

CHAPTER A-10 ROAD NETWORK DEVELOPMENT PLAN

10.1 Road Development Principle

As identified in the existing road condition survey, road network system in Cambodia has sufficient coverage from the perspectives of road density and network, however, many of important roads are not functioning well mainly due to poor surface condition as well as narrow and poor temporary bridges with limited loading capacity. Based on the existing road condition stated above, the Study team establishes the following road development principle;

- (1) Improvement of Existing Road Network
 - * Use existing road network as much as possible
 - * Improvement of existing road network
 - Pavement up-grade for 1-Digit and 2-Digit roads
 - Maintenance for 3-Digit and rural roads
- (2) Strengthening of Road Network and Capacity
 - * 4 lane widening, Ring Road and Bypass
- (3) Reinforcement of Road Network
 - * Provision of alternative routes

10.2 Target of Road Network Development

Based on the above road development principle as well as the 5 strategies developed in the previous chapter, the following target of road network development was established:

Strategy 1: Multi Growth Pole Development

- Target: (1) Widening and upgrading of 1-Digit road
(2) Construction of Bypass around major cities
(3) Reinforcement of road network around Phnom Penh by Ring Road

Strategy 2: National Integration

- Target: (1) Improvement of accessibility to provincial capital
(2) Reinforcement of main 2-Digit roads

Strategy 3: Development of International Corridor

- Target: (1) Strengthening of international highway(GMS and Asian Highway)
(2) Improvement of access to the border to neighboring countries

Strategy 4: Enhancement of Rural Economic Development

- Target: (1) Tourism development, (2) Manufacturing Development, (3) Agricultural Development

Strategy 5: Regional Development for Poverty Reduction

- Target: Improvement of rural roads by road maintenance

10.3 Proposed Roads to be Improved

To achieve the target mentioned above, the following roads are selected to be improved.

Table 10.3.1 Summary of Proposed Roads to be Improved

Target of Road Network Development		Proposed Roads to be Improved						
Support for Strategy 1: Multi Growth Pole Development								
(1)	Widening and Upgrading of 1-Digit National Roads	NR1	NR2	NR3	NR4	NR5	NR6	NR7
		NR8	2 nd Mekong Br					
(2)	Construction of Bypasses around Main Cities	Siem Reap, Battambang and Kampong Chhanang Bypass						
(3)	Reinforcement of the Road Network around PP by Ring Road	PP Ring Rd. including 2 nd Monibong Br. and 2 nd Chrucy Chanbvar Br.						
Support for Strategy 2: National Integration								
(1)	Improvement of Accessibility to Provincial Capitals	NR11	NR31	NR33	NR48	NR56	NR57	NR62
		NR68	NR76	NR78				
(2)	Reinforcement of Main Routes	NR11	NR13	NR22	NR33	NR51	NR61	NR71
		PR104	PR111	PR114	PR127	PR128	PR308	PR319
		Kratie-Kamp. Thom						
(3)	For Access Road to Provincial Capitals	NR59	NR65	NR66	NR76	PR148	PR160	PR210
		PR305						
Support for Strategy 3: Development of International Corridor								
(1)	International Highway (GMS and Asian Highway)	NR1	NR3	NR4	NR5	NR7	NR33	NR48
		NR66	NR78					
(2)	Access to the Border	NR2	NR21	NR33	NR48	NR57	NR62	NR64
		NR68	NR72	NR74	NR78			
(3)	Improvement of Access to the Railway and Inland Waterways							
	- Linkage to Railway Facilities	NR31	NR33	NR42	NR51	NR53	NR55	PR114
	- Linkage to Inland Waterway Facilities	NR52	NR54	NR63	NR70			
	- Linkage to Seaport Facility	NR4						
Support for Strategy 4: Enhancement of Rural Economic Development								
(1)	Tourism Development							
	- Eco-Tourism Area (Northeast Region)	NR7	NR76	NR78	NR78 A	NR78 B	PR301	PR305
	- Siem Reap and Wider Tourism Area (North Region)	NR6	NR62	NR63	NR64	NR65	PR210	PR212
	- PP Gate Town and Sihanoukville and Coastal Area	PR213	PR214	PR274	Siem Reap Bypass			
(2)	Manufacturing Development							
	- Special Economic Zone near Vietnam Border	NR1						
	- Sihanoukville - PP Growth Corridor	NR4	NR48	NR51	PR104	PR127	PR128	
(3)	Agricultural Development							
	- Northeast Region	NR78	NR78A	NR78B	PR301			
	- North Region	NR64	NR65	NR68	PR274			
	- Middle East Region	NR71	NR73					
	- West Region	NR57	NR59					
	- South Region	NR44	NR48	PR148				
Support for Strategy 5: Regional Development of Poverty Reduction								
(1)	Rural area	NR76	NR78	NR78A	PR301	PR305		
(2)	Rural area	3-Digit roads and rural roads						

Note: Existing NR64 and NR67 was changed in 2005 to the number of NR62 and NR64 respectively.

(2) Construction of Bypasses around Main Cities

The construction of bypasses around the main cities, namely Siem Reap, Battambang and Kampong Chhnang, are proposed in order to not only reduce traffic congestion but also to support urban development, to reduce traffic accidents, to aid the transit of heavy vehicles through the cities and to improve access to commodity distribution facilities as shown in **Figure 10.3.2**.

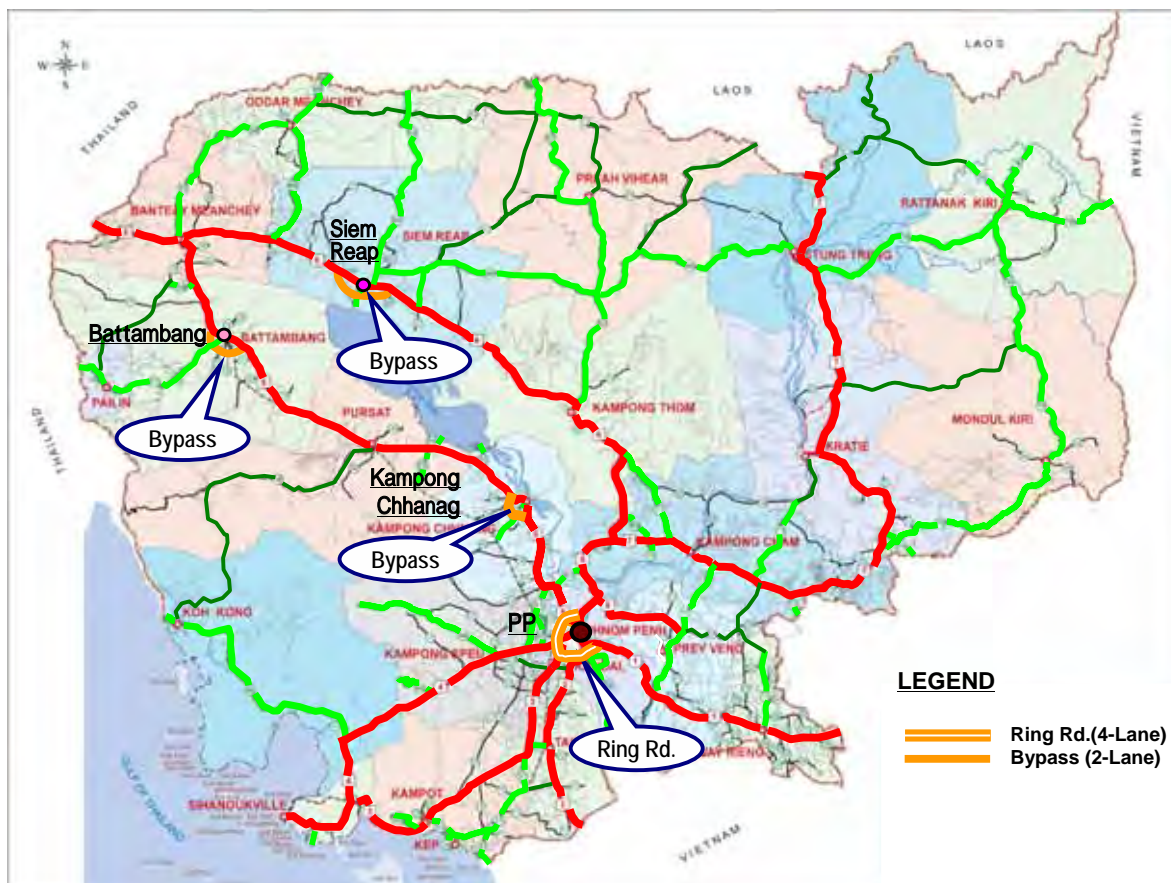


Figure 10.3.2 New Bypasses

(3) Reinforcement of Road Network around Phnom Penh City by Ring Road

Phnom Penh City is the capital of Cambodia and the political and economic center. However, recently there have been some problems due to over-concentration including traffic congestion, electric power shortages, lack of sanitary facilities, and a widening economic gap.

In relation to traffic issues, traffic congestion during the morning and evening peak periods is already observed on many road sections in Phnom Penh. Regulatory measures have been introduced to reduce the number of heavy vehicles in Phnom Penh; however the number of traffic accidents keeps increasing every year.

Phnom Penh is located on the western side of the intersection of the three large rivers; the Mekong River, Bassac River and Tonle Sab River. Six 1-Digit national roads (NR.1, NR.2, NR.3, NR.4, NR.5, NR.6) extend radially from Phnom Penh, however there are only two bridges; Monyvong Bridge and Chruoy Changvar Bridge.

Hence, an outer ring road around Phnom Penh is proposed for the reinforcement of the road network.

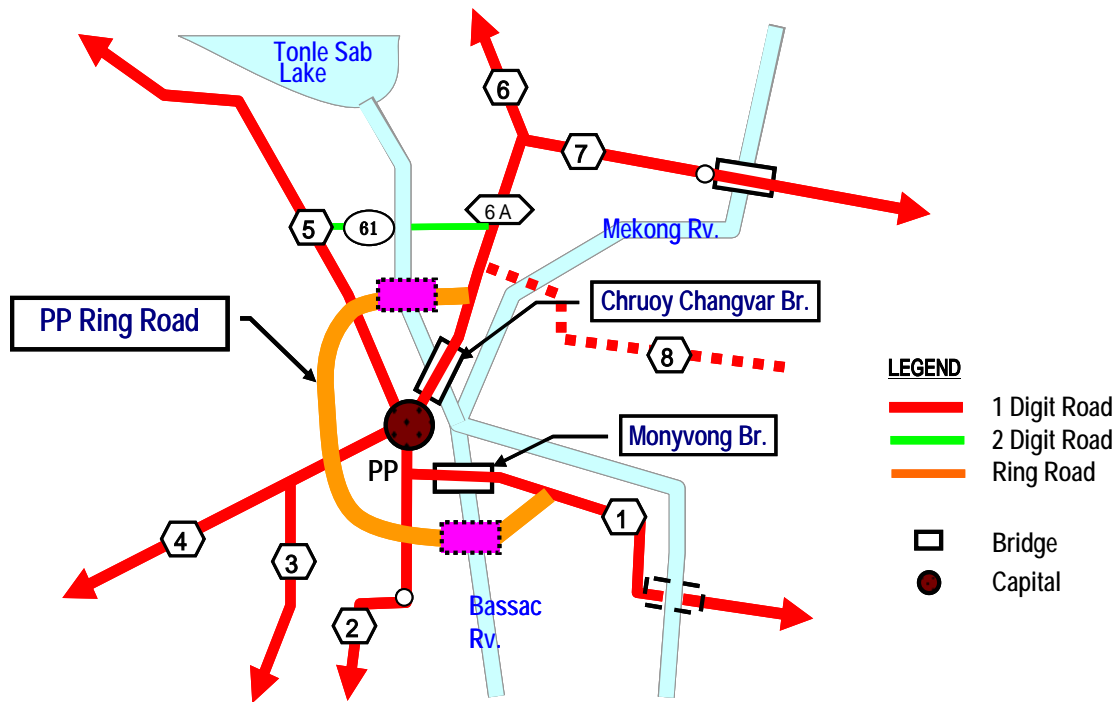


Figure 10.3.3 Phnom Penh Ring Road

10.3.2 Supporting Projects for Strategy 2: National Integration

The distributing of public administration services across the whole country is one of the most important factors for strengthening the cohesion and loyalty of the Cambodian people, which in turn will lead to the growth and development of the country.

However, at present, people who are located a significant distance from Phnom Penh receive unsatisfactory public administration services due to the poor road conditions.

Consequently, the improvement of the supporting roads to improve access is proposed as follows.

(1) Improvement of Accessibility to Provincial Capitals

There are 24 provinces in Cambodia of which 16 provincial capitals are located on 1-Digit national roads and the other eight provincial capitals are connected to 1-Digit national roads by 2-Digit national roads. All of the 1-Digit national roads are being improved by the Cambodia Government with the cooperation of the Japanese Government, the World Bank, ADB and other donors. However, the 2-Digit national roads connected to the eight provincial capitals have not been improved, as shown in **Table 10.3.2**. These roads are one of the most important lifelines for the eight provincial capitals.

Hence, the following development works are proposed to improve the roads to function under all weather conditions.

Table 10.3.2 2-Digit National Roads Providing Access to Eight Provincial Capitals

Provincial	Capital	Rd. NO.	Existing Condition	Remarks
Prey Veng	Prey Veng	NR11	DBST/ Temporary Br.	Pavement: Improved by ADB Bridge: No plan
Kep	Kep	NR31	DBST/ Temporary Br.	Pavement: Improved by ADB Bridge: No plan
		NR33	DBST/ Temporary Br.	
Koh Kong	Koh Kong	NR48	DBST/ Permanent Br.	Pavement: Improved by Thailand Bridge: Improved by Thailand
Pailin	Pailin	NR57	Laterite/ Temporary Br.	Proposal submitted to Japan
Preah Vihear	Tbaeng Mean Chey	NR62	DBST/ Temporary Br.	Pavement: On-going by WB Bridge: No plan
Oddar Meanchey	Samraong	NR68	Laterite/ Permanent Br.	Bridge: Under construction by ADB Pavement: Proposal submitted
		NR56	Laterite/ Permanent Br.	
Mondul Kiri	Saen Monourom	NR76	Laterite/ Temporary Br.	Proposal submitted to Korea
Ratanak Kiri	Ban Lung	NR78	Laterite/ Temporary Br.	Proposal submitted to China

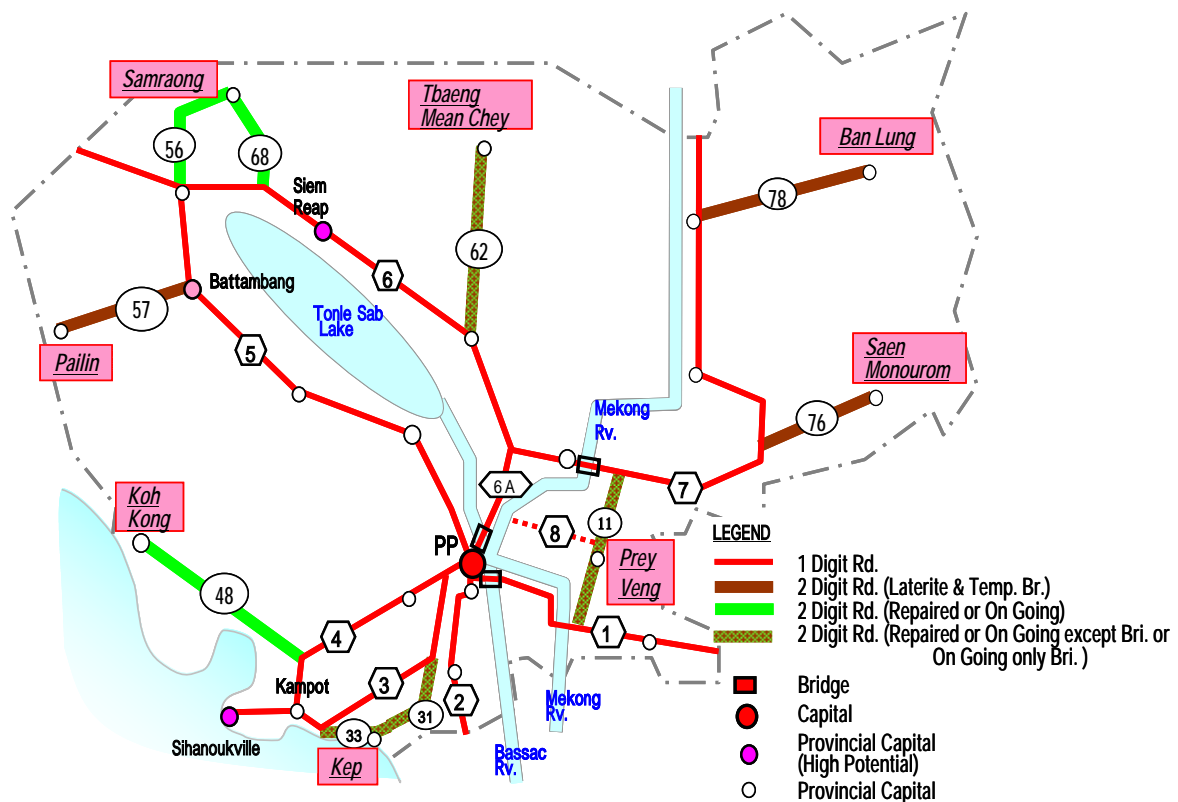


Figure 10.3.4 2-Digit National Roads Providing Access to Eight Provincial Capitals

(2) Reinforcement of Main Routes

The main arterial roads (NR.1, NR.2, NR.3, NR.4, NR.5, NR.6, and NR.21) extend radially from Phnom Penh, and there are not many other roads connected to these roads as they are restricted by geographical features. There are no alternative routes by which the following 2-Digit roads can access the provincial capitals; NR.48, NR.57, NR.62, NR.76 and NR.78.

Consequently, the reinforcement of roads connecting with the main routes is proposed in order to improve the roads to function under all weather conditions.

Table 10.3.3 List of Reinforcement Roads for the Main Routes

Reinforcement	Main Road	Reinforcement Road No.	Reinforcement	Main Road	Reinforcement Road No.
For Main Roads (between 1-Digit roads, and between 1- and 2-Digit road)	NR.1/NR.7	NR.11, NR.13/PR.319	For Access Road to Provincial Capitals	NR.48	PR.148
	NR.2/NR.3	NR.22, NR.33, PR.104		NR.57	NR.59/PR160
	NR.3/NR.4	PR.127/PR.128		NR.62	NR.65/NR.66/PR.210
	NR.4/NR.5	NR.51		NR.76	NR.76/PR.305
	NR.5/NR.6	NR.61		NR.78	NR.76/PR.305
	NR.6/NR.7	NR.71, Kratie-Kamp. Thom			
	NR.7	NR.73/PR308			
	NR.2/NR.21	PR.111			
	NR.2/NR.31	PR.114			

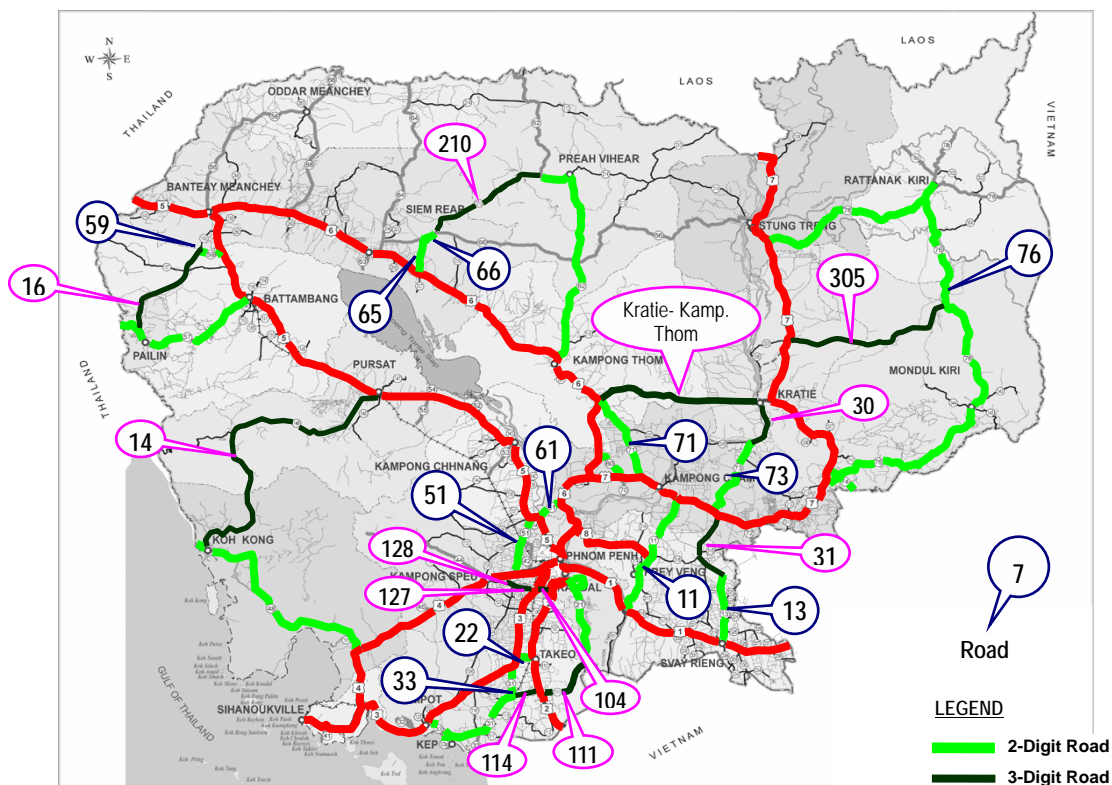


Figure 10.3.5 Reinforcement Roads for the Main Routes

10.3.3 Supporting Projects for Strategy 3: Development of International Corridor

International routes are very important not only in Cambodia but also in other Asian countries to promote and develop international road transport, strengthen relations and promote international trade and tourism. International routes are highway routes of international importance within Asia, including highway routes substantially crossing more than one sub-region, highway routes within sub-regions, and highway routes within member countries.

In Cambodia the modes of transportation consist of road transport as well as the railway and waterways. It is important to form an efficient transportation network in collaboration with the railway and waterway networks.

Hence, the improvement of the previous roads is proposed as follows.

(1) International Highway(GMS and Asian Highway)

There are four transport corridors within Cambodia, as shown in **Figure 10.3.6**. Three of these corridors overlap with the Asian and ASEAN Highway road network as presented in **Table 10.3.4**. These national roads shall be improved to the required standard.

Table 10.3.4 International Highway Routes in Cambodia

Route	GMS Rd. No.	Asian Hwy No.	ASEAN Hwy No.	Cambodian NR No.
Poipet – Sisophon – Phnom Penh – Bavet	R1	AH1	AH1	NR1, NR5
Sihanoukville – Phnom Penh – Kampong Cham – Stung Treng – Trapengkreal	R6	AH11	AH11	NR4, NR6, NR7
Cham Yeam – Koh Kong – Phum Daung Bridge – Sre Ambel – Chamkar Luong	R10	-	AH123	NR48, NR3, NR33
Siem Reap – Preah Vihear – Stung Treng – Rattanak Kiri – O Yadav Border	R9	-	-	NR66, NR78

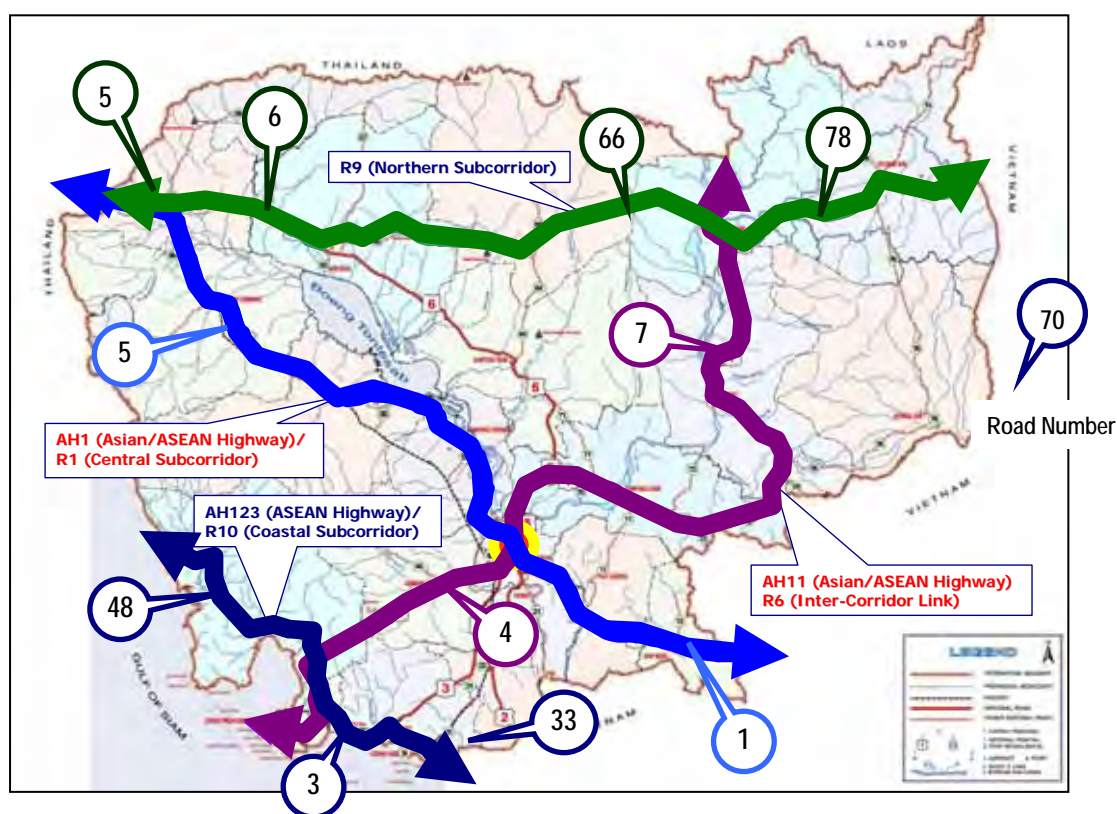


Figure 10.3.6 International Highway Routes

(2) Access to the Borders

Access roads to the international borders with Thailand, Vietnam, Laos and the international port, are also very important for supporting the function of the international corridor and the local economy.

There are fourteen access roads to the international border consisting of 1-Digit and 2-Digit national roads as shown in **Table 10.3.5** and **Figure 10.3.7**. These roads shall be improved to an all-season passable condition.

Table 10.3.5 List of Access Roads to the Border

International Border	Access Road No.
To Thailand	NR.48, NR.57, NR.62, NR.64, NR.68
To Viet Nam	NR.21, NR.33, NR.72, NR.74, NR.78
To Laos	NR.7
To international port	NR.4

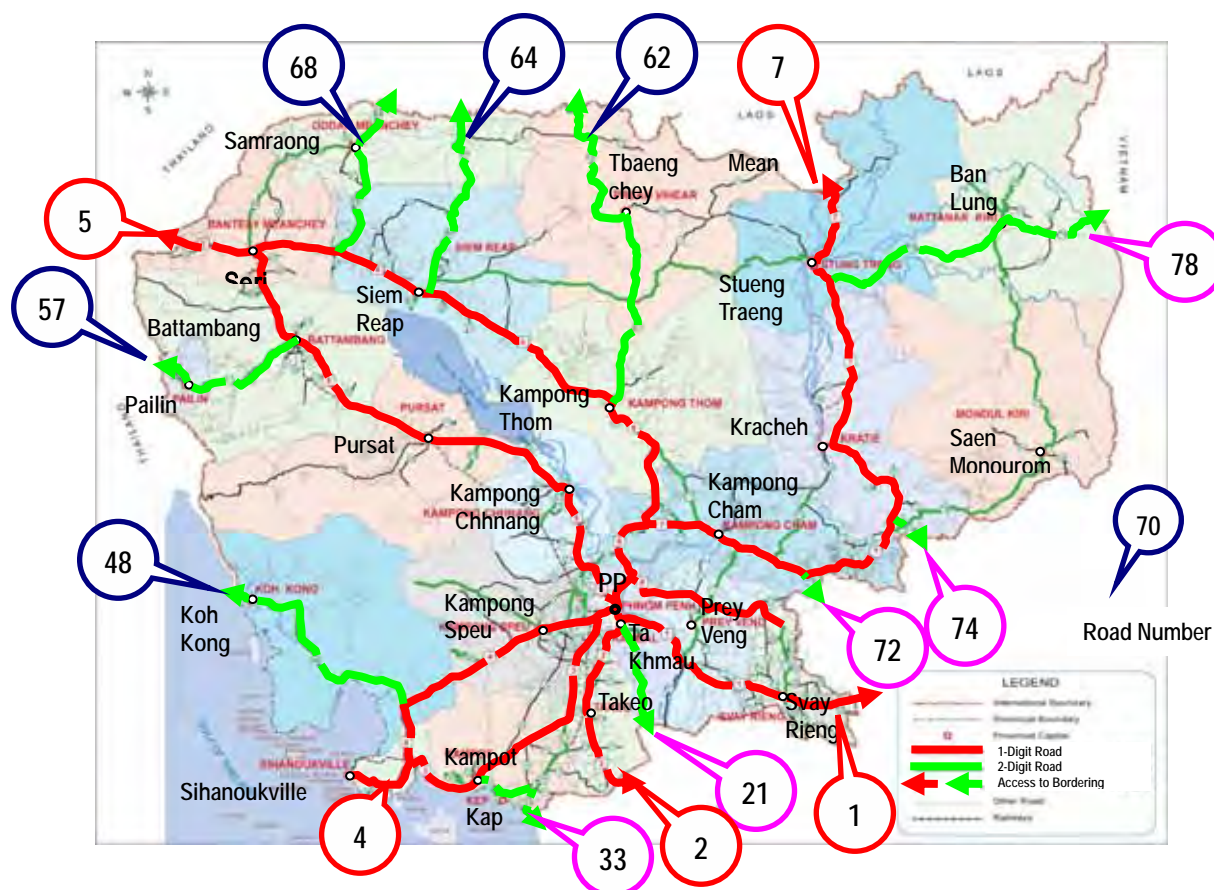


Figure 10.3.7 Access Roads to the Border

(3) Improvement of Access to the Railway and Waterways

The modes of transportation in Cambodia consist of road transport as well as the railway and waterways. Road transportation accounts for an overwhelming share of the transported volume of passengers and freight. However, the railway and waterways have a higher efficiency in terms of energy consumption per unit of transported volume and are superior for long-distance mass transit. Consequently, it is important to form an efficient transportation network in collaboration with the railway and waterways. Based on the above reasons, access roads to the railway and waterways, as shown in **Table 10.3.6** and **Figure 10.3.8**, shall be improved.

Table 10.3.6 List of Access Roads to the Railway and Waterways

Tourism Area	Access Road No.
Linkage to Railway Facility	NR.31, NR.33, NR.42, NR.51, NR.53, NR.55, PR.114
Linkage to Inland Waterway Facility	NR.52, NR.54, NR.63, NR.70
Linkage to Seaport Facility	NR.4

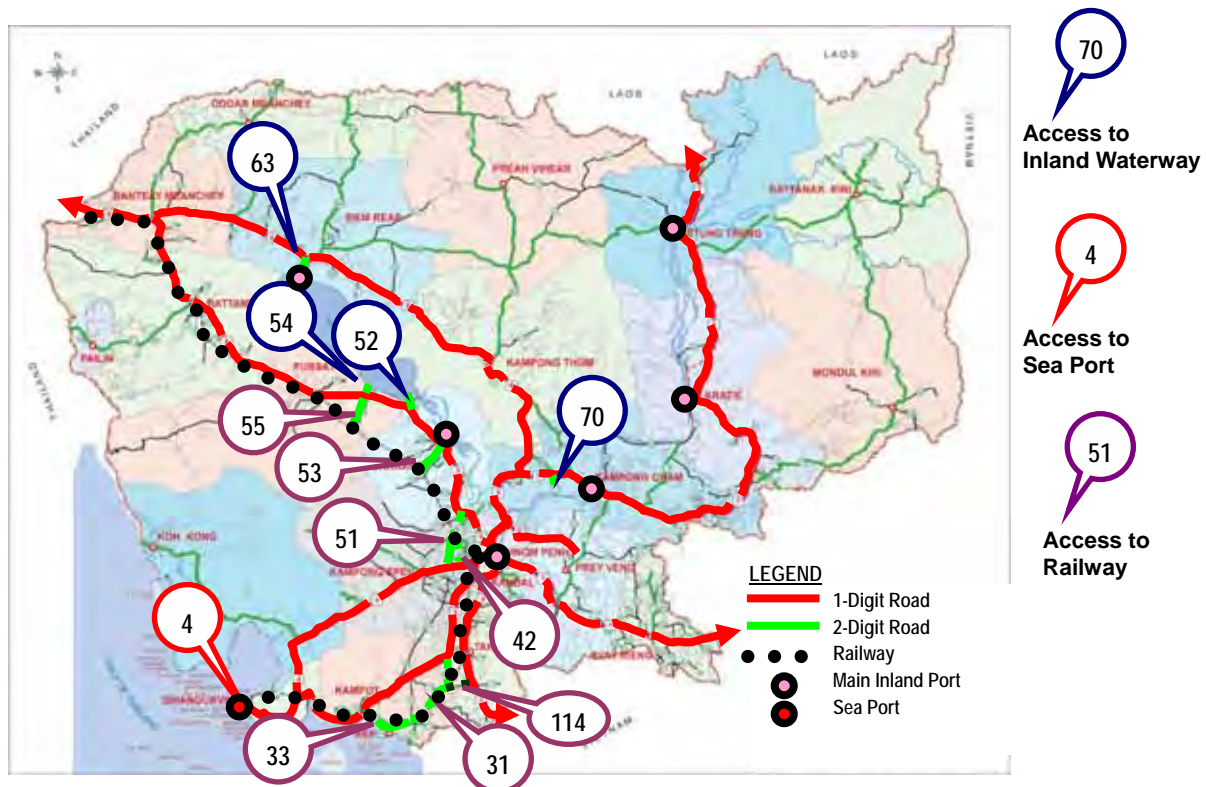


Figure 10.3.8 Access Roads to the Railway and Waterways

10.3.4 Supporting Projects for Strategy 4: Enhancement of Rural Economic Development

The Prime Minister of Cambodia has designated three sectors, namely industry, agriculture, and tourism, as the focal sectors for national growth with a special emphasis on agriculture and tourism. These sectors are very important and have the highest potential of ensuring the development and self-sustainability of Cambodia.

Hence, the improvement of the supporting roads for each of these three sectors (industry, agriculture, and tourism) is proposed, as outlined below.

(1) Tourism Development

There are many world heritage sites in Cambodia (for example Angkor Wat) and tourism is one of the sectors with the highest potential for development. In Cambodia, there are three tourism development areas and one gate town as shown in **Table 10.3.7** and **Figure 10.3.9**. However, these tourism resources have not been effectively used as it is difficult for tourists to visit the sites as they are spread over a large range and there are poor road conditions.

Hence, it is proposed that the roads to the tourist sites are improved within the foreseeable time schedule.

Table 10.3.7 List of Supporting Roads for Tourism Development

Tourism Area	Supporting Road No.
Siem Reap and Wider Tourism Area	NR.6, NR.62, NR.63, NR.64, NR.66, PR.210, PR.212, PR.213, PR.214, PR.274, Siem Reap Bypass
Eco-Tourism Area	NR.7, NR76, NR.78, NR.78A, NR.78B, PR.301
Sihanoukville and Coastal Area	NR.4, NR.48
PP Gate Town	PP Ring Rd.

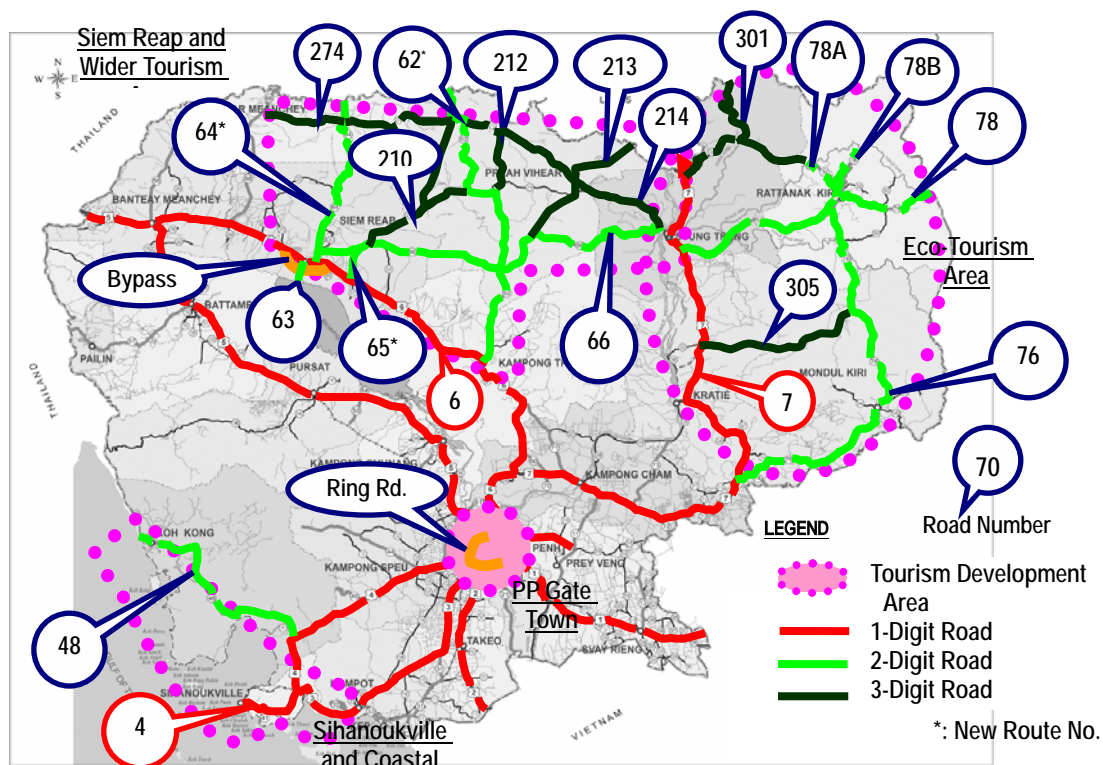


Figure 10.3.9 Supporting Roads for Tourism Development

(2) Manufacturing Development

There are no objections against industries that offer high employment opportunities, however, at present no industrial map is available for Cambodia, and the regional distribution of industries has not been identified. A preliminary plan was prepared in line with the Study on Regional Development Phnom Penh - Sihanoukville Growth Corridor. In addition, other industrial estates (both actual and planned) have been identified.

Consequently, the roads supporting the development of the manufacturing areas, as shown in **Table 10.3.8**, shall be improved to enable the establishment of efficient distribution systems for manufacturing products and materials.

Table 10.3.8 List of Supporting Roads for Manufacturing Development

Manufacturing Area	Supporting Road No.
Sihanoukville - PP Growth Corridor	NR.4, NR.48, NR.51, PR.104, PR.127, PR.128
Special Economic Zone	NR.1

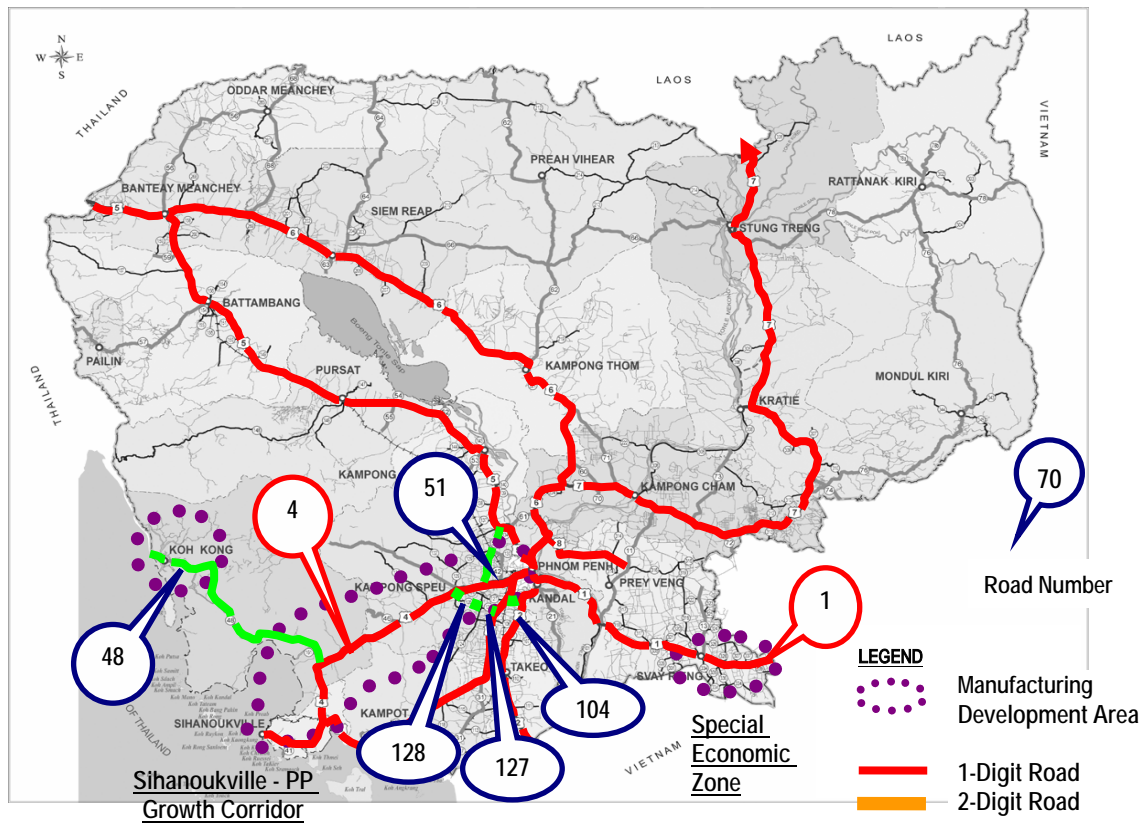


Figure 10.3.10 Supporting Roads for Manufacturing Development

(3) Agricultural Development

Agriculture has played a significant role in the national economy, and engages the majority of the population. However, the agriculture industry faces difficulties in retaining its status as there is only a small amount of appropriate land remaining for paddy cultivation, and the paddy market has not been expanding. The productivity of agriculture in the high-land areas, however, has expanded and these newly opened land areas are expanding in the area near to the national boundary with Thailand and Vietnam as shown in **Figure 10.3.11**.

Consequently, roads supporting the agricultural development area, as shown in **Table 10.3.9**, shall be improved for the establishment of efficient distribution systems for fresh agricultural products.

Table 10.3.9 List of Supporting Roads for Agricultural Development

Agricultural Area	Supporting Road No.
Northeast Region	NR.78, NR78A, NR78B,PR301
North Region	NR.64, NR.65, NR.68, PR.274
Middle East Region	NR.71, NR.73
West Region	NR.57, NR.59
South Region	NR.44, NR.48, PR.148