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**BASIC DESIGN STUDY REPORT**  
**ON**  
**THE PROJECT FOR THE PROVISION OF IDENTIFICATION EQUIPMENT**  
**IN**  
**THE KINGDOM OF THAILAND**

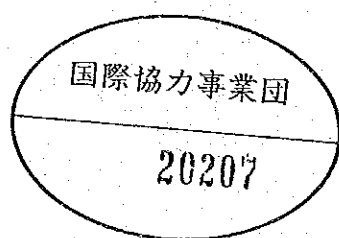
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**OCTOBER 1989**

**JAPAN INTERNATIONAL COOPERATION AGENCY**



## PREFACE

In response to the request of the Government of the Kingdom of Thailand, the Government of Japan has decided to conduct a Basic Design Study on the Project for the Provision of Identification Equipment and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Thailand a survey team headed by Mr. Tadatoshi Naito, Assistant Director, Identification Division, Criminal Investigation Bureau, National Police Agency from July 30 to August 18, 1989.

The team exchanged views with the officials concerned of the Government of Thailand and conducted a field survey in the Bangkok Metropolitan area. After the team returned to Japan, further studies were made. Then, a mission was sent to the Kingdom of Thailand in order to discuss the draft report and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Kingdom of Thailand for their close cooperation extended to the team.

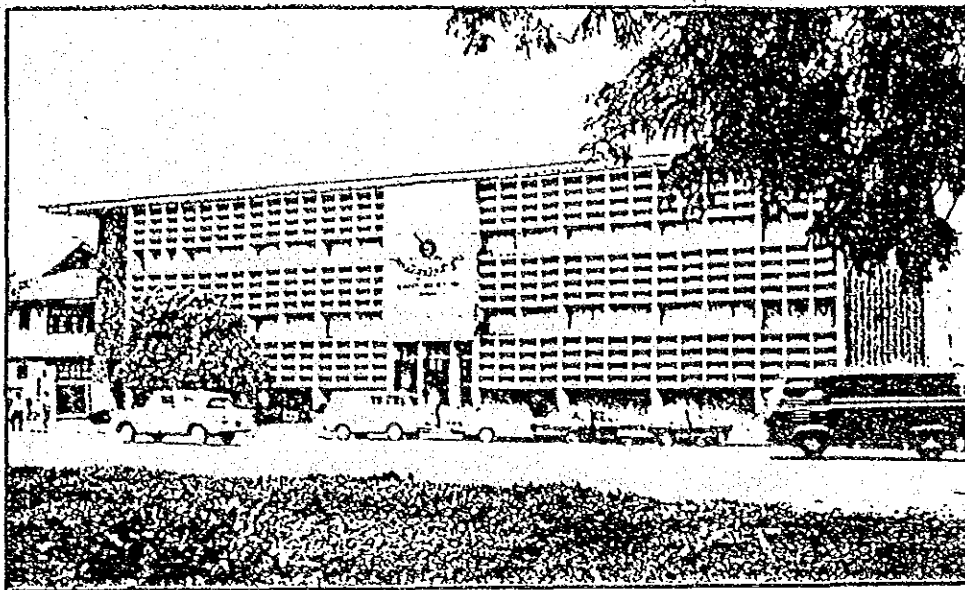
October, 1989



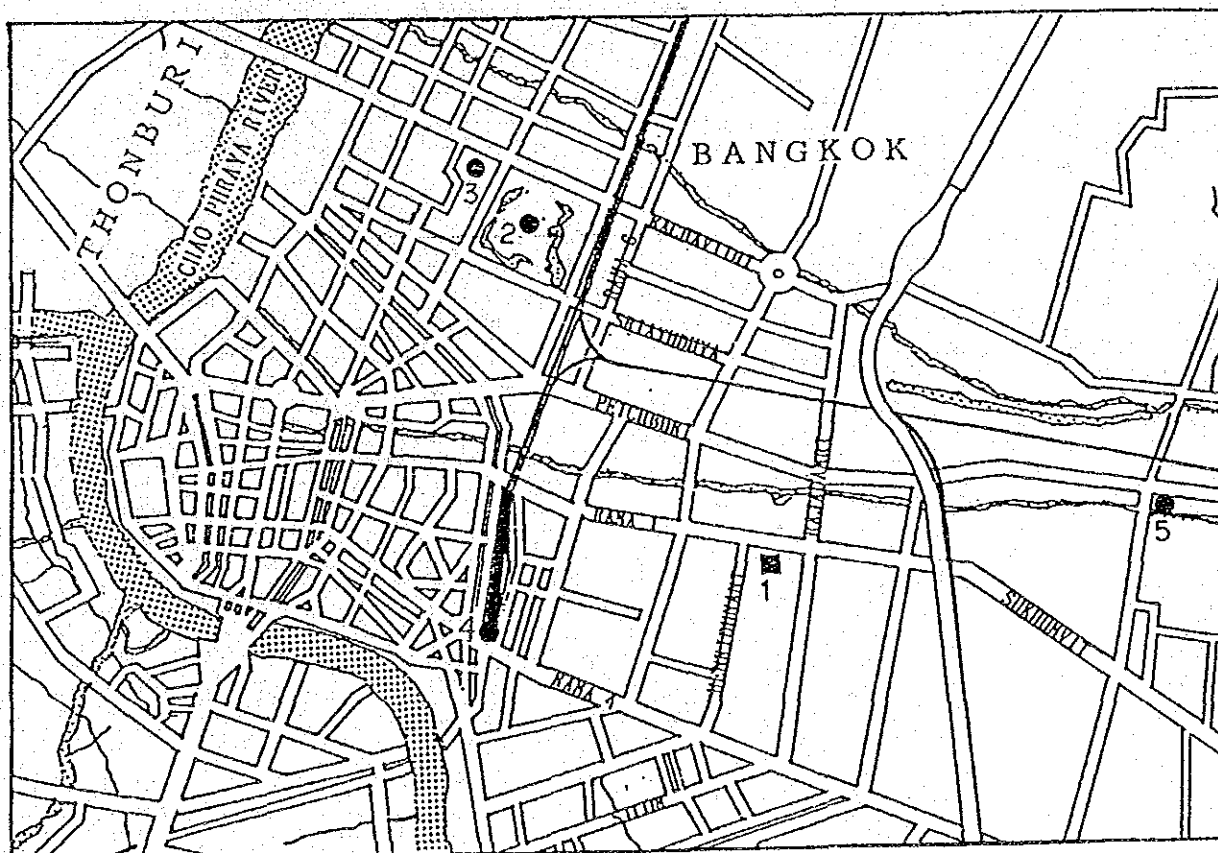
Kensuke Yanagiya  
President

Japan International Cooperation Agency





SCIENTIFIC CRIME DETECTION DIVISION BUILDING



1. ROYAL THAI POLICE DEPARTMENT
2. CHITR LADA PALACE
3. NATIONAL ASSEMBLY
4. KRUNG THEP STATION
5. EMBASSY OF JAPAN



0 1 2 3 4 5KM

BANGKOK CITY MAP





## SUMMARY



## SUMMARY

The Royal Thai Police Department (hereinafter referred to as the "RTPD"), The Government of the Kingdom of Thailand is in charge of crime prevention, national security and public service.

Public safety in Thailand has been well maintained in recent years. However, due to the various kinds of economic investment in urban commerce and industry, the rural population has been migrating to the Bangkok Metropolitan area seeking employment opportunities. As a result, the protection of people's lives and property, as well as housing and unemployment problems, have become serious issues. Public safety is one of the main aims of the Sixth National Development Plan, together with better education, public health, water supply, and housing services. At the same time, protection of the lives and property of foreign nationals has also become a big issue because the number of tourists and foreign residents in Thailand has been rapidly increasing.

The number of crimes in Thailand has not increased much in recent years; however, various kinds of crimes such as theft, robbery, murder and drug dealing can be observed over a wider area and with increasing viciousness. In this circumstance, the number of arrests decreased compared with the previous year. Therefore, it is urgent for RTPD to modernize its crime detection support system by introducing new scientific crime detection equipment, so that public safety can be guaranteed through the optimum functioning of crime detection activities.

At present, the RTPD is using conventional equipment for crime detection. Under such circumstances, the Government of the Kingdom of Thailand has requested the Government of Japan to provide Identification equipment to support crime detection activities in Thailand.

In response to the request, the Government of Japan has decided to conduct a basic design study on the Project for provision of Identification Equipment, and entrusted this study to the Japan International Cooperation Agency (JICA). JICA sent to Thailand a basic design study team headed by the identification expert of the National Police Agency of Japan from July 30 to August 18, 1989. The team examined the validity of the Project, confirmed the contents of the request, and discussed the scope of the project with the Thai officials concerned. The team also studied the present condition of fingerprint processing in Thailand and discussed a new system of fingerprint processing and building conditions at the Project site. As a result of the study and discussions, the two parties exchanged Minutes of Discussions which include the following agreements:

1. The objective of the Project is to provide identification equipment for the scientific crime detection system, and thereby to assure protection of people's lives and property.
2. The administrative agency for the Project is the RTPD. The Scientific Crime Detection Division of the RTPD is in charge of its implementation.
3. The Project site is a part of Building No. 10, Police Department Henridunant Road, Bangkok and belongs to the Scientific Crime Detection Division.

4. Equipment requested by the Thai Government is Automated Fingerprint Identification System (AFIS) consisting of Input sub-system, and Matching sub-system inclusive of optical disk unit, etc.
5. The Government of the Kingdom of Thailand is responsible for executing the following work:
  - construction of building for AFIS facility and related electrical work
  - modification of the existing building for operator room
  - electric wiring work for the Power Distribution Board to be installed in new building

The total expenses for the implementation of the above are estimated at 2,000,000 Baht.

As for the implementation schedule, approximate 3 months will be required for the detailed design for the contract, 7 months for the equipment manufacturing and its shipping and 3 months for installation and inspection.

The RTPD has been utilizing latent fingerprints only when a suspect emerged in the process of a criminal investigation. In cases where there is no suspect, the latent fingerprints are totally ignored, which is a quite ineffective method of crime detection. After the introduction of AFIS, the police will be able to use of the latent fingerprints by automatically checking them, with the data base of AFIS which has all the fingerprints taken in past criminal investigations. A suspected person could be arrested more easily.

This will improve the number of arrests and eventually reduce detection expenses.

Furthermore, the collected number of latent fingerprints will increase as a secondary effect of the increased number of arrested persons, which in turn will again contribute to the improvement of the number of arrests. The implementation of this Project under the grant aid from the Government of Japan has great significance. It will effectively contribute to decreasing the number of crimes in Thailand, and thereby play a great role in protecting people's lives and property.

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## CHAPTER 1 INTRODUCTION



## CHAPTER 1 INTRODUCTION

The RTPD is in charge of crime prevention, national security and public service. The Department consists of the Administrative Section and Control Section, and the Central Investigation Bureau engaged in crime prevention and crime investigation.

The Scientific Crime Detection Division under the Central Investigation Bureau is responsible for supporting criminal investigations through various scientific detection methods such as the use of fingerprints, photographs, chemical analysis and so on. The Division has been playing a great role in criminal investigations and trials.

Recent crimes in Thailand, especially in the Bangkok Metropolitan area, tend to happen over a wider area and with increasing viciousness. This is because the rural population is migrating to urban areas to seek employment opportunities, arising from the growth of economic activities there. As a result, a complicated social structure has emerged from serious problems of housing, unemployment the growth of slums. The number of crimes has not increased much; however, the number of arrests is lower than in the previous year.

As a matter of fact, The Scientific Crime Detection Division, being responsible for supporting criminal investigations through an analytical process, has been using conventional equipment. Consequently, the scientific detection methods of Thailand are far behind those of developed nations.

It is urgent for the RTPD to introduce scientific detection equipment and to modernize its detection supporting system so that crimes can be prevented.

Under such circumstances, the Government of the Kingdom of Thailand has requested the Government of Japan for grant aid to provide AFIS identification equipment.

In response to the request, the Government of Japan entrusted the basic design study to the Japan International Cooperation Agency (JICA). JICA sent to Thailand a study team headed by Mr. Tadatoshi Naito, Assistant Director, Technical Official, Identification Division, Criminal Investigation Bureau, National Police Agency of Japan, from July 30 to August 18, 1989.

The team discussed the contents of the request with the Thai police officials of the Scientific Crime Detection Division and the Criminal Record Division. The team also conducted a survey on the facilities of the Scientific Crime Detection Division, the Criminal Record Division and other related offices. Through the survey, the team collected the necessary basic data including investigations of commercial power stability.

As a result of the discussions and survey, Thai officials and the team reached a basic agreement and exchanged Minutes of Discussions on August 7, 1989. The team further explained and discussed the expenses which the Government of Kingdom of Thailand should bear for the implementation of the Project.

It is now clear that the scope of cooperation is to provide AFIS, and this report will present the basic design of the AFIS and the installation of AFIS based on the Minutes of Discussions. The report also presents all the Thai Government's responsibilities including the expenses for the implementation of the Project, and operation and maintenance costs after installation. A list of team members, the study schedule, a list of interviewees, and the Minutes of Discussions are attached as appendices.

## CHAPTER 2 BACKGROUND OF THE PROJECT



## CHAPTER 2 BACKGROUND OF THE PROJECT

### 2-1 Social and Criminal Conditions in Thailand

#### (1) Social Conditions

About 70% of the total population in Thailand are engaged in agriculture and fishery in 1989. Although these primary industries account for 19% of the country's total industries, their share has been decreasing year by year. On the other hand, manufacturing and construction industries share 29%, and their share has been increasing in recent years partly due to the establishment of new foreign companies in Thailand. The increase of the working population engaged in secondary industries also implies the growth of the urban population.

Bangkok has a growing population of 5.6 million which is equivalent to approximately 10% of the total population of Thailand as of 1989. It can also be expected that people's life styles will change rapidly, being influenced by more urbanization and industrialization.

#### (2) Criminal Conditions

Due to the great amount of economic investment in Bangkok by both domestic and foreign companies, the rural population has been migrating there to seek employment opportunities, and consequently the population of Bangkok has been increasing every year. As a result, housing, unemployment and slum growth have become serious problems and these problems could possibly be related to some crimes.

According to the International Crime Statistics of ICPO in 1986, crimes in Thailand numbered 163,053 cases, which is about the same number as compared with the previous year. However, the number of arrests has been decreasing.

Kinds of crimes vary such as theft, robbery, murder, sex crimes and drug dealing, although there is a slight difference in the types of crimes between urban and local areas.

For example, the number of crimes in the Metropolitan area is one third of total crimes. The number of crimes per 100,000 population in the Metropolitan area is as much as 5 times the rate of local areas. On the other hand, regarding murders, local cases happen at 10 times of urban ones.

## 2-2 Organization of Royal Thai Police Department

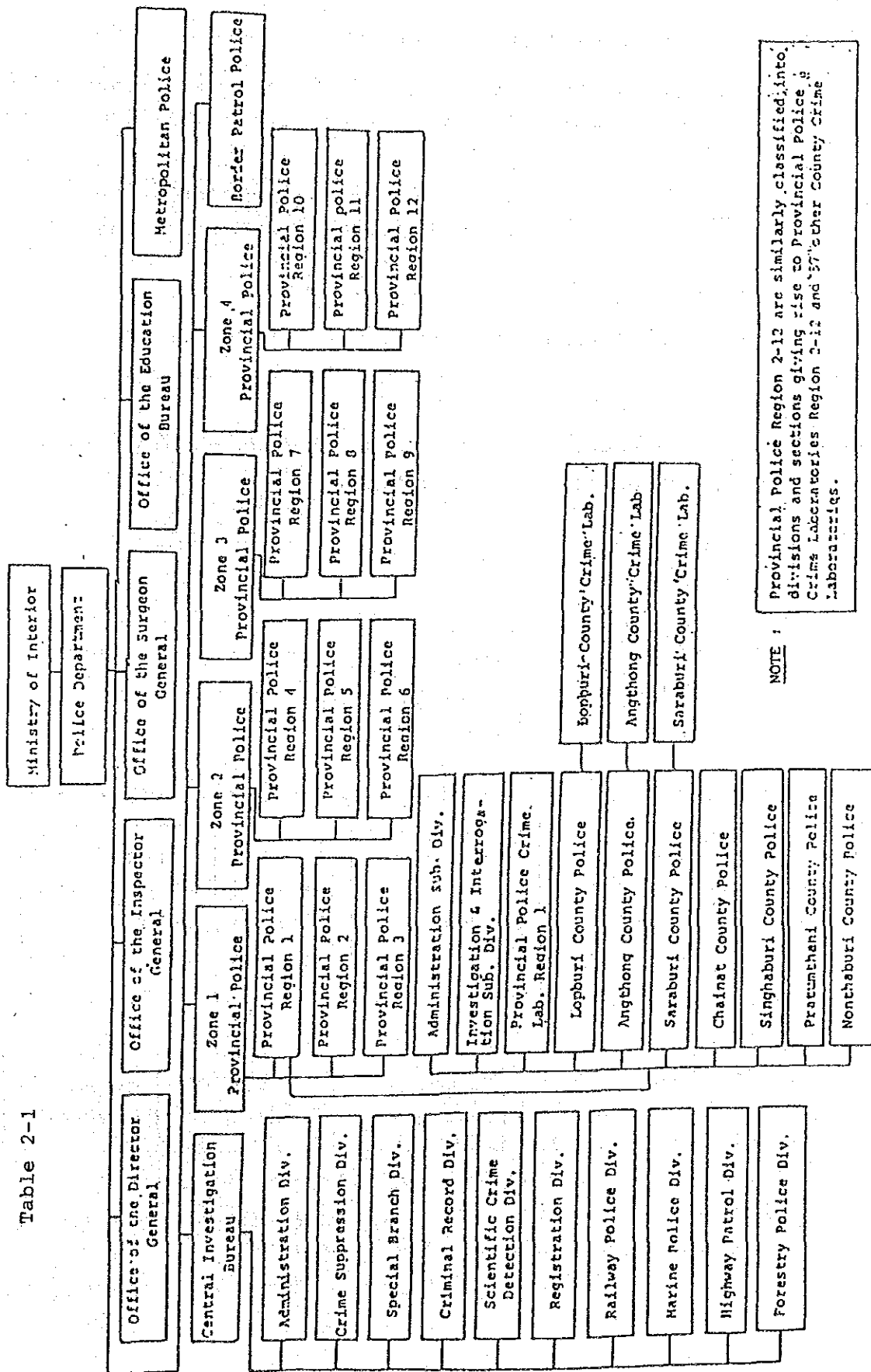
### (1) Royal Thai Police Department

The RTPD is one of 13 departments of the Ministry of Interior, and is responsible for crime prevention, national security and public service. The Department is the sole national police agency with 140,000 police officials headed by a Director General. There is no such organization as self-governing police or a sheriff system. In addition to the ordinary police functions such as those of the Japanese National Police Agency, the RTPD has wide powers to cover immigration, fire fighting, marine security, forestry patrol and national border patrol.

The organizational chart of the Department is shown in Table 2-1.



Table 2-1



(2) Central Investigation Bureau

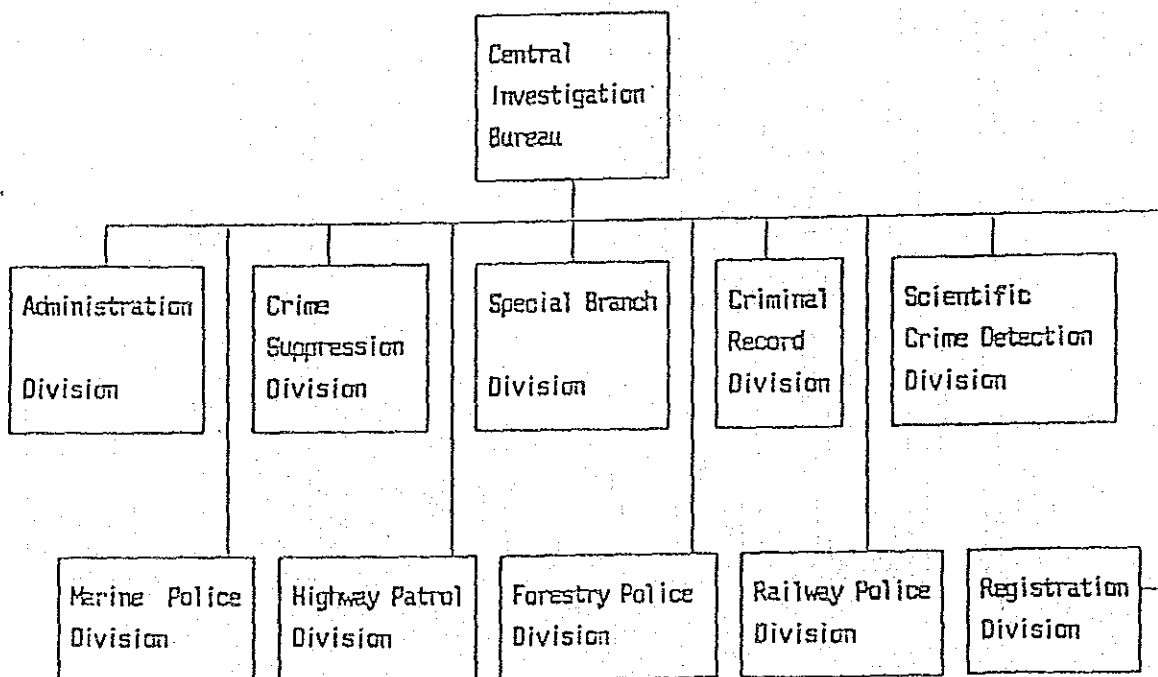
The Central Investigation Bureau is in charge of crime prevention and crime investigation.

The Bureau has a nation-wide investigation network for political crimes and other serious crimes.

The Bureau also has control of the marine, railroad, highway patrols and forest patrols.

The Central Investigation Bureau consists of 10 divisions as shown in Table 2-2.

Table 2-2



### (3) Scientific Crime Detection Division

The Scientific Crime Detection Division is responsible for the implementation of the Project.

The Division has 280 officials including 125 commissioned officers and 155 non-commissioned officers. Most of the commissioned officers are university graduates with science majors. Some of them have even obtained doctorates or studied at abroad. The academic level of the commissioned officers is quite high. The Division consists of 4 sub-divisions and 12 sections as shown in Table 2-3. The Division is engaged in detecting any crimes through scientific detection techniques. The techniques include scientific evidence testing, use of photographs and scene identification. And in order to make the best use of evidence, the collation of fingerprints, signatures and styles of typing, and the identification of coins and paper money are also carried out in this Division.

### 2-3 Problems of the Crime Detection Support System

#### (1) The Utilization of Fingerprints in Thailand

After arresting criminals the Thai Police take their ten fingerprints, and classifies and files the prints by the Henry method. The filed fingerprints have been utilized for the identification of repeated criminals when they commit other crimes. The latent fingerprints found at crime scenes are matched with the ten fingerprints of the suspects to identify criminals. The filed fingerprints are also utilized in demonstrating the "no crime record" of applicants for government positions and positions in state enterprises. Thus, the filed fingerprints have been used in various police activities.

## (2) Problems of Fingerprint Usage in Criminal Detection

### a. Fingerprint Cards

The RTPD has approximately 6 million fingerprint cards, consisting of 4 million cards of criminals and 2 million cards of various applicants. When the criminal has been arrested and his name is known, his fingerprint card on file is searched by his name. Then his name can be verified by matching his print with the fingerprint card on file. If the identify of the criminal is not verified in this way, the next step is to look for the right card out of a great number of fingerprints classified by the Henry method. Such work requires considerable time and effort, and this has become one of the problems in fingerprint matching.

### b. Latent Fingerprints

When a crime is committed, upon request by the local police, the Crime Scene Investigation Section of the Scientific Crime Detection Division or the Crime Laboratory immediately goes to the crime scene and collects the latent fingerprints. If the fingerprints of a suspect (called the latest fingerprints) are collected, they are matched with the fingerprint cards of the known suspects to identify the criminal.

The annual number of latent fingerprints collected has been about 5,000. However, it is almost impossible for the latent fingerprints to be matched with the fingerprint cards, because the Henry method of classification can only be applied for ten fingerprints, not for only latent single fingerprint.

Therefore, the matching of latent fingerprints become only possible when a suspect is identified in the process of a criminal investigation.

This is one of the reasons for the decrease in the number of arrests in spite of the increasing number of crime scene identification activities.

(3) Effectiveness of AFIS

By introducing AFIS, the fingerprints of various crime suspects are accumulated in the data base, and a suspect can be identified in a short period by automated matching of the latent fingerprints and the data. As a result, the number of arrests will be increased and the criminal investigation period will be shortened. This will eventually save investigation expenses.

Furthermore, the shortening of arrest period will prevent the criminals from committing other crimes, and thereby protect people from harm.

2-4 Contents of the Request

The RTPD is promoting the modernization of the criminal investigation support system in order to protect people's lives and property efficiently. Such being the case, the Thai Government requested the Japanese Government to provide grant aid for this effort. Descriptions of the equipment requested are shown in Table 2-4.

Table 2-3

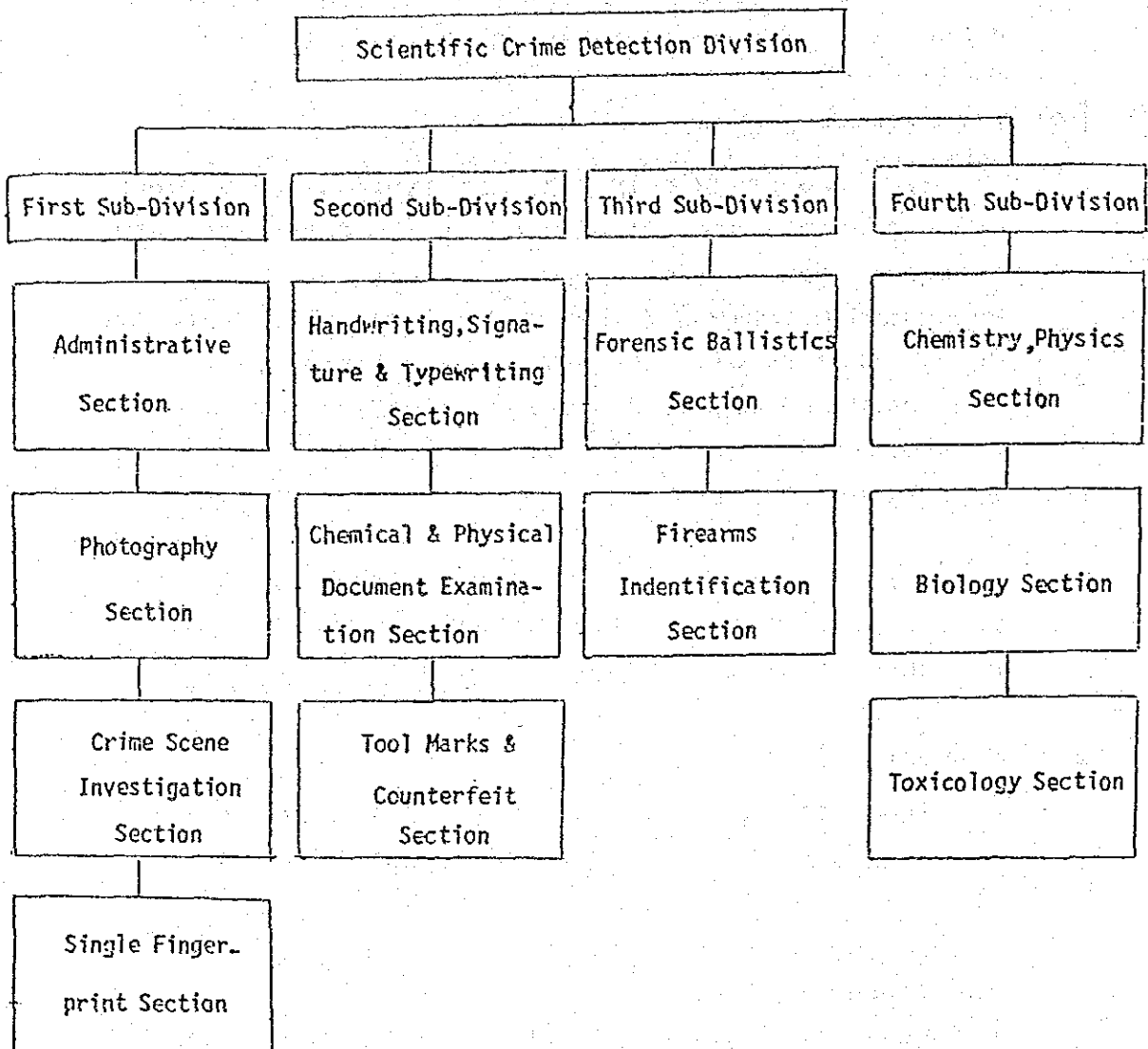


Table 2-4 Description of Equipment Required

Order of Preference	Instruments	Number	
1	Automated Fingerprint Identification System (AFIS)	1	





## CHAPTER 3 CONTENTS OF THE PROJECT



## CHAPTER 3 CONTENTS OF THE PROJECT

### 3-1 Objective of the Project

When a crime is committed, the staff of the Crime Scene Investigation Section is immediately called on to start the identification activities and collect the fingerprints at the scene.

The Provincial Police and the County Police have the Crime Laboratories which are capable of collecting the latent fingerprints.

The Scientific Crime Detection Department is engaged in identifying these latent fingerprints. As mentioned in the previous chapters, the matching of the ten fingerprints of the suspects and the latent fingerprints is only possible when a suspect is apprehended.

Therefore, the number of arrests has been decreasing in spite of the increasing number of crime scene identification activities. Such being the case, the objective of the Project is to introduce a new Automated Fingerprint Identification System (AFIS) so that the Thai Police can solve as many crimes as possible, and thereby decrease the number of crimes.

### 3-2 Review of the Requests

#### (1) System Configuration

The following equipment are requested by the Government of Thailand.

- Input Subsystem
- Matching Subsystem inclusive of Optical Disk Unit
- Other Facilities

To review the appropriateness of the request, the Basic Design Study Team studied the following matters which are essential for the system configuration.

Each item of the request have been studied from the following feasibility standpoint:

1) Input Subsystem and Matching Subsystem

These two subsystems are indispensable for AFIS operations. It is, however, necessary to design its system configuration in consideration of the number of matching inquiries per day and the size of effective data base.

2) Optical Disk Unit

The optical disk unit is used to effectively confirm identification of the candidate fingerprints which were printed out as a result of fingerprint matching and the inquired fingerprint.

The optical disk unit is not indispensable for AFIS operations, but it is necessary to install it in view of the usage of AFIS effectively.

3) Other Facilities

In connection with introduction of AFIS, the following facilities are also required:

- Air Conditioner
- Uninterruptable Power Supply System
- Power Distribution Board
- Free Access Floor

## (2) System Operation

The introduction of AFIS is a new operation system for the RTPD. Therefore, it is necessary to secure employees and to enhance the technology training system. Also, in order to use AFIS effectively, a part of the current fingerprint operation must be improved. We judged that the above measures can be taken as a result of our study in the local site.

The result will be substantially affected by the way of AFIS operation after putting it into operation. Japanese technical cooperation is necessary to assist an appropriate operation and maintenance management plan as well as for the education and training of employees and the transfer of operation know-how.

## (3) Management and Operation Capability of AFIS System

The Scientific Crime Detection Division is responsible for operating AFIS. As stated in the paragraph 2-2-(3), the staff member of the Division has a high level technical background. Therefore, the staff will be able to operate AFIS effectively after a certain period of training.

Furthermore, the RTPD has already experience of operating the computerized police information system in the Planning and Research Division. Therefore, the management and operation of AFIS will not be any problem for the Department.

1) Location of AFIS

AFIS shall be installed in the annex building to be constructed because the existing building is not suitable considering the weakness of floor loading for AFIS and the inconvenience for the equipment layout due to small size of room space. The Thai Government shall provide the necessary building facility.

2) Financial Arrangements

The RTPD belongs to the Ministry of the Interior, and the national budget covers its costs and expenses. The budget for the Department has shown a stable increase in recent years. The Thai officials concerned agreed, as mentioned in the Minutes of Discussions, to assure sufficient funds for the operation of AFIS. There is no need to worry about the financial arrangements for the Project.

3-3 Outline of the Project

(1) Administration and Operation Agencies of Project

The administrative agency for the Project is the RTPD.

The Scientific Crime Detection Division is in charge of its operation. The Scientific Crime Detection Division consists of 4 sub-divisions and 12 sections.

The division is engaged in finding any clues or evidence connected with crimes through scientific detection techniques.

## (2) Outline of AFIS

The following is the outline of AFIS to be installed by this project.

### 1) Application Works

The following works are covered by this system:

#### a) Fingerprint Registration

Registration work of fingerprint cards and latent fingerprints to the data base.

#### b) Latent fingerprint matching work

This is the work to identify the criminal by latent fingerprints collected at the scene of the crime. Matching between the latent fingerprints and the fingerprint cards registered as the previous criminals in records.

#### c) Other crime inquiry work

This is the work to confirm other crimes of the new criminal before he is arrested, and matching is conducted between the newly registered fingerprint cards and the unsolved latent fingerprints.

### 2) System Functions

The following three functions are required for the system:

#### a) Registration function

Fingerprints are automatically read and the fingerprint data base is prepared by extracting minutiae from the fingerprints.

b) Matching function

Candidate fingerprints are printed out by matching the minutiae of the inquired fingerprint and the data base.

c) Confirmation function

The images of the candidate fingerprints and the inquired fingerprints are displayed on the same CRT.

3) Outline of the System Configuration

The following system configuration is required to achieve this project.

a) Input subsystem

The input subsystem functions to read fingerprint data (fingerprint cards, traced latent fingerprint) to extract minutiae, to output responses.

b) Matching Subsystem

The matching subsystem functions to control various data bases, and to make fingerprint matching, registration and renewal.

Table 3-1 shows the list of equipment composing each subsystem:



Table 3-1 List of Equipment

Sub-system	Description	Quantity	Outline of Equipment
Input Sub-system	Input Subsystem Control Unit	1	This unit controls all equipment which makes up the Input Subsystem.
	Printed Fingerprint Reader	1	This equipment carries out such image processing works as to read the fingerprint cards automatically and extract the minutiae, etc. 100 cards can be set at one time. It consists of the scanner, console and processor.
	Fingerprint Input monitor	2	This equipment is used for confirmation and revision of the fingerprint images read by the Printed Fingerprint Reader, and also used for inputting the individual ID number and fingerprint classification number, etc. In addition, it is possible to output the candidate fingerprint list, and to display the inquired fingerprint image and the candidate fingerprint image on the same picture display (CRT). It consists of the color monitor, keyboard, image printer, and processor.

Table 3-1 List of Equipment (Cont'd)

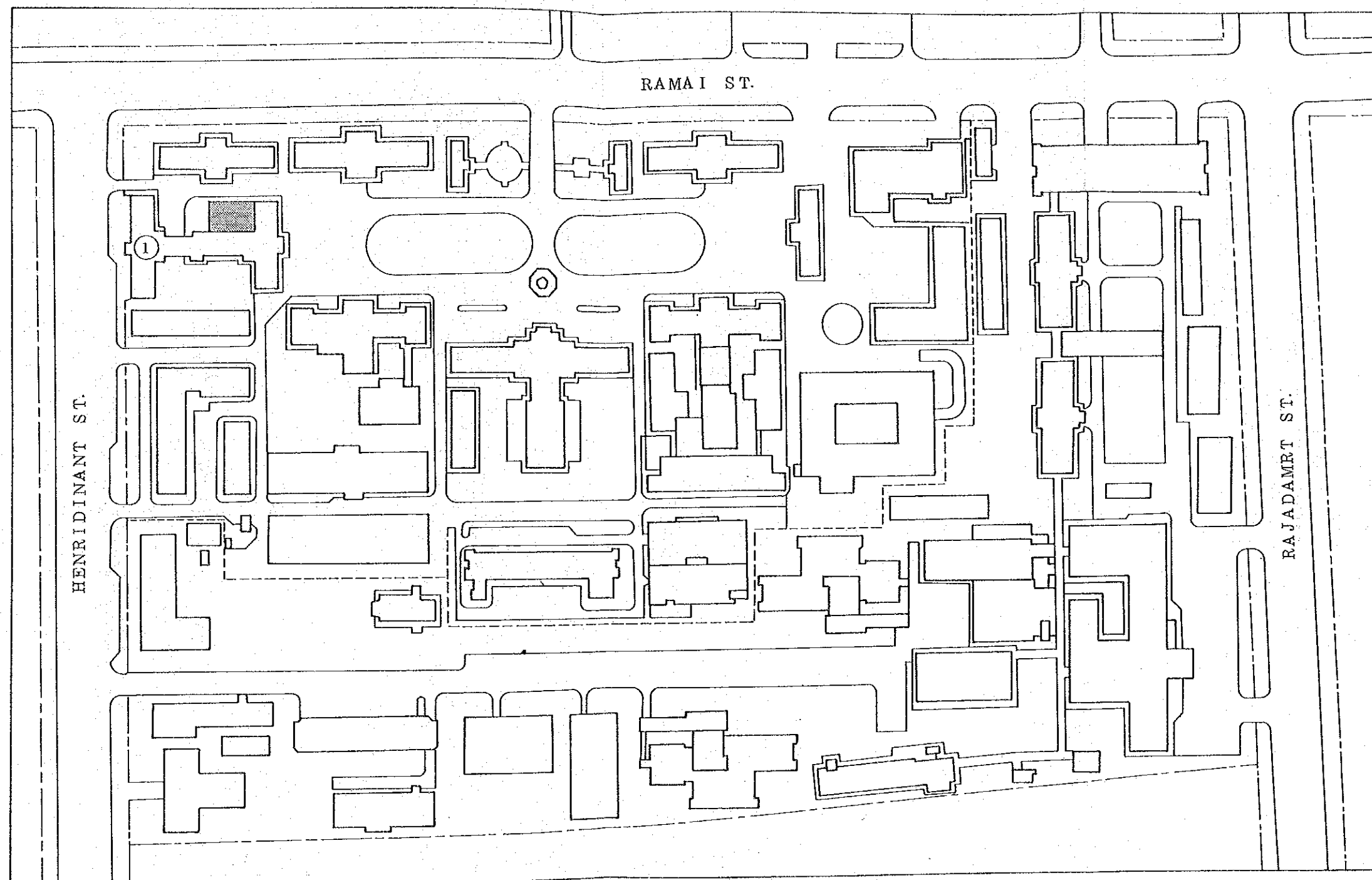
Sub-system	Description	Quantity	Outline of Equipment
Input Sub-system	Latent Fingerprint Reader	1	This equipment reads the latent fingerprints and the traced/five times enlarged latent fingerprints, and extracts their minutiae. Also the image revisions and inputting the additional information are possible by operator through this equipment. Like the Fingerprint Input Monitor, this equipment can also output the candidate fingerprint list, and displays the inquired fingerprint image and the candidate fingerprint image on the same picture display. This equipment consists of the scanner, color monitor, keyboard, and printer.
	Fingerprint Data Suppression and Expansion Equipment	1	In order to record many fingerprint images on the optical disks, data is suppressed or the suppressed data is expanded to the original by this equipment.

Table 3-1 List of Equipment (Cont'd)

Sub-system	Description	Quantity	Outline of Equipment
Matching Sub-system	Matching Sub-system Control Unit	1	All equipment consisting of the Matching Subsystem is controlled through this unit.
	Fingerprint Matching Processor	1	This equipment outputs the candidate fingerprint list through matching the input fingerprint minutiae data with the data base.
	Magnetic Disk Unit	9	This equipment records the following minutiae data: (1) The printed fingerprint data used for inquiry of the latent fingerprint.  (2) Unsolved latent fingerprint data.
	Multiple Disk Unit	1	This unit records fingerprint images to the optical disk and prints out the recorded data. The Optical Disk Processor is necessary to control this equipment.

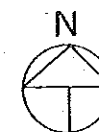
(3) Outline of Project Site. (Tentative)

- 1) The Project Site is a part of building No. 10 Police Department, Henridunant Road, Bangkok and belongs to the Scientific Crime Detection Division. The location of Project Site is shown in Figure 3-1.
- 2) The construction plan of the new building where AFIS shall be installed and the remodeling plan of the existing room annexed to the new building are shown in Figures 3-2, 3-3 and 3-4.

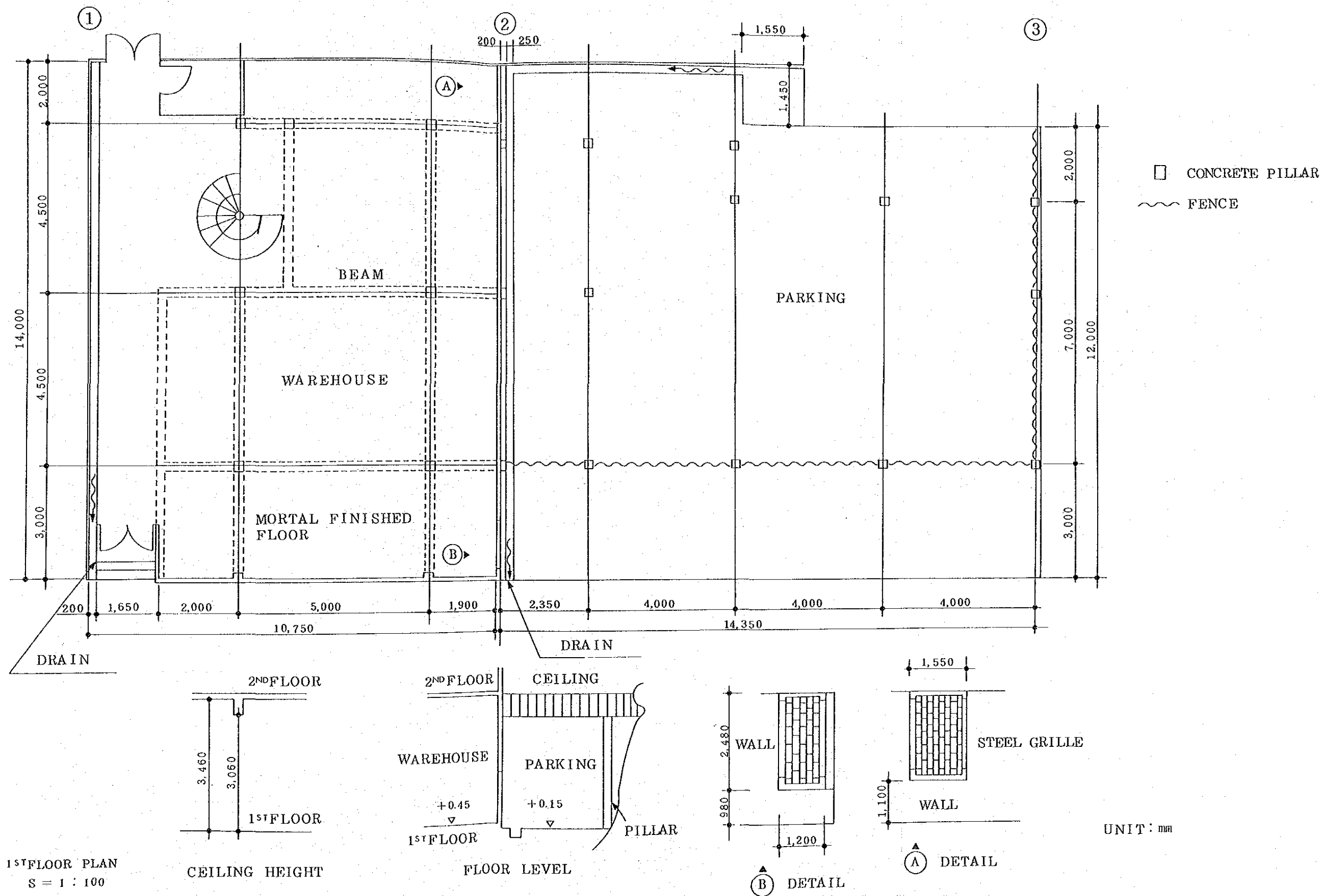


ROYAL THAI POLICE SITE PLAN

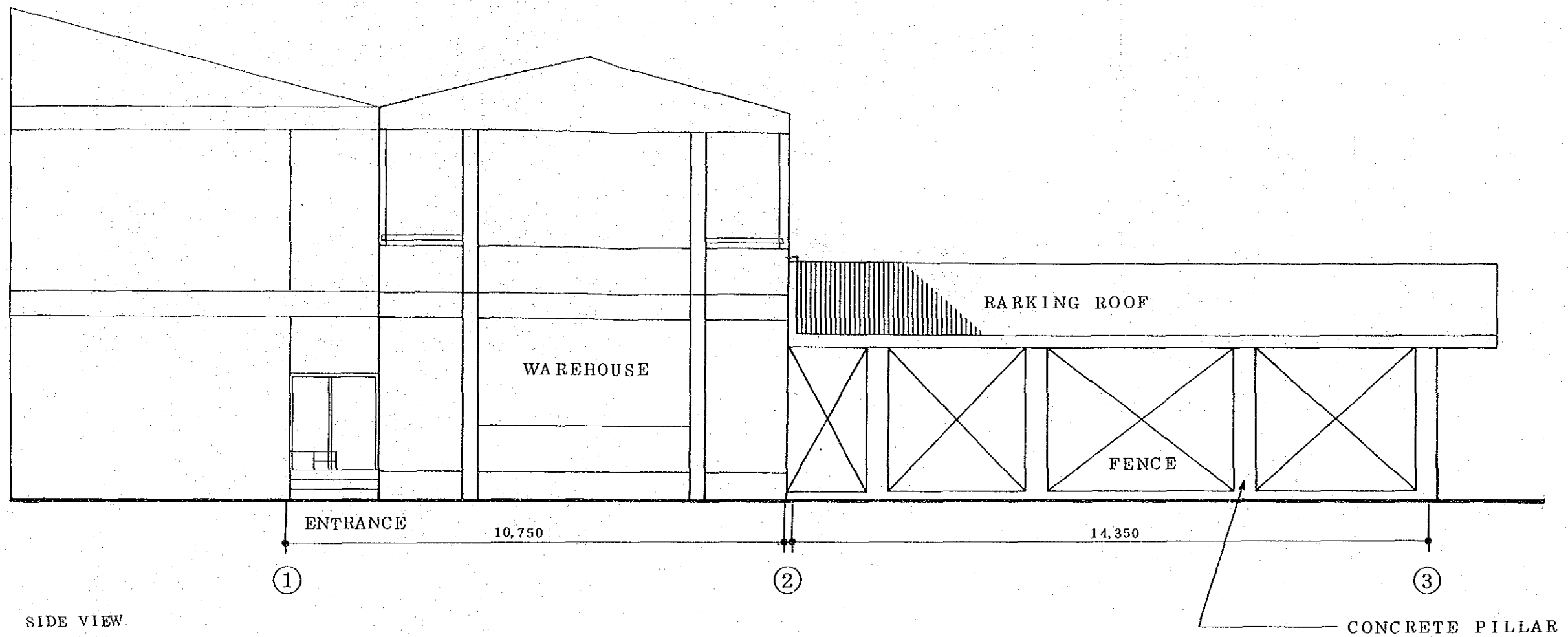
- ① SCIENTIFIC CRIME DETECTION DIVISION BUILDING
- : SURVEYED AREA (AFIS will be installed)



BUILDING LAYOUT OF ROYAL THAI POLICE DEPARTMENT Fig. 3 - 1  
THE PROJECT FOR PROVISION OF THE IDENTIFICATION EQUIPMENT



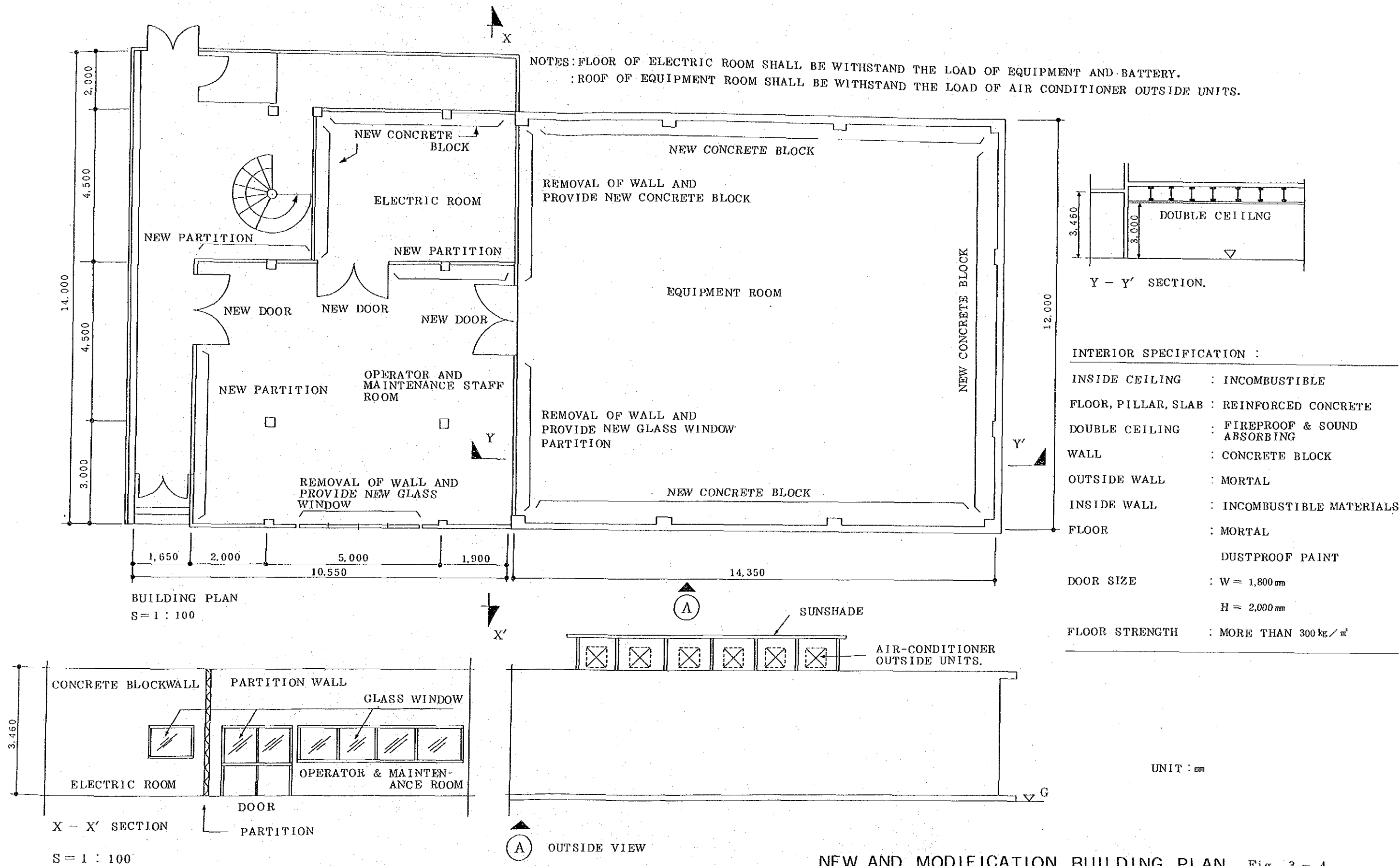
PRESENT FLOOR PLAN OF SCIENTIFIC CRIME DETECTION DIVISION BUILDING Fig. 3 - 2  
THE PROJECT FOR PROVISION OF THE IDENTIFICATION EQUIPMENT



SIDE VIEW  
S = 1 : 100

UNIT : mm

SIDE VIEW OF PRESENT SCIENTIFIC CRIME DETECTION DIVISION BUILDING Fig. 3 - 3  
THE PROJECT FOR PROVISION OF THE IDENTIFICATION EQUIPMENT



NEW AND MODIFICATION BUILDING PLAN Fig. 3 - 4  
THE PROJECT FOR PROVISION OF THE IDENTIFICATION EQUIPMENT



