

APPENDICES TO CHAPTER 7

APPENDIX 7.1 FIELD SURVEY ON BUS PASSENGERS MOVEMENT

7.1.1 Passenger Surveys

(1) On the Air Conditioned Buses

Passengers on selected bus trip running along FES and SES corridors were interviewed of their origin, destination, access transportation, etc. The survey covered both directions. The interviewed items are shown in Appendix Table 7-1. On the same bus trip, passengers on and off at each bus stop and those on the bus were counted simultaneously.

Survey date and hours were as follows :

North-south corridor : February 22, Hours 6.00 - 20.00

East corridor : February 23, Hours 6.00 - 20.00

Through First Stage Expressways (Din Daeng-Port-Bang Na)
: March 17, Hours 6.00 - 20.00

The air conditioned bus routes on which these surveys were conducted are shown in Fig. 7-1 (the same Figure is shown in Appendix Fig. 7-1). These Figures also present the air conditioned bus route which had the passengers' inter-bus-stop movement survey in 1980 by BMTA.

The recovered interview sheets and the number of bus trips on which survey was conducted are shown in Appendix Table 7-2 together with the recent bus operation statistics.

(2) At Major Bus Stops

At major bus stops, inbound passengers on selected bus routes were interviewed of their origin, destination, access transportation, etc. The interview sheets are same as those used on the air conditioned buses. (See Appendix Table 7-1). Simultaneously, the counting of on and off passengers inbound was conducted on all buses of the selected routes stopping at these stops. Survey date and hours were same to those in (1) on the Air Conditioned Buses :

North-south corridor : February 22, Hours 6.00 - 20.00

East corridor : February 23, Hours 6.00 - 20.00

Through First Stage Expressways (Din Daeng-Port-Bang Na)
: March 17, Hours 6.00 - 20.00

The location of the bus stops at which survey was conducted is shown in Fig. 7-2. (Appendix Fig. 7-2 also shows the same map). Appendix Table 7-3 shows the routes selected for the survey and the routes on which the passengers' inter-bus-stop movement survey in 1980 was conducted. The numbers of recovered interview sheets on these bus stops are in Appendix Tables 7-4 and 7-5.

7.1.2 Bus Traffic Volume Counting

Bus traffic volume was counted on the road sections running in these corridors. The counting

APPENDIX TABLE 7-1 BUS PASSENGER SURVEY SHEET

Surveyor name Date

<p><u>In the air-conditioned bus only</u></p> <p>Bus Route No.</p> <p>From</p> <p>To</p> <p>Q1 <u>Where did you get on ?</u></p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>Q2 <u>Where was your starting place ?</u></p> <p>Soi Road Nearby well known location</p> <p>Q3 <u>How did you come to the bus stop ?</u></p> <p><input type="checkbox"/> Walk or bicycle <input type="checkbox"/> BMTA Bus <input type="checkbox"/> Mini Bus <input type="checkbox"/> Private Car</p> <p><input type="checkbox"/> Taxi, Sanlor, Seclor <input type="checkbox"/> Motorcycle <input type="checkbox"/> Railway <input type="checkbox"/> Boat</p> <p><input type="checkbox"/> Others</p> <p>Time Taken Minutes</p> <p>Q4 <u>Where will you get off ?</u></p> <p>Bus Stop Location</p> <p>After getting off the bus, what transport mode will you use ?</p> <p><input type="checkbox"/> Walk or bicycle <input type="checkbox"/> BMTA Bus <input type="checkbox"/> Mini Bus <input type="checkbox"/> Private Car</p> <p><input type="checkbox"/> Taxi, Sanlor, Seclor <input type="checkbox"/> Motorcycle <input type="checkbox"/> Railway <input type="checkbox"/> Boat</p> <p><input type="checkbox"/> Others</p> <p>Time Taken Minutes</p> <p>Q5 <u>Where is your destination ?</u></p> <p>Soi Road Nearby well known location</p> <p>Q6 <u>Trip Purpose</u></p> <p><input type="checkbox"/> Home to work <input type="checkbox"/> Home to school <input type="checkbox"/> On business</p> <p><input type="checkbox"/> Go home <input type="checkbox"/> On personal matter <input type="checkbox"/> Others</p> <p>Q7 <u>Car Ownership</u></p> <p>Do you or your family member usually use private vehicle ?</p> <p><input type="checkbox"/> YES → Type of Vehicle <input type="checkbox"/> Motorcycle <input type="checkbox"/> Driven by you ? <input type="checkbox"/> YES</p> <p><input type="checkbox"/> NO <input type="checkbox"/> Private Car <input type="checkbox"/> NO</p> <p>Q8 <u>Why do you use the bus ?</u></p> <p>.....</p> <p>.....</p>	<p><u>At Bus Stop only</u></p> <p>Bus Stop</p> <p>Interview Time</p> <p>Q1 <u>What bus will you take ?</u></p> <p><input type="checkbox"/> Any bus coming first</p> <p><input type="checkbox"/> Bus Route No.</p> <p>Bus Type <input type="checkbox"/> Mini <input type="checkbox"/> Large</p> <p><input type="checkbox"/> Either</p>
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<p><u>In the air conditioned bus only :</u></p> <p>Why do you use the air conditioned bus ?</p> <p>.....</p> <p>.....</p>	<p><u>At Bus Stop only :</u></p> <p>Why don't you use the air conditioned bus ?</p> <p>.....</p> <p>.....</p>
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Q9 Service on Expressway

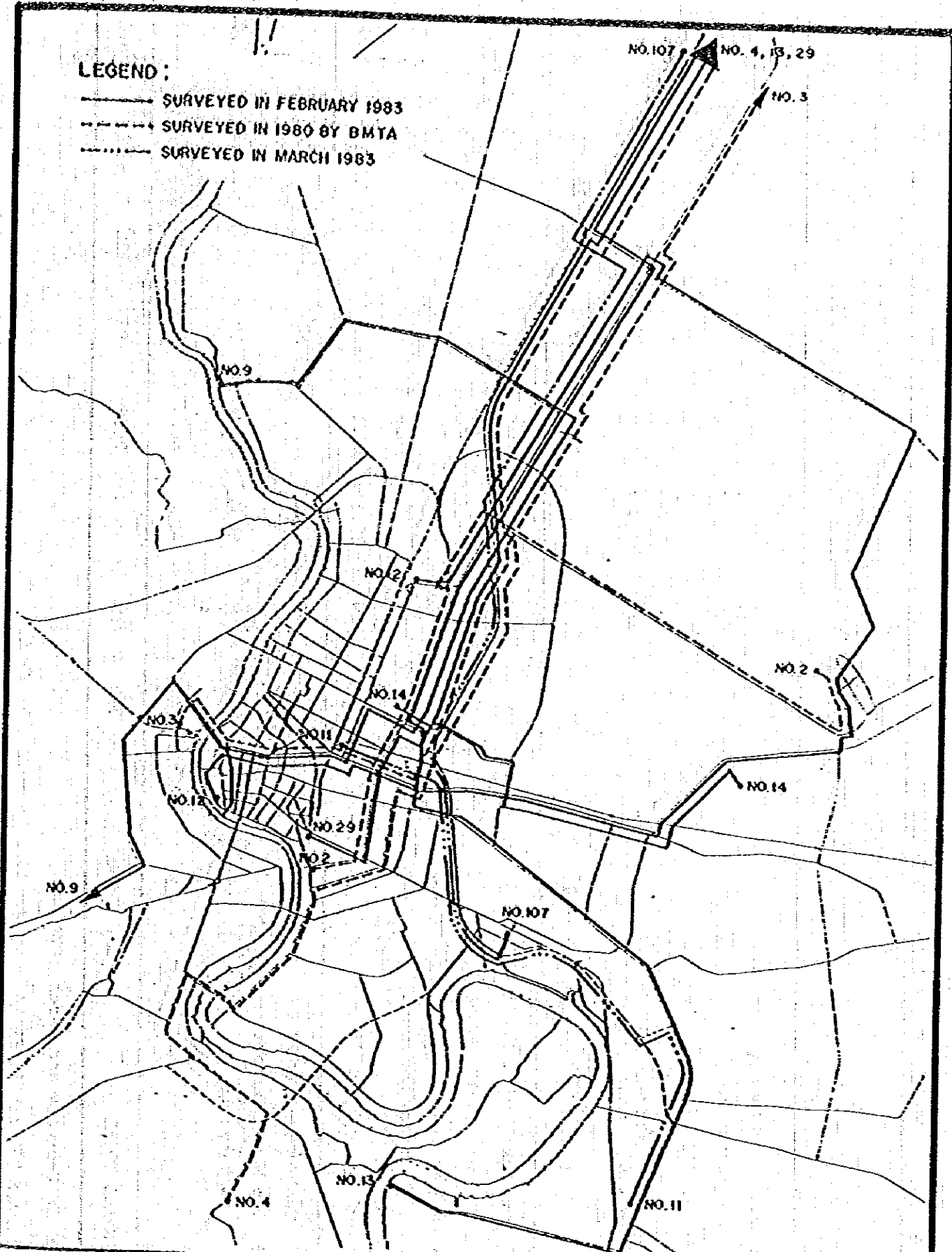
If some buses pass through the expressway and arrive at your destination in shorter time, will you use it?

YES → If so, how much can you pay additionally ?

NO

LEGEND :

- SURVEYED IN FEBRUARY 1983
- - - - - SURVEYED IN 1980 BY BMTA
- SURVEYED IN MARCH 1983



**APPENDIX
FIG. 7.1**

**AIR CONDITIONED BUS ROUTES :
PASSENGERS INTERVIEWED**

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

APPENDIX TABLE 7-2 SURVEY ON AIR CONDITIONED BUSES

Corridor	Route No.	Origin-Destination	Bus Trips 1) Surveyed		Bus Trips 2) in Operation		The Ratio in Percent		Passengers 1) Interviewed		Passengers Carried Both Ways	The Ratio in Percent
			Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound		
N-S	9	Sedtakit Housing Project - Nonthaburi	6	5	56	57	10.7	8.8	115	95	8,930	2.4
	13	Rang Sit - Poochao Saming Prai	4	5	94	94	4.3	5.3	61	86	13,410	1.1
	29	Rang Sit - Hua Lump Pong	7	8	40	40	17.5	20.0	63	70	4,160	3.2
		TOTAL	17	18	190	191	8.9	9.4	239	251	26,500	1.8
E	12	Yansinke Phahol Yochin - Pak Khlong Talad	11	10	74	75	14.9	13.3	164	189	13,410	2.6
	14	Ram Kam Haeng University - Victory Monument	25	25	54	54	46.3	46.3	472	353	4,940	16.7
		TOTAL	36	35	128	129	28.1	27.1	636	542	18,350	6.4
First Stage Express- way	11	Sam Rong - Yommarat	6	8	15	15	40.0	53.3	58	44	872	11.7
	107	Don Muang Airport - Kasem Raj	9	11	16	16	56.3	68.8	59	91	1,156	13.0
		TOTAL	15	19	31	31	48.4	61.3	117	135	2,028	12.4
		GRAND TOTAL	68	72	349	351	19.5	20.5	992	928	46,878	4.1

Sources : 1) In February and March, 1983

2) A weekday average in December 1982, provided by BMTA

LEGEND

1-----15. BUS STOPS SURVEYED IN FEBRUARY 1983

S-83	34, 59
S-80	29, 39

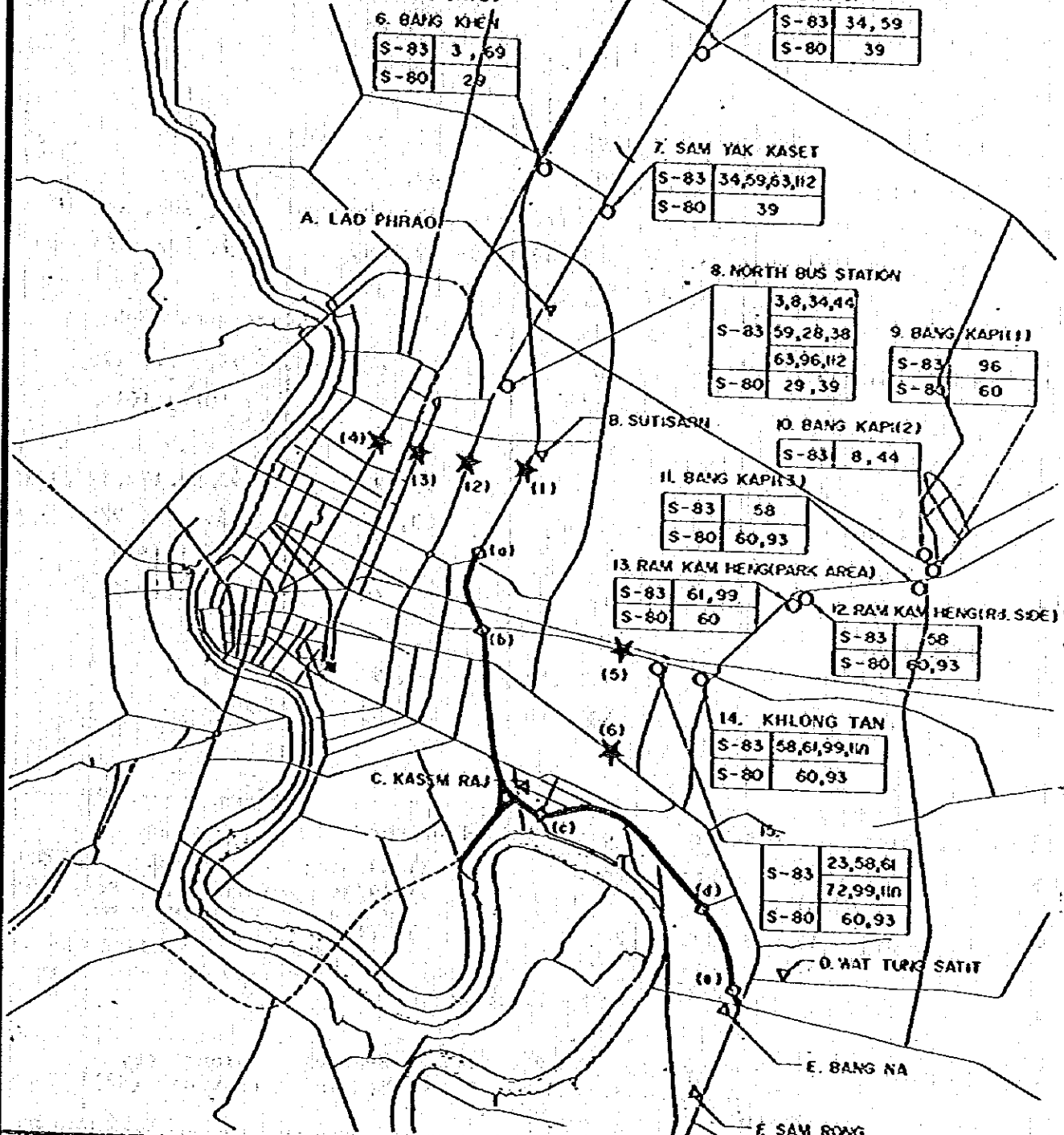
-- SURVEYED BUS ROUTE NO. 34 & 59 IN 1983

-- SURVEYED BUS ROUTE NO. 29 & 39 IN 1980

A-----F SURVEYS ON MINIBUSES RUNNING THROUGH EXPRESSWAYS IN MARCH 1983

★(1)---★(6) BUS COUNTING LOCATIONS

○(a)---○(e) BUS COUNTING AT TOLL GATES



APPENDIX
FIG. 7.2

**NORMAL BUSES : PASSENGER INTERVIEWING
AND BUS COUNTING LOCATIONS**

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

APPENDIX TABLE 7-3 BUS ROUTES OF EACH BUS STOPS

Bus Stop		Interviewing (S-83)	Not Interviewing (S-80)	Other Directions
1.	Rang Sit (1)	34, 59	29, 39	95
2.	Rang Sit (2)	34, 59	29, 39	95
3.	Don Muang Airport	59	29	95
4.	Sapan Mai	34	39	114
5.	Lak Si	34, 59	26, 39	114
6.	Bang Khen	3, 69	29, 52	-
7.	Sam Yak Kaset	34, 59, 63, 112	26, 39	126, 206, 24, 104
8.	North Bus Station	3, 8, 34, 59, 63, 96, 38, 112, 28, 44	59, 26, 29, 39	27, 122, 104
9.	Bang Kapi (1)	96	60	95, 71, 27, 1011, 1015
10.	Bang Kapi (2)	8, 44	-	-
11.	Bang Kapi (3)	58	60, 93	71, 92, 95, 122, 126, 1015
12.	Ram Kam Haeng Road Side	58	60, 93	95, 71, 92, 1015
13.	Ram Kam Haeng Park Area	61, 99	60	126, 122, 22
14.	Khlong Tan	58, 61, 99, 11n	60, 93	-
15.	Ekkamai	23, 72, 58, 11n 61, 99	60, 93	-

A.	Lad Phrao	Lad Phrao - Port (Mini) + Driver	
B.	Sutisan	1) Lad Phrao - Port 3) No. 107	2) 83 Bang Na - NE Bus 4) 89/34 Span Mai - Sam Rong
C.	Kasem Raj	1) Lad Phrao - Port 3) 42 - Port - Bang Na	2) Driver
D.	Tung Satit Temple	1014 (Udom Sook - Pratunam)	
E.	Bang Na	1) 83 - Bang Na - NE Bus 3) Udom Sook - Pratunam 5) Sam Rong - Sapan Mai	2) Bearing - Khlong Toey 4) Bearing - Pratunam (82)
F.	Sam Rong	1) 82 - Bearing - Pratunam 2) 89/34 - Bearing - Sapan Mai	Include Driver

Notes : 1 ~ 8 Surveyed on February 22, 1983; A ~ F Surveyed on March 17, 1983;
9 ~ 15 Surveyed on February 23, 1983.

APPENDIX TABLE 7-4 PASSENGERS AT SELECTED BUS STOPS :
COUNTED AND INTERVIEWED

BUS STOP		Route No.	Passengers Counted		Passengers Interviewed	The Ratio in Percent
No.	Location		get-on	get-off	get-on (Total)	
1	Rang Sit - 1	34	1,090	41	98	9.0
		59	1,062	231	115	10.8
		Total	2,152	272	213	9.9
2	Rang Sit - 2	34	1,282	25	92	7.2
		59	775	65	67	8.6
		Total	2,057	90	159	7.7
3	Don Muang Air Port	59	1,562	480	451	28.9
4	Sapan Mai	34	2,434	1,396	279	11.5
5	Lak Si	34	1,165	1,186	221	19.0
		59	901	820	181	20.1
		Total	2,066	2,006	402	19.5
6	Bang Khen	3	672	61	191	28.4
		69	298	186	154	51.7
		Total	970	247	345	35.6
7	Sam Yak Kaset	34	618	1,369	94	15.2
		59	576	1,282	111	19.3
		63	885	1,075	110	12.4
		112	540	222	62	11.5
		Total	2,619	3,726	377	14.4
8	North Bus Station	3	1,212	184	119	9.8
		8	851	270	59	6.9
		28	1,184	74	89	7.5
		34	510	182	66	12.9
		38	2,245	144	107	4.8
		44	955	132	52	5.4

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B U S STOP		Route No.	Passengers Counted		Passengers Interviewed	The Ratio in Percent
No.	Location		get-on	get-off	get-on (Total)	
8	North Bus Station	59	253	129	29	11.5
		63	128	312	14	10.9
		96	170	123	28	16.5
		112	76	74	13	17.1
		Total	7,584	1,624	576	7.6
9	Bang Kapi - 1	96	747	529	220	29.5
10	Bang Kapi - 2	8	1,688	4	54	3.2
		44	1,215	5	64	5.3
		Total	2,903	9	118	4.1
11	Bang Kapi - 3	58	1,127	743	181	16.1
12	Ram Kam Haeng Road Side	58	480	915	72	15.0
13	Ram Kam Haeng Park Area	61	6,203	3,339	370	6.0
		99	3,965	2,418	227	5.7
		Total	10,168	5,757	597	5.9
14	Khlong Tan	58	680	193	93	13.7
		61	1,395	49	247	17.7
		99	581	29	84	14.5
		11 n	469	605	22	4.7
		Total	3,125	876	446	14.3
15	Ekkamai	23	305	1,300	44	14.4
		58	183	195	31	16.9
		61	766	170	198	25.8
		72	242	632	45	18.6
		99	57	112	10	17.5
		11 n	13	259	3	23.1
Total	1,566	2,668	331	21.1		
GRAND TOTAL			41,560	21,338	4,767	11.5

Remarks : In February, 1983

7-4-2

APPENDIX TABLE 7-5 PASSENGERS COUNTED AND INTERVIEWED USING THE BUSES THROUGH EXPRESSWAYS

Bus Stop No	Location	Mini Bus Routes Running The Expressways	Passengers Counted ¹⁾	Passengers Interviewed ²⁾	The Ratio ³⁾
A	Lad Phrao	Lad Phrao - Khlong Toey	1,890	340	18.0
B	Sutisan	Lad Phrao - Khlong Toey	1,890	125	6.6
		Talad Mochid - Bang Na	665	22	3.3
		Sapan Mai - Soi Bearing	822	29	3.5
		TOTAL	3,377	176	5.2
C	Kasem Raj	Lad Phrao - Khlong Toey	2,111	281	13.3
		Tung Satit - Khlong Toey	258	32	12.4
		TOTAL	2,369	313	13.2
D	Tung Satit Temple	Soi Udomsuk - Pratunam	1,379	256	18.6
E	Bang Na	Talad Mochid - Bang Na	813	112	13.8
		Sapan Mai - Soi Bearing	1,135	41	3.6
		Tung Satit - Khlong Toey	318	2	0.6
		Soi Udomsuk - Pratunam	1,379	10	0.7
		Sam Rong - Pratunam	3,061	57	1.9
		Sam Rong - Khlong Toey	1,658	30	1.8
		TOTAL	8,364	252	3.0
F	Sam Rong	Sapan Mai - Soi Bearing	1,135	23	2.0
		Sam Rong - Pratunam	3,061	145	4.7
		TOTAL	4,196	168	4.0
	TOTAL		21,575	1,505	7.0

Notes : 1) Passengers were counted at the toll gates.

2) Passengers interviewed at the terminal points of the buses through the expressway.

3) The ratio in percent, 2)/1)

Remarks : In March, 1983

was classified by hour and by respective route. For the case of mini-bus running through the First Stage Expressway Sections (Din Daeng-Port-Bang Na), the counting was conducted at the toll gates through which the buses pass. Survey date and hours were same to those in (1) and (2) above :

North-south corridor : February 22, Hours 6.00 – 22.00

East corridor : February 23, Hours 6.00 – 22.00

First Stage Toll Gates : March 17, Hours 6.00 – 22.00

The locations of the bus volume counting are also shown in Fig. 7-2. The preliminary results of the counting are shown in Appendix Table 7-6.

7.1.3 Bus Driver Interview

Drivers of mini-buses running through the First Stage Expressway were interviewed of the ownership of mini buses and service routes before and after the opening of the Bang Na Section, etc. at the same terminal areas of passenger interviewing, locations (A) – (F) in Fig. 7-2.

APPENDIX TABLE 7-6 BUS COUNTING¹⁾

Location No.	Road	Bus Route	Counted Buses				
			Mini Bus	Large Bus	Total		
1	Wiphwaderungsit (Super Highway)	2) 4	-	61	61		
		24	-	59	59		
		69	-	66	66		
		82	35	-	35		
		83	2	-	2		
		89/34	56	-	56		
		92	178	158	336		
		TOTAL	271	344	615		
		2	Phahol Yothin	2) 2	-	92	92
				2) 3	-	72	72
2) 8	2			235	237		
2) 9	-			54	54		
2) 10	-			85	85		
2) 13	-			93	93		
2) 14	-			9	9		
26	-			134	134		
27	6			164	170		
2) 28	8			198	206		
2) 29	-			37	37		
29	-			149	149		
34	36			168	204		
38	117			224	341		
39	99			161	260		
54	-			222	222		
59	-			149	149		
63	36			168	204		
74	-			124	124		
77	-			63	63		
96	-			119	119		
97	-			137	137		
104	21			90	111		
112	-			112	112		
201	-			15	15		
204	2			95	97		
1041	5			-	5		
1097	5	-	5				
TOTAL	337	3169	3506				
3	Rama VI	1	-	1	1		
		2) 12	-	1	1		
		2) 44	-	28	28		
		44	157	129	286		
		67	-	153	153		
TOTAL	157	312	469				
4	Rama V	5	114	165	279		
		50	-	118	118		
		70	-	168	168		
		TOTAL	114	451	565		

Location No.	Road	Bus Route	Counted Buses				
			Mini Bus	Large Bus	Total		
5	New Petchaburi	11	-	83	83		
		2) 12	-	67	67		
		2) 14	-	51	51		
		23	-	187	187		
		58	-	163	163		
		60	258	293	551		
		61	9	200	209		
		72	-	133	133		
		93	-	220	220		
		99	-	123	123		
		206	7	103	110		
		TOTAL			274	1623	1897
		6	Sukhumvit	2) 1	-	71	71
				2) 2	199	262	461
2) 8	-			82	82		
2) 11	-			81	81		
2) 13	-			96	96		
23	-			172	172		
25	-			164	164		
38	71			217	288		
40	-			85	85		
46	-			2	2		
48	-			172	172		
71	-			83	83		
72	-			102	102		
98	-			116	116		
2) 119	-			170	170		
2) 126	-			46	46		
TOTAL			270	1921	2191		
TOTAL			1423	7820	9243		
(A)	Din Daeng	82	78	-	78		
		83	54	-	54		
		89/34 No. 107	63	-	63		
		TOTAL	195	14	209		
(B)	Phetchaburi	2	6	-	6		
		82	59	-	59		
		1014 No. 11	53	-	53		
		TOTAL	118	7	125		
(C)	Kasem- raj to Din Daeng	82	79	-	79		
		No. 107	-	13	13		
		TOTAL	79	13	92		

Location No.	Road	Bus Route	Counted Buses			
			Mini Bus	Large Bus	Total	
(C)	Kasem- raj	to Bang	2	25	-	25
		Na	22	5	-	5
			42	14	-	14
			99	27	-	27
		TOTAL		71	-	71
(D)	Sol 62		2	10	-	10
			42	4	-	4
			83	49	-	49
		No. 11	-	9	-	9
		TOTAL		63	9	72
(E)	Bang Na		2	74	-	74
			42	19	-	19
			46	11	-	11
			82	58	-	58
			89/34	61	-	61
			99	30	-	30
			1014	53	-	53
TOTAL		306	-	306		
TOTAL				832	43	875

7-6-3

Notes : 1) For locations 1-6 on February 22 and 23, 1983 and for locations (A)-(E) on March 17, 1983

2) Air conditioned buses

APPENDIX 7.2 RESULTS OF THE FIELD SURVEY ON BUS PASSENGER MOVEMENT

7.2.1 Passengers on the Air Conditioned Buses

(1) Average Passengers

Average number of passengers on the buses passing Sapankwai area was 41 for inbound and 33 for outbound, resulting in the average of 37 persons, while they were 25 (inbound 23 and outbound 28) passing Bang Khen area. The average persons on the buses running New Petchaburi Road at Asoke area was 44, while they were 31 on the road south of Ram Kam Haeng University. (Appendix Table 7-7)

(2) Average Travelling Speed

Average travelling speed of buses were measured by observing the travelling time between the starting and the ending time of bus trips. In average, 23 km/h was the travelling speed of the air conditioned buses in the corridors. (Appendix Table 7-7)

(3) Access Time

Average access time of passengers on-to and off the air conditioned buses was 9.2 minutes and 11.4 minutes, respectively: in average 10 minutes. It was hard to conclude that the access time was shorter in inner urban areas than outside areas. (Appendix Table 7-8)

(4) Car Ownership

Approximately 40% of the passengers on the air conditioned buses had private cars and/or motorcycles at the household. The percent share differed when they were classified by the get-on bus stop blocks from which it was found that those using North Bus Terminal and Hualumpong Railway Station had the lowest ownership percentage (11.0% and 20.0% respectively). It would be caused by terminal services through which non-owning passengers on the long distant public transportation (buses and trains) transfer to intra-urban public transportation or vice versa. (Appendix Table 7-8)

(5) Access Modes

When access transportation modes were classified, it was found that 59% of the passengers were on foot or bicycle, 30% on other buses, 6.5% on private cars and motorcycles. However, the percentage figures of additional bus use of on-access modes were high at North Bus Terminal (43%) and Victory Monument (50%), while those using buses in off-access modes were high at Ratanakosin area (48%), Victory Monument (53%) and Bang Na (64%). (Appendix Table 7-9)

(6) Trip Purposes

The trip purpose distribution of the passengers on the buses surveyed was 26% for home to work, 15% for home to school, 3% on business, 34% for going home, and 22% for others. Since these surveyed buses ran the roads adjacent to Kasetsart University,

APPENDIX TABLE 7-7 NUMBER OF PASSENGERS AND AVERAGE TRAVEL SPEED

On the air conditioned buses

Route No.	Directions Inwards Outwards	Surveyed Bus Trips	Number of Passengers at Selected Points ¹⁾				Route Distance Km	Average Speed V = Km/H ²⁾
			Adjacent to	Passengers	Adjacent to	Passengers		
9	I	6	South Sapan Kwai	37	Bang Khen	48.0	22	
	O	5	"	38	"	48.0	22	
13	I	4	"	46	"	52.0	24	
	O	5	"	32	"	52.0	23	
29	I	7	"	34	"	34.0	26	
	O	8	"	27	"	34.0	26	
Average	I	-	"	41	"	-	23	
	O	-	"	33	"	-	23	
12	I	11	Asoke Intersection	43	Nam Kam Haeng Bus Terminal	50.0	22	
	O	10	"	45	"	50.0	23	
14	I	25	"	44	"	11.0	16	
	O	25	"	44	"	11.0	21	
Average	I	-	"	43	"	-	21	
	O	-	"	45	"	-	23	
Average	I	-	-	42	"	-	23	
	O	-	-	37	"	-	23	

Notes : 1) Passengers counted on the buses passing through these areas.

2) Average travel speed on the overall route.

APPENDIX TABLE 7-8 AVERAGE ACCESS MINUTES AND CAR OWNERSHIP :
SELECTED BUS-STOP GROUPS

On the air conditioned buses.

Bus-Stop Area	Average Access Minutes ¹⁾			Car Ownership ²⁾		
	On	Off	Average	Yes	No	Total
A. Rang Sit-Airport-Lak Si	8.2	11.5	10.0	2,111 (38.1)	3,426 (61.9)	5,537 (100.0)
B. Bang Khen	8.1	11.1	9.4	2,012 (40.8)	2,915 (59.2)	4,927 (100.0)
C. Ram Kam Haeng - Bang Kapi	7.1	12.2	9.6	2,924 (45.4)	3,517 (54.6)	6,441 (100.0)
D. New Petchaburi Road	9.7	8.4	9.0	585 (40.8)	850 (59.2)	1,435 (100.0)
E. North Bus Terminal	14.6	7.4	11.6	391 (11.0)	3,158 (89.0)	3,549 (100.0)
F. Sapan Kwai	7.1	14.0	10.3	1,234 (37.3)	2,074 (62.7)	3,308 (100.0)
G. Victory Monument	9.5	14.3	12.1	2,019 (34.6)	3,815 (65.4)	5,834 (100.0)
H. Hua Lampong Railway St.	9.0	12.2	10.7	159 (20.0)	633 (80.0)	792 (100.0)
I. Ratanakosin Area	9.7	15.7	12.3	2,503 (56.4)	1,932 (43.6)	4,435 (100.0)
J. Sukhumvit Road	11.3	8.0	9.7	1,337 (47.8)	1,461 (52.2)	2,798 (100.0)
K. Bang Na	15.5	10.4	13.6	1,205 (74.4)	414 (25.6)	1,619 (100.0)
L. Others	8.6	9.9	9.2	4,848 (42.7)	6,512 (57.3)	11,360 (100.0)
M. All bus stops	9.2	11.4	10.3	21,328 (41.0)	30,707 (59.0)	52,035 (100.0)

Notes : 1) Access time in minutes upto the get-on bus-stop and after the get-off bus-stop.

2) Private cars and motorcycles. Percentages are shown in ().

APPENDIX TABLE 7-9 ACCESS MODE COMPOSITION

On the air conditioned buses

Bus Stop Area	On-Access Modes ¹⁾				Off-Access Modes ¹⁾				Total
	Walk/Bic	Bus	Car/Mc	Others	Walk/Bic	Bus	Car/Mc	Others	
A. Rang Sit-Airport-Lak Si	3,573 (64.5)	1,167 (20.2)	705 (12.8)	146 (2.6)	4,102 (63.0)	1,980 (30.9)	-	431 (6.6)	6,513 ²⁾ (100.0)
B. Bang Khen	2,564 (52.3)	1,601 (32.6)	607 (12.4)	130 (2.7)	2,395 (61.9)	966 (25.4)	338 (9.6)	174 (4.5)	3,873 (100.0)
C. Ram Kam Haeng - Bang Kapi	4,714 (72.3)	1,435 (22.0)	361 (5.6)	11 (0.2)	4,391 (68.2)	1,640 (25.5)	295 (4.6)	110 (1.7)	6,436 (100.0)
D. New Petchaburi Road	710 (49.4)	394 (27.4)	319 (22.2)	13 (0.9)	1,079 (71.6)	347 (23.0)	76 (5.0)	6 (0.4)	1,508 (100.0)
E. North Bus Terminal	1,432 (40.3)	1,533 (43.2)	73 (2.1)	511 (14.4)	1,495 (64.0)	605 (25.9)	-	236 (10.1)	2,337 (100.0)
F. Sapan Kwai	2,304 (68.4)	950 (28.2)	112 (3.4)	-	1,953 (69.0)	730 (25.1)	146 (5.2)	-	2,829 (100.0)
G. Victory Monument	2,779 (47.3)	2,909 (49.5)	51 (0.8)	133 (2.2)	3,251 (43.3)	3,999 (53.3)	28 (0.4)	223 (3.0)	7,501 (100.0)
H. Hua Lumpong Railway Station	438 (59.6)	195 (23.9)	110 (13.5)	74 (9.1)	616 (57.7)	136 (12.7)	-	316 (29.6)	1,068 (100.0)
I. Ratana Kosin Area	2,521 (56.4)	1,397 (31.3)	290 (6.5)	265 (5.9)	1,577 (48.1)	1,565 (47.8)	-	135 (4.1)	3,277 (100.0)
J. Sukhumvit Road	1,884 (61.2)	635 (20.6)	561 (18.3)	-	1,457 (47.7)	611 (20.0)	551 (18.1)	433 (14.2)	3,052 (100.0)
K. Bang Na	436 (26.9)	540 (33.4)	436 (27.0)	207 (12.8)	343 (35.7)	618 (64.3)	-	-	961 (100.0)
L. Others	7,648 (67.7)	2,707 (24.0)	860 (13.7)	77 (0.7)	7,592 (59.3)	3,172 (24.8)	802 (6.2)	1,226 (9.6)	12,792 (100.0)
M. All bus stops	30,994 (59.1)	15,409 (29.4)	4,485 (8.6)	1,567 (3.0)	30,251 (58.0)	16,370 (31.4)	2,236 (4.3)	3,290 (6.2)	52,147 (100.0)

Notes: 1) On-access modes are the transport means coming to the bus stop and off-access modes are the means after getting off the bus.

2) Percentages are shown in ().

Ram Kam Haeng University, etc., it would result in a higher percent figure of "home to school". (Appendix Table 7-10)

(7) Additional Fare

Passengers were questioned if they were willing to pay an additional amount of Baht when a normal bus service running through the Expressway was available. In the questioning, no specific route was shown, however, it was supposed that an Expressway would be constructed in parallel to the existing bus routes and faster bus services through it would be available.

It is found they are willing to pay additional 3.63 Baht, resulting in the average payment of $1.50 + 3.63 = 5.13$ Baht, $2.50 + 3.63 = 6.13$ Baht, depending on the distance they travel. The difference is quite modest between those in the private vehicles owning families and those in non-owning families. (Appendix Table 7-11)

7.2.2 Passengers at Major Bus Stops

(1) Car Ownership

The percent share of those who had private cars and/or motorcycles at the household were 25%. The percent figures differed among the bus stops surveyed in such ways as Sapan Mai 11%, North Bus Terminal 21% and Bang Kapi (2) 39.6%. The variance might be caused by different ownership prevalency among the areas surrounding the bus stop though no explicit data were available. (Appendix Table 7-12)

(2) Access Time

Access time of passengers onto the bus stop from the origin was found at 12 minutes in average in the survey, while the off-access time beyond the bus stop was 17 minutes in average. The difference would be caused partly by the fact that additional use of buses was larger in percent for off-access, mostly in the inner city area, than for on-access resulting in a longer time for the former. Overall access time was determined at 14.5 minutes. (Appendix Table 7-13 and 7-14)

(3) Access Modes

In the total of on-access and off-access modes, 50% of the interviewed passengers were on walk and/or bicycle and 38% used additional buses private cars and motorcycles were small as in the share of 2%. In the case of on-access modes, those bus stops which connected much with other bus lines in the suburban area had higher percent in bus use: Rang Sit (1) 67%, Rang Sit (2) 51%, Bang Khen 66% and Klong Tan 63%. (Appendix Table 7-13)

In the case of off-access time, the above tendency was also identified although percentages were different. (Appendix Table 7-14)

(4) Trip Purpose

The percent distribution of trip purposes was 23% for "home to work", 16% for "home to school", 1.8% "on business", 39% for "go home", and 21% for "personal matter". It registered a high figure on "home to school" and a low figure in "on

APPENDIX TABLE 7-10 TRIP PURPOSE DISTRIBUTION

On the air conditioned buses

Bus Stop Area	Home to Work	Home to School	On Business	Go Home	Others	Total ¹⁾
A. Rang Sit-Airport-Lak Si	1,845 (33.2)	742 (13.4)	81 (1.5)	1,553 (28.0)	1,331 (24.0)	5,552 (100.0)
B. Bang Khen	1,567 (31.0)	737 (14.6)	185 (3.7)	1,492 (29.5)	1,079 (21.3)	5,060 (100.0)
C. Ram Kam Haeng - Bang Kapi	1,462 (22.3)	853 (13.0)	81 (1.2)	2,770 (42.2)	1,398 (21.3)	6,564 (100.0)
D. New Petchaburi Road	331 (23.2)	207 (14.5)	13 (0.9)	541 (38.0)	332 (23.3)	1,424 (100.0)
E. North Bus Terminal	1,378 (38.8)	83 (2.3)	17 (0.5)	1,195 (33.7)	876 (24.7)	3,549 (100.0)
F. Sapan Kwai	1,158 (34.4)	187 (5.6)	59 (1.8)	1,526 (45.3)	436 (13.0)	3,366 (100.0)
G. Victory Monument	796 (13.5)	1,333 (22.6)	205 (3.5)	2,700 (45.7)	877 (14.8)	5,911 (100.0)
H. Hua Lampong Railway Station	146 (17.8)	25 (3.1)	49 (6.0)	316 (38.6)	282 (34.5)	818 (100.0)
I. Ratanakosin Area	904 (19.6)	1,310 (28.8)	74 (1.6)	1,831 (39.7)	493 (10.5)	4,612 (100.0)
J. Sukhumvit Road	650 (22.5)	130 (4.5)	259 (9.0)	611 (21.1)	1,241 (42.9)	2,891 (100.0)
K. Bang Na	310 (19.1)	-	207 (12.8)	333 (20.6)	769 (47.5)	1,619 (100.0)
L. Others	3,123 (27.5)	2,042 (18.0)	406 (3.6)	3,087 (27.1)	2,703 (23.8)	11,367 (100.0)
M. All bus stops	13,670 (25.9)	7,649 (14.5)	1,636 (3.1)	17,955 (34.1)	11,817 (22.4)	52,727 (100.0)

Notes : 1) Percentages are shown in ().

APPENDIX TABLE 7-11 CAR OWNERSHIP AND ADDITIONAL PAYMENT FOR
SUSPOSED NORMAL BUS SERVICE ON EXPRESSWAYS

On the air conditioned buses

Car Ownership ¹⁾	Additional Baht ²⁾										Total	In Percent	Addi- tional Baht
	1	2	3	4	5	6	7	8	9	0			
1 Yes	1,757	2,240	1,885	187	4,868	2,421	2,292	3,360	1,868	450	21,328	(40.2)	3.66
%	8.2	10.5	8.8	0.9	22.8	11.4	10.7	15.8	8.8	2.1	100.0		
2 No	2,197	2,699	2,463	292	5,520	3,003	2,865	6,019	4,534	1,115	30,707	(57.8)	3.61
%	7.2	8.8	8.0	1.0	18.0	9.8	9.3	19.6	14.8	3.6	100.0		
0 No Answer	6	126	46	13	83	6	17	27	494	222	1,040	(2.0)	3.49
%	0.6	12.1	4.5	1.2	7.9	0.6	1.6	2.6	47.5	21.3	100.0		
TOTAL	3,960	5,065	4,394	492	10,471	5,430	5,174	9,406	6,897	1,786	53,074	(100.0)	3.63
(in Percent)	(7.5)	(9.5)	(8.3)	(0.9)	(19.8)	(10.2)	(9.7)	(17.7)	(13.0)	(3.4)	(100.0)		

Notes : 1) Private cars and motorcycles

2) Those who answered Q-9 are classified as follows :

1. 0.01 - 1.99 X
2. 2.00 - 2.99 X
3. 3.00 - 3.99 X
4. 4.00 - 4.99 X
5. 5.00 - 5.99 X
6. 6.00 X and more
7. Yes, but no increase
8. Yes, but no comment
9. No
0. No answer

APPENDIX TABLE 7-12 CAR OWNERSHIP

At Major Bus Stops

Bus Stops	Car Ownership ¹⁾		
	Yes	No	Total
1. Rang Sit (1)	426 (19.8)	1,726 (80.2)	2,152 (100.0)
2. Rang Sit (2)	608 (29.4)	1,460 (70.6)	2,068 (100.0)
3. Don Muang Airport	477 (30.6)	1,083 (69.4)	1,560 (100.0)
4. Sapan Mai	269 (11.1)	2,165 (88.9)	2,434 (100.0)
5. Lak Si	417 (20.2)	1,650 (79.8)	2,067 (100.0)
6. Bang Khen	252 (26.0)	716 (74.0)	968 (100.0)
7. Sam Yake Kaset	704 (27.0)	1,906 (73.0)	2,610 (100.0)
8. North Bus Terminal	1,603 (21.2)	5,947 (78.8)	7,550 (100.0)
9. Bang Kapi (1)	197 (26.5)	547 (73.5)	744 (100.0)
10. Bang Kapi (2)	1,150 (39.6)	1,753 (60.4)	2,903 (100.0)
11. Bang Kapi (3)	137 (12.2)	989 (87.8)	1,126 (100.0)
12. Ram Kam Haeng Road Side	133 (28.3)	337 (71.7)	470 (100.0)
13. Ram Kam Haeng Park Area	2,925 (28.9)	7,201 (71.1)	10,126 (100.0)
14. Khlong Tan	774 (23.1)	2,581 (76.9)	3,355 (100.0)
15. Ekkamai	410 (26.3)	1,150 (73.7)	1,560 (100.0)
All Bus Stops	10,482 (25.1)	31,211 (74.9)	41,693 (100.0)

Note : Private cars and motorcycles.

APPENDIX TABLE 7-13 ON ACCESS MODE AND ACCESS TIME

At Major Bus Stops

Bus Stops	On Access Mode ¹⁾					On Access In Minutes
	Walk /Byc	Bus	Car /Mc	Others	Total	
1. Rang Sit (1)	441 (20.5)	1,450 (67.4)	85 (3.9)	176 (8.2)	2,152 (100.0)	14.7
2. Rang Sit (2)	539 (26.1)	1,060 (51.3)	34 (1.6)	435 (21.0)	2,068 (100.0)	16.5
3. Don Muang Airport	982 (62.7)	401 (25.6)	134 (8.6)	49 (3.1)	1,566 (100.0)	7.2
4. Sapan Mai	1,175 (48.3)	1,167 (48.0)	81 (3.3)	10 (0.4)	2,433 (100.0)	8.3
5. Lak Si	1,060 (51.3)	952 (46.1)	44 (2.1)	11 (0.5)	2,067 (100.0)	10.8
6. Bang Khen	260 (26.8)	640 (66.1)	38 (3.9)	31 (3.2)	969 (100.0)	14.2
7. Sam Yake Kaset	1,764 (67.4)	730 (27.9)	114 (4.4)	11 (0.4)	2,619 (100.0)	7.1
8. North Bus Terminal	1,844 24.3	2,844 (37.5)	264 (3.5)	2,631 (34.7)	7,583 (100.0)	21.1
9. Bang Kapi (1)	374 (49.9)	254 (33.9)	110 (14.7)	11 (1.5)	749 (100.0)	7.7
10. Bang Kapi (2)	1,722 (59.3)	1,151 (39.6)	22 (0.8)	9 (0.3)	2,904 (100.0)	16.3
11. Bang Kapi (3)	532 (47.2)	587 (52.0)	8 (0.7)	1 (0.1)	1,128 (100.0)	10.0
12. Ram Kam Haeng Road Side	391 (81.3)	85 (17.7)	5 (1.0)	-	481 (100.0)	4.2
13. Ram Kam Haeng Park Area	7,936 (78.0)	2,012 (19.8)	178 (1.8)	42 (0.4)	10,168 (100.0)	7.1
14. Khlong Tan	1,085 (32.3)	2,111 (62.8)	106 (3.2)	62 (1.8)	3,364 (100.0)	10.8
15. Ekkamai	786 (50.1)	629 (40.1)	89 (5.7)	65 (4.1)	1,569 (100.0)	9.8
All Bus Stops	20,891 (50.0)	16,073 (38.4)	1,312 (3.1)	3,544 (8.5)	41,820 (100.0)	11.7

Notes : 1) On access modes are the transport means coming to the bus stop and off access modes are the means after getting off the buses.

2) Percentages are shown in ().

APPENDIX TABLE 7-14 OFF ACCESS MODE AND ACCESS TIME

At Major Bus Stops

Bus Stops	Off Access Mode ¹⁾					Off Access in Minutes
	Walk/Byc	Bus	Car/Mc	Others	Total	
1. Don Muang Lak Si	1,091 (46.8)	1,167 (50.2)	14 (0.6)	57 (2.4)	2,329 (100.0)	14.9
2. Bang Khen	1,583 (49.0)	1,562 (48.4)	65 (2.0)	20 (0.6)	3,230 (100.0)	16.9
3. Ram Kam Haeng Bang Kapi	73 (58.4)	42 (33.6)	10 (8.0)	-	125 (100.0)	14.3
4. New Phetch- buri	2,399 (74.4)	788 (24.4)	-	40 (1.2)	3,227 (100.0)	12.1
5. North Bus Terminal	357 (53.4)	299 (44.8)	8 (1.2)	4 (0.6)	668 (100.0)	10.1
6. Sapan Kwai	548 (87.5)	42 (6.7)	-	36 (5.8)	626 (100.0)	12.7
7. Victory Monu- ment	2,369 (57.8)	1,576 (38.4)	28 (0.7)	129 (3.1)	4,102 (100.0)	18.3
8. Hua Lumpong Railway Station	1,095 (63.3)	614 (35.4)	-	22 (1.3)	1,731 (100.0)	17.9
9. Inner City	2,402 (45.8)	2,597 (49.5)	23 (0.4)	226 (4.3)	5,248 (100.0)	18.3
10. Sukhumvit	463 (49.9)	381 (41.1)	-	83 (9.0)	927 (100.0)	14.8
11. Bang Na	29 (43.9)	37 (56.1)	-	-	66 (100.0)	15.5
12. Others	8,710 (44.9)	9,647 (49.7)	166 (0.9)	873 (4.5)	19,396 (100.0)	18.1
All Bus Stops	21,119 (50.6)	18,752 (45.0)	314 (0.8)	1,490 (3.6)	41,675 (100.0)	17.3

Note : 1) See the footnote of Appendix Table 7-13.

business". People in GBA are likely not to use regular bus services for business matters. (Appendix Table 7-15)

(5) Additional Fare

Passengers using normal buses of BMTA were questioned if they were willing to pay an additional amount of Baht when a normal bus service running through expressways was available. In the questioning, no specific route was shown, however, it was supposed that an Expressway would be constructed in parallel to the existing bus route and faster bus service through it would be available.

It was found that they were willing to pay additional 3.10 Baht, resulting in the average payment of $1.50 + 3.10 = 4.60$ Baht, $2.50 + 3.10 = 5.60$ Baht, depending on the distance they travel. When the passengers were divided into those in car owning families and non-car owning ones, the average additional amount was 3.15 Baht and 3.08 Baht, respectively. The difference was quite modest. (Appendix Table 7-15)

Nearly 22% of the passengers answered they would not use the bus service through the Expressway. The percent figure is used in determining the ratio of the expressway use in 7.3.5 of Chapter 7.

7.2.3 Passengers on the Buses Serving through the Expressway

When the Port-Bang Na Section was completed and opened in January 1983, some mini buses began to run through the Expressway. Shortly in March, BMTA began to operate two new routes passing through the Expressway. All these services are provisional and are likely to be changed together with bus fare, trip frequency and route by considering the demand of users and by regulation of DLT.

Main purposes of the survey conducted in March 1983 were to find the new pattern of the passenger movement and their comments on the new bus services. Main results are stated as follows :

(1) Access Time

The average on-access time of mini buses and air conditioned buses running through the Expressway was 11 minutes and 8 minutes, while the average off-access time was 14 minutes and 11 minutes, respectively. These figures are quite similar to those surveyed on the buses on ordinary roads in February 1983. (Appendix Table 7-16)

(2) Access Modes

Approximately 60% of them use buses on and off access modes. It would be caused by the routes which were limited in number and the coverage was less sufficient than normal buses on the roads off-Expressway. (Appendix Table 7-16)

(3) Trip Purposes

Those persons going to school were at 4% and those on business were 2.4% in the total. A smaller percent in "home to school" would be caused by location of universities and other schools which does not induce students to use the buses. (Appendix Table 7-16)

APPENDIX TABLE 7-15 CAR OWNERSHIP AND ADDITIONAL PAYMENT FOR
SUPPORTED NORMAL BUS SERVICE ON EXPRESSWAYS

At Major Bus Stops

Car Ownership	1	2	3	4	5	6	7	8	9	0	Total	In Percent	Average Bahr
1 Yes	2,299	1,185	792	362	1,237	1,026	451	980	2,126	26	10,485	(25.1)	3.15
%	21.9	11.3	7.6	3.5	11.8	9.8	4.3	9.4	20.3	0.2	100.0		
2 No	6,634	3,042	3,538	832	3,218	2,441	1,009	3,076	7,279	141	31,209	(74.6)	3.08
%	21.3	9.7	11.3	2.7	10.3	7.8	3.2	9.9	23.3	0.5	100.0		
0 No Answer	48	11	46	-	-	-	-	9	5	-	118	(0.3)	2.25
%	40.5	9.0	38.8	-	-	-	-	7.7	4.0	-	100.0		
TOTAL	8,981	4,238	4,375	1,194	4,455	3,466	1,460	4,066	9,410	167	41,812	(100.0)	3.10
(In Percent)	(21.5)	(10.1)	(10.5)	(2.9)	(10.7)	(8.3)	(3.5)	(9.7)	(22.4)	(0.4)	(100.0)		

Notes : 1) Private cars and motorcycles

2) Those who answered Q-9 are classified as follows :

1. 0.01 - 1.99 %
2. 2.00 - 2.99 %
3. 3.00 - 3.99 %
4. 4.00 - 4.99 %
5. 5.00 - 5.99 %
6. 6.00 % and more
7. Yes, but no increase
8. Yes, but no comment
9. No
0. No answer

3) Trip purpose distribution of 41,812 persons was enumerated as follows:

Home to work	22.5%
Home to school	16.0%
On business	1.8%
Go home	38.8%
Personal matter	18.2%
Others	2.7%
Total	100.0%

APPENDIX TABLE 7-16 ACCESS TIME, ACCESS MODE AND TRIP PURPOSE :
PASSENGERS USING THE BUSES THROUGH EXPRESSWAYS

(In minutes, persons and percent)

	Access Time		Access Modes ¹⁾					Trip Purposes ²⁾						
	On/Off	Average in Min.	1	2	3	4	5	1	2	3	4	5	6	7
Air Conditioned Buses	On	8.1	911 (49.3)	792 (43.0)	99 (5.4)	42 (2.3)	1,844 (100.0)	641 (34.7)	59 (3.2)	30 (1.6)	885 (45.2)	209 (11.3)	73 (4.0)	1,847 (100.0)
	Off	11.4	808 (41.5)	931 (47.7)	56 (2.9)	153 (7.9)	1,948 (100.0)	670 (34.1)	72 (3.7)	28 (1.4)	832 (42.4)	268 (13.7)	93 (4.7)	1,963 (100.0)
Mini Buses	On	11.2	3,803 (23.6)	10,273 (63.9)	624 (3.9)	1,381 (8.6)	16,081 (100.0)	6,859 (42.8)	646 (4.0)	409 (2.6)	4,690 (29.3)	3,120 (19.5)	295 (1.8)	16,019 (100.0)
	Off	14.1	5,135 (32.8)	9,250 (59.0)	197 (1.3)	1,076 (6.9)	15,658 (100.0)	6,859 (42.8)	646 (4.0)	409 (2.6)	4,690 (29.3)	3,120 (19.5)	295 (1.8)	16,019 (100.0)
TOTAL		12.3	10,657 (30.0)	21,246 (59.8)	976 (2.7)	2,652 (7.5)	35,531 (100.0)	15,029 (41.9)	1,423 (4.0)	876 (2.4)	11,047 (30.8)	6,717 (18.8)	756 (2.1)	35,848 (100.0)

Notes : 1) Access modes : 1. walk and bicycle, 2. buses, 3. cars and motorcycles, 4. others and 5. total.

Figures in () indicate percentages.

2) Trip purposes : 1. home to work, 2. home to school, 3. on business, 4. go home, 5. personal matters, 6. others and 7. total.

Figures in () indicate percentages.

(4) Comments on Bus Fare

Air conditioned buses through the Expressway charged the fare of 5 Baht for a user which was same to those running on the ordinary roads. When they were asked how much to pay additionally for the air conditioned bus service through the Expressway, the average amount was 1.45 Baht (6.45 Baht in total). However, it was found more than half of them (54%) commented no increase in the bus fare. When they were asked how much additional fare to pay for regular (non air conditioned) buses through the Expressway, the average additional fare was 1.66 Baht, resulting in the total of 3.16 Baht. (Appendix Table 7-17)

Passengers who usually paid 5 Baht on either section of Din Daeng-Port or Port-Bang Na on the mini buses were asked if the fare was reasonable or not. They commented reasonable in 66% and the fare should be reduced in 34%. It is understood that an overall expectation of these bus users (air conditioned buses and mini buses) is a lower bus fare than 5 Baht Level. (Appendix Table 7-18)

(5) Changes in Transportation Routes

Changes in transportation routes were studied by comparing the means before (the transportation of bus passengers before the bus operation on the Expressway, e.g. via ordinary roads) and after (the transportation of bus passengers after the opening of the Expressway using the buses operating on it).

a) Previous Transportation Modes

The transportation modes of passengers before they began to use BMTA or mini buses on the Expressway are summarized as in the following classification in Appendix Table 7-19.

APPENDIX TABLE 7-19 TRANSPORTATION MODES BEFORE AND AFTER THE EXPRESSWAY BUSES

(Unit : Persons)

Previous Mode	Present Bus Use	
	BMTA Air-Cond. Buses	Mini Buses
BMTA Bus	1,490 (73.5%)	14,982 (91.9%)
Mini Bus	222 (11.0%)	385 (2.4%)
Passenger Car	169 (8.3%)	362 (2.2%)
Motorcycle	33 (1.6%)	51 (0.3%)
No Answer	114 (5.6%)	528 (3.2%)
TOTAL	2,028 (100.0%)	16,306 (100.0%)

It was found that the majority (74%) of the bus passengers on the air conditioned buses through the Expressway used BMTA buses previously and that 8% of those

APPENDIX TABLE 7-17 ADDITIONAL PAYMENT FOR SUPPOSED BUS SERVICES ON EXPRESSWAYS :
PASSENGERS ON THE AIR CONDITIONED BUSES THROUGH EXPRESSWAYS .

	Additional Baht 1)							Average Additional Payment	
	1	2	3	4	5	6	7		Total
Air conditioned Buses	131	358	129	53	157	13	1,002	1,843	1.45 ¢
Regular Buses	754	397	278	15	125	28	306	1,903	1.66 ¢

Notes : 1) Those who answered Q-9 (3) are classified as follows :

1. 0.01 - 1.99 ¢
2. 2.00 - 2.99 ¢
3. 3.00 - 3.99 ¢
4. 4.00 - 4.99 ¢
5. 5.00 - 5.99 ¢
6. 6.00 ¢ and more
7. No increase

APPENDIX TABLE 7-18 COMMENTS ON MINI BUS FARE :
PASSENGERS ON THE MINI BUSES THROUGH EXPRESSWAYS

	The fare of Mini Buses through Expressways			
	Should be cheaper	Reasonable	Should be Higher	Total
Persons	5,319	10,441	51	15,811
(%)	(33.6%)	(66%)	(0.3%)	(100%)

changed their modes from the use of passenger cars. Those used mini buses previously on the ordinary roads were 11%.

Of the passengers on mini buses through the Expressway, 92% of them changed their transport from BMTA buses and only 2% of them came from the mini buses on ordinary roads. It was 3% of them who abandoned the use of passenger cars and motorcycles.

These facts may encourage the authorities concerned to operate faster, comfort, and extensive services via expressways, resulting in the reduction of some passenger car traffic on ordinary roads.

b) Travel Time

The travel time distributions from origin to destination of passengers on air conditioned buses and mini buses "before and after" the Expressway are illustrated in Appendix Fig. 7-3. In average the mini bus users reduced the time from 85 minutes to 46 minutes and the air conditioned bus users from 66 minutes to 50 minutes.

c) Bus Fare

It is common to understand that passengers who travel on the Expressway by using the bus should pay some additional fare because the bus provides faster and convenient services. However, BMTA now operates two bus routes running through the Expressway with no additional charge. Their operation had started in March 1983. It is said that the BMTA's operation is an experimental stage.

On the other hand unlicensed mini buses operate through the Expressway. They charge a new fare of 5 Baht or more. The distributions of the total bus fare from origin to destination are shown in Appendix Fig. 7-4.

It is found that the average additional fare for the mini buses were 4.60 Baht, resulting in the total of 9.60 Baht in most cases. BMTA charged no additional fare for the air conditioned buses via the Expressway. However, passengers paid 4.4 Baht additionally and the total was 11.3 Baht. (Appendix Fig. 7-4)

It is premature to conclude a pattern of passengers choice (a diversion tendency), since these services are quite new and not fixed for a certain period. Demand is very transient and unstable in these months.

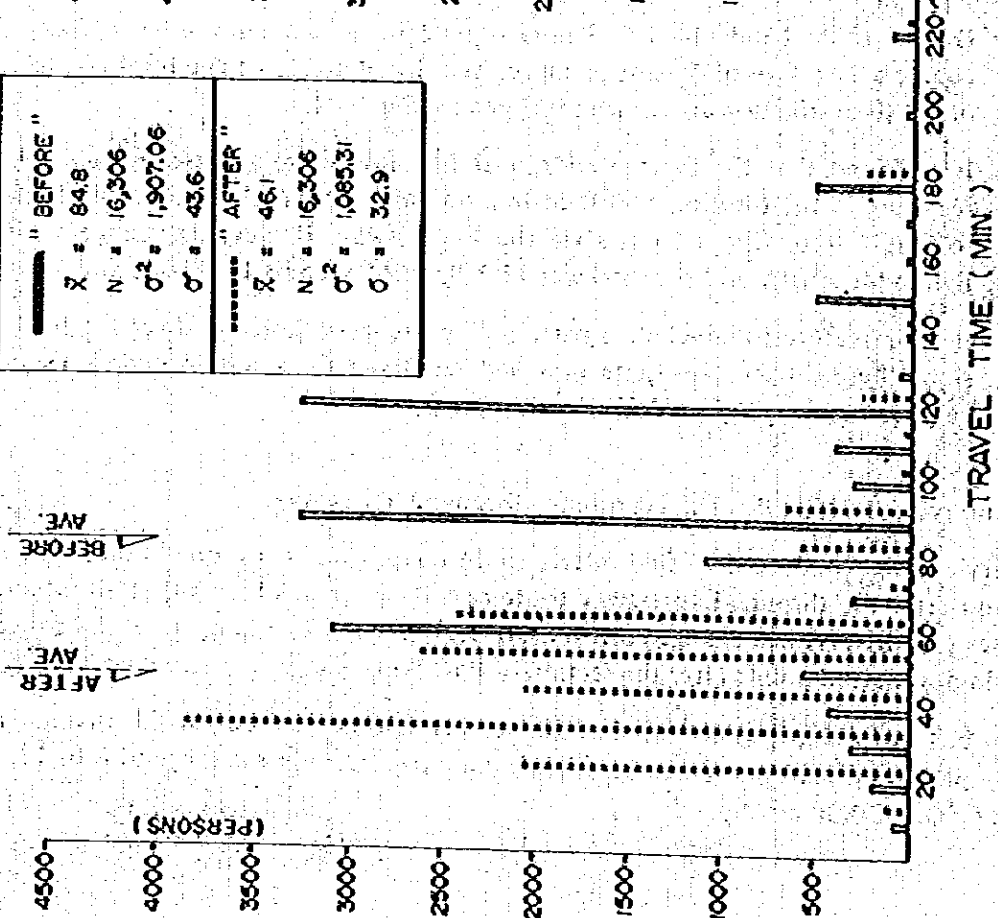
7.2.4 Interview on Mini Bus Drivers running through Expressways

The interview was conducted to find difference in travel time, trips, operational hours, etc. before and after the through-Expressway route operation. It was found that all interviewed mini buses (48 drivers) had changed origin-destination. They came to operate new routes and new origin-destination points after the section of Port-Bang Na opened.

The mini bus ownership was classified as 58% owner-drivers, 33% employed drivers, and 9% in the cooperative organization members. Their daily trips were in the range of 8 to 12, working from 6.00 to 20.00 mostly.

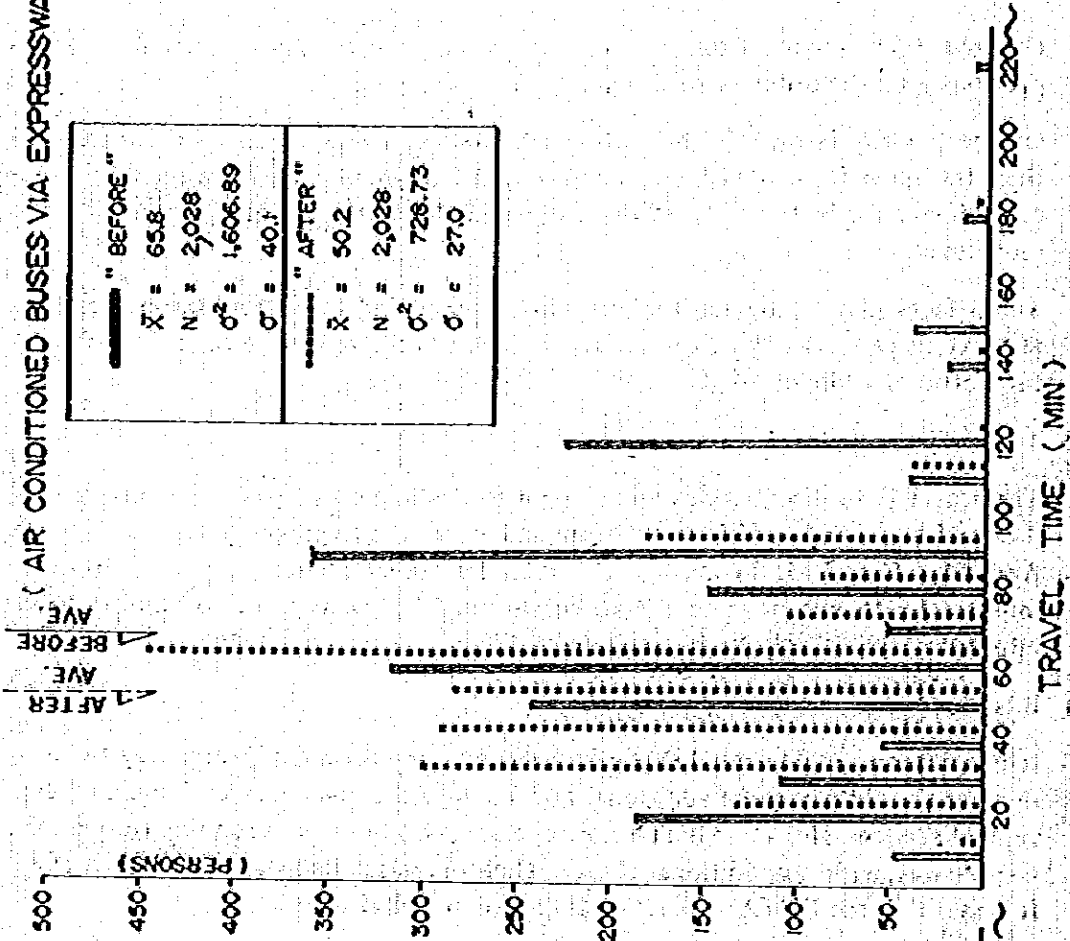
(MINI BUSES VIA EXPRESSWAY)

" BEFORE "	
\bar{X} =	84.8
N =	16,306
σ^2 =	1,907.06
σ =	43.6
" AFTER "	
\bar{X} =	46.1
N =	16,306
σ^2 =	1,085.31
σ =	32.9



(AIR CONDITIONED BUSES VIA EXPRESSWAY)

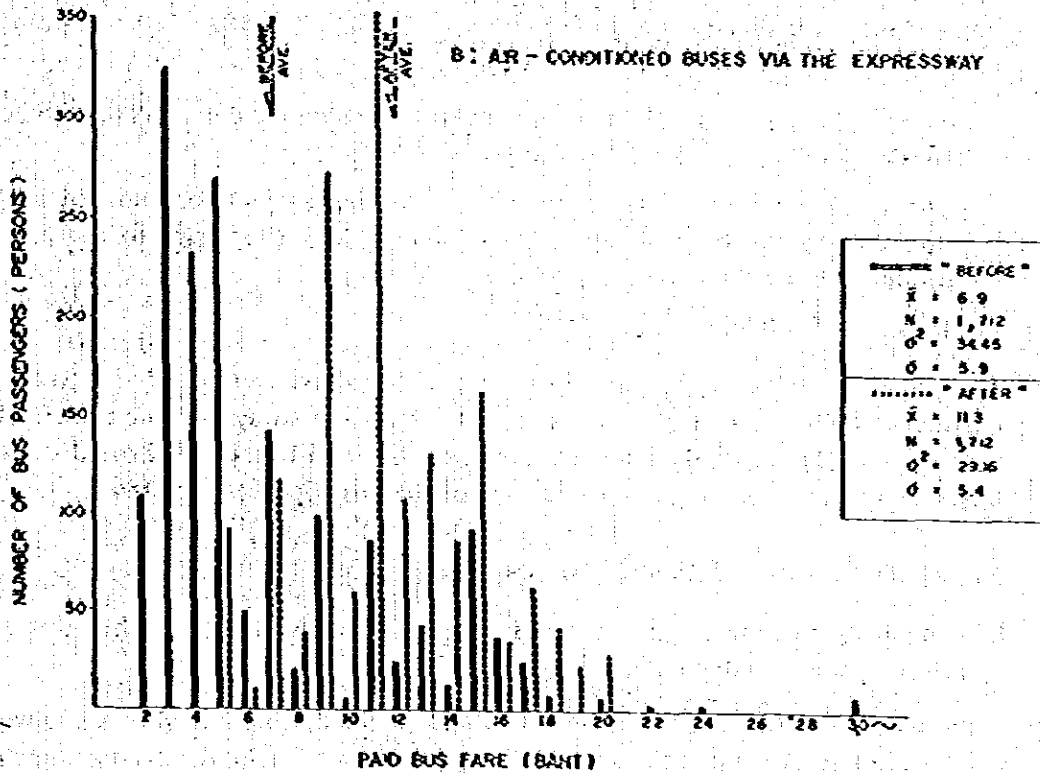
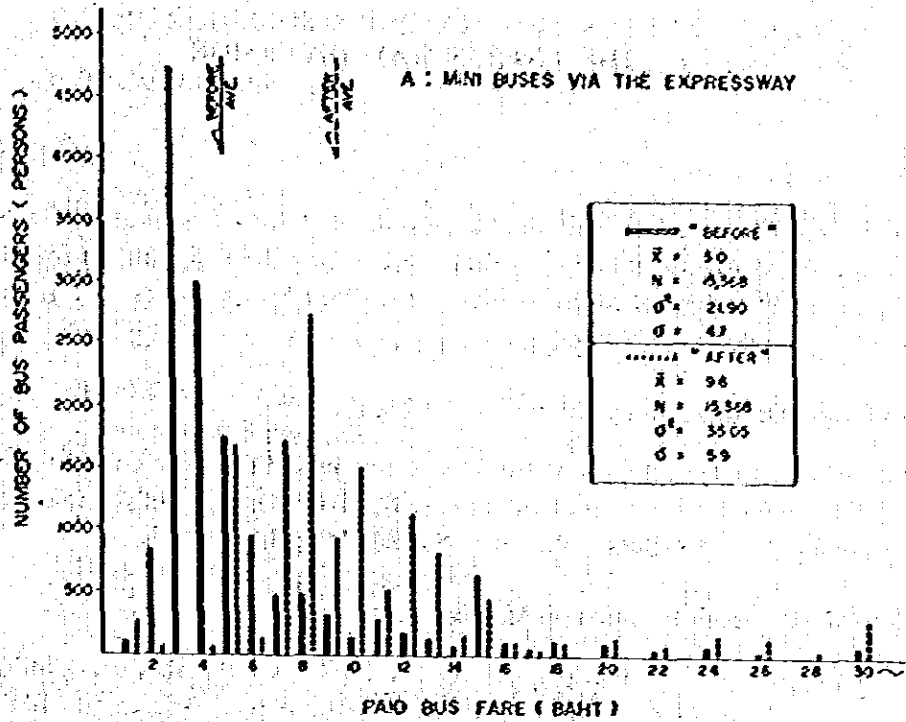
" BEFORE "	
\bar{X} =	65.8
N =	2,028
σ^2 =	1,606.89
σ =	40.1
" AFTER "	
\bar{X} =	50.2
N =	2,028
σ^2 =	726.73
σ =	27.0



APPENDIX
FIG. 7 - 3

PASSENGER TRAVEL TIME

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK



APPENDIX
FIG. 7-4

BUS FARE PAYMENT

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

APPENDIX 7.3 BUS TRIP MATRICES SUBJECT FOR THE EXPRESSWAY DIVERSION

7.3.1 Public Bus Trip Matrices in 1982

Public bus trip matrix produced in Chapter 4 was divided into two matrices : one not relevant to the Expressway diversion and the other representing the trips subject for diversion to the SES. The latter was developed by studying the BMTA bus routes and trips in the following manner :

(1) Bus Trip's Origin-Destination by the Routes of BMTA

The origin and destination points of the bus routes in BMTA were coded to the zone number by using the zoning map of the Study. Bus trips were put in the matrix. These trips would carry the passengers from zone to zone along the route.

(2) Bus Trips converted from Person Trip Matrix

As stated in Chapter 4, the bus trip's matrix covering the whole GBA was produced by converting the number of persons into bus trips without reference to the BMTA bus trips. Accordingly, it was understood this matrix included those trips mentioned in (1) above. As shown below, it was found that the percent shares of the persons in the buses subject for diversion as in (1) above and of those in the buses not subject for as in (2) were 50% each in the corridors of SES.

- The total passengers carried by the bus trips running the corridors of SES according to BMTA data 1.34 million/day
- The total passenger trips of bus uses, including subject for and not subject for diversion to the Expressway in the same corridors. (Referring to the person trips produced in Chapter 4) 2.65 million/day
- $1.34 \div 2.65 \div 0.505$ 50%

The zone pair trips in the bus trip matrix of (2) above were divided into half in the corridors of SES. A half was subject for the diversion study and the remained half of the trips of (2) thus calculated were carried by mini buses and short distant BMTA buses. In this manner the double counting of the bus trips were deleted.

(3) Average Occupants and Average Transport Persons

In converting passenger trips into bus trips, the following relationship was assumed by referring the available data.

Some would use the bus from the origin and to the destination while some would use only part of it. Assuming the average occupants on a bus trip, the average turning ratio is determined as follows:

- a) The average route length of the BMTA buses = 23.4 km
(Referring to Table 7-1)
- b) The average travelling distance of the passengers on the BMTA buses. (By analysing the OD tables of passengers on the selected routes of the SES corridors and using

the average occupant of 47 persons which was shown by BMTA) = 11.5 km

c) The average turn ratio : $\frac{23.4}{11.5} = 2.0$

d) By using the ratio of 2.0, the total passengers assumed by Chapter 4 could be approximated to the figure of total passengers on BMTA in Table 7-1.

From Table 7-1 = 3,775,000

From Chapter 4

BMTA $5,574 \times 0.73 \times 10 \times 2.0 \times 47 = 3,825,000$

The average transport persons per bus trip was the product of the average occupants and the turn ratio : $47 \times 2.0 = 94$

Person trips which were determined in Chapter 4 were converted to bus trips as

$$(\text{Bus Trips}) = \frac{(\text{Person Trips})}{(\text{Average Occupants}) \times (\text{Turn Ratio})} = \frac{(\text{Person Trips})}{94}$$

7.3.2 Public Bus Trip Matrices in the Future Years

The bus trip matrices subject for the Expressway diversion in 1990 and 2000 are filed and submitted separately together with the OD matrices of other vehicles, of which total trips subject for diversion crossing the screen sections are summarized in Table 7-3. The growth factors for the future years in bus passenger volume were determined in Chapter 5. They were used for the estimate of bus trips subject for diversion. In the forecast the average occupants were assumed as follows : 47 persons in 1982, 40 persons in 1990, 2000 and 2010.

	1982	1990	2000	2010
Total bus use - person trips	5,614	6,655	7,956	8,701
(Growth factor)	(1,000)	(1,185)	(1,417)	(1,550)
Total bus trips	119.4	166.4	198.9	217.5
(Growth factor)	(1,000)	(1,394)	(1,666)	(1,822)

APPENDIX 7.4 LOCATION OF BUS BAYS

The candidate locations of bus bay were studied in 7.3.4 of Chapter 7 since the bus bay construction plan is selected as an alternative plan to be compared with other plans. The location was studied from three points : passenger demand, engineering view point, and ROW acquisition.

(1) Studies on the Location

a) Passengers Demand

Passengers movement was studied on representative bus routes in the SES corridors as shown in Appendix Figs. 7-5 and 7-6. The number of passengers on bus stop groups were surveyed in 1980 and adjusted to the 1982 level by the statistical data of BMTA.

Along the N-S corridor, major on and off movements were in Bang Khen, Saphan Khwai, Victory Monument, and Hualumpoeng Station. (Lak Si and the northern areas had also large volumes but the SES plan did not extend into these areas.) In the East corridor, on-off volumes of passengers were large in the inner city areas west of the Expressway, Din Daeng-Port Section. (The volumes were large in Bang Kapi areas, but they were not in the corridor since the E route was planned in parallel with the SRT line.)

Distribution of bus routes to and from the major ordinary roads in the corridors of SES were studied. They are summarized as in Appendix Fig. 7-7. It was found that the above mentioned bus stops on which large on-off volumes of passengers were identified were also important points where bus routes concentrate from various directions.

b) Engineering Aspects

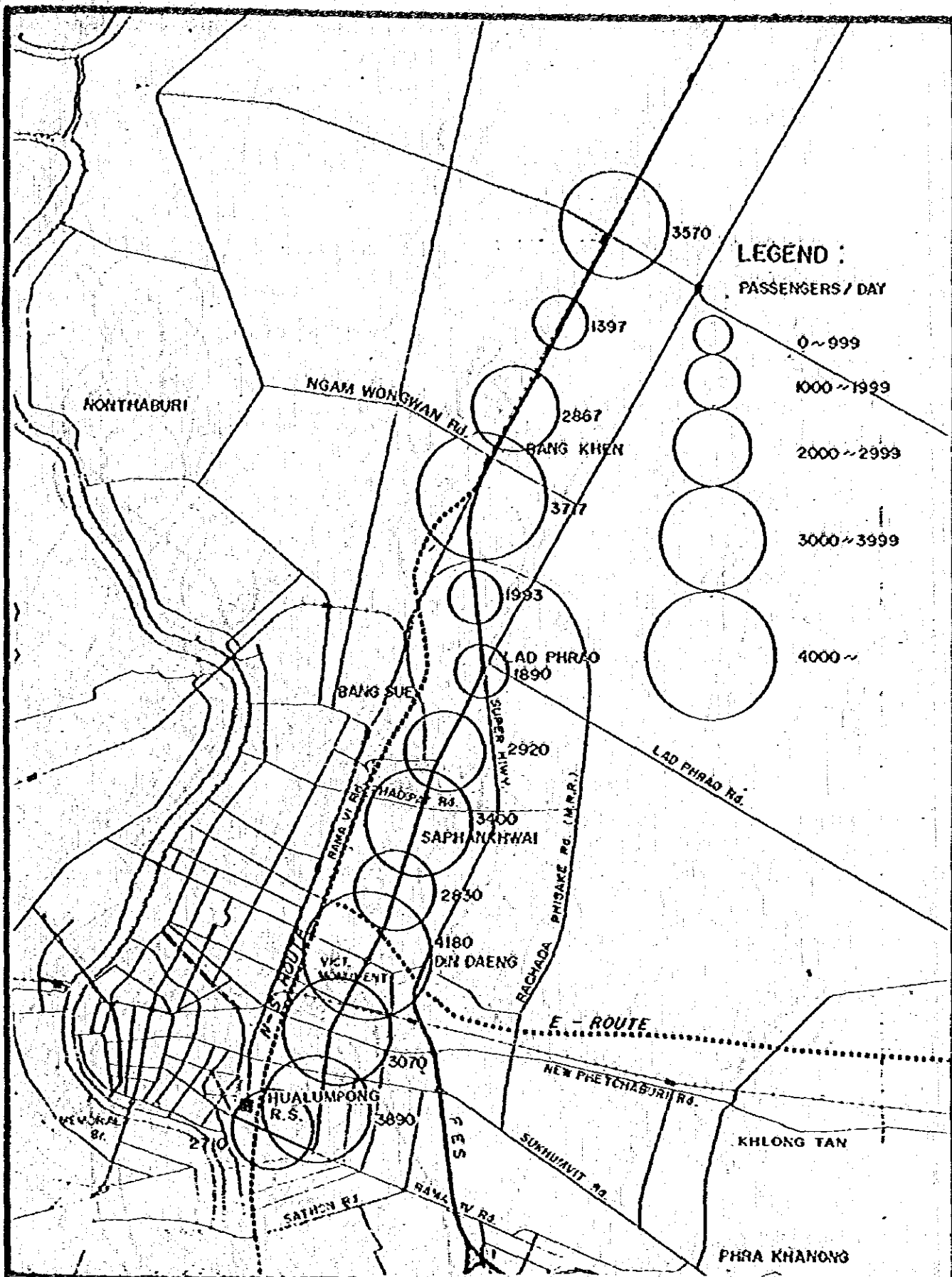
Bus stopping bay should not be located beside the through-lane with a gradient more than 2%. The bus bay on the rampway should not be located at a section with a rampway gradient more than 2%. Passengers' path to the surrounding area or to other bus stops on the ordinary roads should also be provided.

The stairway up to the bus stop bay should be designed with a moderate gradient not to tire passengers unduly, or an escalator should be constructed for the convenience of passengers.

Traffic conflict between the buses using the bus bay and the other vehicles were studied. The location was reviewed with due consideration on the weaving traffic flow on the through-lanes.

c) Right of Way Acquisition

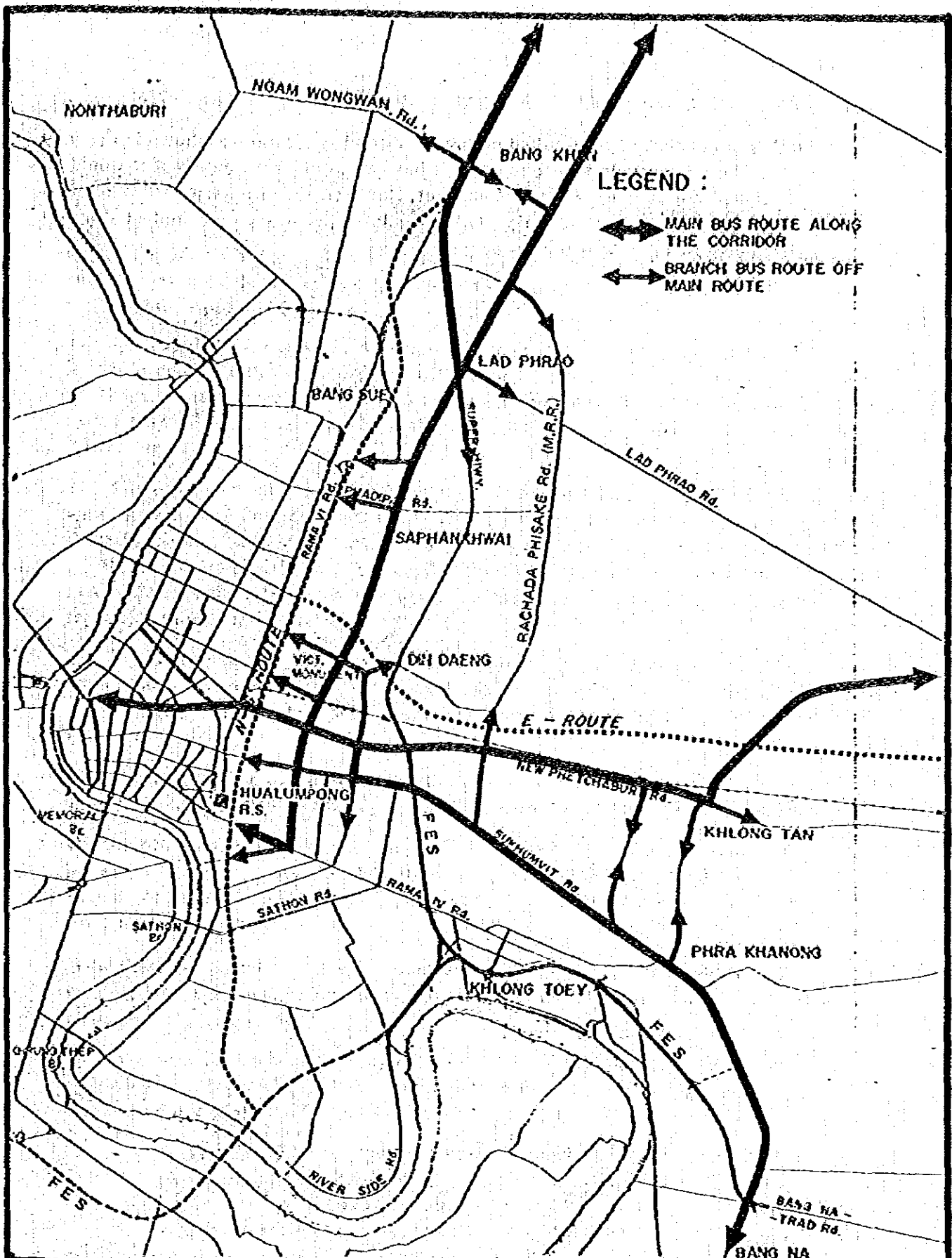
Additional land is necessary for the construction of bus stop bay and the passengers paths. A study was conducted to avoid the locations with difficult land acquirement. It was found if the bay was constructed on the through-lane level additional ROW of 5-10 m width and 400 m length, would be necessary. This would cause much cost burden as well.



APPENDIX
FIG. 7-5

NUMBER OF INBOUND BUS PASSENGERS GETTING ON
AND OFF AT BUS STOPS, N-S

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK



APPENDIX
FIG. 7-7

TYPICAL BUS ROUTES AND DISTRIBUTION
IN THE S-E CORRIDORS

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

(2) Selected Locations

Studies in (1) above have resulted in three bus stop bay locations as shown in Fig. 7--9 of the Main Report. It was found that a bus bay would serve mostly if it would be constructed adjacent to Victory Monument. However, the engineering study resulted in that the idea was not realistic. Other candidate locations were studied also, but deleted because of less bus trips using them.

APPENDIX 7.5 ADDITIONAL BUS FARE AND DIVERSION RATIO

The diversion ratio of passengers on the buses using the Expressway depends on the additional bus fare and the service they provide. The interview survey in March 1983 shows preferences of passengers who assessed the additional bus fare on a hypothetical Expressway bus service (Appendix Table 7-15). It is not the actual out of pocket payment. However, the answers may indicate tendency of preferences of bus users. They are compiled in a chart of the following Appendix Fig. 7-8.

The downward sloping curve in Appendix Fig. 7-8 indicates a decreasing passenger volume shown in percent ratios in accordance with the increased bus fare. The vertical axis shows an accumulated percentage of those who are said to pay more than that amount shown in X axis; i.e. the diversion rate is 62% if the additional fare is at 1 Baht and 47% if the fare is 2 Baht, etc.

The data can be re-edited into the curve showing the total revenue to the BMTA in relation with different levels of additional bus fare. The revenue is estimated by an assumption that those in the accumulated percentage showing to pay more than a certain bus fare level will use the buses and pay the fare. The curve is shown on a chart in Appendix Fig. 7-9 where Y axis represents the relative revenue using the existing 1.50 Baht level at 100, while X axis represents the bus fare increasing by 1 Baht.

The charts in these Figs. also show the curves produced by the comments of those in the air conditioned buses on the ordinary roads. However, the volume of passengers on these buses are small at 5% of the total BMTA buses in the corridor. Their influence is considered negligibly small.

The above argument will suggest that the diversion trips estimated in 7.3.5 of Chapter 7 should be reduced by more than 22.4% depending on the level of additional bus fare.

On the other hand, there will be other factors which will off-set the reduction and rather increase the use; they are the shift from the private vehicle use to the Expressway buses because of shorter travel time service, heavier congestion on roads which would accelerate the diversion much more, etc.

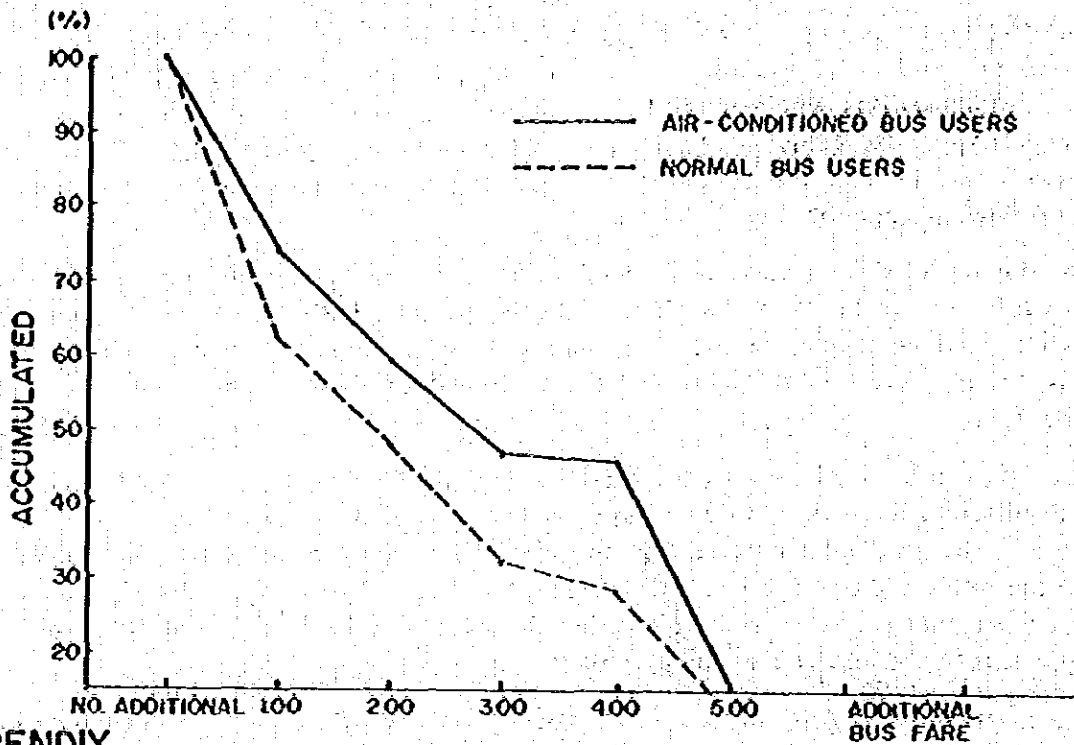
With these consideration, it is determined that if the effect of the additional fare is taken into account, there will be no substantial change in the estimate. The figure of 22.4% is not changed in this case study.

In any case a comprehensive study of bus passengers' demand is considered necessary. The following points should be taken into account in studying a diversion curve of bus users and a revenue curve of the BMTA buses using the Expressway.

- Survey should be conducted to obtain data which show the percent distribution of passengers among alternative routes or modes which differ in travel time and fare between the same OD zone pair. Just as did the diversion model determination of vehicles to the Expressway, bus passengers diversion model will be developed from the data.
- Revenue maximization or profit maximization is a target to be pursued by every private enterprise. However, this must be reviewed from the transport policy and

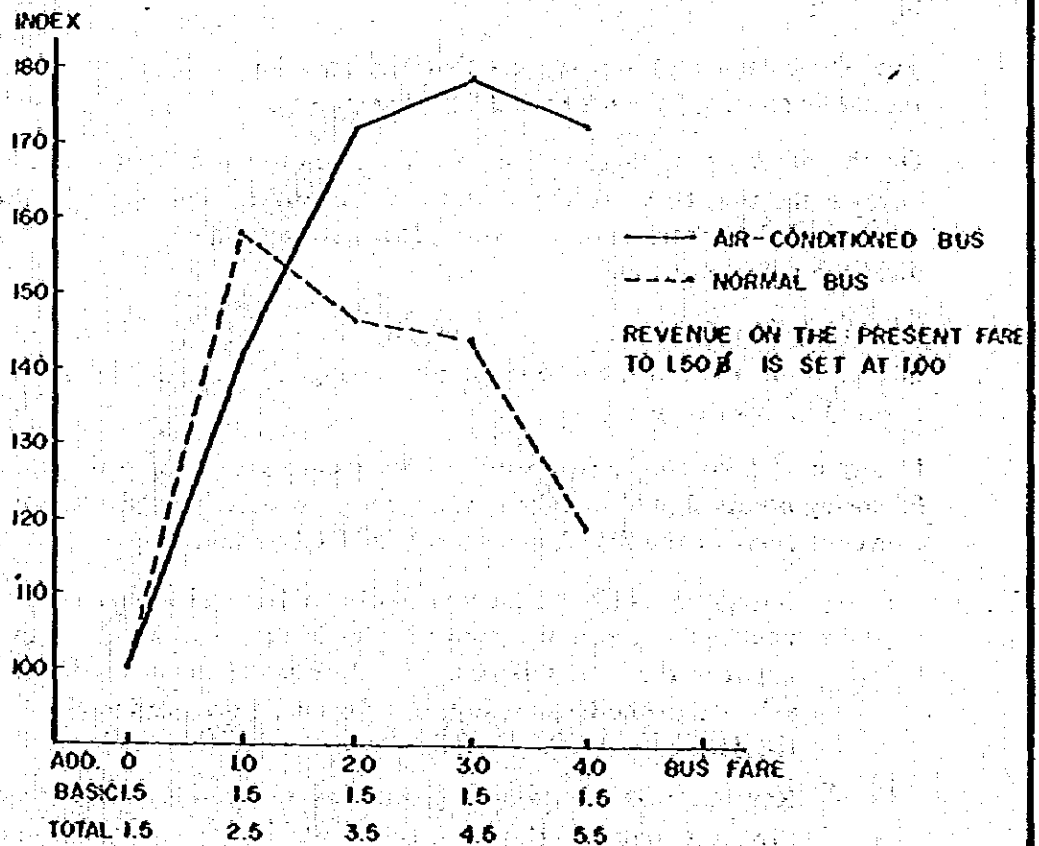
APPENDIX

FIG. 7-8 ACCUMULATED PERCENTAGE OF BUS PASSENGERS AND ADDITIONAL BUS FARE



APPENDIX

FIG. 7-9 REVENUE AND BUS FARE



THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

general pricing policy of the Government together with the monopolistic service of BMTA with which majority of users cannot find alternative means of transport. A welfare factor may be taken into account together with some sort of subsidizing problem.

- In the GBA, not only BMTA buses but also mini buses and soi buses should be subject for the study. Routes, trip frequency, and bus fare of large BMTA buses and mini buses determine the service of the buses which are the main public transport service in the GBA.

APPENDIX TABLE 7-20 BUS ROUTES ON THE SCREEN SECTIONS

1. A-A' (SUPER HIGHWAY, PHAHOL, YOTHIN AND RAMA VI ROADS)

Bus Route	Origin	Destination	Distance (km)	Buses/Day	Trips/Day ¹⁾	Passengers/Day
* 4	Rang Sit	Thonburirom Park	46.5	28	115	9,519
69	Sanambinnam	Victory Monument	22.2	23	135	14,558
* 3	KM 11	Khlong San	39.5	29	138	11,621
* 9	Mooban Sethakit	Nonthaburi	48.0	24	113	8,928
* 10	Thanon Prasricharoen	Nang Lerng	50.4	35	168	15,336
* 13 ²⁾	Huaykwang	Khlong Toey	52.0	52	188	21,704
* 29	Rang Sit	Hualumpong	34.0	11	80	4,159
8	Happyland Market	Sapan Put	25.0	58	455	58,749
26	Minburi	Victory Monument	30.0	46	307	45,134
28	Hor Kung	Siam Technical College	17.2	66	655	57,862
29	Rang Sit	Hualumpong	34.0	46	327	56,256
34	Rang Sit	Hualumpong	34.0	47	328	56,256
38 ²⁾	Bang Na KM 2	Chankasem College	27.8	57	424	61,342
39	Rang Sit	Sanamluang	35.0	45	302	49,995
59	Rang Sit	Sanamluang	35.0	45	303	49,994
63	Nonthaburi	Victory Monument	21.3	39	374	45,749
96	Pata Vikorn	Saochingchar	30.2	33	235	33,867
112	Kasetsart University	Si Phaya	22.1	28	202	22,537
* 44	Happyland Market	Tha Tien	33.0	12	71	2,946
44	Happyland Market	Tha Tien	27.7	33	255	39,547
TOTAL			664.9	757	5,175	666,059

Source : BMTA, February 1983

Notes : 1) Average daily operation in December 1982, including short distance services included

2) No.13* and No.38 are classified in the sections of A-A' and C-C'

Remarks : * indicates the air conditioned bus route

2. B-B' (NEW PHETCHABURI ROAD)

Bus Route	Origin	Destination	Distance (km)	Buses/Day	Trips/Day	Passengers/Day
* 12	Huay Kwang	Ministry of Commerce	50.0	29	149	13,409
* 14	Sri Yan	Tharue Khlong Toey	11.0	9	108	4,936
115	Pasook Village	Pratunam	14.0	12	107	12,357
23	Bang Na	Tawiet	24.0	48	376	52,446
58	Minburi	Bangkok Noi Railway Station	40.5	44	249	43,232
60	Khlong Jun	Pak Khlong Talad	25.2	68	575	84,020
61	Ram Kam Haeng University	Victory Monument	11.6	27	357	21,563
72	Klao Nam Tai	Tawiet	17.0	26	294	26,477
93	Athletic Village	Si Phaya	27.6	48	386	53,447
99	Ram Ram Flaeng University	Victory Monument	14.2	17	227	16,857
TOTAL			235.1	328	2,828	328,744

3. C-C' (SUKHUMVIT AND RAMA IV ROADS)

Bus Route	Origin	Destination	Distance (km)	Buses/Day	Trips/Day	Passengers/Day
* 8	Happyland	Sapan Put	30.0	28	143	9,515
* 11	Makkasan	Sapan Put	34.0	34	169	12,152
* 13 ²⁾	Huay Kwang	Tharue Khlong Toey	52.0	52	188	21,704
2	Samrong	Pak Khlong Talad	24.5	71	546	74,604
25	Paknam	Tha Chang	31.0	62	492	67,988
38 ²⁾	Bang Na	Chankasem College	27.8	57	424	61,342
48	Bang Na	Wat Poa	16.0	36	329	32,691
119	Paknam	Sam Yake	28.0	51	359	46,139
* 7	Khlong Kwang	Noppa Hong	33.0	29	120	8,412
45	Samrong	Banglumpu	25.6	23	102	29,460
46	Tha Nam Pasri Charoen	Tharue Khlong Toey	17.4	47	471	42,652
102	Paknam	Wat Chongnonsee	22.3	17	171	19,779
TOTAL			341.6	507	3,514	426,438

APPENDIX TABLE 7-21 DIVERTED NUMBERS OF BUS TRIPS

(trips/day)

Bus Route No.	OD Zone Pair	Numbers of Existing Bus Trips (1982)	Numbers of Future bus Total Trips (2000)	Diverted Numbers of Future Bus Trips (2000)					
				Alter-1) natives	Using Expressway 2)			Using Expy Total	Ordinary Road 3)
4*	69-52	115	192	P.T.	(7-17) 15	(1-17) 74	-	(46.4%) 89	(53.6%) 103
				B.B	(7-17) 22	(1-17) 82	-	(54.2%) 104	(45.8%) 88
69	65-10	135	225	P.T.	(1-17) 35	-	-	(15.6%) 35	(84.4%) 190
				B.B	(1-17) 61	-	-	(27.1%) 61	(72.9%) 164
3*	69-44	138	230	P.T.	(10,11-17) 27	(1-17) 27	-	(23.5%) 54	(76.5%) 176
				B.B	(10,11-17) 45	(1-17) 27	-	(31.3%) 72	(68.7%) 158
9*	65-54	113	188	P.T.	(10,11-17) 36	(1-17) 22	-	(30.9%) 58	(69.1%) 130
				B.B	(10,11-17) 51	(1-17) 22	-	(38.8%) 73	(61.2%) 115
10*	69-52	168	280	P.T.	(8-17) 54	(1-17) 33	-	(31.1%) 87	(68.9%) 193
				B.B	(8-17) 76	(1-17) 33	-	(38.9%) 109	(61.1%) 171
13*	69-58	188	313	P.T.	(17-24) 61	(17-19) 36	(1-24) 85	(58.1%) 182	(41.9%) 131
				B.B	(17-24) 73	(17-19) 49	(1-24) 85	(66.1%) 207	(33.9%) 106
29*	69-13	80	133	P.T.	(9-17) 15	(1-17) 15	-	(22.6%) 30	(77.4%) 103
				B.B	(9-17) 26	(1-17) 15	-	(30.8%) 41	(69.2%) 92
8	28-4	455	758	P.T.	(10,11-14) 88	-	-	(11.6%) 88	(88.4%) 650
				B.B	(10,11-14) 147	-	-	(19.4%) 147	(80.6%) 591
26	41-10	307	512	P.T.	(1-17) 79	-	-	(15.4%) 79	(84.6%) 433

(trips/day)

Bus Route No.	OD Zone Pair	Numbers of Existing Bus Trips (1982)	Numbers of Future bus Total Trips (2000)	Diverted Numbers of Future Bus Trips (2000)						
				Alter-1 natives	Using Expressway 2)			Using Expy Total	Ordinary Road 3)	
28	241-46	655	1,092	B.B.	(1-17) 139	-	-	(27.1%) 139	(72.9%) 373	
				P.T.	-	-	-	-	-	1,092
				B.B.	-	-	-	-	-	740
29	69-13	327	545	P.T.	(9-17) 63	(1-17) 63	-	(23.1%) 126	(76.9%) 419	
				B.B.	(9-17) 106	(1-17) 63	-	(31.0%) 169	(69.0%) 376	
34	69-13	328	547	P.T.	(9-17) 64	(1-17) 64	-	(23.4%) 128	(76.6%) 262	
				B.B.	(9-17) 106	(1-17) 64	-	(31.1%) 170	(68.9%) 220	
38	240 380	424	707	P.T.	(14-24) 55	(2-14) 219	(1-24) 219	(69.7%) 493	(30.3%) 214	
				B.B.	(14-24) 55	(2-14) 219	(1-24) 219	(69.7%) 493	(30.3%) 214	
39	69-1	302	503	P.T.	(10,11-17) 59	(1-17) 59	-	(23.5%) 118	(76.5%) 385	
				B.B.	(10,11-17) 98	(1-17) 59	-	(31.2%) 157	(68.8%) 346	
59	69-1	303	505	P.T.	(10,11-17) 59	(1-17) 59	-	(23.4%) 118	(76.6%) 267	
				B.B.	(10,11-17) 98	(1-17) 59	-	(31.1%) 157	(68.9%) 228	
63	66-10	374	623	P.T.	(1-17) 97	-	-	(15.6%) 97	(84.4%) 433	
				B.B.	(1-17) 169	-	-	(27.1%) 169	(72.9%) 361	
96	29-2	235	392	P.T.	(10,11-14) 46	-	-	(13.3%) 46	(86.7%) 312	
				B.B.	(10,11-14) 76	-	-	(19.4%) 76	(80.6%) 282	

7-21-2

(trips/day)

Bus Route No.	OD Zone Pair	Numbers of Existing Bus Trips (1982)	Numbers of Future bus Total Trips (2000)	Diverted Numbers of Future Bus Trips (2000)					
				Alter- natives ¹⁾	Using Expressway ²⁾			Using Expwy Total	Ordinary Road ³⁾
112	241-4	202	337	P.T.	(9-17) 39	(1-17) 39	-	(23.1%) 78	(76.9%) 230
				B.B.	(9-17) 65	(1-17) 39	-	(30.9%) 104	(69.1%) 204
44*	28-1	71	118	P.T.	(10,11-14) 14	-	-	(11.9%) 14	(88.1%) 104
				B.B.	(10,11-14) 23	-	-	(19.5%) 23	(80.5%) 95
44	28-1	255	425	P.T.	(10,11-14) 49	-	-	(11.5%) 49	(88.5%) 36
				B.B.	(10,11-14) 82	-	-	(19.3%) 82	(80.7%) 327
12*	240-1	149	248	P.T.	(4-10,11) 67	(1-4) 29	-	(38.7%) 96	(61.3%) 152
				B.B.	(4-10,11) 87	(1-4) 29	-	(46.8%) 116	(53.2%) 132
14*	31-10	108	180	P.T.	(1-4) 98	(2-4) 35	-	(73.9%) 133	(26.1%) 47
				B.B.	(1-4) 98	(2-4) 35	-	(73.9%) 133	(26.1%) 47
11A	37-111	107	178	P.T.	-	-	-	-	178
				B.B.	-	-	-	-	-
23	59-6	376	627	P.T.	(20-24) 146	-	-	(23.3%) 146	(76.7%) 481
				B.B.	(20-24) 146	-	-	(23.3%) 146	(76.7%) 481
58	41-45	249	415	P.T.	(4-10,11) 113	(1-4) 48	-	(38.8%) 161	(61.2%) 58
				B.B.	(4-10,11) 145	(1-4) 48	-	(46.5%) 193	(53.5%) 26

7-21-3

(trips/day)

Bus Route No.	OD Zone Pair	Numbers of Existing Bus Trips (1982)	Numbers of Future bus Total Trips (2000)	Diverted Numbers of Future Bus Trips (2000)					
				Alter-1 natives	Using Expressway 2)			Using Expwy Total	Ordinary Road 3)
60	29-1	575	959	P.T.	(4-10, 11) 260	(1-4) 112	-	(38.8%) 372	(61.2%) 587
				B.B.	(4-10, 11) 335	(1-4) 112	-	(46.6%) 447	(53.4%) 512
61	28-10	357	595	P.T.	(1-4) 323	(1-2) 115	-	(73.6%) 438	(26.4%) 157
				B.B.	(1-4) 323	(1-2) 115	-	(73.6%) 438	(26.4%) 157
72	36-6	294	490	P.T.	-	-	-	-	490
				B.B.	-	-	-	-	-
93	40-4	386	643	P.T.	(4-9) 175	(1-4) 75	-	(38.9%) 250	(61.1%) 393
				B.B.	(4-9) 225	(1-4) 75	-	(46.7%) 300	(53.3%) 343
99	31-6	227	378	P.T.	(4-10, 11) 103	(1-4) 44	-	(38.9%) 147	(61.1%) 231
				B.B.	(4-10, 11) 132	(1-4) 44	-	(46.6%) 176	(53.4%) 202
8*	59-1	143	238	P.T.	(20-24) 55	-	-	(23.1%) 55	(76.9%) 183
				B.B.	(20-24) 55	-	-	(23.1%) 55	(76.9%) 183
11*	59-44	169	282	P.T.	(20-24) 66	-	-	(23.4%) 66	(76.6%) 216
				B.B.	(20-24) 66	-	-	(23.4%) 66	(76.6%) 216
2	59-1	546	910	P.T.	(20-24) 212	-	-	(23.3%) 212	(76.7%) 698
				B.B.	(20-24) 212	-	-	(23.3%) 212	(76.7%) 698
25	59-1	492	820	P.T.	(20-24) 191	-	-	(23.3%) 191	(76.7%) 629
				B.B.	(20-24) 191	-	-	(23.3%) 191	(76.7%) 629

7-21-4

(trips/day)

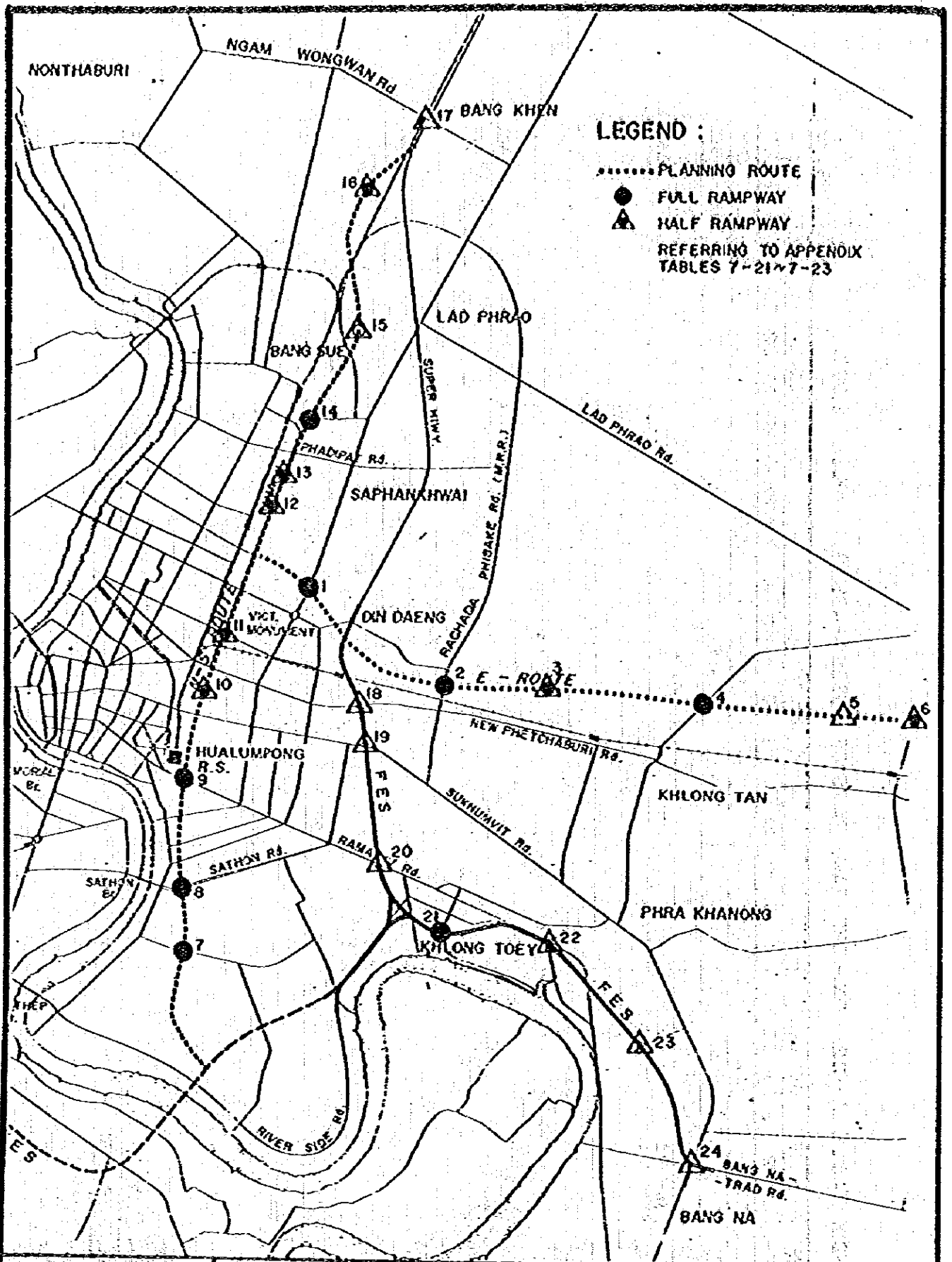
Bus Route No.	OD Zone Pair	Numbers of Existing Bus Trips (1982)	Numbers of Future bus Total Trips (2000)	Diverted Numbers of Future Bus Trips (2000)					
				Alter-1) natives	Using Expressway 2)			Using Expwy Total	Ordinary Road 3)
48	60-1	329	548	P.T.	(20-23) 128	-	-	(23.4%) 128	(76.6%) 420
				B.B.	(20-23) 128	-	-	(23.4%) 128	(76.6%) 420
119	59-4	359	598	P.T.	(20-24) 139	-	-	(23.2%) 139	(76.8%) 459
				B.B.	(20-24) 139	-	-	(23.2%) 139	(76.8%) 459
7*	59-50	120	200	P.T.	(20-24) 47	-	-	(23.5%) 47	(76.5%) 153
				B.B.	(20-24) 47	-	-	(23.5%) 47	(76.5%) 153
45	59-2	102	170	P.T.	(20-24) 40	-	-	(23.5%) 40	(76.5%) 130
				B.B.	(20-24) 40	-	-	(23.5%) 40	(76.5%) 130
46	380-13	471	785	P.T.	(20-23) 183	-	-	(23.3%) 183	(76.7%) 602
				B.B.	(20-23) 183	-	-	(23.3%) 183	(76.7%) 602
102	59-211	171	285	P.T.	-	-	-	-	285
				B.B.	-	-	-	-	285
TOTAL		10,905	18,174	P.T.	-	-	-	(26.3%) 4,773	(73.7%) 13,401
				B.B.	-	-	-	-	5,563

7-21-5

Notes : 1) P.T. is "passing through"
B.B. is "passing through and bus bay use"

2) Upper line in () : a ramp pair of in and out
Lower line : bus trips/day

3) (Total trips, 2000) - (using expressway) = (Ordinary Road)



APPENDIX
FIG. 7-10

RAMPWAYS : LOCATION AND CODE NUMBER
(BUS SERVICE STUDY)

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

APPENDIX TABLE 7 - 23 ON - OFF RAMP PAIRS OF BUSES (BUS BAY USE) 2,000

OFF ON	E ROUTE					N - S ROUTE					FES					TOTAL	TE									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			16	17	18	19	20	21	22	23	24
1				365													416							152	933	1865
2				75										109											184	369
3																										
4	364	75							113	349															901	1803
5																										
6																										
7																										
8																									11	22
9																									38	76
10																									265	529
11																										659
12																									659	659
13																										
14										164															28	302
15																										602
16																										
17	416									146															37	823
18									38	151	146								24							1647
19																										
20																									25	49
21																									155	603
22																										1207
23																										
24	152																								156	311
TOTAL	932	185								902											11	38	264	659	155	665
											300					824					24	604			5963	11726

APPENDIX TABLE 7-24 TRAFFIC COST AND SAVINGS OF NORMAL BUS SERVICE ON THE EXPRESSWAY, 2000

(ECONOMIC cost in '000\$/day)

	Buses ³⁾			All vehicles		
	C	A	B	C	A	B
	"no service"	"passing through"	"with bus bay"	"no service"	"passing through"	"with bus bay"
Traffic Cost¹⁾						
1. VOC	20,203	20,230	19,554	161,477	161,443	161,584
2. PTC	19,274	19,115	19,697	75,785	75,687	75,405
3. Total	39,477	39,345	39,251	237,262	237,130	236,989
Savings²⁾						
C-A or C-B	-	132.0	226.0	-	132.6	273.0

Notes: 1) In the traffic assignment and the subsequent traffic cost estimate, all zone pair routes were determined by the computer simulation system as stated in Chapters 6 and 12. However, in the case of the diverted buses to the Expressways, the routes were determined manually in designating the on-off ramps.

In the repetition of traffic assignment, the velocity and the VOC after the third group of trips were distributed on the network were used in estimating the traffic cost of the all vehicle trips and the bus trips. When the third group was distributed on the network and the traffic is aggregated at every link, it would indicate the 80% of ADT. It would also indicate a traffic flow pattern of day time, except peak hours. No different speeds were given to the buses of A and B, nor different costing was done between the two cases. They were treated same as other vehicles' cost estimate.

- 2) The cost and savings are estimated on the network of R-1.
- 3) Buses includes private buses and public buses (diverting and non-diverting) as shown in OD matrices.