

## 第4章 プロジェクトの評価

### 4-1 プロジェクトの前提条件

#### 4-1-1 事業実施のための前提条件

本プロジェクト実施の前提条件として、以下が挙げられる。

- ① 用地の確保
- ② 「カ」国側負担事項に係る予算措置
- ③ MIME/DIME/水道局で組織される PIU の設立
- ④ 配管布設工事に伴う道路/橋梁/鉄道等、関係機関への通知、許可等の取得
- ⑤ シハヌークビルにおける電動流量制御弁設置に伴う一次側受電設備の設置
- ⑥ 要員の訓練計画への参加と能力向上の励行
- ⑦ 配水管更新に伴う給水管再接続の確実な実施
- ⑧ 貧困世帯に対する接続料の減免に関する政策の策定
- ⑨ 建設工事期間中の環境モニタリング

#### 4-1-2 プロジェクト全体計画達成のための前提条件・外部条件

本プロジェクトの効果を発現・持続するための前提条件として「カ」国側が主体的に取り組むべき課題として以下が挙げられる。

- ① 配水施設の適正な運用、維持管理
- ② 水道局職員の増員と適切な人員配置
- ③ 維持管理に必要な予算の継続的確保
- ④ 新規契約者の加入促進
- ⑤ 貧困世帯に対する接続料の減免措置
- ⑥ 本計画にて調達される給水管材料の計画的据付
- ⑦ 適正な水道料金の徴収
- ⑧ 事業モニタリングに係る指標値の継続した収集と蓄積

また、同様に効果を発現・持続するための外部条件として以下が挙げられる。

- ① 大規模な天候不順や自然災害が発生しないこと
- ② 社会・経済状況が著しく悪化しないこと

### 4-2 プロジェクトの評価

#### 4-2-1 妥当性

本プロジェクトの妥当性に関しては以下の点が挙げられる。

- ① プロジェクトの裨益対象は、貧困層を含むプルサット、シハヌークビル及びバットンバン市の一般市民で、その数が多数である

- ② 給水施設の整備により、飲料水の供給が大きく改善されるものであり、BHN に合致するとともに緊急性が求められているプロジェクトである
- ③ 本プロジェクトにて整備される配水流量監視システムは、既に PPWSA において運用されているように、過度に高度の技術を必要としない
- ④ 本プロジェクトは「カ」国の「国家開発戦略 5 年計画」に掲げられている「都市部における安全な水へのアクセス率を 80%まで引き上げる」という目標達成に確実に貢献する
- ⑤ 本プロジェクトは、その運営維持管理に必要な経費を水道料金によって賄うものであり、過度の収益性には当たらない
- ⑥ 我が国の無償資金協力によって建設される水道施設は、各州都水道局が健全な事業経営を行うことにより資金的・技術的に運営・維持管理が可能である
- ⑦ 本プロジェクトは、建設工事、その後の施設運用、維持管理において環境に与える負の影響はほとんどない
- ⑧ 我が国の無償資金協力の制度により、特段の問題なくプロジェクトの実施が可能である
- ⑨ 本プロジェクトにて整備される配水流量監視システムは、日本の技術を用いて整備された PPWSA におけるシステムと同様のシステムであり、日本の技術を用いる必要性・優位性がある

#### 4-2-2 有効性

本プロジェクトの有効性に関しては、以下の定量的効果、及び定性的効果が見込まれる。

##### (1) 定量的効果

定量的効果を表す指標として、表 4-1 に示す項目が挙げられる。

表 4-1 定量的効果

指 標	州 都	基準値 (2009 年)	目標値 (2016 年) (事業完成 3 年後)
日最大給水量	プルサット	3,410 m <sup>3</sup> /日	5,760 m <sup>3</sup> /日
	バットンバン	9,220 m <sup>3</sup> /日	11,520 m <sup>3</sup> /日
	シハヌークビル	6,200 m <sup>3</sup> /日	12,210 m <sup>3</sup> /日
無収水率	プルサット	23.1 %	19 %～14 %*
	バットンバン	27.6 % (20 時間給水時) 35.5 % (24 時間給水時)	20 %～13 %* (24 時間給水)
	シハヌークビル	18.9 %	14 %～10 %*
浄水場稼働率	プルサット	59 %	100 %
	バットンバン	80 %	100 %
	シハヌークビル	81 % (ANCO: 0 %) **	100 % (ANCO: 45 %) **
給水エネルギー効率	プルサット	軽油消費量 : 0.222 L/m <sup>3</sup>	0.199 L/m <sup>3</sup>
	バットンバン	電力消費量 : 0.609 kWh/m <sup>3</sup>	0.453 kWh/m <sup>3</sup>
	シハヌークビル	電力消費量 : 0.704 kWh/m <sup>3</sup>	0.634 kWh/m <sup>3</sup>
料金回収率	プルサット	114 %	127 %
	バットンバン	149 %	200 %
	シハヌークビル	153 %	161 %
上段 : 給水管接続数、 下段 : 給水人口 (接続 数からの換算値)	プルサット	約 3,600 件	約 6,300 件
		約 18,200 人	約 31,500 人
	バットンバン	約 8,600 件	約 11,300 件
		約 42,900 人	約 56,400 人
	シハヌークビル	約 3,800 件	約 8,000 件
		約 23,000 人	約 48,200 人

\* NRW 率は、最大限に改善されたケースを想定し幅を持たせた。その他の指標は NRW 率が最大に最善されたケースを想定。

\*\* (ANCO: %) は買浄水覚書による ANCO 社からの最大供給量 10,000m<sup>3</sup>/日に占める比率

## (2) 定性的効果

定性的効果としては以下の点が挙げられる。

- ① 配水管内の適正な給水圧力が維持されることにより、給水栓からの水量・水圧不足が改善される
- ② 漏水が削減されることにより、無収水率が低減され、各水道局の経営改善に寄与する

以上の内容により、本案件の妥当性は高く、また有効性が見込まれると判断される。

資料

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## 資料-1 調査団員・氏名

### (1) 第1次現地調査

担当	氏名	所属
総括	沖浦 文彦	JICA 地球環境部水資源第1課 課長
調査監理	植木 雅浩	JICA 地球環境部水資源第1課 調査役
業務主任／上水道計画	阿部 信樹	(株)エヌジェーエス・コンサルタンツ
運営・維持管理計画	コンスエロ・エステパ	
環境社会配慮	ヨーラ・ミンゴア	
管路設計1／浄水施設	佐藤 謙太郎	
管路設計2	外山 篤	
施工・調達計画／積算	崎山 信勝	

### (2) 第2次現地調査

担当	氏名	所属
調査監理	植木 雅浩	JICA 地球環境部水資源第1課 調査役
業務主任／上水道計画	阿部 信樹	(株)エヌジェーエス・コンサルタンツ
運営・維持管理計画	コンスエロ・エステパ	
管路設計1／浄水施設	佐藤 謙太郎	
管路設計2	外山 篤	
施工・調達計画／積算	崎山 信勝	

### (3) 概略設計概要書説明（第1回目）

担当	氏名	所属
総括	沖浦 文彦	JICA 地球環境部水資源第1課 課長
調査監理	植木 雅浩	JICA 地球環境部水資源第1課 調査役
業務主任／上水道計画	阿部 信樹	(株)エヌジェーエス・コンサルタンツ
管路設計1／浄水施設	佐藤 謙太郎	

### (4) 概略設計概要書説明（第2回目）

担当	氏名	所属
業務主任／上水道計画	阿部 信樹	(株)エヌジェーエス・コンサルタンツ

## 資料-2 調査行程

### (1) 第1次現地調査

日順／日程	曜日	JICA団員		コンサルタント団員					
		総括	調査監理	業務主任／ 上水道計画	運営・維持 管理計画	環境社会配慮	管路設計1/ 浄水施設	管路設計2	施工・調達 計画 積算
1	7/25	日	NTR-BKK-PNH						
2	7/26	月	MIMEへのIC/R説明・協議						
3	7/27	火	MIMEとの協議、PPWSA訪問、JICAプロチームとの協議	MIMEとの協議、JICAプロチームとの協議					
4	7/28	水	団内打合せ、UN-HABITATとの協議						
5	7/29	木	ミニッツ署名、JICA事務所、大使館へ報告					NRT-BKK-PNH	
6	7/30	金	プルサット、バタンバン現地調査	JICA技プロチームとの協議				JICA技プロ（資料収集／意見交換）	
7	7/31	土	別業務のため移動		現場調査準備		MNL-PNH	調査準備／資料収集依頼等	
8	8/1	日		プルサットへ移動		プルサットへ移動			
9	8/2	月		プルサット調査	MNL-BKK-PNH	プルサット現地調査（協議／現場視察）			
10	8/3	火		バタンバン調査	バタンバンへ移動、現地調査	PST-BNG、バタンバン現地調査（協議／現場視察）			
11	8/4	水		バタンバン現地調査（現場視察／収集資料確認）					
12	8/5	木		コボントム現地調査（協議）					
13	8/6	金		コボントム現地調査（現場視察／収集資料確認）、プルサットへ移動					
14	8/7	土		調査結果のまとめ／追加資料の提供依頼、調査準備					
15	8/8	日		シアヌークビルへ移動					
16	8/9	月		シアヌークビル現地調査（協議／現場視察）					
17	8/10	火		シアヌークビル現地調査（現場視察／収集資料確認）、プルサットへ移動					
18	8/11	水		カティエン現地調査（協議／現場視察）、プルサットへ移動					
19	8/12	木		JICA技プロ（石井専門家）との協議、第1次現地調査取りまとめ等					
20	8/13	金		帰国前報告（JICA事務所/MIME）					
21	8/14	土		PNH-BKK-NRT	収集資料の確認／検討	PNH-BKK-NRT			
22	8/15	日			報告書作成				
23	8/16	月			PNH-BKK-MNL	情報収集／確認：水資源省 他			
24	8/17	火							
25	8/18	水							
26	8/19	木							
27	8/20	金				PNH-BKK-MNL			

(2) 第2次現地調査

日順／日程	曜日	JICA団員		コンサルタント団員				
		調査監理	業務主任／ 上水道計画	運営・維持 管理計画	管路設計1/ 浄水施設	管路設計2	施工・調達 計画/積算	
1	8/29	日	NRT-BKK-PNH		NRT-BKK-PNH			
2	8/30	月	MIME説明協議		MIME説明協議			
3	8/31	火	シヌークビル現地調査		シヌークビル現地調査			
4	9/1	水	テクニカルノート署名		テクニカルノート署名			
5	9/2	木	報告：JICA/EOJ、別案件のため移動	報告：JICA/EOJ	MNL-PNH	報告：JICA/EOJ	NRT-BKK-PNH	
6	9/3	金	シヌークビル現地調査（測量路線、社会調査対象地区確認、運営・維持管理に係る調査）					
7	9/4	土	同上					
8	9/5	日	アムソットへ移動					
9	9/6	月	アムソット、バックパン調査に係る事前準備					
10	9/7	火	アムソット現地調査（測量路線、社会調査対象地区確認、運営・維持管理に係る調査）、バックパンへ移動					
11	9/8	水	バックパン現地調査（測量路線、社会調査対象地区確認、運営・維持管理に係る調査）					
12	9/9	木	同上					
13	9/10	金	アムソット現地追加調査、アムソットへ移動					
14	9/11	土	調査結果取り纏め、次週現地調査に係る事前準備					NRT-BKK-PNH
15	9/12	日	団内ミーティング、資料整理					
16	9/13	月	PPWSAへのヒアリング、資料収集	資料整理、レポート作成	PPWSAへのヒアリング、資料収集			
17	9/14	火	資料整理	同上			アムソット現地調査	
18	9/15	水	シヌークビル現地調査	同上	シヌークビル現地調査（各路線踏査、資料収集）		バックパン現地調査	
19	9/16	木	同上	同上	同上		アムソット現地追加調査	
20	9/17	金	同上	同上	同上		資料整理	
21	9/18	土	団内ミーティング					
22	9/19	日	バックパンへ移動	資料整理、レポート作成	バックパンへ移動		シヌークビルへ移動	
23	9/20	月	バックパン現地調査	同上	バックパン現地調査（各路線踏査、資料収集）		シヌークビル現地調査	
24	9/21	火		同上			同上	
25	9/22	水	アムソット現地調査	帰国(PNH-MNL)	アムソット現地調査（資料収集）、資料整理		積算/レター資料収集	
26	9/23	木	報告：JICA事務所/MIME		報告：JICA事務所/MIME	報告：JICA事務所	同上	
27	9/24	金	資料整理			資料整理		
28	9/25	土	団内会議			団内会議		
29	9/26	日	帰国 PNH-BKK		帰国 PNH-BKK	現地調査準備	資料整理	
30	9/27	月	-NRT		-NRT	アムソット現地調査	積算/レター資料収集	
31	9/28	火				同上	同上	
32	9/29	水				資料整理	資料整理	
33	9/30	木				PNH-BKK		
34	10/1	金				-NRT		

(3) 概略設計概要書説明（第1回目）

日順／日付		曜日	JICA 団員		コンサルタント団員	
			総括	調査監理	業務主任／上水道計画	管路設計 1/浄水施設
1	1/5	水	/		NRT-BKK-PNH	
2	1/6	木			MIME、プルサット、ハットハン説明・協議	
3	1/7	金			プノンペンへ移動	
4	1/8	土			資料整理	
5	1/9	日			シヌクビルへ移動	
6	1/10	月	NRT-BKK-PNH	REP-PNH	シヌクビル説明・協議、プノンペンへ移動	
7	1/11	火	MIME 説明・協議			
8	1/12	水	JICA 事務所打合せ 議事録署名			
9	1/13	木	日本大使館報告 別案件のため移動	日本大使館、JICA 事務所報告	日本大使館、JICA 事務所報告 帰国 PNH-BKK	
10	1/14	金	/		-NRT	

(4) 概略設計概要書説明（第2回目）

日順／日付		曜日	コンサルタント団員
			業務主任／上水道計画
1	1/29	土	NRT-BKK-PNH
2	1/30	日	シヌクビルへ移動
3	1/31	月	シヌクビル説明・協議
4	2/1	火	プノンペンへ移動 MIME 説明・協議
5	2/2	水	テクニカルノート作成
6	2/3	木	テクニカルノート署名 JICA 事務所報告 帰国 PNH-BKK
7	2/4	金	-NRT



### 資料-3 関係者（面会者）リスト

#### (1) 中央政府（MIME）

HE. Heng Sokkung	Under Secretary of State
Mr. Tan Sochea	Director, Dept. of Potable Water Supply
Mr. Soeung Yuthera	Staff, Dept. of Potable Water Supply
Mr. Som Sethy	Staff, Dept. of Potable Water Supply

#### (2) 州政府／水道局

Mr. Mao San	Director of DIME, Pursat
Mr. Chui Cheang	Director of DIME, Battambang
Mr. Prak Chanroern	Director of DIME, Sihanoukville
Mr. Keo Sara	Director, Pursat WWs
Mr. Sieng Sengputhea	Deputy Director, Pursat WWs
Mr. Un Chantara	Deputy Director, Pursat WWs
Mr. Tauch Choun Saorith	Director, Battambang WWs
Ms. Tith Linda	Deputy Director, Battambang WWs
Mr. Sim Sitha	Director, Sihanoukville WWs
Mr. Ly Seng	Deputy Director, Sihanoukville WWs

#### (3) プノンペン水道公社（PPWSA）

Mr. Khut Vuthiarith	Director, Dept. of Production and Distribution
Mr. Chea Satephoat	Deputy Director of Planning and Project Dept.
Mr. Chpu Phalla	Manager of Procurement Management Office
Mr. Pheng Ty	Manager, Distribution Office

#### (4) 他ドナー（UN-Habitat）

Mr. In Sokthoern	Staff, MEK-WATSAN Safer Cities Programme, Cambodia Office
Ms. Joyce Mmaitisi	UNV Project Officer, Lao Office

#### (5) 在カンボジア日本大使館

黒木 雅文	特命全権大使
近藤 直光	二等書記官

#### (6) JICA カンボジア事務所

鈴木 康次郎	所長
小林 雪治	次長
野中 博之	所員
Mr. SEAK Pengkeang	Program Officer, Infrastructure Division

(7) JICA 技術協力プロジェクト「水道事業人材育成プロジェクト・フェーズ2」

石井 秀雄	チーフアドバイザー
南村 亜矢子	研修計画／業務調整
木山 聡	前チーフアドバイザー

資料-4 討議議事録 (M/D) 及び技術協議書 (T/N)

資料 4-1 討議議事録 (第一次現地調査)

MINUTES OF DISCUSSIONS  
ON THE PREPARATORY SURVEY  
ON PROJECT ON REPLACEMENT AND EXPANSION  
OF WATER DISTRIBUTION SYSTEM  
FOR PURSAT, KAMPONG THOM, SVAY RIENG, SIHANOUKVILLE AND BATTAMBANG  
IN THE KINGDOM OF CAMBODIA

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 Project on Replacement and Expansion of Water Distribution System for Pursat, Kampong Thom, Svay Rieng, Sihanoukville and Battambang (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Cambodia the Preparatory Survey Team ( hereinafter referred to as "the Team" ), which is headed by Mr. Fumihiko Okiura, Director, Water Resources Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA, and is scheduled to stay in the country from July 25 to 31, 2010.

The Team held discussions with the officials concerned of the Government of Cambodia and conducted a field survey at the study areas.

In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Phnom Penh, July 29, 2010

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Fumihiko Okiura  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

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Heng Sokkung  
Under-Secretary of State  
Ministry of Industry, Mines and Energy  
The Kingdom of Cambodia

## ATTACHMENT

### **1. Objective of the Project (Request)**

The objective of the Project is to improve the water supply services in the cities of Pursat, Kampong Thom, Svay Rieng, Sihanoukville and Battambang through the replacement and expansion of water distribution system.

### **2. Project site (Request)**

The sites of the Project are the cities of Pursat, Kampong Thom, Svay Rieng, Sihanoukville and Battambang as shown in **Annex-1**.

### **3. Responsible and Implementing Agency**

3-1. The Responsible Agency is Ministry of Industry, Mines and Energy (hereinafter referred to as "MIME").

3-2. The Implementing Agencies are Department of Potable Water Supply (DPWS) of MIME, Provincial Departments of Industry, Mines and Energy (hereinafter referred to as "DIME"), and the Waterworks in respective Provinces of Pursat, Kampong Thom, Svay Rieng, Sihanoukville and Battambang.

### **4. Items originally requested by the Government of Cambodia**

The items originally requested by the Cambodian side are described in **Annex-2**.

The both sides confirmed that the appropriateness of the request would be examined in accordance with the further studies and analysis, and the final components of the Project would be decided by the Japanese side.

### **5. Japan's Grant Aid Scheme**

5-1 The Cambodian side understands the Japan's Grant Aid Scheme explained by the Team, as described in **Annex-3**.

5-2 The Cambodian side will take the necessary measures, as described in **Annex-4**, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

### **6. Schedule of the Survey**

6-1 The consultant members of the Team will proceed to further studies in Cambodia until September, 2010.

6-2 JICA will prepare the draft basic design report in English and dispatch a mission in order to explain its contents to the Cambodian side around February 2011.

6-3 In case that the contents of the report are accepted in principle by the Cambodian side, JICA will finalize the report and send it to the Cambodian side around April 2011.

6-4 The Cambodian side understands that execution of the Preparatory Survey (hereinafter referred to as "the Survey") does not necessarily imply the Japanese Government's commitment of the



project implementation.

## 7. Other relevant issues

The following issues were discussed and confirmed by both sides.

### 7-1. Priority Project on Pipe Network among 5 Cities

- 1) Both sides agreed that the priority project on pipe networks among 5 cities would be selected in August 2010 based on the Survey results and following consideration. Both sides also found that there are two ways to select the priority project, namely by the cities and by the type of pipes.
- 2) The criteria to select the priority project may include the following;
  - a. Criteria to screen the priority project
    - Overlapping with other donors
    - Operation and maintenance of water treatment plants inclusive of financial status
    - Residents' willingness to connect/pay for water service
  - b. Criteria to select more effective project
    - Population served/ service coverage
    - Rate of loading of water treatment plant
    - Project scale (preliminary estimation of project cost)
    - Socio-economic impact of the project (commerce and/or industry)
    - Priority of Cambodian side

### 7-2. Phasing of Field Survey

The Team explained that the field survey in Cambodia will be divided into following two phases in order to select the priority project on pipe network.

- 1) Field Survey I (from end of July to middle of August, 2010)
  - Confirmation of the necessity and appropriateness of the project requested by the Cambodian side
  - Collection and analysis of the necessary information and data
  - Examination of the requested project on pipe network in 5 cities and appropriate scale of the priority project as a grant aid project
- 2) Homework in Japan (at middle of August, 2010)
  - Selection of the priority project on pipe networks among 5 cities by Government of Japan
- 3) Field Survey II (from end of August to end of September, 2010)
  - Explanation of the priority project to Cambodian side
  - Implementation of the survey necessary for the design of priority project

### 7-3. Planning of Pipe Network

- 1) The Team explained that the target year should be set at a few years after the expected timing of completion the Project, because the Japanese Grant Aid is deemed to be provided to meet urgent



and short-term needs of the recipient country.

- 2) Both sides confirmed that the planning framework, such as water demand projection and unit consumption rate, and design of pipe network would be investigated with making use of the Water Master Plan for respective cities formulated by “The Project on Capacity Building for Water Supply System (Phase 2)” under the cooperation of JICA.
- 3) As for individual house connections, both side agreed that necessity of provision of the materials such as water meters and pipes will be considered in the Survey in order to assist the expansion of water supply to poor communities. Both sides also confirmed that Cambodian side will bear the cost for installation works.

#### 7-4. Social and Environmental Considerations

- 1) Cambodian side explained that the Initial Environmental Impact Assessment (IEIA) and/or the Environmental Impact Assessment (EIA) are not needed for the project under the laws and regulations of Cambodia.
- 2) The Team explained that the environmental and social considerations studies would be conducted according to JICA’s Guidelines for Environmental and Social Considerations in order to examine the mitigation measures of impacts and monitoring plan during/after the implementation.

#### 7-5. Tax exemption

The taxes including Value Added Tax (VAT), custom duty, and any other taxes and levies in Cambodia which is to be arisen from the Project activities will be exempted by Cambodian side. MIME will take any procedures necessary for the tax exemption with the Ministry of Economy and Finance of Cambodia at its responsibility.

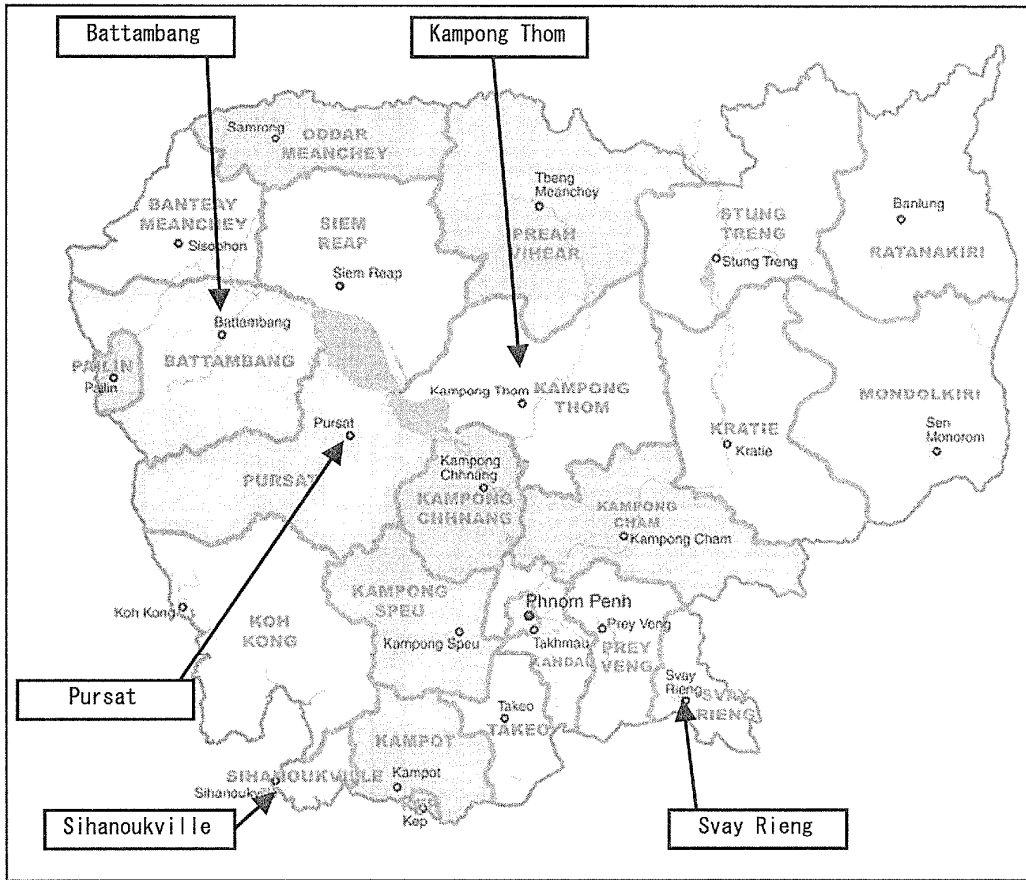
#### 7-6. Overlapping with other projects

Both side confirmed that the on-going / proposed projects in 5 cities supported by other donor agencies, NGO, and Cambodian official organization(s) should be carefully investigated to avoid overlapping with the Project. Cambodian side agreed to provide necessary information on related projects.

- |         |   |
|---------|---|
| Annex-1 | Project Sites Map                                 |
| Annex-2 | Items Requested by the Cambodian Side             |
| Annex-3 | Japan’s Grant Aid Scheme                          |
| Annex-4 | Major Undertakings to be taken by Each Government |



Annex-1: Project Sites Map



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*[Handwritten mark]*

Annex-2: Items Requested by the Cambodian Side

**1. Distribution Facilities**

(1) Pipe network in Battambang	L=38km
(2) Pipe network in Pursat	L=22km
(3) Pipe network in Kampong Thom	L=50km
(4) Pipe network in Svay Rieng	L=30km
(5) Pipe network in Sihanoukville	L=28km

**2. Equipments**

(1) Excavator	5 nos
(2) Rear Dump Truck	5 nos
(3) Tamping Rammer	5 nos
(4) Cargo Truck with Cab Back Crane	5 nos

<b>3. Distribution Management System</b>	5 nos
--	-------





## Annex-3: JAPAN'S GRANT AID SCHEME

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

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

### 1. Grant Aid Procedures (Attachment 1)

Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as “the Survey”)
  - The Survey conducted by JICA
- Appraisal & Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation by Exchange of Notes (hereinafter referred to as “the E/N”)
  - The Notes exchanged between the GOJ and a Government of 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 Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

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

JICA requests the Government of the recipient country to take whatever measures are necessary to ensure 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 in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

#### (2) Selection of Consultants

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

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

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

After the Project is approved by the Cabinet of Japan, the E/N will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

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

(4) Necessity of "Verification"

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

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

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Attachment 1.



(6) Proper Use

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

(7) Export and Re-export

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

(8) Banking Arrangements (B/A)

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

(9) Authorization to Pay (A/P)

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

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA environmental and social considerations guideline.



FLOW CHART OF JAPAN'S GRANT AID PROCEDURES

Stage	Flow & Works	Recipient Government	Japanese Government	JICA	Consultant	Contractor	Others
Application	Request	✓					
	Screening of Project → Evaluation of T/R → Project Identification Survey (T/R : Terms of Reference)		✓	✓			
Project Formulation & Preparation	Preparatory Survey → Field Survey Home Office Work Reporting	✓	✓	✓			
	Preparatory Survey 2 (Basic Design) → Selection & Contracting of Consultant by Proposal → Field Survey Home Office Work Reporting	✓	✓	✓	✓		
	Explanation of Draft Final Report → Final Report	✓	✓	✓	✓		
Appraisal & Approval	Appraisal of Project		✓				
	Inter Ministerial Consultation		✓				
	Presentation of Draft Notes	✓	✓				
	Approval by the Cabinet		✓				
Implementation	E/N & G/A (E/N : Exchange of Notes, G/A : Grant Agreement)	✓	✓	✓			
	Banking Arrangement	✓					✓
	Consultant Contract → Verification → Issuance of A/P	✓		✓	✓		
	Detailed Design & Tender Documents → Approval by Recipient Government → Preparation for Tendering	✓		✓	✓		
	Tendering & Evaluation	✓		✓	✓	✓	
	Procurement /Construction Contract → Verification → A/P	✓		✓	✓	✓	
	Construction → Completion Certificate by Recipient Government → A/P	✓		✓	✓	✓	
	Operation → Post Evaluation Study (A/P : Authorization to Pay)	✓		✓			
	Ex-post Evaluation → Follow up	✓		✓			

Annex-4: Major Undertakings to be taken by Each Government

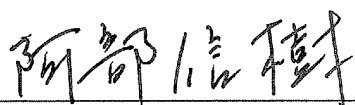
NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
5	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
6	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		●
7	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
8	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment		●

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

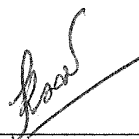
資料 4-2 技術協議書（第二次現地調査）

TECHNICAL NOTE  
ON THE PREPARATORY SURVEY (FIELD SURVEY II)  
ON PROJECT ON REPLACEMENT AND EXPANSION  
OF WATER DISTRIBUTION SYSTEM  
FOR PURSAT, SIHANOUKVILLE AND BATTAMBANG  
IN THE KINGDOM OF CAMBODIA  
AGREED UPON BETWEEN  
MINISTRY OF INDUSTRY, MINES AND ENERGY  
AND  
JICA PREPARATORY SURVEY TEAM

Phnom Penh, September 1<sup>st</sup>, 2010

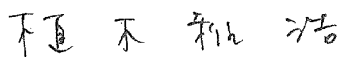


**Nobuki Abe**  
Chief Consultant  
Preparatory Survey Team  
Japan International Cooperation Agency  
(JICA)  
Japan



**Heng Sokkung**  
Under-Secretary of State  
Ministry of Industry, Mines and Energy  
The Kingdom of Cambodia

(As a witness)



**Masahiro Ueki**  
Assistant Director  
Water Resources Management Division I  
Global Environment Department, JICA  
Japan

JICA Preparatory Survey Team (hereinafter referred to as “the Team”) for the Project on Replacement and Expansion of Water Distribution System for Pursat, Kampong Thom, Svay Rieng, Sihanoukville and Battambang (hereinafter referred to as “the Project”) was dispatched to Cambodia from 29th August to 30th September, 2010. The Team held a series of discussions with the concerned officials of Ministry of Industry, Mines and Energy (hereinafter referred to as “MIME”). Based on above discussions, the following items were confirmed between both parties. The Team will proceed to further works and prepare the Outline Design Study Report.

**1. Priority Project on Pipe Network**

- 1-1. MIME understood that the priority project on pipe network would be selected by the cities.
- 1-2. The Team reported that Japanese Government finally selected the cities of Pursat, Sihanoukville and Battambang where further surveys would be carried out during their visit in Cambodia. MIME agreed the decision made by the Japanese Government. Both sides also confirmed that final components of priority project would be decided by Japanese side based on the result of field survey II in Cambodia and analysis in Japan.
- 1-3. The Team explained that IEIA and/or EIA for the Project are not needed under the laws and regulations of Cambodia according to the interviews with the officials of Department of Environment in respective Provinces.

**2. Project Title**

Following above, both sides agreed to change the Project title to “Project on Replacement and Expansion of Water Distribution System for Pursat, Sihanoukville and Battambang.”

**3. Objective of the Project**

Both sides also agreed that the objective of the Project is to improve the water supply services in the cities of Pursat, Sihanoukville and Battambang through the replacement and expansion of water distribution system.

**4. Field Survey II in Cambodia**

The Team explained that the followings would be conducted in each selected city during the field survey II. MIME agreed to extend assistance requested by the Team for smooth implementation of field survey II.

- (1) Topographic survey
    - Topographic survey (route survey) on the proposed replacement and expansion pipeline routes for each prioritized city will be carried out.
    - This survey will be contracted out.
- (Request to the Cambodian side)
- Each WWs are requested to extend assistance to obtain permission from the road



authority for smooth execution of surveying.

(2) Social survey

- Social survey will be carried out aiming at collecting baseline data such as public awareness, water service status, current sanitary condition, confirmation of service coverage status, issues of water supply/sewerage and willingness to connect/pay and affordability to pay.
- This survey will be contracted out under the instruction of the JICA survey team.
- The contents of questionnaire/Interview will be planned by the survey team. Number of samples will be 100/city.

(Request to the Cambodian side)

- Each WWs are requested to extend assistance to identify the specific survey area and allocation of sample number by classification (income level, water use, etc.).

(3) Site survey on the distribution pipes to be replaced/expanded

- Based on the result of the 1st field survey, further survey will be carried out to prepare preliminary design of prioritized project. Proposed sites of flow meters and/ pressure reducing valves to be installed will be also preliminarily examined.

(Request to the Cambodian side)

- Each WWs are requested to extend assistance to attend site survey as required.
- Each WWs are requested to provide data of the existing service connections (number, type/material and diameter) of each pipeline to be replaced.

(4) Survey on operation and maintenance

- Based on the result of the 1st field survey, further survey will be carried out to prepare countermeasures for operation and maintenance accompanied by implementation of the proposed project.

(Request to the Cambodian side)

- Each WWs are requested to extend assistance to collect additional data/information as required.

(5) Survey on preliminary project cost estimates

- Based on the result of the 1st field survey, further survey will be carried out to prepare preliminary project cost estimates.



資料 4-3 討議議事録 (第三次概略設計概要書説明調査)

MINUTES OF DISCUSSIONS  
ON THE PREPARATORY SURVEY (BASIC DESIGN)  
ON PROJECT ON REPLACEMENT AND EXPANSION  
OF WATER DISTRIBUTION SYSTEM  
FOR PURSAT, SIHANOUKVILLE AND BATTAMBANG  
IN THE KINGDOM OF CAMBODIA  
(EXPLANATION ON DRAFT OUTLINE DESIGN REPORT)

In July 2010, the Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched the Preparatory Survey for the Basic Design on Project on Replacement and Expansion of Water Distribution System for Pursat, Sihanoukville and Battambang (hereinafter referred to as “the Project”) to Cambodia and through discussion, field survey and technical examination of the results in Japan, JICA prepared a draft outline design report (hereinafter referred to as “the Draft Report”).

In order to explain and to consult with Cambodia on the components of the Draft Report, JICA sent the Draft Report Explanation Team (hereinafter referred to as “the Team”), which is headed by Mr. Fumihiko Okiura, Director, Water Resources Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA, from January 5 to 13, 2011.

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

Phnom Penh, January 12, 2011

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Mr. Fumihiko Okiura  
Leader  
Draft Report Explanation Team  
Japan International Cooperation Agency  
Japan

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H.E. Heng Sokkung  
Under-Secretary of State  
Ministry of Industry, Mines and Energy  
The Kingdom of Cambodia

## ATTACHMENT

### 1. Components of the Draft Report

The Cambodian side agreed and accepted in principle the components of the Draft Report explained by the Team. The components of the Project are shown in **Annex-1**.

### 2. Japan's Grant Aid Scheme

The Cambodian side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Cambodia as explained by the Team and described in Annex-3, Annex-4 of the Minutes of Discussions signed by both sides on July 29, 2010.

### 3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Cambodian side by April 2011.

### 4. Other Relevant Issues

The following issues were discussed and confirmed by both sides.

#### 4-1) Project Cost Estimation

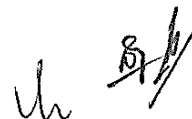
The team explained to the Cambodian side the tentative Project Cost Estimation as described in ANNEX-2. It is provisional estimate and would be further examined by the Government of Japan for the approval of the Grant. The Cambodian side understood that the Project Cost Estimation is not final and subject to be modified. Both sides agreed that the Project Cost Estimation should never be duplicated or released to any outside parties until signing of all the contract(s) for the Project.

#### 4-2) Undertakings and Obligations of the Cambodian Side

In case that the Project would be approved by the Government of Japan, the Cambodian side would execute the obligations in pace with the progress of the construction and procurement in addition to the major undertakings described in Annex-4 of the Minutes of discussions signed by both sides on July 29, 2010. The list of the obligations is described in ANNEX-3.

#### 4-3) Number of Service Pipe Connection in Battambang

The Cambodian side understood that number of new service pipe connection along the newly expanded pipelines in Battambang should be limited to 2,000 households until the capacity of water supply is strengthened.

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#### **4-4) Material of Service Connection for Poor Communities**

The Team explained that material of service connection for poor communities would be provided as Japanese grant aid. The Cambodian side agreed that MIME and/or respective waterworks set the implementation policy of connection fee for poor communities by July 2011.

#### **4-5) Soft Components of the Project's facilities**

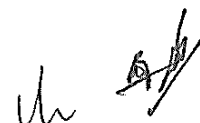
The Project would implement the technology transfer and capacity building in the areas of service pipe connection and flow management as Soft Components, so that the Cambodian side would be able to accomplish the reconnection of service pipes properly and improve operation and maintenance of distribution facilities. The Cambodian side agreed and committed to assign the staff in respective waterworks as follows:

- Service pipe connection: Staffs and casual plumbers as shown in the Draft Report by March 2012
- Flow management: Staffs as shown in the Draft Report by October 2012

#### **4-6) Overlapping with Other Projects**

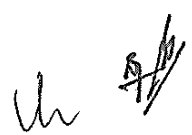
Both sides confirmed that the Project would not be overlapped with any other projects supported by other donor agencies, NGOs, and Cambodian official organizations.

- ANNEX-1      Components of the Project**
- ANNEX-2      Project Cost Estimation (CONFIDENTIAL)**
- ANNEX-3      Obligations of the Cambodian side**



## ANNEX-1 Components of the Project

Component	Category	Major Specifications, Quantity and Contents
Facility Construction	Replacement	Pipe Length: Total 31.8 km Pipe Type: DCIP and HDPE Pipe Diameter: 50A to 350A Note: Re-connection of service pipeline is under Cambodian works.
	Expansion	Pipe Length: Total 91.8 km Pipe Type: DCIP and HDPE Pipe Diameter: 50A~350A
	Particular Route and Major Accessory	Crossings of Road/ Railway/ River and Detour Route: 3 units Flow Meter* <sup>1</sup> , Valves (GV* <sup>1</sup> , PRV* <sup>1</sup> , FCV* <sup>1/2</sup> , ARV, BOV): 3 units Note* <sup>1</sup> : Accessories will be connected to the existing pipeline partially. Note* <sup>2</sup> : Cambodian side shall install the primary distribution line of electric power.
	Flow Monitoring	Distribution Flow Monitoring System (Telemetric Data Processing): 3 units
Procurement	Materials for Service Pipe Connection	Re-connection: Clamp Saddle, HDPE , Valves, Fittings, etc. 4,400 sets New Connection (for expansion pipes): Clamp Saddle and Water Meter: 2,400 sets New Connection (for existing pipes): Water Meter 700 peaces
	Equipment for HDPE Connection	SF Connector: for HDPE suitable with pipe diameter of 50A or below 5 sets Portable Engine Generator: 5 kVA 5 units
Capacity Development	Service Pipe Connection	Skill of qualified service connection and proper turn-over inspection
	Flow Management	Theory and application of the flow monitoring system, preparation of the action plan



(1) Japanese side obligation (Tentative)

施工・調達業者契約認証まで非公表
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(2) Cambodian side obligation

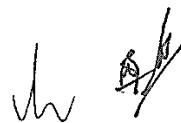
Items	Project Cost (US Dollar)
(1) Ante-project	0
i. Land Acquisition: the rights of use public land	0
(2) During the Project Implementation	66,250
i. Commission: B/A including A/P formalities	15,300
ii. Dispatch Cost: PIU activities	18,000
iii. Construction Cost: service pipe reconnection	32,400
iv. Entry Cost: broadband communications	550
Grand total	<b>66,250</b>

**ANNEX-3 Obligations of the Cambodian side**

Items	
1.	Construction of facilities
(1)	To notify all authorities concerned of the Project, and obtain necessary permissions and approvals for construction/ installation works and traffic control
(2)	To obtain all the acceptances for public land use if necessary
(3)	To announce the traffic control and water cutoff to the residents in construction areas in advance
(4)	To contract the broadband service with telephone provider and bear communication cost for flow monitoring system
(5)	To install primary power supply to flow control valves in Sihanoukville
(6)	To assign casual plumbers for reconnection of service pipe and water meter
2.	Policy of connection fee for poor communities
(1)	To set the implementation policy of connection fee for poor communities
3.	Soft Component
(1)	To assign the responsible personnel for service pipe connection and flow management, and to assign casual plumbers for service pipe connection.
4.	Common items
(1)	To organize Project Implementation Unit (PIU), which consists of officials from MIME, DIME and respective waterworks
(2)	To promote new service connection especially for poor communities
5.	Other items
(1)	To carry out necessary procedures for issue of the Authorization to Pay (A/P) required for payments to Japanese Consultants and Contractor, and to bear the advising commission of the A/P and payment commissions to a bank in Japan for banking services based on the Banking Arrangement (B/A)
(2)	To ensure prompt unloading and customs clearance upon entry into Cambodia and transportation inside Cambodia, for the goods purchased for the implementation of the Project
(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
(4)	To exempt Japanese nationals from the customs duty, internal taxes and other fiscal levies imposed in Cambodia with respect to the supply of the products and services under the verified contract
(5)	To maintain and use properly and effectively the facilities constructed and

equipment provided under the Grant Aid

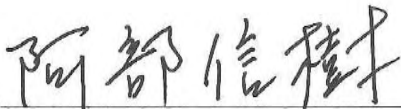
- (6) To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment



資料 4-4 技術協議書（第四次概略設計概要書説調査第 2 回）

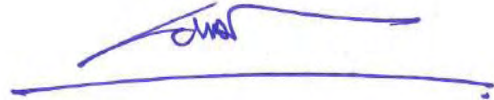
TECHNICAL NOTES  
ON THE PREPARATORY SURVEY (BASIC DESIGN)  
OF THE PROJECT ON REPLACEMENT AND EXPANSION  
OF WATER DISTRIBUTION SYSTEM  
FOR PURSAT, SIHANOUKVILLE AND BATTAMBANG  
IN THE KINGDOM OF CAMBODIA  
BETWEEN  
MINISTRY OF INDUSTRY, MINES AND ENERGY  
AND  
JICA PREPARATORY SURVEY TEAM

Phnom Penh, February 3<sup>rd</sup>, 2011



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Nobuki Abe  
Chief Consultant  
JICA Preparatory Survey Team  
Japan



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Tan Sokchea  
Director of Potable Water Supply Department  
Ministry of Industry, Mines and Energy  
The Kingdom of Cambodia



After confirmation of main items of a draft outline design report (hereinafter referred to “the Draft Report”) between the Japan International Cooperation Agency (hereinafter referred to “JICA”) and the Ministry of Industry, Mines and Energy (hereinafter referred to as “MIME”) on January 12, 2011, JICA Preparatory Survey Team (hereinafter referred to as “the Team”) held a series of discussions with the concerned officials of MIME from 31<sup>st</sup> January to 3<sup>rd</sup> February, 2011 on the modification of the components of Draft Report. Based on the above discussions, the following items were confirmed between both sides.

#### 1. Components of the Draft Report

The Cambodian side agreed and accepted in principle the following modification of the basic plan of Sihanoukville Waterworks explained by the Team.

##### 1-1. Modification of proposed pipelines

The Cambodian side agreed and accepted the concept of modification of replacement and expansion of the proposed pipelines. In this connection, the total length of distribution pipes to be expanded shall be modified from 91.8 km to approximately 90.6 km.

##### 1-2. Provision of remote control system of flow control

The Cambodian side agreed and accepted the concept of provision of remote control system of flow control. In this connection, the installation of primary power supply to flow control valve shall be undertaken by the Cambodian side.

#### 2. Operation and Maintenance Cost for Flow Monitoring System

The Team explained that the required cost for operation and maintenance of flow monitoring system shall be shouldered by the Cambodian side, since it is important to operate and maintain telemetry in order to carry out appropriate distribution flow management considering the experience of PPWSA. The Cambodian side understood the point explained by the Team and agreed that respective waterworks will shoulder operation and maintenance cost.

#### 3. Monitoring for Construction Environment

Project Implementation Unit (PIU) to be formed by the Cambodian side together with Contractor and Consultant of Japanese side shall conduct environmental monitoring during construction stage. The results will be provided to JICA by filling in the Monitoring Sheet as ANNEX-1. Monitoring items shall be considered below:

- 1) Noise and vibration
- 2) Wastes
- 3) Air pollution
- 4) Traffic

ANNEX-1 Environmental Monitoring Sheet


ANNEX-1 Environmental Monitoring Sheet

Identification		Measurement (Contractor)		Monitoring Frequency					
Category	Item	Value or Status	Application	Method	Place	Weekly	Monthly		
Noise	Construction Machinery Generator	To be recorded daily at every subject sites during the construction period. Staffs from the WVs and the Consultant will supervise the activities.	Cambodian Standard	Meter	Near the site where construction machinery is being used.	Daily records will be analyzed every week statistically by the Consultant.	Monthly meeting will be held at MIMB in Phnom Penh. Joint site visit will be done according to the meeting result.		
	Construction Machinery Generator		To be proposed by the Consultant using Japan Standard (local government code).						
Air Pollution	Emission Gas		Cambodian Standard	Standard method specified in Guideline of Ministry of Environment				Visual	The site where pipe laying works were completed. The circumference site where pipe laying works are on-going.
	Dust								
Wastes	Fragments		To be coordinated with the local government concerned.						
	Excess soil								
Traffic	Debris								
	Signboard								
	Traffic Guard								

*[Handwritten signature]*