

(3) On-street parking regulation

On-street parking regulation is mainly classified into the following types:

- Parking permitted places,
- All-day parking prohibited roads,
- Even or odd day (by date) parking prohibited roads with a maximum 60 minutes limitation when allowed,
- No controlled places.

The regulated streets and places are shown in Figure 1.3.5.

1) Parking permitted places

On street parking are permitted near and/or around markets and on roads with ample road width. These are designated by yellow pavement markings. Most of the spaces are layout for angle parking. A parking fee of about 1,000 reils is charged for protection of parked vehicles. However, this fee is not collected by MPP officers.

The locations of roads where on-street parking is permitted are:

- around main markets (not including taxi stands)
 - Central Market
 - Olympic Market
 - Toul Tom Pong Market
- main roads with ample road width
 - Ave. Reine Kussumak (106) and Ave. Okhna Phlong (108)

These two roads are parallel to each other and each has a wide median strip with grass and trees.

2) All-day parking prohibited roads

On-street parking is strictly prohibited along the following streets for the whole day by means of regulatory signs:

- Main street
 - Blvd. Norodom (between Blvd. Sihanouk and Ave. Ang Duong)
Besides parking prohibition, traffic control measures on this important road also include the prohibition of other vehicles except passenger cars.
- Secondary street
 - Rue Trasak (63) (between Blvd. Sihanouk and Rue Neayok Souk near to the Central Market)
 - Rue Pasteur (51) (between Ave. Daun Penh (near Vat Phnom) and Blvd. Sihanouk)
These two streets form a pair of one-way streets system in a north-south direction within the CBD area.

3) Even or odd day parking prohibited roads

This form of on-street parking control is enforced on Blvd. Monivong (between Rue Chey Chetha (118) and Blvd. Sihanouk).

The eastern curb parking on the street is allowed for a maximum duration of 60 minutes while parking on the western curb is prohibited on even-days. On the other hand, on odd-days, the western curb parking is allowed while that on the eastern curb is prohibited. No fee is charged currently.

This parking regulation is indicated on the road using special regulatory signs as shown in Figure 8.3.6.

(4) Area Control (Restrictions for Trucks)

Area-limited and time-limited operation for trucks are regulated in the center of the city as shown in Figure 1.3.7. The time for their operation is limited to between 6:00 to 21:00 hrs everyday.

With this regulation, the traffic situation has improved and traffic accidents will also reduce in the area.

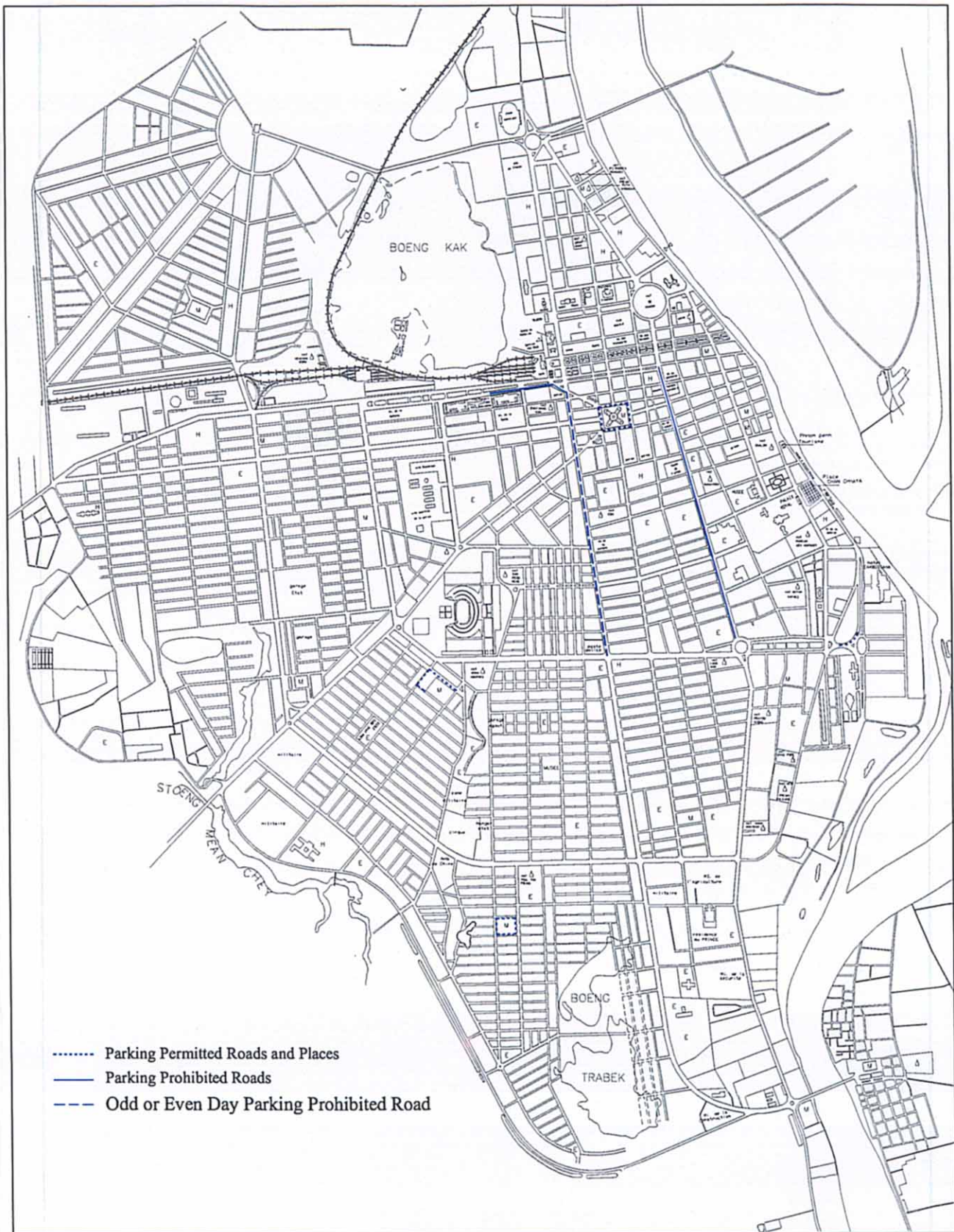


Figure 1.3.5: Locations of Parking Regulation

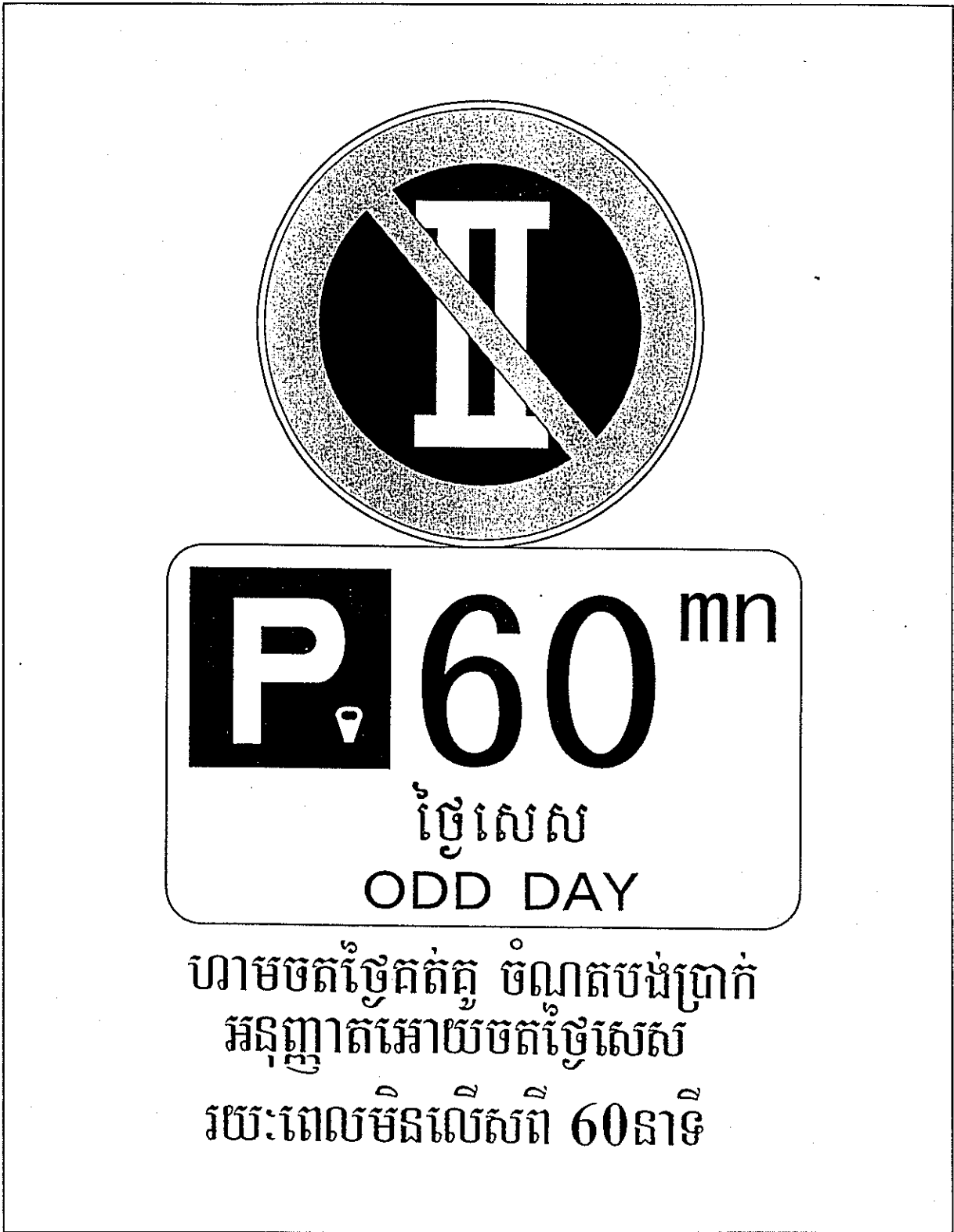


Figure 1.3.6: Special Regulatory Sign



Figure 1.3.7: Location of Area with Restriction for Trucks

1.3.3 Summary of Traffic Control Facilities and Measures

A summary of the various traffic control facilities or measures in Phnom Penh is shown in Table 1.3.2 below:

Table 1.3.2: Summary of Traffic Control Facilities and Measures

No.	Type of Control	Signage	Markings	Others
1.	Intersection Control <ul style="list-style-type: none"> • Roundabout control, • Signal control, • Non signalized control, • Left turn prohibition 	Signs Signals No signs Signs	No marking Markings No marking No marking	Rotary (island) No left turn lane
2.	Street Operation <ul style="list-style-type: none"> • One-way operation • Vehicle type prohibition 	Signs Signs	No marking No marking	-
3.	On-street parking Control <ul style="list-style-type: none"> • All day parking prohibition • Alternate day parking prohibition 	Signs Signs	No marking -	- -
4.	Truck operation control <ul style="list-style-type: none"> • Area and time prohibition on truck operation 	Signs	-	-

Although these regulations, except for the truck prohibition, are in effect the whole day there are many violations especially at night where rampant parking on sidewalks and other prohibited areas can be observed.

1.3.4 Traffic Safety Facilities

(1) Grade-separated Pedestrian Crossing Facility

Grade-separated pedestrian crossing facility in the form of overhead bridge crossing or subway crossing has not been provided in the city of Phnom Penh.

Grade-separated pedestrian crossing has the great advantage of segregating vehicles physically from the pedestrians, hence ensuring the safety of pedestrians while at the same time increasing the road capacity for vehicles. Although overhead bridges are said to be inferior in terms of aesthetics and are relatively less frequently provided in urban centers, they are often found in the suburbs along major highways.

(2) Pedestrian Sidewalk Railing

Railings that protect the safety of pedestrian are not provided in this city. Besides offering some protection to the safety of pedestrians, railing is also often used to control pedestrian movement. Erection of such railings along a road section, for instance, can physically prevent the random crossings by pedestrians.

(3) Street Lighting

Street lighting is particularly essential in improving traffic safety level at nights. Besides, proper street lighting is regarded as an important urban facility that can encourage higher economic activities while preventing crimes.

Street lighting has been recognized as one of the major issues in the city of Phnom Penh. In the last one or two years, many lighting facility have been installed along the major roads under a Street Lighting Improvement Project. Lighting installed under such a project has the following standards:

- Location: along pedestrian sidewalks on both sides of the road at an interval of 60 m.
- Height of Lamp: 10 meter from road surface (compared with 8m previously)
- Lamp: 220 v., 25 w Sodium Bulbs.

- Power line: buried below surface in cable conduits.
- Fail-safe operation: using loop circuit power supply.

Most of the equipment used in street lighting is imported and they often differ in terms of their country of origin between routes such as:

- Blvd. Monivong – Singapore
- National Route No.2 – Singapore
- Blvd. Mao Tse Toung – China
- Blvd. URSS – Thailand
- Rue Kampuchea – Thailand
- Sothiruous – Vietnam.

The existing condition in street lighting in Phnom Penh is shown in Figure 1.3.8. Some street lighting were installed prior to the above mentioned project and these are also shown in the figure.

Lighting condition of the newly installed facilities is as expected, of excellent quality than the others, especially where mercury bulbs were replaced with sodium bulbs, which rarely burned out thus ensuring good and bright lighting condition along the roads.

Nevertheless, about 20% of the lamps along the newly installed facilities are out. More efficient maintenance is therefore required. Lighting at major intersections and their vicinity is particularly important and should be repaired or replaced urgently.

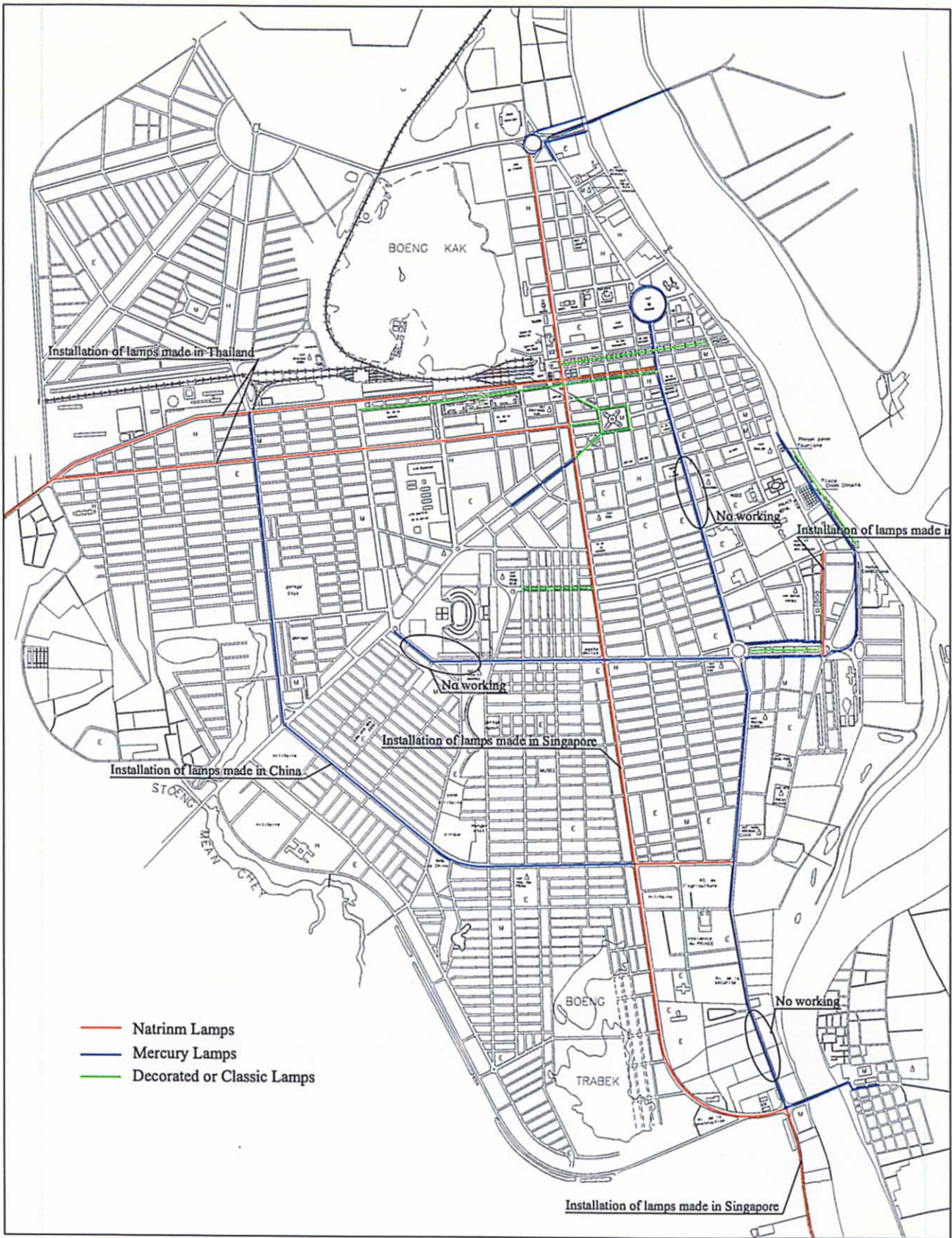


Figure 1.3.8: Streets with Street Lighting

1.4 Behavior of Drivers

This section describes the various drivers' behavior observed in Phnom Penh. These driving behaviors however, must be viewed from the perspective that prevailing physical conditions of roads and other related facilities often are but one of the factors that determine or induce such human behaviors.

There are many different types of vehicles on the roads in the city of Phnom Penh. These include truck, bus and other 4 wheel vehicles; motorcycles, bicycles, cyclos, motor-remoks (rear-cars) and others. Each of these types of vehicles has its own typical driving requirements and behavior. The present traffic situation in the city is that these various kinds of vehicles operate on the same roadways with almost no particular orderliness. Added to this chaotic situation are the pedestrians who are forced to walk on the roadways, as most pedestrian sidewalks are not properly provided or occupied by unintended users.

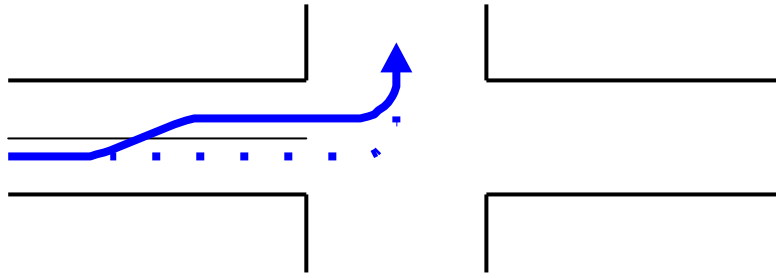
Furthermore, the behaviors of all these drivers are conspicuously different again when traveling on paved and unpaved roads. Any form of road markings obviously cannot be provided on unpaved roads and drivers' behaviors are thus very erratic. But even on many paved roads where numerous large potholes exist, drivers are observed to drive in an erratic manner, irrespective of their direction of travel or lane they are in. The main concern of these drivers is obviously how to maneuver the potholes and they are quite oblivious to the potential hazards of their dangerous driving on the roads. Irrespective of whether their driving manners are to be judged as good or bad, they are clearly giving all they have to drive their vehicles and compete for space with other users on the roads. Such erratic behavior is also discernable on the roads during raining days when flash floods are common in the city.

Legal driving license is compulsory to drive a four wheel vehicle in Phnom Penh. To obtain the necessary driving licenses, drivers have to attend private driving schools through which they learn traffic rules, driving skills, traffic safety and correct driving manners. On the other hand however, license is not required to drive the other types of vehicles. Even for motorcycles, any person above the age of 16 can drive them without going through any form of driving education. (Although traffic regulations required that a legal license is necessary for operating a motorcycle having an engine capacity of above 100 cc, currently the application of this requirement is not enforced).

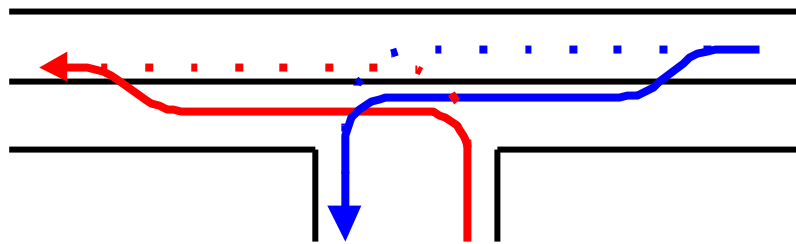
(1) Driving manners of 2 and 4 wheels vehicles

This section describes the driving behaviors of 4 wheel vehicles and motorcycles.

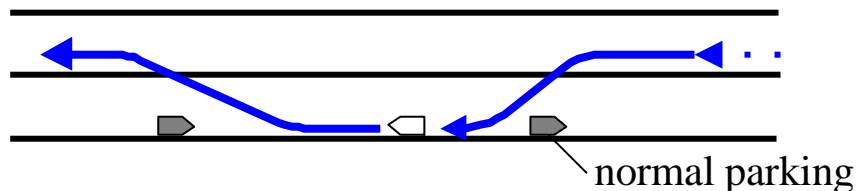
- Generally, most drivers drive at a relatively slow speed. Speed differences between four-wheel vehicles and motorcycles as well as the other types of vehicles on the road are small, thus drivers are able to maintain a short average headway between them. As conditions of these roads improve in the near future, speed differences between these various types of vehicles will inevitably increase. When this happens, the level of danger will also escalate if the present driving behavior is maintained.
- Most drivers in Phnom Penh have yet to grasp the basic notion of driving within a given traffic lane. The very basic rule of driving etiquette is that whoever is in the lane has a higher priority than others who are trying to get into that lane. However, to impose such a rule strictly in this city is also not realistic as most roads have yet to possess proper lane markings and other road facilities. For all the drivers to understand and obey this basic rule is not something that can happen within a short period of time. Proper driving education and time are required. As roads improve progressively in future, drivers will slowly come to realize the benefits (such as faster, safer and smoother travels for everyone on the road) associated with good driving behaviors such as observing traffic lanes.
- Drivers infringing onto the opposite roadway are commonly seen in Phnom Penh (not including areas where it is allowed or when overtaking). Although such driving behavior is illegal, the following types of maneuvers are observed:
 - when making a left turn at a cross road junction, instead of making the turn within the intersecting area in the junction, many drivers are observed to just shift to the exit point of the opposite traffic stream and then make a quick left turn. (see illustration below)



- Drivers exiting a small side street or from an individual driveway into a main road also tend to travel in the roadway meant for the opposing traffic for some distance before weaving into the correct roadway, thus creating havoc to the traffic flow.



- Infringing on to the opposite traffic roadway when attempting to park the vehicle in the opposite direction or exiting from the parking lot.



Driving in the opposite roadway poses great danger to all road users including the driver himself and such behavior must be strictly enforced and outlawed. With the present conditions of road development, such illegal behavior may not seem serious in affecting traffic flow and a cause for accident and congestion. However, as roads in the city improve in the near future and traffic demand increases, such a behavior will undoubtedly become a major cause of traffic confusion and eventually accidents and chronic congestion.

Now its the time to try to get rid of this unwanted driving habit by improving the drivers' driving manners and perceptions. If such habit is left unchecked, serious accidents and severe traffic congestion can be expected in the near future. Traffic control facilities can be introduced to physically prevent drivers from infringing into the opposite roadway to a certain extent, but in the long run, improving the perception and behavior of drivers is more important.

- It is difficult to actually objectively assess whether many Phnom Penh drivers actually do not comprehend the meanings of road markings within the traffic rules or just ignore such markings. Along major road sections with solid yellow median line markings, meant to strictly divide two opposing traffic streams and prohibit any crossing of such line, many drivers have been observed to ignore such marking regulation.

- Many drivers do not seem to be able to differentiate rights-of-way traffic from the others within the traffic rules. At a roundabout, for example, traffic that enters it first has the rights of way. By rapidly discharging traffic from the roundabout, the capacity of the roundabout can be increased and its operation becomes more efficient and safe. However, if those traffics without the rights of way keep entering the roundabout and ignoring those with the rights of way, then a grid-lock congestion will result and finally everyone will be just stranded in the roundabout.
- Finally, at signalized traffic junctions, many drivers do not seem to understand that through traffic have the rights-of-way compared to right or left-turning traffic. Left-turning vehicles often would get into way of the opposing through traffic within the junction. Although they have the rights-of-way in entering the junction, the opposing through traffic has to give way to the left turning vehicles as their exit is blocked. This creates the wrong perception to other road users that the left-turning vehicles have the rights-of-way.

(2) Behavior of 4 wheels drivers

- Most drivers of 4-wheelers seem to think that motorcycles have to give way to 4 wheel vehicles. Most of them seem to think that if they collide with a motorcycle, they will definitely not suffer any significant damage compared to the 2 wheeler. Such a behavior can be seen where when a 4 wheeler tries to enter the traffic stream from the side. Instead of waiting for a gap among the motorcycles, they would bluntly enter the traffic stream by attempting to create a gap for themselves, forcing the motorcyclists to slow down or stop.
- Drivers of 4-wheelers are also often observed to randomly park or stop their vehicles without much thought or consideration to other road users. Enforcement is particular needed on such behavior where it adversely affects traffic flow, such as at traffic junctions. Illegal parking and stopping at the entry or exit points of a junction must be strictly enforced. Double parking is also common whereby an entire road section may be crippled.
- Parking on pedestrian sidewalks is rather common in Phnom Penh. Drivers seems to regard pedestrian sidewalks as convenient parking lots without thinking that they are taking away the safe walking space rightfully belong to the pedestrians. Such behavior should not be allowed.

(3) Behavior of motorcycle drivers

- In Phnom Penh, there are motorcycles that are used as private transport and those for business called motorlop (motorcycle taxi). For those used as a hired formed of transport, more often than not, there would be more than 2 passengers including the driver. As many as 5 persons on one motorcycle can sometimes be observed.
- Motorcycles are more versatile in maneuvering various types of spaces besides the usual roadways such as pedestrian sidewalks or even spaces within the gasoline stands. They are often seen to take 'short-cuts' by diverting to such areas or passages just to get ahead of the traffic. Once a certain motorcycle does a 'short-cut', the others behind him seem to follow. Such a phenomenon is very common in Phnom Penh.
- When waiting for the green signal at a signalized junction, most motorcycle drivers would try to get as close to the stop line as they can irrespective of the presence of other vehicles ahead of them. Instead of forming a queue behind the stop line, most of the motorcycles would amass around the stop line, often spilling on to the exit lanes of the opposing traffic stream. When the signal turns green, the exit point of the opposing traffic stream is often blocked, creating unnecessary traffic jams.

Similar behavior can also be seen along any traffic queue along a road section. Being impatient to wait for the queue to clear, they would try to get ahead of the queue by traveling on the opposite roadway or the pedestrian sidewalk. Such a behavior would only exacerbate the congestion situation and greater delay would result for all road users.

- Although the number is not large, there are some drivers who would ignore traffic signals at junctions. Such a behavior is extremely dangerous.
- Although it is not compulsory by law to put on the protective helmet when driving, very few motorcyclists used them.
- Many motorcyclists wear sandals when driving and particularly dangerous are females wearing high heel sandals.
- Some motorcyclists do not switch on the headlights when driving at night.

(4) Drivers of Cyclos

Cyclos are allowed to operate on the major roads as well as minor roads alongside the other modes of transport in the city. The average travel speed of cyclos is extremely low compared with 4-wheelers and motorcycles. Since travel speed of cyclos is directly affected by slopes, its operation is thus inconsistent and can often become erratic. Although the road occupancy ratio of a cyclo is less than a 4-wheeler but is actually larger than a motorcycle. With such features, the cyclos operate just like any 4-wheeler or motorcycle.

Its driving behavior is detrimental to good traffic operation. Although they generally travel on the curbside along most road sections, they are quick to make 'U' turns at random or making unsuspected sudden stops to pickup or letdown passengers. Similar behaviors can also be seen at intersections or roundabouts. Worst of all, many cyclos drivers are observed to ignore traffic rules such as traveling against the flow of traffic just to meet the passengers' needs or demands. When such a transport mode is allowed to travel on major roads with the 4-wheelers and motorcycles which have much higher average travel speeds, the result is that road capacity is greatly reduced while the level of hazards to other road users is increased.

1.5 Behavior of Pedestrians

Before going into a discussion on the behaviors of pedestrians in this section, the present conditions of various pedestrian facilities, namely sidewalks, crossings and others were first investigated.

In principle, the major roads in the city have their roadways and sidewalks clearly delineated by the curbstone. However, many of the distributor roads are unpaved and there is no way to differentiate the roadways from the sidewalks. For this reason, improvements to these distributors are urgently required.

Although the basic pedestrian facilities are provided along major roads, in actual fact, it is rather doubtful on their functions in serving its intended users.

(1) Conditions of existing pedestrian sidewalks and crossings

Pedestrian sidewalks and crossing along most distributors have not been well provided for. Those that are provided along major roads however, have other kinds of problems as described below:

1) Sidewalks

a. Sidewalks are occupied by other users

- Parts of the sidewalks along some major roads have in fact disappeared. It is discernable that sidewalks once existed along these road sections, but they have become instead private garages or spaces used by individuals to conduct all forms of business activities.
- Wild grass is unattended on some sections of the sidewalks, making walking impossible.

b. Sidewalks are not continuous

Sidewalks are often not continuous, hence making a continuous and safe walk along such a sidewalk is rather impossible. Obstructions along sidewalks come in various forms, such as:

- Parked vehicles – lack of enforcement on illegal parking on sidewalks.
- Vehicle garages – sidewalks are illegally used as private garages.
- Storage space of goods and merchandise – sidewalks are used as business venues.
- Vendors – sidewalks are occupied by vendors of all kinds especially near produce markets
Hawking sometimes spilled over to roadways too.
- Building structures – structures are sometimes erected on sidewalks.
- Road signs – insufficient height clearance of road signs obstacles to pedestrians.
- Plants – insufficient roadside planting maintenance has resulted in many low branches of trees obstructing pedestrians on the sidewalks.

2) Crossings

Traffic control devices used to facilitate pedestrians crossing the roadways in the city of Phnom Penh include zebra crossings along various road sections; pedestrian signals and zebra crossings before stop lines at signalized intersections. However, at non-signalized intersections, zebra crossings are provided only at a few locations. Most of the other non-signalized intersections have no such traffic control devices.

a. Crossings at road sections

- Many zebra markings at road sections have largely faded. Not just the pedestrians, but more importantly, the drivers have great difficulties in recognizing the crossings from a distance. Probably due to poor maintenance, many of the white lines have almost the same hue as soil making them very difficult to distinguish.
- Besides these markings, there are no other supplementary safety devices such as road signs, warning signs or warning markings which may help to warn drivers of the crossing ahead. Pedestrian signals, refuge islands or lighting are also not installed.

b. Non-signalized intersections

Pedestrian crossing facilities at non-signalized intersections are mostly not provided. Distance to cross the roads at locations such as roundabouts are long and without safety devices, pedestrians are at grave danger when crossing these roads. Despite the fact that pedestrian traffic has a significant impact on

vehicular traffic, signs to direct pedestrians to designated crossings are either ambiguous, unclear or non-existent. At these intersections, pedestrian signals and refuge islands are also not provided.

c. Signalized intersections

- Zebra markings are provided on crossings at signalized intersections.
- These markings and the stop-line markings are sometimes difficult to see by the vehicular drivers. Many motorcyclists also tend to stop their vehicles not behind the stop-lines but on the pedestrian crossings in spite of the presence of zebra markings. As a result, pedestrians find it difficult to cross the roads.
- In Phnom Penh, the traffic signal timings are set in such a way that the green phase for vehicles and pedestrians are activated simultaneously. The yellow phase for vehicles therefore has become the clearance time for pedestrians still on the crossings. As the yellow phase is designed based on requirements of vehicles, the time is just too short for pedestrians to clear the crossings (especially where 'all-red' timing is not used). This can pose great danger to pedestrians.

d. Other pedestrian facilities

- There is no pedestrianization of any roadways (including time and day controlled usage) in Phnom Penh.
- Overhead pedestrian crossing bridges are also not provided in the city.
- Pedestrian safety facilities such as guard-rails are also absent.

(2) Pedestrian Behaviors

Given the above pedestrian facility conditions in the city, the behaviors of pedestrians are described below:

- There are relatively few pedestrians in the city, this is probably related to the inadequate provision of pedestrian facilities.
- Since many sidewalks are not continuous, pedestrians are forced to walk on roadways.
- Pedestrians tend to cross the roads at random along the road sections. Even where there is a crossing provided, many pedestrians do not have the perception to use such facility for their safe passage across the road. Such behavior can be observed among both sexes and almost all age groups.
- Along heavily trafficked road sections, most pedestrians would in fact attempt to cross half the roadway by checking for any oncoming traffic on the left, then stop temporarily at the non-protected median, check for traffic on the right and then continue the crossing. Due to this behavior, the central sections of many heavily trafficked roadways are often crowded with waiting pedestrians, posing grave dangers to both the vehicles and the pedestrians themselves.
- Many pedestrians like to make use of the easily available motorbikes in order to shorten their walking distances. These pedestrians would get on or off the motorcycles at any place convenient to them, even within road intersections.

From these observations, it can be concluded that pedestrians in Phnom Penh have low awareness of walking in safe and comfort on designated pedestrian facilities. Rather, most pedestrians would take chances, ignoring some of the obvious dangers in order to shorten their walking distances.

Furthermore, from the perspective of vehicular users, such pedestrian behaviors would only further reduce the average travel speed of vehicles on the roads, the road capacity and a cause for traffic accidents.