THE KINGDOM OF THAILAND

DETAILED DESIGN REPORT

OF

THE BANGKOK TELEPHONE NETWORK PROJECT

(LOCAL CABLE NETWORK)

JUNE 1979

JAPAN INTERNATIONAL COOPERATION AGENCY

THE KINGDOM OF THAILAND

DETAILED DESIGN REPORT
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JAPAN INTERNATIONAL COOPERATION AGENCY

GUIDE MAP

TANDEM EXCHANGE

LOCAL EXCHANGE

SCALE 1:50,000

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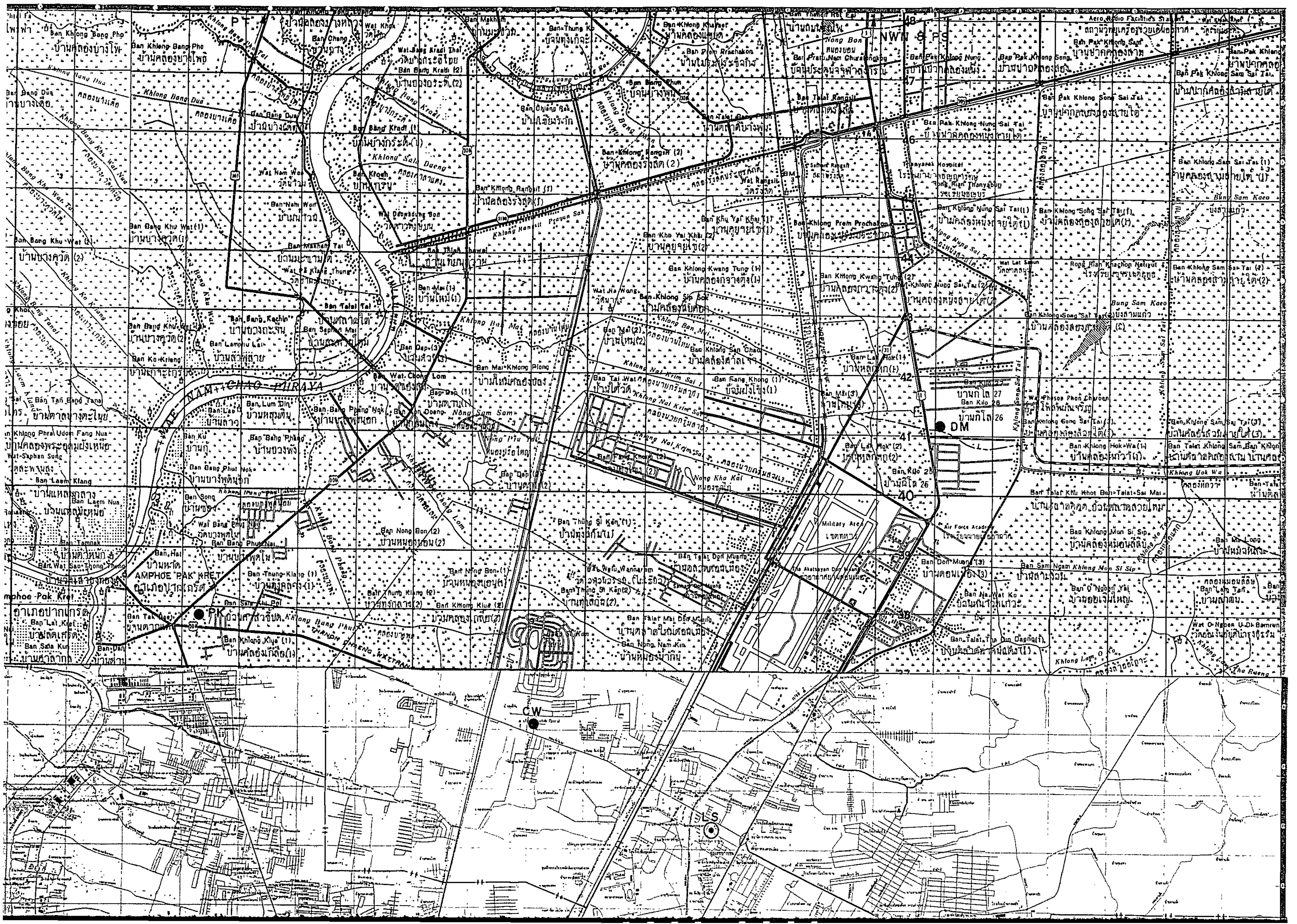
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Ban Makham Tai
Ban Talat Tai
Ban Bang Kachin
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Ban Lamphu Lai
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MAE NAM CHAO PHRAYA
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Ban Khlong Phra Udom Fang Nua
Wat Saphan Sung
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Ban Lum Din
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Ban Khlong Klua (2)
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THANON CHAENG WATTANA
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Ban Nong Bon (1)
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Ban Fang Khong (1)
Ban Fang Khong (2)
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Nong Sam Som
Ban Thung Si Kan (1)
Ban Thung Si Kan (2)
Wat Welu Wannaram
Ban Talat Don Muang
Ban Talat Mai Don Muang
Ban Nong Nam Kin
Military Area
Air Force Academy
Ban Don Muang (3)
Ban Lat Hok (1)
Ban Lat Hok (2)
Ban Kilo 27
Ban Kilo 26
Ban Kilo 25
Aero Radio Facilities Station
Ban Pak Khlong Sam
Ban Pak Khlong Nung
Ban Pak Khlong Song
Ban Pak Khlong Song Sai Tai
Ban Pak Khlong Nung Sai Tai
Ban Pak Khlong Sam Sai Tai
Thanyarak Hospital
Rong Rian Thanyaburi
Ban Khlong Nung Sai Tai (1)
Ban Khlong Nung Sai Tai (2)
Ban Khlong Song Sai Tai (1)
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Khlong Song Sai Tai
Khlong Sam Sai Tai
Wat Lat Sawun
Rong Rian Khachon Netiyut
Bung Sam Kaeo
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Ban Lam Tan
Ban Na Wat Ko
Wat O Ngoen U Di Bamrung
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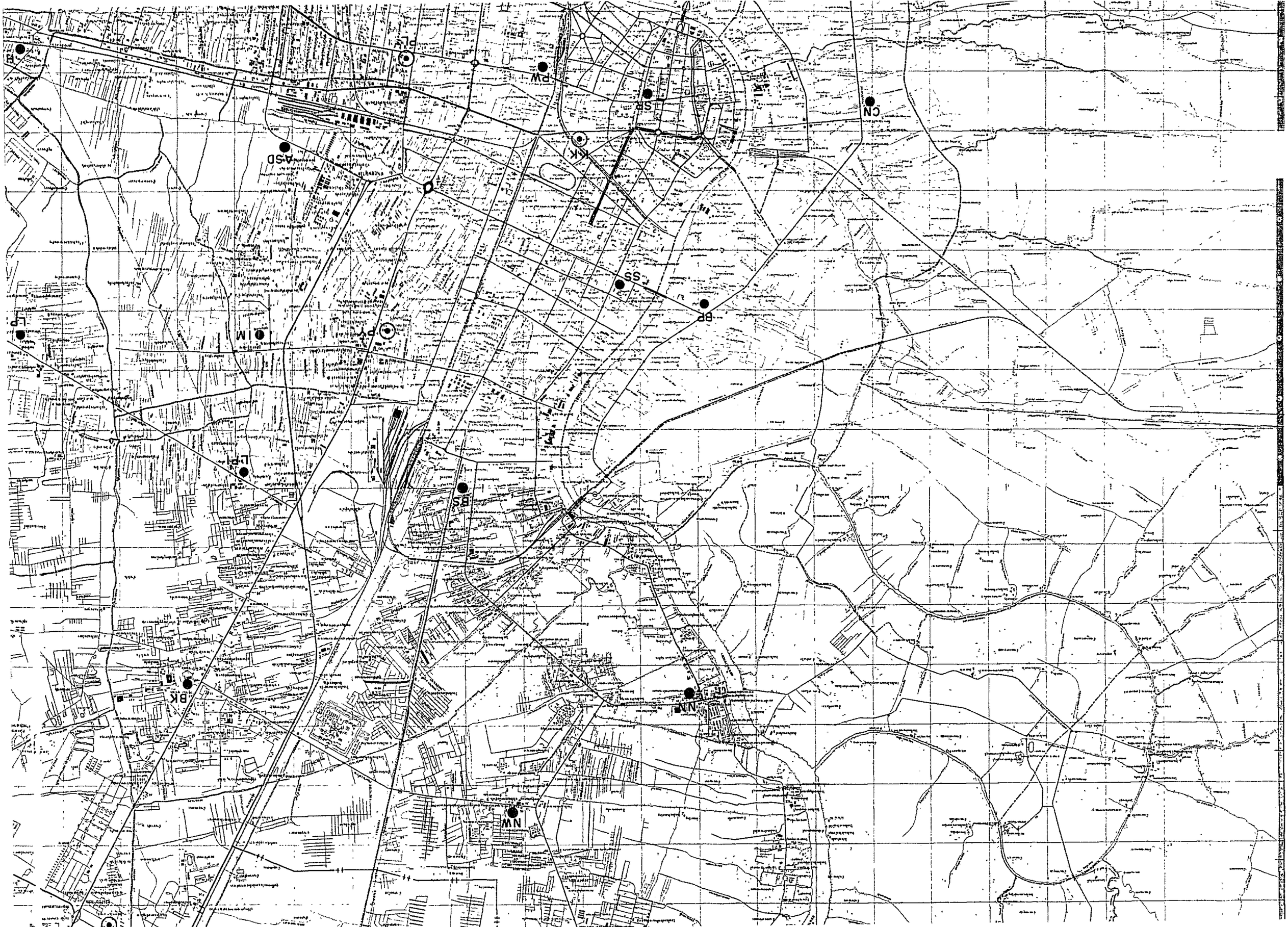
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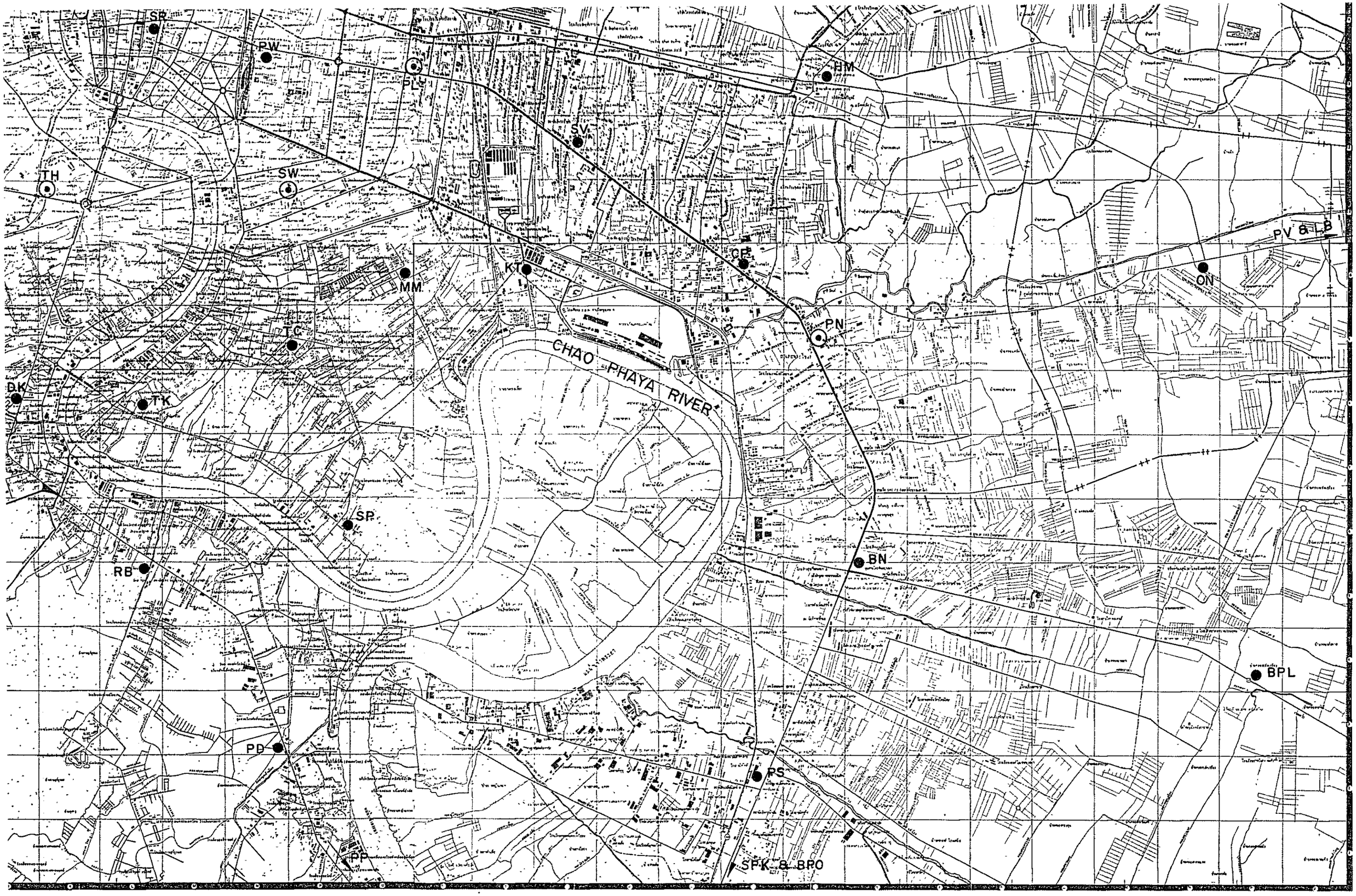
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PREFACE

In responce to the request of the Government of the Kingdom of Thailand, the Government of Japan as part of its overseas technical cooperation decided to make detailed designs of the local cable networks for the Bangkok Telephone Network Project, and the Japan International Cooperation Agency (JICA) carried out the task.

For this purpose JICA organised a twelve-member survey team and dispatched it to Thailand on August 21, 1978 to carry out a field survey for approximately six monthes, in close cooperation with the people and organizations concerned of the Government of Thailand.

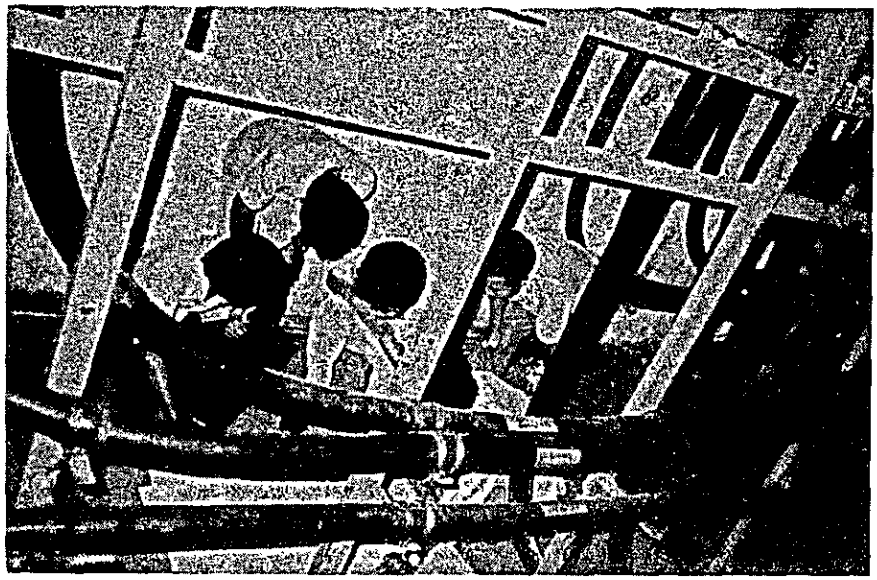
After returning to Japan, the survey team formulated a design report, based on the said survey and discussions held in Bangkok with the people concerned.

I hope that the report will be useful to the expansion and improvement of the telephone network in Bangkok and thereby contribute to the social and economic development of the Kingdom of Thailand and to further enhance the friendly relationship between our two countries.

I would like to express my deep apreciation to the members concerned of the Government of Thailand, the Telephone Organization of Thailand for their full cooperation extended to the team.

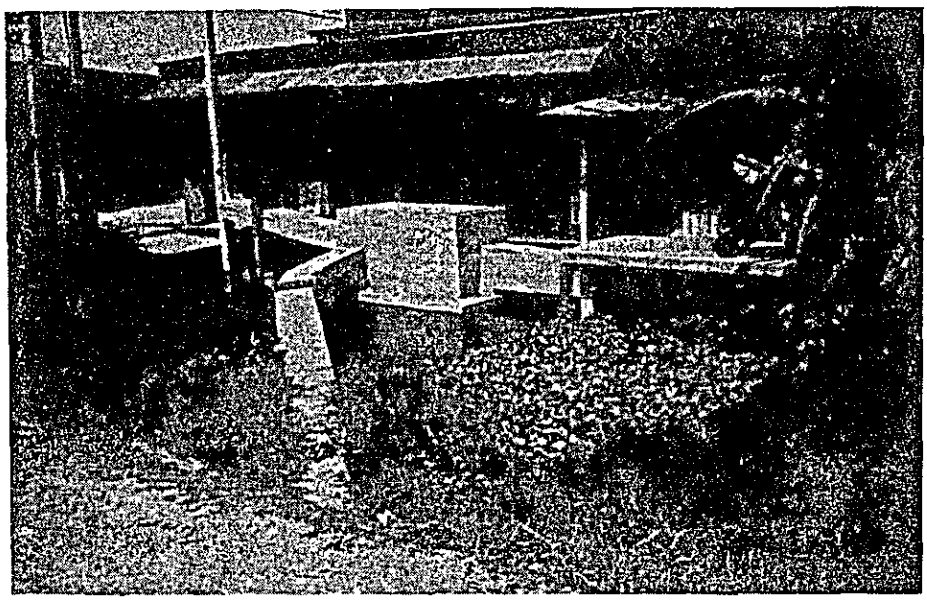
June, 1979

Shinsaku Hogen
President
Japan International
Cooperation Agency

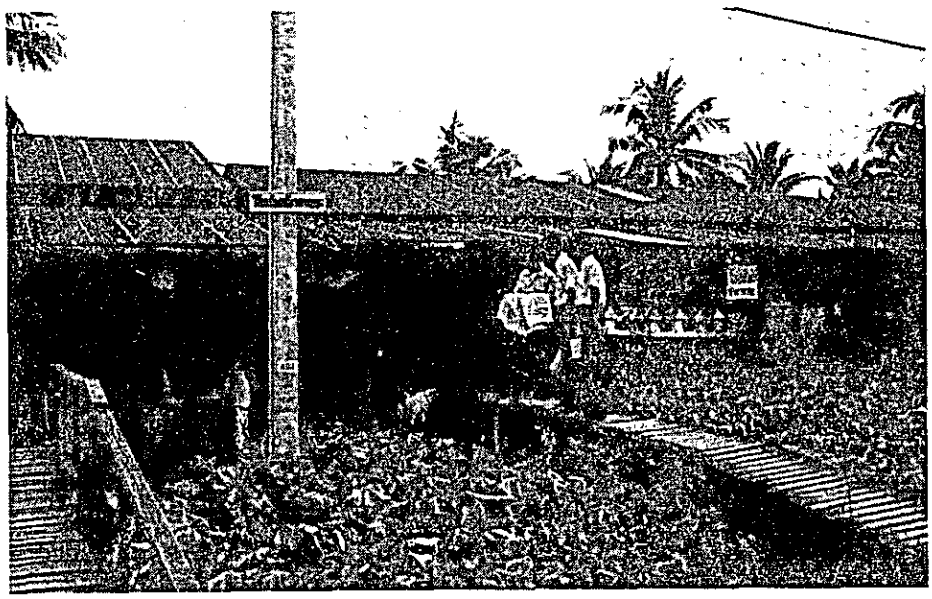


Cable Vault Investigation

Field Measurement in the Chaophraya River



Pulling Box & Riser in the Canal



Detailed Survey

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PART IV DETAILED DESIGN OF EACH EXCHANGE

PART 1 SUMARY

CHAPTER 1. PURPOSE AND BACKGROUND OF SURVEY

The Telephone Organization of Thailand (TOT) is carrying out its Third Telephone Development Project which is a part of the Fourth National Economic Development Plan for the Kingdom of Thailand. The Bangkok Telephone Networks Project (1977-1984) constitutes a central portion of the said Telephone Development Project.

This survey was conducted for the purpose of executing the detailed local cable network designs for the five telephone exchanges of Ploenchit, Chaengwatana, Pakkret, Ramindra and Onnut-1.

These five telephone exchanges are among the 19 exchanges to be expanded or newly opened. The expansion/construction works of the five exchanges belong to Package I, Phase II, of TOT's work schedule.

CHAPTER 2. SUBSTANCE OF MAIN WORK

The main contents of the survey conducted by the survey team are as follows:

(1) Execution of Field Survey and Preparation of Demand Distribution Map

Prior to the detailed design, the field survey was conducted for the purpose of obtaining a general knowledge of field conditions of the exchange areas. Based on the survey results, the telephone demand forecast was made, indicating the demand distribution on the field map. The forecast values for the five exchange areas are given in Figure 1.2.1.

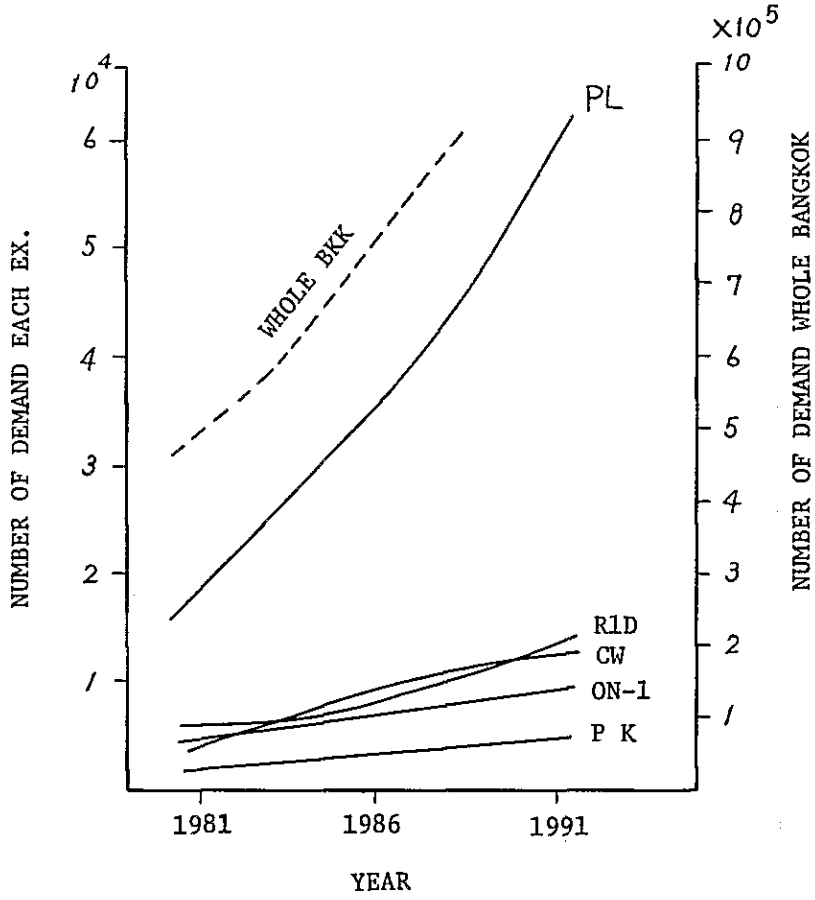

Fig. 1. 2. 1

(2) Establishment of Cabinet Areas

Cabinet areas were established, using main roads, rivers, railways, etc., as boundaries, so that they would need no change for a long period. In the establishment of cabinet areas, the optimum installation of distributing cables and the effective use of existing facilities were also taken into account.

The service area and the number of cabinet areas established for each exchange office are shown in Table 1.2.1.

Table 1.2.1

Exchange	Service Area (hectare)	Number of Cabinet Areas	Remarks
Ploenchit	1,150	146	Direct building lead-in: 4
Chaengwatana	3,050	23	
Pakkret	4,300	18	
Ramindra	4,500	40	Including provisional cabinet areas
Onnut-1	3,000	30	
Total	16,000	257	

(3) Design of Cable Network System

1) Design of Underground Cable System

The study of applicable underground cables, selection of underground cable routes, determination of the number of cable pairs and conductor sizes, cut-over design and gas facility design were conducted. In the determination of conductor sizes, the comparative study of subscriber's line loadings was also made.

2) Design of Aerial Cable System

The selection of aerial cable routes, determination of the number of cable pairs and conductor sizes, and study of existing cables to be utilized were carried out. Information concerning the availability of existing cables is especially important so that the record of existing facilities was complemented, where necessary, with data obtained in the field study.

(4) Design of Civil Works

Investigations were made concerning underground structures on cable routes and bridges along which to lay cable lines. This time, because of the topography of the areas, special cable bridges had to be designed at many places.

(5) Surveys

Surveys were conducted for locations where manholes, pull-boxes and poles would be newly built and concerning their relationships with the existing facilities.

(6) Investigation of Manholes

The investigation of manholes was made for the selection of ducts for cable placing and for the selection of cable jointing places in the manholes. The examination of existing cables in the manholes was another purpose of this investigation.

CHAPTER 3. ESSENTIAL AMOUNT OF WORKS

The essential amount of works calculated from the design drawings prepared on the basis of the foregoing surveys and investigations is shown in Table 1.3.1.

Table 1.3.1

Item	Unit	Quantity	Remarks
Telephone pole erection	Pole	135	
Guys	Line	1,039	
Aerial cables	km	210	
Underground cables	km	58	
Cross-connecting cabinets	Ea.	89	
Terminal sleeves	Ea.	1,987	
Underground conduits	km	32	Pipe length 236km
Manholes	Ea.	151	
Pulling-boxes	Ea.	84	
Bridges	Ea.	15	Total length 645m

PART II INTRODUCTION

CHAPTER 1. WHOLE ASPECT OF THAILAND TELEPHONE EXPANSION PROJECT

The Telephone Organization of Thailand (TOT) is proceeding ahead with the telephone network expansion project for the whole kingdom. The name of this project is the "Economic Development Project 1977-1984 of TOT" and, having been formulated along the line of the Fourth National Economic Development Plan 1977-1981 for the Whole Kingdom, constitutes an integral part of this Plan.

TOT has divided the project into two major segments. They are:

- Package I (1977-1982)
  - Phase I (13 Ex.)
  - Phase II (19 Ex.)
- Package II (1981-1984)
  - Phase I (13 Ex.)
  - Phase II (17 Ex.)

1.1 Contents of Package I, Phase I

(1) Service to Metropolitan Bangkok

1) Installation of additional 50,000 terminals at all 13 telephone exchanges
2) Installation of additional 44,500 pairs lead-in cables at local telephone exchanges
3) Installation of additional 82,000 pair-km local junction cables
4) Additional installation of subscriber's premise equipment

(2) Service to Rural Areas

1) Installation of additional 16,200 terminals at all 39 telephone exchanges
2) Installation of additional 20,800 pairs lead-in cables at local telephone exchanges
3) Installation of new subscriber's premise equipment

(3) Installation of new/additional 4,790 terminal equipment for long-distance telephone circuits

1.2 Contents of Package I, Phase II

(1) Service to Metropolitan Bangkok

1) Installation of additional 63,000 terminals at all 19 telephone exchanges

2) Installation of additional 100,300 pairs lead-in cables at local telephone exchanges

3) Installation of additional 186,650 pair-km of local junction cables

4) Installation of new subscriber's premise equipment

(2) Service to Rural Areas

1) Installation of additional 28,600 terminals at all 39 telephone exchanges

2) Installation of additional 36,600 pairs lead-in cables at local telephone exchanges

3) Installation of new subscriber's premise equipment

(3) Installation of new/additional 2,608 terminal equipment for long-distance telephone circuits

(4) Installation of new long-distance transmission system for long-distance telephone service to/from 210 distant places

1.3 Contents of Package II, Phase I

(1) Service to Metropolitan Bangkok

1) Installation of additional 60,000 terminals at all 15 telephone exchanges

2) Installation of additional 83,400 pairs lead-in cables at local telephone exchanges

3) Installation of additional 191,100 pair-km of local junction cables

4) Installation of new subscriber's premise equipment

(2) Service to Rural Areas

1) Installation of additional 27,400 terminals at all 39 telephone exchanges

2) Installation of additional 39,000 pairs lead-in cables at local telephone exchanges

3) Installation of new subscriber's premise equipment

(3) Installation of new/additional 9,388 terminal equipment for long-distance telephone circuits

(4) Installation of new long-distance transmission system for long-distance telephone service to/from 212 distant places

1.4 Contents of Package II, Phase II

(1) Service to Metropolitan Bangkok

1) Installation of additional 60,000 terminals at all 13 telephone exchanges

2) Installation of additional 97,100 pairs lead-in cables at local telephone exchanges

3) Installation of additional 209,550 pair-km of local junction cables

4) Installation of new subscriber's premise equipment

(2) Service to Rural Areas

1) Installation of additional 25,600 terminals at all 71 telephone exchanges

2) Installation of additional 29,400 pairs lead-in cables at local telephone exchanges

3) Installation of new subscriber's premise equipment

(3) Installation of new/additional 1,434 terminal equipment for long-distance telephone circuits

CHAPTER 2. REQUEST FOR TECHNICAL COOPERATION AND ORGANIZATION OF SURVEY TEAM

The Telephone Organization of Thailand (TOT) is promoting the telephone networks expansion project for the whole kingdom, based on its Third Economic Development Project (1977-1984).

For the successful completion of this project, TOT had to complement the shortage of staff design engineers and found it necessary to acquire technical cooperation from an overseas administration.

Thus TOT, through the Government of Thailand, made a request to the Government of Japan for cooperation in the surveys and designs with respect to the Bangkok Telephone Networks Project and the Rural Long-Distance Public Telephone Service Project.

In response to such request, the Government of Japan entrusted the Japan International Cooperation Agency (JICA) with execution of surveys to make detailed designs.

JICA organized a preliminary survey mission headed by Mr. Mitsugi Iijima (refer to Table 2.1.1) and despatched it to the Kingdom of Thailand for the period from June 28 to July 15 of 1978. The mission carried out discussions with officials concerned of the Government of Thailand and of TOT and compiled a draft of the scope of work for the detailed designs. At the same time, the mission conducted the field surveys of telephone facilities in Bangkok and the northeastern part of Thailand.

On the basis of the preliminary survey results, JICA decided to despatch a full-time survey mission to the Kingdom of Thailand. At the smae time, JICA assigned the Nippon Telecommunications Consulting Co., Ltd. (NTC), a firm with rich experience and service records in respect of telephone system design and system construction supervising in Thailand, to execute the aforementioned work.

Table 2.1.1 Organization of Preliminary Survey Mission

Name	Assignment	Present Position
Mitsugi IIJIMA	Chief	Counsellor of Telecommunications, Ministry of Posts & Telecommunications
Susumu SAITO	Outside Plant Engineering	Senior Engineer, Nippon Telegraph & Telephone Public Corporation
Kunio MIYAKAWA	Radio Engineering	Ditto
Kenzo NAKAJIMA	Carrier Engineering	Ditto
Kenichi HATANO	Communication Network Engineering	Engineer, the Nippon Telecommunications Consulting Co., Ltd.
Tokuichi KATAGIRI	Business Coordination	Social Development Cooperation Officer, Japan International Cooperation Agency

NTC, based on the contents of work assigned, organized two survey teams, one for the rural long-distance telephone network and the other for the local cable system in Bangkok. The latter team headed by Mr. Tateo Kobayashi and composed of 11 other experts (refer to Table 2.1.2) carried out the field survey for the period of approximately six months from August 21, 1978.

Table 2.1.2 Organization of Survey Team for Local Cable System in Bangkok

Name	Assignment	Position in NTC	Survey Period
Tateo KOBAYASHI	Overall Supervising	Technical Section Manager, Communication Design Division (Registered Consulting Engineer)	August 21, 1978 to February 20, 1979
Kuniharu OKUHATA	Local Cable System Design	Ad Hoc Section Manager, Overseas Operation Division	Ditto
Tomio YAMAMOTO	Ditto	Overseas Operation Division	Ditto
Junzo TAKAI	Ditto	Osaka Branch	Ditto
Masaaki KUBOZONO	Ditto	Communication Design Division	Ditto
Tetsuo KATO	Ditto	Ditto	Ditto
Shuichi ISHIMOTO	Ditto	Ditto	Ditto
Kunio YUKINO	Ditto	Ditto	Ditto
Tokio AKASHI	Ditto	Ditto	Ditto
Hiroshi SAKIHARA	Civil Work Design	Communication Design Division (Assistant Manager, Communication Design Department)	October 21, 1978 to February 20, 1978
Shigenori NISHIMOTO	Ditto	Ditto	Ditto
Taira MIKAMI	Ditto	Ditto	Ditto

For the purpose of satisfactory execution of the detailed design work and supervision of work execution, the Work Management Committee (refer to Table 2.1.3) was established.

Table 2.1.3 Organization of Work Management Committee

Name	Assignment	Present Position
Mitsugi IIJIMA	Chairman	Telecommunications Department Manager, Ibaraki Office, Nippon Telegraph & Telephone Public Corporation former: Counsellor of Telecommunications, Ministry of P&T
Shigeomi TAKAHASHI	Member	Assistant Counsellor of Telecommunications, Ministry of Posts & Telecommunications
Susumu SAITO	"	Deputy Manager of Sumida District (Tokyo) Telephone Office, Nippon Telegraph & Telephone Public Corporation former: Senior Engineer, NTTPC
Yoshibumi ITO	"	Engineer, Construction Technique Development Office, Nippon Telegraph & Telephone Public Corporation

ANNEX

Scope of Work for the Detailed Design of Bangkok Telephone Networks Project and the Feasibility Study of Rural Long Distance Public Telephone Service, 1978, and Minutes of the discussions thereof are attached hereto.

SCOPE OF WORK

FOR

THE DETAILED DESIGN OF

BANGKOK TELEPHONE NETWORKS PROJECT AND

THE FEASIBILITY STUDY

OF RURAL LONG DISTANCE PUBLIC

TELEPHONE SERVICE, 1978

I. INTRODUCTION

The Government of Japan has, in response to the request of the Government of Thailand, decided to conduct a detailed design study for local network of five (5) exchange areas in Bangkok Metropolitan area and the feasibility study of rural long distance public telephone service, in accordance with laws and regulations in force in Japan. Based on this decision, the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of Technical Cooperation Programmes, will carry out the study in close cooperation with the Thai authorities concerned. The present document sets forth the Scope of Work for the Study.

II. OUTLINE OF SURVEY/STUDY

1. Local Network

A. The following field survey, accompanied with desk work, for the five (5) exchange areas, i.e., (Ploenchit, Ram Indra, Changwatana, On Noot(1), Pakred) will be carried out for a period of about six (6) months by the Survey Team composed of about eleven (11) experts:

(1) Demand Field Survey

Subscriber forecasts at the micro-level will be conducted to collect data by which to design the cable distribution network. The final segment of this network design requires street-by-street forecasts.

(2) Detailed Survey

Detailed survey will be made, covering all newly proposed duct and cable routes. Study of the existing conducts and cables will be made on the basis of plant records. If Necessary, on-the-spot survey of the existing facilities will be carried out.

(3) Manhole Investigation

Ducts to be used will be selected after the checking of cable placements and locations of cable splices in the existing manholes.

(4) Selection of New Routes

Cable routes will be decided according to the results of investigation of the existing facilities, the study of future plan, and the comparison of several proposed routes.

(5) Dividing of Cabinet Area

Dividing of cabinet areas will be carried out according to the cable routes and considering the demand survey results. Locations of cabinet boxes will then be decided.

(6) Survey of MDF and Cable Vault

Locations of riser cables to MDF and cable placements in cable vaults will be investigated.

(7) Field Measurement

Field measurement will be conducted for all proposed cable routes and some existing cable routes. Levels and cross-sections of roads will be measured to determine the locations of new conduit routes.

B. The final stage of the detailed design work, as indicated below, will be undertaken in Japan by the Survey Team.

Cable Work:

(1) Key Plan
(2) Transmission Sheet, Resistance Design Method
(3) Primary Cable General Plan
(4) Primary Cable Feeder Plan
(5) Secondary Cable General Plan
(6) Secondary Cable Detail
(7) MDF and Cable Vault Plan
(8) Gass Pressurization Plan
(9) Duct Scheme Plan
(10) Manhole Racking Diagram

(11) Cabinet Jointing Plan

(12) Loading Plan

(13) Amount of work for Primary Cable

(14) Amount of work for Secondary Cable

Civil Work:

(1) Guide Map

(2) Conduit Plan

(3) Plane

(4) Cross Section

(5) Manhole Diagram

(6) Special Design (if necessary)

2. Rural Long Distance Public Telephone Service

A. The following study accompanied with field survey for 422 rural districts will be carried out for a period of about five (5) months by the Survey Team composed of about six (6) experts:

(1) Study and Selection of Applicable Area for Transmission Systems
Technical and economic studies concerning the applicable area will be made for the UHF, SHF and domestic satellite systems, as well as voice cable system and other systems.

(2) Selection of Transmission Route
The transmission route will be selected through the following works:

1) Circuit assignment and selection of optimum transmission route.

2) Preparation of circuit demand diagram for each transmission route.

3) Selection of optimum transmission system.

(3) Detailed Study and Field Survey of Transmission Route Selected
For radio system, propagation paths will be studied by means of profile maps. For cable system, cable laying roads will be selected after careful map study. Field survey will be

carried out for the routes for which the survey is considered to be essential.

(4) Establishment of Design Criteria and Study of Each Selected Route

The design criteria will be established for both radio and cable systems. Radio interference to/from existing radio systems and transmission quality will be estimated based upon the design criteria.

(5) Preparation of Yearly Implementation Schedule and Cost Estimation

The yearly implementation schedule will be prepared together with cost estimation.

(6) Economic analysis

B. The final stage of technical and economic studies, as indicated below, will be undertaken in Japan by the Survey Team.

(1) Route Plan
(2) Typical Radio System Configuration
(3) Cable Route Map
(4) Path Profile Maps (if necessary)
(5) Required Antenna Height (if necessary)
(6) System Performance Calculation
(7) Frequency Assignment Plan
(8) Interference Noise Calculation
(9) Cost Estimation and Comparison
(10) Economic Evaluation
(11) Summary of Study and Recommendation

III. REPORT

1. Local Networks

The following documents will be prepared in English and submitted to the Government of Thailand within about four (4) months after the completion of studies in Thailand for the local networks.

(1)	Design Report	(20) copies
(2)	Drawings	(20) copies (plus 1 set of original tracing)
(3)	Amount of Work	(20) copies (in assembly unit)
(4)	List of Main Materials	(20) copies

2. Rural Long Distance Service

The interim report will be prepared in English and submitted to TOT in ten (10) copies at the end of 1978.
The final report will be prepared in English and submitted in ten (10) copies to the Government of Thailand by the end of February, 1979.

IV. COLLABORATION OF THE GOVERNMENT OF THAILAND

1. The Government of Thailand will exempt the Survey Teams from taxes and duties on machinery, equipment and materials to be brought into Thailand by the Teams in the same way as the Government normally accords to the Colombo Plan experts.

2. The Government of Thailand will exempt the Team members from income tax and charges of any kind to be imposed on or in connection with the living allowances remitted from abroad and will exempt the Team members from import and export duties to be imposed on their personal effects.

3. The Government of Thailand will prepare necessary permits for implementation of outdoor work.

4. The Government of Thailand will provide transportation facilities, such as vehicles and boats, which are necessary for the Rural Long Distance Public Telephone Service Survey.

5. The Government of Thailand will assign its counterpart personnels to the Teams during the survey period and will arrange the necessary number of labourers. (Employment cost for labourers will be borne by the Teams.)

6. The Government of Thailand will provide the Teams with relevant data, information and materials necessary for the Survey shown in Annex-I. The Government will also make necessary arrangements for the Teams to take these data and materials back to Japan so as to use them in preparing the report.

Annex-1

Documents to be supplied by T.O.T.

For Local Network

1) Maps of Great Bangkok
2) Long-term plan for conduit lines
3) Construction and installation practices of TOT
4) City planning of Great Bangkok
5) Plant Records of existing facilities concerned
6) Data and Records belonging to other authorities
7) Boundaries of each Exchange area
8) Subscriber forecast in each Exchange area
9) Proposed Exchange office layout
10) List of waiting subscribers and their distribution map
11) Standard method of local network design

For Rural Long Distance Public Telephone Service

1) Basic consideration for the extension of rural long distance communication networks
   i) Priority on the construction of stations now being planned
   ii) Future plan for rural networks except those for the current 422 districts
2) Circuit demand at both initial and final stages
3) Basic plans for toll telephone networks
   i) Toll zone system
   ii) Transmission loss distribution plan
   iii) Noise distribution plan
   iv) Signaling system
   v) Rate (tariff) system
4) Radio frequency assignment for existing systems
5) Basic concept for maintenance and operation

6) Outline of applicable domestic satellite system
   i) Electrical performance of the satellite to be leased
   ii) Lease fee
   iii) Lease conditions
7) Maps of Thailand
8) General Information
   i) Statistical data on national economy
   ii) National development plan
   iii) TOT development plan
   iv) Latest census data
   v) Present organization, number of employees and the budget of TOT
   vi) TOT service revenue and expenditure

NOTE: TOT is required to submit the above-mentioned documents by the beginning of August.

Work Schedule for Bangkok Telephone Network Project

Item \ Month	1978						1979					
		Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
Demand Forecast Data, Existing Plant Study & Check		———										
Field Demand Survey		———	———									
Basic Plan			———									
Field Survey (details)				———	———	———						
				-·-·-	-·-·-	-·-·-						
Manhole Investigation					———	———						
Drawing						———	———	———	———	———	▽Draft	
						-·-·-	-·-·-	-·-·-	-·-·-	-·-·-		
Estimation									———			
									-·-·-			
Report							----------	----------	----------	----------	▽Draft Printing	

REMARKS

	In Thailand	In Japan
Cable work	———	———
Civil work	—·—·—	—·—·—

Minutes of the meeting on the Scope of Work
for the detail design of Bangkok telephone network project and the feasibility study of rural long distance public telephone service 1978.

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At the request of the Government of Thailand for a group of experts, the Government of Japan had sent a preliminary survey team headed by Mr. Mitsugi Iijima, Counsellor of Telecommunications, Ministry of Posts and Telecommunications, to discuss the draft of the scope of work.

Based on this decision, the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of Technical Cooperation Programs, will carry out the study in close cooperation with the Thai Authorities concerned.

The team held a series of discussions and exchanged views with Thai Authorities concerned on the detail design for local network of five exchange areas in Bangkok Metropolitan Area and the feasibility study of rural long distance public telephone service.

As a result of the survey and discussion, both parties have reached an agreement on the scope of work. Minutes of the discussions and the scope of work are attached herewith.

Bangkok July 13, 1978

Mr. Surind Vanichsoni Director of the Office of Planning and Project. Telephone Organization of Thailand	Mr. Mitsugi Iijima Counsellor of Telecommunications, Ministry of Posts and Telecommunications

Record of the discussion on scope of work for the detailed design of Bangkok telephone network project and the feasibility study of rural long-distance public telephone service 1978.

July, 1978

Between

Telephone Organization of Thailand

and

Japanese Mission

Minutes of the discussion on scope of work for
the detailed design of Bangkok telephone network project
and the feasibility study of rural long-distance public
telephone service 1978.

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As for the draft of "Scope of Work", the meeting was held on June 29 - July 13, 1978 at the conference room of the Office of Planning and Project in attendance with TOT representatives and Japanese Mission.

I. For local network

Attendants:-

(TOT representatives)

Mr. Surind Vanichseni	Director of the Office of Planning and Project
Mr. Prayote Dangsupa	Chief of the Outside Plant Planning Division
Mr. Ong-Art Polltavee	Deputy chief of the Outside Planning Division
Mr. Chan Rodphayat	Chief of the Metropolitan Network Planning Unit

(DTEC)

Mr. Sutin Susila	TEO

(Japanese Mission)

Mr. Mitsugi Iijima	Chief of mission
Mr. Susumu Saito	Member of mission
Mr. Kunio Miyagawa	Member of mission
Mr. Kenzo Nakajima	Member of mission
Mr. Kenichi Hatano	Member of mission
Mr. Tokuichi Katagiri	Member of mission

(Embassy of Japan)

Mr. Hitoshi Ikeda	Second Secretary

(JICA)

Mr. Yasuo Kitano	Director of Bangkok Office
Mr. Ryo Suwa	Staff

TOT representatives and Japanese Mission discussed the draft of scope of work. The main results from the meeting are as shown from No.1 to 6 in the following. There were no any other opinions regarding the draft of Scope of Work between TOT representatives and Japanese Mission.

1. On the item A under the subject local network, the name of five exchanges for local network design is as follows:

1.1	Ploenchit	EXCH.
1.2	Changwatana	EXCH.
1.3	On Noot I	EXCH.
1.4	Ram Indra	EXCH.
1.5	Pakred	EXCH.

2. On the item B under the subject of the final stage of the detailed design work, the work consists of the following items.

2.1 Key plan
2.2 Transmission sheet and resistance design method
2.3 Primary cable general plan
2.4 Primary cable feeder plan
2.5 Secondary cable general plan
2.6 Secondary cable detail
2.7 MDF cable vault plan
2.8 Gas pressurization plan
2.9 Duct scheme plan
2.10 Manhole racking diagram
2.11 Cabinet jointing plan
*2.12 Loading plan

*2.13 Amount of work in assembly unit for primary cable work, using TOT's form

*2.14 Amount of work in assembly unit for secondary cable work, using TOT's form

Note: marks * are the new works to be requested by TOT.

3. On the item III under the subject "Report", the number of copy is twenty (20).

4. On the item No. IV-4 and IV-5 under the subject counterpart, TOT arranges the counterpart for the survey team as follows:

- Two (2) counterpart personnels for each exchange and one (1) counterpart personnel for civil work
- Desks and chairs for the counterpart personnels
- Survey cars for the counterpart personnels, if necessary

In this connection, TOT requested that the survey team should not only do the design work but also provide on-the-job training for TOT's counterpart personnels.

5. On the item No. IV-4 TOT proposed to provide the survey team with an office at the Asoke-dindang Exchange. However, after a visit by the Japanese Mission, the Mission pointed out that the office rooms proposed by TOT may not be suitable for a long term study for the reason of no windows, although the Mission greatly appreciated TOT's consideration. It is agreed that the working office for the survey team will be provided by the Government of Japan, therefore a part of the item 4 is to be deleted.

6. In addition, TOT requested the Japanese Mission to provide training for counterpart personnels in Japan and to render technical assistance for the detailed design of local network of five exchanges in the next fiscal year.

II. For rural long distance public telephone service

Attendants:-

(TOT representatives)	
Mr. Surind Vanichseni	Director of the Office of Planning and Project
Mr. Sutham Malila	Chief of Long Distance Plant Installation Division
Mr. Prabhatson Ruchidesa	Acting Chief of Long Distance Plant Engineering Division
(DTEC)	
Mr. Sutin Susila	TEO
(Japanese Mission)	
Mr. Mitsugi Iijima	Chief of mission
Mr. Susumu Saito	Member of mission
Mr. Kunio Miyagawa	Member of mission
Mr. Kenzo Nakajima	Member of mission
Mr. Kenichi Hatano	Member of mission
Mr. Tokuichi Katagiri	Member of mission
(Embassy of Japan)	
Mr. Hitoshi Ikeda	Second Secretary
(JICA)	
Mr. Yasuo Kitano	Director of Bangkok Office
Mr. Ryo Suwa	Staff

TOT representatives and Japanese Mission discussed the draft of Scope of Work. The main results from the meeting are as shown from No. 1 to No. 10 in the following. There were no any other opinions regarding the draft of Scope of Work between TOT representatives and Japanese Mission.

1. On the item B, (4) under the title "Path Profile Maps", the phrase "if necessary" is added at the end of title. Regarding the preparation of path profile maps, TOT explained that the profile maps prepared by TOT will be sufficient for the purpose of feasibility study. However, the Survey Team will carry out the field survey on a sampling basis if the field survey is considered to be essential.

2. On the item B, (5) under the title "Required Antenna Height", the phrase "if necessary" is added at the end of title.

3. On the item B, (6) under the title "Thermal Noise Calculation", the title is replaced by "System Performance Calculation".

4. On the item B, (9) under the title "Cost Estimation", the phrase "and comparison" is added at the end of title.

5. On the item B, the phrase "Summary of Study and Recommendation" is added as item (11) after item (10) "Economic Evaluation".

6. On the item III-2 under the title "Rural Long Distance Service", the following sentences are added: "The interim report will be prepared in English and submitted to TOT in ten (10) copies at the end of 1978. The final report will be prepared in English and submitted to the Government of Thailand in ten (10) copies by the end of February, 1979".

7. On the item IV-4. The whole sentence is changed as follows: "The Government of Thailand will provide transportation facilities, such as vehicles and boats, which are necessary for the Rural Long Distance Public Telephone Service Survey".

8. On the item IV-5, TOT will arrange as follows:
   - three (3) counterpart personnels for the Survey Team
   - desks and chairs for the counterpart personnels

In this connection, TOT requested that the Survey Team should not only do the study work but also provide on-the-job training for TOT's counterpart personnels.

TOT also requested that some counterpart personnels will be trained in Japan.

9. On the item IV-6, the whole sentence as described below is deleted: "The Government of Thailand will assure the security of the Survey Teams".

The reason is that the TOT counterpart personnels will take proper action for the security of the Survey Team depending upon the situation during the field survey.

10. On the Annex-I "Documents to be supplied by TOT", the following documents and information are supplied to Japanese Preliminary Study Team:

1) Traffic distribution for rural long distance telephone service
2) Transmission loss distribution plan
3) Inter - exchange signalling plan
4) Radio frequency assignment for existing system
5) An example of path profile and path calculation
6) Regulations on telephone service charges and deposits
7) Statistical report, 1976
8) Annual report, 1976
9) "PALAPA" Eirp and G/T contours
10) Radio frequency assignment plan for 900 MHz band
11) The national numbering plan
12) Basic concept for maintenance and operation

PART III DETAILED DESIGN WORK

CHAPTER 1. DESIGN OBJECTIVE EXCHANGES AND DEMAND FORECAST

1.1 Outline of the Design Objective Exchanges

(1) Ploenchit (PL) Exchange

The PL Exchange is a local tandem exchange office located in the central part of Bangkok. At present, this exchange is equipped with 20,000 terminals and will have additional 6,000 switching lines in the current project. Approximately 5,000 subscriber lines now accommodated in this exchange can be cut over to the Pathumwan Exchange scheduled to be opened in 1979.

(2) Chaengwatana (CW) Exchange

The CW Exchange is to be branched from the Ngamwongwan Exchange, with initial capacity of 5,000 terminals. (No. of Sub. approx. 800 lines). The Chaengwatana Road traverses the middle part of the service area. The surrounding farmlands and swamps are being reclaimed into the residential lands. The most part of telephone demand in the service area is for residential telephones.

(3) Pakkret (PK) Exchange

The PK Exchange adjoins the CW Exchange and the environmental condition is the same as that of the CW Exchange. This exchange is to start as a mobile exchange with 1000 terminals (No. of Sub. approx. 440 lines) and is scheduled to be cut over to a permanent exchange with 2,000 switching lines to be constructed in 1982. The cable plant is designed to accommodate 2,000 switching lines. Although the opposite side of the Chaophraya River belongs to the service area of the Bangbuathong Exchange, it is difficult to have the telephone demand in that area covered by the Bangbuathong Exchange, so that, in this design such demand is to be met by the PK Exchange.

(4) Ramindra (RID) Exchange

The RID Exchange is located in the northeastern part of Bangkok. The spacious farmlands or swamps in the surrounding area are being reclaimed into the relatively high grade residential quarters. The RID Exchange is presently a mobile exchange with 800 terminals but is to be moved to the permanent exchange with initial capacity of 10,000 switching lines, to be constructed at the adjoining site in the current project. (No. of Sub. approx. 1290 lines)

(5) Onnut-1 (ON-1) Exchange

The ON-1 Exchange embraces in its service area the swampy zone that spreads along the Phathanakarm Road and the Onnut Road. Since recently, the construction of residential houses is making rapid progress in this area. Also, a highway traversing the service area from north to south is being constructed, so that, after the completion of this highway, the environmental condition in this neighborhood is considered to change to a great extent. In the service area of this exchange, the Muangthong mobile exchange is in service at present and a part of HM Exchange and PN Exchange cables are laid. The ON-1 Exchange is to start with 5,000 switching lines. (No. of Sub. approx. 1480 lines)

1.2 Demand Forecast

Detailed field surveys were carried out in the service areas of all exchanges, based on TOT's telephone demand forecast record. As the result of these surveys, the TOT record was corrected and the demand distribution map was formulated.

The demand evaluation was made for three years, i.e., for 1981, for present demand; for 1986, for demand five years later; and for 1991, for demand 10 years later.

1.2.1 Field Surveys

Field surveys were carried out, based on the city map of Bangkok (scale: 1/1,000). The latest information of all kinds, including housing complex construction plans and road construction and expansion plans, were collected and plotted on the map. This time, a large part of design objective areas were suburban residential quarters so that the accurate knowledge of housing complex plans was most important for the correct demand forecast.

(1) Classification of Service Area

Each service area was classified into the following four area categories:

A. Business area

B. Residential area

C. Special demand area

such as governmental offices, schools, hospitals, hotels, military units and factories, where the telephone demand density is by far greater than in the surrounding areas.

D. Pre-construction area

where the town planning was not yet completed at the time of the survey but where the construction of residential houses, factories, etc., is expected in the future so that the collective demand for telephones is likely to be generated.

(2) Overt Demand Forecast

The overt demand forecast standards by user categories are shown in the table below.

Forecast Standards

User Category	Overt Demand	Remarks
Large stores, large restaurants	2-3 telephone for each	
Private stores, common restaurants	1 telephone for each	
High, middle grade residences	1 telephone for each	
Small business offices	2 telephones for each	
High grade apartment houses	1 telephone for each room	
Hotels	1 telephone for 8 rooms	Owners interviewed for prospective telephone demand
Rental office buildings	1 telephone for floor space of 70 m^2	"

(3) Special Demand Forecast

A. For the special demand area, such as office buildings, hospitals and military units, the location and boundary were inscribed on the map and the overt demand was evaluated individually.

B. For the pre-construction area, such as the area where the housing complex construction was scheduled, the location and boundary were inscribed on the map and the overt demand was evaluated individually.

The surveys for all these demand forecasts were carried out with the cooperation of TOT officials. In case where proper answers could not be obtained from potential users interviewed, the possible demand was forecasted by the interviews.

This demand forecast record is attached to the exchange by report.

1.2.2 Demand Forecast Procedure

Based on the overt demand estimate obtained by the field surveys and consulting the demand growth report prepared by TOT, the demand growth rate for each exchange was calculated and thus the demand for each exchange for years 1981, 1986 and 1991 was forecasted. For the special demand area and the pre-construction area, as much latest information as possible was collected. Especially for the housing complex plans, there were cases where the construction was not yet started even after the completion of land formation and sales by lots. As a matter of fact, unless the housing construction period can be known definitely, the demand forecast and, as the result, the cable network design become difficult.

1.2.3 Demand Forecast by Exchange

The demand forecast by exchanges by years is as follows:

Demand Forecast by Exchanges

Exchange		1981	1986	1991
Ploenchit	Demand	18,620	35,650	59,500
	Growth rate	100.0	191.4	319.5
Chaengwatana	Demand	3,730	8,920	12,370
	Growth rate	100.0	239.1	331.6
Pakkret	Demand	1,920	2,830	4,520
	Growth rate	100.0	147.4	235.4
Ramindra	Demand	6,100	8,100	12,700
	Growth rate	100.0	132.8	208.2
Onnut-1	Demand	4,810	7,090	9,500
	Growth rate	100.0	147.4	197.5