

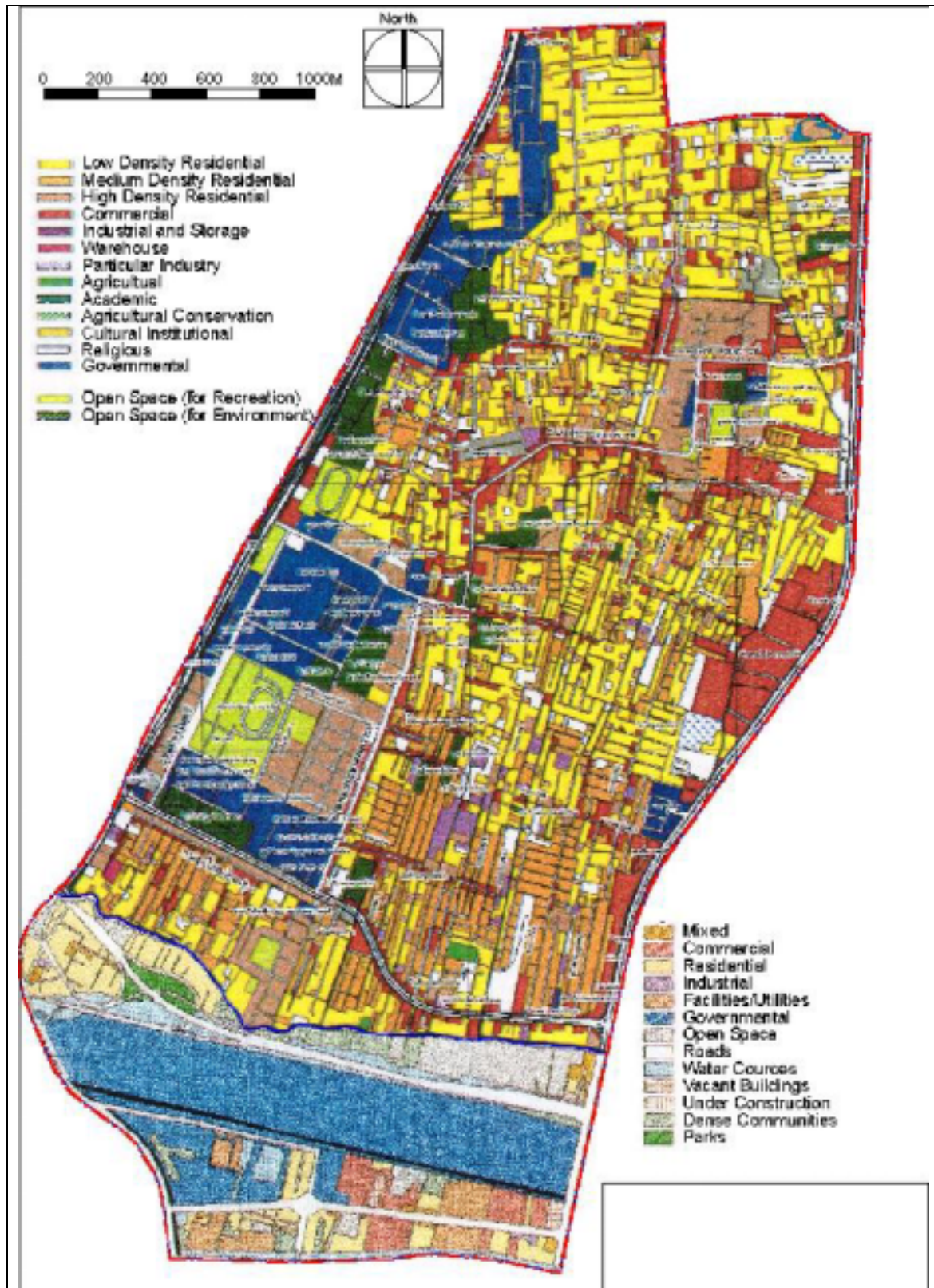
### **3.3 SPATIAL CHARACTERISTICS**

#### **3.3.1 Land Use Pattern**

The land use in the Study Area is depicted in Figure 3.4. As shown in the figure, the land use pattern in the Study Area can be characterized by the following;

- The northern part is largely used for detached houses;
- The southern part is largely used for shop houses;
- The eastern part, especially along Ratchadaphisek road, is used for large-scale commercial facilities; and
- The western part along Vibhavadi Rangsit road is largely used by the government sector with larger land plots.

Figure 3.3: Current Land Use



Source: City Planning Department, BMA

Based on the characteristics mentioned above, the Study Area can be divided into seven land use groups, which may require different skills in the sound management of land use and the living environment.

***1) Din Daeng Community Area***

This area covers NHA's Din Daeng Housing Complex and several other large-scale land plots used by various government sectors. The latter ones include BMA's branch offices, sports facilities blocks named Thai-Japan Youth Center belonging to BMA, Hospital of the Ministry of Public Health, Educational facilities of BMA and the Ministry of Education, etc. There is a plan of redevelopment in this area, initiated by BMA and NHA. BMA aims to relocate its main office to this area from Rattanakosin, while NHA aims to redevelop its housing complex.

***2) SRT's Makkasan Marshalling Yard***

This area is currently used as a marshalling yard of SRT. Along with change of transportation mode, the importance of this yard has been reduced, while potential of the land has been enhanced, especially by the Hopewell project, which attempts to connect the first and second international airports. Consequently, an urban development plan was formulated by SRT for the entire area of SRT's Makkasan Marshalling Yard, which extends further west beyond the boundary of the Study Area. The plan, however, has not yet been implemented due largely to suspension of the Hopewell project.

***3) Strip along Ratchadaphisek Road***

In this area, the land is separated by SRT's marshalling yard but similarly used by commodity markets, shop-houses of small-scale sewing factories, and some squatter housing.

***4) Strip along Asok - Din Daeng Road***

This area accommodates several large-scale facilities such as modern shopping centers run by major corporations, an amusement center, the Chinese Embassy, higher education institutions (Kunnathirutharam etc.) along the street.

**5) *Huai Khwang Housing Complex Area***

A busy atmosphere has been created in this area by a combination of the shopping streets at the front, shop-houses (shops, light industries) together with congested small residences in the back. The area seems to have a fairly good living environment as witnessed by the neat array of houses along 6m-wide fish-bone roads.

**6) *North and West Side of Huai Khwang Community***

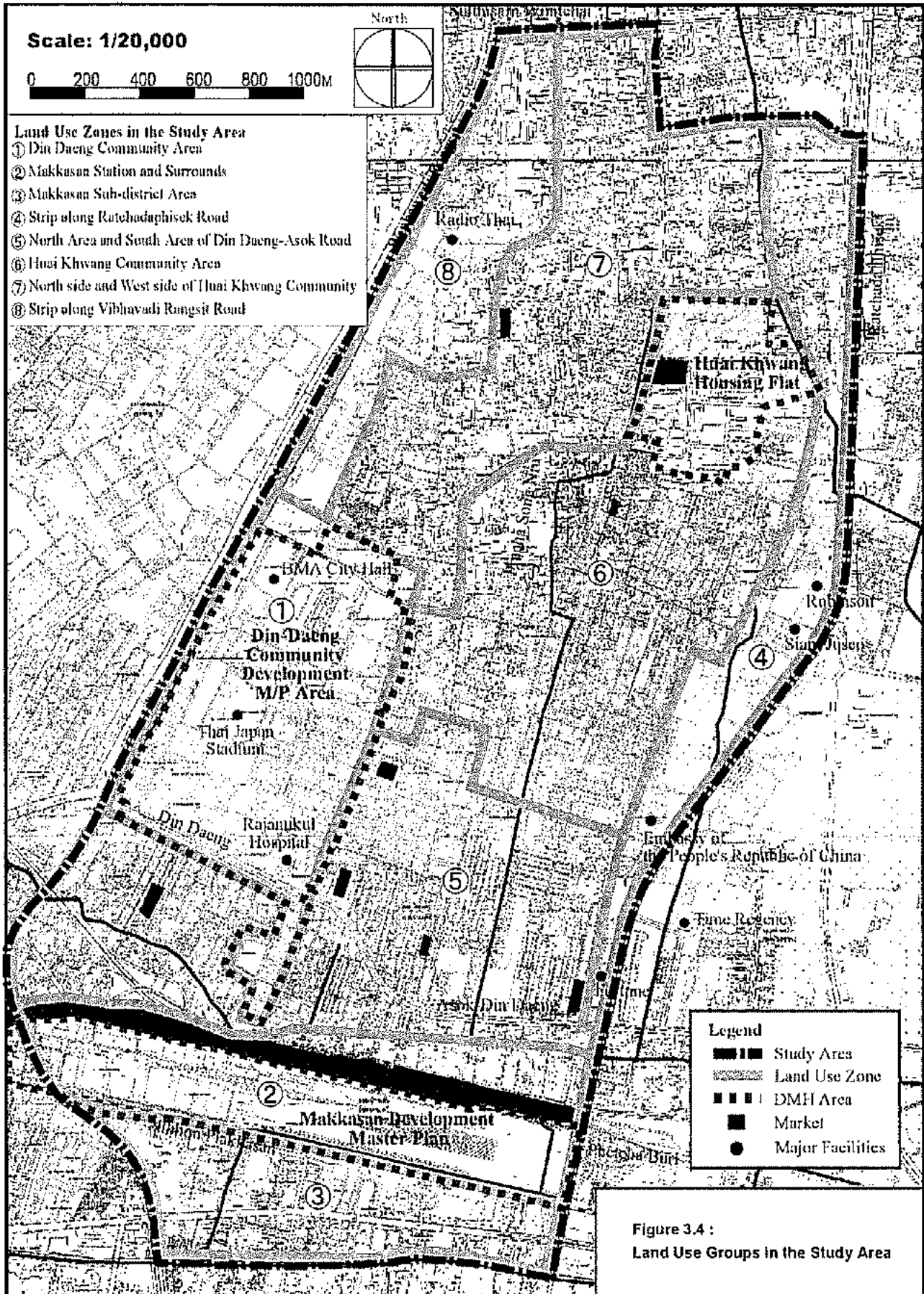
In and around the area of NHA's Huai Khwang Housing Complex is one of the cores of Din Daeng district, where many community facilities are located: shops, markets, schools (Sam Sen, Nork), hospitals and police. Huai Khwang Housing Complex is rather new and does not require immediate rebuilding.

**7) *Strip along Vibhavadi Rangsit Road***

The area from west to north side of Huai Khwang Housing Complex is used as a residential area of detached houses with relatively larger land plots, forming a high-grade residential zone.

**8) *Strip along Vibhavadi Rangsit Road***

The strip along Vibhavadi Rangsit road is characterized by large-scale land uses such as Surasak Montri School, Chakaphong Phuwanat College, Technology & Vocational College, Chamber of Commerce University, and Radio Broadcasting Station of Thailand.

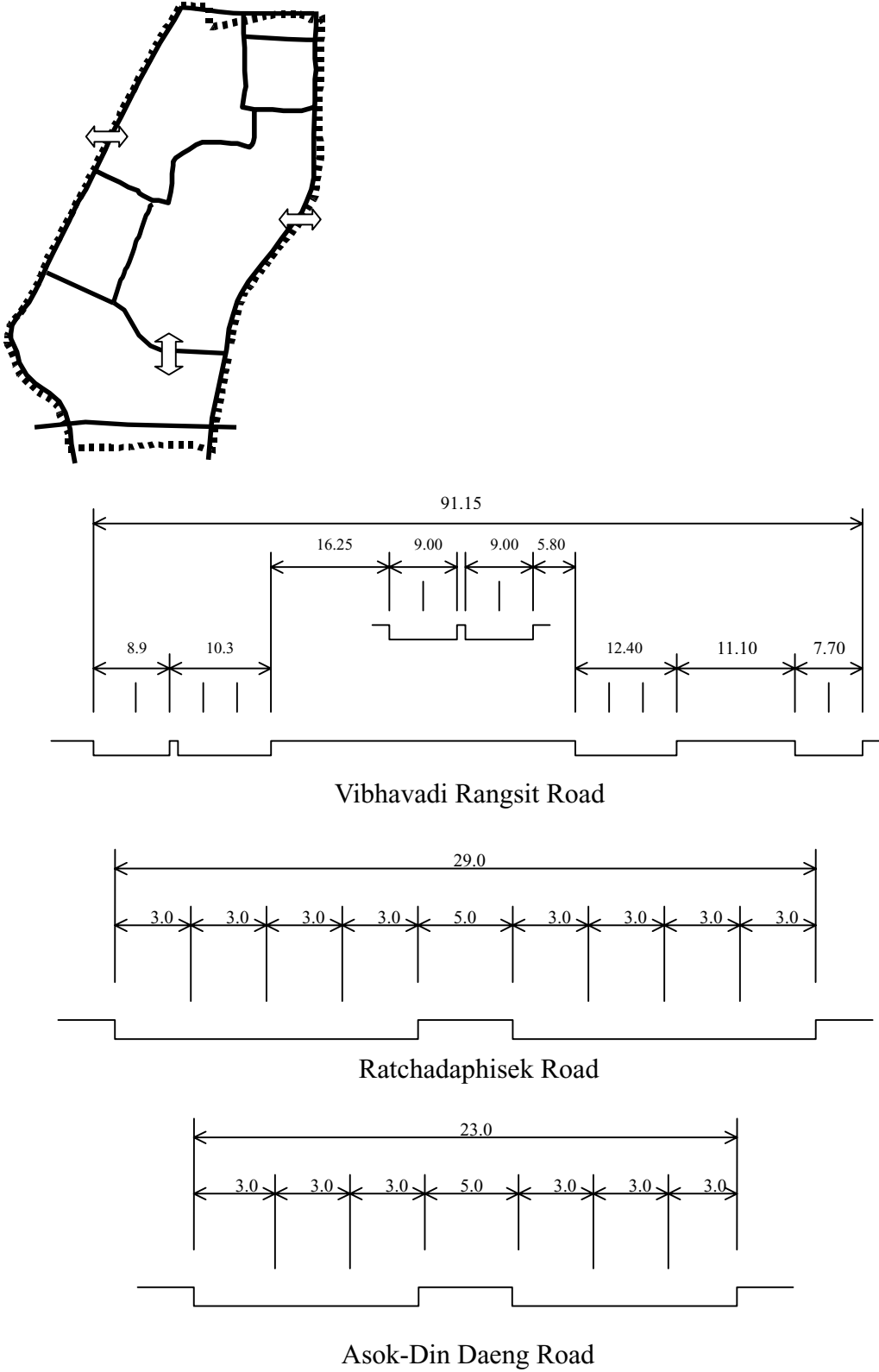


### **3.3.2 Transportation Pattern**

#### **(1) Overview**

Currently, transportation in the Study Area is primarily undertaken by personal cars and supplemented by public transport: buses, Tuk-tuks, motorcycle taxis, and vehicle taxis. There is an SRT railway station in the marshalling yard area of SRT. The eastern and western boundary of the Study Area is surrounded by Bangkok's major urban trunk roads: 1) Vibhavadi Rangsit road along with Don Muang Tollway on the west, and 2) Ratchadaphisek road (Inner Ring road) on the east. At the south, Asok-Din Daeng road (Rama IX road), another major trunk road, passes through the Study Area, connecting the two roads mentioned above. At the north, Sutthisan road, which may be classified as a minor urban trunk road, runs in an east-west direction, and also connects Vibhavadi Rangsit and Ratchadaphisek roads. Cross sections of these three major trunk roads are illustrated in Figure 3.6.

Figure 3.5: Cross Section of Major Trunk Roads



## **(2) Road Network**

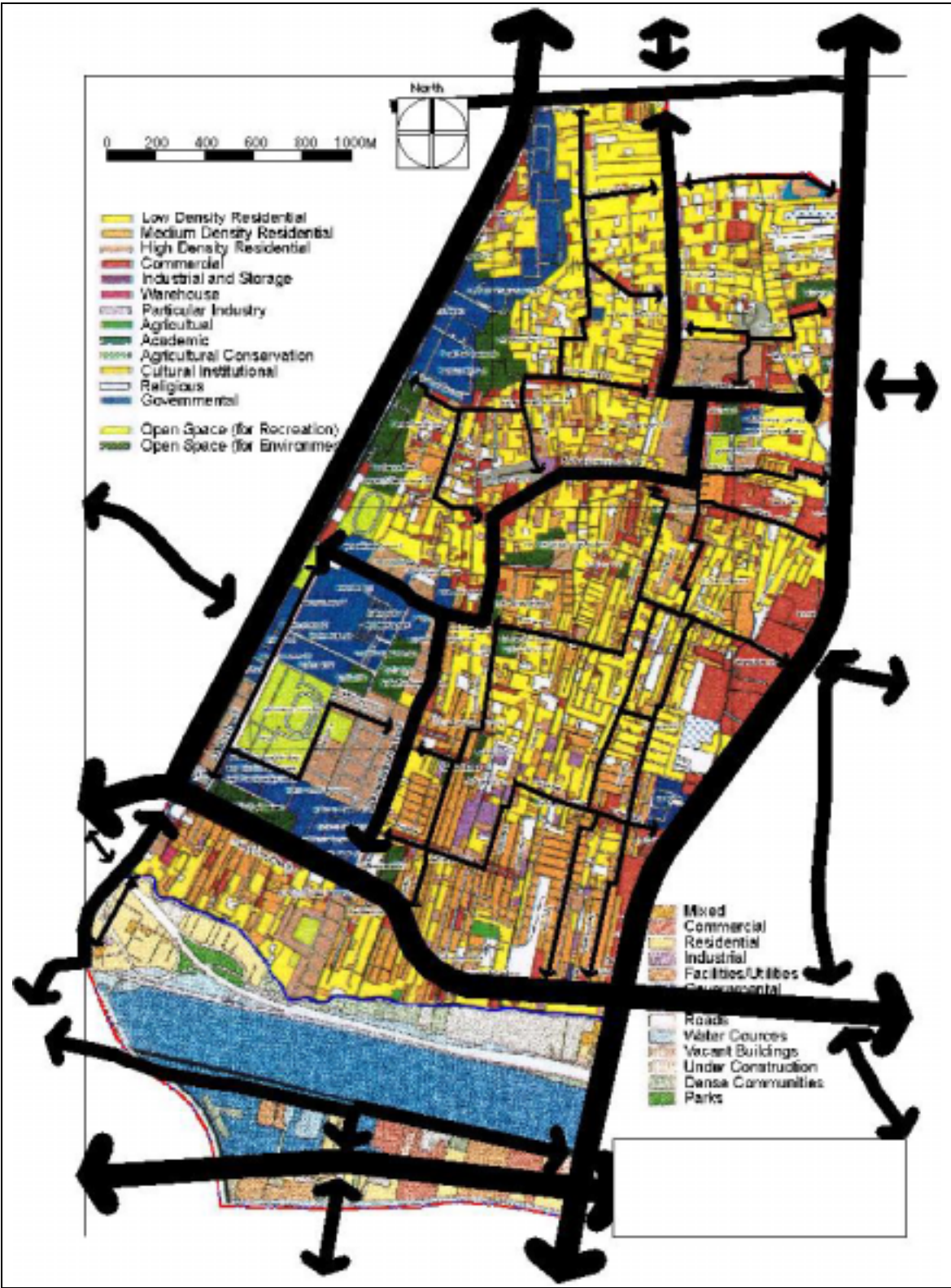
The roads inside the Study Area consist of some multi-lane roads and many service roads (*sois*) with no center line demarcation. The former can be classified as minor trunk road, while the latter directly serves buildings and facilities.

The minor trunk roads include Pracha Songkhro, Pracha Ratbamphen, Pracha Suk, Mit Maitri, and Chaturathit roads. These roads are interwoven with rather low density in the light of the level of urbanization of the Study Area.

Like other parts of the inner city of Bangkok, *sois* in the Study Area are developed in a fish-bone shaped manner. These *sois* are rather well networked, but still many of them become congested, typically at the crossing points with watercourses (*khlongs*). Some of the *sois* have two lanes and function as collector roads. These roads are often very congested from passing through traffic, spilt from junctions of major and/or minor trunk roads.



Figure 3.6: Hierarchical Structure of Existing Road Network in the Study Area



Source: JICA Study Team

### **(3) Public Transport**

Public transport currently available in the Study Area consists of a bus system and the railway network of SRT mentioned earlier.

The railway of SRT has a station inside Makkasan marshalling yard. There are 43 round trips/day (average between October 1999 and September 2000) of passenger trains, which is quite infrequent compared with buses. Coupled with the remote location of the station across Makkasan pond, the use of the railway is disfavored by the residents.

On the other hand, bus routes are rather well-integrated into the bus system of the city. Their operations are frequent, generally 8 round trips/hr from 0600 to 0800 and 1600 to 1900 and 4-5 round trips/hr during other hours.

Regarding pedestrian ways, most wider roads having more than two lanes provide sufficient width for sidewalks, while most of *sois* do not provide sidewalks.

### **(4) Current Problems**

The traffic problems in the Study Area were identified from various perspectives and are summarized below:

#### ***1) Public Transportation and Pedestrian Facilities***

- There are some spots where access to mass transit system stations and/or bus stops is very poor, leading to increased transit traffic of taxis, samlors (tuk-tuk), and bike taxis.
- Roads with pedestrian sidewalks are few, and where pedestrian crossings are needed, protective facilities such as pedestrian traffic signals or over-pass bridges are not adequately provided, and therefore expose pedestrians to danger.

#### ***2) Road Network and Design***

- There are not enough minor trunk roads, which connect to surrounding major trunk roads, resulting in a severe congestion at a few existing connection points.
- Capacity of the existing minor roads is not sufficient as 4-lane roads are scarce and road shoulders or pedestrian sidewalks do not exist.
- Because of the fish-bone pattern of soi network development, almost all the

traffic is directly connected to the major/minor trunk roads.

- Due to limited number of collector roads, their function and hierarchy are not clear, and resulting in inflow of heavy passing-through traffic to narrow roads in residential areas.
- There are not enough road shoulders on the roads serving commercial facilities, which enable roadside parking for loading and unloading.

### ***3) Traffic Control and Management***

- Many intersections are not adequately equipped with traffic control system such as traffic signals, resulting in reduction of traffic capacity and causing traffic jams.
- Illegal roadside parking or roadside loading and unloading activities are frequent even in narrow roads, hindering traffic flow.

### 3.4 PUBLIC FACILITIES

#### 3.4.1 Education

According to telephone interviews, there are 26 formal schools with 28,948 pupils in the Study Area. Among them, there are 15 elementary schools serving 14,193 pupils and 12 lower secondary schools for 7,204 students.

Looking at the capacity of existing schools, the total occupancy ratio was 97% as of educational year 2001, and the spare capacity was 527 pupils in elementary schools and zero in lower secondary schools. It may be necessary to establish more classrooms if the renewal of the Study Area results in an increase of pupils.

**Table 3.8: Classroom/Capacity/Pupils of Schools in the Study Area**

(Educational Year 2001)

Type of School	School	Classroom	(a) Capacity	(b) Pupils	(b)/(a) (%)
Pre-Elementary Kindergarten	15	125	3,125	2,789	89.2
Elementary (Compulsory Education)	15	368	14,720	14,193	96.4
Secondary Lower	12	174	6,960	7,204	103.5
Upper	5	129	5,160	4,762	92.3
Total	26	796	29,965	28,948	96.6

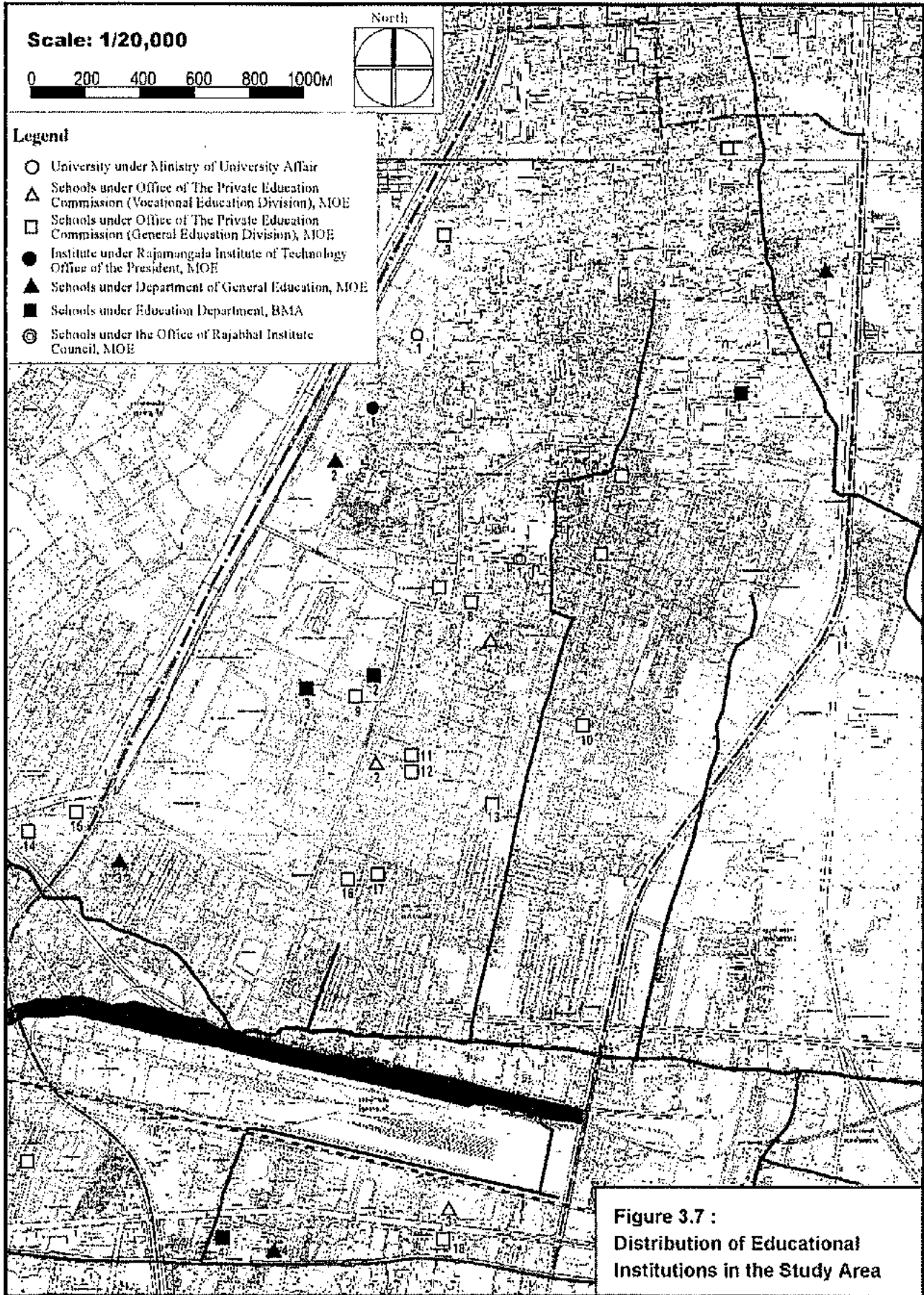
Source: Telephone Interview by NHA

Remarks: Some schools have plural types of school, so the total of schools by types (47) is not equal to the actual total number of school (26).

capacity for kindergarten classroom = 25 pupils

capacity for elementary classroom = 40 pupils

capacity for kindergarten classroom = 40 pupils



### 3.4.2 Health Care

Around the Study Area, there are 10 public hospitals and two private hospitals, which can serve in-patients and emergency cases. The total capacity of these hospitals amounts to 5,301 beds.

Although there is no public hospital inside and in the vicinity of the Study Area, there are four Public Health Centers (PHCs) available for the residents: PHC-4 (Din Daeng district) and PHC-2 (Ratchathewi district) within the Study Area, and PHC-25 and PHC-22 in Huai Khwang district. These PHCs operate during office hours and provide examination and treatment services for general illness. For low-income people, PHCs provide Medical Security Cards.

The number of patients at the four PHCs increased during the past five years from 45,571 in 1995 to 66,010 in 1999 as shown in the table below.

**Table 3.9: Number of Patients by Health Centers (1995-1999)**

Public Health Center	1995		1996		1997		1998		1999		Change Rate	
	Visits	Patients	Visits	Patients	Visits	Patients	Visits	Patients	Visits	Patients	Visits	Patients
PHC- 2	9,448	7,782	11,161	9,366	14,830	12,049	15,075	12,231	12,468	10,510	8.84	9.11
PHC- 4	23,125	15,899	25,845	20,829	28,306	25,258	30,807	26,937	33,496	30,197	9.71	17.76
PHC- 25	10,196	9,266	10,231	10,920	15,288	13,034	13,902	11,872	14,454	12,119	11.17	7.59
PHC- 52	12,831	12,624	12,556	11,895	14,742	11,645	17,080	13,972	16,651	13,184	7.15	1.62
Total	55,600	45,571	59,793	53,010	73,166	61,986	76,864	65,012	77,069	66,010	8.81	9.92

Remark: Number of Patients = New and Old Patients.

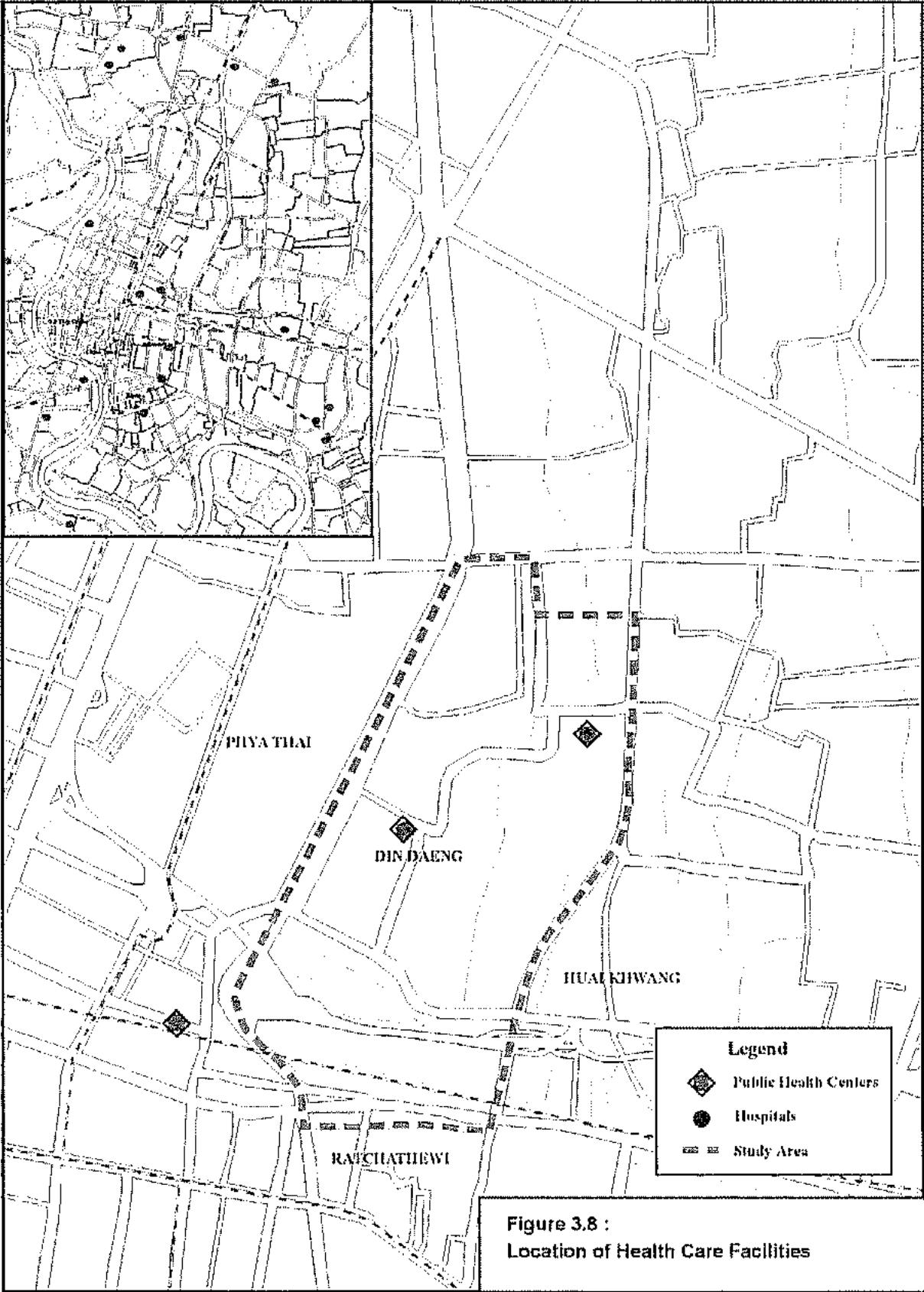
Source: Division of Planning and Statistics, Office of the Secretary, Dept. of Health, BMA, 1995-1999.

Looking at the case of disease, respiratory is the most dominant disease group (35.09%), followed by endocrine (10.64%), and cardiovascular (9.37%).

**Table 3.10: Share of Disease Group**

Disease Group	Percentage(%)	Disease Group	Percentage(%)
Respiratory	35.09	Dermatological	6.50
Endocrine	10.64	Gastrointestinal	6.01
Cardiovascular	9.37	Unidentified Disease Group	24.94
Malnutrition and Metabolism	7.45	Total	100.00

Besides the public health centers, there is a mobile medical service that visits around four times a month for taking care of general illness.



### 3.4.3 Recreation Areas (Parks/Open Space)

Although the Study Area has the Thai-Japan Youth Center providing a large open space, it only has a few small and medium-sized parks that are used in the everyday lives of the residents. Recreation areas in the Study Area are listed below:

- The BMA Youth Center (Thai-Japan). It is a green area and sport grounds, such as soccer field, running track, volleyball, basketball, badminton courts and swimming pool;
- Vibhavadi forest plantation is a village public park, locating on Mit Maitri Road;
- A small park at the entry of Soi Sutthi Phon 2, Asok-Din Daeng Road, Din Daeng district;
- A small park at the entry of Soi Inthamara 45, Pracha Suk Road, Din Daeng district;
- A small park at Soi Inthamara 45, Pracha Suk Road, Din Daeng district; and
- A small park at the clock tower, Huai Khwang Market, Pracha Songkhro Road, Din Daeng district.

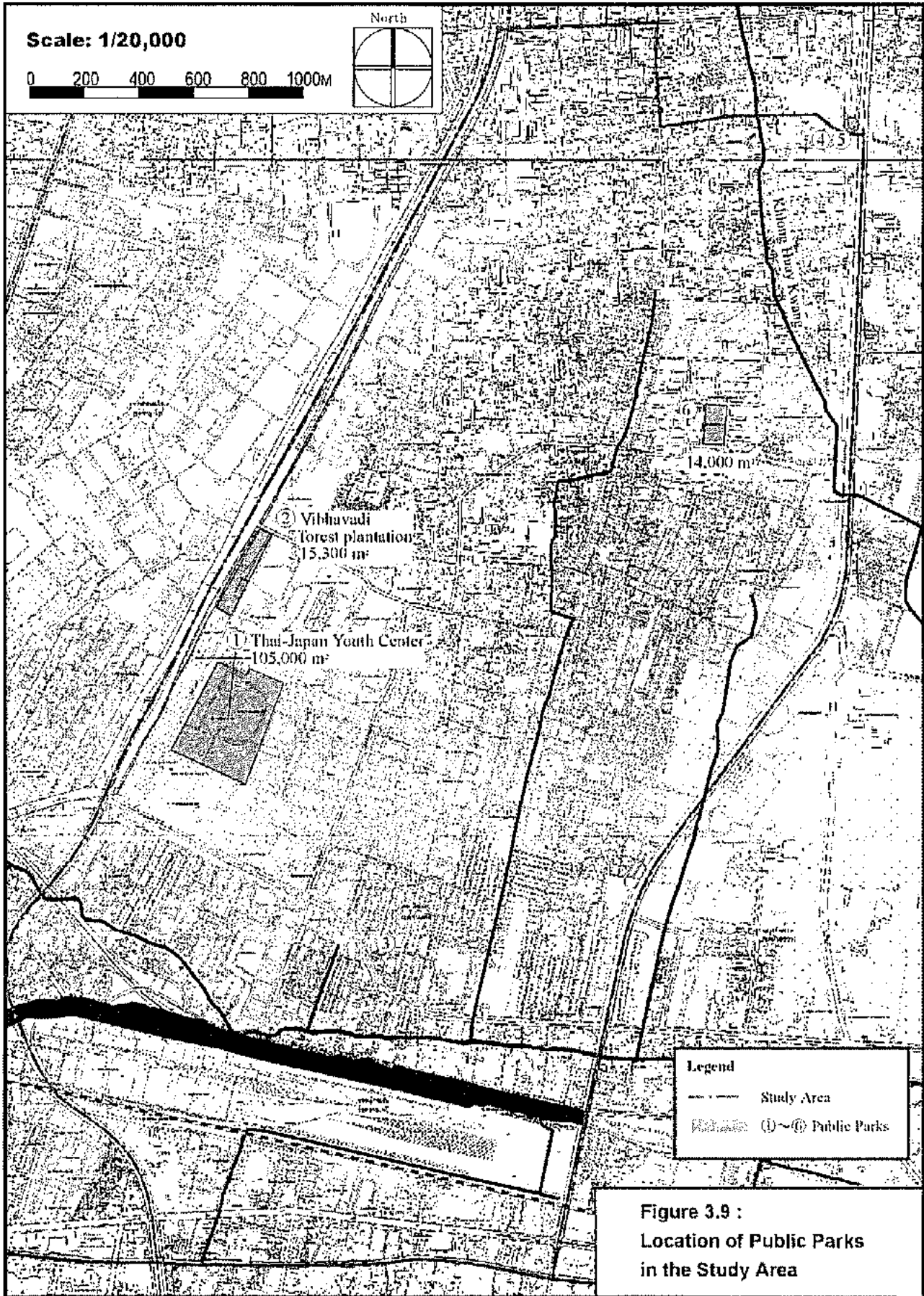
The following table shows the area of public parks per capita in major cities in the world. The park area per capita in BMA is much smaller than those in other major cities in the world. The estimated park area per capita for the Study Area is 0.71 m<sup>2</sup>/person. The number, however, would fall to 0.15 m<sup>2</sup>/person, if the Youth Center were excluded from the estimation.

**Table 3.11: Area of Public Park per Capita and others**

City	Park Area per Capita (m <sup>2</sup> / person)	Year
Bangkok Metropolis	0.86	('00)
Tokyo 23-Ku	3.0	('98)
London	26.9	('97)
Berlin	27.4	('95)
Paris	11.8	('94)
New York	29.3	('97)

Source: Urban Development Corporation, Japan: Statistical Yearbook of BMA 2000





### 3.4.4 Temples/Religious Facilities

There are four temples (or *wat* in Thai) within the Study Area; two in Din Daeng district and the other two in Ratchathewi district as briefly introduced below.

#### ***Din Daeng District***

- **Wat Phrom Wongsaram** was established in 1970 on an area of 72.89 Rai. The Thai style *ubosoth*<sup>1</sup> is constructed by using reinforced concrete and decorated with oil painting describing the history of Lord Buddha. There is a main Buddha image in Sukhothai style.
- **Wat Kun Nathi Rutharam** was established in 1885 on an area of 88.8 ha. There is a main Buddha image in the subduing mara posture.

#### ***Makkasan sub-district, Ratchathewi district***

- **Wat Dishongsaram** was established in 1833 on an area of 69.73 Rai at 509 New Petchaburi Road. There are several buildings of wood and concrete, as well as a primary school within the area.
- **Wat Tatsanarun Sunthrikaram** was established in 1977. It possesses four pieces of land with the total area of 718.02 Rai. Its location is low lying area on a bank of Khlong Sam Sen, and is crowded in by surrounded commercial buildings and residences. The main Buddha image in the *ubosoth* is in blessing posture. There are four replicas of Lord Buddha footprints in the Monthop, and a public primary school is located inside Wat premises.

Other than the temples, there are churches and mosques such as:

- Fatima Church at Asok-Din Daeng Road;
- Rom Klao Christendom at Soi Kun Nathi, Ratchadaphisek Road;
- Prachakorn Christendom at Soi Mae Nieo Section 3, Pracha Songkhro Road;
- Muharin Mosque (Din Daeng) on Mit Maitri Road;
- Muharin Mosque at Soi Chan Mueang; and
- Saint Dominic Church on New Petchaburi Road.

There is no registered historical/archaeological places, based on the registered ancient document in BMA.

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<sup>1</sup> In a Buddhist *wat*, the most important building is the "Ubosoth", a place where religious rites or services are performed.

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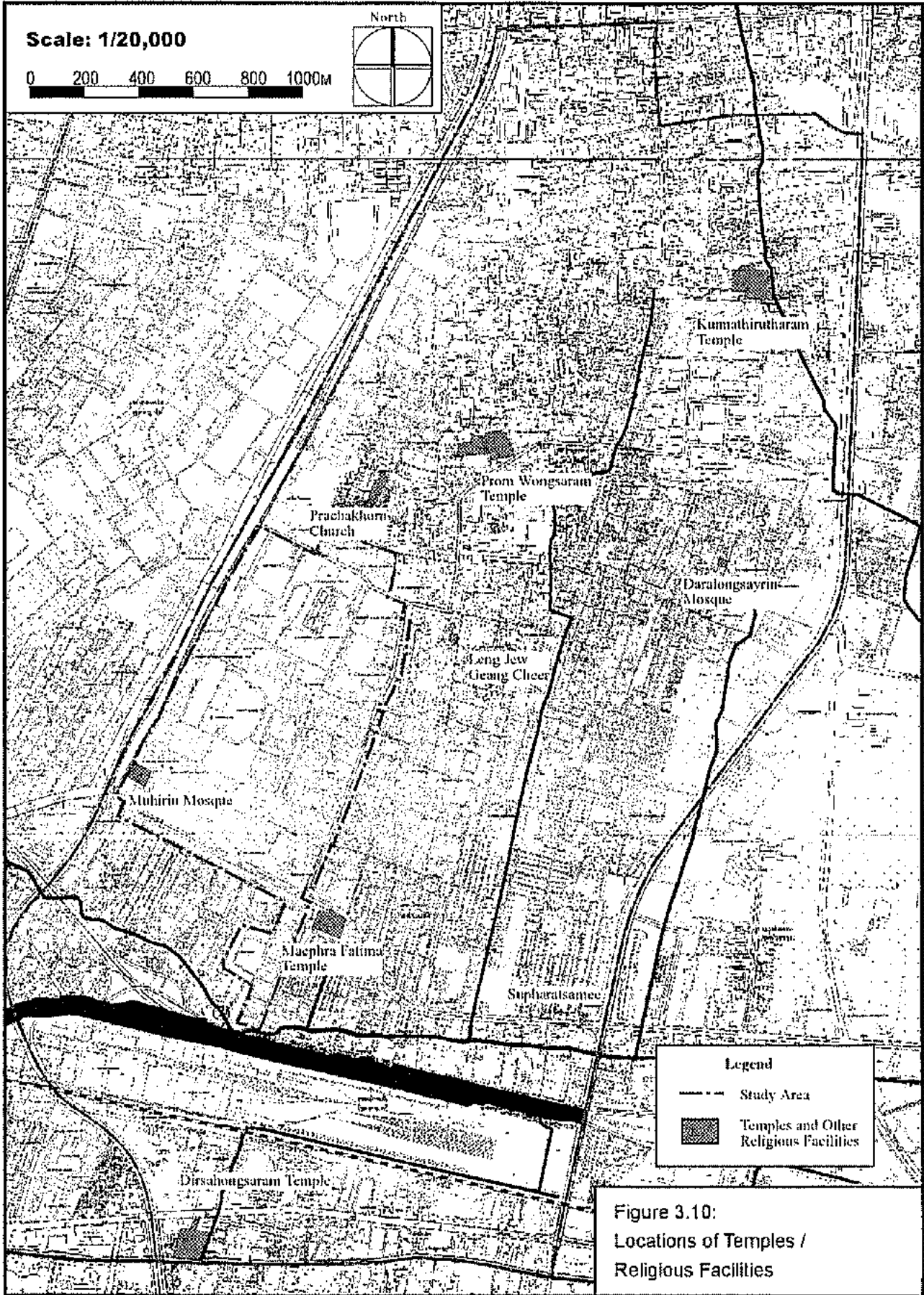


Figure 3.10:  
Locations of Temples /  
Religious Facilities

### **3.4.5 Fire Protection System**

The fire protection in Din Daeng district is the responsibility of Din Daeng District Fire Protection Center and the Civil Volunteer Fire Protection Center. The former is operated by nine staff from BMA's Din Daeng district office who operate the center 24 hours a day, while the latter is located in the Din Daeng district office and is operated by volunteers. The volunteers stay in their respective residential areas and watch for any signs of fire. If there is any evidence of fire, they will immediately inform the staff of the district office.

The facilities for fire fighting in Din Daeng district office are one multi-purpose fire engine with a capacity of 3,000 littrs and a 116 HP pump, two portable fire-extinguishers with capacity of 55 HP, and other necessary facilities such as fire proof clothing and axes. In addition, fire extinguishers are installed in 15 Registered Communities.