

A6.8 Air Transport

A6.8.1 Air Transport Network in Cambodia

Air transport network in Cambodia consists of 9 international routes and 7 domestic routes with Pochentong International Airport in the center, as shown in Figure A6.8.1.

In 1999, total air passengers were approximately 803 thousand, of which 79% (631 thousand) were international passengers. The break down of international passengers by route was as follows: 50% or 313 thousand from Bangkok, 16% or 103 thousand from Ho Chi Minh, and 12% (73 thousand) from Singapore. On the other hand, domestic air passengers in 1999 were an estimated 171 thousand, of which 76.5% (131 thousand) used Siem Reap route where the Angkor Wat is located, followed by Battambang route.

There was an upward trend of air passengers from 1990 to 1996, followed by a drop in 1997 and 1998 due to the unstable political conditions in Cambodia and the economic crisis in the southeastern countries; in 1999, the number increased again. Annual growth rates of flights and air passengers from 1990 to 1999 were 27.2% and 41.1% respectively. Table 7.8.1 summarized air traffic in Cambodia.

A6.8.2 Profile of Pochentong International Airport

Pochentong International Airport serves not only international and domestic flights but also VIP flights and military flight operations. It is not only the largest international airport in Cambodia but also the air transport gateway from/to Phnom Penh.

Pochentong International Airport is located approximately 10 km west of Phnom Penh, along Road No. 4. A summary of the physical facilities at Pochentong International Airport is presented in Table A6.8.2.

The management and development of Pochentong International Airport has been entrusted to Société Concessionnaire de l'Aéroport (SCA) since 15th October 1995 under a BOT agreement between MPWT, Royal Government of Cambodia and SCA. The agreement gives SCA the exclusive right to serve international traffic in Cambodia with effect from October 1995 for 20 years.

Annual air passenger at Pochentong International Airport from 1995 to 1999 and air passenger by purpose and by Country in 1999 are shown in Figure A6.8.2 and Table A6.8.3, respectively.

A6.8.2 Future Development Plan

To cope with the rapid increase of future air traffic demand, SCA prepared the airport development plan as shown in Figure A6.8.3. The initial development plan called for the construction of a new runway at the eastside of the existing runway. But with rising land prices and planned factories in the surrounding area of the airport, the plan was revised to just extend the existing runway.

The Bureau of Urban Affairs (BAU) in the Municipality of Phnom Penh has a schematic long-term comprehensive development plan for Phnom Penh and its surrounding area within a 50-km radius as shown in Figure A6.8.1. The plan showed a new international airport located about 30 km west of Phnom Penh's CBD (the existing airport will serve only domestic air service in the future).

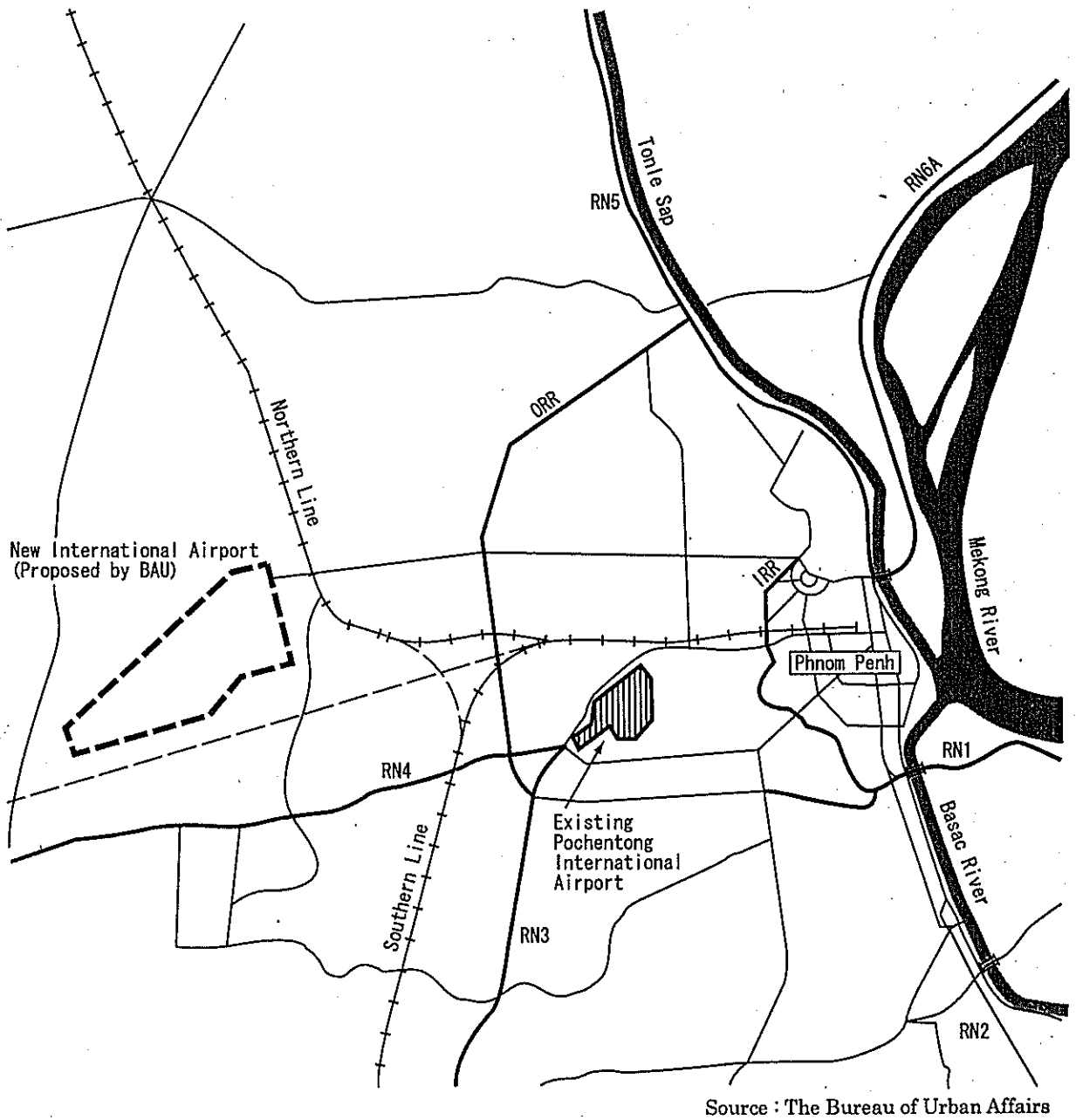


Figure A6.8.1 Location of the Pochentong International Airport

Table A6.8.1 Air Traffic in Cambodia

Trend of Air Transport (1990-1999)		1990-1999												Annual Growth Rate	
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Share	90-99	90-96	
No. of Flight	International	630	1,676	4,353	5,728	6,596	6,326	7,972	9,050	9,740	11,600	68.6%	38.2%	52.7%	
	Domestic	1,310	1,832	2,676	3,366	4,496	5,080	6,744	5,485	4,498	5,318	31.4%	16.8%	31.4%	
	Total	1,940	3,508	7,029	9,094	11,092	11,406	14,716	14,535	14,238	16,918	100.0%	27.2%	40.2%	
No. of Passenger	International	19,753	59,611	199,698	287,407	367,132	451,047	608,228	552,189	480,342	630,823	78.6%	46.9%	77.0%	
	Domestic	15,679	40,502	86,105	96,834	171,450	196,627	221,009	201,736	144,846	171,422	21.4%	30.4%	55.4%	
	Total	35,434	100,113	285,803	384,241	538,582	647,674	829,237	753,925	625,188	802,245	100.0%	41.4%	69.1%	
Freight Tonnes	International						1,295,287	3,160,911	54,575	60,643	43,284				
	Domestic						1,295,287	3,160,911	3,495,354	5,632,407	76,852,137	100.0%			

Monthly Air Passenger in 1999

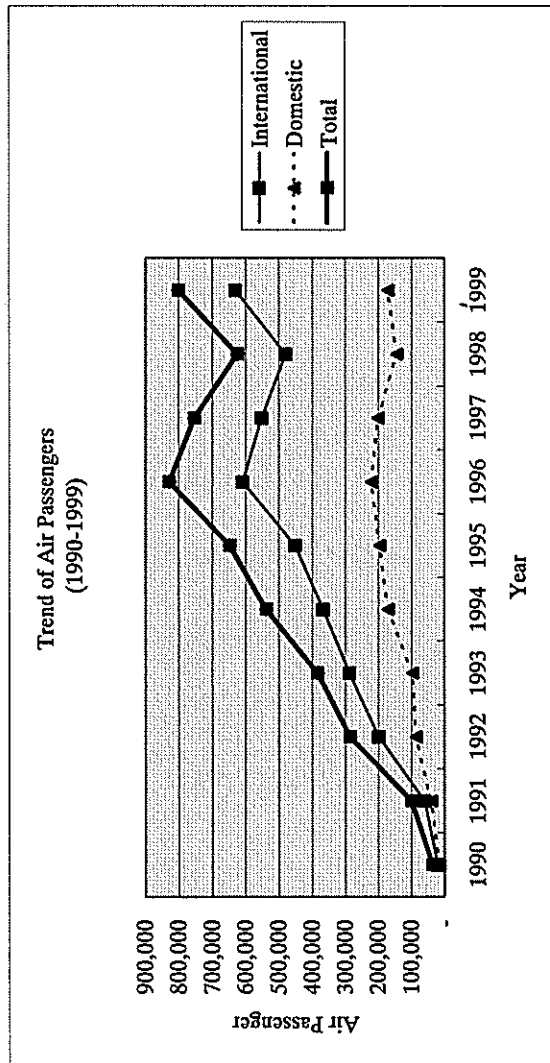
Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
International	58,902	49,727	53,505	52,009	43,596	45,029	52,223	56,805	42,877	52,089	64,944	60,596	632,302
Domestic	14,757	16,022	17,003	14,597	11,712	9,835	10,894	14,056	9,099	12,888	21,203	19,356	171,422
Total	73,659	65,749	70,508	66,606	55,308	54,864	63,117	70,861	51,976	64,977	86,147	79,952	803,724

International Air Passengers by Route in 1999

Destination	Passenger	Share
Bangkok	312,820	49.6%
Ho Chi Minh	103,285	16.4%
Hong Kong	48,212	7.6%
Kuala Lumpur	57,728	9.2%
Singapore	72,890	11.6%
Vientiane	7,135	1.1%
Guang Zhou	26,462	4.2%
Macao	-	0.0%
Moscow	-	0.0%
Other	2,293	0.4%
Total	630,825	100.0%

Domestic Air Passengers by Route in 1999

Destination	Passenger	Share
Siem Reap	131,223	76.5%
Battambang	22,583	13.2%
Stung Treng	5,337	3.1%
Koh Kong	361	0.2%
Rattanakiri	10,676	6.2%
Kampong Som	-	0.0%
Mondulkyri	1,247	0.7%
Total	171,427	100.0%



Source: State Secretariat of Civil Aviation

Table A6.8.2 Profile of the Pochentong International Airport

Items	Dimensions
Runway	
Orientation	05,23
Length	3,000 m
Width	40 m
Surface	Asphalt paved surface, overlay on concrete
Strength	180 tons (PCN 44/F)
Runway Strip	
Strip Length	60 m, beyond end of runway
Strip Width (Min.)	100 m, each side of runway C.L..
Grading	Partially graded, work on progress
Landing Aids	
Visual Approach Slope Indicator	PAPI provided on both runways
Runway Edge Lights	MIRL
Approach Lights	Simple approach lights provided on both sides
ILS	Provided for Rwy. 23
NDB	Provided at a distance of about 4.250 kms. from the airport in line with approach from Rwy. 23
Taxiway (Two Taxiways)	
Width	30 m
Strength	200 tons
Surface	Concrete
Apron	
Dimensions (Main)	355 m X 120 m (Main), 295 m X 85 m (East)
Surface	Concrete (Main), Asphalt (East)
Strength	200 tons (Main), 100 tons (East)
No. of Bays	7 (Main)
Parking Configuration	Power-in push-out
Parking Taxi Lane Distances	Vary
Operational Area Drainage	
	Provided but inadequate. Work to improve drainage system in progress. There are a number of ponds inside the operational area.
Terminal Building	
International Terminal	4,160 sq. m., 300 pax/hour
Domestic Terminal	1,800 sq. m., 250 pax/hour
	There is no visitors concourse inside the building.
Car Park	
Capacity	200 cars
Othe Facilities	
Control tower	
Royal Pavilion for State guests and ceremonial functions	
Airline maintenance hangers	
Fire station	
Static water tank	One pond is used for the purpose.
VIP Lounge	
GSE parking area	
Aviation fuel storage	2 companies
Power sub-stations	Two, one by CAMS and one by SSCA
Airport maintenance workshop	

Source: 'Airport in Cambodia' by SSCA in April, 2000

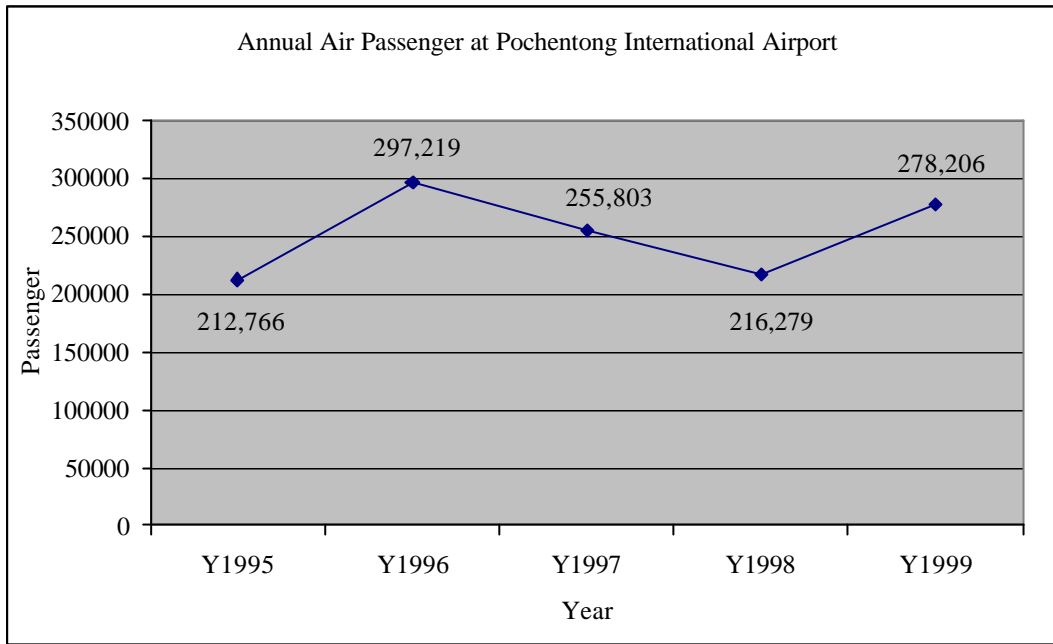


Figure A6.8.2 Annual air passengers at Pochentong International Airport

Table A6.8.3 Air passenger by purpose and by country in 1999

	Purpose				%
	Tourist	Business	Others	Total	
Cambodia	22,503	8,568	12,888	43,959	15.8
US.	14,772	4,878	10,651	30,301	10.9
China	16,174	10,310	321	26,805	9.6
France	16,927	3,640	3,269	23,836	8.6
Taiwan	14,044	6,518	42	20,604	7.4
Japan	15,499	1,542	867	17,908	6.4
Thailand	9,244	5,419	609	15,272	5.5
British	10,289	3,325	220	13,834	5.0
Malayian	8,002	4,341	198	12,541	4.5
Singapor	6,251	4,224	150	10,625	3.8
Others	45,798	11,177	5,546	62,521	22.5
Total	179,503	63,942	34,761	278,206	100.0
%	64.5	23.0	12.5	100.0	

Source: Ministry of Interior

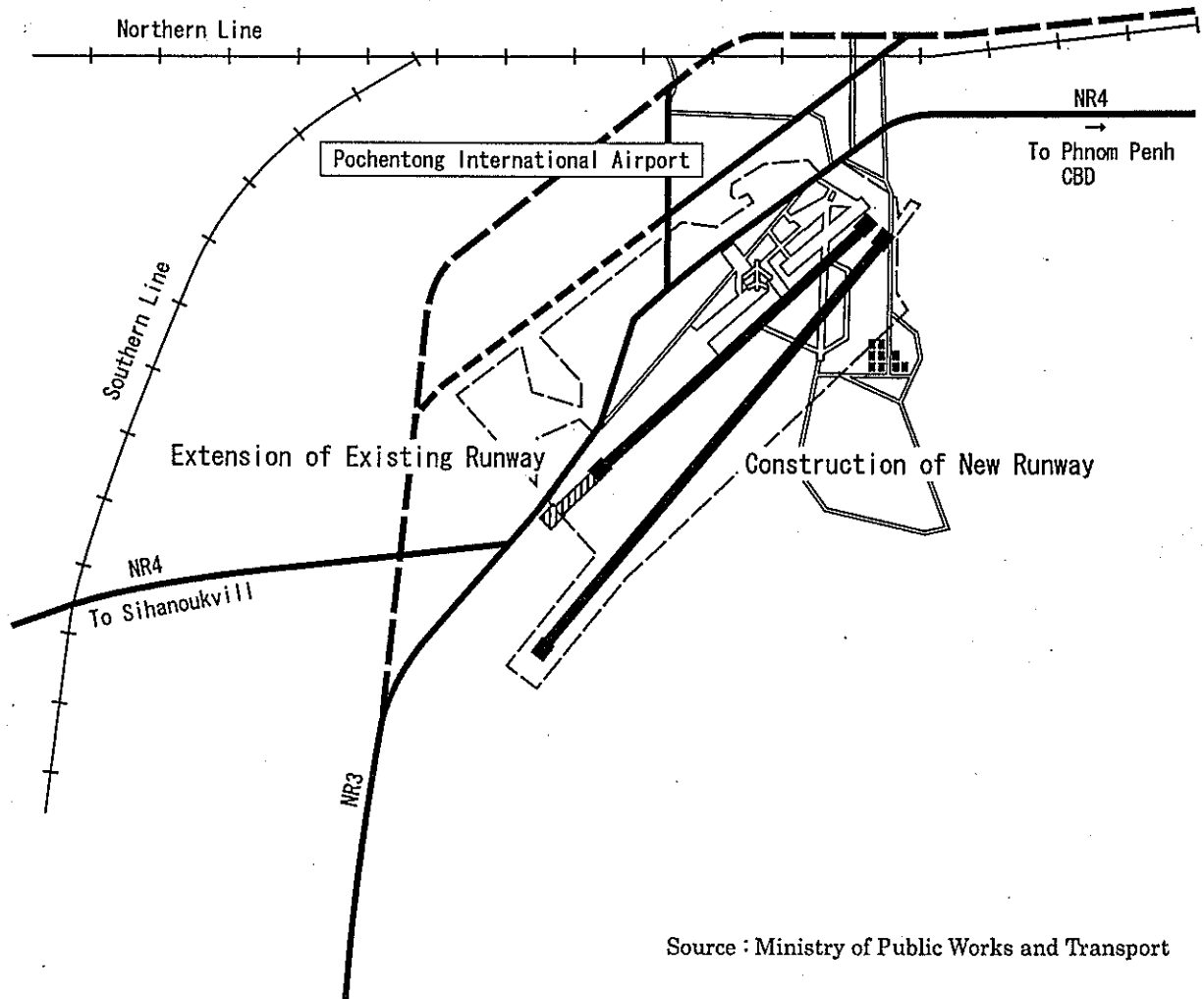


Figure A6.8.3 Development Plan of the Pochentong International Airport

A6.9 Problem Identification and Evaluation

A6.9.1 Urban Scale, Economic Activity and Public Transportation System of Selected Asian Cities

Figure A6.9.2 shows the relation among population, per capita GNP and public transportation system of 17 major cities in Asia, while the location of these cities is given in Figure A6.9.1.

A 13-year trend (1985 – 1998) of the abovementioned items is provided for some cities, such as Bangkok, Manila and Shanghai. It is interesting to note that statistics vary widely among the cities, from a population of 0.5 million in Vientiane, Lao PDR, to over 10 million in the city of Calcutta (11.0 million) in India; from a per capita GNP of US\$260 in Phnom Penh, Cambodia, to US\$3,500 in Kuala Lumpur, Malaysia.

Figure A6.9.2, on the other hand, shows the public transportation system in each city by type as described below. A summary is also prepared in Table A6.9.1.

The 17 cities can be roughly categorized into 4 types of public transportation system. They are as follows:

Type A: Rail + bus/rail + bus + para-transit

It can be said that the cities belonging to this type provide a comprehensive public transportation system. The trend of public transport of this type indicates a shift from bus-oriented system to comprehensive public transport system within approximately 15 years due to the drastic increase of per capita GNP and/or population. However, most of public transport demand is still carried by bus system because the urban rail transit system has a short history as yet.

Type B: Bus oriented

This is the most popular public transport system not only in Asian cities but also in developing countries worldwide. Nevertheless its popularity, the existing bus system in many Asian cities are faced not only with financial problems due to the low level of fare system but also with operational problems due to the drastic increase of private cars. However, it is only the bus system that can serve a large number of public transport passengers without the need for large-scale investment. The introduction of bus priority measures can be seen in some Asian cities on trial basis.

Type C: Para-transit oriented

This type of public transport system is evident in the cities that experienced delay in urbanization due to a troubled historical past such as civil war, low level of per capita income and/or small scale urban area compared with its population and urban activities. For most of the cities in this category, the bus system was introduced to them within a 15-year period. Therefore, motorbike-taxis and cycle-taxis are still the trunk public transport system in these cities.

Type D: Limited to Para-transit

This category is found only in Phnom Penh and other small urban cities. Similar to Type C above, this kind of cities is characterized by delayed urbanization, low level of per capita income and small scale urban area compared with its population and urban activities. However, it is necessary to change the current public transportation system in these cities owing to their increasing rates of urban population growth and number of private cars. The bus system is probably going to be the one of most suitable public transport system in these cities in the future.

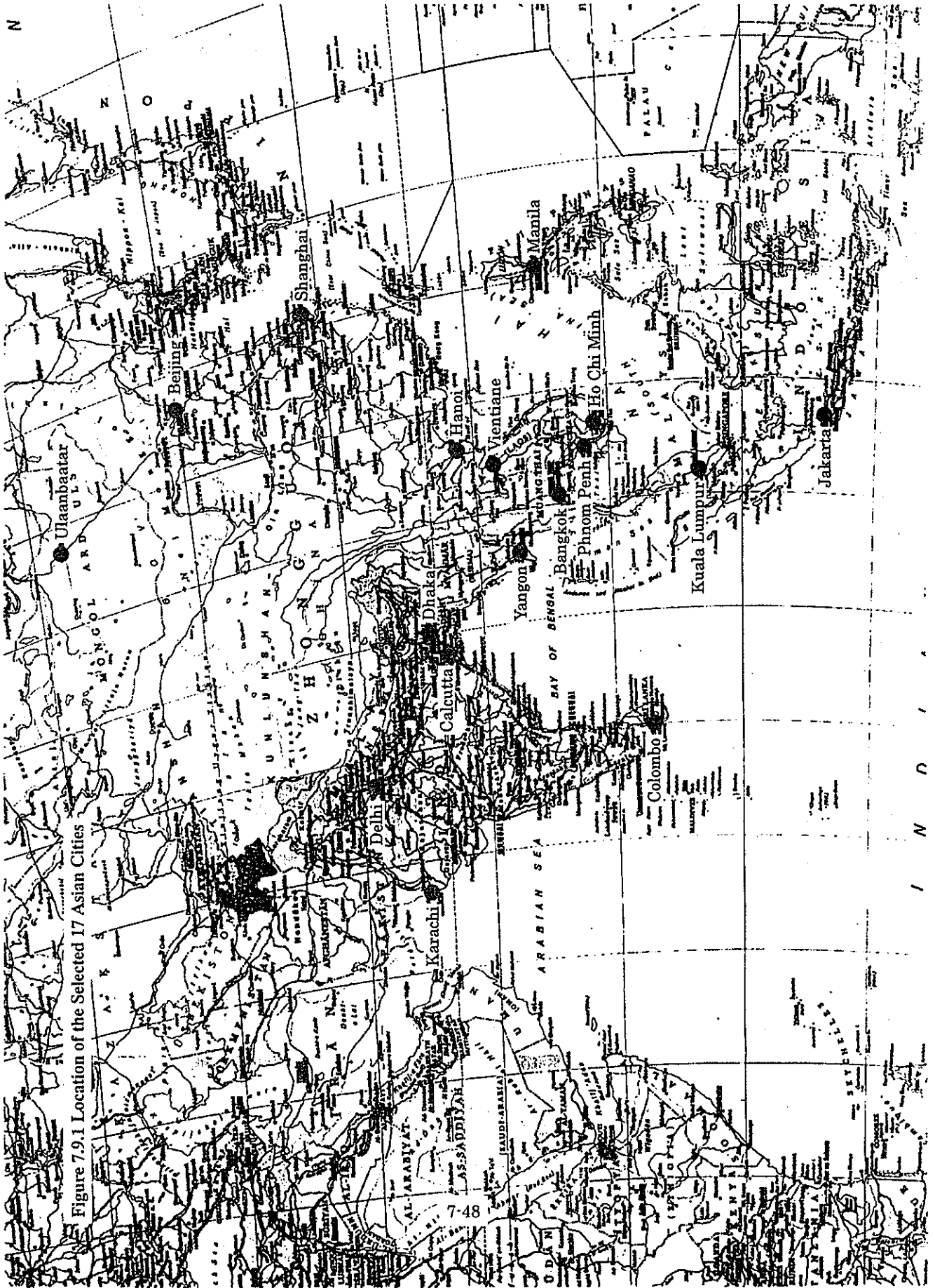


Figure 7.9.1 Location of the Selected 17 Asian Cities

Figure A6.9.1 Location of the Selected 17 Asian Cities

Table A6.9.1 Population, Per capita GNP and Public Transportation System in Asian 17 Cities

Region (ADB Classification)	Country			Capital/Major city			Public Transport Modes *5												
	Name	Population YR1998 *1	Area (km ²) *1	GNP per Capita *2 *3	Name	Population *4 Year	Area (km ²) *4	Population Density (Person/ha)	P.T. System Type *6	Urban Rail Transit	Subway	Light Rail Transit	Trolley Bus	Bus	Mibus	Taxi	Para-transit Motor -ized	Para-transit Non- motor -ized	Water Transport
Peoples Republic of China & Mongolia	Peoples Republic of China	1,236,914,658	9,596,960	750 (310)	Beijing	7,362,426 1990	16,808	4.38	A	O	O	O	O	O	O	O			
					Shanghai	8,205,598 1990	6,100	13.45	A	O	O	O	O	O	O	O			
					Ulaanbaatar	7,800,000 1985	6,100	12.79											
South East Asia excluding Singapore	Mongolia	2,578,530	1,565,000	370	Ulaanbaatar	515,100 1987	4,704	1.10	C				O	O	O	O			
	Cambodia	11,339,562	181,040	260	Phnom Penh	999,804 1998	290	34.48	D							O	O	O	O
	Indonesia	212,941,810	1,919,440	640 (530)	Jakarta	9,160,500 1995	660	138.80	A	O	O	O	O	O	O	O	O	O	O
Lao PDR Malaysia	Lao PDR	5,260,842	236,800	320	Vientiane	8,000,000 1985	660	121.21											
		20,932,901	329,750	3,670 (1,215)	Kuala Lumpur	464,000 1997	180	25.78	C					O	O	O	O	O	O
						1,226,700 1990	244	50.36	A	O	O	O	O	O	O	O			
Myanmar Philippines Thailand	Myanmar	47,305,319	678,500	700	Yangon	1,103,000 1985	244	45.20											
		77,725,862	300,000	1,050 (600)	Manila	2,513,023 1983			C					O	O	O	O	O	O
		60,037,366	514,000	2,160 (830)	Bangkok	9,454,040 1995	636	148.65	A	O	O	O	O	O	O	O	O	O	O
Viet Nam						6,822,000 1985	636	107.26											
		76,236,259	329,560	350	Hanoi	5,647,799 1998	1,569	36.00	A	O	O	O	O	O	O	O	O	O	O
						5,250,478 1985	1,569	33.46											
South Asia excluding Bhutan, Maldives and Nepal	Viet Nam			350	Ho Chi Minh	2,464,000 1997	927	26.57	C					O	O	O	O	O	O
	Bangladesh	127,567,002	144,000	350	Dhaka	4,989,000 1997	2,091	23.86	B					O	O	O	O	O	O
	India	984,003,683	3,287,590	440	Delhi	6,610,000 1991			B					O	O	O	O	O	O
Pakistan and Nepal				440	Calcutta	8,419,084 1991	1,483	56.77	B					O	O	O	O	O	O
		135,135,195	803,940	470 (380)	Karachi	11,021,918 1991	1,380	79.87	A	O	O	O	O	O	O	O	O	O	O
		18,933,558	65,610	810	Colombo	7,800,000 1991	1,970	39.59	B					O	O	O	O	O	O
					800,000 1997	600	13.33	C											

Data sources:

*1 Population and Area in countries: CIA (Internet home page)

*2 GDP per capita in countries excluding Myanmar: World Bank (Internet home page). Figure in Parentheses is 1985 data.

*3 GDP per capita in Myanmar: Data comparison sheet of Southeast Asian countries (Internet home page)

*4 Population and Area in cities: Various internet home page

*5 Public transport mode: JICA studies and various internet home pages

*6 Public Transportation System

A: Rail+Bus or Rail+Bus+Para-transit

B: Bus Oriented

C: Para-transit Oriented

D: Limited to Para-transit

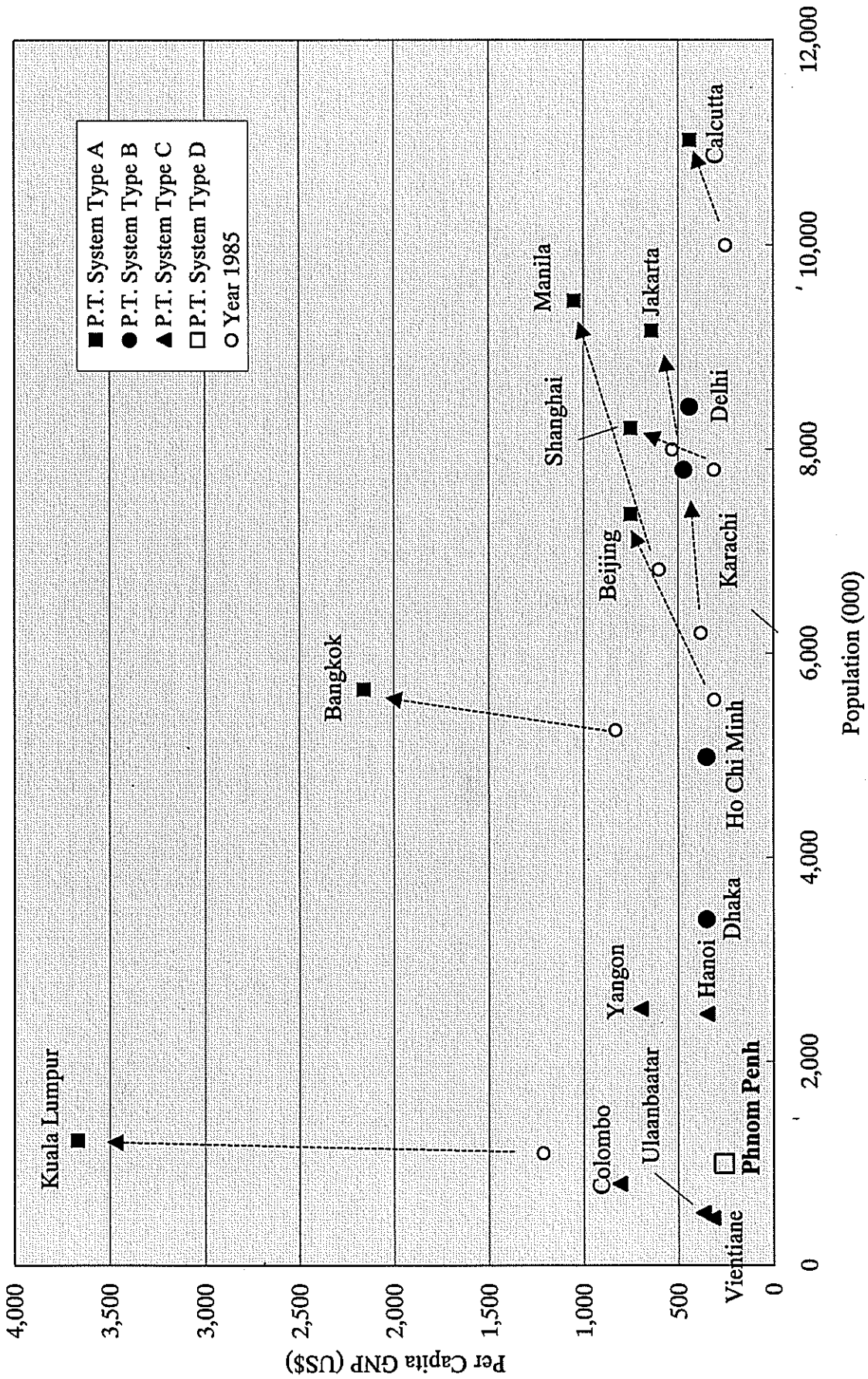


Figure A6.9.2 Population, Per capita GNP and Public Transportation System in Asian 17 Cities

A6.9.2 Absence of City Bus System and Ordinary Taxi Service

The typical feature of public transportation in Phnom Penh is the absence of a city bus system and ordinary taxi service. Phnom Penh used to have a city bus system; however, it was suspended within only a few months of operation due to the relatively small scale of service in the CBD compared to the city's population, and the large volume of motorcycles plus convenient motodops, which provide fast door-to-door service.

The lack of city bus system causes the increase of para-transit modes, such as the motodop. This eventually leads to traffic congestion in the CBD and to the exposure of motodop passengers to the danger of traffic accidents and inclement weather conditions.

On the other hand, although there are taxis in Phnom Penh, they are all found at Pochentong Airport where they serve as airport taxis. Lack of ordinary taxi service causes inconvenience to passengers, who have business and private purpose trip in particular and to foreigners who are unfamiliar with Phnom Penh.

The lack of proper public transport system to cope with various trip purposes, as mentioned above, causes serious problems relating to safety, convenience of urban trips and proper utilization of urban facilities, such as roads.

A6.9.3 Bus and Taxi-bus Operation

(1) Bus and taxi-bus traffic

Main inter-city public transport mode is bus and taxi-bus, which is shared taxi with the word 'Location' in Khmer painted at its side and composed by vans, pickups and sedans. Bus and taxi-bus terminals are scattered in the CBD, mainly located near markets. However, bus and taxi-bus traffic concentrate at 3 entrance/exit of the CBD (north, south and west) because of the arterial road network configuration. Especially, the heaviest traffic volume of bus and taxi-bus of 635 vehicles/day can be found at the north entrance of the CBD (in front of the French embassy near the Japanese-Cambodian Friendship Bridge), shown in Figure A6.9.3, because this point connects to Road No. 6A which has no alternative transportation mode, such as railroad.

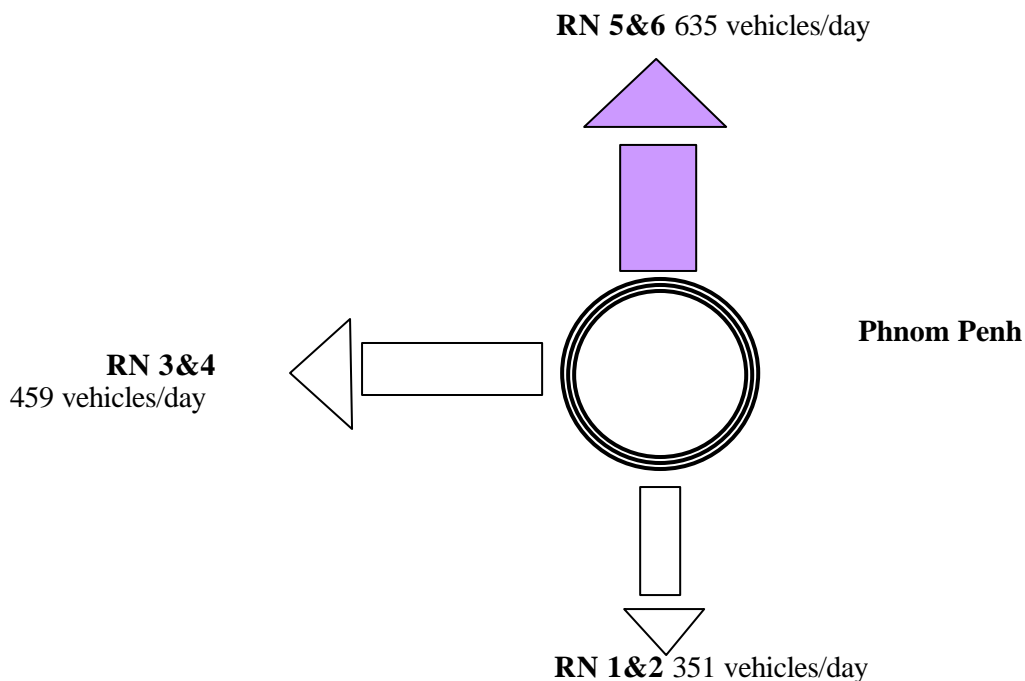


Figure A6.9.3 Bus and Taxi-bus Traffic Volume at Entrance/Exit of CBD

(2) Bus and taxi-bus terminals

Figure A6.9.4, Figure A6.9.5, Figure A6.9.6 and Figure A6.9.7 show the existing layout plan, and the hourly variation of vehicular/passenger traffic volume and vehicle type composition of taxi-bus at the major terminals, respectively. Most of bus and taxi-bus terminals locate at strategic points for urban transport, such as markets. However, not only inside terminals but also adjoining thoroughfares are almost always congested because a large number of bus and taxi-bus traffic converges at limited terminal spaces.

(3) Vehicular composition of taxi-bus

A taxi-bus comprises a variety of vehicle types, such as vans, pickups and sedans. With the wide selection of taxi-buses, passengers can choose whichever type they prefer depending upon their travel circumstance, i.e., trip purpose, number of luggage and road conditions. On the other hand, it is necessary to control the entry of vehicles as taxi-buses, considering the aggravation of traffic congestion caused by complicated vehicular composition and the lack of ordinary city taxi service.

(4) Rerouting of bus and taxi-bus operation along National Road No.6

On June 26, 200, the Municipality of Phnom Penh introduced a rerouting plan, which is schematically illustrated in Figure A6.9.8, including conditions before and after the plan took effect. The objective of this plan is to reduce traffic congestion and to beautify the city's environment, especially around the Central Market. Under this plan, buses and taxi-buses originating from the northern provinces are prohibited from entering the CBD of Phnom Penh. Instead, these buses and taxi-buses should stop at the newly developed Prek Leap Market terminal, located about 5 km from the city center, and their passengers should then transfer to a city bus, which is operated by Ho Wah Genting Transport Company. Some conflict arose between the taxi-bus drivers and bus operator on the starting day of rerouting; illegal operation of the taxi-bus could also be observed after the rerouting. The identified problems are summarized below:

- a. There was insufficient information about the rerouting plan before its implementation;
- b. The terminal fee in Prek Leap is the same as that in Central Market, although the former is located in the suburb; and
- c. Passengers are forced to suffer the inconvenience of transferring from a taxi-bus to a city bus, considering that most of them have several pieces of luggage and their final destination is Central Market.

Hourly Variation of Taxi-bus Traffic and Vehicle Composition

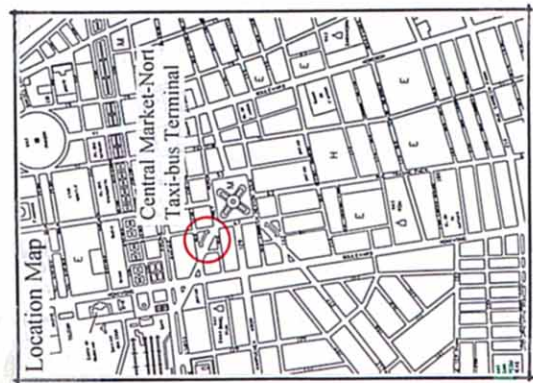
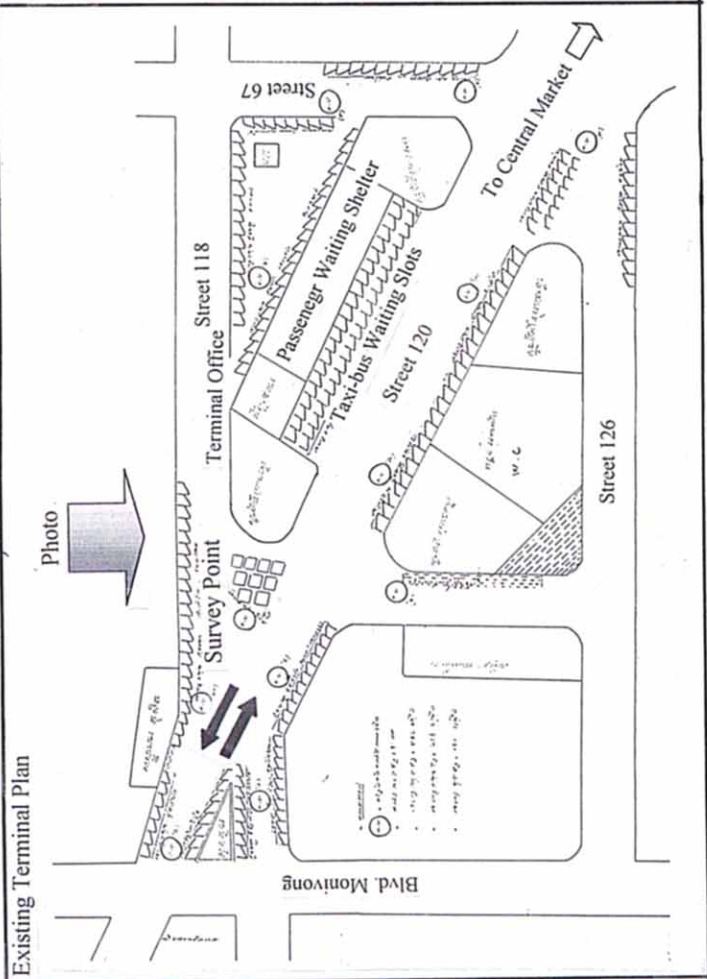
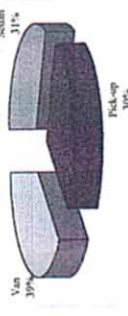
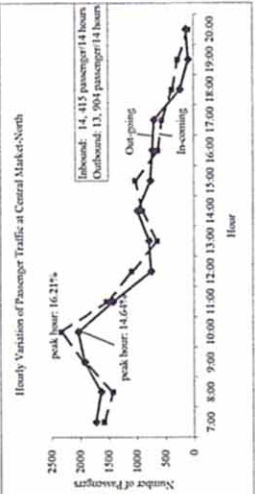
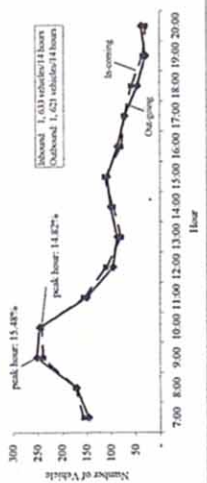


Figure A6.9.4 Traffic Conditions and Existing Layout of Central Market-North Taxi-bus Terminal

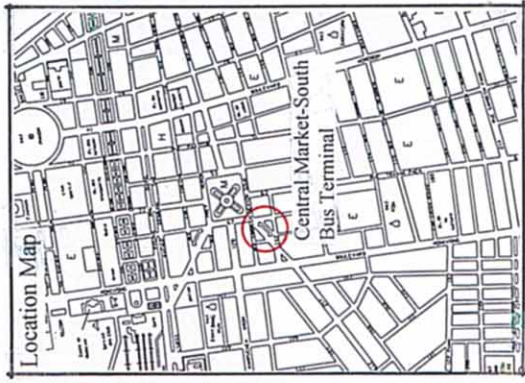
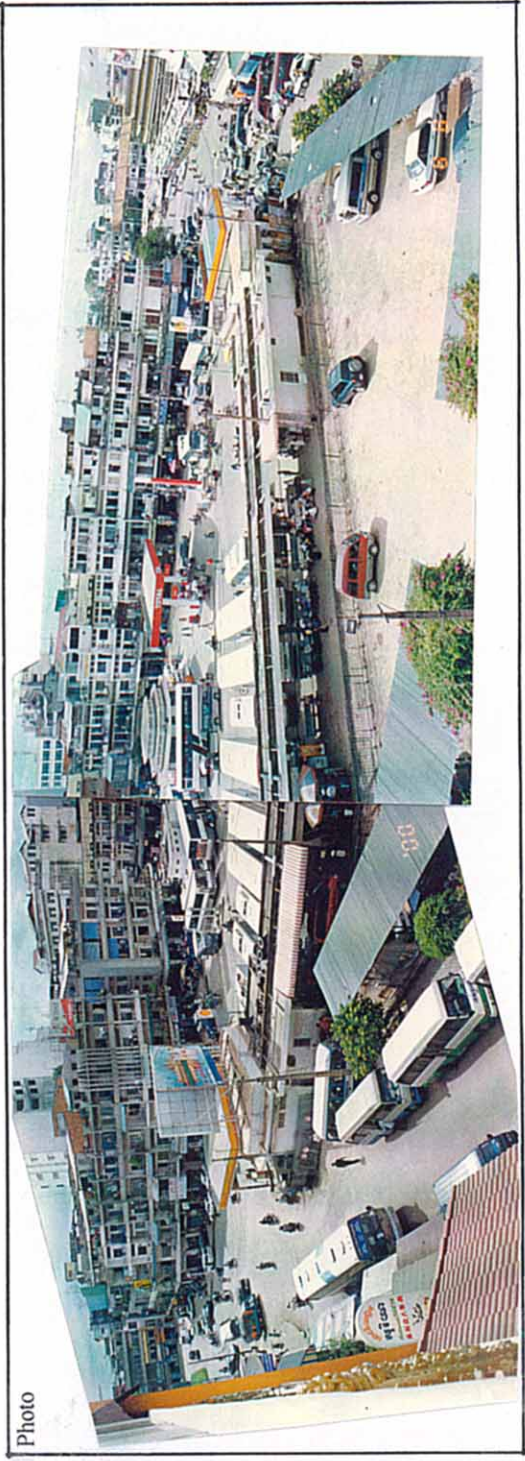
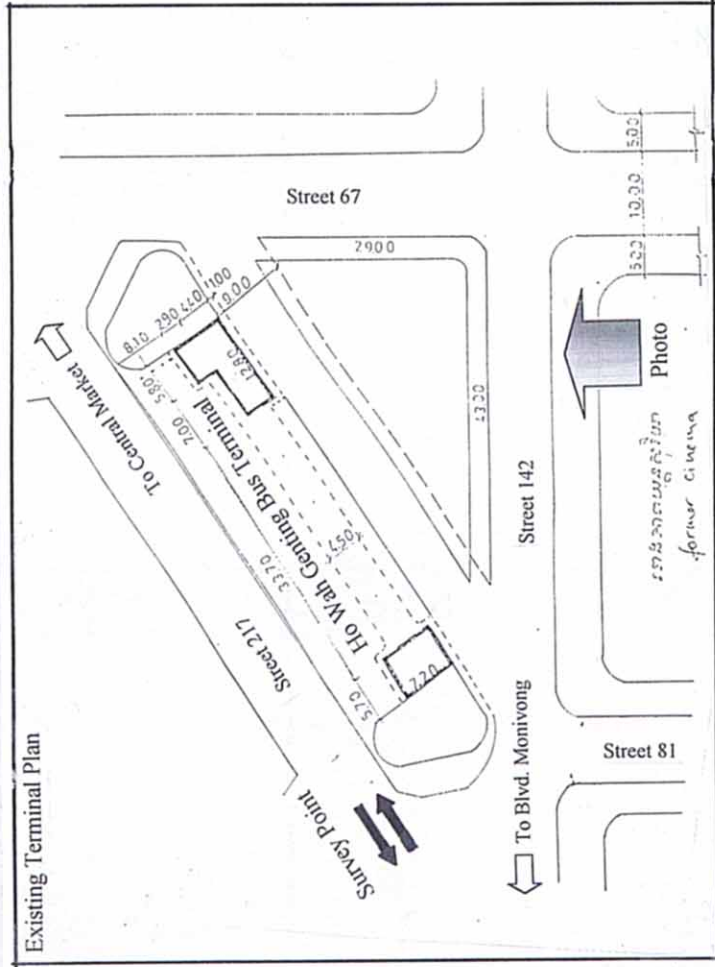
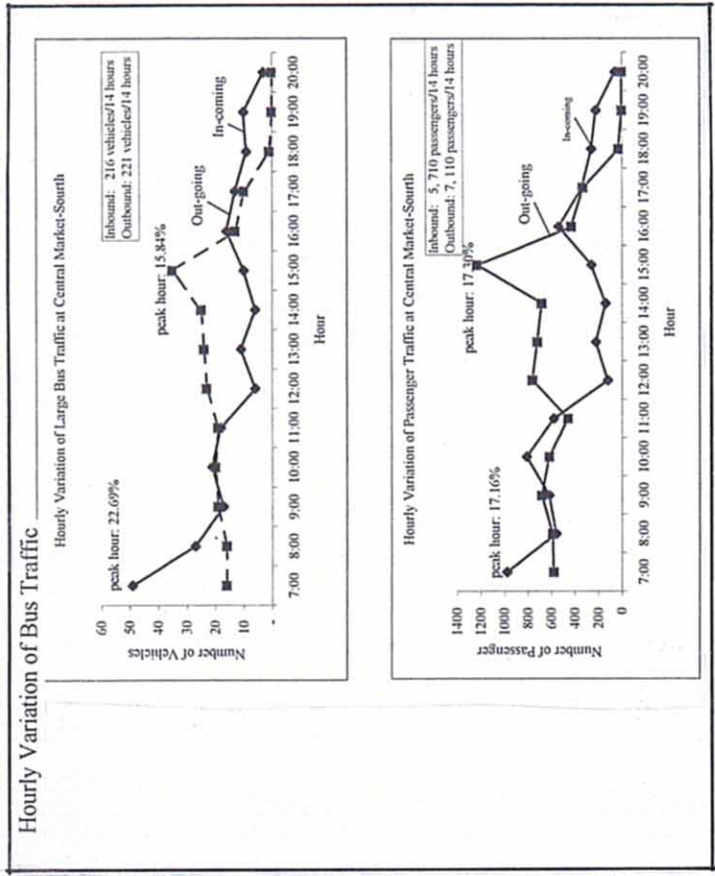


Figure A6.9.5 Traffic Conditions and Existing Layout of Central Market-South Bus Terminal