National Sector Review

Navigation, Transport and River Works

June 2003

Prepared by

Ministry of Public Works and Transport

In association with

Cambodia National Mekong Committee
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Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AADT</td>
<td>Average Annual Daily Traffic</td>
</tr>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of South East Asian Nations</td>
</tr>
<tr>
<td>CDC</td>
<td>Council for the Development of Cambodia</td>
</tr>
<tr>
<td>CNMC</td>
<td>Cambodia National Mekong Committee</td>
</tr>
<tr>
<td>DWT</td>
<td>Deadweight Tonnage</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GMS</td>
<td>Greater Mekong Sub-region</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>MPWT</td>
<td>Ministry of Public Works and Transport</td>
</tr>
<tr>
<td>MRC</td>
<td>Mekong River Commission Secretariat</td>
</tr>
<tr>
<td>MRD</td>
<td>Ministry of Rural Development</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-Governmental Organizations</td>
</tr>
<tr>
<td>NL</td>
<td>Northern Line</td>
</tr>
<tr>
<td>NRM</td>
<td>Natural Resources Management</td>
</tr>
<tr>
<td>NRs</td>
<td>National Roads</td>
</tr>
<tr>
<td>RGC</td>
<td>Royal Government of Cambodia</td>
</tr>
<tr>
<td>RRC</td>
<td>Royal Railway of Cambodia</td>
</tr>
<tr>
<td>SIDA</td>
<td>Swedish International Development Agency</td>
</tr>
<tr>
<td>SL</td>
<td>Southern Line</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
</tbody>
</table>
Executive Summary

The Inland waterway system has traditionally played a vital role in the Cambodian economy. The system consists of the Tonle Sap Lake, the Mekong River and the Bassac River for a total navigable length of 1,750 km, with 580 km navigable all year round. Most of the waterway traffic is on the Mekong River between Phnom Penh and Ho Chi Minh City, and from Phnom Penh upstream to Kratie province. Vessels of up to 5,000 tones can navigate along the Mekong up to Phnom Penh for most of the year.

 Improvements in the efficiency of transport services will in turn create the conditions for investment in a new sector infrastructure. Rapid rehabilitation of transport capacity particularly the re-establishment of the primary road network is essential, as is the implementation of new services to ensure that future economic growth is not constrained by absence of an adequate transport infrastructure.

The transport sector was severely damaged during the period of war beginning in the early 1970s though the mid-1990s. This damage was due to the destruction brought by the war itself and caused by 25 years of neglect. The existing road network in Cambodia consisting of National (primary), provincial (secondary) and rural (tertiary) roads, has a total length of approximately 34,000 km. The primary road network comprises 4,160 km. It is the only transportation mode that has nationwide coverage and carries the bulk of the freight and passenger movements within the country. It carries about 90% of the freight moved within the country. In the road network system, primary routes connecting to neighboring countries such as Vietnam, Lao PDR and Thailand have not been rehabilitated and connected yet.

Only 350 km of roads were reconstructed in accordance with the international standards; while another 550 km have been rehabilitated. This is still inadequate however, with the total length of the national road network amounting to 4,165 km plus some 3,615 km of provincial roads. The National Road Rehabilitation and Reconstruction Program is presently ongoing with the aim at rehabilitating 1,400 km of National Roads by the year 2003. The Cambodian military are also contributing effort to this program, undertaking the rehabilitation of just over 900 km of road. In addition, the Emergency Flood Damage Repair Program repaired the primary road network caused by the flooding of 2000.

Financial support, technical officers, private sector participation, and compliance and enforcement of the rules and regulations are major constraints faced by the transport sector. In response to the constrains, the Royal Government of Cambodia has built on existing reforms and focused on the most pressing constraints to the rapid development of the sector. The efficiency of the sector by promoting greater private sector participation and facilitating competitive markets for transport services has also been increased. Public investment priorities will complement high priority policy actions aimed at strengthening sector institutional capacity and management, expanding transport services, particularly roads, and developing cost recovery mechanisms. The successful development of infrastructure will undoubtedly support the development of the economy and improve the quality of life for all Cambodians.
1. **Introduction**

An efficient transport system is vital to sustain and enhance economic growth and the quality of life. The provision of such transport facilities and services must, however, meet the essential criteria of economic efficiency. Goods and passengers must move by the mode that least costly as uneconomic services impose heavy burden on economy. The transport sector in Cambodia today is not able to efficiently respond to the increase of demand and the diversity of services provided at high cost.

Cambodia is emerging from more than 20 years of war. During that period, most of the country’s basic infrastructure was badly damaged or almost completely destroyed. Within the transport sector, including roads, railways, air-transport and port was also severely damaged.

After civil war, Cambodia is striving and starting the full course and efforts for rebuilding and the development of the nation and socio-economy of the country. Sustaining economic growth through improved efficiency of agriculture, industry and service sectors is constrained by an inadequate internal transport system and poor links to regional trading partners. Transport is critical to Cambodia’s economy because of its growing regional trade and agriculture and rural development priorities. A more efficient transport infrastructure is essential to facilitate the expansion of small and medium sized export oriented enterprises.

Cambodia’s geographic location offers strategic opportunities for it to become a regional transportation and trading hub within the dynamic Greater Mekong sub-region as well as a suitable location for regional institutions and administrative services. Improvements in the efficiency of transport services will in turn create the conditions for investment in new sector infrastructure. Rapid rehabilitation of transport capacity particularly the re-establishment of the primary road network is essential, as is the implementation of new services to ensure that future economic growth is not constrained by absence of an adequate transport infrastructure.

In the medium term, the Government will build on existing reforms and focus on the most pressing constraints to the rapid development of the sector. The priority will be to improve the efficient use of existing infrastructure and accelerate the sector capital program, while enhancing sector planning and financing mechanisms. The Government has the important role to play in increasing the efficiency of the sector by promoting greater private sector participation and facilitating competitive markets for transport services. Public investment priorities will complement high priority policy actions aimed at: (i) strengthening sector institutional capacity and management; (ii) expanding transport services, particularly roads; (iii) developing cost recovery mechanisms and in support of reforms to be taken at the macroeconomic level.
2. The Existing Transport System

As with much of the economic infrastructure, the transport sector was severely damaged during the years of war beginning in the early 1970s though the mid-1990s. This damage was due to the destruction brought by the war itself and caused by 25-years of neglect. Since the early 1990s, concerted efforts by the Government of Cambodia and the donors community has been made to reestablish the kingdom's basic infrastructure especially in transport sector. Success has been achieved in number of areas, but much still remains to be done.

A major constraint faced by the sector is the lack of financial support that ensure the long-term sustainability of the transport infrastructure. The lack of qualified personnel in the public and private sectors that are needed to implement and maintain infrastructure restricts the rate at which it can be restored and maintained. The organized structure needs further strengthening to improve efficiency and performance of the sector. The statuary requirements, which form the legal basic for many activities in the sector, have to be updated to reflect changes in the sector. The current status of each sub-sector is reviewed below.

2.1. Roads Sub-Sector

2.1.1. Road Network

The existing road network in Cambodia consisting of National (primary), provincial (secondary) and rural (tertiary) roads has a total length of approximately 34,000 km, of which about 4,100 bridges and 10,000 km is the primary and secondary network, and the balance of 24,000 km is rural roads. The primary road network comprises 4,160 km National Roads (A&B), which are under the jurisdiction of the Ministry of Public Works and Transport (MPWT). It is the only transportation mode that has nationwide coverage and carries the bulk of the freight and passenger movements within the country. For all the different networks and for most of the roads, their condition can be described as in "poor to bed" with many sections essentially impassable to traffic.

There are adequate linkages between Phnom Penh and Regional cities, but the linkages between the regional cities are not well developed. Approximately 15% of national and provincial roads are paved and the rests are gravel, lateral pavement or earth roads, as shown in table.

<table>
<thead>
<tr>
<th>Type of Roads</th>
<th>Length (Km)</th>
<th>Asphalt or DBST Pavement (Km)</th>
<th>Gravel, Laterite or Earth Pavement (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Roads(A)</td>
<td>2,000</td>
<td>725</td>
<td>1,275</td>
</tr>
<tr>
<td>(Primary Roads)</td>
<td>(5.8%)</td>
<td>(78%)</td>
<td>(3.9%)</td>
</tr>
<tr>
<td>National Roads(B)</td>
<td>2,165</td>
<td>200</td>
<td>1,965</td>
</tr>
<tr>
<td>(Primary Roads)</td>
<td>(6.4%)</td>
<td>(22%)</td>
<td>(6.0%)</td>
</tr>
<tr>
<td>Provincial Roads</td>
<td>3,615</td>
<td>-</td>
<td>3,615</td>
</tr>
<tr>
<td>(Secondary Roads)</td>
<td>(10.6%)</td>
<td></td>
<td>(10.9%)</td>
</tr>
</tbody>
</table>
There are seven major national roads, which eradicate from Phnom Penh and connect with almost all regional centers. A profile of major national roads has been shown in Table 2. The surfaces of these roads are all in construction and rehabilitation, and most of the provincial and rural roads are impassible.

**Table 2: Major Roads in Cambodia**

<table>
<thead>
<tr>
<th>RN No</th>
<th>Route</th>
<th>Length (km)</th>
<th>No. of Lanes</th>
<th>Width (m)</th>
<th>Asphalt surface (km)</th>
<th>Laterite or earth Surface (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN1</td>
<td>Phnom Penh-Svay Rieng-Vietnam Border</td>
<td>167</td>
<td>2</td>
<td>11</td>
<td>60</td>
<td>107</td>
</tr>
<tr>
<td>RN2</td>
<td>Phnom Penh-Chambak-Takeo-Vietnam border</td>
<td>122</td>
<td>2</td>
<td>6-11</td>
<td>74</td>
<td>48</td>
</tr>
<tr>
<td>RN3</td>
<td>Phnom Penh-Kampot-Veal Rinh</td>
<td>202</td>
<td>2</td>
<td>6-11</td>
<td>180</td>
<td>22</td>
</tr>
<tr>
<td>RN4</td>
<td>Phnom Penh – Sihanoukville</td>
<td>226</td>
<td>2</td>
<td>10</td>
<td>226</td>
<td></td>
</tr>
<tr>
<td>RN5</td>
<td>Phnom Penh-Kampong Chhnang-Pursat-Battambang-Sisophone-Poi Pet-Thai Border</td>
<td>407</td>
<td>2</td>
<td>6-11</td>
<td>91</td>
<td>316</td>
</tr>
<tr>
<td>RN6</td>
<td>Skun-Kampong Thom-Sieam Reabp-Sisophone</td>
<td>416</td>
<td>2</td>
<td>11</td>
<td>170</td>
<td>246</td>
</tr>
<tr>
<td>RN7</td>
<td>Skun-Kompong Cham-Snoul-Kratie-Stung Treng-Lao Border</td>
<td>460</td>
<td>2</td>
<td>6-11</td>
<td>122</td>
<td>338</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2003</strong></td>
<td><strong>923</strong></td>
<td></td>
<td></td>
<td><strong>1,080</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: UNDP & Ministry of Public Works and Transport.

**2.1.2. Trend of Road Transport and Road Traffic**

The Road Transport is the only mode, which has nation-wide coverage, and it carries about 90% of the freight moved within the country. In the road network system, primary routes connecting to neighboring countries such as Vietnam, Lao and Thailand have not been rehabilitated and connected yet. The Government of Cambodia gives the priority to the rehabilitation, improvement and connection of the main national roads/corridors and transport system.
National Roads (NRs), the important transport facilities, have been rehabilitated in line with this effort and with the assistance by the donors. The present national road network is severely deteriorated, causing heavy traffic, traffic accidents and adverse influence on the environment. More than half of the primary road network is in urgent need of repair, rehabilitation or improvement. During the rainy season, many roads are not passable and large parts of the country are isolated. The supply of essential commodities and delivery of basic services in rural areas are threatened by the deterioration of the road network.

For domestic traffic, the road transport is dominant. Almost 65% of passenger kilometers per year and 69% of other freight are carried by road. Boat carries about 15% and 20% of passenger and cargo respectively; and rail carries the remaining 20% of passengers and 10% of cargo. International seaports at Sihanoukville and Phnom Penh are the key gateways linking Cambodia to the regional and international markets, handling an estimated 1.6 million tons of cargo in 1999. International Airports in Phnom Penh and Siem Reap are also important gateways for growing passenger traffic.

The traffic traveling over these networks is characterized by a high percentage of motorcycles, and high accident rates. In 2001, the NR5 near Battambang recorded the highest volume of traffic in term of Average Annual daily traffic (AADT) at 1,872 but without motorcycles it hand an AADT of 574 or 31 percent of the total. Traffic decreases to near zero AADT on many tertiary roads especially when they are under water during the wet season. Presently, there is a heavy reliance on ODA funding to restore the road network and a lack of an assured manner of funding road maintenance. Low levels of funding for maintenance and the limited human resources act as constraints on the rapid restoration of the road network.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods</td>
<td>Thousand Tones</td>
<td>1,246</td>
<td>2,116</td>
<td>2,563</td>
<td>2,823</td>
<td>2,685</td>
<td>3,214</td>
</tr>
<tr>
<td></td>
<td>Thousand Tone-km</td>
<td>133,070</td>
<td>214,672</td>
<td>269,164</td>
<td>293,450</td>
<td>284,180</td>
<td>308,158</td>
</tr>
<tr>
<td>Passengers</td>
<td>Thousand Persons</td>
<td>599</td>
<td>1,052</td>
<td>1,194</td>
<td>1,534</td>
<td>1,254</td>
<td>1,719</td>
</tr>
<tr>
<td></td>
<td>Thousand P-km</td>
<td>62,981</td>
<td>105,133</td>
<td>123,885</td>
<td>162,374</td>
<td>141,144</td>
<td>201,223</td>
</tr>
</tbody>
</table>

Indications are that the rates of traffic growth that can be expected on the primary network between the years 2001 and 2015 will result in traffic on most routes doubling over this period.

| Traffic (all vehicles) forecast for the main road network |
### 2.1.3. Road status and condition

Current transportation system in Cambodia consists of road, railways, inland port, and waterway transport, air transport, which has become constraints to the development of Cambodian economy and social activities. The first priority in developing the transportation network is the reestablishment of the road network. Poor and damaged Cambodia’s transport system has been gradually rehabilitated and reconstructed by technical assistance of international agencies and donor countries.

Over the past 20 years or so, the conditions of these roads have significantly deteriorated due to war, neglect, lack of maintenance and excessive flooding.

#### Table 5: Road Conditions

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Km</th>
<th>Good to Excellent</th>
<th>Fair</th>
<th>Poor to bad</th>
<th>Under construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main National Road (1-7)</td>
<td>2,003</td>
<td>206</td>
<td>522</td>
<td>730</td>
<td>545</td>
</tr>
<tr>
<td>Other National Road</td>
<td>2,754</td>
<td>121</td>
<td>502</td>
<td>2,040</td>
<td>90</td>
</tr>
<tr>
<td>Provincial Road</td>
<td>5,700</td>
<td>99</td>
<td>1,275</td>
<td>4,281</td>
<td>45</td>
</tr>
<tr>
<td>Urban Road</td>
<td>1,700</td>
<td>29</td>
<td>390</td>
<td>1,247</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12,156</td>
<td><strong>455</strong></td>
<td><strong>2,682</strong></td>
<td><strong>8,297</strong></td>
<td><strong>715</strong></td>
</tr>
</tbody>
</table>

Source: ADB.

In the late 1990s the Government embarked on a program for the rehabilitation of the National Roads with the aid of grant funds and loan financing. The Government with external assistances from ADB, UNDP, World Bank, USAID, Japan, EU other bilateral agencies and several NGOs has been focusing development efforts on rehabilitation the primary road network including bridges and ferry crossings in order to facilitate goods transport and the integration of markets. Significant projects in this category have included the reconstruction of a bridge across the Tonle Sap at Phnom Penh, the upgrading of the first section of NR6 and NR7 and the construction of the Mekong Bridge at Kampong Cham, the reconstruction of NR4 to Sihanoukville, as well as the rehabilitation of long sections of NR 1,2,3,5 and 11.
The Government has made the efforts with their own limited budget to repair and rehabilitation some primary and secondary roads, which are link to the isolated areas, included NR 56, 58, 59, 67, 69a etc. Several rural roads have been initiated with the purpose of promoting socio-economic development in rural areas. Other projects within the transport sector include improvements to the international ports in Phnom Penh and Sihanoukville.

During the SEDPI-1 period, a number of road projects were completed by the assistances. These include the reconstruction of NR 6 from Phnom Penh to the Junction with NR 7 at Skun; the reconstruction of NR 7 between Skun and Kampong Cham; the construction and rehabilitation of a number of bridges, mostly along NR5 and 6; and the rehabilitation of several ferries, and improvement to ferry site at Neak Loeung (NR 1), Prek Kdam (NR5) and Tunlebit (Kampong Cham).

In total only 350 km of roads were reconstructed to international standards, while another 550 km have been rehabilitated. This is however still inadequate with the total length of the national road network amounting to 4,165 km plus some 3,615 km of provincial roads. The construction of a bridge across the Mekong at Kapong Cham was completed in 2001.

The National Road Rehabilitation and Reconstruction Programme is presently ongoing with the aim at rehabilitating 1,400 km of National Roads by the year 2003. The Cambodian military is also contributing its effort to this program, undertaking the rehabilitation of just over 900 km of road. In addition, an Emergency Flood Damage Repair Program was commenced in 2001 to repair the damage to the primary road network caused by the flooding of 2000.

The road rehabilitation carried out to date has not yet had a significant impact on the traffic volumes, due in part to these works being carried out on sections of rather than whole routes. Greater impacts are anticipated as through routes are completed - especially those constituting the Regional and ASEAN routes - and network usage increases.

### 2.2. Railways

The railroad network consists of two lines: Northern and Southern Lines. Both the Northern and the Southern Lines need to be rehabilitated. 48 km linking between Poipet and Sisophon is missing.

- Northern Line: connecting from Phnom Penh to the Cambodian-Thai border which the last 48 kilometers from Sisophone to Poi Pet on the border need to be restored; and
- Southern Line: the second line, 254 km long, was built between 1960 and 1969 with wood sleepers. The South Line which connects Phnom Penh to Sihanoukville. The condition of the rail bed is poor as well as much of its equipment is old and out of service.

**Table 6: Trend of Traffic Volume on Rail Transport 1994-2001**
In 1969-70, the Cambodian railway system was, at its peak operating 37 trains per day, with 69 locomotives, more than 900 wagons of all types, carrying 2.4 million passengers and 360,000 tons; largely from the Northern line (350,000 tons). More than 20 years of war, the railway lines were severely damaged, with some parts entirely. Normal service was restored in the early 80’s with problems of insecurity persisting until 1998. In 2001, it carried 336,000 passengers and 390,000 tons with a maximum of 7 trains at a maximum speed of 35 km/h because of severe speed limitations all along the line (compared to an average speed of 60 km/h in 1969). The railway system uses a one-meter gauge with 12m rail of 30 kg/m on the Northern Line (NL) and 43 kg/m on the Southern Line (SL). Axle load restrictions are in principle 15t on NL and 20 on SL. In reality the restriction is more 10t per axle on NL. It is useful to put RRC in perspective with other railways.

### 2.3. River Ports and Waterways System

Most of the waterway traffic is on the Mekong River between Phnom Penh and Ho Chi Minh City, and from Phnom Penh upstream to Kratie. Vessels of up to 5,000 tones can navigate along the Mekong up to Phnom Penh for most of the year. Traffic on waterways other than the Mekong is by means of small crafts, which constitute a very small volume. There is no reliable dredging needed to maintain adequate water depths in the dry season. Further reliable statistics related to the water traffic are not available.

The Inland waterway system traditionally plays a vital role in the Cambodian economy. The system consists of the Tonle Sap Lake, the Mekong River and the Bassac River for a total navigable length of 1,750 km, with 580 km navigable all year round. In the dry season, the draft of Mekong upstream of Phnom Penh is some 3.8 m to Kampong Cham (105 km) and 1.5 m to Kratie (116 km from Kampong Cham). With dredging a draft of 2.5 m could be kept the whole year as far as Kratie with annual dredging. Between Kratie and Stung Treng, 50 ton-boat can pass easily during the rainy season, but at low water only 20 ton-boats can pass. On Tonle Sap River the draft is about 3.5 m up to Kampong Chhnang in dry season but from Kampong Chhnang to Chong Kneas (near Siem Reap) on the Lake, dry season draft is 0.8 m and reaches between 5 and 11 m in the rainy season. The Bassac River links Phnom Penh to Chau Doc, the capital of Vietnam’s An Giang province. In the rainy season 100 ton-boat can be used.

The most important domestic ports are in Phnom Penh, Kampong Cham, Kratie and Stung Treng on the Mekong, Kampong Chhange, Chnok Trou and Siem Reap on the Tonle Sap River and lake. Chnok Trou and Kampong Chhang are also road-river
transshipment ports. All the domestic ports suffer from insufficient or the total absence of supporting landing infrastructure. There is presently no any reliable data on domestic cargo movements on the river system. In 1994, it was estimated (in depth survey of boat operators) that about 40 to 50,000 tones could constitute the domestic cargo. Figures between 15 and 50,000 tons are usually quoted. The absence of reliable figures makes the task of designing and promoting river ports extremely difficult.

The shallower Mekong, rather than the Bassac River is the declared international channel for navigation to Phnom Penh, Kompong Cham and Kratie, restricting vessel size. Small seagoing vessels (up to 4,500 DWT) are able to serve Phnom Penh in Cambodia.

2.4. Airports and Aviation

The two major international and domestic airports are Pochentong serving Phnom Penh and Siem Reap. The same concessionaire operates both airports; this assures reasonable levels of capital and maintenance funding for these facilities. The State Secretariat of Civil Aviation operates the seven smaller domestic airports. Traffic is growing rapidly at the two major international airports driven by tourism.

2.5. Urban Transport

Associated with the poor condition of the roads are localized flooding during rainstorms. These cities will be facing major traffic and other transport related problems in the coming years if the development of their infrastructures does not keep pace with the growth of population. Funding of the restoration, expansion and maintenance of basic infrastructures is not assured on a sustainable basis.

Phnom Penh is the commercial and political capital city of Cambodia, with a population of about 1 million persons – about 10% of the national population. In 2001, there were estimated to be about 383,000 registered vehicles in Cambodia. The percentage of the total vehicle fleets being motorcycles has started to reduce gradually in the last 5 years, as the economy has expanded and car ownership has increased. In Phnom Penh, the number of cars was estimated in 2000 to be about 50,000 and motorcycles to be about 250,000. Traffic and household surveys undertaken in 2001 estimated that 60% of daily trips in Phnom Penh were via motorcycle, 34% walking, and only 3% by motor vehicle.

From observation in 2002, most of the main (arterial) road network in the urban area of Phnom Penh appeared to be in reasonable condition, although the secondary and local road system was poor and surfaces of many minor roads were in need of rehabilitation, repair and re-surfacing. Drainage on all roads remains a concern and pedestrian sidewalks (where they exist) are generally in very poor condition.

3. Ferry sites

A large number of river crossings still constitute bottlenecks. There are 10 ferry sites operated in the main rivers, which connect to the main national roads. Four main ferry sites, including Neak Loeung, Prek Kdam, Tonle Bit and Stung Treng are of important links connected to the National Road System. After the construction of Mekong Bridge at
Kompong Cham, the Tonle bit Ferry was moved to the new place at Prek Tamaek on the downstream of Mekong, which is far from Phnom Penh City about 20 km.

The RGC plans to set up new ferry sites and construct the roads towards the triangle area-border point at Northeast region of the country: Cambodia, Lao and Vietnam; and across the Mekong at Stung Treng to connect the north-eastern part (Ratanakiri and Styntreng) to the North-central and North-western parts (Preah Vihear, Kampong thom, sieam reab and Banteay Meanchey) of the countries.

4. Maritime, Port, Shipping and Inland Waterway Transport

4.1. Sihanoukville Port

The development of the port has also to be seen within the context of economic development of the whole region. The development of an industrial park inside a free zone area is definitely a crucial point for the whole economy of the region. Many constraints will need to be removed before it becomes reality, such as the rehabilitation of the access road to the oil terminal - also the access road to the “Free Zone”.

The rehabilitation of the road also raises the question of the future of the relocation of the existing passenger terminal, coastal shipment activities and the fishing port and fishing activities. The cost of the road rehabilitation should be, at least in part, covered by the private sector (fuel companies and users of the new free trade zone). In short, the strategy is to proceed with the development of the free trade zone making all the required adjustments to the infrastructure necessary on a cost recovery basis.

4.2. Phnom Penh Port

The strategy for Phnom Penh Port is based on the competition and competitiveness. The urgency of a vigorous competitive strategy is required otherwise the port may be on an irreversible declining trend. Phnom Penh Port has a role to play in the future and should be in a position to be an alternative to Sihanoukville.

Competitiveness of Phnom Penh Port will be improved in the future if:

- Physical obstacles to river navigation are being removed;
- Satisfactory agreements can be reached with Vietnam; and
- Customs inspections, border and transit formalities are simplified;

Areas requiring annual dredging in Cambodia (Mekong) and Vietnam (Mekong and Bassac) are well known. Dredging is required to maintain all the year round a minimum draft of 5m. Financing dredging in Cambodia (and in Vietnam) has always been a major problem. The private sector approach has been proposed. It is proposed to turn the maintenance of the Mekong channel in Cambodia first, but ideally for Cambodia and Vietnam together, into a BOT or a BOO operation. The international company will operate in Cambodia and Vietnam; and will charge passing vessels (based on draft) a toll
to recover maintenance costs. Maintenance costs will be made of dredging but could also include navigation aids (night navigation).

Some important agreements will need to be reached between Cambodia and Vietnam. These agreements are as follows:

- Authorization by international ships to PP to use the Bassac route as well as the Mekong route;
- Abolition of transit charges to international ships entering Vietnam for PP;
- Simplification of customs formalities for entering vessels; and
- Agreement on not requiring vessels to come to a complete stop to get pilots, customs and immigration officers;

In addition, Cambodian customs should agree to have customs clearance at port (PP); not at the border.

The second aspect of the strategy for PPP is the concerns of its future location in the context of the capital expansion. The location of PPP within the city poses the following problems:

- Limitations (time of operation) on trucking operations within the city affect negatively port activities;
- Any major increases in container port activities will face serious constraints in terms of stocking areas (container yard);
- Fuel pumping terminals located the Tonle Sap River present a serious hazard and there have been talks of relocating these activities further away from the city center;
- Phnom Penh Port, like Sihanouk ville needs an urgent hazard emergency plan for the short term and should plan a move to another location in the next five years especially if the containers activities (by fast barges from Ho Chi Minh) materialize.

4.3. River Ports

Domestic river navigation (passenger and goods) has traditionally been a crucial mean of communication in Cambodia. In the short term, the situation will remain unchanged. After 2005, when major roads are being rehabilitated, a new realignment in domestic river traffic will take place. The realignment will be along the following lines:

- For remote, rural destinations, the natural complementary will persist; roads being preferred in dry season and boats in the rainy season;
- Short haul transportation (goods and passengers) will continue to be economical especially for populations leaving along the river network; and
- River transportation will keep the long haul, bulky and low value transportation; the rest of the transport if it has not yet shifted to the road will eventually do it;
International shipments travel on the Mekong River though they may enter in Vietnam through the Bassac or the Mekong River. Vessels entering Vietnam for Cambodia using the Bassac River would need to switch to the Mekong at the Vam Nau pass in Vietnam. Continuous dredging is required in Vietnam to allow for secure passage of vessels requiring a 5m draft. There are also stretches in Cambodia that require dredging otherwise the available draft can fall to 2.5 m draft. Also the bends of the Mekong River prevent vessels of more than 110m to navigator through.

5. Policy Framework

The Royal Government of Cambodia is committed to restore the condition of primary roads and highway network so that it may connect the principle urban center of the country. In the longer term, the strategy is provide all weather access between the primary road network and all provincial capitals and to all major border crossings.

The RGC realizes the benefit from keeping a well functioning railway system as an essential part of the transport system. Despite its poor condition and low levels of service, it might be possible to bring it into profitable operation through its completed operation. The involvement of the private sector is necessary. The international ports, including airports and maritime ports are required the encouragement form the RGC and the participation from private sectors. Also, the development and strengthening of regional linkages with its ASEAN neighbors have to be encouraged.

5.1. Regional Highways and Main Corridors in Cambodia

Asean Highway
There are three road corridors /sections which are designated as part of the ASEAN Highway Network:

- ASEAN Highway 1 – AH1: (NR5 and NR1) linking Aranyaprarat/Poipet (Thai/Cambodia border) – Phnom Penh to Bavet/Moc Bai (Cambodia/Vietnam Border);
- ASEAN Highway 11 – AH11: (NR7 and NR4) linking VoeunKham (Lao/Cambodia border) – Phnom Penh - Sihanoukville Port; and
- ASEAN Highway 123 – AH123: (NR48) Hat Lek/Cham Yeam (Thai/Cambodia border) Sre Ambil.

Asian Highway in the Framework of UNESCAP

- Asian Highway A1: (NR5 and NR1) linking Aranyaprarat/Poipet (Thai/Cambodia border) Phnom Penh to Bavet/Moc Bai (Cambodia/Vietnam Border); and
- Asian Highway A11: (NR7 and NR4) linking VoeunKham (Lao/Cambodia border) – Phnom Penh-Sihanoukville Port.

Regional Highway GMS Components

- Regional HighwayR1: (NR5 and NR1) linking Aranyaprarat/Poipet (Thai/Cambodia border) – Phnom Penh to Bavet/Moc Bai (Cambodia/Vietnam Border);
Regional Highway R6: (NR7 and NR4) linking VoeunKham (Lao/Cambodia border) – Phnom Penh – Sihanoukville Port;
- Regional Highway R9: (NR78) linking from Opong Moan – Banlung Oyadav; and

Cambodia Main Corridors

- Corridor1(East – West): NR5 and NR1 connecting Bangkok/Thailand with Ho Chi Minh City/Vietnam via Poipet, Sisophone, Battambang, Phnom Penh and Bavet;
- Corridor 2 (North – South): NR7 and NR4 connecting of Southern Port to Southern Lao via Phnom Penh, Kratie, Stung Treng and Voeun Kham;
- Corridor 3 (East – West): (NR48) connecting NR4 with Thailand; eastern sea Board via Koh Kong Hat Lek/Cham Yeam (Thai/Cambodia border) – Sre Ambil; and

Economic Zones or Triangles for the Transportation Purpose
The road rehabilitation program will strengthen the linkage between the three broad economic zones or triangle into which the country is divided for transport planning process, are as follows:

- Tourism zone, formed by the triangle of Siem Reap – Preh Vihear and Kompong Thom; and
- Industrial zone, defined by the entire northern coastal zone of the country.

Agro-industrial and eco-tourism zone, covering the eastern region of the Mekong river, including Ratanakiri and Mundulkiri.

5.2. Maximizing Regional Links
The RGC recognizes that the country’s geographic location offers strategic opportunities for establishing Cambodia as a regional transportation hub for the Greater Mekong sub-region. The RGC places high priority on further expanding trade, particularly within ASEAN and on improving cross border linkages. The budget will be used to the maximum extent possible to finance the local cost of domestic roads and railway programs either alone or in parallel with international agencies. In addition, the RGC will assess the scope for financing the regional infrastructure programs through the participation of the private sectors. Regional routes will be improved and upgraded. the cooperation and coordination among neighboring countries have also been strengthened and improved.
5.3. Rehabilitation, Maintenance and Expansion of Infrastructure

The public investment priorities are firstly to rehabilitate the transport system with roads as the first priority and finance improvements in operations and maintenance capability, so as to pave the way for longer term sector expansion. Road rehabilitation and reconstruction can facilitate people living in remote areas to access to the areas with significant development potential. The pace of improvement of secondary and tertiary road networks serving rural areas will be accelerated.

Other immediate plans include: (i) the preparation of technical studies to assess requirements and priorities for new linking roads; and (ii) the establishment of road-bridge maintenance organizations.

The RGC has to ensure that the maintenance of the road network, including bridges and ferries, is financed by vehicle registration charges, tolls, international transit fees and fuel levies or other related taxes and duties.

5.4. Strengthening Institutional Capacities in Planning and Management

Government interventions will be strictly limited to ensuring that markets work by regulating market entry and the licensing of transport systems. This will ensure that competition is promoted and monopoly situations are avoided. The aim is to safeguard consumers as well as better enforce adherence by transport operators to national safety, technical and environmental standards. Suppliers of transport services will not be constrained in tailoring their services to customers providing that they adhere to legislative and regulatory rules designed to protect consumers, worker health and safety and the environment.

The capability and skills are keys to successfully implement medium term policies. The MPWT will undertake additional identification of longer term priorities by conducting with external assistance an inter-modal transport study for the transport sector as a whole in order to formulate a comprehensive transport policy.

6. The Strategy

The recommendation strategy for the two international ports, Sihanoukville and Phnom Penh, is to ensure that they continue to compete one with the other and remain competitive, as they are likely to face increasing competition in the near future. This will be facilitated by privatizing more services and giving full autonomy to the port authorities. The present autonomous port authorities should be run like private enterprises.

In the case of Phnom Penh, the Government should take all the necessary measures to make navigation on the lower Mekong easier and less costly. This means establishing appropriate international agreements with Vietnam that are enforced regarding fast custom, immigration and piloting services. This also means developing a dredging programme with the active participation of the private sector. In a 10 year horizon, if
traffic peaks up in Phnom Penh port, it is suggested to build a new port along the Mekong further from the core of the city.

In the case of Sihanoukville, the development of the port has to be seen within the context of a regional development programme including the establishment of a light industry duly-free zone and the promotion of tourism activities.

Finally, the Government should support the development of the inland waterway system by providing minimum landing facilities when required, proper navigation aid and dredging. Public expenditures should be minimized however and participation of the private be reviewed with clear distinction made between ownership of assets, regulatory power and management of the port asset. Participation of the private sector should be encouraged.

6.1. Economic and social impact

The economic evaluations consider the net benefits to the economy as a whole that would result if a project were undertaken, in relation to the "do nothing" case. For most water transport projects, the main part of these benefits is derived in the form of reduced operating costs. Due to the competition between operators (at least in the long term), these benefits can be expected to be passed on to the consumers and the traveling public in the form of reduced prices. Benefits resulting from diverted and generated traffic are also included. Savings in maintenance costs or in the operating costs are significant in some cases.

The social benefits could be a very large number of different types, all directly or indirectly related to improved accessibility and reduced transport costs (including the value of time savings). Some of these effects, such as the total cost savings to existing and diverted traffic will be considered in the economic criteria of the strategy formulation. Many others are not and these particularly concern the benefits due to new (generated) traffic. If waterway access is improved from an extremely poor to a reasonable level, this can be expected to result in more social benefits.

6.2. Water transport development and poverty reduction

Water transport sector in directly contributing to poverty reduction has received little attention so far. By and large, the navigation projects were assessed in terms of improving efficiency and promoting economic growth. The contribution of transport operations to poverty alleviation is seen, in general, as indirect and stemming from broadly based economic development. Yet, most direct poverty-targeted interventions (schools, health clinics, nutrition programs, and social services) depend on transport as a complementary input for their effective delivery. It is desirable and timely to assess prevailing views of the role of transport projects in poverty alleviation and to take stock of the treatment of poverty issues. Room has to be allowed to establish a sound conceptual framework for identifying, examining, and shaping the potential role of waterborne transport operations in reducing poverty.

Minimal infrastructure services are one of the essential components of personal welfare and provide more convenient access to a broad range of socio-economic opportunities.
This can be best assessed by examining how navigation affects people’s daily activities. Many villages along the Mekong River and its tributaries are geographically isolated; the river is the only access. Convenient and safe access to the schools, hospitals, markets and to other villages is therefore paramount; lack of affordable and safe access deprives them of the ability to take advantage of job opportunities and even very basic social services.

In general, a transport project is expected to contribute to poverty reduction through its indirect impacts on economic growth or its direct impact on personal welfare of the poor. What exact impact the project would have on poverty reduction hinges on both the type of infrastructure or services and the areas and people the project serve. In general, local waterways or canals in poor rural areas make only a modest contribution to national income growth, but they are likely to have a direct significant impact on the daily life of the poor. On the other hand, shipping is of strategic significance to a national economy. It is provided with the objective to stimulate and facilitate national income growth; their impacts on poverty reduction are indirect.

Transport investment reduces the cost of assembling intermediate inputs for production (raw materials, energy, labor, other intermediate products, and information) from different locations, directly reducing the cost of production. Reduced cost and improved quality in transport services also reduces the market price of products and hence promotes regional and international trade, making it possible for agriculture to commercialize, for industry to specialize, and for production and employment to expand by exploiting scale economies. In a multitude of ways through these mechanisms, transport contributes to economic growth. In addition to improving accessibility, navigation investment affects employment. The provision of the transport services, including the construction and maintenance of transport infrastructure, generates demand for labor (often unskilled labor) and provides income-earning opportunities for the poor. If a transport project generates jobs for the poor who are otherwise unemployed or under-employed, it contributes to the reduction of poverty.

On the Mekong, the great navigation potential has not been addressed yet to the core although lots of small scale projects could primarily help farmers and the agriculture sector in its transportation needs of agricultural goods from production to consumption centers. Indeed, the access provided by waterborne transport to remote areas where the river offers the only possibility for communication and can have an optimum return on interventions in other sectors. For farmers, improved river transport can also ease the introduction of improved farming practices and the transition from subsistence farming to cash crops and a market economy.

Transport development may also have an adverse impact on the poor. The infrastructure works or the navigation operations, if not monitored or regulated well, may cause negative environmental impact. In this case, the poor are the least able to respond, adjust or compensate; they may be the most vulnerable and the most “at risk”. This has to be taken duly into account when drafting the strategy.
In many cases navigation on the Mekong River, due to the hazardous nature of the river, is limited to an association of well experienced pilots and skippers, who restrict their skills and knowledge to their association and family. It is the MRC intention to assist primarily the poorer communities, by facilitating the use of the river through channel marking and training, so this group can safely have access to this mode as well. The natural navigation potential is there and whilst preserving the ecological balance, the long tradition of using boats should be promoted and facilitated.

In summary, in the navigation strategy elements have to be formulated for poverty reduction in terms of a two-pronged approach: broadly based economic growth to generate income-earning opportunities for the poor, and targeted interventions to meet the basic needs of the poor.

7. CONCLUSION
The development of physical infrastructure and utilities is crucial for the economic growth of Cambodia. Concerted efforts will be needed by all agencies, stakeholders and the local community to upgrade, rehabilitate and repair the existing infrastructure network. The projects will have to be implemented according to priority. The required laws and regulations will have to be enacted and implemented. The successful development of infrastructure will undoubtedly support the development of economy and improve the quality of life all Cambodians.