



Two Lanes and Motorcycle Lane on One Side

Road Congestion on NR 1A

Prepared by Project Team

(2) Laem Chabang Port

1) Aranyaprathet - Laem Chabang Port route

The cross-border road network through Aranyaprathet is the most important trunk route supporting cross-border trade between Cambodia and Thailand. The Aranyaprathet–Laem Chabang Port route consists of five roads, namely NR 33, Provincial Road (PR) 304, PR 314, NR 7 and the approach road to the port as shown in Table 2.4-16 below. Road infrastructure, including the traffic control system, is well-maintained and paved with asphalt or AC on the road surface, and there are no continuous steep slopes along all its sections. Accordingly, it is possible to keep considerably high-speed driving (average of 73 km/h) during the road condition survey.

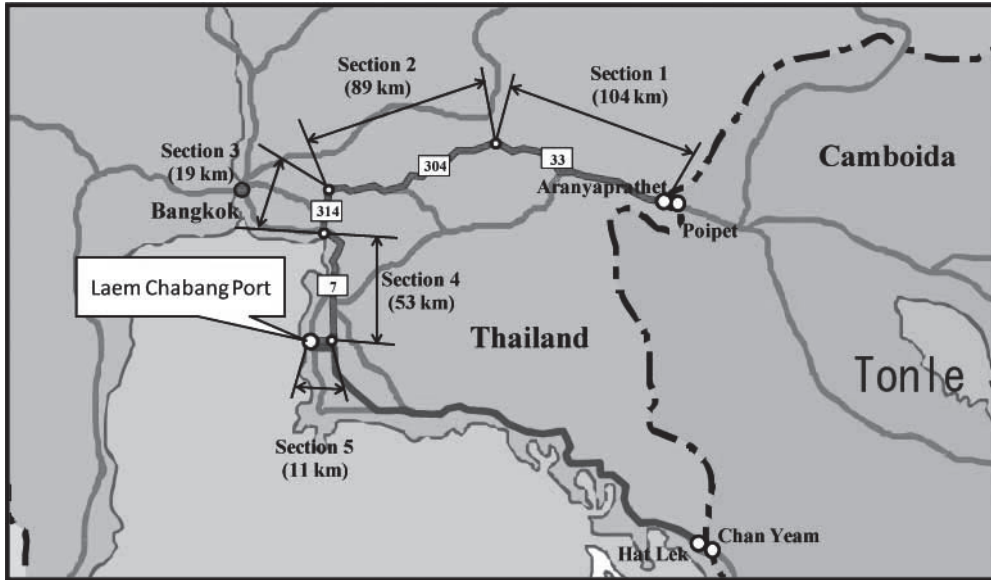
Table 2.4-16 Existing condition of roads between Laem Chabang Port and the border of Cambodia (Aranyaprathet)

Section	Road	Section	Number of Traffic Lanes	Width of Side Lane	Distance	Time ^{*1}	Average Speed ^{*1}
				(m)	(km)	(min)	(km/h)
1	NR 33	Border of Cambodia (Aranyaprathet) – Connection point with PR 304	2	2.5	104	78	80
2	PR 304	Connection point with NR 33 – Connection point with PR 314	2	1.5-2.5	89	66	81
3	PR 314	Connection point with PR 304 - Connection point with NR 51	2	1.5-2.5	19	18	63
4	NR 7	Connection point with PR 314 – Intersection of Laem Chabang Port	4	2.5	53	55	96
5	Approach Road	Intersection of Laem Chabang Port – Gate	2	2.5	11	11	61
				Total	276	228	

Note: National Road (NR), Provincial Road (PR)

*1 Time and average speed mentioned in above table are measured by a sedan car.

Prepared by Project Team



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Figure 2.4-17 Location Map of existing road between Laem Chabang Port and the border of Cambodia (Aranyaprathet)

The existing road between Laem Chabang Port and the border of Cambodia (Aranyaprathet) is shown below.



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2) Hat Lek–Laem Chabang Port route

The cross-border road network through Hat Lek is the second trunk route connecting Cambodia and Thailand. The Hat Lek–Laem Chabang Port route consists of five roads, namely, PR 318, NR 3, NR 36, NR 7 and the approach road to the port as shown in Table 2.4-17 below. This route is moderately maintained and paved with asphalt or AC on the road surface, and arranged with adequate side lanes along all its sections. There are steep upward/downward slopes between Klong Yai and Hat Lek in PR 318, and it was observed that heavy vehicles could drive around 20 km/h at most on the steep upward slope. Road improvement (widening the road and arranging side work) has been implemented at the center of Klong Yai.

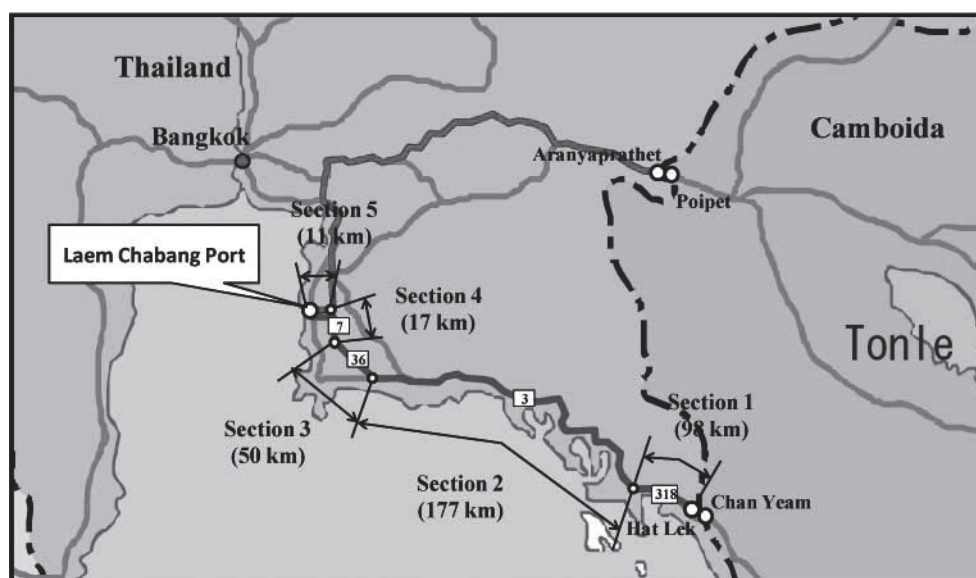
Table 2.4-17 Existing condition of roads between Laem Chabang Port and the border of Cambodia (Hat Lek)

Section	Road	Section	Number of Traffic Lanes	Width of Side Lane	Distance	Time* ¹	Average Speed* ¹
					(km)	(min.)	(km/h)
1	PR 318	Border of Cambodia (Hat Lek) – Connection point with NR 3	2	2.5	98	83	71
2	NR 3	Connection point with PR 318– Connection point with NR 36	2	2.0-2.5	177	144	70
3	NR 36	Connection point with NR 3 – Connection point with NR 7	2	1.5-2.5	50	40	75
4	NR 7	Connection point with NR 36 – Intersection of Laem Chabang Port	3	2.0-2.5	17	9	110
5	Approach Road	Intersection of Laem Chabang Port – Gate	2	2.5	11	11	61
Total					353	287	

Note: National Road (NR), Provincial Road (PR)

*1 Time and average speed mentioned in above table is measured by a sedan car.

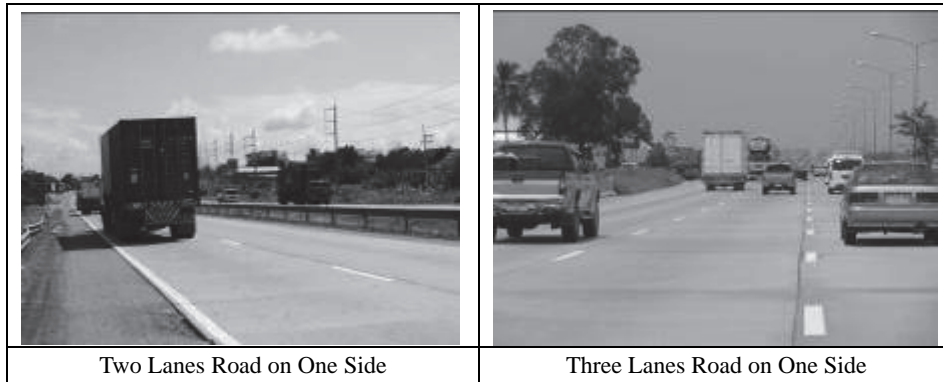
Prepared by Project Team



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Figure 2.4-18 Location map of existing road between Laem Chabang Port and the border of Cambodia (Hat Lek)

The existing road between Laem Chabang Port and the border of Cambodia (Hat Lek) is shown below.

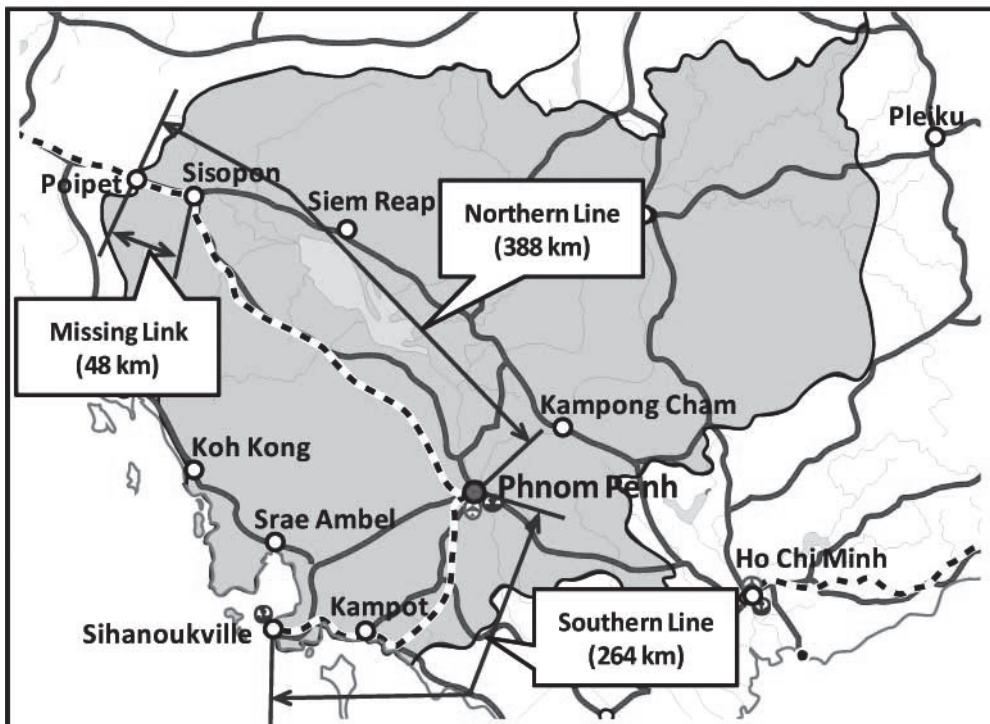


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2.4.4 Railway network

(1) Existing condition and development plan for the railway network

The existing railway network in Cambodia consists of the northern and southern lines. The northern line was constructed during the 1920s and extends to a distance of 388 km from Phnom Penh to Poipet at Cambodia's border with Thailand. The southern line, which has a total length of 264 km, was built in the late 1960s and links Phnom Penh with Sihanoukville. The railway network was destroyed during the civil war, and it has deteriorated due to limited rehabilitation and maintenance. Under such condition, rehabilitation of the railway network has commenced since 2006 with aid from ADB and the Government of Australia. ADB and the Government of Australia have provided US\$84 million and US\$21.5 million, respectively. The project aims to reconstruct and repair the railway network, which extends from Cambodia's border with Thailand, through Phnom Penh, and to Sihanoukville where the country's main seaport is located. The existing railway network is shown in Figure 2.4-19 below.



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Figure 2.4-19 Existing railway network

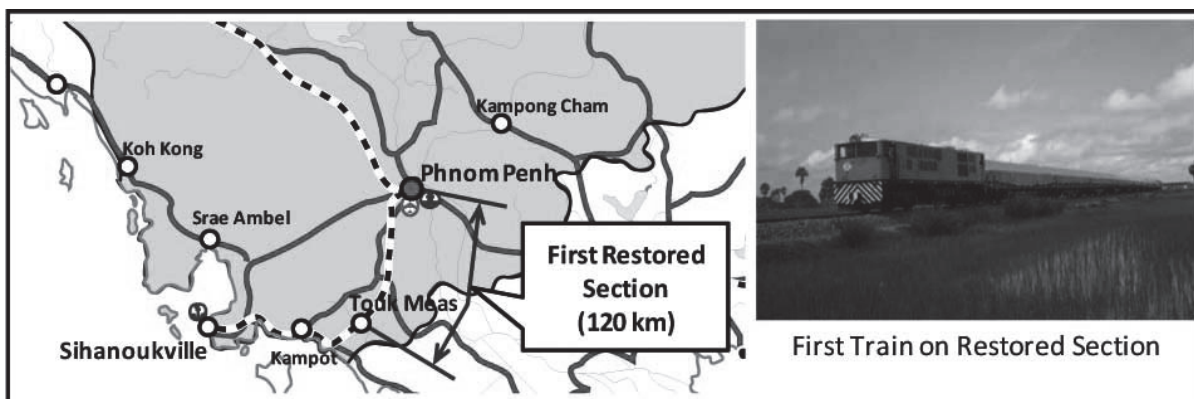
The scope of the rehabilitation project is comprised of the following items:

- Rehabilitation of the Northern Line (340 km):
 - a) Repair of embankments, ballasting and installation of missing fittings;
 - b) Rehabilitating or reconstructing structures including bridges, culverts, buildings and drains;
 - c) Tamping track to accommodate an operational speed of 50 km/h;
 - d) Rehabilitating the existing rail link to the riverbank of Sap above 5 km from Phnom Penh Port; and
 - e) Undertaking supplemental works at level crossing.
- Rehabilitation of the Southern Line (264 km):
 - a) Repairing embankments, replacing worn-out and unserviceable sleepers, fittings and ballasting;
 - b) Rehabilitating or reconstructing structures including bridges, culverts, buildings and drains;
 - c) Constructing new passing loop;
 - d) Tamping track to accommodate an operational speed of 50 km/h; and
 - e) Rehabilitating the rail link to Sihanoukville port, extending its container handling area, and supplemental works at level crossings.
- Rehabilitation of destroyed rail links (48 km):
 - a) reestablishing the railway connection across the border through repair of embankments, preparing track bed and ballasting, rehabilitating or reconstructing the structures with bridges, culverts, buildings and drains, and laying track;
 - b) Constructing supplemental facilities at level crossings; and
 - c) Building passing loops and a station at Poipet with facilities for border crossing.

The scope of the project was modified in 2009 and the construction of workshop and new freight facility in Samrong located in Phnom Penh (about 98 ha) was added. The first restored section with a length of 120 km between Phnom Penh and Touk Meas in Kampot Province was re-opened and a freight rail service commenced in 2010. The railway network is expected as a significant part of achieving greater railway connectivity in GMS countries. The entire railway network will be completed in 2013.

(2) Mitigation of the adverse impact of restructuring:

Restructuring will affect the current railway employees of about 1,100 people. The impact of restructuring will be mitigated through the following: a) providing compensation for future income loss for redundant railway employees; b) providing compensation for lost pension rights for railway employees; and c) counseling and retraining railway employees.



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Figure 2.4-20 First restored section (120 km) and the first train

However, hundreds of families have been asked to resettle for the rehabilitation of the railway. Affected households have complained with regards to compensation rates, compensation payments and assistance, the readiness and adequacy of relocation sites, and so on. In order to minimize the number of relocations, the corridor-of-impact (CoI) approach, in which people are allowed to live 3.5

to 5 m away from the railway, was adopted depending on the situation. The resettlement plan was agreed upon between the Government of Cambodia and ADB in 2006. Five resettlement plans were provided and updated so far. In 2009, a supplementary loan for the project was provided and the resettlement plan for the workshop and freight facility in Samrong was agreed upon between ADB and the Government. The number of affected households due to the rehabilitation of the railway is shown in Table 2.4-18.

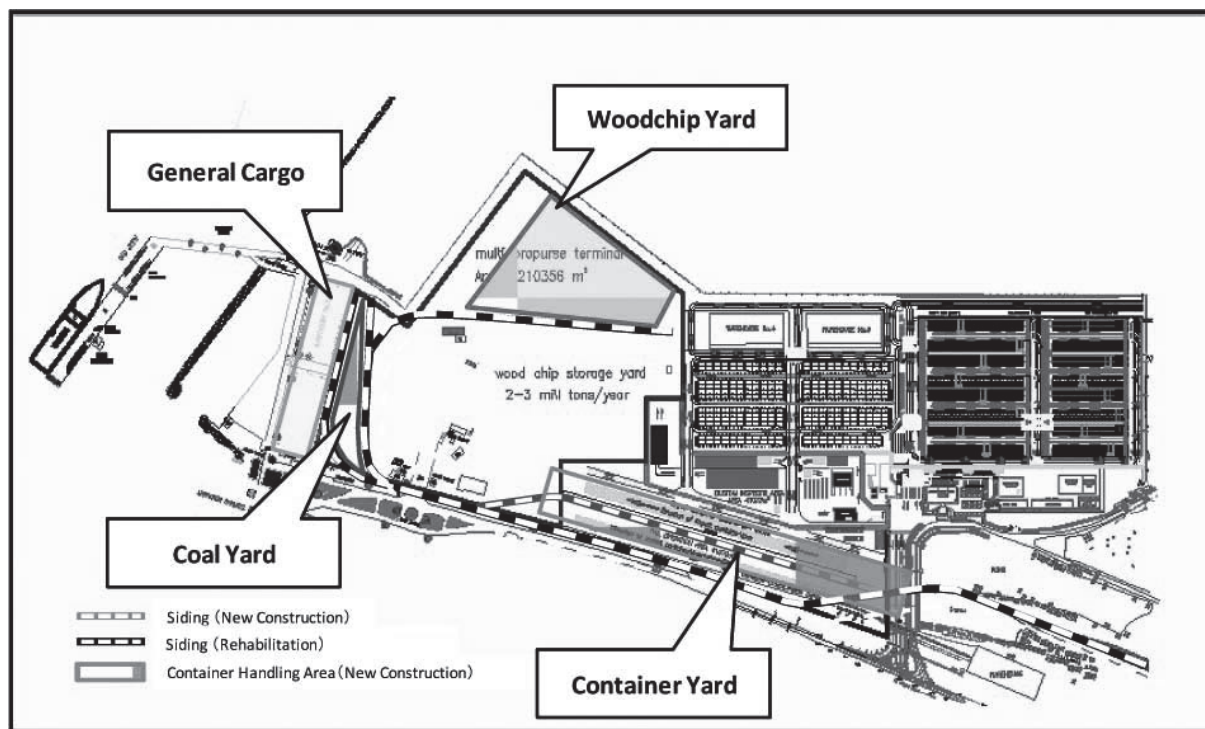
Table 2.4-18 Number of affected households

Compensation to Affected Households	Date of Approval of Updated Resettlement Plan Date of Approval of Updated		Number of Affected Households	Number of Relocated Households
Poipet Section	October 2006	June 2010	1,094	588
Northern Line and Missing Link		July 2008	1,165	51
Southern Line		September 2009	206	30
Phnom Penh		August 2010	1,289	169
Bamboo Rail Transport Operators			189	52
Subtotal			3,943	890
Addendum to the Updated Resettlement Plan for Phnom Penh	July 2009	To be prepared		248
Samrong Estate		To be prepared	231	62
Grand Total			4,174	1,200

Source: Asian Development Bank (ADB)

(3) Development plan of siding at Sihanoukville Port

Siding areas where containers are loaded and unloaded require land development with sufficient compaction. However, it has been a concern that ground subsidence may occur over a period of time because the planned site which consist of ponds will be filled up and prepared for siding. Consolidation settlement tests, boring and topographical surveys are scheduled to be conducted in order to confirm that compaction is sufficient at the siding area. A drainage plan at the siding area will be prepared based on the drainage system planned for the Sihanoukville Port SEZ. The drainage will be connected with the drainage system that will be prepared for the Port SEZ.



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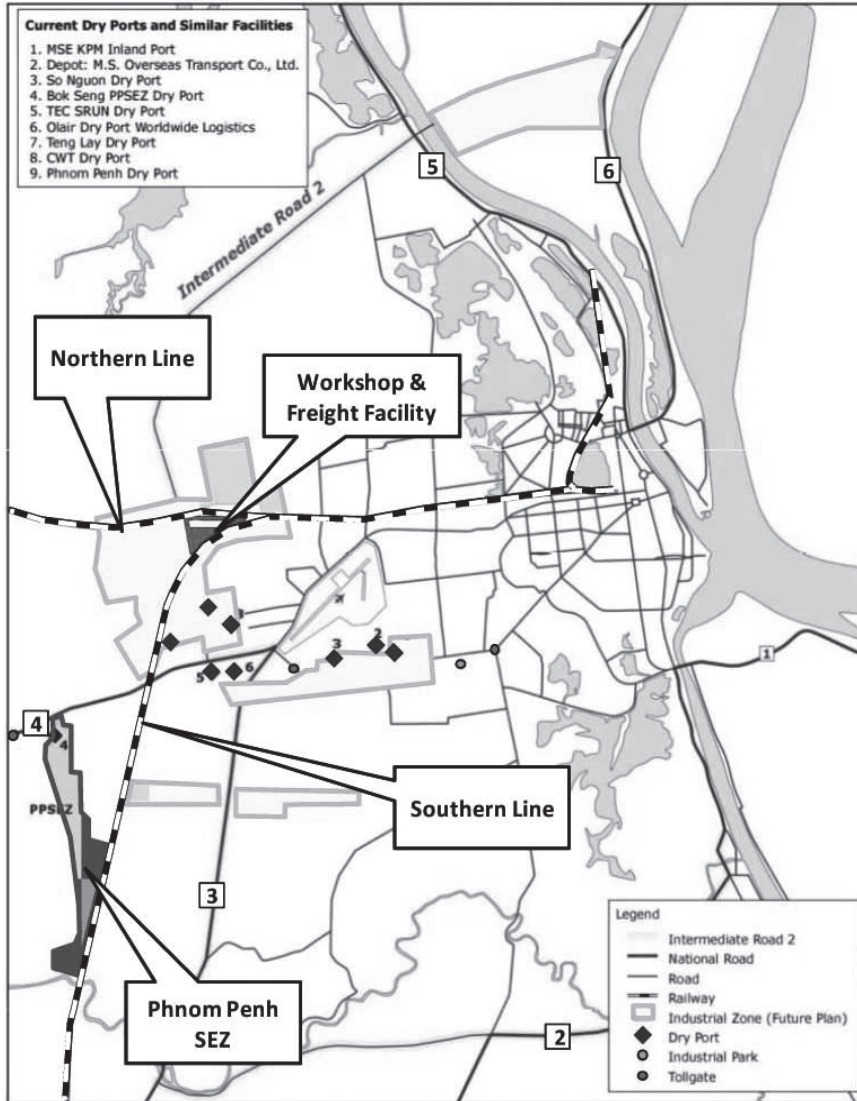
Figure 2.4-21 Layout of siding in Sihanoukville Port

Another siding at Sihanoukville station was prepared in order to arrange a train by connecting freight and container wagons. The plan includes two sidings of 1,000 m length and two sidings of 750 m length. However, it was found out that a part of the planned profile crosses over the land where the SEZ development project will be located. In this regard, changes to the plan are required.

(4) Development plan of workshop and freight facility in Phnom Penh

The construction of a workshop and new freight facility in Samrong in Phnom Penh (about 98 ha) was added in accordance with modification of the scope of the Cambodia Railway Rehabilitation Project in 2009. The workshop and new freight facility was planned to be constructed at the junction point between the northern and southern lines, and near the existing dry ports and factories in Phnom Penh as shown in Figure 2.4-22 and Figure 2.4-23.

Although the tender for embankment works for the construction of the workshop and freight facility was conducted in May 2011, resettlement has not been implemented so far. There are land users, different from land owners, who cultivate the land and are engaged in agriculture. In order to construct the workshop and new freight facility, the affected people should receive appropriate support and not be economically disadvantaged.



Source: The Study on Construction and Operation Business of Inland Container Depot in the Second EAST-WEST Economic Corridor (CAMBODIA)

Figure 2.4-22 Location map of workshop & freight facility in Phnom Penh



Source: Cambodia Railway Rehabilitation Office

Figure 2.4-23 Layout of workshop & freight facility in Phnom Penh

2.4.5 Land transport network in the target years

(1) Estimation of transport network for large vehicles

A transport network for large vehicles consisting of logistics routes was planned. As mentioned in Subsection 2.3.3, economic corridors have been specified and planned for the development of Cambodia. Such corridors will form the transport network for large vehicles. The corridors are shown in Table 2.4-19.

Table 2.4-19 Specified economic corridor in Cambodia

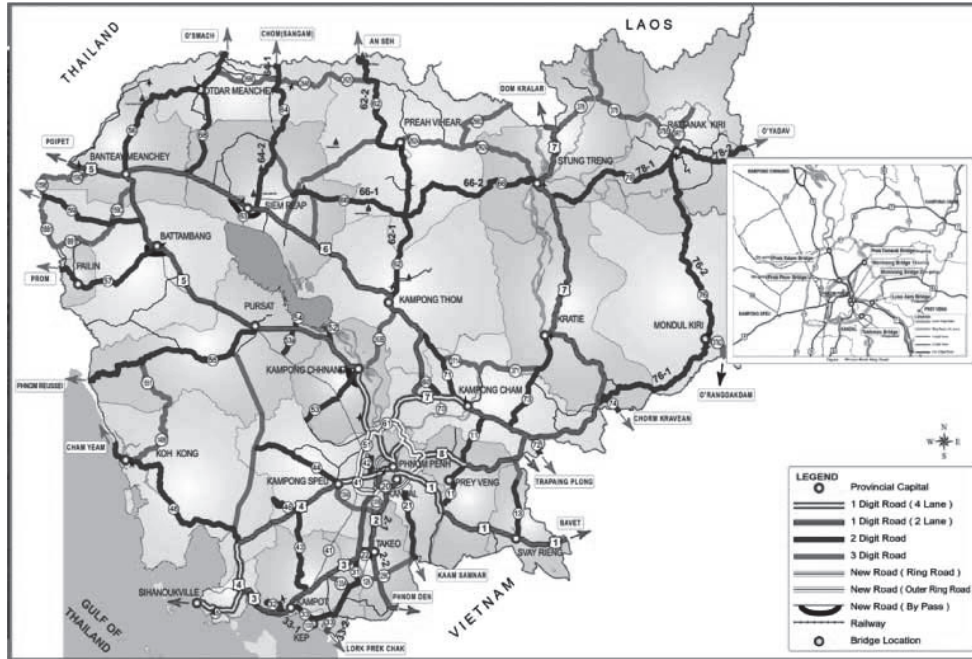
No.	Route	Distance (km)	Route
1	Southern Corridor-I	1,032	Bangkok – Aranyaprathet/Poipet – Phnom Penh – Bavet/Moc Bai – Ho Chi Minh - Vung Tau
2	Southern Corridor-II	1,168	Bangkok – Aranyaprathet/Poipet – Siem Reap – Stung Treng – Ratanakiri/O Yadov – Pleiku – Quy Nhon
3	Central Corridor	893	Sihanoukville – Phnom Penh – Kratie – Stung Treng – Dong Kralor – Veun Kham – Pakse – Savannakhet
4	Southern Coastal Corridor	763	Bangkok – Hat Lei/Chan Yeam – Kampot – Ha Tien – Ca Mau – Nam Can

Source: MPWT



Source: MPWT

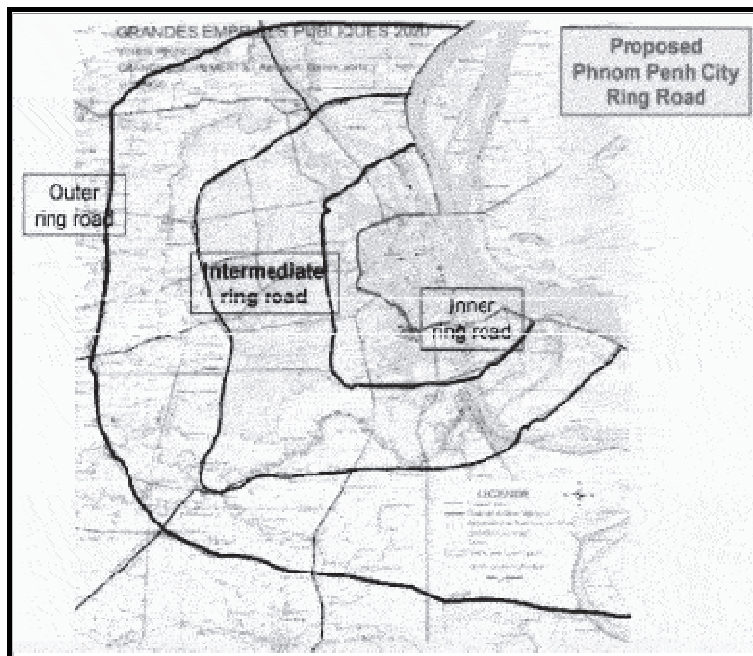
Figure 2.4-24 Location map of the specified economic corridors in Cambodia



Source: MPWT

Figure 2.4-25 Proposed road network master plan 2020

Furthermore, the heavy vehicles transporting network can be promoted much more if the maintenance of each economic corridor is managed. Cambodia's existing road infrastructure maintenance plans are as mentioned in previous section 2.4.1. In these maintenance plans, NR1, 4, 5, 7, and 8 are to be widened from 2 to 4 lanes, and also there is a plan to construct new ring roads in Phnom Penh. Three main routes of proposed Phnom Penh Ring Roads are shown in the below figure.



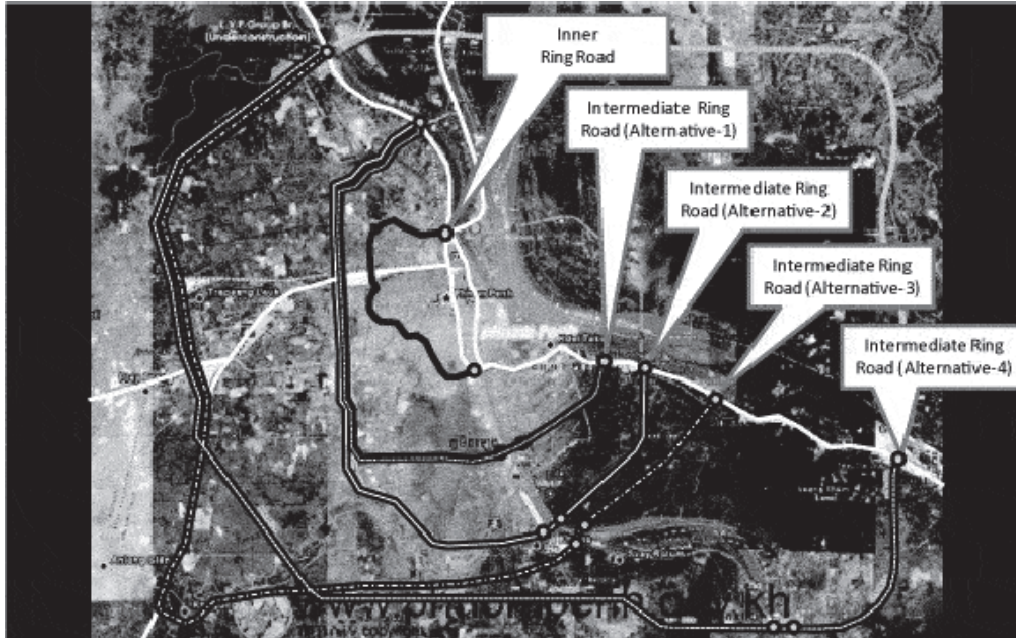
Source: MPWT

Figure 2.4-26 Outline of Phnom Penh Ring Road

At present, the Phnom Penh City Municipality is proposing several alternative routes on the Intermediate Ring Road. The alternative plan 4 diverts the NR 1 from the furthest point at approximately 22 km from the city center only. Under any alternative plan however, the city can

expect more efficient and smoother logistical transportation simply because the traffic congestion currently occurring around the Monivong Bridge can be alleviated.

Currently under construction the New Phnom Penh Port is located approximately 35 km along NR 1 from the city center. The construction of these Ring Roads anticipates increased forwarders' ability to efficiently transport cargos to the new port in the future.



Source: MPWT

Figure 2.4-27 Location Map of Intermediate Ring Road

When taking into consideration the existing road network and future economic corridor development in Cambodia, the main roads to Preah Sihanouk are shown in Figure 2.4-28.

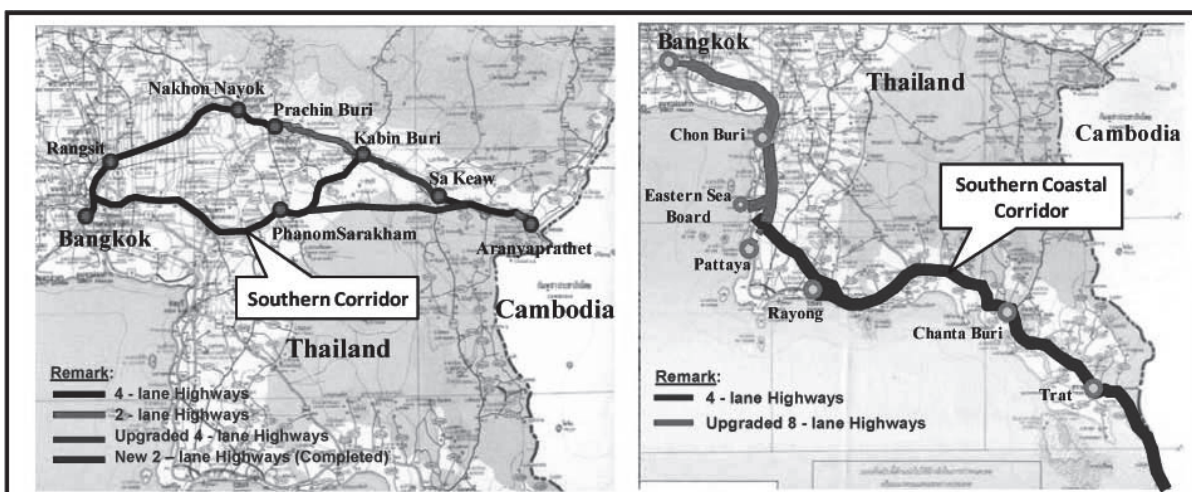


Source: MPWT

Figure 2.4-28 Forecasted main logistics routes to Preah Sihanouk

The staged road maintenance program is vital for all existing road infrastructures (including road bridge structural strengthening, AC pavement, and increase in lane numbers), especially for withstanding heavy vehicle traffic loads, materializing the main transportation routes planned above and realizing an economical and efficient transportation network.

In Thailand, the southern and southern coastal corridors have been planned for improvement and completed as shown in Figure 2.4-29.

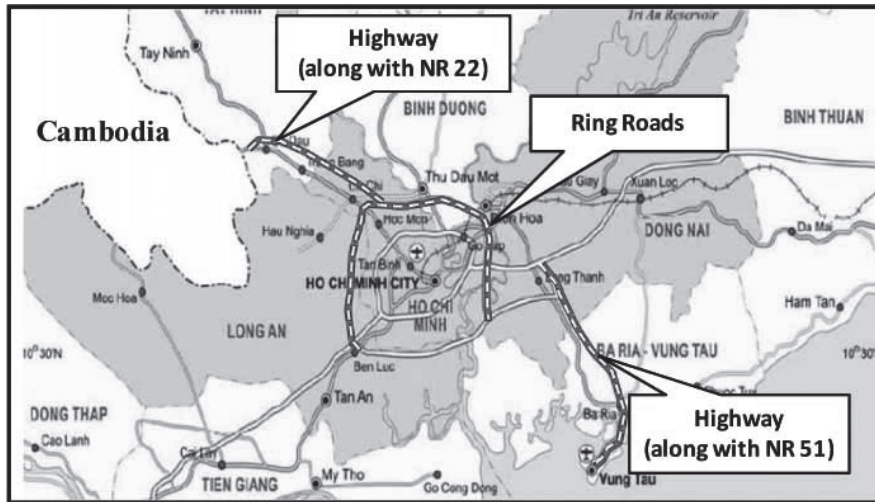


Source: Ministry of Transport, Thailand

Figure 2.4-29 Existing condition of road infrastructure development in Thailand

In Vietnam, the development of two highways was planned. One is a highway located along NR 22 connecting Ho Chi Minh and the border of Cambodia. The other is the Vien Hoa–Vung Tau

Highway which is located along NR 55. Furthermore, ring roads which will be located around Ho Chi Minh City are planned. The road infrastructure development plans in Vietnam are shown in Figure 2.4-30.



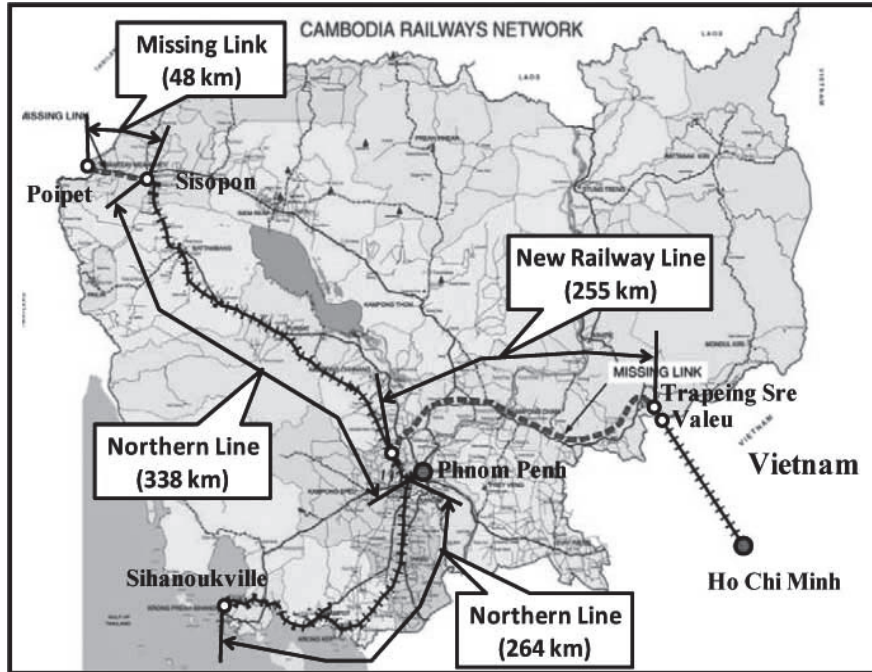
Source: Ministry of Transport, Vietnam (modified by the Project Team)

Figure 2.4-30 Road infrastructure development plan around Ho Chi Minh City

In Laos, a cross-border facility connecting NR 13 in Laos and NR 7 in Cambodia was planned to be developed. It is expected for an efficient transport network to be established through the development of the abovementioned road infrastructure.

(2) Estimation of railway network

As mentioned in Subsection 2.4.3, the existing railway network in Cambodia has been rehabilitated and expected to be completed in 2013. Moreover, a new railway line was planned to be developed between Cambodia and Vietnam as part of the Singapore–Kunming Railway Line initiative. In accordance with the National Strategic Development Plan Update 2009–2013, the MPWT implemented an engineering feasibility study for a new railway line in cooperation with the Government of China. The study has been conducted three times since 2008. The result of the feasibility study was announced on June 2011, in which the total railway construction cost was estimated to be US\$ 686M. But, the cost relating to resettlement and compensation is excluded in this price tag. The Chinese Government has declared to offer financial assistance of US\$ 500M to construct Cambodia-Vietnam Railway, in the scheme of Intra-Asia Railway Development announced in 2008. The Government of Cambodia signed the MOU on the connection of railways between Cambodia and Vietnam at Trapeing Sre (Cambodia side) and Valeu (Vietnam side) in 2008. The location of the planned railway line is shown in Figure 2.4-31.



Source: MPWT (modified by the Project Team)

Figure 2.4-31 Location map of the new railway line in Cambodia

Even though a railway line is implemented in accordance with the plan and MOU, the railway line connecting Ho Chi Minh with the border of Cambodia still does not exist in Vietnam. In order to accomplish the Singapore–Kunming Railway Line initiative and enhance the railway network in GMS countries, new railway lines in both Cambodia and Vietnam have to be constructed. In 2002, the feasibility study was conducted on the railway rehabilitation linking between Ho Chi Minh and Loc Ninh (Total 129 km in length), and this will be reflected in the "Railway Master Plan 2020". The cost of this railway rehabilitation was estimated to be US\$ 204 M according to the feasibility study result. The Vietnamese Government is currently seeking financial assistance to construct this railway.

Although there is a possibility of railway network being constructed connecting Cambodia and Vietnam before the target year, it is thought to be challenging to establish a railway network, mainly because of the enormous construction cost, existing unsolved problem of resettlement over an extensive area, unsecured financial assistance on projects in Vietnam alone, high number of high speed and inter-city railway project plans being proposed in Vietnam other than mentioned above, and also possibly the positively progressing road maintenance linking Cambodia and Vietnam.