

PREPARATORY SURVEY
ON
THE PROJECT FOR IMPROVEMENT OF
NATIONAL ROAD NO.1
(PHNOM PENH-NEAK LOEUNG SECTION)
IN
KINGDOM OF CAMBODIA

FINAL REPORT

February 2012

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

KATAHIRA & ENGINEERS INTERNATIONAL

EID
JR
12-036

PREFACE

Japan International Cooperation Agency (JICA) decided to conduct "The Preparatory Survey on the Project for Improvement of National Road No.1 (Phnom Penh - Neak Loeung Section) and entrusted the study to KATAHIRA & ENGINEERS INTERNATIONAL.

The survey team held a series of discussions with the officials concerned of the Royal Government of Cambodia, and conducted field surveys at the study area. After the team returned to Japan, further studies were made. As this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Royal Government of Cambodia for their close cooperation extended to the survey team.

February, 2012

Kiyofumi Konishi
Director General, Economic Infrastructure Department
Japan International Cooperation Agency

SUMMARY

National Road No.1 connects the Cambodian Capital “Phnom Penh” and “Ho Chi Minh City”, the primary commercial city in Vietnam. Furthermore, this national road forms part of the Asian Highway (AH-1), a well-known international arterial road. At present, the Government of Cambodia (hereinafter referred to as GOC) has been implementing the project of rehabilitation for the section of about 56.0 km from Phnom Penh to Neak Loueng with the grant aid assistance from the Government of Japan (hereinafter referred to as GOJ).

By applying JICA Guidelines for Environmental and Social Considerations April 2004 (hereinafter referred to as JICA Guidelines) prior to its official date of effect, every activity and procedure relating to the Environmental and Social Considerations have been implemented, complying with JICA Guide lines as closely as possible. The discussions with GOC especially about measures for the Resettlements Issue were held as necessary. Preliminary surveys were conducted two times, assisting GOC on the process of Environmental and Social Consideration, to assess the measures to be taken and conduct external monitoring and encourage GOC to reach consensus with PAPs on issues of relocations and setbacks of their properties.

Then, the Basic Design Study (B/D) was commenced in March 2004. The Project was presently composed of 4 stages (previously 3 stages) where Stage-1 and Stage-2 were already completed in 2007 and 2009 respectively then, Stage-3 which is from Sta.4+000 to Sta.13+100 completed in June 2011.

The implementation Review Study for the previous section of Stage-3, from Sta.0+000 to Sta.13+100, was conducted in 2007 and the Preparatory Survey of Stage-4 was conducted afterward in February 2009. During the studies, modification of design aspect and rough estimate of project cost and project implementation schedule were studied, on the bases of the latest development of the situation relating to the Project site such as;

- Completion of New Monivong situated at Sta.0+000, the beginning point of the Project.
- Final decision of Right of Way (ROW) designation of 20.0m width for the section from Sta.0+000 to the Niroth Pagoda at Sta.1+900.
- Immediate implementation of planned project by Phnom Penh Water Supply Authority (hereinafter referred to as PPWSA), namely the Niroth Production Facility Phase-1 project with pipe lying works on National Road No.1 from Sta.0+000 to Sta.3+800.

As for JICA Guidelines, discussions were made to confirm the various measures that GOC had implemented and future procedures to be taken according to the final designation of ROW.

Since then necessary studies have been continued as required for 2 years, corresponding to the changing of topographic profiles caused by land reclamation activities along the road and the progress of the Niroth Production Facility Phase-1 project. Having further development currently being

revealed about future projects such as a project of the ring road with assistance from China, supposedly to be connected to Phase-3 section of the National Road No.1, this Preparatory Survey was conducted in order to deal with the latest development including progress status of the Niroth Production Facility Phase-1 project and to re-estimate of the project cost as well as to confirm the current activities and procedures being taken by GOC and necessary for the implementation of Phase-4 on the Environmental and Social Considerations.

In the course of the study, successive discussions were made with PPWSA, where it was finally confirmed that some existing underground water pipes are not relocated for the Project and exact locations of main ductile pipes with 1,600mm diameter and their fittings to be laid under the road are clarified. In addition, necessary modifications in the design were made over the total section of the Project to cope with continuously changing of topographic profiles due to subsequent land filling along the road and eventual urbanization of the area.

During the Survey, the team worked out the following matters.

- * Review of the number of lane of the project road to four (4) lanes for the whole section (from Sta.0+000 to Sta.4+000) to use the result of traffic survey conducted by MPWT during the site survey.
- * The study team confirmed the location of the water pipe and related structure of PPWSA along the project road and identified the pipe that cannot be removed for this project.
- * As for Niroth Production Facility-1, the study team had discussions with PPWSA and reach agreement that installation of the drainage pipe of this project in part of beside New Monivong Bridge (about 40m) will be conducted by PPWSA.
- * Additional Topographic Survey was conducted to reflect the latest land profile along the road.
- * Drainage system design modification due to the result of the site survey.
- * Project cost was re-estimated based on the information obtained from the Survey.

Major contents of the Project and Stage-4 section studied during the Preparatory Survey are summarized in the following Table; Major Items of the Project.

Direct beneficiaries from the implementation of the Project are 1.33 million residents in Phnom Penh and 1.26 million in Kandal Province where the Project is located and indirect beneficiaries are the entire population of 13.39 million in Cambodia. (Figures from the census in 2008)

The advantageous effects to be obtained from the implementation of the Project are summarized as follows;

- Improvement of functions as an arterial road such as separating traffic lanes (vehicle and motorbike lane), providing 4-lane section and bridge construction and replacement will achieve relatively high traffic capacity and reduce traffic accidents on the road.
- Provision of traffic sign boards, guardrails, and hampers are also expected to increase traffic

safety for vehicles and residents.

- Improvement of road side service facilities at small-scale market areas, bus stops and school/hospital areas will mitigate traffic congestion and provide safety evacuation for livestock along the road as well as safety environment to the local residents.
- As a result of increased traffic capacity and better traveling performance of the road, traveling time between Phnom Penh and Neak Loueng will be about 45 - 50 minutes by improved driving speed from about 30 kph up to 70kph for the most sections.
- Construction of new bridges with revised load design from load limit of 15 tons to 20 tons will cope with increasing heavy cargo and contribute to the efficiency of heavy cargo traffic.
- Raised elevation of the road surface provides safety traffic and evacuation space for the people at the time of flooding. It also contribute to improve durability of the road structure.
- New installation of the drainage facilities for road surface water provide smooth traffic flow and enhance traffic safety.
- Socio-economic activities become vital because of the exchange of goods and people by the improved function of National Road No.1. Moreover, living standards of the people will be upgraded by providing them with user friendly roads in the areas.

The implementation of the Project will yield significant advantageous effects and contribute to better living of the people. Therefore, the Project to be undertaken by the Grant Aid of Japan is appropriate from a viewpoint of contributing to the Cambodian nationwide socio-economic vitalization. Furthermore, it is considered that both of the personnel and financial funds are adequate in managerial and maintenance capability for the Project.

Finally, it is a key requirement for the implementation of the Project under the Grant Aid scheme to obtain “appropriate consensus of PAPs” involved in the resettlement issues. Furthermore, the Government of Cambodia is required to utilize the road facilities to the utmost extent through providing the residents with necessary education on traffic rules and traffic safety through self-help effort of the people after completion of the Project.

Major Items of the Project

Item		Current Condition/Outline of Work	Major Works	
			Whole of project	Stage-4
1. Road Improvement	Road Widening	Existing average width of carriageway is 6.5m and mixed traffic of vehicle and motorbike causing traffic accidents	Road Length 55.98km (Sta.0+000-55+980) 4-lane: 4.00km 2-lane: 51.98km	Road Length 4.00km (Sta.0+000-4+000) 4-lane: 4.00km
	Road Elevation	Existing elevation is only 30cm above the flood level in 2000	Elevation to be raised for most sections	Elevation to be raised by about 50cm
	Pavement	Pavement of 6.5m wide carriageway is seriously damaged by floods	Pavement on carriageway, bike lane and sidewalk for 55.98km.	Pavement on carriageway, bike lane and sidewalk for 4.00km.
2. Widening of Road Shoulder	Market Area	Lack of parking area causing traffic jam	3 nos.	-
	Bus Stop/ Evacuation Space	Bus stop and evacuation space for livestock during flood.	25 nos.	6 nos.
	School/Hospital	Students/pedestrians causing traffic jam	School: 31 nos. Hospital: 9 nos.	School: 2 nos. Hospital: 0 no.
3. Bridge Construction (PC Girder)	Bailey bridges with narrow width and low load capacity causing poor travel performance.	Total length of 3 bridges: 240.6m (68.8+103.0+68.8m) 2 bridges for replacement 1 bridge for construction	-	
4. Pipe/Box Culvert Construction	Existing 4 culverts malfunctioning due to deposit clogging. Lack of opening causing higher floodwater level in Phnom Penh and disturbing farming on the other side.	Total of 8 nos. (Box: 91.8m, Pipe 50.1m) *Pipe Culvert: 2nos. (rehabilitation) *Box Culvert 6 nos. (2 for rehabilitation, 4 for new construction)	-	
5. Road Drainage Facility	Lack of drainage facility causing traffic jam and traffic accidents.	Side Ditch length: 7,051m Drainage Pipe length: 7,122m	Side Ditch length: 4,521m Drainage Pipe length: 5,742m	
6. Revetment/ Riverbed Protection	Revetment	Slope erosion occurring at inlet/outlet opening	3 places at bridges 8 places at culverts	-
	Riverbed Protection	Riverbed scouring occurring at inlet/outlet opening	3 places at bridges 8 places at culverts	-
7. Measures for Slope Erosion	Greenbelt	Slope erosion due to water stream and waves at bridge areas and road curves.	Total length of Greenbelt: 2,800m	-
	Wet Masonry	Slopes around culverts being eroded.	Total length: 1,060m at Mekong side	-
8. Measures for Soft Ground	Replacement by Selected Soil	Existing soft ground to be replaced by selected soil prior to embankment work.	15.08km at Mekong side 44.28km at Calmatage side	-
	Replacement by Sand	Soft soil under water to be replaced by sand.	4.17km at Mekong side 3.46km at Calmatage side	1.17km at Mekong side 1.26km at Calmatage side
9. Intersection Improvement	Traffic jam and traffic accident frequently occurring at busy intersection like Chbar Ampov.	Improvement at 4 locations: Both sides of Chbar Ampov, Niroth Pagoda and Tiger Beer intersections	Improvement at 3 locations: Both sides of Chbar Ampov and Niroth Pagoda intersections	
10. Ancillary Facilities	Track Scale	Track Scale needed to enhance enforcement against overloading.	1 nos at Mekong side 1 nos at Calmatage side	
	Gabion Mat for Slope	Gabion mat needed at toe of slope to confine road embankment according to modification of ROW	Total length: 8,143m	Length: 8,143m
	Road Marking/ Traffic Sign	Road marking and traffic sign to be installed appropriately to control safety traffic.	Road marking: centerline, laneline and sideline Crossing: 35 places Traffic sign: 288 nos.	Road marking: centerline, laneline and sideline Crossing: 9 places Traffic sign: 110 nos.
	Median Strip	Median strip to be installed for traffic safety.	Total length: 1,663m	Length: 1,663m
	Curb	Road curbs to be installed for traffic safety.	Total length: 15,283m	Length: 5,693m
	Guardrail	Guardrail to be installed at approach of bridges and culverts.	Mekong side: 180m Calmatage side: 268m	-
	Guide Post	Guide post to be installed at curbs, bridges, culverts and higher embankment more than 5.0m	Total of 1,016 nos.	-

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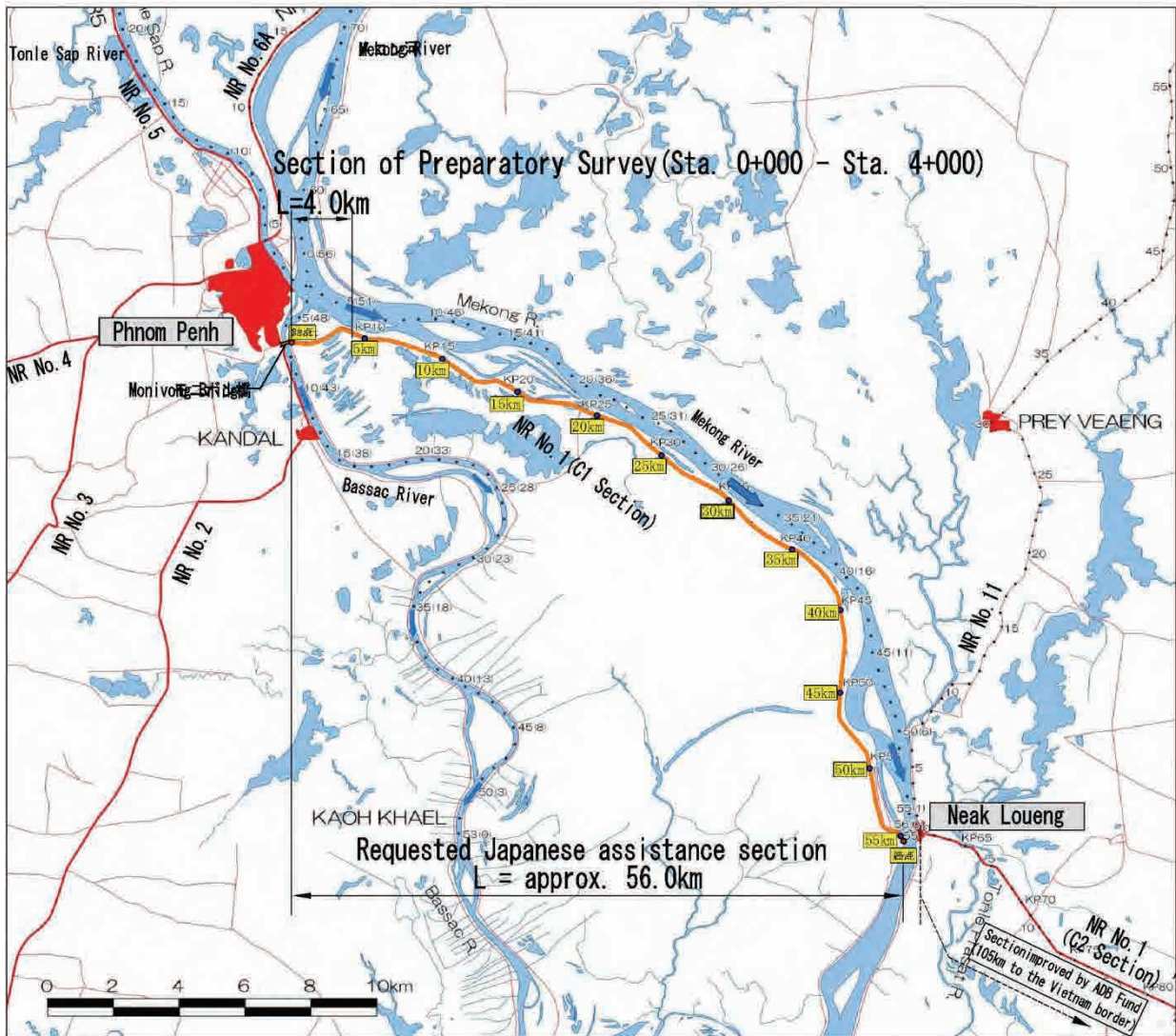
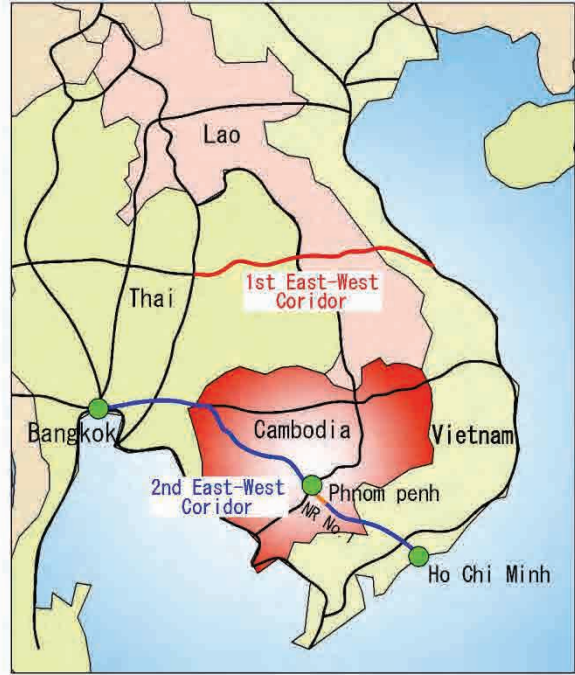
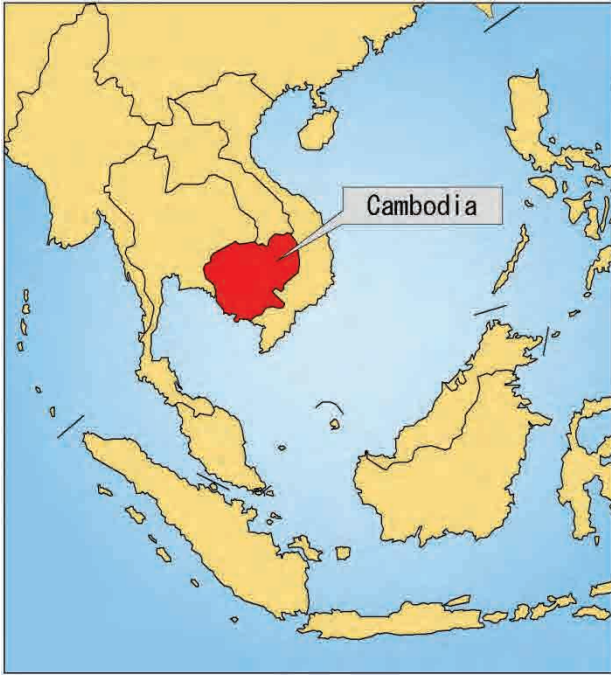
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ABBREVIATIONS

AASHTO	:	American Association of State Highway and Transportation Officials
ADB	:	Asian Development Bank
AH	:	Asian Highway
AH	:	Affected Household
BCU	:	Bridge Construction Unit
B/D	:	Basic Design
DMS	:	Detailed Measurement Survey
EDC	:	Electricite du Camboge
E/N	:	Exchange of Note
ESCAP	:	Economic and Social Commission for Asia and the Pacific
GDP	:	Gross Domestic Product
GOC	:	Government of Cambodia
GOJ	:	Government of Japan
IRC	:	Inter-Ministerial Resettlement Committee
M/D	:	Minutes of Discussions
MPP	:	Municipality of Phnom Penh
MPWT	:	Ministry of Public Works and Transport
PAPs	:	Project Affected Persons
PPWSA	:	Phnom Penh Water Supply Authority
PRW	:	Provisional Road Width
RAP	:	Resettlement Action Plan
RCC	:	Road Construction Center
RCS	:	Replacement Cost Survey
RID	:	Road Infrastructure Department
ROW	:	Right of Way
TC	:	Telecom Cambodia
T/N	:	Tender Notice
UN	:	United Nations
V/C	:	Verification of Contract

Chapter 1 Background of the Project

1.1 Background, History and Outline of the Project

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changing of topographic profiles caused by land reclamation activities along the road and the progress of the Niroth Production Facility Phase-1 project. Having further development currently being revealed about future projects such as a project of the ring road with assistance from China, supposedly to be connected to Phase-3 section of the National Road No.1, this Preparatory Survey was conducted in order to deal with the latest development including progress status of the Niroth Production Facility Phase-1 project and to re-estimate of the project cost as well as to confirm the current activities and procedures being taken by GOC and necessary for the implementation of Phase-4 on the Environmental and Social Considerations.

1.2 Environment Baseline Survey

Noise Survey

Although survey of natural conditions along the road (Noise, Vibration, Air Pollution Water Contamination and others) were conducted in the Basic Design Survey, noise survey was re-conducted in this survey to measure possible increment of noise which would be caused by the corresponding design modification for the number of lanes to 4 lanes over the entire stretch of 4.0km from original 2.0km making a shorter distance between houses alongside and carriageway than previous distance on the certain sections. Survey points were designated at Sta.1+600 on new 4-lane sections where the road width become widened and at Sta.4+100 on 2-lane sections already completed in Phase 2 to compare the noise on 4-lane with that on 2-lane sections. The results of the noise survey are presented in Table 1.2-1.

Equivalent noise values measured for 12 hours at T-1 and T-2 are nearly the same at more than 70 dB. If compared to the basic Design Study, the noise value after the improvement of the road is increased by about 9 dB. Accordingly, it is presumed that noise value would be increased due to the shortened distance between vehicles and PRW lines by implementing 4-lanes design for the Project. Therefore, monitoring of noise level upon completion of the Project is desired as described in Chapter 1.3.2 (2).

Table 1.2-1 Result of Noise Survey

Survey Point	Distance from Road Center (m)	Zone Classification	¹ Equivalent Noise Level (LAeq) dB			Environmental Limit in Cambodia Commercial Area	Environmental Limit in Japan Close Area to Arterial Road
			Upper:BD、 Lower:This time				
			12 hours	Max.	Min.		
T-1 Sta.1+600	15	Commercial/	68.7	69.6	67.7	70	70
	20	Residential	71.1	72.4	69.7		
T-2 Sta.4+100	30	Commercial/	62.1	63.9	60.2	70	70
	20	Residential	71.4	71.9	70.9		

¹ Equivalent Noise Level : A evaluation method of Noise Level. An average of Noise values (dB) for n cases measured momentarily. (An indication of magnitude of sound)
 40dB : Quiet residential area in the daytime. 50dB : Quiet office. 60dB : Normal conversation. 70dB : Busy streets.
 80dB : Inside subway train. 90dB : Inside busy factory. 100dB : Underneath bridge girder with train traveling on.

Survey on Traffic Volume

To identify the variation of traffic volume compared with that at the Basic Design Study, a survey on traffic volume was conducted following the survey in 2007. The survey were carried out with assistance from the Ministry of Public Works and Transport at 2 points at Sta.1+500 and Sta.3+500 on the section of this study. The results of the survey are presented as follows.

Table 1.2-2 Result of Traffic Survey

Survey Points	Distance from Sta.0+000	Basic Design Study in March 2004					
		Motor-cycle MC	Light Vehicle LV	Heavy Vehicle HV	Total	Total (a) eq.PCU	Bicycle
	PCU	0.25	1.25	3.75			
1	0km-100	89,575	11,056	570	101,201	38,351	2,345
2	0km+100	61,350	7,081	432	68,863	25,809	3,867
3	1km+500	21,690	5,471	475	27,636	14,043	1,278
4	3km+500	18,643	5,082	360	24,085	12,363	430

Survey Points	Distance from Sta.0+000	Implementation Review Study in June 2007						Increase (b)/(a)
		Motor-cycle MC	Light Vehicle LV	Heavy Vehicle HV	Total	Total (b) eq.PCU	Bicycle	
	PCU	0.25	1.25	3.75				
1	0km-100	106,118	13,219	3,558	122,895	56,396	2,917	1.47
2	0km+100	69,354	11,385	1,537	82,276	37,334	2,241	1.45
3	1km+500	25,246	6,149	1,121	32,516	18,202	791	1.30
4	3km+500	20,345	5,886	444	26,675	14,109	425	1.14

Survey Points	Distance from Sta.0+000	This Study in September 2011						Increase (c)/(b)
		Motor-cycle MC	Light Vehicle LV	Heavy Vehicle HV	Total	Total (c) eq.PCU	Bicycle	
	PCU	0.25	1.25	3.75				
1	0km-100							
2	0km+100							
3	1km+500	28,008	6,790	1,468	36,266	20,995	642	1.15
4	3km+500	24,687	5,558	1,426	31,671	18,467	453	1.31

Note) MC: Motorbike / Motor Tricycle, Motorbike Trailer,
 LV: Sedan, Wagon / Light Van, Pickup, Jeep / Light Truck,
 HV: Short & Long Body Bus / Short & Long Body Truck / Semi and Full Trailer Truck,

Traffic volume at survey points measured this time has increased by 15% and 31% compared to the volume in 2007 where increment of heavy vehicle is significant at Sta.3+500. According to the traveling speed measured during this study for the section between Sta.0+000 and Sta.4+000, 27km/hour on inbound lane and 20km/hour on outbound lane were recorded in the morning rush hour.

1.3 Environmental and Social Considerations

1.3.1 Involuntary Resettlement

(1) Resettlement Action Plan (RAP)

In contrast to the previous Phase-1 to Phase-3, areas alongside the Phase-4 section are densely populated and commercial areas where further urbanization are progressing and the number of Affected Household (hereinafter referred to as AH) are increasing, who are possibly affected by the Project. In dealing with such differences in social environment conditions, an updated Resettlement Action Plan (hereinafter referred to as RAP) is to be prepared.

Furthermore, the external monitoring is to be conducted to verify the process of land acquisition and efficient cares to be provided for AHs who are largely depending on roadside commercial activities as well as transparency and propriety of measures taken by GOC for the Environmental and Social Considerations.

In addition, GOC is going to disclose the RAP to the public to attain further transparency and public understanding on various measures with regards to the involuntarily resettlement of the people.

(2) Livelihood Stabilization Program

The GOC fully understands the necessity of Livelihood Stabilization Program and agrees with GOJ on formulation and implementation of the program. However, it is considered comparably hard to formulate and implement the program effectively then, GOC actually has been implementing the program in other projects by adopting the trial and error process. Therefore, it is preferable that GOJ is to confirm the status of program being formulated while GOC is to monitor its effectiveness after the implementation for the period of time as long as possible.

(3) Grievance Redress Mechanism

Grievance Redress Mechanism is an important system to follow up the state of PAPs after completion of their relocation while the Grievance Redness Committee already have been established for the Project in Kandal province to be presided by the Governor of Kandal province as chairman.

Since the project area is located in Phnom Penh, establishment of Grievance Redress Committee will be required in Phnom Penh Capital Hall. It is considered necessary to confirm the process of establishment such as proper timing of establishment and appointment of committee members and announcement to stake holders with reference to the previous experience when the committee in Kandal was established.

(4) The schedule of implementation of resettlement activities

In the Project (Stage 4), the number of affected households is 540 among which those who needed physical relocation to alternative sites (Landless PAPs) are 61. The schedule of implementation of resettlement activities are summarized in Table 1.3-1 below. It will take 12-13months. Prior to the implementation of the Project (Stage 4), the GOC developed relocation site No.6 for this project in year 2009 and the first Consultation Meeting was held in November 2011. The Consultant through MPWT, the Client, will monitor that those countermeasures for the Involuntary Resettlements are properly taken in appropriate manner and will provide his advice as necessary. And also the consultant will cooperate with the GOC in implementation of the Consultation Meeting for explanation of the project to Project Affected Persons (PAPs), such as preparation of material as necessary.

Table 1.3-1 Schedule of Implementation of Resettlement Activities

Nos.of Month	-6	-5	-4	-3	-2	-1	*0	1	2	3	4	5	6
(Cambodian side)													
Socioeconomic Survey & RCS (Resettlement Cost Survey)			■	■									
DMS (Detailed Measurement Survey)			■	■									
Discussion with JICA on RAP (Resettlement Action Plan) contents	■	■	■	■									
Drafting RAP				■	■	■							
Revised and Final confirmation of RAP							■						
Disclosure of RAP								■	■	■	■	■	■
Public Consultation			■	■	■	■	■	■	■	■	■	■	■
Resettlement Plan implementation									■	■	■	■	■
Livelihood Stabilization Program implementation											■	■	■
(Japanese side)													
E/N (Exchange of Notes) & G/A (Grant Agreement)								■	■				
Detailed Design & Tendering									■	■	■	■	■
Commencement of Construction													▲

*0 : Cabinet approval

1.3.2 Environment Impact Assessment

(1) Mitigation of Environment Impact during Construction

Since the project area is located in a densely populated area and congested urban areas, environmental consideration and adequate safety mitigation measure are required for the surrounding people, public traffic and construction workers during construction. Expected major negative impacts to be caused by the construction activities are noise, vibration, water contamination, dust emission and air pollution. In addition, the expected impact to the surrounding people is traffic accident due to the construction vehicles. Predicted negative impacts

and recommended mitigating measures are proposed on the following Table 1.3-2. During the construction, environmental monitoring is required to ensure the implementation of mitigation measures and consider countermeasures as needed. In addition, it is proposed that construction works at traffic congestion area is to be carried out during night time hours to avoid any inconvenience to the people in the area (refer to 2.2.4.2(1)).

Table 1.3-2 Negative Impacts and Mitigating Measures (during construction)

Classification of Effect	Negative Effect for Environmental and Social Consideration	Countermeasures/ Measures for Mitigation
Vibration/Noise	Vibration and noise arisen from construction equipment and vehicles in operation	- To employ equipment with features for generating less vibration and noise as much as possible. - To adopt work methods generating less vibration/noise. - To enforce proper work procedures and work schedule.
Dust	Dust pollution arisen from construction and traffic vehicles traveling on site	- To spray water on road regularly. - To enforce speed limit for vehicles. - To maintain road in condition and clean regularly.
Traffic Congestion	Road congestion due to traffic restriction on traveling vehicles during construction	- To post traffic controller properly on site. - To station traffic control guide properly on site. - To maintain good road surface regularly. - To enforce proper work procedures and work schedule.
Traffic Accident	Traffic accident by traffic vehicles traveling on site	- To post the watch man properly on site. - To execute safety educations for drivers regularly.
Water Contamination	Water contamination due to unconscious flow out of materials such as earth materials, stone, bituminous material, oil into nearby water channel	- To implement proper work procedure to prevent any unfavorable flow out into water channel in the area.
Waste Disposal	Environmental pollution due to inadequate disposal of construction waste.	- To designate disposal area for proper treatment of waste materials.

(2) Review of Monitoring Plan during Operation Stage

Draft of monitoring plan is proposed on the following Table 1.3-3 to monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction.

Table 1.3-3 Drafts of Monitoring Plans

Items	Contents	Period
1) PHYSICAL ENVIRONMENT		
Noise Level	To confirm whether noise levels are increasing by traveling vehicles	Short-term
2) SOCIOECONOMIC ENVIRONMENT		
Resettlement	To check the living standards of PAPs in relocation sites to ensure not to worsen the condition due to defective of facilities of sites.	1 year
	To confirm the performance and effectiveness of the Livelihood Stabilization Program	1 year

Chapter 2 Contents of the Project

2.1 Basic Concept of the Project

2.1.1 Overall Goal and Project Purpose

The Government of Cambodia released the National Strategic Development Plan Update 2009 – 2013 (NSDP Update 2009-2013) which was formulated based on the development policy named “Rectangular Strategy”. According to NSDP Update 2009-2013, further rehabilitation and construction of main national roads connecting all parts of the country and with neighbor countries is one of the key policy and following activities are proposed to implement the policy:

- Continuing the rehabilitation of remaining National Roads in order to connect provincial towns to the Capital city and neighbor countries
- Constructing and rehabilitating connecting roads between provincial cities and neighbor countries
- Continuing to seek for funding sources for enlargement of roads around Phnom Penh to have 4 lanes, for the construction of ring roads and for the widening NR1, NR4, NR5, and NR 6 to 4 lanes.
- Conducting studies and seeking for funding sources for the rehabilitation and construction of above roads.

The overall goal and project purpose are as follows:

Overall Goal: To stimulate socioeconomic activities in Cambodia.

Project objective: To improve the movement of people and goods between Phnom Penh and Ho Chi Minh City.

2.1.2 Outline of the Project

This project aims to improve National Road No.1 (Phnom Penh - Neak Loueng Section), approximately with the distance of 56 km to achieve the above overall goal. The project is expected to smoothen the traffic, shorter the travel time and increase the traffic volume as a result of the improvement of road functions.

The Project has been implemented accordingly to the involuntary resettlements schedule initiated by the Government of Cambodia and divided into following four (4) stages.

- Stage 1: Construction of Bridge No.2 and Bridge No.3.
- Stage 2: Sta.13+100 ~ Sta.55+980 Improvement of the section between Sta.13+100 and Sta.55+980 and construction of Bridge No.1.
- Stage 3: Sta.4+000 ~ Sta.13+100 Improvement of the section between Sta.4+000 and Sta.13+100.
- Stage 4: Sta.0+000 ~ Sta.4+000 Improvement of the section between Sta.0+000 and Sta.4+000.

Stage 1 commenced in November 2005 and completed in January 2007.

Stage 2 commenced in November 2006 and completed in February 2009.

Stage 3 commenced in July 2009 and completed in June 2011.

2.2 Outline Design of the Requested Japanese Assistance

2.2.1 Design Policy

2.2.1.1 Scope of Assistance

The Project (Stage 4) is to improve the National Road No.1 for the section from Sta.0+000 to Sta.4+000. Scope of the Project is generally the improvement of road structure, the same as other projects previously implemented under the cooperation from the Government of Japan.

Scope of Assistance from the Government of Japan

Widening of existing roads

Improvement of road pavement

Installation and improvement of drainage system for road surface water

Installation of walk way and bike lane

Installation of traffic safety equipment such as road signs and road markings

Installation of Bus Bay

Installation of median strip and sodding (Sta.0+000~Sta.1+900)

Sodding on embankment slope

2.2.1.2 Basic Policy on Design

(1) Number of Lanes

The request from Government of Cambodia is the widening of the road to four (4) lanes for the whole section (from Sta.0+000 to Sta.4+000). Since the widening NR1, NR4, NR5, and NR 6 to four (4) road lanes are proposed in NSDP Update 2009-2013, it is considered that the request is consistent with the policy.

And the future traffic volume is calculated from the result of traffic survey in year 2004, 2007, 2011 (refer to Table 2.2-1). The Passenger Car Unit (PCU) equivalents used in this study are Motorcycles=0.25, Light vehicles=1.25, Heavy vehicles=3.75 that were estimated in the B/D (Basic Design) by the specialist of traffic and transportation planning based on the traffic condition in the site

Table 2.2-1 Results of Traffic Demand Forecast

(Unit : PCU¹/12hr)

Station	Traffic Volume Survey Result 4-wheel Vehicle+2-wheel Vehicle			Future Traffic Demand 4-wheel Vehicle+2-wheel Vehicle		B/D Report 4-wheel Vehicle
	Mar, 2004	July, 2007	Sep, 2011	2016	2022	2016
1km+500	14,100	18,200	21,000	27,900	38,200	19,690
3km+500	12,400	14,100	18,500	23,900	33,000	17,624

The number of lane of the project road was determined based on the service level of road that the study team set to use HCM (Highway Capacity Manual) as reference. In B/D, 2-wheel vehicle was not counted in the future traffic volume to analysis of the service level of road assuming that 2-wheel vehicle pass on the bike lane only. Since the width of the bike lane was modified from 2.5m to 2.0m from B/D, Possible Traffic Capacity was reviewed based on the future traffic volume considering of the traffic volume of the 2-wheel vehicle assuming that 2-wheel car also pass on the vehicle lane and the study team re-determined Possible Traffic Capacity including of bike lane that are 24,000 PCU/hr for the two (2) road lane and 48,000 for the four (4) road lane. The relation between the future traffic volume and the service level² is shown in Figure 2.2-1.

As indicated in the figure, the traffic volume is around 18,000 ~20,000 and the service level of the two (2) road lane is D-level in year 2011. In year 2022, the service level of the four (4) road lane is anticipated to exceed D-level that is minimum service level in the urban area. In addition, above forecasted future traffic volume will be increase after the completion of the Neak Loeung bridge project and new Phnom Penh port (Sta.25+000) both are under construction. Therefore the construction of the bypath road such as ring road is urgent needed.

Besides, traffic situation in Cambodia is extremely dangerous, some of vehicles are coming from the opposite direction or outside of lane and causing problems such as traffic congestion and accident. The widening of the two-way road to four (4) lane is expected to normalize traffic flow, and consequently lead to the decrease of traffic accident.

¹ Passenger Car Unit

² Service level

The HCM defines six levels of service, ranging from A to F, for each service measures that represent the characteristic of traffic flow;

A-Level : Free flow operations B-Level : Free flow (reasonably) C-Level : Stable flow

D-Level : Between stable and unstable E-Level : Unstable (extremely) F-Level : Forced Flow

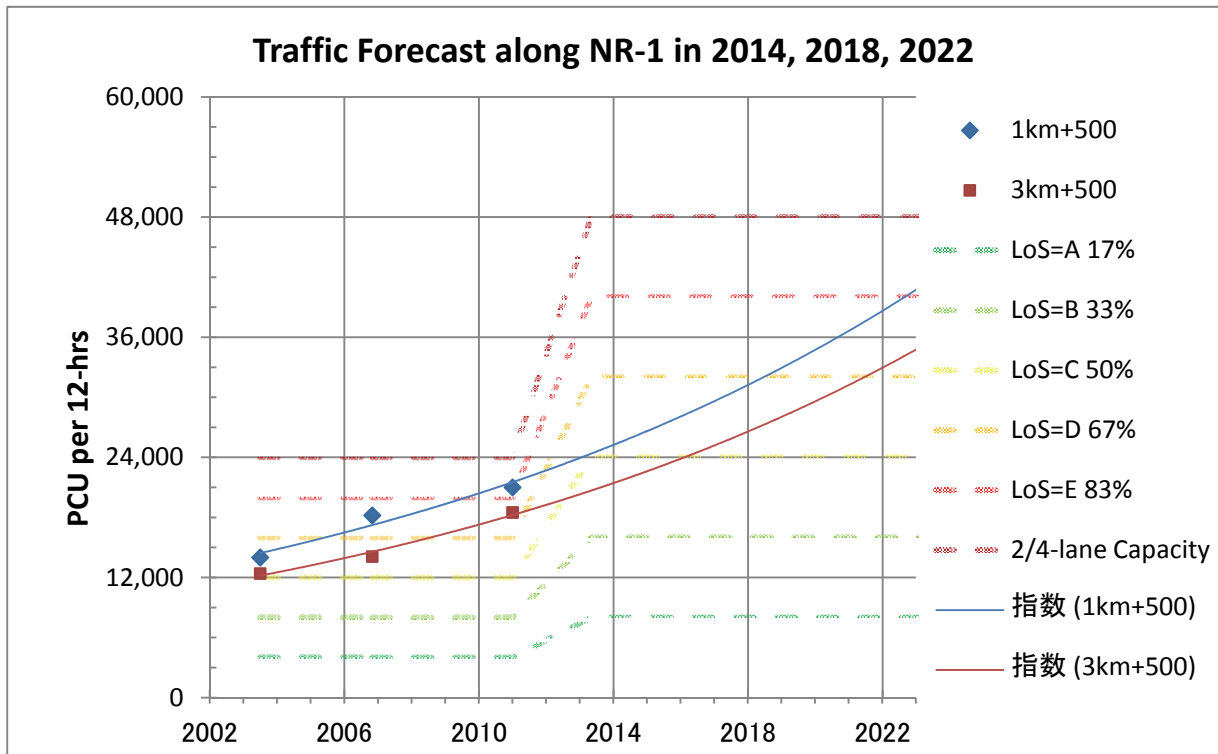


Figure 2.2-1 Review of the Number of Lane

Thus, in consideration of improvement traffic flow and safety, the four (4) road lane are therefore proposed for whole section (from the beginning point to Sta.4+000), in addition the bike lane is also proposed according to the Basic Design (B/D).

(2) Updated Site Conditions to the Design Study

The latest information on site changes and corresponding design considerations are described bellows.

- Review of the road design in consideration of site changes between an approach road of the New Monivong Bridge and the Project
- Review of the drainage plan in consideration of existing water pipes that are unable to remove.
- Review of the location of the drain outlet due to the latest changes in topographical profiles by a land filling.

(3) Safety consideration

Traffic Safety Facilities:

Lane marking, Cat-eye (Reflected Centerline Stud), Sidewalk, Stop Line, Traffic sign (for warning and regulatory)

(4) Considerations on Traffic at Chba Ampov Market (Sta.0+100 to Sta.0+300)

Remarkable site changes from Preparatory Survey in year 2009 are improvement of the intersection such as installation of traffic signals, construction of U-Turn lane, etc. These improvement are carried out with construction of New Monivong Bridge and the over-pass in other side of the Bassac river.

The improvement of the intersection was proposed in the preparatory survey in year 2009. However, there is possibility that the improvement of the intersection will affect to the traffic flow of the over-pass in other side of the river and the improvement of the intersection around the over-pass will also be required, thus, the improvement of the intersection is not proposed in this project.

(5) Underground Utilities consideration

Since the removal of the ductile water pipe (from the beginning point to Sta.1+300) is not conducted, the location of the drain outlet on Mekong side and the depth of the drain pipe crossing the road are changed. Thus, since the depth of the out-let drain pipe is 2-3m, temporary retaining wall work is proposed in this implementation plan.

(6) Niroth Water Supply Project

According to the drainage plan in this project, the drainage pipe is planned to be installed in parallel with the large diameter water supply pipe (D1,600mm) of Niroth Project at the south side of New Monivong Bridge.

However, the area is too narrow to install both pipes on separate timing. The meeting was hold between Phnom Penh Water Supply Authority (PPWSA) and Study team during the site survey to

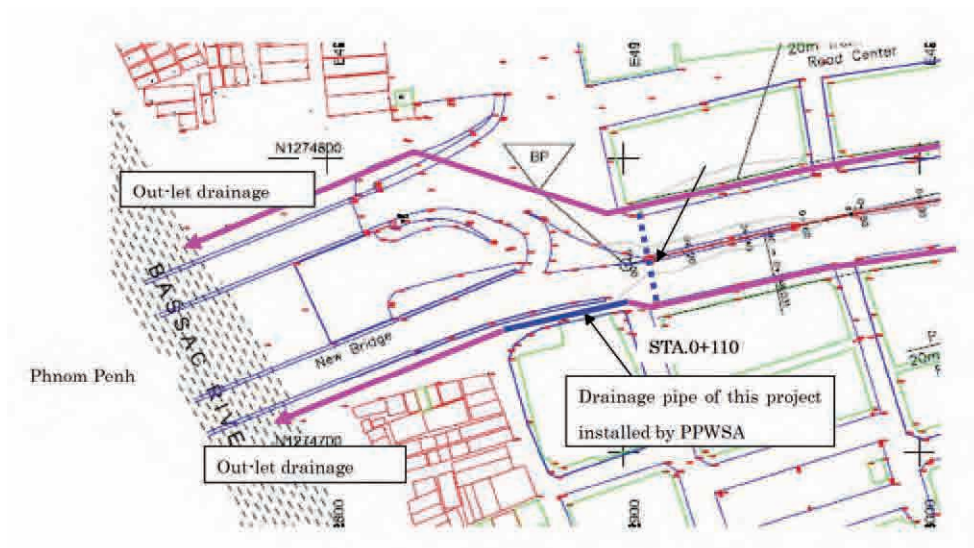


Figure 2.2-2 Drainage Pipe to be Installed by PPWSA

adjust this issue and concluded that installation of the drainage pipe of this project at this location beside New Monivong Bridge (about 40m) will be conducted by PPWSA (refer to Figure 2.2-2). When PPWSA commences this installation work, inspection for the drainage pipe installed by PPWSA is needed by the consultant before backfilling in cooperation with MPWT.

2.2.2 Basic Plan

2.2.2.1 Review on Design Criteria for Road Design

(1) Design Standards

Following standards adopted in the B/D are not changed

AASHTO ; Highway Capacity Manual, 2010

AASHTO ; Guide for Design of Pavement Structure, 1993

UN; Economic and Social Commission for Asia and the Pacific;

Asian Highway(AH); Classification and Design Standards

Cambodia; Ministry of Public Works and Transport ;

Road Design Standard (Part1,2 and 3) (mostly similar to Road Structure Design, Japan Road Association)

(2) Design Speed

Design Speed for Stage 4 section is classified as follows based on traffic volume, road condition and road side situation.

From Sta.0+000 to Sta. 2+000: 40 km/hr

From Sta.2+000 to Sta. 4+000: 60 km/hr

(3) Geometrical Structure Standards

Geometrical road alignment due to changes of design speed is not considered but road banking and transition length of road width is to be modified

Table 2.2-2 Geometry Standards

Design Speed	80km/hr	60km/hr	40km/hr
Minimum Horizontal Curve Radius	280m	150m	60m
Maximum Longitudinal Gradient	4%	5%	7%
Minimum Curve Radius for substitution for Easement Curve	900m	500m	250m
Minimum Easement Curve Length	70m	50m	35m
Minimum Ratio of Lane Transition	1/40	1/30	1/20

2.2.2.2 Review on Road Structure

(1) Typical Cross Section of the Road

Composition of the road width and pavement structure are shown on typical section drawings in the Drawing (refer to Appendix 10). Modifications from the preparatory survey in year 2009 are described in the following.

In addition, the provisional road width (PRW) that was determined in the B/D stage, is considered not to make the additional land acquisition to review of the basic design,

Sta.0+000~Sta.0+100

The U-Turn lane of asphalt pavement was constructed with construction of the over-pass in other side of Bassac river. However, the asphalt pavement already have been damaged because of the Curve Radius of the road alignment at the U-Turn lane is used too small (R=16) for requirement of asphalt pavement.

At the sharp bend in the road, the road design shall be considered with the centrifugal load from vehicle and the frictional force from tires. The concrete pavement that is high durable against friction, is therefore proposed to repair.

Sta.0+250~Sta.0+380

In this section, current conditions of the site were confirmed through the site survey as follows;

- The present surface condition is relatively fair
- This section is heavy congested area and it is difficult to conduct the large-scale earth work without closing traffic.
- Some of the existing water pipe of the surrounding area are impossible to remove.

In designing the improvement of the Study, repairing of only Base course, Sub-base course and Asphalt pavement are proposed, not including improvement of sub-grade considering above factors.

Sta.0+380~Sta.1+900

The composition of the road width for this section is proposed same as designs of the preparatory survey in year 2009. Width of median strip is 4.5m and providing spaces for turning traffic at intersection areas. However, the extension of this compositions from Sta.1+800 to Sta.1+900 (100m) is proposed in consideration of the location of the structure for water supply pipe in Niroth

Project. Besides, the protection for shoulder of the road is modified from the sodding to the gravel pavement because of anticipated damage by pedestrian traffic.

The lane transition taper length

The lane transition taper length in the typical section is determined as follows.

- Sta.1+900~Sta.1+980 (the change in road width)
 This section is the change point of the design speed from 40km/hr to 60km/hr. In calculation of the lane transition taper length, the design speed is adapted 60km/hr to be on the safe side. The change of width of vehicle lanes in this section=2.25m
 $(60\text{km/hr} \times 2.25\text{m}) / 2 = 67.5\text{m} \rightarrow 80\text{m}$

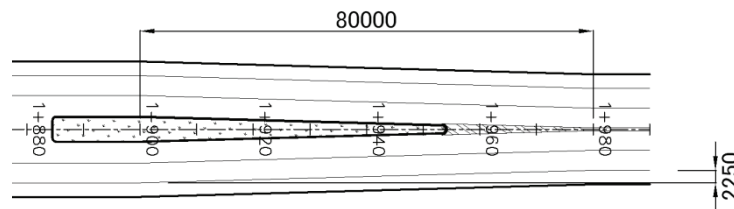


Figure 2.2-3 Change in Road Width

- Sta.3+850~Sta.4+000(the change in number of lanes)
 Ratio of Lane Transition = 1/40(60km/hr, Rural area),
 The change of width of vehicle lanes in this section=3.75m
 $3.75 / (1/40) = 150\text{m}$

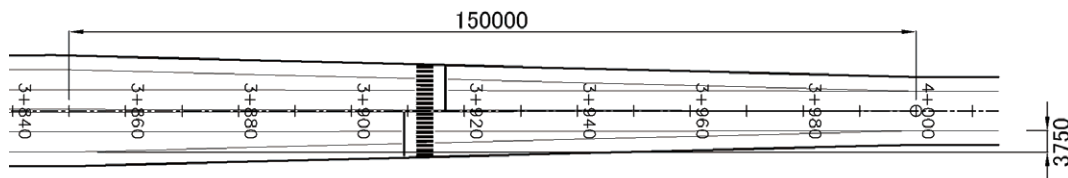


Figure 2.2-4 Change in the Number of Lanes

(2) Design of Road Structures

Divider Block for Dividing Sidewalk from bike lane

Divider blocks of asphalt concrete height of 15mm painted with white color, are proposed at the boundary between sidewalk and bike lane same as designs of the preparatory survey in year 2009. However, the length of Divider block is modified from 5m to 1.5m in order to prevent the collection of dust.

(3) Drainage Plan for Surface Water

Remarkable modifications from Preparatory Survey in year 2009 are as follows;

Drainage Network

Drainage Network for road surface water is presented in Figure 2.2-5 and in the plan and longitudinal drawings. This is confirmed through the site survey that most of the locations of discharge points proposed in Preparatory Survey in year 2009, became inadequate due to changes of land profile attributed to local development project. There are seven (7) discharge points that were confirmed during the site survey. Therefore Modifications of the drainage network are proposed based on changes of above discharge points.

Longitudinal road gradient

Since the existing road had mostly flat gradients, the longitudinal gradient of the road in Preparatory Survey in year 2009 was mostly designed on gentle gradient (less than 0.2 percent) as well as the flat (0%) gradient section were designed more than 1km. In considering of smooth flow of water on drainage system and in order to help washing out of the earth and sand from the road, the flat (0%) gradient section is modified to the gentle gradient.

Drainage structure

Drainage Pipe are proposed in the section of Mound-up sidewalk between Sta.0+100 and Sta.1+900 and U shaped drain are proposed (Drainage Pipes are adapted in some parts where these are found necessary to keep proper gradient) in the section of Flat level type sidewalk between Sta.1+900 and Sta.4+000 same as designs of the preparatory survey in year 2009.

Drainage gradient and flow velocity

In designing the drainage system, the minimum value of the drainage gradient is determined 0.20% in considering of smooth flow of surface water on the road. Also, the flow velocity is determined between 0.5 to 3.0m/s to avoid wearing away of surface of structure and collection of the earth and sand.

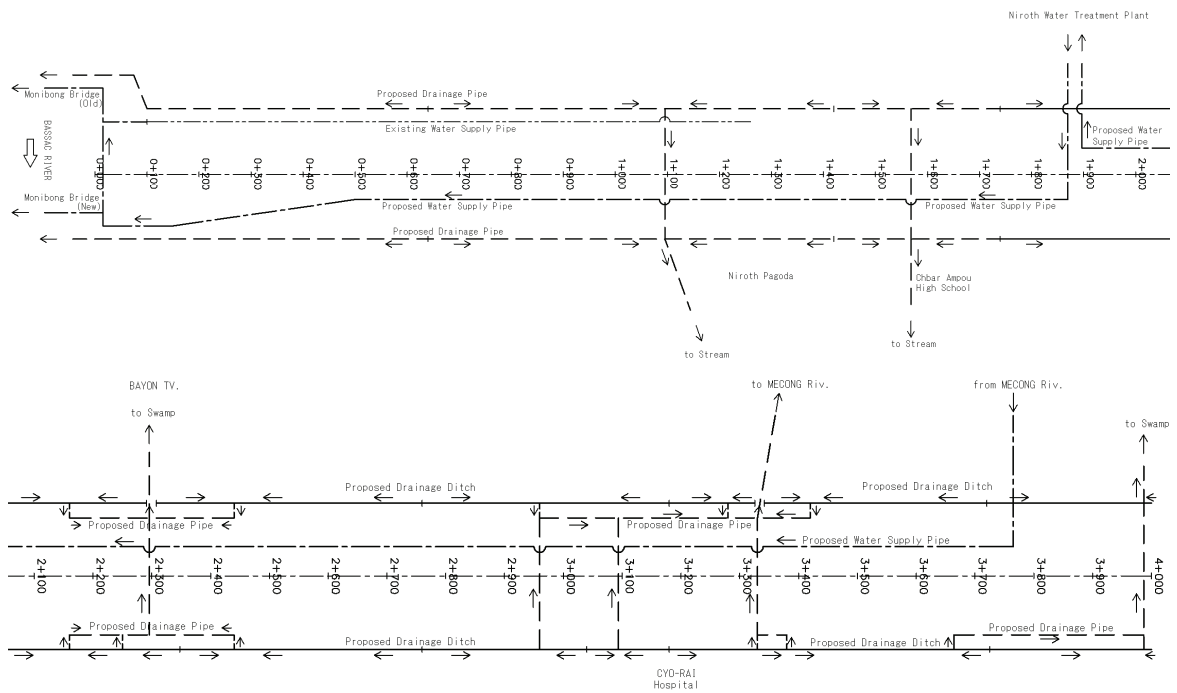


Figure 2.2-5 Drainage Network

(4) Design on Traffic Safety Facilities and Ancillary Facilities

Street Lighting • Traffic Light

Since installation of Street Lighting and Traffic Light of main street in Phnom Penh have made good progress by the Government of Cambodia, these facilities are not proposed.

Road Marking

Road markings on the road such as center line, lane line, side line, crosswalk, stop line, arrow mark are provided and there are no modifications from Preparatory Survey in year 2009. However, thermal insulation paint that was proposed in Preparatory Survey in year 2009, is not proposed because the maintenance is difficult in Cambodia.

Reflected Centerline Stud (Cat-eye)

Cat-eyes are provided and there are no modifications from Preparatory Survey in year 2009. However, Rumble strips are not proposed.

Road Sign

The number of Intersection sign are increased due to Road Design Standard in Cambodia.

Detailed locations of road sign are presented in the attached drawing.

2.2.3 Outline Design Drawing

Major items of the Project are shown in Table 2.2-3 and Drawings of this survey are attached in Appendix 10.

Table 2.2-3 Major Items of the Project

Item		Current Condition/Outline of Work	Major Works	
			Whole of project	Stage-4
1. Road Improvement	Road Widening	Existing average width of carriageway is 6.5m and mixed traffic of vehicle and motorbike causing traffic accidents	Road Length 55.98km (Sta.0+000-55+980) 4-lane: 4.00km 2-lane: 51.98km	Road Length 4.00km (Sta.0+000-4+000) 4-lane: 4.00km
	Road Elevation	Existing elevation is only 30cm above the flood level in 2000	Elevation to be raised for most sections	Elevation to be raised by about 50cm
	Pavement	Pavement of 6.5m wide carriageway is seriously damaged by floods	Pavement on carriageway, bike lane and sidewalk for 55.98km.	Pavement on carriageway, bike lane and sidewalk for 4.00km.
2. Widening of Road Shoulder	Market Area	Lack of parking area causing traffic jam	3 nos.	-
	Bus Stop/ Evacuation Space	Bus stop and evacuation space for livestock during flood.	25 nos.	6 nos.
	School/Hospital	Students/pedestrians causing traffic jam	School: 31 nos. Hospital: 9 nos.	School: 2 nos. Hospital: 0 no.
3. Bridge Construction (PC Girder)	Bailey bridges with narrow width and low load capacity causing poor travel performance.	Total length of 3 bridges: 240.6m (68.8+103.0+68.8m) 2 bridges for replacement 1 bridge for construction	-	
4. Pipe/Box Culvert Construction	Existing 4 culverts malfunctioning due to deposit clogging. Lack of opening causing higher floodwater level in Phnom Penh and disturbing farming on the other side.	Total of 8 nos. (Box: 91.8m, Pipe 50.1m) *Pipe Culvert: 2nos. (rehabilitation) *Box Culvert 6 nos. (2 for rehabilitation, 4 for new construction)	-	
5. Road Drainage Facility	Lack of drainage facility causing traffic jam and traffic accidents.	Side Ditch length: 7,051m Drainage Pipe length: 7,122m	Side Ditch length: 4,521m Drainage Pipe length: 5,742m	
6. Revetment/ Riverbed Protection	Revetment	Slope erosion occurring at inlet/outlet opening	3 places at bridges 8 places at culverts	-
	Riverbed Protection	Riverbed scouring occurring at inlet/outlet opening	3 places at bridges 8 places at culverts	-
7. Measures for Slope Erosion	Greenbelt	Slope erosion due to water stream and waves at bridge areas and road curves.	Total length of Greenbelt: 2,800m	-
	Wet Masonry	Slopes around culverts being eroded.	Total length: 1,060m at Mckong side	-
8. Measures for Soft Ground	Replacement by Selected Soil	Existing soft ground to be replaced by selected soil prior to embankment work.	15.08km at Mckong side 44.28km at Calmatage side	-
	Replacement by Sand	Soft soil under water to be replaced by sand.	4.17km at Mekong side 3.46km at Calmatage side	1.17km at Mekong side 1.26km at Calmatage side
9. Intersection Improvement	Traffic jam and traffic accident frequently occurring at busy intersection like Chbar Ampov.	Improvement at 4 locations: Both sides of Chbar Ampov, Niroth Pagoda and Tiger Beer intersections	Improvement at 3 locations: Both sides of Chbar Ampov and Niroth Pagoda intersections	
10. Ancillary Facilities	Track Scale	Track Scale needed to enhance enforcement against overloading.	1 nos at Mekong side 1 nos at Calmatage side	
	Gabion Mat for Slope	Gabion mat needed at toe of slope to confine road embankment according to modification of ROW	Total length: 8,143m	Length: 8,143m
	Road Marking/ Traffic Sign	Road marking and traffic sign to be installed appropriately to control safety traffic.	Road marking: centerline, laneline and sideline Crossing: 35 places Traffic sign: 288 nos.	Road marking: centerline, laneline and sideline Crossing: 9 places Traffic sign: 110 nos.
	Median Strip	Median strip to be installed for traffic safety.	Total length: 1,663m	Length: 1,663m
	Curb	Road curbs to be installed for traffic safety.	Total length: 15,283m	Length: 5,693m
	Guardrail	Guardrail to be installed at approach of bridges and culverts.	Mekong side: 180m Calmatage side: 268m	-
	Guide Post	Guide post to be installed at curbs, bridges, culverts and higher embankment more than 5.0m	Total of 1,016 nos.	-

2.2.4 Implementation Plan

2.2.4.1 Implementation Policy

The basic conditions for implementing the project are as follows:

- This Project, if approved, will be implemented in accordance with the guidelines of Japan's Grant Aid after the signing of the Exchange of Notes between the Governments of Japan (GOJ) and the Kingdom of Cambodia.
- The Ministry of Public Works and Transport (MPWT) is responsible for implementing the Project
- The detail design, assistance in tendering, and construction supervision of the Project will be undertaken by a Japanese consulting firm in accordance with the contract between the MPWT and the consultant.
- The construction will be undertaken by the successful Japanese tenderer according to the contract with the MPWT

The basic policies in the implementation of the project are as follows:

- The Construction method is based on the method reviewed in Implementation Review Study of the Project
- In order to confirm a position of the existing underground pipe, a trial excavation shall be carried out along the existing pipe that was not removed.
- In planning of the construction schedule, Embankment and Cement stabilization work shall be carried out from November to May during dry season as possible. And Since Drainage outlet work and works in parts of the existing ductile pipe (from Sta.0+000 to Sta.1+300) will take long time, these works shall be carried out as early as possible.
- To secure the safety and smooth traffic flow during the construction, appropriate traffic control method, temporary road occupation and night-time work shall be planned
- In planning of the construction schedule, Asphalt binder course work shall be commence immediately after completion of Base course work in order to keep a high flatness of the road
- Surface course shall be placed and compacted long distance as much as possible at a time in order to reduce construction joint.
- All construction materials and equipment for the Project will be able to procured in Cambodia except a cement mixing plant (in Japan) that is needed for Cement stabilization work.

2.2.4.2 Implementation Conditions

(1) Consideration for road traffic and local residents

In planning of construction method, since the project area is urban area, during the construction, full attention shall be paid to the local residents, passer and road traffic to secure their safety. The main plans are as follows.

1) Traffic management plan during construction

Traffic management plan to secure environmental preservation are divided into three sections shown as follows.

- Sta.0+000-Sta.0+400 (Beginning Point)

In this section, Chba Ampov market abuts on the project road and the traffic congestion along this road is severe every morning and evening, and it is difficult to secure the space for temporary diversion during construction of road. Thus night-time work shall be planned for construction of the road part to take account of influence on the public traffic.

Since the flatness of the base course will affect the flatness of the road, a night-time working schedule shall be planned so that placing of asphalt binder course will be finished until morning in order that vehicles will be able to pass on the asphalt binder course, not on the base course on every morning.

- Sta.0+400-Sta.1+900 (Four traffic lane section with median strip)

In the planning of traffic management plan, the night-time work was planned during construction of the road part in the preparatory survey in year 2009. However, since it was confirmed through the site survey that significant impacts on current road traffic were not expected by construction activities, change to the daytime work. Besides, the traffic management plan shall be planned that the vehicle will be able to pass on the existing asphalt road or at least sub-base course to reduce dust and noise impacts to the local residents.

- Sta.1+800-Sta.4+000 (Four traffic lane section without median strip)

In this section, since the traffic flow volume is little in comparison with above sections, night-time work is not considered. Besides, temporary diversion for road traffic should secure a road width of 6m (3m×2 lanes).

In the planning of temporary diversion for road traffic, the changing timing of the lane for temporary diversion shall be after completion of Sub-base course work in order to provide the safe and easy traffic flow. In addition, since vehicle traffic on the base course will affect

to the flatness of the road, the final changing timing of temporary diversion shall be after completion of Asphalt binder course. Road occupation during construction shall be planned about 300~600m length and Traffic controller shall be backward and forward.

2) Road traffic safety measures

- Placement of Japanese safety supervisor who is responsible for safety measures.
- Regularly safety trainings to the driver, operator and safety watch man.
- Installation of Traffic Controller, electronic signboard, safety signboard, safety-fence, LED tube, etc. as safety measures for the night-time work.
- Installation of safety signboard (before 200m of construction site) and placement of Traffic Controller in the construction zone
- Setting of regulation maximum driving speed 20 km/hr in construction zone and installation of sufficient numbers of Speed Limit Signboards for warning
- Placement of Traffic Controllers at entrance of construction site to control smooth passage of public traffic and construction equipment
- Conduct Safety education to the drivers (e.g., ①the car should slow down speed near populated area and school zone ②the car should observe of traffic regulations)

(2) Environmental Considerations during Construction

- To reduce dust by watering on the dusty roads
- The wastes from construction (e.g., fuels and oils used in the construction equipments) shall be treated and disposed in accordance with the law and guidelines
- Since the surrounding buildings are old and there are a lot of buildings with disorderly extensions, there is a possibility that the construction activities may affect the buildings even with the little vibration. Therefore proper consultation with the authorities concerned, together with stakeholders and the local community is required prior to the construction. In addition the adoption of low vibration methods shall be considered in the selection of construction equipment and construction methods.

2.2.4.3 Scope of Works

Responsibilities of both Japanese and Cambodia governments are shown on Table 2.2-4.

Table 2.2-4 Responsibilities of Both Governments

Items	Contents	Undertaken by		Remarks
		Japan	Cambodia	
Procurement of materials and equipment	Procurement and delivery	○		
	Tax exemption and customs clearance		○	
	Maintenance/improvement of delivery route		○	
Preparation work	Leasing temporary work areas	○		For camp, work yards
	Land acquisition and Resettlement		○	
	Other preparation work	○		
Relocation and / or removal of Public Utilities	Removal of obstructions on the road		○	Electrical pole, cable, Signboard, Road sign etc.
	Removal of Underground utilities		○	Water pipe, optic cable, underground utilities etc.
Construction works		○		

2.2.4.4 Construction Supervision Plan

A Japanese consultant will carry out the detailed design, assistance in tendering and construction supervision in accordance with the contract between the MPWT and the consultant.

(1) Detailed Design

Major works in the detailed design to be carried out by the consultant are as follows:

- Commencement meeting with the executing agency of the Government of Cambodia and site survey
- Detailed design and preparation of drawings
- Procurement plan (construction material and equipment) and cost estimate

The necessary time for the detailed design is estimated 1.5 months

(2) Assistance in Tendering

Major items of the services in the assistance in tendering are as follows:

- Preparation of tender documents (conducted simultaneously with the detailed design)
- Tender publication
- Pre-qualification
- Assistance in tendering
- Tender evaluation
- Contract facilitation

The necessary time for the assistance in tendering is 4 months

(3) Construction Supervision

The Consultant will carry out the supervision of the construction works executed by the contractor. Major items of the construction supervision are as follows:

- Inspection and approval of site survey
- Inspection and approval of construction plan
- Quality control
- Progress control
- Measurement of work
- Inspection of safety aspects
- Final inspection and hand-over

The necessary construction supervision periods are 17 months

2.2.4.5 Quality Control Plan

Quality control plan for concrete work are shown on Table 2.2-5, and quality control plan for earthwork and pavement work are shown on Table 2.2-6

Table 2.2-5 Quality Control Plan for Concrete Work

Item	Test	Test Method (Specification)	Frequency of Test
Cement	Physical property test	JIS R 5201~3	Once before trial mix or when the material brand is changed.
Fine aggregate	Physical property test	JIS A 1103、1109 etc.	Once before trial mix or when supplying place is changed.
	Sieve analysis	JIS A 1102	Once before trial mix or when supplying place is changed.
Coarse aggregate	Physical property test	JIS A 1110、1121 etc.	Once before trial mix or when supplying place is changed.
	Sieve analysis	JIS A 1102	Once before trial mix or when supplying place is changed.
Water	Quality tes	JSCE-B101	Once before trial mix or when supplying place is changed.
Concrete	Slump test	JIS A 1101	Once every 50m ³ for each category
	Moisture content test for sand	JIS A 1111	Once a day
	Compressive strength test	JIS A 1108	6 specimens per 100 m ³ in each category (3 specimens for 7 days strength test and 3 specimens for 28 days strength test)

Table 2.2-6 Quality Control Plan for Earthwork and Pavement Work

Item	Test	Test Method (Specification)	Frequency of Test
Embankment	Density test (compaction test)	JIS A 1214	Once in every 5,000m ³ (once every 500 m ³ in sub-grade)
Base course / Sub-base course	Sieve analysis	JIS A 1102	Once before placement or when supplying place is changed.
	CBR	Hosou-shikenhou 2-3-1	Once before placement or when supplying place is changed.
	Site density test (compaction test)	Hosou-shikenhou 2-5-3	Once every 1,000 m ²
Asphalt pavement	Temperature of asphalt mixture		Every truck
	Los Angeles abrasion test	Hosou-shikenhou	Once every 1,500m ² or when the material source is changed

2.2.4.6 Procurement Plan

(1) Construction Materials

Procurement plan of the major materials is shown in Table 2.2-7.

All construction materials necessary for the Project are available in Cambodia.

Table 2.2-7 Material Procurement Plan

Item	Country origin			Remarks
	Cambodia	Japan	Third Country	
<u>Construction Materials</u>				
Boulder (for Gabion)	○			22.5km away from Site
Base course	○			22.5km away from Site
Sub-base course	○			22.5km away from Site
River sand	○			Sta.4+000
Embankment Material	○			Road excavated material , 1.0km from site
Sub grade Material	○			22.5km away from Site
Cement	○			Local Procurement (import from Thai)
Asphalt concrete	○			Local Procurement (import from Thai)
Reinforcing bar	○			Local Procurement (import from Thai)
Steel round bar	○			Phnom Penh
Diesel	○			Phnom Penh
Gasoline	○			Phnom Penh
Prime coat, Tack coat	○			Phnom Penh
Mix Concrete	○			Phnom Penh
Curb stone	○			Phnom Penh
Cast iron manhole cover	○			Local Procurement (import from Thai)
Grating cover	○			Local Procurement (import from Thai)
Gabion	○			Phnom Penh
Concrete pipe	○			Phnom Penh
<u>Temporary Materials</u>				
Timber	○			Phnom Penh
Plywood	○			Phnom Penh
Welding rod	○			Phnom Penh
Oxyacetylene gas	○			Phnom Penh

(2) Construction equipment

Procurement plan of the major equipment is shown in Table 2.2-8. Construction equipment necessary for the Project are mostly available from local contractors. Although there are some lease companies, prices are approximately expensive compared with contractors one.

Cement mixing plant used for cement stabilization of sub-grade will be procured in Japan.

Table 2.2-8 Procurement Plan of Major Equipment

Item	Type	Lease/ Purchase	Country			Transportation route
			Local	Third Country	Japan	
Backhoe	0.28m ³	lease	○			
Backhoe	0.5m ³	lease	○			
Backhoe	0.8m ³	lease	○			
Bulldozer	3t	lease	○			
Bulldozer	15t	lease	○			
Bulldozer	21t	lease	○			
Motor grader	3.1m	lease	○			
Road roller	10~12t	lease	○			
Tire roller	8-20t	lease	○			
Vibratory roller	0.8~ 1.1t	lease	○			
Vibratory roller	3~4t	lease	○			
Vibratory roller	15~18t	lease	○			
Generator	100kva	lease	○			
Water sprinkler truck	6m ³	lease	○			
Dump truck	10t	lease	○			
Asphalt Finisher		lease	○			
Asphalt Distributor		lease	○			
Truck	2t, 4t	lease	○			
Cement Mix Plant	200t/h	lease			○	Yokohama~ Sihanoukville~Site
Wheel Crane	20t	lease	○			
Truck Crane	2.9t,4t	lease	○			
Trailer	20~40t	lease	○			

2.2.4.7 Implementation Schedule

The implementation schedule of the Project is shown on Table 2.2-9.

Table 2.2-9 Implementation Schedule

Item		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Detail Design Stage	Site Survey	■																	
	Detail Design	■	●																
	Preparation of Tender Document		■	●															
	Approval of Tender Document			■															
	Assistance in Tendering	Tender Publication			▼														
		Explain with Drawing			■														
		Tender					▼												
		Tender Evaluation					■												
Contract Facilitation						●													
Implementation Stage	Preparation	■	■																
	STA 0km-1+900	Road Earthwork		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
		Slope protection work																■	■
		Paving work								■	■	■	■	■	■	■	■	■	■
		Drainage work				■	■	■	■	■	■	■	■	■	■	■	■	■	■
	STA 1+900-4km	Road Earthwork		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
		Slope protection work																■	■
		Paving work								■	■	■	■	■	■	■	■	■	■
		Drainage work				■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Roadside facility																■	■	
	Temporary work		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Site cleaning																	■	

2.3 Obligation of Recipient Country

The following measures should be undertaken by the Government of Cambodia on condition that the Grant Aid by the Government of Japan is extended to the Project.

- To provide data and information necessary for the Project.
- To relocate existing utilities such as traffic signal, power poles, power cable, optical cable and water pipes, etc.
- To bear commissions to the bank in Japan for its banking services based upon the Banking Arrangement, namely the advising commission of the “Authorization to Pay” and payment commission.
- To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Cambodia and prompt internal transportation of the materials and equipment for the Project.
- To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies, which may be imposed in Cambodia with respect to the supply of the products and services under the verified contracts

- To accord Japanese nationals, whose services may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into Cambodia and stay therein for the performance of their work.
- To provide necessary permission, licenses and other authorizations for implementing the Project.
- To maintain and use properly and effectively the facilities constructed under the Project.
- To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.
- To bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project.

The Government of Cambodia should conduct the resettlement of the Project affected people (PAPs) with external monitoring by a local consultant in order to monitor the processes of resettlement and compensation from a neutral and independent perspective, and the Government of Cambodia should share the progress and information the Government of Japan. Matters to be undertaken by the Government of Cambodia are as followings.

- Implementation of Replacement Cost Survey (RCS)
- Agreement on compensation consent from PAPs
- Confirmation to budgetary arrangement for resettlement compensation
- Compensation payment to PAPs
- Implementation of Livelihood Stabilization Program
- Preparation of relocation site for Landless PAP

2.4 Project Operation Plan

(1) Operation and Maintenance System

The project area is located in Phnom Penh. Maintenance of the Project road after completion will be undertaken by MPWT and Phnom Penh Capital Hall. The division of roles of tasks related to maintenance of roads is as follows:

- Daily maintenance works such as cleaning of road surface and ditch, slope vegetation management, etc. are conducted by the Departments of Public Works in Phnom Penh Capital Hall using the maintenance budget of Phnom Penh Capital Hall.
- Repair/rehabilitation works such as crack sealing and pothole patching of pavement, etc. are conducted by the Road and Infrastructure Department (RID), MPWT using the maintenance budget of MPWT.

(2) Necessary maintenance work

Necessary maintenance works for the Project road are as follows:

- Daily Maintenance : Routine inspection, cleaning of road / side walk / ditch/culverts, maintenance of slope planting, etc.
- Repair/Rehabilitation : Sealing of pavement crack, repair of pothole, repair of guidepost, repair of wet masonry / gabion, repair of slope damage, etc.

The daily maintenance and the routine inspection will be conducted by the Departments of Public Works in Phnom Penh Capital Hall and Repair/rehabilitation works are conducted by the Road and Infrastructure Department (RID), MPWT.

Although the road and drainages to be improved/constructed in this Project have high durability and weather resistance, the repair works of the slope or gabion structures at the drainage outlet may possibly be necessary after the floods. Since the repair works of gabion structures have been carried out frequently in Cambodia, no technical difficulty is expected for those repair works. Extensive repairs will not be required for a fairly long time for other structures. No technical difficulty is expected in executing daily maintenance works as well. It is considered possible for the road to be properly operated and maintained under the present system.

2.5 Project Cost Estimation

2.5.1 Initial Cost Estimation

(1) Cost to be borne by the Government of Japan

The total amount will not be disclosed until the contract between the MPWT and the contractor is concluded.

(2) Cost to be borne by the Government of Cambodia

Total Cost approximately 10.2 Million US dollars (approximately 832 Million Yen)

Table 2.5-1 Cost Borne by the Government of Cambodia

Item	Roughly Estimated Cost	
	US\$ in Thousand	Equivalent JPN Yen in Million
Bank Charge	7.6	0.6
Compensation to PAPs	9,350.0	762.7
Relocation of Power Line	400.0	32.6
Relocation of Fiber Optical Cable	70.0	5.7
Relocation of Water Pipe	370.0	30.2
Relocation of Traffic Signal	8.5	0.7
Total	10,206.1	832.5

(3) Conditions of Cost Estimate

- Time of Cost Estimate : September 2011
- Exchange Rate : 1US Dollar = 81.57 Yen
- Construction Period : as shown in the Implementation Schedule
- Others : This Project is implemented in accordance with the system of Japan's Grant Aid.

2.5.2 Maintenance Cost Estimation

The annual costs of the maintenance works are roughly estimated at US\$ 50,000 as detailed in Table 2.5-2.

Table 2.5-2 Maintenance Plan and Cost Estimate

1. Routine Inspection (Undertaken by MPWT : for 56 km)

Facility	Inspection Item	Frequency	Number of Staff	Equipment	Quantity	Cost (US\$/year)
Road		12 times a year (4 days/time)	2 persons	scoop, hammer, sickle, barricade, pick-up truck	Worker: 96 man-day /year	1,423
Pavement	crack, deformation, pothole, etc.					
Sholder/slope	erosion, collapse, etc.					
Pavement marking	injury, deformation, stain, splitting					
Guide post	damage				Pick-up: 48 veh-day /year	3,600
Revetment	crack, damage, collapse, etc.					
Drainage	sedimentation of soils, obstacle					
Bridge						
Pavement	crack, deformation, pothole, etc.					
Drainage	existence of soil, obstacles					
Pavement marking	injury, deformation, stain, splitting					
Structure	damage on bridge surface/ abutment/ pier					
Revetment/ Riverbed protection	crack, damage, collapse, etc.					
Ancillary facilities	damage of lighting, apparatus to attach utilities, handrail etc.					
Culvert						
Structure	displacement, damage					
Revetment/ Riverbed protection	crack, damage, collapse, etc.					
					Subtotal (56km)	5,023
					per 4 km	358

2. Daily maintenance work (Undertaken by the Phnom Penh Capital Hall)

Facility	Work Item	Frequency / Remark	Unit	Quantity	Unit Cost	Amount (US\$/year)
Side Ditch	cleaning, repair of damage	1 time / 2years	m	4,360	3.00	13,080
Drainage Pipe	cleaning, repair of damage	1 time / 2years	m	5,742	4.64	26,643
Center medium grassing	trimming	2 time / years	m ²	9,057	0.14	1,268
Side walk + Shoulder/slope	cleaning, cuting grass	240 times / years	km	240	4.98	1,195
					Subtotal (4km)	42,186

3. Repair/Rehabilitation work (Undertaken by the MPWT)

Facility	Work Item	Frequency / Remark	Unit	Quantity	Unit Cost	Amount
Pavement (Potholes)	patching	1 time / years (Asphalt Concrete)	t	6,191	0.80	4,952
Pavement marking	re-marking	10% of the Total Qty / year	m ²	227	13.76	3,124
					Subtotal (4km)	8,076

The total budgets appropriated for the road maintenance by office in charge in the last three years are shown in Table 2.5-3

Table 2.5-3 Total Maintenance Budgets in the Last Three Years

Year		2008	2009	2010
Phnom Penh Capital Hall maintenance (road, bridge, drainage)		24.3	21.5	14.0
MPWT	Routine maintenance	8.0	17.0	14.5
	Periodic maintenance	26.0	60.2	44.0
	Emergency recovery	0.1	0.8	3.0
	Flood recovery	2.9	-	4.3

Sources: Each general affairs department of MPWT, Phnom Penh capital hall

The required costs for the routine inspection and daily maintenance of the Project road are about 0.18~0.30% of the total budgets of the Phnom Penh capital hall for the maintenance (road, bridge, drainage) in 2008~2010, and the required costs for repair works of the Project road are about 0.06%~0.10% of the budget of the MPWT for the road maintenance in 2008~2010. No financial problem in budgets is expected

Chapter 3 Project Evaluation

3.1 Preconditions for implementing the Project

The details of these preconditions for implementing the Project are presented in the following Table 3.1-1.

Table 3.1-1 Preconditions for Implementing the Project

Items	Applicable clauses in this Report	Remarks
Relocation of existing utilities	Clause 2-3 Obligations of the Recipient Country	Items were confirmed in M/D etc.
Resettlement	Clause 1-3-1 Involuntary Resettlements Clause 2-3 Obligations of the Recipient Country	Items were confirmed in M/D etc.
Obligations of the Recipient Country	Clause 2-3 Obligations of the Recipient Country	Items were confirmed in M/D etc.

The preconditions item for implementing the Project as mentioned above were confirmed the necessity in the Minutes of Discussions (M/D) between the Study team and MPWT. However, Cambodian side could not sign the second M/D as shown in Appendix 4 during the mission period. The details are described in Chapter 4.

3.2 Necessary Inputs by Recipient Country

The Government of Cambodia is expected to fulfill the following items in order to execute the project satisfactorily and maintain the positive effects of the Project:

- For proper road maintenance, periodic inspections and repair works are particularly essential for items such as road pavement, unnecessary deposit and debris in drainage system, revetment and riverbed protection and vegetation on embankment slope in order to achieve high traveling performance and maximize durability of road structures. It is also important to secure the sufficient budget for road maintenance, which is approximately US\$ 50,000.00/year as described in Clause 2-5-2. And Cambodian government is considered capable to allocate the amount for the maintenance work.
- As a result of the road improvement, it is predicted that high speed traffic will be realized . In order to achieve traffic safety, various safety educations enlightening the people on safety regulations, traffic moral and traffic manner are essential. Furthermore, it is also recommended to conduct periodically traffic safety campaigns for the people.
- It is recommended that Cambodian side shall conduct the Monitoring Plan as described in clause 1-3-2 (2) after completion of the Project.

3.3 Project Evaluation

3.3.1 Relevance

This project will contribute to higher standard of living for the people of the project area and significant effects are expected as described bellows. Therefore, it is considered that implementation of the project with the Grant Aid Assistance by the Government of Japan is appropriate.

- The purpose of the Project is to improve a section of the National Road No.1, which is about 56.0km stretch from Phnom Penh to Neak Loueng and the direct beneficiaries by the implementation of the Project are the residents of 1.32 million in Phnom Penh and 1.27 million in Kandal Province where the Project is located. The indirect beneficiaries are entire population of 13.39 million in Cambodia. (Figures from the census 2008)
- It contributes to the improvement of living standard of residents by improving as a life road, reduction of traffic accidents, provision of countermeasure against flood, activation of social and economic activities, as an effects of the project implementation.
- Domestic funds and man-power and technology would be suit for the administration and maintenance, since it doesn't require highly sophisticated technology.
- The Royal Government of Cambodia has targeted in "the National Strategic Development Plan Update 2009 – 2013 (NSDP Update 2009-2013)", to improve National road No.1, in this connection, the present project is worthy to attain the goal of the plan, and in addition, the present project is incorporated in the course of "Asian Highway".
- In terms of negative impacts of the project in aspect of environment social considerations, it is very possible to overcome significantly the impacts, by studying the contents of the present report and reflect the result of it on the design. However, to implementation of resettlement activities, the support and cooperation by Japan side is continue required.

3.3.2 Effectiveness

(1) Quantitative Effect

The Quantitative Effect by the Project implementation is presented in the following Table 3.3-1.

Table 3.3-1 Quantitative Effect

Description	Base value (before project)	Target value (after project)
Increase in safe vehicle speed (Phnom Penh - Neak Loueng)	Travel time: 1.5 hour 30km/hour on average	45 – 50 minutes 70km/hour on average
Heavy Cargo Traffic	Maximum vehicle loads 15 tons	Maximum vehicle loads 20 tons
Flood Countermeasures The Mekong river overflowed the banks in Phnom Penh	3 places (in year 2000)	0 places (No overflow)
Flood section in National road No.1	1,100 m (in year 2000)	0 m (No overflow)

(2) Qualitative Effect

The Qualitative Effect by the Project implementation are presented in the following Table 3.3-2

Table 3.3-2 Qualitative Effect

Present conditions and Issues	Counter Measure under the Project	Effect and its Degree of the Project Improvement
<p>1. Smooth Flow of Goods and Peoples Narrow road width and easily damaged road structure by flood deteriorate functions of the national trunk road and limit the smooth flow of goods and people.</p>	Upgrading the road structures and improve functions of the national trunk roads.	Improvement of functions of national trunk road - reduces transportation time and cost encouraging the exchange of goods and people.
<p>2. Socio-Economic Activities Socio-Economic activities are not activated enough due to inadequate distribution of goods and people.</p>	Improvement of functions as the national trunk road and the lifeline for communities.	Promote socio-economic activities as a result of increased exchange of goods and people.
<p>3. Upgrade of Living Standards of Residents along the Road High transport cost of agricultural products due to long transport time and poor access to schools/hospitals and urban facilities.</p>	<ul style="list-style-type: none"> - Improvement of travel performance and traffic capacity. - Installation of roadside service facilities 	Upgraded living standard of the residents along the road as a result of; <ul style="list-style-type: none"> - Improved transport performance of agricultural product. - Improved access to schools, hospitals and urban facilities encouraging school attendance of children along the road.

Chapter 4 Completion of the Survey and Way Forward of the Project

4.1 Discussion and Conclusion of the Survey Team of Draft Final Report

The survey team dispatched from January 16th, 2012 to January 20th, 2012 had a series of discussions with MPWT, explained contents of the draft final report and discussed the necessary issues such as design conditions. Especially, the road design from Sta. 1+900 to Sta. 4+000 has been changed from 2 lanes to 4 lanes. MPWT and the team confirmed the typical cross section drawing as shown in Appendix 4 of the draft of the Minutes of Discussions (M/D).

On the other hand, the team and Cambodian side could not sign the above-mentioned M/D during the mission period because of some reasons raised by the Cambodian side.

The Embassy of Japan in Cambodia and JICA Cambodia Office continuously has had a series of meetings with the Cambodian side. However, because it is nowhere in sight as of the beginning of February, 2012, thus, JICA decided to conclude the preparatory survey and finalize the report.

4.2 Way Forward

The Japanese side continues to consult with the Cambodian side about the Project while respecting their opinion.

In the case that it takes a lot of time for the Cambodian side to decide it, there is possibility that the project would be postponed. Besides, there is possibility that the schedule of the development of RAP and negotiation among PAPs concerning resettlement would be delayed. Therefore, JICA continues to collect necessary information and appropriately handle this issue.

APPENDICIES

1. Membr List of the Survey Team
2. Survey Schedule
3. List of Parties Concerned in Cambodia
4. Minutes of Discussions
5. Technical Notes
6. District of Phnom Penh Capital Hall
7. List of Collected Data
8. Traffic Survey Data
9. Noise Level Survey Data
10. Drawings

1. Membr List of the Survey Team

Field Survey team : 01 September. 2011~15 September. 2011

Name	Job Title	Occupation
Mr. Hiroyukli HAYASHI	Leader	Director / Urban and Regional Development Division 1, Economic Infrastructure Department, JICA
Mr. Naoki KOBAYASHI	Grand Aid Planning	Ministry of Foreign Affairs
Mr. Yukinari TANAKA	Study Planning	Assistant Director / Urban and Regional Development Division 1, Economic Infrastructure Department, JICA
Mr. Kazuyuki HIRAOKA	Leader/Road Planning I	Katahira & Engineers International
Mr. Yoichi OKAMOTO	Procurement Planning	Katahira & Engineers International
Mr. Shuichi MORITA	Environmental Social Consideration/Natural Condition`s Survey (Topography) I	Katahira & Engineers International
Mr. Toshiaki TUCHIYA	Road Planning II/Natural Condition`s Survey (Topography) II	Katahira & Engineers International

Outline Design Explanation : 15 January. 2012~21 January. 2012

Name	Job Title	Occupation
Mr. Hiroyukli HAYASHI	Leader	Director / Peace Building and Urban and Regional Development Division 2, Economic Infrastructure Department, JICA
Mr. Yukinari TANAKA	Study Planning	Assistant Director/ Peace Building and Urban and Regional Development Division 2, Economic Infrastructure Department, JICA
Mr. Yoichi OKAMOTO	Procurement Planning	Katahira & Engineers International
Mr. Koji TAKAHAMA	Road Planning/Design	Katahira & Engineers International

2. Study Schedule

Field Survey Schedule

No	Date		JICA, MOFA members			Consultants				Stay	
			Hayashi	Kobayashi	Tanaka	Hiraoka	Okamoto	Morita	Tuchiya		
1	9/1	Thu	0020 Dep. Haneda								Phnom Penh
			0430 Arr. Bangkok, 0755 Dep. Bangkok								
			0905 Arr. Phnom Penh								
			12:00-13:45 Site visit (Phase-IV only)								
			14:00-15:00 Meeting with JICA Cambodia Office								
15:30-17:00 Meeting with MPWT (H.E. Tauch Chankosal and his staff) at MPWT											
2	9/2	Fri	9:00-10:00 Courtesy call to EoJ								Phnom Penh
			10:30-11:30 Meeting with PPWSA (H.E. Ek Sonn Chan and his staff) at PPWSA								
			14:30-17:00 Joint meeting with MPWT, IRC and governer of Mean Chey District (H.E. Nhean Leng and his staff and Governor of Mean Chey District) at MEF								
3	9/3	Sat	9:00- 17:00 Site survey (NR-1, resettlement site and Neal Loeung Bridge construction site)								Phnom Penh
4	9/4	Sun	Preparation of M/D (Minutes of Discussion)								Phnom Penh
5	9/5	Mon	8:30- 11:30 Joint discussion on M/D with IRC and MPWT at MPWT								Phnom Penh
6	9/6	Tue	AM Joint discussion on M/D with IRC and MPWT								Phnom Penh
			15:00-16:00 Signing of M/D between JICA, IRC and MPWT at MPWT Signner:H.E. Tram Iv Tek (Minister of MPWT), H.E. Nhean Leng (Chairman of Inter-ministerial Resettlement Committee, Under Secretary of State, Ministry of Economy and Finance)								
7	9/7	Wed	08:30-9:30 Meeting with MEF				Site Survey				
			10:00-11:00 Report to EOJ								
			14:00-15:00 Report to JICA office								
			20:25 Dep. Phnom Penh				Site Survey				
8	9/8	Thu	08:10 Arr. Narita				Site Survey				
9	9/9	Fri					Site Survey				
10	9/10	Sat					Site Survey				
11	9/11	Sun					Site Survey				
12	9/12	Mon					Site Survey Report to JICA office				
13	9/13	Tue					Site Survey				
14	9/14	Sat					Report to MPWT 20:25 Dep. Phnom Penh				
15	9/15	Sun					08:10 Arr. Narita				

Schedule for Expansion of Outline Design

No.	Date		JICA		Consultant		Stay	
			Mr. Hayashi	Mr. Tanaka	Mr. Okamoto	Mr. Takahama		
1	Jan. 15	Sun			13:30 Dep. Narita (oz103), 16:10 Arr. Incheon 19:10 Dep. Incheon(oz739), 22:50 Arr. PHN		PHN	
2	Jan. 16	Mon			0800 JICA Cambodia Office 1400 MPWT		PHN	
3	Jan. 17	Tue			Discussion with MPWT		PHN	
4	Jan. 18	Wed			Discussion with MPWT		PHN	
5	Jan. 19	Thu	0020 Dep. Haneda (TG 661), 0520 Arr. Bangkok 0745 Dep. Bangkok (TG580), 0900 Arr. PHN 1100 EOJ 1400 JICA Cambodia Office 1530 Joint Meeting with IRC, MPWT, Mean Chey District					PHN
6	Jan. 20	Fri	AM Internal meeting 1500 MPWT 1800 Internal meeting			23:50 Dep. PHN (oz740)		PHN
7	Jan.21	Sat	Site survey on NR6A, NR11, NR7, NR6, & NR5 (up to Battambang)			06:50 Arr. Incheon 09:00 Dep. Incheon (oz102) 11:10 Arr. Narita		BTN
8	Jan.22	Sun	Site Survey on NR5					PHN

9	Jan.23	Mon	0830 Discussion with CDC 1030 Discussion with NCDM 1430 Discussion with MPWT 1600 Discussion with MEF			PHN
10	Jan.24	Tue	0830 Internal meeting 1100 Report to EOJ 1300 Site survey on NR118 1630 Meeting with MPWT			PHN
11	Jan.25	Wed	1100 Report to JICA office 1600 Signing of MD 2040 Dep. PHN, 2145 Arr. Bangkok 2350 Dep. Bangkok			PHN
12	Jan.26	Thu	0730 Arr. Narita			

3. List of Parties Concerned in Cambodia

A. Ministry of Public Works and Transport	
H.E. Tram Iv Tek	Minister of MPWT
H.E. Tauh Chankosal	Secretary of State
H.E. Kem Borey	Director General, Directorate of MPWT
Mr. Chhim Phalla	Inspector, General Department of Inspectorate, MPWT
B. Inter ministerial Resettlement Committee (IRC)	
H.E. Nhean Leng	Chairman of IRC, Undersecretary of MEF
H.E. Dr. Chhorn Sopheap	Deputy Secretary General
Mr. Im Sethyra	Chief, Resettlement Department, MEF
Mr. Sim Samnang	Deputy Chief, Resettlement Department, MEF
Mr. Ben Daramony	Chief of Bilateral Cooperation Office, MEF
Mr. Pich Socheata	Deputy Chief of Bilateral, RD, MEF
Mr. Akira YAMASHITA	JICA Expert / Chief Advisor
Mr. Seiji KUROKAWA	JICA Expert
Mr. Takahiro KUMAGAI	JICA Expert/ Project Coordinator
C. Mean Chey District, Phnom Penh	
H.E. Kuoch Charmroenn	Mayor of Mean Chey
Mr. Moeung Sophan	Deputy Director DPWT of PHN
D. Phnom Penh Water Supply Authority (PPWSA)	
Mr. EK Sonn Chan	General Director of PPWSA
Mr. Samreth Sovithia	Director of Planning and Technical Department, PPWSA
Mr. Long Naro	Deputy General Director, PPWSA
Mr. Chea Satephoat	Deputy Director of Planning and Technical Department, PPWSA
E. Phnom Penh Capital Hall	
Mr. Tetsuji GOTO	JICA Expert
F. Electricite du Cambodia (EDC)	
Mr. Iv Visal	Director, Distribution Department, EDC
G. Telecom Cambodia (TC)	
Mr. Hun Pros	Deputy Director of ICT Department, TC
G. Anco Brothers Co., Ltd	
Mr. Chhor Say	Water Supply Engineering
Mr. Lim Sokhom	General Manager
Embassy of Japan in Cambodia	
H.E. Masafumi KUROKI	Ambassador
Mr. Hideaki MATSUO	First Secretary
Mr. Manabu OFUSA	Second Secretary
JICA Cambodia Office	
H.E. Yasujiro SUZUKI	Chief Representative, JICA Cambodia
Mr. Yukiharu KOBAYASHI	Senior Representative
Mr. Masahiko EGAMI	Assistant Resident Representative

4. Minutes of Discussions

for Field Survey


Minutes of Discussions
on the Preparatory Survey
on the Project for the Improvement of National Road No. 1
(Phnom Penh – Neak Loeung Section)
in the Kingdom of Cambodia


Based on the results of the Basic Design Study and several studies, the Government of Japan decided to conduct a Preparatory Survey on the project for the Improvement of National Road No. 1 (Phnom Penh - Neak Loeung Section) (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA").


JICA sent to Cambodia the Preparatory Survey Team (hereinafter referred to as "the Team"), headed by Mr. Hiroyuki HAYASHI, Director for Urban and Regional Development Division 1, Economic Infrastructure Department, JICA, which is scheduled to stay in Cambodia from 1st to 7th September, 2011.

The Team held a series of discussions with the concerned officials of the Royal Government of Cambodia as attached in ANNEX 1. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Phnom Penh, 6th September, 2011


Hiroyuki Hayashi
Leader
Preparatory Survey Team
Japan International Cooperation Agency


H. E. Tram Iv Tek
Minister
Ministry of Public Works and Transport (MPWT)
Kingdom of Cambodia


H.E. Nhean Leng
Under Secretary of State
Ministry of Economy and Finance (MEF)
Kingdom of Cambodia

ATTACHMENT

1. Purpose of the Preparatory Survey

- (1) To re-design the section of Stage-4 with necessary adjustments to the design prepared in the previous Preparatory Survey, and
- (2) To re-estimate the project cost and to confirm the appropriate measures in terms of environmental and social considerations.

2. Design of the Road

- (1) Cambodian side strongly requested the Team to change the design of the road from the existing one (4 lanes for Sta. 0+000 - Sta. 1+ 900 and 2 lanes for Sta. 1+900 - Sta. 4+000) to proposed one (4 lanes for Sta. 0+000 - Sta. 4+000), because traffic congestion has become heavier than before due to rapid urbanization in this area.

The Team replied that sufficient relevant data and documents listed below should be submitted by Cambodian side in order to study the possibility of the above-mentioned design change. Cambodian side agreed to submit them by 10th September, 2011.

- 1) Latest traffic survey data for section around Sta. 0+000 - Sta. 4+000 including future traffic demand and related documents.
 - 2) Hard copy(ies) of the decree and/or official document about the boundary change of Phnom Penh City in regard with the Mean Chey District.
- (2) The both sides confirmed that even if the Team studies the improved design, it should be designed within the present Provisional Road Width (PRW) 20m, and should not set up additional PRW.
- (3) Both sides confirmed that PRW on the section from Sta. 0+000 to Sta. 4+000 is 20m in principal from the road center line in both sides. The design of the road would be reviewed in line with the above-mentioned PRW after the topographic survey in the section.
- (4) The Team explained that retaining wall would be remained at some parts of the road in Stage-4, even PRW already secured 20m from the center line. Cambodian side agreed on aforementioned facts and making explanation to the people in the area of Stage-4 at the public consultations in order to avoid any confusion among the people after the drawing which clarifies parts of retaining walls and slopes is drafted and both sides consult whether its design is reasonable and possible.
- (5) The Team will carry out topographic survey in the project area in order to make sure the latest situation and provide the results to Cambodian side by 14th September, 2011.

3. Environmental and Social Considerations for the section of Stage-4 of the Project

(1) The Team explained the necessity of the preparation of Resettlement Action Plan (RAP) for stage-4, Cambodian side agreed on it.

(2) Cambodian side explained on the policy of the resettlement including preparation of RAP and compensation to Project Affected Persons (PAPs) in Stage-4 as follows:

1) Items listed below should be referred to the previous Minutes of Discussions signed on February 26th, 2009.

- The policy of the resettlement should be based on Stage-1, Stage-2 and Stage-3.
- The Socioeconomic Survey and the Replacement Cost Survey (RCS) will be implemented for the preparation of RAP for Stage-4.
- Terms of References (TORs) for the Socioeconomic Survey and Replacement Cost Survey should be submitted to JICA Cambodia Office before its commencement.
- The compensation to PAPs in Stage-4 should be based on the RCS.
- As for the compensation for lands between the existing road edges to 20m from the road center line in both sides in the section between Sta. 0+000 and Sta.1+900 (the end of Niroth Pagoda fence), its payment should be made according to the RCS.
- Public consultations should be done before DMS and payment to PAPs in Stage-4.

2) Items listed below are confirmed by the both sides.

- RAP for Stage-4 will be prepared separately with same principal of RAP for Stage-1, Stage-2 and Stage-3.
- The both sides confirmed that the contents of RAP for stage-4 should be reviewed in line with the contents as shown in ANNEX 2.
- The both sides confirmed that the schedule of environmental and social considerations should be carried out as shown in ANNEX 3. The Team requested Cambodian side to make necessary arrangements for disclosure (open to public) of the English Version of RAP for Stage-4 by Cambodian side and Cambodian side will confirm the possibility of disclosure and inform to Japanese side by 14th October, 2011.
- Terms of Reference for the external monitoring should be included in the RAP for Stage-4, the cost will be covered by Cambodian side. Cambodian side will submit the monitoring report to JICA Cambodia Office.

4. Relocation of Public Utilities

(1) Cambodian side agreed on the following items requested by the Team

- Public utilities including optical fiber cable, telecommunication line, power cable, tertiary water

pipe should be relocated and removed.

- All information on the relocation of the public utilities should be shared in writing among the related organizations.
- (2) The Team strongly requested that MPWT should make the coordination among the related parties to the relocation of public utilities in order to make smooth construction work in Stage-4.
- (3) Cambodian side agreed the implementation procedure for the relocation of public utilities as shown in ANNEX 4.

5. Schedule of the study

- (1) The Team will proceed to further studies in Cambodia by the day of 14th September, 2011.
- (2) JICA will prepare the draft report in English and send it to the Royal Government of Cambodia around January 2012. JICA may dispatch another team to explain its contents, if necessary.
- (3) JICA will prepare the final report in English and send it to the Royal Government of Cambodia around the end of February 2012.

ANNEX 1 Attendance List

ANNEX 2 Contents of RAP for Stage-4

ANNEX 3 Tentative Schedule of Environmental and Social Considerations for NR1 Stage-4

ANNEX 4 Flow Chart of Public Utilities Relocation

Attendance List

1. Ministry of Public Works and Transport (MPWT)

H. E. Tram Iv Tek	Minister
H. E. Tauch Chankosal	Secretary of State
H. E. Kem Borey	Director General
Chhim Phalla	Director of International Cooperation Department

2. Inter-Ministerial Resettlement Committee (IRC), Ministry of Economy and Finance

H. E. Nhean Leng	Undersecretary of State/Chairman of IRC
H. E. Dr. Chhorn Sopheap	Deputy Secretary General
Im Sethyra	Director of Resettlement Department
Sim Samnang	Deputy Director of Resettlement Department
Ben Daramony	Chief of Bilateral Project
Pich Socheata	Deputy Chief of Bilateral Project
Akira YAMASHITA	JICA expert (Chief Advisor)
Seiji KUROKAWA	JICA expert (Participatory Planning and Development)

3. Mean Chey District

Kuoch Charmroenn	District Governor
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4. Phnom Penh Water Supply Authority (PPWSA)

H. E. EK Sonn Chan	General Director
Long Naro	Deputy General Director
Samreth Sovithia	Director of Planning and Technical Department

5. The Survey Team

Hiroyuki HAYASHI	Leader Director, JICA
Naoki KOBAYASHI	Grant Aid Planning, Ministry of Foreign Affairs
Yukinari TANAKA	Study Planning, JICA
Kazuyuki HIRAOKA	Leader/Road Planning I, Katahira & Engineers International
Yoichi OKAMOTO	Procurement Planning, Katahira & Engineers International
Shuichi MORITA	Environment Social Consideration, Katahira & Engineers International
Toshiaki TSUCHIYA	Road Planning II, Katahira & Engineers International

Draft Contents of RAP for Stage-4

Chapters	Contents
1. Description of the project	General project outline
2. Potential impacts	Possible impacts caused by the project
3. Objectives	RAP objectives
4. Socioeconomic Studies	Result of Census and Socioeconomic survey
5. Legal Framework	Relevant domestic laws and regulations, and Development Partner's Safeguard Policy
6. Institutional framework	<ul style="list-style-type: none"> ● Identification of agencies responsible for resettlement ● Demarcation and organizational chart & network
7. Eligibility	<ul style="list-style-type: none"> ● Definition of Displaced Persons ● Criteria for determining eligibility for compensation and assistances ● Cut-off dates conditions
8. Valuation of and compensation for losses	Methodology to be used in valuing losses (Replacement Cost)
9. Compensation packages (Assistance such as allowances)	<ul style="list-style-type: none"> ● Income Restoration Program (IRP) ● Assistance
10. Relocation Site	<ul style="list-style-type: none"> ● Policy and Assistance for Landless PAPs ● Outline, selection process and conditions of Relocations Site
11. Community participation	<ul style="list-style-type: none"> ● Public Consultation Meeting (PCM) ● Information disclosure policy
12. Grievance Redress Mechanism (GRM)	<ul style="list-style-type: none"> ● Grievance Redress Committee ● Grievance Redress Process
13. Implementation Schedule	Schedule covering all resettlement activities from preparation through implementation
14. Costs and Budget	Cost estimates for all resettlement activities
15. Monitoring and evaluation	<ul style="list-style-type: none"> ● Monitoring plan (Internal and External) ● Evaluation plan (post)

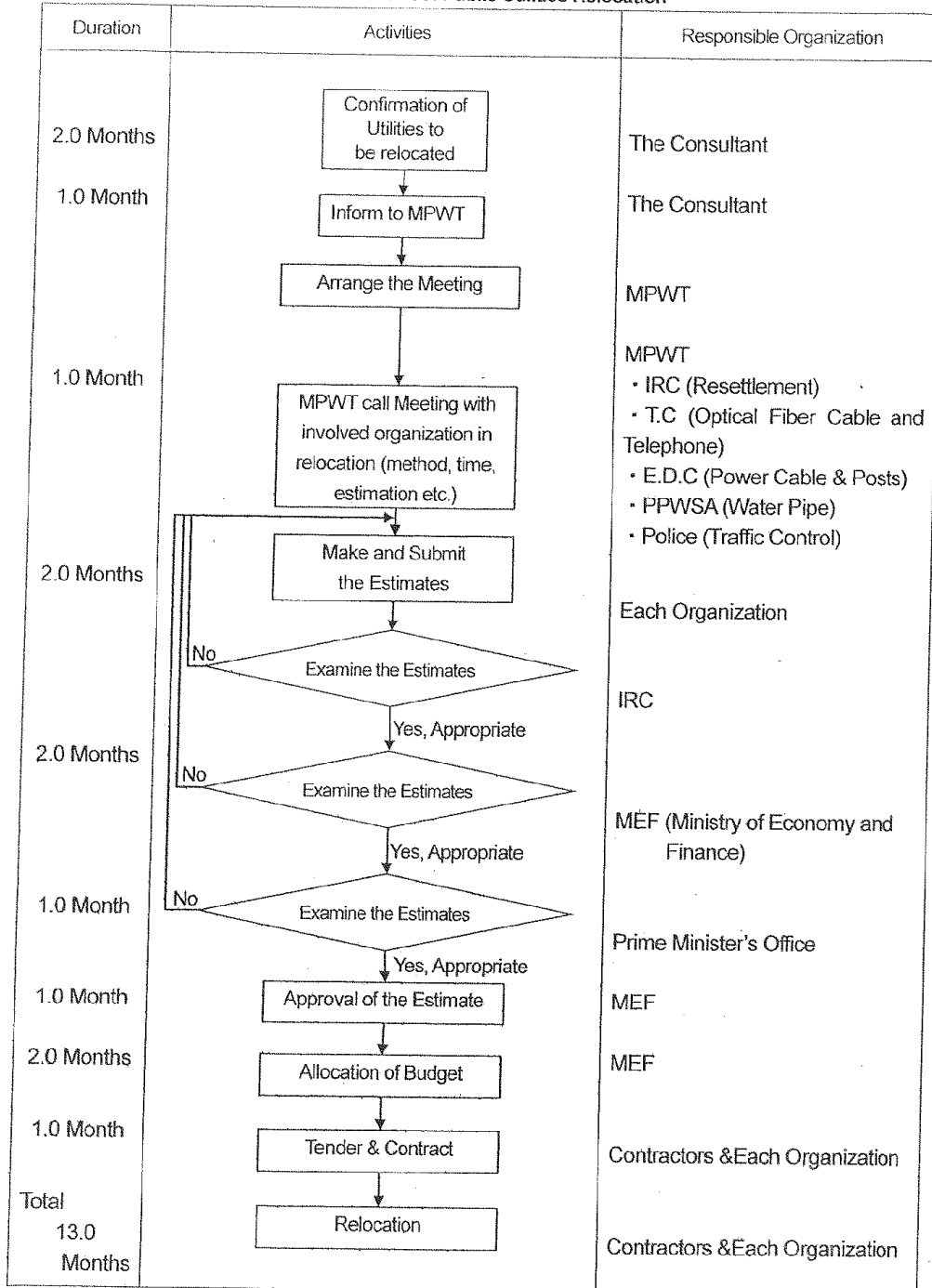
Tentative Schedule for Environmental and Social Considerations for NR1 Stage-4

Subjects/procedures	Nos. of Month												
	1	2	3	4	5	6	7	8	9	10	11	12	
Socioeconomic Survey and RCS													
DMS													
RAP contents for Stage-4 discussion with JICA (except IRP)													
Drafting RAP for Stage-4													
(submission to Japanese side for confirmation)													
Revised RAP for Stage-4													
Final confirmation of RAP													
Disclosure (Open to public) of RAP													
Public Consultation													
Resettlement plan implementation (after E/N)													
(reference only) procedures for Japanese side													
Preparatory Survey/preparation for Cabinet Approval													
Cabinet Approval													
E/N, G/A													
Project implementation stage (Detailed Design, Tendering, Construction)													

5 (11)

9/20

Flow Chart of Public Utilities Relocation



Handwritten initials/signature

**Minutes of Discussions
on the Preparatory Survey
on the Project for the Improvement of National Road No. 1
(Phnom Penh – Neak Loeung Section)
in the Kingdom of Cambodia
(Explanation on Draft Final Report)**

In September 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Survey Team on the project for the Improvement of National Road No. 1 (Phnom Penh - Neak Loeung Section) (hereinafter referred to as "the Project") to the Royal Government of Cambodia and through discussion, field surveys and technical evaluation of the results in Japan, JICA prepared a draft final report of the study.

In order to explain and consult with the Royal Government of Cambodia on the components of the draft final report, JICA sent to Cambodia the Explanation Team (hereinafter referred to as "the Team"), headed by Mr. Hiroyuki HAYASHI, Director for Peace Building and Urban and Regional Development Division 2, Economic Infrastructure Department, JICA from 16th to 20th January, 2012.

As a result of discussions with the concerned officials of the Royal Government of Cambodia, both sides confirmed the main items described in the attached sheets.

Phnom Penh, _____, 2012

Hiroyuki Hayashi
Leader
Preparatory Survey Team
Japan International Cooperation Agency

H. E. Tram Iv Tek
Minister
Ministry of Public Works and Transport
(MPWT)
Kingdom of Cambodia

H.E. Nhean Leng
Under Secretary of State
Ministry of Economy and Finance (MEF)
Kingdom of Cambodia

ATTACHMENT

1. Components of the Draft Final Report

Cambodian side agreed and accepted in principle the components of the Draft Final Report of the preparatory Survey (hereinafter referred to as "Report") explained by the Team.

As for the Typical Cross Section from Sta.1+900 To Sta.4+000, Cambodian side requested to change the design to secure the enough space for median strip for future development by Cambodian side, such as installation of street lights, center divider.

The Team carefully studied it's possibility from viewpoints of technical aspects and procedures/regulations of Japan's Grant Aid, and then, the Team proposed alternatives as attached in ANNEX 1 to Cambodian side. As the results of a series of discussion, both sides finally agreed to apply the design as PLAN E shown in ANNEX 1. This modification should be reflected in the detailed design stage.

Both sides confirmed that additional information shall be described in a Final Report in the process of finalization, if necessary.

2. Cost Estimation

The Team explained the project cost estimation as attached in ANNEX 2. Both sides confirmed that it is provisional and would be examined further by the Government of Japan for its approval as the Grant. Both sides confirmed that the project cost is highly confidential for securing fairness of tender procedure and should never be duplicated or released to any third parties until relevant contracts are awarded by the implementing agency.

3. Schedule of the Survey

The Team mentioned that the Survey will be completed in accordance with the confirmed item and send the final report to the Royal Government of Cambodia by the end of February, 2012.

4. Japan's Grant Aid Scheme

Cambodian side understood the Scheme the Japan's Grant Aid Scheme and the necessary measures to be taken by the Royal Government of Cambodia, which was

described in ANNEX 3 and ANNEX 4.

5. Environmental and Social Considerations for the Section of Stage-4 of the Project

(1) Progress and Schedule of RAP

Both sides confirmed the progress and schedule of the preparation for Resettlement Action Plan (RAP) for Stage-4 as the below;

- Detailed Measurement Survey (DMS) and RCS (Replacement Cost Survey) had been completed.
- Socio-Economic Survey (SES) is on-going and will have completed by 25th of January, 2012.
- Based on the result of DMS, SES and RCS, IRC is developing RAP for Stage-4.
- Draft RAP should be submitted to Japanese side through JICA Cambodia office by the end of January, 2012.
- MEF will approve RAP for Stage-4 by the middle of February, 2012 and submit it to Japanese side by 28th of February, 2012.
- Japanese side will confirm RAP by 25th of March, 2012.
- Cambodian side will disclose necessary information of RAP for Stage-4 in Khmer version by the end of March, 2012.

(2) Income Restoration Program

The Team confirmed the progress of the income restoration program in RAP for Stage-4 as the below;

- Income Restoration Program (IRP) can be considered after SES report submitted.
- Terms of Reference (TOR) of IRP will be included in the draft RAP.

(3) Grievance Committee

Cambodia side confirmed that the Grievance Committee for Stage-4 would be set up by the end of March, 2012. The copy of the member list of the Grievance Committee will be provided to JICA Cambodia office by the middle of April, 2012.

(4) RAP Disclosure

Cambodian side will disclose necessary information of RAP for Stage-4 in Khmer version at MPWT homepage. Japanese side will disclose necessary information of RAP for Stage-4 in English version at Japanese homepage. The contents of RAP need to be discussed and agreed by both sides before disclosing.

6. Relocation of Public Utilities

The Team reminded MPWT of the implementation procedure for the relocation of public utilities as shown in ANNEX 5 in order to make smooth construction work in Stage-4 and Cambodian side agreed on it.

7. Other Relevant Issue

Cambodian side agreed that Japanese side disclose the final report of the follow-up study on the 2007 replacement cost study of the project for the improvement of national road No.1 (Stage-1 to Stage-3) through Japanese homepage.

ANNEX 1 Alternatives of Typical Cross Section Sta.1+900 – Sta.4+000

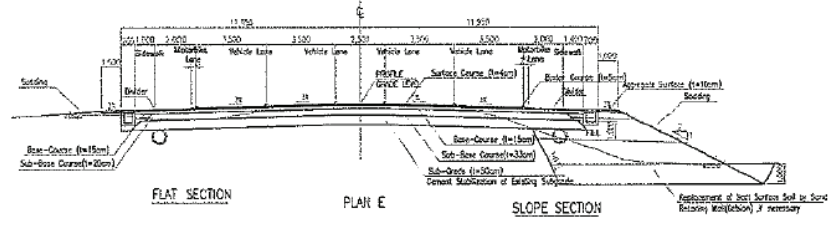
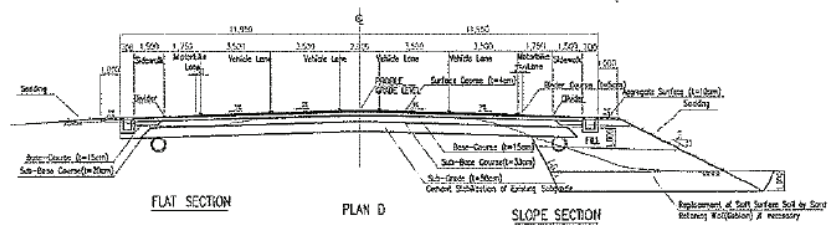
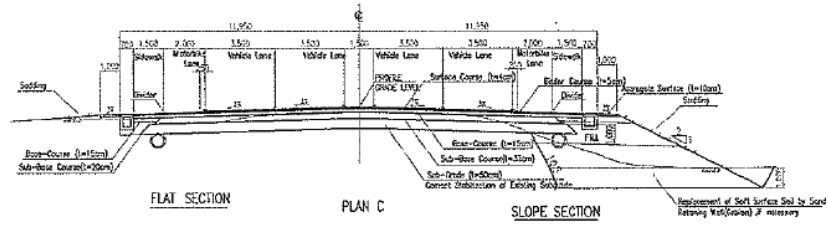
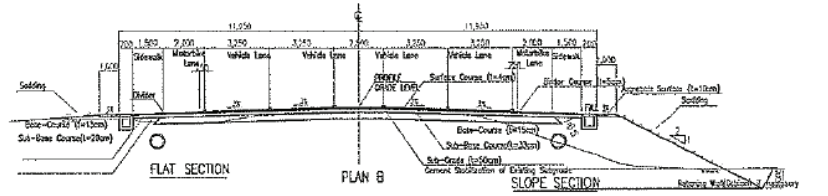
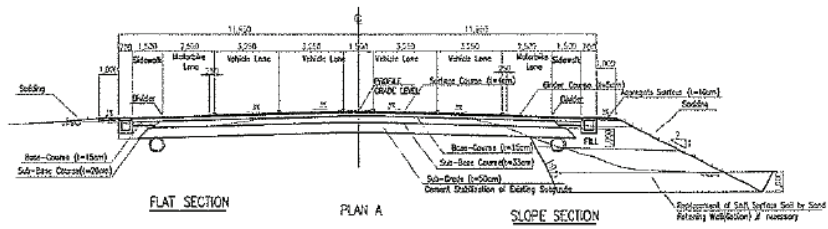
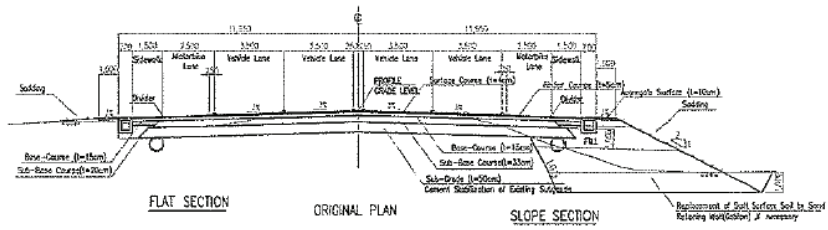
ANNEX 2 Project Cost to be borne by the Japan's Grant Aid (CONFIDENTIAL)

ANNEX 3 Japan's Grant Aid

ANNEX 4 Major Undertakings to be taken by Each Government

ANNEX 5 Flow Chart of Public Utilities Relocation

ALTERNATIVES OF TYPICAL CROSS SECTION STA.1+900 – STA.4+000 ANNEX1



CONFIDENTIAL

Project Cost to be borne by the Japan's Grant Aid

ITEMS		Cost (Million Yen)
Construction Facilities	- Improvement of road (4km)	■
Consulting Services	- Detailed design - Procurement Management - Construction Supervision	■
Total		■

Conditions of Cost Estimation

- 1) Date of estimation: September 2011
- 2) Exchange rate: 1 US Dollar = 81.57 Yen
- 3) Construction Period: as shown in the Implementation Schedule

JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
 - The Survey conducted by JICA
- Appraisal &Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the

implementation of the Project.

- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the

necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure a lot of land necessary for the implementation of the Project and to clear the site;		●
2	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
3	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted		●
4	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
5	To ensure that the Facilities be maintained and used properly and effectively for the implementation of the Project		●
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
7	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
8	To give due environmental and social consideration in the implementation of the Project.		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

Flow Chart of Public Utilities Relocation

Duration	Activities	Responsible Organization
2.0 Months	Confirmation of Utilities to be relocated	The Consultant
1.0 Month	Inform to MPWT	The Consultant
	Arrange the Meeting	MPWT
1.0 Month	MPWT call Meeting with involved organization in relocation (method, time, estimation etc.)	MPWT <ul style="list-style-type: none"> • IRC (Resettlement) • T.C (Optical Fiber Cable and Telephone) • E.D.C (Power Cable & Posts) • PPWSA (Water Pipe) • Police (Traffic Control) • DPWT of P.P. (Traffic Signal)
2.0 Months	Make and Submit the Estimates	Each Organization
	Examine the Estimates	IRC
2.0 Months	Examine the Estimates	MEF (Ministry of Economy and Finance)
1.0 Month	Examine the Estimates	Prime Minister's Office
1.0 Month	Approval of the Estimate	MEF
2.0 Months	Allocation of Budget	MEF
1.0 Month	Tender & Contract	Contractors & Each Organization
Total 13.0 Months	Relocation	Contractors & Each Organization

5. Technical Note

The Project for the Improvement of National No.1
(Phnom Penh – Neak Loeung Section)
Preparatory Study 2011
Technical Note

Date: 14th September 2011

Ministry of Public Works and Transport (MPWT) and Katahira & Engineers International (KEI) confirmed on the Technical matters as follows:

1. Cross Section of the Road

KEI has submitted the drawing of 6 types of Road Cross section between STA.1+800 and STA.4+000 shown on Annex 1.

In terms of adaptability to the Site Condition, MPWT would like to request 4 lane road as wider as possible, if JPAN Side accepted.

KEI will discuss with JICA HQ taking account of the request of MPWT.

2. Drawings

KEI submitted the Drawing of Geographic Survey, and will design the Road in accordance with the Drawings.

3. Traffic Survey

MPWT Submitted KEI the Traffic Survey Data carried out in 7th September 2011.

KEI will utilize the data for determining the Road Cross Section after due consultation with JICA HQ.

4. Water pipes and Fittings under Jurisdiction of Phnom Penh Water Supply Authority (PPWSA)

MPWT agreed KEI to design road to accommodate the Water Pipes and Fittings in conformity with the drawings provided by PPWSA.

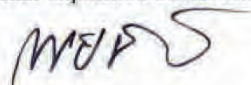
5. Road Surface Water Discharge and Discharge from Cho Ray Hospital

KEI indicated the planned Discharge Points of NR-1 shown in Annex 2.

KEI and DPWT of Phnom Penh's Engineer in charge of Cho Ray Hospital exchanged the information on the planned drainage systems of NR-1 and C.R. Hospital on 14th September 2011. DPWT promised to confirm their Bench mark and provide the technical information to KEI.

Keeping close contact with MPWT, DPWT and KEI, the three parties will share the information for smooth projects implementation.

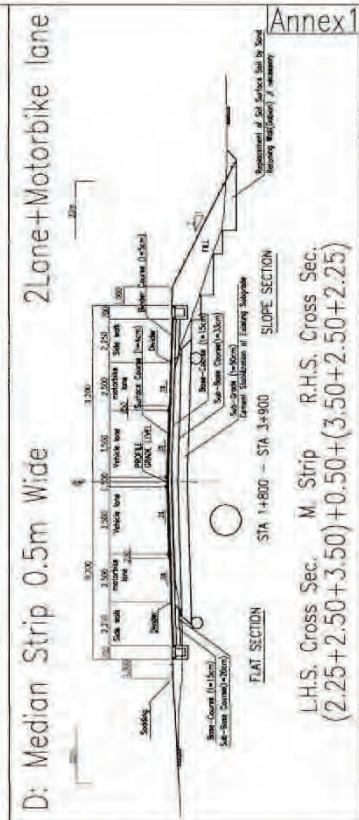
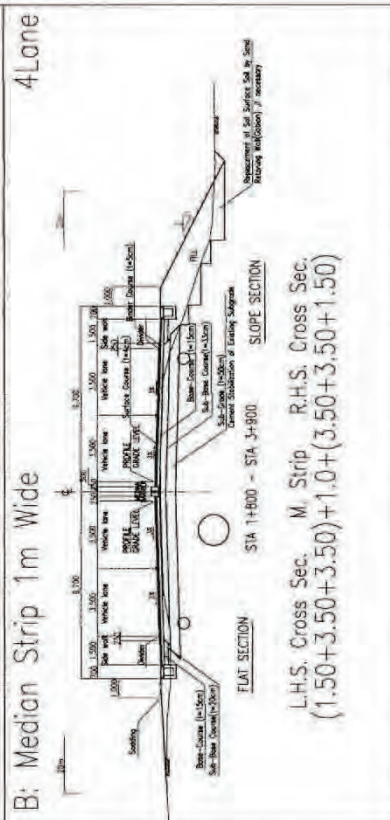
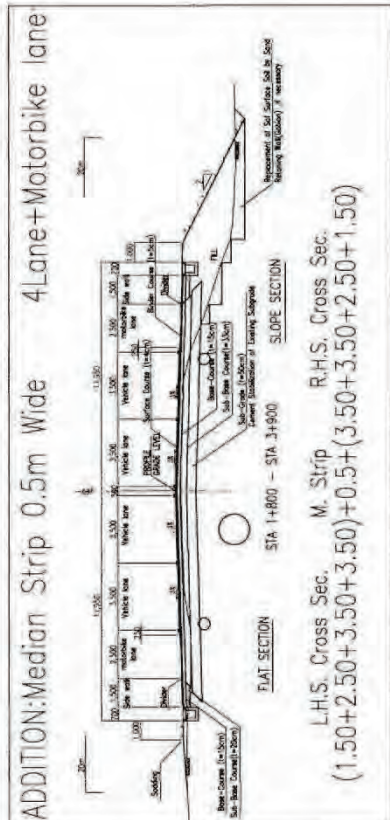
KEI explained environmental concern and possible blockage of discharge pond in future.



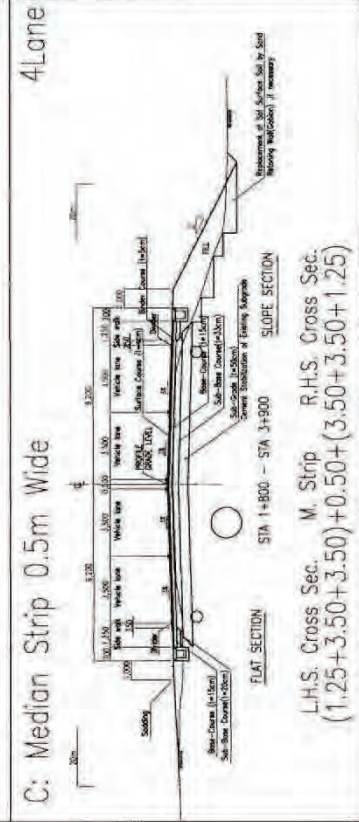
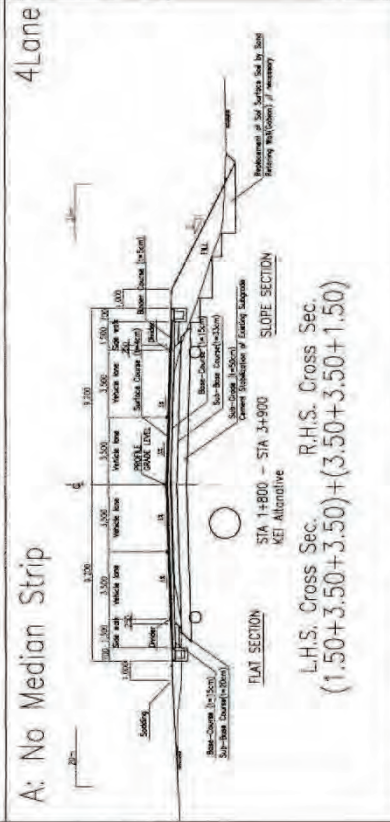
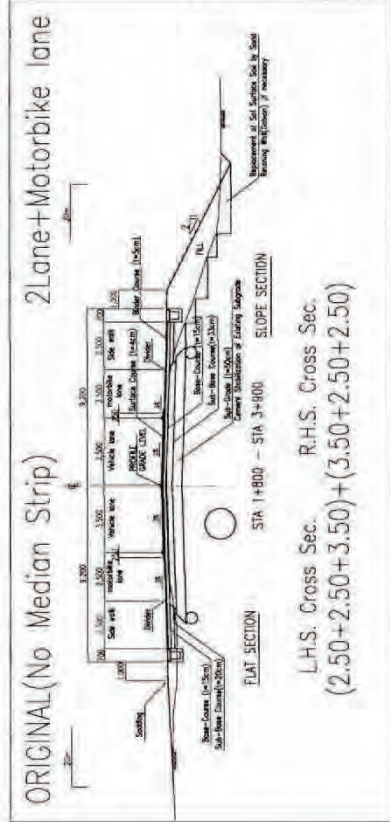
CHHIM PHALLA
Director of International Cooperation Dept.
MPWT



K. HIRAOKA
Chief Consultant
KEI



Annex 1





Annex 2

7. List of Collected Data

No	Name of Data	Form	Original Copy	Agency of Issuance	Year of Issue
1	Plan of pipe arrangement in Niroth Water Supply Project	Drawing CD	Copy	PPWSA	2011
2	Detail drawing for Air Valve in Niroth Water Supply Project	Drawing	Copy	PPWSA	2011
3	Detail drawing for Wash Out Pipe in Niroth Water Supply Project	Drawing	Copy	PPWSA	2011
4	Specification of Ductile pipe in Niroth Water Supply Project	Book	Copy	PPWSA	2011
5	As-Build drawing of existing water pipe along NR1	CD	Copy	PPWSA	2011
6	Updated Resettlement Action Plan (URAP)	CD	Copy	IRC	2009
7	DMS sample data	Sheet	Copy	IRC	2009
8	District of Phnom Penh Capital Hall	Map	Copy	Phnom Penh Capital Hall	2009
9	Overview of Traffic Demand Forecast in Phnom Penh	Report CD	Copy	Phnom Penh Capital Hall	2011
10	Overview of Urban Development in Phnom Penh Capital City ver.3 (Draft)	Report CD	Copy	Phnom Penh Capital Hall	2011

8. Traffic Survey Data

Result of the traffic survey by MPWT in September, 2011

Sta.1km+500

	STA.1+500 (Neak Loeung to Monivong)										STA.1+500 (Monivong to Neak Loeung)										Ttotal PCU/h	Time
	Bicycle	M/B	L/V	H/V	PCU	PCU (2wheel)	PCU (4wheel)	PCU (2wheel)/h	PCU (4wheel)/h	Bicycle	M/B	L/V	H/V	PCU	PCU (2wheel)	PCU (4wheel)	PCU (2wheel)/h	PCU (4wheel)/h				
1	23	796	94	19	394	205	189	546	490	17	418	76	21	283	109	174	286	378	1,699	6-7		
2	36	1,329	157	28	643	341	301			25	683	76	29	381	177	204						
3	27	1,403	205	21	693	358	335	625	625	7	818	102	25	428	206	221	342	508	2,099	7-8		
4	13	1,055	172	20	557	267	290			9	534	118	37	422	136	286						
5	47	729	129	36	490	194	296	347	586	29	677	131	40	490	177	314	336	663	1,931	8-9		
6	46	566	145	29	443	153	290			6	630	180	33	508	159	349						
7	34	549	134	19	385	146	239	272	548	9	512	151	24	409	130	279	263	554	1,635	9-10		
8	8	495	148	33	435	126	309			2	527	139	27	407	132	275						
9	2	444	158	30	422	112	310	228	635	8	537	144	28	421	136	285	281	625	1,768	10-11		
10	3	461	167	31	441	116	325			5	573	152	40	485	145	340						
11	2	471	155	29	421	118	303	238	588	6	514	156	26	423	130	293	252	594	1,670	11-12		
12	5	472	171	19	404	119	285			9	477	142	33	423	122	301						
13	8	380	138	29	378	97	281	206	484	6	469	125	42	433	119	314	225	578	1,492	12-13		
14	12	425	90	24	312	109	203			13	410	127	28	370	106	264						
15	9	475	124	33	400	121	279	262	555	7	436	113	27	353	111	243	202	565	1,583	13-14		
16	7	555	128	31	417	141	276			6	358	126	44	414	91	323						
17	10	479	154	35	446	122	324	226	628	0	374	186	36	461	94	368	214	723	1,790	14-15		
18	4	409	141	34	407	103	304			2	481	176	36	476	121	355						
19	5	289	142	38	394	74	320	197	618	4	220	129	53	416	56	360	163	630	1,607	15-16		
20	17	478	133	35	421	124	298			9	417	93	41	377	107	270						
21	8	554	165	27	448	141	308	305	638	9	520	142	27	411	132	279	316	596	1,855	16-17		
22	22	636	162	34	495	165	330			8	728	164	30	502	184	318						
23	35	841	175	26	535	219	316	380	623	15	997	157	28	554	253	301	456	566	2,025	17-18		
24	26	619	164	27	468	161	306			22	788	134	26	468	203	265						
Total	409	14,910	3,551	687	10,845	3,830	7,015	3,830	7,015	233	13,098	3,239	781	10,310	3,333	6,978	3,333	6,978	21,155			

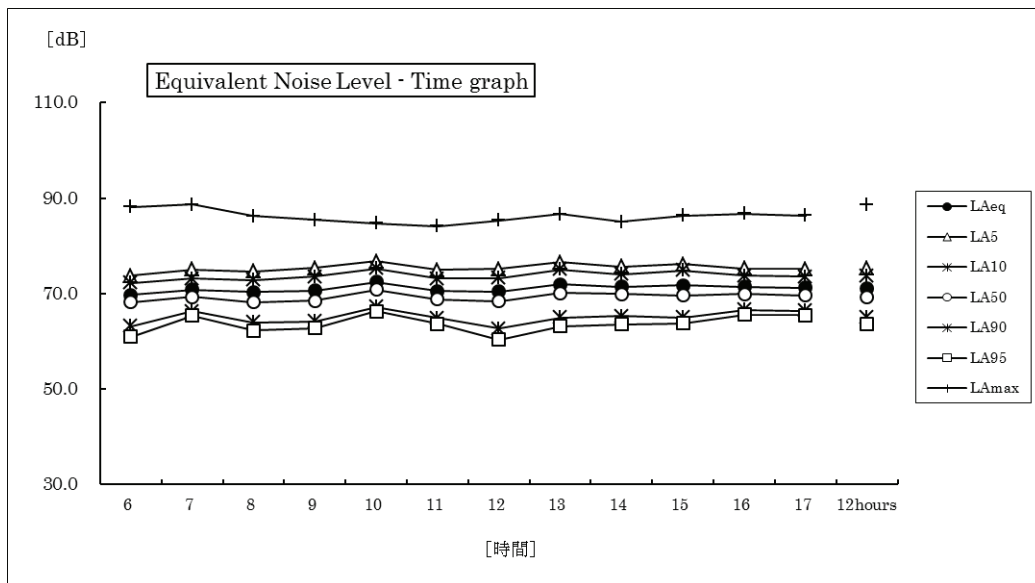
Sta.3+500

	STA.3+500 (Neak Loeung to Monivong)										STA.3+500 (Monivong to Neak Loeung)										Ttotal PCU/h	Time
	Bicycle	M/B	L/V	H/V	PCU	PCU (2wheel)	PCU (4wheel)	PCU (2wheel)/h	PCU (4wheel)/h	Bicycle	M/B	L/V	H/V	PCU	PCU (2wheel)	PCU (4wheel)	PCU (2wheel)/h	PCU (4wheel)/h				
1	53	1,060	104	28	500	278	235	612	505	8	271	44	28	228	70	160	185	319	1,621	6-7		
2	35	1,299	117	33	595	334	270			15	447	67	20	271	116	159						
3	23	1,238	184	27	641	315	331	558	606	6	536	74	21	305	136	171	257	389	1,810	7-8		
4	3	966	121	33	517	242	275			6	481	111	21	338	122	218						
5	1	611	101	30	392	153	239	271	504	3	522	109	21	346	131	215	243	455	1,473	8-9		
6	4	469	110	34	382	118	265			10	437	141	17	349	112	240						
7	6	429	82	40	360	109	253	212	559	1	475	147	24	393	119	274	236	496	1,503	9-10		
8	8	405	122	41	408	103	306			4	463	109	23	338	117	223						
9	3	400	103	39	375	101	275	203	504	0	481	128	24	370	120	250	253	554	1,513	10-11		
10	0	409	126	19	331	102	229			5	525	153	30	435	133	304						
11	2	390	110	28	340	98	243	182	531	10	564	116	29	395	144	254	276	534	1,523	11-12		
12	7	329	126	35	371	84	289			5	524	143	27	411	132	280						
13	8	359	100	26	312	92	223	202	441	3	445	120	26	359	112	248	199	496	1,339	12-13		
14	15	426	76	33	325	110	219			3	346	130	23	335	87	249						
15	11	420	122	26	355	108	250	224	545	0	383	99	25	313	96	218	193	519	1,480	13-14		
16	6	458	116	40	410	116	295			0	387	136	35	398	97	301						
17	5	428	105	42	396	108	289	174	553	2	392	136	47	444	99	346	194	644	1,565	14-15		
18	1	263	100	37	330	66	264			0	383	139	33	393	96	298						
19	3	238	108	35	326	60	266	154	488	2	311	123	46	404	78	326	166	613	1,420	15-16		
20	7	366	96	27	313	93	221			7	345	103	42	373	88	286						
21	12	455	123	27	369	117	255	253	528	20	590	121	28	404	153	256	330	511	1,622	16-17		
22	11	535	131	29	406	137	273			5	703	135	23	431	177	255						
23	9	534	115	19	349	136	215	253	474	43	863	127	20	450	227	234	456	530	1,713	17-18		
24	6	464	99	36	375	118	259			56	862	150	29	512	230	296						
Total	239	12,951	2,697	764	9,474	3,298	6,236	3,298	6,236	214	11,736	2,861	662	8,993	2,988	6,059	2,988	6,059	18,580			

9. Noise Level Survey Data

T1 : Sta.1+600

	Equivalent Noise Level			Max	percentile noise level [L _{Ax}]				
	L _{Aeq}	Cambodia standard	evaluation	L _{Amax}	L _{A5}	L _{A10}	L _{A50}	L _{A90}	L _{A95}
6 ~ 7	69.7	70	○	88.2	73.8	72.2	68.2	63.2	61.0
7 ~ 8	70.8		×	88.7	75.1	73.1	69.3	66.3	65.4
8 ~ 9	70.3		○	86.3	74.7	72.8	68.2	64.0	62.3
9 ~ 10	70.6		×	85.4	75.4	73.6	68.5	64.2	62.8
10 ~ 11	72.4		×	84.7	76.8	75.3	70.8	67.2	66.3
11 ~ 12	70.5		×	84.1	75.0	73.2	68.8	64.9	63.7
12 ~ 13	70.4		○	85.3	75.2	73.3	68.4	62.7	60.4
13 ~ 14	71.9		×	86.7	76.6	75.1	70.1	65.0	63.2
14 ~ 15	71.4		×	85.0	75.7	74.1	69.9	65.3	63.6
15 ~ 16	71.7		×	86.4	76.2	74.9	69.6	65.0	63.8
16 ~ 17	71.4		×	86.8	75.3	73.8	69.9	66.6	65.6
17 ~ 18	71.2		×	86.4	75.2	73.6	69.6	66.4	65.5
12hours	71.1		70	×	—	75.4	73.8	69.3	65.1
MAX	72.4	—	—	88.7	76.8	75.3	70.8	67.2	66.3
MIN	69.7	—	—	—	73.8	72.2	68.2	62.7	60.4



T2 : Sta.4+100

	Equivalent Noise Level			Max	percentile noise level [L _{Ax}]				
	L _{Aeq}	Cambodia standard	evaluation		L _{Amax}	L _{A5}	L _{A10}	L _{A50}	L _{A90}
6 ~ 7	71.5	70	×	87.5	76.5	74.7	69.1	63.4	61.4
7 ~ 8	71.6		×	86.2	76.1	74.5	69.8	65.0	63.7
8 ~ 9	71.8		×	87.6	76.8	74.9	69.5	64.0	62.1
9 ~ 10	71.4		×	87.9	76.6	74.7	69.0	62.2	60.4
10 ~ 11	70.9		×	88.9	75.9	74.1	68.5	62.0	60.2
11 ~ 12	71.3		×	85.1	76.2	74.5	69.1	62.1	60.0
12 ~ 13	71.5		×	87.8	76.9	75.1	68.8	61.4	59.5
13 ~ 14	71.1		×	87.8	76.3	74.6	68.4	61.0	58.9
14 ~ 15	71.1		×	88.0	76.3	74.4	68.3	60.9	59.0
15 ~ 16	70.9		×	87.9	76.1	74.3	68.5	61.1	59.2
16 ~ 17	71.5		×	86.9	76.4	74.6	69.0	62.9	61.3
17 ~ 18	71.9		×	87.0	76.5	74.8	70.0	64.6	63.0
12hours	71.4		70	×	—	76.4	74.6	69.0	62.6
MAX	71.9	—	—	88.9	76.9	75.1	70.0	65.0	63.7
MIN	70.9	—	—	—	75.9	74.1	68.3	60.9	58.9

