central processing unit damage in the main facilities. Indirect strikes via transmission lines inflict especially severe damage on the switching system itself, suspending it as long as one week in the worst case.

However, since no good protection system has been established, the most effective protection is to always maintain spare parts for repairs, immediately replacing applicable parts when damaged to minimize the length of suspensions of the switching system.

Spare parts have been selected in accordance with the above considerations. Since this project can provide only a small number of parts, one spare part per each removable electronic unit, in principle, will be implemented. For echo cancelers, however, there will be two spare parts, since these are directly connected to the transmission lines.

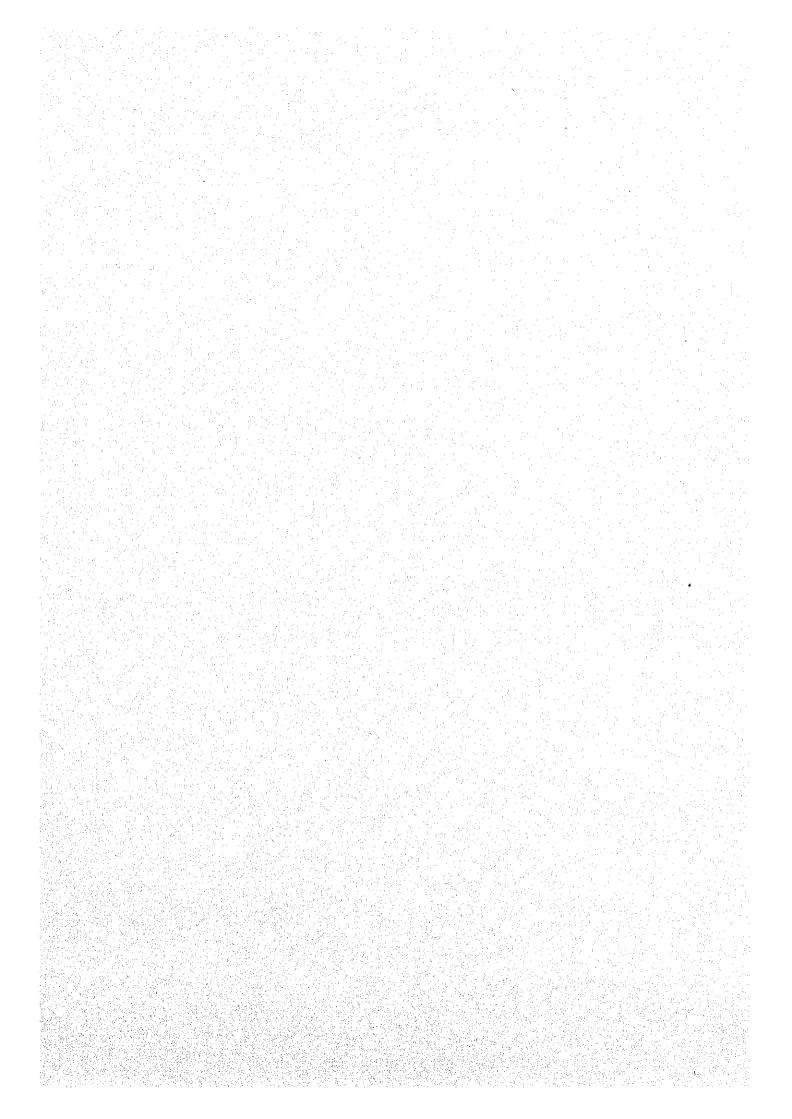
2) Consumables

Consumables like printing ribbons, magnetic tapes, and cartridge tapes for two years will be provided.

3-3-4 Basic Design Drawings

The following basic design drawings are prepared.

- 1) Figure 3-14 Survey Drawing
- 2) Figure 3-15 Site Layout of Earth Station
- 3) Figure 3-16 Floor Layout of Satellite Communication Building
- 4) Figure 3-17 Elevation Plan of Satellite Communication Building
- 5) Figure 3-18 Section Plan of Satellite Communication Building
- 6) Figure 3-19 Engine Generator House at Earth Station
- 7) Figure 3-20 Site Layout of Repeater Station
- 8) Figure 3-21 Engine Generator House at Repeater Station



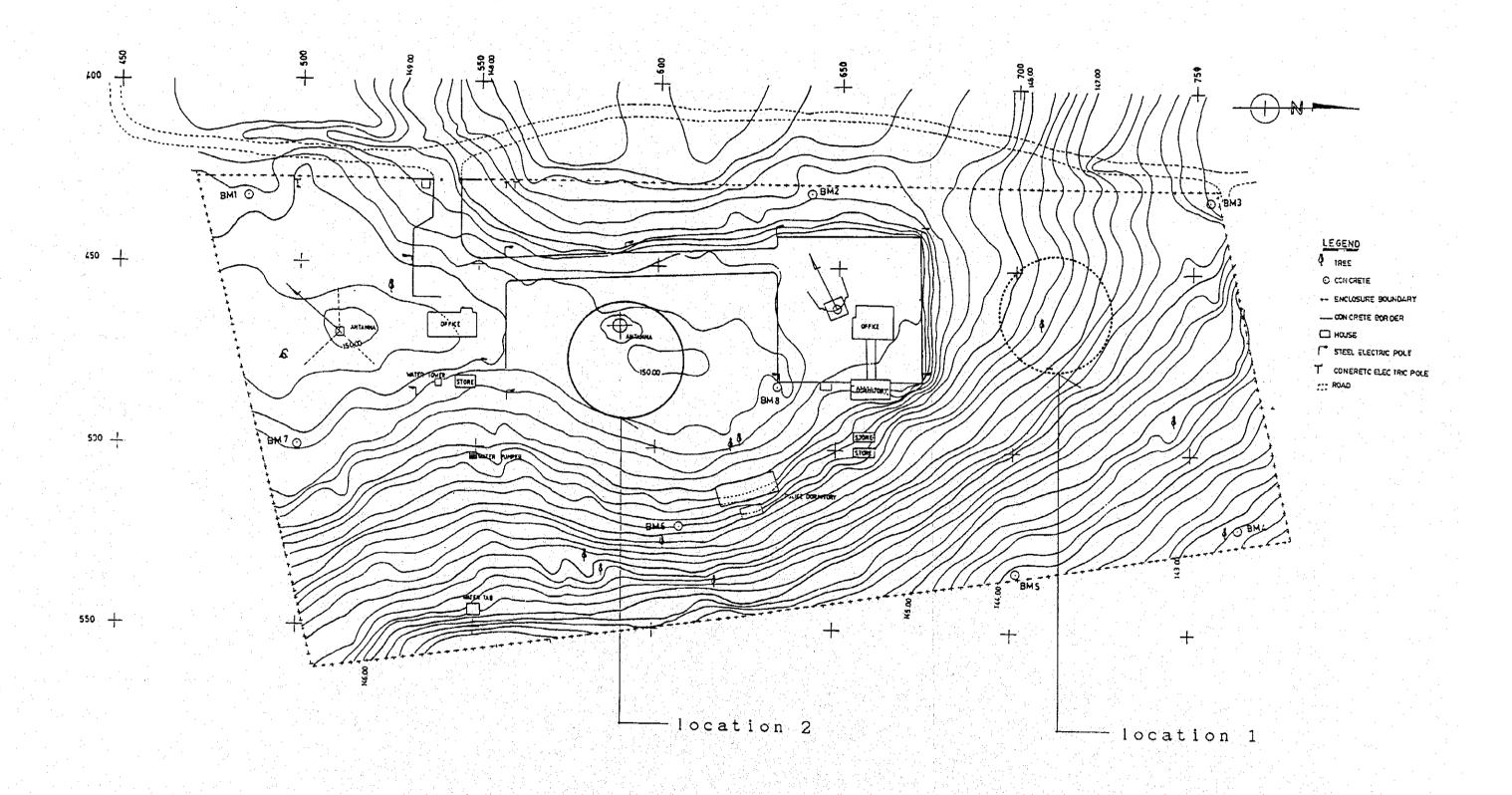
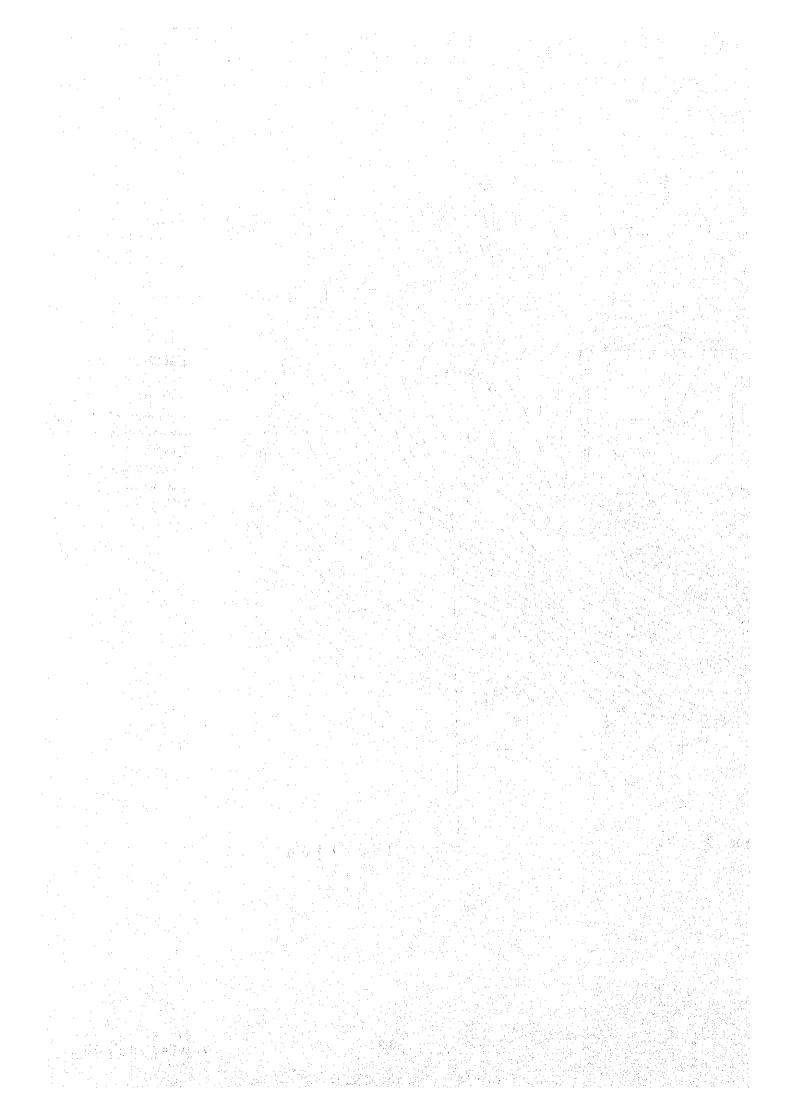
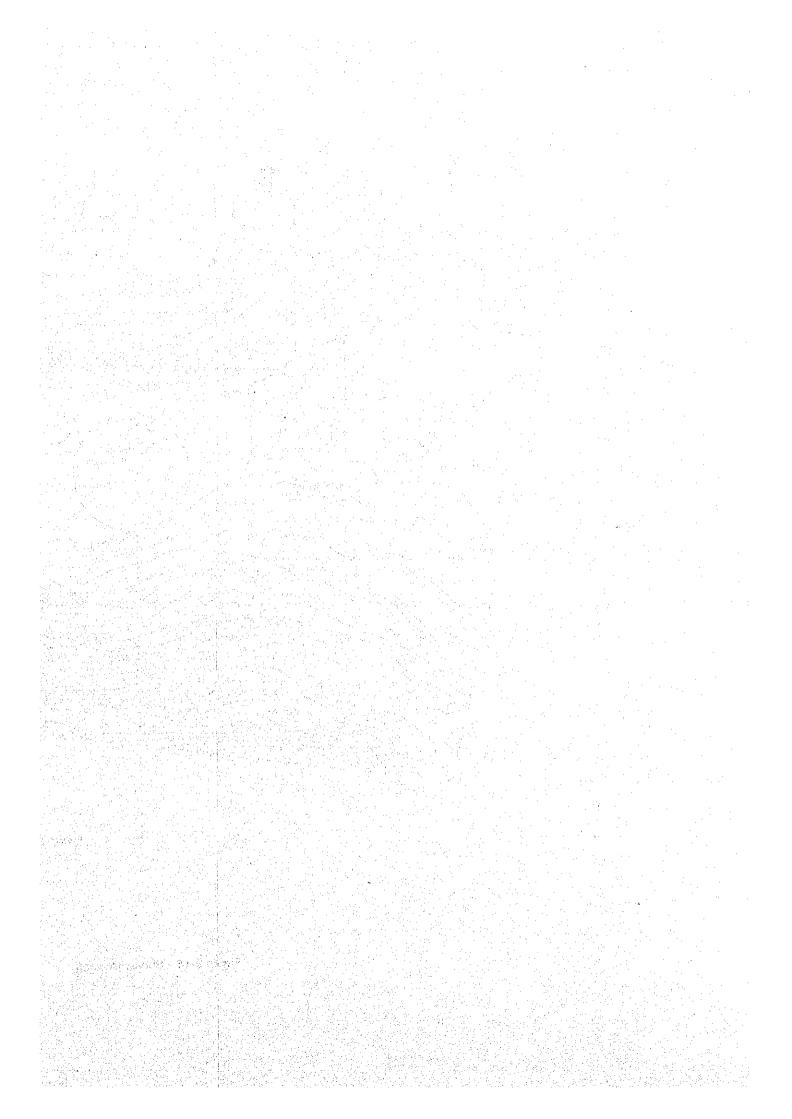


Figure 3-14 Survey Drawing







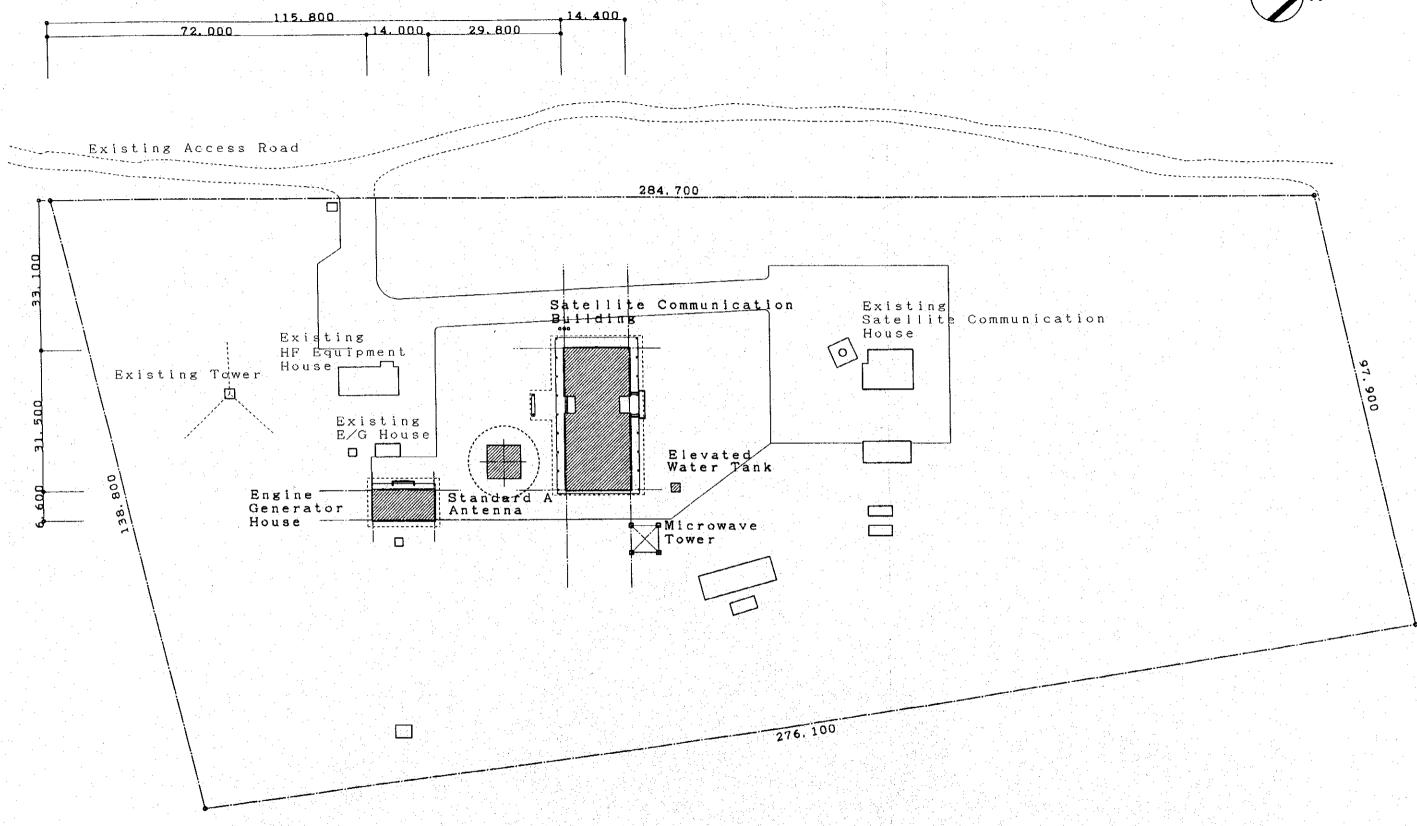
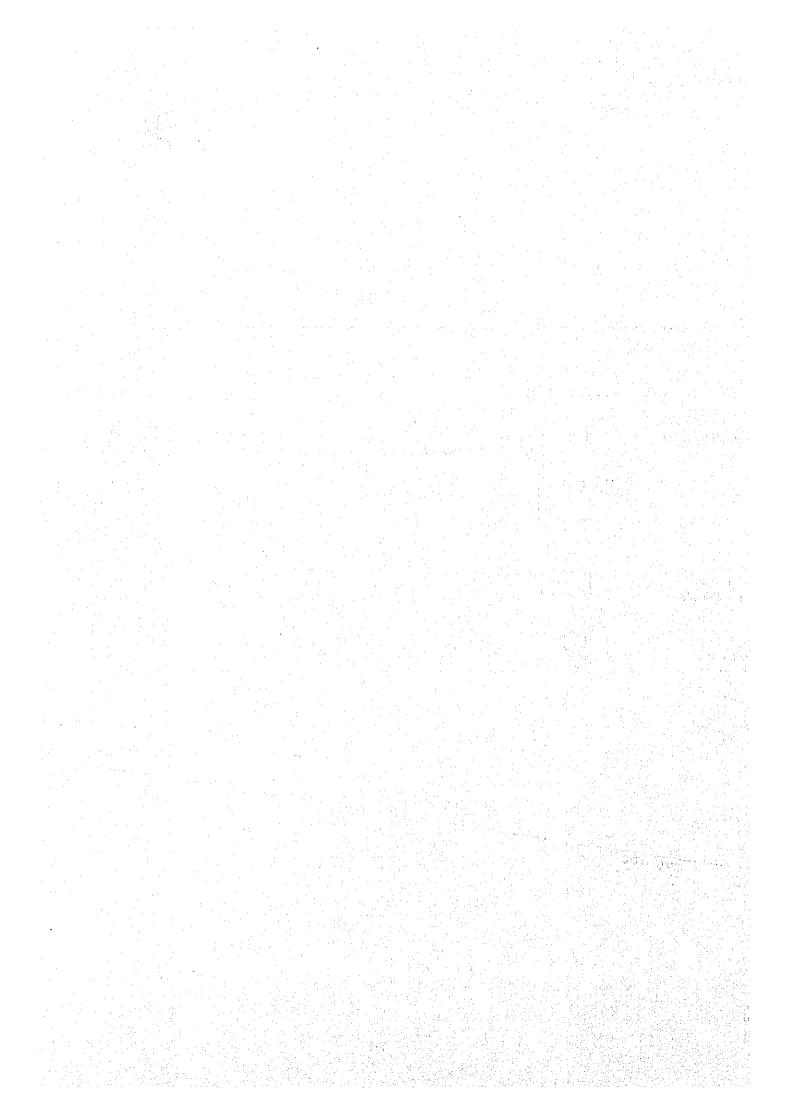


Figure 3-15 Site Layout of Earth Station



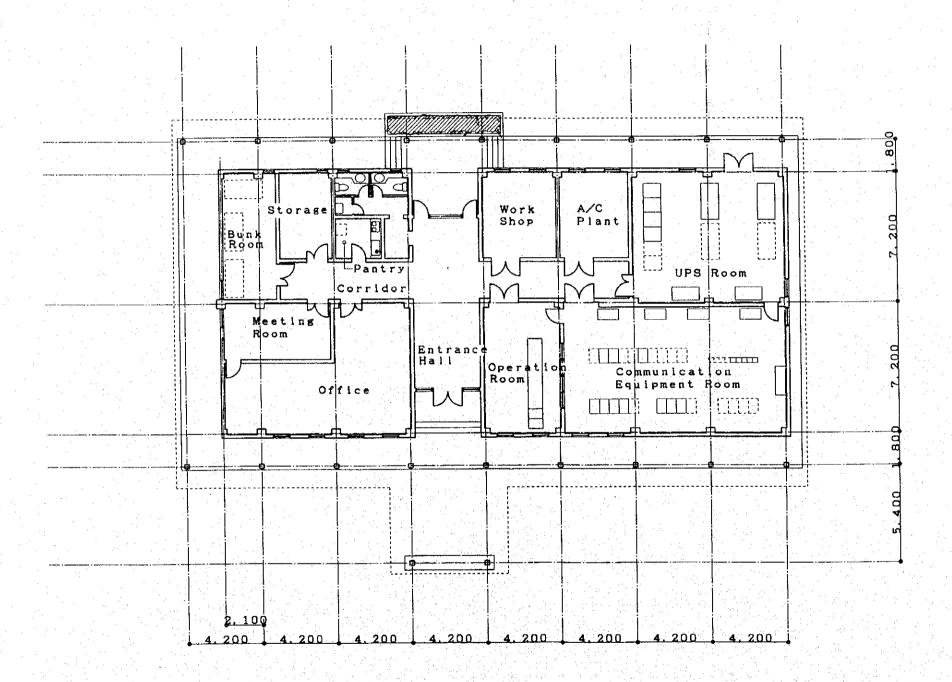
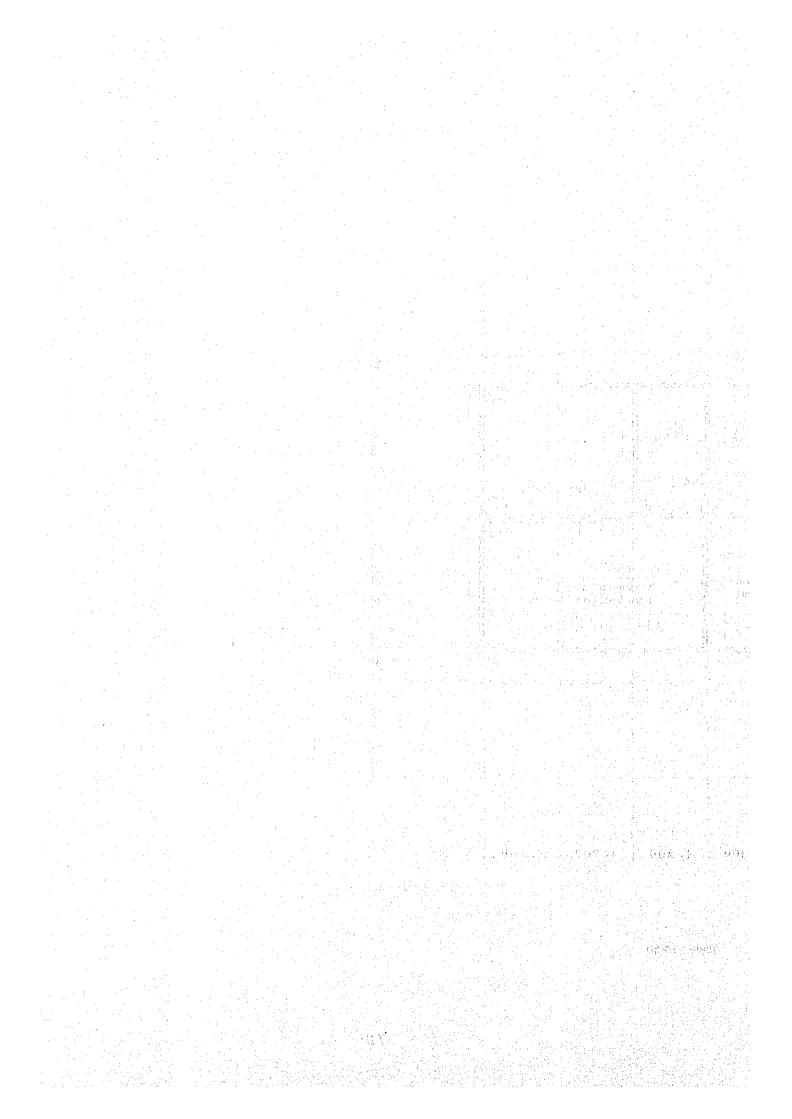
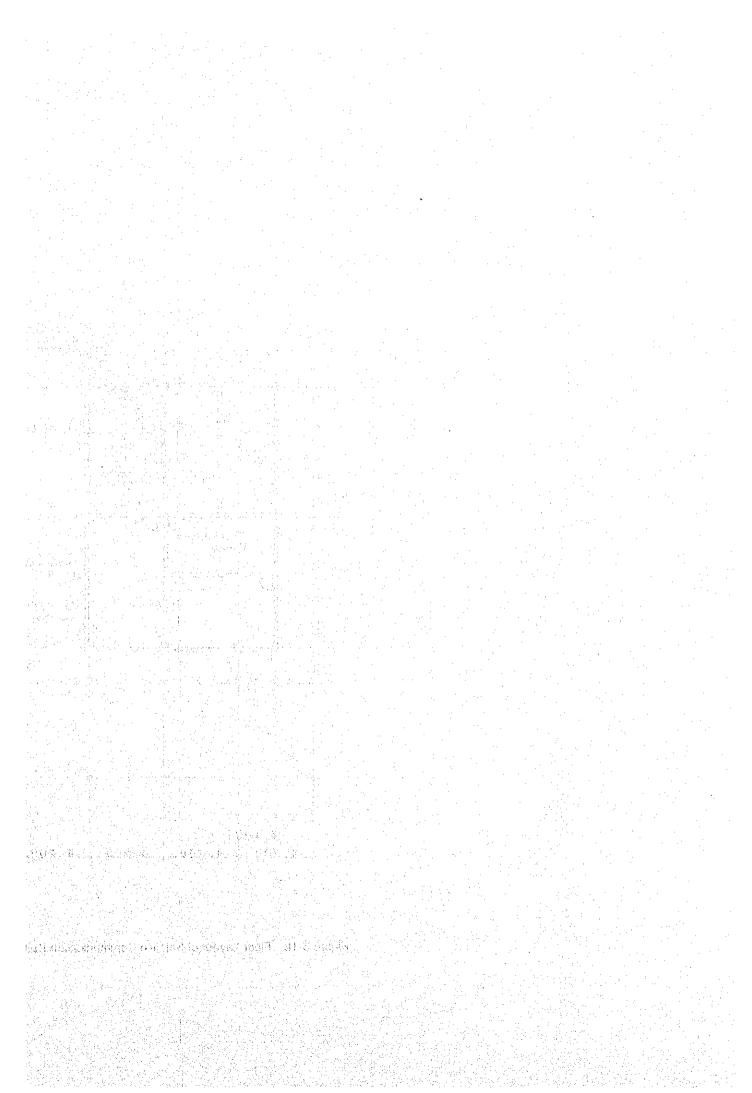
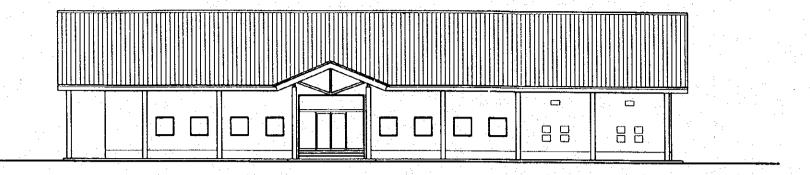


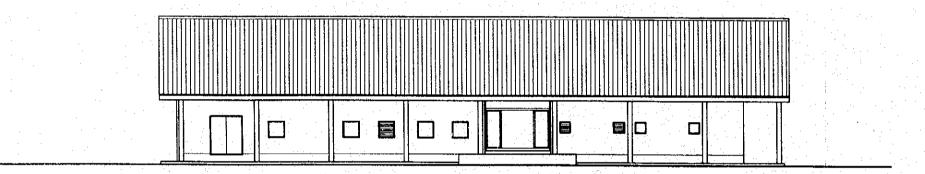
Figure 3-16 Floor Layout of Satellite Communication Building scale: 1/200



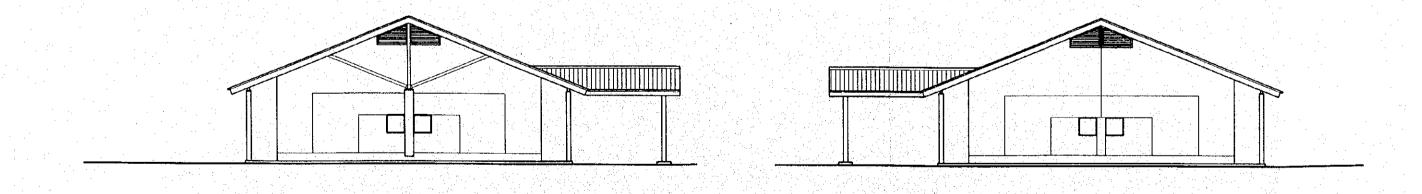




South Elevation



North Elevation

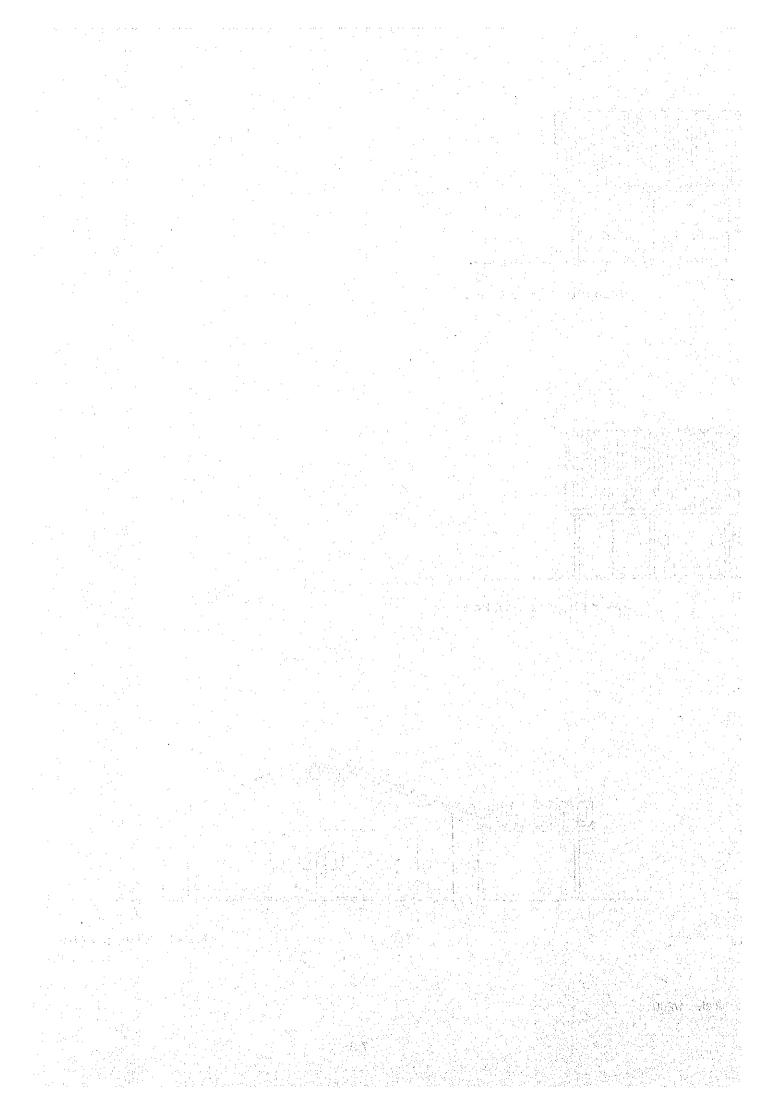


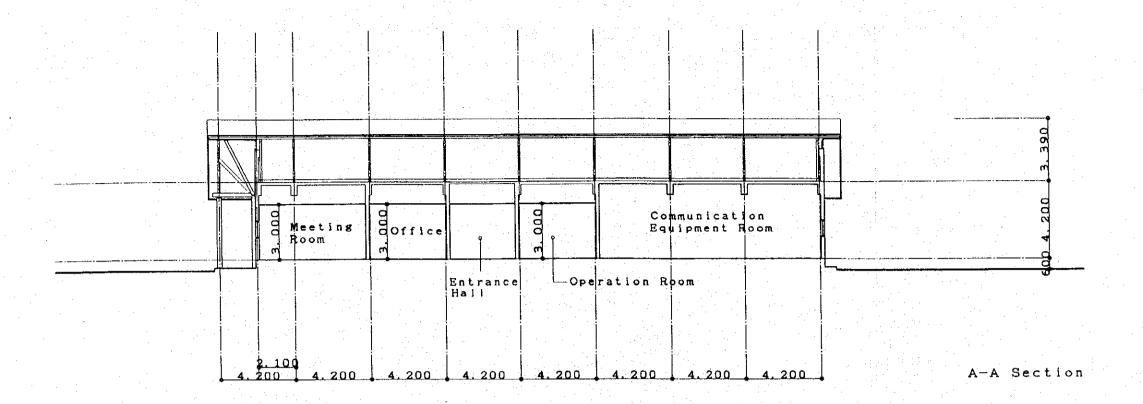
West Elevation

Figure 3-17 Elevation Plan of Satellite Communication Building

scale: 1/200

East Elevation





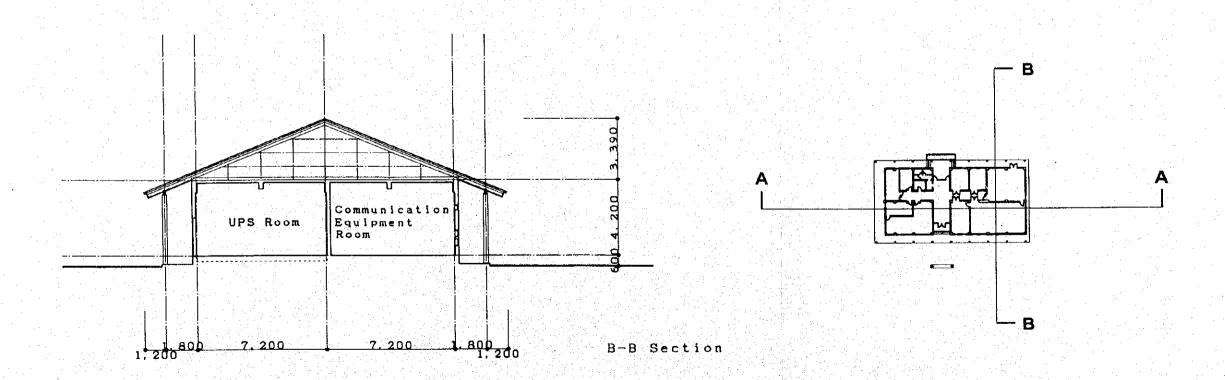
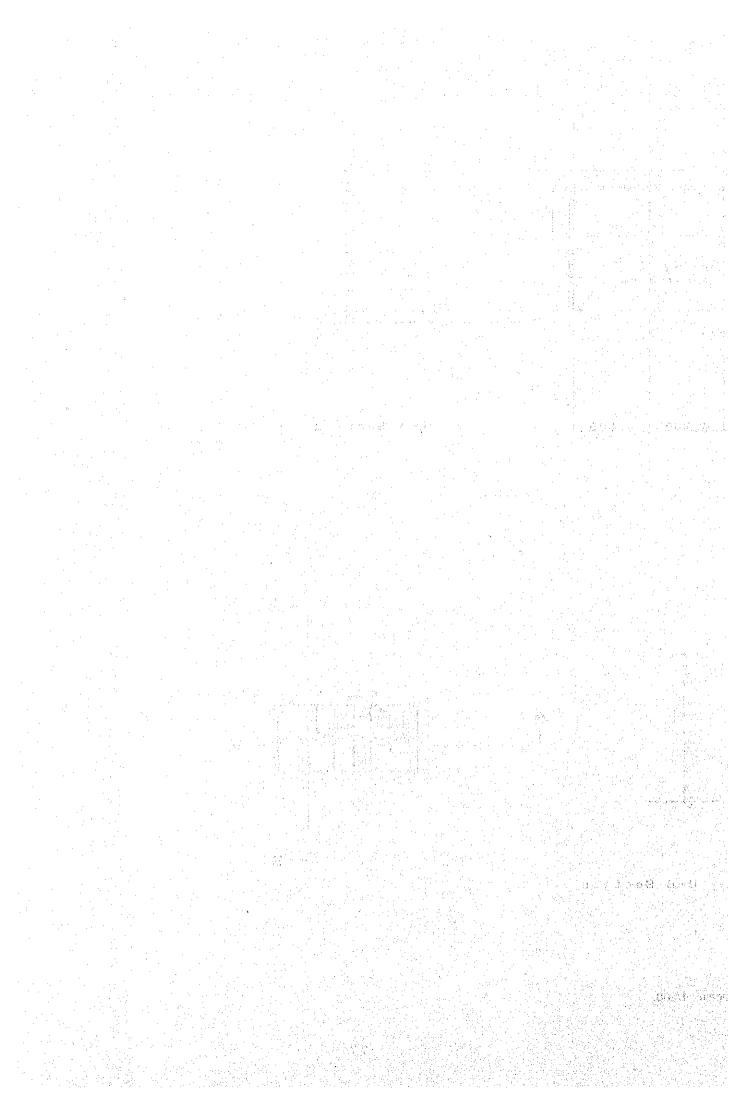
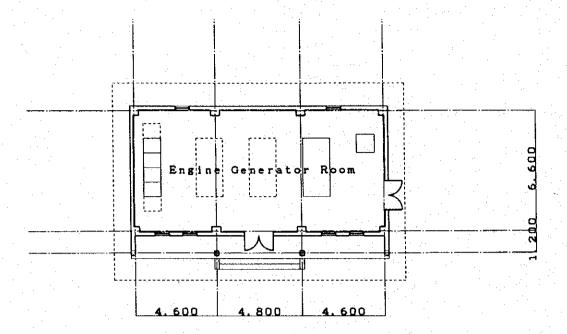


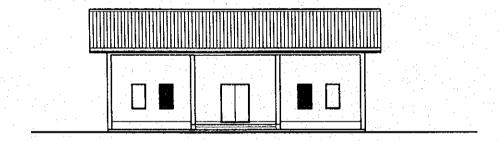
Figure 3-18 Section Plan of Satellite Communication Building



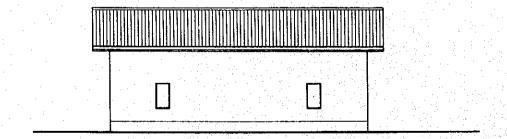
andstromakusinenni kitakasatan pat lasbaat 1900 sase 4.



Ground Floor Plan

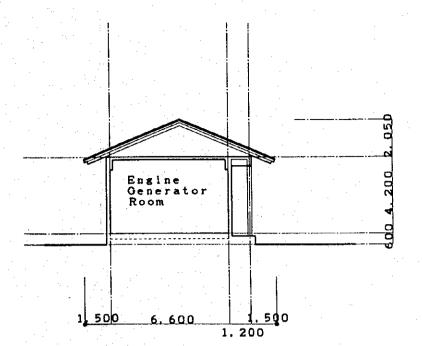


West Elevation

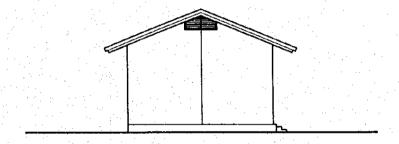


East Elevation

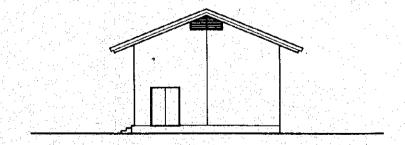
Figure 3-19 Engine Generator House at Earth Station



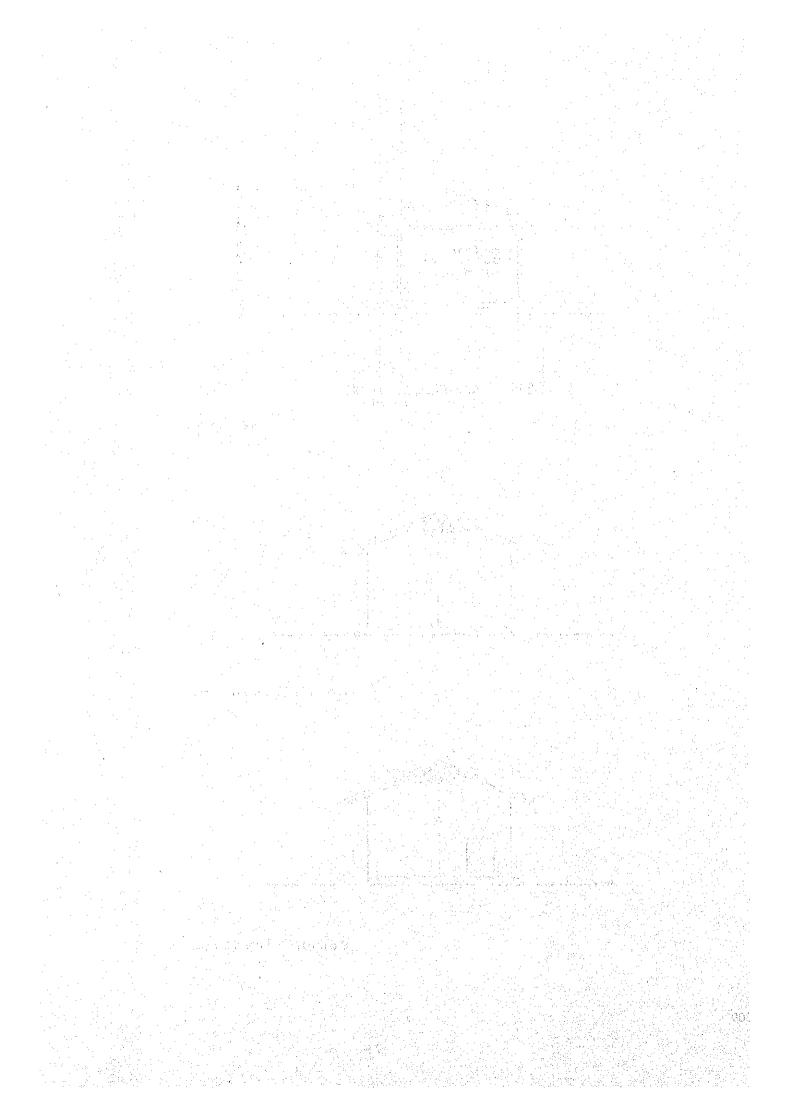
Section



North Elevation



South Elevation



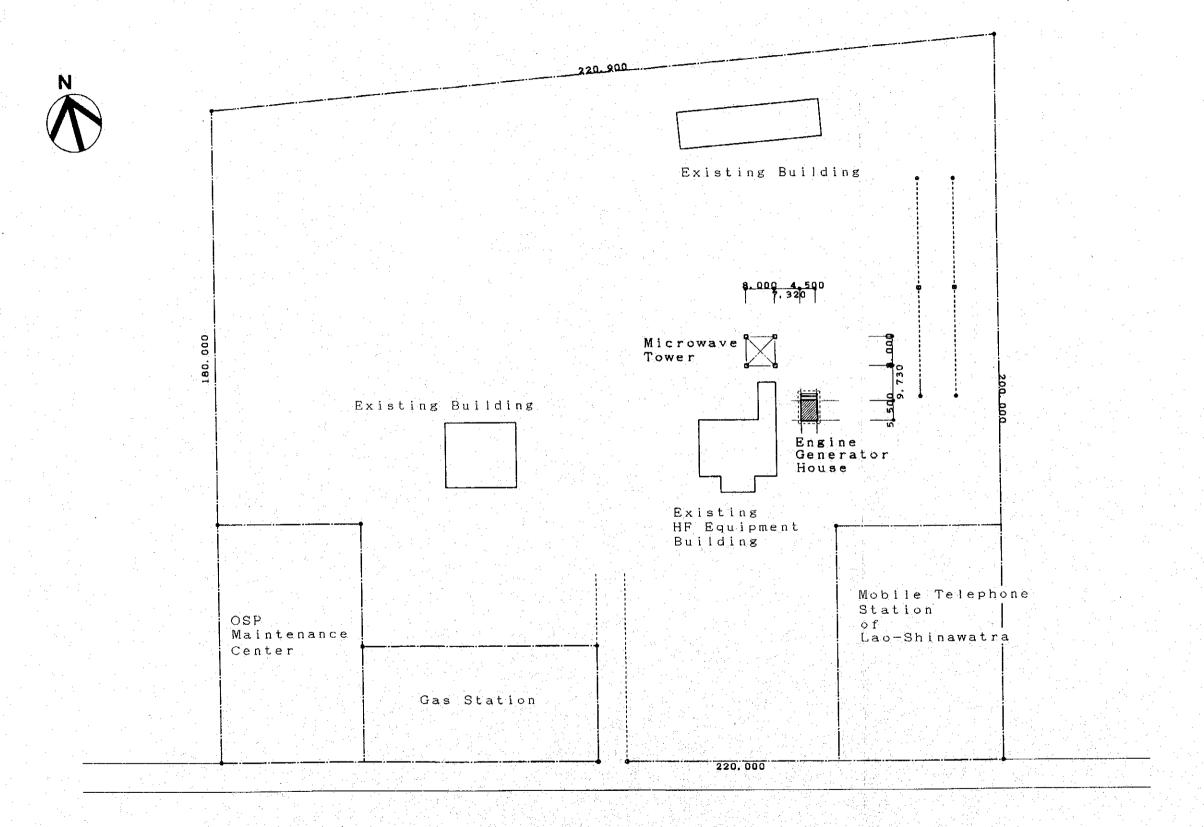
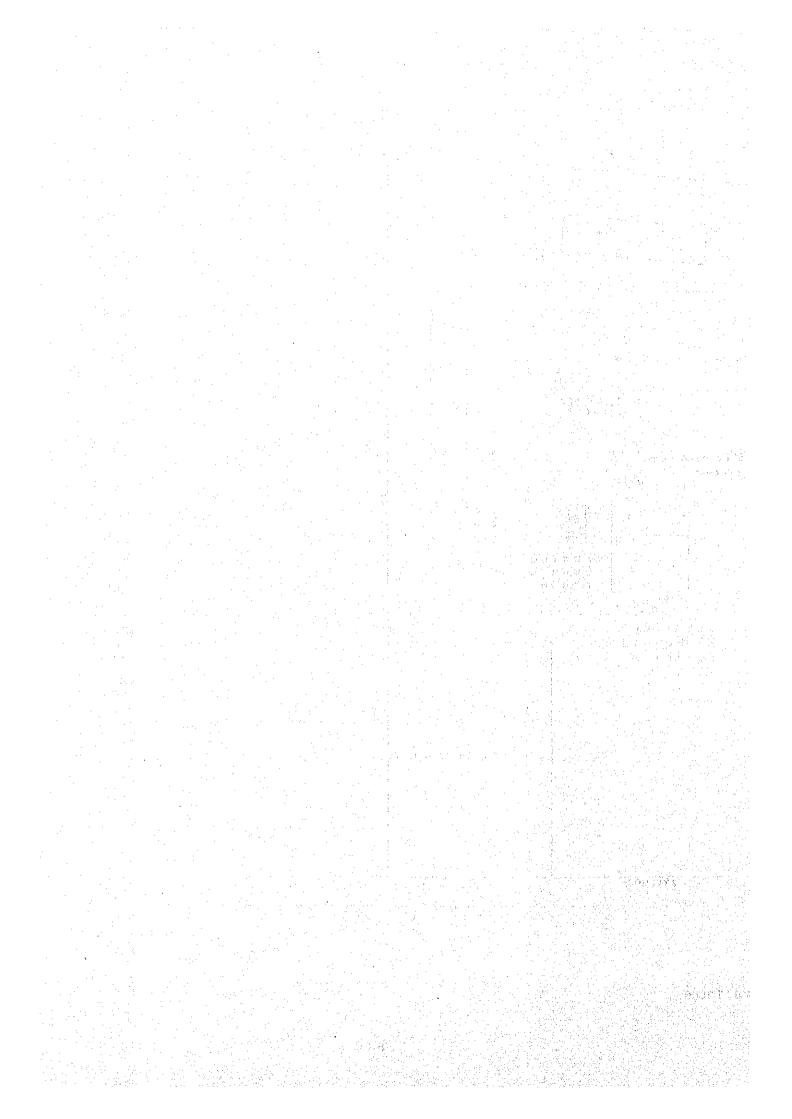
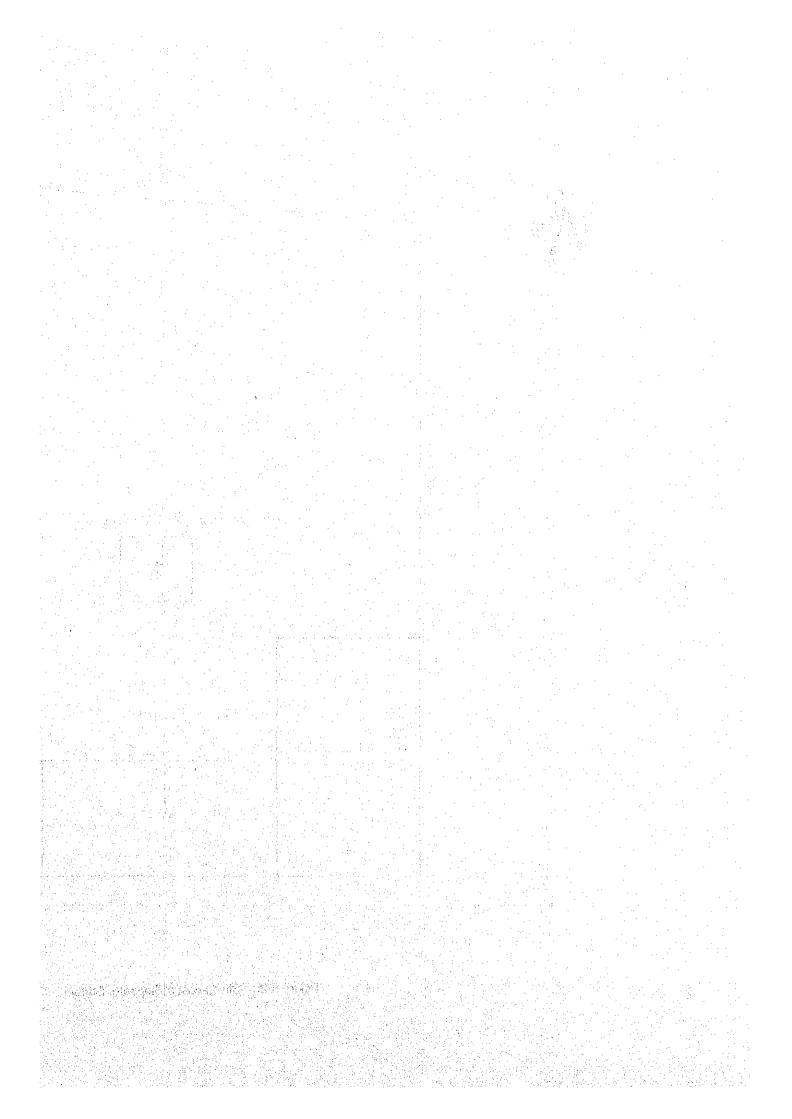
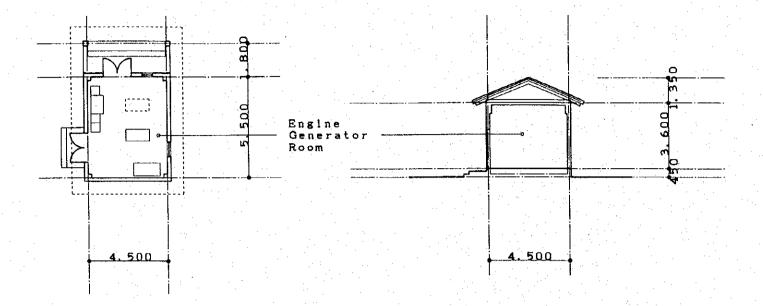


Figure 3-20 Site Layout of Repeater Station

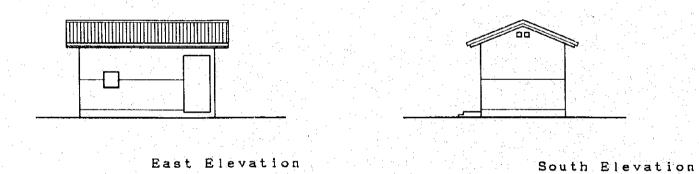




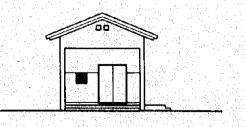


Ground Foor Plan

Section



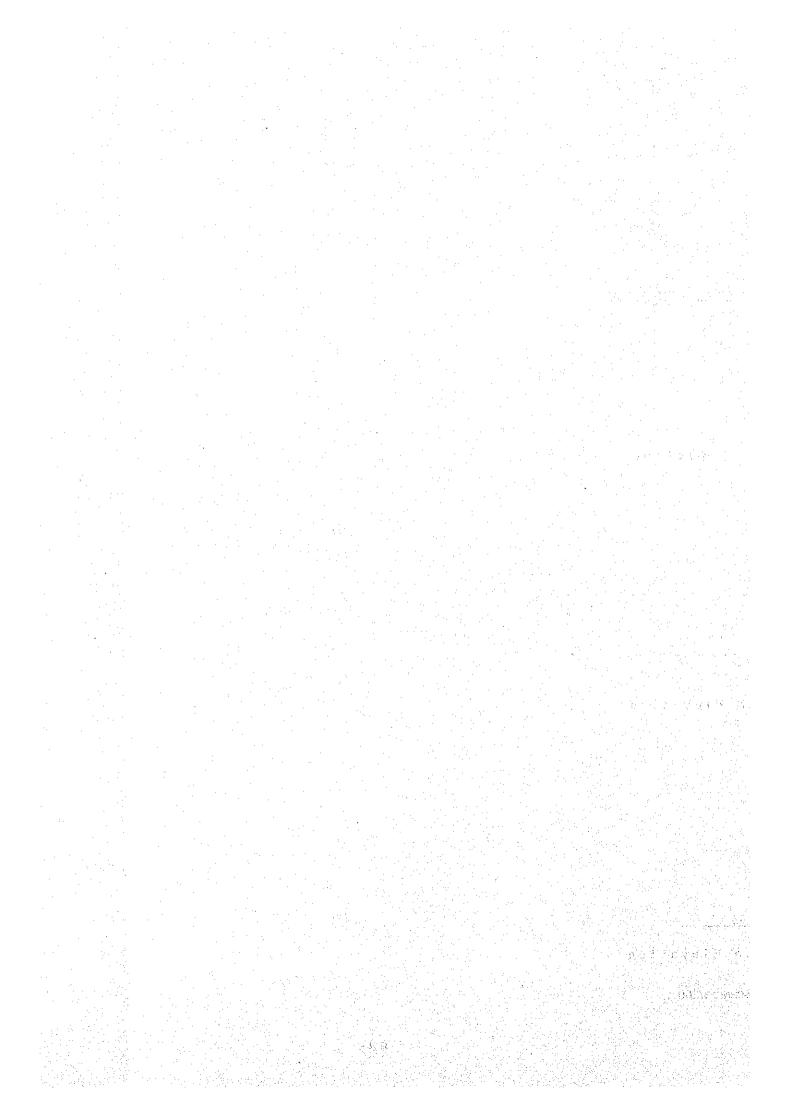
West Elevation



North Elevation

Figure 3-21 Engine Generator House at Repeater Station

scale : 1/200





en en la companya de la grafa de la Magra mode de la partenar y de la lagra de la 1980, de la migra de la 1980, de la	d ee
그는 이 1일 시간 생님은 사람들은 아이들은 아이들은 나는 아이들은 그를 가장 살아 있다.	
그는 그들의 일반인 그는 마른테는 그 인터 인터 그리고 하다 경우를 했다고 있다면 되었다면 없었다.	
	: 1344. ·
보인하는 사이 가족에게 하는데 네트리스 모든 물론에 하는 사람들에게 다시하는데 나를 했다.	
	14.1
그 한국은 교통하는 이 목으로 한 사람들은 그 작은 일 대학 역을 일을 갖고 있는 원인의 일본 사람이다.	
에 가는 생생님의 그는 사람들이 되었다. 그런 사람들이 되었다는 것이 되었다는 그리는 사람들이 되었다는 것이 되었다. 그런 사람들이 되었다는 것이다. 그는 사람들이 그렇게 하는 것이 되었다는 사람들이 되었다. 그는 사람들이 되었다는 것이 되었다는 것이 되었다.	
보는 이번에 되었다. 일반이었다. 전반 방법 시작에 다른 사고 있는 하지 않을 때문에 하루 했다.	
그런 역사들은 살아진다. 어느로 사고 있는 사고 있는 사람들은 살맞으면 하고 있었는 살아 들었다.	
그리는 그는 사람들은 이름을 살아 되는 이 없는 이들의 일반을 받는 말을 모양하는 것이 살았다.	
그는 그 이 집에 가장 얼마나 되었다면 그렇게 되었다면 하는 사이를 받는 사람들 때문을 받는 것을	
보다는 보면 있는 모든 마음은 남자를 마음하는 이 모든 사람들이 모든 것은 것이다.	
이 문이 되는 일이 되었다면 하고 하나를 모르고 있는 이 말을 다는 그는 것을 만나를 하다고 하는데 모르고 있다.	e de la compania de La compania de la co
이 돈으로 있다면서 안내가 이용하셨다. 그러워 되었다고 하고만 말로 가고 있다면 하는데 다른데 된	
이는 그는 그는 사람들이 모르는데 되는데 되었다면서 아무리에 다른 이렇게 하는데 흔들었다면데?	
되는 그리고 보고 그리고 말하는 것이 그렇게 되었는데 전통하는 것이 되었다면 하는데 보다 모양했다.	
하는 사람들이 되는 그는 사람이 그 사람들은 경찰에 가지 않아 되어 못하고 있는데 되었다. 이 얼굴을 다 된	
마이트 보고 있는데 그런 그런 그런 사람들이 되었다. 그런 그런 그런 그런 그런 사람들은 그는 그것 같은 그런 것이 되었습니다. 이렇게 되었다. 전략한 모든 것 	
그 만든 이 사람들이 하는 사람들은 사람들의 사람들이 되었다. 그리고 살아들고 살아갔다. 나는 사람들이 없다.	
사는 사용하는 사용하는 사람들이 되고 하는 것이 되었다. 그는 사람들이 되고 있는 사람들이 되었다. 그는 사람들이 바로 하는 것을 받는 것을 하는 것을 하는 것을 하는 것을 하는 것을 하는 것을 하는 	
는 사람들이 되어 되었다. 그러스 한테스 시간에 하는 사람이 가지 않는 사람들이 모르는 사람들이 모르는 것이다. 그는 사람들이 되었다. 사람들이 되었다. 그는 사람들이 보는 사람들이 되었다. 그런 사람들이 가장 하는 사람들이 되었다. 그는 사람들이 되었다면서 기관을 가장 하는 것이다.	
보는 보고 있는 것이 많은 사람들이 되고 한 것이 되는 사람들이 되는 것이 되는 것이 되는 것이 되었다. 그런	
그리고 있는 것이 되었다. 그런 그는 것이 되었다. 그는 것이 하지만 하지만 하지만 하는 것을 하는 것을 하는 것이 되었다. 그런 것은 것은 것을 하는 것을 하는 것이 되었다. 	
는 사람들이 보고 있는 것들이 되었다. 그런 사람들이 되는 것이 되었다는 것이 되었다. 그런 사람들이 되는 것을 모르는 것이 되었다. 그런 것이 되었다. 	
그는 사람이 있다. 사람이 들어 있는 것이 되었다. 그는 이 기를 다른 사람이 하는 것을 하는 것이 되었다. 사람이 되었다. 이 기를 다 하는 것이 되었다. 	
가는 사람들이 되었다. 그는 사람들이 사용하는 사람들이 되었다. 그는 사람들이 사람들이 되었다. 그는 사람들이 되었다면 보다는 것이다. 그는 사람들이 되었다면 보다면 보다면 보다면 보다는 것이다. 그는 사람들이 되었다면 보다면 보다면 보다면 보다면 보다면 보다면 보다면 보다면 보다면 보	
는 사람들이 되는 것들이 되는 것이 되었다. 사람들이 되었다. 그 사람들이 되었다. 그런 사람들이 가장 하는 것을 받았다. 그런 사람들이 되었다. 	
가는 물로 하는 것이 되었다. 그런 그는 사람들은 보고 있는 것들이 되었다면 보고 있습니다. 전략에 가능하게 되었다면 보고 있는 것을 하는 것을 가능한다면 함께 되었다. 	104일 : 10일 1일 (11일)

3-4 Implementation Plan

3-4-1 Conditions of Construction

(1) Phasing of Work

As mentioned above, the operation of the existing switching systems international functions, are irregular, causing delays monthly. The switching system should be improved as soon as possible.

On the other hand, work on the earth station and the approach link will take a long time. The commencement of these works should be timed with due consideration of the characteristics of the Japan's grant aid system.

Therefore, work on the project should be divided into two phases. In the first phase, the enhancement of the existing switching system will be implemented and in the second phase, construction of buildings, satellite communication facilities, and approach link facilities will be implemented.

(2) Consultant

After the signing of the Note of Exchange between the governments of the Lao PDR and Japan, EPTL should contract with a Japanese consulting firm in order to make a detailed design, prepare the tender document, and administer construction work. The contract should be concluded shortly after the signing of the Note of Exchange in order to shorten the total work time.

Services of the consultant are as follows:

- 1) Drafting specifications and tender document
- 2) Assisting evaluation of bids and negotiation with a contractor

grang tree, galanda gagaga hii gagata at galaga kat tak talihiiti kata

- 3) Witnessing factory tests
- 4) Supervising work
- 5) Assisting tests

3-4-2 Method of Implementation

Implementation of this project requires advanced technology. To ensure execution of the work within a limited period, and because construction requires close cooperation between

manufacturers of communication equipment, building constructors, and the consultant. Therefore, construction should be by Japanese contractors on a full turn-key basis.

3-4-3 Construction and Supervision

The executing agency of the project is EPTL. EPTL should set up a project team to do procurement, construction, testing, and operation.

This project is to proceed as follows:

(1) Signing of Note of Exchange and the state of the stat

Note of Exchange for grant aid for this project signed by and between the Government of the Lao PDR and the Government of Japan.

at authorite de le communication de la communi

la comi e in especial de la comi par en la

n a Data kalendari ngangga sa Malangaran anda da

(2) Banking Arrangement

The Government of the Lao PDR appoints a Japanese bank to disburse grant aid, from among Japanese banks officially approved by the Japanese Government.

(3) Contract With Consultant

EPTL contracts with a Japanese consultant to assist EPTL in designing and supervising the work of this project. The contract becomes effective subject to the approval of the Japanese Government.

(4) Field Survey and Preparation of Tender Documents

The consultant contracted with EPTL carries out the field survey at the sites. Detailed design is made up based on the field survey findings, and then the tender documents are prepared. The tender documents are finalized subject to the approval of EPTL.

(5) Tender Evaluation and Conclusion of Contract

The consultant assists with bidding and evaluates the proposals using a method approved in advance by EPTL.

EPTL begins to negotiate with the top bidder. The consultant drafts a contract and assists EPTL in contracting with suppliers. The contract becomes effective subject to the approval of

the Japanese Government.

(6) Approval of Installation Drawings

On behalf of the Government of the Lao PDR, the consultant examines the installation drawings submitted by the contractor, to finalize the Bill of Quantity, and reports to EPTL.

(7) Witnessing Factory Inspection

Prior to shipping, the consultant inspects the equipment and materials to confirm their compliance with the contracted specifications, particularly with respect to the mechanical and electrical characteristics.

(8) Installation Work Supervision

The consultant checks the work schedule submitted by the contractor, and gives instructions, where necessary. The consultant visits the sites periodically and supervises work and progress.

(9) Delivery of Completed System

The consultant witnesses tests of the equipment, and examines documents. After confirming that spares/accessories, measuring equipment, operation manuals, etc., supplied by the contractor are as specified, the consultant recommends that EPTL accept the project.

3-4-4 Procurement Plan

The equipment and materials for this project should be procured economically as long as quality is maintained.

Guidelines for the procurement of each component are as follows:

12、10年1月2日東京中央市場

(1) Satellite Communication System and Approach Link System

galegie, a come Milloyd, de pad i Mad Pad I

The equipment for this project introduces advanced technology and is produced in industrialized countries including Japan. Among such countries, Japan's is of superior long term quality and reliability.

Considering achievements, reliability, after-care and price of products, it is recommended that at least principal communication equipment be Japanese.

However, for products not requiring high technology, such as power supply and iron tower, products from another country should be purchased, if they comply with specifications and are economical.

(2) Switching and Billing Systems

Switching systems are designed and manufactured based on each manufacturer's own philosophy making it impossible for another manufacturer to modify another's equipment.

The equipment and materials for expansion of trunks and of functions of the existing switching system can be procured solely from the original manufacturer of the switching system, for technical and economical reasons. It costs too much for a manufacturer to supply equipment not its own. As patents and manufacturing are known exclusively by the original manufacturer, the original equipment should be purchased, by paying for manufacturing technical information.

In this case, manufacturing is extremely expensive compared to buying directly from the original manufacturer.

Consequently, equipment and materials for the switching system and billing system should be procured under a private contract with the supplier of the existing system.

(3) Equipment and Materials for Building

Construction materials locally produced in Laos are primary commodities such as concrete aggregate, bricks, blocks, and timber. Laos, therefore, almost completely depends on imports from other countries for other materials such as cement, reinforcing steel, finishing materials, and equipment-related materials. The country Laos most heavily depends on for such imports is Thailand, followed by Vietnam and China. Imports from Thailand are diverse and of high quality, and their supply is dependable. In this project, therefore, construction materials will be mostly procured domestically or imported from Thailand in order to ensure ease of maintenance. Only those materials that are difficult to obtain from Thailand will be supplied from Japan.

3-4-5 Implementation Schedule

The implementation schedule for the project is shown in Table 3-12.

รูบภริสท์ (ว่าน้ำสะเสียกที่เกียวที่เคียงที่เลี้ยวที่ผลกระวาที่ กับแล้วที่เกมี่ยวใหม่ เรื่

3-4-6 Scope of Work

The scope of work for each party, i.e., Japan and the Lao PDR, is as follows:

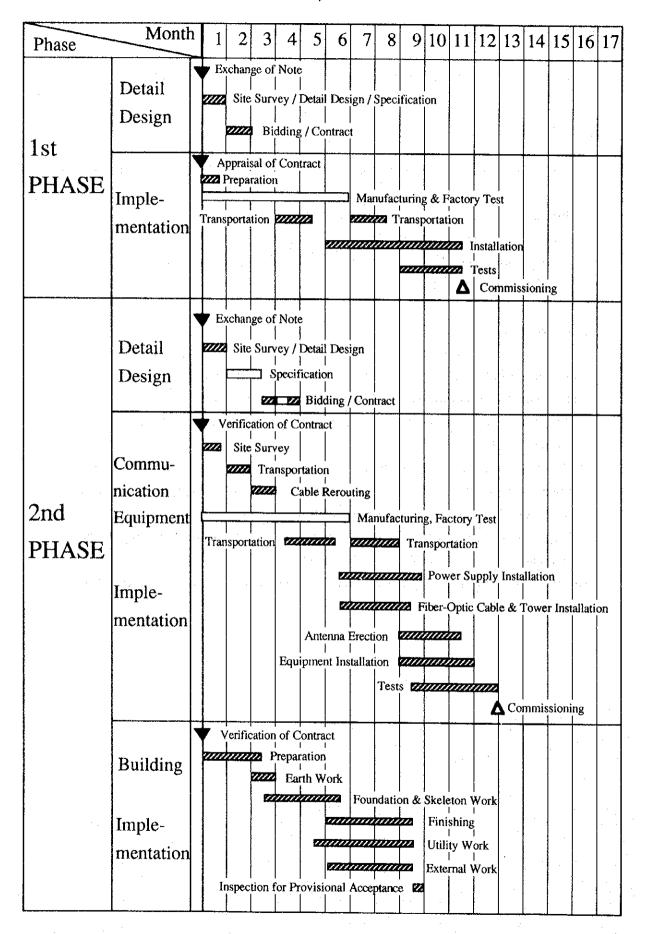
(1) Japan

- 1) Provision of equipment and materials for enhancement of telephone switching and charging systems
- 2) Provision of equipment and materials for the earth station
- 3) Provision of equipment and materials for the approach link
- 4) Construction of buildings at the earth station and the repeater station
- 5) Provision of spare parts

(2) The Lao PDR

- 1) Removal of obstacles in the sites of the earth station and the repeater station
- 2) Leveling the sites of the earth station and the repeater station
- 3) Incidental outdoor work such as gardening, fencing, gate, and exterior lighting in and around the site
- 4) Providing facilities for distribution of electricity (including a transformer for primary power), water supply (including provision of a well water feed pipe to the receiving tank), telephone, drainage, sewage and other incidental facilities
- 5) Taking necessary measures for radio coordination procedures in Radio Regulations and for an application for use of INTELSAT space segment
- 6) Negotiating with foreign telecommunications administrations for establishment of international lines

Table 3-12 Implementation Schedule



CHAPTER 4 EVALUATION AND CONCLUSION

			eggeneral services	
alian d u				
a de la companya de La companya de la co	and the second s			
			and the second s	
		2/3/24/10/25 2/2/3/24/10/25/24/26/26/26/26/26/26/26/26/26/26/26/26/26/		and the second

Chapter 4 Evaluation and Conclusion

4-1 Beneficial Effects

The expected beneficial effects for the Lao PDR and the Laotian people, direct and indirect, are as follows:

4-1-1 Direct Effects

(1) Meeting the Demand for International Telecommunications

The demand for international telecommunications in the Lao PDR has been growing at a very high rate due to the revitalization of the economy under the new economic mechanism. This project, which strengthens the capability of international telecommunications, will contribute greatly to meeting the demand of the citizens and enterprises of the nation.

(2) Reduction of Transit Charges

By establishing a direct line, transit charges will be reduced, EPTL can reduce its costs, and Laos can minimize payments to other countries. In the year 2001, such savings should amount to over 1,000 million Kips (1.4 million dollars or 140 million yen).

(3) Reduction of Satellite Charge

By introducing a Standard-A earth station, the space segment charges per line will be less expensive than with the existing Standard F-3 earth station, reducing the payment to INTELSAT. The total sum saved for all lines in the year 2001 will be 240 million Kips (330 thousand dollars or 33 million yen).

(4) Stabilization of Finances

Improving international telecommunications, which account for more than 60 percent of all telecommunication business sales. Secure sales will contribute to stabilizing finances of EPTL and, consequently, sound finances for the Laotian Government.

(5) Improving Quality of International Telephone Calls

By using newly established direct routes and sufficient number of international lines, quality of international telephone call will be much improved for both national and foreign users. This will increase demand for international calls and consequently increase sales.

4-1-2 Indirect Effects

(1) Revitalization of the Economy

Business enterprises, when investing in a country, generally regard the international telecommunication infrastructure of as extremely important. Therefore, the improvement of international telecommunications in this project will result in increased foreign investment and the revitalization of the whole national economy.

(2) Contribution to the Development of Domestic Telecommunications Networks

By appropriating a part of the revenue from international telecommunications, it will be possible to accelerate the development of domestic telecommunications networks which are now very poor. It is expected that the revenue can partially finance Telecom III (a rural telecommunications project under consideration).

4-2 Recommendations

The use of grant aid to implement this project is therefore plausible, as it is expected to produce the considerable effects mentioned above. Furthermore, the recipient country is able to offer the necessary personnel and money for this project.

However, if the following items are improved and upgraded, this project can be implemented more effectively.

(1) The Reinforcement of the Organizations

The earth station for the project is only hardware and cannot achieve its objectives unless it is operated properly. Therefore planning international networks is of urgent necessity. In addition, there will be more external contacts in accordance with the increase of direct lines. Accordingly, a new department needs to be established to plan international telecommunications networks and negotiate with foreign entities such as INTELSAT and telecommunications carriers.

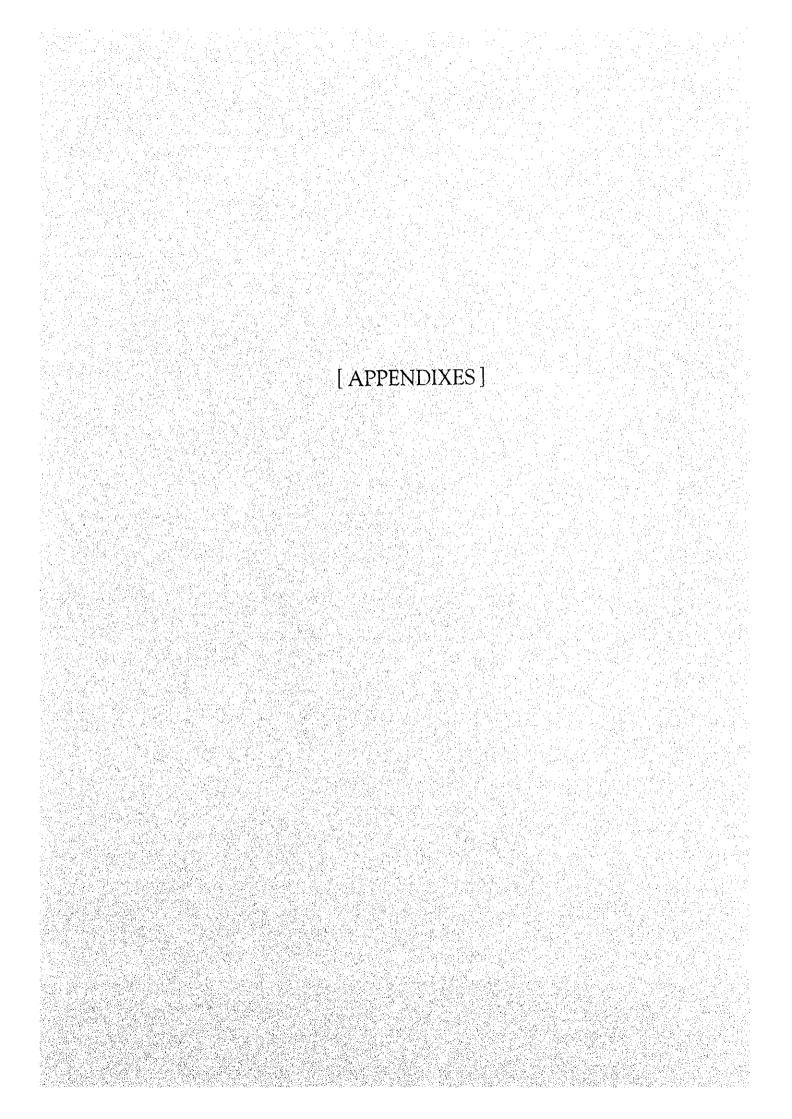
(2) Development of Human Resources

For securing skilled human resources and continuous recruitment of the staff, it is recommended that the Posts and Telecommunications Training Center be taken advantage of and national educational institutions be used.

(3) Marketing Activities

To fuel demand for international telecommunications and to secure EPTL business income, it is of vital importance that EPTL put more stress on formerly neglected marketing activities.





eren er			

Member List of Survey Team

1. Field Survey Team

Yusuke KITAMURA Leader,

Project Coordinator

Director, Training Div., Tsukuba International Center

Japan International Cooperation Agency

Toshio TAKAHASHI International Communication Planner

International Cooperation Div.,
International Affairs Department

Ministry of Posts and Telecommunications

Toru KIZUKA Chief Consultant,

Satellite Communication System Planner KDD Engineering and Consulting, Inc.

Takahiko ADACHI Switching System Planner

The Nippon Telecommunications Consulting Co., Ltd.

Ryusuke TAKEHIRA Radio Transmission System Planner

KDD Engineering and Consulting, Inc.

Masaaki RYOKE Architecture Planner

KDD Engineering and Consulting, Inc.

2. Draft Final Report Explanation and Consultation Team

Yusuke KITAMURA Leader,

Project Coordinator

Director, Training Div., Tsukuba International Center

Japan International Cooperation Agency

Atsushi OZU International Communication Planner

International Cooperation Div.,
International Affairs Department

Ministry of Posts and Telecommunications

Toru KIZUKA Chief Consultant,

Satellite Communication System Planner KDD Engineering and Consulting, Inc.

Takahiko ADACHI Switching System Planner

The Nippon Telecommunications Consulting Co., Ltd.

Masaaki RYOKE Architecture Planner

KDD Engineering and Consulting, Inc.

Survey Schedule

1. Field Survey

1994

- Oct. 13 Thu Arrival in Vientiane
 - 14 Fri Courtesy call to MCTPC, EPTL, M. of Foreign Affairs
 - 15 Sat Courtesy call to Minister of MCTPC, Field survey
 - 16 Sun Internal meeting
 - 17 Mon Discussion on the project, Field survey
 - 18 Tue Discussion on the project, Field survey
 - 19 Wed Signing on Minutes of Discussions
 - 20 Thu Field survey, Technical discussion
 - 21 Fri Field survey
 - 22 Sat Field survey
 - 23 Sun Internal meeting
 - 24 Mon Field survey, Technical discussion
 - 25 Tue Field survey, Technical discussion
 - 26 Wed Field survey, Technical discussion
 - 27 Thu Field survey, Technical discussion
 - 28 Fri Field survey, Technical discussion
 - 29 Sat Field survey, Technical discussion
 - 30 Sun Field survey, Technical discussion
 - 31 Mon Field survey, Technical discussion
- Nov. 1 Tue Field survey, Technical discussion
 - 2 Wed Confirmation of discussion
 - 3 Thu Additional survey
 - 4 Fri Leave Vientiane

2. Explanation of Draft Final Report

1995

- Jan. 6 Fri Arrival in Vientiane
 - 7 Sat Courtesy call to EPTL, Explanation of D/F Report
 - 8 Sun Internal meeting
 - 9 Mon Courtesy call to MCTPC, Meeting with CPC, Explanation of D/F Report
 - 10 Tue Discussion on D/F Report
 - 11 Wed Signing on Minutes of Discussions
 - 12 Thu Leave Vientiane