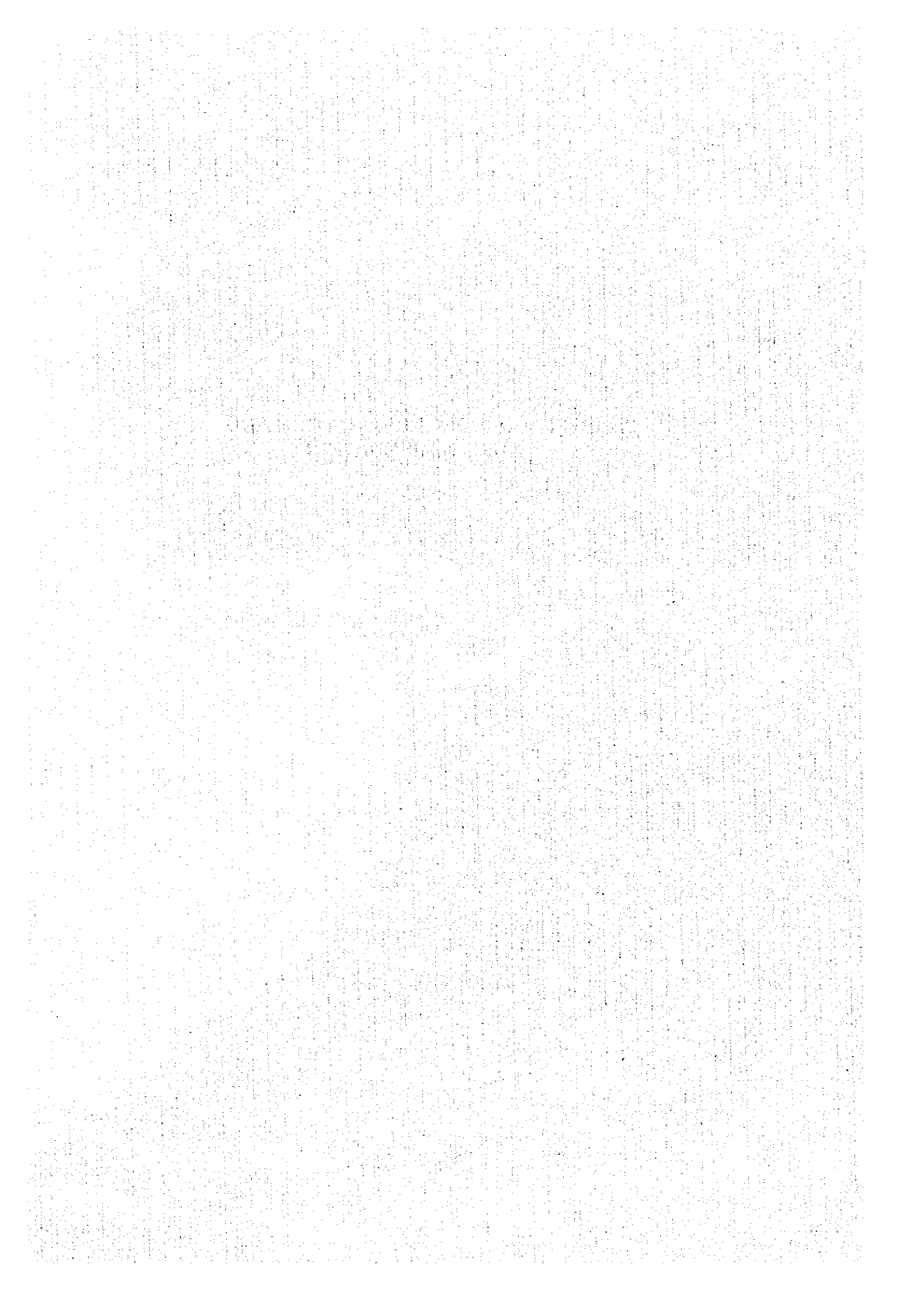


CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION



CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

The outside plant facilities to be provided by this project are easy to expand and maintain. ETA intends to absorb the new technologies, technical practices and project management knowhow through the implementation of this project, and utilise the obtained expertise for local production of necessary parts and materials, and further for improvement of telecommunications in the country.

In addition, the beneficiaries of this project are ordinary people of various kinds and no problem is foreseen in the operation and maintenance of facilities completed by this project. Hence, it can be said that this project is appropriate as a grant aid project.

Expected benefits of this project are:

- (1) The initial direct beneficiaries of this project are some of the subscribers of Arada Exchange, numbering approx. 6,400. After the expansion of switching facilities, the number of direct beneficiaries will increase to approx. 15,600 subscribers.

Facilities to be introduced are easy to expand. That is, the network can be expanded easily when occasion demands in the future. They are also easy to maintain, and line failures due to water penetration into cables during two rainy seasons can be eliminated, permitting ETA to reduce the number of maintenance staff.

- (2) Currently, the average number of faults per 100 subscribers in the objective area is approx. 11 per month, which is expected to be improved to 1~2 per month with the implementation of this project.
- (3) Outside plant facilities provided by this project will employ most advanced equipment, materials, and installation practices so that service quality

deterioration factors involved in the existing poor outside plant facilities can be eliminated. That is, the grade of services can be improved remarkably, and the requirements for advanced telecommunications services in the future can be sufficiently satisfied.

- (4) Subscribers in the objective area will no longer be deprived of good business opportunities on account of the poor telephone services which are now often interrupted for a long while. Thus the improved telephone services will significantly contribute to the promotion of economic and social activities in the area.
- (5) The objective area embraces a number of important subscribers, such as governmental agencies, hospitals, medical offices, schools, etc. The improved telecommunication services will contribute to speedy information transmission, and further to the enhancement of the quality of public services for the inhabitants of the area.
- (6) Traffic of transportation as the substitute for the communication means will be decreased.

4.2 Recommendation

As mentioned above, much can be expected from this project including the improvement of the social environment of the people residing in the project area. In order to implement this important project smoothly as scheduled, due attention must be paid to the following:

- (1) Adjustment of the Scope of Work of the Japanese and Ethiopian Sides

The part to be undertaken by the Ethiopian side covers the purchase and installation of MDF and blocks, the transfer of existing cables due to the road expansion plan of the municipality, the transfer of existing subscribers as a result of the replacement of the existing cables with new cables, the restoration of excavated paved roads, etc. Raise of necessary fund on the Ethiopian side for the above, the technical compatibility and the coordination of schedules between the works to be undertaken by both the sides are crucial factors for successful completion of the project. Hence, due attention should be paid to

the following:

- 1) As soon as possible after the signing of the Exchange of Notes by both the governments, ETA must take action for the budget for the work under its responsibility.
- 2) A detailed time schedule must be prepared for the whole project, prior to the start of the construction work, through discussions between ETA and the Consultant with respect to basic items and the expected schedules of individual items.
- 3) All the work under the responsibility of ETA must be completed one month prior to the commencement of the work to be undertaken by the Japanese side.

(2) Switching Facilities in Arada Exchange

As for switching facilities of Arada Exchange, the installation of Sidist Kilo Exchange (5,000 L.U.) and the expansion of the switching facilities in Arada Exchange will be insufficient to meet the urgent requirements. Additional expansion plans should be drawn up and implemented as soon as possible. In planning, a study should cover not only the demand forecast but also matters related to subscriber transfer, renewal of crossbar switching equipment and the re-organisation of floor space, etc. The outcome of a basic study of the future expansion plan based on the data obtained through the field survey is attached for reference.

(3) Faults Measurement and Management

EAT compiles a record of faults in outside plant facilities, with the data on the number of faults and the time required for service restoration analysed as instructed by JICA experts. However, the outcome of such efforts has not been reflected during actual operation and maintenance of the facilities due to lack of funds for rehabilitation.

Also with respect to switching facilities, traffic measurements are made but the results obtained are insufficient and they cannot be reflected in the facility expansion plan.

Portable type traffic measuring equipment capable of measuring the number of

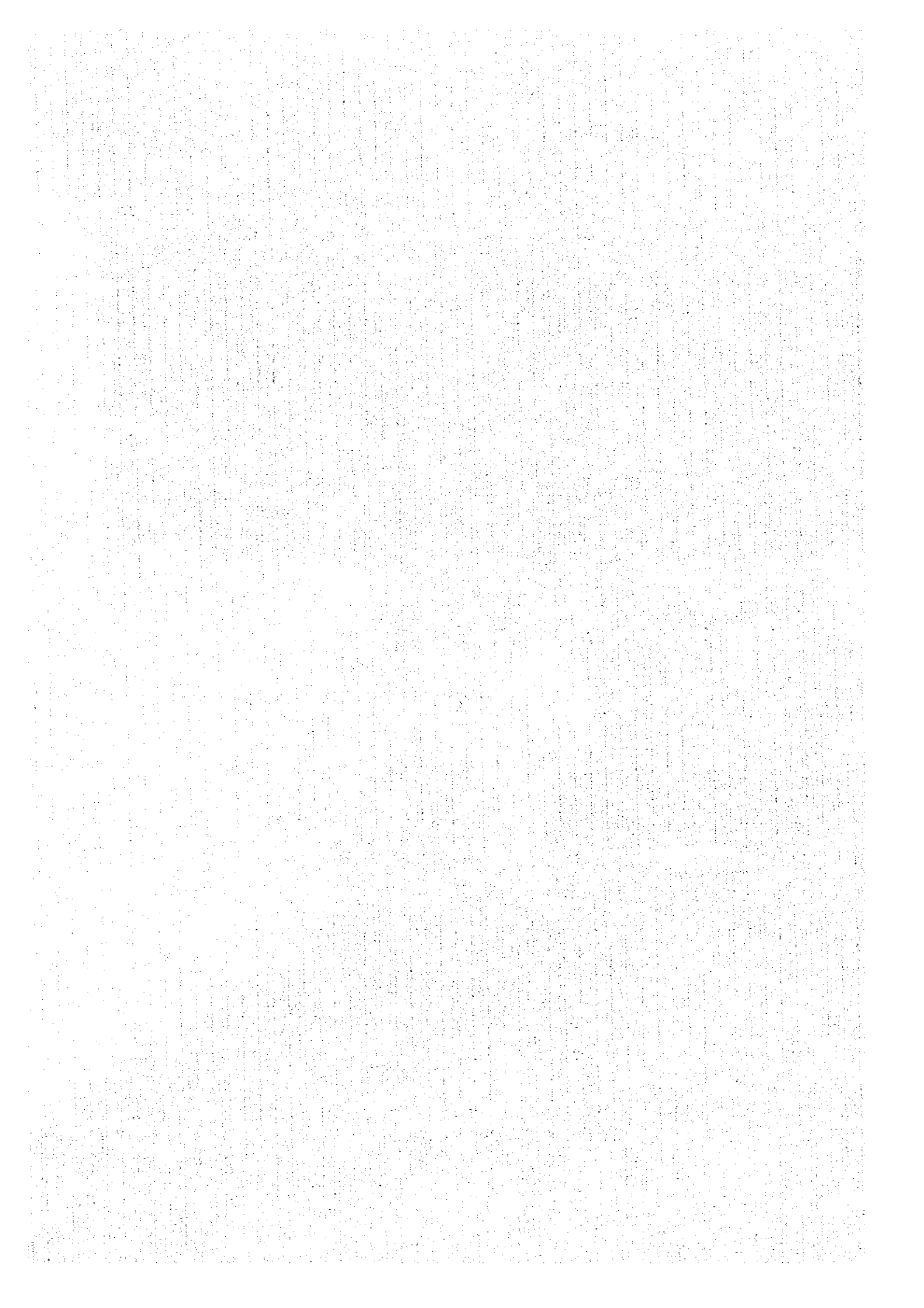
calls, holding time, traffic, the number of completed and incomplete calls, and also of summing up the obtained data by item. In addition, detailed data on each subscriber can be analysed and processed.

Furthermore, abnormal circuit condition, faulty switching equipment, etc. can be detected by this equipment because data on ineffective calls, such as no dialling and no dial tone, can be obtained. The use of this equipment is particularly effective for traffic engineering with respect to crossbar switching equipment which is scarcely provided with traffic measuring function or of which the measuring equipment is faulty.

Hence, the introduction of the portable type traffic measuring equipment is recommended, with a view to observing current fault and traffic conditions and evaluating performance improvements obtained in the outside plant facilities completed by this project as well as supporting the operation and maintenance work.

The introduction of the portable type measuring equipment will require examination of the performance of the existing switching systems of ETA. Training of maintenance staff in operation of this equipment should also be made to ensure its effective utilisation for traffic control and management. For this purpose, the technical cooperation by JICA including the short-term dispatch of JICA experts will be available.

APPENDICES



Appendix 1. Member List of the Survey Team

(1) Basic Design Study

| Name | Duty | Affiliated to |
|----------------------|--|--|
| Shigemaro AOKI | Team Leader | Development Specialist, Institute for International Cooperation, JICA |
| Takayuki HATAZOE | Technical Adviser | Assistant Director, International Cooperation Division, International Department, Ministry of Posts and Telecommunications |
| Takemichi KOBAYASHI | Project Coordinator | Follow-up Division, Grant Aid Project Management Department, JICA |
| Hideo MITSUHASHI | Chief Consultant | Nippon Telecommunications Consulting Co., Ltd. (NTC) |
| Takatoshi HAYASHI | Outside Plant Planner | NTC |
| Hiroshi ITO | Switching System Planner | NTC |
| Islamnurul HASHIMOTO | Civil Facilities Planner, Cost Estimator | NTC |

(2) Explanation of Draft Basic Design Study Report

| Name | Duty | Affiliated to |
|----------------------|--|---|
| Shigemaro AOKI | Team Leader | Development Specialist, Institute for International Cooperation, JICA |
| Yoshiyuki TAKANO | Technical Adviser | International Cooperation Division International Department, Ministry of Posts and Telecommunications |
| Toshiho RYO | Project Coordinator | Legal Affairs Division, General Affairs Department, JICA |
| Hideo MITSUHASHI | Chief Consultant | Nippon Telecommunications Consulting Co., Ltd. (NTC) |
| Islamnurul HASHIMOTO | Civil Facilities Planner, Cost Estimator | NTC |

Appendix 2 Survey Schedule

(1) Basic Design Schedule

| Date | | Contents of Activities |
|---------|--------|--|
| 1995 | | |
| 27 Nov. | (Mon.) | Departure from Tokyo and Arrival in Frankfurt. |
| 28 Nov. | (Tue.) | Departure from Frankfurt and Arrival in Addis Ababa. |
| 29 Nov. | (Wed.) | Meeting with JICA. Meeting with Japanese Embassy. Meeting with ETA. |
| 30 Nov. | (Thu.) | Meeting with MEDAC. Meeting with MTC. Explanation and Discussion of Inception Report in ETA. Site Survey. |
| 1 Dec. | (Fri.) | Site Survey. |
| 2 Dec. | (Sat.) | Site Survey. |
| 3 Dec. | (Sun.) | Site Survey. |
| 4 Dec. | (Mon.) | Discussion with ETA. Discussion with MEDAC. Site Survey. |
| 5 Dec. | (Tue.) | Discussion with MEDAC. Meeting with Japanese Embassy. Preparation of Minutes of Discussion. Site Survey. |
| 6 Dec. | (Wed.) | Signing of Minutes of Discussion. Report to Japanese Embassy. Site Survey. |
| 7 Dec. | (Thu.) | Report to JICA. Site Survey. Departure from Addis Ababa (Government Members). |
| 8 Dec. | (Fri.) | Site Survey. Collection of Cost Estimation Data. Arrival in Frankfurt (Government Members). |

| Date | Contents of Activities |
|----------------|---|
| 1995 | |
| 9 Dec. (Sat.) | Site Survey. Collection of Cost Estimation Data. Departure from Frankfurt (Government Members). Departure from Addis Ababa (Switching System Planner). |
| 10 Dec. (Sun.) | Site Survey. Collection of Cost Estimation Data. Arrival in Tokyo (Government Members). Arrival in Frankfurt (Switching System Planner). |
| 11 Dec. (Mon.) | Site Survey. Collection of Cost Estimation Data. Departure from Frankfurt (Switching System Planner). |
| 12 Dec. (Tue.) | Site Survey. Collection of Cost Estimation Data. Arrival in Tokyo (Switching System Planner). |
| 13 Dec. (Wed.) | Site Survey. Collection of Cost Estimation Data. |
| 14 Dec. (Thu.) | Site Survey. Collection of Cost Estimation Data. |
| 15 Dec. (Fri.) | Site Survey. Collection of Cost Estimation Data. |
| 16 Dec. (Sat.) | Site Survey. Collection of Cost Estimation Data. |
| 17 Dec. (Sun.) | Site Survey. Collection of Cost Estimation Data. |
| 18 Dec. (Mon.) | Site Survey. Collection of Cost Estimation Data. Preparation of Draft Basic Design Drawing. |
| 19 Dec. (Tue.) | Discussion with ETA. Collection of Cost Estimation Data. Preparation of Draft Basic Design Drawing . |
| 20 Dec. (Wed.) | Discussion with ETA. Collection of Cost Estimation Data. |
| 21 Dec. (Thu.) | Discussion of Technical Matters with ETA and Preparation of Minutes of Discussion. |

| Date | | Contents of Activities |
|---------|--------|--------------------------------------|
| 1995 | | |
| 22 Dec. | (Fri.) | Report to JICA and Japanese Embassy. |
| 23 Dec. | (Sat.) | Departure from Addis Ababa. |
| 24 Dec. | (Sun.) | Arrival in Frankfurt. |
| 25 Dec. | (Mon.) | Departure from Frankfurt. |
| 26 Dec. | (Tue.) | Arrival in Tokyo. |

(2) Explanation of the Draft Basic Design Report

| Date | | Contents of Activities |
|---------|--------|--|
| 1996 | | |
| 28 Feb. | (Wed.) | Departure from Dar es Salaam and Arrival in Addis Ababa (Team Leader). Departure from Tokyo and Arrival in Frankfurt (Other members). |
| 29 Feb. | (Thu.) | Data compiling (Team Leader). Departure from Frankfurt and Arrival in Addis Ababa (Other members). |
| 1 Mar. | (Fri.) | Meeting with JICA. Meeting with Japanese Embassy. Meeting with MEDAC. Meeting with MTC. Meeting with ETA. |
| 2 Mar. | (Sat.) | Site Survey. |
| 3 Mar. | (Sun.) | Site Survey. |
| 4 Mar. | (Mon.) | Discussion of the Draft Basic Design Report with ETA. |
| 5 Mar. | (Tue.) | Discussion of the Draft Basic Design Report with ETA. |
| 6 Mar. | (Wed.) | Site Survey. Discussion of the Draft Basic Design Report with ETA. Discussion of the Minutes of Discussion with MEDAC. |
| 7 Mar. | (Thu.) | Signing of Minutes of Discussion. Report to Japanese Embassy and JICA. |
| 8 Mar. | (Fri.) | Departure from Addis Ababa. Arrival in London. |
| 9 Mar. | (Sat.) | Departure from London. |
| 10 Mar. | (Sun.) | Arrival in Tokyo. |

Appendix 3. List of Party Concerned in the Recipient Country

(1) Basic Design Study

- 1. Ministry of Economic Development and Cooperation**
Mr. Alemayhu Yirgu A/Head, Bilateral Cooperation
Department
Mr. Kinjiro Wada Adviser, Economic & Technical
Cooperation
Mr. Tamirat Kediro Senior Expert, Japanese Desk
Mr. Seble Getachew Senior Expert, Japanese Desk

- 2. Ministry of Transport and Communication**
Mr. Zaid Wolde Gebriel Head, Planning and Research Department

- 3. Ministry of Labour and Social Affairs**
Mr. Wossen Public Relation Officer

- 4. Ministry of Agriculture and Forestry**
Mr. Girma Dante Information Department
Mr. Leykun Berhanu Forest Preservation Department
Mrs. Haimanot Yohannes Head of forestry Department

- 5. Embassy of Japan**
Mr. Yasuhiro Hamada Ambassador
Mr. Kenji Miyata Councilor
Mr. Akira Okura First Secretary
Mr. Yoichi Sakai Second Secretary

- 6. JICA Office**
Mr. Hiroshi Matsutani Resident Representative
Mr. Yasuyuki Uehara Deputy Resident Representative
Mr. Minoru Yoshimura Assistant Resident Representative

- 7. Ethiopian Telecommunications Authority**
Mr. Asmara Abate A/General Manager
Mr. Asheber Getachew Telephone Division Manager
Mr. Retfa Dessie Addis Ababa Network Branch Chief
Mr. Abdurahman Mohammed Administration Officer

- | | | |
|------------|---|--|
| | Mr. Lewde Haile Georgis | Disbursement Section Chief |
| | Mr. Mesfin Haile | Switching Engineer |
| | Mr. Tibebu Hailu | Engineer |
| | Mr. Michael Russum | Planner |
| | Mr. Addis Adunga | A/Civil Engineering Division Manager |
| | Mr. Tashale Mekonen | Construction Engineer |
| | Mr. Solomon Manoro | Senior Draftsman |
| | Mr. Abebe Belayneh | Carrier Section Chief |
| | Mr. Mesfin Maile | Engineer, Switch Section |
| | Mr. Kebede, G/Selassie | Planning & Programming Manager |
| | Mr. Tadale Gurara | Exchange Branch Chief |
| | Mr. Abebe Belete | Deputy General Manager |
| | Mr. Yamane | Head, Engineering Department |
| | Mr. Mikre Selassie | Distribution System Division |
| | Mr. Mustefa | Planner |
| | Mr. Berhane Woldegeorgis | Arada Branch Chief |
| 8. | National Bank of Ethiopia | |
| | Mr. Bekele Wolde Abajifar | Governor Office |
| 9. | Addis Ababa University | |
| | Dr. Mikyas Abayneh | Faculty of Technology |
| 10. | Addis Ababa City Council | |
| | Mr. Yitagesu Balcha | Head, Planning Section, Town Planning Department |
| 11. | Ethiopian Roads Authority | |
| | Mr. Belaynigh Selassie | A/Operation Manager |
| | Mr. Wondwossen Hailu | Director |
| 12. | Embassy of Italy | |
| | Dr. Paolo Ottaviani | First Secretary |
| 13. | Ethiopian Electric Light and Power Authority | |
| | Mr. Haile Marife Tsegaya | Customer Service Department |
| 14. | Addis Ababa Industrial Polytechnic | |
| | Mr. Tedesse Kebebe | Head, Material Research and |

- | | | |
|-----|---|-----------------------------------|
| | | Testing Department |
| | Mr. Bedilu Habte | Head, Material Testing Department |
| 15. | Nyala Insurance Company | |
| | Mr. Gtachew Mekasha | |
| 16. | Ethiopian Insurance Company | |
| | Mr. Solomon Tesfaye | Underwriting Head |
| 17. | Muger Cement Factory | |
| | Mr. Mengitsu | Sales Manager |
| 18. | Ethiopia Plastic Factory | |
| | Mr. Mantoos Shamebo | General Manager |
| | Mr. Demelash Dejene | Production & Technical Manager |
| 19. | Wanza Wood Works | |
| | Mr. Alem Kassa | Production Manager |
| 20. | Zecca Concrete Pole | |
| | Mrs. Selamawit Kros | |
| 21. | Akaki Spare Parts & Hand Tools Factory | |
| | Mr. Aklilu Desta | Marketing Manager |
| 22. | Batu Construction Enterprise | |
| | Mr. Tafesse Teklu | Civil Engineer |
| 23. | Alem General Contractor Ltd. | |
| | Mr. Alem Biru Gebray | General Manager |
| 24. | Blue Nile Construction Enterprise | |
| | Mr. Ali Mohammed | General Manager |
| 25. | Awash Construction Enterprise | |
| | Mr. Geremew Debissa | General Manager |
| 26. | Alberto Varnero Construction | |
| | Mr. Alberto Varnero | |

27. **Rental House Agent**
Mr. Ayalew Mekonen

(2) **Explanation of Draft Basic Design Report**

1. **Ministry of Economic Development and Cooperation**

| | |
|----------------------|---|
| Mr. Admasu Abebe | Head, Bilateral Cooperation Department |
| Mr. Dirma Zwedie | Senior Expert, Asian Desk |
| Ms. Asnakech Teffera | Senior Expert, Asian Desk |
| Ms. Seble Getachew | Junior Expert, Asian Desk |
| Mr. Kinjiro Wada | Adviser, Economic & Technical Cooperation |

2. **Ministry of Transport and Communication**

| | |
|------------------------|--|
| Mr. Zaid Wolde Gebriel | Head, Planning and Research Department |
|------------------------|--|

3. **Embassy of Japan**

| | |
|---------------------|------------------|
| Mr. Kenji Miyata | Councilor |
| Mr. Akira Okura | First Secretary |
| Mr. Yoichi Sakai | Second Secretary |
| Mr. Minoru Kirihara | Third Secretary |

4. **JICA Office**

| | |
|----------------------|--------------------------------|
| Mr. Hiroshi Matutani | Resident Representative |
| Mr. Hiroyuki Uehara | Deputy Resident Representative |
| Mr. Minoru Yoshimura | Coordinator |

5. **Ethiopian Telecommunications Authority**

| | |
|----------------------|-----------------------------------|
| Mr. Admasu Abebe | General Manager |
| Mr. Asheber Getachew | Manger, Telephone Division |
| Mr. Retta Dessie | Chief, Addis Ababa Network Branch |
| Mr. Tibebe Hailu | Engineer |

6. **Ethiopian Plastic Factory**

| | |
|--------------------------|-----------------------------|
| Mr. Mateos Shamebo | General Manager |
| Mr. Mammo Hailu Christos | Head, Planning and Research |
| Mr. Demelash Dejene | Head, Process Engineering |

Appendix 4-1 Minutes of Discussion (Basic Design Study)

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON
THE PROJECT FOR REHABILITATION FOR THE TELEPHONE CABLE NETWORK
FOR
ADDIS ABABA
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

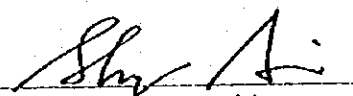
In response to a request from the Government of the Federal Democratic Republic of Ethiopia, the Government of Japan has decided to conduct a Basic Design Study on the Project for Rehabilitation of the Telephone Cable Network for Addis Ababa (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Federal Democratic Republic of Ethiopia a Basic Design Study Team, headed by Mr. Shigemaro AOKI, Development Specialist, Institute of International Cooperation, JICA, which is scheduled to stay in the country from November 28 to December 23, 1995.

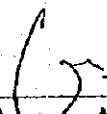
The team had a series of discussions with the concerned officials of the Government of the Federal Democratic Republic of Ethiopia, and conducted a field survey at the study area.

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

Addis Ababa, December 6, 1995



Mr. Shigemaro Aoki
Leader
Basic Design Study Team
Japan International
Cooperation Agency (JICA)



Mr. Asmare Abate
A/General Manager
Ethiopian Telecommunications
Authority (ETA)



Mr. Alemayhu Yirgu
A/Head, Department for Bilateral
Cooperation, Ministry of Economic
Development and Cooperation (MEDAC)

ATTACHMENT

1. OBJECTIVE

The objective of the Project is to execute the rehabilitation of the telephone cable network in Addis Ababa which is part of the development of the national telecommunications network in Ethiopia, and thus, to contribute to socio-economic development in Ethiopia.

2. PROJECT IMPLEMENTING AGENCY

Ethiopian Telecommunications Authority (hereinafter referred to as "ETA") under the Ministry of Transport and Communications.

3. PROJECT SITE

The proposed site of the Project is Arada area shown in Annex-1. However the final boundary of the proposed site will be decided after further studies.

4. MAJOR ITEMS REQUESTED BY THE GOVERNMENT OF THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

As a result of the series of discussions, the following items are requested by the Federal Democratic Republic of Ethiopia (hereinafter referred to as "the Ethiopian side") for the Project.

(1) Supply of Materials and Construction/Installation

- (a) Duct
- (b) Manhole
- (c) Primary Cable
- (d) Secondary Cable

(2) Supply of Equipment

- (a) Vehicle
- (b) Tool
- (c) Measuring Equipment

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

5. JAPANESE GRANT AID PROGRAM

The Ethiopian side has understood the system of Japanese Grant Aid Program described in Annex-2.

6. NECESSARY MEASURES TO BE TAKEN BY THE ETHIOPIAN SIDE

The Ethiopian side will take necessary measures described in Annex-3 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. WORK DEMARCATION TO BE CONDUCTED BY BOTH SIDES

The respective work to be undertaken by the Government of Japan and the Ethiopian side is described in Annex 4.

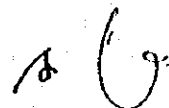
8. FURTHER SCHEDULE OF THE STUDY

- (1) The Basic Design Study Team will proceed to further studies in Ethiopia until December 23, 1995.
- (2) JICA will prepare a Draft Basic Design and dispatch Draft Basic Design Explanation Team in March, 1996 in order to explain and confirm the contents of the Draft Basic Design.
- (3) In case that the contents of the Draft Basic Design is accepted by the Ethiopian side, JICA will complete the Final Report and send it to the Ethiopian side in March, 1996.

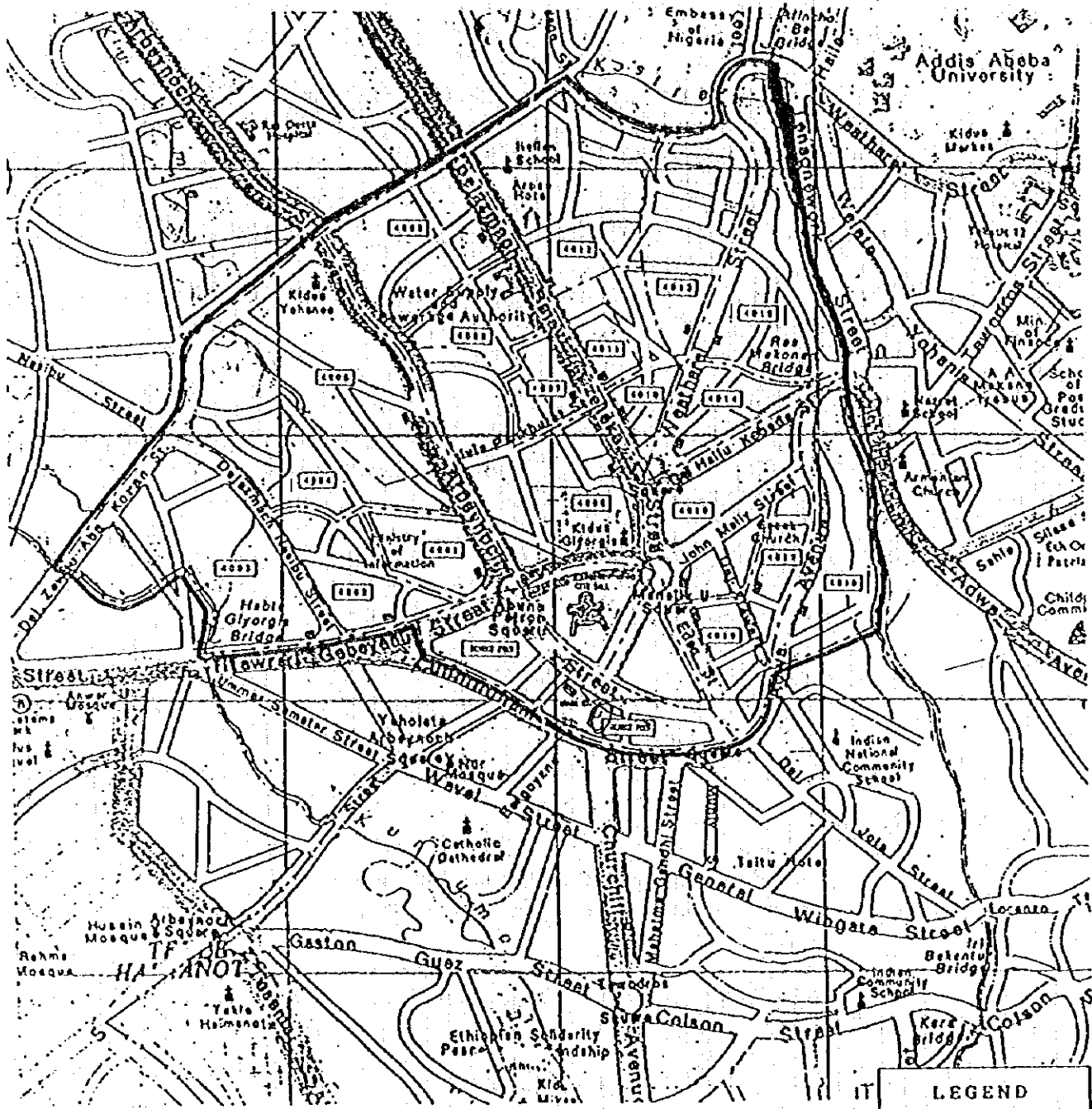
9. OTHERS

- (1) Both sides confirmed that there was no change on the Minutes of Discussion of the Preliminary Study of the Project signed on August 29, 1995.
- (2) Both sides confirmed the necessity of further studies on the following items:
 - (a) Handhole for secondary cable network
 - (b) Subscriber call monitor and analyser
 - (c) Multiple dropwire and one pair subscriber terminal

Note : The above item (c) is not covered under the scope of Japan's Grant Aid Scheme.



ANNEX 1 THE PROPOSED SITE OF THE PROJECT



| LEGEND | |
|--------|-------------------|
| | EXCHANGE |
| | CABINET |
| | EXCHANGE BOUNDARY |
| | CABINET BOUNDARY |
| | CABINET NUMBER |
| | CABINET NUMBER |

gm
A-12 *to G*

ANNEX 2 JAPAN'S GRANT AID PROGRAM

1. Grant Aid Procedures

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

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

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

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

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

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

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

2. Basic Design Study

(1) Contents of the Study

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

- (a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- (b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- (c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

- (d) Preparation of a basic design of the Project.
- (e) Estimation of costs of the Project.

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

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

(2) Selection of Consultants

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

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

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

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

(2) Exchange of Notes (E/N)

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

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

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

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

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

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

- (5) Necessity of "Verification"

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

- (6) Undertakings required to the Government of the Recipient Country

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

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

- (7) "Proper Use"

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

(8) "Re-export"

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

(9) Banking Arrangement (B/A)

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

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ANNEX-3 NECESSARY MEASURES TO BE TAKEN BY THE ETHIOPIAN SIDE

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

1. To secure the site for the Project.
2. To provide data and information necessary for the Project.
3. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Ethiopia and prompt inland transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
4. To exempt Japanese juridical and physical nationals engaged in the Project for customs duties, internal taxes and other fiscal levies which may be imposed in the Federal Democratic Republic of Ethiopia with respect to the supply of the products and services under the verified contracts.
5. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into Ethiopia and stay therein for the performance of their work.
6. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
7. To maintain and use properly and effectively the facilities constructed under the Project.

ANNEX-4 WORK DEMARCATION TO BE CONDUCTED BY BOTH SIDES

As a basic concept to determine the responsibility of the work, the funding provided by the Government of Japan will be deployed intensively to the work such as the procurement of equipment/materials from foreign countries and Ethiopia and installation of those facilities which can complete the work as a total system. The Government of Ethiopia will make maximum effort to support the above works.

The respective work to be undertaken by the Governments of Japan and Ethiopia is stated below.

1. Work to be Conducted by the Japanese Side

The funding provided by the Government of Japan is to be utilized for the construction/installation of the targeted facilities including the supply of equipment and materials for completion of the Project.

The main facilities to be conducted using the fund are as follows:

- (1) Design and plan of the local cable network facilities for installation and construction.
- (2) Provision of necessary materials and accessories for manholes and underground ducts.
- (3) Provision of primary and secondary cables, necessary materials and accessories for the local cable network.
- (4) Provision of special tools, spare parts, test and measuring equipment, materials and vehicles to be procured for maintenance of the new cable network established by the Project.
- (5) Transportation fee to the Project site with necessary costs for all equipment and materials to be procured in foreign countries.
- (6) Construction of manholes and installation of underground ducts.
- (7) Installation of primary and secondary cables and necessary accessories.
- (8) To conduct temporary re-pavement of roads such that gravel can not be scattered by cars.
- (9) Testing of new civil facilities.
- (10) Testing of new cable network facilities.

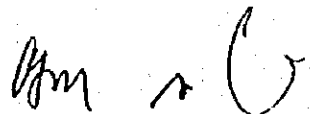
2. Work to be Conducted by the Ethiopian Side

The ETA acting on behalf of the Ethiopian side will be responsible for the works mentioned below in connection with the construction/installation of the targeted facilities, as well as provision of data necessary for the realization of the Project, e.g., subscribers' cards, etc.

- (1) Provision of warehouses for keeping the equipment and materials to be used for the Project.
- (2) Taking necessary procedure of application for approval of the excavation of the public roads from the city council.
- (3) Taking necessary procedure for permission of the installation of distribution cable, internal DP (Distribution Point), wall type DP and necessary accessories from the owner of the house/building.

- (4) Removal of goods and materials kept in cable vault of Arada exchange and cleaning before commencement of civil construction work by the Contractor
- (5) Final re-pavement of roads after completion of civil construction works, cable installation works and temporary restoration done by the Contractor.
- (6) Provision of the subscriber transfer sheets before commencement of the subscriber transfer work.
- (7) Provision and erection of necessary wooden poles for installation of the dropwires.
- (8) Installation of jumper wires at MDF in exchange.
- (9) Installation of dropwires, internal wires and apparatus in subscribers' premises.
- (10) Transfer of subscribers from the existing cable network to the new cable network (DP to subscriber premises).
- (11) Transfer connection of the new primary cables with the existing cables in order to re-route the existing underground facilities for the building and road construction by the city council.
- (12) Re-location and re-arrangement works (transfer connection and shortening of surplus length) of the existing cables due to the modification of exchange manhole.
- (13) Removal of disused dropwires, internal wires and apparatus in subscribers' premises after completion of the subscriber transfer work.
- (14) Removal of existing cables, poles and any other disused facilities after completion of the subscriber transfer work.

Note : The works in the items (11) and (12) above will be jointly executed by both sides.



Appendix 4-2 Minutes of Discussion (Explanation of Basic Design Report)

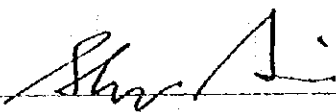
MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
REHABILITATION FOR THE TELEPHONE CABLE NETWORK
FOR ADDIS ABABA
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
(EXPLANATION ON DRAFT BASIC DESIGN)

From November 28 to December 23, 1995, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Rehabilitation of the Telephone Cable Network for Addis Ababa (hereinafter referred to as "the Project"), to the Federal Democratic Republic of Ethiopia, and through discussions and field survey in Ethiopia, and technical examination of the results in Japan, has prepared the Draft Basic Design on the study.

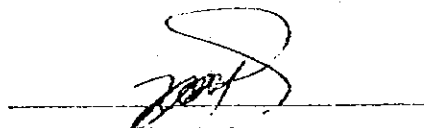
In order to explain and to consult the Government of Ethiopia on the components of the Draft Basic Design, JICA sent to Ethiopia a study team, which is headed by Mr. Shigemaro AOKI, Senior Telecommunication Advisor, Institute for International Cooperation, JICA, and is scheduled to stay in the country from February 28 to March 8, 1996.

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

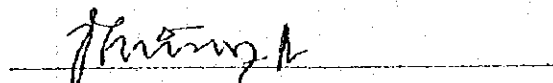
Addis Ababa, March 7, 1996



Mr. Shigemaro AOKI
Leader, The Explanation Team
for Draft Basic Design
Japan International
Cooperation Agency (JICA)



Mr. Mesfin Haile
General Manager
Ethiopian Telecommunication
Authority (ETA)



Mr. Admasu Abebe
Head, Bilateral Cooperation Department,
Ministry of Economic Development and
Cooperation (MEDAC)

ATTACHMENT

1. Components of Draft Basic Design

The Ethiopian side has agreed and accepted in principle the components of the Draft Basic Design proposed by the Team.

2. Japan's Grant Aid System

(1) The Ethiopian side has understood the system of Japanese Grant Aid explained by the Team as attached in ANNEX I.

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

3. Work Demarcation to be Conducted by Both Sides

The respective work to be undertaken by the Japanese side and the Ethiopian side is described in ANNEX III.

4. Future Schedule

The Team will make the Final Basic Design Study Report in accordance with the confirmed items and send it to the Government of Ethiopia by the end of March 1996.

5. Other Relevant Issues

(1) It was confirmed that the Government of Ethiopia wholly owns all the ETA's assets and ETA shall remain as a monopolized service provider of the basic telephone service as stipulated in the 5 Year National Development Programme (1995 - 2000)

(2) Primary cables of over 200 lines will be installed in the underground conduits up to PDF without using CCC (Cross Connection Cabinet) system.

- (3) Wooden poles will be procured locally with the ETA's assistance.
- (4) PVC pipes will be procured locally if found technically acceptable.
- (5) ETA assured that the installation of MDF (Main Distribution Frame) frames and terminal blocks in Arada Exchange will be completed before commencement of the primary cable termination by the contractor.

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ANNEX I JAPAN'S GRANT AID PROGRAM

1. Grant Aid Procedures

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

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

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

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

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

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

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

2. Basic Design Study

(1) Contents of the Study

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

- (a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- (b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- (c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

(d) Preparation of a basic design of the Project.

(e) Estimation of costs of the Project.

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

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

(2) Selection of Consultants

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

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

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

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

(2) Exchange of Notes (E/N)

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

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

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

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

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

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

- (5) Necessity of "Verification"

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

- (6) Undertakings required to the Government of the Recipient Country

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

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

- (7) "Proper Use"

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

(8) "Re-export"

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

(9) Banking Arrangement (B/A)

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

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Yes

**ANNEX II NECESSARY MEASURES TO BE TAKEN BY THE ETHIOPIAN
SIDE**

Necessary measures to be taken by the Ethiopian side on condition that Japan's Grant Aid is extended:

1. To secure the sites for the Project;
2. To provide data and information necessary for the Project;
3. To ensure prompt unloading and customs clearance at the port of disembarkation in Ethiopia and prompt inland transportation therein of the materials and equipment for the Project purchased under the Grant;
4. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Ethiopia with respect to the supply of the products and services under the verified contracts;
5. To accord Japanese Nationals, whose services may be required in connection with the supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into Ethiopia and stay therein for the performance of their work;
6. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary, and
7. To use and maintain properly and effectively all the facilities constructed and equipment purchased under the Grant.

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ANNEX III WORK DEMARCATION TO BE CONDUCTED BY BOTH SIDES

Works to be done by the Japanese side and the Ethiopian side for the implementation of this project are as follows:

1. Works under the Responsibility of the Japanese Side

- (1) Detailed design for construction of outside plant and civil facilities.
- (2) Provision of major equipment and materials.
- (3) Procurement of construction work equipment and materials in Ethiopia.
- (4) Construction of manholes.
- (5) Construction of a trench in cable vault.
- (6) Installation of underground conduits.
- (7) Installation and connection of primary and secondary cables.
- (8) Installation and connection of new cables for cable re-location due to road expansion work (excluding cable transfer work) by the Municipality.
- (9) Installation of CCC (Cross Connection Cabinet).
- (10) Installation of DP (Distribution Point).
- (11) Dust-prevention treatment pavement after road excavation.
- (12) As-built drawings of new outside plant and civil facilities.
- (13) Testing of completed facilities.
- (14) Preparation of a standard form of subscriber transfer sheet.
- (15) Jumper wiring in CCC for subscriber transfer.
- (16) Handing-over of maintenance equipment and materials and measuring equipment and tools to ETA.
- (17) Handing-over of the maintenance vehicle to ETA.
- (18) Technical assistance and guidance for cable transfer and joint related to the road expansion by the Municipality, and for subscriber transfer works.

2. Works under the Responsibility of the Ethiopian Side

- (1) Preparation of warehouses to store equipment and materials imported by the contractor.

- (2) Obtaining permission from relevant authorities for road occupation and excavation for installation of underground facilities and overhead cables.
- (3) Payment of costs for complete restoration of paved roads after excavation to the Municipality.
- (4) Obtaining agreement of the owner or user on installation of DP and cable and land excavation in their premises or buildings.
- (5) Removal of equipment, parts and materials stored in the cable vault of Arada Exchange, and cleaning of the cable vault, prior to the commencement of the civil work.
- (6) Procurement and installation of MDF (Main Distribution Frame) and terminal block.
- (7) Investigation and design of subscriber's premises for subscriber transfer.
- (8) Investigation of jumper wire of MDF for subscriber transfer.
- (9) Entry in the subscriber transfer sheets to prepare for the subscriber transfer work.
- (10) Installation of subscribers' premises (facilities from new DP up to subscribers, i.e., installation of poles, drop wires, one-pair subscriber terminals, etc.) for subscriber transfer.
- (11) Jumper wiring at MDF for subscriber transfer.
- (12) Confirmation test on subscriber transfer after the transfer work.
- (13) Removal of the existing cables, poles, CCCs, DPs, jumper wires which have become disused after the completion of the subscriber transfer.
- (14) Subscriber transfer and cable connection for cables re-located in connection with the road expansion work (including works referred to above for the subscriber transfer) under the technical assistance and guidance by the Japanese side.
- (15) Re-arrangement of the existing cables in the cable vault (where necessary) under the technical assistance and guidance by the Japanese side.
- (16) Assistance in the local procurement of wooden poles and PVC pipes. *Y.J.*

Appendix 5. Cost Estimation Borne by The Recipient Country

| Ref. No. | Items | Total Cost (Birr) |
|-----------------|--|--------------------------|
| 1 | Procurement and Installation of MDF and Terminal Block | 575,000 |
| 2 | Cable Relocation Work due to Road Construction | 125,000 |
| 3 | Subscriber Transfer and Subscriber Premises Work | 942,000 |
| 4 | Permanent Restoration of Road Surface | 1,203,000 |
| 5 | Removal Work of Existing Facilities | 225,000 |
| 6 | Total | 3,070,000 |

Appendix 6-1 Other Relevant Data

STUDY ON EXPANSION OF SWITCHING FACILITIES IN ARADA EXCHANGE

1. Introduction

A basic study was made concerning the improvement of the switching facilities in Arada Exchange. Items taken into consideration are future demand, transfer of the existing subscribers to a planned new exchange (Sidist Kilo), renewal of crossbar switching equipment, re-organisation of floor space for facility expansion, etc.

2. Scale of the Planned Expansion

Future demand is estimated for Arada and a new exchange, Sidist Kilo, as follows:

| Exchange | No. of Subscribers (End of Sept. 1995) | Demand (End of Sept. 1995) | Demand (2000) |
|-------------|---|-------------------------------|------------------|
| Arada | 14,990 | 26,572 | 34,080 |
| Sidist Kilo | 8,354 | 18,506 | 25,225 |
| Total | 23,344 | 45,078 | 59,305 |

Note: Demand in 2000 based on ETA data

Required switching system capacity in the year 2000 will be 35,000 L.U. at Arada Exchange and 26,000 L.U. at Sidist Kilo Exchange.

Out of the existing capacity of 24,000 L.U. at Arada Exchange, 20,000 L.U. is provided by 2 units of the overage crossbar switching equipment, which ETA intends to renew by the year 2000. Hence the addition of 31,000 L.U. will have to be made for Arada Exchange, including those to be renewed.

Initial capacity of the switching system at Sidist Kilo Exchange is only 5,000 L.U., necessitating the addition of 21,000 L.U. by the year 2000. Subscribers in the Sidist Kilo Exchange area now being served by Arada Exchange are scheduled to be transferred to Sidist Kilo Exchange during the course of the above expansion.

3. Floor Space for Facility Expansion

The digital switching room in Arada Exchange has not sufficient floor space to install new facilities having required capacity of 31,000 L.U. Facilities having a capacity of only 10,000 L.U. or so can be installed there. Hence, some floor space which permits the installation of new switching systems having required capacity will have to be reserved to meet the future demand, (The Arada Exchange area after separation of the area for Sidist Kilo Exchange will become rectangular in shape, extending from north to south, and there is a question whether or not Arada Exchange should continue to cover the whole area. Anyhow, the existing switching room is too small in space.)

On the other hand, the wide and large space will become available in the crossbar switching system room after the renewal of the existing crossbar switching equipment. It will be reasonable to utilise such space for installation of new switching facilities. The expansion of the existing building is also conceivable, but it will prove to be very expensive, as compared with the above plan.

4. Study for Switching System Expansion

(1) Steps to be Taken

It will be advisable to take the following three steps in renewing the existing crossbar switching systems:

Step 1: Firstly, only 1 unit of the crossbar switching equipment is to be renewed. As a result, the space for accommodation of new switching facilities can be obtained.

Step 2: New switching facilities are installed in the space thus obtained. With this, demand can be satisfied.

Step 3: Remaining 1 unit of the crossbar switching equipment is renewed within the target period.

Transfer of subscribers should preferably be made, without changing their

respective telephone numbers. To meet this requirement, all the subscribers accommodated by the same 1 unit of equipment be transferred as a whole at one time. (The crossbar switching equipment in Arada Exchange is connected with local analogue switching equipment, forming a network. In consequence, partial transfer of subscribers will make the transfer work complicated and difficult, necessitating the increase of the translators (unit for digit analysis) of the outdated switching equipment, etc.)

(2) **Renewal Schedule**

The renewal schedule should be drawn up, in consideration of the schedules for (1) transfer of the existing subscribers to the new Sidist Kilo Exchange, and (2) transfer of the remaining subscribers to the new switching facilities in Arada Exchange.

a) **Transfer of Subscribers to Sidist Kilo Exchange**

The initial capacity of Sidist Kilo Exchange is only 5,000 L.U., though there are a large number of waiting applicants in Sidist Kilo Exchange area. It is a matter for discussion if all the capacity be allocated for the transfer of subscribers from Arada Exchange or some capacity be utilised for connection of new subscribers. Anyhow, the transfer of subscribers should be further proceeded with in accordance with the succeeding switching system expansion plans of Sidist Kilo Exchange.

As a result of the transfer of subscribers to Sidist Kilo Exchange, the switching systems in Arada Exchange will come to have spare L.U. How to deal with such spare units should be discussed for each system concerned. In case of digital switching system, spare units can be used for accommodation of new subscribers. On the other hand, in the case of the crossbar switching system, such units should be kept idle, because they are scheduled to be renewed soon. To be noted here is that the transfer of subscribers to Sidist Kilo Exchange be completed before the renewal of the crossbar switching system, to avoid the repeated transfer of the same subscribers.

In consequence, subscribers of the crossbar switching equipment to be renewed firstly should be included in those to be initially transferred to Sidist Kilo Exchange. Spare units of the crossbar switching equipment as a result of the above transfer should be kept as they are and not reutilised for connection of new subscribers.

b) Transfer within Arada Exchange

Two methods are conceivable: (A) to transfer objective subscribers at the time of installation of new switching systems in the existing available space, and (B) to install container type switching system in the future, postponing the renewal of the crossbar switching system.

Plan (B) will be materialised as follows:

- i) Container type switching equipment will be installed and subscribers of crossbar switching equipment will be transferred temporarily to this equipment.
- ii) Crossbar switching systems will be dismantled and removed.
- iii) New switching systems will be installed in the floor space which has become available as a result of the removal of the crossbar switching system. Subscribers temporarily accommodated by the container type equipment will be transferred to the new switching systems. (The container type switching equipment can be re-utilised thereafter to meet another requirement.)

Plan (B) will require repetition of complicated transfer work and will be higher in cost. Hence, Plan (A) will be preferable.

(3) Review

In case of Plan (A), Step 1 must be executed in advance to the installation of new systems in the existing available space. That is, renewal of the first unit must be done earlier. This will mean earlier solution of problems with service quality, operation and maintenance; in other words, it will be rather preferable for ETA. (The removed unit can be reused, after being dismantled, as spare parts, etc.)

In view of the above, adoption of Plan (A) is recommended. Since there is an urgent need to solve the problem of a large quantity of unsatisfied demand, the capacity of the initial expansion must be increased to the maximum extent within the limit of the allowable floor space. In addition, no less effort should be given to earlier materialisation of the succeeding expansion plans.

The above is the primary analysis of the matters related to the expansion of Arada Exchange. A further study should be made for formulation of actual expansion plans, in consideration of occupancy of line units at each switching system in Arada Exchange and the number of subscribers to be transferred to Sidist Kilo Exchange.

5. Expansion Plan (draft)

A draft expansion plan has been prepared on the following assumptions:

- (1) At the time of the inauguration of Sidist Kilo Exchange, subscribers now being served by the crossbar switching equipment to be renewed under Step 1 will be transferred. (Renewal of the remaining equipment will be made by the year 2000, at a time of the switching system expansion to be made thereafter.)
- (2) The accommodation situation of the existing subscribers in the future Sidist Kilo Exchange area is in proportion to the capacity of respective switching systems.
- (3) Capacity of a new switching system to be installed in the existing switching

room is 10,000 L.U.

- (4) At each step, demand in respective years is satisfied to the extent possible, in addition to the transfer of subscribers of the crossbar switching equipment.

The expansion plan thus prepared is given below, together with the switching system capacities.

Expansion Plan (draft)

| Phase | Year | Expansion Capacity | Installation Place | New or Expansion | Shortage in Capacity |
|--------|------|--------------------|--------------------|------------------|----------------------|
| Step 1 | 1997 | 10,000 | Existing Sw. Room | New | 10,200 |
| Step 2 | 1998 | 12,000 | New Sw. Room | New | 0 |
| Step 3 | 2000 | 9,000 | New Sw. Room | Expansion | 0 |

Switching System Capacities

| Switching | Objective Areas | Present Condition | Step 1 | Step 2 | Step 3 |
|----------------------|-----------------|-------------------|--------|--------|--------|
| Arada 1 | Arada | 6,600 | 0 | 0 | 0 |
| | Sidist Kilo | 3,400 | 0 | 0 | 0 |
| Arada 2 | Arada | 6,600 | 6,600 | 6,600 | 0 |
| | Sidist Kilo | 3,400 | 3,400 | 3,400 | 0 |
| Arada 3 (RSS+new) | Arada | 2,700 | 12,700 | 12,700 | 14,000 |
| | Sidist Kilo | 1,300 | 1,300 | 1,300 | 0 |
| Arada-next | Arada | 0 | 0 | 12,000 | 21,000 |
| | Sidist Kilo | 0 | 0 | 0 | 0 |
| Total | Arada | 15,900 | 19,300 | 31,300 | 35,000 |
| | Sidist Kilo | 8,100 | 4,700 | 4,700 | 0 |
| Demand | Arada | 26,754 | 29,500 | 31,000 | 34,100 |

Note 1: Step 1 is assumed to be implemented in the fiscal 1977, in view of the progress of the aid/loan projects. Reasonable capacity expansion was assumed, in consideration of the number of waiting applicants.

Note 2: Step 2 is assumed to be implemented in the fiscal 1998. However, Step 1 can meet demand only to a limited extent, and a large number of waiting applicants remain unsatisfied. Hence, it will be advisable to implement Step 2 soon after Step 1, if possible.

The above is a draft plan based on various assumptions and presented here just for reference. For implementation, an action plan should be drawn up through a study and analysis of detailed data.

Appendix 6-2. Other Relevant Data

1. Ethiopian Telecommunications Authority (ETA)

- (1) List of Addis Ababa Network Branch Employees including Cable and Line Maintenance Activity
- (2) Present Status of Telecommunications
- (3) Number of ETA Employees (Division Wise and Category Basis)
- (4) Balance Sheet
- (5) AC Mains Situation
- (6) Power System Situation
- (7) Transmission Equipment Situation
- (8) Organization Structure of ETA
- (9) Development Program (Human Resource Management and Development Activities)
- (10) Telephone Demand and Supply Status
- (11) Upgrading and Expansion of the ETA Telecommunications Network by Swedish Government Financing
- (12) 42nd Annual Report of ETA
- (13) Existing Cable Circuits Allocation for Addis Ababa Analogue Multi-Exchange Network
- (14) Existing Circuits of PCM and Optical Fiber for Addis Ababa Digital Multi-Exchange Network
- (15) National Routing Plans (Digital, Analogue Exchange)
- (16) Capacity and Subscriber
- (17) Forecast for Domestic and International (Calls, Minutes, Pulse and Message)
- (18) National Hierarchy Plan for Ethiopia
- (19) Data for Automatic Exchanges in Addis Ababa
- (20) Sample Traffic Measurement Data
- (21) Bidding Document for Procurement of Local Telephone Cable (Technical Specifications)
- (22) Booklet for Fixing and Suspension materials, Poles, Risers

2. Other Data

- (1) Annual Report (1993/94) from National Bank of Ethiopia
- (2) Quarterly Merchandise Trade Statistics
- (3) The 1984 Population and Housing Census of Ethiopia

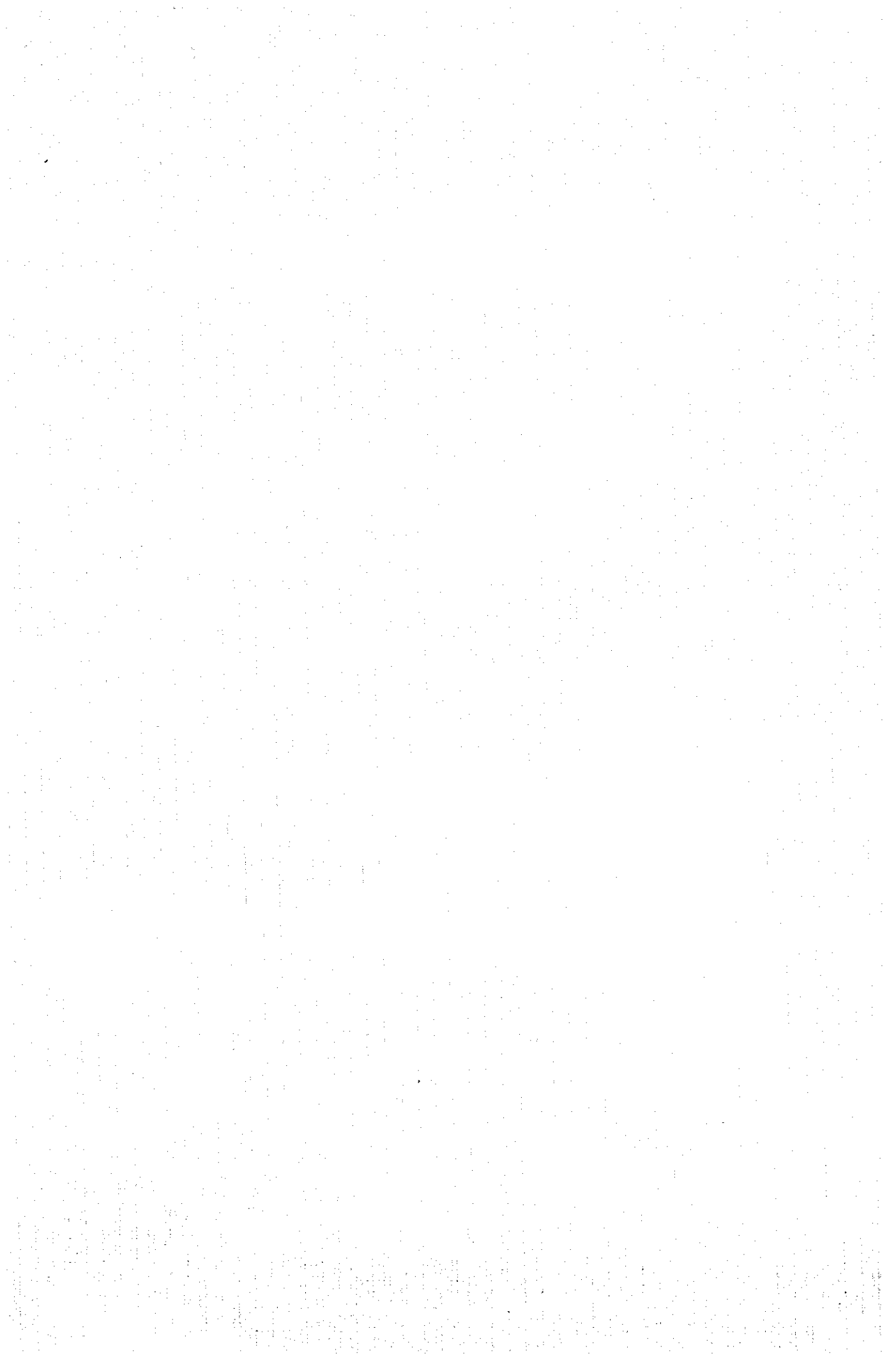
- (4) Labour Law and Regulations
- (5) Exchange Rate (Commercial Bank of Ethiopia)
- (6) Forestry Conservation, Development and Utilization Proclamation
- (7) Price List for Concrete Cube Test from Addis Ababa University
- (8) Agricultural Sample Survey Report on Area and Production for Major Crops (1994/95)
- (9) Agricultural Sample Survey Report on Livestock, Poultry & Beehives Population (1994/95)

3. Data by Preliminary JICA Mission

- (1) Reply to Questionnaire for Rehabilitation of Telephone Cable Network (Addis Ababa) to be Financed by Japanese Government Grant
- (2) 41st Annual Report of ETA (1992/93)
- (3) 42nd Annual Report of ETA (1993/94)
- (4) Project Implementation (ERRP)
- (5) Telecommunications Services in Ethiopia (1894 - 1994)
- (6) Facts and Figures (Planning & Programming - 1994)
- (7) Sample Traffic Measurement at Analogue & Digital Local and Transit Exchanges
- (8) Tender for Local Telephone Cables (Technical Specifications)
- (9) Outside Plant Materials and Accessories (Technical Specifications)
- (10) Manhole Design
- (11) Addis Ababa Map (1/15,000)

4. Drawings and Maps

- (1) ETA Plant Records for Primary and Secondary Cables
- (2) Town Development Plan (1/2,000, 1/5,000, 1/10,000)
- (3) Water Supply Plant Record
- (4) Electric Supply Plant Record



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