

4.1.9 Field Survey Organization

1) Organization

An echelon system was used for field survey control. The upper echelons controlled the lower echelons as shown below (Fig. 4.1.12), so that the survey would make clear progress.

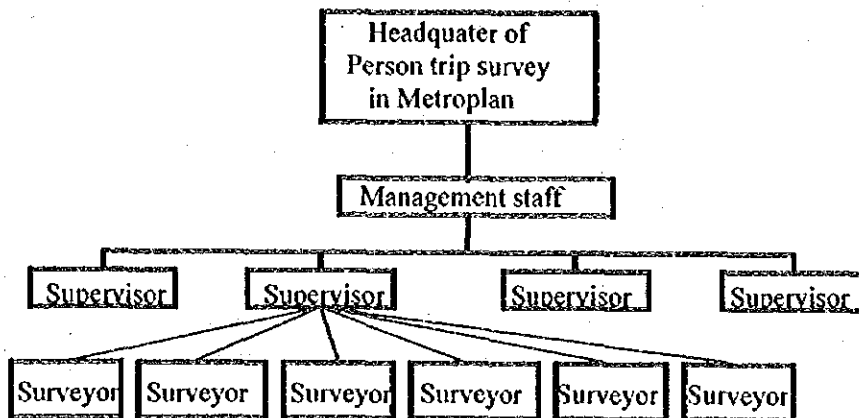


Fig.4.1.12 Survey Organization

The role of each member is defined below:

(1) Managerial Staff

The managerial staff should managed the person trip survey operation, supervisors and surveyors to make the survey progress and conform to design. The staff was composed of local consultants.. The principal duties of this staff were as follows:

- a) Operation of the survey as a whole
- b) Production and preparation of survey materials
- c) Surveyor recruitment and training
- d) Supervisor education and control
- e) Inspection to the returned questionnaire forms

(2) Supervisors

Supervisors controlled the conduct and progress of the field survey, inspected the questionnaires, and dealt with imperfect entries. For survey management purposes, the study area, was divided among 12 supervisors. Each supervisor was in charge of 10 to 12 surveyors.

(3) Inspectors

Under the direction of a supervision, an inspector singled out two to four sample households in a surveyor sector and visited such households to investigate whether the survey was conducted in conformity to instructions, whether or not there was "making" on

the part of the surveyors. The inspectors also assisted the assistant work for the supervisors.

(4) Surveyors

Surveyors visited households specified in the list of sample households and interviewed the respondents about their activities on the survey date according to the survey items. Upon completion of each interview, they inspected the complete questionnaires for omissions and commissions of errors in entry.

Each surveyor was in responsible for 25 households per week and brought the completed questionnaires to the Headquarters weekly for inspection by supervisors.

2) Supervisor Recruitment and Training

The supervisors were recruited through the members of the Managerial Staff and employed after personal interviews. Supervisor training was based on the Surveyor's Manual, which mainly contains the following:

- a) The role of the Supervisor and Surveyor
- b) A general description of the person trip survey
- c) The work processes of the survey
- d) The details of the Supervisor's work (Surveyor control and questionnaire inspection)
- e) The details of the Surveyor's work
- f) The materials necessary for the survey and how to use them

3) Surveyor Recruitment and Training

The Surveyors were recruited and trained shown in the following steps:

(1) Surveyor recruitment

The Surveyors were recruited through Metroplan office, universities, members of the Managerial Staff and the Supervisors. The required number of Surveyors was 150.

(2) Interviews with the applicants

The member of the Managerial Staff interviewed the applicants and decided whether or not to accept them. The following criteria were used for acceptance at the interviews:

- a) Ability to understand the survey contents
- b) Availability of sufficient work time
- c) A strong sense of responsibility

(3) Training

By reference to the Surveyors manual, they were mainly trained in the contents of the questionnaire, such as the purpose of the survey, an outline of the survey, the definition of the trip, and the method of entry of answers to the items in the questionnaire. The first

instruction was given to supervisors. Then, supervisors gave a instruction to surveyors for re-inforcemente.

Upon completion of the instruction, each surveyor was subjected to a pre-survey designed to teach the following points.:

- a) Entry into the questionnaire form
- b) Answers to questions
- c) Questionnaire inspection points

Pre-survey results were reviewed to ascertain the degree of the trainees' understanding of the survey. Supplementary explanations were given to them about misunderstood points. At the same time, they were trained in survey work a preparations for visiting sample households, visits households, inspection and corrections, etc.

At the same time, a Japanese study team member gave a finishing touch to instruction and confirmed the important points in this survey (survey date, trip content, sample) The trainees were given an explanation about how to use the materials necessary for the survey materials. They were assigned to particular areas and received their materials. This assignment of the surveyors to particular areas took their places of residence into consideration. The number of applicants accepted as surveyors was 152.

4.1.10 Field Survey

1) Definition of Trip

A "trip" is defined as "the movement of a person from one place (place of departure) to another (place of arrival) for a certain purpose." One such movement is counted as one trip. Here are concrete examples of trips:

Example 1 An Office Worker

A certain person goes to his office, attends to meeting in other office, takes a lunch in his own home, goes to cinema and coffee shop after work ,then goes back his home. In such case, trips(vieje in espanol) can be defined as followings.

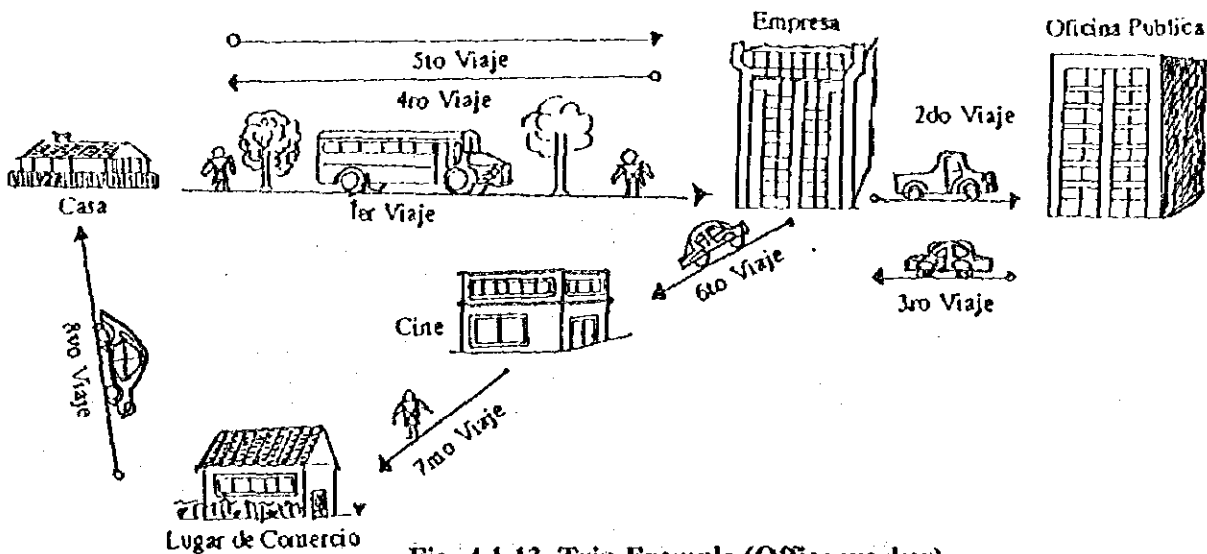


Fig. 4.1.13 Trip Example (Office worker)

Example 2 Trips for the same purpose in a narrow areas, localized areas

When a person moves about a narrow area for the same purpose as shopping, delivery or some other work, the farthest point in the area is regarded as the place of arrival. Going to and returning from these are counted as two trips. The "Narrow area" refers to a space of about 300 meter square.

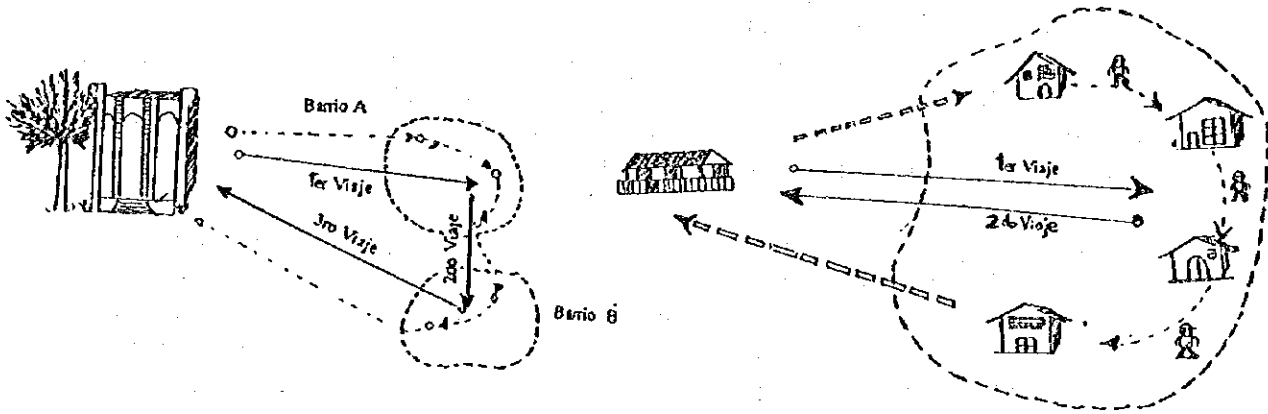


Fig. 4.1.14. Trip example (Same trip purpose)

Example 3 Repeated trips between the same places

When a truck makes repeated trips between for example, a warehouse and construction site, each trip is counted as one trip.

Example 4 A trip without any particular destination

When a person has no particular destination as in the case of a stroll, jogging, pleasure driving, etc., the farthest place from the departure place is regarded as the place of arrival. Going to and returning from this destination is counted as two trips.

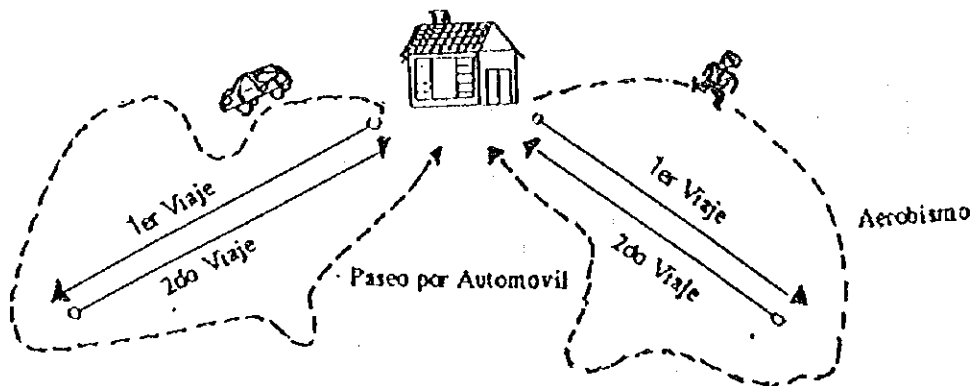


Fig.4.1.15. Trip example (No particular destination)

Example 5 Trips to an outside the survey area on the survey date

Trips which someone visited outside the survey area were be counted. In the case of foreign travel or return from abroad, the places of departure and arrival of an airliner passenger are the airports used, those of a ship passenger are the sea ports used, and those of a user of a car or any other means of overland transport are the national boundary towns concerned.

Example 6 A trip at 4:00 on the morning of the survey date or of the next day

When the time of departure is within the survey date (from 4:00 am of the survey day to 4:00 am of the next day), the individual concerned is regarded as having made a trip even if the time of arrival is after 4:00 a.m. of the survey day and is not regarded as having made a trip even if the time of arrival is within the survey day.

2) Trips Excluded from the Survey

The following movements are not regarded as trips:

- (1) Movement in a building
- (2) Movement on the same site
- (3) Movement in a foreign country
- (4) Movement such as playing, shopping or the like on a nearby road
- (5) Movement as a non-regular movement by taxi. However, the movement of the driver of a commercial truck or bus is not excluded.

3) Survey Activities in Brief

Surveys can be divided into four stages shown in Fig. 4.1.16. These are: (1) preparations prior to visits, (2) actual survey, (3) questionnaire inspection and ordering and (4) inspection and collection by a Supervisor. The details of these stage will be described in 4).

The surveyors should carry out survey activities for about five weeks toward the final collection of questionnaire. During that period the surveyors should to visit 125 sample households.

The survey day should be on weekdays, Monday through Friday. Friday was included in the survey days because "movement" on Friday does not change so much from other usual weekday.

4) Preparation Prior to Visits

The Surveyors made the following preparations prior to visits to the sample households:

- (a) The location of the sample households were confirmed by plotting them on maps.
- (b) Survey schedules were drawn up to distribute the survey days evenly.
- (c) The materials necessary for the survey were divided into sets for the individual households.

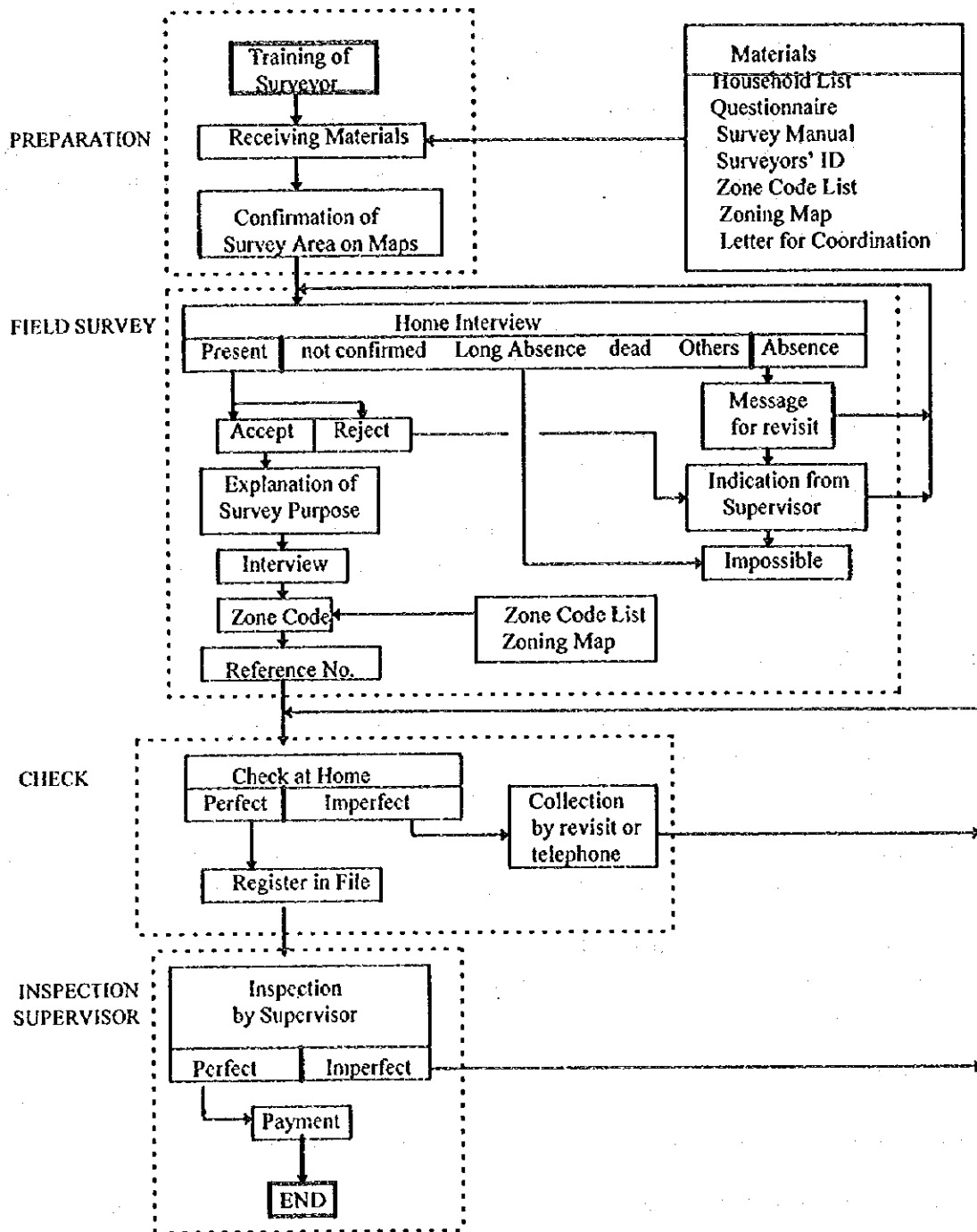


Fig. 4.1.16. Flow Chart of Surveyor's activity

5) Actual Survey

The households listed on the sampled households list were visited and interviewed according to the questionnaire. The interview at each household followed the following procedure shown belows:

(1) Greeting

- a) Confirmation of the sample household
- b) Presentation of the Surveyor certificate
- c) An explanation of the purpose of the survey, a request for cooperation

(2) Confirmation of the basis items

- a) Confirmation of the number of respondents (six or older)
- b) Confirmation of the survey data
- c) Confirmation of the number of household members present

(3) Explanation

- a) Interview about the attributes of the individuals
- b) Interview about household attributes
- c) Interview about trips

(4) Leaving

- a) Leave the questionnaire to be filled out by members of family
- b) Promise of a revisit to absent respondents and collection
- c) Thanks for cooperation, presentation of gift for cooperation.

(5) Questionnaires Inspection and Ordering

Received questionnaires were inspected and checked by the Surveyors in their homes as shown below before submission to the supervisors.

- (a) Entry of reference numbers (in eight digits)
- (b) Entry of whether there was a trip or not
- (c) Entry into the trip number column of the number of trips entered in the questionnaire
- (d) Questionnaire reinspection with a view to making the collected questionnaires perfect.
- (e) Check of the number of effective and ineffective questionnaires per household and a breakdown of ineffective questionnaires
- (f) Stapling per-household effective questionnaires

(6) Inspection and Recovery by the Supervisors

Upon completion of a week's survey, the surveyors submitted the collected questionnaires to the supervisors for inspection.

The Supervisors inspected them in conformity to the procedure described below and accepted them if they were perfect. If imperfections were found, the supervisors should order the surveyor to conduct another survey.

- (a) Inspection as to whether all relevant households on the sampled household had been surveyed

- (b) Inspection as to whether the number of effective responses per household meet with the number of questionnaires**
- (c) Inspection as to whether a reference number, the survey date, whether a trip had been made or not, and the number of trips were properly entered in each questionnaire.**
- (d) Inspection as to whether entries in the questionnaire were properly filled.**
- (e) Inspection as to whether there was no "making" or any other dishonest act on the part of the surveyor concerned**

4.2. Supplemental Surveys

Supplemental surveys for determining the traffic volume of the Origin and Destination Table (OD) by traffic mode and trip purpose were made from the results of the person-trip survey.

These surveys were:

- (1) Screen-line survey
- (2) Cordon-line survey
- (3) Traffic speed survey

4.2.1 Screen Line Survey

1) Survey Objectives

A screen-line survey aims at obtaining data for examining whether the contents of OD table based on the PT survey findings faithfully reflect the reality. When the PT survey area is divided into two, it is possible to compare the quantity passing the line with a similar traffic volume. Such dividing line is generally called as a Screen Line.

2) Survey Design

(a) Screen-line Characteristics

A screen line divides the survey area into two. In order to determine the characteristic of traffic volume, it is desirable that traffic between two areas should be free from short-trip traffic. Therefore, generally, geographical or physical dividing lines such as rivers, mountains and railways are used for area-division in most cases.

In the present survey, the screen line was been established by using the Choluteca River, which crosses the center of the survey area dividing two areas. Thus one area was Tegcigalpa area, including Centro of Tegcigalpa, Palmira, Alameda, Miraflores, Kennedy, Suyapa, San Jose, etc.. The other area was Comayagueta area, including Comayagueta, Cerro Grande, Las Mercados, Aeropuerto, La Pradera, Santa Barbara, Los Angeles, etc..

In choosing the survey points, we conducted detailed on-the-spot investigations in advance to examine whether observed traffic could be compared to the results obtained by the Person Trip survey.

In order to know the capability of surveyors to count and to be accustomed to the work, the preliminary survey was conducted. This preliminary survey had the same characteristics of the preliminary survey for the Traffic counting of Cordon Line, Intersection Survey (Complemental Survey-5), and Major Road Survey (Complemental Survey-6). This preliminary survey was conducted for 16 hours on 20 June, as a pre-survey of the traffic volume at intersections.

(b) Problem from observation

The quantity of unit obtained by PT survey is a person-trip quantity (number of persons). While a screen line survey produces results expressed by the number of motor vehicles. Therefore, it would be necessary to unify the units. In that case, the number of bus passengers raised two problems.

-1. Bus passengers are hard to count.

At survey points, totally 11,126 buses pass in both directions in a day. Because of several buses pass in a group owing to traffic signals, no accurate count of passengers per bus is possible. To deal with this problem, a bus passenger count survey (Complementary Survey 9) was conducted separately.

-2. Difference in the average number of bus passengers

Unit size of buses has much variation, even in the same category such as bus grande. The number of bus passenger or the average number of passengers which is used for conversion into the number of buses should be obtained as the average number of passengers passing the screen line. Therefore, a survey of the average number of passengers on each of the principal routes within the city (Complemental Survey 11) was conducted.

3) Survey Plan

(a) Screen line position

Screen Line has been set on the Choluteca River, shown in Fig. 4.2.1.

(b) Screen line survey points

The Choluteca River crosses the center of the study area. The section of the Choluteca River has 10 bridges. All of these bridge have been set as the station for survey points. These survey points are described below:

From observation, the traffic volume after 8:00 p.m. decreases rapidly. Thus, The screen line survey was conducted for 16 hours from 6:00 am to 10:00 p.m. But since there were no existing traffic data, it was necessary to know the hourly traffic variation through 24 hours. Three survey points were observed for 24 hours from 6:00 am to 6:00 am on next day.



Fig. 4.2.1 Screen Line & Survey points

Those 24 hours traffic volume observation (counting) were carried out at the following survey points.

Survey point 3 Puente Soberania
Survey point 5 Puente Juan Ramon Molina
Survey point 8 Puente las Brisas

Seven other survey points were counted for 16 hours for traffic volumes

Survey point 1 Puente el Chile
Survey point 2 Puente Carias
Survey point 4 Puente Mallol
Survey point 6 Puente Prado
Survey point 7 Puente San Jose
Survey point 9 Puente la Vega
Survey point 10 Puente Loarque

(c) Categories of Vehicle Type

Vehicles were classified as below: These classifications were explained in detail in the Surveyor's Manual for the person trip survey.

1. Automobile (including jeeps, light vans and wagons)
2. Autobus (including school buses, sightseeing buses, long-distance intercity buses and urban route buses.)
3. Micro bus
4. Taxi
5. Camion - Tractor (Tractor type such as Container Truck)
6. Camion Grande (large trucks for more than 5 tons)
7. Camioneta (Small truck less than 5 tons, including pick-up)
8. Motorcycle
9. Others

4) Survey Execution

The survey was conducted from 19 July (Tue) to 25 July (Mon).

Lacking counter machine, the survey was conducted by manual counting. The survey sheet is shown in Fig.4.2.2..

4.2.2. Cordon Line Survey

1) Survey Objectives

The objective of this survey was to obtain information on the traffic passing through the border of the study area. With these data, the volume and characteristics of the traffic can be determined.

The person trip survey was conducted among the residents of the urban area of Tegucigalpa and Comayagua. It gained information about the movement and characteristics of trips made by these local residents. But trips in the study area are also made by persons outside the Tegucigalpa and Comayagua urban area. These were not obtained by person trip survey. Therefore, this survey was carried out at the boundary of the urban study area.

This cordon line survey supplements the person trip survey. By examining the starting points and destinations of traffic crossing the boundary of the study area, the traffic volume of outside residents into the study area can be determined and the study team can complete the Origin and Destination Table.

The traffic from outside of the study area is increasing with the progress of urbanization. There is considerable traffic between the capital city outside the study area, city of Tegucigalpa and Comayagua and outside study area as shown in this survey.

2) Cordon Line Characteristic

An desirable characteristic of a cordon line is that it should enclose urban activity as much as possible. The Cordon Line should be located outside the fringe of the urbanized area.

Distrito Central, Police check points located on each principal road are on the edge of the urbanized area. Survey points for the Cordon Line to carry out on those Police check points. This is convenient for the cooperation of Policeman and operation of the survey. The cordon line was drawn on the police check points as both sufficiently distant from urban activity and convenient for police cooperation in the operation of the survey.

3) Survey Stations

The survey station were set up at the crossing point between the trunk roads and the border of the cordon line. Six stations were selected from field investigation. These are shown in Fig. 4.2.3

Station	Location	Duration
No. 1	Carrtera de Norte	24 horas
No. 2	Carrtera de Olancho	24 horas
No. 3	Carrtera de Oriente	24 horas
No. 4	Carrtera de Sur	24 horas
No. 5	Carrtera de Lepaterique	16 horas
No. 6	Carrtera a Valle de Angeles	16 horas

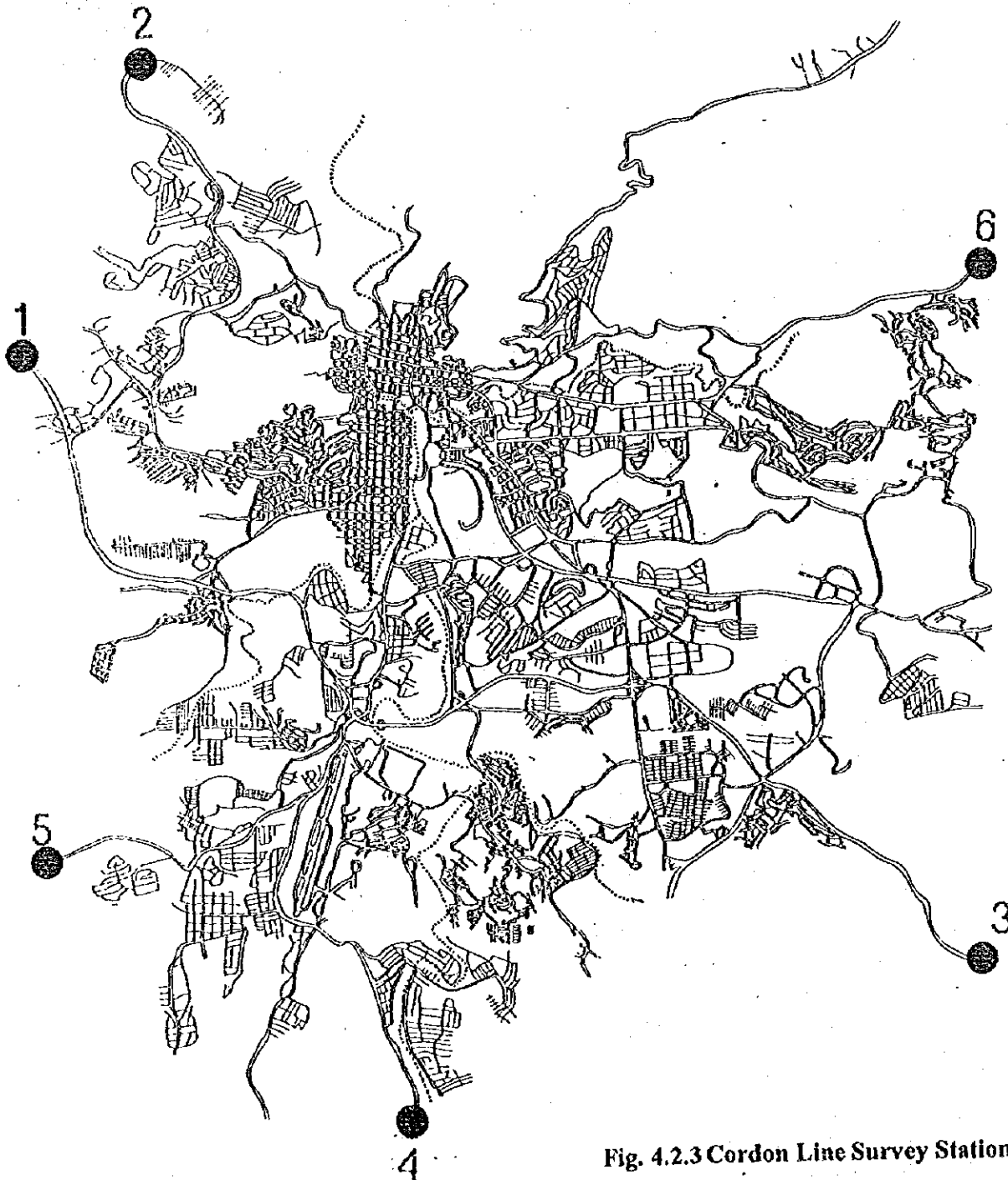


Fig. 4.2.3 Cordon Line Survey Station

The survey is an OD survey, but road side. Motor vehicles were be stopped for interviews about starting points the and destinations. At the same time, a traffic volume survey was also be conducted to count the motor traffic by type. The results of this survey was used for control totals and adjustment of the person trip OD table.rson trip OD table.

The survey was divided into two types a 16-hour survey and a 24-hour survey. The latter was conducted at 4 points on the principal trunk roads of largest motor traffic volume, on Carretera del Norte, Oláncho, Oriente, and Sur. The 16-hour survey was carried out at two points, the Carrtera de Lepaterique and a Valle de Angeles.

There is so much freight transport to and from outside the study area at night and early morning. The 24 hour survey was necessary to obtain informations about this traffic flow and to calculate a daytime-nighttime flow ration.ut that.

4) Survey Items

The survey items were:

Roadside OD survey

- a) Address of residence
- b) Origin and destination of the trip
- c) Purpose of the trip
- d) Type of the automobile used
- e) Time of passage
- f) Number of passengers

Roadside survey of traffic volume

- Traffic volume classified by time and vehicle types

Item (a) is necessary to identify the trip by resident in external area. This data is useful to make a OD table regarding to the external area in data processing.

Item (b),(c) and (d) are information for trip of a OD table, directly.

Item (e) is to get a hourly variation of traffic flow

Item (f) is a reference of the value of number of passenger per vehicles.

Type of vehicles is divided by following 9 categories.

- (a) Automobile : Passenger car
- (b) Autobus : General route bus
- (c) Microbus : Micro bus
- (d) Taxi : Taxi
- (e) Camion - Tractor : Truck - Tractor type
- (f) Camion - Gurande : Truck - More than 5 tons
- (g) Camioneta : Truck - Less than 5 tons
- (h) Motocicleta : Motercycle
- (i) Otoros : Others

Trip purpose is classified by following 7 categories.

- (a) going to work
- (b) going to school
- (c) going back to residence
- (d) going back to company
- (e) business activities

- (f) going to shopping or restrante
- (g) social activities

Number of passenger does not include the driver.

The questionnaire is shown in Fig.4.2.4..

5) Survey Execution Procedure

The personnel involved for 1 station is assigned as following Fig.4.2.5..

Generally, one station (both direction) has

- 3 Policemen
- 2 Supervisors of interviewers
- 20 Interviewers
- 6 Traffic counters

All the personnel has been located their own position, then the survey should be commenced. The leader of policemen and staff of the study team members should always watch the condition to perform the survey safely and smoothly.

Policemen should stop a running car and indicate to the place where interviewer is wating. Other personnels can not stop a running car.

Each station has 2 supervisors of interviewers. They are engaged to check the progress of the survey from time to time. Also, they should always give a indication to the interviewers which car should be interviewed safety along the roadside.

When the peak hour comes, a traffic volume would increase. If the queue of the waiting vehicles grow long distance, interview survey should be stopped up to the time when a traffic volume decreases and waiting queue will not be happened. This judgment shall be done by the staff of the study team. Otherwise, while the interviewing has been stopped, traffic counting should be continuing. Traffic counting should be carried out even if anything happened.

The pedestrians and bicycles are not interviewed by this survey. At the same time, the following vehicles should be excluded for the interviewing in this survey.

The reason why they should be excluded is these traffic are unusual traffic flow. This survey should grasp general/usual traffic flow at the station on the each road.

- 1. Police cars
- 2. Security vehicles
- 3. Ambulances
- 4. Fire Engines
- 5. Post office van
- 6. Armed service vehicles
- 7. Buses on the regular route
- 8. VIP cars with/without police escort

It must be emphasized here that the cooperation of the people is entirely voluntary. Therefore, any driver can refuse to answer the question. But, such time when he/she leaves the group of stopping vehcles, give to him/her indication to keep safety drive for leaving or let him/her wait until other

interviewing cars have been completely finished. This aims to avoid any accidents, especially in the night time.

In the case of 24 hours survey, the interviewing is conducted from 6:00am to 6:00am in next day continually. In the case of 16 hours survey, it will be carried out from 6:00am to 10:00pm in the same day.

6) Survey Schedule

Survey has been carried out on following date;

No.1	Carrtera de Norte	8/ August/1995
No.2	Carrtera de Olancho	9/ August/1995
No.1	Carrtera de Oriente	10/ August/1995
No.1	Carrtera de Sur	11/ August/1995
No.1	Carrtera de Lepatrique	14/ August/1995
No.1	Carrtera de Valle de Angeles	14/ August/1995

ENCUESTA DE LINEA CORDON METROPLAN - JICA

(AGENCIA DE COOPERACION
INTERNACIONAL DEL JAPON)

/ Agosto/95

ESTACION No.	HORA:		DIRECCION:		NOMBRE DEL ENCUESTADOR:		SUPERVISOR:		HOJA	
	1	2	DE	A						
VIAJE	TIPO DE VEHICULO	DOMICILIO	ORIGEN	DESTINO	SOLO AUTOMOVIL PARTICULAR PASAJEROS					
1	1. Automóvil Particular 2. Autobus 3. Micro Bus 4. Taxi 5. Camión-Tractor 6. Camión Grande 7. Camióneta 8. Motocicleta 9. Otros				1. Al trabajo 2. Al estudio 3. Regreso al trabajo 4. Actividad de trabajo 5. A compras / comer 6. A la casa 7. Otros					Conductor + (Personas
2	1. 2. 3. 4. 5. 6. 7. 8. 9. ()				1. 2. 3. 4. 5. 6. 7. ()					Conductor + (Personas
3	1. 2. 3. 4. 5. 6. 7. 8. 9. ()				1. 2. 3. 4. 5. 6. 7. ()					Conductor + (Personas
4	1. 2. 3. 4. 5. 6. 7. 8. 9. ()				1. 2. 3. 4. 5. 6. 7. ()					Conductor + (Personas
5	1. 2. 3. 4. 5. 6. 7. 8. 9. ()				1. 2. 3. 4. 5. 6. 7. ()					Conductor + (Personas

Fig. 4.2.4 Cordon Line Questionnaire

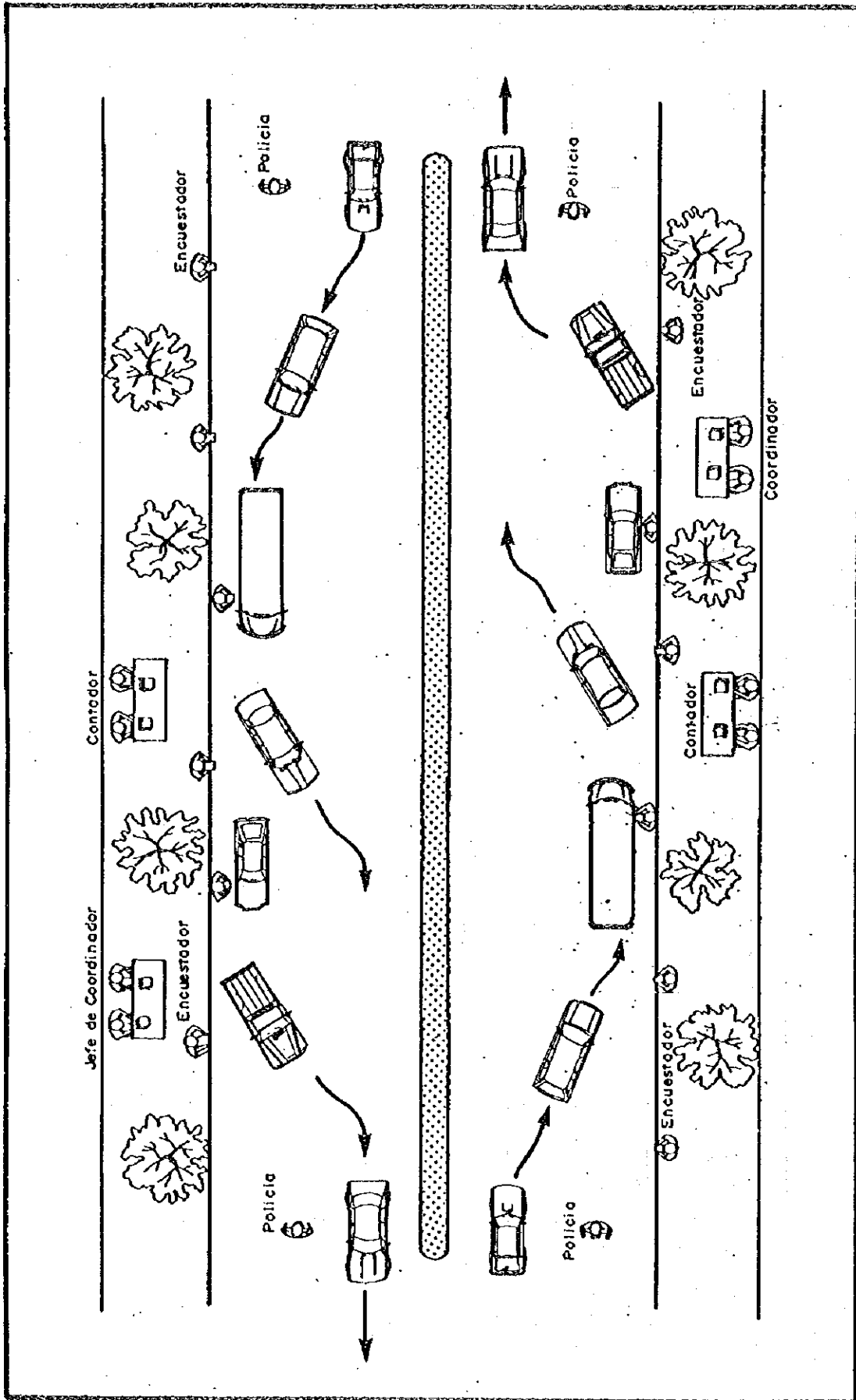


Fig. 4.2.5 Allocation of Surveyors

4.2.3 Traffic Speed Survey

1) Survey Objectives

This survey obtained data of the average vehicle driving speed on the principle roads. These data would be used for the average driving speed for the traffic assignment process and for analysis conditions.

2) Survey Roads

10 principal roads were chosen for survey. These roads are shown in Fig. 4.2.6

3) Survey Procedure

A survey vehicle drove with the general traffic flow on the survey roads. The driver took care not to pass a vehicle and not to be passed by another vehicle. Surveyors measured the time and distance in each road section. Surveyor recorded reasons for traffic example, accidents, traffic signal.

The survey was carried out 4 times a day, the morning peak flow (7~9 am), the peak hour of lunch time (12~1 pm), off peak hour, (2~3 pm) and afternoon peak hour (4~6 pm).

4) Survey Schedule

This survey has been carried out on 1 August ~ 4 August 1995.

5) Survey Sheet

Survey Sheet is shown in Fig 4.2.7.~ 8.

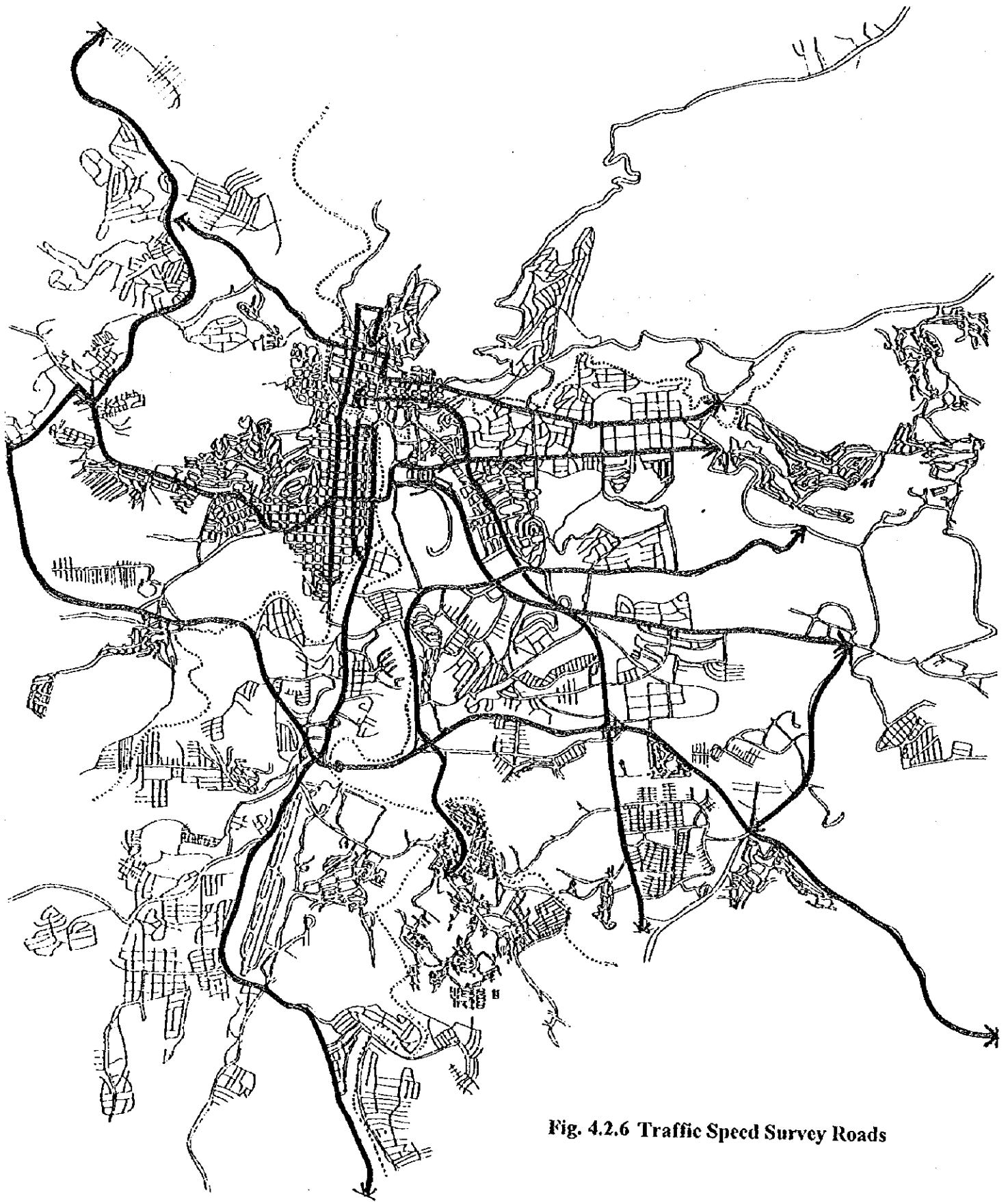


Fig. 4.2.6 Traffic Speed Survey Roads

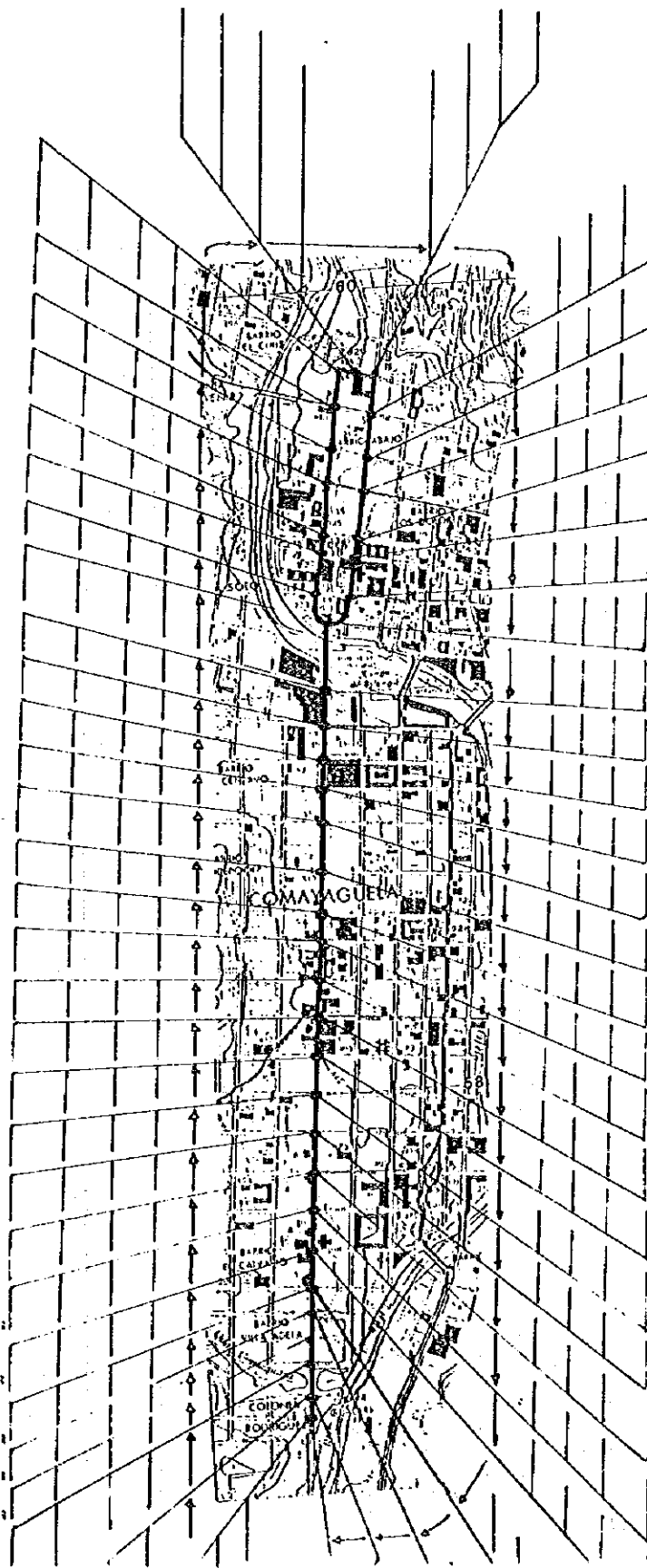


Fig. 4.2.7 Traffic Speed Survey Sheet (1)

ENCUESTA DE VELOCIDAD DE VEHICULOS

Ruta: No

Fecha
Direccion de Encuesta

Encuestador

Record No	Punto de chequeo	Cuando Para	1	2	3	4	5	6	7	8	9
NO		tiempo de Parada	:	:	:	:	:	:	:	:	:
0min.00sec.	0.0Km	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	tiempo de Parada	:	:	:	:	:	:	:	:	:
NO	m. s.	Razon de Parada	:	:	:	:	:	:	:	:	:

Razon de Parada

- 01 por semaforo
- 02 por congestonamiento
- 03 por peatonal
- 04 por construccion
- 05 por vehiculo girando a la izquierda
- 06 por vehiculo girando a la derecha
- 07 por vehiculo estacionandose
- 08 por accidente
- 09 por pasajero bajando/subiendo
- 10 por carga bajando/subiendo
- 11 por parada del bus
- 12 por otra razon

Fig. 4.2.8 (2) Traffic Speed Survey Sheet (3)

4.3. Traffic Volume Survey at Cross Sections

4.3.1. Objectives

By the observation, some sections of the principal roads have more traffic volume than capacity. There is existing showing road capacity. There are some other reasons as well for volume, capacity differences to unbalance, for example a intersection, configuration lack of traffic signals, etc..

Therefore, study team carried out a traffic volume survey of principal roads. These data show volumes on each main sections on each major road. It makes This assist analysis of present conditions of study road network.

4.3.2. Survey Procedure and Contents

This survey counted traffic volumes by type and by hour. The counting method was the same as that of the Screen Line Survey. Manual counting machine were not available.

The survey sheet is shown in following Fig 4.3.1.

The survey of traffic volum was by vehycle type and the categories of type correspond to the Person trip and Screen line surveys.

4.3.3. Survey Sections

The number of survey sections total 17 on the major roads. These sections were selected by investigation of each road. These sections are listed below and shown in Fig. 4.3.2.

ENCUESTA DE VOLUMEN DE TRAFICO

Estación	: _____	Dirección de	: _____ a _____		
Hoja	: _____ / _____	Hora	: _____ a _____ a.m./p.m.		
Encuestador	: _____				
Cheque	: _____				
/Agosto/95					
Tipo de Vehículo	5	10	15	20	25

Fig. 4.3.1 Survey Sheet



Fig. 4.3.2 Survey Section

4.4. Traffic Volume Survey at Intersection

4.4.1 Objectives

On the peak hour, many sections on the major roads are congested caused by various factors such as no traffic signal, inadequate of the intersection, poor intersection configuration, and so on. In order to analyze the kinds of problems that exist . It was necessary to collect data at each major intersection.

Therefore study team carried out a survey for high traffic volume intersections on the major roads.

4.4.2 Survey Procedure

This survey was counted traffic volumes in the same manner as the survey of cross sections on the major roads. Traffic volume was counted direction and by hour. Generally, an intersection has 12 directions. Data of this survey will be used to analyze the capacity of intersection and the timing of signals.

4.4.3 Survey Execution

This survey was carried out on weekdays from 6 July to 28 July 1995. The survey sheet was the same as the survey of cross section on major roads.

Detail survey items are as follows:

1. Traffic volume by vehicle type and by direction
2. The forum of intersection
3. Cross-section structure of each roads
4. Location of traffic signal and traffic mark
5. Pedestrian way
6. Lighting on the roads

4.4.4 Survey Points

Survey points were selected for 23 intersections on the major roads of investigation. The location of the survey points is shown in Fig.4.4.1 and Table 4.4.1.

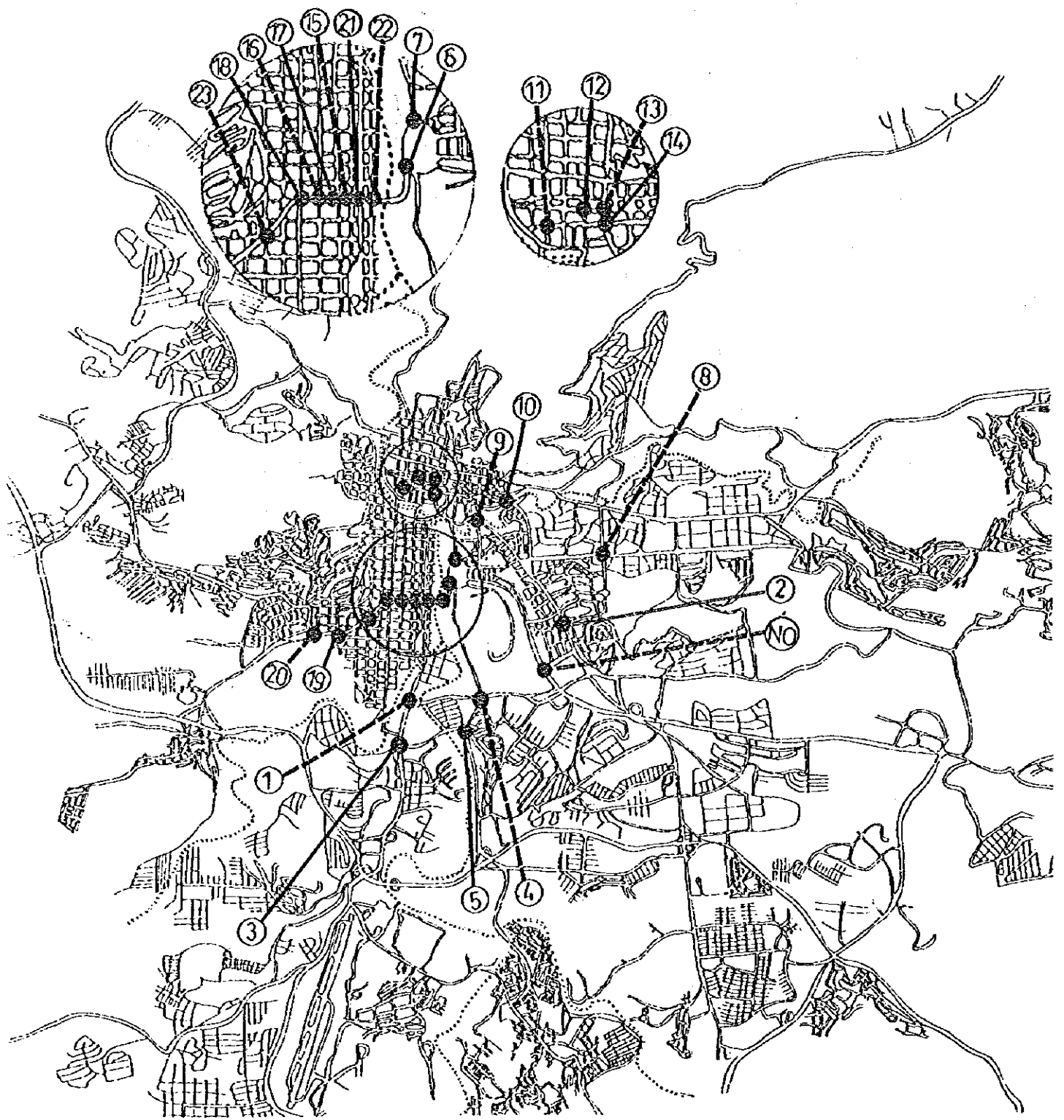


Fig. 4.4.1 Survey Points

Table 4.4.1 List of Survey Points

No.	Date	Direction
1.	6/7.	-Blvar.Comunidad Economica Europea, Comayaguela.
2.	7/7.	-Blvar. Juan Pablo II (Burger King).
3.	10/7.	-I.H.S.S. Blvar. Comun. Econo. Europea,Bo.La Granja, Comayaguela.
4.	11/7.	-Prado, Esquina de Restaurante Criollos, Tegucigalpa.
5.	12/7.	-Prado,Blvar. Jose Cecilio del Valle, Tegucigalpa
6.	13/7.	-Estadio Nacional, Rumbo al puente Juan Ramon Molina, Tegucigalpa.
7.	13/7.	-Estadio Nacional , Rumbo al puente La Isla, Tegucigalpa.
8.	14/7.	-Blvar. Morazan, Esquina de Restaurante Rincon Espanol, Tegucigalpa.
9.	17/7.	-Puente La Hoya, Contiguo a Penitencieria Central, Tegucigalpa
10.	18/7.	-Bo.San Rafael, en la bajada del Hotel Honduras Maya, Tegucigalpa.
11.	18/7.	-Casa Alianza, Fte a Bigos, Tegucigalpa.
12.	19/7.	-Almacen Acapulco, Calle a Hondutel, Tegucigalpa.
13.	19/7.	-Esquina Cine Variedades y Biblioteca Nacional, Tegucigalpa.
14.	19/7.	-Esquina de Larach & Cia, Tegucigalpa.
15.	20/7.	-11-3a Avenida, 9a Calle, Comayaguela.
16.	20/7.	-5a A12venida, 9a, Calle, Comayaguela
17.	21/7.	-4a Avenida, 9a Calle, Comayaguela, (Empresa el Rey)
18.	24/7.	-6a Avenida 9a Calle, Comayaguela.
19.	25/7.	-Blvar del Norte, esquina del Banco Atlantida, Comayaguela.
20.	26/7.	-Interseccion de Contry Club y Blvar del Norte, Comayaguela.
21.	27/7.	-1a Avenida, 9a Calle, Comayaguela. (Esquina de Tulin)
22.	27/7.	-2a Avenida, 9a Calle, Comayaguela. (Bigos Calle Real)
23.	28/7.	-8a Avenida, 9a Calle, Comayaguela, (Esquina Hotel Alfaro)

4.5 Public Transportation Survey

Due to the low ownership rate of automobiles the majority of people in the study area use buses and taxis. These means of public transportation have great impact on the making of the transportation plan. However, there is no existing on how data people use buses, bus routes, and taxis in the study area, or what the capacity of these buses and facilities have are.

The study team carried out a public transportation survey to assess (1) condition of facilities (2) usage of facilities and (3) usage of transport modes, such as bus taxi.

The public transportation survey, was carried out from 30 August to 15 September 1995 taxi survey was performed from 28 August to 5 September 1995.

4.5.1 Bus Terminal Inventory survey

1) Survey Execution

It is difficult to define a bus terminal in the study area. Working purposes, the study team defined a bus terminal as (1) end of the bus route, (2) common use of the same place as a bus stop where many bus routes connect and (3) transfer points. This survey selected 10 bus terminal by this definition.

2) Survey Items

Survey Items included:

- a. Area (Total area and forum)
- b. Pavement
- c. Time table
- d. Platform
- e. Ticket office
- f. Information office
- g. Telephone box
- h. Route map
- i. Traffic signal
- j. Sanitary facilities
- k. Coffee shop
- l. Taxi
- m. No. of bus route

3) Survey Sheet

Survey sheet is shown in Fig.4.5.1.

4) Survey Terminal

Selected terminal facilities were:

1. La Isla, Tegucigalpa
2. Parque Central, frente Burger King, Tegucigalpa
3. Parque Central, Frente Banco Atlantida, Tegucigalpa
4. Farmacia Universal, Mercado San Isidro, Comayaguela
5. Contiguo al Puente Carias, Tegucigalpa
6. Miraflores, Col. Miraflores, Tegucigalpa
7. Kennedy, Col. Kennedy, Tegucigalpa
8. La Pena Abajo, Comayaguela

INVENTARIO DE TERMINAL DE BUS

TERMINAL :	
DIRECCION :	Fecha: _____

No.	Cuestionario	Cods	Estado Fisico	Nota
1	Area Total de la Estacion			m2
2	Area de la estacion	1	con pavimento	
		2	sin pavimento	
3	Area de espera para buses	1	con pavimento	
		2	sin pavimento	
4	Calle de entrada y salida	1	con pavimento	
		2	sin pavimento	
5	Tablero de horarios	1	existe	
		2	No existe	
6	Plataforma para pasajeros	1	existe	
		2	No existe	
7	No. de plataform para pasajeros			
8	Oficina de venta de boletos	1	existe	
		2	No existe	
9	oficina de informacion	1	existe	
		2	No existe	
10	oficina de control de trafico	1	existe	
		2	No existe	
11	Tienda de venta de regalos	1	Existe	
		2	No existe	
12	Reloj de pared	1	Existe	
		2	No existe	
13	Telefono publico	1	Existe	
		2	No existe	
14	Mapa de rutas de bus	1	Existe	
		2	No existe	
15	Senalizacion dentro de la estacion	1	Existe	
		2	No existe	
16	Cafeteria	1	Existe	
		2	No existe	
17	Servicios sanitarios publicos	1	Existe	
		2	No existe	
18	No. de campanias de bus			
19	Transferencia	1	Inter-urbano	
		2	Taxi	
		3	Carro paticurar	
		4	Otra ruta urbano	

Fig. 4.5.1 Survey Sheet of Bus Terminal

9. Reparto Abajo, Tegucigalpa
10. Carrizal, Col. Lomas del Norte, Comayagua

Facilities, (1) to (4) large bus stops with large concentrations of people and buses, (5) to (6) are bus stops where many people change to another bus, (7) to (10) are bus terminal where a bus route ends. These are shown in following Fig.4.5.2.

4.5.2 Bus Volume Survey at Bus Terminal

1) Survey Procedure

This survey counted the number of departing and arriving buses at the bus terminal. Surveyors counted the number of buses by route and by time. Counting was done on survey sheets, which are shown in Fig. 4.5.3.

2) Survey Points

Survey points were the 10 bus terminals identified in Section 4.5.1.

4.5.3 Bus Passenger Survey at Bus Terminal

1) Bus Passenger Count Survey

This survey counted the number of passengers getting on/of each bus on arrival and departure. The following items were counted:

1. Direction (arrival and departure)
2. Time (arrival and departure)
3. Route (origin and destination)
4. No. of Passengers (getting on and off)

The survey sheet is shown in Fig.4.5.4

2) Bus Passenger Interview Survey

The bus passenger survey obtained the following:

1. Direction (arrival and departure)
2. Time (arrival and departure)
3. Route (origin and destination)
4. Origin bus stop (for arrival passenger)
5. Destination bus stop (for departure passenger)
6. Trip purpose

The survey sheet is shown in Fig. 4.5.5.

4.5.4 Bus Stop Inventory Survey

1) Selection of Bus Route

There are 45 bus routes in the study area that fall within 10 categories based on their characteristics and pattern of passing through the central area of the study area ten bus routes were for the bus stop survey, one each for each of the 10 categories of central bus path configuring as shown in following Fig. 4.5.6.

2) Bus Stop Location

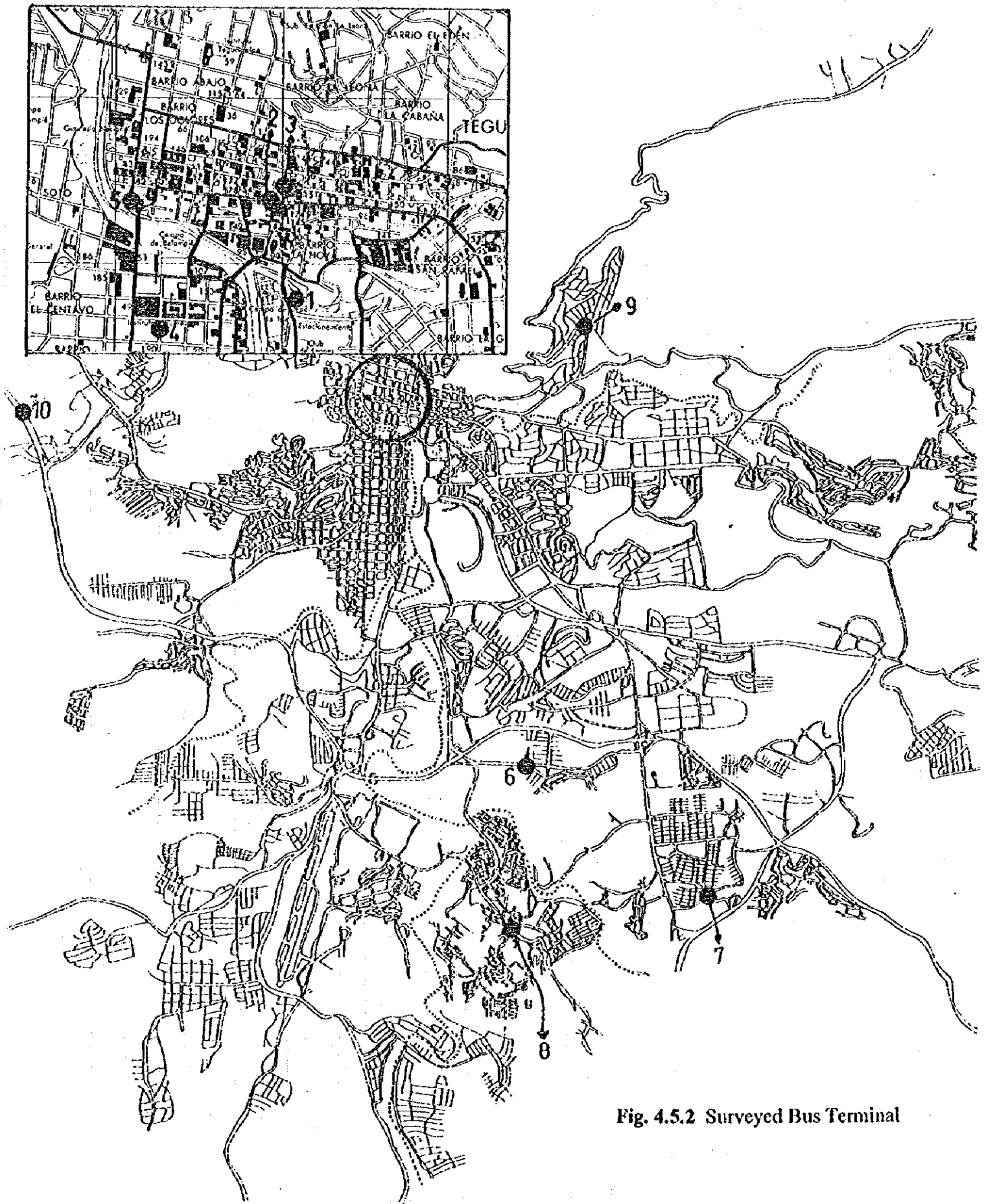


Fig. 4.5.2 Surveyed Bus Terminal

ENCUESTA DE CANTIDAD DE PASAJEROS DE BUS

(A)

Terminal :	LLEGADA	Fecha :
------------	----------------	---------

	Ruta de Bus	Hora				Ruta de Bus	Hora		
		h	: mh	:			h	: mh	:
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Fig. 4.5.4 Bus Passenger Counting Sheet

ENCUESTA DE ORIGEN DE PASAJEROS DE BUS

TYPE A : LLEGADA

TERMINAL No.		DIRECCION		Proposito del viaje	
Fecha :				1. Al Trabajo 2. Al Estudio 3. A la Casa 4. Regreso al trabajo 5. Actividades de trabajo 6. Compras o Comer 7. Esparcimiento social 8. Otras	
No	No.	Hora	hr:	min	Destino
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Fig. 4.5.5 Bus Passenger Interview Sheet

Generally, bus stops were not fixed in each route in some places the bus stops have been designated by traffic marks. These are very few. Therefore, study team determined bus stop on each study route by investigation and information from the study counterpart along the roadside. There area total of 405 bus stops on the 10 studied bus routes, including overlapped bus stops. The actual number of bus stops may vary by 20%. Bus stops for one route are shown in Fig. 4.5.7.

3) Bus Stop Inventory

Survey items included:

- a. Direction
- b. Pavement condition
- c. Bus bay
- d. Time table
- e. Waiting Facilities
- f. Information board
- g. Bus stop mark

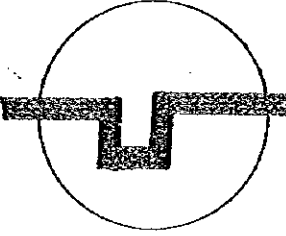
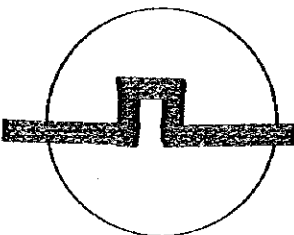
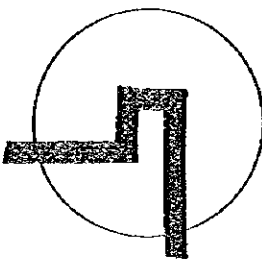
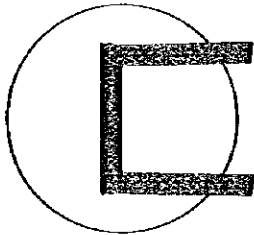
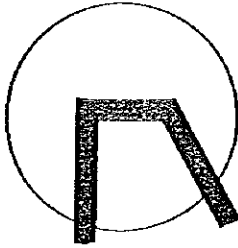
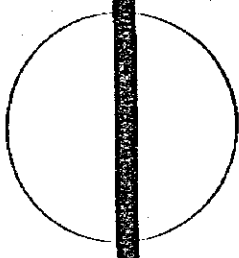
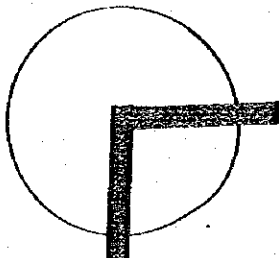
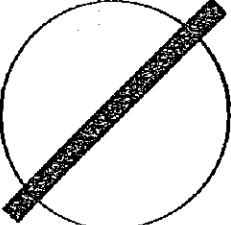
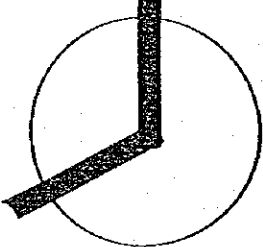
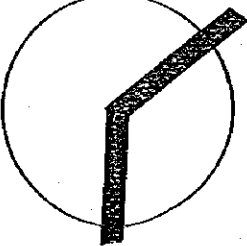
CATEGORIA	RUTA	NUMERO de Ruta
1 	Cerro Grande- La Esperanza Cerro Grande- La Sosa	1 2
2 	Carrizal- Hogar Carrizal- Miraflores Carrizal- Universidad Norte Centro America- Universidad Norte	3 4 5 6
3 	Carrizal- Prado Centro America- Prado Cerro Grande- Hogar Cerro Grande- Kennedy Cerro Grande- Villanueva Lolo- Buenos Aires	7 8 9 10 11 12
4 	Lomas- Popular Rio Grande- Reparto Rio Grande- Lomas Popular- Reparto Abajo Popular- El Sitio Popular- Reparto Arriba Flor del Campo- El Sitio	13 14 15 16 17 18 19
5 	Rio Grande- Kennedy Hato- Los Robles Miraflores- Rio Grande Miraflores- Los Laureles Miraflores- San Francisco Miraflores- Popular Tiloarque- Prado	20 21 22 23 24 25 26

Fig. 4.5.6 Characteristics of Bus Route

6		San Francisco- Reparto Arriba Centro America- Reparto Arriba Carrizal- Reparto Arriba Centro America- Reparto Abajo	27 28 29 30
7		Universidad Norte- Divanna Universidad Norte- Flor del Campo Universidad Norte- San Francisco Universidad Norte- Los Laureles Suyapa- Mercado San Isidro	31 32 33 34 35
8		Carrizal- La Sosa Carrizal- La Esperanza Carrizal- El Sitio San Francisco- La Sosa	36 37 38 39
9		Reparto Abajo- Carrizal Reparto Abajo- Profesores	40 41
10		Tiloarque- La Sosa Tiloarque- La Esperanza Tiloarque- El Sitio Centro America- El Sitio	42 43 44 45

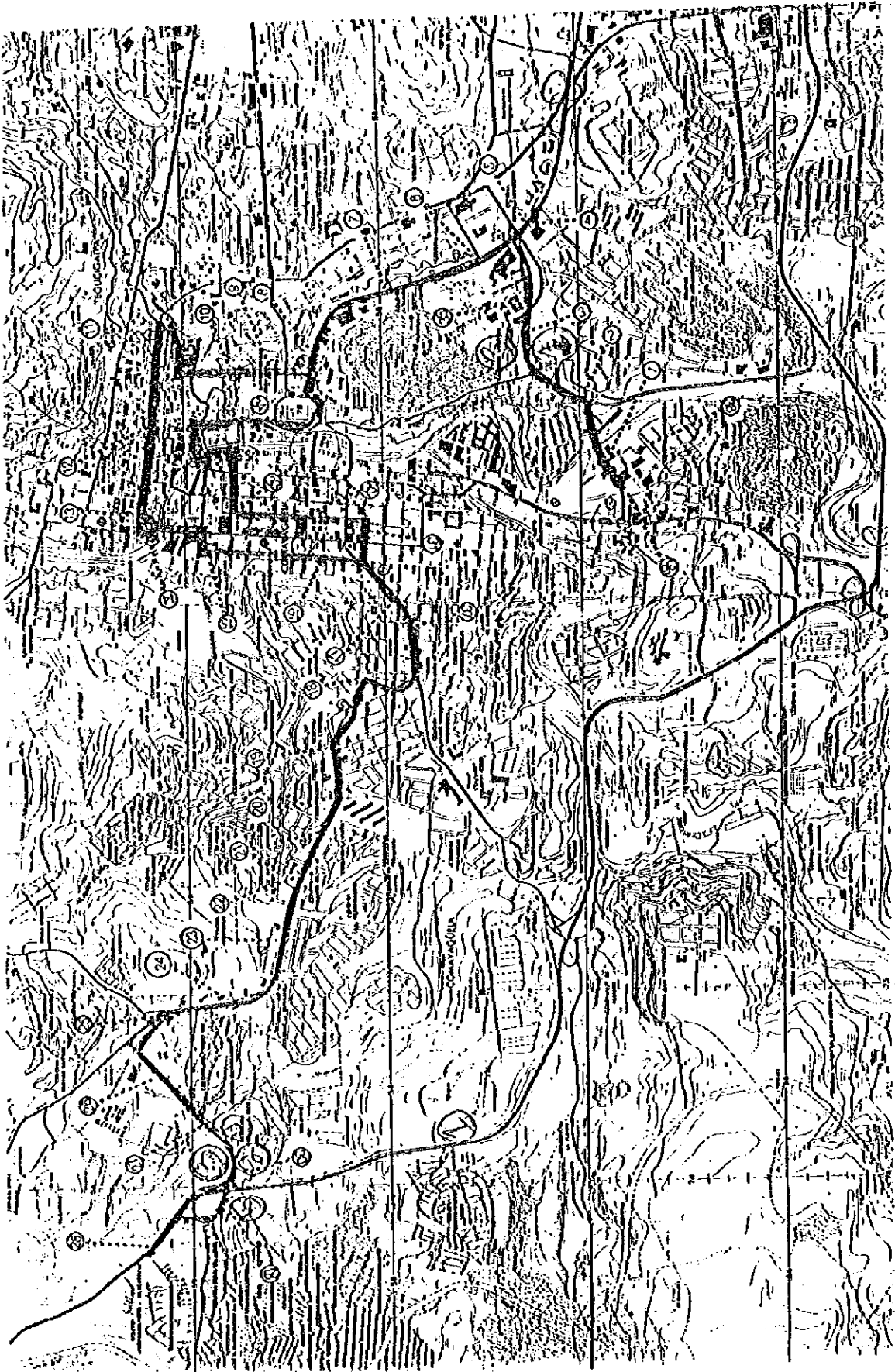


Fig. 4.5.7 Bus Stops Location Map (Example)

4.5.5 Bus Passenger Survey at Bus Stop

1) Bus Passenger Count Survey

This survey is counted the number of passengers getting into and off at all bus stops, the bus routes surveyed were the 10 routes already mentioned by classification.

One or two surveyors counted the number of passenger in the bus. Five buses were selected for survey from each route. These buses were surveyed from the start to the end of their services for one day.

Survey form is show in Fig. 4.5.8

2) Bus Passenger Interview Survey

This survey was carried out parallel to the count survey on the same buses. Two surveyors interviewed passengers who got onto the bus. This survey covered 5 buses on 10 regular routes from start in the morning to end of operation night. Survey items included origin and destination of bus stop and trip purpose. Survey sheet is shown in Fig. 4.5.9

4.5.6 Taxi Pool Inventory Survey

There are 18 taxi pools in Tegucigalpa and 23 taxi pools in Comayaguela, which according to the *Municipalidad*. This survey validated this information. Survey items included:.

- a. Direction of trip
- b. Capacity(number of passengers by taxi)
- c. Service area

The survey found that 3 taxi pools are no longer in operation.

The location and capacity of these pools is shown in Fig.4.5.10,11 and 12

ENCUESTA DE CANTIDAD DE PASAJEROS en BUS

-2-

Bus No.	Salida	Fecha:
---------	--------	--------

	Parada de Bus	Hora			No.	Parada de Bus	Hora			No.
		h	:	min			h	:	min	
1					31					
2					32					
3					33					
4					34					
5					35					
6					36					
7					37					
8					38					
9					39					
10					40					
11					41					
12					42					
13					43					
14					44					
15					45					
16					46					
17					47					
18					48					
19					49					
20					50					
21					51					
22					52					
23					53					
24					54					
25					55					
26					56					
27					57					
28					58					
29					59					
30					60					

NOTA:

Fig. 4.5.8 Bus Passenger Survey in Bus (Counting)

ENCUESTA DE ORIGEN DE PASAJEROS DE BUS					
TIPO A : LLEGADA					
TERMINAL No.			DIRECCION		Proposito del viaje 1. Al Trabajo 2. Al Estudio 3. A la Casa 4. Regreso al trabajo 5. Actividades de trabajo 6. Compras o Comer 7. Esparcimiento social 8. Otras
Fecha:					
No	Ruta de bus	Hora hr:	min	Destino	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Fig. 4.5.9 Bus Passenger Survey (Interview)

Direction of Taxi pool

Direction	Capacity
Tegucigalpa	26
Centro-Reparto	28
Centro-Los Robles	32
Centro-Loarque	26
Centro-Cerro Grande	23
Centro-Buenos Aires	25
Centro-El Bosque	48
Centro-Torocagua	11
La Isla-La Joya	26
Centro-Villa Olimpica	24
Centro-Col.21de Octubre	15
Centro-El Sitio	48
Centro-Col.San Miguel	42
Centro-Col.Los Llanos	21
Centro-Col.Victor F Ardon	66
Centro-Col.Hato de Enmedio	87
Centro-Col.Kennedy	34
Centro-Corte Suprema de Justicia	7
Mercado San Miguel-Punto Varios	

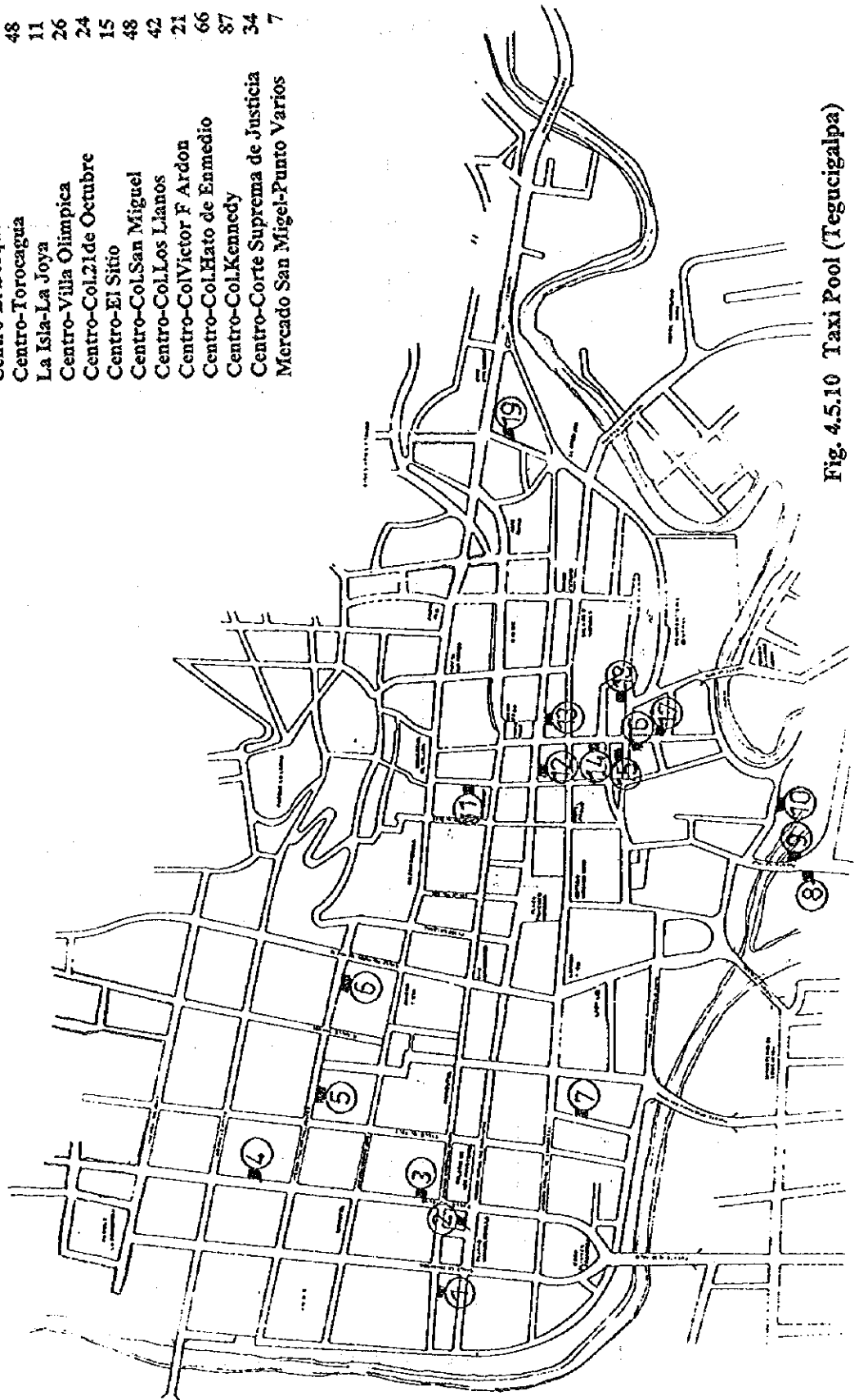
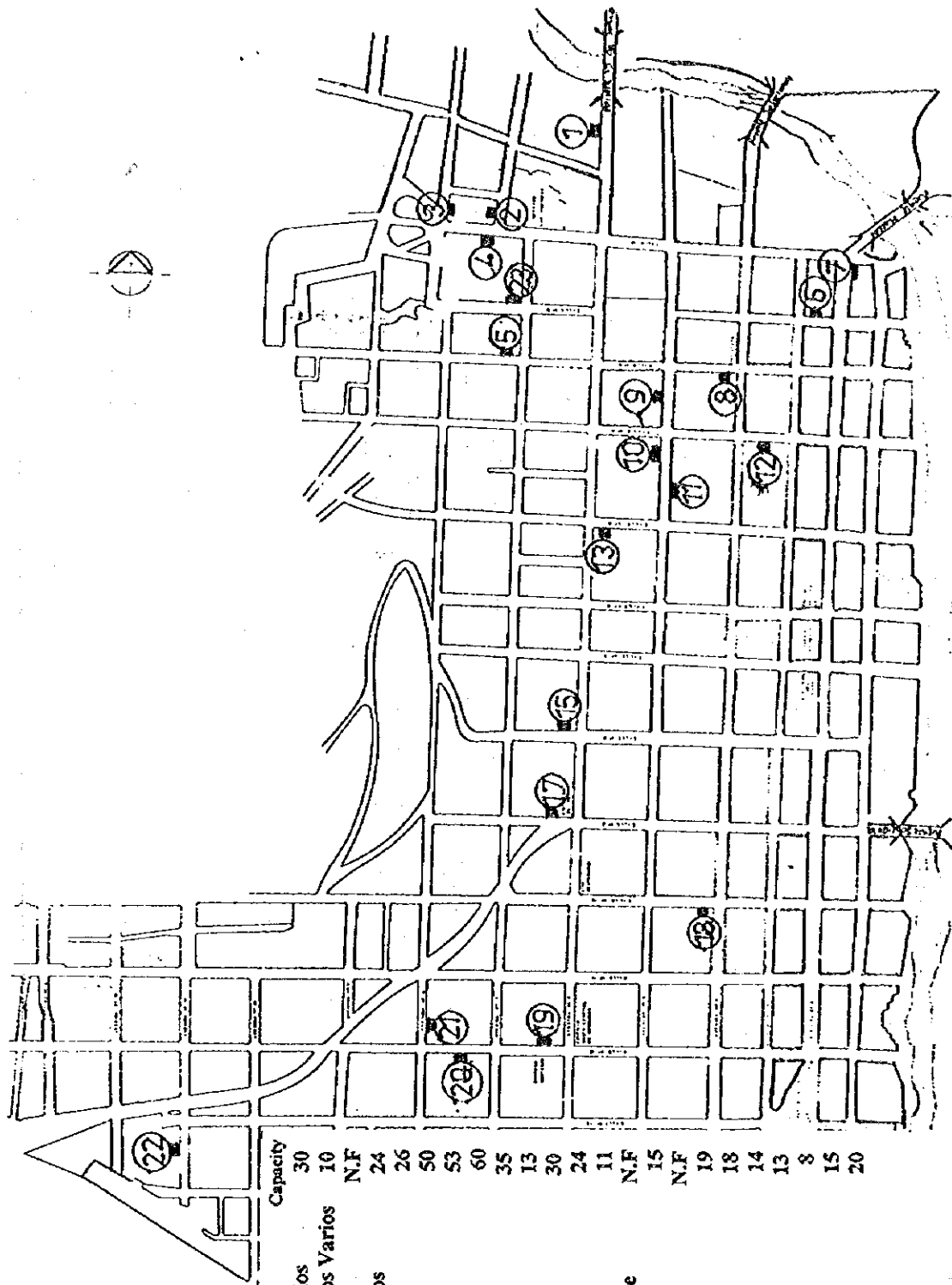


Fig. 4.5.10 Taxi Pool (Tegucigalpa)



	Capacity
Comayaguella	30
Mercado Las Americas-Puntos Varios	10
Fletes Mercado Las Americas-Puntos Varios	N.F.
Mercado Las Americas-El Carrizal	24
Super Mercado Mirna-Puntos Varios	26
A Colonia Profesores	50
A Colonia Centro America Oeste	53
A Colonia El Pedregal	60
A Colonia Kennedy	35
A Colonia Hato de Enmedio	13
A Colonia Suyapa	30
A Colonia San Miguel	24
A Colonia Pena por bajo	11
A Colonia Cerro Grande	N.F.
A Residencial Centro America Oeste	15
Terminal Aurora	N.F.
Central Automotris-El Carrizal	19
Terminal El Rey	18
Hermano Pedro-Punto Varios	14
Terminal Nortenos	13
Terminal Saenz	8
Terminal Maribel Junquenos	15
Terminal Hedman-Alas	20
Mercado-Carrizal	

*NF: No function at present

Fig. 4.5.11 Taxi Pool (Comayaguella)

INVENTARIO DE PUNTO DE TAXI

No.

Parada : _____	DIRECCION : _____
Fecha: _____	

No.	Cuestionario	Cote	Estado Físico	Nota
1*	Area Total de la parada			m
2	Area de la estacion	1	con pavimento	
		2	sin pavimento	
3	Calle de acceso y salida	1	con pavimento	
		2	sin pavimento	
4*	Area de espera para taxi	1	Existe	
		2	No existe	
5*	Plataforma para pasajeros	1	existe	
		2	No existe	
6*	Ancho de calle y acera	1	calle	m
		2	acera	m
7	Mapa de ruta o area servicio	1	Existe	
		2	No existe	
8*	Tablero de informacion	1	existe	
		2	No existe	
9*	Telefono publico	1	existe	
		2	No existe	
10	Reloj	1	existe	
		2	No existe	
11	Servicios sanitario	1	Existe	
		2	No existe	
12	No. total de taxis en parada			

* : CROQUIS

Fig. 4.5.12 Taxi Pool Inventory

4.5.7 Taxi Passenger Interview Survey

This survey aims to know how the taxi passengers use a taxi. Each taxi pool has been fixed the direction to transport. Taxi waits a passenger until 5 passengers to come.

Study team selects 5 major taxi pool from Tegucigalpa and 5 major taxi pool from Comayaguela. Total 10 taxi pool has been surveyed. This survey is the interview survey to the taxi passenger. Survey items are as follows.

- a. Time
- b. Destination
- c. Trip purpose

All the taxi to departure should be interviewed. Arrival taxi is not interviewed because the passenger will get off on the way to come this taxi pool. Survey points of taxi pool has been selected where has a large number of taxi. Survey points are as follows.

Tegucigalpa	1. No.7	Centro ~ Trocagua
	2. No.13	Centro ~ Col. San Miguel
	3. No.14	Centro ~ Col. Los Llanos
	4. No.16	Centro ~ Col. Hato de Enmedio
	5. No.17	Centro ~ Col. Kennedy
Comayaguela	6. No.1	Mercado las Americas
	7. No.6	A Col. Centro America Oeste
	8. No.7	A Col. el Pedregal
	9. No.8	A Col. Kennedy
	10. No.9	A. Col. Hato de Enmedio

Note: Taxi pool No. is shown in Fig 4.5.10 ~Fig. 4.5.11

And Survey sheet are shown in Fig. 4.5.13 and Fig. 4.5.14

ENCUESTA DE SALIDA DE TAXI PUNTO

SALIDA

PUNTO No. _____	DIRECCION _____	Fecha: _____
-----------------	-----------------	--------------

1	Hora			No. de pasajeros	Max taxi	No. pasajeros	31	Hora			NO. de taxi	No. de pasajeros	Max taxi	No. pasajeros
	h	:	min					h	:	min				
2							32							
3							33							
4							34							
5							35							
6							36							
7							37							
8							38							
9							39							
10							40							
11							41							
12							42							
13							43							
14							44							
15							45							
16							46							
17							47							
18							48							
19							49							
20							50							
21							51							
22							52							
23							53							
24							54							
25							55							
26							56							
27							57							
28							58							
29							59							
30							60							

NOTA :

Fig. 4.5.13 Taxi Pool Counting Sheet

ENCUESTA DE PASAJEROS EN PUNTO DE TAXIS					
Punto No.			Direccion		Proposito del viaje
Fecha:					1. Al Trabajo 2. Al Estudio 3. A la Casa 4. Regreso al trabajo 5. Actividades de trabajo 6. Compras o Comer 7. Esparcimiento social 8. Otras
No	Taxi No.	Hora hr: min		Destino	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

NOTA:

Fig. 4.5.14 Taxi Passenger Interview Sheet

4.6 Parking Survey

4.6.1 Parking Inventory Survey

This survey determined the parking capacity in the central areas of Tegucigalpa and Comayagua. Survey items were:

- a. Direction Location
- b. Area
- c. Capacity
- d. Public or Private Operation

There are 74 parking lots in Tegucigalpa and 122 in Comayagua. These locations are shown in Fig. 4.6.1(1) and 4.6.1 (2).

4.6.2 Interview Survey for Parking Lot User

In order to determine how parking is presently used, this survey was by interview of users. Survey items were:

- a. Time of arrival
- b. Destination
- c. Walking Distance
- d. Parking time
- e. Cost
- f. Trip purpose

Survey sheet is shown in Fig. 4.6.2.

4.6.3 Survey on Road Parking

Many vehicles are parked on street throughout the central study area with much traffic congestion. The study team selected areas where on street parking was heaviest.

The survey has carried out in two ways. The first was a count of parked vehicles. This for 10 blocks survey each in Tegucigalpa and Comayagua. Surveyors walked around each block and counted the number of parked vehicles.

Survey sheet are show in Fig. 4.6.3 and 4.

The second survey consisted of interviews of drivers of the parked cars. Survey items included:

- a. Time of arrival
- b. Destination
- c. Walking distance
- d. Parking time
- e. Cost can be paid
- f. Trip purpose

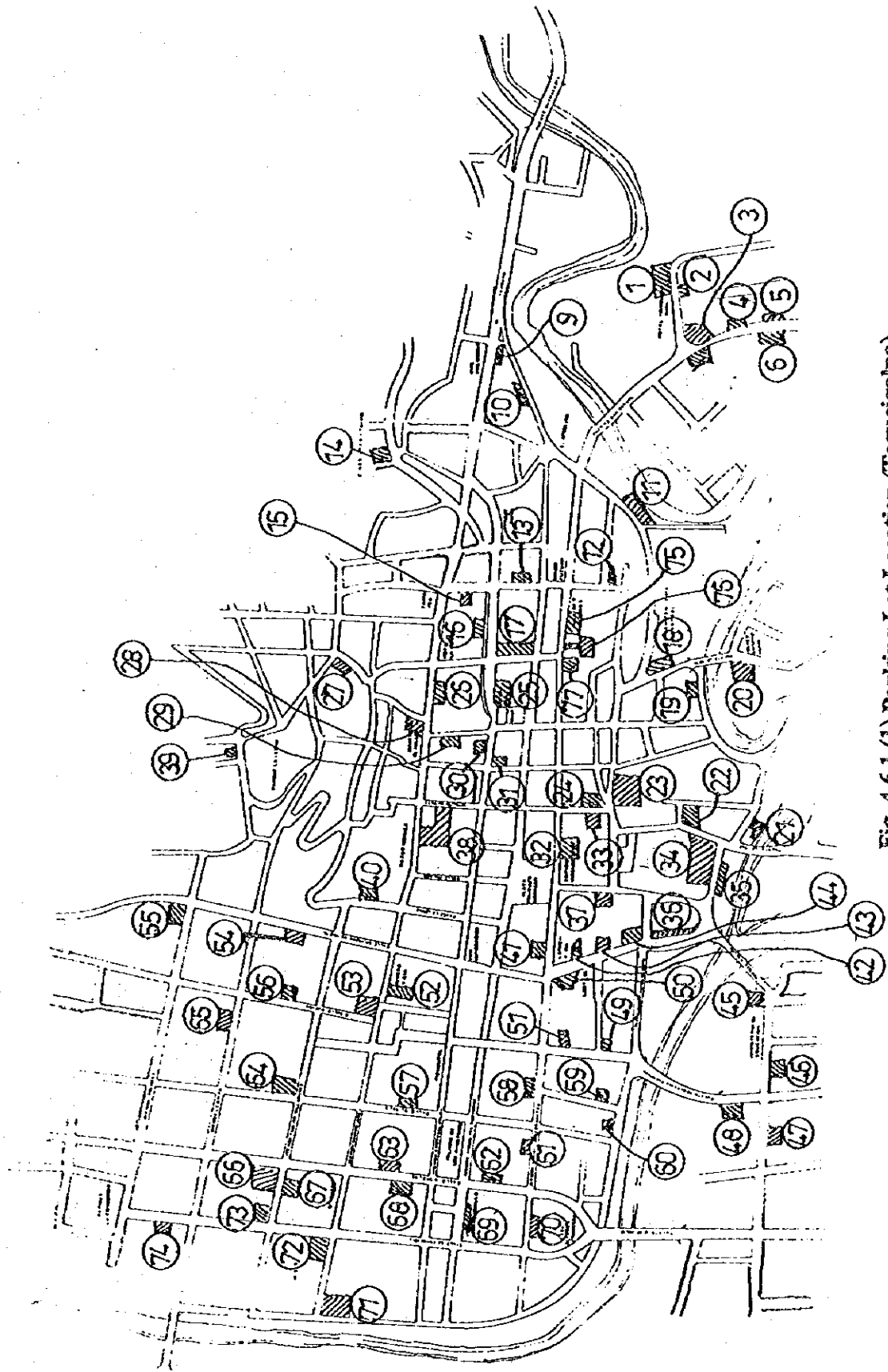


Fig. 4.6.1 (1) Parking Lot Location (Tegucigalpa)

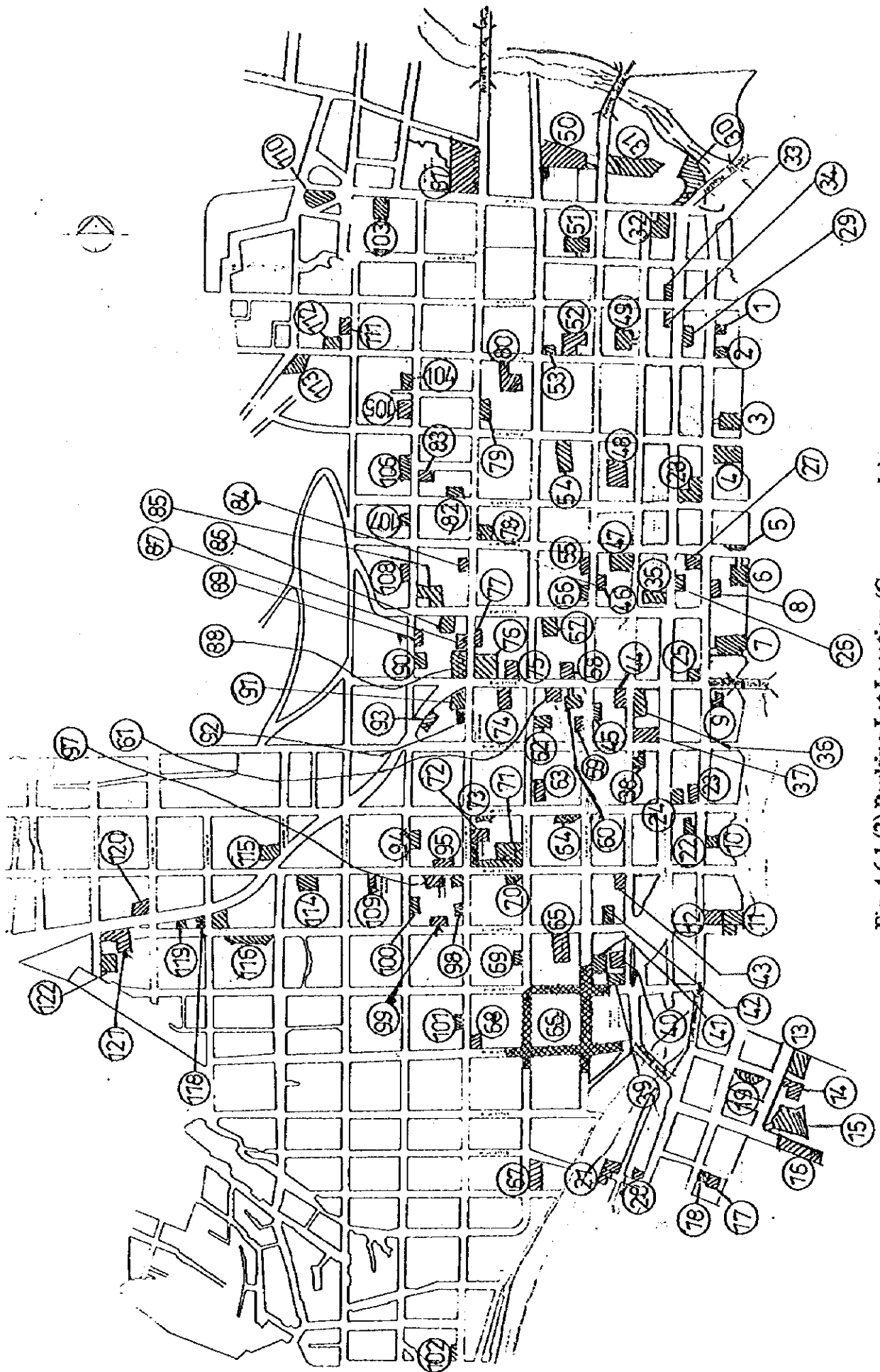


Fig. 4.6.1 (2) Parking Lot Location (Comayaguela)

HOJA de Encuesta del Sitio

Nombre de Encuestador:
Fecha de Encuesta :

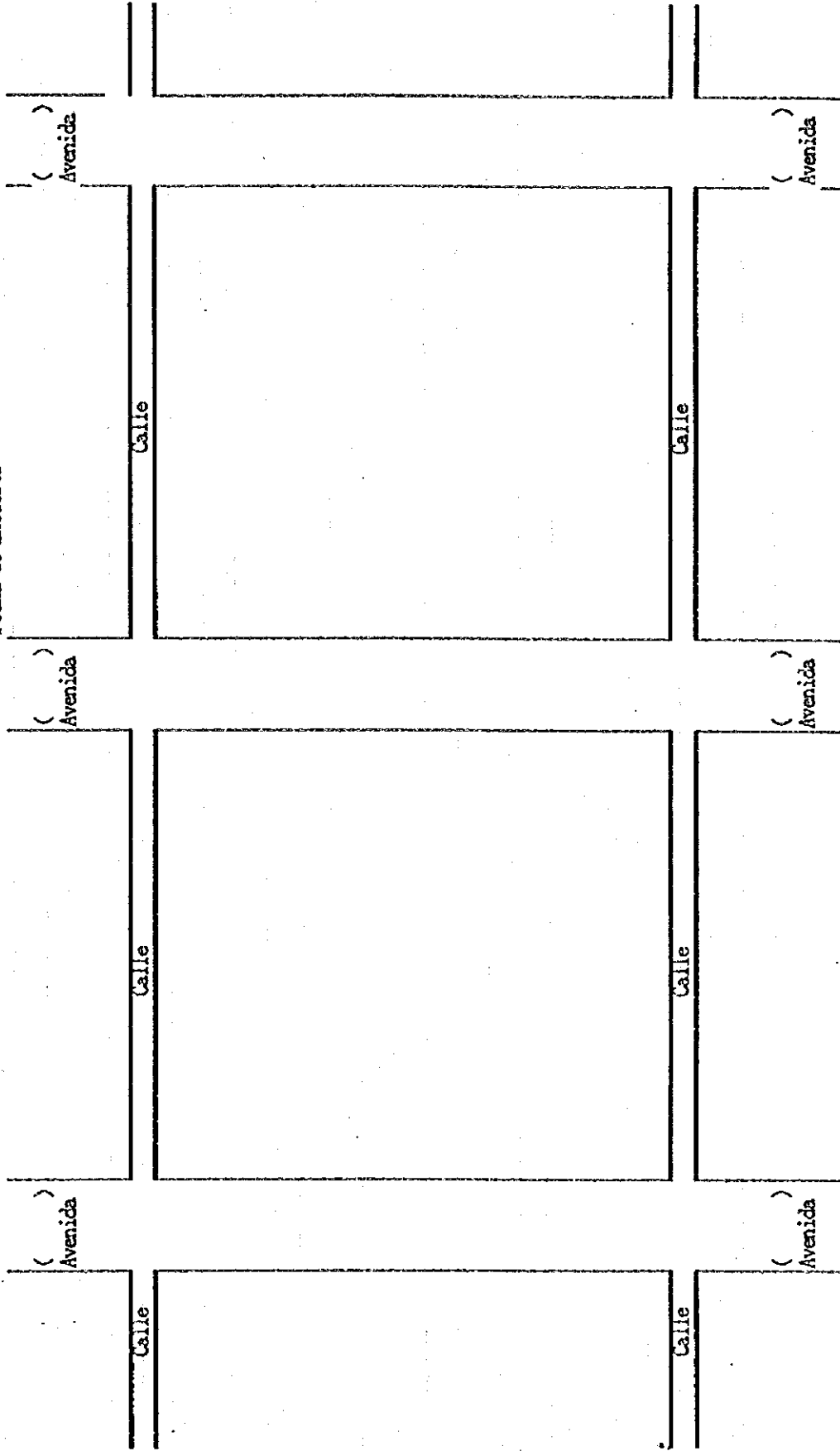


Fig. 4.6.2 Parking on Road Survey Sheet (1)

