No.

Ministry of Public Works and Transport
The Royal Government of Cambodia

The Follow-Up Study on the Construction of the Second Mekong Bridge

Final Report

November 2007

JAPAN INTERNATIONAL COOPERATION AGENCY

PACIFIC CONSULTANTS INTERNATIONAL

CHODAI CO, LTD.

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PREFACE

In response to the request from the Royal Government of Cambodia, the Government of Japan decided to conduct the Study on the Construction of the Second Mekong Bridge in the Kingdom of Cambodia and entrusted the Study to the Japan International Cooperation Agency (JICA). The Study was completed in March 2006.

Following the recommendations explored in the Study, JICA conducted the Follow-up Study on the Construction of the Second Mekong Bridge. This final report was prepared through discussions with the officials concerned of the Royal Government of Cambodia and field surveys at the study area.

JICA dispatched the Study Team which consists of Pacific Consultants International and Chodai Co, Ltd. to the Kingdom of Cambodia between November 2006 and September 2007. The Study Team is headed by Mr. Atsushi Saito of Pacific Consultants International. The Study Team provided the technical assistance to counterpart personnel through the traffic impact monitoring and EIA evaluation process on the project.

It is my hope that this report will contribute to development in the Kingdom of Cambodia, and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to all the officials concerned of the Royal Government of Cambodia for their generous cooperation to the Study Team.

November 2007

Eiji Hashimoto
Vice-President
Japan International Cooperation Agency

November 2007

Mr. Eiji Hashimoto
Vice-President
Japan International Cooperation Agency

Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the Final Report of "the Follow-up Study on the Construction of the Second Mekong Bridge in the Kingdom of Cambodia".

The Study was undertaken in the Kingdom of Cambodia from November 2006 through September 2007 by the Study Team organized by Pacific Consultants International and Chodai Co, Ltd. under the contract with JICA.

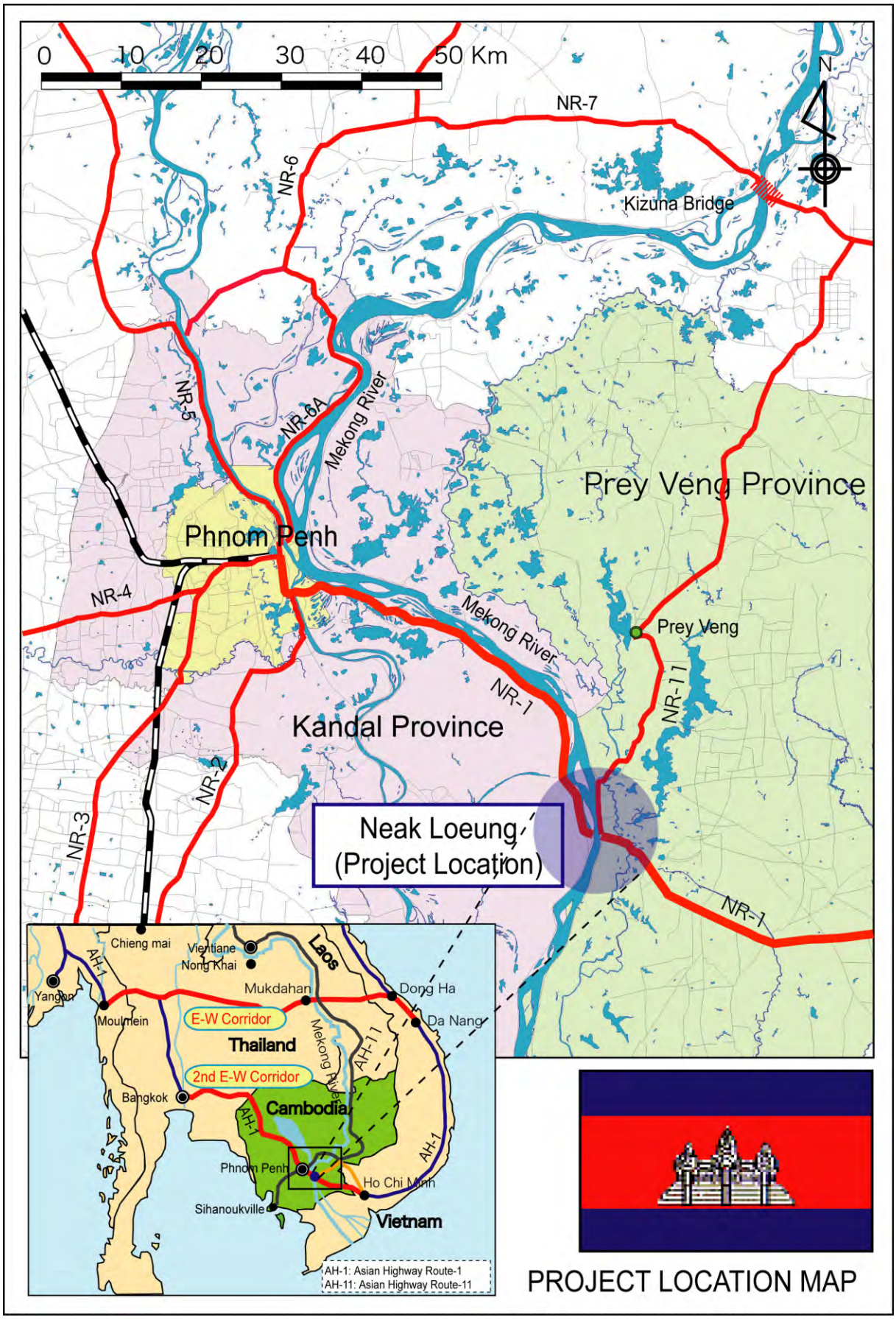
This report consists of two volumes: Executive Summary and Main Report. It examines to verify the study outcomes in the previous Study, which was completed in March 2006 with a full application of the JICA Guideline for Environmental and Social Consideration.

We would like to express our sincere gratitude and appreciation to all the officials of your agency and the Ministry of Public Works and Transport as the counterpart agency, and to counterpart personnel.

We hope that the report will be able to contribute significantly to development in the Kingdom of Cambodia.

Very truly yours,

Atsushi Saito
Team Leader
The Follow-up Study on the Construction of the Second Mekong Bridge in the Kingdom of Cambodia



PROJECT LOCATION MAP

The Follow-up Study on the Construction of the Second Mekong Bridge
Final Report

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Chapter 1 Outline of the Study

1.1 Results of Previous Feasibility Study

1.1.1 Project Summary

The Study on Construction of the Second Mekong Bridge in Cambodia (hereinafter referred to as "the previous FS"), was conducted to examine the optimum solution to improve traffic capacity across Mekong River at Neak Loeung, of which is a bottleneck of transport along the National Road No.1. The National Road No. 1 is designated as a part of Asian Highway Route 1 and Southern Economic Corridor connecting Ho Chi Minh City and Bangkok via Phnom Penh. Large increase of traffic is projected due to regional economic integration in Indochina and in GMS (Greater Mekong Sub-region) in the near future.

In response to the increase of traffic demand, the previous FS proposed the construction of the Second Mekong Bridge (hereinafter referred to as "the Project") as the best solution to strengthen traffic capacity across the Mekong River at Neak Loeung, considering various alternatives. Location and the method to cross the river (bridge) were decided through the engineering design and economic and environmental studies, and public consensus on the Project was obtained by the results of the series of public consultation meetings. The previous FS then elaborated conceptual design and implementation plan of the Project as summarized in Table 1.1 and Figure 1.1.

Table 1.1 Summary of the Project

1. Location of the Project	River crossing point at Neak Loeung
2. Target Year	2020
3. Socio-economic Framework	Three development scenarios were set: high GDP growth rate (8% p.a.), medium growth rate (6%) and low growth rate (4%). The medium growth rate of 6% was applied as the base case of the socio-economic framework. Other than GDP growth rate, the population and employment were projected and taken into account in the socio-economic framework.
4. Traffic Demand Forecast	The traffic demand observed at Neak Loeung in May and June 2007 was 2,376 PCU (passenger car unit). Based on Base Case (under the same ferry operation), the incremental traffic generated from the following development program was taken into consideration in estimating the river-crossing traffic demand. (A) Traffic generated by improvement of NR 1 (to be completed by early 2011). (B) Cross-border truck traffic generated by implementation of cross border facilitation agreement at the border with Vietnam (to be executed in 2007). (C) Traffic generated from modal change by the transfer from pedestrians and pedal-cycles currently using the ferry to mini-buses (when the bridge is completed). (D) Cross-border passenger traffic between Cambodia and Vietnam after the implementation of cross border facilitation agreement (executed in 2005). (E) Traffic generated by bridge construction. (F) Traffic increase generated from the flood-free land development. Accordingly, the traffic volume in 2010/2015/2020 was estimated at 3,629 PCU, 7,202 PCU, 9,615 PCU, respectively.
5. Outline of Preliminary Engineering Design	
Highway Design By applying AASHTO and comparing with the design standards adopted in the past projects in Cambodia, the Highway Design Standard adopted in this Project recommend to accommodate 2-lanes on the carriage way and two motorbike lanes with design speed of 80 km/h. Bridge Design Horizontal and vertical clearance of the project bridge is proposed in minimum 180 m and 37.5 m respectively, considering external conditions and development policies and plans, and which allows a 5,000 DWT container ship for one-way traffic and 500 DWT coasters for two-way traffic. Taking into account the safety navigation of local ships and therefore minimization of the number of piers in the river, construction costs and features of alternative bridge types, Pre-stressed concrete Cable Stay Bridge were selected eventually with center span length of 320 m. Profile of the Project The total length of the Project: 5,420 m Bridge length: 2,220 m (600 m-long main bridge, approach bridges with length of 960 m on the west side and 660 m on the east side) Approach road length: 3,200 m (800 m on the west side and 2,400 m on the east side)	
6. Project Costs and Implementation Plan	
Total project cost is estimated at US$ 74 million, including the construction cost, land acquisition and compensation costs, de-mining and UXO clearance costs, using the price level in September 2005. The total construction period, including the mobilization period, is estimated at 45 months, and the overall project implementation period is to be about 6 years.	
7. Economic and Financial Evaluation	
The EIRR of the project is 23.0% and the sensitivity analysis results in 16.8 %, when the traffic demand decreases by 20% and the project cost increases by 20%. It is, therefore, concluded that a high priority should be given to implementation of the project to promote economic and social development in Cambodia and GMS region as well. The results of financial analysis show low FIRR of 6.6% (toll level equivalent to the current ferry tariff) or 2.9% (toll level to cover 100% of the bridge user benefit). Therefore, the project will not be attractive for private sector to invest in without significant financial support by the government.	

Source: The previous FS report

Figure 1.1 Project Location Map

1.1.2 Recommendations for Further Action

The previous FS, at the same time, made several recommendations toward the realization of the Project as listed below:

- It is advised to monitor the actual traffic volume for the next few years and also suggested that, based on the results of traffic demand monitoring during this period, further consideration be given to appropriate timing of preparation for the construction.
- EIA report should be prepared and submitted by MPWT, and it needs to be approved by MOE at appropriate timing for implementation of the Project.

1.2 Objectives of the Follow-up Study

This Follow-up Study was organized to provide technical support to proceed on the recommendations made in the previous FS to Cambodian Government. In particular, the Follow-up Study aims at the following three main objectives:

- Reconfirmation of implementation planning of the Second Mekong Bridge from comprehensive viewpoints through monitoring the traffic impacts by CBTA (Cross Boarder Transport Agreement) and the road improvement projects around the project area.
- Pursuit of capacity development of Cambodian counterparts and other stakeholders through support to formulate EIA report and for evaluation on the report and the assistance to revise the framework of Resettlement Action Plan.
- Investigation on the required action for the implementation of the Project with reference to above two points.

1.3 Study Schedule

The Study commenced in November 2006 and is scheduled to terminate in November 2007. The Study work schedule is shown in the following figure.

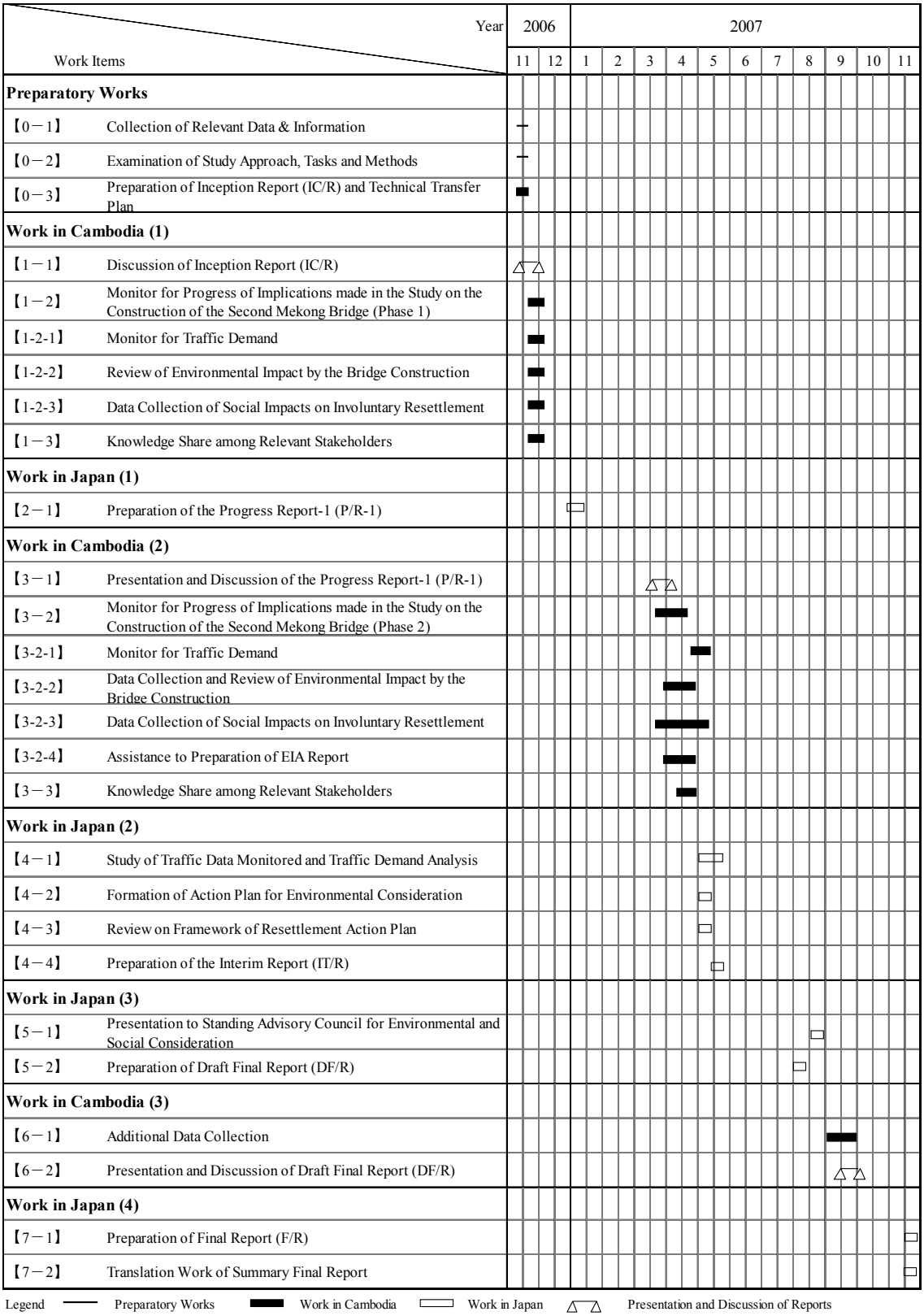


Figure 1.2 Study Work Schedule

Chapter 2 Monitoring of Traffic

2.1 Socio-economic Framework

2.1.1 GDP Growth

(1) Past Trend

According to the staff report for the 2006 Article IV consultation as well as that for the 2007, which was prepared by the IMF, the past GDP real growth in Cambodia is shown in Table 2.1.1. The annual growth rate of the real GDP from 2002 to 2005 are at a higher rate of 6 – 10% per annum. This high growth rate is an index of the rapid economic development of Cambodia. In 2006, although the growth rate is lower than that in 2005, it remains at a high level over 10%. The high growth of economy is projected to continue through 2007.

Table 2.1.1 Real GDP Growth in Cambodia

Year	2002	2003	2004	2005	2006*[1]	2007 *[2)]
Real Growth (%)	6.2	8.6	10.0	13.4	10.8	9.1

Source: IMF staff report

Note: *1) Estimation, *2) Projection

The staff report issued by the IMF in 2004 projected the low real GDP growth in 2005 due to the termination of MFA quota system for Cambodia in USA and EU in 2005. Actual GDP growth, however, was 13.4% in 2005. The staff report by the IMF analyzes the reason as follows:

- Because of exceptionally favorable weather conditions, agricultural output grew by around 17%.
- Garment exports continued to expand in 2005 albeit at a lower space despite the termination of MFA quota.
- Construction boosted by tourism-related and donor-financed construction spent exceeding initial forecasts.

(2) Medium-Term Outlook

The staff report by the IMF also predicted the forthcoming medium-term macro economic growth as well as the long-term growth as shown in Table 2.1.2.

Table 2.1.2 Medium and Long Term Economic Growth

Year	2008	2009	2010	2011	2012-2026
Real Growth (%)	6.1	5.8	5.8	5.8	5.8

Source: IMF staff report
Note: long term is for the reference

The IMF projection eliminates uncertain factors for increase of the growth rate of GDP and projects economic growth. The main elements of the projection are as follows:

- Garment exports, construction and tourism are expected to continue to underpin buoyant economic activity in the near term but decelerate in the medium term as the broader private sector begins to make a greater contribution.
- A return to more normal weather conditions is likely to lead a fall to the average level in agricultural output in 2006.
- Inflation should ease slightly, to about 5% in the near term, as higher oil prices impede a more rapid decline. In the medium term, it is expected to decline to the level of trading partners (about 3%).

Under these circumstances it is anticipated that annual growth rate of GDP will be nearly 6% in the medium and long term in Cambodia.

(3) Precondition for Demand Forecast

Three growth scenarios such as High, Medium and Low of the future GDP growth were set up in the traffic demand forecast in the previous FS as shown in Table 2.1.3[1]. In the scenarios of the FS for the analysis on the construction timing of the bridge at Neak Loeung, the GDP growth in the future was examined and assumed using the medium growth case (annual GDP growth at 6%) mainly for the following reasons:

- GDP growth was 6.2% in 2002 and National Institute of Statistics (NIS) announced the preliminary rate of GDP growth at 5.5% in 2003.
- The future GDP growth in medium term of Cambodia by IMF is the only reliable projection attainable during the previous FS.

Table 2.1.3 Future GDP Growth

Growth Case	GDP Growth
High	8%
Medium	6%
Low	4%

Source: The previous FS

[1] The medium growth case (6% p.a) was used for the analysis on the construction timing of the bridge at Neak Loeung. Several other indicators such as the number of jobs and vehicles were preconditioned as a basic data for the traffic demand forecast in the previous FS and these are subordinate to the future GDP growth and population.

2.1.2 Population

Population census was carried out in Cambodia in 1998. Based on the census results, NIS projected the future population up to 2020. This projection was revised once in 2005 (called the first revision) and this revision was used for the traffic demand forecast in the previous FS. Currently there is no new revision on this matter (see Table 2.1.4).

Table 2.1.4 Population Projection

Unit: 1,000

Year	Population
1998	12,132
2005	13,807
2010	15,269
2020	18,724

Source: NIS (the first revision)

2.2 Cross Border Transport

2.2.1 Progress of CBTA

The ADB has focused on strategic regional development on Greater Mekong Sub-region (GMS) for a long time. The Cross Border Transport Agreement (CBTA) is one of the important agenda to achieve the regional integration of GMS. CBTA is a compact and comprehensive multilateral instrument that covers all the relevant aspects of cross-border transport facilitation in one document. These include the following:

- Single-stop / single-window customs inspection.
- Cross-border movement of persons.
- Transit traffic regimes including exemptions from physical customs inspection, bond deposit, escort, and agriculture and veterinary inspection.
- Requirements that road vehicles will have to meet to be eligible for cross-border traffic
- Exchange of commercial traffic right.
- Infrastructure including road and bridge design standards, road signs and signals.

CBTA was originally a trilateral agreement between and among the Government of Lao PDR, the Kingdom of Thailand and the Socialist Republic of Vietnam signed in November 1999 at Vientiane. The Kingdom of Cambodia acceded to CBTA in November 2001 at Yangon, Myanmar, followed by People's Republic of China and Union of Myanmar, in November 2002 and in September 2003, respectively. CTBA has entered into force with its ratification by all six GMS member countries in December 2003. Full implementation of the Agreement, and its annexes and protocols are expected by 2007 / 2008. CBTA is now formally known as the Agreement between and among the Governments of Kingdom of Cambodia, the People's

Republic of China, the Lao People's Democratic Republic, the Union of Myanmar, the Kingdom of Thailand, and the Socialist Republic of Vietnam for the Facilitation of Cross-border Transport of Goods and People.

2.2.2 Facilitation to Cross the Border with Vietnam

(1) Local Perspectives on CBTA

The findings of the past and current status of CBTA between Cambodia and Vietnam are summarized as follows:

- 40 vehicles including buses and trucks were officially registered both in Cambodia and Vietnam respectively for the border crossing in October 2006. 19 buses and 21 trucks out of 40 vehicles were registered in Cambodia. All registered vehicles consisted of buses in Vietnam.
- Daily traffic of around 12 to 16 buses registered in Cambodia has been passing through the border at Bavet in 2006. On the other hand, no truck registered in Cambodia has been passing through the border so far. Daily traffic of more than 30 buses registered in Vietnam have been passing through the border. Regarding bus traffic, totally 50 buses of Cambodia and Vietnam have been passing through the boarder without transshipment in April 2007.
- The registered number of vehicles for border crossing will be expanded to 150 in respective country by the end of 2007.

Although the facilitation step to open the border between the countries has made progress, some problems can be also observed in full operation of CBTA. These are the following:

- Vietnam side may occupy the vacant room for registration in case the Cambodian side cannot fully use its own privilege of registration.
- Owing to the less number of trucks registered by Cambodian transport-companies (each company registered only 3 trucks), the business cannot make profit at this moment. This has discouraged joining of trucking business in border crossing in Cambodia. One-way-cargo trip makes it difficult to promote cross border trucking business in Cambodia.
- In addition, the Cambodian trucking business has been at a standstill due to difficulties to open Cambodian branch offices in Vietnam. Any loss or damage caused by an accident in Vietnam will not be insured with Cambodian insurance, which also discourages the traffic operators to expand their business.

(2) Preconditions in Traffic Demand Forecast

Two preconditions were set up for the traffic demand forecast in the previous FS: one is for

facilitation in passengers crossing at the border with Vietnam and the other is transshipment in truck transport.

1) Passenger Traffic at Bavet

Passengers had to change their transport at the border except for limited and some bus transport, which were permitted by both countries, Cambodia and Vietnam in the 2004 when the previous FS completed. It was preconditioned in the demand forecast of the FS that the border with Vietnam would be fully operational for passenger without transferring in 2005. Actually 40 buses in Vietnam and 19 buses in Cambodia are only registered to pass through the border without transferring.

2) Truck Traffic at Bavet

It was assumed in the previous FS that no transshipment between trucks at the border with Vietnam would be expected in 2007 according to the implementation of CBTA. Trucks, however, have been still transferring their cargoes taking four (4) or five (5) hours at the border even at this moment at Bavet in Cambodia. On the other hand, a small scale industrial complex was built near the border in Cambodian side and some trucks coming from Vietnam have been passing through the border without transferring their cargoes between the border and the industrial complex on the Cambodian side. It is assumed that this activity has been carried out based on a gentleman's agreement between local people and has nothing to do with CBTA.

A sign of full implementation to cross the border, such as extending the number of vehicles registered for crossing the border to 150 in 2007, can be observed. However, there are still some constraints on the Cambodian side, such as one-way-cargo trip, difficulties to open Cambodian branch offices in Vietnam and insurance system of Cambodia, for the expansion of the number of registered vehicles.

2.3 Traffic Characteristics

2.3.1 Traffic Volume at Neak Loeung Ferry

(1) Traffic Survey

Traffic survey was carried out at Neak Loeung in the previous FS and the FU study in the following manner. ADT (Average Daily Traffic) for a week is used as the basic indicator of the traffic in the traffic survey. Although AADT (Annual Average Daily Traffic) is essentially a desirable indicator in the traffic survey, it requires a long period and high cost to measure AADT. It is commonly accepted to use ADT as a basic indicator to discuss average traffic instead of AADT.

Table 2.3.1 Summary of Traffic Survey

Survey Item	Location	2004 (May & June)	2006 (November & December)	2007 (May)
Traffic Count	Neak Loeung	7 days	7 days	7 days
	Bavet	4 days	-	4 days
	Trapeang Phlong (Samach)	4 days	-	4 days*[1)]
Dwell Time	Neak Loeung	7 days	7 days	7 days
Ferry Operation	Neak Loeung	7 days	7 days	7 days

Note: *[1)]Only two-day data of traffic count are available at Trapeang Phlong due to lack of cooperation by Kompong Cham Province

The survey schedule is shown in Table 2.3.2.

Table 2.3.2 Schedule of Traffic Survey

Year					
2004		2006		2007	
Day	Day of week	Day	Day of week	Day	Day of week
May 29	SAT	Nov 29	WED	May 6	SUN
May 30	SUN	Nov 30	THU	May 7	MON
May 31	MON	Dec 1	FRI	May 8	TUE
Jun 1	TUE/ Holiday	Dec 2	SAT	May 9	WED
Jun 2	WED	Dec 3	SUN	May 10	THU
Jun 3	THU	Dec 4	MON	May 11	FRI
Jun 4	FRI	Dec 5	TUE	May 12	SAT

Note: Shadow columns indicate non-weekday.

1st of June (Tue.), 2004 was a holiday as well as the holidays to celebrate the birthday of the King Norodom Sihamoni during the period from 13th to 15th of May in 2007 began from the next day of the completion of the traffic survey.

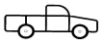
The survey in 2004 was carried out from the end of May to the beginning of June and is referred to as the survey in May 2004. The survey in 2006 from the end of November to the beginning of December is referred to as the survey in November 2006, hereinafter.

1) General Conditions

a. Category of Vehicles

The following 11 categories were used for the traffic survey with a view to keeping the consistency with that in the previous FS. Unified categories shown in the following table were used to compare the traffic of the survey with that of the demand forecast.

Table 2.3.3 Category of Traffic

11 Category	Type	Unified Category	
1	Motorcycle /M. Tricycle	I (MC)	
2	Motorcycle Trailer		
3	Sedan / Wagon / Light Van	II (LV)	
4	Pick-up / Jeep / Light Truck		
5	Short & Long Body Bus	III (HV)	
6	Short & Long Body Truck		
7	Semi & Full Trailer Truck		
8	Bicycle	IV	
9	Cyclo / Bicycle Trailer		
10	Pedestrian / Cart	V	
11	Ox / Horse / Farm Trailer		

Source: The previous FS
Note: Mini bus was independently counted in 2007 and included in Type 5.

2) Ferry Operation

The ferry was operated from 5:00 to 24:00 during November 2006 and May 2007 at Neak Loeung while the operating time was from 5:30 to 21:00 in 2004. In addition, three ferry boats were in service in 2006 and 2007 while two ferry boats were in service in 2004. The extension of operating time at night was instructed by Prime Minister Hun Sen to serve the border traffic at Neak Loeung which was generated due to the extension of the service hours at Bavet, the border of Cambodia and Vietnam. However, this impact on the traffic demand was limited, since the actual traffic within a range from 21:00 to 24:00, observed during the traffic survey, accounts for only 3-6% of all the traffic in PCU base. In 2004 the ferry was operated with two boats and it increased to three boat operation when the survey of FU study was carried out. One of the two boats being operated at Prek Tamak, located in the northern part of Phnom Penh was moved to Neak Loeung and it made possible three boat operation at peak hours to cope with the increase of ferry users at Neak Loeung.

3) Traffic Volume

a. Neak Loeung

The average traffic volume of ferry users by 11 categories counted at Neak Loeung is shown in Table 2.3.4. Mini-bus was included in Type 5 in the survey in 2004, while it was included in

Type 3 in 2006. In the survey in 2007 Mini-bus was counted as an independent category and finally adjusted as Type 5 in the result.

In the survey in 2007, the construction vehicles for the improvement of National Highway Route 1 (section from Phnom Penh to Neak Loeung), which was implemented by Japanese Grant Aid, were generated. About 105 construction vehicles were included in Type 7 and the number of these vehicles was eliminated from the results of the survey of weekday and non-weekday.

Weekday Average means the average of the survey results in weekday and Non-weekday Average means the average of the survey results on Saturday, Sunday and Holiday. The traffic on non-weekday indicates slightly larger values comparing to that on a weekday.

Table 2.3.4 Traffic Volume by 11 Categories

Unit: Vehicles/Passengers

Year	Survey Day	11 Categories											PCU
		Type (1)	Type (2)	Type (3)	Type (4)	Type (5)	Type (6)	Type (7)	Type (8)	Type (9)	Type (10)	Type (11)	
		0.123	0.75	1	1.5	1.75	3	4.5					
2007	Weekday Average	2,172	20	615	290	764	281	133	498	31	5,282	71	4,107
	Non-weekday Averag	2,865	22	849	302	1,031	248	135	549	8	6,716	103	4,824
	All Week Average	2,370	20	682	293	840	271	133	512	24	5,691	80	4,312
2006	Weekday Average	1,875	14	571	147	710	246	73	511	0	4,200	59	3,342
	Non-weekday Averag	2,187	13	723	179	848	264	52	488	0	4,569	51	3,777
	All Week Average	1,964	14	615	156	749	251	67	504	0	4,305	57	3,466
2004	Weekday Average	1,649	14	535	268	351	184	14	580	0	5,948	36	2,376
	Non-weekday Averag	1,788	18	534	327	319	211	11	593	0	6,304	57	2,499
	All Week Average	1,709	15	536	293	337	195	12	586	0	6,100	45	2,426

Source: Traffic survey by JICA Study Team

Note: 1) Vehicles for construction work was excluded in 2007. 2) Mini bus is included in Type (5)

3) Passenger car equivalent: 0.123 for Type 1 was decided through investigation on the ferry. Others were decided according to the past traffic survey results (refer to "2.3.2 Comparison between Monitored Traffic and Demand Forecast").

The monthly and seasonal fluctuation excluding natural increase are small except Type III in November and December 2004 (refer to Table 2.3.5). As the future traffic demand was forecast based on the results of the traffic survey in May 2004, the results of survey in May 2007 was not adjusted by seasonal variation, but the results of survey in November 2006 were adjusted by seasonal variation. In the economic analysis of the previous FS, the annual traffic was estimated considering the monthly variation of the traffic.

Table 2.3.5 Monthly Variation of Survey Day

Unified Category		2003		2004		2005	
		May & Jun.	Nov. & Dec.	May & Jun.	Nov. & Dec.	May & Jun.	Nov. & Dec.
Type I	MC	0.949	0.988	1.001	0.967	0.924	0.963
Type II	Light Vehicle	0.997	1.048	1.008	1.111	1.041	0.917
Type III	Heavy Vehicle	1.081	1.077	1.075	1.233	0.987	1.031
Monthly Variation in PCU unit (A)		1.049	1.128	1.050	1.165	1.003	1.039
Coefficient for adjustment: 1/(A)		0.954	0.886	0.952	0.858	0.997	0.962

Source: Annual statistic data of ferry operation by MPWT is referred to estimate monthly variation.
Note: Natural increase is eliminated from monthly variation.

The characteristics of the results of the traffic surveys are described below.

Traffic Volume of 11 Categories of Vehicle

The change in the traffic volume of motorized vehicles of seven categories is shown for weekday and non-weekday during the traffic surveys in Figures 2.3.1 and 2.3.2, respectively. The traffic volume in May 2004, November 2005 and May 2006 represents the volume of each year.

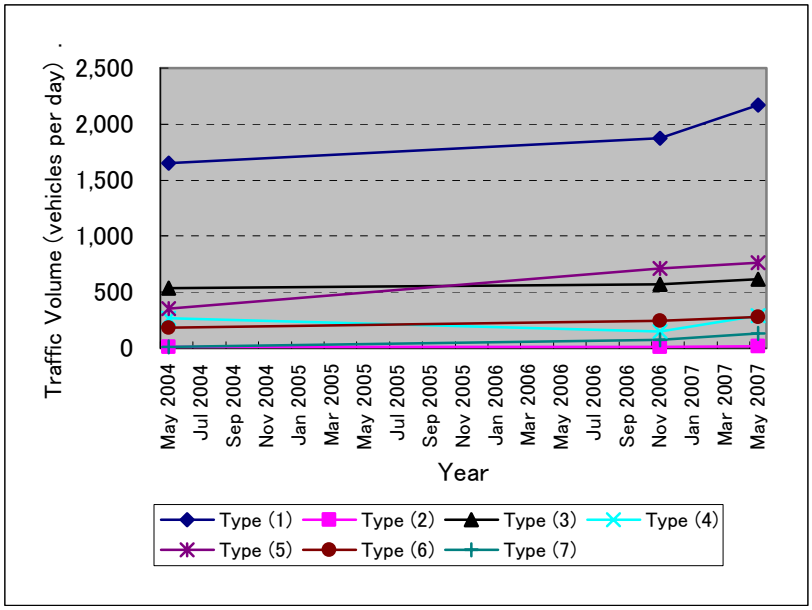


Figure 2.3.1 Average of Weekday Traffic Volume in Traffic Surveys

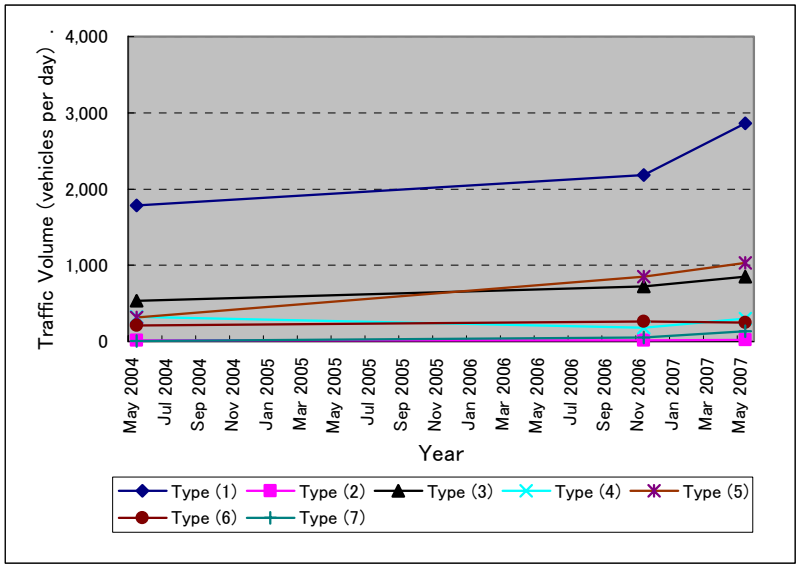


Figure 2.3.2 Average of Non-weekday Traffic Volume in Traffic Surveys

The results of the surveys show the distinct characteristics of the traffic for weekday as well as non-weekday as follows:

- Traffic of Type 1 (MC) increased much and the increase from 2006 to 2007 was particularly high.
- Traffic of Type 3 (Sedan) showed a stable increase.
- Traffic of Type 5 (Bus) increased a lot.
- Traffic of Type 7 (Trailer) showed very high increase from 2006 to 2007 although the total volume of Type 7 was small.

Traffic Volume by Unified Categories

The traffic volume by unified 3 categories in motorized vehicles in 2004, 2006 and 2007 is shown in Table 2.3.6. Type I (Motorcycle) has a dominant position and high growth of Type III (Heavy vehicle) can be observed indicating around 2.2 times from May 2004 to May 2007.

Table 2.3.6 Traffic Volume by Unified Category (Weekday)

Year	Type	I (MC)	II (LV)	III (HV)	Unified category PCU
	PCU Equivalent	0.128	1.165	2.241	
2007	Weekday Average	2,192	905	1,177	3,972
	Non-weekday Average	2,887	1,151	1,413	4,877
	All Week Average	2,391	975	1,244	4,230
2006	Weekday Average	1,889	718	1,029	3,385
	Non-weekday Average	2,200	901	1,163	3,939
	All Week Average	1,978	771	1,067	3,543
2004	Weekday Average*1	1,663	803	549	2,376
	Non-weekday Average	1,806	861	541	2,447
	All Week Average	1,724	829	544	2,406

Source: Traffic survey by JICA Study Team

Figure 2.3.3 shows the trend of traffic volume by unified categories for weekday and non-weekday. Every three type shows the similar trend of change in traffic volume and the increase was remarkable in three types from 2006 to 2007.

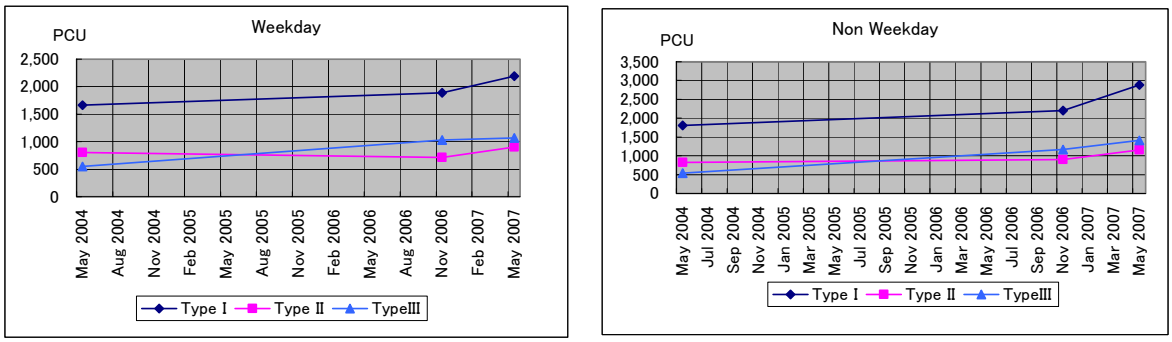


Figure 2.3.3 Traffic Volume by Unified Category

Composition Ratio of Vehicle-type

Figure 2.3.4 shows the composition ratio of vehicle-type among users on weekday average traffic in May 2004, November 2006 and May 2007. Pedestrian (Type 10) occupies the largest portion followed by motorcycle (Type 1) and bus including mini bus (Type 5).

Based on the OD survey of ferry users in 2004, the trip purpose of a few pedestrians (Type 10) was on the other side and most pedestrian use bus services from the bus terminals on the both sides of the ferry to their final destination such as Phnom Penh and the surrounding areas. Users of bus leave the bus and board a ferry at Neak Loeung because the charge of ferry for pedestrian is cheap and it saves their total trip cost.

Pedestrian users of the ferry decreased by 10% from 2004 to 2007 and the conversion of pedestrian to bus are assumed to have increased.

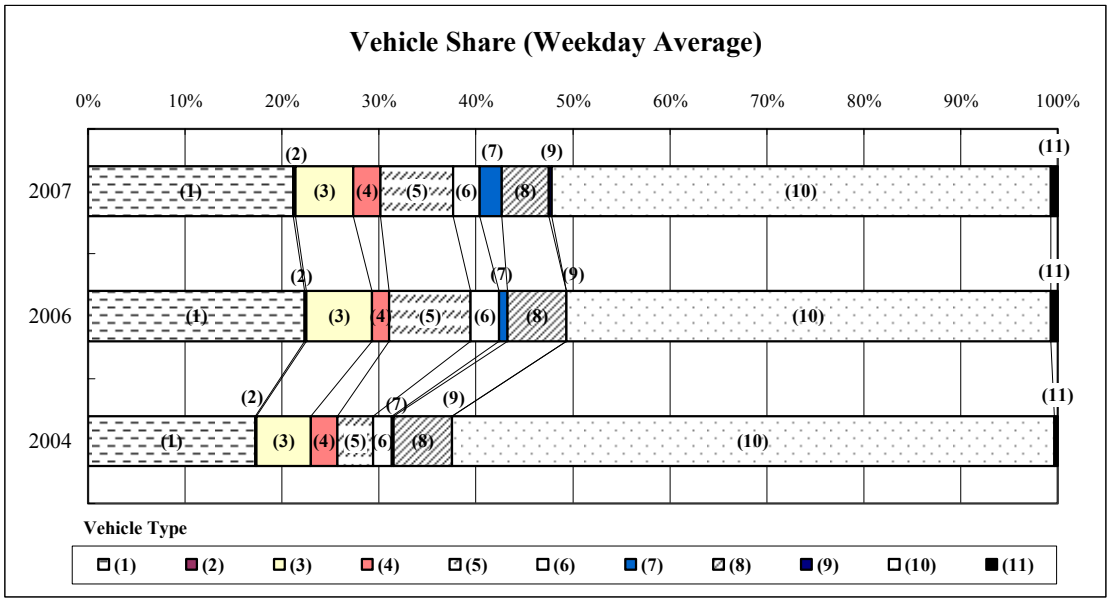


Figure 2.3.4 Composition Ratio in 2004, 2006 and 2007 (Weekday Average)

b. Hourly Traffic

Hourly Traffic by Vehicle Type

Hourly traffic volume of ferry users on weekday average by the direction from Phnom Penh to the east is shown in Figures 2.3.5, 2.3.6 and 2.3.7 in 2004, 2006 and 2007, respectively. In every year, Type 1 (MC) indicates the largest share of all the vehicles, while the increase in the share of Type 5 (Bus) is noticeable in 2006 and 2007. The share of the other vehicles is small and shows almost the same hourly traffic pattern in 2004, 2006 and 2007.

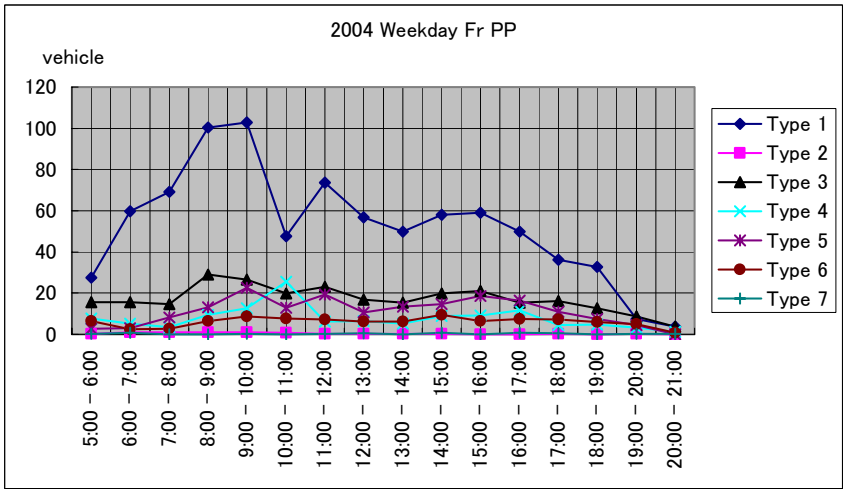


Figure 2.3.5 Hourly Traffic by Vehicle Type in 2004 (Weekday Average)

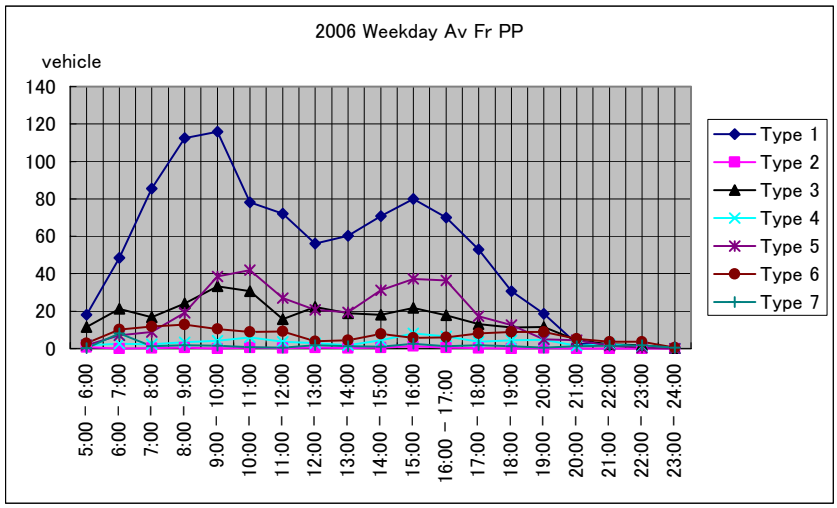


Figure 2.3.6 Hourly Traffic by Vehicle Type in 2006 (Weekday Average)

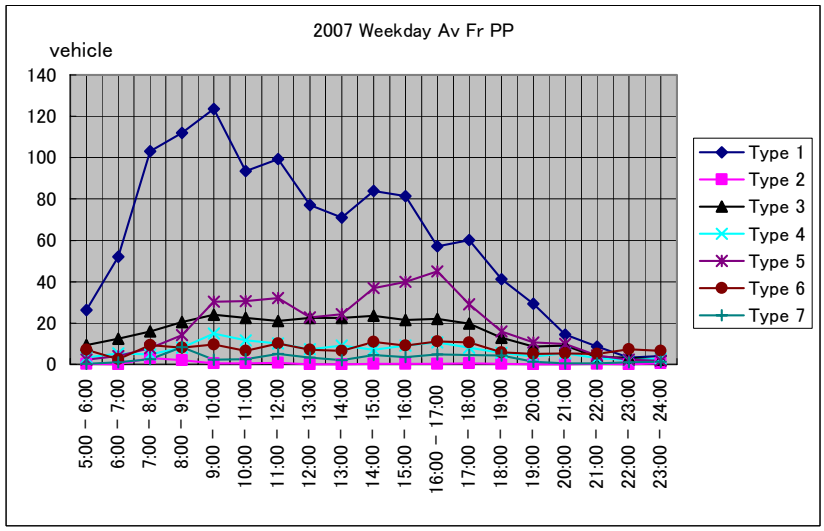


Figure 2.3.7 Hourly Traffic by Vehicle Type in 2007 (Weekday Average)

On the other hand, hourly traffic volume of ferry users on weekday in PCU base by direction from Phnom Penh to the east and from the east to Phnom Penh is shown in Figures 2.3.8 and 2.3.9, respectively.

From Phnom Penh to the East

- Hourly traffic volume increased from 2004 to 2006 and from 2006 to 2007 in almost every hourly band. Especially, the traffic volume during the off-peak hours increased in 2007.
- For all the three years of 2004, 2006 and 2007, the trend of peak hourly traffic was observed in morning and evening. In 2007 hourly traffic during the evening peak hours between 16:00 and 17:00 was greater than that during the morning peak hours and it made the congestion in the evening peak longer.

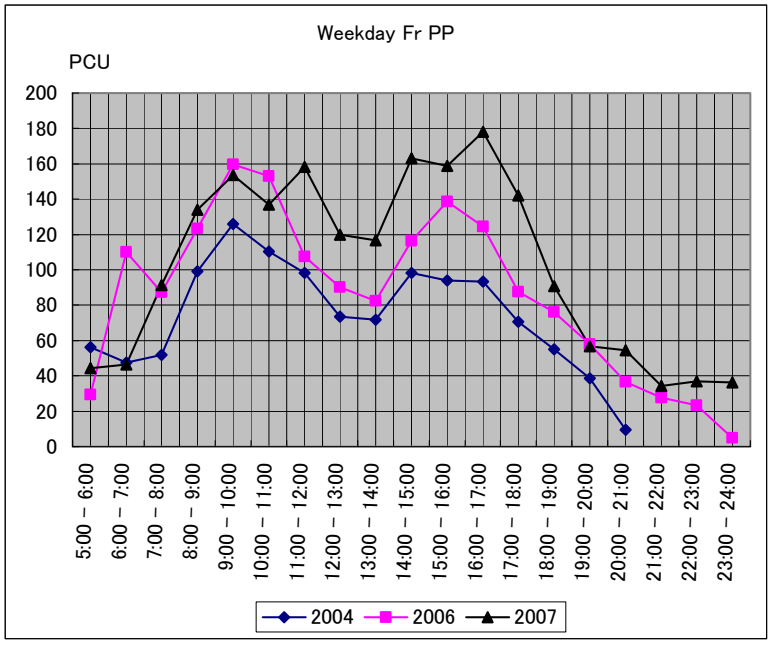


Figure 2.3.8 Hourly Traffic from Phnom Penh in 2004, 2006 and 2007 (Weekday Average)

To Phnom Penh from the East

- In 2007 hourly traffic volume from 06:00 to 14:00 was the largest compared with that in 2004 and 2006, while hourly traffic volume after 14:00 was almost same as that in 2006.
- When compared hourly traffic in 2006 with that in 2004, the traffic in 2006 was higher than that in 2004 in every hourly band except that after 8:00.
- In every three year peak traffic in morning from 9:00 to 10:00 was much higher than that in evening.

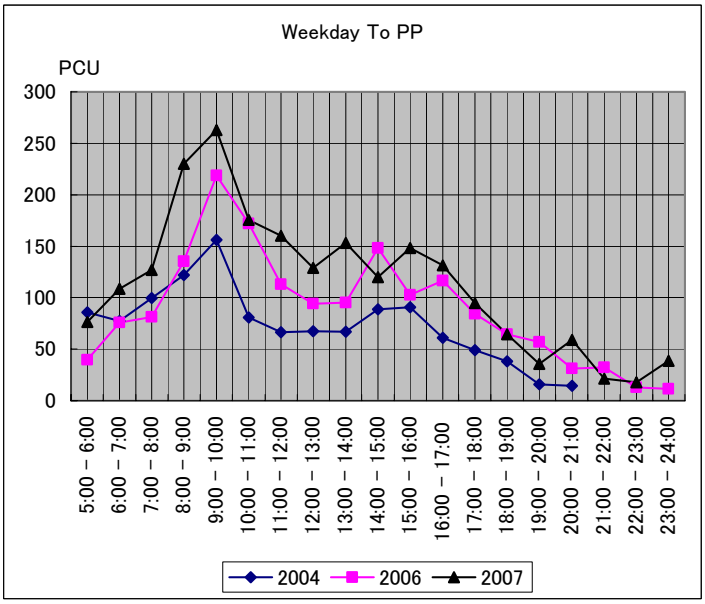


Figure 2.3.9 Hourly Traffic to Phnom Penh in 2004, 2006 and 2007 (Weekday Average)

(2) Ferry Service Operation

Three (3) ferry boats were in service when the traffic was high and two (2) or one (1) ferry boats were available except for peak hours. Three (3) ferry boats were more frequently operated (25 hours) in a week in May 2007 than in November 2006 (16 hours).

Table 2.3.7 Ferry Operation in 2007

Unit: Ferry boats

Time	No. of Operating Ferry (2007)						
	6-May	7-May	8-May	9-May	10-May	11-May	12-May
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
5-6	1	2	2	2	1	2	2
6-7	1	2	2	2	2	2	2
7-8	2	2	2	2	2	2	2
8-9	3	3	3	3	2	2	3
9-10	3	3	3	3	3	3	3
10-11	2	2	2	3	2	3	3
11-12	2*	3	3	2	2	3	3
12-13	1	2	1	1	2	3	3
13-14	2	2	2	2	2	3	2
14-15	2	2	2	3	2	2	2
15-16	2	2	2	2	3	2	2
16-17	2	2	2	2	2	3	2
17-18	2	2	2	2	1	2	2
18-19	1	2	1	1	1	1	1
19-20	1	2	1	1	1	1	1
20-21	1	1	1	1	1	1	1
21-22	1	1	1	1	1	1	2
22-23	1	1	1	1	1	1	1
23-24	1	1	1	1	1	1	1

Source: Traffic survey by JICA Study Team
Note: Shadow column is 3 boat operation.

Table 2.3.8 Ferry Operation in 2006

Unit: Ferry boats

Time	No. of Operating Ferry (2006)						
	29-Nov	30-Nov	1-Dec	2-Dec	3-Dec	4-Dec	5-Dec
	Wed	Thu	Fri	Sat	Sun	Mon	Tue
5-6	2	2	1	2	1	1	2
6-7	3	2	2	2	1	1	2
7-8	3	2	1	2	2	2	2
8-9	3	3	2	2	2	2	2
9-10	3	3	3	3	3	3	2
10-11	2	3	2	2	3	3	2
11-12	2	2	2	2	3	2	2
12-13	1	2	2	2	2	3	1
13-14	2	2	1	2	2	3	1
14-15	2	2	2	2	2	2	2
15-16	2	2	2	2	2	1	1
16-17	2	1	2	2	2	2	2
17-18	2	1	2	2	2	1	2
18-19	1	1	1	1	1	2	1
19-20	1	1	1	1	1	2	1
20-21	1	1	1	1	1	1	1

Time	No. of Operating Ferry (2006)						
	29-Nov	30-Nov	1-Dec	2-Dec	3-Dec	4-Dec	5-Dec
21-22	1	1	1	1	1	1	1
22-23	1	1	1	1	1	1	1
23-24	1	1	1	1	1	1	1

Source: Traffic survey by JICA Study Team
Note: Shadow column is 3 boat operation.

(3) Dwell Time

Dwell time was surveyed for sampled vehicles at both sides of the ferry terminal in 2006 and 2007. As the samples were small for some types of vehicles, an average dwell time was calculated by four (4) types of vehicles (such as all vehicles, sedans, buses and medium trucks) for five (5) hour time bands. Maximum dwell time by 5 hour time bands is calculated by the average of maximum dwell time by hourly time band.

1) Average Dwell Time

The average dwell time for four (4) types vehicle categories is shown in Tables 2.3.9 - 12. The following tendencies are observed.

- No remarkable differences of dwell time by type was seen.
- The dwell time from 5:00 to 9:00 and 20:00 to 24:00 is longer in 2006. On the other hand, that from 20:00-24:00 is longer in 2007. As one (1) ferry boat operation is common in the night time, the dwell time seems to increase.
- Although the traffic volume in 2007 is higher than that in 2006, the average dwell in 2007 is smaller than in 2006 in almost all the time bands.

Table 2.3.9 Average Dwell Time by Time Band (All Vehicles)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:22	0:15	0:21	0:16
9:00 - 12:00	0:14	0:14	0:15	0:16
12:00 - 15:00	0:18	0:14	0:16	0:17
15:00 - 20:00	0:21	0:15	0:18	0:17
20:00 - 24:00	0:32	0:20	0:37	0:23
Average	0:19	0:15	0:19	0:17

Source: JICA Study

Table 2.3.10 Average Dwell Time by Time Band (Sedan)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:19	0:12	0:20	0:15
9:00 - 12:00	0:13	0:12	0:14	0:13
12:00 - 15:00	0:17	0:12	0:16	0:15
15:00 - 20:00	0:21	0:13	0:18	0:15
20:00 - 24:00	0:30	0:20	0:44	0:20
Average	0:18	0:13	0:19	0:15

Source: JICA Study

Table 2.3.11 Average Dwell Time by Time Band (Bus)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:20	0:15	0:22	0:16
9:00 - 12:00	0:13	0:14	0:14	0:16
12:00 - 15:00	0:16	0:14	0:16	0:18
15:00 - 20:00	0:17	0:16	0:16	0:19
20:00 - 24:00		0:19	0:58	0:22
Average	0:16	0:15	0:17	0:17

Source: JICA Study

Table 2.3.12 Average Dwell Time by Time Band (Medium Truck[1)])

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:23	0:16	0:22	0:19
9:00 - 12:00	0:15	0:15	0:17	0:20
12:00 - 15:00	0:19	0:15	0:17	0:18
15:00 - 20:00	0:22	0:14	0:19	0:17
20:00 - 24:00	0:32	0:23	0:35	0:27
Average	0:20	0:16	0:20	0:19

Source: JICA Study
Note: 1) Short & Long Body Truck

2) Average of Maximum Dwell Time

The maximum average dwell time, which is obtained by average of hourly maximum dwell time is shown in Tables 2.3.13 – 16. The following tendencies are observed.

- High dwell time is observed from 5:00 to 9:00 in the morning, and from 20:00 to 24:00.
- Almost the same pattern of the average maximum dwell time is observed in all types of vehicles in weekday and non weekday in 2007.
- The average maximum dwell time from 9:00 to 15:00 in 2007 is higher than that in 2006.

Table 2.3.13 Average Maximum Dwell Time (All vehicles)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:27	0:27	0:28	0:31
9:00 - 12:00	0:17	0:28	0:19	0:32
12:00 - 15:00	0:23	0:27	0:19	0:30
15:00 - 20:00	0:25	0:26	0:21	0:28
20:00 - 24:00	0:34	0:28	0:42	0:31
Average	0:25	0:27	0:26	0:31

Source: JICA Study
Note) The average maximum dwell time comes from average of hourly maximum dwell time.

Table 2.3.14 Average Maximum Dwell Time (Sedan)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:25	0:30	0:26	0:34
9:00 - 12:00	0:18	0:33	0:18	0:39
12:00 - 15:00	0:25	0:33	0:22	0:32
15:00 - 20:00	0:26	0:33	0:23	0:33
20:00 - 24:00	0:31	0:28	0:45	0:31
Average	0:25	0:31	0:27	0:34

Source: JICA Study
Note) the dwell time comes from average of hourly dwell time in the time band.

Table 2.3.15 Average Maximum Dwell Time (Bus)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:23	0:34	0:27	0:37
9:00 - 12:00	0:16	0:36	0:18	0:42
12:00 - 15:00	0:18	0:33	0:18	0:36
15:00 - 20:00	0:19	0:30	0:15	0:32
20:00 - 24:00		0:27	0:58	0:38
Average	0:19	0:32	0:27	0:37

Source: JICA Study
Note) the dwell time comes from average of hourly dwell time in the time band.

Table 2.3.16 Average Maximum Dwell Time (Medium Truck)

Time Band	Weekday		Non-weekday	
	2006	2007	2006	2007
5:00 - 9:00	0:30	0:26	0:32	0:34
9:00 - 12:00	0:19	0:28	0:21	0:32
12:00 - 15:00	0:25	0:27	0:22	0:24
15:00 - 20:00	0:28	0:24	0:25	0:26
20:00 - 24:00	0:34	0:32	0:41	0:31
Average	0:27	0:27	0:28	0:29

Source: JICA Study
Note) the dwell time comes from average of hourly dwell time in the time band.

3) Dwell Time by Ferry Operation

Average maximum dwell time under three (3) ferry boat operation is shown in Table 2.3.17. This indicates that the dwell time in 2007 is higher than that in 2006 for all of vehicle types except for that of medium truck.

Table 2.3.17 Average Maximum Dwell Time under 3 Ferry Boat Operation

Vehicle Type	Weekday		Non-weekday	
	2006	2007	2006	2007
All Vehicles	0:22	0:29	0:17	0:31
Sedan	0:21	0:34	0:15	0:41
Bus	0:18	0:37	0:17	0:46
Truck	0:28	0:28	0:21	0:25

Source: JICA Study

4) Consequences

According to the above, the following are the consequences.

- The ferry has no special diagram for services and necessary ferry boats have been increased to meet the users' demand. Although the traffic in 2007 is higher than that in 2006, the average dwell time in 2007 decreased because the three (3) ferry boat operation service was extended.
- On the other hand, average maximum dwell time in 2007 increased except for that of medium truck. The reason is that some vehicles have longer maximum dwell time than that in 2006 due to high peak traffic in 2007.

(4) Traffic at the Border with Vietnam

Traffic volume was counted at Bavet and Trapeang Phlong (Samach) in 2004 in the previous FS and 2007 in the FU study. The traffic was, however, not counted in 2006.

1) Traffic Survey Location

Only a simple custom house is located at Bavet and some new custom facilities were under construction in 2004. No regional development was seen at that time. Therefore, traffic survey location was placed in Cambodian side, which is 500 m away from the border with Vietnam. Several farmhouses were observed between the border and the traffic survey location. All traffic, which crossed the border, passed through the traffic survey spot.

On the other hand, the custom facilities were completed and hotels with casino, and small industrial estate were developed in Cambodian side near the border in 2007. As the situations near the border were largely changed in 2007, a large number of vehicles passing the border have a destination within the area near the border. Furthermore, there are many intra-trips in the area. Therefore the traffic survey location was placed in the same location as that in 2004 with a view to comparing both traffic results. In other words, all the monitored traffic at Bavet in 2007 does not cross the border with Vietnam. Figure 2.3.10 shows the traffic survey location and regional development area at Bavet.

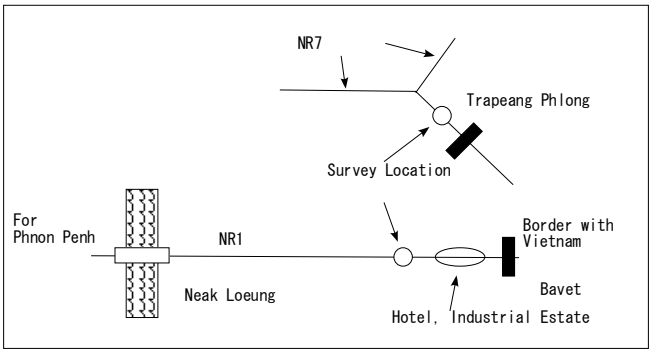


Figure 2.3.10 Survey Location at Bavet

At Trapeang Phlong, no regional development was observed near the border in 2004 and 2007. Although the traffic survey location was away from the border, all vehicles crossing the border passed the traffic survey spot.

2) Traffic Regulation at Bavet

Large truck traffic was regulated to avoid passing through Bavet because new custom facilities were under construction in 2004 and directed to make a detour via Trapeang Phlong. All the large trucks, which had used Bavet, were forced to make a detour via Trapeang Phlong and transhipped their cargoes there. According to an interview with drivers in 2004, most of their final destinations were Phnom Penh.

3) Results of Traffic Survey

a. Bavet

Table 2.3.18 shows the traffic survey results at Bavet.

Table 2.3.18 Traffic at the Border (Weekday)

Year	Type	11 Categories							PCU
		Type (1)	Type (2)	Type (3)	Type (4)	Type (5)	Type (6)	Type (7)	
	PCU Equivalent	0.254	0.75	1	1.5	1.75	3	4.5	
Bavet	2007	13,739	91	1,143	237	1,096	129	186	8,198
	2004	4,178	51	488	117	20	106	0	2,116
Trapeang	2007	2,699	57	145	92	-	92	80	1,647
	2004	1,622	31	113	84	0	205	59	1,555

Source: Traffic survey by JICA Study Team
Note: PCU equivalent of 0.254 is employed for Type 1 counted at the border due to road traffic (not on the ferry). On the other hand, 0.123 is employed for Type 1 on the ferry.

High traffic growth from 2004 to 2007 can be observed in almost all types of vehicles at Bavet. Especially, it is remarkable that Type 5 (bus traffic) indicates growth by 55 times, Type 1 (MC traffic) 3.3 times and Type 3 (sedan traffic) 2.3 times. The large truck traffic (trailer type), which was restricted to pass Bavet in 2004, reached 186 vehicles.

In terms of Type 5 (bus), it is estimates to be around 50 buses that cross the border without transferring between Phnom Penh and HCM, although the institutional framework was in the process of being set up. The number of buses to pass the border without transferring is expected to be expanded in the near future and this is one of reasons to expect induced inflow of tourists from Vietnam. In addition, the regional development such as hotels with casino might be another reason to get induced passenger traffic from Vietnam to Phnom Penh conurbation.

In terms of large truck traffic such as trailer type, many vehicles, which had been forced to make a detour via Trapeang Phlong, returned to Bavet due to completion of new custom facilities at Bavet. In addition, industrial development, of which scale is small, might accelerate the truck generation from the area at Bavet. Also, such changes in the physical distribution pattern as an increase of the trade between Cambodia and Vietnam[2] and an increase of the imported cargo via Bavet[3], which are off-loaded at the Ho Chi Minh Port, also contribute to the increase of truck volume at Bavet.

[2] The volume of import cargos from Vietnam increased by 14% between 2004 and 2005 in terms of its weight, whereas the total volume of import cargo to Cambodia decreases by 2% during the same period.

[3] According to the interview at the private trucking company, the construction materials (mainly ceramic tiles) were imported via Bavet in 2006 and its volume now reaches 450TEU per month and 40 trucks per day transport these materials between Phnom Penh and Bavet.

Table 2.3.19 Traffic Increase from 2004 and 2007 (Bavet)

Unit: Vehicles

Type	2004	2007	2007/2004
Type (1)	4,178	13,739	3.29
Type (2)	51	91	1.79
Type (3)	488	1,143	2.34
Type (4)	117	237	2.03
Type (5)	20	1,096	54.80
Type (6)	106	129	1.22
Type (7)	0	186	

Source: Traffic survey by JICA Study Team

b. Trapeang Phlong

The traffic growth at Trapeang Phlong was moderate comparing that at Bavet, except Type 6 (medium truck), which decreased to 45%. It is supposed that the large truck traffic, which had made a detour via Trapeang Phlong due to restriction to cross the border at Bavet in 2004, returned to Bavet in 2007. The large truck traffic increased in 2007. Type 6 (medium truck), however, decreased in 2007. As Type 6 traffic slightly increased from 106 to 129 at Bavet, it is not considered that Type 6 at Trapeang Phlong returned to Bavet. The reason for decrease of Type 6 at Trapeang Phlong is not clear. On the other hand, no bus passed at Trapeang Phlong in 2004 and 2007.

Table 2.3.20 Traffic Increase from 2004 to 2007 (Trapeang Phlong)

Unit: Vehicles

Type	2004	2007	2007/2004
Type (1)	1,622	2,699	1.66
Type (2)	31	57	1.84
Type (3)	113	145	1.28
Type (4)	84	92	1.10
Type (5)	0	0	
Type (6)	205	92	0.45
Type (7)	59	80	1.36

Source: Traffic survey by JICA Study Team

2.3.2 Comparison between Monitored Traffic and Demand Forecast

(1) Passenger Car Unit (PCU)

The demand forecast in the previous FS was carried out based on the traffic volume in 2004 and the forecast traffic was monitored both in 2006 and 2007. Passenger car unit (PCU) has been employed to facilitate the comparison between both results in the motorized traffic because the traffic is composed of various types of traffic. PCU equivalent, which shows area occupancy

rates to the passenger car by various types of motorized vehicles on ferry boats and this PCU indicates the general traffic to cross the Mekong River by ferry at Neak Loeung. PCU equivalent on a motorcycle was decided through the investigation on the ferry boats and others were decided on the basis of that which was employed in the past studies. PCU, which was employed in the study, is shown in Table 2.3.21.

Furthermore, unified types of vehicle categories, which consist of MC (Motorcycles), LV (light vehicles) and HV (heavy vehicles), were employed in the study because OD matrices with the same vehicle categories, which were built up by the Feasibility Study on the Improvement of National Road No. 1, JICA, was employed in the study. The PCU equivalent was estimated by weighted average from traffic volume and initially counted by the 11 types of vehicles in the study. Non-motorized vehicles and pedestrians are, however, excluded from PCU because they do not occupy the space on the ferry boats which is allocated to the motorized vehicles.

Table 2.3.21 Vehicle Types and PCU Equivalent

Category	Type	PCU	Unified Type	PCU Equivalent
1	Motorbike /M.Tricycle	0.123	I	0.128
2	Motorbike Trailer	0.75		
3	Sedan / Wagon / Light Van	1.00	II	1.165
4	Pick-up / Jeep / Light Truck	1.50		
5	Short & Long Body Bus	1.75	III	2.241
6	Short & Long Body Truck	3.00		
7	Semi & Full Trailer Truck	4.50		
8	Bicycle	-	IV	-
9	Cyclo / Bicycle Trailer	-		
10	Pedestrian / Cart	-	V	-
11	Ox / Horse / Farm Trailer	-		

PCU were calculated from 11 types of vehicles and unified three types of vehicles as well with PCU equivalent. Almost the same PCU are observed for all the categories although a different PCU equivalent was employed.

Table 2.3.22 PCU by Different Type of Vehicles

Unit: Vehicles/PCU

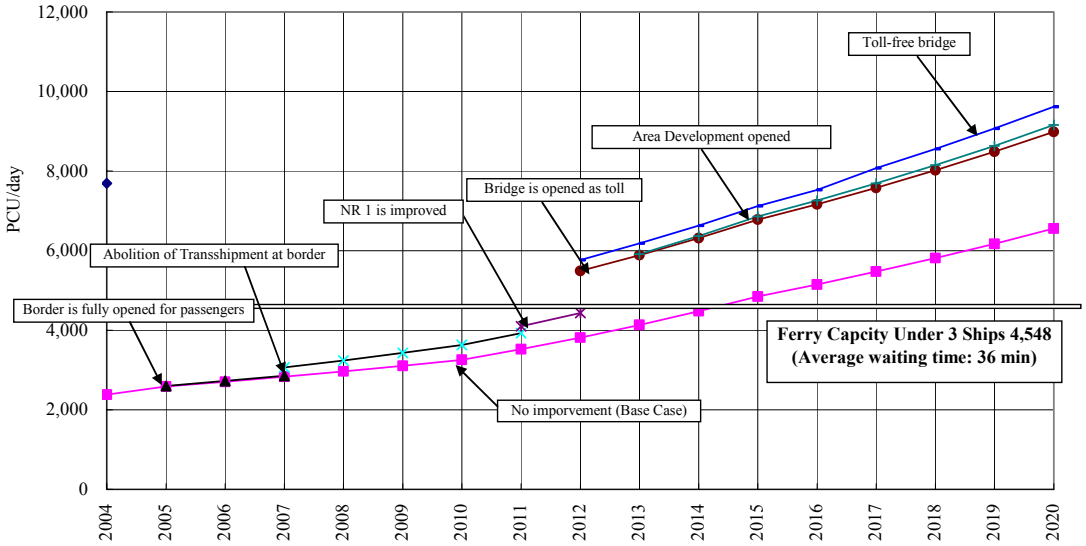
Year	Type	I (MC)	II (LV)	III (HV)	Unified Category PCU(A)	PCU by 7 Categories (B)
	PCU Equivalent	0.128	1.165	2.241		
2007	Weekday Average	2,192	905	1,177	3,972	4,107
	Non-weekday Average	2,887	1,151	1,413	4,877	4,824
	All Week Average	2,391	975	1,244	4,230	4,312
2006	Weekday Average	1,889	718	1,029	3,385	3,342
	Non-weekday Average	2,200	901	1,163	3,939	3,777
	All Week Average	1,978	771	1,067	3,543	3,466
2004	Weekday Average*1	1,663	803	549	2,376	2,376
	Non-weekday Average	1,806	861	541	2,447	2,499
	All Week Average	1,724	829	544	2,406	2,426

Source: JICA Study

(2) Verification of Demand Forecast

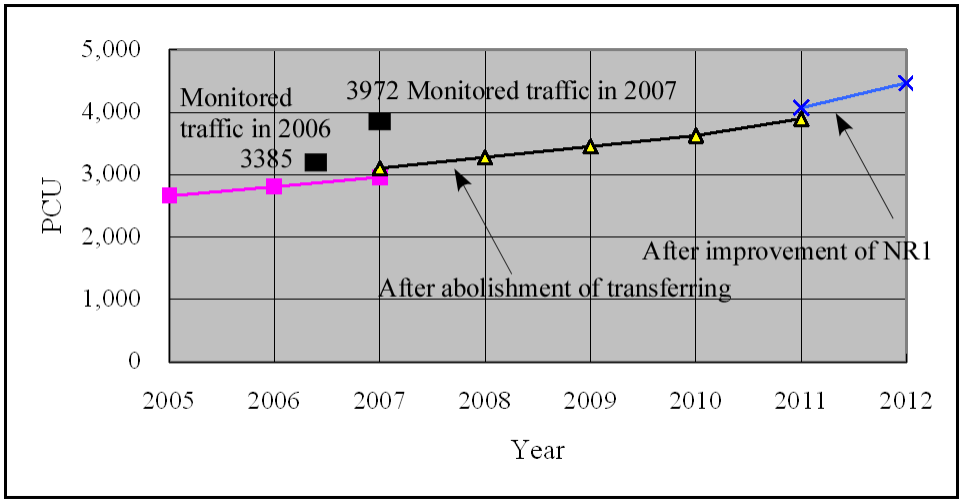
1) Demand Traffic and Monitored Traffic

The demand forecast in the previous FS was based on the weekday average traffic in 2004. 2,809 PCU and 3,104 PCU (no transferring case at Bavet) were forecast at Neak Loeung in 2006 and 2007. The weekday average traffic monitored at Neak Loeung in 2006 and 2007 show 3,385 PCU and 3,972 PCU respectively in the FU study. The monitored traffic grew sharply beyond the forecast; especially growth from 2006 to 2007 is remarkable (see Figure 2.3.12).



Source: Previous FS
Note 1) All cases are forecasted under the condition of medium growth scenario.
Note 2) Bridge will be opened in 2012 under the condition of toll and toll free.
Note 3) Ferry capacity is estimated under the condition of level of service: 0.815 x maximum capacity.

Figure 2.3.11 Traffic Demand Forecast in the Previous FS



Source: JICA Study

Figure 2.3.12 Verification of Projected Traffic

2) Reasons for High Monitored Traffic

Many reasons for high monitored traffic at Neak Loeung in 2006 and 2007 can be observed as follows:

a. Difference between Forecast and Monitored Traffic

Table 2.3.23 shows comparison between the forecast in the previous FS and the monitored traffic by three unified types of vehicles in 2006 and 2007.

Table 2.3.23 Comparison between forecast and Monitored Traffic by Unified Type (Weekday Average)

Unit: Vehicles/PCU

Unified Type	PCU Equivalent	Monitored traffic (A)		Forecast Traffic (B)		(A)−(B)		(A−B)/Forecast	
		2006	2007	2006	2007	2006	2007	2006	2007
MC	0.128	1,889	2,192	1,920	2,023	−31	169	−0.02	0.08
LV	1.165	718	905	926	976	−208	−71	−0.22	−0.07
HV	2.241	1,029	1,177	650	685	379	492	0.58	0.72
PCU		3,385	3,972	2,809	2,961	603	1,041	0.21	0.35

Note: 1) Forecast traffic in 2007 comes from cargo transferring case to makes the condition equal.
2) Forecast traffic is based on the medium growth scenario.

The comparison shows the small differences between the forecast and the monitored traffic in MC type in 2006 and 2007. Furthermore, although the forecast traffic is beyond the monitored traffic in 2006, the differences become small in MC in 2007. On the other hand, big differences between the forecast and the monitored traffic of HV type can be observed both in 2006 and 2007.

b. Impact by Seasonal Variation

No seasonal adjustments on monitored traffic in 2007 has been done because the forecast traffic was based on traffic in May and the monitored traffic was surveyed in the same season, in May.

The monitored traffic in 2006 was, however, adjusted by seasonal variation because the traffic was surveyed in November. The traffic in 2006 was adjusted as follows:

Adjusted traffic in 2006: 3,385PCU x 0.962/0.997= 3,266 PCU

The seasonal coefficient in 2005 is employed for November and December due to inefficient ferry statistics in 2006 (refer to Table 2.3.5.)

c. Condition of Economic Growth Scenario

Although the preconditions for the traffic demand forecast on economic growth is shown in Table 2.1.3, big differences can be observed between the preconditioned and the real growth. The impact on the traffic demand forecast by the economic growth is analyzed as below. The traffic demand was forecast under the condition of medium economic growth, 6% annually in the mid and long term, while 8% of economic growth was presumed as a high economic growth scenario. Based on the traffic volume forecast under these conditions, traffic demand under the condition of 10% and 12% of economic growth was approximately estimated as shown in Table 2.3.24.

Table 2.3.24 Traffic Demand by Economic Growth

Unit: Vehicle/PCU

Growth	Type	May in 2004	May in 2006	May in 2007	Remarks
6%	MC	1,663	1,920	2,023	Demand by Medium Case
	LV	803	926	976	
	HV	549	650	685	
	PCU	2,376	2,809	2,961	
8%	MC	1,663	1,930	2,044	Demand by High Case
	LV	803	932	989	
	HV	549	672	727	
	Total PCU	2,376	2,867	3,077	
10%	MC	1,663	1,961	2,089	Approximate Estimation
	LV	803	948	1,014	
	HV	549	701	781	
	Total PCU	2,376	2,926	3,198	
12%	MC	1,663	1,972	2,110	Approximate Estimation
	LV	803	954	1,027	
	HV	549	724	828	
	Total PCU	2,376	2,987	3,323	

Source: JICA Study

Figure 2.1.13 shows the estimated traffic by economic growth and the monitored traffic.

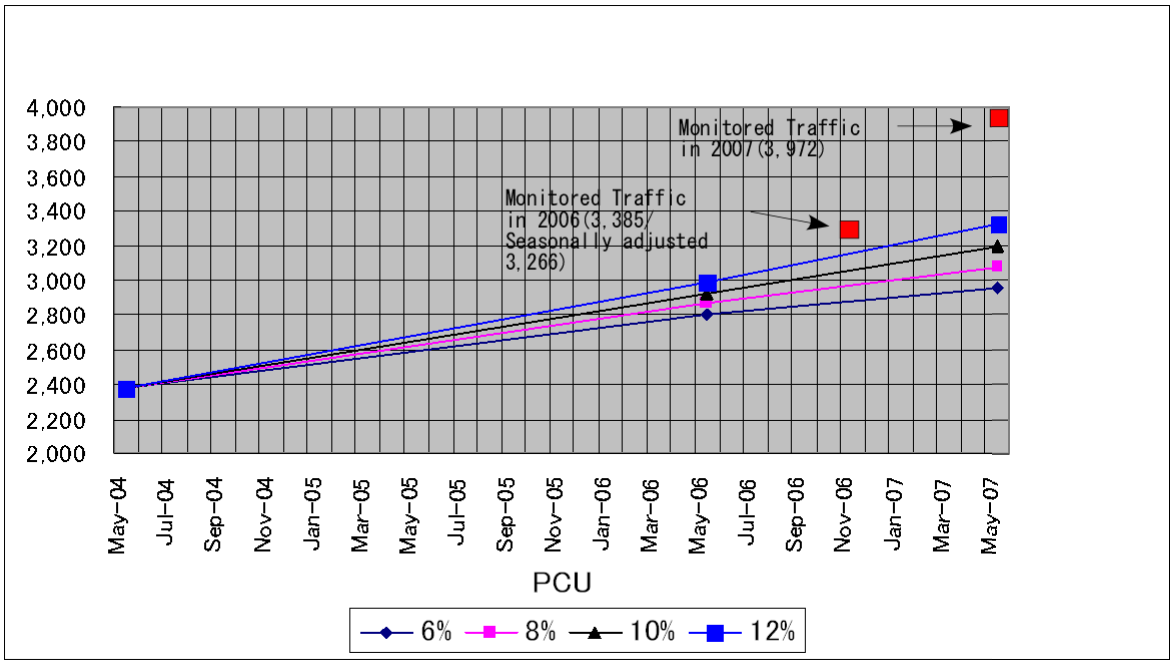


Figure 2.3.13 Forecast and Monitored Traffic

The real economic growth in 2005 and 2006 shows 13.4% and 10.8% respectively. Assuming the traffic in 2006 is reflected around 12% of annual economic growth in this period, the differences between forecast and monitored traffic in 2006 can be explained by the differences between preconditioned economic growth and actual economic growth, although the monitored traffic looks still exceeding the forecast traffic in Figure 2.3.13. In addition, considering the seasonal adjustment by traffic survey period, the monitored traffic indicates 3,266 PCU and the modified forecast traffic under the 12% economic growth on November in 2006 is around 3,155 PCU ((2,987+3,323)/2: see Table 2.3.24). The analysis indicates almost the same traffic volume.

On the other hand, the monitored traffic in 2007 shows a big difference from the forecast traffic in high economic growth case. Table 2.3.25 shows the comparison between both traffic volumes.

Table 2.3.25 Monitored and Forecast Traffic in 2007 (12% growth case)

Unified Type	PCU Equivalent	Monitored Traffic (A)	Forecast Traffic (B)	(A)-(B)	PCU
MC	0.128	2,192	2,110	82	10
LV	1.165	905	1,027	-122	-142
HV	2.241	1,177	828	349	782
Total (V)		4,274	3,965	309	
	PCU	3,972	3,323	650	650

Source: JICA Study

As the differences come from that of HV traffic, the following analysis focuses the differences in HV traffic.

d. Impact by Border Traffic

Bus Traffic

The ferry traffic at Neak Loeung is reflected in the traffic volume at Bavet: the national border with Vietnam. The weekday average bus traffic at Bavet largely increased from 20 in 2004 to 1096 in 2007 as shown in Table 2.3.19. On the other hand, the weekday average bus traffic at Neak Loeung also increased from 351 in 2004 to 764 in 2007 (see Table 2.3.4). Although it is not sure how many buses come to Neak Loeung via Bavet, it is easily supposed that much bus-traffic come to Neak Loeung from Bavet because the purpose of traffic passing at Bavet mainly is for tourism and business.

The reason why bus traffic increases from 2004 to 2007 at Bavet is that the bus traffic passing the border is reflected in the implementation initiative of CBTA between Cambodia and Vietnam. According to the interview with concerned officials, it is supposed that 50 buses were estimated to pass the border without transferring in April 2007. One of the reasons for the increase is that many parties of tourists have been visiting at Angkor Watt from Vietnam these days and business activities have been remarkable. These activities are accelerating the increase of bus traffic crossing the border. Another reason is that regional development has progressed including construction of hotels with casino and industrial estate development near the border. This also contributes to the increase of bus traffic at Bavet.

Decentralization and deregulation may also be contributors. According to interviews with the concerned officers, the responsibility for registration of the commercial bus (mainly using mini-buses) was transferred to the Provincial Government. The requirement to resister the bus was also minimized, which contributed to the expansion of the existing commercial bus business and the increase in the new entrepreneurs and therefore to the increase of bus traffic at Neak Loeung.

In the traffic demand forecast in the previous FS, small volume of bus traffic crossing the border was estimated. Regional development, decentralization and deregulation were not forecast because no initiatives were observed during the previous FS. This caused the differences between the forecast and monitored traffic.

Truck Traffic

The big differences between the forecast and monitored traffic come from increase in traffic of Type 7, trailer type truck. Part of increase of Type 7 truck comes from diverging truck traffic from Trapeang Phlong because large trucks were not allowed to pass the national border at Bavet due to construction works of customhouse in 2004. The large trucks needed to temporarily pass through Trapeang Phlong at that time. However, more traffic (186 vehicles) than that diverging from Trapeang Phlong passed at Bavet because only 59 trucks of Type 7

passed at Trapeang Phlong in 2004. This cannot explain all the increase of large truck traffic at Bavet as cargo transshipment was not abolished even in 2007 and CBTA has been still on the way of full implementation though some progress can be seen in its institutional framework.

The regional development including hotels with casino and industrial estate is another reason for the increase of large truck traffic at Bavet. Cargo traffic is reflected as physical distribution, which comes from regional development. Also, as discussed earlier, such changes in the physical distribution pattern such as an increase of the trade between Cambodia and Vietnam and an increase of the imported cargo via Bavet also contribute to the increase of truck traffic.

It is supposed that the increase of large truck traffic passing the border at Bavet and generated from the regional development caused the differences between the forecast and monitored traffic.

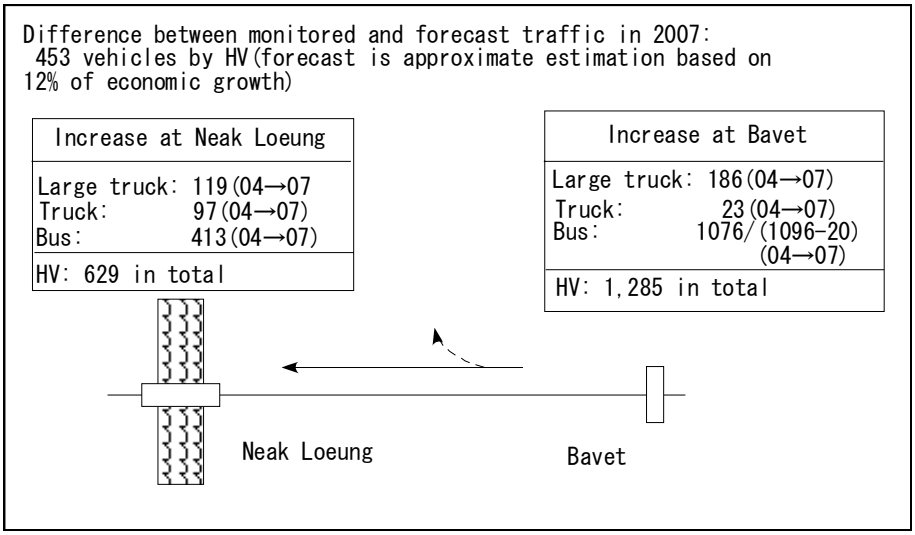


Figure 2.3.14 Increase of Large Types of Traffic

e. Impact by Holidays

The monitoring traffic survey in 2007 finished on Saturday, 12 May. After the survey, there were national holidays until Tuesday, 15 May. It is well known that many people go back to their home and to Phnom Penh for sightseeing during holidays.

The monitoring traffic-survey began on Sunday, 6 May and finished on Saturday, 12 May in 2007. The daily traffic by PCU is shown in Figure 2.3.15. The traffic increased from Thursday, 10 May to Saturday, 12 May. This apparently shows the impact by the holiday of this weekend. It is not clear whether the weekly traffic itself was reflected in the holidays in the weekend or not.

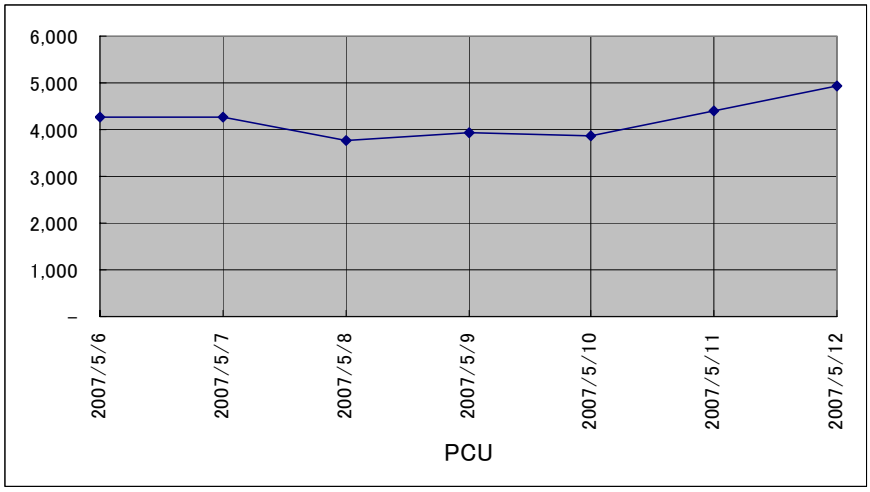


Figure 2.3.15 Daily Traffic in 2007 (PCU)

f. Others

Another difference of conditions between the forecast and the monitoring is longer operation time of ferry service in 2006 and 2007. The ferry was operated from 5:00 to 24:00 in 2006 and 2007, while it was from 5:30 to 21:00 in 2004. It is sure that the longer ferry operation contributed to the increase of ferry capacity. The increase of ferry traffic is, however, around 3%-6% to the total traffic and impact by longer service is not so big.

g. Consequences

The above analysis reveals that the differences between the forecast and the monitored traffic in 2006 came from the difference between the economic growth of 6%, medium growth scenario, in the demand forecast in the previous FS and actual growth of around 12% over the period from 2005 to 2006.

On the other hand, the monitored traffic in 2007 largely grew comparing with that in 2006 despite the short period of 6 months from 2006 to 2007. The reason comes from the increase of HV type traffic (large vehicle traffic), consisting of bus and truck traffic. The increase of bus traffic comes from the cross border traffic and deregulation of the commercial bus business. In terms of large truck traffic, increase comes partly from cross border traffic and industrial estate development near the area at Bavet and as an increase of the trade between Cambodia and Vietnam and an increase of the imported cargo via Bavet. The traffic, which was generated from the industrial estate, was not covered in the previous FS. Although the border truck traffic was included in the demand forecast in the previous FS, the forecast traffic was not enough to match the monitored traffic.

2.4 Traffic by Ferry Transport

2.4.1 Ferry Traffic by MPWT

(1) Category for Toll

The ferry fare has been regulated mainly by weight of users. This category is different from that of forecast and monitoring traffic. Table 2.4.1 shows ferry fares by category.

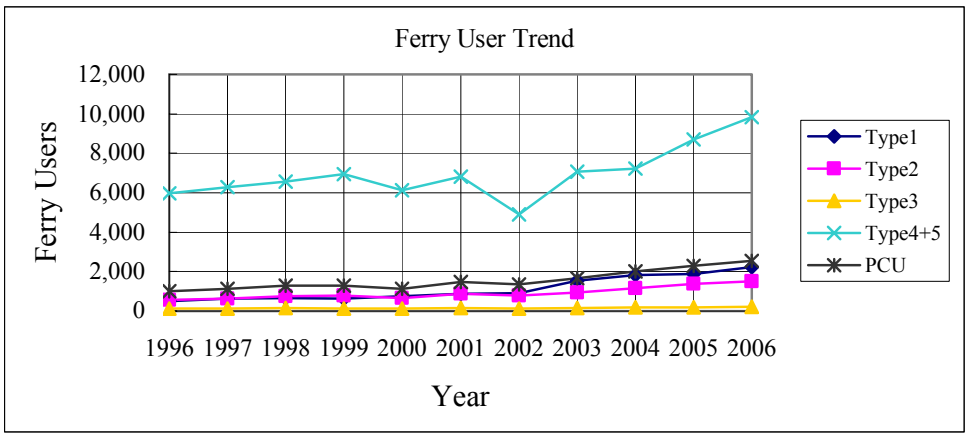
Table 2.4.1 Category of Ferry Tariff

No.	Category	Toll (Riel)	Unified Type	PCU Equivalent
1	Pedestrian	100	V	-
2	Bicycle, Passenger carry goods and cattle cart	200	IV	-
3	Motorbike	500	I	0.128
4	Trailer (horse, pushing, bicycle)	1,000	IV	-
5	Motorbike trailer and vehicle under 5 seats	5,800	II	1.165
6	Vehicle 6 seats and up to 12 seats	8,500		
7	Passenger car from 13 seats to 20 seats and all types of vhicles loaded under 5 tons	12,600	III	2.241
8	Passenger car from 21 seats up and all types of vehicles loaded from 6 tons up to 8 tons	23,600		
9	All types of heavy vehicles loaded from 9 tons up to 15 tons	39,600		
10	All types of trailer v ehicles loaded from 16 tons up to 18 tons	45,500		
11	Logging truck loaded from 18 tons up to 20 tons	52,800		

Source: MPWT
PCU Equivalent is only for motorized traffic.

(2) Growth of Traffic

The ferry at Neak Loeung has been managed and operated by MPWT. According to the ferry statistics by MPWT, user trend by type is shown in Figure 2.4.1. Stable user trend can be observed excluding that in 2000 and 2002: flood years.



Note: Flood happened in 2000 and 2002

Figure 2.4.1 Traffic Growth by Ferry from 1996 to 2006

Table 2.4.2 shows the average annual daily users from 2003. Annual growth shows as high as more than 10% in every type.

Table 2.4.2 Average Annual Daily Traffic by Ferry

Unit: Vehicles / Passengers

Type*[1)]	2003	2004	2005	2006	Average Growth Rate from 2003-2006
Type I	1,534	1,807	1,886	2,215	13.2%
Type II	945	1,176	1,379	1,502	16.9%
Type III	161	182	201	222	11.3%
TypeIV,V	7,070	7,224	8,696	9,843	11.9%

Source: MPWT
Note: *[1)] Unified type. Traffic in 2006 is up to August. As flood happened in 2000 and 2002, the figures are set forth from 2003. Users are indicated by annual users / 365.

On the other hand, Table 2.4.3 shows an annual growth rate of monitored traffic. Although there are some difficulties to analyze the growth trend due to fluctuation of the growth rate between the periods, Type II traffic shows low growth and Type III traffic shows high growth from 2004 to 2007. On the other hand, Type IV traffic (bicycle and others) and Type V traffic (pedestrian and others) decreased.

Table 2.4.3 Monitoring Traffic Growth

Type	04-06	04-07	06-07
Type I	5.65%	11.51%	9.94%
Type II	-2.87%	5.57%	12.49%
Type III	30.93%	31.75%	7.97%
Type IV	-5.83%	-2.91%	3.12%
Type V	-12.81%	-2.07%	15.03%

Note) Weekly average growth is employed to compare with annual ferry traffic
04-06 is 2.5 years period and 06-07 is half year period.

(3) Traffic Survey and Ferry Statistics

Table 2.4.4 shows surveyed traffic by JICA and the MPWT statistics in PCU base but motorized vehicles only. The ferry traffic by MPWT indicates slightly smaller values comparing to that by traffic survey by JICA. This difference arises from the several reasons including that category of traffic of the two is not one-to-one correspondence and that traffic estimated by JICA is based on one week traffic survey whereas the traffic by MPWT is based on annual statistics. The coverage ratio of the tariff cannot always reaches 100% due to vehicles for maintenance works and official purposes. This also causes the difference of the traffic between JICA and MPWT. The difference between the two was 75% in the previous FS. However, this ratio was 88% and 84% in 2004 and 2006 respectively. The seasonal variation in 2003 is employed for the traffic in Table 2.4.4 to compare the ratio in the previous FS.

Table 2.4.4 Traffic Survey and Ferry Statistics (Annual Average Daily Basis)

Unit: PCU

	2004	2006	2007
Traffic Survey by JICA(A)	2,271	2,999	3,789
Traffic by Ferry by MPWT(B)	2,009	2,530	_
B/A	88%	84%	

Source: MPWT and JICA

Note: Ferry traffic by MPWT is obtained from daily traffic, which is annual volume/365. Traffic by JICA Study Team is adjusted as AADT, which is obtained by average weekday traffic x seasonal variation coefficient (May: 0.954, Nov.: 0.88, which come from that in 2003 / 2381x0.954=2271 in 2004, 3385x0.886=2999 in 2006, 3972x0.954=3789 in 2007).

2.4.2 Revenue of Ferry Service

Table 2.4.5 shows the ferry revenue, which was announced by MPWT. This revenue is, of course, consistent with the ferry traffic.

Table 2.4.5 Ferry Revenue

Unit: Million Riel

Year	Revenue	Remarks
2004	5,105	Full year
2005	5,942	Full year
2006	4,495	Up to August

Source: MPWT

Note: Revenue in 2006 is up to August

2.5 Construction Timing of the Bridge

Technically speaking, it is preferable that the bridge crossing the Mekong River at Neak Loeung will be constructed and open to public when the forthcoming ferry traffic goes beyond the current ferry capacity. Comparing the monitored traffic survey results in 2006 and 2007 with the demand forecast traffic in the previous FS together with various preconditions such as socio-economic conditions, related road facility improvement and other programs, the following viewpoints were confirmed and verified.

(1) Socio-economic Conditions

According to the previous FS, the GDP growth and population are the main indicators to discuss the future traffic demand crossing the Mekong River at Neak Loeung.

1) Future GDP Growth

Recent high economic growth in Cambodia exceeded the preconditions in the demand forecast in the previous FS. This is one reason to increase the ferry traffic at Neak Loeung.

In terms of future economic growth in Cambodia, IMF announced the growth as steady as 5.8% in the mid and long term. This future growth is still the same as the preconditions in the previous FS. In other words, although the differences could be seen between the forecast and

monitored traffic, the same traffic growth, which is preconditioned in the demand forecast in the previous FS, is expected for the ferry traffic after 2007.

2) Future Population

Population was projected by NIS (National Institute of Statistics) in Cambodia and the first revision is still valid so far. This projected population is also a precondition for the traffic demand in the previous FS as well.

3) Consequences

Against this background, there is no big difference between the preconditions in the previous FS and the future socio-economic conditions. The forthcoming regional development at Bavet is an uncertain factor to discuss future ferry traffic because this was not predicted in the previous FS.

(2) Improvement of Road Facilities Program

1) Road Development

NR 1 between Phnom Penh and Neak Loeung is under construction based on the scheme of Japan Grand Aid program. It is expected to be completed by the year in 2011 and this precondition was taken into account in the traffic demand forecast in the previous FS. Some other road development programs can be observed in Cambodia. National Route 8 (NR 8) development program, which is expected to be extended under the scheme of China loan, may impact on ferry traffic at Neak Loeung. NR 8 will form a route between Ho Chi Menh (HCM) in Vietnam and Bangkok (BKK) in Thailand via Phnom Penh and is expected to be completed by 2011. The traffic from HCM to BKK is expected to be generated in long term basis so that no traffic was estimated in the demand forecast in the previous FS. After the completion of NR 8 improvement, the route seems to compete with NR 1 from HCM to Phnom Penh via Neak Loeung. The route, however, needs to make a detour by around 20% more in distance for Phnom Penh by NR 1 because the route passes Prek Tamak located at the north of Phnom Penh (see Figure 2.5.1).

From the viewpoint of road function, NR 1 via Neak Loeung is located in the Asian Highway. This clearly indicates that NR1 is established as an international arterial road. In terms of future road development, high development potential will impact future traffic growth. Many road improvements have been planned around Phnom Penh conurbation such as widening of Monivon Bridge, extension of 4-lane widening of NR 1 and outer ring road development. Hence, NR 1 via Neak Loeung between HCM and Phnom Penh has higher priority to NR 8 route after the completion of the bridge.

There are also some other road improvement programs in Cambodia. The impacts on traffic at Neak Loeung by these road improvement programs seem negligible, although the programs will contribute to the increase of traffic demand in the whole of Cambodia.

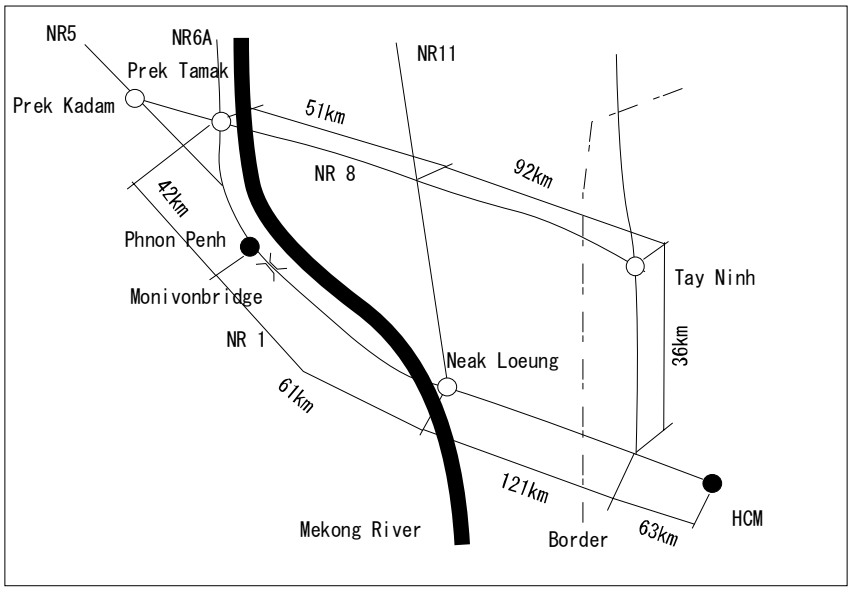


Figure 2.5.1 Approximate Route of NR8

2) CBTA

Full cross border facilitation at Bavet for passengers and cargoes was expected in the demand forecast in the previous FS. The border is partly opened for passengers and many buses pass through between the two countries at this moment. In terms of bus traffic, there is not so much difference in CBTA between the current situations and the preconditions set in the demand forecast in the previous FS. Monitored bus traffic is, however, surpassing that in demand forecast in the previous FS.

In terms of truck traffic, full facilitation has not been implemented officially so far although the institutional framework has been built up. However, an increase in the imported goods and the change in the physical distribution pattern between Cambodia and Vietnam is expected and may contribute to the traffic increase crossing the river at Neak Loeung.

(3) Traffic Characteristics

1) Traffic Growth

Average weekday traffic is employed to discuss the future traffic crossing the Mekong River at Neak Loeung. According to the traffic survey results, which were obtained through the traffic survey by JICA in 2006 and 2007, high monitoring traffic volume was observed as 3,385 (3,266 after adjustment by seasonal variation) and 3,972 in PCU respectively. Monitored traffic exceeds that in the demand forecast in the previous FS.

2) Ferry Operation Time and Capacity

The ferry was operated from 5:30 to 21:00 in 2004 at Neak Loeung. The ferry operation was extended from 5:00 in the morning to 24:00 in the night in 2006 and 2007. The ferry capacity was estimated under the 15.5-hour operation time in the previous FS as follows:

Maximum Capacity: 7.5 (times/hr) x 24 PCU x 15.5 hr x 2 (round trip) = 5,580 PCU

- 24 minutes are required for a round trip (7.5 times/hour by 3 ferry boats)
- Loading capacity of the ferry is 24 PCU

As it is not suitable to employ the maximum capacity to plan a transport facility, the concept of level of service, 0.815, was introduced. The ferry capacity for plan is estimated as 4,548 PCU (5,580 x 0.815). The level of service 0.815 means the average dwell time of around 36 minutes, which shows an allowable limit of dwell time for ferry users. In case the ferry traffic exceeds the ferry capacity of the plan, the construction of bridge is required.

The Ferry operation time was extended 30 minutes in the morning and 3 hour in the night. Considering the current ferry operation, the following calculation conditions were set up.

- One ferry boat will be in service from 5:00 to 5:30.
- One ferry boat will be in service from 21:00 to 24:00 in the night.

Under this condition, additional increase of ferry capacity is as follows:

- Additional increase by 30 minutes in the morning: 2.5 times/hr x 24PCU x 2(direction) x 0.5 hours x 0.815 = 49 PCU
- Additional increase by 3 hours in the night: 2.5 times/hr x 24 PCU x 2 (direction) x 3 hours x 0.815 = 294 PCU
- Total ferry capacity by 3 boats: 4,548+49+294 = 4,891 PCU

(4) Timing of Bridge Construction

a. Ferry Capacity

According to the above examination, the ferry capacity with three (3) boat operation is as follows:

- Ferry capacity in the previous FS: 4,548 PCU
- Increased ferry capacity after extension of service time: 4,891 PCU

b. Future Traffic Growth after 2007

Figure 2.5.2 shows future traffic growth based on the monitored traffic in 2006 in making good use of traffic growth in the demand forecast in the previous FS. This is obtained under the condition that the abolition of transshipment at the border will be implemented in 2008 because it was originally predicted in 2007 but it was not implemented. The following discussion limits to the future traffic demand based on the monitored traffic in 2006, since the traffic demand based on the traffic in 2007 may be overestimated due to the impact of holidays which may increase the monitored traffic in 2007.

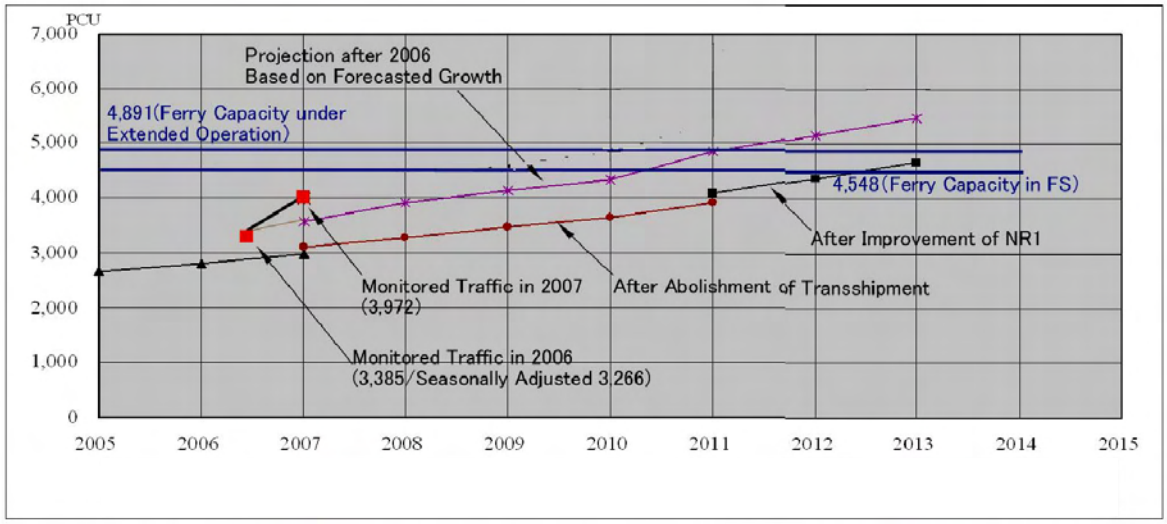


Figure 2.5.2 Traffic Growth after 2006

c. Timing of Bridge Construction

Based on the above examination, the monitored traffic largely exceeded that in the demand forecast in the previous FS. In addition, the ferry capacity has increased through the extension of operation time. One focal point is traffic growth after 2006. Although the economy in Cambodia has grown remarkably, IMF predicted the mid and long term growth to be around 6%. This is consistent with that in the demand forecast in the previous FS so that the traffic growth based on the demand forecast in the previous FS is appropriate after the monitored traffic survey in 2006 at Neak Loeung.

Against this background, the ferry traffic at Neak Loeung will be beyond the ferry capacity after 2011 with three (3) boat operation even after the extension of ferry operation time. Accordingly, it is preferable that the bridge will be open to the public before 2012, which was proposed in the previous FS considering required period for basic design, detailed design and compensation for resettlement.

Chapter 3 IEIA and EIA

3.1 Introduction

After completion of the official IEIA[4] (Initial Environmental Impact Assessment), several IEIA comments were provided from the Ministry of Environment (hereinafter referred to as MoE) to MPWT. According to those comments, upon considering the significance of potential negative both environmental and social environmental impacts to be caused by the proposed project, it was concluded that EIA study shall be carried out for more precise evaluation of those potential environmental impacts and its environmental license application process. Also, the importance of the set-up of an appropriate environmental management program was stressed out.

Based on the study results of F/S of this project, EIA D/F reports that reflected those IEIA comments were prepared. These EIA D/F reports were submitted to MoE and then, the official EIA examination was started. After EIA examination process was terminated, the environmental approval of this project was made and its examination results were provided to MPWT.

In Section 3.2, entire flow of IEIA/EIA examination process, based on the current Cambodian EIA framework is summarized. Both official IEIA and EIA procedures of the proposed project are summarized in Sections 3.3 and 3.4, respectively. Outline of the environmental management program (hereinafter referred to as EMP), described in both F/S and EIA reports, is summarized in Section 3.5.

3.2 Reconfirmation of IEIA and EIA Procedure

Within the interview with MoE officials, it is confirmed that there is no significant change in IEIA/EIA examination process in Cambodia after the F/S of the proposed project was completed in March 2006. Following EIA-related information are excerpts from the main report of the feasibility study of the proposed project.

3.2.1 Environmental Approval

The main purpose of EIA study is to seek and obtain the environmental approval made by MoE or other competent governmental agencies. Officially, EIA studies of the infrastructure development project can be initiated after the term of reference (ToR) of environmental studies required for the IEIA/or EIA examination process is properly developed. Basically, contents

[4] IEE (Initial Environment Evaluation) is called as IEIA (Initial Environmental Impact Assessment) in Cambodia.

of this ToR are to be determined through the consultation process with MoE at the initial stage (see Article 10 of the EIA Law) of the project cycle. More detailed descriptions of Cambodian environmental approval process will be presented in the following section.

3.2.2 Approval Steps

Basically, entire EIA examination process in Cambodia consists of the following two major steps: (1) IEIA, and (2) a full-scale EIA study. Besides, there are three EIA examination procedures for the newly proposed infrastructure development project while two for the existing (or on-going) project implemented before the current EIA law became active in 1999 (see Table 3.1).

Table 3.1 Categorization of IEIA/EIA Examination Process in Cambodia

Process	Examiner of IEIA & EIA Report	Approval made by	Review Period
Proposed project			
1	MoE	Royal Government or CDC	30 days for IEIA 30 days for EIA
2	MoE	PO	
3	PUED	PUA	
Existing (or on-going) project			
4	MoE	No need approval but contents of IEIA/EIA reports be well-studied.	1 year for IEIA 8 months for EIA
5	PUED		

Note that CDC: Cambodia Development Council, PO: Project Owner, PUED: Provincial Urban Environmental Department, PUA: Provincial Urban Authority

Based on the discussions with Department of EIA, MoE, held within the F/S, it was highly likely that the IEIA/EIA examination of the proposed project should take the examination scheme of the Process 2, summarized in Table 3.1. The following are the major steps of this Process 2 - IEIA/EIA Examination steps.

3.2.3 IEIA Procedure

1) Develop the ToR of required environmental study to be associated with the proposed project through the consultations with MoE at the early stage of the project cycle.

2) Carry out relevant environmental studies, based on the ToR developed in previous step.

3) Prepare for IEIA D/F reports, and then, submit these reports to MoE with the Environmental Examination Application (EEA, official EIA application form).

4) After MoE receives IEIA D/F reports with EEA, the examination of IEIA by MoE eventually starts in order to decide if further environmental study (i.e., full-scale EIA study) is necessary for the proposed project. MoE assembles an inter-ministry EIA examination committee for the reviewing the submitted IEIA D/F reports. Usually, this committee consists of several line ministries such as MoWRM, MoAFF and CNMC and other relevant

agencies/or organizations such as MRC. This examination process takes at most 30 working days.

5) If MoE concludes the contents of submitted IEIA D/F reports are satisfactory and no severe negative environmental impacts would be caused by the proposed project, MoE will notice this IEIA examination results to the project owner. Then, the environmental approval will be made by the project owner (i.e., it will be the MPWT within this project).

6) When MoE finds that the proposed project will not cause severe environmental damage but a submitted IEIA D/F report is not satisfactory for the examination process, MoE will order the project owner to revise the IEIA D/F report/or conduct additional environmental studies until contents of IEIA D/F report will become satisfactory.

7) After the environmental approval is officially made, the project owner must carry out the environmental management plan as developed in the IEIA study.

3.2.4 EIA Procedure

1) When MoE concludes that potential environmental impacts to be caused by the proposed project is significant and need more elaborate environmental studies, MoE will notice the project owner to carry out a full-scale EIA study. Upon receiving this notice from MoE, the project owner must carry out relevant EIA study and submit EIA D/F reports to MoE within the next six months.

2) After receiving EIA D/F reports, MoE assembles an inter-ministry EIA examination committee for the reviewing the submitted EIA D/F report. Usually, this committee consists of several line ministries such as MoWRM, MoAFF and CNMC and other relevant agencies/or organizations such as MRC. Basically, this review process takes at most 30 working days.

3) If MoE concludes the contents of submitted EIA D/F reports are satisfactory and EMP is well-prepared, MoE will notice this EIA examination results to the project owner. Then, the environmental approval for the proposed project will be officially made by the project owner. If MoE finds that a submitted EIA D/F report is not satisfactory, MoE will order the project owner to revise the EIA D/F report/or conduct additional environmental studies until contents of EIA D/F report will become satisfactory. Revised EIA D/F reports shall be submitted to MoE, and then, another round of EIA examination will be conducted by MoE.

4) If MoE concludes the contents of submitted revised EIA D/F reports are satisfactory, MoE will notice a final EIA examination results to the project owner. Then, the environmental approval for the proposed project will be officially made by the project owner. After the environmental approval is officially given, the project owner must carry out the environmental management plan as developed in the EIA study.

3.3 IEIA Examination

3.3.1 Progress of IEIA Examination

Table 3.2 summarizes key features of IEIA examination process of this proposed project. IEIA examination committee consists of four (4) MoE officials. In general, there are three intra-ministerial meetings within the IEIA examination process. However, after quick review of entire project outline and significance of potential impacts to be caused, MoE decided to skip one open meeting in that the project owner's attendance and presentation are required, and carry over a comprehensive explanation of the proposed project from the project owner at the EIA examination process to be followed.

Table 3.2 IEIA Summary

	Items	Descriptions
1	Submitted Materials	14 copies (Khmer) and 4 copies (English) of IEIA Report
2	Committee Member	1. Mr. Dong Sam Keat, Deputy Director of EIA Department 2. Mr. Ong Vuthy, Chief of Planning Office 3. Mr. Ngorn Mengly, Project Inspection Member 4. Mr. Baut Ly, Project Inspection Member

3.3.2 Comments of IEIA

IEIA comments, issued on January 2007, mainly covers four (4) topics. Based on those comments and relevant environmental study results summarized within this feasibility study, EIA D/F report was prepared.

3.4 EIA Examination

3.4.1 Progress of EIA Examination

Table 3.3 summarizes key features of EIA examination process of this proposed project. Besides, two more provincial MoE officials get involved, so that, six (6) MoE officials examine submitted EIA Reports. There are three intra-ministerial meetings within this EIA examination process.

Table 3.3 EIA Summary

	Items	Descriptions
1	Submitted Materials	21 copies (Khmer) of main reports 11 copies (English) of appendix reports
2	Committee Member	1. Mr. Dong Sam Keat, Deputy Director of EIA Department 2. Mr. Ong Vuthy, Chief of Planning Office 3. Mr. Ngorn Mengly, Project Inspection Member 4. Mr. Baut Ly, Project Inspection Member 5. Mr. Om Phat, MoE Staff of Kandal Province 6. Mr. Bem Sothy, MoE Staff of Prey Veng Province.

3.4.2 Comments of EIA

Official environmental approval was made and written in the MoE's letter to MPWT, issued on June 2007, provided that relevant social impact studies such as involuntary resettlement issue shall be carried out with appropriate consultations process with MoE during the detailed design study period. Later on July 11, 2007, 21 EIA examination comments were sent from MoE to MPWT. Based on those comments, the draft of reply comments was prepared by both the Study Team and MPWT while exact meaning and/or background of each comment and validations of those prepared replies were discussed through a series of consultation process with EIA Department of MoE.

In general, most comments are related with study results of field surveys conducted within the F/S, and requests of supplemental explanations to the submitted EIA report. There are several EMP-related comments, and the Study Team and EIA Department of MoE had agreed that suggested EMP framework, summarized in a submitted EIA report, is appropriate for the F/S, and more comprehensive and effective EMP shall be prepared based on study results of the detailed design to be followed.

3.5 Preparation of Environmental Management Program

EMP that covers key environmental issues, identified within the environmental studies carried out within the F/S, has been established. EMP for both natural and social environment is described in Chapter 3 of submitted EIA D/F report. Outline of impact mitigations program for both natural and social environments are summarized in Sections 3.3.4 and 3.4.5, respectively. Fundamental principles and concepts related with the set-up of the environmental management program for the natural environment are discussed in both Sections 3.3.5 and 3.3.6. Monitoring plan for the social environment and the framework of the resettlement action plan (RAP) are described in Sections 3.4.6 and 3.5, respectively.

EMP, presented in EIA D/F, is thorough and provides comprehensive environmental mitigation measures against each identified potential environmental impacts. During the consultation with Department of EIA, its relevance and comprehensiveness of the EMP, described in the EIA D/F report, was confirmed.

As mentioned earlier, the official environmental approval for this proposed project was made in July 2007. It shall be noted that EMP must interact dynamically as the project cycle proceeds and new study results and/or findings related with D/D (e.g., final route alignment and final scope of the relevant expropriation process) will become to be known, dealing flexibly with significant potential environmental impacts, newly identified in that process. This EMP can assimilate those comments if there will be any specific EMP-related comments and/or issues arising, summarized during this examination process.

Chapter 4 Follow-up Studies for Natural Environment

4.1 Introduction

4.1.1 Outline

During this Follow-up Study, supplemental EIA-related studies were carried out to follow up pending and/or unsolved discussion points, including those raised at JICA social and environmental consideration committee during the previous FS.

4.1.2 ToR Development of Follow-up Natural Environmental Studies

ToR of this follow-up study was developed based on discussions at JICA social and environmental consideration committee, held in March of 2006. In that committee, several natural environmental issues such as both terrestrial and aquatic flora/fauna, the local flow circulation pattern of the Mekong River and others were discussed. Table 4.1 summarizes some of major discussion topics, raised at this committee.

Based on this table, the following three environmental field studies were selected and carried out within this follow-up study.

(1) Preliminary water quality (i.e., thermal regime) study of the Mekong River

(2) Regional biological environmental study

(3) Preliminary benthos study

Outline and major findings of each environmental studies, mentioned above, are described in the following section, separately.

Table 4.1 Major Issues for the Follow-up Study

	Major findings of F/S Environmental Study	Issues to be studied within follow-up study
Hydrodynamics of the Mekong River	1. Cross sectional depth-averaged velocity profile during the rain season was measured along the proposed bridge alignment. 2. Sometimes, the depth-averaged velocity reaches about 3.0 m/sec at some points. So, it is likely that strong current that may exceed more than 3.0 m/sec around the somewhere across Neak Loeung deep-pool area. 3. Entire flow condition of the shallow area is slower than that of deep-pool area. So, it is can be assumed that this shallow area may be a temporal evacuation place for local aquatic species during the rainy season.	1. Detailed hydrodynamic pattern (e.g., three-dimensionality of the local flow pattern). 2. Development of the thermal stratification pattern. Expected Results By studying those features, several knowledge of local flow pattern can be obtained, so that more accurate prediction of pollutants dispersion in case of accident events would be possible.

	Major findings of F/S Environmental Study	Issues to be studied within follow-up study
Terrestrial and aquatic flora/fauna	1. Field biological environmental study was conducted along the proposed alignment, and basic fauna/flora inventories at current condition were updated and strengthened by this study. 2. Illegal trades of IUCN-vulnerable species such as Asian Box Turtle were recognized at the east side of Neak Loeung market while several occurrences of IUCN-vulnerable species seem to occur around the Mekong floodplain around Neak Loeung. 3. Several ponds and/or lakes exist across the eastside Mekong floodplain, that may provide suitable habitats for wildlife including IUCN-vulnerable species, mentioned above. 4. Shallow channel part of the Mekong River along the alignment (i.e., the river space between the island and the west bank) is not important fish spawning area, but may be a temporal evacuation place for local aquatic species during the rainy season, mentioned above.	1. Regional flora/fauna study at the east side of the Mekong River. 2. Benthos study of the Mekong River. 3. Potential habitat study of IUCN-vulnerable box turtle and its illegal trade at Neak Loeung. Expected Results Most of IUCN-vulnerable species seem to occur at the eastside Mekong floodplain. Also, no site-specific information of the Mekong Benthos is obtained. By studying those topics, more site-specific biological environmental information can be obtained along the proposed alignment.

4.2 Environmental Field Studies

4.2.1 Mekong River Water Temperature Study

(1) Objectives

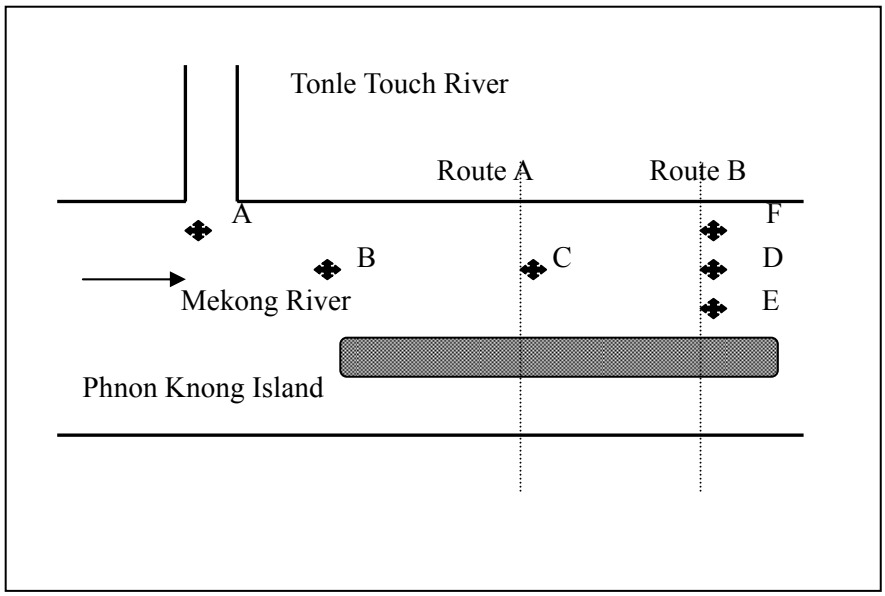
Preliminary water temperature measurement is carried out in order to study the mechanism of the thermal regime (i.e., the location of the thermocline) across Neak Loeung deep-pool area of the Mekong River and analyze the three-dimensional characteristics of the local circulation pattern around the project route.

(2) Survey Program

In this preliminary survey, only one parameter, water temperature, is of concern, and the water temperature is measured at 15 different depths, summarized in Table 4.2. Within the first and second surveys, two sampling points were selected within the Mekong River (i.e., Points A and B of Figure 4.1) and two different temperature surveys were carried out in May and June 2007, respectively. Based on those results, the third survey was conducted in September 2007. Within this third survey, four points (i.e., Points C, D, E and F of Figure 4.1) were selected in order to see the spatial variation of thermal stratification pattern along both cross-sectional and longitudinal directions of the river. Figures 4.2 and 4.3 show a typical cross section of the Mekong River at Neak Loeung Gauge Station and the time variation of the water level of the Mekong River measured at Neak Loeung Gauge Station (monitoring period: June 01, 2007 – September 08, 2007), respectively.

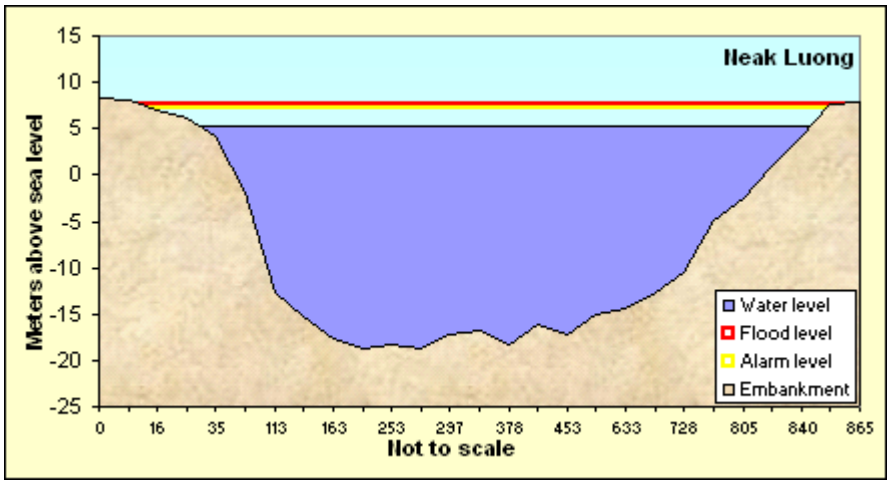
Table 4.2 Water Temperature Survey Program

Measuring period: 1st measurement: May/09/07 2nd measurement: June/10/07 3rd measurement September/08/07	
Parameter	Temperature
Survey Depth (m)	Water temperature surveys are carried out at the following 15 different depths, D1=0.1 m, D2=0.5 m, D3 = 1.0 m, D4 = 1.5 m, D5 = 2.0 m D6 = 2.5 m, D7 = 3.0 m, D8 = 3.5 m, D9 = 4.0 m, D10 = 4.5 m D11 = 5.0 m, D12 = 5.5 m, D13 = 6.0 m, D14 = 7.0 m, D15 = 8.0 m
Equipment	D.O and Temperature Meter: Personal D.O/ORP Meter 90 Series TPX- 90, 90i, TRX-90 Instruction Manual, Tokyo Chemical Laboratories Co., Ltd. Japan TPS WP-84 Conductivity - Salinity Meter



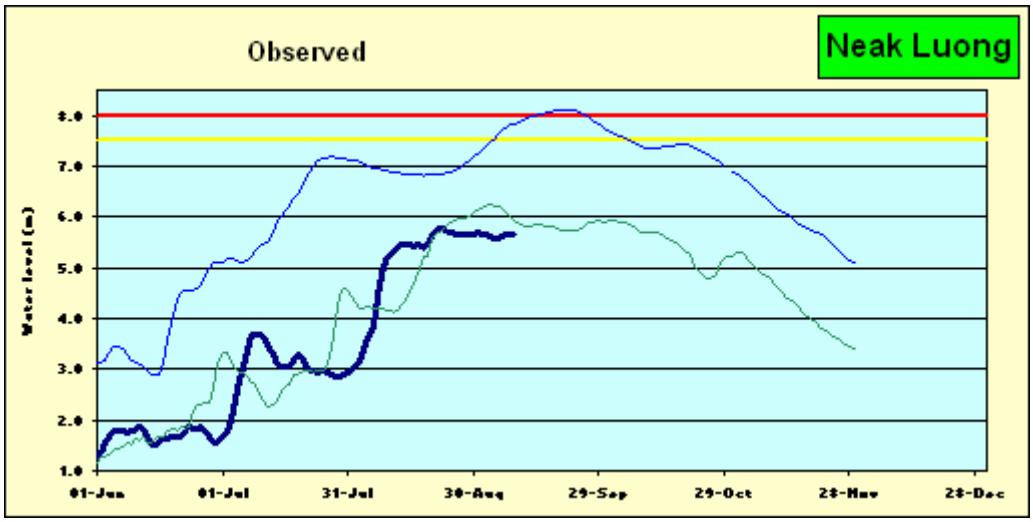
Note: Two points, A and B, are used for both first and second surveys while four points, C, D, E and F are used for the third survey.

Figure 4.1 Outline of Water Temperature Survey Location



Source: http://www.mrcmekong.org

Figure 4.2 Typical Cross Section of the Mekong River at Neak Loeung Gauge Station



Note: Red and Yellow Lines indicate Flood and Alarm Levels, respectively. Dark Blue, Light Blue and Light Green Curves indicate Observed Water Level, Water Level of Flood Year 2000, and Water Level of Dry Year 1992, respectively.

Source: http://www.mrcmekong.org

Figure 4.3 Time Variation of the Water Level of the Mekong River measured at Neak Loueng Gage Station (Monitoring Period: June 01, 2007 – September 08, 2007)

(3) Results

1) First and Second Surveys

Figures 4.4 and 4.5 show the survey results measured at Points B and A, respectively. Figure 4.4 shows clear thermal stratification pattern, mainly developed in the epolimnion (i.e., the

upper part of the Mekong River water body between the water surface and the thermocline) within this study. It may be likely that the location of the stable thermocline is situated deeper than 7 m below the water surface.

Point A has a shallow water depth (less than 3 m), so that a complete water temperature survey to the depth of 8 m, specified in the ToR of this study, was not made at this point. Since no typical temperature variation in z-direction (i.e., depth) is recognized, it can be said that the water body at this point is completely mixed in May.

2) Third Survey

Figure 4.6 shows the survey results measured at Points C, D, E and F. As shown in this figure, no significant temperature variation in z-direction is recognized at all four points, and, no major spatial variation is recognized, either. So that, it can be said that there is a strong mixing of the water body for the upper layer (i.e., the layer with the water depth less than 8 m) of the Mekong River.

(4) Discussions

From this preliminary water temperature study, it can be guessed that the thermocline is developed deeper than 7 m below the water surface at Neak Loeung deep-pool area during May and June 2007. This indicates that there are at least two different local flow patterns in z-direction. This preliminary water temperature study suggests, though the further study is necessary to verify, an instantaneous complete mixing of substances and/or pollutants spilled accidentally would not occur at Neak Loeung deep-pool area (see Figure 4.7).

However, in September 2007 when the water level of the Mekong River is rising, the thermal stratification pattern, recognized in May and June, seems to be disappeared. This may be due to a strong mixing phenomenon of the water body for the upper layer (i.e., the upper layer with the water depth less than 8 m) of the Mekong River. Considering the bathymetric feature of Neak Loeung deep-pool region, it is also possible to assume that a thermal stratification pattern, observed in May and June 2007, is shifting to more deeper parts of this deep-pool area.

In the past, no hydrological and/or limnological studies of LMB (Lower Mekong Basin) region, that analyzed the mechanism of the thermal regime development was carried out, so far. The knowledge of the thermal stratification pattern of Neak Loeung deep-pool area would be useful for the study of the local flow pattern as well as the preparation of an appropriate contingency program for the local water quality degradation problems, that may be triggered by the accidental spillage of hazardous construction wastes and/or chemicals.

It shall be noted that study results of this preliminary survey is very limited (i.e., six points and three short survey campaigns). It is recommended that during the design stage of this Project, more elaborate and comprehensive survey program, if implemented, shall provide the regional characteristics of Neak Loeung deep-pool thermal stratification pattern, which shall be an essential input to the environmental management plan of the Project.

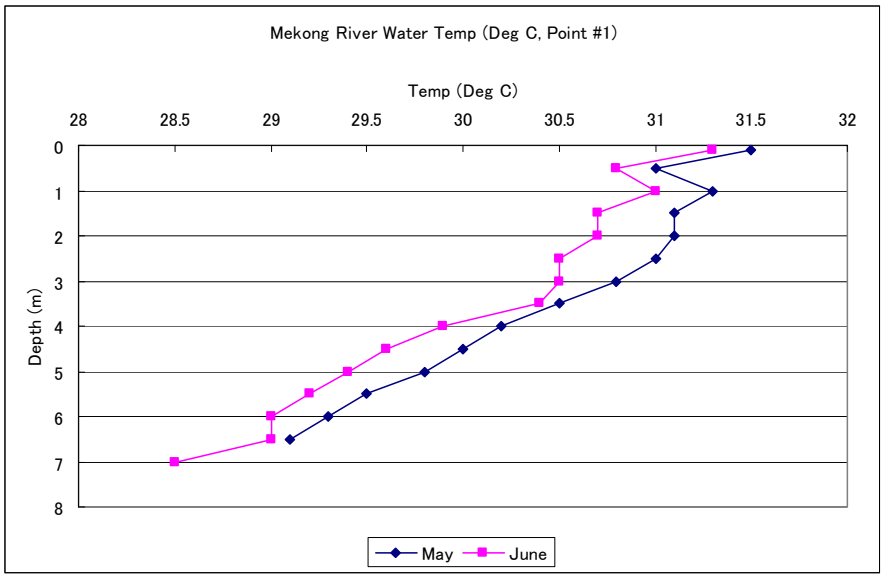


Figure 4.4 Water Temperature Profile (Mekong River, Point B)

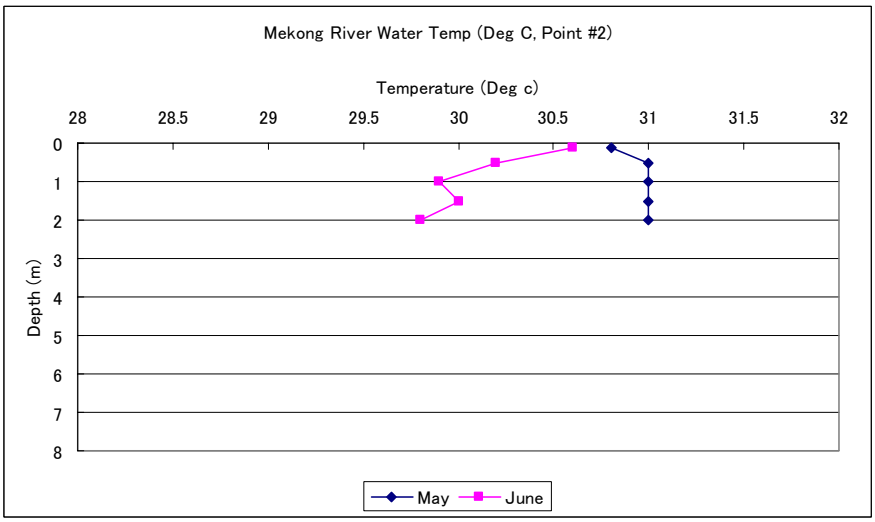


Figure 4.5 Water Temperature Profile (Mekong River, Point A)

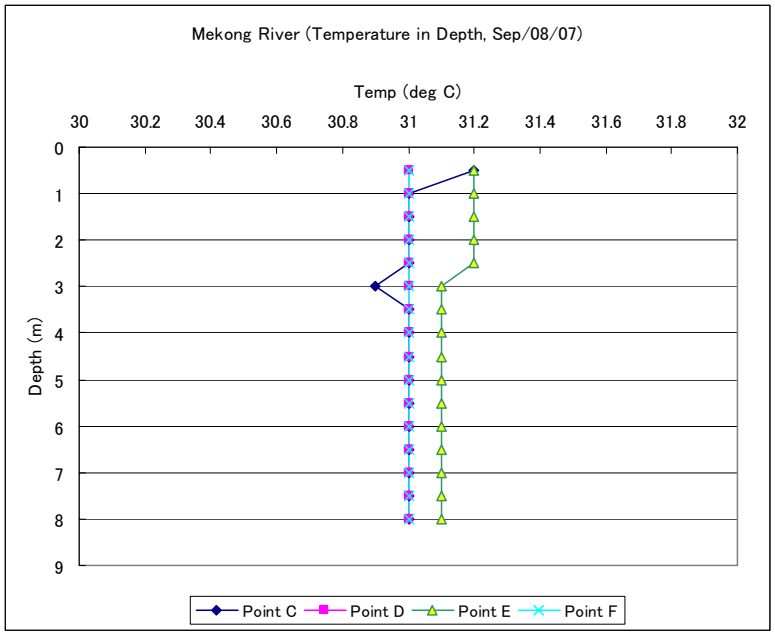
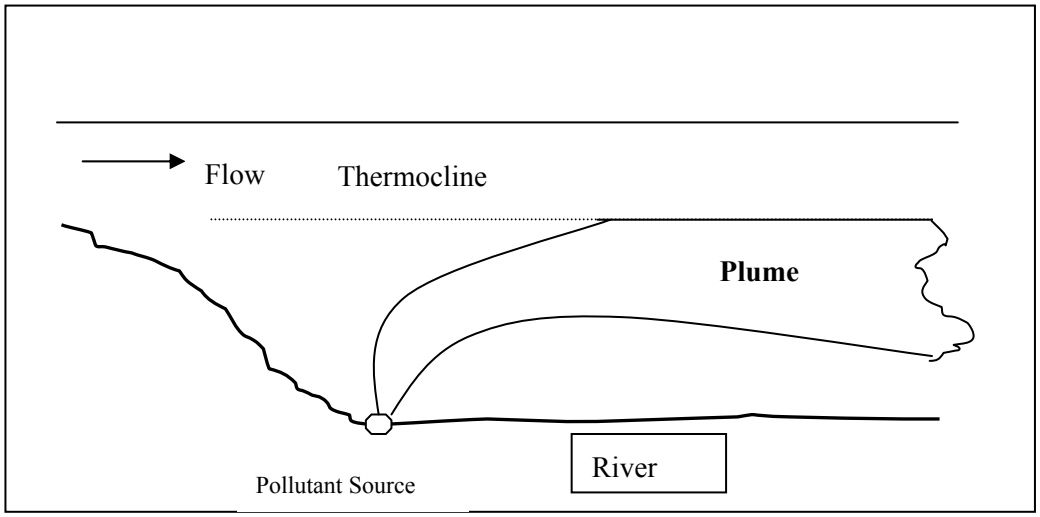


Figure 4.6 Water Temperature Profile (Mekong River, Third Survey)



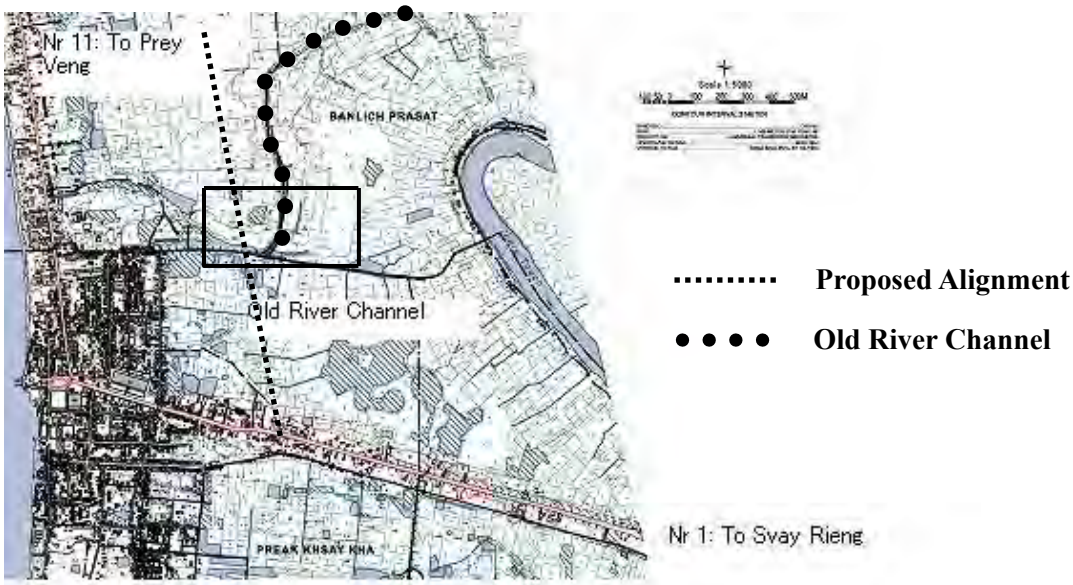
Note: Due to the development of a stable thermocline at Neak Loeung deep-pool area, pollutants discharged from the river bottom do not penetrate into the epolimnion (i.e., the upper part of the Mekong River water body between the water surface and the thermocline).

Figure 4.7 Schematic Diagram of Pollutant Dispersion at Neak Loeung Deep-Pool Area

4.2.2 Local Biological Environment Study

(1) Objectives

Local biological environment and water quality surveys are carried out in order to obtain the baseline information of the current local floodplain flora/fauna condition across the east-side Mekong floodplain around Neak Loeung (see Figure 4.8). Mainly, this study consists of the following four sub-tasks: (i) the local biological environment study across the east-side Mekong floodplain, (ii) a preliminary hydrological study on existing floodplain ponds (iii) the water quality study of the floodplain pond, and (iv) a preliminary interview survey of Asian Box Turtle trade. The outline of each study method is described in the following section, separately.



Note that the water quality sampling was carried out at the floodplain pond, located inside of the box shown in this figure.

Figure 4.8 East-side Mekong Floodplain around Neak Loeung

(2) Study Methods

1) Local Biological Environment Study

This study utilizes two methods of baseline data gathering. The first is the current literature review, mainly information derived from recent biological environmental studies such as WCS periodical reports. The other way is the direct survey method producing data collected during the field surveys and observations. An overview of the past and current status of each faunal group and habitat/vegetation type is given.

2) Preliminary Hydrological Study on existing Floodplain Pond

There are several permanent ponds (note: permanent pond means a pond that is not dried up throughout the year) at the Mekong floodplain, and it was found that many species including some of IUCN vulnerable species such as Asian Box Turtle [JICA, 2006] occur around those remnant floodplain areas. A preliminary field study was carried out in order to study the current hydrological condition of those existing ponds across the eastside floodplain.

3) Water Quality Study of Floodplain Pond

Based on the study results of previous study, one typical pond was chosen and the water quality study was conducted therein in order to obtain its baseline water quality data (see Table 4.3).

Table 4.3 Water Quality Measurement

Total number of sampling points = 1.	
Parameter	Temperature, pH, Turbidity, Conductivity, TSS, DO, BOD, COD

4) Preliminary Interview Survey of Asian Box Turtle Illegal Trade

There are several restaurants who engage illegal trade of IUCN-vulnerable species such as Asian Box Turtle at the east-side of Neak Loeung market (see Figure 4.9). Study team visited those restaurants, identified species for illegal trades, and then had a series of interviews with those restaurant owners in order to obtain relevant information such as rough estimate of those species' abundance, possible habitats and others.

Note: Asian Box Turtle (*Cuora amboinensis*: IUCN-Vulnerable) was for sale (photo taken on November, 2006)

Figure 4.9 Current Illegal Trade of Asian Box Turtle at east-side Neak Loeung Market

(3) Results

1) Local Biological Environment Study

The following is the summary of this local biological environment study.

Immediately east of the Mekong River, along the eastern approach route, there is a belt of residential housing and gardens with some trees affording a lower proportion of canopy cover than on Koh Chamraoeng or the west of the Mekong. East of this was an area of mostly fallow field, one or two of which were under preparation for the cultivation, having been ploughed on a small scale using domestic livestock. These fields were situated south of the 90-degree southward bend.

The eastern approach route had more remnant semi-natural habitat, especially shrub, sedge beds and wetlands, than any other part of the route. Evidence that the area formerly supported flooded shrub-forest was provided by the presence of occasional *Barringtonia sp*. trees, none of which were more than 5 m high, and woody *Morinda sp./spp.* shrubs. Other shrub species included representatives of the families P*apillionidae* and *Malvaceae*, and a tall species closely resembling *Aeschynomene indica*.

Mimosa pigra was dominant in several areas, especially the grassy fallow fields near the east bank of the Mekong, along the channel bisecting the *Eucalyptus sp.* plantation, and in the wetlands to the south. Eucalyptus is generally planted as a monoculture and supports very low bio-diversity in non-native plantation environments such as Neak Loeung.

2) Preliminary Hydrological Study on existing Floodplain Pond

Field study was carried out for the floodplain pond across the east-side Mekong floodplain, located around the regional development projects, proposed by F/S. This pond is some portion of old river channel that used to be connected to the Mekong River but currently disconnected due to the recent National Road 11 rehabilitation project. Current lakeside vegetation is classified as “semi-natural habitat”, mentioned earlier, and provides enough shadows over the waterfront of this pond (Figures 4.10 – 4.13). It is observed that this pond is never dried out throughout the year but flooded temporally during the rainy season (this observation made at both F/S and this Follow-up studies).

Note: This pond is located in Peam Ror Commune, Prey Veng Province (located inside of the box shown in Figure 4.8). Photo taken from western end of this pond.

Figure 4.10 Eastside Floodplain Pond around Neak Loeung

Note: This pond is located in Peam Ror Commune, Prey Veng Province (located inside of the box shown in Figure 4.8). Photo taken around the middle of this pond.

Figure 4.11 Eastside Floodplain Pond around Neak Loeung

Note: This pond is located in Peam Ror Commune, Prey Veng Province (located inside of the box shown in Figure 4.8). Photo taken around the bending point of this pond.

Figure 4.12 Eastside Floodplain Pond around Neak Loeung

Note: This pond is located in Peam Ror Commune, Prey Veng Province (located inside of the box shown in Figure 4.8). Photo taken at the bending point of this pond.

Figure 4.13 Lakeside vegetation of Eastside Floodplain Pond around Neak Loeung

3) Water Quality Study of Floodplain Pond

Water quality study was carried out for the floodplain pond, selected within the previous study (located inside of the box shown in Figure 4.8). Its analytical results are summarized in Table 4.4. Compared with several Cambodian water quality standards, it is recognized that measured values are below and/or within recommended ranges of those environmental criteria. So, it can be said that water quality of this floodplain pond is in good condition.

Table 4.4 Water Quality Sampling

Sampling Location: Peam Ror Commune, Prey Veng Province GPS Coordinate of Sampling Point N: 11"16.380 & E: 105"17.552. Measuring Date: July 14, 07

Table 4.5 Water Quality Analytical Results

Parameter	Analytical Results	W/Q Standards[1)]
Depth	1.01 ± 0.08 m	N/A
PH	7.81 to 7.89	6.5 – 8.5
Turbidity	68.5 ± 0.5	N/A
Transparency	31.00 ± 1.15 cm	N/A
DO	6.73 ± 0.25 mg/l	2.0 – 7.5 mg/l
BOD	1.44 ± 0.39 mg/l	1 –10 mg/l
COD	39.38.10 ± 17.49 mg/l	N/A
Conductivity	0.16 ± 0.01 ms/cm	N/A

[1)] Canbodian Water Quality Standards（Sub-Decree on Air and Noise Pollution Control of 2000）.

4) Preliminary Interview Survey of Asian Box Turtle Illegal Trade

The study team visited local restaurants and traders in Neak Loeung. The following four species of freshwater turtle were recorded; i.e., (i) Malayan Snail-eating Turtle (*Malayemys subtrijuga*: IUCN-Vulnerable), (ii) Asian Box Turtle (*Cuora amboinensis*: IUCN-Vulnerable), (iii) Yellow-headed Temple Turtle (*Hieremys annandalii*: IUCN-Endangered) and (iv) Asian Giant Pond Turtle (*Heosemys grandis*: IUCN-Endangered).

All traders stated that Malayan Snail-eating Turtle and Asian Box Turtles are frequently found in nearby marshlands, and that Yellow-headed Temple Turtles and Asian Giant Pond Turtles are also found in the area, but in low and declining numbers. Traders also state that the Asian Softshell Turtle (*Amyda cartilaginea*) is still widespread in deep-water area of wetlands throughout the Neak Loeung Area.

It is very likely that the Black Marsh Turtle (*Siebenrockiella crassicollis*: IUCN-Vulnerable) also occurs in wetlands in the Neak Loeung area since the habitat is ideal for this species. However, this species is rarely seen or caught due to their very small size and cryptic coloration, so could not be found in any trades.

Following site survey team's visit to Neak Loeung, government's mobile wildlife enforcement unit raided several restaurants at Neak Loeung due to the fact that several bags of globally threatened turtles are stored. As a result of this raid, they confiscated more than 100 turtles of four species. Conservation International's turtle program staff helped them to relocate the turtles to a fairly secured wild site (Conservation International, personal communication, 2007). Figure 4.14 shows poached Asian Box Turtles founds at the backyard of the eastside Neak Loeung market.

(4) Discussions

From this local biological environmental study, it is observed that eastside Mekong floodplain around Neak Loeung has several habitats of reptile species even though some lands are influenced by the human activities such as the cultivation of rice and other vegetables. As described in the F/S report of this proposed project, it is re-confirmed that it is highly likely that several IUCN-vulnerable species such as Asian Box Turtle (*Cuora amboinensis*) still occur around the remnant wetlands or marsh across the floodplain.

Note: Asian Box Turtle (*Cuora* amboinensis: IUCN-Vulnerable – Photo taken in September 2007)

Figure 4.14 Illegally caught Turtle found at the backyard of East-side Neak Loeung Market

4.2.3 Preliminary Benthos Survey

(1) Objectives

Invertebrate faunal sampling such as molluscus is carried out in order to obtain baseline benthos-related information.

(2) Sampling Program

Invertebrate faunal sampling such as molluscus was carried out at two river-bed points of the Mekong River along the project route (see Table 4.6).

Table 4.6 Sampling Points for Benthos Survey

1	River bed around Bati Hatchery Station (Bati Village, Peam Ror District, Prey Veng Province
2	Kbal Chrouy Village, Kompong Phnom Commune, Leuk Dek District, Kandal Province

The survey focused on those species either likely to be of conservation significance or which have a livelihood value to local communities around Neak Loeung.

The sampling program consisted of the following two sub-components: (i) a direct sampling of the benthos of the area, and (ii) a cursory socio-economic interview survey with fishermen and communities to assess the importance of some benthos to their livelihoods. The following specific components were planned:

Sub-Component 1: Representative samples of benthos, such as molluscus, are collected from the focal area. These are identified to species or genus level where possible. Their conservation significances are assessed and other national or regional records are compared.

Sub-Component 2: Standardized interview is undertaken with communities living in and around the focal area to assess which species of benthos have a commercial or livelihood value. Interview also seeks to make crude assessment of their livelihood significance in order to be able to predict what impact a change in species abundance will have on local communities.

(3) Results

During the study period, 12 species of snails were found and recorded, and those scientific and local names are summarized in Table 4.7. Among those, only two dominant species (*Corbicula sp.* and *Mekongia pongenis*) are important in contributing to the daily livelihoods of the local people in Neak Loeung. Other species, *Pila scutata* and *Pila pesmi,* also contribute to the local income of people in Neak Loeung during the rainy season.

Table 4.7 Species Composition of Freshwater Snail found during the Field Survey

	Species	Local Name	Habitat Descriptions
1	*Corbicula sp.*	Leas Boeung	Found in muddy bottom of stream, river, especially in the lake.
2	*Unidentified.*	Leas Tonle	Occurred in river with sandy bottom.
3	*Mekongia pongensis*	Kchaov Doung	Occurred in river with sandy bottom.
4	*Siamopaludina sp.*	Kchaov Chor	Founded in the muddy bottom of stream, river, especially in the lake.
5	*Clea sp.*	Kchaov Koutsrouch	Found in stream and river with muddy bottom, also found in the lake and the sandy bottom river.
6	*Unidentified.*	Krom Pork	Occurred in river with sandy bottom.
7	*Scabies nucleus*	Krom Kbach	Found in river with the sandy bottom.
8	*Ensidens ingallsianus*	Krom Chompos Tear	Found in river with the sandy bottom.
9	*Pseudodon vondembuschianus*	Unknown in local name.	Occurred in standing water with muddy bed (lake, flooded lowland).
10	*Hyriopsis sp.*	Krom Khnay	Lowland, lake, stream and river.
11	*Pila pesmi*	Kchoyng Boeung	Pond, lowland, small canal stream and lake.
12	*Pila scutata*	Kchoyng Srer	Rice field, lowland and pond.

(4) Discussions

The invertebrate fauna of the LMB region is little known and not well documented, since its economic value is lower than those of fish products, fisheries scientist seems to ignore them. In fact, freshwater invertebrates are critical element which also contribute as an aquatic environment indicator. In this study, 12 species of snails were found during the short period of this survey and are recorded as the baseline benthos data around the study area.

Chapter 5 Monitoring of Resettlement

5.1 Review of Cambodian Resettlement Policy and Practices

5.1.1 Cambodia Legal Framework for Land Acquisition and Resettlement

Currently, there is no legal framework and mechanism for land acquisition and resettlement in Cambodia. In order to meet the resettlement requirements, an Inter-Ministerial Resettlement Committee (IRC) was established in 1999. IRC is an ad-hoc organization in charge of land acquisition and resettlement for specific projects under the chairmanship of the Ministry of Economy and Finance (MEF).

The 2001 Land Law is the basic legal framework defining the regime for ownership of land in Cambodia, and it includes provisions and articles in relation to involuntary resettlement. Article 5 of the 2001 Land Law stipulates that "No person shall be deprived of his ownership unless it is in the public interest. An ownership deprivation shall be carried out in accordance with the forms and procedures provided by law and regulations and only after the payment of fair and just compensation".

On the other hand, the Constitution of Cambodia includes an article relevant to the involuntary resettlement. The land acquisition for public purposes is stipulated in Article 44 of the Constitution which requires separate law or procedure to be able to acquire land from any person only after the “fair and just” compensation. However, the Article does not refer to legal or illegal status of the person.

In relation to the land acquisition for the construction of roads, there had been no specific legal basis specifying the Right of Way (ROW) until the Prakas No.6 on "Measures to Crack Down on Anarchic Land Grabbing and Encroachments" was declared on September 27, 1999. The Prakas No.6 specifies that the ROW is basically 30 m (or 25 m) from the center line of the national roads with a one-digit number, and prohibits private ownership of the state-owned lands, including land adjacent to roads and railways. The Ministry of Economy and Finance (MEF) Decree No. 961 (2000) also declares that the Government of Cambodia will not pay compensation to people who occupy the ROW for any structures or assets located on the land.

5.1.2 National Resettlement Policy and Its Related Sub-decree

Under these legal circumstances, the international donor community has been trying to enhance the present insufficient land acquisition resettlement policy in Cambodia. According to the

guidelines by donor agencies such as ADB, WB and JICA, it is required to assist PAPs[5] to improve their livelihoods, at least, so as to restore their income earning capacity and living standards to the pre-project level. For example, the underlying philosophies of ADB are summarized as below:

- Acquisition of land and other assets as well as the scale of the resettlement should be minimized as much as possible by studying possible alternative project options, and appropriate social, economic, operational and engineering solutions that have the least impact on PAPs.
- PAPs should be entitled to be compensated for their lost assets at full replacement cost and provided with the sufficient rehabilitation measures to restore their livelihood.
- PAP should be equally eligible for compensation and rehabilitation assistance, regardless of tenure status, social or economic standing and any such factors that may discriminate against achieving the objectives of the RAP.
- Special measures shall be incorporated in the RAP and complementary mitigation and enhancement activities to protect socially and economically vulnerable groups such female-headed households, children, physically-handicapped persons, people living below the poverty line.
- The above principles are to avoid adverse social and environmental impacts as result of its development projects; if not avoidable the impact shall be minimized and the quality of life of the PAPs shall be restored to at least pre-project level; and mitigated the social impact by providing compensation and rehabilitation measures and assistances to the PAP. Compensation shall be in full amount at replacement cost and at current market value of their affected assets.

Under the technical assistance of ADB, National Resettlement Policy (NRP) was drafted in 2002. When drafting the NRP, it has been pointed out that there are considerable gaps between Cambodia's present legal framework and the international best practices as shown below.

- Compensation for land and assets is performed without a comprehensive legal framework, using the resettlement plans or simply a governmental authority's discretion. There are no ample rules and procedures for compensation or valuation other than what may be contained within a resettlement plan.
- While an individual's rights to ownership and compensation are protected as defined under the various articles, there is no clear-cut mechanism for the land acquisition and amounts of compensation. At present, there is no formally established national policy for resettlement in Cambodia.
- There are no effective regulations on how to determine whether compensation is just or fair.

[5] In the resettlement reports and literatures, both PAPs (Project Affected Persons) and APs (Affected Persons, often used by ADB) are often used. PAP(s) is employed throughout this report in order to ensure consistency of the terminology.

- There are no clear-cut procedures and guidelines to guide development of the implementation plan and how the livelihood of recipients is restored after moving to the uncertain resettlement sites.
- Livelihood and income restoration is still limitation stating by the current domestic laws and policies. There has been insufficient effort to address income restoration so that PAPs who are left without a source of income are assisted to restore that income to its pre-project level.

In summary, it has been observed that since there are no systematic, consistent and comprehensive resettlement policies in Cambodia, and donors are extending cooperation on ad-hoc basis, depending on the particular donors' specific requirements.

In response to these observations, ADB embarked on the regional technical cooperation in the field of the resettlement, which is called RETA 6091 in 2004. Through this regional technical assistance, ADB continues to give assistance to the practical approach to transform the recommended NRP into the actual enactment of the Sub-decree in terms of mitigating the various resettlement risks of PAPs.

ADB stressed that the draft NRP should be issued under the appropriate legal instrument. The fact finding mission of ADB visited Cambodia in April 2004, and, in October 2004, ADB and the Government reached an agreement on implementing the technical assistance in Cambodia, recognizing that the main policy issues in Cambodia is a lack of a legalized mechanism on land acquisition and resettlement. At the same time, it has been also emphasized that the most serious institutional issue is the ad-hoc institutional arrangement in currently performing land acquisition and resettlement.

The major objectives of the technical assistance are to help the Government (i) draft a Sub-decree on compensation, resettlement, and rehabilitation for practical uses when the Government takes land owned or occupied by Cambodian nationals; (ii) formulate complementary implementing regulations and technical guidelines; and (iii) develop resettlement planning, implementation, financing, monitoring, and legal enforcement capacity. The technical assistance comprises three phases, and, in the second phase, the relevant Sub-decree and implementing regulations are planned to be submitted to the Government for the final approval.

Recently, the drafted Sub-decree has been submitted to the international donor community as well as relevant stakeholders, and the national workshop for the discussion on the drafted Sub-decree was held, followed by a certain period of the public comment. The major contents of the draft are briefly summarized as follows:

- The clear-cut entitlement matrix for compensation has been created.
- Replacement costs for a wide range of compensation package are clearly employed.
- A wide range of social and rehabilitation assistance is added as a relevant entitlement matrix for income restoration as well rehabilitation measures.
- Full-cost budgetary arrangement is proposed.
- Various nation-wide institutional set-up for land acquisition and resettlement is also proposed.

The detailed contents of the drafted Sub-decree will be comprehensively reviewed in section 5.3.

5.1.3 Resettlement and Compensation Practices in Recent Projects

(1) GMS Cambodia Road Improvement Project

The GMS Cambodia Road Improvement Project is designed to rehabilitate approximately 146 km of national highway in northwestern Cambodia, between Poipet and Siem Reap, reestablishing Cambodia's road infrastructure in general and in particular the roads connecting northwestern Cambodia with Phnom Penh, National Road (NR) 5 and NR6. ADB provided technical assistance in preparing the RAP in order to mitigate the adverse impacts on the PAPs. The Project required the acquisition of approximately 60 hectares of land along NR5 and NR6, identifying approximately affected 2,000 farmers, 240 houses and house-shops, and 300 small roadside stalls, which will need to be moved out of the COI.

A Replacement Cost Survey (RCS) was undertaken in October 2004, involving field investigations to determine the compensation rates for agricultural land, urban land, houses, other structures, and crops. The methodology employed for costing structures was composed of quantity surveying and detailed measurement of the component parts of each structure. Labor costs were also assessed at market prices for the structure as a whole based on the information provided by local building contractors on regional basis. Totally, the following 14 categories of housing structures were identified :

- 4 categories of low-cost thatch and timber house, shops and stalls.
- 6 categories of higher cost and more permanent mainly timber house, shop or stall using other permanent materials.
- 2 categories of permanent, mainly masonry town house or shop house.
- 2 categories of permanent, mainly masonry villa.

(2) GMS Southern Coastal Corridor Project

Under the TA No. ADB 6235-REG, technical assistance is provided by ADB to assist the Government of Cambodia and the Government of Viet Nam to study the economic, technical, social and environmental feasibility of a project to rehabilitate, upgrade and construct transport links and facilities along portions of the Cambodian and Vietnamese sections of the GMS-Southern Coastal Corridor Project. The draft final report for the Project has recently been submitted. According to the report, along NR 33, a total of 728 individuals, households, businesses and community institutions have been identified, and, out of them, 337 households are regarded as PAPs.

A Replacement Cost Survey (RCS) was also conducted in May 2006 to determine current market prices for: (i) agricultural, residential and commercial land outside the ROW along NR 33, (ii) different types of structures along NR 33, and (iii) crops and trees.

(3) Current Practices on Replacement Cost and Lessons Learned from the Recent Projects

The historical review on the recent projects suggests that the ADB-funded projects are currently on the direction to apply replacement costs for the relevant compensation rates. In this connection, in case of land, the replacement cost means the cost of buying a replacement land near the lost land with equal productive potential and same legal status, including transaction costs. In case of structures, the replacement cost is the current fair market price of building materials and required labor cost without depreciation or deductions for salvaged building materials or other transaction costs.

Basically, in the situations where the market poorly functions, it is rather difficult to accurately calculate the replacement cost. Under these circumstances, the donor community has been flexibly adjusting the compensation rates in an effort to make the rates being as closely as possible to the replacement cost.

For example, through the recent ADB's technical assistance for the GMS power distribution and transmission project, ADB and IRC reached an agreement in 2004 that a cost of living increase of 3% per annum for 4 years (i.e. 12%) would be added to the former compensation rates. (This compensation rate was initially proposed in the Resettlement Action Plan for 2003: GMS Trans-mission line Project and the actual compensation was made based on the replacement cost.)

The Government of Cambodia has been intensively discussing the updating of the compensation rates for the National Route No.1 project, taking into account a wide range of factors such as i) consistency with the compensation rates employed by other donors, ii) the rate reflecting Cambodia's on-going realistic efforts, iii) the long-term improvement process updating the compensation rates reflecting the progress of the NRP, and etc. Furthermore, the Government of Cambodia (IRC) has also recently conducted the additional replacement cost survey for the NR1 Improvement Project (the section of Japan's grant project).

The above 2 ADB projects as well as the practices for the NR1 section of Japan's grant project are typical improvement process of the on-going compensation rates in line with the concept of the drafted Sub-decree of the NRP (The livelihood of PAPs should be maintained or better off even after the resettlement).

In conclusion, through a wide range of efforts of the international donor agencies, the step-by-step approach respecting the ownership of the Government of Cambodia has been successful to put its compensation practices on the right truck, and it should be noted that the actual enactment of the Sub-decree of the NRP including the complete application of replacement costs for compensation rates will further support this approach, making the Government move further forward from the transitional process of the NRP .

5.2 Review of Current Framework for Resettlement Action Plan (RAP)

5.2.1 Objectives of Framework for RAP

A Resettlement Action Plan (RAP) is a document required for any project which results in the physical resettlement of people, and it must specify the procedures and actions it should take in order to properly resettle and compensate PAPs and communities. According to the basic concept of the JICA guidelines, a RAP is required to ensure that the implementing agency will make the best effort to restore their incomes and living standards of PAPs at least pre-project levels and not to make them worse off than they would have been without the project. More specifically, a RAP should be prepared as a detailed plan for mitigating the land acquisition impacts by the ferry plus bridge option (Route A) of the 2nd Mekong Bridge Project in an attempt:

- to ensure that the social and economic livelihood of PAPs is recovered at least the pre-project level.
- to provide policy and procedural guidelines for the acquisition of land and other assets, compensation, and resettlement.
- to identify households that will be adversely affected by the Project, where they are located, what compensation and related alleviating measures are to be provided and how and when these measures will be implemented.
- to provide a plan on for the community participation of the PAPs could be involved in the various stages of the project, including the implementation of the RAP.
- to estimate an overall budget of the required resources needed and the actual assessed compensation to implement the RAP.

5.2.2 Eligibility, Entitlement and Compensation Policies

Eligibility as well as entitlement policy is an integral part of the RAP, since PAPs should clearly recognize the established date for eligibility as well as entitlement for the compensation of losses.

Among potential PAPs, eligibility for entitlement for compensation is determined by the establishment of a cut-off date. Cut-off date means the date prior to which the occupation or use of the Project area makes residents/users eligible to be categorized as PAPs. According to the drafted Sub-decree, the cut-off date/deadline for eligibility is set as 30 days prior to the last day of census survey of PAPs or families for a specific project. Persons or families not covered in the census survey will not be eligible for compensation and other assistance. The establishment of the cut-off date aims at preventing the inflow of ineligible non-residents who might take advantage of the compensation policies or speculate on land values.

Since the "Construction Area" for the 2nd Mekong Bridge does not belong to the existing ROW, the current provisional declaration of "Construction Area" cannot lead to the cut-off date. After the final alignment is fixed, the ROW for approach roads for the bridge and other affected areas for the construction of the bridge should be officially declared in order to set the cut-off date to fix the formal eligibility prior to the census survey. In this case, the new ROW for approach roads of the both sides of the River are part of NR1, and should be declared under the Prakas No.6.

On the other hand, the entitled PAPs for the compensation on which major impacts of the bridge construction works will affect are houses, agricultural land use, mainly rice field on flood plains and paddy, and some grazing lands and small fruit tree plantations, along the margin of the road. More specifically, there are two broad categories of PAPs for this project: (i) Affected Households and ii) Affected Individuals.

Table 5.1 Tentatively Identified PAPs in the Previous FS

No.	Commune	Number of Affected Households	Number of Affected Structures and Land Recorded (Houses and Land)	Number of Affected Individuals	Number of Affected Communities
1	Prek Ksay Ka	69	71	373	0
2	Prek Ksay Kha	81	88	437	0
3	Kampong Phnom	110	113	594	0
Total		260	270	1,404	0

The entitlement policy consists of a set of guidelines and criteria that define the compensation measures for each category of PAPs who are eligible to receive. It also enables the IRC to classify all identified PAPs and to allocate the appropriate compensation packages. The compensation package includes a wide range of compensation measures like cash compensation and institutional support provided to eligible PAPs. A Detailed Measurement Survey (DMS) will be carried out covering 100% PAPs to quantify and categorize the affected households and structures. The current compensation and mitigation measures comprise for the following 5 categories:

- Loss of land
- Loss of structures
- Loss of productive trees
- Loss of commune and public assets
- Allowances for disruption/resettlement and for socially vulnerable households

(1) Loss of Land

The determination of market value for land in the current framework of the RAP is based on transactions that have taken place for the same type of land in the same geographic area. In Cambodia, compensation for is generally assessed based on result of a transaction survey and then the value of each land category has been fixed by IRC.

Compensation for land also depends on category of affected land and the type of land use rights possessed by PAPs. Values of construction and industrial lands are comparatively much higher than agricultural and forest land. The below table shows the tentatively applied compensation rates for both agricultural and residential land in the previous FS.

Table 5.2 Tentatively Applied Compensation Rate for Land in the Previous FS

Item	2000 MEF/IRC Rate (USD/sq.m)	2004 GMS Transmission Line Project Rate (ADB) (USD/sq.m)	2004 National Route No.1 Project Rate (JICA) (USD/sq.m)	Tentatively Applied Rate for this Project (USD/sq.m)
Agricultural Land (Paddy Field)	0.50	0.56*	0.56	0.56
Residential Land	2.00	2.24*	2.24	2.24

Note: * This compensation rate was initially proposed in the Resettlement Action Plan for 2003: GMS Transmission line Project and the actual compensation, which differs from the above figure, was made based on the replacement cost.

(2) Loss of Structures

The method for the determination of the compensation for the loss of structures requires establishing standard categories of structures based on the type and use of building material and determining cost of per unit area of each category covering the cost of material and labor. The structures affected in the project are then classified into these categories and area of each affected structure is multiplied with the predetermined unit rates. The classification of all residential structures is proposed into just only four subjective categories for compensation. The below table shows the compensation rates tentatively applied to the house structures in the previous FS.

Table 5.3 Tentatively Applied Compensation Rate for Structures in the Previous FS

Item	2000 MEF/IRC Rate (USD/sq.m)	2004 GMS Transmission Line Project Rate (ADB) (USD/sq.m)	2004 National Route No.1 Project Rate (JICA) (USD/sq.m)	Tentatively Applied Rate for this Project (USD/sq.m)
House Type 1	4.50	5.04*	5.04	5.04
House Type 2	12.00	13.44*	13.44	13.44
House Type 3	85.00	95.20*	95.20	95.20
House Type 4	140.00	156.80*	156.80	156.80

Note: * This compensation rate was initially proposed in the Resettlement Action Plan for 2003: GMS Trans- mission line Project and the actual compensation, which differs from the above figure, was made based on the replacement cost.

Other structures entitled for cash compensation include fence, well, grave, tomb, lotus pond, and etc. Those structures are currently paid in lump sum. It is also a subject of price negotiation due to different size and material use of the structure. In principle, compensation for these structures is made in accordance with government price based on categories. The below table shows the tentatively applied compensation rates for wells and fences in the previous FS.

Table 5.4 Tentatively Applied Compensation Rate for Wells in the Previous FS

Item	2000 MEF/IRC Rate (USD)	2004 GMS Transmission Line Project Rate (ADB) (USD)	2004 National Route No.1 Project Rate (JICA) (USD)	Tentatively Applied Rate for this Project (USD)
Dig Well	50.00	56.00*	56.00	56.00
Pump Well	75.00	84.00*	84.00	84.00

Note: * This compensation rate was initially proposed in the Resettlement Action Plan for 2003: GMS Trans- mission line Project and the actual compensation, which differs from the above figure, was made based on the replacement cost.

Table 5.5 Tentatively Applied Compensation Rate for Fences in the Previous FS

Item	2000 MEF/IRC Rate (USD/m)	2004 GMS Transmission Line Project Rate (ADB) (USD/m)	2004 National Route No.1 Project Rate (JICA) (USD/m)	Tentatively Applied Rate for this Project (USD/m)
Wooden Fence	0.75	0.84*	0.84	0.84
Concrete Fence	4.86	5.44*	5.44	5.44

Note: * This compensation rate was initially proposed in the Resettlement Action Plan for 2003: GMS Trans- mission line Project and the actual compensation, which differs from the above figure, was made based on the replacement cost.

(3) Loss of Productive Trees

Costing for crops, trees and plants are generally established based on the age and productivity of fruit and perennial trees. Costing for affected crops should be based on the farm gate prices and mandated crop valuation set by concerned government agencies. Farm gate prices can be

obtained from the nearest market. In Cambodia, affected crops have been classified into two categories, All compensation rates for affected crops and trees should be based on cross harvest income taking into consideration the cost of production and material.

(4) Loss of Public/Commune Assets

Public and community properties include commune offices, schools and temple fences and gates, community water ponds and amenities. Costing for such properties should be same as costing of structures of individuals. At this stage, no affected assets of public and commune properties in the Project area are identified.

(5) Allowances for disruption/resettlement and for vulnerable households

The tentatively applied special allowances include disruption/resettlement allowances and allowances for socially vulnerable households with the following details.

1) Disruption and Resettlement Allowances

If income restoration measures are necessary, financial arrangements should ensure that income support is provided for a reasonable period of transition allowing restoration of income streams. However, estimating the cost of providing opportunities for those eligible for income-restoration measures is highly uncertain. And a flat unit-cost is employed for these income-restoration activities, despite the high variability in actual costs.

Those whose houses are affected, by which their lives are disrupted, disruption allowance USD 40.0 per household is subject to be provided as support for meal and/or income loss while reconstruction/repair of their residential houses. No disruption allowance is provided for the reconstruction of buildings other than of residential purpose. For those whose houses are affected so that they have to move to relocation site or other places outside ROW, resettlement allowance USD 40.0 per household is also provided in addition to disruption allowance above.

2) Allowance for Socially Vulnerable Households

Vulnerable groups who will experience a considerable degree of social and economic disruption than the general population, female headed households, disabled head of households and households below the Cambodian poverty line will be provided with special assistance. This counter-measure is part of the income restoration activities. In this connection, cash allowance for USD 20.0 per household to each household applicable is provided in the framework of the current practices.

5.2.3 Institutional Set-up

(1) Project Management Unit and Resettlement Supporting Group (RSG)

A Project Management Unit (PMU) who is responsible for the management and administration of the Project will be set up, and a Resettlement Supporting Group (RSG) will be created in

MPWT for various supporting activities for the land acquisition and resettlement in cooperation with other agencies concerned. RSG will be responsible for the whole process of public consultation to explain the RAP and its entitlements to the PAPs, implementing the verification process for confirming individual entitlements, ensuring that appropriate payments are made and grievances are treated in the proper manner.

(2) IRC and Resettlement Unit (RU)

While IRC is an inter-ministerial committee which is individually set up on the project basis, Resettlement Unit (RU) is a regular institution under the MEF whose members are being assigned to IRC. The functions of the IRC are summarized as below:

- to conduct DMS as well as the associated official census and other relevant preparatory studies.
- to undertake overall planning, management and monitoring of resettlement programs.
- to identify all eligible PAPs and promote understandings of their entitlements.
- to train resettlement officials at provincial, district and commune level resettlement units.
- to supervise the disbursement of compensation to PAPs based on an updated database for the resettlement and ensure that compensation payments are completed on schedule.
- to calculate and determine compensation and entitlements.
- to coordinate grievances of PAPs.

(3) Provincial, District and Commune Resettlement Organizations

Provincial resettlement organizations will be established at both Kandal and Prey Veng Provinces, which are headed by Provincial Governors and are located within the Provincial Public Works Departments. Those organizations will be responsible for all aspects of the local resettlement activities within the provinces. District resettlement organizations will be in charge of the identification of resettlement sites and on-site services, while commune resettlement organizations will act as facilitators to guarantee the timely implementation of the resettlement activities.

(4) Independent Monitoring Organization (IMO)

An independent monitoring organization (IMO) should be employed to conduct external monitoring and evaluation of the resettlement activities.

5.2.4 Budgetary Arrangement

A full itemized budget is required for all resettlement activities, including compensation for land acquisition and resettlement cost. Based on the Detailed Measurement Survey (DMS) and the market price survey to be carried out, the estimated cost for the compensation for land acquisition and resettlement will be accurately updated. The Government must ensure timely

provision of the required RAP budget and is required to meet any unpredictable obligations in excess of the budget estimates in order to satisfy resettlement objectives.

Although the cost for the RAP cannot be precisely estimated at this stage, it is required to estimate the approximate cost for the RAP, taking into account a reasonable margin of adjustment as well as a reliable contingency arrangement subject to the results of the DMS. Based on these conditions, the budget for the RAP will be prepared on the condition that there might be quantity changes after the census survey, the DMS and other surveys are completed. The total budget for resettlement and implementation of the RAP is tentatively estimated at USD 672,692- subject to changes after the results of the census survey, the DMS and other surveys.

In addition to direct compensation costs of the RAP reflecting the eligibility and entitlements previously discussed, there would be administrative and management costs associated with the implementation of the RAP. These costs will include a wide range of the resettlement assistance activities such as the implementation of the DMS, grievance resolution activities, monitoring and evaluation activities. Tentatively, 15% of the direct compensation costs are included as the administrative and management cost of the RAP, while 10% of the total cost is regarded as the contingency. Consequently, the current cost estimate for the RAP is summarized as below. It should be noted that the detailed breakdown of the compensation is not specified the due to the fact that the quantity is not based on the results of the census survey, the DMS and other surveys.

However, when the budget for the RAP is applied for the Ministry of Economy and Finance, the item-wise detailed budget should be calculated including all budgetary items related to the RAP.

Table 5.6 Cost Estimates for RAP

Location	Commune	Quantity	Compensation (USD)	Remarks
1. Compensation	House Structure (sq.m)	5,773	103,497	
	Wells (no.)	32	2,520	
	Fences (m)	2016	10,449	
	Trees (no.)	6624	52,576	
	Allowances (m)	227	8,460	
Sub Total		-	177,502	
2. Land Acquisition	Construction Yard (Paddy Field) (sq.m)	161,038	90,181	
	Residential Land (sq.m)	70,807	158,608	
	Paddy Field (sq.m)	188,359	105,481	
Sub Total		420,204	354,270	
3. Management Cost			79,766	15% of (1+2)
4. Contingency			61,154	10% of (1+2+3)
Total			672,692	

5.2.5 Implementation Schedule

The detailed implementation schedule for the RAP is discussed and specified in the section 5.5, taking into account the availability of the fund and the timing of the construction of the Bridge. The implementation schedule would be divided into the preparation stage, the implementation stage, and the supervision/monitoring stage.

5.2.6 Public Consultation and Information Disclosure

The information disclosure and public consultations will commence prior to the marking of the alignment and will continue at all stages of decision making. The transparent information disclosure is a key to promoting effective public consultations for planning and implementation of the RAP. In other words, keeping PAPs fully informed of their rights and obligations is crucial to the success of the implementation of the RAP. In order to make the information understandable and accessible for all PAPs, relevant information should be translated into local languages, paying special attentions to accessibility of socially vulnerable groups of people.

- Definitions of terms in the RAP
- Frequently asked questions and answers over the Project
- Detailed explanation on the Project
- Scope and categories of PAPs and predicted impacts
- Details of eligibility and entitlements under the RAP
- Implementation schedule together with the timetable for the delivery of entitlements
- Compensation policies and rates
- Procedures for the grievance redress
- Outline of the public consultations

Generally, the following meetings and consultations will be conducted during the preparation stage of the RAP.

(1) Kick-off Information Campaigns before RAP Preparation

A series of kick-off Information campaigns will be held at each relevant district before assessing the affected land and properties by the Inventory of Losses Survey (IOL) as well as the Detailed Measurement Survey (DMS). The objectives of these campaigns are to ensure that all stakeholders receive basic information about the Project and resettlement activities, and have an opportunity to raise questions and concerns. A Public Information Booklet (PIB) will be prepared and copies will be delivered to all PAPs who might be affected by land acquisition for the Project in order to ensure that PAPs sufficiently understand the details of the proposed compensation, assistance and resettlement packages.

(2) Consultations during RAP Preparation

During the preparation for the RAP, a series of consultations with PAPs will be held, and provincial and local authorities must ensure that PAPs and others properly understand and accept the contents for the compensation for land acquisition, compensation, assistance and resettlement.

(3) Public Information Meeting after RAP Preparation

Following the completion of drafting the RAP, a series of public information meeting will be held in each commune to provide PAPs with additional information about the Project and an opportunity for open discussion about resettlement policies and procedures. The updated PIB together with other relevant information will be provided for PAPs. The major objectives of these public information meetings are:

- Outline of the results of the DMS and asset valuations.
- PAP rights, entitlements and special provisions for different categories of PAPs.
- Compensation rates and allowances to be provided to PAPs for different types of losses.
- Grievance mechanism and appeal process.
- PAP rights to participate in public consultations and outline of information disclosure.
- Proposed timing for compensation payments and schedule.

5.2.7 Grievance Mechanism

It is critical to allow PAPs to express their complaints or claims with assuring timely and satisfactory resolutions of those complaints or claims, when PAPs are not satisfied with the compensation and resettlement package in accordance with the formal procedure. The main objective of the grievance procedure is to provide PAPs with ample opportunities to ensure that the compensation and resettlement package proposed by the will be implemented in the accurate and fair manner. The current grievance mechanism is being individually established on ad-hoc and project basis.

Two provincial-level Grievance Committees (GCs) will be established in Kandal and Prey Veng Provinces, and these GCs will be composed of the provincial governors, heads of relevant communes, heads of relevant villages, a staff of MEF, and staff from provincial PWT as technical advisors, and also a secretary from governor's office.

In order to resolve any problem or constraints for smooth operation of the resettlement activities, the said GCs should act as a legal coordinator for the PAPs to deal with their complaints. The functions of the grievance redress process will be i) to make all PAPs aware of the process of the RAP and entitlement policy together with the timetable for implementation, ii) to render support for the PAPs on problems derived from the adjustment to their new living environments, iii) to record grievances of the PAPs and streamline those grievances which need to be resolved by the GCs, and etc.

According to ADB, the current practices for the grievance procedures in donor-funded projects are generally as below.

- Step 1: If the PAP is not satisfied with the compensation package offered, the PAP has the right to lodge a complaint. The resettlement officer and the head of the village will seek for amicable solution for issues brought to their attention by the PAP. The resettlement officer and the head of the village are to address the complaint within 15 days of its receipt.
- Step 2: The PAP, in the event that the previous step does not resolve the grievance, contacts the Provincial Grievance Committee by letter, and describes what the grievance is and indicates what the corrective measures might be. This appeal must be made within 15 days of receiving official notification of the entitlement.
- Step 3: The Provincial Grievance Committee meets with the PAP and tries to resolve the situation. The Committee may ask for a review of the DMS by and/or the external monitor. Within 21 days of the submission of the grievance, the Committee must make a written decision and submit copies to MPWT, the monitoring organization and the PAP.
- Step 4: If the decision is in favor of the PAP, corrective actions must be prescribed in the letter and implemented within 14 days of the decision with interest added for any back payment of compensation.
- Step 5: If no decision can be agreed in Step 4, the solution must be done in the relevant court, and the decision at the court will be final.

  Since it often happens that PAPs do not have writing skills, PAPs are encouraged to seek assistance from other family members, village heads or community chiefs to have their grievances recorded in writing to ensure that their grievances will be delivered to the concerned parties appropriately.

5.2.8 Monitoring and Evaluation

(1) Monitoring

Monitoring for the implementation of the RAP is of critical importance in all projects involving involuntary resettlement in terms of the following factors:

- Measurement of input indicators against proposed timetable and budget related to the contents of the compensation.
- Measurement of effectiveness of inputs against baseline indicators and assessment of PAPs' satisfaction with inputs.
- Measurement of output indicators such as livelihood restoration an development impact against baseline.

In addition to internal monitoring, external monitoring is normally required to provide an independent periodic assessment of resettlement implementation and impacts, to verify internal

reporting and monitoring, and to suggest adjustment of delivery mechanisms and procedures as required to function effectively.

(2) Evaluation and Monitoring Indicators

The main indicators which should be regularly monitored are:

- Entitlements of PAPs are in accordance with the approved entitlement policies.
- Assessment of compensation is carried out in accordance with agreed procedures.
- Payment of compensation to the affected people in the various categories according to the level of compensation as described in the RAP.
- Public information and public consultation and grievance procedures are followed as described in the RAP.
- Relocation, if any, and payment of compensation are made in timely manner

The collection of monitored data as well as their evaluations should be implemented by the relevant agency by conducting regular sample surveys and etc.

5.3 Summary of the Drafted Sub-decree of the NRP

The major important points for the drafted Sub-decree of the NRP are summarized as below.

(1) Compensation Rate and Replacement Cost

The most important point on compensation and entitlement policies for PAPs under the drafted Sub-decree is the comprehensive and complete application of the concept of "Replacement Cost".

ANNEX 2 of the drafted Sub-decree defines "Replacement Cost" by stating that it is an amount needed for obtaining or replacing acquired land or property with similar land or property with equivalent or better productive capacity at current market price/value without deduction of any salvage or depreciation and take no account of the influence by development project on the value of the acquired land or property, plus the cost of transferring or registering the rights to the new land or property.

More concretely, Article 21 of the Drafted Sub-decree stipulates "Detailed Contents of Compensation Package" by stating:

(a) In any case other than provided in article 21 (b) (acquisition of land from indigenous minority community), Article 21 (d) (acquisition of residential land leaves affected person land less) and article 24 (security), the agency responsible for addressing project impacts must compensate each affected person or family entitled to compensation, by offering the following relevant options, depending on the level of impact, which shall be determined

through close and informed consultation:

- Appropriate and acceptable replacement land or property for any land or property acquired, or
- Sufficient money to allow the affected person or family to obtain or buy land or property with equivalent or better productive capacity in a similar area at current market values at the time of acquisition or at the time of payment. (replacement cost), or
- A combination of land or property and money based on the agreement with the affected person or family.

(b) Compensation in the form of replacement land must be provided when land is acquired from a recognized indigenous minority community.

(c) In the case of acquiring land and replacement land is needed, the Agency responsible for addressing project impacts shall make best efforts to get land with equivalent or better quality or productive capacity for the replacement land in comparison with the acquired land and at a location acceptable to each affected person family.

(d) In a case where the acquisition of residential would leave the land processor or owner landless, the agency responsible for addressing project impacts must provided the affected person or family with an appropriate size of land not less than $30m^2$ with public services at least at the same level as the affected person or family enjoyed at the former place.

(e) Each affected person or family must be compensated at replacement cost for any structures and other assets fixed to any land that is acquired without deduction of salvage value or depreciation.

(f) In any case where the value of land or property given to and received by an affected person or family as compensation is less than the replacement cost of the land or property acquired, without regard to any influence on the value by proposed project, the difference in value must be paid to the affected person or family in money.

(g) In any case where the value of land or property given to and received by an affected person or family as compensation is greater than the replacement cost of the land or property acquired, without regard to any influence on the value by the proposed project, the affected person or family is not required to pay the difference in value.

(h) In any case where an affected person or family loses the entire land or structure, or in the case of acquiring only part of land or structure of an affected person or family and the remaining land or structure is not viable for continued use (less than 30 m^2 for residential, commercial or industrial land or less than 100 m^2 for irrigated agricultural or production land and or 200 m^2 for non irrigated agricultural or production land, the affected person or family has the right to request full acquisition of the land or structure and is entitled to be paid compensation for the entire land or structure at replacement cost.

(i) In any case where only part of the land or structure of an affected person or family is acquired and the remaining land or structure is viable for continued use, compensation must

be paid for the replacement cost without regard to any influence on the value by the proposed project, of the specific part of the land or structure acquired plus the value of any detrimental affect or other reduction in value of the remaining land or structure.

(j) Compensation for annual or perennial crops or trees shall be based on current local market value if the affected crop or tree is planted or maintained for sale without deduction of any value of salvage collected by PAPs for their use or consumption.

(k) Compensation for domestic animals including aqua cultural animals, which cannot be relocated and are not yet mature for sale or cannot be sold at profitable price at the time of acquisition, shall be calculated based on the actual damage, which is the local market price for mature animals sufficiently grown for sale under normal market condition, minus any amount from selling the animals at the time of acquisition if the main purpose of farming or maintenance is for sale ; however no deduction for salvage value or taking the salvage from the owner is permitted if the main purpose of farming or maintenance is for personal or family consumption.

(l) Details of the compensation provide for loss of rights or interests to land or other property is as provided in the Annex on compensation and Social / Rehabilitation Assistance to this sub decree.

(2) Entitlement and Compensation Policies

The major points for the entitlement as well as compensation policies under the current framework for the RAP are summarized as below.

(a) Loss of Land

Item No. I-A-1 of ANNEX 2 of the drafted sub-decree refers to the entitlement of the loss of land for the lawful owner or acquisitive possessor who is entitled to ownership under the Land Law by stating that:

- Cash Compensation for the acquired land/part of land at 100% of replacement cost and plus cost of land certificate, if any, or free subsequent registration of the charge to the land parcel.

(b) Loss of Structures

Item No. IV-1 of ANNEX 2 of the drafted Sub-decree refers to the entitlement of the loss of structures for owners of the affected structures by stating that:

- Fully affected structure or partially affected but the remaining part of the structure is not viable for further use, will be entitled to compensation at 100% of replacement cost of the affected structure, in material cash or combination of the two. No deduction will be made for depreciation or for salvageable materials. Owner of structure with proper construction permit is entitled to recover the cost of obtaining the construction permit; and

- Partially affected structures and the remaining part of the structure is viable for further use, will be compensated for the affected part at replacement cost and additional cash assistance)repair allowance) will be made to cover the cost of repairing the structure. Owner of structure with proper construction permit is entitled to a free repair permit.

At the same time, Item No. IV-2 of ANNEX 2 of the drafted Sub-decree refers to the entitlement of the loss of structures for tenants of leased affected structure or other lawful private user of the structure by stating that:

- Tenants/users of structures will be entitled to cash assistance of 3-month rent (based on contractual rate or current local market rate if not provided in the contract) and assistance in finding alternative structure, plus any loss of business.

Meanwhile, Item No. VII of ANNEX 2 of the drafted Sub-decree refers to the entitlement of the loss of private wells for households who own the affected wells by stating that:

- Cash compensation at replacement cost or a replacement wells if requested by PAPs.

(c) Loss of Productive Trees

Item No. X of ANNEX 2 of the drafted Sub-decree refers to the entitlement of the loss of perennial trees for owners of the affected trees by stating that:

- For young non-fruit bearing trees, a lump sum amount to cover for the cost of seedling and fertilizer and cost of nurturing/maintenance to be determined by Prakas; and
- For fruit bearing trees compensation in cash for estimated value of the annual fruit at farmgate price multiplied by remaining number of productive years in accordance with Prakas.

At the same time, Item No. X1 of ANNEX 2 of the drafted Sub-decree refers to the entitlement of the loss of standing non-fruit trees for owners of the affected trees by stating that:

- Compensation in cash at rate per matured tree set by Prakas (based on the specific category and usefulness of the affected trees) and the owner keeps the wood.

(d) Loss of Public and Community Assets

Item No. XV of ANNEX 2 of the drafted Sub-decree refers to the entitlement of the loss of or damage to public infrastructure/facilities for owners of concerned agencies/institutions by stating that:

- Repair or replacement or compensation in cash at replacement cost to respective agencies/institutions.

(e) Allowances for Socially Vulnerable Households

Unlike the current relatively narrow scope of the assistance, a wide range of the social/ rehabilitation assistance are proposed by the drafted Sub-decree.

According to the Social/Rehabilitation Assistance Matrix of ANNEX 2 of the drafted Sub-decree, the following lump sum of special assistance for an affected family is being proposed with broader categories of the vulnerable group than those of the current practices.

- Affected family whose regular household income is below the national poverty line.
- Affected family who is an elderly family with no means of support.
- Affected family with disabled-head and with no able adult earning member.
- Affected family with no land tenure security or weak tenure status or landless and with no permanent and sustainable means of support.
- Affected family who is female-headed with no sustainable means of support or with low regular income.
- Affected family living depends on labor of young members under 16 years old.

More detailed contents in relation to social/rehabilitation assistance are described in Article 23 of the drafted Sub-decree.

Article 23 of the Sub-decree stipulates "Contents of Social/Rehabilitation Assistance" by stating:

a. Other than the compensation entitlement as provided in article 21 above, severely affected persons or families, displace persons, vulnerable affected persons or affected indigenous minority community members may be eligible for social /rehabilitation assistance as provided in the attached Annex on Compensation and Social / Rehabilitation Assistance to this sub decree and parkas and decisions of the authority to regulate the addressing of project impacts pursuant of this sub decree.

b. The agency responsible for addressing project impacts must pay compensation and/or social/ rehabilitation assistance, so that the economic, social, cultural features of the affected persons families or communities is equivalent to or better than if there had been no such development of the project within a reasonable period which must not exceed 24 months from displacement or being affected.

c. Provision of compensation and social / rehabilitation assistance must be made based on plan to address project impacts approved by the authority to regulate the addressing of the project impacts or based on later advice of the authority to regulate the addressing of the project impacts, as provided in this sub decree.

(3) Institutional Setting-up and Monitoring

Article 30 of the drafted Sub-decree stipulates a wide range of institutions who shall be responsible for land or property acquisition for state development projects, addressing project impacts, project implementation and monitoring, and etc.

(4) Budgetary Arrangement

Under the Article 29 of the drafted Sub-decree, a full project budget including all the related costs is required to be funded by the Government as below.

a. A proposed full project budget for a development project which requires land or property acquisition whether temporary (short term), long-term or permanent, must include sufficient budget provision for (i) all costs and payments for implementation of the plan to address project impacts, (ii) costs carrying out consultations related to the plans implementation (but does not include costs of consultation for determining general public or national interest, the amount of which must be included in the project study budget, (iii) costs for land or property valuation, and (iv) costs for implementing procedures for addressing complaints of affected persons concerning their rights or interests to land or property or related to compensation or social/rehabilitation assistance, (v) costs for monitoring and evaluation (internal and external) of the plan to address project impacts implementation, and (vi) expenses for engineering or development technical work and construction or project operation (project implementation costs).

b. Where a development project is being funded by a loan from an international finance institution or a bilateral funding organization, the amount needed for the budget to address project impacts may be included in the loan package.

(5) Public Consultation and Information Disclosure

Article 17 of the drafted Sub-decree refers to the procedures for public consultation and information disclosure by stating:

a. Prior to submitting a draft plan to address project impacts as provided in Article 16 of the Sub-decree for approval of the Authority to regulate the addressing of project impacts, the Agency responsible for addressing project impacts must conduct public consultation, especially with representatives of affected persons or families or communities on (i) details of the proposed development project which may affect physical or legal persons, (ii) relevant plan as well as the various degree of social and environmental impacts ofd the development project activities, (iii) preliminary information related to persons, families and communities that are likely to be affected and the target beneficiary communities; (iv) detailed prediction of rights or entitlements and requirements to be met by affected persons in claiming the rights or entitlement; (v) compensation process, estimated compensation rates, (vi) and social/rehabilitation assistance scheme, and (vii) Timetable for residential reestablishment site and/or relocation site development if a site is required as well as implementation timetable for provision.

b. The Agency responsible for addressing project impacts must provide at least 10 days public notice of the time and place for consultation meeting on the draft plan to address project impacts through radio or loud speaker announcements, posting of notices in public places and publication in Khmer language newspapers circulating in the locality.

c. The Agency responsible for addressing project impacts shall provide copies of the draft and approved plans to the Commune-Sangkat, who shall make them freely and easily accessible to persons or families that are likely to be affected by the project. For non-literate persons, appropriate means of communication shall be used to ensure that non-literate affected persons are fully informed of and consulted on the draft and approved plan. Individuals, institutions or agencies may request a copy of the whole plan or part of it and can be required to pay the photocopy costs.

(6) Grievance Mechanism

Article 26 of the drafted Sub-decree is the related part to the grievance procedures with the following details.

a. Article 26 (a) of the drafted Sub-decree allows an PAP who is not satisfied with the determination of the person's right or interests to the person's land or property acquired for a project or the compensation and social/rehabilitation assistance entitlements top address project impacts to file a complaint with the Rights and Entitlements Determining Authority in accordance with procedures to be determined by parkas of the Authority to regulate the addressing of project impacts.

b. Article 26 (b) of the drafted Sub-decree also states that an PAP who is not satisfied with the valuation of the person's land or property rights or interests by the Agency responsible for addressing project impacts may file a complaint with the Land Valuation Authority in accordance with procedure to be determined by parkas of the Authority to regulate the addressing of project impacts.

5.4 Relationship between Updating of the Contents of RAP and Progress of Legalization of the Sub-decree of the NRP

In response to the progress of the legalization of the drafted Sub-decree of the NRP, the RAP will be studied to be updated in accordance with the following basic concepts.

(1) Entitlement and Compensation Policies

Regarding the loss of land, structures, productive trees, and public and community assets suggested by the current framework of the RAP, the entitlement and compensation policies will be studied to be updated in accordance with the entitlement matrix stipulated by Annex 2 of the legalized Sub-decree and relevant Prakas, in case that the Sub-decree and relevant Prakas are legalized at the time of the approval of the budget for the RAP. At the same time, the entitlement and compensation policies related to income and livelihood restorations will be also studied to be updated in accordance with the social and restoration matrix stipulated by Annex 2 of the legalized Sub-decree and relevant Prakas, in case that the Sub-decree and relevant Prakas are legalized at the time of the approval of the budget for the RAP.

(2) Budgetary Arrangement, Public Consultations, Information Disclosure, Grievance Procedures and Monitoring

Regarding various items such as budgetary arrangement, public consultations, information disclosure, grievance procedures and monitoring, the contents of the RAP will be studied to be updated in accordance with the respective Articles of the legalized Sub-decree and relevant Prakas, in case that the Sub-decree and relevant Prakas are legalized at the time of the approval of the budget for the RAP.

5.5 Recommendations for the Actions to be Taken

In order to smoothly implement the 2nd Mekong Bridge Project, the action plans which will be required to be implemented or should be studied to be implemented during the preparation stage are recommended as below. The recommended action plans should be modified as the final action plan for preparing and implementing the RAP, taking into account the actions taken in case of the NR1 Project and etc.

In this case, the contents of the current RAP which are specified in section 5.2 should be properly updated through monitoring of the legalization of the Sub-decree and the relevant Prakas. If the Sub-decree and the relevant Prakas are not legalized at the time of the approval of the budget for the RAP, the RAP will be reviewed on the project basis with reference to the basic concept of the Sub-decree including possible application of replacement costs which will be able to be applied at the said timing, respecting the ownership of the Government of Cambodia.

Meanwhile, although the drafted Sub-decree of the NRP comprehensively covers a wide range of entitled PAPs, there are a considerable number of the indirectly affected local people due to the construction of the Bridge. Those people include local market sellers and vendors nearby ferry terminals of the both sides of the river as well as the locally-employed staff and workers of the Neak Loeung Ferry.

Proposed facilities which provide opportunities to sell local products to drivers and passengers who will stop over near the crossing point of the river, and the smooth transfer of the local staff of the state-owned Neak Loeung Ferry to other crossing points should be more concretely planned by the relevant agencies of the Government of Cambodia as mitigation measures.

(1) Monitoring of Legalization of the NRP Sub-decree and Relevant Prakas

Since the Sub-decree and the relevant Prakas has not yet been officially enacted, their legalization will be continuously monitored, so that the contents of the Sub-decree and the relevant Prakas can be reflected on the RAP.

(2) Identification of Final Alignment and Minimization of PAPs

The clear-cut final alignment and the COI should be mapped as early as possible during the design stage. Immediately after the finalization of the road alignment, the exact alignment will

be determined during the design stage. It is anticipated that there could be minimization in the numbers of PAPs after the finalization of the alignment.

(3) Preparatory Works for Setting Cut-off Date

The following preparatory works for setting cut-off date will be required.

- Land Acquisition Request in line with Article 7 of the Drafted Sub-decree
- Obtaining Land Requiring Agency Award in line with Article 11 of the Drafted Sub-decree
- Mapping of Final ROW and COI
- Pegging and Rapid Field Survey on Land Acquisition

(4) Establishment of Cut-off Date for Eligibility

A cut-off date will be set as 30-day prior to the last day of the census survey to fix the eligibility of PAPs.

(5) Implementation of Relevant Surveys for Preparation of the Draft RAP

In order to prepare for the draft RAP, the following wide range of surveys to fix the scope of PAPs will be required.

1) Census Survey (CS)

In addition to the Simple Survey which was conducted in the previous FS, a census should be carried out as soon as possible after the cut-off date has been established to determine the number of PAPs, the number of structures and other affected assets, and to minimize influx of people into the affected areas. A census is a household questionnaire that covers all PAPs irrespective of entitlement or ownership. It provides a complete inventory of all PAPs and their assets. It can be used to minimize fraudulent claims made by people who move into the affected area in the hope of being compensated. The information collected in the census survey includes: (i) demographic and occupational data on household heads and household members; (ii) tenure status and use of land and other assets; (iii) business activities; and, (iv) knowledge and attitudes about the Project and etc. The above-mentioned census can be conducted by simply updating the results of the Simple Survey in the previous FS.

Mapping for the affected area by the construction of the 2nd Mekong Bridge should be undertaken during the census survey, and the results of the census survey are used immediately to: prepare the list of PAPs in accordance with the existing compensation policy to identify the PAPs who are eligible for entitlements.

2) Inventory of Losses Survey (IOL)

The preparation of the RAP is also based on the census of potential PAPs and an initial survey of their affected land and non-land assets. This survey is referred to as the Inventory of Losses (IOL). During preparation of the draft RAP following the design stage, a similar

survey referred to as Detailed Measurement Survey (DMS) will be also conducted, preceded by a cadastral survey in the scope of IOL. The Detailed Measurement Survey (DMS) will collect data of land, structures and other assets from all PAPs with assets entirely or partially in the COI, as well as census data for these households. During the DMS, information to be collected will include: (i) drawing of structures; (ii) exact measurements of land and fixed assets; (iii) detailed descriptions and specifications of building materials; and, (iv) photographs of each structure.

3) Land Acquisition Survey (LAS)

The Land Acquisition Survey (LAS) is mandatory to identify landowners and to prepare compensation payments for land. The LAS is normally carried out by the land agency, acting on the request of the land requiring agency. The LAS only includes entitled persons for compensation. Non-entitled persons are not included.

4) Market Price Survey to Fix Replacement Costs

The market price survey to fix replacement costs will be undertaken, and in this process, the outline of the socio-economic profiles of the PAPs will be also grasped.

(6) Formulation of Draft Approval and Updating of the RAP

1) Creation of Inventory of PAPs

Technical drawings of structures and exact measurement of land and other fixed assets will be recorded together with photographs of each structure.

2) Formulation of Final Entitlement Matrix and Compensation Policies

The final entitlement matrix and compensation package will be prepared based on the applicable legal framework.

3) Formulation of Income Restoration/Rehabilitation Measures

Prepare a framework for participation of people affected in the finalization of project component designs, entitlements and the implementation of land acquisition and resettlement. Prepare special measures for consultation with any socially vulnerable groups

4) Formulation of Relocation Plan, if any

5) Updating of the RAP, if any

6) Budgetary Arrangement

Preparation of an itemized indicative budget including all the related costs will be prepared.

(7) Implementation of the RAP

1) **Issuing of Certificates of Entitlements to PAPs**
2) **Development and Assistance to Relocations, if any**
3) **Prepare Procedural Guide for Compensation Package**
4) **Final Negotiation and Signing with PAPs**
5) **Cash Disbursement to PAPs**

During the previous FS, the Simple Survey was conducted for the tentative PAPs to grasp such general information as the list of the tentative PAPs and their assets. A socio-economic survey was also conducted to the tentative PAPs and the vulnerable people. The information obtained by these surveys will be effectively utilized in the next stage and can provide baseline data of Census Survey and Inventory of Losses Survey.

Chapter 6 Conclusions and Recommendations

6.1 Conclusions

(1) Monitoring of Traffic Volume

- The demand forecast in the previous FS was 2,809 PCU in 2006 and 3,104 PCU in 2007. The weekday average traffic monitored at Neak Loeung in 2006 and 2007 show 3,385 PCU and 3,972 PCU, respectively, in the FU study. The monitored traffic grew sharply beyond the forecast. Especially growth from 2006 to 2007 is remarkable.
- The differences between the forecast and the monitored traffic in 2006 come from the difference between the economic growth of 6%, medium growth scenario, in the demand forecast in the previous FS and actual growth of around 12% over the period from 2005 to 2006.
- On the other hand, the monitored traffic in 2007 largely grew compared with that in 2006. The reason comes from the increase of HV type traffic (large vehicle traffic), consisting of bus (mostly mini-bus) and truck traffic.
- Looking at the bus traffic at Neak Loeung, the number of buses increased from 351 (2004) to 764 (2007). It is supposed that 50 buses were allowed to pass the Vietnam border without transferring in April 2007. Other factors, which create the gap between demand forecast and monitored traffic, include an increase in bus traffic generated from regional development, decentralization and deregulation of the commercial bus business, those of which were not taken into account during the previous FS.
- On the other hand, the number of trailers increased from 14 (2004) to 133 (2007), which also contributed to the increase in the heavy vehicles. This cannot be explained by the increase of large truck traffic at Bavet as cargo transshipment was not abolished even in 2007 and CBTA has still not completed full implementation although some progress can be seen in its institutional framework. The reasons may include: 1) the large trucks divert to pass through Bavet, which then passed through Trapeang Phlong in 2004 when the custom facilities were under construction, and 2) the regional development such as the industrial estate at Bavet also generates the increase of large truck traffic. Also, such changes in the physical distribution pattern as an increase of the trade between Cambodia and Vietnam and an increase of the imported cargo via Bavet also contribute to the increase of truck traffic.
- The holiday, which was followed by monitoring traffic survey in 2007, may also contribute to the increase in the go-home-purpose and/or tour-purpose traffic. The longer ferry

operation can also contribute to the increase of ferry capacity. The increase of ferry traffic is, however, around 3%-6% to the total traffic and impact by longer service is not so big.

- The projected population and GDP growth, which are both preconditions of the traffic demand forecast, shows the same trend to those in the previous FS. For instance, the population projection, done by NIS (National Institute of Statistics) in Cambodia and applied to the previous FS, is still valid and the economic growth, in the long run, is projected to reach as much as 5.8%, which is almost same as the precondition of the previous FS.
- NR 1 between Phnom Penh and Neak Loeung is under construction based on the scheme of Japan Grand Aid program. It is expected to be completed by 2011 and this precondition was taken into account in the traffic demand forecast in the previous FS. National Route 8 (NR 8) development program, which is expected to be extended under the scheme of China loan, may impact on ferry traffic at Neak Loeung. The route, however, needs to make a detour around 20% more in distance for Phnom Penh by NR 1. The impact of the NR 8 development program may have little affect on the traffic at Neak Loeung.
- Full cross border facilitation at Bavet for passengers and cargoes was expected in the demand forecast in the previous FS. The precondition in the previous FS includes that the registered number of vehicles for border crossing will be expanded to 150 and 500 vehicles in 2007 and 2009 respectively. Full facilitation has not been implemented officially so far although the institutional framework has been built up. However, an increase in the imported goods and the change in the physical distribution pattern between Cambodia and Vietnam, deregulation of the commercial bus business, etc. are all unknown but may contribute to the traffic increase crossing the river at Neak Loeung.

(2) Monitoring of EIA Evaluation

- IEIA D/F reports was submitted to EIA Department of MoE by MPWT officials in November 2006, and afterward, the official IEIA examination by MoE was terminated in January 2007 and its examination comments were given to MPWT. According to these comments, it was concluded that further environmental studies such as EIA are required for the environmental license evaluation process for this bridge construction project. These comments also included the necessity of further clarification of the quarries and borrow pits and that of further study on the environmental management plan.
- In March 2007, the EIA D/F report was submitted to EIA Department of MoE, and three official EIA examination committees were held in May and June 2007. In the last committee, the Minister for Environment stated that the EIA report was approved under the condition that the appropriate arrangement for the project affective persons is made through reporting and consultation at the appropriate timing.
- The EIA D/F report will be approved officially, soon after the MPWT responds the official EIA examination comments provided in July and August 2007 by the MoE.

(3) Monitoring of Natural Environment and Resettlement

- Based on the discussion at JICA social and environmental consideration committee, held in March of 2006, the supplemental environment field studies – water quality study, regional biological environmental study, and preliminary benthos study – were conducted. The results show: 1) several knowledge of local flow pattern was obtained, so that more accurate prediction of pollutants dispersion in case of accident events would be possible, 2) the features of the potential habitat study of IUCN-vulnerable box turtle was obtained, 3) the biological environmental information was added to the baseline data, which was prepared during the previous FS.
- Under the technical assistance by the ADB, the drafted Sub-decree has been prepared by the Cambodian Government. The major contents of the draft are: the clear-cut entitlement matrix for compensation has been created, replacement costs for a wide range of compensation package are clearly employed and a wide range of social and rehabilitation assistance is added as a relevant entitlement matrix for income restoration as well rehabilitation measures.

6.2 Recommendations

- According to the comparison between the results of monitoring traffic survey and that of traffic demand forecast in the previous FS, early construction of the bridge should be considered because of recent high traffic volume at Neak Loeung. It is also advised to monitor the actual traffic volume by the implementing agencies in order to reconfirm the findings of both the previous FS and the FU study.
- During the design stage of the Second Mekong Bridge Project, the clear-cut final alignment and the COI will be determined. Immediately after the finalization of the road alignment, the implementing agencies need to identify the affected area where the adverse environmental impacts will be observed, and prepare for the full-scale RAP and revise the EMP, if necessary.
- The Sub-decree has not yet been legalized and relevant prakas of the Sub-decree has not yet been drafted. For the smooth implementation of the Project, the implementing agency and other concerned agencies need to conduct necessary surveys and prepare for the full-scale RAP, if necessary, through monitoring of legalization of the NRP sub-decree and relevant parkas.

Appendices

AP-1 Traffic Survey

Appendix 1 Traffic Survey

AP 1-1 Result of Traffic Survey

(1) Hourly Traffic at Neak Loeung

Note: The minibus (one box car) is including in type 5. That in 2006 is adjusted by the hourly traffic survey results counted in 2007 so that some difference between the weekly total and hourly total occurs due to round off. The construction trucks are excluding from all the results in weekday and non weekday traffic in 2007.

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	28	0	16	8	3	7	0	56
6:00 - 7:00	60	1	16	5	3	3	1	48
7:00 - 8:00	69	1	15	4	8	3	0	52
8:00 - 9:00	101	1	29	10	13	7	0	99
9:00 - 10:00	103	1	27	13	23	9	0	126
10:00 - 11:0	48	1	20	26	13	8	0	110
11:00 - 12:0	74	0	23	6	19	7	0	98
12:00 - 13:0	57	0	17	7	11	6	1	73
13:00 - 14:0	50	0	15	5	14	6	0	72
14:00 - 15:0	58	0	20	9	15	10	1	98
15:00 - 16:0	59	0	21	9	19	7	0	94
16:00 - 17:0	50	0	15	12	16	8	1	93
17:00 - 18:0	36	0	16	5	11	7	1	71
18:00 - 19:0	33	0	13	5	8	6	0	55
19:00 - 20:0	8	0	9	3	5	5	0	39
20:00 - 21:0	4	0	4	1	0	1	0	9
17 H Total	834.75	6.5	273.25	126	178.75	97	4.5	1,194

2004 Fr PP Non Weekday Average

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	38	0	18	8	4	9	2	80
6:00 - 7:00	47	2	11	2	3	4	1	43
7:00 - 8:00	130	1	27	6	10	6	1	93
8:00 - 9:00	121	0	32	9	19	3	0	103
9:00 - 10:00	84	0	25	7	16	5	0	89
10:00 - 11:0	74	1	24	7	16	8	1	98
11:00 - 12:0	52	0	20	5	16	8	1	89
12:00 - 13:0	36	1	16	8	14	9	0	86
13:00 - 14:0	47	0	16	6	15	4	0	68
14:00 - 15:0	51	0	18	6	9	5	1	66
15:00 - 16:0	58	4	22	11	19	5	1	98
16:00 - 17:0	50	0	17	8	15	7	0	82
17:00 - 18:0	67	0	12	7	13	4	0	67
18:00 - 19:0	48	0	13	4	6	7	1	63
19:00 - 20:0	10	0	7	3	1	3	1	29
20:00 - 21:0	4	0	5	1	0	3	1	21
17 H Total	916	10	283	97	177	91	10	1,176

2004 To PP Non Weekday Average

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	36	0	9	19	11	10	0	92
6:00 - 7:00	69	0	5	23	10	9	0	92
7:00 - 8:00	105	1	11	43	10	12	0	142
8:00 - 9:00	78	0	23	27	24	8	0	139
9:00 - 10:00	88	0	19	6	23	7	0	100
10:00 - 11:0	59	1	28	4	12	7	0	85
11:00 - 12:0	56	0	25	14	9	7	0	91
12:00 - 13:0	54	0	17	14	4	5	0	67
13:00 - 14:0	47	3	17	14	7	7	0	79
14:00 - 15:0	81	0	15	18	7	9	0	93
15:00 - 16:0	67	0	23	11	8	11	0	94
16:00 - 17:0	62	1	24	10	7	11	0	93
17:00 - 18:0	50	0	18	15	8	9	0	88
18:00 - 19:0	17	0	9	8	1	3	0	35
19:00 - 20:0	2	0	8	2	0	3	0	23
20:00 - 21:0	1	1	2	1	0	2	0	12
17 H Total	872	8	251	230	142	120	1	1,323

2004 Both Direction Non Weekday 1,741

Time Band	Type 1	Type 2	pe 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	74	1	27	27	15	19	3	171
6:00 - 7:00	116	2	16	25	13	13	1	135
7:00 - 8:00	235	2	38	49	20	18	1	235
8:00 - 9:00	199	0	55	36	43	11	0	241
9:00 - 10:00	172	0	43	12	39	12	0	189
10:00 - 11:0	133	2	52	11	28	15	1	183
11:00 - 12:0	108	0	45	19	25	15	1	180
12:00 - 13:0	90	2	33	22	18	14	0	152
13:00 - 14:0	94	3	33	20	22	11	0	148
14:00 - 15:0	131	0	33	24	16	13	1	159
15:00 - 16:0	126	4	44	22	27	16	1	192
16:00 - 17:0	112	1	40	18	22	18	0	175
17:00 - 18:0	116	0	30	22	21	14	0	156
18:00 - 19:0	65	0	22	12	7	10	1	98
19:00 - 20:0	12	0	16	6	1	6	1	52
20:00 - 21:0	6	1	7	2	1	5	1	33
Sub Total	1,788	18	535	327	319	210	11	2,498

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	18	1	11	2	2	3	0	29
6:00 - 7:00	49	0	21	3	7	10	8	110
7:00 - 8:00	85	0	17	2	9	12	1	87
8:00 - 9:00	113	0	24	3	19	13	2	123
9:00 - 10:0(	116	0	33	4	39	10	2	160
10:00 - 11:(	78	1	31	6	42	9	1	153
11:00 - 12:(	72	0	16	4	27	9	1	108
12:00 - 13:(	56	0	22	3	21	4	2	90
13:00 - 14:(	60	0	19	2	19	4	1	83
14:00 - 15:(	71	1	18	4	31	8	1	116
15:00 - 16:(	80	1	22	8	37	6	3	139
16:00 - 17:(	70	0	18	7	36	6	1	125
17:00 - 18:(	53	0	13	4	17	8	2	88
18:00 - 19:(	31	0	11	4	12	9	1	76
19:00 - 20:(	19	0	12	5	5	9	0	58
20:00 - 21:(	3	0	4	2	4	5	1	37
21:00 - 22:(	2	0	2	2	2	4	2	28
22:00 - 23:(	2	0	2	1	1	4	2	23
23:00 - 24:(	1	0	0	0	0	1	1	5
Sub Total	977	5	296	65	331	133	31	1,637

2006 To PP Weekday Average

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	25	0	6	3	12	2	0	40
6:00 - 7:00	29	0	12	2	14	6	3	76
7:00 - 8:00	68	0	10	3	21	5	2	81
8:00 - 9:00	109	0	15	5	42	7	1	136
9:00 - 10:0(	115	2	25	7	78	9	1	219
10:00 - 11:(	82	1	28	6	55	5	3	172
11:00 - 12:(	68	0	20	4	28	6	3	113
12:00 - 13:(	51	0	17	3	15	8	3	94
13:00 - 14:(	53	0	18	5	13	10	2	95
14:00 - 15:(	63	0	30	11	24	11	4	148
15:00 - 16:(	75	1	22	7	18	6	3	103
16:00 - 17:(	72	2	26	7	17	9	3	117
17:00 - 18:(	51	1	20	7	7	8	2	84
18:00 - 19:(	22	1	20	3	4	6	3	64
19:00 - 20:(	15	0	15	3	4	5	3	57
20:00 - 21:(	3	1	7	2	1	3	2	31
21:00 - 22:(	3	0	6	1	1	3	3	32
22:00 - 23:(	1	0	4	1	0	1	1	13
23:00 - 24:(	0	0	1	1	1	1	1	11
Sub Total	906	9	299	81	355	113	42	1,688

2006 Both Direction Weekday Average 1,806

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	43	1	17	5	14	5	0	69
6:00 - 7:00	78	0	33	4	21	17	11	186
7:00 - 8:00	153	0	26	5	30	17	3	169
8:00 - 9:00	222	1	39	9	61	20	3	259
9:00 - 10:0(	230	2	58	11	117	20	3	379
10:00 - 11:(	160	1	59	12	97	14	3	325
11:00 - 12:(	140	0	36	8	55	15	3	221
12:00 - 13:(	107	0	39	6	36	12	5	185
13:00 - 14:(	113	1	36	7	32	14	4	178
14:00 - 15:(	134	1	48	15	55	19	5	265
15:00 - 16:(	155	2	44	15	55	11	5	242
16:00 - 17:(	142	2	44	13	53	15	4	241
17:00 - 18:(	104	1	33	10	25	16	4	172
18:00 - 19:(	53	1	31	8	17	15	4	140
19:00 - 20:(	34	0	26	8	9	14	3	115
20:00 - 21:(	6	1	11	4	6	8	3	68
21:00 - 22:(	5	0	8	3	3	7	4	60
22:00 - 23:(	3	0	6	2	1	5	3	36
23:00 - 24:(	1	0	1	1	1	2	2	16
Sub Total	1,884	14	596	147	686	246	73	3,325

2006 Fr PP Non Weekday Average

Time Band	Type 1	Type 2	pe 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	29	0	9	3	2	4	1	35
6:00 - 7:00	56	1	18	4	11	13	2	97
7:00 - 8:00	129	0	29	5	16	11	2	117
8:00 - 9:00	98	1	26	6	20	5	1	101
9:00 - 10:00	146	2	51	8	35	17	3	203
10:00 - 11:0	107	0	35	8	44	6	2	162
11:00 - 12:0	68	0	24	5	24	9	1	109
12:00 - 13:0	76	1	27	4	20	10	1	111
13:00 - 14:0	48	1	22	5	25	7	1	102
14:00 - 15:0	92	1	24	5	48	6	0	144
15:00 - 16:0	59	0	22	5	31	6	2	115
16:00 - 17:0	83	2	28	9	46	9	3	169
17:00 - 18:0	93	0	28	6	22	6	1	107
18:00 - 19:0	58	0	16	4	27	2	1	88
19:00 - 20:0	23	0	15	4	9	7	5	81
20:00 - 21:0	3	0	5	4	7	5	0	37
21:00 - 22:0	6	0	4	2	6	7	1	42
22:00 - 23:0	2	0	2	0	0	4	1	19
23:00 - 24:0	1	0	1	0	0	3	2	17
Sub Total	1,174	6	386	81	392	131	28	1,857

2006 To PP Non Weekday Average

Time Band	Type 1	Type 2	pe 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	26	0	9	3	13	6	0	57
6:00 - 7:00	31	0	11	4	12	6	1	62
7:00 - 8:00	69	1	14	3	21	8	0	86
8:00 - 9:00	137	0	22	7	52	8	0	162
9:00 - 10:00	104	1	22	3	74	10	1	200
10:00 - 11:0	69	1	32	7	59	4	2	174
11:00 - 12:0	59	1	23	3	32	5	2	112
12:00 - 13:0	82	1	28	6	27	18	4	164
13:00 - 14:0	37	2	22	9	16	9	3	108
14:00 - 15:0	71	0	33	13	23	10	1	131
15:00 - 16:0	122	1	45	12	31	10	1	167
16:00 - 17:0	96	1	34	7	24	12	4	149
17:00 - 18:0	60	1	33	8	11	8	2	104
18:00 - 19:0	29	1	26	4	6	8	1	71
19:00 - 20:0	9	0	10	5	3	3	1	34
20:00 - 21:0	6	0	6	4	3	4	1	29
21:00 - 22:0	8	0	10	3	1	6	1	37
22:00 - 23:0	1	0	1	1	0	3	1	15
23:00 - 24:0	1	0	3	1	0	2	3	20
Sub Total	1,013	8	384	98	408	134	24	1,883

2006 Both Non Weekday Average 2,068

Time Band	Type 1	Type 2	pe 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	55	0	18	6	15	10	1	92
6:00 - 7:00	87	1	29	7	23	18	3	159
7:00 - 8:00	198	1	43	7	37	18	2	203
8:00 - 9:00	235	1	47	12	73	13	1	264
9:00 - 10:00	250	3	74	11	108	26	3	403
10:00 - 11:0	176	1	68	14	103	10	4	335
11:00 - 12:0	127	1	47	7	56	14	2	220
12:00 - 13:0	158	1	55	10	47	28	5	276
13:00 - 14:0	85	2	44	14	41	16	4	210
14:00 - 15:0	163	1	58	18	71	15	1	275
15:00 - 16:0	180	1	67	16	62	16	3	282
16:00 - 17:0	179	2	62	15	69	21	6	318
17:00 - 18:0	153	1	61	14	33	13	3	211
18:00 - 19:0	86	1	42	8	33	10	2	158
19:00 - 20:0	32	0	25	9	13	9	6	116
20:00 - 21:0	9	0	10	8	9	9	1	66
21:00 - 22:0	14	0	14	5	7	12	2	80
22:00 - 23:0	3	0	3	1	1	7	2	34
23:00 - 24:0	2	0	4	1	0	4	5	38
Sub Total	2,187	13	771	179	800	264	52	3,740

2007 Fr PP Weekday Average

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	26	0	9	3	2	7	0	44
6:00 - 7:00	52	0	12	5	4	3	1	46
7:00 - 8:00	103	3	16	5	8	9	3	91
8:00 - 9:00	112	2	20	8	14	8	8	134
9:00 - 10:00	124	0	24	15	30	10	2	154
10:00 - 11:0	94	0	22	12	31	7	3	137
11:00 - 12:0	99	1	21	10	32	10	5	158
12:00 - 13:0	77	0	23	7	23	7	3	120
13:00 - 14:0	71	0	22	9	24	7	2	117
14:00 - 15:0	84	0	24	7	37	11	5	163
15:00 - 16:0	81	0	21	9	40	9	4	159
16:00 - 17:0	57	0	22	11	45	11	5	178
17:00 - 18:0	60	0	20	8	29	11	4	142
18:00 - 19:0	41	0	13	6	16	6	4	91
19:00 - 20:0	29	0	9	4	11	5	1	57
20:00 - 21:0	14	0	9	5	10	5	1	54
21:00 - 22:0	9	0	4	3	4	5	1	34
22:00 - 23:0	3	0	3	2	2	7	1	37
23:00 - 24:0	4	0	2	3	2	7	1	36
Sub Total	1,141	9	297	132	364	144	54	1,953

2007 ToPP Weekday Average

Time Band	Type 1	Type 2	pe 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	36	0	8	5	15	5	3	76
6:00 - 7:00	58	0	12	4	17	7	7	108
7:00 - 8:00	77	1	12	7	24	10	5	127
8:00 - 9:00	147	1	27	10	77	7	3	230
9:00 - 10:00	112	0	27	11	85	10	6	263
10:00 - 11:0	84	1	21	10	41	9	6	175
11:00 - 12:0	90	1	23	9	32	11	5	160
12:00 - 13:0	68	1	22	12	18	11	4	129
13:00 - 14:0	65	0	26	15	17	11	8	153
14:00 - 15:0	52	1	24	9	15	7	6	120
15:00 - 16:0	76	1	23	14	19	10	7	148
16:00 - 17:0	61	2	22	16	15	9	6	131
17:00 - 18:0	46	1	22	11	8	7	3	95
18:00 - 19:0	22	1	18	9	5	4	2	65
19:00 - 20:0	14	0	6	6	2	4	1	36
20:00 - 21:0	11	0	14	6	4	6	2	59
21:00 - 22:0	2	0	5	1	1	2	1	21
22:00 - 23:0	3	0	4	1	1	1	1	18
23:00 - 24:0	8	0	3	2	3	5	2	38
Sub Total	1,031	11	319	157	400	137	79	2,153

2007 Both Direction Weekday Average

Time Band	Type 1	Type 2	pe 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	62	1	18	8	17	12	4	121
6:00 - 7:00	110	0	24	9	21	10	8	155
7:00 - 8:00	180	4	28	11	32	19	7	218
8:00 - 9:00	259	3	48	18	92	15	11	364
9:00 - 10:00	236	1	51	26	115	20	8	417
10:00 - 11:0	178	1	44	21	72	16	9	312
11:00 - 12:0	189	1	44	19	64	21	11	319
12:00 - 13:0	145	1	45	19	41	18	7	249
13:00 - 14:0	136	0	48	24	41	18	10	270
14:00 - 15:0	136	1	47	17	52	18	11	283
15:00 - 16:0	158	1	44	23	59	19	10	307
16:00 - 17:0	118	2	44	27	60	20	10	310
17:00 - 18:0	107	1	42	20	37	17	8	237
18:00 - 19:0	63	1	31	15	21	10	6	155
19:00 - 20:0	43	0	15	10	13	9	2	93
20:00 - 21:0	25	0	24	11	14	11	3	113
21:00 - 22:0	10	0	9	4	6	7	2	56
22:00 - 23:0	6	0	7	3	3	9	2	55
23:00 - 24:0	12	0	6	4	5	12	4	75
Sub Total	2,172	20	616	290	763	281	133	4,106

2007 Fr PP Non Weekday Average

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	26	0	12	5	4	4	1	45
6:00 - 7:00	46	1	16	8	12	3	2	73
7:00 - 8:00	105	1	21	15	17	8	3	125
8:00 - 9:00	159	1	20	10	17	9	6	138
9:00 - 10:00	159	1	37	13	29	8	2	160
10:00 - 11:0	147	3	35	15	43	6	3	184
11:00 - 12:0	133	0	40	9	39	8	2	170
12:00 - 13:0	62	0	18	7	15	10	5	114
13:00 - 14:0	97	1	28	8	30	5	3	131
14:00 - 15:0	83	0	21	7	41	8	4	155
15:00 - 16:0	83	0	29	10	41	9	1	152
16:00 - 17:0	97	0	28	11	42	7	5	170
17:00 - 18:0	100	0	33	8	25	7	6	147
18:00 - 19:0	88	0	21	8	29	7	4	131
19:00 - 20:0	67	0	11	4	10	2	2	55
20:00 - 21:0	20	0	8	4	14	4	0	53
21:00 - 22:0	18	0	10	3	42	4	1	103
22:00 - 23:0	4	0	6	1	13	4	2	48
23:00 - 24:0	4	0	3	1	0	4	1	21
Sub Total	1,493	7	392	142	459	114	53	2,176

2007 To PP Non Weekday Average

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	41	0	9	5	13	3	4	69
6:00 - 7:00	63	1	19	6	20	9	5	118
7:00 - 8:00	101	1	28	4	38	9	9	180
8:00 - 9:00	200	2	42	16	103	8	6	321
9:00 - 10:00	145	1	41	12	133	9	4	355
10:00 - 11:0	127	0	35	13	64	10	6	240
11:00 - 12:0	121	2	29	8	46	6	4	174
12:00 - 13:0	76	1	19	8	21	8	5	126
13:00 - 14:0	108	2	32	14	24	14	6	175
14:00 - 15:0	114	1	48	13	32	15	7	211
15:00 - 16:0	81	2	39	15	27	10	6	176
16:00 - 17:0	73	1	26	11	18	11	6	141
17:00 - 18:0	55	1	32	15	15	7	4	125
18:00 - 19:0	42	3	25	12	8	7	2	93
19:00 - 20:0	13	0	10	5	4	3	2	43
20:00 - 21:0	14	1	10	3	4	3	2	38
21:00 - 22:0	3	1	10	3	3	2	1	30
22:00 - 23:0	1	1	2	0	1	0	0	4
23:00 - 24:0	2	0	5	1	1	2	1	19
Sub Total	1,373	16	458	161	571	134	80	2,638

2007 Both Direction Non Weekday Average 2,791

Time Band	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	PCU
5:00 - 6:00	66	0	20	9	16	7	5	114
6:00 - 7:00	109	1	35	14	32	12	7	191
7:00 - 8:00	206	2	49	19	55	17	12	304
8:00 - 9:00	359	3	62	25	120	17	12	459
9:00 - 10:00	304	2	78	25	162	17	7	515
10:00 - 11:0	274	3	70	27	107	16	10	424
11:00 - 12:0	254	2	69	17	85	14	6	344
12:00 - 13:0	138	1	37	15	36	18	10	240
13:00 - 14:0	204	2	60	22	54	19	9	307
14:00 - 15:0	197	1	68	20	73	22	11	367
15:00 - 16:0	163	2	68	25	67	19	7	328
16:00 - 17:0	169	1	53	22	60	18	11	311
17:00 - 18:0	155	1	65	23	40	14	10	272
18:00 - 19:0	130	3	45	20	36	13	7	224
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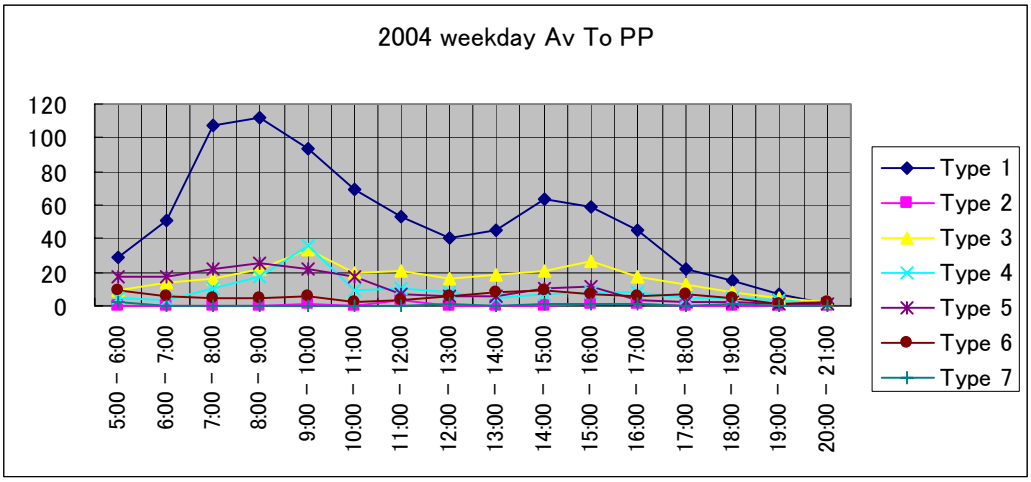
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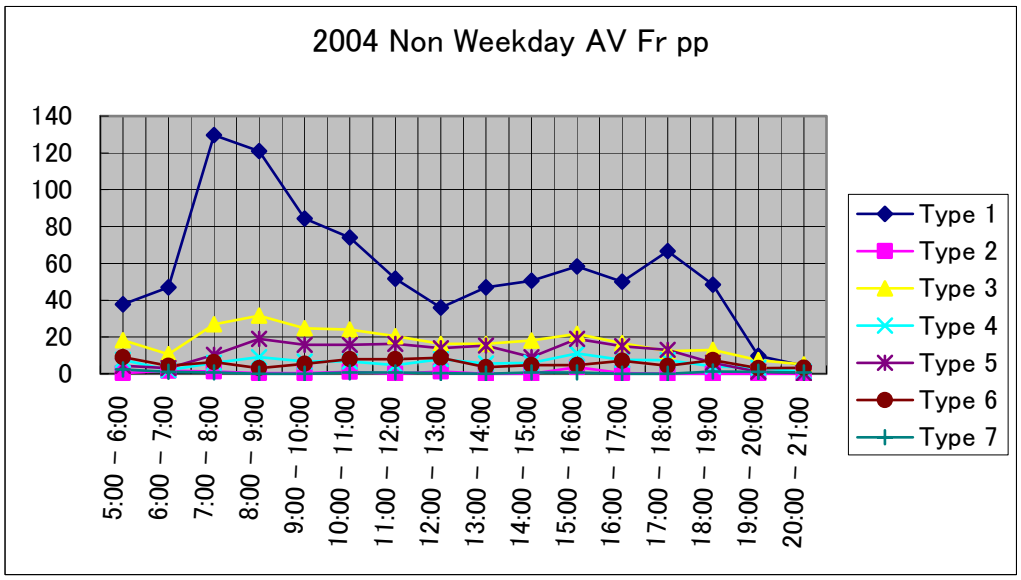
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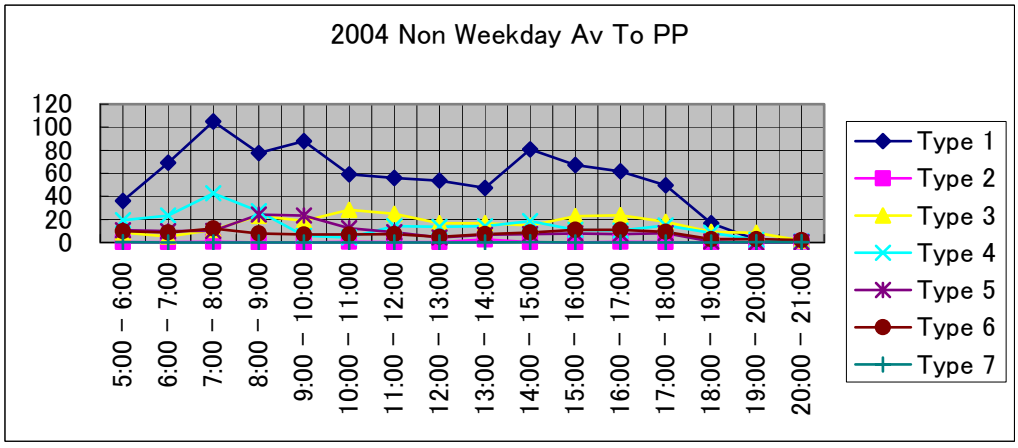
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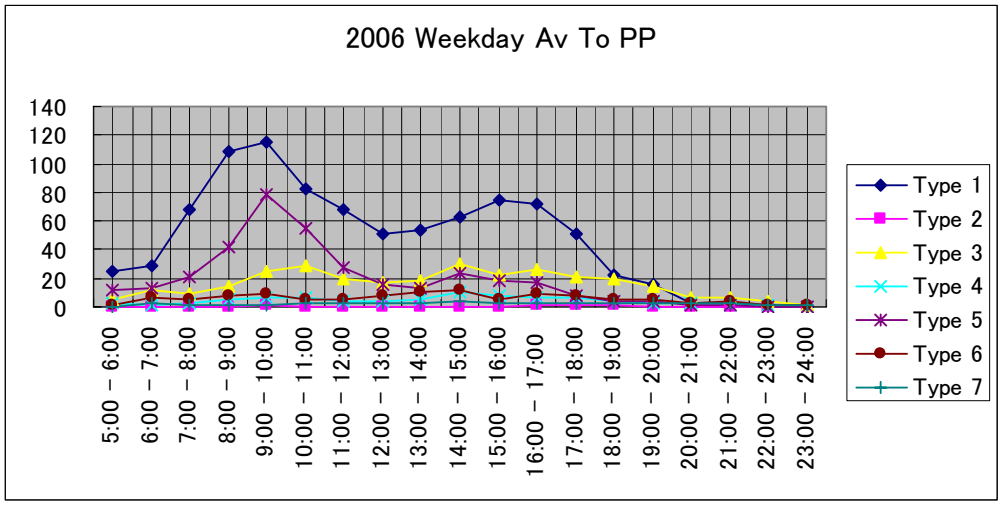
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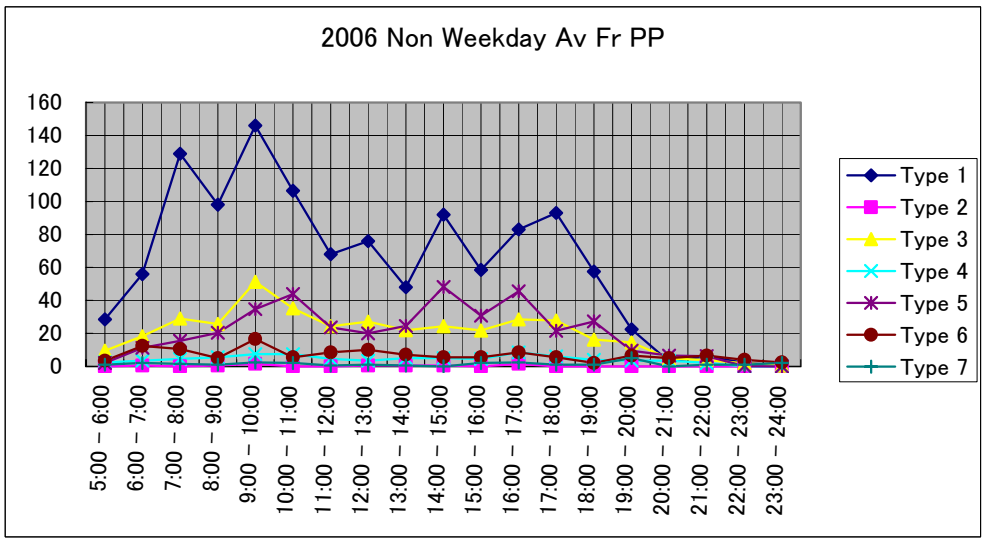
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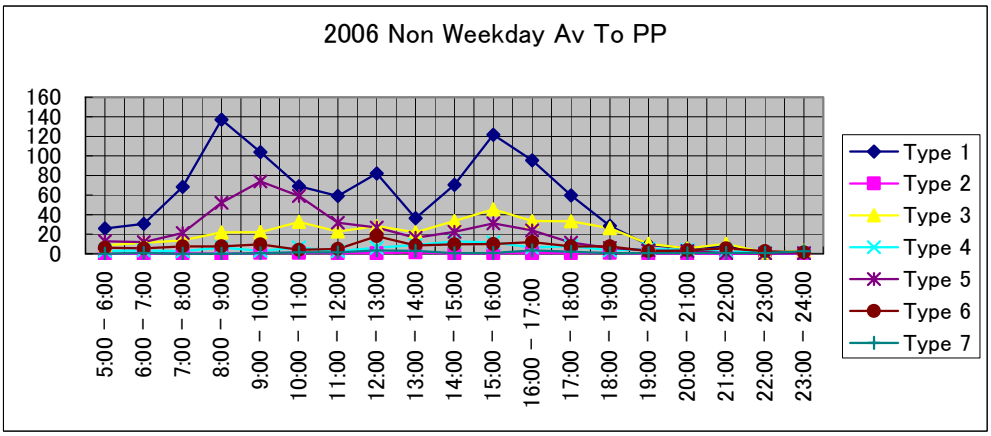
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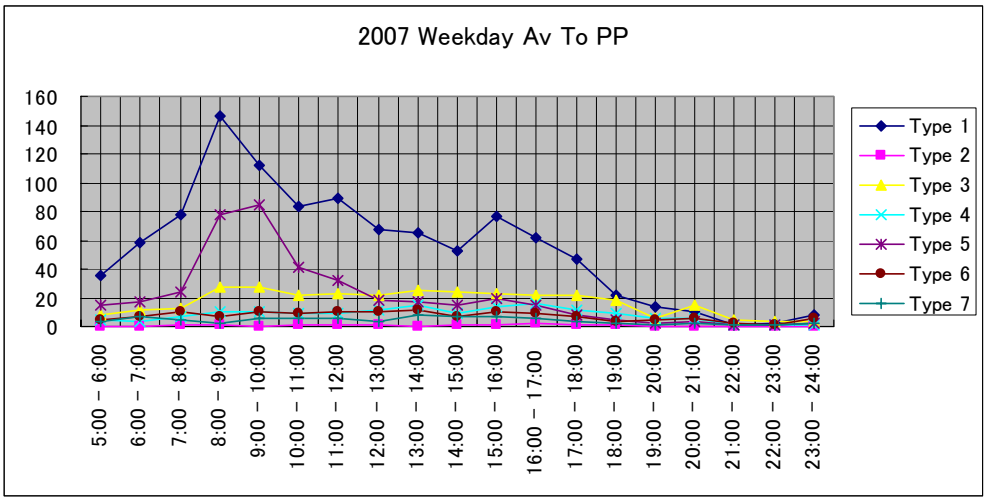
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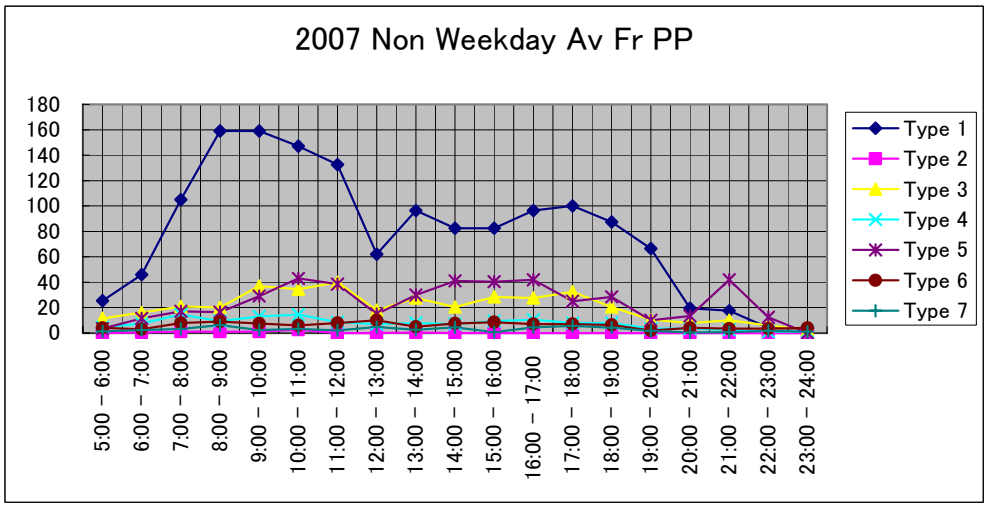
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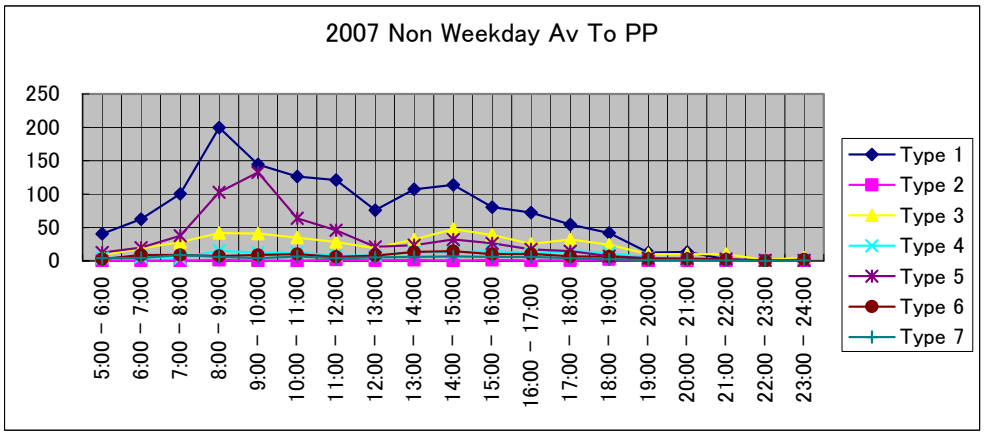
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(2) Ferry Operation at Neak Loeung

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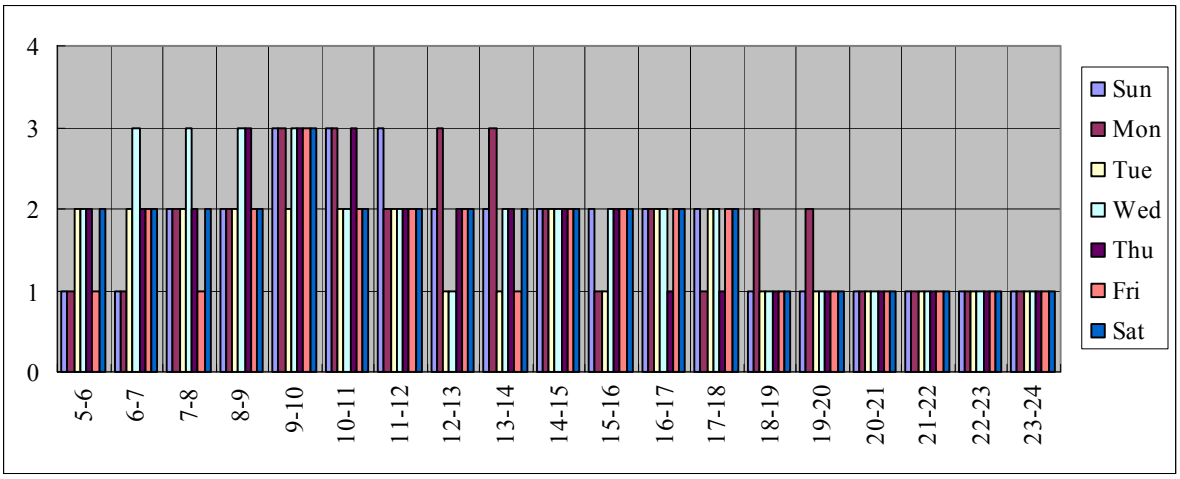

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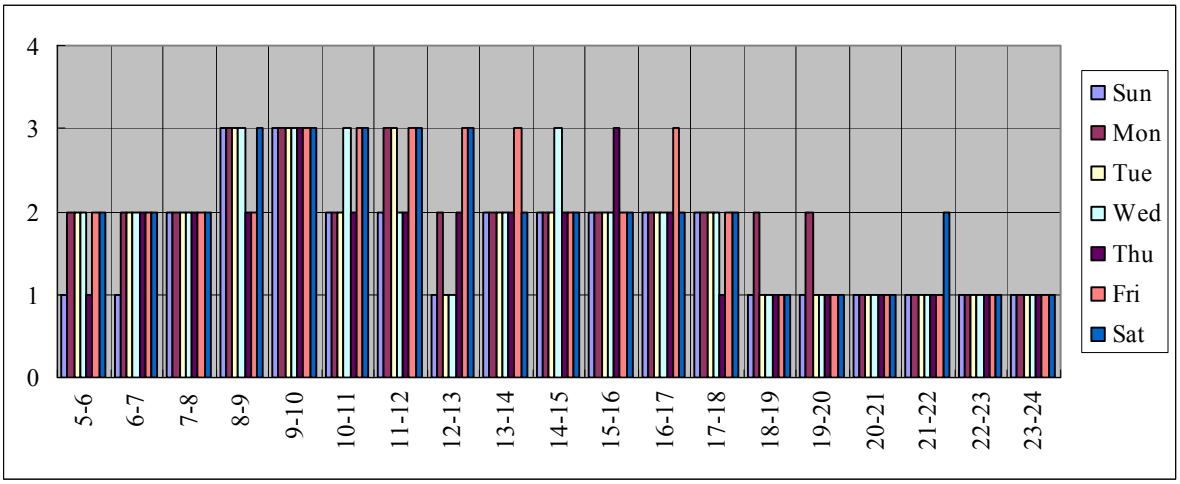

AP 1-2 Ferry Traffic by MPWT

Ferry Users in 2003

	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	Pedestrian	218,067	240,560	235,625	303,064	210,387	182,084	187,421	163,401	237,277	172,372	203,784	177,554	2,531,596
2	Bicycle, Passenger carry good	3,154	2,962	3,452	2,929	2,276	2,280	1,994	2,544	2,581	2,338	2,043	1,932	30,485
3	Motorbike	45,839	48,804	49,203	69,704	41,541	39,638	41,886	37,370	60,693	38,548	45,034	41,585	559,845
4	Trailer (horse, pushing, bicyc	1,868	1,684	2,090	1,526	1,504	1,545	1,421	1,483	1,329	1,294	1,237	1,327	18,308
5	Motorbike trailer and vehicle	10,900	10,579	12,278	14,814	10,651	10,301	10,250	9,605	13,165	10,654	11,863	12,315	137,375
6	Vehicle 6 seats and up to 12 s	16,536	15,951	18,185	21,784	16,582	15,766	17,091	15,203	18,951	15,930	17,713	17,710	207,402
7	Passenger car from 13 seats to	2,823	2,777	2,988	2,723	2,822	2,907	2,659	2,576	2,558	3,089	3,130	2,932	33,984
8	Passenger car from 21 seats u	1,055	1,098	1,120	978	1,211	1,329	1,196	1,333	1,215	1,334	1,228	1,464	14,561
9	All types of heavy vehicles lo	185	212	271	249	216	327	400	381	267	288	249	305	3,350
10	All types of trailer v ehicles l	284	263	409	294	370	424	277	293	365	300	390	515	4,184
11	Logging truck loaded from 18	75	118	114	87	187	129	517	416	256	249	88	382	2,618

Ferry Users in 2004

	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	Pedestrian	245,289	240,252	242,041	324,304	202,976	178,735	196,248	178,450	154,150	246,468	192,032	182,978	2,583,923
2	Bicycle, Passenger carry good	4,306	4,113	3,946	4,055	3,506	3,176	3,371	4,226	3,725	2,824	2,476	2,580	42,304
3	Motorbike	56,903	54,112	56,223	89,539	51,398	46,104	48,305	50,018	42,841	74,144	48,951	42,815	661,353
4	Trailer (horse, pushing, bicyc	1,774	1,730	1,817	1,481	1,318	1,262	1,279	1,456	1,369	1,261	1,469	1,649	17,865
5	Motorbike trailer and vehicle	15,060	13,830	15,471	20,691	14,160	13,295	14,451	13,837	12,797	18,141	15,164	14,684	181,581
6	Vehicle 6 seats and up to 12 s	20,514	19,402	21,160	26,645	19,581	18,211	19,743	18,770	18,066	24,478	21,614	20,675	248,859
7	Passenger car from 13 seats to	3,041	3,173	3,692	3,429	3,445	3,159	3,332	3,313	2,894	3,444	4,015	3,621	40,558
8	Passenger car from 21 seats u	1,199	1,244	1,451	1,240	1,375	1,386	1,416	1,421	1,365	1,597	1,484	1,279	16,457
9	All types of heavy vehicles lo	270	162	146	206	202	164	315	226	313	347	357	666	3,374
10	All types of trailer v ehicles l	452	439	383	375	327	368	394	302	300	367	596	284	4,587
11	Logging truck loaded from 18	180	131	113	102	104	119	109	56	87	72	192	246	1,511

Ferry Users in 2005

	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	Pedestrian	218,313	245,027	273,216	380,592	254,641	222,893	207,418	226,033	217,065	335,377	267,175	243,232	3,090,982
2	Bicycle, Passenger carry good	2,109	2,790	2,993	3,425	3,057	3,158	2,867	9,982	10,849	8,501	7,958	8,070	65,759
3	Motorbike	42,980	54,257	58,323	91,528	52,485	47,355	45,564	53,857	51,428	82,451	53,118	55,160	688,506
4	Trailer (horse, pushing, bicyc	1,365	1,266	1,603	1,769	1,708	1,626	1,685	1,809	1,382	1,152	1,084	1,181	17,630
5	Motorbike trailer and vehicle	16,809	15,893	17,528	23,064	16,510	15,767	17,106	15,225	15,300	16,943	14,845	14,409	199,399
6	Vehicle 6 seats and up to 12 s	24,412	22,891	26,544	31,775	25,370	23,719	25,156	24,788	23,084	27,509	24,779	24,077	304,104
7	Passenger car from 13 seats to	3,962	3,053	3,757	3,582	3,609	3,310	3,696	3,756	3,584	3,863	4,061	4,155	44,388
8	Passenger car from 21 seats u	1,280	919	1,285	1,214	1,154	1,080	1,243	1,338	1,209	1,277	1,224	1,454	14,677
9	All types of heavy vehicles lo	550	462	629	708	732	681	770	844	784	771	801	933	8,665
10	All types of trailer v ehicles l	292	193	270	192	260	234	207	225	130	175	217	382	2,777
11	Logging truck loaded from 18	383	268	202	83	327	231	209	110	190	215	213	239	2,670

Ferry Traffic in 2006

	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	Pedestrian	302882	281,790	294,679	432,566	290,577	249,529	246,672	220,240
2	Bicycle, Passenger carry good	7,416	6,738	7,176	7,886	6,674	7,127	9,999	8,552
3	Motorbike	66,303	61,964	68,887	111,048	64,106	56,671	57,035	52,205
4	Trailer (horse, pushing, bicyc	1,121	1,137	1,525	1,477	1,432	1,358	1,468	1,847
5	Motorbike trailer and vehicle	16,512	15,405	18,261	23,301	15,439	13,984	15,917	13,989
6	Vehicle 6 seats and up to 12 s	28,696	27,194	30,921	36,602	28,857	26,334	27,527	26,095
7	Passenger car from 13 seats to	3,637	3,509	3,121	2,042	3,604	3,759	4,252	4,143
8	Passenger car from 21 seats u	1,452	1,284	1,825	2,360	1,340	1,231	1,362	1,309
9	All types of heavy vehicles lo	915	816	1,078	1,554	1,144	1,202	1,161	1,088
10	All types of trailer v ehicles l	279	209	216	232	390	336	282	271
11	Logging truck loaded from 18	221	209	232	273	412	314	375	424

Note: The ferry statistics after September in 2006 issues by MPWT was not used as there are some problems on reliability.

	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	Pedestrian	302882	281,790	294,679	432,566	290,577	249,529	246,672	220,240
2	Bicycle, Passenger carry good	7,416	6,738	7,176	7,886	6,674	7,127	9,999	8,552
3	Motorbike	66,303	61,964	68,887	111,048	64,106	56,671	57,035	52,205
4	Trailer (horse, pushing, bicyc	1,121	1,137	1,525	1,477	1,432	1,358	1,468	1,847
5	Motorbike trailer and vehicle	16,512	15,405	18,261	23,301	15,439	13,984	15,917	13,989
6	Vehicle 6 seats and up to 12 s	28,696	27,194	30,921	36,602	28,857	26,334	27,527	26,095
7	Passenger car from 13 seats to	3,637	3,509	3,121	2,042	3,604	3,759	4,252	4,143
8	Passenger car from 21 seats u	1,452	1,284	1,825	2,360	1,340	1,231	1,362	1,309
9	All types of heavy vehicles lo	915	816	1,078	1,554	1,144	1,202	1,161	1,088
10	All types of trailer v ehicles l	279	209	216	232	390	336	282	271
11	Logging truck loaded from 18	221	209	232	273	412	314	375	424

AP-2 EIA Monitoring Survey

Appendix 2 EIA Monitoring Survey

IEIA and EIA Monitoring Weekly Report (1)

Date	**4/May/2007**
Week Monitored	**30/April-4/May**
Monitoring Activities	
Date	**Activities**
30/April-4/May	1. Confirm the progress of EIA evaluation - Un-official Announcement of Initiation of EIA Evaluation by MoE - Member List of EIA Evaluation Committee 2. Arrange a meeting with the team leader of EIA evaluation team (Arranged on 8/May)
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation □1st Meeting of EIA Evaluation /MoE Evaluation Committee □2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study □10. Confirmation of Date of Field Study (EIA Evaluation) □11. Nomination of Member of Field Survey (MOE) □12. Nomination of Member of Field Survey (Project Owner) □13. Completion of Field Survey Licensing (EIA) □14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[47]%

IEIA and EIA Monitoring Weekly Report (2)

Date	**11/May/2007**
Week Monitored	**7/May-11/May**
Monitoring Activities	
Date	**Activities**
30/April-4/May	1. Confirm the progress of EIA evaluation - Confirmation of Date of Field Study (EIA Evaluation) - Nomination of Member of Field Survey (MOE) - Nomination of Member of Field Survey (Project Owner) - 1st Field Survey (conducted on 10/May) 2. Meeting with the team leader of EIA evaluation team (on 8/May) Attendants: Mr. K. Takahashi, JICA Study Team

	Mr. Chhim Phalla, Counterpart from MPWT Mr. Dong Sam Keat, Monitoring MOE 3. Accompany a field survey at Neak Loeung with EIA evaluation team Attendants: Mr. K. Takahashi, JICA Study Team Mr. Kubuta, JICA expert Mr. Chhim Phalla, Counterpart from MPWT Mr. Dong Sam Keat, Monitoring MOE Mr. Ong Vuthy , Monitoring MOE and Two member from Prey Veng and Kandal Province
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation □1st Meeting of EIA Evaluation /MoE Evaluation Committee □2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study □10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) □13. Completion of Field Survey Licensing (EIA) □14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[63]%

IEIA and EIA Monitoring Weekly Report (3)

Date	**18/May/2007**
Week Monitored	**14/May-18/May**
Monitoring Activities	
Date	**Activities**
30/April-4/May	1. Confirm the progress of EIA evaluation - 2nd Field Survey (conducted on 18/May) - Completion of Field Survey 2. Accompany a field survey at Neak Loeung with EIA evaluation team Attendants: Mr. Chhim Phalla, Counterpart from MPWT Monitoring from MOE Mr. Dong Sam Keat, Mr. Ong Vuthy and the Monitoring of MOE from Kandal Province 3. Arrange a meeting with the team leader of EIA evaluation team (Arranged on 23/May)

Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation □1st Meeting of EIA Evaluation /MoE Evaluation Committee □2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) □14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[68]%

IEIA and EIA Monitoring Weekly Report (4)

Date	**25/May/2007**
Week Monitored	**21/May-25/May**
Monitoring Activities	
Date	**Activities**
30/April-4/May	1. Confirm the progress of EIA evaluation - 1st Meeting of EIA Evaluation /MoE Evaluation Committee (on 22/May) 2. Meeting with the team leader of EIA evaluation team (on 23/May) Attendants: Mr. Dong Sam Keat, Deputy Director of EIA Dept., MoE and his two associates MPWT: Mr. Chhim Phalla Study Team: T. Hayashida
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee □2nd Meeting of EIA Evaluation /High-ranking Officers at MoE

	□3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) □14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[68]%

IEIA and EIA Monitoring Weekly Report (5)

Date	**08/06/2007**
Week Monitored	**01/June-08/June/2007**
Monitoring Activities	
Date	**Activities**
06//6/2007	- MPWT was requested by MoE and submitted the EIA main Report to MOE (7 copies) for the 2nd Meeting of EIA Evaluation - The schedule of the 2nd Evaluation Meeting was discussed and confirmed to be held on 14/06/2007.
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee □2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) □14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[68]%

IEIA and EIA Monitoring Weekly Report (6)

Date	**15/06/2007**
Week Monitored	**08/June/2007-15/ June /2007**
Monitoring Activities	
Date	**Activities**
14/6/2007	- 2nd Meeting of EIA Evaluation was held on 14/06/2007. The minutes of the meeting and the participants will be informed soon. - The EIA report was submitted to the Minister for Environment. - The schedule of the 3rd Meeting will be discussed and confirmed to be held on 21/06/2007.
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee ■2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) ■14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[74]%

IEIA and EIA Monitoring Weekly Report (7)

Date	**22/06/2007**
Week Monitored	**15/06/2007-22/06/07**
Monitoring Activities	
Date	**Activities**
21/06/2007	- The 3rd Meeting of EIA Evaluation was held to provide the comments on EIA report for the Second Mekong Project and all the members agreed and supported the EIA report for the Second Mekong Bridge Project. Attendants: MOE: Acting Minister of Ministry of Environment and the members of MOE. MPWT: Mr. Touch Chankosal, Under Secretary of State and Chairman of the Project, Mr. Chhim Phalla, Counterpart of MPWT JICA Study Team: Mr. Atsushi Saito, Team Leader

Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee ■2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) ■14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[74]%

IEIA and EIA Monitoring Weekly Report (8)

Date	**29/06/2007**
Week Monitored	**22/06/07-29/06/2007**
Monitoring Activities	
Date	**Activities**
25/06/2007	- The regular meeting between IRC and JICA was held at JICA Cambodia Office. MPWT reported that EIA is about to be approved by MOE with condition of continuous arrangement for resettlement issues. Attendants: IRC: H.E Mr. Nhean Leng, Under Secretary of State, MEF MPWT: Mr. Chhim Phalla JICA: Chief of JICA Cambodia Office
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee

	■2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) ■14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[74]%

IEIA and EIA Monitoring Weekly Report (9)

Date	**06/07/2007**
Week Monitored	**29/06/2007-06/07/2007**
Monitoring Activities	
Date	**Activities**
	- The Minutes of the Meetings and the comments on the EIA report is under preparation at the MOE.
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee ■2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) ■14. Submission of EIA Report to Minister for Environment □15. Requirement of EIA Revising □16. Necessity of Supplemental EIA Evaluation □17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[74]%

IEIA and EIA Monitoring Weekly Report (10)

Date	**20/July/2007**
Week Monitored	**16/July/2007-20/July/2007**
Monitoring Activities	
Date	**Activities**
	- The Minutes of the Meetings and the comment on the EIA report was prepared and sent to the MPWT as per attached. - The internal translation of these documents has been done on 19/July.
Check Lists	EIA Preparation ■1. Preparation of EIA Draft ■2. Submission of EIA Report to MoE ■3. Official Submission Letter from Project Owner EIA Payment ■4. Payment Request of EIA Evaluation Fee from Project Owner to MoF ■5. Invoice from MoE ■6. Confirmation of Payment of EIA Evaluation Fee (MoE) Initiation of EIA Evaluation ■7. Official Announcement of Initiation of EIA Evaluation by MoE ■8. Member List of EIA Evaluation Committee ■9. Notice of Date of Open Meeting of EIA Evaluation ■1st Meeting of EIA Evaluation /MoE Evaluation Committee ■2nd Meeting of EIA Evaluation /High-ranking Officers at MoE □3rd Meeting of EIA Evaluation /Related Ministries Field Study ■10. Confirmation of Date of Field Study (EIA Evaluation) ■11. Nomination of Member of Field Survey (MOE) ■12. Nomination of Member of Field Survey (Project Owner) ■13. Completion of Field Survey Licensing (EIA) ■14. Submission of EIA Report to Minister for Environment ■15. Requirement of EIA Revising ■16. Necessity of Supplemental EIA Evaluation ■17. Summary of Comments of EIA Evaluation (Final) □18. Necessity of EIA Study □19. Environmental License (Approval)
Overall Progress	[89]%

KINGDOM OF CAMBODIA

NATION RELIGION KING

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Minutes of Meeting

Comments at the Meeting of EIA Evaluation for the Project of the Second Mekong Bridge Construction (Neak Loeung)

On May 31, 2007, the Ministry of Environment held the meeting to provide the comments on the Evaluation of Natural Environment and Social Impact of the Project on the Second Mekong Bridge, led by His Excellency **Mr. Prach Sun,** the Acting Minister and the Secretary of the State of the Ministry of Environment and joined by the concerned departments under the Ministry of Environment (see attached attendant list).

At the beginning of the meeting, His Excellency Mr. Prach Sun, the Acting Minister and the Secretary of the State of the Ministry of Environment opened the meeting on the EIA Evaluation of the Social and Natural Environment Impact. His Excellency confirms that: construction of the Second Mekong Bridge was supported by the Prime Minister Sam Dach Hun Sen and this Project has to work with the support of the Government of Japan. Following to Mr. Prach Sun's comments, the attendants of the meeting were requested to provide some comments as below:

His Excellency Mr. Tear Chup, Under Secretary of State of Ministry of Environment:

We have experienced at Kizuna Bridge, there were some problems such as: the fatalities during the construction of the bridge and complaints raised by the people. The public consultation during the planning and construction of the Kizuna Bridge was not held to inform the land and property owners at the site. The Second Mekong Bridge Project is different from the old practice. So, for the Second Mekong Bridges Project, there must be full consideration to those issues that may be arising, and especially from those local people.

At last, His Excellency, a chairman of the meeting and all the members agreed and supported the environment impacts of the Second Mekong Bridge discussed in the main report. But all the attendants would like to request the project owner to respect and pay attention to the culture and customs by arranging the ceremony to pray for an accident occurred before.

Seen and Agreed

Chairman

Phnom Penh, Date: May 31, 2007

Parch Sun Oung Vuthy

List Attendant

- Project for Construction of Second Mekong Bridge

Date: May 31, 2007

No.	Name	Department	Position
1	H.E Mr. Prach Sun	MOE	Secretary of State
2	Mr. Lonch Hal	MOE	Director General
3	Mr. Tea Chop	MOE	Under Secretary of State
4	Mr. Sou Sovuth	MOE	Chief office
5	Mr. Sam Chamrean	MOE	Chief Office
6	Mr. Ou Rathana	MOE	Deputy Chief office
7	Mr. Chhear Marith	MOE	Deputy Chief of Dept.
8	Mr. Eng Penglong	MOE	Chief of Office
9	Ms. Chou Sokphany	EIA, MOE	Chief of Dept.
10	Mr. Oung Vuthy	EIA, MOE	Chief of office
11	Mr. Ngoun Mengly	EIA, MOE	Staff
12	Mr. Danch Serey	EIA, MOE	Chief of Office
13	Mr. Long Rithyrak	MOE	Deputy Director General

KINGDOM OF CAMBODIA

NATION RELIGION KING

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Minute of Meeting

Comments at the Meeting of EIA Evaluation for the Project of the Second Mekong Bridge Construction (Neak Loeung)

On June 14, 2007, the Ministry of Environment held the meeting to provide the comments on the Evaluation of Natural Environment and Social Impact of the Second Mekong Bridge Project, led by Senior Minister, Minister of the Ministry of Environment, His Excellency Mok Marath and joined by the related department under the Ministry of Environment (see attached attendant list).

At the beginning, His Excellency Mok Marath, Senior Minister, Minister of Ministry of Environment opened the meeting on the EIA Evaluation for natural environment and social impacts of the Second Mekong Bridge Project. Following to His Excellency Mok Marath's comments, the attendants of the meeting were requested to provide some comments as below:

- **His Excellency Mr. Parch Sun, Secretary of State of MOE**:
  Providing comments of technical part, if we compare the negative impact of the natural source caused by the bridge construction and the positive impacts from the bridge construction, it was verified that less adverse impact on the loss of natural source will be observed than the positive impacts from the bridge construction.

- **His Excellency Mr. Kheav Mot: Secretary of State of MOE**:
  It is the first time that we have to consider and give the comments on the EIA Evaluation for natural environment and social impacts for the Second Mekong Bridge. The main problem lies at the point that we cannot make sure when the bridge will be constructed and we don't have the baseline data of water quality and underground water, noise and construction waste. Regarding underground water, a focus should be made on the quality and quantity of well which are located around the project side that it can be fundamental to investigate and manage the project for conducting environment analysis later. About the waste, there are many kinds of construction waste and there is always problem, for instance, no dump site. Also about the oil, oil will be sometimes spilled and that will be the cause to contaminate the water. This Bridge will cross the Mekong River, so that the Bridge must be designed with a higher clearance which enables all of kind vessel to cross it.

- **His Excellency Mr. Tear Chop, Under Secretary of State of MOE**:
  1- Can we recognize this report officially? Coz the people who are preparing this report are not yet to obtain the official endorsement from the MOE unlike the other reports, submitted to the MOE. If we consider the regulation, the progress of the EIA evaluation is clarified that: the company can prepare the report or can ask the expert to examine and prepare for the EIA report and to submit the report to the MOE for evaluation.

2- The Second Mekong Bridge project is a large-scale project that may cause a lot of impact. Such as the fatalities of the workers in construction, for example when the worker die while construction of KIZUNA Bridge then the construction was suspended because the local people requested to arrange the ceremony for safe and the client agreed.
3- This Second Mekong Bridge Project constructs the new road or not? Did the client study the current water and especially swage system in the technical parts of the report or not?
4- This Second Mekong Bridge Project is crossing the Mekong River. So, should we inform the MRC or not?

- **Mr. Som Khandy:**

This main report is explaining very well about the social impact but is to some extent not good about the environment impact management.

- **His Excellency Mr. Kheav Mot:**

For the construction of this large bridge crossing the Mekong River, I would like to request to have the expert that relates to this project to work with Mr. Tear Chop.

- **His Excellency Chairmen:**

The main problems for this project are that alluvium, underground water will be affected and many kinds of construction wastes will make the adverse impact. I think that the Ministry of Environment should not take politics into account for this project and want to request this project to quickly be implemented. About the Environment Management is to some extend not good but the matrix in the report shows the details and is very well prepared and including the clarification and planning for examination and responsibilities of the Ministry of Public Works and Transport.

At last, His Excellency Chairmen and the members of the meeting agree and support the EIA Report for the Second Mekong Bridge Project that His Excellency states that: the Ministry (MOE) also recognizes the quality of the report and the Ministry inputs all the recommendations to this report. During the construction of this bridge, the Project will change the direction of water flow that will cause the accidents of the vessels. The Ministry will investigate what will happen and will impact when the bridge construction starts.

Phnom Penh, Date June
14, 2007

Reporter

Oung Vuthy

Seen and Agreed
Chairmen of Meeting
Mok Marath,
Minister of Environment

List of Attendant

- Project for Construction of Second Mekong Bridge

Date: June 14, 2007

No.	Name	Department	Position
1	H.E Mr. Mok Marath	MOE	Senior Minister
2	H.E. Mr. Parch Sun	MOE	Secretary of State
3	H.E Mr. Kheav Mot	MOE	Secretary of State
4	H.E. Mr. Tear Chop	MOE	Secretary of State
5	H.E. Mr. Khong Sam noun	MOE	Secretary of State
6	H.E. Mr. Yin Kim San	MOE	Secretary of State
7	H.E. Mr. Tan Rotha	MOE	Under Secretary of State
8	Mr. Sam Khandy	MOE	Director General
9	Ms. Chou Sokphany	EIA, MOE	Chief of Dept.
10	Mr. Danch Serey	EIA, MOE	Chief of Office
11	Mr. Danch Serey	EIA, MOE	Chief of Office
12	Mr. Oung Vuthy	EIA, MOE	Chief of Office
13	Mr. Hout Hey	EIA, MOE	Staff

KINGDOM OF CAMBODIA

NATION RELIGION KING

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Minute of Meeting

Comments at the Meeting of EIA Evaluation for the Project of the Second Mekong Bridge Construction (Neak Loeung)

On June 21, 2007, the Ministry of Environment held the meeting to provide the comments on the Evaluation of Natural Environment and Social Impact of the Second Mekong Bridge Project, led by Senior Minister, Minister of the Ministry of Environment, His Excellency Mok Marath and joined by the related department under the Ministry of Environment (see attached attendant list).

At the beginning, His Excellency Mok Marath, Senior Minister, Minister of Ministry of Environment opened the meeting on the EIA Evaluation for natural environment and social impact and His Excellency states that: this Project Development will change some natural resource. The report confirmed yet the environment impact in the initial step. His Excellency is not opposed with this report because in the report clearly indicates the responsibilities of concerned departments. The Ministry of Environment has a duty to invest and carry out this project. Before giving the chance for the members of the meeting to provide the comments, His Excellency states that the client should add summary of the page 3-10 and we should examine the water quality.

- **His Excellency Mr. Chhan Saphan, Secretary of State, Ministry of Land Managerment:**
  The pages 3-57 studies the turtles in the local area. So, do we study those problems to stop and to avoid for losing of herd turtles? About the island along of the Mekong River, we have lost some island and also some island is still growing. So, when the bridge is constructed, the island of Koh Chamrean will be lost or not?

- **Mr. Chhim Phalla, MPWT (Counterpart)**
  He explained technical aspects of the bridge design and the measurement for the protection (of the natural and social environment). Also, he explained that in those islands, like the river-mouth, JICA Study Team and MPWT have visited and investigated that there are a lot of farm in that areas.

- **His Excellency Mr. Chhan Saphan, Secretary of State, Ministry of Land Management:**
  This report only explains the negative impacts and the positive impacts are not mentioned.

- **His Excellency Chairman:**
  We can recognize this report as the completed one. But JICA Study Team will prepare a new report at the Basic Design stage and submit it.

- **His Excellency Eat Nody (Under Secretary of State) Ministry of Agriculture:**

  1- The Second Mekong Bridge Project relates to the MRC. So, have we discussed with MRC or not?

  2- At the Preak Khsay at present, there is a property occupied by some people already.

  3- This Project is recognized as the solid construction. So, I would like to request to prepare the full documents.

- **His Excellency Mr. Touch Chankosal, (Under Secretary of State) MPWT.**

  We have held stakeholder meetings, together with concerned agencies 13 times in total. About MRC, we also have discussed and agreed already with the vertical clearance of the bridge and water flow etc. According to the condition of JICA, we have not yet known we can have this bridge or not. Though a decision making is not clear yet, we will know the result after the completion of the Basic Design report. The option A is the most optimum option with full consideration including technical aspects. About the foundation we drilled 70m below.

  At last, His Excellency Chairmen and the members of the meeting agreed and supported the EIA report for the Second Mekong Bridge Project and His Excellency states that: about this report we have not yet recognized as the completed report and we wait to provide the comments at the Basic Design Stage.

Phnom Penh, Date June 21, 2007

Reporter

Oung Vuthy

Seen and Agreed
Chairmen of Meeting
Mok Marath,
Minister of Environment

List Attendant

- Project for Construction of Second Mekong Bridge

Date: June 21, 2007

No.	Name	Department	Position
1	H.E. Mr. Mok Marath	MOE	Senior Minister
2	H.E. Mr. Prach Sun	MOE	Secretary of State
3	H.E. Mr. Tear Chop	MOE	Under Secretary of State
4	Luch Hel	MOE	Director General
5	Kuy Sokharith	MOWRAM	Under Secretary of State
6	Chhim Phalla	MPWT	Counterpart
7	H.E Chhan Saphan	Ministry of Land management	Secretary of State
8	H.E Eat Nody	Ministry of Agriculture	Under Secretary of State
9	H.E Touch Chankosal	MPWT	Under Secretary of State
10	H.E Seang Kim han	MOT	Secretary of State
11	Chhoung Siv vouth	Kampot hall provincial	Deputy Governor
12	Hang Youth	Kandal hall provincial	Deputy Governor
13	Om Somon	Siem Reap hall province	Deputy Governor
14	Long Yan	Detp. Kandal Environment	Chief of Dept.
15	Em Chhoeng	Dept. Prey Veng Environment	Chief of Dept.
16	Khem Bunheng	Dept. Kampot Environment	Chief of Dept.
17	Kao Setha	GEC	Team Leader
18	Sokun Narong	MOT	Deputy Chief dept. planning

KINGDOM OF CAMBODIA

NATION RELIGION KING

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Council Minister

Ministry of Environment

No. 331 Phnom Penh, July 11, 2007

Would Like to Inform to

His Excellency Minister of Ministry of Public Works and Transport

Objectives: Request for correction and completion of the EIA report

Reference:

- Royal Order No. 1296/36, issued on December 24, 1996 to announce the law regarding the protection of environment and management of natural resources.
- Order No. 72, issued on August, 1999 for development of environmental impact assessment.
- Request letter for evaluation of EIA report submitted by Ministry of Public Works and Transport on April 09, 2007, No. 119/07 to Dept. of EIA.
- Letter No. 2431, issued on November 28, 2006 by Ministry of Public Works and Transport.
- Minute of Meeting on the EIA evaluation of the Second Mekong Bridge by Dept. of Investigation, issued on May 22, 2007.
- Minute of Meeting on EIA valuation by MOE, issued on May 31, 2007.
- Minute of Meeting on EIA valuation, issued on June 14, 2007.
- Minute of Meeting on EIA valuation, Issued on June 21, 2007 by Inter-Ministry of Environment.

As the objectives and reference mentioned above, the Ministry of Environment would like to inform His Excellency to join for the protection and management of environment and of natural resource to ensure its sustainability and according to the order of the legal process of environment impact assessment, the Ministry of Environment would like to request to the client to be responsible to revise and complete the report as below:

- Pages 3-5 and 310 describe the result such as: air, water, soil, noise and flora/fauna as shown in Annex 1. But, in the report, the annex 1 is missing. So, the client needs to show the necessary data because it is the baseline data for evaluation in the construction stage.
- As Pages 3-15 in the column 3-4 and 3-5-5 show the result of air and soil quality, there is no such information like date issued and the location of the survey. So, the client needs to answer this point.
- In Pages 3-38 in column 3-3-14, the summary of the mitigation measures (bio-physical environment), monitoring requirements by engineer is described in the column 5. In this regards, the client should describe all the concerned agencies, which are responsible for monitoring constructors such as: the Ministry of Public Works and Transport,

the Ministry of Environment, the Ministry of Water Resource, the Ministry of Agriculture etc. In case the client will not revise this column now, they should be revised in the Basic Design stage.

- In Page 3-40 in column 2, the mitigation measure of construction wastes, which may be dumped at the main bank of the river, is described. Regarding this matter, the client described not very considerably in order to ensure the construction wastes (such as oil) to be thrown away in the safe manner. So, the client should describe the mitigation measure to keep wastes, such as oil, to re-use or sell to the business men.
- Pages 3-142 in column 3.4.45 outlines the mitigation measures for impacts on social environment. The column 4 describes budgetary arrangements by the concerned ministries. Separately, the client does not mention the cooperation with MOE. So, the client should specify the needs of the cooperative work with the Ministry of Environment, Department of Kandal and Prey Veng Environment.
- At the pages 4-14 and 415, it was mentioned that the stakeholder meeting is described in the Annex 2, but there is no annex in the report. So, the client should attach the Annex 2.
- The main problems lies at the point that we do not yet know when the bridge will be constructed and we don't have any baseline information such detailed data as water quality, quantity of water, noise and dust.
- About the ground water, there should be consideration for quantity of wells around of the project site, which provides the baseline data for monitoring and environment management.
- There will be so many kinds of construction wastes generated from this project and there is no place for dumping those wastes, which are not exactly mentioned in the report and also oil will be spilled, that is the main cause to pollute the water quality.
- This bridge is crossing the Mekong River. So, the client should pay attention to the vertical clearance of the bridge, which enables the vessel to cross the bridge.
- Also this is a large-scale project which may cause adverse impacts such as the fatalities of workers during the bridge construction as those caused in the accidents during the construction of the Kizuna Bridge and the construction will be suspended in order to respond the requests to organize the ceremony for praying. In this reason, the possibility of those accidents should be mentioned in the report or not?
- This project will also construct the new road. Did the client study current water and pipe system based on technical aspects?
- This main report is explaining very well about the social impact but is to some extent not good at managing the environment impact.
- For the construction of this large-scale bridge, which crosses the Mekong River, I would like to request to invite the experts who relates to this project to work with Mr. Tear Chop.
- The main problems are alluvial soil and ground water that will be adversely impacted and many kinds of construction wastes that will be generated.
- At the pages 3-57, it describes the turtles in the project site. So, did we study those problems to avoid the loss of those herd turtles?
- At the island along the Mekong River, we have lost some islands and also some islands were expanding. So, when bridge is constructed, the land at Koh Chamrean can be lost or not?
- The client should submit the revised report during the Basic Design Stage for to provide the further comments.
- As the Second Mekong Bridge Project relates to the MRC, have we discussed with the MRC or not?
- This Project is known as construction of the hard infrastructure. So, I would like to request to prepare for the full documents.

Additional Points:

- The Chapter 3 describes the environmental resource available including the environmental impact assessment on the social and natural environment, and also including the mitigation measure to mitigate the environmental impact.
- So, the client should separate those in the following order.
- The available environment resource
- Environment impact assessment including the mitigation measures to reduce the adverse impacts (during the construction stage and implementation stage).
- The environment management plan.
- Please attach the official data such as: air, water, soil and noise, to the environmental test described in the pages 3-1.

Minister of State Minister of Environment

MOK MARATH

DOCTOR