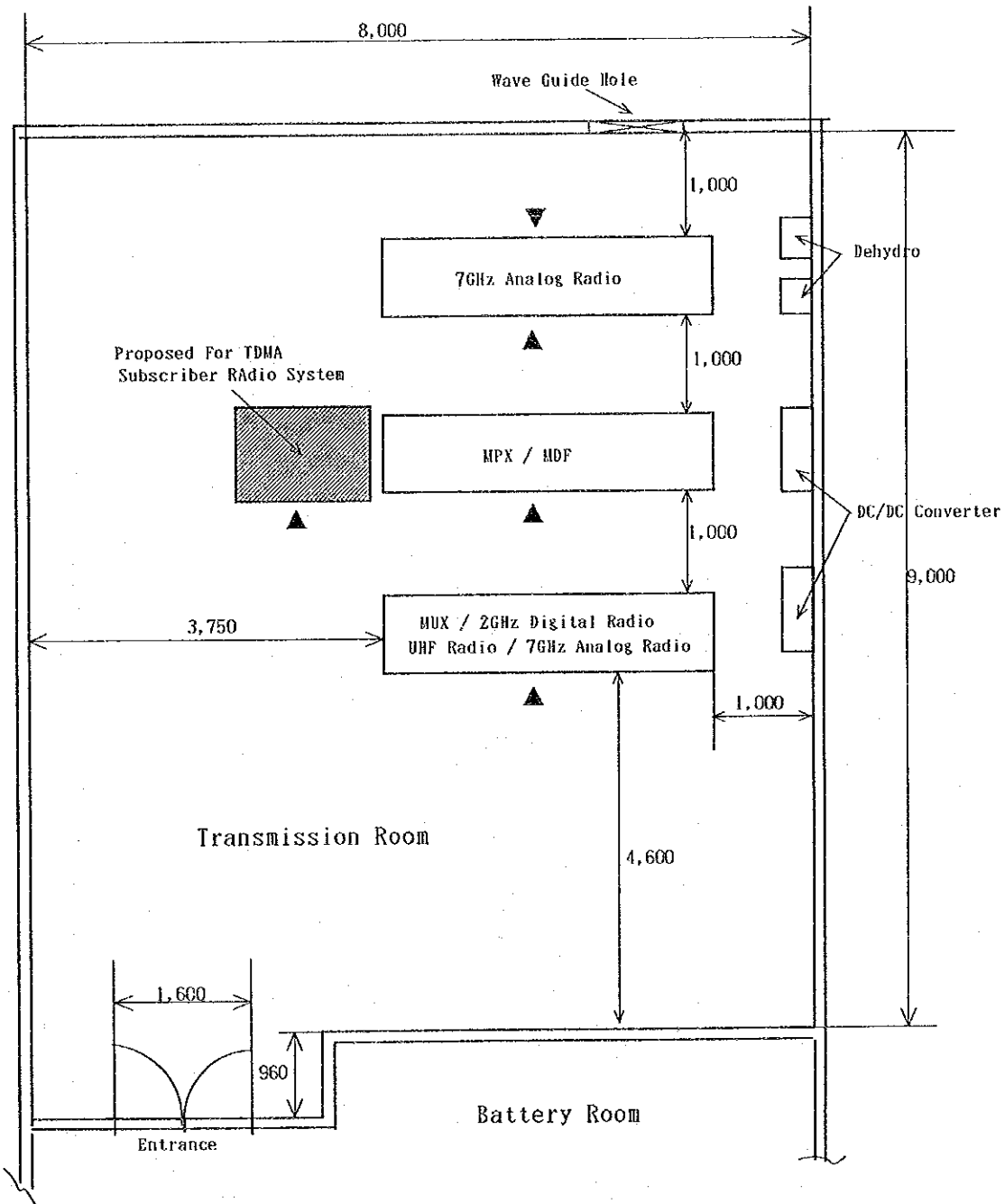


Figure 2 Equipment Layout Plan for NTONDOZI Repeater Station

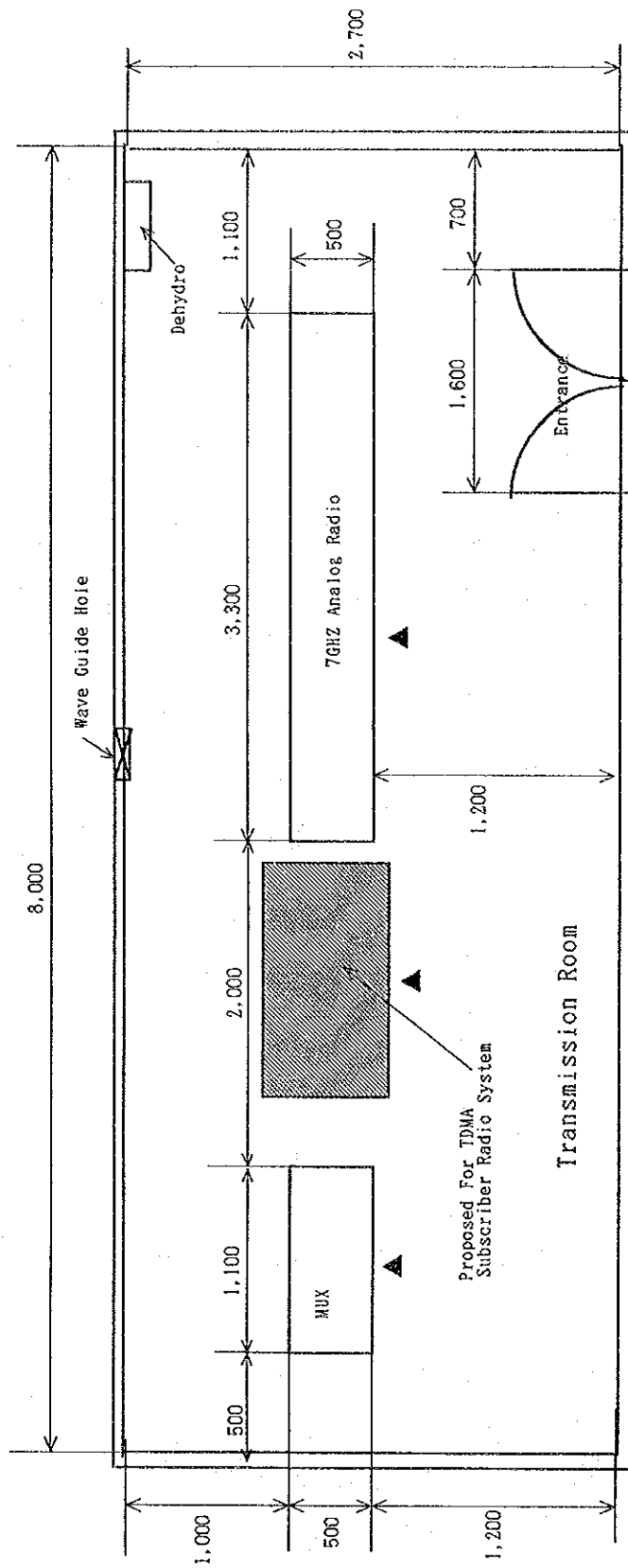


Figure 3 Equipment Layout Plan for NHLANGANO Exchange Office

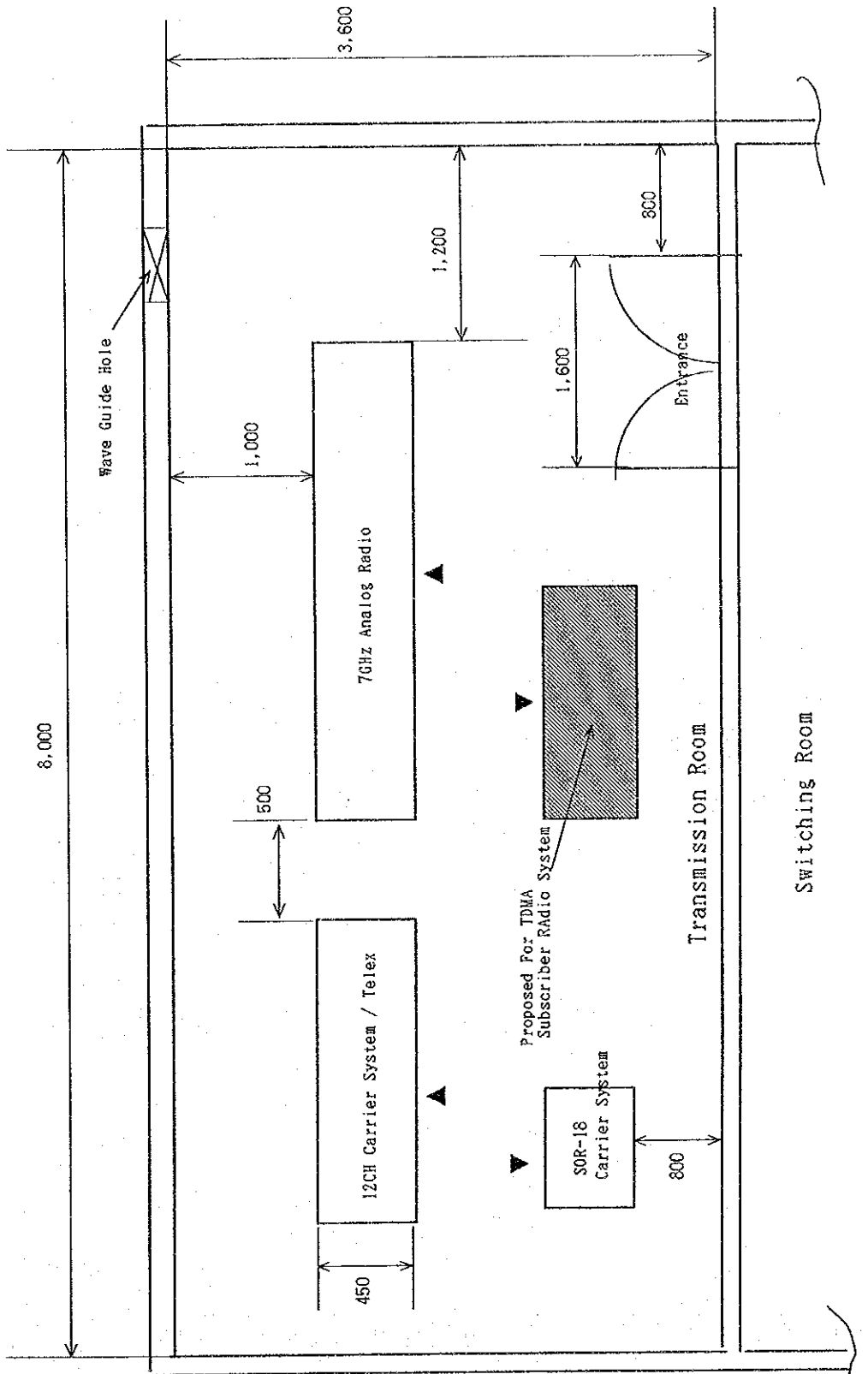


Figure 4 Equipment Layout Plan for PIGGS PEAK Exchange Office

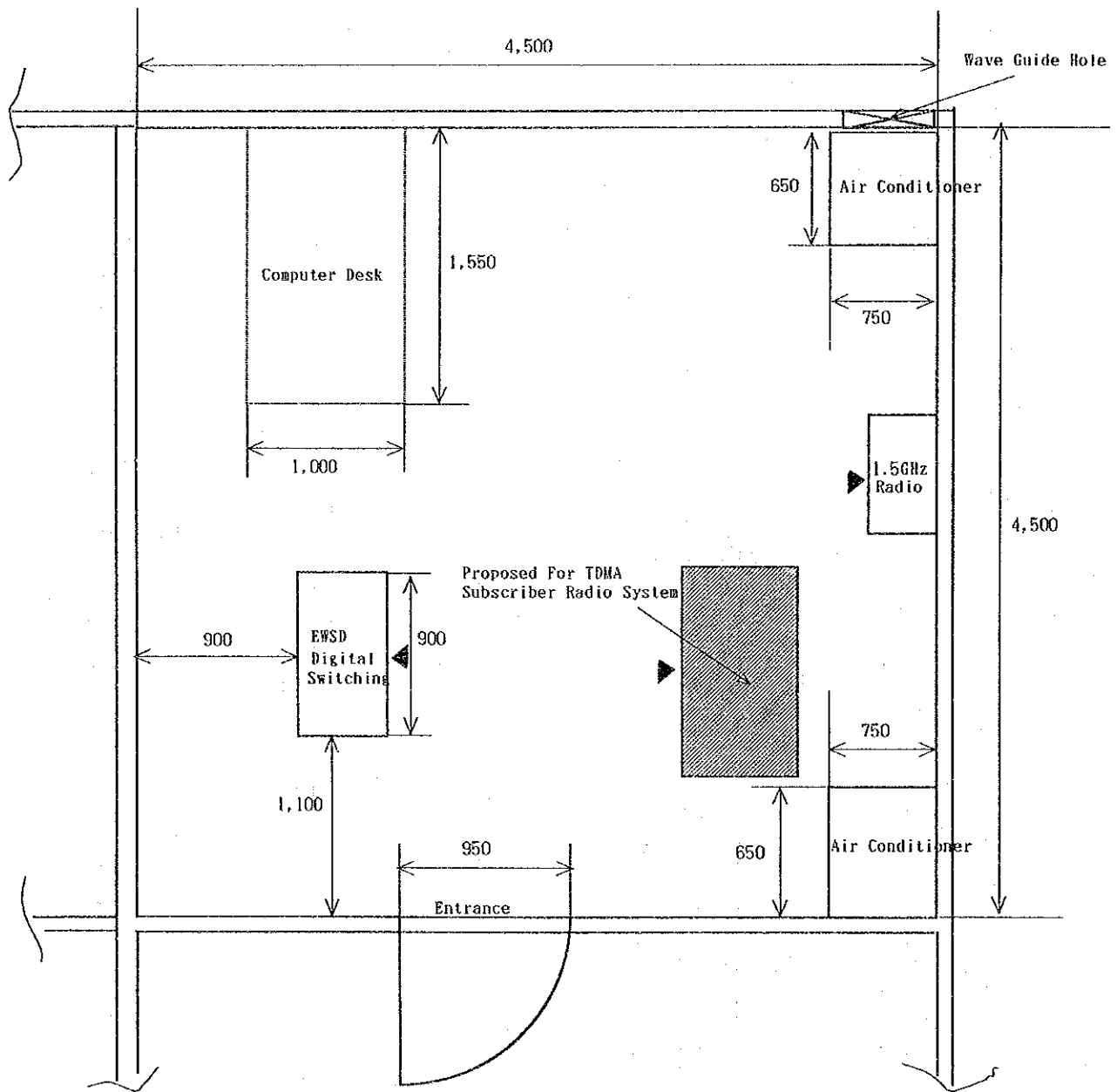


Figure 5 Equipment Layout Plan for SIMUNYE Exchange Office

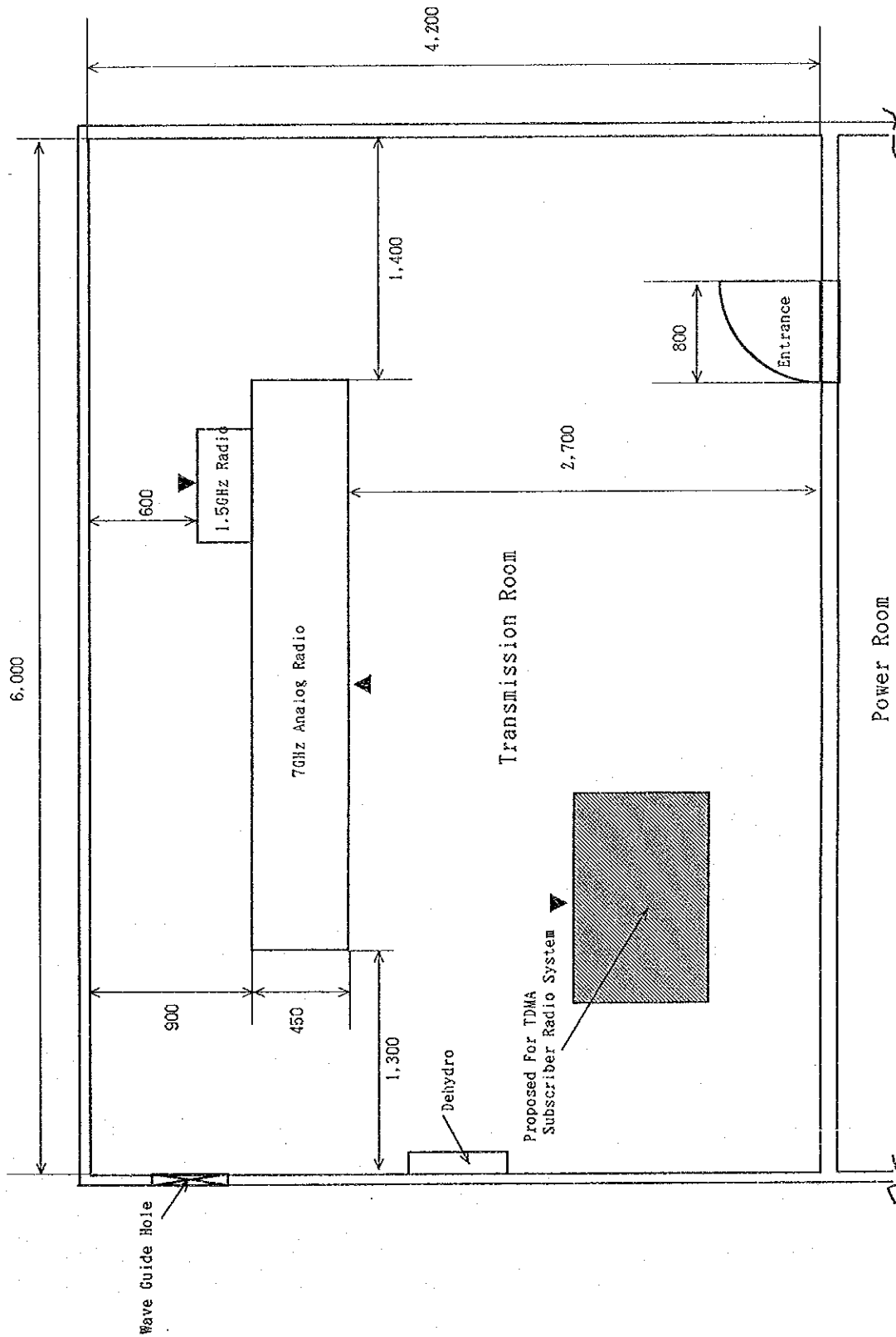


Figure 6 Equipment Layout Plan for MLIBA Repeater Station

JICA