

## CHAPTER 3 PROJECT EVALUATION

### 3.1 Preconditions

#### (1) Land Acquisition

In order to improve drainage system, the Project will implement the construction of drainage pipes under public road, underground reservoir within the public park under the jurisdiction of PPCC, pumping station and mechanical screens. During the construction, a temporary occupation of a workspace like traffic control is required for the safe implementation.

There is no permanent resettlement of the residents by the Project. But, land acquisition of two land lots is required for the Project implementation. One is of permanent removal and land acquisition of a vacant building. Other one is temporary relocation of one house during construction to secure work space for construction of box culvert. These building and house are located at the connection point between R315 Drainage Main (box culvert) in Tuol Kork area and Tuol Kork-1 Pumping Station.

Removal and land acquisition of one vacant building and the temporary relocation of one house are the precondition of implementation of the Project. Removal and land acquisition of one vacant building shall be completed prior to the tendering for construction and procurement work. Temporary relocation of one house shall be completed prior to the commencement of construction work.

Other precondition is that DPWT shall be completed the arrangements of the temporary land acquisition for site office, material storage space, stock yard, dumping site, etc. prior to the commencement of construction.

#### (2) Construction Permit

Drainage pipes will be constructed under public road and construction work of underground reservoir, pumping station and mechanical screen will be done within the public park. Public roads and public parks in PPCC is under the jurisdiction of PPCC. DPWT is responsible for management of those public spaces.

Hence, it is not difficult to obtain the construction permit for the Project because PPCC and DPWT are the issuer of the construction permit.

#### (3) Acquisition of Approval of IEIA

In conformity to the Environmental Law in Cambodia, following procedure is required for implementation of the Project.

- IEIA is required to carry out since the area of the Project is larger than 5,000ha.
- IEIA survey must be conducted by the consultant who is registered by MOE in Cambodia.
- IEIA must be approved by MOE because the project cost is higher than US\$2,000,000.

As mentioned above, the environmental precondition for the Project is that the result of IEIA survey is approved by the MOE.

#### **(4) Precondition for Smooth Implementation of the Project**

Most part of construction area of the Project is public land of PPCC, and project site is surrounded with many residential houses, stores/shops, restaurants

Therefore, noise, vibration or dust generated by construction works during the Project may have a negative impact to the residents and owners of the stores/shops/restaurants. DPWT shall hold public consultation and explain to the residents and owners of the stores / shops / restaurants about possibility of negative impact during construction, as well as effect and duration of construction work to obtain the consent of the people in cooperation with the Consultant and the Contractor prior to the construction.

### **3.2 Necessary Inputs by Recipient Country**

Necessary inputs by government of Cambodia to exert and sustain the effect of the Project are as shown below.

#### **(1) Securing of Adequate Budget**

To keep function of drainage facilities in good condition, regular maintenance works, such as cleaning work of drainage pipes, are indispensable.

DSD of DPWT-PPCC shall make annual working schedule of cleaning work of drainage pipe and request PPCC to allocate budget adequate to the working schedule. PPCC is required to allocate and disburse the budget based on the annual working plan of cleaning work of drainage pipe

Annual working volume of cleaning work of drainage pipe shall be constant in every year to keep consistency of the work. Therefore, annual budget of cleaning work shall also be constant in every year.

DPWT shall periodically check/monitor the execution of cleaning work of drainage pipe and disbursement status of budget, and negotiate with PPCC.

#### **(2) Training and Capability Development of DSD Staffs**

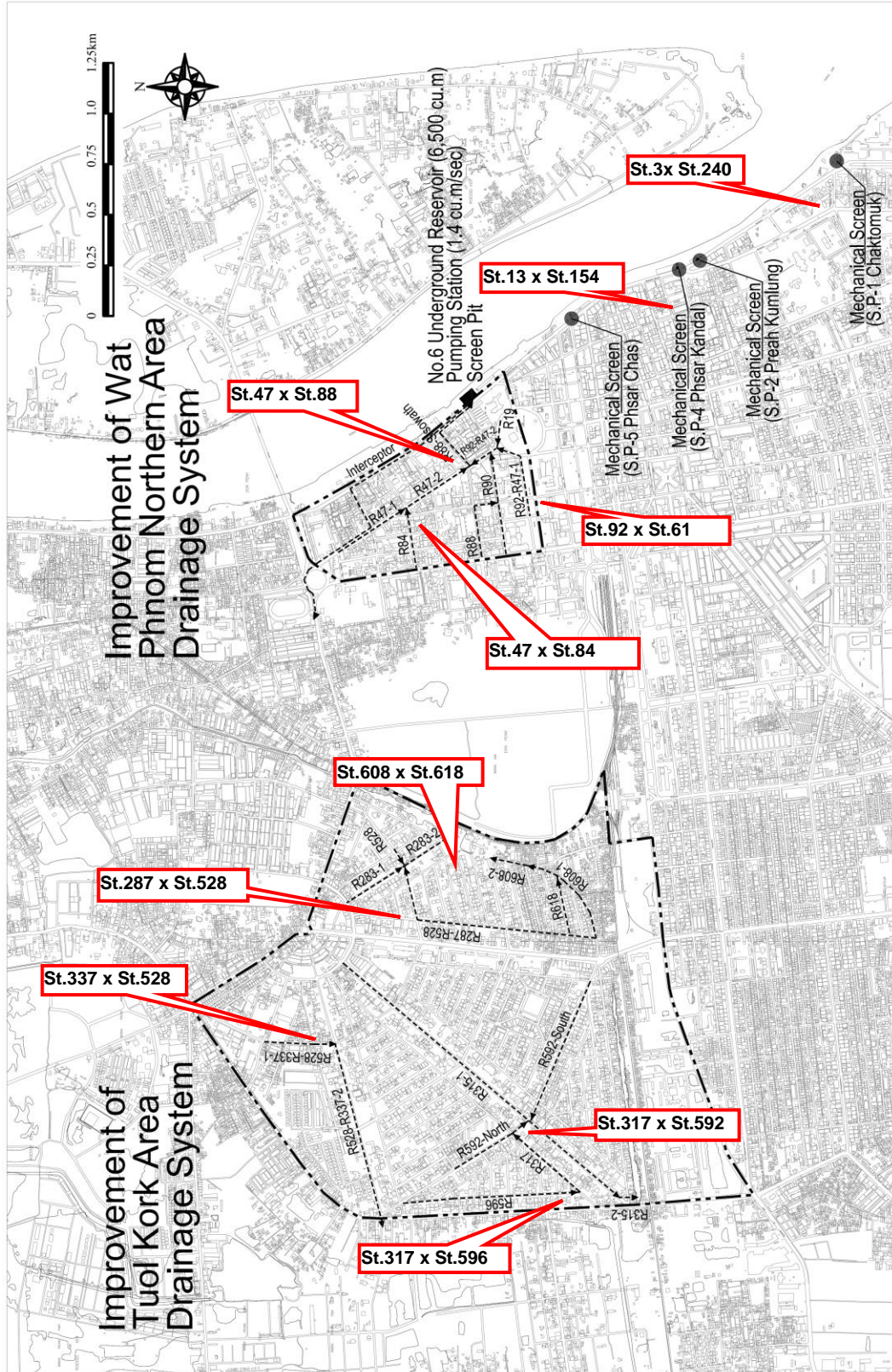
DSD staffs in charge of supervising the cleaning work of drainage pipes at the site and in charge of management of database of drainage facilities are key persons to carry out the efficient and effective O&M work for drainage facilities. Those key personnel need to be increased in DSD. To increase the number of such key personnel, DPWT and DSD shall employ younger staffs and educate them to be able to play a role of supervisor or data manager. DPWT and DSD shall be responsible to maintain the enhanced technical capabilities of DSD staffs.

#### **(3) Conduct of Sustainable Operation and Maintenance Works and Establishment of Management System**

DSD had made base map and database of drainage facilities in Phnom Penh with the support of soft component in the Phase III. DSD must keep updating the base map and database. DSD must keep making annual working plan every year and annual working record of cleaning work of drainage pipe, also. DSD shall report the progress of cleaning work to DPWT periodically. DPWT shall support DSD to carry out actual cleaning work in accordance to working plan and negotiate with PPCC about budget disbursement conforming to working plan.

**(4) Monitoring of Inundation Condition**

To confirm effectiveness of the Project, PPCC (or DPWT) shall carry out inundation monitoring at the locations shown in the following figure. Collected data will be analysed and utilized for reviewing of clearing schedule and drainage improvement plan.



**Fig. R 3.2.1 Proposed Location of Inundation Monitoring**

### **3.3 Important Assumptions**

Important assumptions to accomplish the project objective and to make project effectiveness sustainable are as follows.

- Development strategy of national level and municipal level will not be changed.
- Budget of O&M for drainage facilities will not be rapidly reduced by the PPCC.
- Public order in PPCC and Cambodia will not deteriorate.

### **3.4 Project Evaluation**

#### **3.4.1 Relevance**

The target area of the Project has frequently suffered from inundation damage by heavy rain. This inundation and insufficient drainage system in PPCC is serious problem. This inundation problem, which not only disturb inhabitant's life in PPCC but also might paralyze the capital functions of Cambodia, shall be contended and solved urgently. Relevance of the Project is verified from the following viewpoints:

##### **(1) Target Scale of Benefit**

The target area to be directly benefited by the Project is Wat Phnom Northern Area, Tuol Kork Area and the catchment area of pumping stations which were constructed by Phase II.

The number of direct beneficiary by the Project is approximately 80 thousand people in Wat Phnom Northern Area and Tuol Kork Area, and 120 thousand peoples in the catchment area of pumping stations of Phase II. Total of direct beneficiary is about 12% of the population of Phnom Penh (approximately 1.69million as of 2013 official statistics). Public facilities, such as public market, school and hospital, can be considered as beneficially of the Project.

Additionally, the procurement of vehicle-mounted drainage pumps contributes to mitigate the inundation damage in whole area of Phnom Penh. In this connection, all citizen of PPCC can be considered as beneficially of the Project.

Thus, the number of direct beneficiary of the Project is large. It is considered that the Project is effective to retain the function of capital city of the Cambodia and to stabilize the life of residents in Phnom Penh.

##### **(2) Human Security**

As the positive effects of the Project, the mitigation of deterioration of sanitary environment including the reduction of inundation damage of houses and assets is expected.

Mitigation of inundation will also contribute to preserve people's health, conserve living conditions and sustain working environment, hence, compatible with "Basic Human Needs". These positive effects contribute to improve living condition of poor people because they often live at frequently inundated places

**(3) Operation and Maintenance of Facilities**

DSD of DPWT is has working teams for operation and maintenance work of drainage facilities. Before the project implementation of Phase III, their activities had been not so active due to decrepit and inefficient equipment for maintenance work. To improve cleaning and maintenance capability of DSD, some cleaning equipment had been procured and technical assistance by soft component had been executed in Phase III.

Technical assistance by soft component will also be executed in this Project to improve capability of DSD's staffs for operation and maintenance of drainage facilities and utilization of the vehicle-mounted drainage pumps. Proper operation and maintenance of drainage facilities and equipment will contribute mitigation of inundation damage. Thus, the relevance of the Project is considered to be high.

**(4) Consistency with Long-Term Development Programme**

The Project is to be implemented based on the master plan established in MP1999. It is expected that the Project contributes the proposed action plan of "Flood Mitigations and Development of Urban Infrastructures" in National Strategic Development Plan (NSDP) 2014-2018. The Project is also consistent with the development strategy of PPCC, such as "Improvement of Drainage System" and "Development of Infrastructure and Transportation".

The relevance of the Project is high since the goal of the Project is consistent with the long-term development programme of the Cambodia and PPCC.

**(5) Impact to Environment**

There is no significant or permanent negative impact to natural and social environments caused by the Project. In contrast, positive impact such as improved living and social environments by mitigation of inundation damage and enhancement of maintenance work of drainage facilities is expected.

**(6) Consistency with Japan's Aid Policy and Objective**

The Project is to be implemented based on the master plan established in MP1999 and revised in "The Study on Drainage and Sewerage Improvement Project in Phnom Penh Metropolitan Area, JICA, December 2016".

The relevance of the Project is high since the Project is consistent with development plan formulated by Japanese assistance.

**(7) International Efforts**

"Sendai Framework for Disaster Risk Reduction 2015-2030" was adopted at the Third World Conference on Disaster Risk Reduction which held from 14 to 18 March 2015 in Sendai city, Japan, and four priority actions and seven global targets have been agreed. The Project is consistent with a priority action "Investing in disaster risk reduction for resilience". The Project is also consistent with "Make cities and human settlements inclusive, safe, resilient and sustainable" that is one of the 17 Sustainable Development Goals (SDGs) published in "Transforming our world: the 2030 Agenda for Sustainable Development" which was adopted on September 2015.

The relevance of the Project is high since the Project is consistent with the international efforts.

### 3.4.2 Effectiveness

#### (1) Quantitative and Direct Effectiveness

The inundation depth under a 2-year rainfall is less than 0.2m, the duration is shorter than 2 hours, and the flood damage in Wat Phnom Northern Area and Tuol Kork Area is mitigated by the proposed drainage improvement in the Project. Moreover, the decrease of frequency of flood is also expected.

**Table R 3.4.1 Index of Drainage System Improvement by the Project**

Name of Index		Baseline (Actual Value in 2015)	Target Value (in 2023) 【3 Years after the Project】
Inundation Area	Wat Phnom Northern Area (m <sup>2</sup> )	111,600	49,500
	Tuol Kork Area (m <sup>2</sup> )	460,800	169,200
Inundation Depth (Above Both Area) (cm)		Max. 50	Max. 20
Flood Duration (Above Both Area) (hour)		Max. 9	Max. 2

Note 1) The above target value is computed by the condition of the lower scale of 2-year return period rainfall. The intensity of 2-year return period rainfall is 44.8mm/hr. or 87.8mm/day.

Note 2) The above inundation area is computed by the flood duration which is longer than 10 minutes

Note 3) The monitoring point is as given below

Wat Phnom North Area : St.47×St.84, St.47×St.88

Tuol Kork Area : St.337×St.528, St.317×St.592, St.287×St.528

#### (2) Qualitative and Indirect Effectiveness

##### (a) Economic Effectiveness

The prevention/mitigation of inundation damage by the construction of drainage improvement facilities and procurement of vehicle-mounted drainage pumps in the Project contribute to avoid the occurrence of economic damage by the inundation in PPCC. The Project also contributes to accomplish the “Stabilization of the livelihood of people in the Phnom Penh Capital City” which is the one of objective of strategy of urban development in PPCC. The following economic effect is expected.

- Reduction of the economic loss due to mitigation of flood/inundation damage in the commercial, tourist and administrative area of Wat Phnom Northern Area and commercial and residential area of Tuol Kork Area.
- Promotion of commercial activities and tourism in Wat Phnom Northern Area and Tuol Kork Area due to mitigation of flood/inundation damage.

##### (b) Improvement of Urban Environment and Hygienic Condition

The following improvement of urban environment and hygienic condition is expected due to mitigation of flood/inundation damage by the Project.

- Urban environmental condition, such as unpleasant odorous emission and scattering of sediment/sludge/solid waste out from drainage facilities, are improved by the improvement of the drainage system and mitigation/ minimization of inundation damage in Wat Phnom Northern Area and Tuol Kork Area
- The incidence rate of waterborne disease, like cutaneous disease, cold, diarrhea, typhoid and dysentery, are decreased by the improvement of the hygienic condition due to mitigation of inundation.

This effectiveness contributes to accomplish the “Improvement of Urban Environment and Hygienic Condition” on City Development Strategy of PPCC.

**(c) Improvement of Traffic Condition**

The road traffic not only at central city but also at suburbs of PPCC are blocked due to flood/inundation damages, which frequently causes the concentration of traffic jam along the road which has no inundation. The target area of the Project includes a busy road which is used by many citizen of PPCC during morning and evening rush hours for going to work and to school. The inundation during rush hours negatively affects commercial activity as well as administrative activities in PPCC.

In regard to this, the Project has primary effectiveness that the mitigation of inundation in Wat Phnom Northern Area and Tuol Kork Area contributes to reduce traffic jam along principal road and others. Likewise, the Project has secondary effectiveness that the reduction of traffic jam might contribute to reduce the traffic accidents and to provide a comfortable vehicle travel.

This effectiveness contributes to accomplish the “Urban Development in consideration of flood mitigation” on City Development Strategy of PPCC.

**3.4.3 Conclusion**

The Project has high relevance and effectiveness. Hence, early implementation of “the Project for Flood Protection and Drainage Improvement in Phnom Penh (Phase IV)” is highly recommended.





# ***[APPENDICES]***

Appendix 1. Member List of the Survey Team

Appendix 2. Survey Schedule

Appendix 3. List of Parties Concerned in Cambodia

Appendix 4. Minutes of Discussions

Appendix 5. Soft Component (Technical Assistance) Plan

Appendix 6. Result of Inundation Condition Survey

Appendix 7. Summary of Gap Analysis on Resettlement Policy between Cambodian Laws/  
Regulation and JICA Guidelines



## Appendix 1. Member List of the Survey Team

### (1) Field Survey in Cambodia (March 28 to June 9, 2016)

Name	Designation	Affiliation
Mr. Atsushi SOMA	Leader	Deputy Director, Disaster Risk Reduction Team 1, Disaster Risk Reduction Group, Global Environment Department, JICA
Mr. Tsuyoshi MATSUSHITA	Consultant's Project Manager / Flood Protection Planning / O & M Planning	CTI Engineering International Co., Ltd.
Mr. Hitoshi SHIMOKOCHI	Drainage Facility Planning (Facilities Plan / Design)	CTI Engineering International Co., Ltd.
Mr. Hitoshi NAGATA	Drainage Facility Planning (Drainage Analysis)	CTI Engineering International Co., Ltd.
Mr. Shuji SATO	Drainage Facility Planning (Pump / Mechanical Screen)	CTI Engineering International Co., Ltd.
Mr. Hideo MAEDA	Construction Planning / Cost Estimate	CTI Engineering International Co., Ltd.
Mr. Keigo ITO	Environmental and Social Consideration	CTI Engineering International Co., Ltd.
Mr. Satoru HADA	Equipment Planning / Natural Condition Survey	CTI Engineering International Co., Ltd.

### (2) Explanation on Draft Final Report in Cambodia (October 8 to October 16, 2016)

Name	Designation	Affiliation
Mr. Yuki ARATSU	Leader	Senior Assistant Director, Water Resources Group, Disaster Risk Reduction Group, Global Environment Department, JICA
Mr. Atsushi SOMA	Survey Planning	Deputy Director, Disaster Risk Reduction Team 1, Disaster Risk Reduction Group, Global Environment Department, JICA
Mr. Tsuyoshi MATSUSHITA	Consultant's Project Manager / Flood Protection Planning / O & M Planning	CTI Engineering International Co., Ltd.
Mr. Hitoshi SHIMOKOCHI	Drainage Facility Planning (Facilities Plan / Design)	CTI Engineering International Co., Ltd.



## Appendix 2. Survey Schedule

### (1) Field Survey in Cambodia (March 28 to June 9, 2016)

No.	Date		Leader	Consultant's PM / Flood Protection Planning / O&M Planning	Drainage Facility Planning (Facilities Plan/Design)	Drainage Facility Planning (Drainage Analysis)	Drainage Facility Planning (Pump / Mechanical Screen)	Construction Planning / Cost Estimate	Environmental and Social Consideration	Equipment Planning/Natural Condition Survey		
			SOMA Atsushi	MATSUSHITA Tsuyoshi	SHIMOKOCHI Hitoshi	NAGATA Hitoshi	SATO Shuji	MAEDA Hideo	ITO Keigo	HADA Satoru		
1	28-Mar	Mon										
2	29-Mar	Tue		Meeting with JICA Cambodia / Meeting with DPWT								
3	30-Mar	Wed		Data Collection / Preparation for Subcontract Survey								
4	31-Mar	Thu		Data Collection / Preparation for Subcontract Survey								
5	1-Apr	Fri		Meeting with DPWT								
6	2-Apr	Sat		Site Survey								
7	3-Apr	Sun		ditto								
8	4-Apr	Mon		Data Collection / Selection of Subcontractor								
9	5-Apr	Tue		Meeting with DOEPP								
10	6-Apr	Wed		Meeting with PPWSA / Site Survey								
11	7-Apr	Thu		Meeting with DSD / Contract of Inundation Condition (E/S) Survey								
12	8-Apr	Fri		Data Collection / Meeting with PPCC								
13	9-Apr	Sat		Data Arrangement								
14	10-Apr	Sun		ditto								
15	11-Apr	Mon		Inundation Condition (E/S) Survey / Site Survey								
16	12-Apr	Tue		Preparation of Topo., Geo., Manhole & Test Excavation Survey								
17	13-Apr	Wed		Confirmation of Schedule & TOR / Bid for Topo., Geo., Manhole & Test Excavation Survey								
18	14-Apr	Thu		Selection of Contractor & Contract for Topo., Geo., Manhole & Test Excavation Survey								
19	15-Apr	Fri		Site Survey								
20	16-Apr	Sat		Data Arrangement								
21	17-Apr	Sun		Data Arrangement								
22	18-Apr	Mon		Study of the Project Components								
23	19-Apr	Tue		Team Meeting / Site Survey						/ Meeting		
24	20-Apr	Wed		Data Collection / Study of the Project Components			Site Survey	Site Survey	Meeting with MOE	Site Survey		
25	21-Apr	Thu		Meeting with DPWT			Meeting with DPWT					
26	22-Apr	Fri		Data Collection / Study of the Project Components			Data Collection	Data Collection	Data Collection	Survey Supervision		
27	23-Apr	Sat		Data Arrangement								
28	24-Apr	Sun		ditto								

No.	Date		Leader	Consultant's PM / Flood Protection Planning / O&M Planning	Drainage Facility Planning (Facilities Plan/Design)	Drainage Facility Planning (Drainage Analysis)	Drainage Facility Planning (Pump/Mechanical Screen)	Construction Planning / Cost Estimate	Environmental and Social Consideration	Equipment Planning/Natural Condition Survey
			SOMA Atsushi	MATSUSHITA Tsuyoshi	SHIMOKOCHI Hitoshi	NAGATA Hitoshi	SATO Shuji	MAEDA Hideo	ITO Keigo	HADA Satoru
29	25-Apr	Mon	AM: Meeting in JICA and DPWT, PM: Courtesy Call on PPCC, Kick-off Meeting on IC/R		Planning Design		Site Survey	Data Collection	Data Collection	Data Collection
30	26-Apr	Tue	AM: Discussion on M/D with PPCC PM: Site Survey		ditto		ditto	ditto	ditto	ditto
31	27-Apr	Wed	AM: Discussion on M/D with PPCC PM: Site Survey		ditto		Planning Design	ditto	ditto	ditto
32	28-Apr	Thu	Signing on M/D		Team Meeting					
33	29-Apr	Fri	AM: Report to EOJ and JICA		Planning Design	Data Collection	Planning Design	Data Collection	Data Collection	Data Collection
34	30-Apr	Sat	Report to EOJ and JICA		ditto					
				Data Arrangement						
35	1-May	Sun	Data Arrangement							
36	2-May	Mon		Planning & Design	Planning Design	Data Collection	Planning Design	Data Collection	Data Collection	Survey Supervision
37	3-May	Tue		ditto	ditto	Data Collection	ditto	ditto	ditto	ditto
38	4-May	Wed	Meeting with DPWT							
39	5-May	Thu		Planning & Design	Planning Design	Data Collection	Planning Design	Data Collection	Data Collection	Data Collection
40	6-May	Fri		ditto	Reporting	Analysis	Reporting			ditto
41	7-May	Sat		ditto	Reporting	ditto	Reporting			Progress Check
42	8-May	Sun		Data arrangement		Data arrangement				Data arrangement
43	9-May	Mon		Planning & Design		Analysis				Interim Report
44	10-May	Tue		Reporting		ditto				Survey Supervision
45	11-May	Wed		Reporting		ditto				ditto
46	12-May	Thu		Report of Site Survey Result to DPWT/PPCC		ditto				ditto
47	13-May	Fri		Data Arrangement		ditto				ditto
48	14-May	Sat		Data Arrangement		Data Arrangement				ditto
49	15-May	Sun		ditto		ditto				ditto
50	16-May	Mon		Reporting		Analysis				ditto
51	17-May	Tue		Reporting						ditto
52	18-May	Wed		Reporting						ditto
53	19-May	Thu		Reporting						ditto
54	20-May	Fri		Report to JICA, EOJ						ditto
55	21-May	Sat								ditto
~	~	~								ditto
60	4-Jun	Sat								Data arrangement
61	5-Jun	Sun								Summarize Survey Result
62	6-Jun	Mon								ditto
63	7-Jun	Tue								ditto
64	8-Jun	Wed								ditto
65	9-Jun	Thu								

PPCC : Phnom Penh Capital City

DPWT : Department of Public Works and Transport

Mobilization to Phnom Penh

Demobilization from Phnom Penh

Saturday	Saturday
Sunday	Sunday
Holiday	Holiday

**(2) Explanation on Draft Final Report in Cambodia (October 8 to October 16, 2016)**

No.	Date		Team Leader	Survey Planning	Consultant's PM / Flood Protection Planning / O&M Planning	Drainage Facility Planning (Facilities Plan/Design)
			ARATSU Yuki	SOMA Atsushi	MATSUSHITA Tsuyoshi	SHIMOKOCHI Hitoshi
1	8-Oct	Sat	Mobilization from Japan to Phnom Penh			
2	9-Oct	Sun	Arrive in Phnom Penh			Preparation for M/D Discussion
3	10-Oct	Mon	a.m.	Meeting with JICA Cambodia Office (@JICA Cambodia Office) Internal Meeting (@JICA Cambodia Office)		
			p.m.	Meeting with DPWT (@DPWT Office)		
4	11-Oct	Tue	a.m.	Courtesy Call on Vice Governor of PPCC Explanation of the Draft Report and Discussion of M/D (@PPCH)		
			p.m.	Finalization of M/D and Preparation for Signing on M/D		
5	12-Oct	Wed	a.m.	Signing on M/D (@PPCH)		
			p.m.	Site Visit		
6	13-Oct	Thu	a.m.	Site Visit		
			p.m.	Meeting with IRC of MEF on Land Acquisition and Temporary House Relocation		
7	14-Oct	Fri	a.m.	Report to Embassy of Japan in Cambodia Meeting with Department of Bilateral Cooperation of MEF on Project Implementation		
			p.m.	Depart from Phnom Penh	Site Visit	
8	15-Oct	Sat	Arrive in Japan			Depart from Phnom Penh
9	16-Oct	Sun	Arrive in Japan			

M/D : Minutes of Discussion  
 PPCC : Phnom Penh Capital City  
 PPCH : Phnom Penh Capital Hall  
 DPWT : Department of Public Works and Transport  
 MEF : Ministry of Economy and Finance  
 IRC : Inter-ministerial Resettlement Committee  
 JICA : Japan International Cooperation Agency

Saturday
Sunday





### Appendix 3. List of Parties Concerned in Cambodia

Name	Designation	Organization
<b><u>Phnom Penh Capital City: PPCC (Head Office)</u></b>		
H.E. Pa Socheatevong	Governor	PPCC
H.E. Ieng Aunny	Vice Governor	PPCC
H.E. Suy Serith	Vice Governor	PPCC
Mean Chanyada	Director	Administration
Huot Hay	Deputy Director	Administration
Yut Longdy	Deputy Director	Administration
So Phannara	Director	Administration Division
Sok Chamroeun	Deputy Director	Administration Division
Chhay Sopheara	Assistant	Assistant of H.E. Suy Serith
Seng Vannak	Deputy Director	City Management
Chou Meangchan	Director	Planning and Investment Division
Uk Sophal	Director	Financial Division
Sin Boramey	Director	Urbanization Division
Phal Sophak	Deputy Director	Urbanization Division
Suos Chormoni	Director	Accounting Office
Nuon Samnavuth	Deputy Director	Waste Management Division
Phan Sopheaknita	Chief	Public Relations and International Cooperation Office
<b><u>Department of Public Works &amp; Transport : DPWT/PPCC</u></b>		
Sam Piseth	Director	DPWT/PPCC
Chou Kimtry	Deputy Director	DPWT/PPCC
Peov Meng Hai	Deputy Director	DPWT/PPCC
Moeung Sophan	Advisor	DPWT/PPCC
Pheng Pharinet	Officer	DPWT/PPCC
<b><u>Drainage and Sewerage Division : DSD-DPWT</u></b>		
Dourng Chansarath	Cheif	DSD
Chhorng Vantha	Deputy Cheif	DSD
Men Sokkhen	Deputy Cheif	DSD
Sim Lyda	Engineer	DSD
<b><u>Department of Environment : DOE/PPCC</u></b>		
Choeun Sothon	Director	DOE
Khuon Dara	Deputy Director	DOE
<b><u>Department of Land Management, Urban Planning and Construction: DLMUPC/PPCC</u></b>		
Saren Vanna	Director	DLMUPC/PPCC
Dy Sanith	Deputy Director	DLMUPC/PPCC
Sean Soyany	Chief of Cadastral Office	DLMUPC/PPCC
<b><u>Department of Planning: DOP/PPCC</u></b>		
Kim Chandina	Director	Department of Planning
<b><u>Department of Economy and Finance: DEF/PPCC</u></b>		
Va Sothea	Director	DFE/PPCC
Chey Vimearithhea	Deputy Director	DFE/PPCC
<b><u>Department of Water Resources and Meteorology : DOWRAM/PPCC</u></b>		
Mao Bundheurn	Director	DOWRAM/PPCC
Chea Ahuchit	Office Head	DOWRAM/PPCC
<b><u>Khans in Phnom Penh Capital City</u></b>		
Phang Lyda	Deputy Governor	Khan Toul Kork
Yous Yuthy	Deputy Governor	Khan Daun Penh
Lay Oudom	Deputy Governor	Khan Sen Sok
<b><u>Phnom Penh Police</u></b>		
Ouk Samrach	Deputy Chief	
Chom Soheat	Deputy Chief	Military Police

**Ministry of Economy and Finance : MEF**

Chhuon Samrith                      Director  
Im Sethyra                              Director  
Yen Sophan                              Deputy Director

General Department of Budget  
Resettlement Department  
Resettlement Department

**Ministry of Environment : MOE**

Pak Sokharavuth                      Director  
Thiv Sophearith                        Deputy Director  
Danh Serey                                Director

Department of Air and Noise Quality Management  
Department of Air and Noise Quality Management  
Environmental Impact Assessment Department

**Phnom Penh Water Supply Authority : PPWSA**

Samreth Sovithiea                      Deputy General Director  
Chea Satephoat                         Director

Planning and Project Department

**Electricité du Cambodge : EDC**

Iv Visal                                      Deputy Director  
Somarith Sam                              Chief

Distribution Department  
Project Planning of Distribution Technical Office

**Embassy of Japan in Cambodia**

Taizo Chiba                                Second Secretary

Embassy of Japan

**JICA Cambodia**

Itsu ADACHI                                Chief Representative  
Takashi ITO                                Senior Representative  
Togo UCHIDA                               Project Formulation Advisor  
Say Bora                                      Program Officer  
Seng Solady                                 Program Officer

JICA, Cambodia Office  
JICA, Cambodia Office  
JICA, Cambodia Office  
JICA, Cambodia Office  
JICA, Cambodia Office

## Appendix 4. Minutes of Discussions


### 4.1 Field Survey in Cambodia (Signed on April 28, 2016)

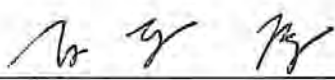
**MINUTES OF DISCUSSIONS**  
**ON**  
**THE PREPARATORY SURVEY ON**  
**THE PROJECT FOR FLOOD PROTECTION AND**  
**DRAINAGE IMPROVEMENT**  
**IN THE PHNOM PENH CAPITAL CITY (Phase IV)**

In response to the request from the Government of the Kingdom of Cambodia (hereinafter referred to as "Cambodia"), the Government of Japan decided to conduct a Preparatory Survey on the Project for Flood Protection and Drainage Improvement in the Phnom Penh Capital City (Phase IV) (hereinafter referred to as "the Project"), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to Cambodia, headed by Mr. Atsushi Soma, Deputy Director of Disaster Risk Reduction Team 1, Global Environment Department, and the Team stayed in Cambodia from 25th to 29th April, 2016.

The Team held a series of discussions with the officials concerned of the Government of Cambodia and conducted field surveys in the Project sites. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Phnom Penh, 28th April, 2016 



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**Atsushi Soma**  
**Team Leader**  
**Preparatory Survey Team**  
**Japan International Cooperation Agency**  
**Japan**


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**H.E. PA Socheatevong**  
**Governor**  
**Phnom Penh Capital City**  
**Cambodia**

## ATTACHMENT

1. Objective of the Project  
The objective of the Project is to minimize inundation by local rainfall and to reduce inundation damage.
2. Title of the Preparatory Survey  
Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Flood Protection and Drainage Improvement in the Phnom Penh Capital City (Phase IV)”.
3. Project Site  
Both sides confirmed that the sites of the Project are Tuol Kork Area, Wat Phnom Northern Area and Four Pumping Stations which are shown in Annex 1.
4. Line Agency and Executing Agency  
Both sides confirmed the line agency and the executing agency as follows:
  - 4-1. The line agency is the Phnom Penh Capital City (hereinafter referred to as “PPCC”), which would supervise the executing organization.
  - 4-2. The executing agency is the Department of Public Works and Transport of PPCC (hereinafter referred to as “DPWT”), which shall coordinate with all the relevant agencies/departments to ensure smooth implementation of the Project and ensure that the Undertakings are taken by them properly and on schedule. The organization charts are shown in Annex 2.
5. Items requested by the Government of Cambodia
  - 5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Cambodia for the Project are as shown in the Table below.

Components	Category	Detailed Contents (will be studied in the Preparatory Survey)
Improvement of Wat Phnom Northern area drainage system	Construction of Facility	- Drainage Pipe (Dia.1,000mm~1,800mm, Length=Max. 3.2km in total) - Pumping Station (Q=1.4m <sup>3</sup> /s) - Underground Reservoir (V=5,000m <sup>3</sup> ) Interceptor Pipe (Dia.1,000mm, Length=approx. 1.5km)
Mechanical screen cleaning facilities to screen pits at pumping stations constructed in phase 2	Construction of Facility	Mechanical Screen at existing Four Pumping Stations (Chak Tomuk P.S. (P1), Preah Kumulung P.S. (P2), Phsar Kandal P.S. (P4), Phsar Chaas P.S. (P5))
Improvement of Tuol Kork area drainage system	Construction of Facility	- Pumping Station (Q=1.4m <sup>3</sup> /s) - Drainage Pipe (Dia.1,000mm~1,800mm, Length=Max. 7.3km in total) Drainage Box Culvert (2m x 2m ~ 2.5m x 3.5m, Length=Max. 0.7km in total)
Procurement of Detention Pond cleaning equipment	Procurement of Equipment	Vehicle-Mounted Drainage Pump (1~2 units)

Note: The outline of these components is summarized in Annex 3.

- 5-2. JICA will assess the appropriateness of the above requested items through the survey and will report findings to the Government of Japan. The final components of the Project would be decided by the Government of Japan.
6. Japanese Grant Aid Scheme
- 6-1. The Cambodian side understands the Japanese Grant Scheme and its procedures as described in Annex 4, Annex 5 and Annex 6, and necessary measures to be taken by the Government of Cambodia.
- 6-2. The Cambodian side understands to take the necessary measures, as described in Annex 7, for smooth implementation of the Project, as a condition for the Japanese Grant to be implemented. The detailed contents of the Annex 7 will be worked out during the survey and shall be agreed no later than the explanation of a draft Preparatory Survey Report.  
The contents of Annex 7 will be used to determine the following:  
(1) Scope of the Project.  
(2) Schedule of the Project implementation.  
(3) Time and possibility of budget allocation.  
Contents of Annex 7 will be updated as the Preparatory Survey progresses, and will finally be the Attachment to the Grant Agreement.
7. Schedule of the Survey
- 7-1. The Team will proceed with further survey in Cambodia until June 2016.
- 7-2. JICA will prepare a draft Preparatory Survey Report in English and will dispatch another mission to Cambodia in order to explain its contents around middle of September 2016.
- 7-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the undertakings are fully agreed by the Cambodian side, JICA will complete the final report in English and send it to the Government of Cambodia around December 2016.
- 7-4. The above schedule is tentative and subject to change due to the progress of the Survey.
8. Environmental and Social Considerations
- 8-1. The Cambodian side confirmed to give due environmental and social considerations during implementation of the Project, and after completion of the Project, in accordance with “the JICA Guidelines for Environmental and Social Considerations [April, 2010]”.
- 8-2. The Project is categorized as B because the Project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under “the JICA guidelines for environmental and social considerations [April 2010]”, and its potential adverse impacts on the environment are not likely to be significant. The Cambodian side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by December 2016. And both sides confirmed that the EIA/IEE report shall be submitted to the responsible authorities by the end of August 2016.
- 8-3. For projects that will result in involuntary resettlement, the Cambodian side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Cambodian side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, in a timely manner.

*Nr*



## 9. Other Relevant Issues

### 9-1. Possibility of modification of items, components and detail contents

Both side confirmed that there is a possibility of modifying and/or deleting the requested items, components and detail contents for the Project, described in 5-1. above, according to the result of the Preparatory Survey. The Team will make necessary further survey and will make deep analysis in Japan. Detailed specifications will be explained by next mission team from JICA to be scheduled around the middle of September 2016.

### 9-2. Implementation of RAP

Both sides confirmed that a necessary procedure of RAP to make available of lands and spaces for the Project must be completed before the Tender of Notice as described in Annex 7. And both side also confirmed that PPCC will submit a tentative schedule of this procedure by the end of August 2016 which will be a precondition for JICA to dispatch next mission to explain the draft Preparatory Survey Report.

### 9-3. Land acquisition

Both sides confirmed that it will be necessary to secure enough lands and spaces mentioned below for constructing a new drainage pumping station and drainage pipelines in Tuol Kork area in the Project. PPCC agreed that a land acquisition plan shall be submitted to JICA by the end of August 2016 which will also be a precondition for JICA to dispatch next mission to explain the draft Preparatory Survey Report. And PPCC also confirmed that it is necessary to complete the acquisitions before the notice Tender, otherwise the schedule of the Project may be affected.

- At least 20m x 40m land at the area of the intersection of St.337 and St.592
- A parking shelter at the corner between St.315 and St.608

### 9-4. Soft component

Both sides confirmed that initial guidance for operation and maintenance of the facilities, equipment and machinery will be included in the Project to support smooth operation and maintenance by DPWT. And both side confirmed that these are idea of the soft component requested by Cambodia and these will be studied further by the Team and proposed in the draft Preparatory Survey Report.

- Capacity building of Drainage and Sewerage Division of DPWT (hereinafter referred to as "DSD") to execute systematic and scheduled cleaning work of the drainage system
- Capacity building of DSD to execute appropriate utilization and maintenance of the equipment procured by the Project
- Enlightening activities by PPCC, DPWT, Department of Environment of PPCC (hereinafter referred to as "DOE"), Local authorities and the Consultant to reduce illegal dumping of solid waste into drainage facilities by Community Participation

### 9-5. Taxes borne by Cambodian side and its budget allocation

With reference to Annex-4 and Annex-7, both sides confirmed that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the recipient with respect to the purchase of the products and/or the services be exempted by its designated authority without using the Grant.

### 9-6. Monitoring during the implementation

PPCC and DPWT agreed to monitor the Project every three (3) months during the implementation by using the Project Monitoring Report form as attached in Annex-8

### 9-7. Confidentiality of the Project

The Team explained that the Preparatory Survey Report to be prepared at the end of the survey would be disclosed to the public in Japan. However, the Team also explained that a confidential part which might affect bidding process such as cost estimation should be kept undisclosed until the bidding has been completed.

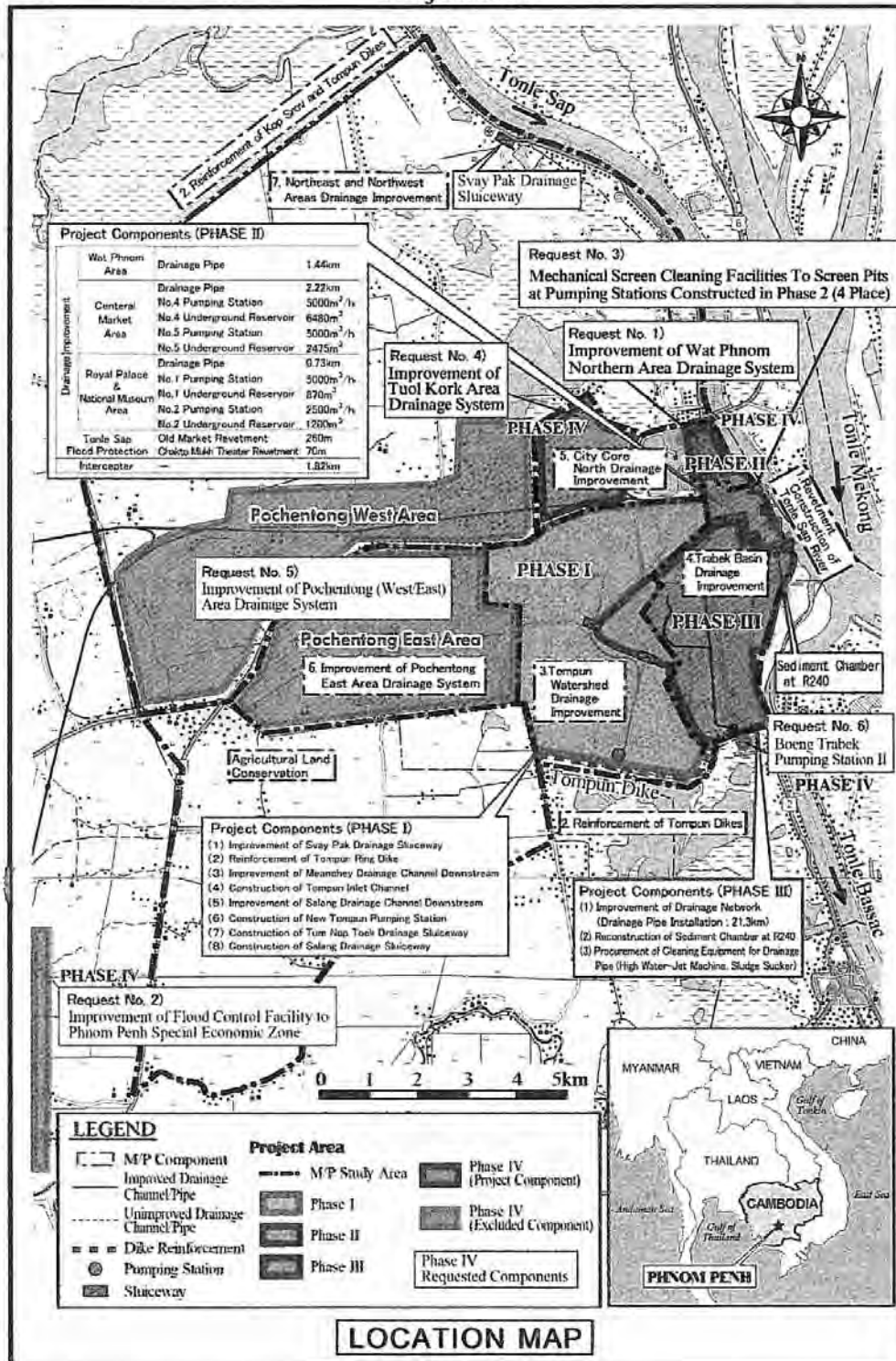
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- Annex 1 Project Sites
- Annex 2 Organization Chart
- Annex 3 Location Map
- Annex 4 Japanese Grant
- Annex 5 Flow Chart of Japan's Grant and Procedures
- Annex 6 Financial Flow of Grant Aid
- Annex 7 Major Undertakings to be taken by Recipient Government
- Annex 8 Project Monitoring Report (template)

*Nr*

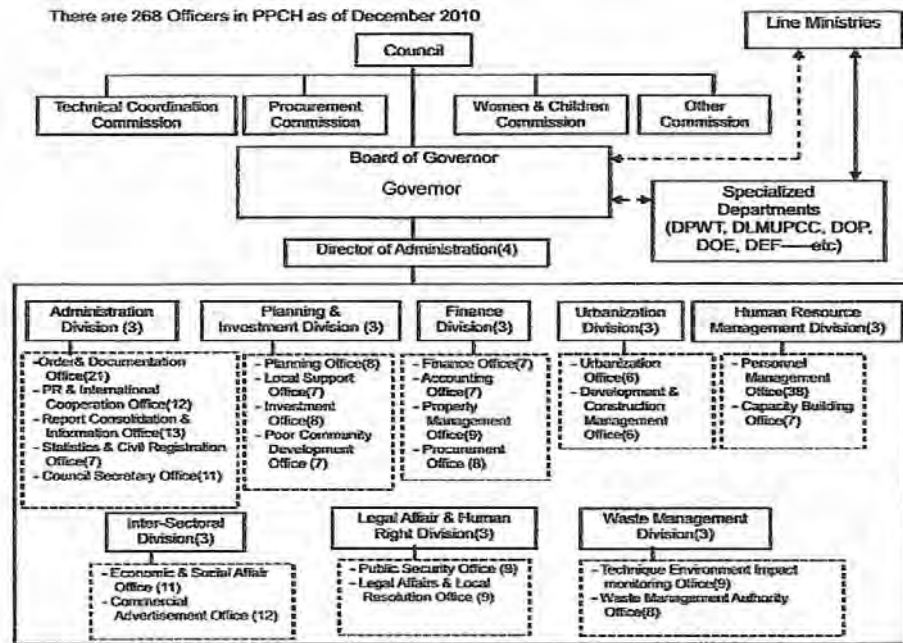
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Project Sites

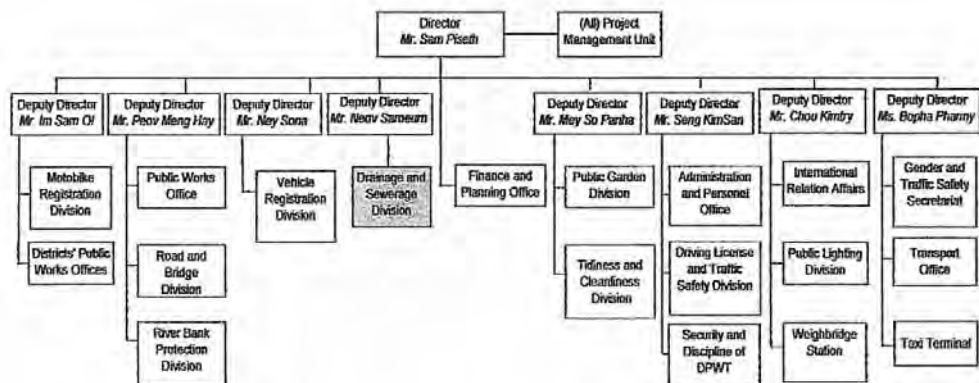


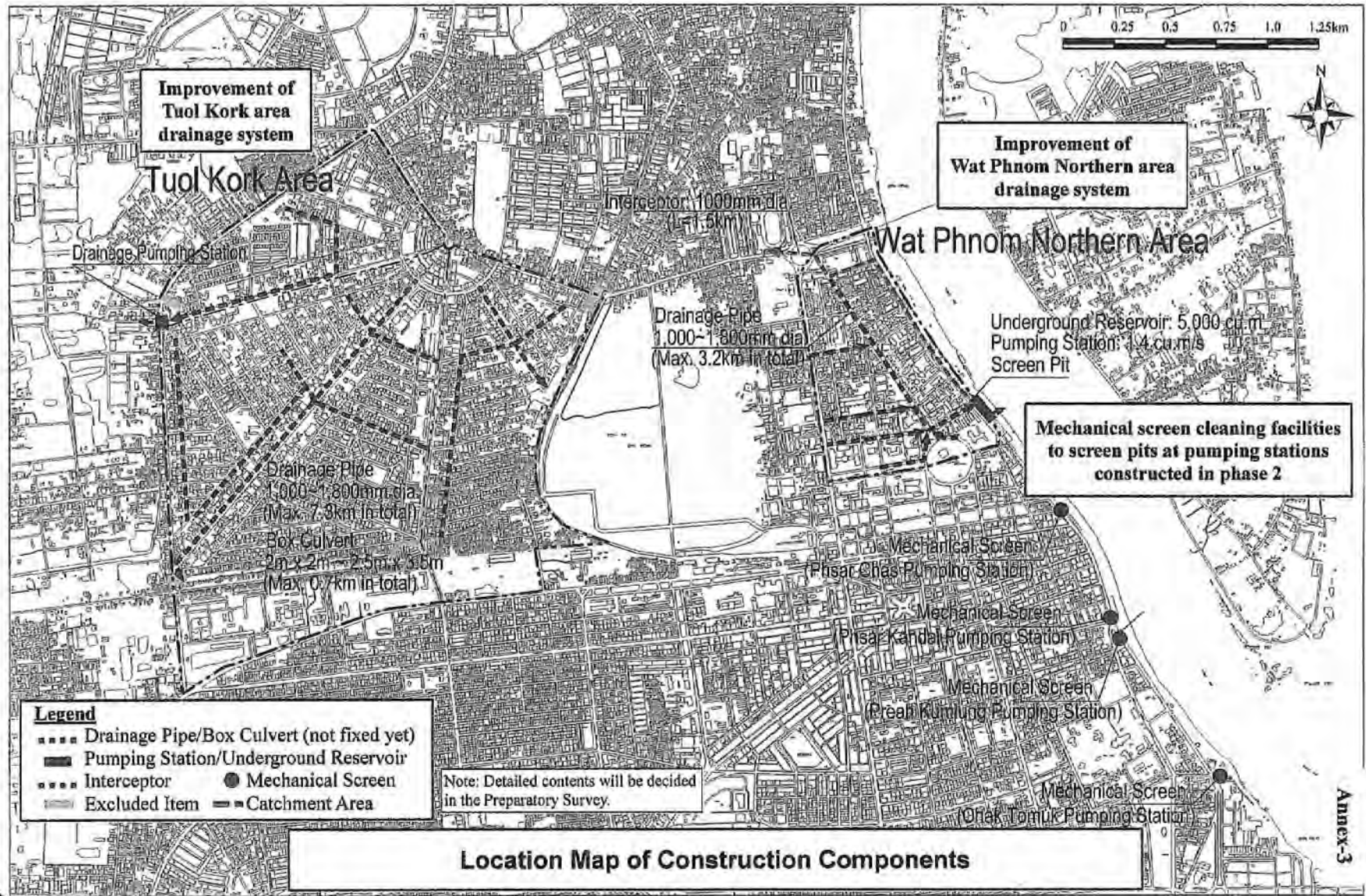


Organization Chart of PPCC



Organization Chart of DPWT





## JAPANESE GRANT

The Japanese Grant (hereinafter referred to as the "Grant") 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 is not supplied through the donation of materials as such.

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

### 1. Grant Procedures

The Grant 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 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 an 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 project. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant 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) 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. Japanese Grant 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, in accordance with the E/N, 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 Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. 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 Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant fund comes from the Japanese taxpayers.

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(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, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

(7) "Export and Re-export"

The products purchased under the Grant 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"), in principle. JICA will execute the Grant by making payments in Japanese yen, in principle, 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) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010) .

(11) Monitoring

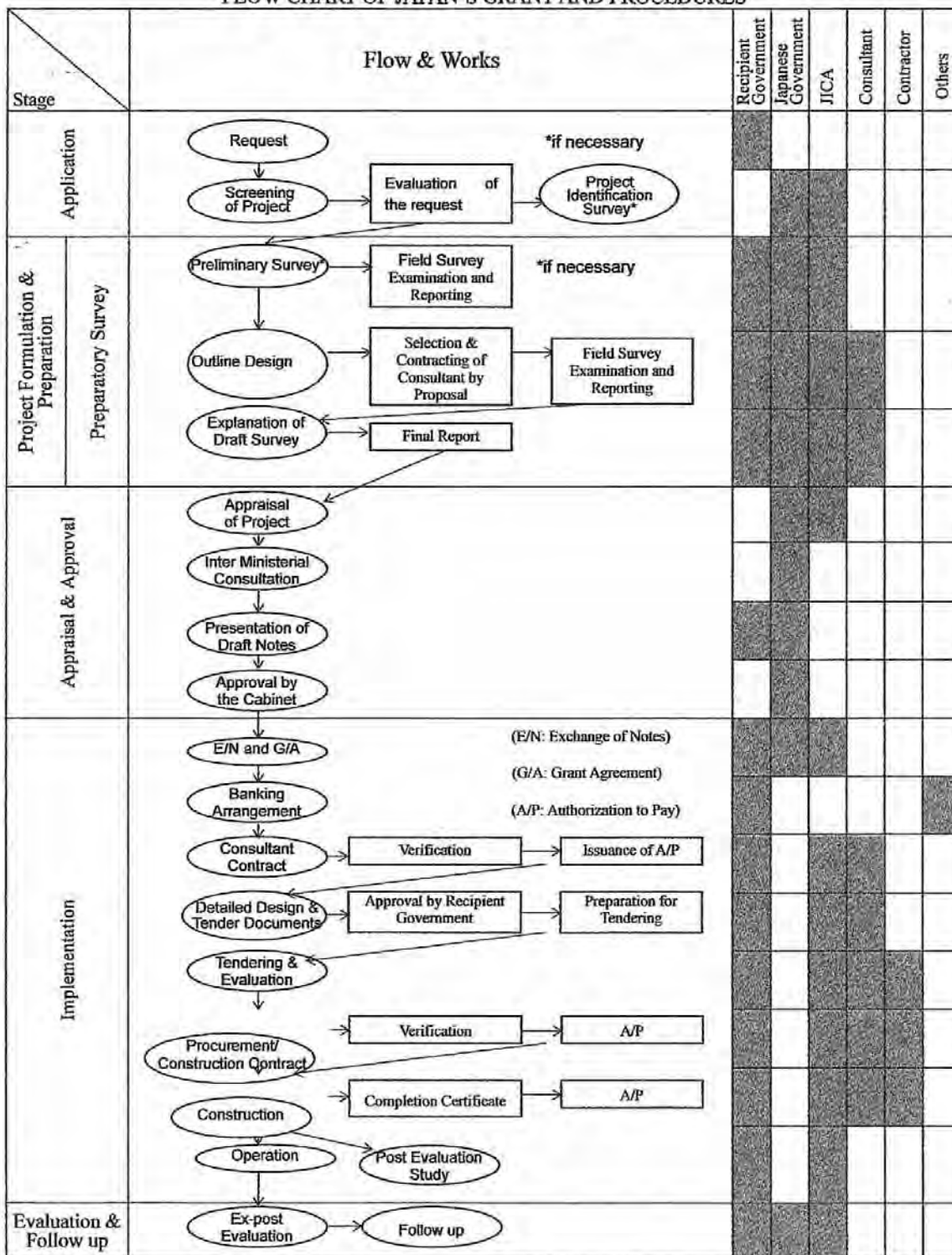
The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.



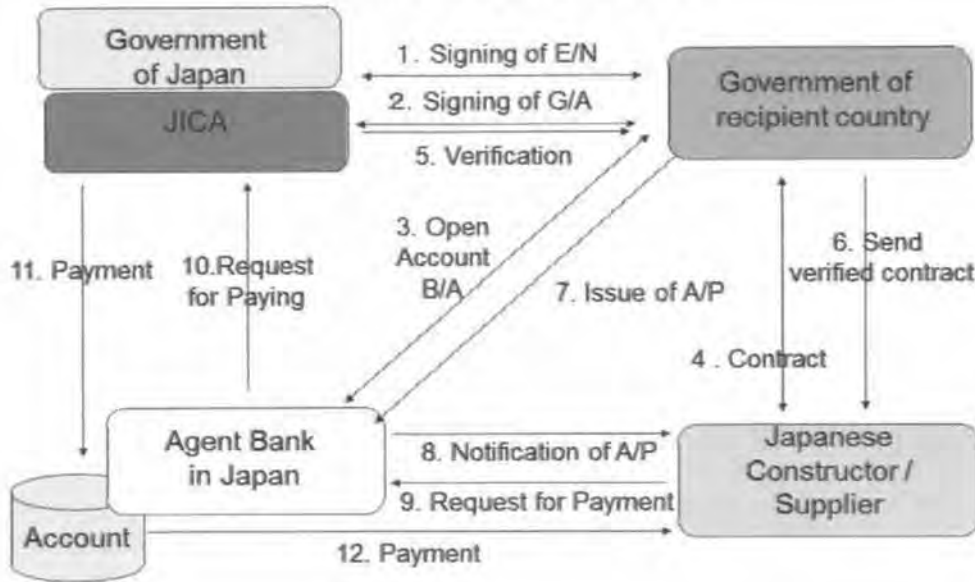
FLOW CHART OF JAPAN'S GRANT AND PROCEDURES



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### Financial Flow of Grant Aid



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## Major Undertakings to be taken by Recipient Government

## 1) Before the Tender

NO	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	PPCC		
2	To approve IEE (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation	within 1 month after G/A	PPCC		
3	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before start of the construction	MEF, PPCC		
4	To secure sufficient spaces at the respective Project site/s for temporary facilities such as a contractor's office, workshop, building materials storage, etc. needed for the construction work.	before notice of of the Tender	PPCC		
5	To obtain basic agreement from the residents who will be requested to resettle for the implementation of the Project	within 1 month after G/A	IRC, PPCC, DPWT		
6	To secure enough lands and spaces for the construction of a new drainage pumping station and drainage pipelines in Tuol Kork area	before notice of of the Tender	PPCC		
7	To submit the required application to the Electricite Du Cambodge (EDC) for Commercial Power Supply for the New Pumping Station to be constructed in front of Sap river at north east of the Wat Phnom and Tuol Kork area	before notice of the Tender	PPCC, DPWT		

## 2) During the Project

NO	Items	Deadline	In charge	Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract	PPCC		
	2) Payment commission for A/P	every payment	PPCC		
2	To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation in the country of the Recipient of the products	during the Project	PPCC		
3	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 the recipient country and stay therein for the performance of their work	during the Project	PPCC		
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant	during the Project	PPCC		
5	To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	PPCC		
6	To provide temporary facilities for the availability or accessibility of electricity, water, etc. for the construction work	prior to commencement of the construction	PPCC		
7	To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				
	1) Electricity				
	Distribution lines to the site		PPCC		
	2) Water Supply				
	City water distribution main to the site		PPCC		



8	To implement EMP and EMoP	during the construction	PPCC, DOE		
9	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	PPCC		
10	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	PPCC		
11	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between PPCC and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	PPCC, DPWT		
12	To secure necessary conditions and environments on the site(s) in cooperation with related authorities and local residents (c.g. Security guards, traffic control, etc.)	during the construction	PPCC		

(EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

### 3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	PPCC, DOE		
	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between PPCC and JICA.	for three years after the Project	PPCC, DOE		
2	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	after completion of the construction	PPCC, DPWT		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(Note) Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

**Project Monitoring Report**  
*on*  
**Project for Flood Protection and Drainage Improvement in the Phnom Penh  
 Capital City (Phase IV)**  
**Grant Agreement No. XXXXXXXX**  
 20XX, Month

**Organization Information**

<b>Authority (Signer of the G/A)</b>	Person in Charge Contacts                      Address: Phone/FAX: Email:
<b>Executing Agency</b>	Person in Charge Contacts                      Address: Phone/FAX: Email:
<b>Line Agency</b>	Person in Charge Contacts                      Address: Phone/FAX: Email:

**Outline of Grant Agreement:**

<b>Source of Finance</b>	Government of Japan: Not exceeding JPY . Government of Cambodia:
<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:

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**1: Project Description**

**1-1 Project Objective**

--

**1-2 Necessity and Priority of the Project**

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

--

**1-3 Effectiveness and the indicators**

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr 2013)	Target (Yr 2021)
Qualitative Effect		

**2: Project Implementation**

**2-1 Project Scope**

Table 2-1-1a: Comparison of Original and Actual Location

Location	Original: (M/D)	Actual: (PMR)
	Attachment(s):Map	Attachment(s):Map

*N*

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Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual

2-1-2 Reason(s) for the modification if there have been any.

--

**2-2 Implementation Schedule**

**2-2-1 Implementation Schedule**

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval		-	-
E/N			
G/A			
Approval of consultant contract			
Early Mobilization of consultant			
Detailed Design			
Budget Request for FY2016			
Tender Process of contractor and supplier			
Approval of contractor and supplier contract			
Budget Appropriation and Issuance of A/P			
Construction Period			
Shipment			
Custom Clearance			
Installation and acceptance Check			
Soft component			
Project Completion Date			
Defect Liability Period			

\*Project Completion was defined as Completion of Soft component at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

--

**2-3 Undertakings by each Government**

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**2-3-1 Major Undertakings**

See Attachment 2.

**2-3-2 Activities**

See Attachment 3.

**2-3-3 Report on RD**

See Attachment 4.

**2-4 Project Cost**

**2-4-1 Project Cost**

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan  
(Confidential until the Tender)

Items	Cost (Million Yen)			
	Original	Actual	Original	Actual
Construction of Facilities				
Equipment				
Soft Component				
Consulting Services				
Contingency				
Total				

Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar =\*\*Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of \*\*

Items	Cost (Thousand MMK)			
	Original	Actual	Original	Actual
				Please state not only the most updated schedule but also other past revisions

Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar =(local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

--

**2-5 Organizations for Implementation**

**2-5-1 Executing Agency:**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<b>Original:</b> (M/D)
<b>Actual, if changed:</b> (PMR)

**2-6 Environmental and Social Impacts**

- The environmental monitoring is not required in the Project as this project was categorized as category C in accordance with the GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS of JICA as of April 2010.

**3: Operation and Maintenance (O&M)**

**3-1 O&M and Management**

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

<b>Original:</b> (M/D)
<b>Actual:</b> (PMR)

**3-2 O&M Cost and Budget**

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

<b>Original:</b> (M/D)
<b>Actual:</b> (PMR)

*M*

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**4: Precautions (Risk Management)**

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

<b>Original Issues and Countermeasure(s): (M/D)</b>	
Potential Project Risks	Assessment
1. Delay of budget appropriation	Probability: H/M/L
	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
<b>Actual issues and Countermeasure(s)</b>	
(PMR)	

**5: Evaluation at Project Completion and Monitoring Plan**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

*No*

*[Signature]*

**5-3 Monitoring Plan for the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

--

**Attachment**

1. Project Location Map
  2. Undertakings to be taken by each Government
  3. Monthly Report
  4. Report on RD
  5. Yearly disbursement plan
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
- (Final Report Only)





4.2 Explanation on Draft Final Report in Cambodia (Signed on October 12, 2016)

**MINUTES OF DISCUSSIONS**  
**ON THE PREPARATORY SURVEY FOR**  
**THE PROJECT FOR FLOOD PROTECTION AND**  
**DRAINAGE IMPROVEMENT**  
**IN THE PHNOM PENH CAPITAL CITY (Phase IV)**  
**(Explanation on Draft Preparatory Survey Report)**

On the basis of the discussions and field survey in the Kingdom of Cambodia (hereinafter referred to as "Cambodia") from April to June in 2016, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") on the Project for Flood Protection and Drainage Improvement in the Phnom Penh Capital City (Phase IV) (hereinafter referred to as "the Project").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Cambodia on its contents, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") to Cambodia, headed by Mr. Yuki Aratsu, Senior Assistant Director, Global Environment Dept., JICA HQ, and the team stayed in the country from 10 to 14 October, 2016.

As a result of the discussions, both sides confirmed the main items described in the attached sheets.

Phnom Penh, 12 October, 2016 ✓



**Yuki Aratsu**  
**Team Leader**  
**Preparatory Survey Team**  
**Japan International Cooperation Agency**  
**Japan**



**H.E. PA Socheatevong**  
**Governor**  
**Phnom Penh Capital City**  
**Cambodia**



## ATTACHMENT

1. **Objective of the Project**  
The objective of the Project is to minimize inundation by local rainfall and to reduce inundation damage through improvement of drainage system and facilities in Wat Phnom Northern area and Tuol Kork area, thereby contributing to improvement of urban environment in Phnom Penh Capital City (hereinafter referred to as “PPCC”).
2. **Contents of the Draft Report**  
After the explanation of the contents of the Draft Report by the Team, the Cambodian side agreed in principle to its contents.
3. **Cost Estimation**  
Both sides confirmed that the cost estimate including the contingency described in the Draft Report is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.
4. **Confidentiality of the Cost Estimation and Specifications**  
Both sides confirmed that the Project cost estimation and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.
5. **Japanese Grant Scheme**  
The Cambodian side understands the Japanese Grant Scheme and its procedures as described in Annex 2, Annex 3 and Annex 4, and necessary measures to be taken by the Government of Cambodia.
6. **Project Implementation Schedule**  
The Team explained to the Cambodian side that the expected implementation schedule is as attached in Annex 5.
7. **Expected outcomes and Indicators**  
Both sides agreed that key indicators for expected outcomes are as follows. The Cambodian side has responsibility to monitor the progress of the indicators and achieve the target in year 2023.

**[Quantitative Effect]**

With the improvement of drainage facilities with a planning scale of 2-year probability rainfall (44.8mm/hr., 87.8mm/day), following effect shall be expected.

Indicator		Present Condition (in 2015)	Target After Improvement (Target Year: 2023)
Inundation Area <sup>(*1)</sup>	Wat Phnom Northern Area	111,600m <sup>2</sup>	49,500m <sup>2</sup>
	Tuol Kork Area	460,800m <sup>2</sup>	169,200m <sup>2</sup>
Inundation Depth		50cm Max.	20cm Max.
Duration of Inundation		9 hour Max.	2 hour Max.

Note: (\*1) Duration of inundation will be more than 10 minutes in “Inundation Area” shown in the table.

[Qualitative Effect]

- The Project will improve urban environment by minimization of inundation damage in the Project area caused by local rainfall by improving the drainage system and providing equipment for emergency drainage works.
- The Project will contribute to the avoidance of occurrence of economic damage caused by flood/inundation in the Project area encompasses commercial, tourist, residential, and public office areas.
- The Project will contribute activation of commercial activity and promotion of tourism industry by mitigation of regional inundation damage in the Project area. The Project will also be able to contribute poverty alleviation by promotion of income of citizens engaged in those economic activities.
- The Project will contribute improvement of hygienic environment by reducing occurrence and spread of epidemics, such as cold, skin disease, diarrhea, typhoid and dysentery, due to long duration of inundation.
- The Project will improve traffic condition of major streets and branch streets in the Project area by resolving and reducing traffic congestion and traffic interruption caused by inundation. The Project will also be able to contribute reduction of traffic accident and improvement of traffic comfortableness.
- Water flow at screen pits, constructed in the Phase II, will not be disturbed by garbage, and then underground reservoirs and pumps will work as designed.

8. Technical assistance (“Soft Component” of the Project)

Considering the sustainable operation and maintenance of the provided facility, following technical assistance is planned to be provided under the Project. The Cambodian side confirmed that it will assign necessary number of competent and appropriate C/Ps as described in the Draft Report.


- Capacity building of the Drainage and Sewerage Division (hereinafter referred to as “DSD”) of Department of Public Works and Transport (hereinafter referred to as “DPWT”) of PPCC to execute systematic and scheduled cleaning work of the drainage system
- Capacity building of DSD to execute appropriate utilization and maintenance of the equipment procured by the Project
- Enlightening activities by PPCC, DPWT, Department of Environment of PPCC (hereinafter referred to as “DOE”), Local authorities and the Consultant to reduce illegal dumping of solid waste into drainage facilities by Community Participation in the area described in the Draft Report

9. Undertakings Taken by Both Sides

Both sides confirmed undertakings described in Annex 6. The Cambodian side assured to take the necessary measures and coordination including allocation of the necessary budget which is precondition of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage. Contents of Annex 6 will be updated as the Detailed Design progresses, and will finally be used in the contract document.

10. Monitoring during the Implementation

The Project will be monitored and reported to JICA every month by the executing agency using the Project Monitoring Report (PMR) in Annex 7.



11. Project completion  
Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the project will be reported to JICA promptly.
12. Ex-Post Evaluation  
JICA will conduct an ex-post evaluation three (3) years after the project completion with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability) of the Project. Result of the evaluation will be publicized. The Cambodian side will be required to provide necessary support for it.
13. Schedule of the Study  
JICA will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Cambodian side around the middle of December 2016.
14. Environmental and Social Considerations
  - 14-1-1. Environmental Guidelines and Environmental Category  
The JICA mission explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as 'the Guidelines') is applicable for the Project. The Project is categorized as B because the Project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.
  - 14-1-2. Environmental Checklist  
The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 8. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, The Cambodian side shall submit the modified version to JICA in a timely manner.
  - 14-2-1. Initial Environmental Impact Assessment (IEIA)  
Both sides confirmed the IEIA report will be approved by the Ministry of Environment in January 2017.
  - 14-2-2. Environmental Management Plan and Environmental Monitoring Plan  
Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 9, respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.
  - 14-3. Social Environment
    - 14-3-1. Land Acquisition and Resettlement  
Both sides confirmed the around 63m<sup>2</sup> of land would be acquired and one household would temporarily be relocated due to the implementation of the Project.  
Such land acquisition and resettlement shall be implemented based on the Abbreviated Resettlement Action Plan (ARAP) which will be authorized by the Inter-ministerial Resettlement Committee (hereinafter referred to as "IRC") in January 2017.

#### 14-3-2. Entitlement Matrix

Both sides agreed that all project affected people will be eligible for compensation, rehabilitation/resettlement assistance, and disturbance allowance based on the Entitlement Matrix as per Annex 11.

#### 14-4. Environmental and Social Monitoring

##### 14-4-1. Environmental Monitoring

Both sides agreed that the Cambodian side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex 10.

##### 14-4-2. Information Disclosure of Monitoring Results

Both sides confirmed that the Cambodian side will disclose results of environmental and social monitoring to local stakeholders on request basis.

The Cambodian side agreed JICA will disclose results of environmental and social monitoring submitted by the Cambodian side as the monitoring forms attached as Annex 10 on its website.

#### 15. Other Relevant Issues

##### 15-1. Operation and Maintenance of the Facilities (Equipment)

The team explained the importance of operation and maintenance of the facilities constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. The Cambodian side shall secure enough staff and budgets necessary for appropriate operation and maintenance of the facilities. The annual operation and maintenance costs are estimated and shown in Annex 6.

##### 15-2. Safety Measures

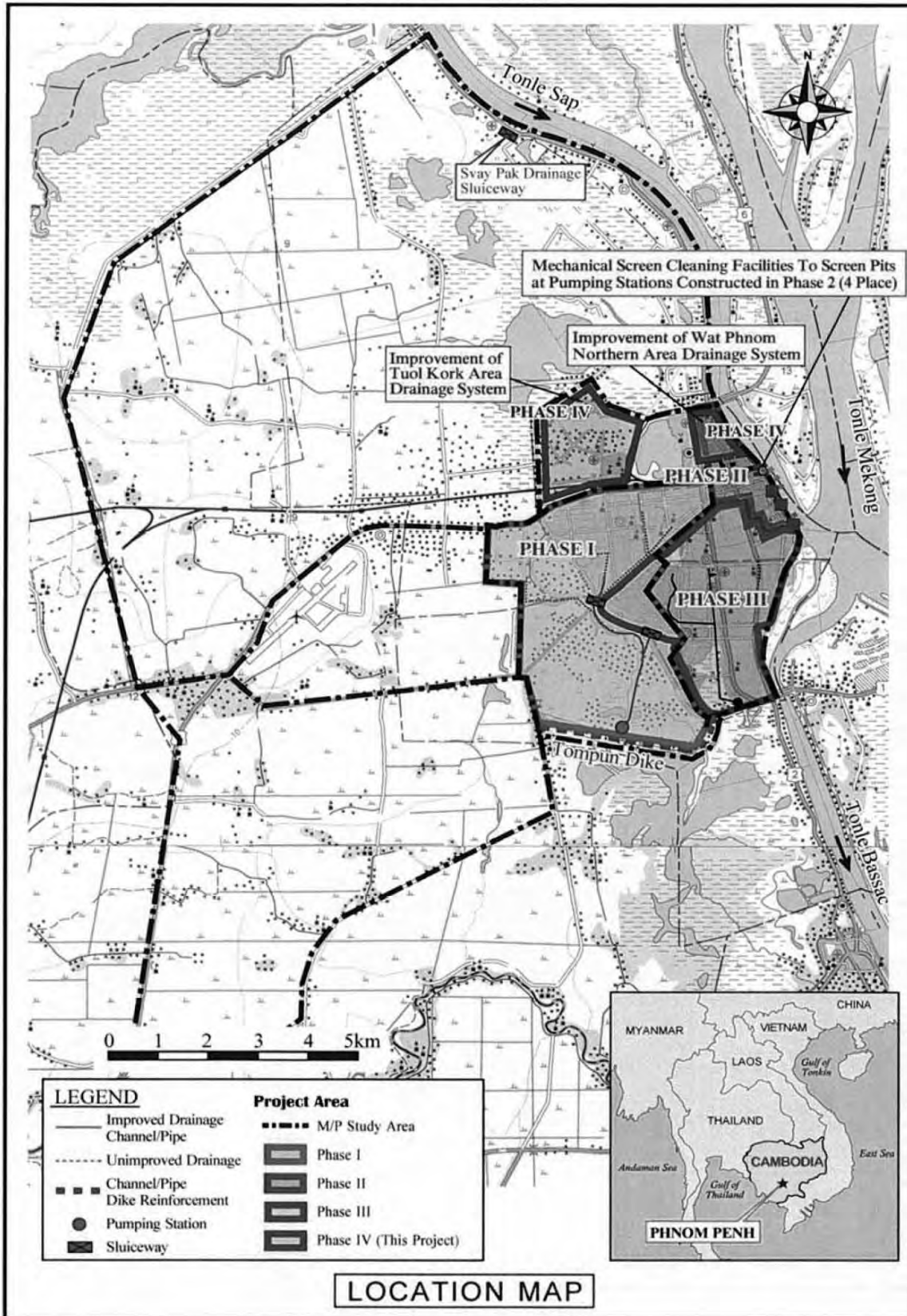
Both sides confirmed that PPCC has a responsibility to take necessary measures to secure safety in the construction sites of the Project in cooperation with relevant authorities and communities described in Annex 6.

##### 15-3. Disclosure of Information

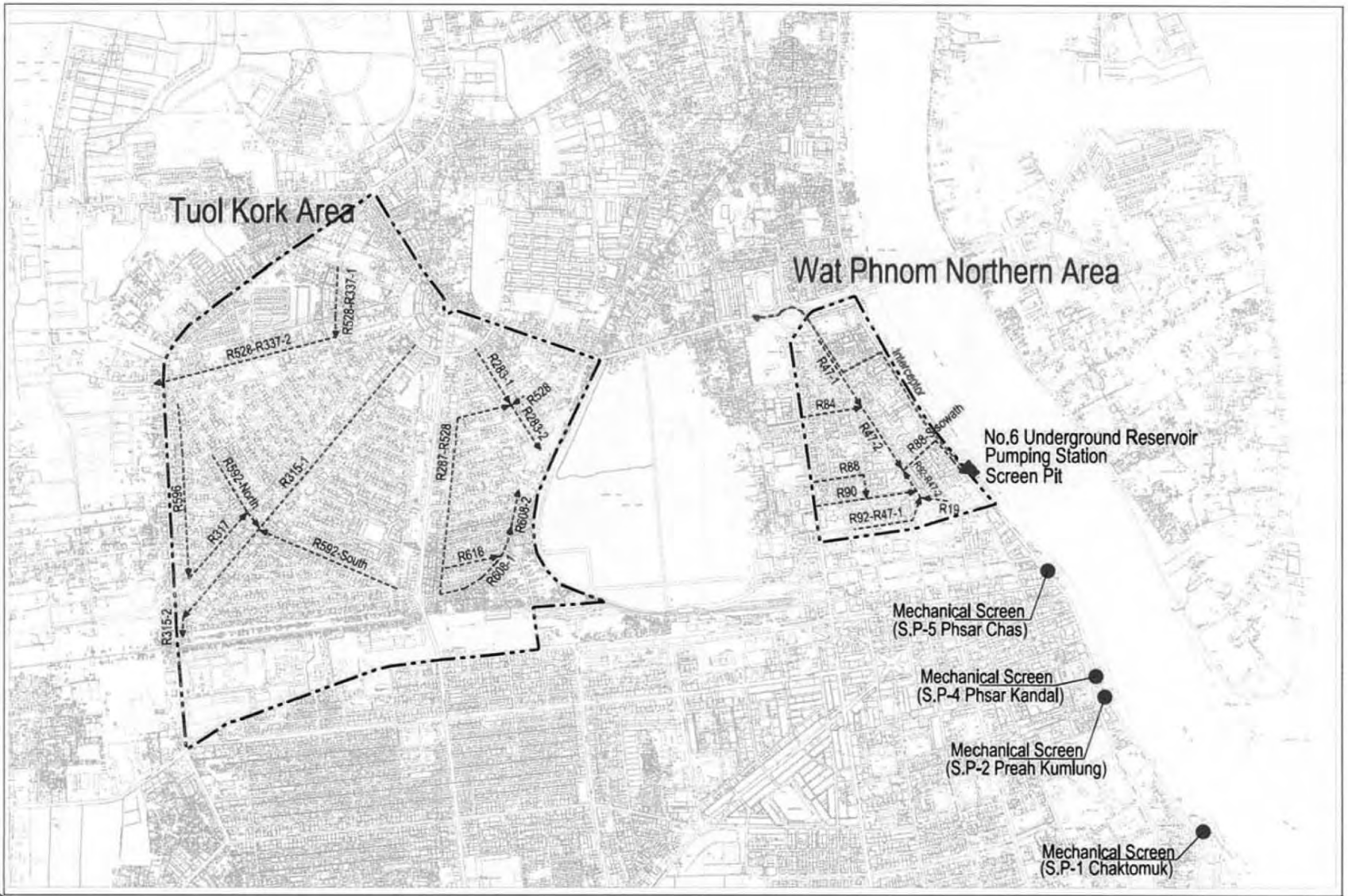
Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after completion of the Preparatory Survey. All the study results including the project cost will be disclosed to the public after all the contracts for the Project are concluded.

Annex 1	Location Maps
Annex 2	Japanese Grant
Annex 3	Flow Chart of Japanese Grant Procedures
Annex 4	Financial Flow of Japanese Grant
Annex 5	Project Implementation Schedule
Annex 6	Major Undertakings to be taken by Each Government
Annex 7	Project Monitoring Report (template)
Annex 8	Environmental Check List
Annex 9	Environmental Management Plan/Environmental Monitoring Plan
Annex 10	Environmental and Social Monitoring Form
Annex 11	Entitlement Matrix

Location Map [1]



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Location Map [2]

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## JAPANESE GRANT

The Japanese Grant (hereinafter referred to as the “Grant”) 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 is not supplied through the donation of materials as such.

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

### 1. Grant Procedures

The Grant 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 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.

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- Preparation of an 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 project. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant 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) 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. Japanese Grant 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, in accordance with the E/N, 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 Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. 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

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In the implementation of the Grant Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant fund comes from the Japanese taxpayers.

(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, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

(7) "Export and Re-export"

The products purchased under the Grant 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"), in principle. JICA will execute the Grant by making payments in Japanese yen, in principle, 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) Environmental and Social Considerations

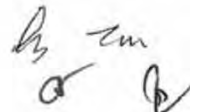
The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010) .

(11) Monitoring

The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

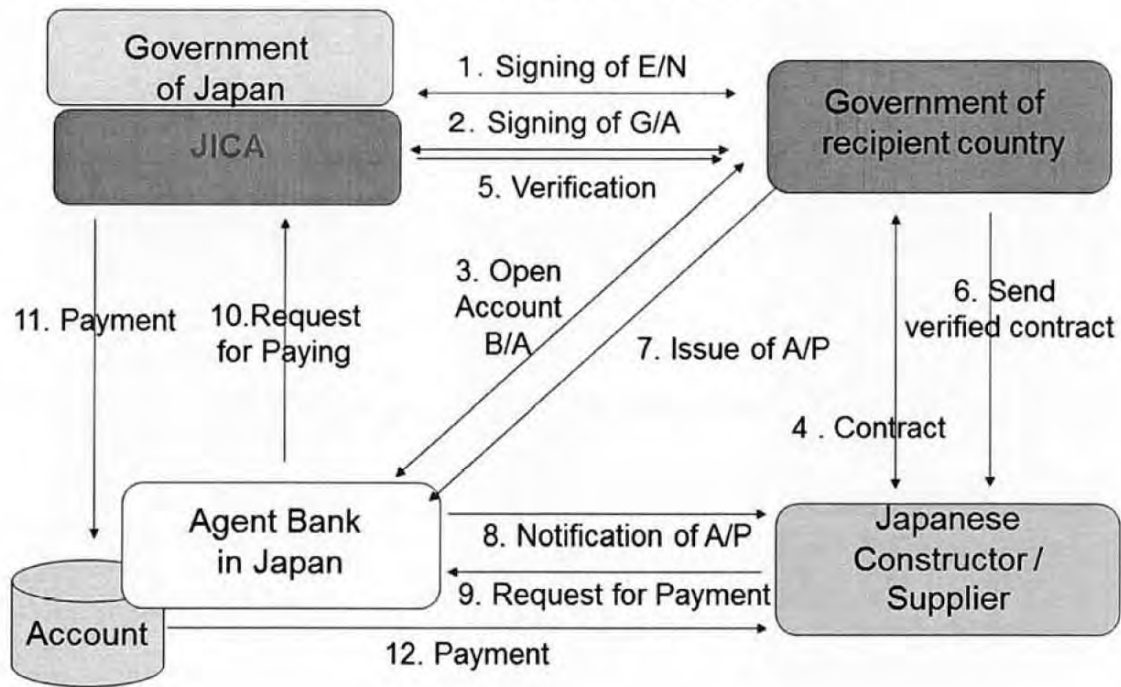


FLOW CHART OF JAPAN'S GRANT AND PROCEDURES

Stage	Flow & Works	Recipient Government	Japanese Government	JICA	Consultant	Contractor	Others
Application							
Project Formulation & Preparation							
Approval & Approval							
Implementation	<p>(E/N: Exchange of Notes) (G/A: Grant Agreement) (A/P: Authorization to Pay)</p>						
Evaluation & Follow up							

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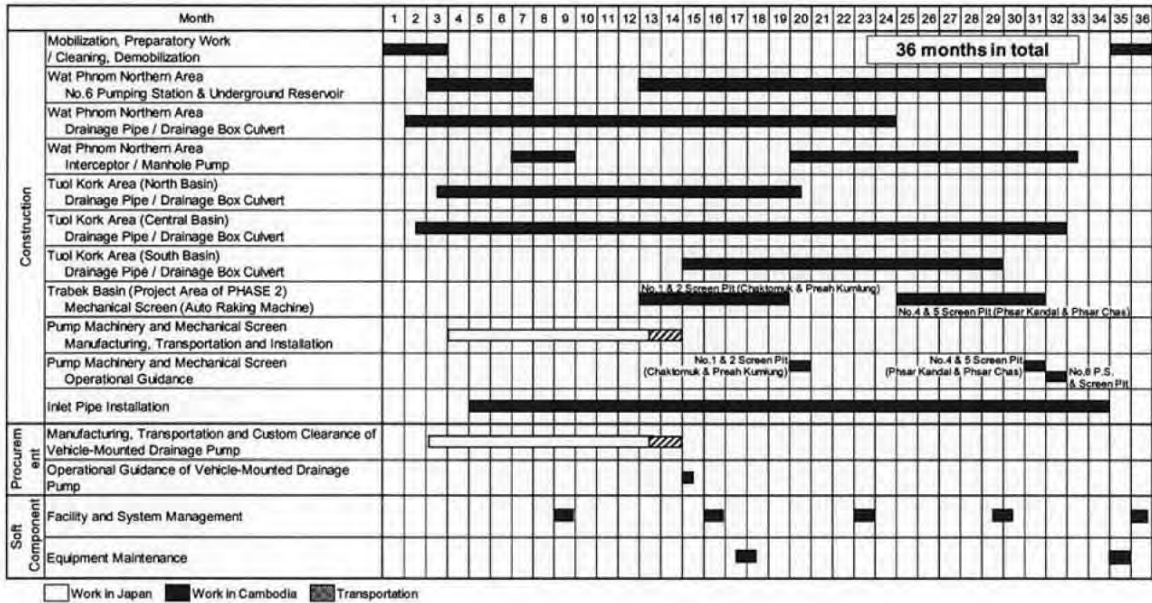
### Financial Flow of Grant Aid



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Project Implementation Schedule

Month	1	2	3	4	5	6	7	8	9	10	
Detailed Design / Tendering	8.5 months in total										
Detailed Design	[Bar chart showing duration from month 1 to 8.5]										
Tendering Procedures							[Bar chart showing duration from month 7 to 10]				



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### Major Undertakings to be taken by Recipient Government

#### 1) Before the Tender

No.	Items	Deadline	In charge	Cost [US\$]	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	PPCC		
2	To get approval on IEIA from MOE (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation	before G/A	PPCC		
3	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with ARAP	before the Tender	MEF, PPCC	300,000	
4	To secure sufficient spaces at the respective Project site/s for temporary facilities such as a contractor's office, workshop, building materials storage, etc. needed for the construction work.	before the Tender	PPCC		
5	To obtain basic agreement from the residents who will be requested to resettle for the implementation of the Project	within 1 month after G/A	IRC, PPCC, DPWT		

#### 2) During the Project

No.	Items	Deadline	In charge	Cost [US\$]	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract	PPCC	76,500	
	2) Payment commission for A/P	every payment			
2	To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to bear internal transportation cost in the country of the Recipient of the products	during the Project	PPCC	4,000	
3	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 the recipient country and stay therein for the performance of their work	during the Project	PPCC		
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant.	during the Project	PPCC		
5	To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	PPCC		
6	To provide temporary facilities for the availability or accessibility of electricity, water, etc. for the construction work	Prior to commencement of the construction	PPCC		
7	To submit the required application to the Electricite Du Cambodge (EDC) for Commercial Power Supply for the New Pumping Station to be constructed in front of Sap river at north east of the Wat Phnom	within 1 year after the signing of the contract	PPCC, DPWT	4,000	
8	To submit the required application to the Phnom Penh Water Supply	within 1 year after the	PPCC,	500	

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	Authority (PPWSA) for Water Supply for the New Pumping Station to be constructed in front of Sap river at north east of the Wat Phnom	signing of the contract	DPWT		
9	To implement EMP and EMoP and to submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	PPCC	13,200	
10	To submit Project Monitoring Report	every month	PPCC		
11	To implement ARAP (livelihood restoration program, if needed)	for a period described in the ARAP	PPCC		
12	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between PPCC and JICA.	Until the completion of the temporary resettlement	PPCC, DPWT		
13	To secure necessary conditions and environments on the site(s) in cooperation with related authorities and local residents (e.g. Security guards, traffic control, etc.)	During the construction	PPCC		
14	To implement enlightening activities to reduce illegal dumping of solid waste into drainage facilities by Community Participation (e.g. Installation of trash box around local market in the project area, study tour of drainage facilities along Tonle Sap river, pick up trash campaign at local market, etc.)	During the Project	PPCC, DPWT, DOE, Local Authorities	20,000	

(EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

### 3) After the Project

No.	Items	Deadline	In charge	Cost [US\$]	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	PPCC, DOE		
	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between PPCC and JICA.	for three years after the Project	PPCC, DOE		
2	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	after completion of the Project	PPCC, DPWT	72,400 /year	

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(Note) Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

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### Major Undertakings to be covered by the Japanese Grant

No	Items	Deadline	Cost Estimated (Million Japanese Yen)*	
1	To construct following drainage facilities a) Drainage Main (drainage pipes, drainage box culverts) b) Pumping Station & Underground Reservoir c) Interceptor (interceptor pipes, manhole pump) d) Mechanical Screens (auto-raking machines)	November 2020	Confidential	
2	To procure Vehicle-Mounted Drainage Pumps			
3	To implement detailed design, tender support, construction supervision and technical assistance (soft component) [Consultant]			
4	Contingencies			
	Total			

\*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

**This Page is closed due to the confidentiality.**

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***Project Monitoring Report***  
***on***  
***Project for Flood Protection and Drainage Improvement in the Phnom Penh***  
***Capital City (Phase IV)***  
***Grant Agreement No. XXXXXXXX***  
***20XX, Month***

**Organization Information**

<b>Authority (Signer of the G/A)</b>	Person in Charge Contacts                      Address: Phone/FAX: Email:
<b>Executing Agency</b>	Person in Charge Contacts                      Address: Phone/FAX: Email:
<b>Line Agency</b>	Person in Charge Contacts                      Address: Phone/FAX: Email:

**Outline of Grant Agreement:**

<b>Source of Finance</b>	Government of Japan: Not exceeding JPY . Government of Cambodia:
<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:

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## 1: Project Description

### 1-1 Project Objective

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### 1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

--

### 1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr 2013)	Target (Yr 2021)
Qualitative Effect		

## 2: Project Implementation

### 2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Location	Original: (M/D) Attachment(s):Map	Actual: (PMR) Attachment(s):Map

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual

2-1-2 Reason(s) for the modification if there have been any.

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**2-2 Implementation Schedule**

**2-2-1 Implementation Schedule**

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval E/N G/A Approval of consultant contract Early Mobilization of consultant Detailed Design Budget Request for FY2016 Tender Process of contractor and supplier Approval of contractor and supplier contract Budget Appropriation and Issuance of A/P Construction Period Shipment Custom Clearance Installation and acceptance Check Soft component Project Completion Date Defect Liability Period		-	-

\*Project Completion was defined as all the facilities constructed and equipment procured by the grant are in operation at the time of G/A.

**2-2-2 Reasons for any changes of the schedule, and their effects on the project.**

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**2-3 Undertakings by each Government**

**2-3-1 Major Undertakings**

See Attachment 2.

**2-3-2 Activities**

See Attachment 3.

**2-3-3 Report on RD**

See Attachment 4.

**2-4 Project Cost**

**2-4-1 Project Cost**


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Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan  
(Confidential until the Tender)

	Items		Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction of Facilities				
Equipment				
Soft Component				
Consulting Services				
Contingency				
Total				

Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =\*\*Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of \*\*

	Items		Cost (Thousand MMK)	
	Original	Actual	Original	Actual
				Please state not only the most updated schedule but also other past revisions

Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =(local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

**2-5 Organizations for Implementation**

**2-5-1 Executing Agency:**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

**Original:** (M/D)

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**Actual, if changed:** (PMR)

**2-6 Environmental and Social Impacts**

- The Project is categorized as B because the Project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

Both sides agreed that PPCC will submit the results of environmental and social monitoring to JICA as a part of Project Monitoring Report (PMR) by filling in the Environmental and Social Monitoring Form as per Annex 10 of this M/D on a quarterly basis during construction and semiannually after the completion of the Project for three years.

**3: Operation and Maintenance (O&M)**

**3-1 O&M and Management**

- Organization chart of O&M  
- Operational and maintenance system (structure and the number, qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

**Original:** (M/D)

**Actual:** (PMR)

**3-2 O&M Cost and Budget**

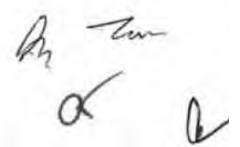
- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

**Original:** (M/D)

**Actual:** (PMR)

**4: Precautions (Risk Management)**

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.



<b>Original Issues and Countermeasure(s): (M/D)</b>	
Potential Project Risks	Assessment
1. Delay of budget appropriation	Probability: H/M/L
	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
<b>Actual issues and Countermeasure(s)</b>	
(PMR)	

## 5: Evaluation at Project Completion and Monitoring Plan

### 5-1 Overall evaluation

Please describe your overall evaluation on the project.

### 5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

### 5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
  2. Undertakings to be taken by each Government
  3. Monthly Report
  4. Report on RD
  5. Yearly disbursement plan
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
- (Final Report Only)

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## Environmental Checklist for the Project (1/4)

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1. Approval in Permits and Explanation	(1) IEIA/EIA and Environmental Permits	1) Was IEIA (IEE) or EIA for Phase IV of the Project officially confirmed?	1) In May 6, 2016, the MOE confirmed that IEIA (IEE) report was needed for the Project (Phase IV) not EIA.
	(2) Explanation to the Public	1) Are the contents of the Project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public?  2) Are the proper responses made to comments from the public and regulatory authorities?	1) The Project contents and the potential impacts shall be explained to affected people after before and completion of the Draft Final Report of Phase IV to obtain the understanding of the public.  2) In the environmental and social consideration survey for in Phase-IV, twice stakeholder meetings are to be made in May and August 2016 through subletting to comments from the public and regulatory authorities.
2. Pollution Measures	(1) Air Quality	1) Do air pollutants, (such as sulfur oxides (SO <sub>x</sub> ), nitrogen oxides (NO <sub>x</sub> ), carbon monoxide (CO), and soot and dust) emitted from the proposed infrastructure facilities and ancillary facilities comply with the country's emission standards and ambient air quality standards?	1) There will no effect on air pollution.
	(2) Water Quality	1) Do effluents or leachates from various facilities, such as infrastructure facilities and the ancillary facilities comply with the country's effluent standards and ambient water quality standards?	1) The Project will flow the waste water from the PPCC.
	(3) Wastes	1) Are wastes from the infrastructure facilities and ancillary facilities properly treated and disposed of in accordance with the country's standards?	1) The Project will not product any wastes.
	(4) Soil Contamination	1) Are adequate measures taken to prevent contamination of soil and groundwater by the effluents or leachates from the infrastructure facilities and the ancillary facilities?	1) There will no effect on soil contamination.
	(5) Noise and Vibration	1) Do noise and vibrations comply with the country's standards?	1) The Project will not make noise and vibrations during the operation stage.
	(6) Subsidence	1) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	1) The Project will not extract groundwater.
	(7) Odor	1) Are there any odor sources? Are adequate odor control measures taken?	1) There will no effect on offensive odor.

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**Environmental Checklist for the Project (2/4)**

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
3. Natural Environment	(1) Protected Areas	1) Is the Project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the Project will affect the protected areas?	1) The Project is not located in protected areas. There is no possibility that the Project will affect the protected areas.
	(2) Ecosystem	1) Does the Project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? 2) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? 3) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? 4) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?	1) The Project site does not encompass ecologically valuable habitats. 2) The Project site does not encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions. 3) There is no significant ecological impacts. 4) The Project will not use water.
	(3) Hydrology	1) Is there a possibility that hydrologic changes due to the Project will adversely affect surface water and groundwater flows?	1) There are the positive changes on drainage condition in the Project Area.
	(4) Topography and Geology	1) Is there a possibility the Project will cause large-scale alteration of the topographic features and geologic structures in the project site and surrounding areas?	1) There is no possibility the Project will cause large-scale alteration of the topographic features and geologic structures in the Project site and surrounding areas



### Environmental Checklist for the Project (3/4)

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
4. Social Environment	(1) Resettlement	<ol style="list-style-type: none"> <li>1) Is involuntary resettlement caused by the Project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</li> <li>2) Is adequate explanation on relocation and compensation given to affected persons prior to resettlement?</li> <li>3) Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</li> <li>4) Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</li> <li>5) Are agreements with the affected persons obtained prior to resettlement?</li> <li>6) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</li> <li>7) Is a plan developed to monitor the impacts of resettlement?</li> </ol>	<ol style="list-style-type: none"> <li>1) In the initial stage of the Preparatory Survey of the Project (Phase IV), more than 20 PAFs were considered. Effort was made to reduce into only 2 structure-owners by proper rearrangement of drainage pipe installation with DPWT/PPCC.</li> <li>2) Through a subletting contract for relocation the necessary meetings with affected houses &amp; stakeholders were conducted in June and September 2016.</li> <li>3) Following proper procedure for land acquisition and relocation process with DPWP-PPCC &amp; RD-IRC-MEF, relocation plan and payment will be discussed and carried out.</li> <li>4) Relocation plan to vulnerable groups is considered by the related law for the Project (Phase IV).</li> <li>5) Same as the above 4).</li> <li>6) Proper relocation framework is under process of IRC-GDR-MEF.</li> <li>7) A monitoring plan on relocation will be developed by the relevant agencies such as DPWT, MOE, etc.</li> </ol>
	(2) Living and Livelihood	<ol style="list-style-type: none"> <li>1) Is there a possibility that the Project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</li> </ol>	<ol style="list-style-type: none"> <li>1) The Project will improve the living conditions of inhabitants during the operation stage.</li> </ol>
	(3) Heritage	<ol style="list-style-type: none"> <li>1) Is there a possibility that the Project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?</li> </ol>	<ol style="list-style-type: none"> <li>1) There is no possibility that the Project will damage the local archeological, historical, cultural, and religious heritage sites.</li> </ol>
	(4) Landscape	<ol style="list-style-type: none"> <li>1) Is there a possibility that the Project will adversely affect the local landscape? Are necessary measures taken?</li> </ol>	<ol style="list-style-type: none"> <li>1) There is no possibility that the Project will adversely affect the local landscape.</li> </ol>
	(5) Ethnic Minorities and Indigenous Peoples	<ol style="list-style-type: none"> <li>1) Does the Project comply with the country's laws for rights of ethnic minorities and indigenous peoples?</li> <li>2) Are considerations given to reduce the impacts on culture and lifestyle of ethnic minorities and indigenous peoples?</li> </ol>	<ol style="list-style-type: none"> <li>1) There are no ethnic minority people living in the Project Area.</li> </ol>

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### Environmental Checklist for the Project (4/4)

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
5. Others	(1) Impacts during Construction	<ol style="list-style-type: none"> <li>1) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</li> <li>2) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</li> <li>3) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</li> <li>4) If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?</li> </ol>	<ol style="list-style-type: none"> <li>1) Adequate measures considered to reduce impacts during construction stage.(Refer to tables of Mitigation Measure for the Key impacts).</li> <li>2) The construction activities will not adversely affect the natural environment.</li> <li>3) Adequate measures considered to reduce the impacts.</li> <li>4) Health and safety education is necessary and provided for project personnel, including workers.</li> </ol>
	(2) Monitoring	<ol style="list-style-type: none"> <li>1) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</li> <li>2) Are the items, methods and frequencies included in the monitoring program judged to be appropriate?</li> <li>3) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</li> <li>4) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</li> </ol>	<ol style="list-style-type: none"> <li>1) The implementation plan of monitoring program for the environmental items will be prepared by the implementation authority (DPWT/PPCC).</li> <li>2) The items, methods and frequencies included in the monitoring program are judged to be appropriate.</li> <li>3) DPWT/PPCC will establish an adequate monitoring framework including budget.</li> <li>4) There are some regulatory requirements pertaining to the monitoring report system identified.</li> </ol>

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**[Draft] Environmental Management Plan and Environmental Monitoring Plan**

Environmental Item	Monitoring Item	Location	Frequency	Related Standard	Responsible Organization	Cost
<b>Pre-work</b>						
Noise and Vibration	Noise level	2 points : one is in Tuol Kork area, the other is in Wat Phnom Northern area.	Once	Sub-decree on Air Pollution Control and Noise Disturbance (2000)	Sub-contracting work	Cost involved in the JICA Preparatory Work
Air Pollution	CO, NO2, SO2	-	-	Sub-decree on Air Pollution Control and Noise Disturbance (2000)	MOE Quoted from Existing reports	-
Water Pollution (sampling from sewerage)	10 items (pH, turbidity, conductivity, TSS, DO, BOD5, NO3, PO4, total coliform, oil & grease)	3 sampling points : 1 point at Tuol Kork area, 2 outlet drainage points in Tonle Sap River	Once	Sub-decree on Water Pollution Control (1999)	Sub-contracting work	Cost involved in the JICA Preparatory Work
<b>At-work</b>						
Air Pollution	CO, NO2, SO2	2 points : 1 point in Tuol Kork area, 1 point in Wat Phnom Northern area.	Monthly	Sub-decree on Air Pollution Control and Noise Disturbance (2000)	Contractor	Involved in the Project Cost
Noise and Vibration	Noise level	2 points : 1 point in Tuol Kork area, 1 point in Wat Phnom Northern area.	Monthly	Sub-decree on Air Pollution Control and Noise Disturbance (2000)	Contractor	Involved in the Project Cost
Water Pollution (sampling from sewerage)	Drainage standard of 10 items (pH, turbidity, conductivity, TSS, DO, BOD5, NO3, PO4, total coliform, oil & grease)	3 sampling points : 1 point at Tuol Kork area, 2 outlet drainage points in Tonle Sap River	Monthly	Sub-decree on Water Pollution Control (1999)	Contractor	Involved in the Project Cost
Waste	Site survey for confirming whether or not the process of generated wastes (both general and works) is properly treated.	Waste disposal site	Monthly	Sub-decree on Solid Waste Management, (1999)	Contractor	There is no cost because of field survey.
Ecosystem	Field reconnaissance for confirming presence or	Project area, especially, the	Once	Declaration on Protected Areas (1994)	Contractor	Involved in the Project cost

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Environmental Item	Monitoring Item	Location	Frequency	Related Standard	Responsible Organization	Cost
	absence of protected animals, plants or any precious organisms.	surrounding area of each construction site.		Protected Areas Laws (Royal Decree (2008))		
Local Economy such as Employment and Livelihood, etc.	Hearing survey for confirming presence or absence of any complaints or disturbance on their commercial activities.	Every project site.	Once (every work site)	JICA Guideline (2010)	Contractor	There is no cost because of field survey.
Existing social infrastructures and services	Field reconnaissance for confirming presence or absence of any traffic disturbance.	Each work site and its surrounding. Connecting roads.	Weekly or as work site moves	The Traffic Law (2006)	Contractor	Involved in the Project cost
HIV	Holding meetings for providing necessary instructions to workers.	Each construction site.	Weekly or as work site moves	The Law on Prevention and Control of HIV/AIDS	Contractor	There is no cost because of the Contractor's own expences.
Work Environment (incl. Work Safety)	Inspection for construction sites regarding stipulated rules are followed or not.	Each construction site.	Weekly or as work site moves	The Labor Law (2002)	Contractor	There is no cost because of the Contractor's own expences.
Accident	Site investigation as accidents occure.	Each work site	Weekly or as work site moves	The Traffic Law (2006)	Contractor	There is no cost because of the Contractor's own expences.
<b>In use</b>						
Water pollution	Water pollution of 10 items :  (pH, turbidity, conductivity, TSS, DO, BOD5, NO3, PO4, total coliform, oil & grease)	3 sampling points : 1 point at Tuol Kork area, 2 outlet drainage points in Tonle Sap River	Semi-annually (for one year after the initial operation period starts.)	Sub-decree on Water Pollution Control (1999)	DPWT/PPCC	Involved in the Project cost

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**Environmental Monitoring Form for Construction Stage – Phase IV (1/4)**

Date: \_\_\_\_\_ Place: \_\_\_\_\_

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards <sup>1)</sup>	Remarks (Measurement Point, Frequency, Method, etc.)
Noise						
Quiet Area <sup>2)</sup> (6 am to 6 pm)	dB (A)			45	85	
Residential Area <sup>3)</sup> (6 am to 6 pm)	dB (A)			60	85	
Commercial and service areas and mix (6 am to 6 pm)	dB (A)			70	85	
Small industrial factories, intermingling in residential areas (6 am to 6 pm)	dB (A)			75	85	

- Note: 1) Japanese law for construction works  
 2) Hospital, libraries, school and kindergarten  
 3) Hotels, administration offices and house

**Results of Vibration Measurement – Phase IV (2/4)**

Date: \_\_\_\_\_ Place: \_\_\_\_\_

Place • Time	Japanese Standard (**), dB(A)	Measurement (dB(A))	
		Average	Maximum
Station 1: Wat Phnom Northern Area			
Day (6:00 - 18:00)	65		
Night (23:00 - 6:00)	60		
Station 2: Toul Kork Area			
Day (6:00 - 18:00)	65		
Night (23:00 - 6:00)	60		

Note : (\*\*) Environmental Quality Standard of Japan

**Environmental Monitoring Form for Construction Stage – Phase IV (3/4)**

Monitoring Item	Monitoring Result during Report Period
Dust generation	
Vibration	
Accident	
Change to drainage pattern	
Soil erosion and slope failure	
Construction waste and general waste	
Effect on amenity of tourism-related development	
Impact on road safety	
Impact on road traffic and vehicle movement	
Risk of infectious diseases such as HIV/AIDS	
Impact on livelihood/income	

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## ARAP Monitoring Form– Phase IV (4/4)

### Relocation Monitoring Sheet

Name of AH: \_\_\_\_\_

1. Progress of Tentative Relocation during construction

Progress	Date	Check	Remarks
Official Notice			
Confirmation on survey results of inventory			
Survey on relocation if any			
Negotiation			
1 <sup>st</sup>			
2 <sup>nd</sup>			
3 <sup>rd</sup>			
4 <sup>th</sup>			
Agreement on compensation and relocation			
Compensation payment			

2. Record of Grievance / Perception and Redress

Date	Record of Grievance / Perception and Redress	Remarks

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## Entitlement Matrix

Item No.	Type of Loss	Eligible Persons	Entitlement	Implementation Issues	Responsible Organization
<b>A. Impact on Land</b>					
Inside ROW (Public State Land)					
1.	Partial impact on residential and / or commercial land, in which the remaining land is <b>STILL VIABLE</b> for continued use.	AHs with main house and/or small shop (independent/ family-owned business)	<ul style="list-style-type: none"> <li>▪ AHs should be removed entirely from PRW and no cash compensation is available for affected land in ROW.</li> <li>▪ No new permanent structures (i.e. structures on a foundation or wooden house larger than the affected one) are permitted to be constructed in the ROW.</li> </ul>	<ul style="list-style-type: none"> <li>▪ AHs to be notified at least <u>90 days</u> in advance before the start of civil works in the actual date that the land will be acquired by the Project.</li> <li>▪ IRC will ensure the payment of all compensation and allowances for which AHs are entitled to at least <u>30 days</u> prior to the scheduled start of civil works.</li> <li>▪ Remaining ROW is still <b>public state land</b>.</li> </ul>	MEF PPCC
Outside ROW (Private Land)					
2.	Loss of Land (all kinds); <b>Either Partial or Entire Land is Lost</b>	All Affected Households (AHs) with recognized proof of ownership whose land will be acquired (for the project construction).	AHs have two options: <ul style="list-style-type: none"> <li>- Land replacement (land to land): Land replacement will be provided with similar land quality and productivity potential.</li> <li>- Cash compensation at replacement cost.</li> </ul>	<ul style="list-style-type: none"> <li>▪ AHs to be notified at least <u>90 days</u> in advance before the start of civil works in the actual date that the land will be acquired by the project.</li> <li>▪ IRC will ensure payment of all compensation and allowances for which AHs are entitled to at least <u>30 days</u> prior to the scheduled start of civil works.</li> <li>▪ IRC will support the AHs to separate or transform the affected land title certificate. Cost of the procedure will be borne by RGC.</li> </ul>	MEF PPCC
<b>B. Loss of Structures</b>					
1.	<b>I. Loss of Houses or Shop/Store; Either Partial or Entire Structure is Lost</b>	All the AHs confirmed to be residing in, doing business or having right over resources within the project affected area during the conduct of IOL and census of AH (on Cut-off Date)	<ul style="list-style-type: none"> <li>▪ Cash compensation at replacement cost without deduction for depreciation or salvageable materials (i.e. present cost of construction materials in the locality plus cost of labor).</li> <li>▪ AHs are also entitled to have transport (moving) allowance (cf. Item C).</li> </ul>	<ul style="list-style-type: none"> <li>▪ AHs to be notified at least <u>90 days</u> in advance before the start of civil works in the actual date that the land will be acquired by the project.</li> <li>▪ AHs to get cash compensation at least <u>30 days</u> ahead of civil works to have the AHs sufficient time to reorganize the house and/or shop, avoiding any disruption in their livelihood.</li> <li>▪ If the structure is found no longer viable for living, compensation can be paid for the entire structure and the AH will also be entitled to other allowances.</li> </ul>	MEF PPCC
		Renters	<ul style="list-style-type: none"> <li>Renters are entitled to get allowances as below:</li> <li>▪ <b>Transportation (moving) allowance:</b> USD200</li> <li>▪ <b>Disruption allowance:</b> A lump sum cash assistance of USD300 (if it is a renting for business purpose as provided in C.IV Temporary loss of business income during relocation).</li> <li>▪ Local authority will help the renter in finding alternate rental</li> </ul>	<ul style="list-style-type: none"> <li>▪ AHs to be notified at least <u>90 days</u> in advance before the start of civil works in the actual date that the land will be acquired by the project.</li> <li>▪ IRC will ensure a payment of all allowances for which AHs are entitled to at least <u>30 days</u> prior to the scheduled start of civil works.</li> <li>▪ AHs should know that a rent house and/or shop are entitled to a one time transport allowance only.</li> <li>▪ The renter is also entitled for the disruption allowance.</li> </ul>	

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Item No.	Type of Loss	Eligible Persons	Entitlement	Implementation Issues	Responsible Organization
			accommodation (if requested by the AH).		
2.	II. Other Structures (porch, extended eaves, spirit house, fence, etc.)	All the AHs confirmed to be residing in, doing business or having right over resources within the project affected area during the conduct of IOL and census of AH (Cut-off Date)	<ul style="list-style-type: none"> <li>▪Cash compensation at replacement cost without deduction for depreciation or salvageable materials.</li> </ul>	<ul style="list-style-type: none"> <li>▪AHs to be notified at least <b>90 days</b> in advance before the start of civil works in the actual date that the land will be acquired by the project.</li> <li>▪IRC will ensure a payment of all allowances for which AHs are entitled to at least <b>30 days</b> prior to the scheduled start of civil works.</li> </ul>	MEF PPCC
C. Allowances and Assurances					
1.	I. Transport (moving) Allowance	<ul style="list-style-type: none"> <li>AHs that relocate their living house</li> <li>Affected Shop</li> </ul>	<ul style="list-style-type: none"> <li>▪Houses relocating in other village outside the ROW: USD 500</li> <li>▪Shop – USD 250</li> </ul>	<ul style="list-style-type: none"> <li>▪Owners of the living houses are entitled to one time transport allowance only.</li> <li>▪Remaining ROW is still <b>public state land</b>.</li> </ul>	PPCC
2.	II. Vulnerable AHs Allowance	Vulnerable AHs	<ul style="list-style-type: none"> <li>▪One time cash assistance equivalent to <b>USD150</b> per Vulnerable AHs.</li> </ul>	<ul style="list-style-type: none"> <li>▪As indicated above, relocating landless AHs are entitled to replace a land with title at no cost.</li> </ul>	PPCC
3.	III. Disruption Allowance	<ul style="list-style-type: none"> <li>▪Relocating shop</li> <li>▪Relocating AH for renting</li> </ul>	<ul style="list-style-type: none"> <li>▪Three months of the shop renting fee at one time cash assistance equivalent to USD 1,500.</li> <li>▪Three months for the renting house fee at one time cash assistance equivalent to USD 750.</li> </ul>	<ul style="list-style-type: none"> <li>▪Allowance shall be paid at the same time with compensation.</li> </ul>	PPCC
4.	IV. Temporary loss of business income during relocation	Owners of shop who relocate their shop	Lump sum cash assistance of USD300.		PPCC
D. Temporary Impacts due to Project Construction					
1.	I. Temporary Settlement Allowance	Owner of Living House (AH-2) who will temporarily relocate by the project construction work.	<ul style="list-style-type: none"> <li>▪Living House rental fee is 800 USD/month.</li> <li>▪Owners of living houses (AH-2) are entitled for rental allowance up to 12 months.</li> </ul>	<ul style="list-style-type: none"> <li>▪IRC will ensure payment of the allowances for which AHs are entitled to at least <b>60 days</b> prior to the scheduled start of civil works.</li> </ul>	PPCC DPWT/PPCC
2.	II. Affected assets during construction	Owners of assets	<ul style="list-style-type: none"> <li>▪Compensation for lost assets in cash at replacement cost, or</li> <li>▪Compensation as leasing fee based on replacement cost, and temporarily affected land will be returned to original owner/occupant.</li> </ul>	<ul style="list-style-type: none"> <li>▪Contractor will be required by contract to pay these costs.</li> <li>▪Construction will be carried out so as to minimize damage.</li> <li>▪Construction will be required by contract to stay within PRW.</li> <li>▪As part of the civil works contract, all access roads/ driveways to properties affected by the construction work will be repaired or replaced including culverts and other facilities, to a condition equal to or better than at present.</li> </ul>	PPCC DPWT/PPCC
3.	III. Damage private or community infrastructure including walls, drains and channels, etc.	Owners	<ul style="list-style-type: none"> <li>▪Repair of damage or payment for repair of damage at replacement cost.</li> </ul>	<ul style="list-style-type: none"> <li>▪The disruption period will be minimized as much as possible.</li> <li>▪The contractor will repair the land back to its original condition where the construction work is over.</li> </ul>	PPCC DPWT/PPCC

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## Appendix 5. Soft Component (Technical Assistance) Plan

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# 1. BACKGROUND OF FORMULATION OF THE SOFT COMPONENT PLAN

## 1.1 Background of the Project

Phnom Penh, the capital city of the Kingdom of Cambodia, is located in the western side of the confluence of Mekong River and Tonle Sap. In the 1960's, urban drainage facilities with functions of draining storm water and domestic wastewater were gradually improved in line with the development of the city. However, all such drainage facilities constructed since the beginning of the 1900's stopped functioning well due to old age, as well as poor maintenance after the 1970's. As a result, the city suffers from habitual inundation and poor environmental conditions caused by stagnant wastewater in the lowland areas, which are serious constraints to the improvement of residents' living environment as well as social and economic development.

To hasten the rehabilitation and improvement of drainage facilities, the Government of Cambodia had requested technical cooperation from the Government of Japan. In response, the Government of Japan dispatched a study team through the Japan International Cooperation Agency (JICA) to formulate the master plan for flood protection and urban drainage improvement in Phnom Penh City and suburbs and to conduct a feasibility study on priority projects selected from the master plan. The study was carried out from March 1998 to August 1999. Based on the proposed priority projects, "The Project for Flood Protection and Drainage Improvement in the Municipality of Phnom Penh (Phase I, II and III)" were carried out under the Japan's Grant-Aid Scheme.

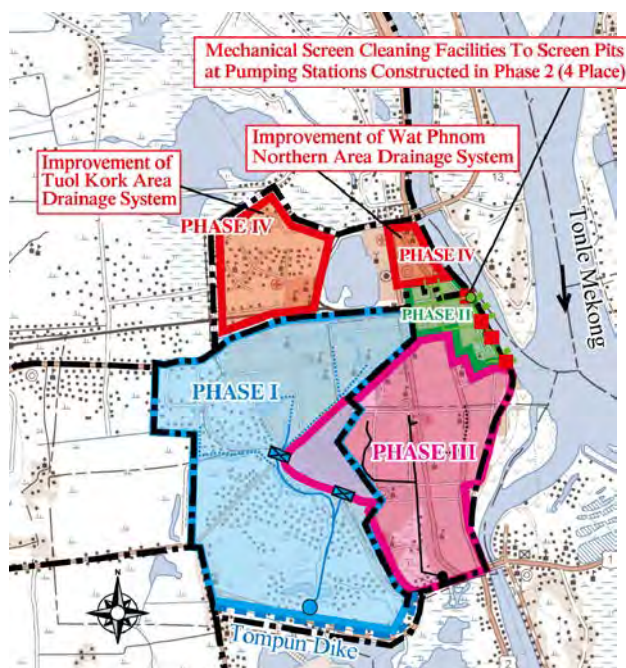


Fig. 1.1 Area of Japan's Grant Aid Project

This Project is phase IV of the preceding three Projects, namely, "The Project for Flood Protection and Drainage Improvement in Phnom Penh (Phase IV)".

## 1.2 Overall Goal and Project Objective

Although the drainage condition in central parts of the city had gradually improved in the past decade, the other areas such as the Wat Phnom Northern Area and Tuol Kork Area still suffer from flooding in the rainy season. As a result, the city is beset with poor environmental conditions caused by stagnant wastewater in the lowland areas, causing deterioration of the residents' living environment and posing a serious constraint to social and economic development.

To find a solution to these issues, the Government of Cambodia and the Phnom Penh Capital City (hereinafter referred to as “PPCC”) had conducted various studies on flood protection and drainage improvement to achieve the overall goals listed below in accordance with basic strategies of the NSDP (National Strategic Development Plan), the national policies of Rectangular Strategy of the Government of Cambodia and the City Development Strategy of the PPCC.

### **Overall Goal**

- Stabilization of livelihood of people in the Phnom Penh Capital City
- Development of the Phnom Penh Capital City through the mitigation of flood damage
- Improvement of sanitary and environmental conditions in the Phnom Penh Capital City

The Project has the following objective under the overall goals mentioned above:

### **Project Objective**

- To minimize inundation and damage caused by local rainfall by improving the drainage system and providing equipment for cleaning the drainage facilities in the targeted area of the Project (See Fig.1.1).

## **1.3 Basic Concept of the Project**

To achieve the objective of the Project, drainage facilities in the project area, including underground reservoir, pumping station, drainage pipes and drainage box culverts, shall be installed or improved at the planning scale of 2-year probability, and two units of vehicle-mounted drainage pump shall be procured as drainage improvement equipment.

**Table 1.2 Contents of the Project (Phase IV)**

Covered by the Japan’s Grant Aid			Quantity	Covered by the Recipient Country
Items	Description			
<b>Construction Works</b>				
Improvement of Wat Phnom Northern Area Drainage System	Drainage Main	Pipe	2.7 km	- Improvement of branch line of drainage pipe - Operation and maintenance of drainage system / facilities
		Box Culvert	0.5 km	
	Interceptor	Pipe	1.6 km	
		Manhole Pump	1 unit	
	Pumping Station	Pump	1.4 m <sup>3</sup> /sec	
		Underground Reservoir	6,500 m <sup>3</sup>	
Improvement of Tuol Kork Area Drainage System	Drainage Main	Pipe	7.0 km	
		Box Culvert	1.4 km	
Mechanical Screen Cleaning Facilities to Screen Pits at Pumping Stations Constructed in Phase 2	Auto Raking Machine	Chak Tomuk PS	4 units	- Operation and maintenance of mechanical screen - Clearing/removal/disposal of solid waste/sludge/sediment
		Preah Kumulung PS		
		Phsar Kandal PS		
		Phsar Chaas PS		
<b>Procurement Works</b>				
Procurement of Drainage Improvement Equipment	Vehicle-Mounted Drainage Pump		2 units	- O&M work and emergency drainage work utilizing equipment procured by the Project
<b>Soft Component</b>				
The soft component (technical assistance) aims to enable the DSD carry out the systematic and scheduled maintenance work and to utilize drainage facilities/equipment constructed/procured by Japan’s Grant Aid Projects. PPCC is required to install garbage boxes and to carry out activities for raising public awareness to stop garbage dumping in and around the markets during the soft component (technical assistance) of the Project.				

## **1.4 Necessity of the Soft Component (Technical Assistance)**

### **1.4.1 Formulation of Systematic Pipe Cleaning Plan**

The Department of Public Works and Transport (hereinafter referred to as “DPWT”) of the PPCH, the implementation agency of the Project, is mandated with the responsibility to manage the constructed facilities and procured equipment. Based on this responsibility, the cleaning and maintenance of drainage pipes shall be implemented by the Drainage and Sewerage Division (hereinafter referred to as “DSD”) of DPWT, utilizing cleaning equipment and funds provided from the cleaning and management budget of PPCC.

DSD staffs possess the basic knowledge and experience in operating and maintaining cleaning equipment for drainage pipes because it presently uses its cleaning equipment (4 sets of water-jet machine and sludge sucker as well as 2 combined sludge sucker vehicles with auxiliary equipment) for the cleaning and maintenance of the drainage system. Most of the present cleaning work on drainage pipes is, however, limited to symptomatic treatment, such as cleaning work at site where inundation happens frequently or claimed by the residents. Besides, discrepancy between cleaning work plan and actual work implementation is large because the monthly and annual work plan of DSD includes only pipe length to be cleaned and does not include inspection work plan to be implemented prior to the cleaning work, and also actual cleaning work is symptomatic treatment.

To improve the above conditions, technology transfer concerning formulation of systematic drainage pipe cleaning plan and drainage pipe database was executed in the soft component in Phase III Project. As a result, systematic drainage pipe cleaning plan and drainage pipe database was successfully formulated. Furthermore, the activities in the technology transfer revealed that additional activities for raising awareness of DSD’s staff to continuously improve and update the cleaning plan as well as database, would be required.

Ideally, preventive approach should prevail for drainage pipe cleaning works. In order to sustainably develop the approach and thus drainage pipes installed in the Project are properly functioning, periodical updating of the plan and database is essential and budget allocation for the activities are indispensable.

To this end, soft component for technology transfer to develop capacity for drainage cleaning works, is proposed to update systematic drainage cleaning plan and thus to ensure sustainable and effective use of pipes constructed and equipment procured in the Project.

### **1.4.2 Operation and Maintenance of Mechanical Screens and Vehicle-mounted Drainage Pump**

DPWT and DSD have no O&M experience of mechanical screen because this type of screen is equipped in drainage system in PPCC for the first time. In addition, DPWT and DSD have not yet been given technical guidance for vehicle-mounted drainage pump.

To appropriately and sustainably operate and maintain the equipment procured in the Project, technical transfer through On-the-Job Training (OJT) is required in the Project.

### **1.4.3 Educational Activities for Prevention of Garbage Dumping to Drainage Facilities**

People in Phnom Penh have been dumping their garbage to the drainage channels/pipes and thus drainage function of the drainage channels/pipes has been deteriorated. It is not easy to prevent people from dumping garbage in drainage channels/pipes, because their garbage dumping is closely related to their awareness of environment, priority in their daily lives and cultural level of people. However, to sustainably operate and maintain drainage pipes installed in the Project, prevention and reduction of garbage dumping to drainage channels/pipes, are indispensable.

In order to reduce garbage in drainage channels/pipes, two approaches are considered, namely, to prevent the garbage from entering into the drainage channels/pipes, and to reduce generation of garbage.

Most of the garbage dumped to the drainage pipes/channels is plastics accumulated on the roads. Usually the plastics are used as container of drink sold at the stalls. To reduce the plastics on the roads, educational activities for proper garbage dumping are required.

In consideration of the facts that: (i) most of the garbage are produced in the markets, (ii) garbage box installed in PPCC is small in number and (iii) lack of awareness for garbage dumping among people in PPCC, educational activities for prevention of garbage dumping to drainage facilities, are proposed in the soft component.

## **2. OBJECTIVES OF THE SOFT COMPONENT**

The objectives to be achieved by DSD through the soft component service are as follows:

- DSD can compose systematic and scheduled cleaning plan of the drainage system as a part of the total maintenance work of the drainage system.
- DSD can execute appropriate utilization and maintenance of mechanical screen and vehicle-mounted drainage pump procured by the Project.
- Amount of garbage dumped to the roads are reduced in PPCC

## **3. OUTPUT OF THE SOFT COMPONENT**

### **3.1 Formulation of Systematic Pipe Cleaning Plan**

Outputs of formulation of systematic pipe cleaning plan, targeting DSD's staff in operation and maintenance and technical sections, are as follows.

- DSD can execute pipe cleaning works in accordance with the systematic pipe cleaning plan, formulated by themselves and they can revise the plan depends on the situations.
- DSD can assure budget for the systematic pipe cleaning works.



- DSD can update and revise drainage pipe network diagram.

### **3.2 Operation and Maintenance of Mechanical Screens and Vehicle-mounted Drainage Pump**

Outputs of operation and maintenance of mechanical screens and vehicle-mounted drainage pump, targeting DSD's staff in operation and maintenance and technical sections, are as follows.

- DSD can properly operate and maintain mechanical screen and vehicle-mounted drainage pump.
- DSD can inspect the procured equipment in accordance with operation, maintenance and inspection manual for the equipment.

### **3.3 Educational Activities for Prevention of Garbage Dumping to Drainage Facilities**

Outputs of educational activities for prevention of garbage dumping to drainage facilities, targeting people in PPCC, are as follows.

- PPCC raise public awareness for proper disposal of garbage.

## **4. METHODOLOGY FOR CONFIRMATION OF ACHIEVEMENT**

Methodology for confirmation of achievement after completion of the soft component is described below.

### **4.1 Formulation of Systematic Pipe Cleaning Plan**

- Comparison between systematic pipe cleaning plan and actual achievement, using bar chart and drainage pipe network diagram.
- Confirmation of update of drainage pipe network diagram, progress of formulation of drainage pipe database, targeting drainage pipes cleaned and drainage pipes constructed, in the period from commencement to completion of soft component.

### **4.2 Operation and Maintenance of Mechanical Screens and Vehicle-mounted Drainage Pump**

- To confirm achievement of O&M skills for the equipment procured in the Project.
- To confirm O&M record of the equipment procured in the Project, targeting daily, monthly and yearly records.
- To confirm updating of O&M, safety control and inspection manuals for the equipment procured in the Project.

### **4.3 Educational Activities for Prevention of Garbage Dumping to Drainage Facilities**

- To confirm record of educational activities conducted in the Project.

#### 4.4 Targeted Number of Staff in the Soft Component

Items	Present			After completion of soft component		
	Manager	Technician	Worker	Manager	Technician	Worker
Formulation and updating of drainage pipe network diagram	-	1	-	-	2~3	-
Formulation of systematic pipe cleaning plan	1	-	-	2	-	-
O&M of vehicle-mounted drainage pump	0	0	0	1	2	4
O&M of mechanical screen	0	0	0	1	1	5

Note: 「-」 : “No staff is assigned.”

### 5. ACTIVITIES OF THE SOFT COMPONENT

Two (2) Japanese experts, assigned as “Systematic Pipe Cleaning Plan Expert” and “Equipment Operation and Maintenance (O&M) Expert” respectively, shall be dispatched.

Systematic Pipe Cleaning Expert shall be in charge of assistance of (i) formulation of systematic pipe cleaning plan and (ii) educational activities for prevention of garbage dumping to drainage facilities. On the other hand, Equipment O&M Expert shall be in charge of assistance and training for DSD’s staffs in terms of O&M of mechanical screen and vehicle-mounted drainage pump.

#### 5.1 Implementation of Drainage Pipe Cleaning based on Systematic Pipe Cleaning Plan

To implement the activities, Systematic Pipe Cleaning Expert shall be dispatched. The expert shall be a specialist in technology transfer to the recipient country in the field of O&M of drainage pipes, and shall have management capability for overall activities in the soft component.

The soft component shall be implemented to assist formulation of systematic pipe cleaning plan, targeting managing and technical staff of DSD. The Expert shall be dispatched in the dry and rainy season each year, and at the completion of soft component.

The Expert shall assist the formulation of systematic pipe cleaning plan, on daily, monthly and yearly basis, and review the plan in terms of safety control, environmental consideration and so on in consultation with DSD. The Expert shall also request PPCC to assure budget for the pipe cleaning works.

The Expert shall confirm that (i) the pipe cleaning works are kept in daily, monthly and yearly records, (ii) updating of pipe cleaning plan, drainage pipe database and drainage pipe network diagram, based on the bar chart presenting “plan” and “actual achievement”. The Expert shall give instruction for solving issues identified in the course of soft component.

#### 5.2 Operation and Maintenance of Mechanical Screens and Vehicle-mounted Drainage Pump

An Equipment Operation and Maintenance (O&M) Expert shall be dispatched. The expert shall be skilled at O&M of the equipment procured in the Project.

The Expert shall establish O&M and inspection manuals and working records for the equipment procured in the Project in collaboration with managing technician selected in DSD. The Expert shall educate operator of DSD on O&M and inspection for the equipment using O&M and inspection manuals and working records established in the Project.

In particular, the Expert shall analyze troubles and malfunction of mechanical screen identified in the course of soft component and educate the operator of DSD on countermeasures to solve the troubles. The Expert shall test the operator on the case study to confirm his/her achievement.

### **5.3 Educational Activities for Prevention of Garbage Dumping to Drainage Facilities**

The Systematic Pipe Cleaning Expert shall be in charge of the activities.

The Expert shall explain to PPCC about (i) negative impacts originated from garbage dumping to drainage channels/pipes and (ii) requirement of activities for raising public awareness of proper garbage disposal in PPCC, to ensure sustainable use of drainage facilities. In addition, the Expert shall encourage PPCC to implement the activities in collaboration with communes in the Project site.

Most of the garbage dumped to the drainage pipes/channels is plastics accumulated on the road and they are usually used as container of drink sold at the stalls in and around markets. Therefore, campaigns including installation of garbage boxes and activities for raising public awareness in and around the markets, are proposed in the soft component. The campaigns include, (i) site tours in screen pits of the existing pumping station along Sap River to make people understand negative impacts of garbage to drainage functions and (ii) garbage pickup campaign by staff of administrative agencies and residents in several sites.

### **5.4 Inputs for the Soft Component**

Inputs for the soft component in the Project is estimated at (i) 4.60 MM for dispatch of “Systematic Pipe Cleaning Expert” and (ii) 1.86 MM for dispatch of “Equipment Operation and Maintenance (O&M) Expert”, totaling 6.46 MM. The inputs are detailed below.

#### **(1) Formulation of Systematic Pipe Cleaning Plan Expert: 4.60 MM**

The Expert shall be dispatched for five times in the dry and rainy seasons in the course of soft component. In addition, the Expert shall report the progress to JICA and compile all outputs of the soft component at the completion.

##### Major Activities

- To explain overall soft component plan in consultation with DPWT
- To review and assist updating of systematic pipe cleaning plan
- To review and assist updating of drainage pipe database

- To review pipe cleaning works in terms of safety and schedule control, and identify issues
- To check the deference between “plan” and “actual achievement”
- To request PPCC to secure budget for drainage pipe cleaning
- To explain overall plan of “Educational Activities for Prevention of Garbage Dumping to Drainage Facilities” to PPCC, and facilitate implementation of the activities
- To assist activities including installation of garbage boxes, collection of garbage, site tour of drainage facilities.

#### Timing and Duration of Dispatch

Duration for the activities is 138 days (4.60 months) in total as below.

- **Term-1** : 28 days : Six months after commencement of construction work
- **Term-2** : 28 days : Six months after the commencement of the first term
- **Term-3** : 28 days : Six months after the commencement of the second term
- **Term-4** : 28 days : Six months after the commencement of the third term
- **Term-5** : 26 days : At the completion of the Project to prepare report compiling all activities of soft component and submit the report to PPCC and JICA Cambodia Office

Schedule of the activities is summarized below.

#### **Detailed Schedule for Systematic Pipe Cleaning Expert**

Day	1 <sup>st</sup> Term	2 <sup>nd</sup> Term	3 <sup>rd</sup> Term	4 <sup>th</sup> Term	5 <sup>th</sup> Term
1	Sun	Move from Japan to Cambodia			
2	Mon	- Explanation of overall plan to DPWT and DSD in 1 <sup>st</sup> Term, and activities plan for each term from 2 <sup>nd</sup> Term to 5 <sup>th</sup> Term - Request PPCC to hold meeting - Explanation of activities to JICA Cambodia Office			
3	Tue	- Explanation of contents of activities in the soft component to DSD staff	- Explanation of objectives and contents of activities to DSD staff		
4	Wed	- Confirmation of progress of drainage pipe network diagram and drainage pipe database	- Confirmation of progress/updating of drainage pipe network diagram and drainage pipe database		
5	Thu	- Ditto	- Assistance for updating of drainage pipe network diagram and drainage pipe database		
6	Fri	- Assistance for updating of drainage pipe network diagram and drainage pipe database	- Confirmation of difference between “plan” and “actual achievement” in drainage pipe cleaning activities		
7	Sat	Holiday			
8	Sun	Holiday			
9	Mon	- Assistance for updating of drainage pipe network diagram and drainage pipe database	- Confirmation of pipe cleaning condition and assistance for job improvement		
10	Tue	- Ditto	- Consultation with PPCC on implementation of activities for prevention of garbage dumping	- Identification and analysis of the issues in pipe cleaning works	

Day		1 <sup>st</sup> Term	2 <sup>nd</sup> Term	3 <sup>rd</sup> Term	4 <sup>th</sup> Term	5 <sup>th</sup> Term
11	Wed	- Consultation with PPCC on strategy for raising public awareness and prevention of garbage dumping	- Identification and analysis of the issues in pipe cleaning works		- Assistance for solving the issues in pipe cleaning works	
12	Thu	- Confirmation of difference between “plan” and “actual achievement” in drainage pipe cleaning activities	- Assistance for solving the issues in pipe cleaning works		- Assistance for revision of systematic pipe cleaning plan	
13	Fri	- Assistance for revision of systematic pipe cleaning plan and drainage pipe database				
14	Sat	Holiday				
15	Sun	Holiday				
16	Mon	- Identification and analysis of the issues in pipe cleaning works	- Assistance for revision of systematic pipe cleaning plan		- Assistance for revision of systematic pipe cleaning plan	
17	Tue	- Finalization of activities for raising public awareness and prevention of garbage dumping	- Assistance for revision of systematic pipe cleaning plan		- Compiling of drainage pipe network diagram and database	
18	Wed	- Consultation with implementation agency on activities for raising public awareness and prevention of garbage dumping	- Preparation of activities for raising public awareness and prevention of garbage dumping		- Preparation of completion report compiling all activities in the soft component	
19	Thu	- Consultation of solving the issues in pipe cleaning works	- Ditto		- Ditto	
20	Fri	- Assistance for revision of systematic pipe cleaning plan and drainage pipe database			- Ditto	
21	Sat	Holiday				
22	Sun	Holiday				
23	Mon	- Assistance for solving the issues in pipe cleaning works	- Site tour of drainage facilities		- Printing of the completion report - Report to DSD	
24	Tue	- Assistance for formulation systematic pipe cleaning plan	- Implementation of activities for raising public awareness and prevention of garbage dumping		- Report to DPWT and submit the completion report	
			- Kandar market	- Old market		
25	Wed	- Consultation with implementation agency on activities for raising public awareness and prevention of garbage dumping	- Consultation with implementation agency on activities for raising public awareness and prevention of garbage dumping in the next term - Compiling results of activities for garbage dumping and recommendations for the future activities		- Report to JICA Cambodia Office and Japanese Embassy - Move to Japan	
26	Thu	- Report to DPWT and DSD			- Arrival at Japan	
27	Fri	- Report to JICA Cambodia Office, and move to Japan				
28	Sat	Arrival at Japan				

## (2) Equipment Operation and Maintenance (O&M) Expert: 1.86 MM

The Expert shall be dispatched for two times, namely, (i) after arrival of vehicle-mounted drainage pump and (ii) at the completion of installation of mechanical screen, in the course of soft component.

### Major Activities

- To establish O&M and inspection manuals, check sheets and working records for the equipment procured in the Project
- To educate the operator of DSD through OJT (on-the-job training), using O&M and inspection manuals, check sheets and working records for the equipment procured
- To educate the operator of DSD to solve issues arising in the operation of the equipment, and update the O&M and inspection manuals, check sheets and working records for the equipment procured, based on the results of activities
- To confirm check sheets and working records, which shows progress and achievement in the soft component (from 2<sup>nd</sup> Term)
- To educate the operator of DSD on case study and test whether the operator achieve the skills to recover troubles and malfunction of the equipment

### Timing and Duration of Dispatch

Duration for the activities is 56 days (1.86 months) in total as below.

- **Term-1** : 28 days : At the arrival of vehicle-mounted drainage pump to educate DSD's staff assigned to operate and maintain the equipment
- **Term-2** : 28 days : At the arrival of mechanical screen to educate DSD's staff assigned to operate and maintain the equipment. At the completion of the Project, the Expert prepare report compiling all activities of soft component and submit the report to PPCC and JICA Cambodia Office

Schedule of the activities is summarized below.

### **Detailed Schedule for Equipment Operation and Maintenance (O&M) Expert**

Day	1 <sup>st</sup> Term	2 <sup>nd</sup> Term
1	Sun	Move from Japan to Cambodia
2	Mon	- Explanation of overall plan to DPWT and DSD - Explanation of activities to JICA Cambodia Office
3	Tue	- Explanation of objectives and contents of activities to DSD staff
4	Wed	- Establishment of methods of inspection and repair for vehicle-mounted drainage pump - Confirmation of working condition, as well as working records for O&M and inspection
5	Thu	- Establishment of safety control system and countermeasures to cope with emergencies for vehicle-mounted drainage pump - Review and revise O&M of vehicle-mounted drainage pump
6	Fri	- Establishment of O&M and inspection manuals for vehicle-mounted drainage pump - Establishment of methods of inspection, safety control, countermeasures for emergency and repair for mechanical screen
7	Sat	Holiday
8	Sun	Holiday
9	Mon	- Establishment of O&M and inspection manuals for vehicle-mounted drainage pump - Establishment of O&M and inspection manuals, check sheet and working record for mechanical screen
10	Tue	- Establishment of check lists and working records for vehicle-mounted drainage pump - Training of operator for O&M and inspection for mechanical screen
11	Wed	- Training of operator for O&M and inspection for vehicle-mounted drainage pump - Implementation of O&M and inspection activities at the site for mechanical screen (PS1)

Day		1 <sup>st</sup> Term	2 <sup>nd</sup> Term
12	Thu	- Case study on troubles and malfunctions of vehicle-mounted drainage pump	- Implementation of O&M and inspection activities at the site for mechanical screen (PS2)
13	Fri	- Preparation of pilot activities for operation of vehicle-mounted drainage pump	- Implementation of O&M and inspection activities at the site for mechanical screen (PS4)
14	Sat	Holiday	Holiday
15	Sun	Holiday	Holiday
16	Mon	- Implementation of pilot activities for operation of vehicle-mounted drainage pump (1 location)	- Implementation of O&M and inspection activities at the site for mechanical screen (PS5)
17	Tue	- Review and improve pilot activities for vehicle-mounted drainage pump	- Implementation of O&M and inspection activities at the site for mechanical screen (PS6)
18	Wed	- Implementation of pilot activities for operation of vehicle-mounted drainage pump (1 location)	- Review and improve O&M and inspection activities for mechanical screen
19	Thu	- Review and improve pilot activities for vehicle-mounted drainage pump	- Case study on troubles and malfunctions of mechanical screen
20	Fri	- Review and revise O&M and inspection manuals, check sheet and working record for vehicle-mounted drainage pump	- Test of operator to check his/her achievement of O&M and inspection of mechanical screen
21	Sat	Holiday	Holiday
22	Sun	Holiday	Holiday
23	Mon	- Guidance of revised manuals, check sheet and working record	- Review and revise O&M and inspection manuals, check sheet and working record for mechanical screen
24	Tue	- Implementation of pilot activities for operation of vehicle-mounted drainage pump (1 location)	- Guidance of revised manuals, check sheet and working record
25	Wed	- Compiling results of activities using vehicle-mounted drainage pump and recommendations for the future activities - Preparation of report	- Compiling results of activities using mechanical screen and recommendations for the future activities - Preparation of report
26	Thu	- Report to DPWT and DSD	-
27	Fri	- Report to JICA Cambodia Office, and move to Japan	
28	Sat	Arrival at Japan	

## 6. ARRANGEMENT AND INPUTS OF DISPATCHED EXPERTS

For the implementation of the Soft Component in which the activities of DSD will be improved, two (2) Japanese Experts (“Systematic Pipe Cleaning Expert” and “Equipment Operation and Maintenance (O&M) Expert”) shall be arranged and dispatched for the following reasons:

- In Cambodia, there are few experts who have enough experience in managing municipal drainage network systems and in the planning of long-term management strategies and improvement of management skills.
- There are also few experts who may be able to strictly manage the progress of the work based on the planned schedule.
- Equipment, which is equipped in PPCC for the first time, is included in the Project.

Therefore, the “Systematic Pipe Cleaning Expert” with extensive experience in the maintenance and management of sewerage and drainage facilities shall be dispatched during the Soft Component Service. Likewise, the “Equipment Operation and Maintenance (O&M) Expert” who has extensive

experience in the maintenance and management of the procured equipment shall be dispatched as described in previous chapter.

## 7. IMPLEMENTATION SCHEDULE OF THE SOFT COMPONENT

The Systematic Pipe Cleaning Expert shall be dispatched in about six months interval. The Equipment Operation and Maintenance (O&M) Expert shall be dispatched at the timing of hand-over of vehicle-mounted drainage pump and at the completion of installation of mechanical screen. Overall schedule is shown in the following figure.

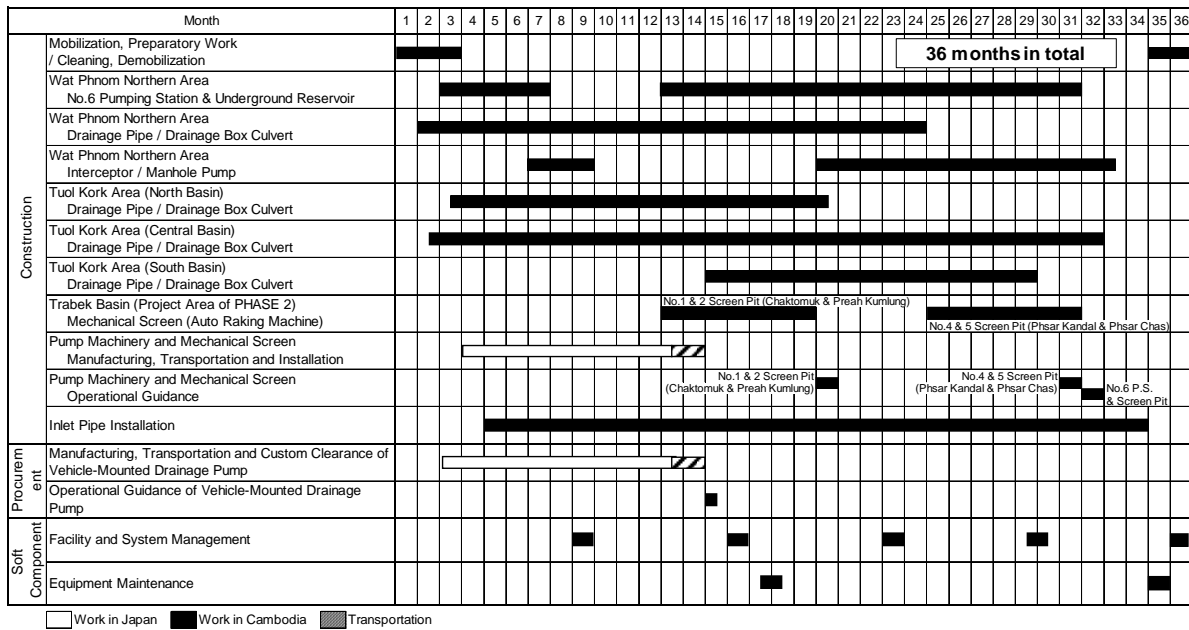


Fig. 7.1 Implementation Schedule of the Soft Component Plan

## 8. OUTPUT OF ACTIVITIES OF THE SOFT COMPONENT

The activities of the soft component shall be completed at the end of construction work of the Project; hence, the activities shall be implemented in parallel with the main construction work. Outputs of the activities shall be as follows:

- Revised drainage pipe network diagram and drainage pipe database
- Result of review of drainage pipe cleaning work and systematic drainage pipe cleaning plan, based on the PDCA cycle
- O&M and inspection manuals for the procured equipment, check sheets and working records
- Results of pilot activities using vehicle-mounted drainage pump and working records including O&M and inspection of the equipment
- Records of budget provided by PPCC and expenditure for implementation of drainage pipe cleaning work
- Records of activities for prevention of garbage dumping in the course of the soft component
- Completion report for all activities



## 9. RESPONSIBILITY OF CAMBODIAN SIDE

Responsibility of the Cambodian side for the soft component is enumerated below.

### (1) Securing Budget

PPCC should secure budget for drainage pipe cleaning works to implement the soft component. DSD should prepare drainage pipe cleaning annual plan and submit the plan to PPCC to request PPCC to secure budget.

### (2) Raising Public Awareness

PPCC should proactively implement activities for raising public awareness of environmental protection. In the soft component, PPCC should implement site tours of drainage facilities, install garbage boxes and carry out campaigns on appropriate garbage disposal in PPCC.

### (3) Active Participation of DSD staff

In order to obtain fruitful outputs, PPCC and DPWT should encourage DSD staff to proactively participate in the activities in the soft component.

### (4) Self-motivating Activities of DSD

Japanese expert is only dispatched once in about six months in the soft component. Thus, DSD should implement activities by themselves, including drainage pipe cleaning and update of drainage pipe network diagram and drainage pipe database, during the Japanese expert's absence.

### (5) Requirements for Sustainable Use of Outputs in the Soft Component

Requirements for sustainable use of outputs in the soft component are enumerated below.

#### Formulation of appropriate plan

DSD should continuously formulate systematic drainage pipe cleaning plan, based on the knowledge obtained in the course of soft component. For the sustainable formulation of the cleaning plan, DPWT should elaborate to assure budget for the cleaning works.

#### Securing Budget

PPCC should allocate budget corresponds to the amount of drainage pipe cleaning works done by DSD in accordance with systematic pipe cleaning plan. Periodical check of gaps between budget and expenditure should be done by DPWT.

#### Securing Human Resources

A system to recruit and educate young staff shall be established in order to smoothly implement the cleaning activities.

#### Human Resources Development

Supervisors for cleaning and maintenance works, as well as operators, who formulate drainage network diagram, are key persons to accomplish outputs. So, training of supervisors and operators are essential to smoothly implement activities. A system to recruit new staff should be established in order to cope with retirement of the staff who engages in the activities.

#### Establishing Monitoring System for Sustainable Activities

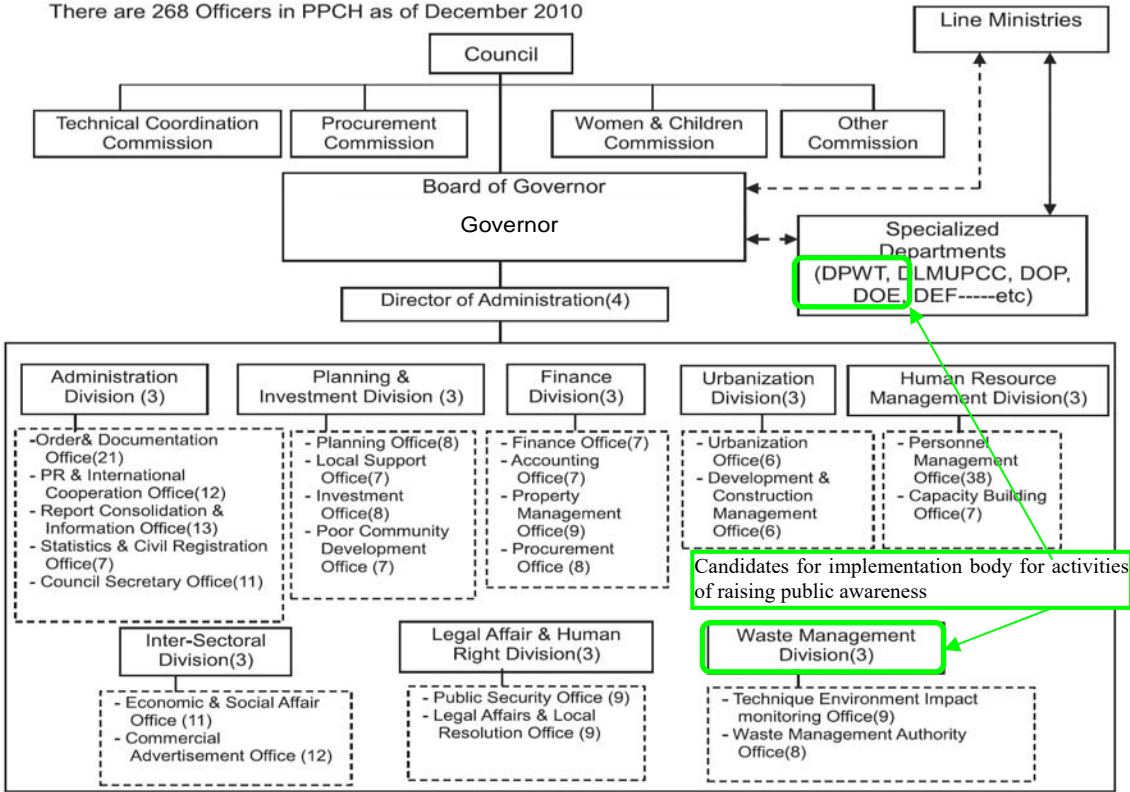
DSD should continuously conduct activities such as cleaning and maintenance of drainage pipe, keeping working records and updating drainage pipe network diagram, based on the methodologies and skill transferred in the soft component. DSD should periodically report their activities to DPWT and DPWT should establish monitoring system to make the activities sustainable.

#### Sustainable Use of the Equipment procured in the Project

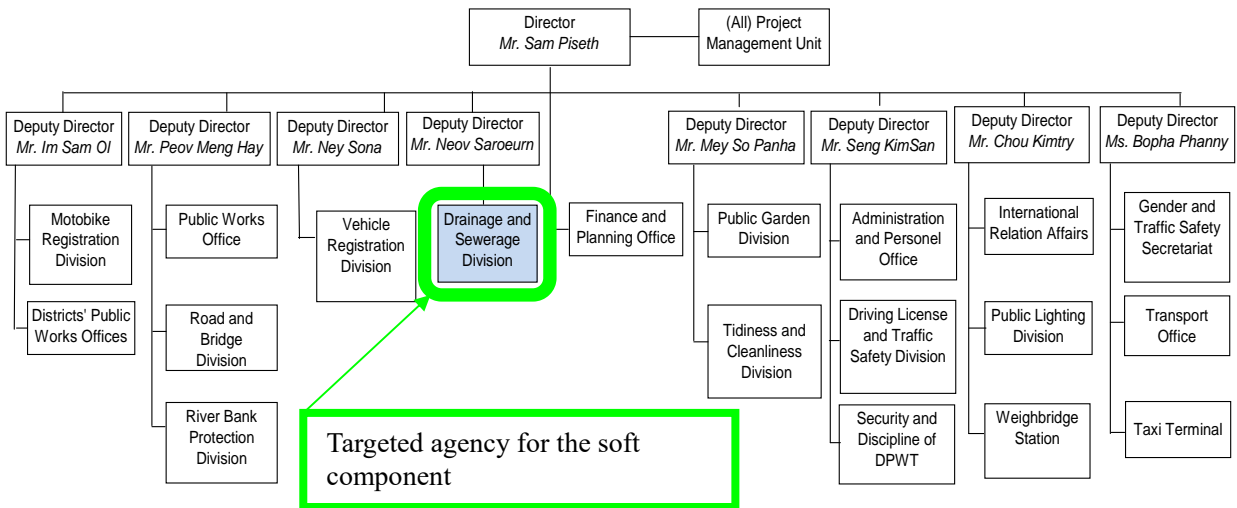
Periodical inspection and repair shall be required and protection from property loss and damage shall be avoided for the sustainable use of the equipment procured in the Project.

**Attachment**

There are 268 Officers in PPCH as of December 2010



Organization Chart of PPCC and related Agencies for the Soft Component



Organization Chart of DPWT and targeted Agency for the Soft Component (DSD)



## Appendix 6. Result of Inundation Condition Survey

### QUESTIONNAIRE FOR PUBLIC AWARENESS AND SANITARY CONDITION SURVEY RELATING TO FLOODING (To Sangkat Chief)

No. \_\_\_\_\_

Date: \_\_\_\_\_

Interviewer name: \_\_\_\_\_

Name of Sangkat: \_\_\_\_\_

Name of Sangkat Chief: \_\_\_\_\_

1. Where is the flooding area/road in your Sangkat? (Name of street)

Road No./Name	Duration / Length / Area of Flood	Flood Depth
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High
		Low/Medium/High

Flood Depth : Low (1 :ankle ~2: shin) / Medium (3 :knee ~4: thigh) / High (5 :waist ~)

2. Where is the area/road without Drainage System? (Name of street)

Road No./Name	Length of "No Drainage"	Present Drainage/Flood Condition

3. Where do you want to improve the drainage condition in your Sangkat? (Name of street)

Road No./Name	Length of Improvement	Present Drainage/Flood Condition

**QUESTIONNAIRE FOR PUBLIC AWARENESS AND  
ENVIRONMENT&SANITARY CONDITION SURVEY RELATING TO FLOODING**

No. \_\_\_\_\_

Date: \_\_\_\_\_

Interviewer name: \_\_\_\_\_

**I. General Questions**

1. Type of interviewee: \_\_\_\_\_

- 1 Housewife
- 2 The master
- 3 Children
- 4 Other house member
- 5 Housekeeper (servant)
- 6 Others (please specify): \_\_\_\_\_

2. Address: \_\_\_\_\_  
\_\_\_\_\_

3. Employment of the master: \_\_\_\_\_

- 1 Primary industry (agriculture & mining)
- 2 Secondary industry (manufacturing)
- 3 Tertiary industry (service oriented profession)
- 4 Pensioner (retired)
- 5 Unemployed
- 6 Others (please specify): \_\_\_\_\_
- 7 I don't know

4. Number of persons staying in the house: \_\_\_\_\_

5. Number of dwelling years at this place: \_\_\_\_\_

- 1 Less than 5 years
- 2 5 – 9 years
- 3 10 – 19 years
- 4 20 years or more
- 5 I don't know

6. What type of your dwelling: \_\_\_\_\_

- 1 Own house
- 2 Rental
- 3 I don't know

7. If "Question No.6 answer 2 Rental", how much is your house rent? : \_\_\_\_\_ US\$/month

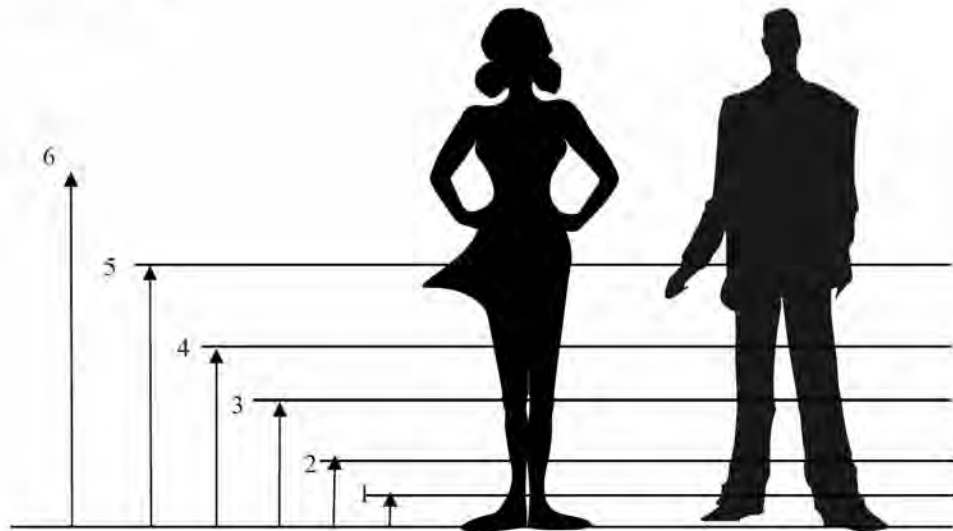
8. Total **expenditure** of your house per month: \_\_\_\_\_
- 1 Less than 100 US\$/month
  - 2 101 – 200 US\$/month
  - 3 201 – 500 US\$/month
  - 4 501 – 1000 US\$/month
  - 5 1001 – 2000 US\$/month
  - 6 More than 2001 US\$/month
  - 7 I don't know

**II. Questions on Inundation Situation**

9. Have you ever had experience in flooding in front of your house? : \_\_\_\_\_
- 1 Yes
  - 2 No
  - 3 I don't know

10. If “Question No.9 answer Yes”, how often do you have the flooding? : \_\_\_\_\_
- 1 Once a year
  - 2 2 – 3 times a year
  - 3 More than 4 times a year
  - 4 Once in 2 – 3 years
  - 5 Others (please specify): \_\_\_\_\_
  - 6 I don't know

11. If “Question No.9 answer Yes”, how deep was the flooding? : \_\_\_\_\_
- 1 Up to your ankle
  - 2 Up to your shin
  - 3 Up to your knee
  - 4 Up to your thigh
  - 5 Up to your waist
  - 6 Higher than waist
  - 7 I don't know



12. If "Question No.9 answer Yes", how long was the flooding? : \_\_\_\_\_

- 1 Less than 30 minutes
- 2 30 min. to 1 hour
- 3 2 – 3 hours
- 4 Around 4 – 6 hours
- 5 Almost half day
- 6 1 day
- 7 More than 1 day
- 8 I don't know

### **III. Questions on Sanitary Condition**

13. Do you have any trouble after flooding? : \_\_\_\_\_

- 1 Yes
- 2 No

14. If "Question No.13 answer Yes", what kind of trouble did you have due to the flooding? : \_\_\_\_\_

- 1 Cannot go out for business or shopping
- 2 Cannot open for business
- 3 Soil the furniture, merchandize or inside the house
- 4 Smell the house
- 5 Others (please specify): \_\_\_\_\_
- 6 I don't know

15. How do you dispose of your nightsoil? : \_\_\_\_\_

- 1 No treatment (defecate in your backyard)
- 2 Septic tank
- 3 Flowing to a drainage pipe
- 4 Others (please specify): \_\_\_\_\_
- 5 I don't know

16. Have you and your family ever had the following disease after flooding?

(multiple answer acceptable):

- |                  |         |        |                            |
|------------------|---------|--------|----------------------------|
| 1 Skin disease   | Yes ( ) | No ( ) | please tick in the bracket |
| 2 Flu            | Yes ( ) | No ( ) | -ditto-                    |
| 3 Food poisoning | Yes ( ) | No ( ) | -ditto-                    |
| 4 Diarrhea       | Yes ( ) | No ( ) | -ditto-                    |
| 5 Typhoid        | Yes ( ) | No ( ) | -ditto-                    |
| 6 Dysentery      | Yes ( ) | No ( ) | -ditto-                    |
| 7 I don't know   |         |        |                            |

### **IV. Others**

17. Do you agree that the road in front of your house and drainage condition will be improved? : \_\_\_\_\_

- 1 Yes
- 2 No
- 3 I don't know



18. If “Question No.17 answer Yes”, do you still agree that the improvement requires construction work in front of your house? : \_\_\_\_\_
- 1 Yes
  - 2 No
  - 3 I don't know
19. If “Question No.17 answer Yes”, what kind of benefits do you expect the road and drainage improvement in front of your house? : \_\_\_\_\_ (multiple answer acceptable)
- 1 Better sanitary condition (including outbreak of insects, water-borne disease, etc.)
  - 2 Better environmental condition (air, dust, odor, etc.)
  - 3 Better traffic condition
  - 4 Better business condition
  - 5 Others (please specify)
  - 6 I don't know
20. If “Question No.17 answer No”, why do not you agree the improvement in front of your house? : \_\_\_\_\_ (multiple answer acceptable)
- 1 Do not feel the necessity
  - 2 Do not like noise, vibration, dust and so on resulting from the construction work
  - 3 Do not want to interfere with my business
  - 4 Others (please specify): \_\_\_\_\_
  - 5 I don't know

#### **V. Effect of Japan's Grant Aid Drainage Project**

21. After installation of drainage pipe by Japan's Grant Aid Project, do you find any improvement of inundation condition near your house? : \_\_\_\_\_
- 1 Yes
  - 2 No
  - 3 I don't know
  - 4 Others (please specify): \_\_\_\_\_
22. If “Question No.21 answer Yes”, what kind of improvement of inundation condition do you find? : \_\_\_\_\_ (multiple answer acceptable)
- 1 Number of flooding is reduced: \_\_\_\_\_ times/year → \_\_\_\_\_ times/year
  - 2 Depth of flooding is reduced: \_\_\_\_\_ cm → \_\_\_\_\_ cm
  - 3 Duration of flooding is shortened: \_\_\_\_\_ hour → \_\_\_\_\_ hour
  - 4 Waterborne diseases are reduced.
  - 5 Commuting to office or school become easier.
  - 6 Traffic jam originated from flooding is reduced.
  - 7 Others (please specify): \_\_\_\_\_

(End of Questions)

Table 6.1 Result of Interview-1 (1/2)

No.	Sangkat (Representative)	Result of Interview Survey	Improvement Planning
1	<b>Toeu Laork 1</b> (Mr. Pech Sok Khoeun)  Researcher: Chea Hak Date: 08-Apr-16	<b>Location and Situation</b>	Name of Road      Length (m)
		Name of Road      Length (m)      Inundation Level	
		112                      250                      Middle	
		253                      140                      Middle	
		257                      139                      Middle	
		259                      140                      Middle	
		261                      140                      High	
		118                      120                      Low	
		128                      650                      High	
		<b>Total=              1,579</b>	
<b>Existing Drainage Pipe</b>			
Name of Road			
112			
<b>High Priority Area for Improvement</b>			
Name of Road      Length (m)			
112                      150			
261                      16			
253                      21			
138                      250			
2	<b>Boeungkak 2</b> (Mr. Vann Sareth)  Researcher: Chea Hak Date: 08-Apr-16	<b>Location and Situation</b>	Name of Road      Length (m)
		Name of Road      Length (m)      Inundation Level	
		132 (608)              720                      Middle	
		618                      405                      Middle	
		616                      470                      Middle	
		<b>Total=              1595</b>	
		<b>Existing Drainage Pipe</b>	
		None	
		<b>High Priority Area for Improvement</b>	
		Name of Road      Length (m)	
None			
3	<b>Boeungkak 1</b> (Mr. Vith Darith)  Researcher: Chea Hak Date: 08-Apr-16	<b>Location and Situation</b>	Name of Road      Length (m)
		Name of Road      Length (m)      Inundation Level	
		345                      370                      Middle	
		<b>Total=              370</b>	
		<b>Existing Drainage Pipe</b>	
		None	
		<b>High Priority Area for Improvement</b>	
		Name of Road      Length (m)	
		345                      370	
		4	<b>Psadepo 1</b> (Mr. Chiem Seda)  Researcher: Chea Hak Date: 08-Apr-16
Name of Road      Length (m)      Inundation Level			
182                      660                      Middle			
237                      80                      Middle			
194                      150                      Middle			
188                      530                      Middle			
<b>Total=              1420</b>			
<b>Existing Drainage Pipe</b>			
None			
<b>High Priority Area for Improvement</b>			
Name of Road      Length (m)			
221                      550			
182                      660			
237                      770			
194                      150			
188                      530			

Table 6.2 Result of Interview-1 (2/2)

No.	Sangkat (Representative)	Result of Interview Survey	Improvement Planning
5	<b><i>Wat Phnom</i></b> ( <i>Mr. Hao Sinith</i> )  Researcher: Leng Someth Date: 12-Apr-16	<b>Location and Situation</b>	Name of Road      Length (m)
		Name of Road      Length (m)      Inundation Level	
		90                      490                      Middle	
		92                      200                      Middle	
		Roudabout              750                      Middle	
		<b>Total=              1440</b>	
		<b>Existing Drainage Pipe</b>	
		None	
		<b>High Priority Area for Improvement</b>	
		Name of Road      Length (m)	
		90                      490	
92                      200			
Roundabout              750			
6	<b><i>Srah Chak</i></b> ( <i>Mr. En Sathan</i> )  Researcher: Leng Someth Date: 12-Apr-16	<b>Location and Situation</b>	Name of Road      Length (m)
		Name of Road      Length (m)      Inundation Level	
		47                      515                      Middle	
		84                      100                      Middle	
		45                      300                      High	
		88                      440                      Middle	
		86                      610                      High	
		93                      720                      High	
		<b>Total=              2,685</b>	
		<b>Existing Drainage Pipe</b>	
		Name of Road      Length (m)	
Sisovath                      1400                      * riverside			
<b>High Priority Area for Improvement</b>			
Name of Road      Length (m)			

Note: (1) The words and values in parentheses are data described in drawings attached to interview survey sheets. The definitive values are determined by Study Team after careful checking  
(2) The locations and values followed by "-" are inundation area identified by Study Team.

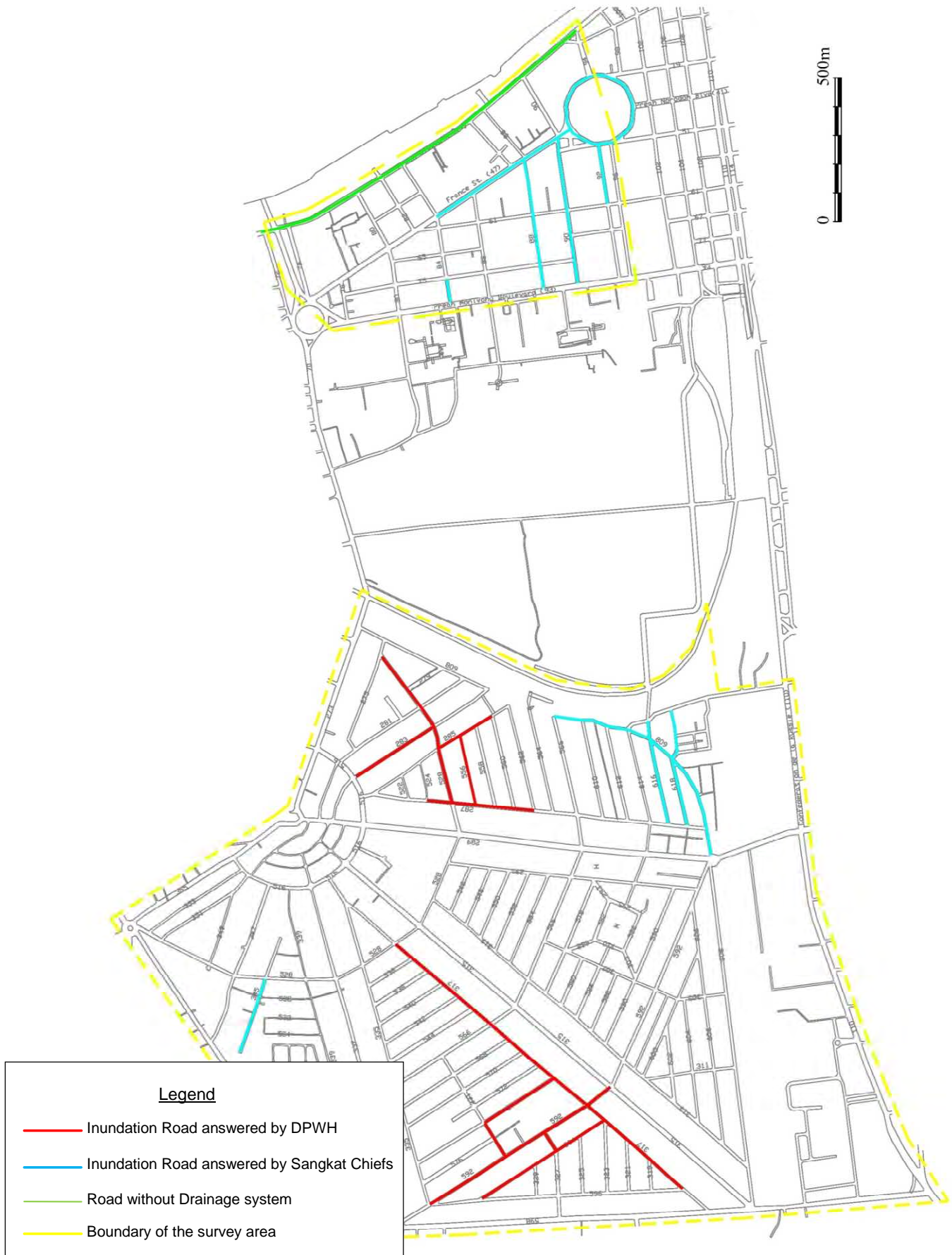


Figure 6.1 Result of Interview-1

Table 6.3 Result of Interview-2 (Phase IV, 170households) (1/3)

No	Area	Name of Street	I. General Questions								II. Questions on Inundation Situation				III. Questions on Sanitary Condition				IV. Others			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			Type of interviewee	Address	Employment of the master	Number of persons staying in the house	Number of dwelling years at this place	What type of your dwelling	If "Question No.6 answer 2 Rental", how much is your house rent?	Total expenditure of your house per month (US\$/month)	Have you ever had experience in flooding in front of your house?	If "Question No.9 answer Yes", how often do you have the flooding?	If "Question No.9 answer Yes", how deep was the flooding?	If "Question No.9 answer Yes", how long was the flooding?	Do you have any trouble after flooding?	If "Question No.13 answer Yes", what kind of trouble did you have due to the flooding?	How do you dispose of your nightsoil?	Have you and your family ever had the following disease after flooding?	Do you agree that the road in front of your house and drainage condition will be improved?	If "Question No.17 answer Yes", do you still agree that the improvement requires construction work in front of your house?	If "Question No.17 answer Yes", what kind of benefits do you expect the road and drainage improvement in front of your house?	If "Question No.17 answer No", why do not you agree the improvement in front of your house?
1.Housewife 2.The master 3.Children 4.Other house member 5.Housekeeper (servant) 6.Others		1.Primary industry 2.Secondary industry 3.Tertiary industry 4.Pensioner (retired) 5.Unemployed 6.Others	1.Less than 5 2.5- 9 3.10- 19 4.20 or more 5.1 don't know	1.Own house 2.Rental 3.1 don't know		1.Less than 100 2.101- 200 3.201- 500 4.501- 1000 5.1001- 2000 6.More than 2001 7.1 don't know	1.Yes 2.No 3.1 don't know	1.Once a year 2.2-3 times a year 3.More than 4 times a year 4.Once in 2-3 years 5.Others 6.1 don't know	1.Up to ankle 2.Up to shin 3.Up to knee 4.Up to thigh 5.Up to waist 6.Higher than waist 7.1 don't know	1.Less than 30 min. 2.30 min. to 1 hour 3.2-3 hours 4.Around 4-6 hours 5.Almost half day 6.1 day 7.More than 1 day 8.1 don't know	1.Yes 2.No	1.Cannot go out for business or shopping 2.Cannot open for business 3.Soil the furniture, merchandize or inside the house 4.Smell the house 5.Others 6.1 don't know	1.No treatment (defecate in your backyard) 2.Septic tank 3.Flowing to a drainage pipe 4.Others 5.1 don't know	1.Skin disease 2.Flu 3.Food poisoning 4.Diarrhea 5.Typhoid 6.Dysentery 7.1 don't know	1.Yes 2.No 3.1 don't know	1.Yes 2.No 3.1 don't know	1.Better sanitary condition (including outbreak of insects, water-borne disease, etc.) 2.Better environmental condition (air, dust, odor, etc.) 3.Better traffic condition 4.Better business condition 5.Others 6.1 don't know	1.Do not feel the necessity 2.Do not like noise, vibration, dust and so on resulting from the construction work 3.Do not want to interfere with my business 4.Others 5.1 don't know				
1	Tuol Kork	528	1	st528-7	4	5	2	1	-	4	1	2	1	1	1	2,4	3	1	1	2,3,4	-	
2	Tuol Kork	528	3	st528-41	6	3	3	1	-	5	1	3	1	1	4	3	None	1	1	4	-	
3	Tuol Kork	528	1	st528-26	3	3	2	1	-	3	1	3	2	1	3,4	3	None	1	1	3,4	-	
4	Tuol Kork	528	1	st528-29	3	7	3	1	-	5	1	3	1	1	2,3,4	3	None	1	1	3,4	-	
5	Tuol Kork	281	1	st281-2	3	9	4	1	-	3	2	-	-	-	-	3	None	2	-	-	1	
6	Tuol Kork	281	4	st281-01	3	13	4	1	-	4	2	-	-	-	-	3	None	2	-	-	1	
7	Tuol Kork	281	1	st281-31	3	8	4	1	-	4	2	-	-	-	-	3	None	2	-	-	3	
8	Tuol Kork	281	4	st281-N23B	3	5	4	1	-	3	2	-	-	-	-	2	None	2	-	-	1	
9	Tuol Kork	281	4	st281-26	2	13	4	1	-	3	2	-	-	-	-	3	None	2	-	-	1	
10	Tuol Kork	281	3	st281-22	4	5	3	1	-	3	2	-	-	-	-	3	None	2	-	-	1	
11	Tuol Kork	283	4	st283-26	4	5	4	1	-	3	1	2	3	7	1	12,3,4	3	2	1	2,3,4	-	
12	Tuol Kork	283	4	st283-930	3	4	3	1	-	5	1	3	5	7	1	1,2,3,4	3	1,2	1	1,2,4	-	
13	Tuol Kork	283	2	st283-31	3	8	3	1	-	5	3	6	7	8	2	-	3	None	2	-	1	
14	Tuol Kork	283	5	st283-27	3	7	3	1	-	4	3	6	7	8	2	-	3	None	2	-	1	
15	Tuol Kork	283	3	st283-16	4	6	3	1	-	4	1	2	3	6	1	1,2,3,4	3	1,2,4	1	1	2,3,4	
16	Tuol Kork	283	1	st283-19	5	7	4	1	-	3	1	2	3	7	1	1,2,3,4	3	None	1	1	3,4	
17	Tuol Kork	288	2	st288-38	3	7	3	1	-	5	2	-	-	-	-	3	None	2	-	-	1	
18	Tuol Kork	285	5	st285-40	3	9	4	1	-	6	2	-	-	-	-	3	None	2	-	-	1	
19	Tuol Kork	285	2	st285-36	3	8	4	1	-	5	2	-	-	-	-	3	None	2	-	-	1,3	
20	Tuol Kork	285	2	st285-53	3	6	3	1	-	4	3	6	7	8	2	-	3	None	2	-	1,3	
21	Tuol Kork	285	3	st285-5	3	5	4	1	-	3	3	6	7	8	2	-	3	None	2	-	1,3	
22	Tuol Kork	285	1	st285	3	2	1	2	150	3	3	6	7	8	2	-	3	None	2	-	1,2	
23	Tuol Kork	285	1	st285-5	1	5	4	1	-	3	3	6	7	8	2	-	3	None	2	-	1,3	
24	Tuol Kork	288	3	st288-5	3	15	4	1	-	4	3	6	7	8	2	-	3	None	2	-	1,3	
25	Tuol Kork	558	1	st558-20	3	4	3	1	-	3	1	3	1	1	1	2,3,4	3	1	1	1	2,4	
26	Tuol Kork	558	1	st558-08	2	9	4	1	-	5	3	6	7	8	2	-	3	None	2	-	1,3	
27	Tuol Kork	556	1	st556-8Ea	3	3	4	1	-	4	1	2	3	6	1	1,2,3,4	3	2,4	1	1	2,4	
28	Tuol Kork	556	1	st556-12	4	6	4	1	-	3	1	2	3	7	1	1,2,3	3	1,2	1	2	2,3,4	
29	Tuol Kork	528	1	st528-49A	3	6	2	1	-	4	1	2	1	2	1	2,3,4	3	None	1	1	3,4	
30	Tuol Kork	528	5	st528-17	3	4	2	1	-	5	3	6	7	8	1	4	3	None	1	1	3,4	
31	Tuol Kork	524	2	st524-37	3	6	2	1	-	5	1	3	2	2	1	4	3	None	1	1	2,4	
32	Tuol Kork	524	1	st524-18	3	4	3	1	-	4	1	2	1	2	1	4	3	None	1	1	3,4	
33	Tuol Kork	287	1	st287-23	3	6	4	1	-	3	1	3	4	6	1	1,2	3	1,2,4,6	1	1	4	
34	Tuol Kork	287	1	st287-23D	3	4	4	1	-	3	1	3	2	5	1	1,2	3	2	1	1	2,3,4	
35	Tuol Kork	287	4	st287-15	3	5	1	2	180	5	1	3	2	2	1	1,2,4	3	1,2,4	1	1	3,4	
36	Tuol Kork	287	1	st287-27A	3	5	4	1	-	3	1	3	2	2	1	1,2,4	3	1,2,4	1	1	2,3,4	
37	Tuol Kork	528	1	st528	3	5	2	2	200	4	1	3	2	3	2	-	3	1,2	2	-	1	
38	Tuol Kork	528	1	st528-58A	3	4	1	1	-	4	1	3	2	3	2	-	3	None	2	-	1	
39	Tuol Kork	339	1	st339	4	10	4	1	-	3	1	3	1	3	1	1	3	None	1	1	1,2	
40	Tuol Kork	339	1	st339	4	7	4	1	-	3	1	3	2	3	1	1,4	3	1,2	1	1	-	
41	Tuol Kork	528	3	st528	5	5	4	2	350	4	1	3	2	3	1	1,4	3	1,2,6	1	1	-	
42	Tuol Kork	528	1	st528	5	5	2	2	150	3	1	3	2	3	1	1,4	3	1,2	1	1	-	
43	Tuol Kork	345	1	st345	4	-	4	1	-	3	1	3	2	6	1	1,4	3	1,2	1	1	-	
44	Tuol Kork	345	1	st345	3	4	4	1	-	3	1	3	2	6	1	1,4	2	1,2	1	1	-	
45	Tuol Kork	335	5	st335-4	3	8	4	1	-	5	2	-	-	-	-	3	None	2	-	-	1	
46	Tuol Kork	335	5	st335-60	3	6	4	1	-	5	2	-	-	-	-	3	None	2	-	-	1	
47	Tuol Kork	335	2	st335-52	5	7	4	1	-	5	2	-	-	-	-	3	None	2	-	-	1	
48	Tuol Kork	335	2	st335-45	3	8	4	1	-	5	2	-	-	-	-	3	None	2	-	-	1	
49	Tuol Kork	592	1	st592-106	4	5	3	1	-	3	1	3	2	2	2	-	3	None	1	1	-	
50	Tuol Kork	592	1	st592-104	6	4	4	1	-	2	1	2	2	2	2	-	3	None	1	1	-	
51	Tuol Kork	592	1	st592-96	5	6	1	2	-	3	1	3	2	2	2	-	3	None	1	1	1,2	
52	Tuol Kork	592	1	st592-99	3	4	1	2	70	2	1	2	2	2	1	3	3	None	1	1	1,2	
53	Tuol Kork	315	-	st315-48	3	4	2	1	-	6	1	3	2	3	1	2,4	3	None	1	1	2,3	
54	Tuol Kork	315	5	st315-53	3	6	2	1	-	6	1	3	2	2	1	2,4	3	1	1	1	2,3,4	
55	Tuol Kork	317	1	st317-42	3	4	4	1	-	3	1	3	2	3	1	2,4	3	4,6	1	1	2,4	
56	Tuol Kork	317	1	st317-42	3	10	3	1	-	5	1	3	1	1	4	3	None	1	1	1	3,4	
57	Tuol Kork	317	1	st317-42	3	3	2	1	-	4	1	3	1	2	1	1,2,4	3	None	1	1	1,4	

Table 6.4 Result of Interview-2 (Phase IV, 170households) (2/3)

No	Area	Name of Street	I. General Questions								II. Questions on Inundation Situation				III. Questions on Sanitary Condition				IV. Others			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			Type of interviewee	Address	Employment of the master	Number of persons staying in the house	Number of dwelling years at this place	What type of your dwelling	If "Question No.6 Rental", how much is your house rent?	Total expenditure of your house per month (US\$/month)	Have you ever had experience in flooding in front of your house?	If "Question No.9 answer Yes", how often do you have the flooding?	If "Question No.9 answer Yes", how deep was the flooding?	If "Question No.9 answer Yes", how long was the flooding?	Do you have any trouble after flooding?	If "Question No.13 answer Yes", what kind of trouble did you have due to the flooding?	How do you dispose of your nightsoil?	Have you and your family ever had the following disease after flooding?	Do you agree that the road in front of your house and drainage condition will be improved?	If "Question No.17 answer Yes", do you still agree that the improvement requires construction work in front of your house?	If "Question No.17 answer Yes", what kind of benefits do you expect the road and drainage improvement in front of your house?	If "Question No.17 answer No", why do not you agree the improvement in front of your house?
Answers								Answers				Answers				Answers						
58	Tuol Kork	317	1	st317-46	3	3	4	1	-	4	1	3	3	3	1	1,2,3	3	None	1	1	1,3,4	-
59	Tuol Kork	317	1	st317-47	3	5	2	2	100	4	1	3	2	2	1	1,4	3	1	1	1	2,3,4	-
60	Tuol Kork	317	1	st317-47	3	4	4	1	-	3	1	3	3	2	1	2,3,4	3	1,4,6	1	1	3,4	-
61	Tuol Kork	317	4	st317-11	3	-	4	1	-	5	1	3	2	2	1	1,2,4	3	None	1	1	2,3,4	-
62	Tuol Kork	317	5	st317-53	3	6	2	1	-	6	1	2	2	3	1	1,2,4	3	None	1	1	1,2,4	-
63	Tuol Kork	317	1	st317-77	3	3	1	2	250	4	1	3	3	3	1	1,2,3,4	3	4	1	1	3,4	-
64	Tuol Kork	317	-	st317-74	3	7	4	1	-	3	1	3	2	3	1	2,4	3	None	1	1	2,3,4	-
65	Tuol Kork	592	1	st592-70	3	7	4	1	-	3	1	3	2	2	1	2,4	3	1	1	1	2,4	-
66	Tuol Kork	592	1	st592-66	3	8	2	1	-	3	1	3	1	2	1	1,2,4	3	None	1	1	4	-
67	Tuol Kork	592	1	st592-91	3	9	2	1	-	3	1	2	2	2	1	1	3	4,6	1	1	2,3	-
68	Tuol Kork	592	1	st592-91	3	8	1	2	400	4	1	3	1	2	1	4	3	1	2	-	1	-
69	Wat Phnom Northern Area	47	1	St47-16	3	12	4	1	-	4	1	2	2	2	1	1,2,3,4	5	2,5	1	1	1,2,3	-
70	Wat Phnom Northern Area	47	1	St47-01	3	4	5	1	-	4	1	2	2	3	1	1,2,3,4	2	2,4	1	1	1,2,3,4	-
71	Wat Phnom Northern Area	47	1	St47-3E0	3	5	1	2	800	4	1	3	3	3	1	4	3	1,2	1	1	1,2,3,4	-
72	Wat Phnom Northern Area	47	1	St47-16	3	10	4	1	-	4	1	2	3	2	1	1,2,3,4	3	2,5	2	-	-	1,4(Already do it)
73	Wat Phnom Northern Area	47	1	St47	3	4	1	2	-	2	1	3	3	3	1	2	3	2	1	1	1,2,3,4	-
74	Wat Phnom Northern Area	47	6	St47	3	5	4	3	-	1	1	3	4	2	1	2	3	1,2	1	1	1,2,3,4	-
75	Wat Phnom Northern Area	47	6	St47	3	4	4	3	-	2	1	3	4	4	1	1,2,4	5	2,5	1	1	1,2,3,4	-
76	Wat Phnom Northern Area	47	6	St47	3	5	4	3	-	1	1	3	3	3	1	4	3	1,2	1	1	1,2,3,4	-
77	Wat Phnom Northern Area	47	6	St47	3	2	4	3	-	1	1	3	3	2	1	1,2,4	5	1,2,4,6	1	1	1,2,3,4	-
78	Wat Phnom Northern Area	47	6	St47	3	5	-	1	-	2	1	2	3	3	1	1,4	5	2	1	1	1,2,3	-
79	Wat Phnom Northern Area	47	5	St47-21	3	15	1	1	-	4	1	2	2	1	1,2,3	3	1,2,4,6	1	1	1	1,2,3,4	-
80	Wat Phnom Northern Area	47	4	St47	3	4	4	2	50	2	1	3	3	2	1	2	3	1,2	1	1	1,2,3,4	-
81	Wat Phnom Northern Area	92	1	St92	3	5	4	1	-	5	1	3	4	3	1	2	3	1,2	1	1	1,2,3,4	-
82	Wat Phnom Northern Area	92	1	St92	3	5	1	1	-	3	1	3	4	3	1	2	3	2	1	1	2,3,4	-
83	Wat Phnom Northern Area	92	1	St92-19	3	4	1	2	150	3	1	3	3	3	1	1,2,4	3	2	1	1	1,2,3	-
84	Wat Phnom Northern Area	92	1	St92-22	3	5	2	1	-	3	1	2	3	3	1	1,2,4	3	1,2,4,5	1	1	1,2,3,4	-
85	Wat Phnom Northern Area	90	4	St90-15AE0	3	7	2	2	140	4	1	2	2	2	1	2,3,4	3	1,2,4,5,6	2	-	-	3
86	Wat Phnom Northern Area	90	1	St90-3	3	6	4	2	200	5	1	2	1	3	1	1,2,3,4	2	1,2	1	1	1,2,3,4	-
87	Wat Phnom Northern Area	90	1	st90-8E0	3	3	1	2	250	3	1	3	2	2	1	2	3	1,4	1	1	4	-
88	Wat Phnom Northern Area	90	1	St90-7E0	3	3	4	1	-	4	1	3	1	2	1	2	3	1,4,6	1	1	4	-
89	Wat Phnom Northern Area	90	1	St90-36	3	5	2	2	350	3	1	2	3	3	1	2	3	2	1	1	1,3,4	-
90	Wat Phnom Northern Area	90	4	St90-43	3	9	1	2	900	4	1	2	2	2	1	1,2,3,4	5	2	1	1	2,3,4	-
91	Wat Phnom Northern Area	90	2	St90-16	3	5	4	1	-	4	1	3	3	2	1	4	3	2	1	1	1,2,3	-
92	Wat Phnom Northern Area	90	2	St90-13	3	9	1	1	-	4	1	2	2	2	1	1,2,4	5	2	1	1	2,3,4	-
93	Wat Phnom Northern Area	88	1	St88-17	3	3	4	1	-	3	1	3	3	3	1	4	3	2,4	1	1	1,2,3,4	-
94	Wat Phnom Northern Area	88	3	St88-18	5	7	3	2	300	4	1	2	2	2	1	1,2,3,4	3	2,4,5,6	2	-	-	1,4(Re-build already)
95	Wat Phnom Northern Area	88	1	St88-52	3	5	4	1	-	3	1	2	2	3	1	1,3,4	3	1,2	2	-	-	1
96	Wat Phnom Northern Area	88	1	St88-17B2	3	8	4	1	-	4	1	3	3	2	1	1,4	3	1,2	1	1	1,2,3,4	-
97	Wat Phnom Northern Area	86	1	St86-01	3	13	3	2	180	5	1	3	3	4	1	4	3	2	1	1	1,2,3,4	-
98	Wat Phnom Northern Area	86	1	St86-01	3	7	3	1	-	4	1	3	3	3	1	1,2,4	2	2,3	1	1	1,3,4	-
99	Wat Phnom Northern Area	84	2	St84-10	3	6	4	1	-	4	1	2	3	4	1	4	3	1,2	1	1	1,3,4	-
100	Wat Phnom Northern Area	84	4	St84-7A	5	-	4	1	-	4	1	2	3	2	1	1,2,3,4	3	2,4	2	-	-	1,4(Already do it)
101	Wat Phnom Northern Area	84	4	St84-36	3	10	5	1	-	4	1	3	1	1	1	1,2,3,4	5	2,4,6	1	1	1,2,3	-
102	Wat Phnom Northern Area	93	1	St93-36	2	5	1	2	400	3	1	3	1	2	1	2	3	1,2	1	1	1,2,3,4	-
103	Wat Phnom Northern Area	80	1	St80-5E02	3	10	4	1	-	4	1	3	2	2	1	1,2,4	2	1,2,4,6	1	1	1,2,3,4	-
104	Wat Phnom Northern Area	80	1	St80-6AB	3	7	4	1	-	3	1	3	3	2	1	4	3	2	1	1	1,2,3,4	-
105	Wat Phnom Northern Area	80	1	St80-32	3	12	2	1	-	4	1	4	3	3	1	1,2,4	3	1,2,4,6	1	1	1,2,3,4	-
106	Wat Phnom Northern Area	80	1	St80	3	3	3	2	50	3	1	2	2	2	1	2	3	2	1	1	1,2,3,4	-
107	Tuol Kork	616	1	St616-U2E0	5	6	4	1	-	4	1	3	3	3	1	1,2,3,4	3	1,2,3,4,5,6	1	1	1,2,3,4	-
108	Tuol Kork	616	1	St616-27A	6	4	3	1	-	3	1	2	2	7	1	1	3	1,2	1	1	1,2,3,4	-
109	Tuol Kork	616	1	St616-20B	6	12	4	1	-	4	1	3	3	6	1	1,2,3,4	2	1,2,4,5,6	1	1	1,2,3,4	-
110	Tuol Kork	616	3	St616-11	6	10	4	1	-	3	1	2	2	3	1	4	4	1,2,4	1	1	1,2,3,4	-
111	Tuol Kork	618	4	St618-21E0	6	5	1	1	-	4	1	3	3	6	1	1,2,3,4	3	2,4	1	1	1,2,3,4	-
112	Tuol Kork	618	1	St618-21E0	4	2	4	1	-	3	1	3	4	6	1	4	3	1,2	1	1	1,2,3,4	-
113	Tuol Kork	618	1	St618-5C	6	4	4	1	-	4	1	3	4	7	1	1,2,3,4	3	2	1	1	1,2,3,4	-
114	Tuol Kork	618	1	St618-20C	5	4	4	1	-	3	1	3	3	7	1	4	3	1,2	1	1	1,2,3,4	-

Table 6.5 Result of Interview-2 (Phase IV, 170households) (3/3)

No	Area	Name of Street	I. General Questions								II. Questions on Inundation Situation				III. Questions on Sanitary Condition				IV. Others			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			Type of interviewee	Address	Employment of the master	Number of persons staying in the house	Number of dwelling years at this place	What type of your dwelling	If "Question No.6 answer 2 Rental", how much is your house rent?	Total expenditure of your house per month (US\$/month)	Have you ever had experience in flooding in front of your house?	If "Question No.9 answer Yes", how often do you have the flooding?	If "Question No.9 answer Yes", how deep was the flooding?	If "Question No.9 answer Yes", how long was the flooding?	Do you have any trouble after flooding?	If "Question No.13 answer Yes", what kind of trouble did you have due to the flooding?	How do you dispose of your nightsoil?	Have you and your family ever had the following disease after flooding?	Do you agree that the road in front of your house and drainage condition will be improved?	If "Question No.17 answer Yes", do you still agree that the improvement requires construction work in front of your house?	If "Question No.17 answer Yes", what kind of benefits do you expect the road and drainage improvement in front of your house?	If "Question No.17 answer No", why do not you agree the improvement in front of your house?
			Answers								Answers				Answers				Answers			
			1.Housewife 2.The master 3.Children 4.Other house member 5.Housekeeper (servant) 6.Others	1.Primary industry 2.Secondary industry 3.Tertiary industry 4.Pensioner (retired) 5.Unemployed 6.Others	1.Less than 5 2.5- 9 3.10- 19 4.20 or more 5.1 don't know	1.Own house 2.Rental 3.1 don't know	1.Less than 100 2.101- 200 3.201- 500 4.501- 1000 5.1001- 2000 6.More than 2001 7.1 don't know	1.Yes 2.No 3.1 don't know	1.Once a year 2.2-3 times a year 3.More than 4 times a year 4.Once in 2-3 years 5.Others 6.1 don't know	1.Up to ankle 2.Up to shin 3.Up to knee 4.Up to thigh 5.Up to waist 6.Higher than waist 7.1 don't know	1.Less than 30 min. 2.30 min. to 1 hour 3.2-3 hours 4.Around 4-6 hours 5.Almost half day 6.1 day 7.More than 1 day 8.1 don't know	1.Yes 2.No	1.Cannot go out for business or shopping 2.Cannot open for business 3.Soil the furniture, merchandize or inside the house 4.Smell the house 5.Others 6.1 don't know	1.No treatment (defecate in your backyard) 2.Septic tank 3.Flowing to a drainage pipe 4.Others 5.1 don't know	1.Skin disease 2.Flu 3.Food poisoning 4.Diarrhea 5.Typhoid 6.Dysentery 7.1 don't know	1.Yes 2.No 3.1 don't know	1.Yes 2.No 3.1 don't know	1.Better sanitary condition (including outbreak of insects, water-borne disease, etc.) 2.Better environmental condition (air, dust, odor, etc.) 3.Better traffic condition 4.Better business condition 5.Others 6.1 don't know	1.Do not feel the necessity 2.Do not like noise, vibration, dust and so on resulting form the construction work 3.Do not want to interfere with my business 4.Others 5.1 don't know			
115	Tuol Kork	608	1	St608-5B	3	3	1	2	300	3	1	3	3	3	1	1,2,3,4	5	2,4,6	1	1	1,2,3,4	-
116	Tuol Kork	608	1	St608-19	3	6	4	1	-	4	1	2	1	2	1	2	3	2	1	1	1,2,3,4	-
117	Tuol Kork	608	1	St608-22	3	6	3	1	-	3	1	3	2	3	1	1,2,3,4	3	1,2,4,5,6	1	1	1,2,3,4	-
118	Tuol Kork	608	1	St608-26	5	3	3	1	-	3	1	3	3	6	1	2	3	1,2,4	1	1	1,2,3,4	-
119	Tuol Kork	608	1	St608-17	3	6	3	1	-	3	1	3	3	6	1	2	3	1,2,4,6	1	1	1,2,3,4	-
120	Tuol Kork	608	1	St608-2	5	8	4	1	-	3	1	3	3	4	1	1,3,4	3	1,2,6	1	1	1,2,3,4	-
121	Tuol Kork	315	1	St315-75	3	3	2	2	3,500	6	2	-	-	-	2	-	3	None	1	1	1,2,4	-
122	Tuol Kork	315	1	St315-78	3	8	4	1	-	4	1	1	2	3	1	3,4	3	None	1	1	1,2,4	-
123	Tuol Kork	315	1	St315-68	3	13	4	1	-	4	1	3	3	6	1	2,3,4	3	None	2	-	-	1,3
124	Tuol Kork	315	1	St315-68	3	4	2	2	500	4	1	3	2	6	1	1,3,4	3	None	1	1	1,2,4	-
125	Tuol Kork	592	1	St592-58	3	2	2	2	420	4	1	3	2	6	1	2,3,4	3	1,2	1	1	1,2,4	-
126	Tuol Kork	592	1	St592-58	3	4	2	2	350	4	1	3	2	6	2	-	3	None	2	-	-	1
127	Tuol Kork	592	1	St592-30AR	3	13	4	1	-	4	1	3	2	3	1	3	3	2	1	1	1,2,3	-
128	Tuol Kork	592	1	St592-38D	3	4	2	2	300	4	1	3	3	3	1	1,3,4	3	2	1	1	1,2	-
129	Tuol Kork	592	5	St592-17	3	12	3	1	-	5	2	-	-	-	1	2,3	3	1,2	2	-	-	1,3
130	Tuol Kork	592	5	St592-10	3	15	1	1	-	5	1	3	2	3	1	2,3,4	4	1,2	1	1	2,3,4	-
131	Tuol Kork	592	5	St592-5	3	8	3	1	-	4	1	3	2	3	1	2,3	3	2	2	-	-	1,3
132	Tuol Kork	592	4	St592-92	2	3	1	1	-	4	1	3	2	3	1	1,3,4	3	1,2	1	1	1,2,3	-
133	Tuol Kork	311	5	St311-18	4	8	3	1	-	4	1	2	3	3	1	3,4	3	1,2	2	-	-	1,2,3
134	Tuol Kork	311	1	St311-19	3	8	4	1	-	3	1	2	2	3	1	1,2,3	2	1	1	1	2,3	-
135	Tuol Kork	608	1	St608-93B	3	15	4	1	-	3	1	1	3	6	1	2	3	2,4	1	1	2,3	-
136	Tuol Kork	608	2	St608-98	3	6	1	2	150	3	1	1	3	6	1	1,2	3	1,2,6	1	1	1,2,3	-
137	Tuol Kork	608	1	St608-48	2	9	1	2	500	3	1	1	2	2	1	3,4	4	2	2	-	-	1
138	Tuol Kork	608	1	St608-47	3	3	4	1	-	3	1	2	2	6	1	2,3	3	1,2	1	1	1,2,4	-
139	Tuol Kork	289	3	St289-22	6	6	2	1	-	5	1	3	2	3	1	2	3	-	1	1	1	-
140	Tuol Kork	289	5	St289-34	3	5	1	3	-	4	1	3	2	3	1	1	3	-	1	1	1	-
141	Tuol Kork	289	1	St289-10	6	-	2	1	-	4	1	2	2	3	1	4	3	-	1	1	1	-
142	Tuol Kork	289	1	St289-1B	2	-	1	1	-	4	1	2	2	3	1	1	3	-	1	1	1	-
143	Tuol Kork	566	1	St566-52	3	9	1	1	-	5	1	2	1	2	1	2	-	-	1	1	3	-
144	Tuol Kork	566	3	St566-54	6	10	1	1	-	4	1	2	1	2	2	-	5	-	1	1	3	-
145	Tuol Kork	528	3	St528-41	6	5	2	1	-	4	2	-	-	-	2	-	5	-	1	1	1	-
146	Tuol Kork	528	5	St528-22	3	6	1	1	-	4	1	2	1	2	1	5	3	-	1	1	1	-
147	Tuol Kork	566	3	St566-12	6	9	2	1	-	5	1	2	1	2	1	1	3	-	1	1	3	-
148	Tuol Kork	566	3	St566-32	6	8	1	1	-	4	1	2	1	2	1	4	3	-	1	1	2	-
149	Tuol Kork	528	3	St528-18	6	9	2	1	-	5	1	2	2	2	1	1	3	-	1	1	2,3	-
150	Tuol Kork	528	2	St528-14	5	7	1	1	-	4	1	2	2	2	1	1	3	-	1	1	3	-
151	Tuol Kork	315	2	St315-11	3	7	2	1	-	4	1	3	2	3	1	1	3	-	1	1	1	-
152	Tuol Kork	315	3	St315-13	6	10	1	1	-	4	1	3	2	3	1	1	3	-	1	1	1	-
153	Tuol Kork	315	1	St315-32	3	4	2	2	350	5	2	-	-	-	2	-	3	-	2	-	-	1
154	Tuol Kork	315	2	St315-30	3	8	3	2	350	4	2	-	-	-	2	-	3	-	2	-	-	1
155	Tuol Kork	315	3	St315-20	6	6	1	1	-	4	1	2	2	3	1	1	3	-	1	1	1	-
156	Tuol Kork	315	2	St315-18	3	5	1	1	-	5	1	2	2	3	1	4	3	-	1	1	1	-
157	Tuol Kork	317	5	St317-15	3	15	1	1	-	5	1	3	2	3	1	1,2,4	3	2	2	-	-	1
158	Tuol Kork	317	1	St317-28	3	4	4	1	-	4	2	-	-	-	2	-	3	-	2	-	-	1
159	Tuol Kork	317	3	St317-23	6	4	1	1	-	3	2	-	-	-	2	-	3	-	1	1	1	-
160	Tuol Kork	317	1	St317-21	2	10	4	1	-	5	2	-	-	-	2	-	5	-	2	-	-	1,3
161	Tuol Kork	566	1	St566-65	3	7	2	1	-	5	2	-	-	-	2	-	3	-	2	-	-	1,3
162	Tuol Kork	566	5	St566-58	3	7	3	1	-	5	2	-	-	-	2	-	3	-	2	-	-	1,3
163	Tuol Kork	566	3	St566-121	6	9	2	1	-	5	1	3	2	3	1	1	3	-	1	1	3	-
164	Tuol Kork	566	3	St566-131	6	10	1	1	-	4	1	2	1	3	1	1	3	-	1	1	1	-
165	Tuol Kork	528	3	St528-20	6	8	2	1	-	4	1	2	2	2	1	1	3	-	1	1	1	-
166	Tuol Kork	528	3	St528-11	6	6	2	1	-	5	1	2	2	3	1	1	3	-	1	1	1,2	-
167	Tuol Kork	335	1	St335-21	6	6	2	1	-	4	1	2	2	3	1	1	3	-	1	1	1,2	-
168	Tuol Kork	335	3	St335-20	6	4	1	1	-	4	1	2	1	3	2	-	3	-	1	1	1,2	-
169	Tuol Kork	335	3	St335-37	6	7	2	1	-	4	2	-	-	-	2	-	3	-	1	1	2	-
170	Tuol Kork	335	3	St335-35	3	8	2	1	-	4	2	-	-	-	2	-	3	-	1	1	1	-

Table 6.6 Innundation Condition in each street (Phase IV, 170households)

Area	Street Name	Have you ever had experience in flooding in front of your house?				If "Question No.9 answer Yes", how often do you have the flooding?							If "Question No.9 answer Yes", how deep was the flooding?							If "Question No.9 answer Yes", how long was the flooding?									
		1.Yes	2.No	3.I don't know	Total	1.Once a year	2.2-3 times a year	3.More than 4 times a year	4.Once in 2-3 years	5.Others	6. I don't know	Total	1.Up to ankle	2.Up to shin	3.Up to knee	4.Up to thigh	5.Up to waist	6.Higher than waist	7.I don't know	Total	1. Less than 30 min.	2. 30 min. to 1 hour	3. 2-3 hours	4.Around 4-6 hours	5.Almost half day	6. 1 day	7.More than 1 day	8.I don't know	Total
Wat Ohnom Northern Are	47	12	0	0	12	0	5	7	0	0	0	12	0	3	7	2	0	0	0	12	1	5	5	1	0	0	0	0	12
Wat Ohnom Northern Are	80	4	0	0	4	0	1	2	1	0	0	4	0	2	2	0	0	0	0	4	0	3	1	0	0	0	0	4	
Wat Ohnom Northern Are	84	4	0	0	4	0	2	2	0	0	0	4	2	0	2	0	0	0	0	4	1	2	0	1	0	0	0	4	
Wat Ohnom Northern Are	86	2	0	0	2	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	0	1	1	0	0	0	2	
Wat Ohnom Northern Are	88	4	0	0	4	0	2	2	0	0	0	4	0	2	2	0	0	0	0	4	0	2	2	0	0	0	0	4	
Wat Ohnom Northern Are	90	8	0	0	8	0	5	3	0	0	0	8	2	4	2	0	0	0	0	8	0	6	2	0	0	0	0	8	
Wat Ohnom Northern Are	92	4	0	0	4	0	1	3	0	0	0	4	0	0	2	2	0	0	0	4	0	0	4	0	0	0	0	4	
Tuol Kork Area	281	0	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tuol Kork Area	283	4	0	2	6	0	3	1	0	0	2	6	0	0	3	0	1	0	2	6	0	0	0	0	0	1	3	2	
Tuol Kork Area	285	0	3	5	8	0	0	0	0	0	5	5	0	0	0	0	0	0	5	5	0	0	0	0	0	0	5	5	
Tuol Kork Area	287	4	0	0	4	0	0	4	0	0	0	4	0	3	0	1	0	0	0	4	0	2	0	0	1	1	0	4	
Tuol Kork Area	289	4	0	0	4	0	2	2	0	0	0	4	0	4	0	0	0	0	0	4	0	0	4	0	0	0	0	4	
Tuol Kork Area	311	2	0	0	2	0	2	0	0	0	0	2	0	1	1	0	0	0	0	2	0	0	2	0	0	0	0	2	
Tuol Kork Area	315	9	3	0	12	1	2	6	0	0	0	9	0	8	1	0	0	0	0	9	0	1	6	0	0	2	0	9	
Tuol Kork Area	317	11	3	0	14	0	1	10	0	0	0	11	2	6	3	0	0	0	0	11	1	4	6	0	0	0	0	11	
Tuol Kork Area	335	2	6	0	8	0	2	0	0	0	0	2	1	1	0	0	0	0	2	0	0	2	0	0	0	0	0	2	
Tuol Kork Area	339	2	0	0	2	0	0	2	0	0	0	2	1	1	0	0	0	0	0	2	0	0	2	0	0	0	0	2	
Tuol Kork Area	345	2	0	0	2	0	0	2	0	0	0	2	0	2	0	0	0	0	0	2	0	0	0	0	0	2	0	2	
Tuol Kork Area	518	4	0	0	4	0	0	4	0	0	0	4	0	0	2	2	0	0	0	4	0	0	0	0	0	2	2	4	
Tuol Kork Area	524	2	0	0	2	0	1	1	0	0	0	2	1	1	0	0	0	0	0	2	0	2	0	0	0	0	0	2	
Tuol Kork Area	528	14	1	1	16	0	7	7	0	0	1	15	5	9	0	0	0	0	1	15	4	5	5	0	0	0	1	15	
Tuol Kork Area	556	2	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	0	0	1	1	2	
Tuol Kork Area	558	1	0	1	2	0	0	1	0	0	1	2	1	0	0	0	0	0	1	2	1	0	0	0	0	0	1	2	
Tuol Kork Area	566	6	2	0	8	0	5	1	0	0	0	6	5	1	0	0	0	0	6	0	4	2	0	0	0	0	0	6	
Tuol Kork Area	592	15	1	0	16	0	3	12	0	0	0	15	2	12	1	0	0	0	0	15	0	8	5	0	0	2	0	15	
Tuol Kork Area	608	10	0	0	10	3	2	5	0	0	0	10	1	3	6	0	0	0	0	10	0	2	2	1	0	5	0	10	
Tuol Kork Area	616	4	0	0	4	0	2	2	0	0	0	4	0	2	2	0	0	0	0	4	0	0	2	0	0	1	1	4	
Total		136	25	9	170	4	50	81	1	0	9	145	23	65	40	7	1	0	9	145	8	46	53	4	1	17	7	9	145



Table 6.7 Result of Interview-2 (Phase II and III, 130households) (1/2)

No.	Name of Street	I. General Questions								II. Questions on Inundation Situation						III. Questions on Sanitary Condition						IV. Others					V. Effect of Japan's Grant Aid Drainage Project					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		22-1		22-2		22-3			
		Type of interviewee	Address	Employment of the master	Number of persons staying in the house	Number of dwelling years at this place	What type of your dwelling	If "Question No.9 answer 2 Rental", how much is your house rent?	Total expenditure of your house per month (US\$/month)	Have you ever had experience of flooding in front of your house?	If "Question No.9 answer Yes", how often do you have the flooding?	If "Question No.9 answer Yes", how deep was the flooding?	If "Question No.9 answer Yes", how long was the flooding?	Do you have any trouble after flooding?	If "Question No.13 answer Yes", what kind of trouble did you have due to the flooding?	How do you dispose of your nightsoil?	Have you and your family ever had the following disease after flooding?	Do you agree that the road in front of your house and drainage condition will be improved?	If "Question No.17 answer Yes", do you still agree that the improvement requires construction work in front of your house?	If "Question No.17 answer Yes", what kind of benefits do you expect the road and drainage improvement in front of your house?	If "Question No.17 answer No", why do not you agree the improvement in front of your house?	After installation of drainage pipe by Japan's Grant Aid Project, do you find any improvement of inundation condition near your house?	If "Question No.21 answer YES", what kind of improvement of inundation condition do you find?		Number of flooding	Depth of flooding	Before	After	Before	After	Before	After
		Answers								Answers						Answers					Answer											
		1.Housewife 2.The master 3.Children 4.Other house member 5.Housekeeper (servant) 6.Others		1.Primary industry 2.Secondary industry 3.Tertiary industry 4.Pensioner (retired) 5.Unemployed 6.Others	1.Less than 5 2.5- 9 3.10- 19 4.20 or more 5.1 don't know	1.Own house 2.Rental 3.1 don't know		1.Less than 100 2.101- 200 3.201- 500 4.501- 1000 5.1001- 2000 6.More than 2001 7.1 don't know	1.Yes 2.No 3.1 don't know	1.Once a year 2.2-3 times a year 3.More than 4 times a year 4.Once in 2-3 years 5.Always in heavy rain 6.Flood in heavy rain 7.Others 8.1 don't know	1.Up to ankle 2.Up to shin 3.Up to knee 4.Up to thigh 5.Up to waist 6.Higher 7.1 don't know 8.1 don't know	1.Less than 30 min. 2.30 min. to 1 hour 3.2-3 hours 4.Around 4-6 hours 5.Almost half day 6.1 day 7.More than 1 day 8.1 don't know	1.No 2.No	1.Cannot go out for business or shopping 2.Cannot open for business 3.Set the furniture, merchandise or inside the house 4.Smell the house 5.Others 6.1 don't know	1.No treatment (defecate in your backyard) 2.Sepic tank 3.Flowing to a drainage pipe 4.Others 5.1 don't know	1.Skin disease 2.Flu 3.Food poisoning 4.Diarrrhea 5.Typhoid 6.Dysentery 7.1 don't know	1.Yes 2.No 3.1 don't know	1.Yes 2.No 3.1 don't know	1.Better sanitary condition (including outbreak of insects, water-borne disease, etc.) 2.Better environmental condition (air, dust, odor, etc.) 3.Better traffic condition 4.Better business condition 5.Others 6.1 don't know	1.Do not feel the necessity 2.Do not like noise, vibration, dust and so on resulting from the construction work 3.Do not want to interfere with my business 4.Others 5.1 don't know	1.Yes 2.No 3.1 don't know 4.Others	1.Number of flooding is reduced 2.Depth of flooding is reduced 3.Duration of flooding is shortened 4.Waterborne diseases are reduced 5.Commuting to office or school become easier 6.Traffic jam originated from flooding is reduced 7.Others		Before	After	Before	After	Before	After			
1	13	1	St13-135	3	4	2	2	900	5	1	3,6	5	2	1	1,2,4	2	None	1	1	2,3,4	-	1	1,2,3,5,6		10	5	70	40	50	30		
2	13	1	St13-189E0	3	5	1	2	450	5	1	3,5	5	2	1	1,2,3,4	2	1,2,3,4	1	1	1,2,3,4	-	1	1,2,3,4,5,6		5	3	60	30	30	15		
3	15	1	St15-73	3	3	4	1	-	3	1	2	3	2	1	2,3,4	2	None	1	1	1,2,4	-	1	1,2,3,4,5,6		3	1	40	20	90	60		
4	15	1	St15-115	3	5	1	2	700	5	1	2	1	2	1	1,3	2	None	1	1	1,3	-	1	1,2,3,4,5,6		4	2	20	10	90	60		
5	63	1	St63-40	3	6	4	1	-	5	1	3	2	4	1	1,2,4	3	None	2	-	-	1,3	1	1,2,3,5,6		4	1	30	10	15	10		
6	63	6	St63-NO	3	25	1	2	1,200	6	1	3	3	3	2	2,4	3	2	1	1	1,5(Free street inundated)	-	1	1,2,3,4,6		4	2	50	10	120	30		
7	63	1	St63-235	3	10	1	2	700	5	1	3	2	3	1	2,3	2	None	1	1	1,3,4	-	3	-		-	-	-	-	-	-		
8	63	6	St63-216	3	2	1	2	40	2	1	3	3	3	1	1	3	None	1	1	1,2,3	-	1	1,2,3,4,5,6		4	2	60	20	45	25		
9	63	1	St63-NO	3	4	4	1	-	3	1	3	3	3	1	1,2,4	3	1	1	1	3,4	-	1	1,2,3,6		3	1	25	5	150	35		
10	63	1	St63-13	4	9	2	1	-	5	1	2	2	3	2	-	3	None	1	1	1,2,3,4	-	1	1,2,3,6(Flood quickly release)		3	1	12	3	120	15		
11	63	4	St63-45	3	5	4	1	-	4	1	3	2	2	1	5	3	1,2	1	1	1,4,5(Release water out)	-	1	1,2,3,5,6		4	2	10	3	120	30		
12	63	4	St63-12E0	6	4	3	1	-	3	1	3	2	1	1	1,2,4	2	None	1	2	3,4	-	1	1,2,3,6,(easy to pass the water)		4	1	30	5	60	30		
13	63	1	St63-42Ea	3	6	3	1	-	6	1	2	2	1	2	-	3	None	2	-	-	2,3	1	1,2,3,4,5,6		6	4	40	20	50	30		
14	63	1	St63-82	3	10	4	1	-	3	1	3	2	2	2	-	3	None	2	-	-	1,2,3	1	1,2,3,4,5,6		5	2	40	10	60	20		
15	63	3	St63-80	2	3	3	1	-	4	1	3	2	2	1	2,3,4	2	None	2	-	-	2,3	1	1,2,3,4,6		4	2	40	20	60	30		
16	63	6	St63-78	3	6	3	2	400	4	1	3,6	1	2	1	1,2	3	None	1	1	2,3,4	-	1	1,2,3,4,6		15	10	15	7	120	45		
17	63	1	St63-126	3	6	4	1	-	4	1	2	2	1	2	-	3	None	2	-	-	1,2	1	1,2,3,5,6		4	2	40	20	180	60		
18	63	1	St63-128	3	5	4	1	-	3	3	-	-	-	2	-	3	None	1	1	2,3,4	-	3	-		-	-	-	-	-	-		
19	94	1	St94-6BE0	3	4	2	2	150	5	1	3	2	3	1	1,3,4	3	None	1	1	1,2,3	-	1	1,2,3,5		5	2	30	10	150	60		
20	94	3	St94-10	3	5	3	1	-	5	1	2	2	2	2	-	3	None	1	1	2,3,5(without clogging pipe)	-	1	1,2,3,6		3	2	40	20	90	45		
21	94	4	St94-6	3	6	2	2	1,500	5	1	3	3	3	1	2,3,4	3	None	1	1	1,2,3,4	-	1	1,2,3,6		6	3	55	20	240	150		
22	94	4	St94-NO	3	10	1	2	2,000	6	1	2	4	2	1	1,2,3	2	None	1	1	1,3,4	-	1	1,2,3,4,5		3	1	60	50	90	30		
23	94	6	St94-Orange massage	3	24	1	2	150	2	1	2	4	4	1	1,4,5(more rubbish)	3	2	1	1	1,2,3	-	1	1,2,3,4,5,6		3	1	60	40	300	180		
24	94	6	EDC	3	8	4	3	-	7	1	3	4	3	1	1,4	-	None	1	1	2,3,5(stop to destroy road)	-	1	1,2,3,4,5,6		4	2	60	25	240	120		
25	94	6	St94-27	3	3	1	2	80	2	1	3,6	3	2	1	1,4	3	None	1	1	2,3	-	1	1,2,3,4,5,6		5	1	50	10	60	20		
26	94	1	St94	3	4	3	1	-	4	2	-	-	-	2	-	3	None	1	1	2,3,4	-	2	-		-	-	-	-	-	-		
27	107	2	St107-88B	3	4	1	2	850	4	1	3	2	2	1	1,2,4	3	2	1	1	2,3,4	-	1	1,2,3,4,5,6		5	2	50	40	90	35		
28	107	1	St107-140	4	3	3	1	-	5	1	3,5	2	3	1	1,2,4	3	None	1	1	2,3,4	-	1	1,2,3,4,5,6		7	2	60	20	90	20		
29	111	1	St111-50	2	6	3	1	-	5	1	3	2	3	1	1,2,3,4	2	None	1	1	1,2,3,4	-	1	1,2,3,6		8	2	50	30	120	30		
30	111	6	St111-52	3	6	3	2	240	4	1	3,6	3	2	1	1,2,4	3	1,2	1	1	2,3,4,5	-	1	1,2,3,5,6		6	2	60	40	45	15		
31	143	1	St143-1226	3	5	2	1	-	4	1	2,8	7	8	2	-	3	None	1	1	3,4	-	3	-		-	-	-	-	-	-		
32	143	3	St143-208	3	6	1	1	-	5	1	3	2	2	1	2	2	1,2,4,6	2	-	-	2,3	1	1,2,3,5		9	5	60	40	50	40		
33	143	1	St143-156	2	13	4	1	-	5	1	3(10times)	3	2	1	2	2	None	1	1	1,2,3,4	-	1	1,2,3,4,5,6		15	7	50	20	30	10		
34	143	2	St143-198	2	6	2	2	300	3	1	3(10times)	3	2	1	2,3,4	2	None	1	1	1,2,4	-	3	-		-	-	-	-	-	-		
35	143	1	St143-136	3	6	3	1	-	4	1	3	3	2	1	2,3	3	None	2	-	-	2,3	1	1,2,3,5,6		7	3	60	25	40	25		
36	143	1	St143-133	3	6	4	1	-	3	1	3	2	2	1	2,3,4	3	2	2	-	-	2,3	1	1,2,3,4,5,6		4	2	40	20	120	30		
37	143	1	St143-125	2	5	1	2	800	5	2	-	-	-	2	2	2	None	2	-	-	3	3	-		-	-	-	-	-	-		
38	143	1	St143-121	3	11	4	1	-	3	1	3	1	3	2	3	2	None	1	1	1,3	-	1	1,2,3,4,5,6		5	2	30	20	30	10		
39	144	6	St144-117	3	5	3	2	100	3	1	3,6	3	3	1	1,2,4	3	1	1	1	1,2,3,4	-	1	1,2,3,4,5,6		7	3	50	20	120	40		
40	144	1	St144-129	3	3	4	1	-	3	1	3	4	3	1	2,3,4	3	1	1	1	2,3,4	-	1	2,3,4,6		60	20	120	30	30			
41	154	1	St154-7	3	4	4	1	-	4	1	3	3	3	1	1,2	2	1,2	2	-	-	1,2	1	1,2,3,4,5,6		6	4	50	30	120	90		
42	154	1	St154-39	2	5	3	1	-	3	1	2	2	4	1	1,3,4	2	1	1	1	1,2,3,4	-	1	1,2,3,4,5,6		7	4	30	10	180	90		
43	154	1	St154-191	3	8	1	2	800	5	1	3	2	2	1	1,2,4,5	3	None	2	-	-	1,3	1	1,2,3,5,6		5							



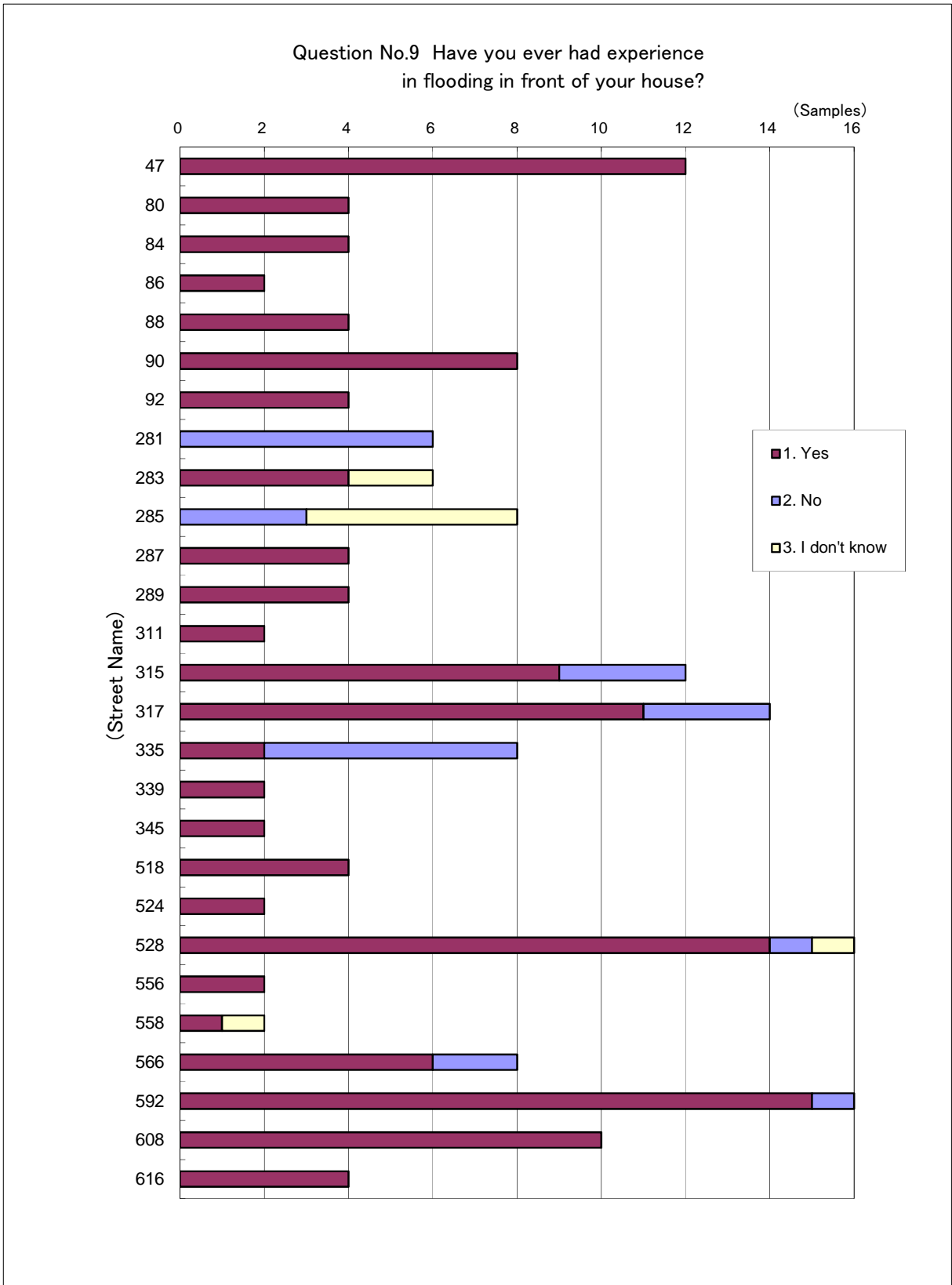


Figure 6.2 Experience of Inundation (Number of Samples)

Question No.9 Have you ever had experience in flooding in front of your house?

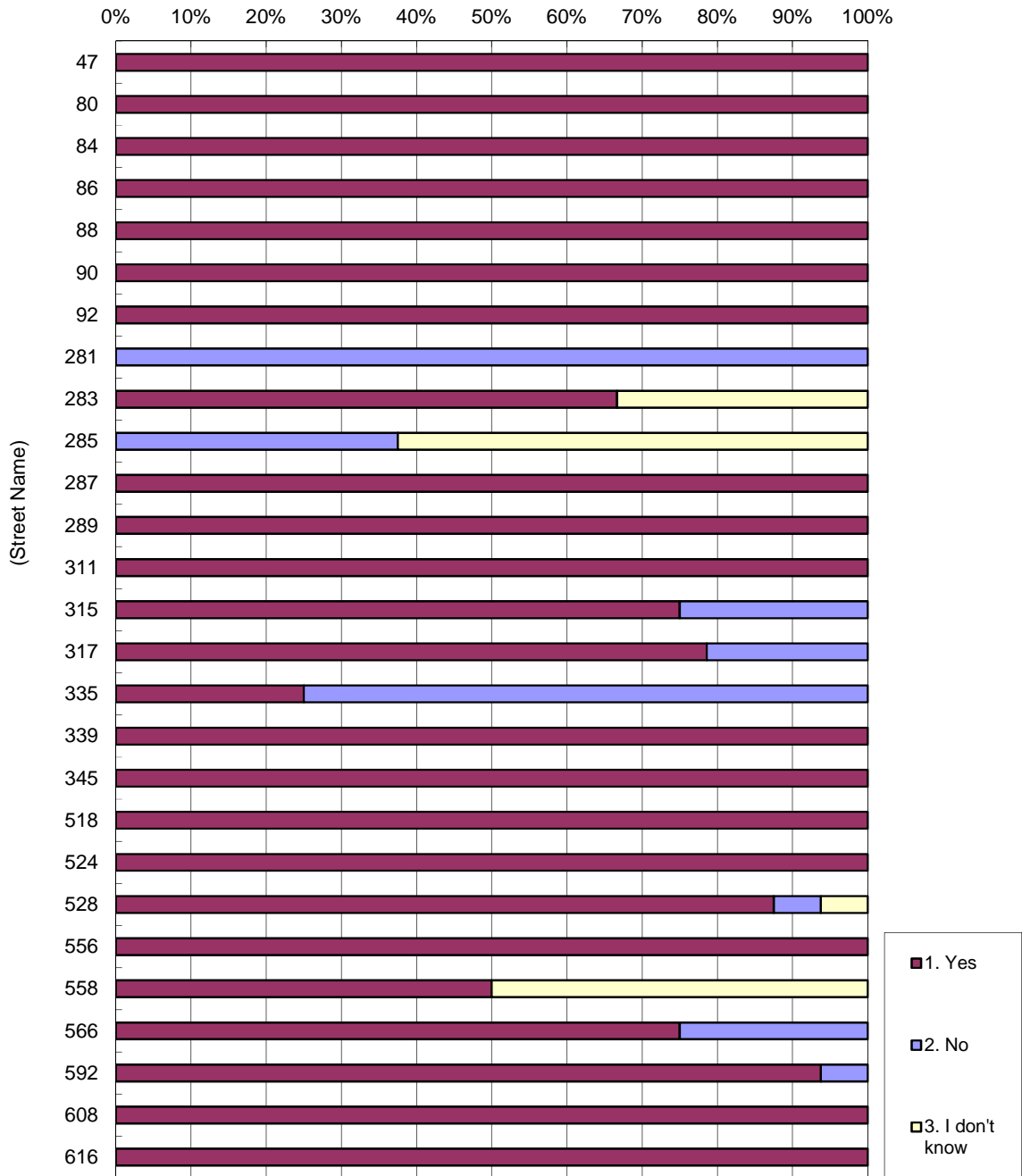


Figure 6.3 Experience of Inundation (Percentage)

Question No.10 If "Question No.9 answer Yes",  
how often do you have the flooding?

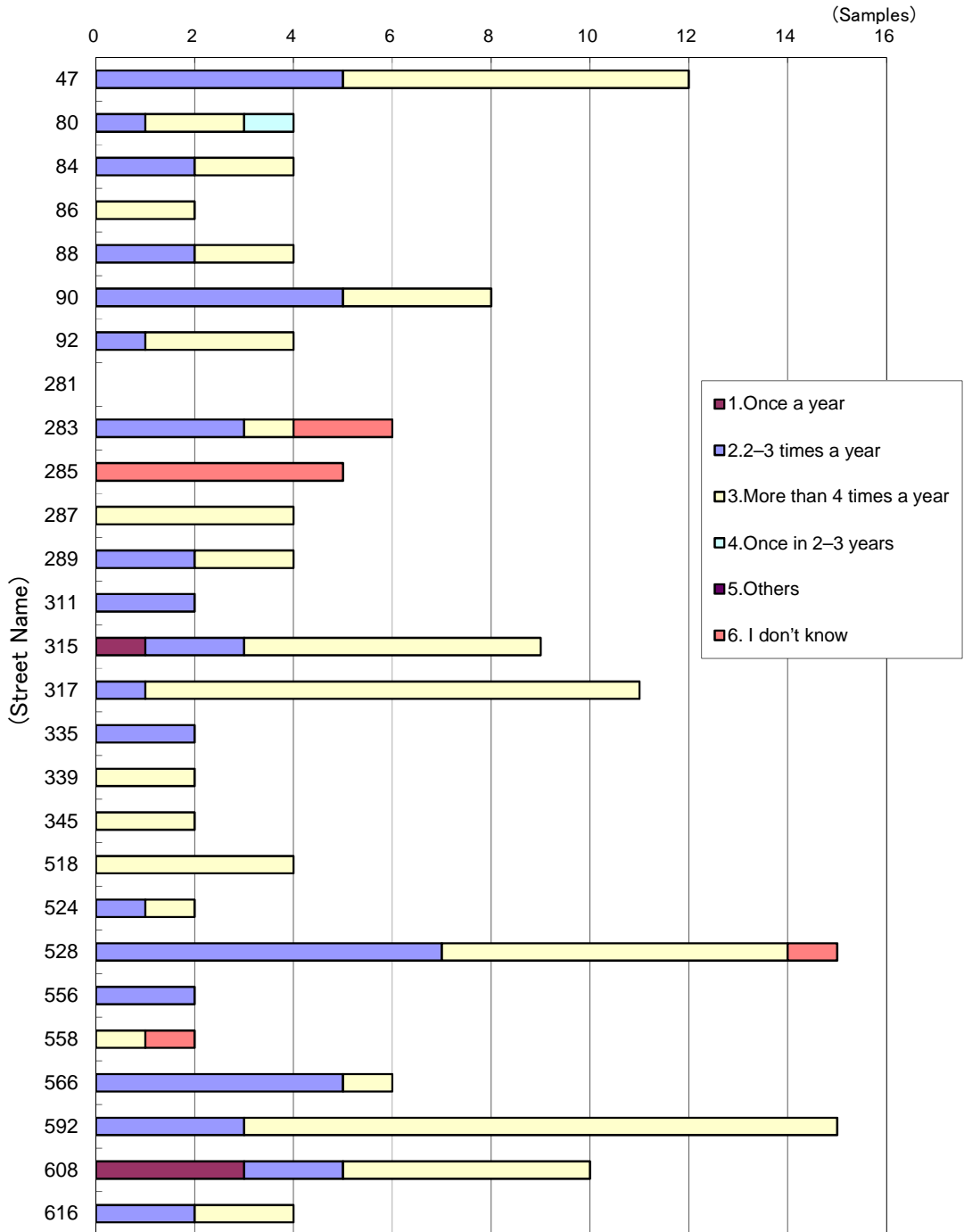


Figure 6.4 Inundation Occurrences (Number of Samples)

Question No.10 If "Question No.9 answer Yes",  
how often do you have the flooding?

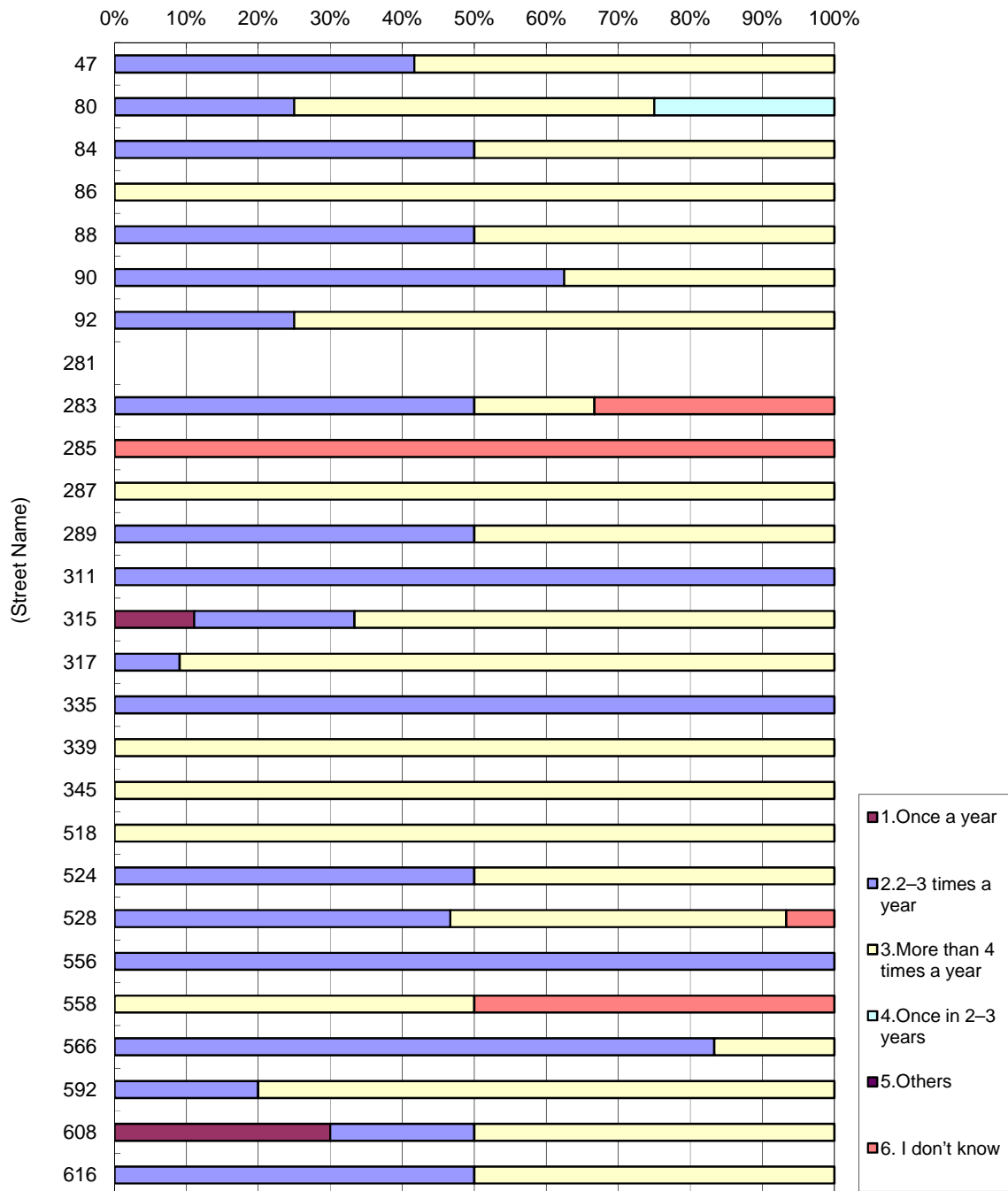


Figure 6.5 Inundation Occurrences (Percentage)

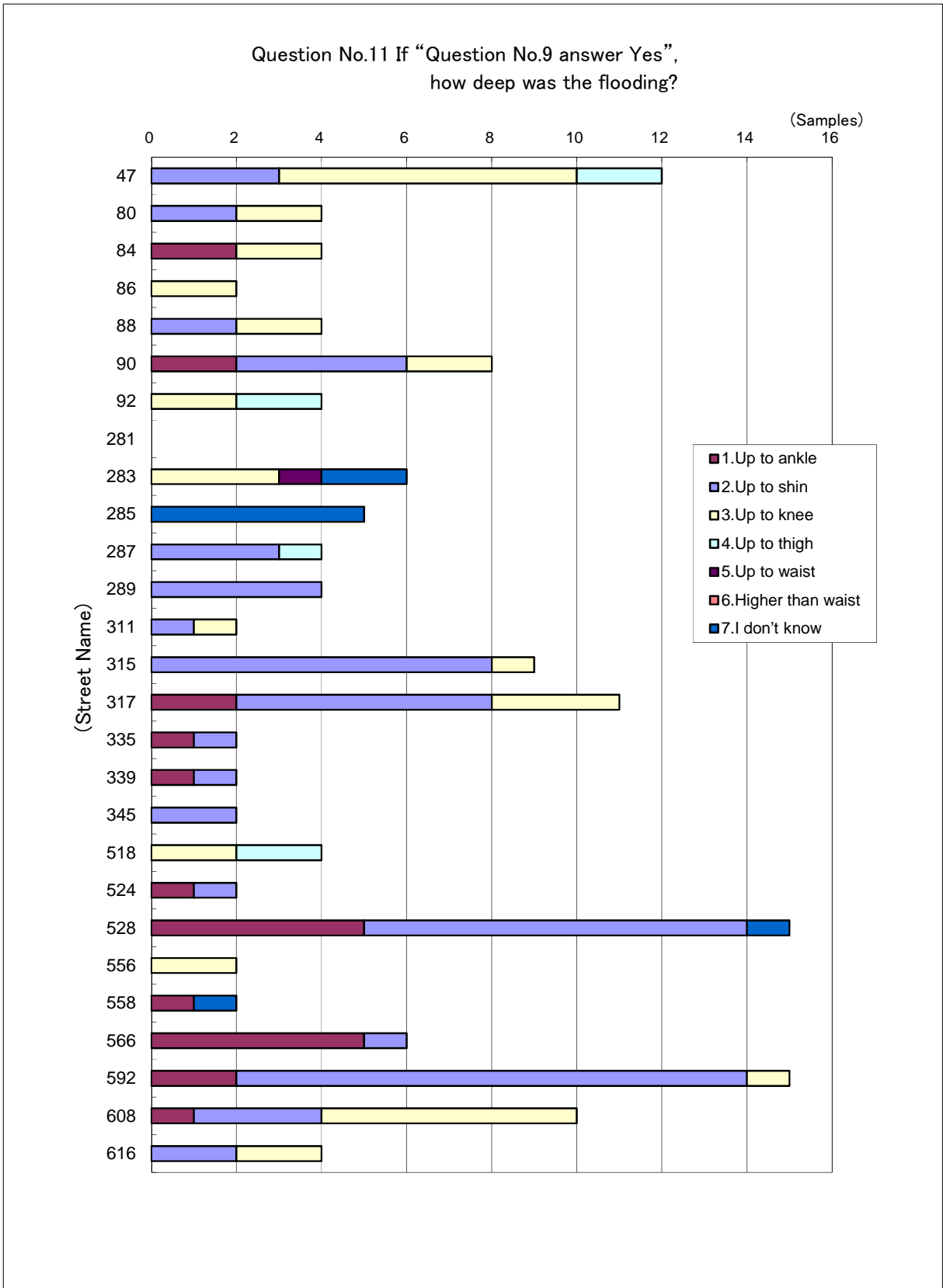


Figure 6.6 Inundation Depth (Number of Samples)

Question No.11 If "Question No.9 answer Yes",  
how deep was the flooding?

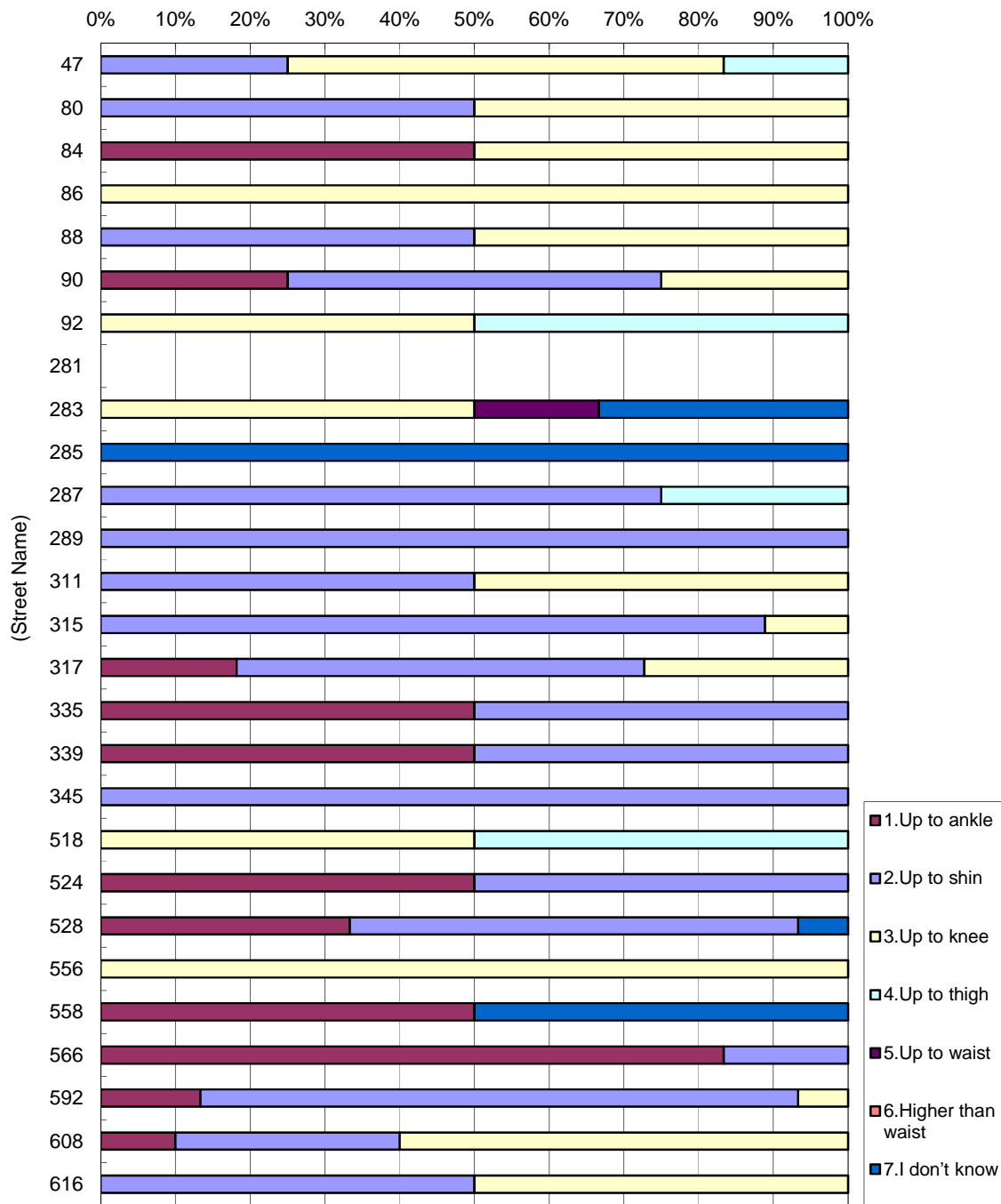


Figure 6.7 Inundation Depth (Percentage)



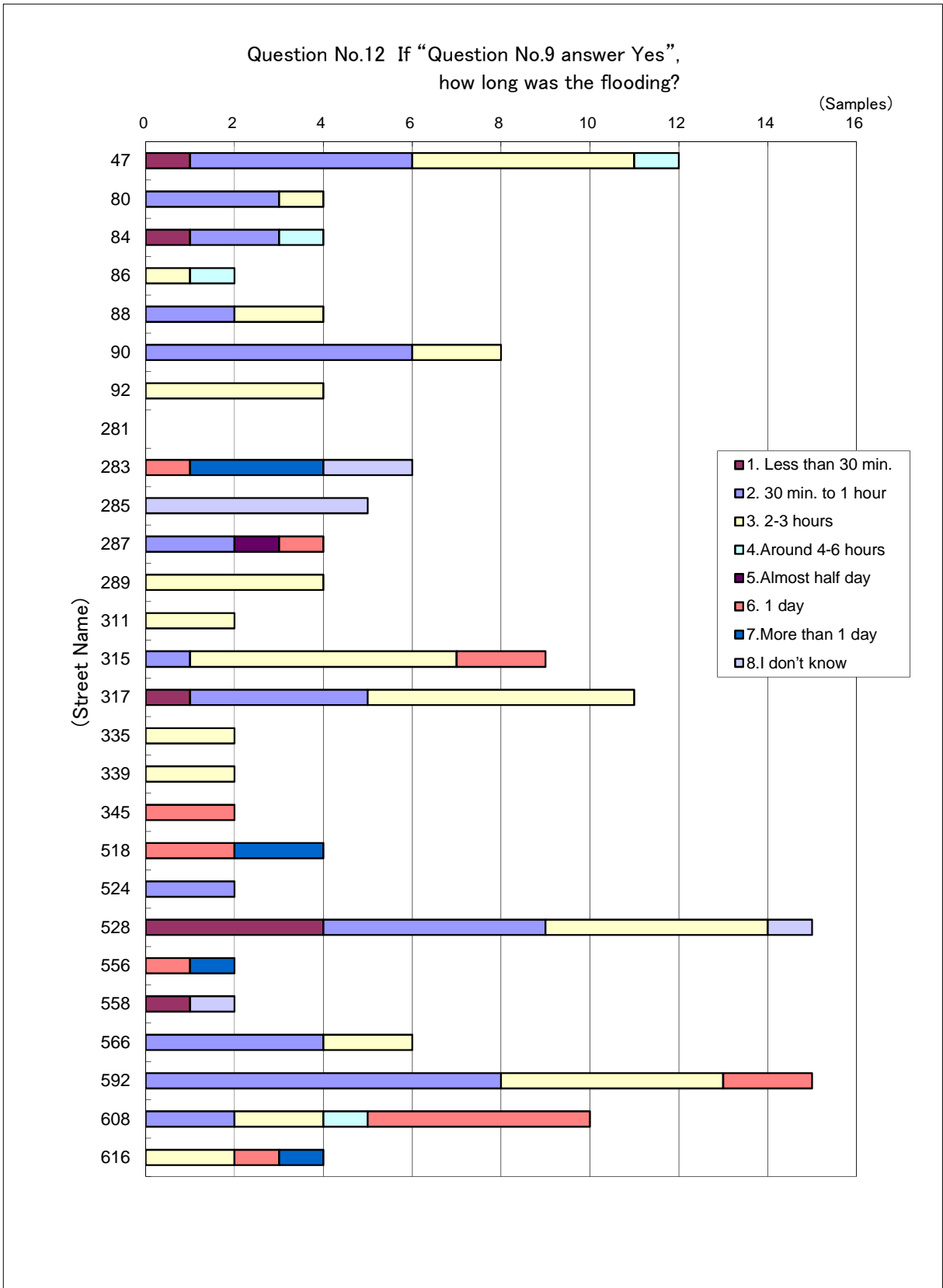


Figure 6.8 Inundation Time (Number of Samples)

Question No.12 If "Question No.9 answer Yes",  
how long was the flooding?

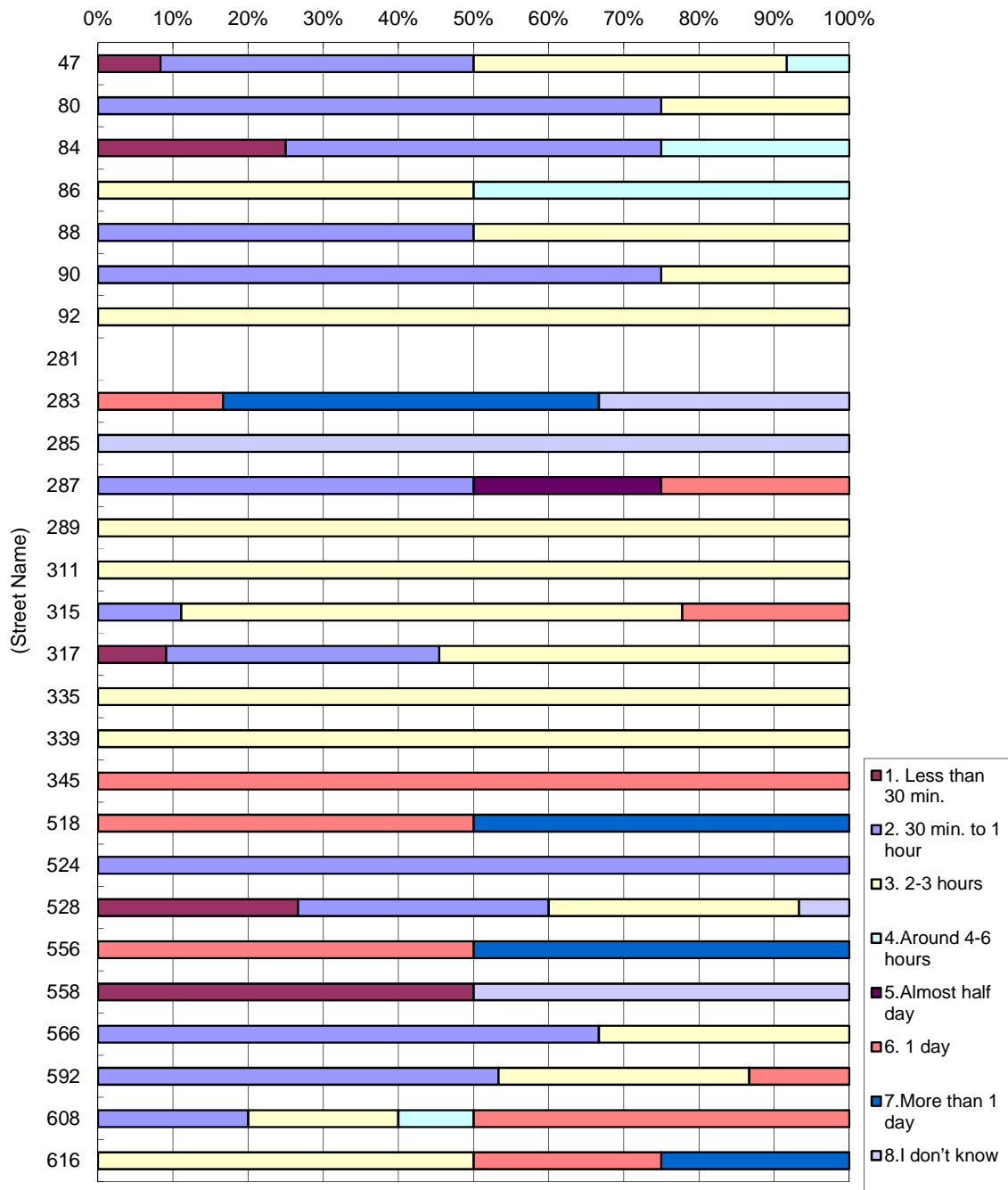


Figure 6.9 Inundation Time (Percentage)

## Appendix 7. Summary of Gap Analysis on Resettlement Policy between Cambodian Laws/ Regulation and JICA Guidelines

No.	JICA Guidelines	Laws & Regulations in Cambodia	Differences	Policy in the Project
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	<p><b>Constitution (1993) Article 44</b> Legal private ownership shall be protected by the law. The right to confiscated possessions from any person shall be exercised <b>only in the public interest</b> as provided for under law and shall require <b>fair and just compensation in advance.</b></p> <p><b>Land Law (2001) Article 4</b> The right of ownership, recognized by Article 44 of the 1993 Constitution, applies to all immovable properties within the Kingdom of Cambodia in accordance with condition set forth by this law.</p> <p><b>Article 5</b> No person may be deprived of his ownership, unless it is in the public interest. An ownership deprivation shall be carried out in accordance with the forms and procedures provided by law and regulations and after the payment of <b>fair and just compensation in advance.</b></p>	Cambodian laws/ regulations do not stipulate avoidance of resettlement and loss of means of livelihood while the JICA guidelines stipulate them.	Same as JICA GL.
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	<p><b>Constitution (1993) Article 44 (as described in 1)</b></p> <p><b>Land Law (2001) Article 5 (as described in 1)</b></p>	There is no line in Cambodian laws/ regulations which stipulate minimization of resettlement and loss of means of livelihood while JICA guidelines stipulate them.	Same as JICA GL.
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	<p><b>Constitution (1993) Article 44 (Refer to 1)</b></p> <p><b>Land Law (2001) Article 5 (Refer to 1)</b></p> <p><b>Expropriation Law (2009) Article 4</b> Expropriation refers to confiscation of ownership of, with fair and just compensation in advance, immovable property or the real right to immovable property of a physical person or legal entity or legal public entity, which includes land, buildings, and cultivated plants, and for construction, for rehabilitation or for expansion of public physical infrastructure which is in the national and public interests.</p> <p><b>Article 22</b></p>	Both Cambodian laws/regulations and JICA guidelines stipulate compensation while no explicit scope for the compensation is given in Cambodian laws/ regulations. Also, as described in Section 2, the JICA guidelines stipulate compensation for loss of means of livelihood while Cambodian laws/ regulations stipulate the objective	Same as JICA GL.

No.	JICA Guidelines	Laws & Regulations in Cambodia	Differences	Policy in the Project
		Financial compensation given to the property owner and/or rightful owner shall be based on a <b>market price or replacement price</b> on the date of declaration of the expropriation. The market price or the replacement price shall be determined by an independent committee or agent selected by the Expropriation Committee.	of the compensation is that resettled residents can improve or restore their standard of living.	
4.	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	<b>Expropriation Law (2009)</b> <b>Article 22</b> <b>(as described in 3)</b> <b>Article 23</b> The owner and/or the rightful owner has the right to compensation for actual damages commencing from the last date of declaration of expropriation for which they are entitled to fair and just compensation.	Compensation stipulated by the JICA guidelines include essential costs for recovering livelihood as pre-project conditions while that of the Cambodian laws/ regulations is stipulated as “actual damage” without detailed information.	Same as JICA GL.
5.	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	<b>Constitution (1993)</b> <b>Article 44 (as described in 1)</b> <b>Land Law (2001)</b> <b>Article 5 (as described in 1)</b> <b>Expropriation Law (2009)</b> <b>Article 19</b> The expropriation of ownership of immovable property and real right to immovable property can be exercised only if the Expropriation Committee has paid fair and just compensation to the property’s owner and/or rightful owner in advance, in accordance with the compensation procedures and principles set out in Section 3 of Chapter 4 of this law.	Both Cambodian laws/ regulations and JICA guidelines stipulate that compensation must be provided prior to displacement while the Cambodian laws/ regulations do not stipulate “other kind of assistance”.	Same as JICA GL.
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	No matching regulation or Laws exists.	Cambodian laws/ regulations do not stipulate RAP preparation.	Same as JICA GL.
7.	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	<b>Expropriation Law (2009)</b> <b>Article 16</b> In conducting this survey, the Expropriation Committee shall arrange a public consultation with the authorities at provincial, district and commune level, the commune councils and village representatives or the communities or persons affected by the expropriation in order to give them clear and specific information and to have all opinions from all concerned parties about the propose for public	Both stipulate holding public consultation with sufficient information while Cambodian laws/ regulations do not stipulate RAP preparation.	Same as JICA GL.

No.	JICA Guidelines	Laws & Regulations in Cambodia	Differences	Policy in the Project
		physical infrastructure project.		
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	<b>Expropriation Law (2009)</b> <b>Article 16</b> (Refer to 7) Note: No description exists for manner and language.	Both stipulate holding public consultation while JICA guidelines specify more detailed manners, especially, accessibility for conducting the consultation.	Same as JICA GL.
9.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	<b>Expropriation Law (2009)</b> <b>Article 16</b> In conducting this survey, the Expropriation Committee shall arrange a public consultation with the authorities at provincial, district and commune level, the commune councils and village representatives or the communities affected by the expropriation. <b>Sub-Decree on Environmental Impact Assessment Process (1999)</b> <b>Article 1</b> Encourage public participation in the implementation of EIA process and take into account of their conceptual input and suggestion for re-consideration prior to the implementation of any project.	Expropriation law stipulated participation of the affected people in public consultation while JICA guidelines promote participation of the affected people in all stages of the project.	Same as JICA GL.
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	<b>Expropriation Law (2009)</b> <b>Article 14</b> A Complaint Resolution Committee shall be established and led by representatives of Ministry of Land Management, Urban Planning and Construction, and representatives of other concerned ministries/ institutions shall be involved. The organization and functioning of the Complaint Resolution Committee shall be determined by a separate sub-decree.	Both stipulate establishment of grievance mechanism. Expropriation law is short on applicability for affected people while JICA guidelines specify more detailed manners, especially, accessibility for conducting the consultation.	Same as JICA GL.
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP 4.12 Para. 6)	<b>Expropriation Law (2009)</b> <b>Article 16</b> Before proposing an expropriation project, the Expropriation Committee shall publicly conduct a survey by recording a detailed description of all rights of the owners and/or rightful owners to the immovable property and other properties which might be needed for compensation; all other related problems shall be recorded as well.	Both stipulate conduction of precise survey. Expropriation focuses on the rightful property and its owner while JICA guidelines following OP4.12 includes affected person who have formal legal rights to land and also affected person who do not have formal legal rights.	Same as JICA GL following WB4.12 will be applied for this section.

No.	JICA Guidelines	Laws & Regulations in Cambodia	Differences	Policy in the Project
12.	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP 4.12 Para. 15)	<p><b>Expropriation Law (2009)</b></p> <p><b>Article 16</b> Owner of immovable property and/ or rightful owner refer to a physical person, private legal person, or public legal entity including a proprietor, possessor and all persons who have rights to land and are affected by the expropriation project.</p> <p><b>Article 18</b> The following are null and void and cannot be made legal in any form whatsoever:</p> <ul style="list-style-type: none"> <li>- any entering into possession of public properties of the State and public legal entities and any transformation of possession of private properties of the State into ownership rights that was not made pursuant to the legal formalities and procedures that had been stipulated prior to that time, irrespective of the date of the creation of possession or transformation;</li> <li>- any transformation of a land concession, into a right of ownership, regardless of whether the transformation existed before this law came into effect, except concessions that are in response to social purposes;</li> <li>- any land concession which fails to comply with the provisions of Chapter 5;</li> <li>- any entering into possession of properties in the private property of the State, through any means, that occurs after this law comes into effect.</li> </ul>	Expropriation law stipulate “owner of immovable property and rightful owner” as eligible person for compensation while JICA guidelines include PAPs who do not have formal legal rights to land as eligible person.	Same as JICA GL following WB4.12 will be applied for this section.
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP 4.12 Para. 11)	No matching regulation or law exists.	Cambodian laws/ regulations do not stipulate any provision of preference to land-based resettlement strategies.	Same as JICA GL following WB4.12 will be applied for this section.
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP 4. 12, para.6)	No matching regulation or laws exists.	Cambodian laws/ regulations do not stipulate provision of support for the transition period.	Same as JICA GL following WB4.12 will be applied for this section.
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP 4.12 Para. 8)	No matching regulation or law exists.	Cambodian laws/ regulations do not stipulate particular assistance, care or attention toward vulnerable group.	Same as JICA GL following WB4.12 will be applied for this section.

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16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	No matching regulation or laws exists.	Cambodian laws/ regulations do not stipulate preparation of RAP nor ARAP.	Same as JICA GL following WB4.12 will be applied for this section.

*Source: JICA Guidelines for Environmental and Social Considerations (2010), World Bank Operational Policy 4.12 (2001), PAPs mean project affected persons.*

