


## Appendix 4 Minutes of Discussions

- MINUTES OF DISCUSSIONS OF THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU IN THE KINGDOM OF CAMBODIA (29th March, 2019)
- TECHNICAL NOTES ON THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU IN THE KINGDOM OF CAMBODIA (5th April, 2019)
- MINUTES OF DISCUSSIONS OF THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU (EXPLANATION ON DRAFT PREPARATORY SURVEY REPORT) (28th June, 2019)
- MINUTES OF DISCUSSIONS OF THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU (EXPLANATION ON DRAFT PREPARATORY SURVEY REPORT) (21th November, 2019)

**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Expansion of Water Supply System in Ta Khmau**

In response to the request from the Government of the Kingdom of Cambodia (hereinafter referred to as "Cambodia"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Expansion of Water Supply System in Ta Khmau (hereinafter referred to as "the Project") to the Government of Cambodia. The Team held a series of discussions with the officials of the Government of Cambodia and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.


Phnom Penh, 29<sup>th</sup> March, 2019



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Witness 



**PEN Thirong**

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## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to improve the access to safe water in Ta Khmau District through the expansion of water supply system including construction and operation and maintenance (hereinafter referred to as "O&M") of the new water treatment plant (hereinafter referred to as "WTP").

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau".

### 3. Project site

Both sides confirmed that the construction site of the new WTP is located in Ta Khmau District, which is shown in Annex 1.

PPWSA is responsible for distribution plan, and explained that it should be flexible in accordance with change of water demand, future development of the Ta Khmau District and the surrounding area, the possibility of bulk water sale to local private water vendors, and other factors. The Team understood it, and pointed out that it would be necessary to clarify planning basis for the project appraisal as an assumption for the initial stage. Both sides agreed to further discuss the planning basis to set and justify the requirements for the SPC, such as production amount and water pressure.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

#### 4-1. PPWSA will be the executing agency and the implementing agency for the Project.

The organization chart is shown in Annex 2.

#### 4-2. PPWSA is autonomously able to agree with the O&M contract and off-take price if such agreement does not affect the current water tariff system.

### 5. Items requested for Japanese Grant Aid by the Government of Cambodia.

#### 5-1. As a result of discussion, both sides confirmed that the items requested by the Government of Cambodia are as follows:

Facility

- Intake: Capacity of 33,000m<sup>3</sup>/day



- Raw Water Intake Pump Station: Quantity 22m<sup>3</sup>/min, Lift 23m
- Raw Water Transmission Pipe: D 600mm L=100m
- Water Treatment Plant: Capacity of 30,000m<sup>3</sup>/day, Solar Power System 146kWh
- Distribution Facility: Distribution Pump (Quantity 20m<sup>3</sup>/min)
- Bulk meters
- SCADA

Equipment

- Water Quality Analysis Equipment
- O&M Tools for Electrical and Mechanical Equipment

Consulting Service

- Tender Assistance, Construction and Procurement Supervision

Soft Component (technical assistance on O&M) was also requested in the Application Form for Grant Aid from Cambodia, but technical instruction will be implemented during O&M period that is not covered by Grant Aid. Both sides confirmed that the Soft Component is excluded from the items requested for Grant Aid.

Material and equipment for service connection was requested in the original request, but PPWSA explained that it would not be necessary and taken care of by PPWSA.

The original request mentioned the water treatment process as rapid sand filtration, but PPWSA explained that other process such as the membrane filtration could be acceptable if it is proposed by the SPC and it has cost advantages.

Regarding the water quality analysis equipment, PPWSA requested only equipment necessary for daily test because it had the central laboratory.

Although the original request mentioned to the lift of distribution pump as 50m, both sides agreed to reconsider it from the technical viewpoint, because PPWSA generally use 35 to 40m to keep the pressure 20m at taps.

PPWSA requested to include a bulk meter to measure the amount of water which

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PPWSA received from SPC. The Team suggested two bulk meters, one for SPC and the other for PPWSA, but PPWSA confirmed only one bulk meter is sufficient for the measurement.

PPWSA requested to include SCADA for the operation of WTP and minimize the number of required staff.

- 6-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.
6. Procedures and Basic Principles of Japanese Grant
- 6-1. The Cambodian side agreed that the procedures and basic principles of Japanese Grant as described in Annex 3 shall be applied to the Project.  
As for the monitoring of the implementation of the Project, JICA requires the Cambodian side to submit the Project Monitoring Report that the form is attached as Annex 4.
  - 6-2. The Cambodian side agreed to take the necessary measures, as described in Annex 5, for smooth implementation of the Project. The contents of the Annex 5 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report. The contents of Annex 5 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.
7. Schedule of the Survey
- 7-1. The Team will proceed with further survey in Cambodia until April 2019.
  - 7-2. JICA will hold a project briefing session for Japanese companies to give information in terms of project outline, draft requirements to be stipulated in the bidding documents, and draft term sheet of the contracts around July, 2019.
  - 7-3. JICA will prepare a draft Preparatory Survey Report in English, and dispatch a mission to Cambodia in order to explain its contents around October, 2019.
  - 7-4. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by the Cambodian side, JICA will finalize the Preparatory Survey Report and send it to the Cambodian side around March, 2020.
  - 7-5. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Cambodian side confirmed to give due environmental and social considerations during implementation, 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" from the following considerations:

PPWSA 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.). Both sides agreed that the team would make EIA/IEE report of the Project and support for approval. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by October 2019 before the signing of the G/A.

9. Other Relevant Issues

9-1. Application of the Japanese Grant Aid with O&M

The Team explained that the Project would be implemented by applying the Japanese Grant Aid with O&M, whose outline is explained in Annex 3. The Team also explained important matters as follows and the Cambodian side understood them:

- 1) The Japanese Grant Aid shall be used for construction of the facilities and procurement of equipment necessary for the Project, and the consulting service for procurement and supervision of the above-mentioned facilities and equipment,
- 2) The prime contractor(s), namely, special purpose company (hereinafter referred to as "SPC"), and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle,
- 3) The SPC shall be responsible for the construction, procurement and O&M consistently,
- 4) Quality and Cost Based Selection (QCBS) that includes technical, financial and legal evaluation will be applied for the bidding of SPC,
- 5) Contracts consist (a) comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (b) contract(s) for the purchase of products and/or

services and (c) contract(s) for the operation and maintenance, and

- 6) The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

#### 9-2. Tax exemption

The Cambodian side confirmed that it gives necessary support to collect the information of tax exemption.

The Team explained the precondition that the tax such as corporate tax, personal income tax, value added tax and customs to be imposed for the construction work and the service which will be covered by the Japanese Grant Aid shall be exempted or reimbursed, and the Cambodian side understood it.

The Team will also study the possibility for tax exemption during the period of O&M and Cambodian side agreed to offer necessary cooperation to the Team. The Cambodian side explained that the tax exemption for the O&M phase should be discussed with General Department of Taxation (GDT) and the Council for the Development of Cambodia (CDC).

PPWSA recommended the Team to pay attention to subcontractors to be exempted from tax, because this point had been a cause of dispute in some previous Grant Aid projects.

#### 9-3. Necessity of reclamation of the banana plant area

The Team explained that considering the limitation of the area of the site, multi-level WTP would be one option to be considered. However, the Team also explained that the multi-level WTP has some negative aspects such as higher electricity cost, additional waterproofing work and space limitation for rehabilitation work. Both sides agreed that the banana plant area could be used to create extra space, and the necessity of reclamation work would be further discussed technically between PPWSA and the Team.

#### 9-4. Issue of raw water quality



The Team explained concern about worsening raw water quality of the Bassac River, and its survey policy to check odor-causing substances and Ammonium in the raw water. PPWSA explained that it considered chlorine dosing to treat Ammonium, and the pretreatment process would not be necessary, because the problem of odor was limited to the dry season.

9-5. Relocation of the tariff collection office

Both sides agreed that the existing office in the Ta Khmau site should be transferred to clear the space for the new WTP before the expected start of the construction work by PPWSA.

9-6. Unexploded ordnance (UXO)

PPWSA explained that the site had been already cleared from UXO, and nothing had been found when the existing water tower was constructed. Both sides agreed that in case that UXO was found during the survey and the Project, the Cambodian side should take necessary measures to secure the safety of the site.

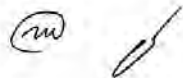
9-7. Conditions for handover of bulk water

The Team proposed the basic concepts of conditions for handover of bulk water in terms of handover point, water quality, water pressure and off-take price.

Both sides agreed that PPWSA would purchase the bulk water of at least 30,000m<sup>3</sup>/day throughout the O&M phase.

Both sides agreed that off-take price should be affordable for PPWSA and acceptable for the operations by SPC, and be decided based on the formula, which is taken safe water production O&M costs, extra service cost, administration cost, reasonable expected return for SPC, inflation rate, and so on into consideration. Both sides also agreed that inflation rate can be adopted the rate in the Quarterly Bulletins published by the National Bank of Cambodia.

PPWSA explained their opinion that it is necessary to discuss which cost items should be included into off-take price first, and the off-take price should be equal to or lower than the average production cost of PPWSA. The Team explained that the current PPWSA's average O&M cost and average tariff in Ta Khmau District should not serve as a benchmark to determine the off-take price, because PPWSA



could have significant advantage to receive Japanese Grant to construct WTP by paying the off-take price, and there would be some project-specific factors to make the off-take price higher than the current PPWSA's average O&M cost such as the involvement of Japanese companies for quality assurance and technical transfer, and space limitation of the site which could result in higher electricity cost.

Both sides agreed that the conditions for handback should be discussed further on a priority basis to reach consensus by the middle of June, 2019, before the project briefing session for Japanese companies.

PPWSA explained that the off-take price should be approved by the Board of Directors of PPWSA and no other approval would be necessary, if such approval does not affect the current water tariff system. Both sides agreed that PPWSA would further study whether other ministries and authorities need to be informed or involved for the approval process.

#### 9-8. Conditions for hand-back after the termination of O&M contract

The Team proposed the basic concepts of conditions for hand-back after the termination of O&M contract as follows.

- PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the Assets. The Value of the Asset shall be net book value of the assets.

PPWSA requested that SPC should keep good conditions of the facility and equipment, and SOP for operation to reduce the risk of breakdown soon after the hand-back.

Both sides agreed that this topic should be discussed further on a priority basis to reach consensus by the middle of June, 2019, before the project briefing session for Japanese companies.

#### 9-9. Conditions for hand-back in case of the early termination of O&M contract

The Team proposed the basic concepts of conditions for hand-back in case of the early termination of O&M contract as follows.

1) Termination for convenience (Unilateral termination):

PPWSA has the right to terminate the contract early for public interest. In this case the SPC shall be compensated in full, for all the private investments, additional costs incurred by the termination of the contract, and opportunity costs for the equity.

2) Termination for default by PPWSA:

The termination condition shall be in line with the case of the termination for convenience.

3) Termination for default by SPC.

PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the Assets. The Value of the Asset shall be net book value of the assets minus cost of damages and losses suffered by PPWSA, which is equivalent to 30% of the net book value.

4) Termination for Force Majeure:

A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for a certain period. Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the Assets. The Value of the Asset shall be net book value of the assets.

Both sides agreed that this topic should be discussed further on a priority basis to reach consensus by the middle of June, 2019, before the project briefing session for Japanese companies.

9-10. Risk allocation during the O&M period

The Team proposed the basic concept of risk allocation as follows.

1) Facilities Design and Construction Risks: Facilities Design and Construction Risks are taken by SPC under conditions to be defined in the contracts.

2) Safe water production quality and quantity variation risk: Maintaining the quality and quantity of safe water production is under control of SPC, therefore

such variation risks are taken by SPC under conditions to be defined in the contracts.

3) Demand variation risk: Water demand variation risk is not under control of SPC, therefore such risk is taken by PPWSA.

4) Inflation variation risk: Inflation variation risk is not under control of SPC, therefore such risk is taken by PPWSA

5) Intake water quality variation risk: Intake water quality variation risk is not under control of SPC, therefore such risk is taken by PPWSA.

6) Electricity price variation risk: Electricity price variation risk is not under control of SPC therefore such risk is taken by PPWSA.

7) Law change risk especially related with water requirement is not under control of SPC, therefore such risk is taken by PPWSA.

Both sides agreed that risk allocation should be discussed further on a priority basis to reach consensus by the middle of June, 2019, before the project briefing session for Japanese companies.

9-11. Reconfirmation of the Minutes of Meetings (M/M) concluded between PPWSA and JICA Cambodia Office.

Both sides reconfirmed the M/M which had been signed on March 22, 2019 attached as Annex 6.

9-12. Applicable procurement rule and the domestic law in Cambodia

The Team explained that the bidding for Japanese Grant Aid with O&M should be Japan-tied in accordance with JICA's procurement rule based on the Article 3 of the Public Procurement Law in Cambodia. MEF and PPWSA agreed with it.

9-13. Duration of O&M phase

PPWSA explained that the duration of O&M should be 10 years at the longest after the commencement of the O&M.

9-14. Dispatch of PPWSA staff to SPC

PPWSA expressed its interest to dispatch its staff to SPC for technical transfer.

9-15. The schedule of the Project

The Cambodian side requested to accelerate the schedule to complete the construction before July 2023. The Team replied that possibility to shorten the schedule would be studied.

9-16. Water quality

The Cambodian side requested that SPC should comply with the water quality standards of PPWSA, because PPWSA is highly evaluated by its good quality of supplied water.

9-17. Ownership of the WTP

MEF and PPWSA confirmed that PPWSA would own the WTP to be constructed in the Project.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Japanese Grant Aid Scheme

Annex 4 Project Monitoring Report (template)

Annex 5 Major Undertakings to be taken by the Government of Cambodia

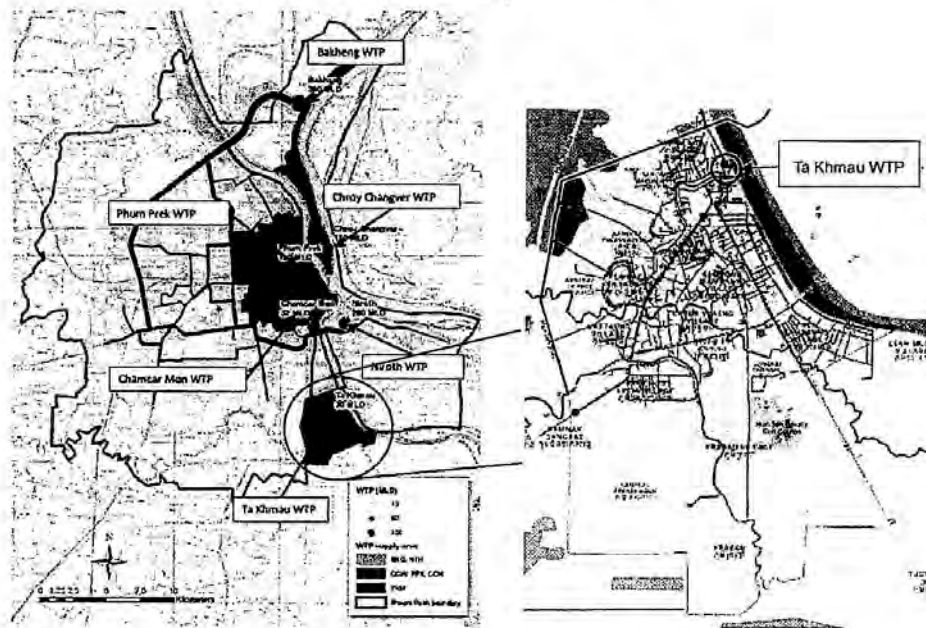
Annex 6 M/M between PPWSA and JICA Cambodia



Annex1 Project Site Map



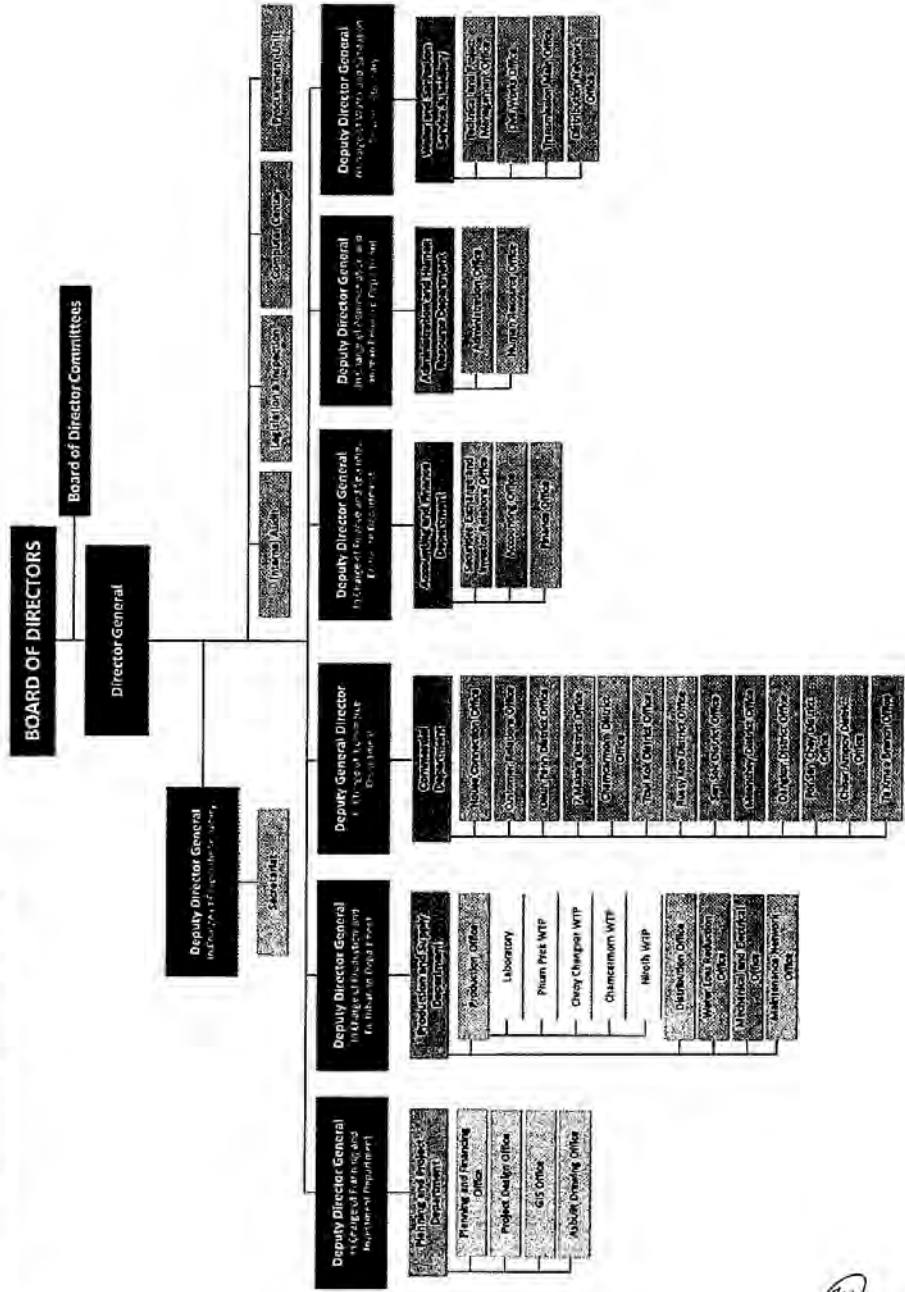
Cambodian Map



Site location Map

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Annex2 Organization Chart of PPWSA



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## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or 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. Followings are the basic features of this project grants operated by JICA (hereinafter referred to as "the Project Grant"). The Project Grant means a public project which is implemented by (a) private company (ies) with the technologies and experience of Japanese nationals. The private company(ies) will be comprehensively engaged in construction of facilities, procurement of equipment, and operation and management as well.

### 1. Procedures of the Project Grant

The Project Grant is conducted through following procedures. (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the Japanese Grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project", the term "the Project" means that the Recipient concludes contract(s) to construct facilities and/or procure equipment by using the Japanese Grant.) on the basis of the G/A

(4) Operation and Management (without using the Japanese Grant)

-Operation and management of the facilities and equipment

(5) Ex-post Monitoring and Evaluation

-Monitoring and evaluation of the Project at post-implementation stage

## 2. Preparatory Survey

### (1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project Grant and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project Grant to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project Grant.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project Grant.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take 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 executing agency of the Project. Therefore, the contents of the Project Grant are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

### (2) Selection of Consultants

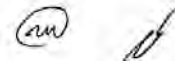
For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

### (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 feasibility of the Project Grant.

## 3. Basic Principles of the Project Grant

### (1) Implementation Stage



1) The E/N and the G/A

After the Project Grant 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 to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

- a) The Recipient shall open an account or shall cause its designated authority to open an account in the Bank. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.
- b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) 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 to continue to work on the Project's implementation after the E/N and G/A.

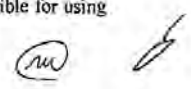
5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be provided for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractor(s), namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals".

6) Contracts and Concurrence by JICA

1) Contracts consist of (a) a comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (b) contract(s) for the purchase of products and/or services and (c) contract(s) for the operation and maintenance.

2) The Recipient will conclude (b) contract(s) for the purchase of products and/or services denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.



#### 7) Monitoring

The Recipient is required to 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 to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

#### 8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

#### 9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

#### (2) Operation and Management Stage

The Contractor operates and manages the facilities and equipment based on the contract(s) for operation and maintenance with the Recipient.

#### (3) Ex-post Monitoring and Evaluation Stage

1) After the project completion of all construction and procurement works by using the Japanese Grant, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion of all construction and procurement works by using the Japanese Grant. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(m)

(4) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

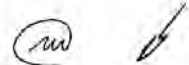
For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Japanese Grant and its accrued interest.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

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



## PROCEDURES OF JAPANESE GRANT

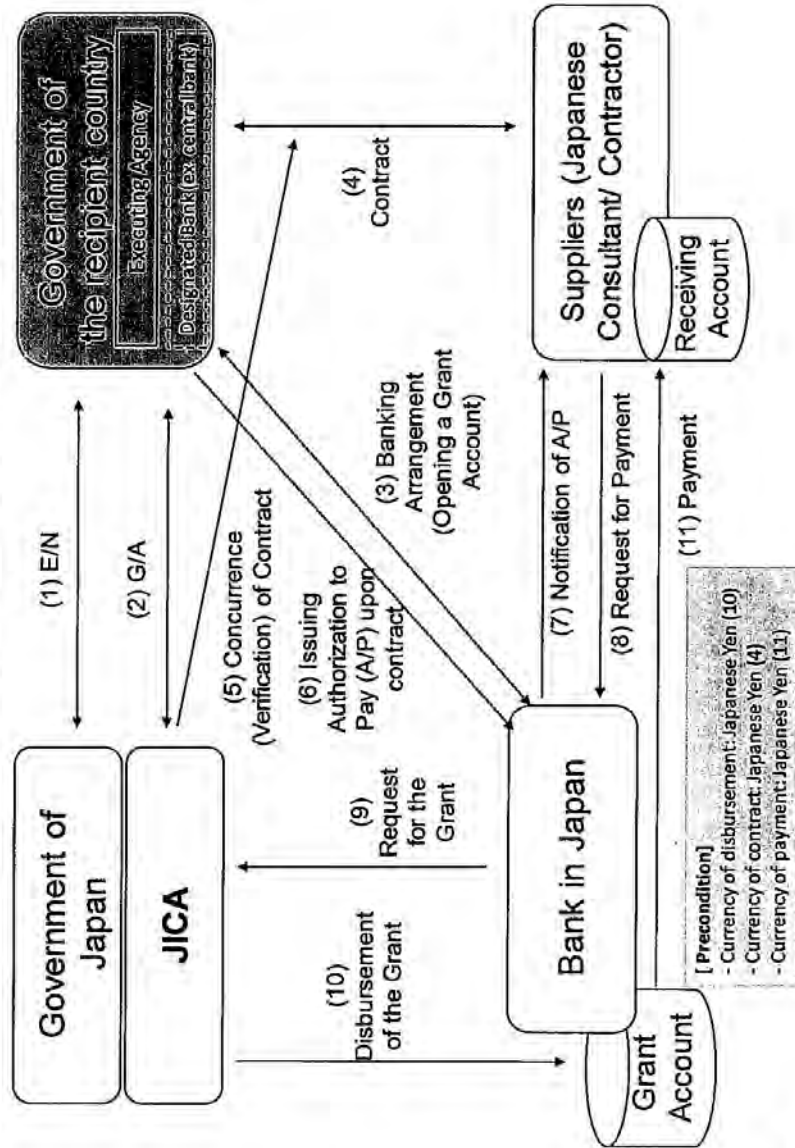
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
3. Implementation	(4) Approval by the Japanese cabinet			x				
	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(10) Bidding	Concurrence by JICA is required	x			x	x	
	(11) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(12) Design/Construction works/procurement	Concurrence by JICA is required for amendment of contract.	x			x	x	
	(13) Completion certificate		x			x	x	
4. Operation & Management	(14) Operation and management of the facilities and equipment		x			x	x	
5. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

- Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
- Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.



### Financial Flow of Japanese Grant (A/P Type)



<p><b><u>Project Monitoring Report</u></b>  <b>on</b>  <b><u>Project Name</u></b>  <b>Grant Agreement No. <u>XXXXXXX</u></b>          20XX, Month</p>
---

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	Person in Charge <u>(Designation)</u> _____ Contacts <u>Address:</u> _____
	<u>Phone/FAX:</u> _____ <u>Email:</u> _____
<b>Executing Agency</b>	Person in Charge <u>(Designation)</u> _____ Contacts <u>Address:</u> _____
	<u>Phone/FAX:</u> _____ <u>Email:</u> _____
<b>Line Ministry</b>	Person in Charge <u>(Designation)</u> _____ Contacts <u>Address:</u> _____
	<u>Phone/FAX:</u> _____ <u>Email:</u> _____

**General Information:**

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

(rw)

<b>1: Project Description</b>	
-------------------------------	--

1-1 Project Objective

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1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

<b>2: Details of the Project</b>
----------------------------------

2-1 Location

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
-------

**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

**2-4 Obligations by the Recipient**

2-4-1 Progress of Specific Obligations  
 See Attachment 2.

2-4-2 Activities  
 See Attachment 3.

2-4-3 Report on RD  
 See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant (Confidential until the Bidding)**

Components	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Cost (Million Yen)	
			Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
1.				
Total				

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

**2-5-2 Cost borne by the Recipient**

Components	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Cost (1,000 Taka)	
			Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
1.				

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

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 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 (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

Actual (PMR)

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

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

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original (at the time of outline design)

Actual (PMR)

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

Original (at the time of outline design)

Actual (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):

	Contingency Plan (if applicable):
Actual Situation and Countermeasures (PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**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.

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**5-3 Monitoring Plan of 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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*en* ✓

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
  - Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

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Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	% of Contract Price D	Condition of Payment Price (Increased) E=C-D	Condition of Payment Price (Increased) F=C+D
1 Item 1	●●	●	●	●	●	●
2 Item 2	●●	●	●	●		
3 Item 3						
4 Item 4						
5 Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st Month, 2016	2nd Month, 2016	3rd Month, 2016	4th	5th	6th
1 Item 1						
2 Item 2						
3 Item 3						
4 Item 4						
5 Item 5						

(3) Summary of Discussion with Contractor (if necessary)

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

## Major Undertakings to be taken by the Royal Government of Cambodia

**1. Specific obligations of the Royal Government of Cambodia which will not be funded with the Grant****(1) Before the Bidding**

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A	PPWSA		
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract(s)	PPWSA		
3	To approve IEIA/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation	within 1 month after the signing of the G/A	PPWSA		
4	To notice the construction of the intake facility in the Bassac River to local authorities	before notice of the bidding document(s)	PPWSA		
5	To secure, clear, level and reclaim the following lands/sites * 1) Site for Ta Khmau WTP *The details will be confirmed by the Preparatory Survey	before notice of the bidding document(s)	PPWSA		
6	To explore landmines and UXO at construction site	before notice of the bidding document(s)	PPWSA		
7	To obtain water right from the Bassac River from MOWRAM	before notice of the bidding document(s)	PPWSA		
8	To demolish and transfer the existing tariff collection office	before notice of the bidding document(s)	PPWSA		
9	To submit Project Monitoring Report	before preparation of bidding document(s)	PPWSA		

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

(2) During the Project Implementation (during construction)

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)	PPWSA		
2	To bear the following commissions to a bank in 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(s)	PPWSA/ NBC		
	2) Payment commission for A/P	every payment	PPWSA/ NBC		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the country of the Recipient	during the Project	PPWSA		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into Cambodia and stay therein for the performance of their work	during the Project	PPWSA		
5	To ensure that customs duties, VAT, internal taxes and other fiscal levies which may be imposed in Cambodia 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	MEF		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	PPWSA		
7	1) To submit Project Monitoring Report	every month	PPWSA		
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	PPWSA		
8	To submit a report concerning completion of the Project	within six months after completion of the Project	PPWSA		
9	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		PPWSA		
	1) Electricity The distributing line to the site *To be confirmed by the Preparatory Survey	before start of the construction			
	2) Drainage The city drainage main ( for storm, sewer and others ) to the site *To be confirmed by the Preparatory Survey	before start of the construction			
10	To take necessary measure for safety of construction - Coordination with the police for traffic control - Coordination with relevant authority to ensure the safety of boats and ships in relation to the construction of intake facility  *To be confirmed by the Preparatory Survey	during the construction	PPWSA		
11	To implement EMP and EMoP	during the construction	PPWSA		
12	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	PPWSA		

NBC: National Bank of Cambodia

mw

(3) During the Project Implementation (during O&M)

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	PPWSA		
2	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 PPWSA and JICA.	for three years after the commissioning	PPWSA		
3	To extend distribution network and facilitate the service connections.	for the O&M period	PPWSA		
4	To submit reports to JICA regarding the situation of O&M* *The details will be confirmed by the Preparatory Survey	for the O&M period	PPWSA		
5	To comply strictly with the O&M contract	for the O&M period	PPWSA		

am ✓

Annex 6

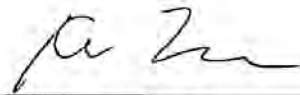
**THE MINUTES OF MEETINGS  
ON  
THE PROJECT FOR CONSTRUCTION OF WATER TREATMENT  
SYSTEM IN TA KHMAU  
AGREED UPON BETWEEN  
PHNOM PENH WATER SUPPLY AUTHORITY  
AND  
JAPAN INTERNATIONAL COOPERATION AGENCY  
CAMBODIA OFFICE**

Phnom Penh, March 22, 2019

Based on a series of discussions between Phnom Penh Water Supply Authority (hereinafter referred to as "PPWSA") and Japan International Cooperation Agency (hereinafter referred to as "JICA") Cambodia Office concerning the project formulation for water treatment plant in Ta Khmau, both sides discussed pre-condition to conduct the Preparatory Survey of the Project for Construction of Water Treatment System in Ta Khmau (hereinafter referred to as "the Project").

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

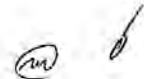
Annex 1: Main Points Discussed



Mr. Kotaro TANAKA  
Deputy Chief Representative  
Japan International Cooperation Agency  
Cambodia Office



Dr. Sim Sitha  
Director General  
Phnom Penh Water Supply Authority



## MAIN POINTS DISCUSSED

### 1. Water Source

PPWSA confirmed that raw water source should be the Bassac River for the water treatment plant (WTP) in Ta Khmau, and there was no other reservation and option. PPWSA also provided JICA Cambodia Office with the feasibility study report for rehabilitation and extension of Chamcar Mon WTP which contained flow rate, water level and water quality data of the Bassac River. JICA Cambodia Office requested PPWSA to obtain latest data from 2015 to 2018 from MOWRAM and provide them to JICA, because the feasibility study report contained data up to 2014. JICA provides the list of general and specific data of the Bassac River that would assist PPWSA to obtaining the required data from MOWRAM.

### 2. Water Rights

PPWSA explained that the project is to replace the existing facilities, which a permit to withdraw raw water from the Bassac River in amount of 33,000m<sup>3</sup>/day is not required. PPWSA additionally explained that since the written document did not remain, PPWSA could apply a permit to MOWRAM if JICA requested. The related official documents are required in case of application of the permit, and the approval from MOWRAM may take at least three (3) months. JICA Cambodia Office requested PPWSA to obtain a written permit from MOWRAM in the course of the Preparatory Survey.

With this respect, PPWSA would request JICA to provide some supporting documents such as initial design of WTP, intake facility, river bank protection, the related data and information like volume of raw water intake, location of intake facility and WTP. JICA Cambodia Office took note of it.

### 3. Population and water demand

PPWSA confirmed that population increase and water demand in Ta Khmau is based on the report of Third Master Plan. PPWSA explained that the area of Ta Khmau had recently added 4 communes to the original 6 communes, but those communes were supplied water by private operators and PPWSA were still not authorized to cover the new area. Considering this situation, both sides agreed to target original 6 communes in the Preparatory Survey as a planning basis.

#### 4. Quality of raw water and intake facility

PPWSA explained that the raw water quality from the Bassac River was not good, but a pre-treatment facility would not be necessary, since the space of the construction was limited. PPWSA explained that ammonium could be treated using chlorine, and the intake tower was recommended to be constructed off the river bank to take raw water of better quality especially during the dry season. JICA Cambodia Office took note of it. Odor substance in raw water will be also examined in the Preparatory Survey since PPWSA explained the number of complaints about odor was increasing. Optimal treatment process would be considered based on the water quality examination in the course of the Preparatory Survey.

#### 5. Capacity of WTP and Distribution Plan

PPWSA explained that it had a plan to distribute surplus water to Phnom Penh when water demand would not reach up to 30,000m<sup>3</sup>/day in Ta Khmau. PPWSA also confirmed that it was technically possible to transmit water from the new WTP to Phnom Penh using the existing pipe DN 500mm.

JICA Cambodia Office took note of it, and explained that the JICA Preparatory Survey Team would confirm technical justification during the Preparatory Survey.

PPWSA also explained that handing over point of bulk water (the place of water meter) should be installed inside of the WTP, and the exact location would be determined during the Preparatory Survey.

#### 6. Ownership of the WTP

PPWSA confirmed that PPWSA would own the WTP to be constructed in the Project after the completion of the construction.

#### 7. Off-take price

PPWSA and JICA Cambodia Office discussed and exchanged opinions about off-take price. PPWSA explained that it may be expensive to set up off-take price in the amount of 800 KHR/m<sup>3</sup>, which is indicated in the Data Collection Survey on Water Supply Sector in Phnom Penh Capital City (hereinafter referred to as the Survey), considering the pre-conditions shown below.

- The cost calculation for electricity is estimated too high (300 KHR/m<sup>3</sup>) comparing the current cost of electricity (200 KHR/m<sup>3</sup>).
- The estimated cost for salary is also high, which should be 17-18% from the



total production cost.

- o Operation and maintenance cost should be also estimated around 6%.

In this context, PPWSA roughly estimates off-take price in amounting 400-500 KHR/m<sup>3</sup>. PPWSA additionally explained that the production cost and distribution cost are 400 KHR/m<sup>3</sup> and 500 KHR/m<sup>3</sup> respectively. Off-take price can be adjustable based on inflation and possibly either fixed or variable. It is also subject for further discussion and approval by Ministry of Economy and Finance (MEF) as PPWSA is a public listing company, which MEF holds 85% of stock share from PPWSA.

PPWSA also explained that private water operators may receive the right to be exempted from VAT tax, withholding tax, profit tax, and corporate tax for their investment, though it is still on-going discussion in the government. It can be applied during the construction and operation period.

#### 8. Proposed type of contracts

JICA Cambodia Office explained that the facilities should be handed over to PPWSA after the completion of construction due to the rule of Japan's ODA grant aid. In this regard, JICA explained that the following composition of the contract documents were currently considered.

- i. EPC Contract
- ii. Lease Contract to let SPC to use the constructed facilities (can be integrated into the Bulk Water Supply Contract below if the facility belongs to PPWSA)
- iii. Bulk Water Supply Contract
- iv. Overarching document to stipulate the relationship of these contract documents

JICA explained that the contents of each contract would be considered further during the Preparatory Survey, and PPWSA took note of it.

#### 9. Multi-level WTP

PPWSA confirmed that there was no other alternative site. JICA Cambodia Office explained that multi-level WTP could be required since the existing site may not be enough for the horizontal treatment plant. JICA Cambodia Office also explained that there are key points to note that multi-level WTPs have some considerations as follows.

- Pumping cost becomes more expensive compared to the normal horizontal process.
- Also, additional waterproofing work and periodic rehabilitation are necessary.

- Future expansion is difficult due to space limitation.
- Facility layout needs to be carefully designed taking future improvement and rehabilitation work into consideration, and management would be complicated during renewal and rehabilitation.

If it is difficult to acquire new site and if PPWSA would not request vertical WTP, creation of extra space such as reclamation of the area outside of the fence near the river where banana plants are growing and demolition of existing water tower (elevated tank) will be necessary to construct a horizontal WTP. PPWSA explained that the existing water tower had been built in 2008 by the support of the World Bank, and depreciation period is 50 years so that it was difficult to demolish it. PPWSA preferred to construct horizontal type WTP though detailed study would be necessary to assess the extra space. If it is not large enough for a horizontal WTP, both sides confirmed that there was possibility to conduct reclamation for the site with the banana plants to avoid flooding by the Bassac River to enlarge the site for WTP.

PPWSA confirmed that there is no regulation for building construction such as building ratio. Foundation of old facilities may still remain under the ground so that the study should be conducted.

**10. Replacement of the equipment after the completion of operation (lease contract)**

PPWSA and JICA Cambodia Office discussed the condition of replacement for the equipment after the lease contract. PPWSA requested that the equipment should be handed over with the condition that the WTP can be operated at least 2 years without repair and/or replacement for budget approval and procurement procedure, depending on product lifecycle of the equipment, and JICA Cambodia Office took note of it.

**11. Case of damages due to disaster occurred**

PPWSA and JICA Cambodia Office discussed the obligation of rehabilitation/repair if there would be any cause of damage due to disaster such as flooding. PPWSA explained that Force Majeure clause under the agreement/contract for SPC might be applied.

(END)

**Preparatory Survey for the Project for Expansion of Water Supply Systems in  
Ta Khmau in the Kingdom of Cambodia**

**1. Purpose of the Mission**

- to confirm the requests from Cambodian side
- to explain New Grant Aid with SPC Projects scheme and tentative schedule of the project
- to explain schedule and key points of the preparatory survey

**2. Schedule of Meetings**

Date and time		Contents	Venue
26 March 2019	8:30-12:00	Meeting with PPWSA	PPWSA
	14:00-15:30	Meeting with MIH	MIH
	15:30-	Site Visit at Proposed site at Ta Khumau	Ta Khumau WTP
27 March 2019	8:30-12:00	Meeting with PPWSA	PPWSA
	14:30-16:00	Meeting with MEF/GDICDB	MEF
28 March 2019	8:30-12:00	Meeting with PPWSA	PPWSA
	14:00-15:30	Site visit to Chamcar Mon WTP	CM WTP
29 March 2019	AM	Sign Minute of Meeting (PPWSA, MEF and JICA)	TBC
	14:00-15:00	Report to JICA Office	JICA
	15:30-16:30	Report to Embassy of Japan	EOJ

**3. Member list:**

**JICA Members**

No	Name	Title	Affiliation
1	Dr. Shigeyuki MATSUMOTO	Leader	Deputy Director General, Water Resources Group, Global Environment Department, JICA
2	Mr. Kazunori NAKAI	Cooperation Planning	Water Resources Team 1, Water Resources Group, Global Environment Department, JICA

**Consultant Team**

Name	Title	Period
Mr. Koichi OKAZAKI	Chief Consultant / Water Supply Facility Planning & Design Nihon Suido Consultants Co., Ltd.	From 18 March 2019
Mr. Takahiro NAKATA	Deputy Chief Consultant / Construction Planning & Cost Estimate Nihon Suido Consultants Co., Ltd.	
Mr. Hiroshi KUMAGAE	PPP Project Development Crown Agents Japan Ltd.	
Mr. Makoto KANEDA	Electrical Plant Process Planning & Design Nihon Suido Consultants Co., Ltd.	
Mr. Ryunan MATSUE	Environmental and Social Consideration / UXO Survey Nihon Suido Consultants Co., Ltd.	
Mr. Umi TOGASAWA	Business Modeling / Bidding & Contractual Development Crown Agents Japan Ltd.	
Mr. Takehiko OGA	Water Supply Planning Advisor Nihon Suido Consultants Co., Ltd.	

1. Domestic Law and regulations in Cambodia

- Operation and Maintenance for Ta Khmau WTP will be implemented by SPC, which conducts civil works. Please confirm if it is possible to contract out to only Japanese companies for the construction works and O&M since the project is grant aid of Japanese ODA. Please confirm if article 3 of law on public procurement shall apply for this project.
- Please confirm if VAT and other taxation can be exempted for the Project portion which is covered by Japanese grant, namely design and construction.
- Please confirm the possibility for VAT exemption during the period of operation.
- If the construction cost is partially covered by private investment, is it possible to contract out to only Japanese companies based on the procurement guidelines of grant aid? (application for article 3 of concession law)

2. Proposed type of contracts

JICA explained PPWSA that the facilities should be handed over to PPWSA after the completion of construction due to the rule of Japan's ODA grant aid. In this regard, the following composition of the contract documents were currently considered.

- i. EPC Contract
- ii. Lease Contract to let SPC to use the constructed facilities (can be integrated into the Bulk Water Supply Contract below if the facility belongs to PPWSA)
- iii. Bulk Water Supply Contract
- iv. Overarching document to stipulate the relationship of these contract documents

JICA also explained that the contents of each contract would be considered further during the Preparatory Survey. Are there any comments regarding proposed type of contracts from the position of MEF?

3. Government Guarantee

- In case of failure to abide by conditions of contract from PPWSA, Is there any possibility to have government guarantee to reduce risk of SPC? In order for the government to provide the guarantee, what is the process for the approval? Are there any projects that the government provides guarantee? If not, what is idea for MEF in case of contractual default?

4. Off-take price

- JICA and PPWSA discussed off-take price as attached M/M, which requires further approval from MEF.
- What will be the process for the approval for off-take price within MEF. Does PPWSA need to go through approval process for bulk water supply contract?
- Is there any case of PPP contract which stipulates payment by foreign currency?

TECHNICAL NOTES  
ON  
THE PREPARATORY SURVEY  
FOR  
THE PROJECT FOR EXPANSION OF  
WATER SUPPLY SYSTEM  
IN TA KHMAU  
IN THE KINGDOM OF CAMBODIA

Based on the Minutes of Discussions (hereinafter referred to as "M/D") on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau (hereinafter referred to as "the Project") signed on 29th March, 2019 between Japan International Cooperation Agency (hereinafter referred to as "JICA") and Phnom Penh Water Supply Authority (hereinafter referred to as "PPWSA"), the consultant members of the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") had a series of discussions and conducted field surveys from 1<sup>st</sup> April to 5<sup>th</sup> April, 2019.

As a result of the discussions and the surveys, both sides confirmed the technical and financial conditions described as per the attached.

It should be noted that this technical note does not mean the commitment of the project scope, project implementation, design and method to be implemented. The final project scope, project implementation, designs, etc. will be decided by the Government of Japan.

Phnom Penh, 5th April, 2019



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Koichi OKAZAKI  
Chief Consultant /  
Water Supply Facility Planning and Design,  
JICA Preparatory Survey Team

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SAMRETH Sovithiea  
Deputy Director General, in charge of Plan  
and Project, Phnom Penh Water Supply  
Authority

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## ATTACHMENT

Both parties agreed upon and confirmed the following items.

### **1 Layout Plan for Water Treatment Facility**

The team explained the layout of WTP and treatment process, O&M cost structure, and distribution plan is shown in Annex-1. Cambodian side has no objection to the layout of WTP with intake tower and the capacity of service reservoir for cost estimation.

### **2 Contract Terms and Payment Mechanism**

The team explained the basic principles of project structure, payment mechanism, risk allocation, contract terms, and bid evaluation methodologies and Cambodian side has no objection to the contents. (Annex-2)

ANNEX - 2-1



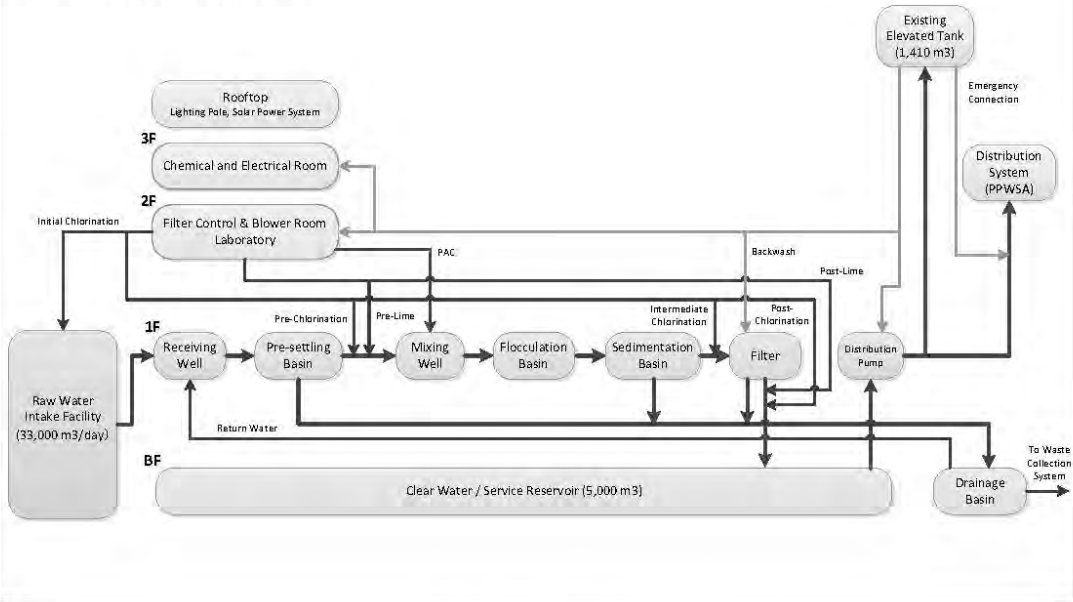




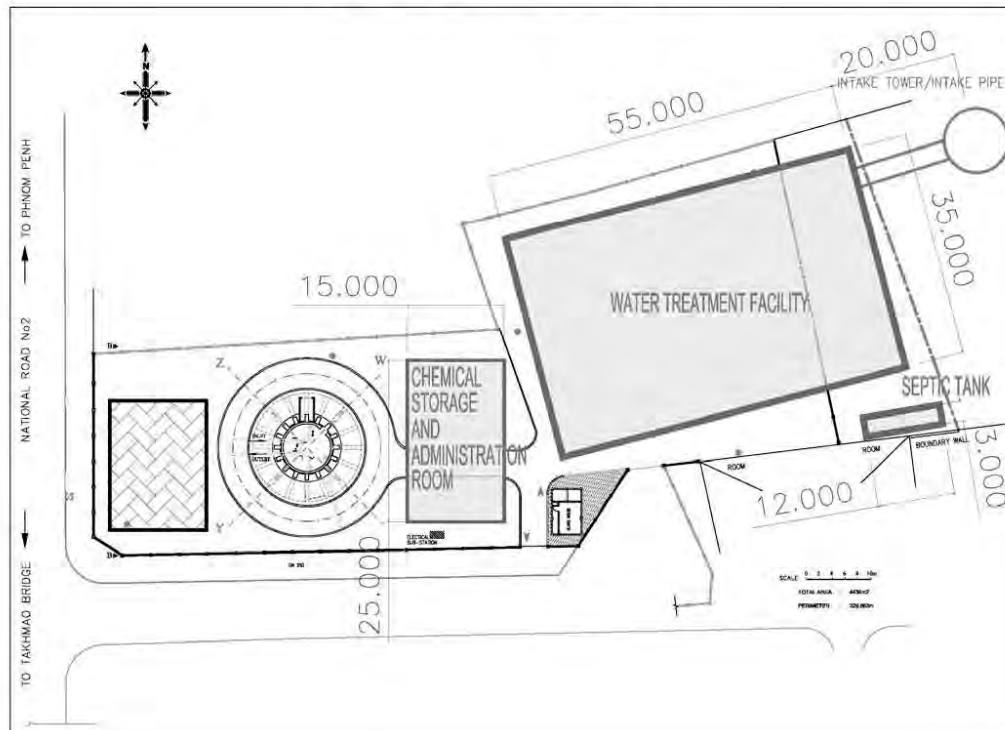
# Treatment Process(Draft)

**Ta Khmau WTP  
Treatment Process**

**Water Treatment Facility (30,000 m<sup>3</sup>/day)**



# Draft Outline Design





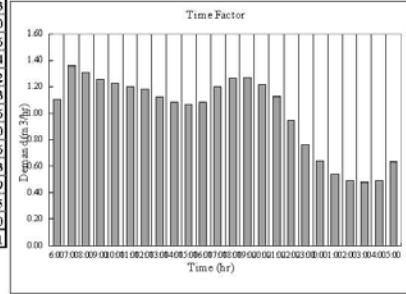
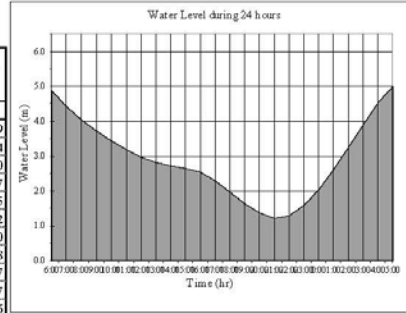


**Ta Khman Reservoir**

Day max = 30000 m<sup>3</sup>/day      Res. Cap. = 5000 m<sup>3</sup>  
 = 1250.00 m<sup>3</sup>/hr      Effec. Dpt. = 5 m<sup>3</sup>  
 Day ave. = 30000.0 m<sup>3</sup>/day      Effec. Area = 1000 m<sup>2</sup>  
 1250.0 m<sup>3</sup>/hr      4.0 hours

Time (hr)	Peak Factor	% of Daily Demand (%)	Water Demand (m <sup>3</sup> /hr)	Fire Demand (m <sup>3</sup> /hr)	Total Outlet	Inlet (m <sup>3</sup> /hr)	Volume (m <sup>3</sup> )	Water Level (m)
0								
6:00	1.10	4.6%	1,375		1,375	1,250	4,875	4.9
7:00	1.36	5.7%	1,700		1,700	1,250	4,425	4.4
8:00	1.31	5.5%	1,638		1,638	1,250	4,038	4.0
9:00	1.25	5.2%	1,563		1,563	1,250	3,725	3.7
10:00	1.22	5.1%	1,525		1,525	1,250	3,450	3.5
11:00	1.20	5.0%	1,500		1,500	1,250	3,200	3.2
12:00	1.18	4.9%	1,475		1,475	1,250	2,975	3.0
13:00	1.12	4.7%	1,400		1,400	1,250	2,825	2.8
14:00	1.08	4.5%	1,350		1,350	1,250	2,725	2.7
15:00	1.06	4.4%	1,325		1,325	1,250	2,650	2.7
16:00	1.08	4.5%	1,350		1,350	1,250	2,550	2.6
17:00	1.20	5.0%	1,500		1,500	1,250	2,300	2.3
18:00	1.26	5.3%	1,575		1,575	1,250	1,975	2.0
19:00	1.27	5.3%	1,588		1,588	1,250	1,638	1.6
20:00	1.21	5.0%	1,513		1,513	1,250	1,375	1.4
21:00	1.13	4.7%	1,413		1,413	1,250	1,213	1.2
22:00	0.94	3.9%	1,175		1,175	1,250	1,288	1.3
23:00	0.76	3.2%	950		950	1,250	1,588	1.6
0:00	0.64	2.7%	800		800	1,250	2,038	2.0
1:00	0.54	2.3%	675		675	1,250	2,613	2.6
2:00	0.49	2.0%	613		613	1,250	3,250	3.3
3:00	0.48	2.0%	600		600	1,250	3,900	3.9
4:00	0.49	2.0%	613		613	1,250	4,538	4.5
5:00	0.63	2.6%	788		788	1,250	5,000	5.0
<b>Total</b>	<b>24</b>	<b>100%</b>	<b>30000</b>	<b>0</b>		<b>Min.</b>	<b>1212.50</b>	<b>1.21</b>

Max. 1.36      Required Min. Cap. of Res. (hour)  
 Min. 0.48      3.03 hr

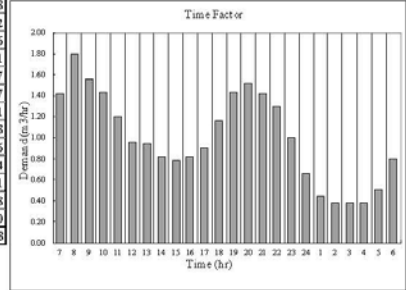
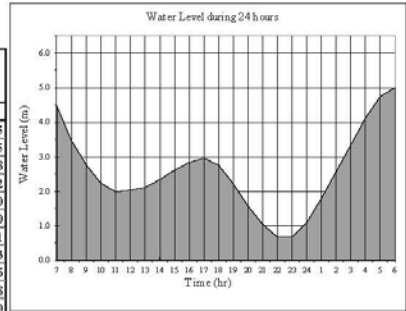


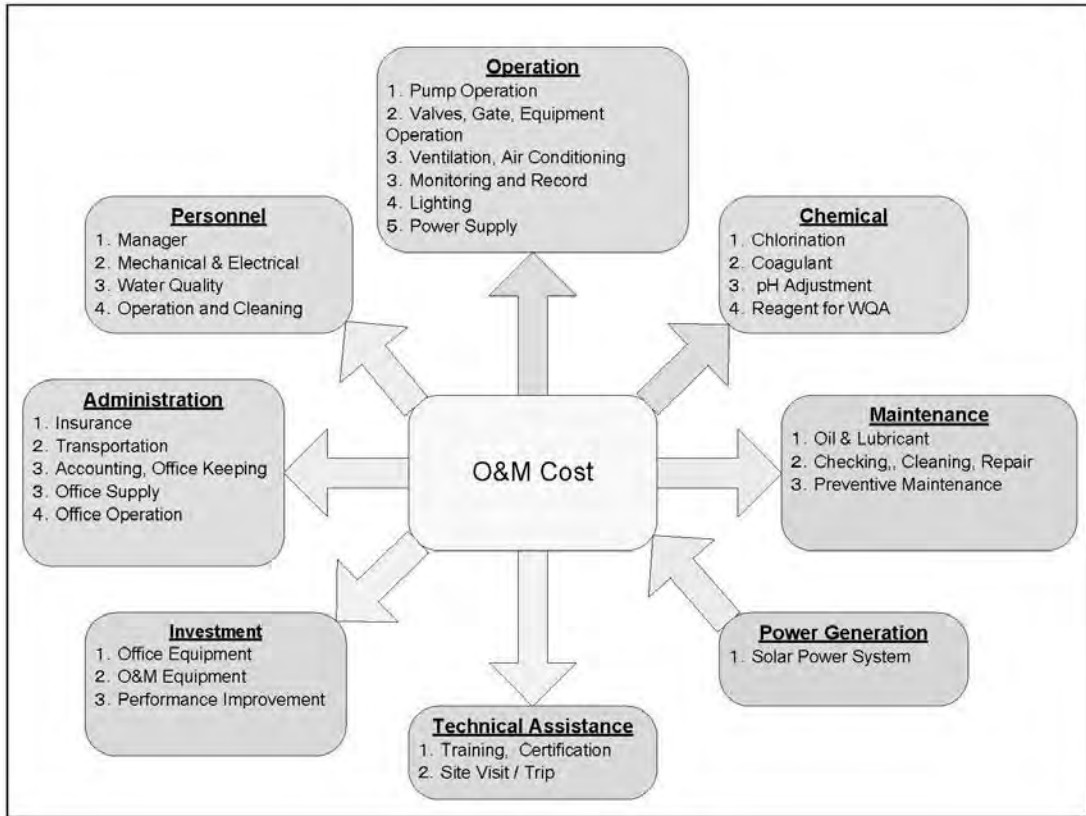
**Ta Khman Reservoir**

Day max = 30000 m<sup>3</sup>/day      Res. Cap. = 5000 m<sup>3</sup>  
 = 1250.00 m<sup>3</sup>/hr      Effec. Dpt. = 5 m<sup>3</sup>  
 Day ave. = 30000.0 m<sup>3</sup>/day      Effec. Area = 1000 m<sup>2</sup>  
 1250.0 m<sup>3</sup>/hr      4.0 hours

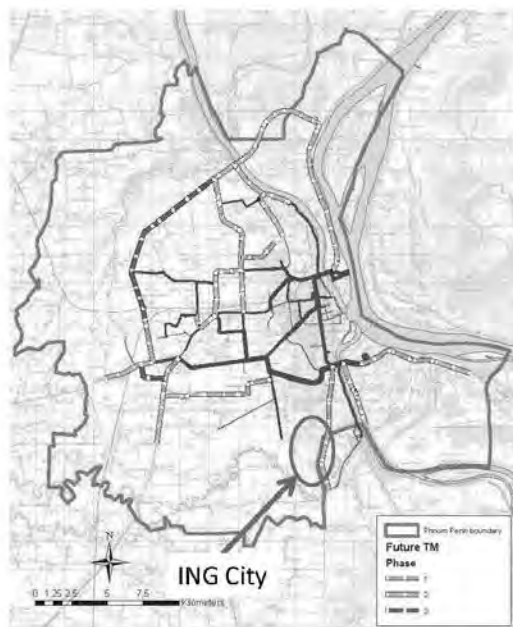
Time (hr)	Peak Factor	% of Daily Demand (%)	Water Demand (m <sup>3</sup> /hr)	Fire Demand (m <sup>3</sup> /hr)	Total Outlet	Inlet (m <sup>3</sup> /hr)	Volume (m <sup>3</sup> )	Water Level (m)
0								
7	1.42	5.9%	1,775		1,775	1,250	4,475	4.5
8	1.80	7.5%	2,250		2,250	1,250	3,475	3.5
9	1.56	6.5%	1,950		1,950	1,250	2,775	2.8
10	1.43	6.0%	1,788		1,788	1,250	2,238	2.2
11	1.20	5.0%	1,500		1,500	1,250	1,988	2.0
12	0.96	4.0%	1,200		1,200	1,250	2,038	2.0
13	0.94	3.9%	1,175		1,175	1,250	2,113	2.1
14	0.82	3.4%	1,025		1,025	1,250	2,338	2.3
15	0.78	3.3%	975		975	1,250	2,613	2.6
16	0.82	3.4%	1,025		1,025	1,250	2,838	2.8
17	0.90	3.8%	1,125		1,125	1,250	2,963	3.0
18	1.16	4.8%	1,450		1,450	1,250	2,763	2.8
19	1.43	6.0%	1,788		1,788	1,250	2,225	2.2
20	1.52	6.3%	1,900		1,900	1,250	1,575	1.6
21	1.42	5.9%	1,775		1,775	1,250	1,050	1.1
22	1.30	5.4%	1,625		1,625	1,250	675	0.7
23	1.00	4.2%	1,250		1,250	1,250	675	0.7
24	0.66	2.8%	825		825	1,250	1,100	1.1
1	0.44	1.8%	550		550	1,250	1,800	1.8
2	0.38	1.6%	475		475	1,250	2,575	2.6
3	0.38	1.6%	475		475	1,250	3,350	3.4
4	0.38	1.6%	475		475	1,250	4,125	4.1
5	0.50	2.1%	625		625	1,250	4,750	4.8
6	0.80	3.3%	1,000		1,000	1,250	5,000	5.0
<b>Total</b>	<b>24</b>	<b>100%</b>	<b>30000</b>	<b>0</b>		<b>Min.</b>	<b>675.00</b>	<b>0.68</b>

Max. 1.80      Required Min. Cap. of Res. (hour)  
 Min. 0.38      3.46 hr





### Distribution Plan



**THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU**

Annex-2

**CONFIDENTIAL / DRAFT / DISCUSSION PURPOSE ONLY**

Abbreviations:

**1. Project Outline**

1.1 Project Background

- The water demand in the area supplied by PPWSA is projected to be double in 2030 and capacity of existing WTP in Phnom Penh will be insufficient to meet the demand in 2020.
- New WTP shall be developed to supply the water mainly in Ta Khmau area in which many low-income households need access to clean water at affordable water tariff and neighbor Phnom Penh areas where PPWSA develops water distribution system.
- The Government of Cambodia requested to the Government of Japan for the funds to implement the project for expansion of water supply system in Ta Khmau.

1.2 Project Objectives

The objective of the Project is to improve the access to safe water in Ta Khmau District through the expansion of water supply system including construction and operation and maintenance (hereinafter referred to as "O&M") of the new water treatment plant (hereinafter referred to as "WTP").

1.3 Project Structure

The Project would be implemented by applying the Japanese Grant Aid with O&M, whose outline is explained in Annex 3 of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29<sup>th</sup> March 2019 in particular;

- The Japanese Grant Aid shall be used for construction of the facilities and procurement of equipment necessary for the Project, and the consulting service for, procurement, evaluation and approval of detail design prepared by SPC and supervision of the above-mentioned facilities and equipment,
- The SPC shall be responsible for the design, construction, procurement and O&M consistently,
- Contracts consist (a) comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (b) contract(s) for the purchase of products and/or services and (c) contract(s) for the operation and maintenance, and
- The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without

1

using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

#### 1.4 Project Site

The construction site of the new WTP is located in Ta Khmau District, which is shown in Annex I of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29<sup>th</sup> March 2019.

#### 1.5 Risk Allocations

Risks	PPWSA	SPC	Remarks/Examples
<b>EPC risk</b>		○	Any additional costs shall be borne by SPC (e.g. inflation during construction period, design deficiency, change in natural conditions (e.g. unforeseen ground conditions)). Acts of PPWSA such as variation orders from PPWSA to SPC and UXO related costs will be paid by PPWSA.
<b>Demand risk</b>	○		PPWSA shall pay for treated water from SPC up to 30,000m <sup>3</sup> /day if SPC satisfies the required water pressure, regardless of any reason on PPWSA side (e.g. demand stays low or distribution pipes get damaged).
<b>Operation risk</b>		○	No payment shall be made if quality water is not delivered due to poor operation by SPC (e.g. facility malfunction, inappropriate usage of water treatment chemicals etc.). Penalty is applicable in case the water delivered by SPC does not comply with the drinking water standards of the WHO and national drinking water standards.
<b>Electricity price risk</b>	○		If the electricity price shall be covered by PPWSA according to the price formula.
<b>Electricity availability risk</b>	○	○	In case the electricity is not supplied to the facility due to blackout, SPC has no obligation to supply water and no payment shall be made for the period.
<b>Inflation risk (during O&amp;M period)</b>	○		Increase in production costs caused by inflation (e.g. wages or raw materials) shall be paid by PPWSA calculated with the formula for the PPWSA payment to SPC.
<b>Intake water quality risk</b>	○		Additional cost of production due to change in quality of intake water shall be compensated to the SPC according to the methodology agreed in the contract.
<b>Licensing risk</b>	○		IEIA/EIA or any other permit/authorization necessary for

2

Risks	PPWSA	SPC	Remarks/Examples
			the SPC to operate the facility shall be obtained by PPWSA.
<b>Legal risk (change of project specific law)</b>	○		Additional cost caused by a change in law that specifically affects the project (e.g. upgrade of national quality standard for drinking water) shall be covered by PPWSA. SPC shall be compensated according to the methodology agreed between PPWSA and the SPC.
<b>Legal risk (change of general law)</b>		○	Additional cost caused by a change in general law that would affect the whole economy (e.g. VAT) shall be covered by the SPC.
<b>Force Majeure risk</b>	○	○	A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for a certain period (based on practice of water utilities). Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the Assets. The Value of the Assets shall be net book value of the assets.



1.6 Tender Evaluation

- The prime contractor(s), namely, special purpose company (hereinafter referred to as "SPC"), and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.
- Quality and Cost Based Selection (QCBS) that includes technical, commercial, financial and legal evaluation will be applied for the bidding of SPC.

Bidding evaluation (example)

Note: This shall be reviewed and approved by JICA.

$$\text{Comprehensive Evaluation Score} = \text{Technical Score} * X + \text{Price Score} * (1-X)$$

where X is a weight factor  $1 > X > 0$  supposedly 0.5-0.8

Technical Score (Example)

	Category	Score
1	Tenderers experience with respect to comparable projects,	TBA
2	Proposed Organization	TBA
3	Experience of key staff in relation to the scope of work,	TBA
4	Outline Design	TBA
5	Construction Work Plan	TBA
6	Operation and Maintenance and Monitoring Plan	TBA
	Maximum possible score	100

Price Score (Example)

The tenderer bids on 10-year Life Cycle Cost (LCC) where

(proposed) 10-year LCC = EPC price + Net present value of O&M costs + risk adjustments caused by proposals (Discount rate applicable for PPWSA project is 4.5%)

$$\text{Price score} = 100 * (1 - ((10\text{-year LCC proposed} + \text{risk adjustment}) / \text{LCC of comparator})) * Y$$

where Y is an adjustment factor defining price competition range and maximum price score is 100 required that

- (1) EPC price is below the Grant budget, and
- (2) O&M will be reflected in the contract price of bulk water

## 2. Contract Terms

Draft contracts for EPC and O&M will be prepared in accordance with JICA's standard form of contract and international best practices including items below.

	Contract Terms	Conditions
1	<b>O&amp;M period</b>	10 years at the longest after commencement (definition is to be agreed) of O&M
2	<b>Equity structure of SPC</b>	100% owned by Japanese companies (likely be a Joint Venture by EPC and O&M companies)
3	<b>Engineering, Procurement, and Construction (EPC)</b>	The WTP shall be designed and constructed based on the EPC contract with the SPC. EPC contract shall be prepared by JICA. (Application of Global Standard EPC Contract is requested by PPWSA)
4	<b>Production of bulk water</b>	Production of bulk water is fundamentally a responsibility of the SPC. PPWSA however shall cover agreed risks in production costs that are out of SPC's control.
5	<b>Purchase of bulk water</b>	On a separate sheet
6	<b>Price of bulk water and risk allocation</b>	On a separate sheet
7	<b>Licensing risk</b>	IEIA/EIA shall be obtained by PPWSA before E/N and G/A.
8	<b>Land acquisition risk</b>	The land has already been acquired by PPWSA.
9	<b>Repairment</b>	While using the WTP free of charge, the SPC shall be responsible for any repairment of the facilities at its own cost. SPC shall keep good conditions of the facility and equipment, and SOP for operation to reduce the risk of breakdown soon after the hand-back.
10	<b>Conditions for the hand-back</b>	The WTP shall be handed back to PPWSA by the SPC under certain requirements.
11	<b>Invoice settlement</b>	SPC shall report and charge to PPWSA by 10 <sup>th</sup> of each month for the bulk water produced in the previous month. PPWSA shall in return review the invoice and make payment within two months after the invoice receiving date. Currency to be used for the invoice settlement shall be agreed between PPWSA and SPC, either US Dollars or Cambodian Riel.
12	<b>Private investment</b>	The SPC may invest in some additional facilities, software, or any other equipment necessary for the operations. PPWSA has the right to purchase the private investments from the SPC at their residual value (net book value) at the end of O&M period.

5

13	<b>Operation data and financial information</b>	The SPC shall record and report all the operation data and financial information in a required format. PPWSA may utilizes the data to continue operation of the WTP after hand-back.
14	<b>Staff Employment</b>	1) PPWSA shall take over the employment contracts from the SPC at the end of O&M period. 2) If PPWSA wishes to send its employee to the SPC, conditions shall be discussed (role, responsibility, payment, reporting line, etc.)
15	<b>Monitoring</b>	Monitoring SPC operations is important not only for PPWSA but also for Japanese government as the project is finance by Japanese Grant. Cost for third party monitoring shall be covered within the project cash flow in a way that PPWSA and SPC establish a monitoring funds in SPC.
16	<b>Early termination / compensation events</b>	<p>Termination for convenience (Unilateral termination) PPWSA has the right to terminate the contract early for public interest. In this case the SPC shall be compensated in full, for all the private investments, additional costs incurred by the termination of the contract, and opportunity costs for the equity.</p> <p>Termination for default by PPWSA The termination condition shall be in line with the case of the termination for convenience.</p> <p>Termination for default by SPC PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the Assets. The Value of the Asset shall be net book value of the assets minus cost of damages and losses suffered by PPWSA due to the termination of the contract.</p> <p>Termination for Force Majeure A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for a certain period. Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the Assets. The Value of the Asset shall be net book value of the assets.</p>

**Formula of SPC Invoice / PPWSA's payment to SPC**

SPC Invoice (PPWSA payment to SPC) = (1) sales of bulk water + (2) additional services - (9) penalties

(1) Sales of bulk water = (3) volume of water delivered \* (4) unit price of bulk water

(4) Unit price of bulk water =

- $\alpha$  \* (5) inflation index
- +  $\beta$  \* (6) electricity price
- + (7) required margin for SPC
- + (8) additional production costs

if and only if caused by quality deterioration of intake water or change in water quality standard (Measures to compensate against raw water quality deterioration or upgrade of water quality standard shall be agreed in the contract)

where

$\alpha$  is a fixed (agreed) basis for O&M costs excluding electricity and

$\beta$  is a fixed (agreed) volume of electricity usage per m3 and

(2) Additional services include deeper analysis of water quality or site visit tour or any other services that are not included in the ordinary O&M activities defined in the contract

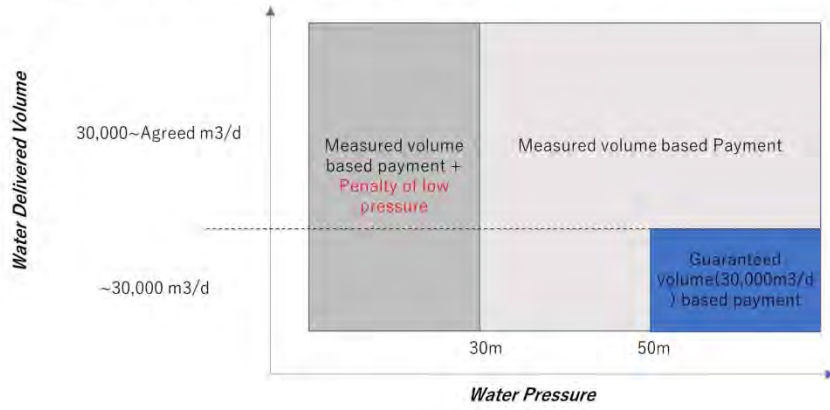
Example for the month of June 2025 (all figures are assumptions)

(1)	Sales of bulk water	= (3) * (4)	KHR559,800,000
(3)	Volume of water delivered	as delivered by SPC	900,000m <sup>3</sup> per month
(4)	Unit price of bulk water	= $\alpha * (5) + \beta * (6) + (7) + (8)$	KHR622/m <sup>3</sup>
	$\alpha$	Basis for O&M costs excluding electricity	as defined in the contract
	$\beta$	Volume of electricity usage per m <sup>3</sup>	as defined in the contract
(5)	Inflation index	= 200.05 for June 2025 / 176.02 for Jan 2021 at the time of contract (All item CPI from monthly report by the Bank of Cambodia)	1.13
(6)	Electricity price	Electricity price for June 2025	KHR750/kWh
(7)	Required margin	= $(\alpha * (5) + \beta * (6) + (8)) * 15\%$ 15% as defined in the contract	KHR81/m <sup>3</sup>
(8)	Additional production costs	Not applicable	0
(2)	Additional services	Work shop program requested by PPWSA	KHR4,000,000
(9)	Penalties	Not applicable	0
	SPC Invoice	= (1) + (2) + (9)	KHR563,800,000

**Methodologies to determine volume of water delivered**

- Water Pressure meter must be installed at the location near bulk meter according to the relevant regulations
- Guaranteed volume-based payment is applicable in case water pressure is more than 50m and the water delivered volume is less than 30,000m<sup>3</sup>.
- Penalty is applicable if the water distribution pressure does not satisfy the agreed minimum level (30 m is recommendable).

**Water Delivered Volume and Water Pressure and Their Applicable Payment Methods**



**Minutes of Discussions  
on the Preparatory Survey for the Project for  
Expansion of Water Supply System in Ta Khmau**

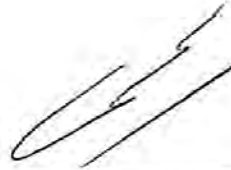
In response to the request from the Government of the Kingdom of Cambodia (hereinafter referred to as “Cambodia”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for Expansion of Water Supply System in Ta Khmau (hereinafter referred to as “the Project”) to the Government of Cambodia. The Team held a series of discussions with the officials of the Government of Cambodia and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Phnom Penh, 28<sup>th</sup> June, 2019



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Dr. Shigeyuki Matsumoto  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



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H.E. Dr. Sim Sitha  
Director General  
Phnom Penh Water Supply Authority  
Kingdom of Cambodia

## ATTACHMENT

### Project Outline

1. Outline of comparator facility

The Team explained the outline of comparator facilities as Annex 1. Both sides confirmed that comparator facilities were used only for estimating project cost, and the actual design of the facilities would be proposed by SPC in the later stage.

2. Risk allocation during the O&M period

The Team explained the risk allocations described in Annex 2, and both sides agreed with it.

3. Project schedule

The Team explained the tentative project schedule based on the comparator facilities described in Annex 2, which was shortened from the previous plan based on the requests from the Cambodian side. Both sides confirmed that the proposal for shortening the construction schedule by SPC should be included as one of the bidding evaluation items to encourage earlier completion.

The Team also explained that the tentative schedule might be reconsidered with reflection of opinions in a project briefing session for Japanese companies to be held by JICA in Tokyo in July, 2019.

4. Basic framework of evaluation of Quality and Cost Based Selection (QCBS)

The Team explained the basic framework of evaluation of QCBS described in Annex 2, and both sides agreed with it.

### Requirements

5. Installation of solar power facilities

The Team explained that the solar power facilities could not be covered by the Grant as the amount of Grant is limited, and the solar panel installation shall not be included in the tender. The Team also explained the result of scenario analysis which calculated the viability of the solar power investment described in Annex 3. WTP specification shall allow optional solar power installation with minimum 146kW, and PPWSA shall decide whether to install or request SPC to install solar power facilities after the tender.



6. Laboratory for water quality test in WTP

PPWSA requested that the layout and equipment of the laboratory attached to WTP should be in accordance with ISO9001 and ISO17025. The Team took note of it.

Both sides agreed that the laboratory in WTP should be equipped with enough equipment to analyze daily test items in the National Drinking Water Quality Standards.

7. Water quality standards

Both sides confirmed the water quality standards which SPC should meet as Annex 4. The daily test items shall be analyzed by SPC in the laboratory attached to WTP, and quarterly and yearly test items shall be analyzed by PPWSA. PPWSA specifically requested that turbidity of treated water should be 1NTU or less. PPWSA also explained that it would not require SPC to treat trihalomethane precursors and odor substances.

8. Required pumping head of the distribution pumps and the water pressure requirement

PPWSA requested the Team to design the pumping head of the distribution pumps at least 4.5 bars (0.45Mpa) based on the recommendation of the Master Plan, and to set up the water pressure requirement as 4 bars (0.4Mpa) at the off-take point (flow meter) subject to the hydraulic analysis by the Team. PPWSA accepts reasonable decline in water pressure if the demand exceeds 33,000 m<sup>3</sup>/day.

9. Production amount

SPC shall make best efforts to produce water 30,000-33,000m<sup>3</sup>/day and the suspension of intake should be avoided as far as possible in any case of raw water deterioration. SPC shall also request a meeting to PPWSA in case the actual production amount is varied from the production plan which shall be submitted to PPWSA in advance.

**Contract Terms**

10. Contract terms

The Team explained the contract terms including the conditions for hand-back after the termination of O&M contract and the conditions for hand-back after the termination of O&M contract described in Annex 2, and both sides agreed with

(m) §

them.

#### 11. Method for off-take price calculation

The Team explained the method for off-take price calculation described in Annex 2. PPWSA understood the composition of the price formula. The Team explained that through the bidding process, the proposals from SPC to reduce off-take price would be encouraged. Both sides also understood off-take price is subject to a proposal by SPC.

PPWSA strongly requested to refer to the benchmark of existing WTPs in terms of efficiency, namely 275 Wh/m<sup>3</sup> for unit electricity consumption and 346 Riel/m<sup>3</sup> for the unit production cost. PPWSA understood that the off-take price could be more than the benchmark because of the specific cost items required for the Grant Aid with O&M, but strongly requested that the off-take price should be less than 500 Riel/m<sup>3</sup>.

Final approval of the off-take price will be made by the Board of Directors, but off-take price based on the comparator facility are basically discussed at the moment as attached Annex 5. PPWSA requested to further improve the efficiency of electricity consumption.

The Team explained the following three steps to decide the off-take price:

- (1) Assumption based on the comparator facility to be agreed in the Preparatory Survey, which will be written in the Minutes of Discussions at the explanation of the draft report which is scheduled around October to November in 2019, and the schedule of Grant Agreement (G/A),
- (2) Requirement to be written in the bidding document, which should be the same as the assumption above in principle, and
- (3) Final decision to be fixed based on the proposal from SPC and the contract negotiation between SPC and PPWSA, which will be written in the contract.

The Team requested PPWSA to report to the Board of Directors about the progress of examination of the off-take price based on the comparator facility before the end of August 2019 and inform the Team of the result.

Both sides reconfirmed that the off-take price should be approved by the Board of Directors of PPWSA and no other approval from related authorities would be necessary.

#### Others

12. Stockyard and office for the consultant and SPC during the construction stage

The Team requested PPWSA to find possible space for the stockyard and office necessary for the construction stage in the previous meeting. PPWSA explained that the space of Niroth WTP would be available for free of charge.

13. Technical transfer

The Team proposed that the proposal of asset management and preventive maintenance by SPC, which are the advantage of Japanese companies, would be included as an item to be evaluated in the bidding. PPWSA agreed the proposal by the Team.

14. Trading currency

The Team explained that some Japanese companies requested the payment of O&M contract from PPWSA to SPC in US dollar. PPWSA explained that only Cambodian Riel is acceptable, because the water tariff is collected in Riel.

15. Dispatch of staff from PPWSA to SPC

PPWSA explained their intention to dispatch about 5 staff to SPC and bear their salary mainly for smooth hand-back at the termination of O&M period. PPWSA staff shall report to SPC in daily operation. Relative salaries shall be subtracted from the off-take price.

16. Salaries of local employees

SPC's salaries to local employees shall be equivalent to those of PPWSA in principle.

17. Third party monitoring

PPWSA explained that third party monitoring would not be necessary during O&M period.

Annex 1 Outline design of the comparator facilities

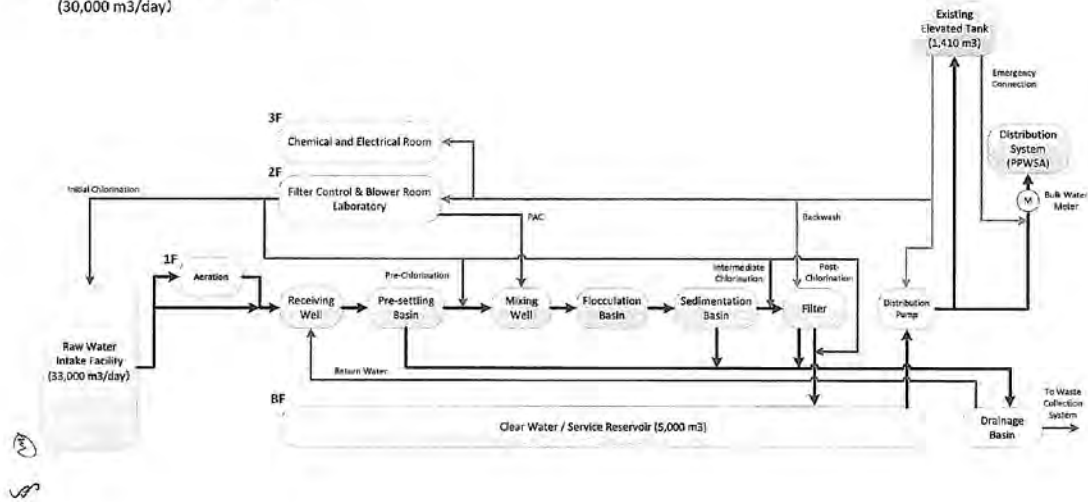
Annex 2 Term Sheet

Annex 3 Analysis of private investment for solar panel

Annex 4 Water quality standards

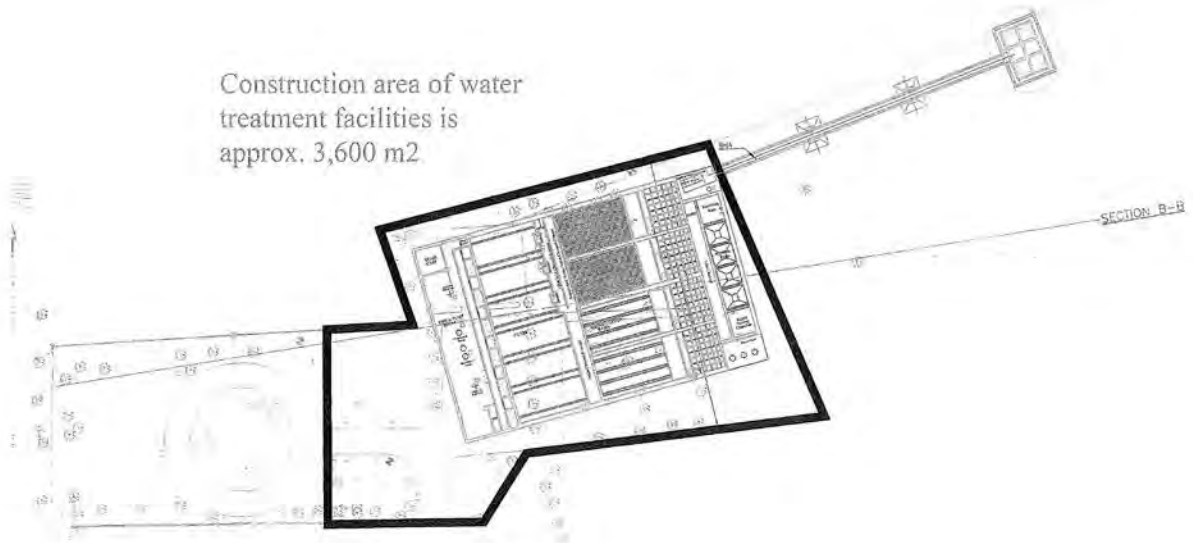
Annex 5 O&M cost analysis for off-take price

**Ta Khmau WTP**  
**Treatment Process**  
**Water Treatment Facility**  
 (30,000 m<sup>3</sup>/day)

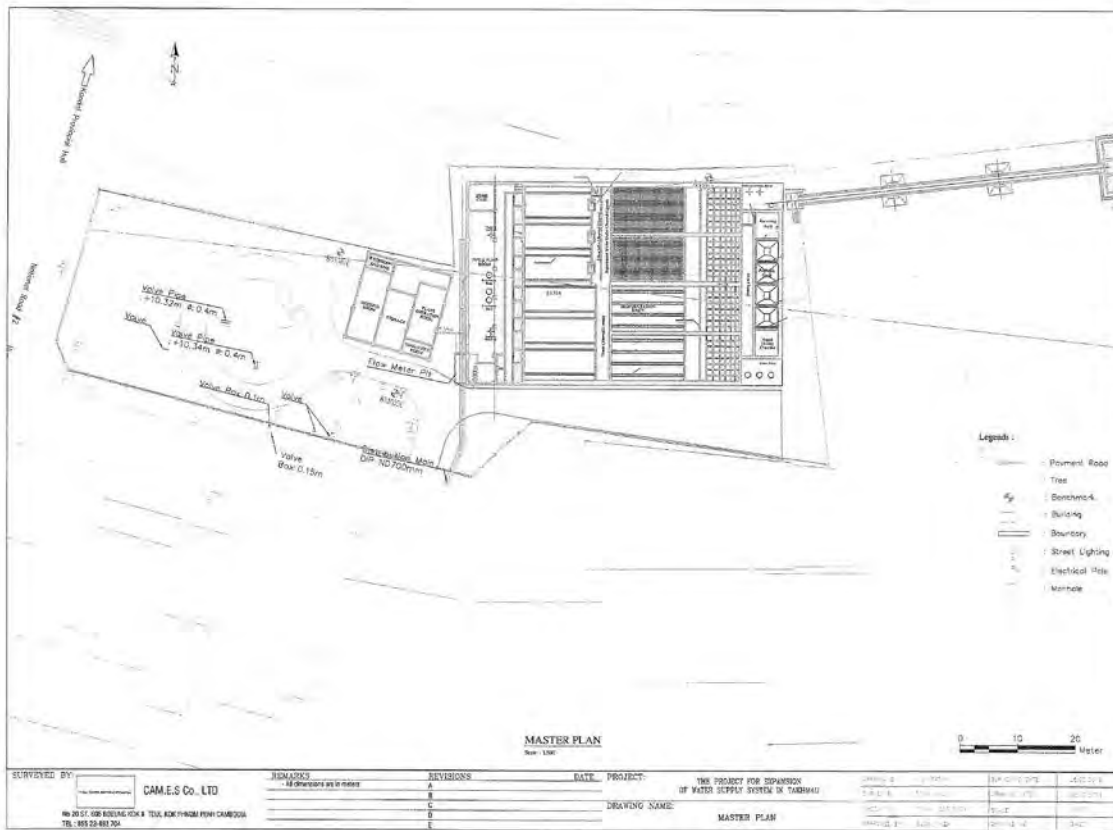




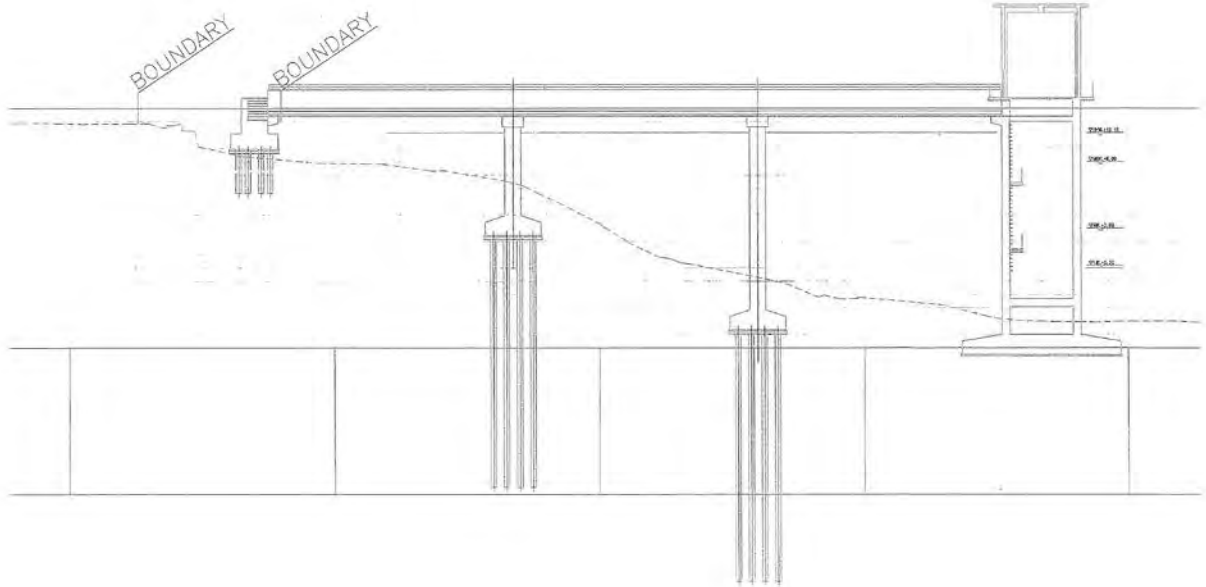
Construction area of water treatment facilities is approx. 3,600 m<sup>2</sup>.



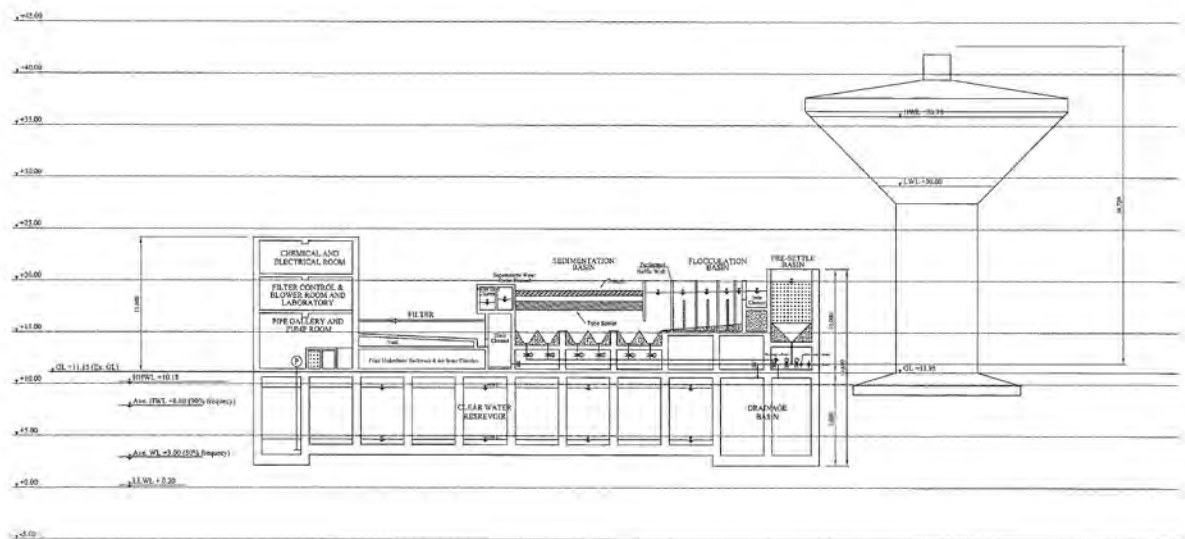
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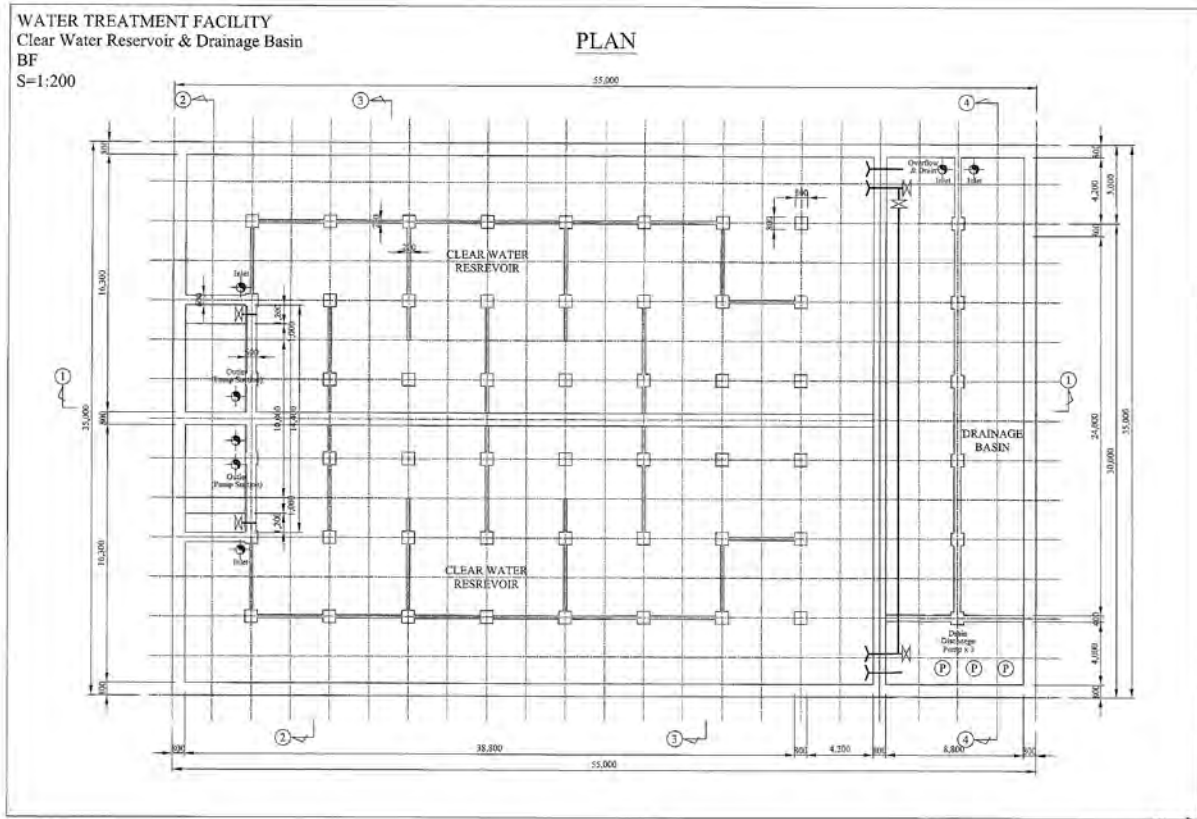
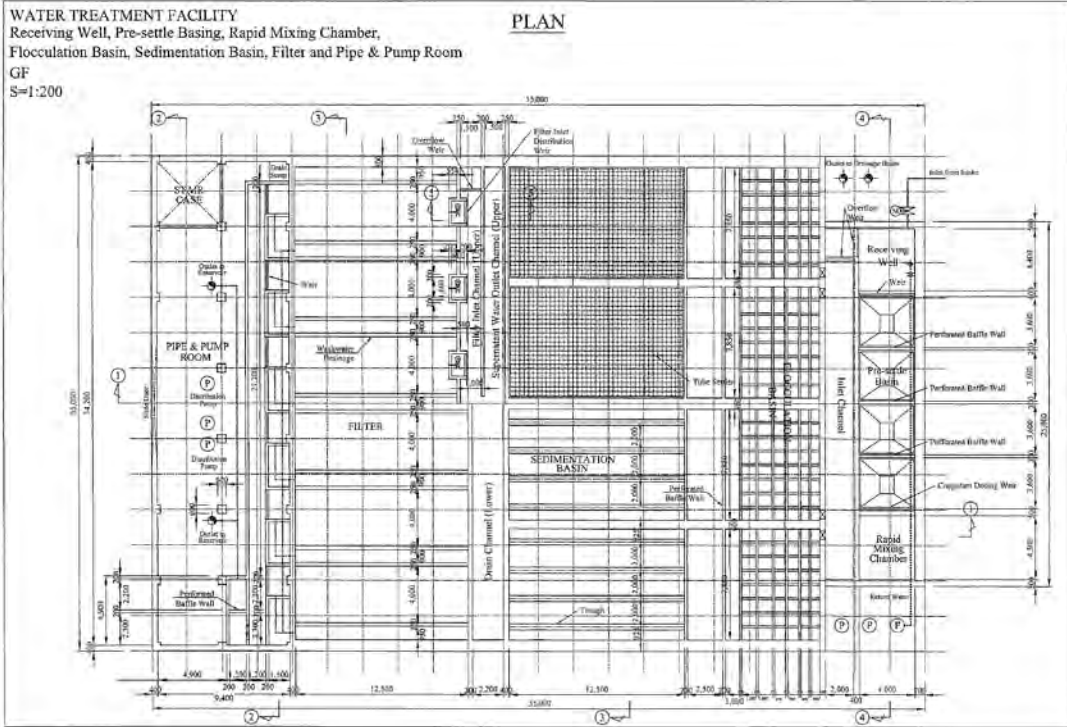
SURVEYED BY:		REVISIONS	DATE	PROJECT	DATE	BY	CHECKED BY	APPROVED BY
CAMES Co. LTD		A		THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TAKHREAU				
No 20 St. 100 Khouang Phou & Teu, Kham Phou Phou, Camboon		B						
TEL: 855 22 483 264		C						
		D						
		E						



AP 3



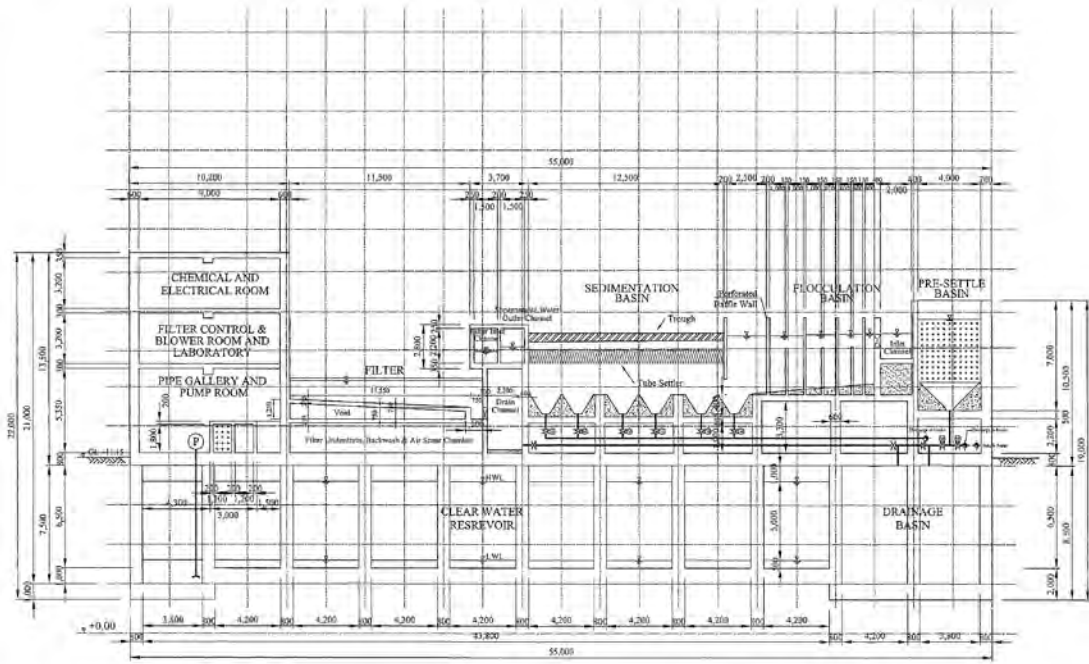
AP 3





WATER TREATMENT FACILITY  
 General Section  
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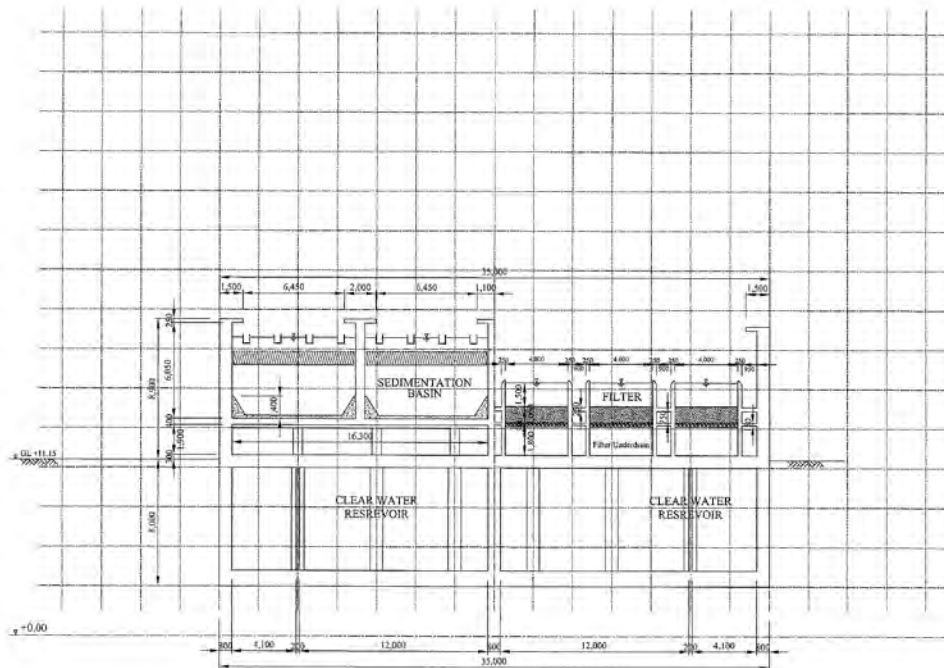
GENERAL SECTION 1-1



REV 5

WATER TREATMENT FACILITY  
 Section  
 S=1:200

SECTION 3-3



REV 5

**Document No.1 Term Sheet**

**THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU**

**CONFIDENTIAL / DRAFT / DISCUSSION PURPOSE ONLY**

**1. Project Outline**

**1.1 Project Background**

- The water demand in the area supplied by PPWSA is projected to be double in 2030 and capacity of existing water treatment plants (hereinafter referred to as “WTP/WTPs”) in Phnom Penh will be insufficient to meet the demand in 2020.
- The New WTP shall be developed to supply the water mainly in Ta Khmau area in which many low-income households need access to clean water at affordable water tariff and neighbor Phnom Penh areas where PPWSA develops water distribution system.
- The Government of Cambodia requested to the Government of Japan for the funds to implement the project for expansion of water supply system in Ta Khmau.

**1.2 Project Objectives**

The objective of the Project is to improve the access to safe water in Ta Khmau District through the expansion of water supply system including construction, operation and maintenance (hereinafter referred to as “O&M”) of the new WTP.

**1.3 Project Structure**

The Project would be implemented by applying the Japanese Grant Aid with O&M, whose outline is explained in Annex 3 of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29<sup>th</sup> March 2019 in particular;

- PPWSA will be the executing agency and the implementing agency for the Project.
- The Japanese Grant Aid shall be used for construction of the facilities and procurement of equipment necessary for the Project, and the consulting service to be assigned to consultants.
- A Japanese company or a joint venture of Japanese companies will be selected through a competitive tender and establish a Special Purpose Company (SPC) in Cambodia that shall be responsible for the design, construction, and O&M of the new WTP consistently,
- Contracts consist (a) comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (b) contract(s) for the purchase of products and/or services and (c) contract(s) for the operation and maintenance, and
- The Government of Cambodia shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Government of Cambodia with respect to the

purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant and its accrued interest.

#### 1.4 Project Site

The construction site of the new WTP is located in Ta Khmau District, which is shown in Annex I of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29<sup>th</sup> March 2019.

#### 1.5 Risk Allocations

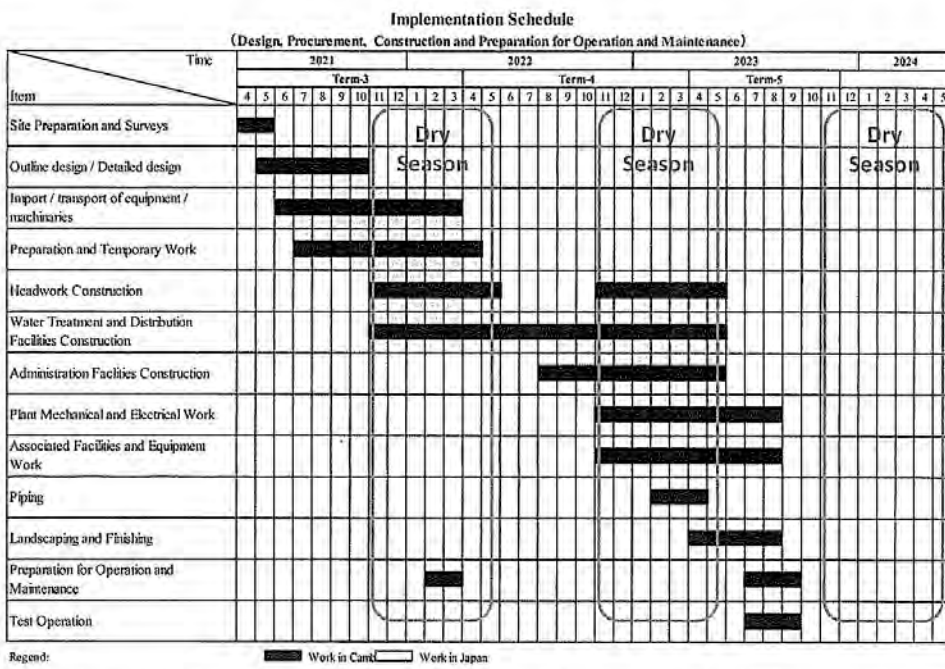
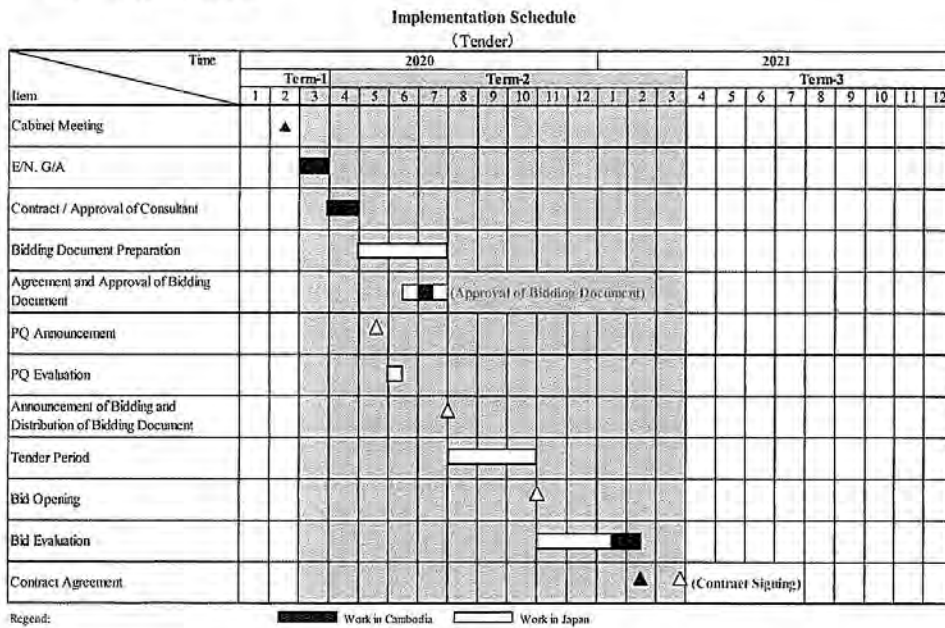
Risks	PPWSA	SPC	Remarks/Examples
<b>EPC risk</b>	O	O	<ul style="list-style-type: none"> <li>- Any additional costs caused by PPWSA shall be borne by PPWSA (e.g. variation orders from PPWSA to SPC, UXO related costs)</li> <li>- Any additional costs caused by change in external conditions shall be borne by PPWSA (e.g. unforeseen ground conditions, major inflation during construction period). These costs may be covered by the amount of the grant for contingency mentioned in the Grant Agreement which is applicable according to the JICA guideline.</li> <li>- Any additional costs caused by SPC shall be borne by SPC (e.g. design deficiency, inflation during construction period).</li> </ul>
<b>Demand risk</b>	O		PPWSA shall pay for 30,000m <sup>3</sup> /day of treated water if SPC provides or is ready to provide 30,000m <sup>3</sup> /day of treated water that satisfies the required water quality on a monthly average, regardless of any reason on PPWSA side (e.g. demand stays low or distribution pipes get damaged).
<b>Operation risk</b>		O	<p>No payment shall be made if the delivered water does not satisfy the water quality requirement due to poor operation by SPC (e.g. facility malfunction, inappropriate usage of water treatment chemicals etc.).</p> <p>In case the water delivered by SPC does not comply with national drinking water standards required by PPWSA, SPC shall compensate for any damage (e.g. compensation to end-customers) suffered by PPWSA as a result of such poor operation by SPC.</p>
<b>Electricity price</b>	O		Any fluctuations in electricity price shall be covered by

2

(M) S

Risks	PPWSA	SPC	Remarks/Examples
risk			PPWSA according to the Price Formula for Bulk Water Supply.
Electricity availability risk		O	In case the electricity is not supplied to the facility due to blackout, neither SPC has obligation to supply water to PPWSA, nor PPWSA must pay SPC for the period. SPC does not have a right to claim operating loss caused by such blackout to PPWSA.
Inflation risk (during O&M period)	O		Increase in production costs caused by inflation (e.g. wages or raw materials) shall be covered by PPWSA according to the Price Formula for Bulk Water Supply.
Raw water quality risk	O		Additional cost of production due to change in quality of raw water shall be covered by PPWSA and compensated to the SPC.
Licensing risk	O		IEIA/EIA or any other permit/authorization necessary for the SPC to operate the facility shall be obtained by PPWSA.
Legal risk (change of project specific law)	O		Additional cost caused by a change in law that specifically affects the project (e.g. upgrade of national quality standard for drinking water) shall be covered by PPWSA and compensated to the SPC.
Legal risk (change of general law)		O	Additional cost caused by a change in general law that would affect the whole economy (e.g. VAT) shall be covered by the SPC.
Force Majeure risk	O	O	A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for a certain period (based on practice of water utilities). Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets. The value of the assets shall be net book value of the assets.

1.6 Project Schedule



The schedule above is based on the Comparator facilities (the Consultants plan) and SPC may propose shorter construction duration in the tender.

*(Handwritten marks)*

### 1.7 Tender Evaluation

- The prime contractor(s), namely, SPC and the prime consulting firm, which enter into contracts with PPWSA, are limited to "Japanese nationals", in principle.
- Quality and Cost Based Selection (QCBS) that includes technical, commercial, financial and legal evaluation will be applied for the bidding of SPC.

#### Evaluation methodology

Note: This shall be reviewed and concurred by JICA.

Comprehensive Evaluation Score = Technical Score \* X + Price Score \* (1-X)

where X is a weight factor  $1 > X > 0$  (In this stage the Consultants propose 0.5 as X. Please refer the separate sheet for the analysis of the weight factor X of Price score)

#### Tentative Technical Score

	Category	Score
1	Tenderers experience with respect to comparable projects;	TBA
2	Proposed Organization	TBA
3	Experience of key staff in relation to the scope of work;	TBA
4	Proposed design by SPC for bidding	TBA
5	Construction Work Plan	TBA
6	Operation and Maintenance and Monitoring Plan	TBA
	Maximum possible score	100

#### Tentative Price Score

The tenderer bids on 10-year Life Cycle Cost (LCC) where

10-year LCC = EPC price + Net present value of O&M costs discounted at 4.5%

(SPC submit EPC price, 10-year average O&M Cost ( $\alpha$ ), 10-year average fixed volume of electricity usage ( $\beta$ ), and the margin rate at bidding to calculate 10-year LCC)

Price score = Lowest Price / Price of the Tenderer \* 100

Note that

- (1) EPC price shall be below the Grant budget applicable to the EPC contract, and
- (2) O&M cost will be reflected in the contract price of bulk water

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## 2. Requirements

### 2.1. Preconditions

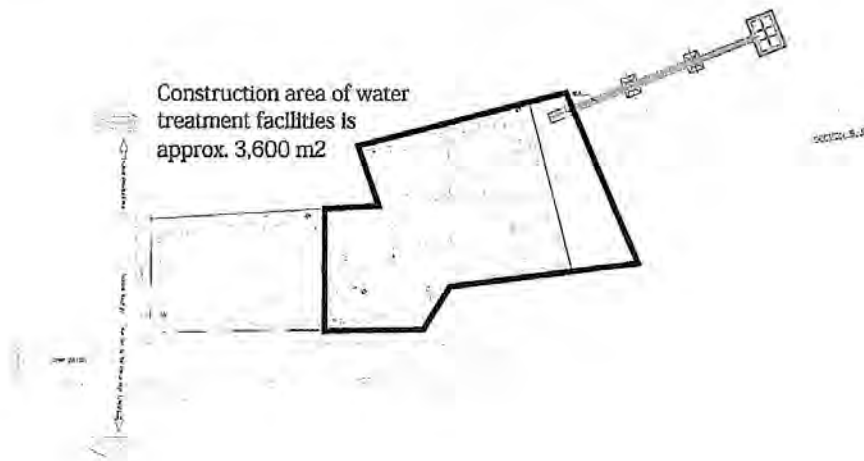
#### 2.1.1. Construction Area

There are an existing elevated tank and a tariff collection station as major facilities within the PPWSA's property where the new WTP shall be constructed. The available construction area of water treatment facilities (WTFs) excluding headworks (intake and raw water transmission facilities) is approximately 3,600 m<sup>2</sup>.

Headworks shall be constructed in the river outside of PPWSA's property.

There is unlevelled land along the river that are PPWSA's property but outside of existing fence. This area could be levelled as part of SPC's EPC work.

Existing tariff collection station shall be shifted to outside of construction area by PPWSA before commencement of the design-build work.



The site area is limited therefore, stockyard, workshop, temporary office etc. required for the construction shall be provided by PPWSA.

Topographic and geotechnical features will be provided to SPC by PPWSA in later stage.

#### 2.1.2. Raw Water Quality

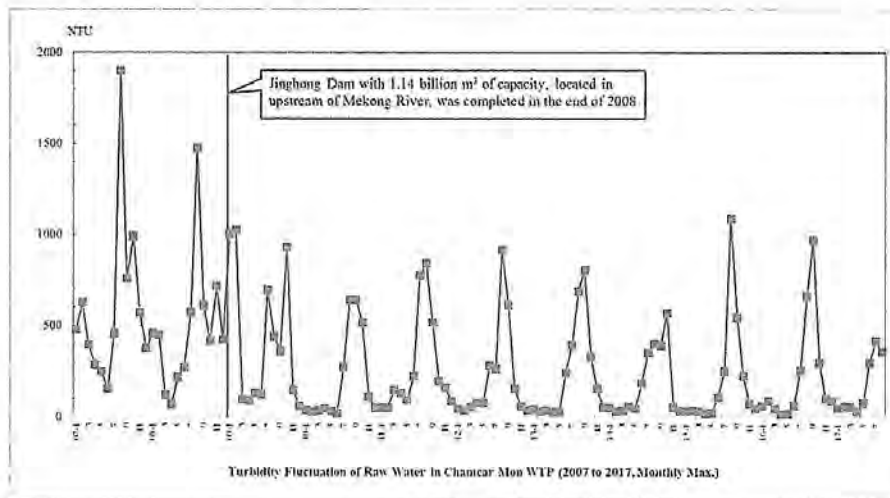
Raw water source shall be Bassac River.

The raw water quality recorded at intake of Chamcar Mon WTP located at upstream of Ta Khmau site along Bassac River during 2009-2017 after Jinghong dam was commenced operation in 2008 shows following characteristics.

- Turbidities are quite different in dry season and wet season. Minimum turbidity in dry season was 7NTU, average turbidity in wet season is 250 NTU and maximum turbidity was 1088NTU.
- pH is generally high in wet season and low in dry season, average pH is 7.4, Minimum pH was 6.7.
- Color is a bit high, average color is approximately 30TCU.
- Average Ammonium (NH<sub>4</sub>) is approximately 0.5mg/l in wet season and approximately 0.2mg/l in dry season. However Ammonium (NH<sub>4</sub>) has been on the rise from 2016 and maximum was 1.81.

Followings are summary of raw water turbidity at intake of Chamcar Mon WTP during 2009-2016.

- Average Turbidity in Dry Season: 40NTU
- Average Turbidity in Wet Season: 245NTU
- Average Turbidity over 8 years: 115NTU
- Maximum Turbidity over 8 years: 1088NTU
- Minimum Turbidity over 8 years: 7NTU



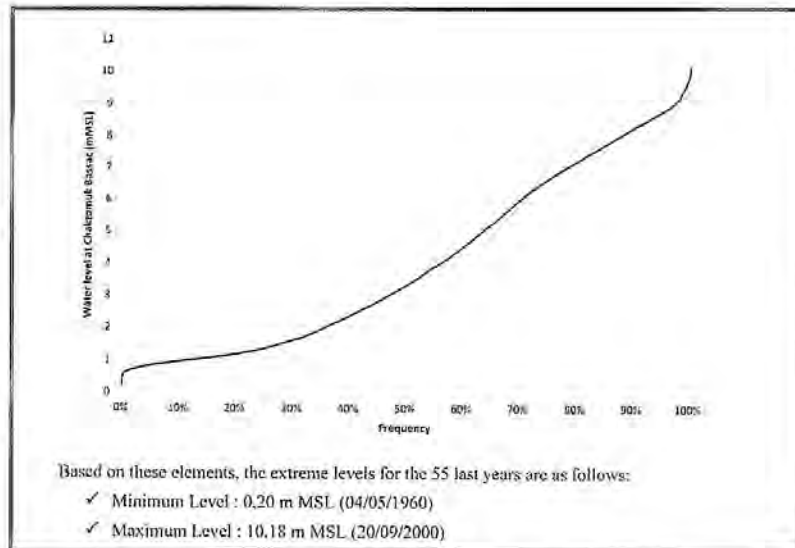
The result of monthly raw water quality analysis of March-May 2017 at intake location of Ta Khmau Site carried out under our Survey will be provided separately.

### 2.1.3. Water Level of Bassac River

rw 7



The feasibility study for expansion of Chamca Mon WTP gives minimum river water level and maximum river water level, as MSL+0.20m and MSL+10.28m respectively as shown below.



## 2.2. Output requirements

### 2.2.1. Requirement for the Facilities

#### 2.2.1.1. Requirement of Treated Water Quantity

Water Treatment Capacity of 30,000 m<sup>3</sup>/day.

#### 2.2.1.2. Required pumping head

The pumping head of the distribution pumps shall be at least 4.5 bars (0.45Mpa) based on the recommendation of the Master Plan.

#### 2.2.1.3. Laboratory for water quality test in WTP

The layout and equipment of the laboratory attached to WTP should be in accordance with ISO9001 and ISO17025. The laboratory in WTP should be equipped with enough equipment to analyze daily test items in the National Drinking Water Quality Standards.

#### 2.2.1.4. Intake Type

Intake facility shall be intake tower type.

#### 2.2.1.5. Disinfection

Disinfection shall be by On-Site Electro-Chlorination System (OSEC System).

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## 2.2.2. Requirement for the Operation

### 2.2.2.1. Requirement of Treated Water Quantity

SPC shall make best efforts to produce water 30,000-33,000m<sup>3</sup>/day and the suspension of intake should be avoided as far as possible in any case of raw water deterioration. SPC shall also request a meeting to PPWSA in case the actual production amount is varied from the production plan which shall be submitted to PPWSA in advance.

### 2.2.2.2. Requirement of Treated Water Quality

The water quality standards which SPC should meet as Annex 4 of Minutes of Discussions signed on June 28<sup>th</sup>, 2019 between PPWSA and JICA. The daily test items shall be analyzed by SPC in the laboratory attached to WTP, and quarterly and yearly test items shall be analyzed by PPWSA. Turbidity of treated water should be INTU or less. SPC would not be required to treat trihalomethane precursors and odor substances.

### 2.2.2.3. Requirement of Distribution Pressure

The water pressure shall be at least 4 bars (0.4Mpa) at off-take point (flow meter). Reasonable decline in distribution pressure is accepted if the demand exceeds 33,000 m<sup>3</sup>/day.

## 2.3. Work to be done by SPC

SPC shall work for followings.

1. Design of New WTP
  - (a) Basic Design
  - (b) Detailed Design
  - (c) Application Work for Design
  - (d) Laws and Regulations to be complied.
2. Construction of New WTP
  - (a) Civil and Equipment Works
  - (b) Plant Mechanical Work
  - (c) Plan Electrical Work
  - (d) Application Work for Construction
3. Operation and Maintenance of New WTP
  - (a) Water Quality Control
  - (b) Treated Water Volume Control in case required by PPWSA
  - (c) Monitoring and Control of Water Treatment
  - (d) Maintenance and Repair
  - (e) Procurement of Fuel, Chemical and Other Consumables
  - (f) Management of Power Receiving, Water Use and Fuel / Chemical Storage and Safety
  - (g) Cleaning

- (h) Security and Safety
- (i) Emergency Action
- 4. Hand-Over Work at the End of the O&M period
  - (a) Performance Test of WTP
  - (b) Asset Check and Evaluation

2.4. Cost to be borne by SPC.

Following cost shall be borne by SPC.

Design and Build Stage:

- (a) Head office over-head cost related to construction work

Operation Stage

- (b) Head Office over-head cost related to the operation and maintenance work
- (c) Any other cost which is not directly related with operation of the new WTP

2.5. Reporting Obligations

Following submittals shall be provided by SPC. Detail shall be provided in later stage

- (a) At the time of work commencement
  - (i) Work commencement application
  - (ii) Design, Construction and Operation Plan
  - (iii) Organization structure for the operation
- (b) Design and Build period
  - (i) Report related to construction works including progress record
  - (ii) Draft of Operation and Maintenance Manual
  - (iii) Draft of Self-monitoring Report
  - (iv) Modification and additional work confirmation report
  - (v) Commissioning reports
- (c) At the time of hand-over
  - (i) Completion report or substantial completion certificate and list of outstanding works
  - (ii) Final operation and maintenance manual
  - (iii) Final self-monitoring reports template
- (d) During operation period
  - (i) Monthly report including self-monitoring report
- (e) At the time of hand-back
  - (i) Performance check list of the facilities.
  - (ii) Remaining book value calculation and confirmation sheet.
  - (iii) Purchase agreement of SPC's facilities, if any.
  - (iv) Letter of Waiver of claims and liens and release of rights relating this project from PPWSA to SPC.
- (f) At the time of Expiration of warranty against defect period

(i) Report on Expiration of Warranty against Defect Period

### 3. Contract Terms

Draft O&M contract shall be prepared based on the following items. Draft EPC contract shall be prepared separately in accordance with JICA's standard form of contract.

	Contract Terms	Conditions
1	<b>O&amp;M period</b>	After the completion of the new WTP, the ownership of the WTP will be transferred from SPC to PPWSA, then PPWSA and SPC will agree the O&M contract for 10 years after commencement (definition is to be agreed) of O&M on the facilities owned by PPWSA.
2	<b>Production of bulk water</b>	Production of bulk water is fundamentally a responsibility of the SPC.
3	<b>Payment mechanism and price of bulk water</b>	On a separate sheet
4	<b>Repairment</b>	During O&M period, SPC may use leased facilities free of charge, however, the SPC shall be responsible for any repairment of the facilities at its own cost. SPC shall keep good conditions of the facility and equipment in accordance with PPWSA's Standard Operation Procedure (SOP).
5	<b>Conditions for the hand-back</b>	<ul style="list-style-type: none"> <li>- After the end of O&amp;M period, PPWSA has the right to be handed back the leased WTP facilities from the SPC under certain requirements (e.g. the result of the motor vibration test is within 5% of initial specification).</li> <li>- The SPC shall remove any additional facilities or equipment installed for its operation and restore the WTP to its initial condition at its own cost, if required by PPWSA.</li> <li>- PPWSA has the right to purchase any remaining inventories (e.g. raw materials) at their book value.</li> </ul>
6	<b>Private investment</b>	The SPC may invest in some additional facilities, software, or any other equipment necessary for the operations. PPWSA has the right to purchase the private investments from the SPC at their residual value (net book value) at the end of O&M period.
7	<b>Self-monitoring</b>	SPC shall monitor and report to PPWSA its operation. Monitoring requirements shall be studied.
8	<b>Operation data and financial information</b>	The SPC shall record and report all the operation data and financial information in a required format. PPWSA may utilize the data to continue operation of the WTP after hand-back.
9	<b>Early termination / compensation events</b>	<ul style="list-style-type: none"> <li>- Termination for convenience (Unilateral termination)</li> </ul> PPWSA has the right to terminate the contract early for public

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		<p>interest. In this case the SPC shall be compensated in full, for all the private investments, inventories and additional costs incurred by the termination of the contract, and opportunity costs for the equity. Opportunity costs for the equity shall be a sum of net profit for the remaining contract period based on the SPC's initial financial plan initially agreed in the contract.</p> <ul style="list-style-type: none"> <li>- Termination for default by PPWSA</li> </ul> <p>The termination condition shall be in line with the case of the termination for convenience.</p> <ul style="list-style-type: none"> <li>- Termination for default by SPC</li> </ul> <p>PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets and inventories. The value of the assets and inventories shall be net book value of the assets minus cost of damages and losses suffered by PPWSA due to the termination of the contract.</p> <ul style="list-style-type: none"> <li>- Termination for Force Majeure</li> </ul> <p>A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for 180 days. Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets and inventories. The value of the assets and inventories shall be net book value of the assets.</p>
10	<b>Invoice settlement</b>	<p>SPC shall report and charge to PPWSA by the 10<sup>th</sup> day of each month for the bulk water produced in the previous month. PPWSA shall in return review the invoice and make payment within two months after the invoice receiving date.</p> <p>Currency to be used for the invoice settlement shall be Cambodian Riel.</p>
11	<b>Staff Employment</b>	<p>1) PPWSA shall take over the employment contracts from the SPC at the end of O&amp;M period.</p> <p>2) PPWSA intends to dispatch about 5 staff to SPC and bear their salary. PPWSA staff shall report to SPC in daily operation.</p> <p>Relative salaries shall be subtracted from the off-take price.</p>

**Payment mechanism – Price Formula for Bulk Water Supply**

In the bidding documents, SPC shall submit EPC price, 10-year average O&M Cost(  $\alpha$  ), 10-year average fixed volume of electricity usage(  $\beta$  ), and the margin rate at bidding to calculate 10-year LCC

SPC Invoice (PPWSA payment to SPC) = (1) sales of bulk water + (2) additional services – (3) penalties

(1) Sales of bulk water = (4) volume of water delivered \* (5) unit price of bulk water

(4) volume of water delivered shall be confirmed by a volume meter just after distribution pump

(5) Unit price of bulk water =  $\alpha$  \* (6) inflation index +  $\beta$  \* (7) electricity price  
+ (8) additional production costs + (9) agreed margin for SPC

$\alpha$  is a fixed (agreed) basis for O&M costs excluding electricity defined in the contract

(6) Inflation index for the first year of O&M shall be All Item Index of Consumer Price Index published by National Institute of Statistics for the latest available month at O&M commencement divided by that for the contract month. Inflation index shall be revised based on the same methodology annually.

$\beta$  is a fixed (agreed) volume of electricity usage per m<sup>3</sup> defined in the contract

(7) Electricity price shall be the price determined in the contract between PPWSA and the electricity supplier.

(8) applies if and only if quality deterioration of raw water or change in water quality standard cause additional production costs.

(9) = agreed margin rate \* (  $\alpha$  \* (6) +  $\beta$  \* (7) + (8) )

Agreed margin rate is a fixed (agreed) rate defined in the contract

(2) Additional services include deeper analysis of water quality or site visit tour or any other services that are not included in the ordinary O&M activities defined in the contract.

(3) In case the water delivered by SPC does not comply with the drinking water standards of the WHO and national drinking water standards, PPWSA will not pay for the delivered water by SPC. In addition, SPC shall compensate for any damage (e.g. compensation to end-customers) suffered by PPWSA as a result of the such poor operation of SPC.

**Based on the Comparator facilities,  $\alpha$  is estimated KHR182/m<sup>3</sup> and  $\beta$  302Wh/m<sup>3</sup>.**

Example for the month of June 2025 (all figures are assumptions)

(1)	Sales of bulk water	= (4) * (5)	KHR395,125,200
(4)	Volume of water delivered	as delivered by SPC	900,000m3 per month
(5)	Unit price of bulk water	= $\alpha$ * (6) + $\beta$ * (7) + (8) + (9)	KHR438/m3
$\alpha$	Basis for O&M costs excluding electricity	as defined in the contract	KHR182/m3
(6)	Inflation index	= 200.05 for Jan 2025 / 176.02 for Jan 2021 at the time of contract (All item CPI from monthly report by the National Institute of Statistics)	1.13
$\beta$	Volume of electricity usage per m3	as defined in the contract	302Wh/m3
(7)	Electricity price	Electricity price for June 2025	KHR584/kWh
(8)	Additional production costs	Not applicable	0
(9)	Required margin	= ( $\alpha$ * (6) + $\beta$ * (7) + (8)) * 15% 15% as defined in the contract	KHR57/m3
(2)	Additional services	Work shop program requested by PPWSA	KHR4,000,000
(3)	Compensation	Not applicable	0
	SPC Invoice	= (1) + (2) + (9)	KHR399,125,200



		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
<b>Plant consumption</b>											
Annual production	m3	15,903,000	15,903,000	15,903,000	15,903,000	15,903,000	15,903,000	15,903,000	15,903,000	15,903,000	15,903,000
FX rate	¥/JPY	307	357	367	367	367	367	367	367	367	367
Efficiency rate	%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Efficiency ratio	%	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Efficiency price	¥/m3	584	584	584	584	584	584	584	584	584	584
Discount rate	%	4.5%									
<b>Electricity</b>											
EPC price	¥/kWh	1,800,000									
<b>Consumption (excl. initial effect)</b>											
Electricity	kWh	261.2	261.2	261.2	261.2	261.2	261.2	261.2	261.2	261.2	261.2
Wastewater	m3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3
Chemical	kg	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Others	kg	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
<b>Total</b>		<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>	<b>491.3</b>
<b>Consumption</b>											
Initial	¥/m3	1,412,312	1,412,312	1,412,312	1,412,312	1,412,312	1,412,312	1,412,312	1,412,312	1,412,312	1,412,312
Treatment	¥/m3	64,459	64,459	64,459	64,459	64,459	64,459	64,459	64,459	64,459	64,459
Chemical	¥/m3	30,368	30,368	30,368	30,368	30,368	30,368	30,368	30,368	30,368	30,368
Distribution	¥/m3	1,742,240	1,742,240	1,742,240	1,742,240	1,742,240	1,742,240	1,742,240	1,742,240	1,742,240	1,742,240
Others	¥/m3	27,133	27,133	27,133	27,133	27,133	27,133	27,133	27,133	27,133	27,133
<b>Total</b>		<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>	<b>3,281,512</b>
per m3	¥/m3	302	302	302	302	302	302	302	302	302	302
<b>Total cost</b>	¥/m3	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>	<b>1,832,210</b>
per m3	¥/m3	176	176	176	176	176	176	176	176	176	176
% of total cost	%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
<b>Personnel</b>											
Total employees	persons	95	95	95	95	95	95	95	95	95	95
CEO	persons	1	1	1	1	1	1	1	1	1	1
GM & technical training advisor	persons	1	1	1	1	1	1	1	1	1	1
Chief manager	persons	1	1	1	1	1	1	1	1	1	1
Facility manager	persons	1	1	1	1	1	1	1	1	1	1
Quality manager	persons	1	1	1	1	1	1	1	1	1	1
Administrative staff	persons	3	3	3	3	3	3	3	3	3	3
M&E Engineer	persons	1	1	1	1	1	1	1	1	1	1
Operating staff	persons	6	6	6	6	6	6	6	6	6	6
<b>Total</b>	persons	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>
<b>Salaries (excl. initial effect)</b>											
CEO	¥/m3	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092
GM & technical training advisor	¥/m3	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092	724,092
Chief manager	¥/m3	90,221	90,221	90,221	90,221	90,221	90,221	90,221	90,221	90,221	90,221
Facility manager	¥/m3	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634
Quality manager	¥/m3	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634	47,634
Administrative staff	¥/m3	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047
M&E Engineer	¥/m3	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047
Operating staff	¥/m3	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047	35,047
<b>Total</b>		<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>	<b>1,206,649</b>
per m3	¥/m3	112	112	112	112	112	112	112	112	112	112
% of total cost	%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
<b>Unit consumption</b>											
PAC	g/m3	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Chlorine	g/m3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
<b>Unit price (excl. initial effect)</b>											
PAC	¥/kg	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137
Chlorine	¥/kg	2,288	2,288	2,288	2,288	2,288	2,288	2,288	2,288	2,288	2,288
<b>Total</b>		<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>	<b>342,517</b>
per m3	¥/m3	23	23	23	23	23	23	23	23	23	23
% of total cost	%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
<b>Electricity (excl. initial effect)</b>											
Machinery	¥/kWh	108,614	108,614	108,614	108,614	108,614	108,614	108,614	108,614	108,614	108,614
Electrical equipment	¥/kWh	72,409	72,409	72,409	72,409	72,409	72,409	72,409	72,409	72,409	72,409
<b>Total</b>		<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>	<b>181,023</b>
per m3	¥/m3	17	17	17	17	17	17	17	17	17	17
% of total cost	%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
<b>Other (excl. initial effect)</b>											
Employee basic security	¥/m3	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720
Transportation	¥/m3	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723
Office keeping	¥/m3	43,446	43,446	43,446	43,446	43,446	43,446	43,446	43,446	43,446	43,446
Accounting audit / legal services	¥/m3	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723	21,723
Other operating costs	¥/m3	9,361	9,361	9,361	9,361	9,361	9,361	9,361	9,361	9,361	9,361
VAT/expense tax	¥/m3	18,524	18,524	18,524	18,524	18,524	18,524	18,524	18,524	18,524	18,524
<b>Total</b>		<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>	<b>129,997</b>
per m3	¥/m3	8	8	8	8	8	8	8	8	8	8
% of total cost	%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
<b>O&amp;M cost excl. electricity (excl. initial effect)</b>											
O&M cost excl. electricity per m3 production (excl. initial effect)	¥/m3	199	199	199	199	199	199	199	199	199	199
Electricity cost per m3 production	¥/m3	176	176	176	176	176	176	176	176	176	176
<b>Total unit cost of m3 production</b>	¥/m3	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>	<b>375</b>
Total unit cost of m3 production (excl. initial effect)	¥/m3	346	346	346	346	346	346	346	346	346	346
<b>10 year total O&amp;M cost excl. electricity</b>											
10 year total production	m3	159,030,000									
10 year average O&M cost excl. electricity excl. initial effect	¥/m3	182									
10 year average consumption of electricity per m3 production	¥/m3	302									
<b>Electricity (excl. initial effect)</b>											
EPC	¥/kWh	1,800,000									
Operating range	%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
Electricity payment	¥/kWh	4,783,364	4,783,364	4,783,364	4,783,364	4,783,364	4,783,364	4,783,364	4,783,364	4,783,364	4,783,364
<b>TOTAL</b>	¥/kWh	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>	<b>6,583,364</b>
<b>10 year lifecycle cost to PPRSA (NPV)</b>											
Unit Price of bulk water	¥/m3	422	422	445	453	460	468	476	484	493	501



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ACCELERATING SELF-SUFFICIENCY & PROSPERITY

**DOCUMENT NO.3 SOLAR POWER  
TA KHMAU WATER PURIFICATION PLANT**

Analysis of Private Investment for Solar Panel



## Decision making is required for Solar Power Investment

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- ❑ The solar power facilities cannot be covered by the Grant as the Grant budget is limited.
- ❑ PPWSA needs to decide whether to install the solar power facilities at its own investment or SPC' private investment.
- ❑ If the solar power facilities should be installed,
  - PPWSA shall discuss, negotiate, and agree with SPC at its own risk apart from this Grant scheme because private investment must be separated from the Grant component.
  - The Consultants shall prepare the requirements for the WTP to be consistent with the solar power installation.
- ❑ Given that the electricity price in Cambodia is relatively high @720KHR/kWh and Electricity price cut is expected in the near future, scenario analysis is provided on the next page for PPWSA's investment decision.

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## Scenario Analysis for Solar Power Investment

Assumptions		
Capacity	kW	146
Efficiency coefficient		8
Electricity generation	kWh/year	319,740
Initial capital expenditure	JPY	-10,000,000
FX rate	KHR/JPY	36.2
Initial capital expenditure	000KHR	1,418,183
Depreciation method	--	Straight line
Lifetime	years	17

Economic analysis tells us that solar panel investment is worth to do, even the electricity price goes down to KHR400/kWh.  
 If it goes down below KHR300/kWh from the first year of this project period, it is not worth to invest.

Case 1		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17		
Electricity price	KHR/kWh		720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	
Electricity value	000KHR		230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	
Depreciation	000KHR		85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	
Net profit	000KHR	0	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	145,026	
Cash in/out	000KHR	-1,418,183	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	230,213	
Internal Rate of Return	%																			14.2%	
NPV at 4.5%	000KHR																				1,193,285

Case 2		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17		
Electricity price	KHR/kWh		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	
Electricity value	000KHR		127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	
Depreciation	000KHR		85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	
Net profit	000KHR	0	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	42,709	
Cash in/out	000KHR	-1,418,183	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	127,896	
Internal Rate of Return	%																				4.9%
NPV at 4.5%	000KHR																				47,005

Case 3		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17		
Electricity price	KHR/kWh		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	
Electricity value	000KHR		95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	
Depreciation	000KHR		85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	85,187	
Net profit	000KHR	0	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	10,735	
Cash in/out	000KHR	-1,418,183	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	95,922	
Internal Rate of Return	%																				1.4%
NPV at 4.5%	000KHR																				-111,703

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For reference: Electricity price at other Asian Countries

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- ❑ Actual Electricity cost in Phnom Penh Cambodia is 720KHR/kWh (USD 0.18)
- ❑ Electricity Price in nearby countries are as follows (June 2018 from Global PetrolPrices.com)

<u>Country</u>	<u>USD/kWh</u>
• Myanmar	0.02
• Malaysia	0.06
• Vietnam	0.07
• China	0.08
• Taiwan	0.08
• Thailand	0.12
• Hong Kong	0.14
• Singapore	0.16
• Cambodia	0.18
• Philippines	0.19
• Japan	0.27



Electricity Cost in Cambodia is relatively expensive comparing other nearby countries.  
Cost reduction is expected near future.  
Thailand level is USD 0.12/kWh, (480KHR/kWh)  
Malaysian level is USD 0.06/kWh, (240KHR/kWh)

Table 5-1: Urban water system parameters

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
		Unit	Permissible limite			A	B	C
			National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
<b>Microbial</b>								
	E.Coli or thermoteloerant	CFU or MPN / 100 ml	0	0			B	
<b>Chemical</b>								
	Aluminium (Al)	mg/l	0.2	0.2	in the case that alum is used		B	
	Ammonia (NH <sub>3</sub> )	mg/l	1.5	1.5			B	
	Arsenic (As)	mg/l	0.05	0.05	for the case of groundwater source			C
	Barium (Ba)	mg/l	0.7	0.7				C
	Cadmium (Cd)	mg/l	0.003	0.003				C
	Chloride (Cl <sup>-</sup> )	mg/l	250	250			B	
●	Chlorine Cl <sub>2</sub> * (free residual)	mg/l	0.1-1.0	0.1-1.0	for the case of using chlorine for disinfectant	A		
	Chromium (Cr)	mg/l	0.05	0.05				C



Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter		Exception	Formal Monitoring Examination level			
		Unit	Permissible limits		A	B	C	
			National Drinking water Standard		Requirement for Ta Khmau WTP	Daily	Quarterly	Annually
	Copper (Cu)	mg/l	1	1			C	
	Fluoride (F)	mg/l	1.5	1.5			C	
	Total hardness as CaCO <sub>3</sub>	mg/l	300	300	For the case of groundwater source	B		
	Iron (Fe)	mg/l	0.3	0.3	case of groundwater	B		
	Lead (Pb)	mg/l	0.01	0.01			C	
	Manganese (Mn)	mg/l	0.1	0.1	case of groundwater	B		
	Mercury (Hg)	mg/l	0.001	0.001			C	
	Nitrate (NO <sub>3</sub> <sup>-</sup> )	mg/l	50	50		B		
	Nitrite (NO <sub>2</sub> <sup>-</sup> )	mg/l	3	3		B		
	Sodium (Na)	mg/l	250	250	case at coastal areas		C	
	Sulfate ion (SO <sub>4</sub> <sup>2-</sup> )	mg/l	250	250		B		
	Zinc (Zn)	mg/l	3	3			C	

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
		Unit	Permissible limits			A	B	C
			National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
<i>Physical</i>								
●	Colour	TCU	5	5		A		
●	pH	n/a	6.5-8.5	6.5-8.5		A		
●	TDS or Conductivity	mg/l or $\mu$ S/cm	800 or 1600	800 or 1600		A		
●	Turbidity	NTU	5	1		A		
●	Taste and Odour	-	Acceptable	Acceptable		A		

\*Residual chlorine must be daily analysed in production system and fortnightly (two weeks) at end points of networks (water supply system with more than 3001 connections). The number of samples is dependent on situations of end points of networks of each unit or service provider. We can analyse thermotolerant coliform bacteria for E Coli.

\*\*Conductivity is an acceptable alternative to TDS. The above limits assume that Conductivity is twice TDS, but this relationship should be confirmed at each site if conductivity is used.

\*\*\* Whether the analysis of taste and odour by operators is acceptable depends on users.

**Source: National Drinking Water Quality Standard (MIH)**



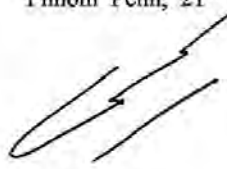
**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Expansion of the Water Supply System in Ta Khmau**  
**(Explanation on Draft Preparatory Survey Report)**

With reference to the minutes of discussions signed between Phnom Penh Water Supply Authority (hereinafter referred to as "PPWSA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 29<sup>th</sup> March, 2019 and 28<sup>th</sup> June, 2019, and in response to the request from the Government of Cambodia dated 8<sup>th</sup> August 2017, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Expansion of the Water Supply System in Ta Khmau (hereinafter referred to as "the Project").

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

Phnom Penh, 21<sup>st</sup> November, 2019

  
\_\_\_\_\_  
Dr. Shigeyuki Matsumoto  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

  
\_\_\_\_\_  
H.E. Dr. Sim Sitha §  
Director General  
Phnom Penh Water Supply Authority (PPWSA)  
Kingdom of Cambodia

## ATTACHEMENT

### 1. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau”. However, PPWSA suggested that the spelling of “Ta Khmau” should be changed to “Ta Khmao” in accordance with the official website of Cambodian Government in the later stage. The Team agreed with it and would take necessary procedure to officially revise the spelling of the title in the later stage.

### 2. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Cambodian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Cambodian side around March 2020.

### 3. Cost estimate

Both sides confirmed that the cost estimate including the contingency explained by the Team 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 estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

### 5. Timeline for the project implementation

The Team explained to the Cambodian side that the expected timeline for the project implementation is as attached in Annex 1.

### 6. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Cambodian side will be responsible for the achievement of agreed key indicators targeted in year 2026 and shall monitor the progress based on those indicators.

[Quantitative indicators]

Indicator	Baseline Data (Year 2015)	Target (Year 2026) 【3 years after completion of the new facilities】
daily average water supply amount (m <sup>3</sup> /day)	11,440	30,000

[Qualitative indicators]

- Improving the water quantity and water pressure from tap
- Improving public health
- Increasing house connections for poor households
- Maintaining affordable water tariff for poor households
- Enhancing PPWSA's O&M capacity of WTP by technical transfer
- Creating a good example of O&M of WTP by SPC in Cambodia

7. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 2. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2) 5 of Annex 2, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by PPWSA during the implementation stage of the Project.

The Cambodian side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level.

Both sides confirmed that the area in the Niroth WTP and PPWSA's land in Kampong Samnanh Village in Ta Khmau city shall be provided during the EPC period for the stock yard free of charge as stipulated in (2)13 of Annex 2.

Both sides confirmed that PPWSA would be in charge of sludge disposal from the sludge basin as stipulated in (3)5 of Annex 2.

Both sides also confirmed that the Annex 2 will be used as an attachment of G/A.

8. Monitoring during the implementation

The Project will be monitored by PPWSA and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 3. The timing of submission of the PMR is described in Annex 2.

9. Project completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the Grant. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

10. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Cambodian side is required to provide necessary support for the data collection.

11. Environmental and Social Considerations

11-1. General Issues

11-1-1. Environmental Guidelines and Environmental Category

The Team 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 sensitive characteristics, nor falls into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

11-1-2. 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 4. 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.

11-2. Environmental Issues

11-2-1. Initial Environmental Impact Assessment (IEIA)

Both sides confirmed the IEIA report will be approved by Ministry of Environment in January, 2020. The Team requested that the IEIA report would be approved before Cabinet approval by the government of Japan in February.

#### 11-2-2. 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 5, respectively. Both sides 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.

#### 11-3. Environmental and Social Monitoring

##### 11-3-1. 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 6. The timing of submission of the monitoring form is described in Annex 2.

##### 11-3-2. Information Disclosure of Monitoring Results

Both sides confirmed that the Cambodian side will disclose results of environmental and social monitoring to local stakeholders through their website / in their field offices.

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 6 on its website.

#### 12. Other Relevant Issues

##### **Project Outline**

##### 12-1. Outline of the Comparator Facility

The Team explained final version of comparator facilities as Annex 7. The location of bulk water in the Ta Khumau WTP treatment process is added to the final version. PPWSA understood it.

##### 12-2. Emergency Response against Unexpected Raw Water Quality

The Team explained emergency response of the following two cases.

- a) In case turbidity becomes higher than 1000NTU, intake amount shall follow PPWSA's instruction as same as other PPWSA's treatment plants.
- b) In case serious issue (such as toxic substance or oil discharge) happens, SPC can autonomously reduce or stop intake operation to avoid serious damage on WTP facilities and contaminated water supply to customers, and report to and discuss with PPWSA as soon as possible.

If above restricted intake conditions continue until remaining water in the service reservoir is empty, both parties do not have responsibilities to suspend water supply.

PPWSA agreed those suggestions.

#### 12-3. Responsibility of Damage of the Existing Elevated Tank

Both sides confirmed that EPC contractor/SPC would have responsibility against any damage on existing elevated tank due to EPC contractor/SPC's fault and PPWSA would have responsibility against aged deterioration. Before construction commences, both EPC contractor and PPWSA will evaluate the condition of the existing elevated tank.

#### 12-4. Risk Allocation of Strengthening of Sludge Treatment Regulation

Both sides confirmed that the risk of strengthening of sludge treatment regulation was categorized in legal risk (change of project specific law) described in Annex 8, and necessary cost for additional facility and treatment to meet strengthened regulation would be borne by PPWSA. In case PPWSA outsource the task such as facility planning and additional O&M to SPC, PPWSA additionally needs to pay appropriate outsourcing fee to SPC.

#### 12-5. Disinfection Method

Both sides confirmed that on-site chlorination system for disinfection method shall be included for requirements in the bidding documents.

### **Requirements**

#### 12-6. Items of Requirements

Both sides confirmed the following items shall be included for requirements in the bidding documents at this time and requirements would be finalized in the later stage.

- WTP capacity of nominal 30,000m<sup>3</sup>/day
- 10 years O&M period
- Intake tower type
- On-site chlorination system
- Volume of service reservoir of 5,000 m<sup>3</sup> or more
- Pressure of 4 bar at off-take point
- 24 hours supply
- Water quality standards described in Annex 12
- O&M manual in both Khmer Language and English
- Prevention against adhesion of shell inside raw water transmission pipe
- 5 % of production loss ratio from intake to the bulk meter
- prevention of oil inflow into the WTP

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### **Contract Terms**

#### 12-7. Insurance for WTP

The Team explained that Japanese companies requested to add insurance cost for WTP on off-take price to lower the hurdle to participate in the Project, because they operate PPWSA's asset so that there is possibility for them to accept liability for damages to the facilities or the third party.

The Team also explained options for this request with reference to Annex 9.

PPWSA explained that it has responsibility to cover asset insurance. Both sides agreed that insurance other than PPWSA's coverage can be included in off-take price in case initial off-take price is less than or equal to 500KHR/m<sup>3</sup>, and social insurance for the staff dispatched from PPWSA will be covered by PPWSA.

#### 12-8. Third party monitoring during O&M

PPWSA explained that third party monitoring would not be necessary during O&M period in the previous meeting. However, the Team explained that any monitoring would not be included in consultant service by Grant during O&M and suggested third party monitoring to assure good condition of WTP. PPWSA took note of it.

#### 12-9. Chemical Procurement

Both sides confirmed that the necessary amount of chemical for O&M by SPC could be procured by PPWSA at the same price as PPWSA's. PPWSA explained that the procurement planning starts in September every year, so SPC should submit necessary amount of chemical for one year consumption by September and follow PPWSA's specification. The Team took note of it.

#### 12-10. Frequency of Revision for the Unit Price of Bulk Water

The Team suggested that the frequency of revision of off-take price would be basically yearly base to mitigate inflation risk and electricity price variation risk on SPC in accordance with the risk category both sides had previously agreed. PPWSA explained that Board of Director and Ministry of Economy and Finance cannot accept yearly variable off-take price because water tariff cannot be revised in accordance with inflation rate. PPWSA suggested every three years or more for recalculation of off-take price.

Both sides agreed that initial off-take price shall be less than or equal to 500KHR/m<sup>3</sup> and that off-take price should be reviewed and adjusted at the end of third year, sixth year and ninth year from the effective date of O&M period. Both sides agreed such revision and



adjustment should be in accordance with the formula described in Annex 8. The off-take price shall be revised only when the value calculated by the formula exceeds the previously-agreed off-take price. When the value calculated based on the formula exceeds 500KHR/m<sup>3</sup>, SPC should verify the cost structure based on inflation rate and electricity cost.

#### 12-11. Contract Structure

The Team explained two options of contract structure for the Project described in Annex 10 and JICA decided Consortium for EPC+ local SPC for O&M would be more feasible for the Project with following reasons.

- It may take time to establish local SPC , register tax exemption and implement other necessary procedure to start the activity of local SPC. This might cause the miss of the critical pass of intake construction which should be commenced in November, 2021 . And, it leads to the delay of the Project.
- Japanese companies which attended the project briefing session expressed the concern about above situation. This may cause no applicants for the Project.

Both sides agreed that Consortium for EPC+ local SPC for O&M would be selected for the Project.

#### 12-12. Dispute Settlement during O&M

The Team proposed dispute settlement during O&M described in Annex 11. PPWSA took note of it. Both sides confirmed this would be finally decided through contract negotiation between PPWSA and SPC.

#### 12-13. Payment Currency

The Team explained that some Japanese companies expressed their preference for the payment in US dollar. PPWSA explained only Khmer Riel can be applied for the payment to SPC, because water tariff is paid by KHR and most of expenses of SPC is also paid in KHR in accordance with Cambodian Procurement Law.

#### 12-14. Contract Terms

The Team explained the latest version of contract terms described in Annex 8. Following items have been revised from the previous version.

- Emergency response against unexpected raw water quality
- Timeline for the project implementation
- Invoice settlement (mentioned below)





• Requirements for the Operation

12-15. Invoice settlement

Deadline of payment from PPWSA to SPC was tentatively decided within two months after the invoice receiving day in the previous meeting.

The Team suggested 30 days as a deadline in consideration with the opinion from Japanese companies in order to maintain sound cash flow. PPWSA agreed with it.

**Others**

12-16. Report to the Board of Directors of PPWSA

The Team requested PPWSA to report to the Board of Directors about the result of the Preparatory Survey especially the project scheme of Grant Aid with O&M, off-take price based on the comparator facility and bidding system in December, 2019, because the Japanese side would enter into the formal appraisal process at the government level. Both sides confirmed PPWSA would report to the Board of Directors on 5<sup>th</sup> December, 2019.

Annex 1 Project Implementation Schedule

Annex 2 Major Undertakings to be taken by the Cambodian side

Annex 3 Project Monitoring Report

Annex 4 Environmental Check List

Annex 5 Environmental Management Plan

Annex 6 Environmental Monitoring Form

Annex 7 Outline Design

Annex 8 Term Sheet

Annex 9 Insurance and limited equity contribution

Annex 10 Contract structure

Annex 11 Dispute Settlement

Annex 12 Water quality monitoring items



## Major Undertakings to be taken by the Royal Government of Cambodia

**1. Specific obligations of the Royal Government of Cambodia which will not be funded with the Grant****(1) Before the Bidding**

No	Items	Deadline	In charge	Estimated Cost (USD)	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A	PPWSA	-	
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract(s)	PPWSA	-	
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	PPWSA/ NBC	50	
	2) Payment commission for A/P	every payment	PPWSA/ NBC	1,500	
4	To approve IEIA/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation.	within 1 month after the signing of the G/A	PPWSA	-	
5	To notice the construction of the intake facility in the Bassac River to local authorities.	before notice of the bidding document(s)	PPWSA	-	
6	To secure, clear, level and reclaim the following lands/sites * 1) Site for Ta Khmau WTP	before notice of the bidding document(s)	PPWSA	-	
7	To explore landmines and UXO at construction site	before notice of the bidding document(s)	PPWSA	25,000	
8	To obtain water right for intake from the Bassac River from MOWRAM	before notice of the bidding document(s)	PPWSA	-	
9	To demolish and transfer the existing tariff collection office	before notice of the bidding document(s)	PPWSA	61,000	

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

NBC: National Bank of Cambodia

## (2) During the Project Implementation (during EPC)

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)	PPWSA	-	
2	To bear the following commissions to a bank in 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(s)	PPWSA/ NBC	600(in total)	
	2) Payment commission for A/P	every payment	PPWSA/ NBC	30,000(in total)	
3	to ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	PPWSA	-	
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into Cambodia and stay therein for the performance of their work	during the Project	PPWSA	-	
5	To ensure that customs duties, VAT, internal taxes and other fiscal levies which may be imposed on prime contractors and subcontractors in Cambodia 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	MEF	-	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	PPWSA	-	
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	PPWSA		
8	1) To submit Project Monitoring Report	every month	PPWSA	-	
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	PPWSA	-	
9	To submit a report concerning completion of the Project	within six months after completion of the Project	PPWSA	-	
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		PPWSA	-	
	1) Electricity Construction of utility poles and wiring work including conduit from the power receiving point to the transformer, procedures for receiving power, and procedures for receiving two lines.	before start of the construction		5,000	
	2) Drainage The city drainage main ( for storm, sewer and others ) to the site	before start of the construction			

11	To take necessary measure for safety of construction - Coordination with the police for traffic control - Coordination with relevant authority to ensure the safety of boats and ships in relation to the construction of intake facility	during the construction	PPWSA	-	
12	To implement EMP and EMoP	during the construction	PPWSA	31,250	
13	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	PPWSA	-	
14	To provide sufficient space in Niroth WTP and PPWSA's land in Kampong Samnang Village in Ta Khmau city as a stockyard and office space for free of charge	during the construction	PPWSA	-	

(3) During O&M

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	PPWSA		
2	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 PPWSA and JICA.	for three years after the commissioning	PPWSA		
3	To extend distribution network and facilitate the service connections.	for the O&M period	PPWSA		
4	To comply strictly with the O&M contract	for the O&M period	PPWSA		
5	To extract sludge from WTP and dispose it	for the O&M period	PPWSA		

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**Project Monitoring Report**  
**on**  
**the Project for Expansion of Water Supply System in Ta Khmau**  
**Grant Agreement No. XXXXXXXX**  
20XX, Month

**Organizational Information**

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

**General Information:**

<b>Project Title</b>	<b><i>Expansion of Water Supply System in Ta Khmau</i></b>
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

(m)      20

<b>1: Project Description</b>	
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**1-1 Project Objective**

The project aims to achieve the objectives as follows; 1)Construct a water treatment plant (30,000m<sup>3</sup> / day) for water distribution to Ta Khmau City and the surrounding area; 2) Improving water supply services, and 3)Contribute to improving the living environment in Ta Khmau and Phnom Penh.

**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

The National Strategic Development Plan, issued by the Royal Government of the Kingdom of Cambodia (RGC) in 2006 and reviewed in 2008, aims to boost access to safe water in urban areas to 80% by 2015 and 100% by 2025.

Development of water supply in the country started in the mid-1990s, mainly in the capital city of Phnom Penh. JICA conducted the Study on Phnom Penh Water Supply System in 1993. With the support of the Government of Japan (hereinafter referred to as "GOJ") and other donors, water supply capacity in Phnom Penh has improved through the construction and rehabilitation of facilities and capacity building for operation and maintenance. Now, Phnom Penh has a service ratio of over 90 % for 24-hour water supply. Water supply is still inadequate in the surrounding areas because production capacity is not keeping up with the rapid increase in domestic and commercial demand. The expansion of water supply facilities is urgently needed.

Ta Khmau city is part of Kandal province and located south of Phnom Penh city. Public water had been supplied mainly from the Bassac river and wells within Ta Khmau city. At present, water is supplied directly through distribution pipes connected to the Phnom Penh system, which is operated by the Phnom Penh Water Supply Authority (hereinafter referred to as "PPWSA"). PPWSA was instructed to do so in 2004 by RGC due to the growing population and water quality problems (e.g. arsenic has been detected in multiple wells).

There are many low-income households in the area, and PPWSA takes measures to provide free connections and lower water tariffs.

**1-3 Indicators for measurement of "Effectiveness"**

<b>Quantitative indicators to measure the attainment of project objectives</b>		
Indicators	Original (Yr 2015)	Target (Yr 2027)
Daily Average Water Supply Volume	11,440 m <sup>3</sup> / day	30,000 m <sup>3</sup> /day
<b>Qualitative indicators to measure the attainment of project objectives</b>		
1. Increase of Service Ratio		
2. Expansion of Service Area		
3. Increase of Water Supply Volume		
4. Increase of Water Pressure		
5. Increase of Service Connection of LowIncome Group		

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| 6. Sustainment of Special Measurement against Low Income Group on Water Supply |
| 7. 7. Technology Transfer  |

**2: Details of the Project**

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.	Attachment 1: Map	

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1. Intake and Raw Water Transmission Facilities	- Intake Capacity : 33,000 m3/day - Raw Water Intake Tower - Raw Water Transmission Facility	
2. Water Treatment Facility	- Water Treatment Capacity : 30,000 m3/day - Water Treatment Facility	
3. Distribution Facilities	- Clear Water/Service Reservoir - Distribution Equipment - Bulk Meter (Count: 1)	
4. SCADA	- Central Supervisory System in the WIP	
5. Consulting Service	- Tender Assistance - Design Confirmation - Construction and Procurement Supervision - Support for O&M, and monitoring system	

Reasons for modification of scope (if any).

(PMR)

**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	
E/N	Mar 2020		
G/A	Mar 2020		
PQ Announcement	May 2020		
Tender Announcement	July 2020		
Signing of Contract	Mar. 2021		
Completion of EPC	Dec 2023		
Defect Liability Date	Dec 2024		

mw ss



Completion of O&M	Dec 2033		
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Reasons for any changes of the schedule, and their effects on the project (if any)

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- 2-4 Obligations by the Recipient**
  - 2-4-1 Progress of Specific Obligations**  
See Attachment 2.
  - 2-4-2 Activities**  
See Attachment 3.
  - 2-4-3 Report on RD**  
See Attachment 11.
- 2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

	Components		Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>(1),2)</sup> <i>(proposed in the outline design)</i>	Actual
EPC	1. EPC			
Consulting Service	EPC Supervision			
Contingencies				
Total				

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

**2-5-2 Cost borne by the Recipient**

	Components		Cost (1,000 KHR)		Cost (Million JPY)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>(1),2)</sup> <i>(proposed in the outline design)</i>	Actual	Original <sup>(1),2)</sup> <i>(proposed in the outline design)</i>	Actual
Land preparation for WTP construction	1. Land preparation of WTP site		0			
	2. Relocation of tariff collection office		61,000			
Electrical Work	Cost for two-line power receiving such as procedures, construction.		5,000			
Unexploded or	Cost for		25,000			

(w)

f

mine survey	construction work for the primary side power receiving facility for water intake and WTP					
Environmental and social considerations	Expenses for investigating in advance whether there are unexploded bombs and landmines etc		31,250			
Banking fee	Environmental impact monitoring costs (2021-2024)				3.3	
			122,250		3.3	

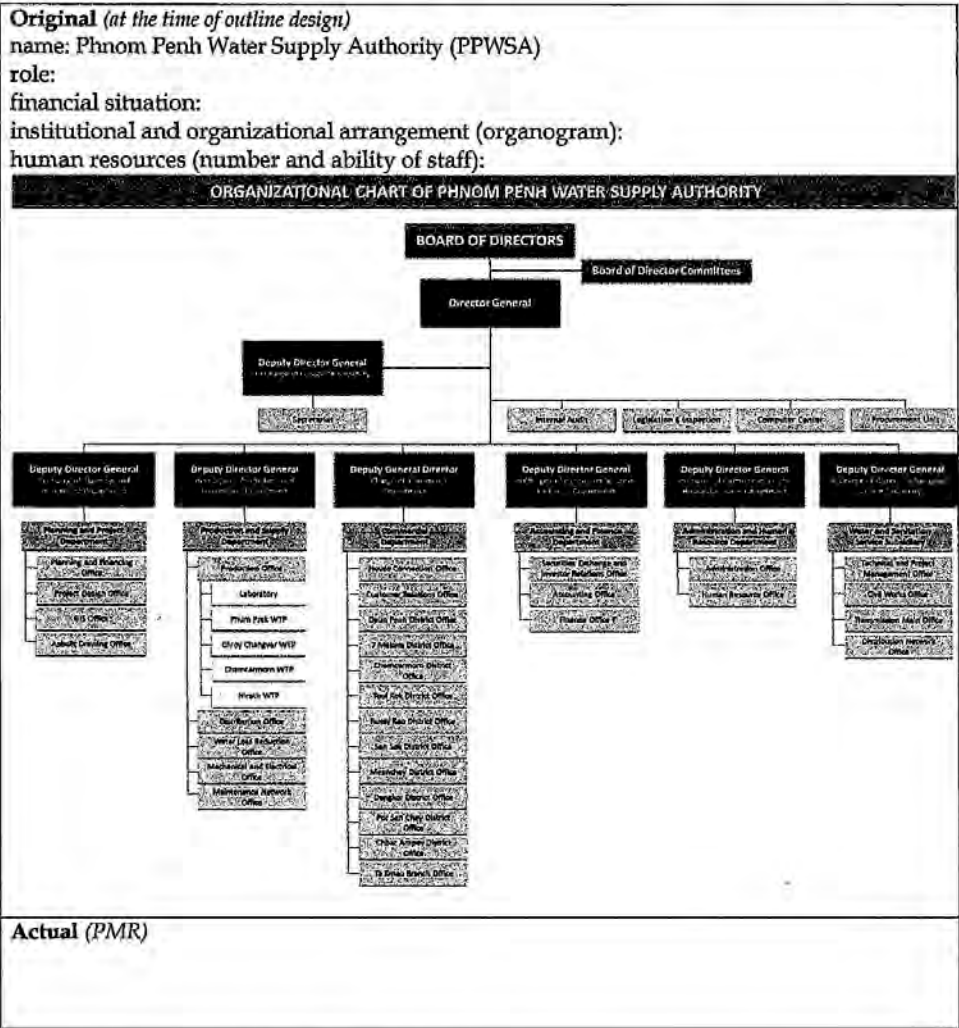
Note: 1) Date of estimation: April, 2019  
 2) Exchange rate: 1 US Dollar = 111.21, 1 KHR = 0.026 JPY

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 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.



- 2-7 Environmental and Social Impacts**
- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
  - The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
  - Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

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

- 3-1 Physical Arrangement**
- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**3-2 Budgetary Arrangement**  
 - Required O&M cost and actual budget allocation for O&M

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks** (at the time of outline design)

Potential Risks	Assessment
1. Long wet period and high river water level	Probability: High/Moderate/Low
	Impact: (High) Moderate/Low
	Analysis of Probability and Impact: It shall be unforeseen case. if construction of intake is delayed, completion of overall construction will be delayed.
	Mitigation Measures: Extension of construction period
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. Deterioration of raw water quality	Probability: High/Moderate/(Low)
	Impact: High/Moderate/Low
	Analysis of Probability and Impact: Unforeseen contents may be contained in raw water which effect to treatment process.
	Mitigation Measures: Modification of treatment process.
	Action required during the implementation stage:

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	Contingency Plan (if applicable):
3. Time takes long at commencement of works	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Approval or permission takes long time to establish entity at commencement of EPC effect overall construction period.
	Mitigation Measures:
	Extension of construction period
	Action required during the implementation stage:
	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**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 of 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. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
  8. Pictures (by JPEG style by CD-R) (PMR (final) only)
  9. Equipment List (PMR (final) only)
  10. Drawing (PMR (final) only)
  11. Report on RD (After project)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment Price (Decreased) E=C-D	Price (Increased) F=C+D
1 Item 1	●●t	●	●	●	●	●
2 Item 2	●●t	●	●	●		
3 Item 3						
4 Item 4						
5 Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1 Item 1	●	●	●			
2 Item 2						
3 Item 3						
4 Item 4						
5 Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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## Environmental Checklist

Category	Environmental Item	Main Check Items	Yes/No	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1. Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process?	Y	(a) Initial Environmental Impact Assessment (IEIA) report has been prepared and submitted to Ministry of Environment (MoE) in the end of August, 2019. (b) The IEIA report is currently under review by MoE. It is expected that MoE will issue approval letter on the IEIA report by the end of November, 2019. (c) The IEIA report is currently under review by MoE. (d) In addition to the above approvals, a permit for water intake is required. On Sep. 12, 2019, approval letter for the water extraction right was issued by Cambodia National Mekong Committee (CNMCC) signed by Chief of Committee, H.E. LIM Kean Hor (Minister of Water Resources and Meteorology). (a) Stakeholder consultation meetings were held in Derm Mien Village on June 22, 2019 and in Kandal Provincial Department of Environment (DoE) on July 18, 2019. During the meetings, the project contents and the potential impacts are explained to the local stakeholders. Understanding was obtained from the local stakeholders considering the discussion and comments collected from them during the meetings. In addition, information disclosure has been also carried out through local authorities and NGOs. (b) Local residents required to increase house connection, regular water supply, appropriate water tariff and lower price of house connection. These comments and requirements have been reflected in the project design (increasing service population from current 48,000 to 120,000, providing 24 hours water supply, providing subsidized connections and tariff for low income households). (a) Three alternative studies (without project, conventional treatment and advanced treatment) have been examined. In order to avoid land acquisition and resettlement, conventional treatment method is selected.
		(b) Have EIA reports been approved by authorities of the host country's government?	N	
		(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	N	
		(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	N	
2. Mitigation Measure	(1) Air Quality	(a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution?	N	(a) On-site sodium hypochlorite generation system with high safety will be applied. Therefore, chlorine gas will not be used in the WTP and leakage of chlorine is not expected. (b) In the on-site sodium hypochlorite generation system, the disinfectant is produced and stored in liquid form. Therefore, there is no danger of gas leaks from high-pressure chlorine cylinders. In addition, in Cambodia there are no regulations on chlorine concentrations within working environments.
		(b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards?	Y	

Category	Environmental Item	Main Check Items	Yes/No	Confirmation of Environmental Considerations (Reasons/Mitigation Measure)
(2) Water Quality	(a) Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards?	Y		(a) During construction period: Domestic wastewater generated from construction site at Ta Khmau WTP will be discharged into existing sewerage system. During operation period: Wastewater from the WTP administration building will be treated at wastewater treatment facility before being discharged into existing sewerage system. SS, BOD, COD of effluents discharged from the WTP will comply with Cambodia effluent standards to sewerage system (Sub-decree No. 27 on the Water Pollution Control; SS<120 mg/L, BOD<80 mg/L and COD<100 mg/L).
(3) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations?	N		(a) In Cambodia, there are no laws or regulations on WTP sludge disposal. During construction phase: part of construction waste soil (app. 1,000 m <sup>3</sup> ) will be reused for backfilling at construction site. The remaining waste soil (app. 1,000 m <sup>3</sup> ) will be reused for backfilling of Boeung Tompun (Isgoon, 3 km far from the WTP). During operation period: WTP sludge will be collected and transported to new landfill site by PPWSA who is conducting a detailed survey on the reuse of sludge for backfilling. In addition, the amount of the sludge is limited (app. 3 IDS/day).
(4) Noise and Vibration	(a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards?	Y		(a) During construction period: Current noise levels around the WTP are 57 to 69 dB(A). During construction, the noise level at boundary of the WTP is estimated to be 78-87 dB(A) due to construction equipment and vehicles operation, which exceeds the standard (75 dB) slightly. However, no sensitive facilities have been identified around the WTP site. In addition, EMP has been prepared and contractor will follow the EMP to minimize noise and vibration during construction period. Current vibration levels (equivalent levels) at the project area are 17 to 26 dB, which are much lower than that of Japanese standards (65 dB). Therefore, it is estimated that vibration levels during construction period will comply with Japanese standards (no vibration standards in Cambodia). During operation period: All pumps will be installed within pump stations, therefore, the noise and vibration level in outside of pump stations is considered to be same as the background level of the site.
(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	N		(a) During construction period and operation period, no groundwater will be extracted. Therefore, the impacts of subsidence are not expected.
3. Natural Environment	(1) Protected Areas	N		(a) The project sites are not located in protected area or environmentally sensitive areas designated by Cambodia laws or international treaties. In addition, all proposed treatment facilities will be located within the existing WTP site. Therefore, there is no possibility that the project will affect the protected areas.

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Category	Environmental Item	Main Check Items	Yes/No	Confirmation of Environmental Considerations (Reasons/Mitigation Measures)
	(2) Ecosystem and Biota	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	N	(a) The project site doesn't encompass primeval forests, tropical rain forests, and ecologically valuable habitats.
		(b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?	N	(b) Within the project site, there are no protected habitats of endangered species designated by Cambodia laws or international treaties and conventions.
		(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	N	(c) It is not anticipated to cause significant ecological impacts because there are no protected habitats in the area of the WTP site.
		(d) 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?	Y	(d) Raw water of 0.38 m <sup>3</sup> /s will be intaken from Bassac River, which is much less than low flow (40 m <sup>3</sup> /s) of the River. Therefore, the impacts of the project on aquatic environments of Bassac River are considered to be not significant. In addition, an approval letter has been obtained from Cambodia National Mekong Committee. PPWSA will prepare water supply plan during dry period in cooperation with MoE in order to ensure suitable environmental flow of Bassac River in the future.
4. Social Environment	(1) Resettlement	(a) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect surface water and groundwater flows?	N	(c) Compared with low flow (40 m <sup>3</sup> /s) of Bassac River, intake volume (33,000 m <sup>3</sup> /d or 0.38 m <sup>3</sup> /s) will not have significant impacts on surface water and groundwater flow. In addition, an approval letter has been obtained from Cambodia National Mekong Committee.
		(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?	N	(a) Because the considerations for avoiding resettlement are made and the WTP will be constructed within existing WTP site of PPWSA, there is no resettlement caused by the project.
		(b) Is adequate explanation on compensation and resettlement given to affected people prior to resettlement?	N	(b) For the proposed project, no resettlement will take place.
		(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?	N	(c) For the proposed project, neither resettlement nor land acquisition will take place. Therefore, preparation of resettlement plan including compensation is not needed.
		(d) Is the compensations going to be paid prior to the resettlement?	N	(d) For the proposed project, neither resettlement nor land acquisition will take place. Therefore, no compensations will be necessary for the resettlement.

Category	Environmental Item	Main Check Item	Yes/No	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(e) Is the compensation policies prepared in document?	N	(e) For the proposed project, neither resettlement nor land acquisition will take place. Therefore, preparation of compensation policies is not expected.
		(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?	N	(f) For the proposed project, there is no resettlement or land acquisition.
		(g) Are agreements with the affected people obtained prior to resettlement?	N	(g) For the proposed project, there is no resettlement and land acquisition. Therefore, it is not necessary to get agreement with the affected people.
		(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	N	(h) For the proposed project, there is no resettlement and land acquisition.
		(i) Are any plans developed to monitor the impacts of resettlement?	N	(i) For the proposed project, alternative studies have been carried out to avoid resettlement. As the results, there is no resettlement or land acquisition will be required. Therefore, it is not necessary to monitoring the impacts of resettlement.
		(j) Is the grievance redress mechanism established?	N	(j) For the proposed project, there is no resettlement or land acquisition. Thus, it is not necessary to establish grievance redress mechanism.
		(a) 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?	N	(a) All proposed facilities will be located within the existing WTP site and will not affect the living environment of the land other than the construction site. The project is expected to improve the living environment as the water supply rate increases. Fishing activity is prohibited from July 1 to November 30 each year because this is the breeding season for all kinds of fish. Therefore, the impacts of the construction on fishing activity are not expected during this period. During fishing season, the construction of the WTP may create impacts on fishing activity. However, fishing activity can be conducted at upstream or downstream (500m or more) of intake construction site. Therefore, the impacts on fishing activity are low and mitigable.
(2) Living and Livelihood		(b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses?	N	(a) Comparing with low flow (40 m <sup>3</sup> /s) of Bassac River, intake amount (33,000 m <sup>3</sup> /d or 0.38 m <sup>3</sup> /s) will not have significant impacts on the existing water uses and water area uses. In addition, an approval letter has been obtained from Cambodia National Mekong Committee.
(3) Heritage		(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	N	(a) Ta Khmau WTP site is located within existing WTP site. Thus, the impact is considered to be negligible.

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Category	Environmental Item	Main Check Items	Yes/No/Nil	Confirmation of Environmental Considerations (Reasons/Mitigation Measures)
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken? (a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	N Y Y	(a) The WTP is located within the existing WTP site, and area is small (0.45 ha). In addition, tree planting will be conducted in the WTP.  (a) There is no ethnic minority or indigenous group in the project area. In addition, water service rate will be increased up to 100%.  (b) Ditto
	(5) Ethnic Minorities and Indigenous Peoples	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	Y Y Y Y	(a) Cambodian laws and ordinances (such as Labor Law 1997 and amendment Law 2018, the Law on Social Security, Sub-Decree 11/16, on Health Care Scheme etc.) associated with working conditions (such as wage and hours of work etc.) will be followed by the project proponent during construction works and operation of the project based on Environmental Management Plan (EMP).  (b) Safety considerations will be taken during construction works and operation of the project based on the EMP prepared (such as ear protection equipment must be provided to workers when a noise level exceeds 80 dB(A) in the WTP construction site or within pump station). In addition, inspections of PPWSA and other authorities on safety will be conducted.  (c) Safety and health program and safety training for workers will be planned and implemented during construction works and operation of the project based on EMP prepared. (such as wearing safety shoes and elements during construction, following Standard Operation Procedures for the works during operation).  (d) Appropriate measures will be taken based on EMP prepared. (such as specific security guards will be assigned by contractor and PPWSA will conduct regular inspection during construction and operation)
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	Y	(a) Mitigation measures on utilization of local resources (fishing), water usage/water right, traffic control, poor households, accidents (such as safety plan preparation, O/M manual etc.), air pollution (such as covering trucks and spraying exposed areas with water etc.), water pollution, wastes (sludge reuse methods etc.), noise and vibrations (such as application of reasonable construction schedule and methods etc.) have been proposed.



Category	Environmental Item	Main Check Items	CS Y/N	Confirmation of Environmental Considerations (Reasons/Mitigation Measures)
		(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?	Y	(b) All construction works of Ta Khmau WTP will be carried out within the existing WTP site. Therefore, the impacts on the natural environment (ecosystem) will be very limited.
		(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	Y	(c) Before construction starts, information will be delivered to fisherman via commune and village chiefs in advance. A detailed traffic control plan will be prepared. In addition, proper construction schedule and methods to reduce traffic disruption and traffic accident. Education of staff/workers on the safety and fire will also be conducted to reduce impacts.
		(d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?	Y	(d) Proper construction plan of the WTP and traffic control plan will be prepared before construction.
		(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?	Y	(a) Environmental monitoring program has been prepared in the IEIA report based on the recommendations from the JICA Survey Team.
		(b) What are the items, methods and frequencies of the monitoring program?	Y	(b) The items, methods and frequencies of the monitoring program have been proposed and presented in Preparatory Survey Report. Basically, air quality (CO, NO <sub>2</sub> , SO <sub>2</sub> , O <sub>3</sub> , Pb TSP PM <sub>10</sub> and PM <sub>2.5</sub> ): time/6 months; basin water quality (pH, temperature, TDS, TSS, DC, BOD, COD, Oil and Grease, NO <sub>3</sub> , T-N, T-P, As, Hg, Total Coliform etc. 17 parameters): time/two weeks, noise and vibration: time/6 months, traffic (along National Highway 102): regularly.
	(2) Monitoring	(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	Y	(c) Monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework) has been prepared.
		(d) 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?	Y	(d) Monitoring format has been proposed.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked.	N	(a) Not necessary.

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Category	Environmental Items	Main Objectives	Yes/No/N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	Y	(b) Not necessary.

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## Environmental Management Plan

Impacts	Mitigation Measures	Implementing Organization	Responsible Organization	Cost
Before / During Construction Traffic	1) Prepare a detailed traffic control plan and to coordinate with local government. 2) Prepare proper construction schedule and methods to reduce traffic disruption and traffic accident. 3) Assign traffic control person at the entrance of the WTP while construction is taking place.	Contractor	PPWSA	Included in the construction cost
Air Pollution	1) Cover stored materials with plastic or other materials. 2) Cover trucks, and to spray exposed areas with water. 3) Wash vehicles before going out the construction site. 4) Minimize traffic over freshly exposed surfaces. 5) Install barrier walls for limiting wind dispersing if necessary. 6) Prepare air quality monitoring plan and carry out it during construction. 7) Update the Environmental Monitoring Plan during Detailed Design	Contractor	PPWSA	2,000 USD/year (Included in the construction cost)
Waste	1) Prepare reasonable plan for solid waste disposal, especially for excavated soil. 2) Install temporary toilet at the construction site for workers, and set sanitary bins for domestic wastes. 3) PPWSA has a plan to sell the surplus waste soil to buyer as backfilling materials. 4) Dispose solid wastes appropriately	Contractor	PPWSA	Included in the construction cost
Noise	1) Prepare a detailed plan for noise control and coordinate with local government. 2) Prepare proper construction schedule and methods. 3) Set speed limits for vehicles and train workers on mitigation measures for environmental impacts. 4) Use low noise level equipment, if necessary. 5) Prepare noise monitoring plan and carrying out monitoring during construction.	Contractor	PPWSA	1,000 USD/year (Included in the construction cost)
Water Pollution	1) The embankment will be constructed to prevent land erosion during the rainfall. 2) Carry out water quality monitoring. 3) Install wastewater treatment system within the WTP to treat domestic wastewater during construction and operation.	Contractor	PPWSA	1,000 USD/year (Included in the construction cost)
During Operation Air quality	1) Preparing air quality monitoring plan. 2) Implementation of air quality monitoring.	Operator	PPWSA	1,000 USD/year (Included in the O&M cost)
Waste	1) Monitoring on volume of sludge and solid wastes from the WTP. 2) Implementation of EMP for operation of the WTP.	Operator	PPWSA	Included in the O&M cost
Water pollution	1) Preparing water quality monitoring plan. 2) Implementation of water quality monitoring at downstream of the WTP.	Operator	PPWSA	2,000 USD/year (Included in the O&M cost)



**Environmental Monitoring Form (Construction Phase)**

The latest results of the below monitoring items should be submitted to JICA Cambodia Office as part of Quarterly Progress Report throughout the construction phase.

**1. Response/Actions to Comments and Guidance from Government Authorities and the Public**

Monitoring Item	Monitoring Results during Report Period
Number and contents of formal comments made by the public	
Number and contents of responses from government agencies (such as MoE etc.)	

**2. Pollution**

**2.1 Water Quality**

Parameter	Unit	Measures Value (Average)	Measures Value (Max.)	Cambodian Standards	Japanese Standards	To be met the requirements instructed by PPWSA	Measurement Point	Frequency
pH						To be confirmed		
SS	mg/L					To be confirmed		
Turbidity	mg/L					To be confirmed		
COD	mg/L					To be confirmed		
NH <sub>4</sub> -N	mg/L					To be confirmed		
Coliform	MPN/100mL					To be confirmed		
SS	mg/L			120	80	120	2 points (1 at upstream of WTP intake, 1 at downstream of the WTP intake) for intake construction	Preconstruction: 1 time/point Construction: 1 time/point
BOD	mg/L			80	40	80		
COD	mg/L			100	40	100		
							1 point (at the discharge point to existing sewerage system) for sewerage management in construction site	1 time/point/month

**2.2 Air Quality**

Parameter	Unit	Measures Value (Average)	Measures Value (Max.)	Cambodian Standards	Japanese Standards	Standards for Contract	Measurement Point	Frequency
CO				20	20	20	1 point (1 at the WTP site)	Preconstruction: 1 time/point Construction: 1 time/point
NO <sub>2</sub>	mg/m <sup>3</sup>			0.1	0.04	0.1		
SO <sub>2</sub>				0.3	0.04	0.3		

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O <sub>3</sub>				0.2	0.06	0.2	1 time/point/6 months
Pb			0.005	-		0.005	
TSP			0.33	0.1		0.33	
PM <sub>10</sub>			0.005	-		0.005	
PM <sub>2.5</sub>			0.025	0.015		0.025	

2.3 Noise and Vibration and Solid Waste

Parameter	Unit	Measures Value (Average)	Measures Value (Max.)	Waste Disposal Method	Cambodian Standards	Japanese Standards	Standards for Contract	Measurement Point	Frequency
Equivalent continuous A sound level (L <sub>aeq</sub> , 10)	dB(A)			-	75 (6:00-18:00)	70	75	2 points (1 at the WTP, 1 at western boundary of the WTP)	Preconstruction: 1 time/point Construction: 1 time/point/6 months
Vibration level (L <sub>v</sub> 10)	dB(A)			-	-	65 (8:00-19:00)	65	2 points (1 at the WTP, 1 at western boundary of the WTP)	Preconstruction: 1 time/point Construction: 1 time/point/6 months
Volume of wastes (waste soil)	m <sup>3</sup>				-	-	-	2 points (1 at Gate of the WTP, 1 at Boeung Tompun Lagoon)	1 time (24 hr)/month
Volume of wastes (other construction wastes)	m <sup>3</sup>				-	-	-	2 points (1 at Gate of the WTP, 1 at existing Dangkor landfill site by 2021 or new landfill sit after 2021)	1 time (24 hr)/month

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**Environmental Monitoring Form (Operation Phase)**

**3.1 Water Quality**

Parameter	Unit	Measures Value (Average)	Measures Value (Max.)	Cambodian Standards	Japanese Standards	Standards for Contract	Measurement Point	Frequency
SS	mg/L			120	80	120	1 point (at the discharge point to existing sewerage system)	1 time/point/month
BOD	mg/L			80	40	80		
COD	mg/L			100	40	100		

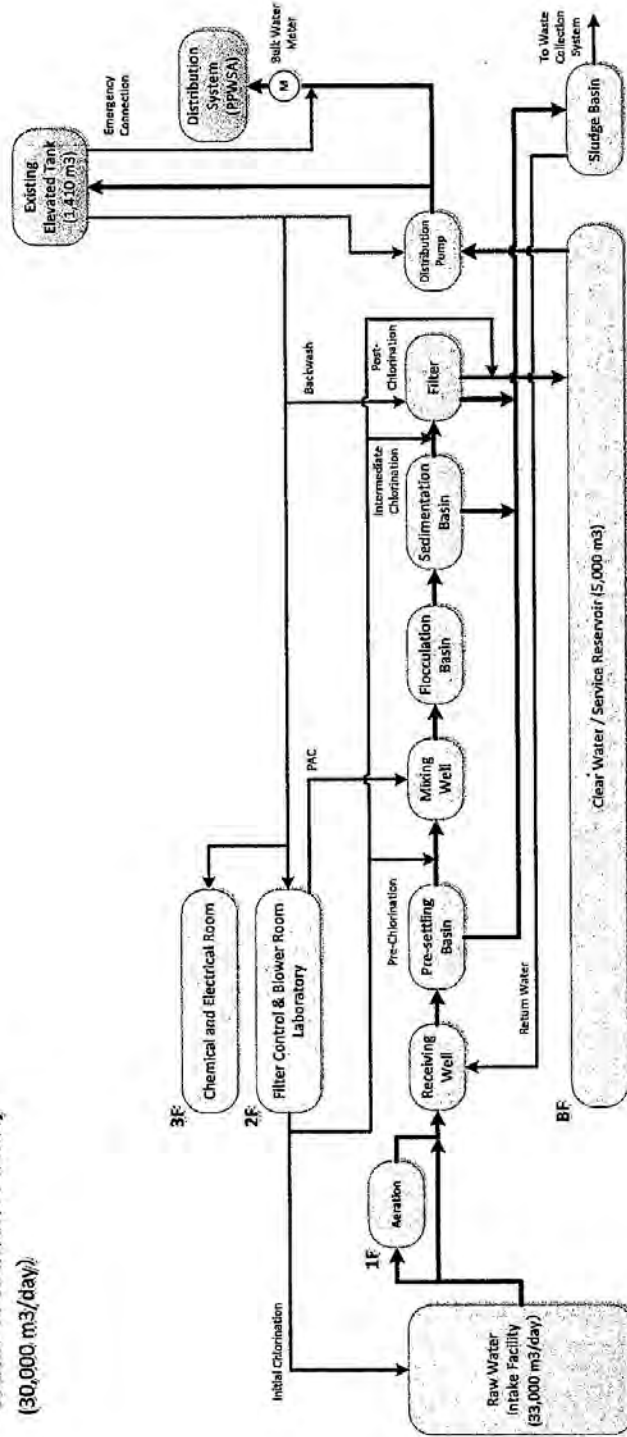
**3.2 Air Quality**

Parameter	Unit	Measures Value (Average)	Measures Value (Max.)	Cambodian Standards	Japanese Standards	Standards for Contract	Measurement Point	Frequency
CO	mg/m <sup>3</sup>			20	20	20	1 point (1 at the WTP site)	Preconstruction 1 time/point Construction: 1 time/point/6 months
NO <sub>2</sub>				0.1	0.04	0.1		
SO <sub>2</sub>				0.3	0.04	0.3		
O <sub>3</sub>				0.2	0.06	0.2		
Pb				0.005	-	0.005		
TSP				0.33	0.1	0.33		
PM <sub>10</sub>				0.005	-	0.005		
PM <sub>2.5</sub>			0.025	0.015	0.025			

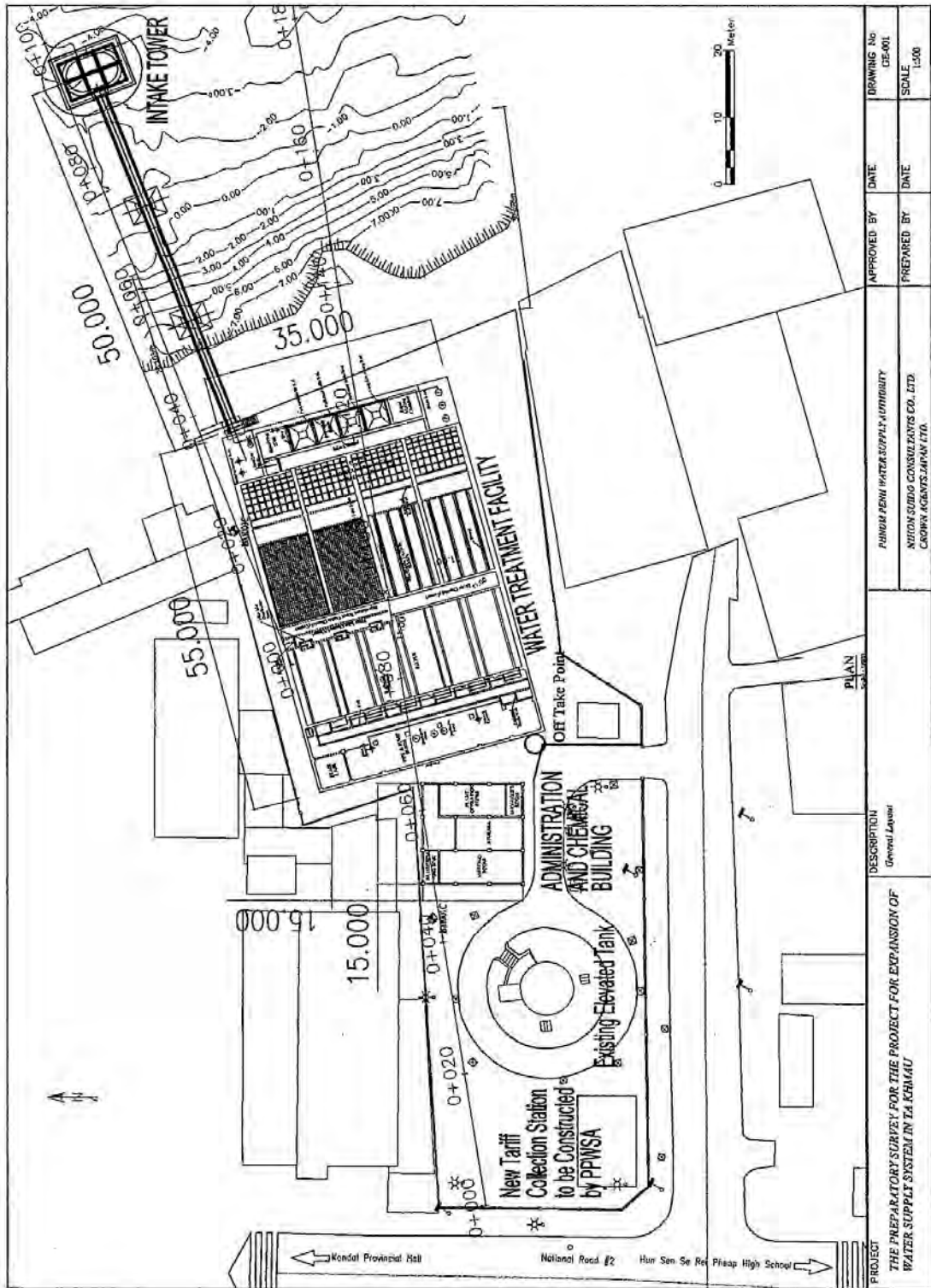
**3.3 Solid Waste**

Parameter	Unit	Measures Value (Average)	Measures Value (Max.)	Sludge Disposal Method	Cambodian Standards	Standards for Contract	Measurement Point	Frequency
Volume of sludge	m <sup>3</sup>			[1] Landfill [2] Reuse for backfilling [3] Other			2 points (1 at Gate of the WTP, 1 at new landfill site or reuse site)	1 time (24 hr)/6 months

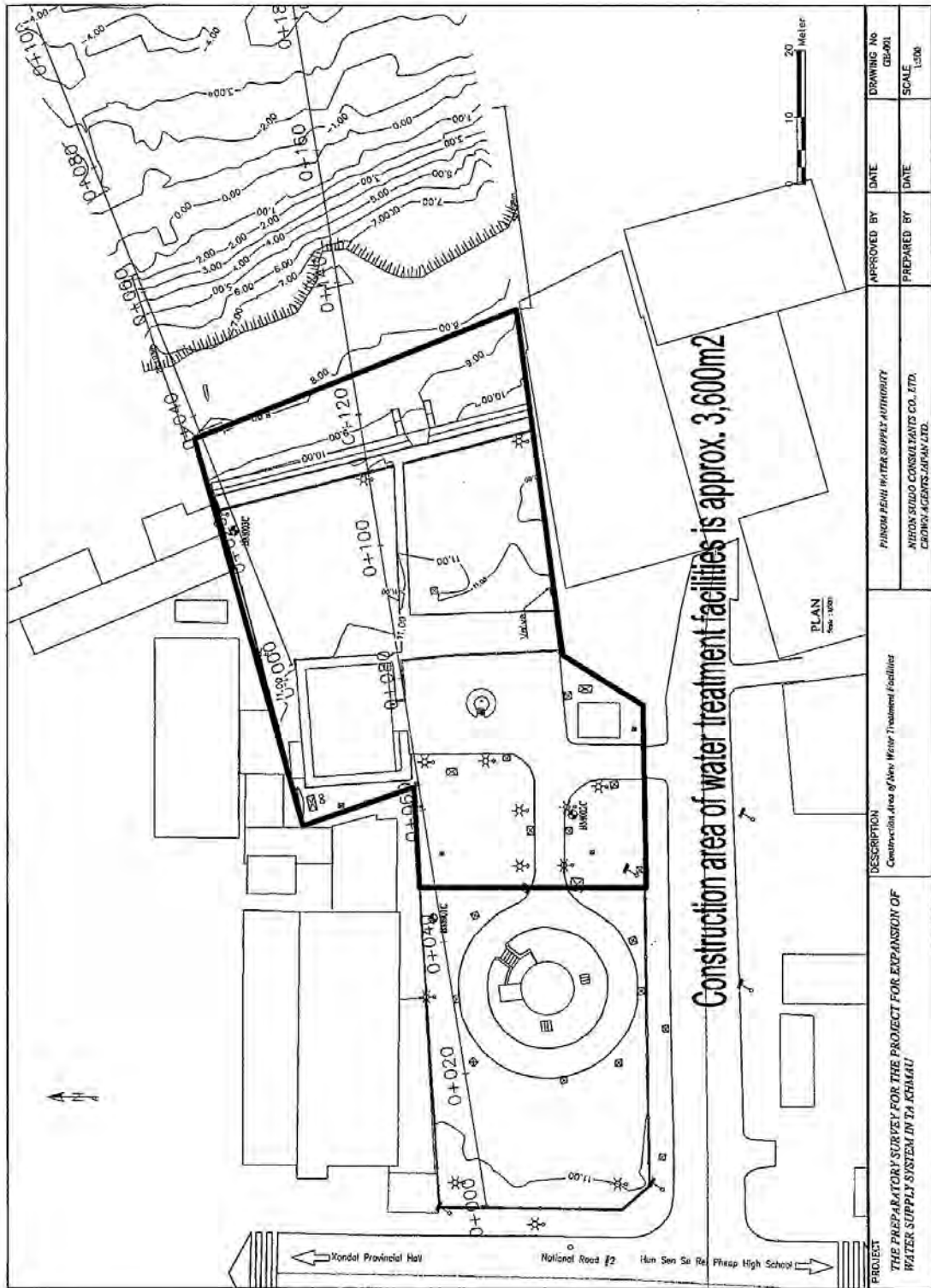
**Ta Khmau WTP  
Treatment Process  
Water Treatment Facility  
(30,000 m<sup>3</sup>/day)**



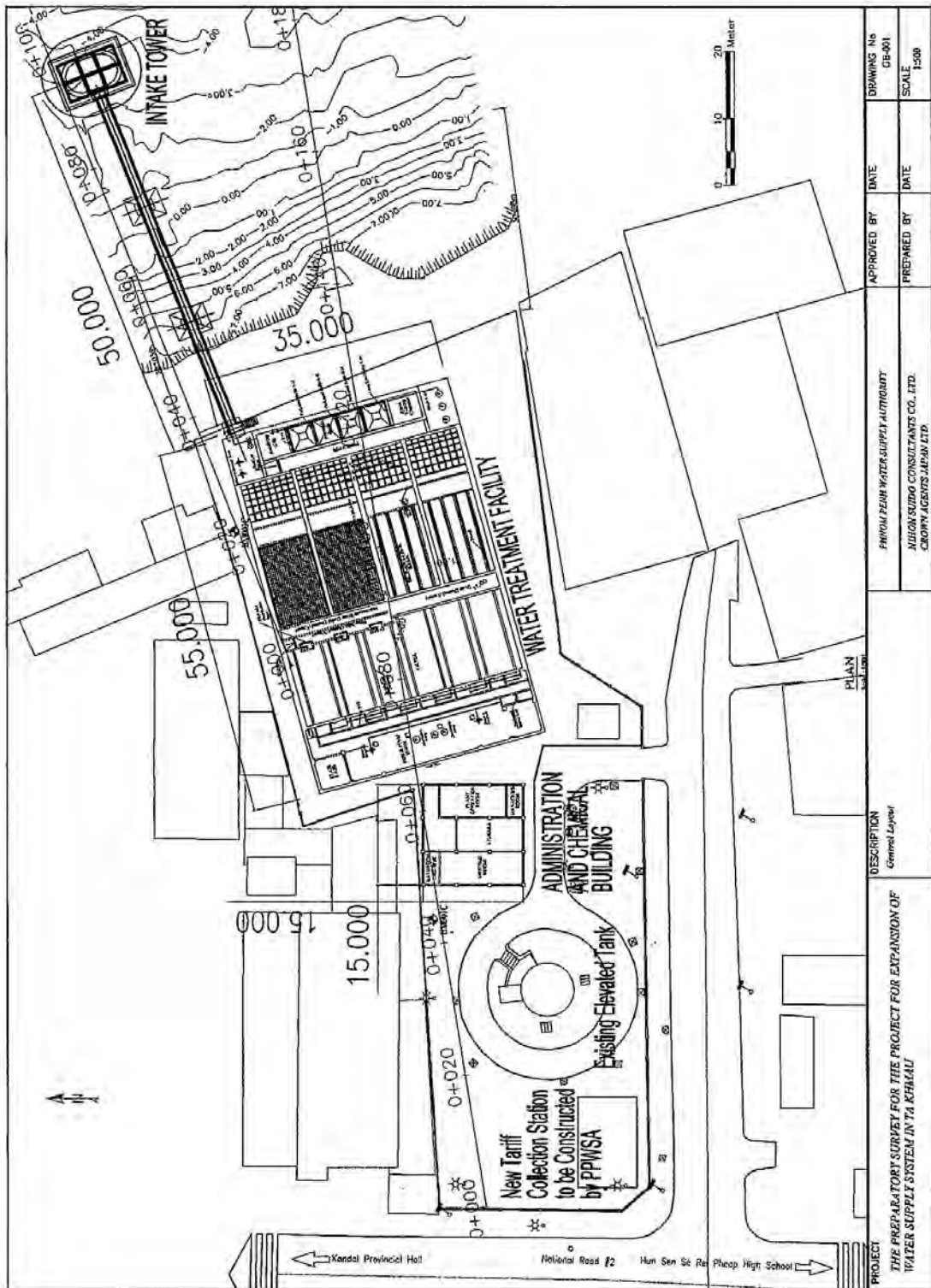
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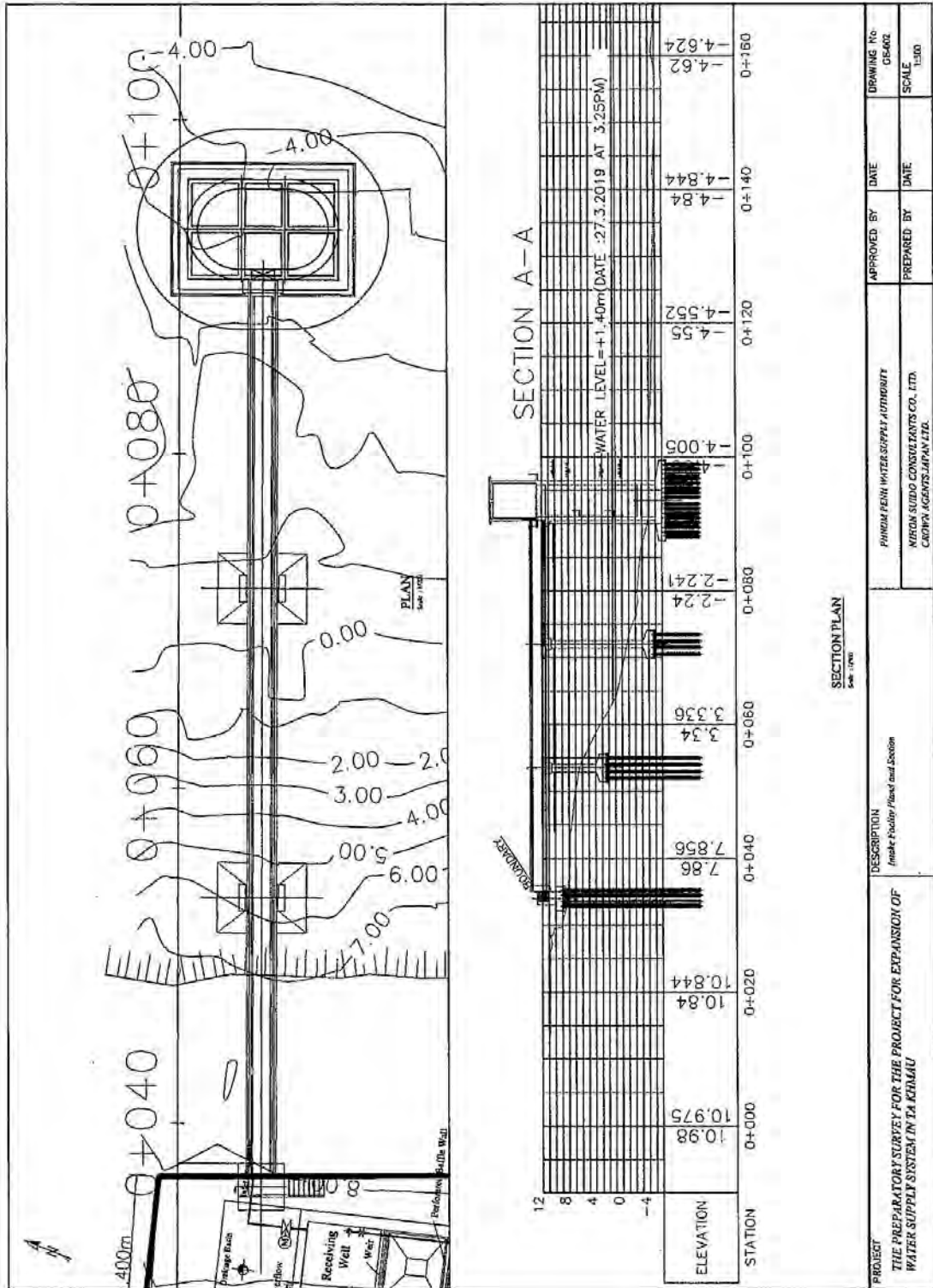
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PROJECT THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU	DESCRIPTION General Layout	PHOEN TECH WATER SUPPLY AUTHORITY	APPROVED BY	DRAWING NO. CB-001
		NIJION SUJODO CONSULTANTS CO., LTD. CROWN AGENTS JAPAN LTD.	PREPARED BY	SCALE 1:500
			DATE	DATE

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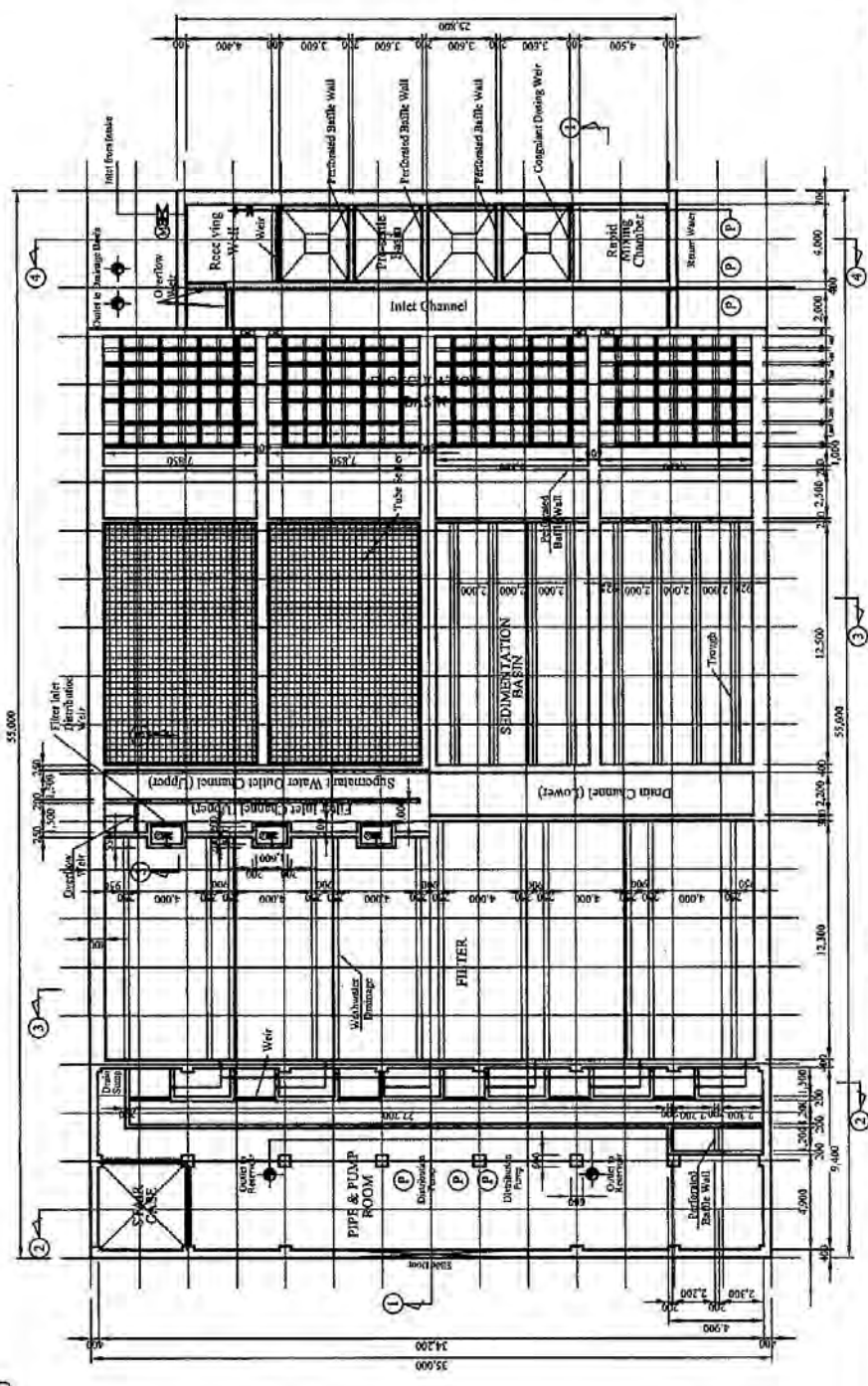






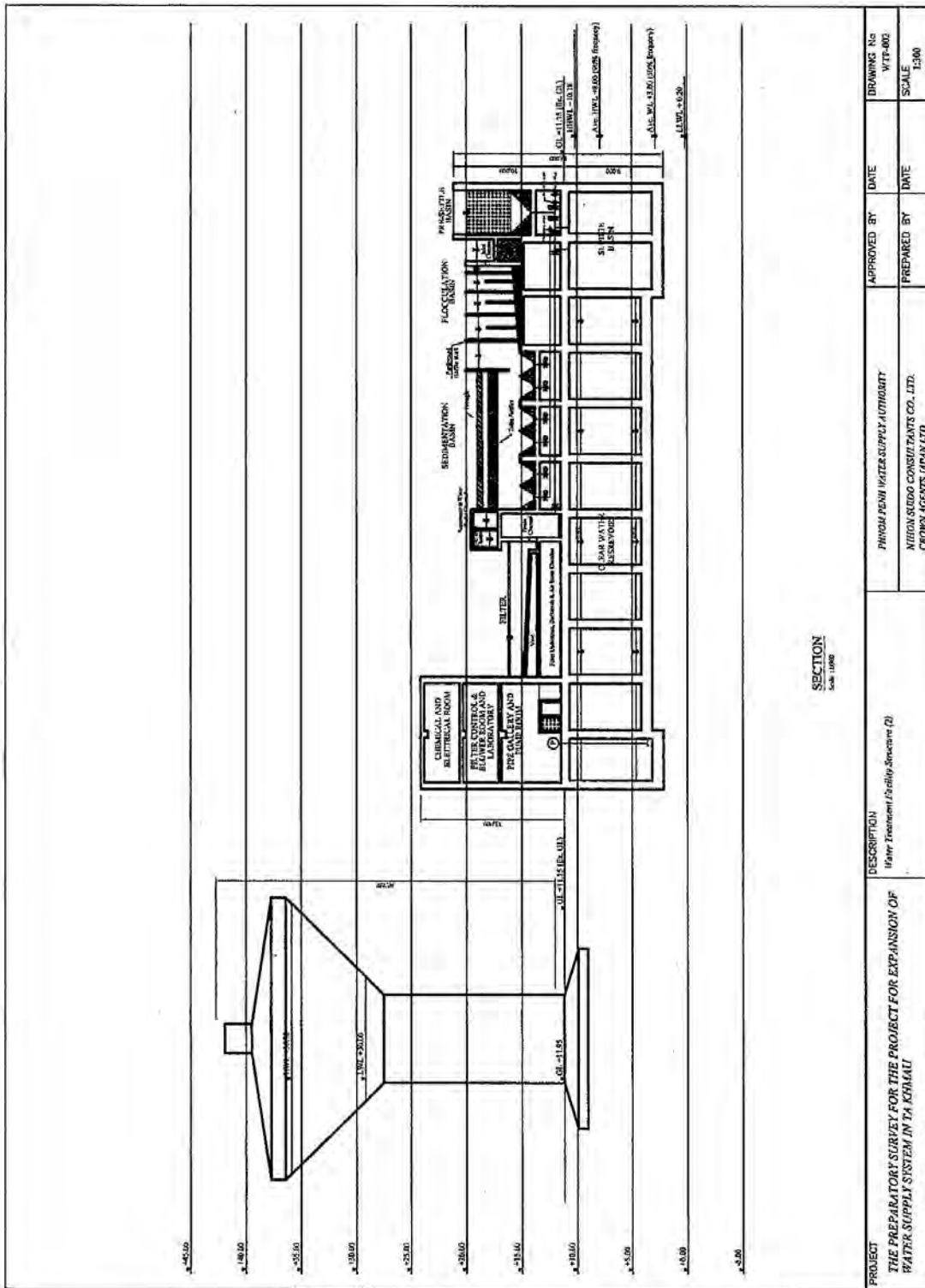
**PLAN**

**WATER TREATMENT FACILITY**  
 Receiving Well, Pre-settle Basing, Rapid Mixing Chamber,  
 Flocculation Basin, Sedimentation Basin, Filter and Pipe & Pump Room  
 GF  
 S=1:200



PROJECT THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KANAU	DESCRIPTION Water Treatment Facility Schemes (I)	PHINON PEHI WATER SUPPLY AUTHORITY	APPROVED BY	DATE	DRAWING No WT-401
		NIHON SUDO CONSULTANTS CO. LTD. CHOKRY-AGENTS JAPAN LTD.	PREPARED BY	DATE	SCALE 1:200

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SECTION  
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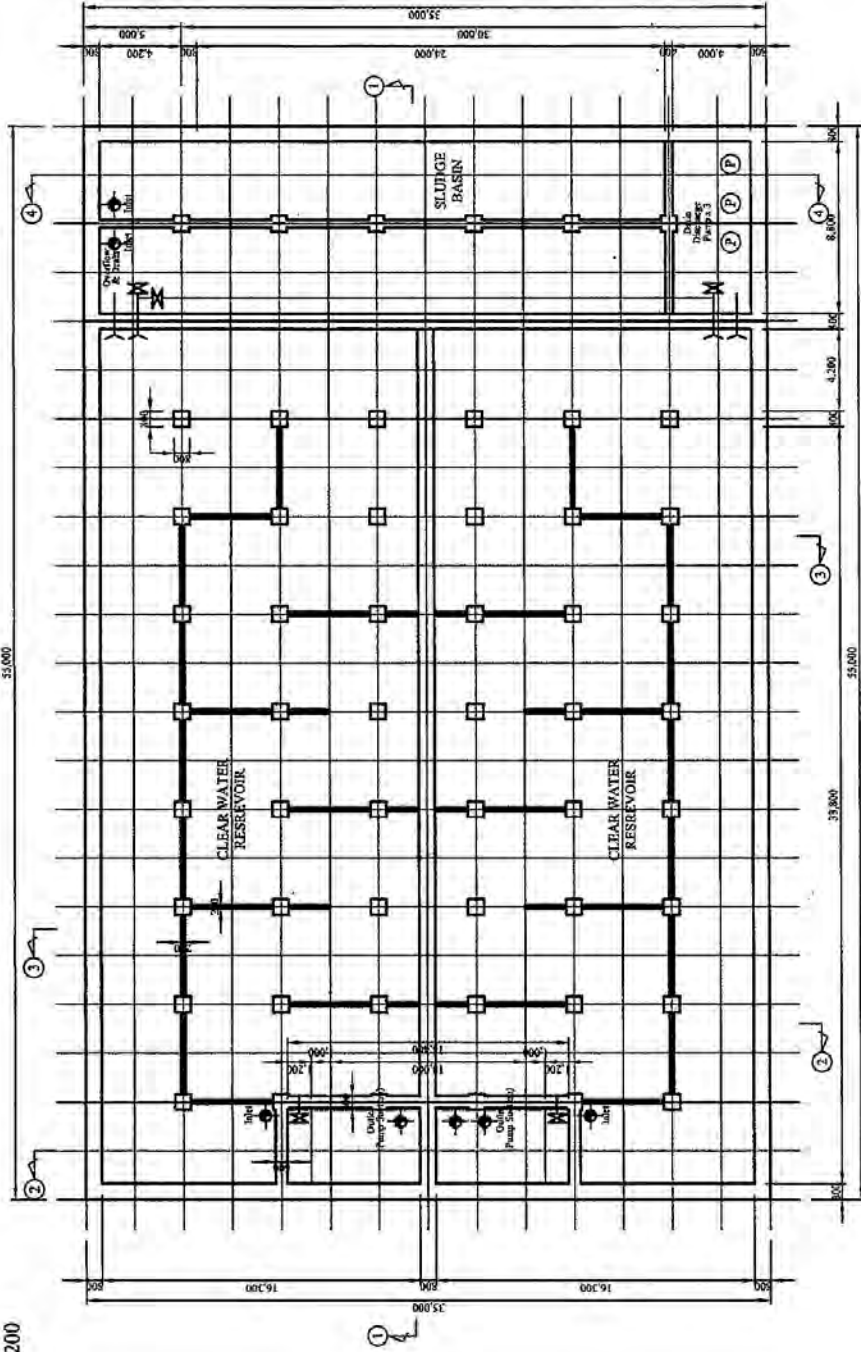
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PROJECT THE PRELIMINARY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KAMAU	DESCRIPTION Water Treatment Facility Section (2)	PHONG PHU WATER SUPPLY AUTHORITY	APPROVED BY	DATE	DRAWING No.
		NITTON SUDO CONSULTANTS CO., LTD. CROWN AGENTS JAPAN LTD.	PREPARED BY	DATE	SCALE 1:500

**WATER TREATMENT FACILITY**  
 Clear Water Reservoir & Sludge Basin

BF  
 S=1:200

**PLAN**

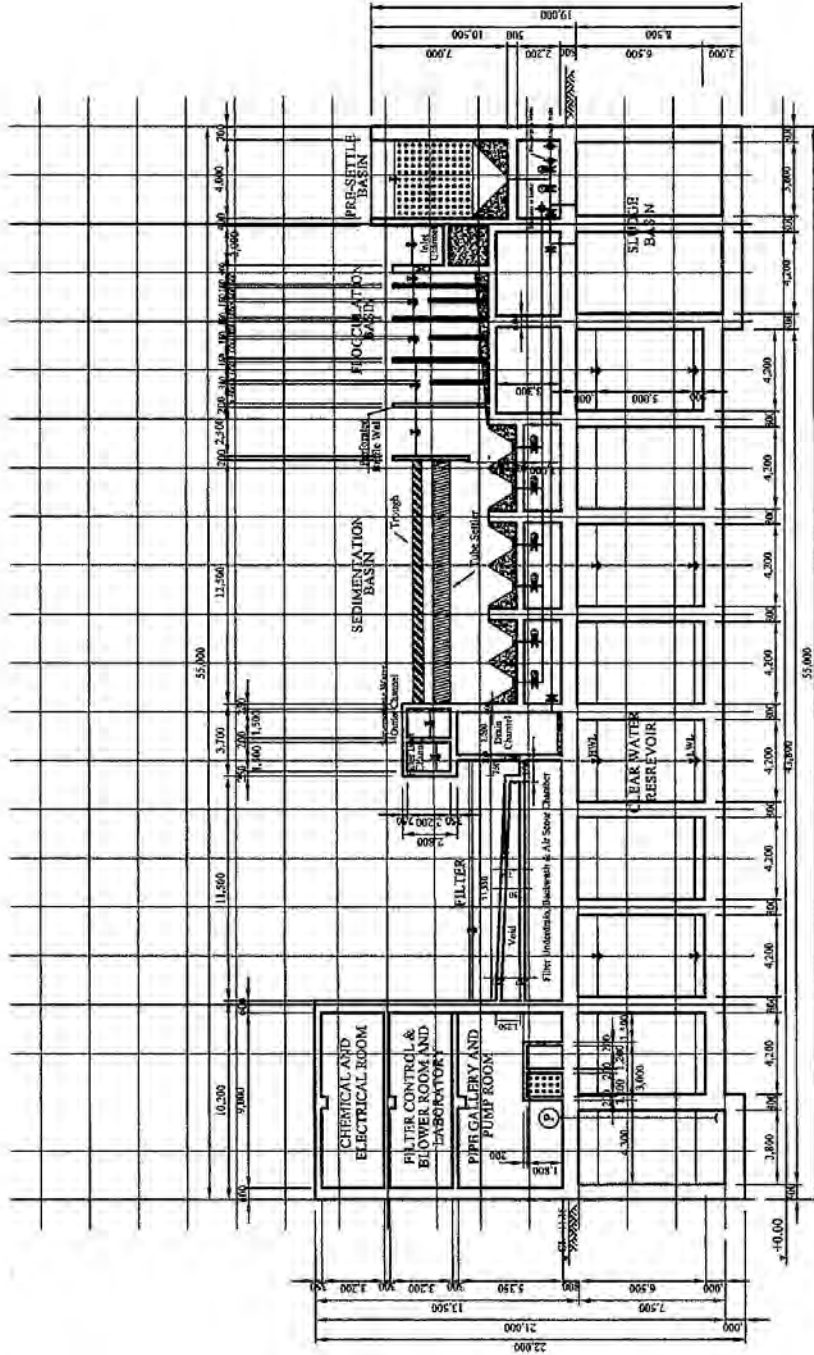


PROJECT THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KINJAU	DESCRIPTION Water Treatment Facility Structure (B)	APPROVED BY	DATE	DRAWING No WTL-003
	PINOM PENH WATER SUPPLY AUTHORITY NIHON SUDO CONSULTANTS CO., LTD. CROYO, AGOYU, JAPAN, LTD.	PREPARED BY	DATE	SCALE 1:200

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WATER TREATMENT FACILITY  
 General Section  
 S=1:200

GENERAL SECTION 1-1



PROJECT THE PREPARATORY SURVEY FOR THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KUNIAU	DESCRIPTION Water Treatment Facility Section (4)	PHIROM FEHAI WATER SUPPLY AUTHORITY NICHON SUJODO CONSULTANTS CO., LTD. CROPPY AGENTS JAPAN LTD.	APPROVED BY	DATE	DRAWING No. WTT-001
			PREPARED BY	DATE	SCALE 1:200



**Document No.1 Term Sheet**

**THE PROJECT FOR EXPANSION OF WATER SUPPLY SYSTEM IN TA KHMAU**

**CONFIDENTIAL / DRAFT / DISCUSSION PURPOSE ONLY**

**1. Project Outline**

**1.1 Project Background**

- The water demand in the area supplied by PPWSA is projected to be double in 2030 and capacity of existing water treatment plants (hereinafter referred to as "WTP/WTPs") in Phnom Penh will be insufficient to meet the demand in 2020.
- The New WTP shall be developed to supply the water mainly in Ta Khmau area in which many low-income households need access to clean water at affordable water tariff and neighbor Phnom Penh areas where PPWSA develops water distribution system.
- The Government of Cambodia requested to the Government of Japan for the funds to implement the project for expansion of water supply system in Ta Khmau.

**1.2 Project Objectives**

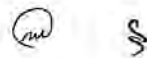
The objective of the Project is to improve the access to safe water in Ta Khmau District through the expansion of water supply system including construction, operation and maintenance (hereinafter referred to as "O&M") of the new WTP.

**1.3 Project Structure**

The Project would be implemented by applying the Japanese Grant Aid with O&M, whose outline is explained in Annex 3 of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29<sup>th</sup> March 2019 in particular;

- PPWSA will be the executing agency and the implementing agency for the Project.
- The Japanese Grant Aid shall be used for construction of the facilities and procurement of equipment necessary for the Project, and the consulting service to be assigned to consultants.
- A Japanese company or a joint venture of Japanese companies will be selected through a competitive tender and establish a Special Purpose Company (SPC) in Cambodia that shall be responsible for the design, construction, and O&M of the new WTP consistently,
- Contracts consist (a) comprehensive contract which consolidates both contracts for the purchase of the products and/or services and for the operation and maintenance, (b) contract(s) for the purchase of products and/or services and (c) contract(s) for the operation and maintenance, and
- The Government of Cambodia shall ensure that customs duties, internal taxes and other

1



fiscal levies which may be imposed in the Government of Cambodia with respect to the purchase of the products and/or the services be exempted or be borne by its designated authority without using the Grant and its accrued interest.

1.4 Project Site

The construction site of the new WTP is located in Ta Khmau District, which is shown in Annex 1 of Minutes of Discussions on the Preparatory Survey for the Project for Expansion of Water Supply System in Ta Khmau dated 29<sup>th</sup> March 2019.

1.5 Risk Allocations

Risks	PPWSA	SPC	Remarks/Examples
<b>Risks related to EPC contract</b>			
<b>EPC risk</b>	<b>O</b>	<b>O</b>	<ul style="list-style-type: none"> <li>- Any additional costs caused by PPWSA shall be borne by PPWSA (e.g. variation orders from PPWSA to SPC, UXO related costs)</li> <li>- Any additional costs caused by change in external conditions shall be borne by PPWSA (e.g. unforeseen ground conditions, major inflation during construction period). These costs may be covered by the amount of the grant for contingency mentioned in the Grant Agreement which is applicable according to the JICA guideline.</li> <li>- Any additional costs caused by SPC shall be borne by SPC (e.g. design deficiency, inflation during construction period).</li> </ul>
<b>Force majeure risk at the facility construction stage</b>	<b>O</b>		A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. However, if a Force Majeure occurred during the facility construction stage, such cost shall be borne by PPWSA. (However, such compensation amount will be within the JICA's contingency budget.)
<b>Risks related to O&amp;M contract</b>			
<b>Demand risk</b>	<b>O</b>		PPWSA shall pay for 30,000m <sup>3</sup> /day of treated water if SPC provides or is ready to provide 30,000m <sup>3</sup> /day of treated water that satisfies the required water quality on a monthly average, regardless of any reason on

*rw* *ss*



			<b>PPWSA side (e.g. demand stays low or distribution pipes get damaged).</b>
<b>Operation risk</b>		O	No payment shall be made if the delivered water does not satisfy the water quality requirement due to poor operation by SPC (e.g. facility malfunction, inappropriate usage of water treatment chemicals etc.). In case the water delivered by SPC does not comply with national drinking water standards required by PPWSA, SPC shall compensate for any damage (e.g. compensation to end-customers) suffered by PPWSA as a result of such poor operation by SPC.
<b>Electricity price risk</b>	O		Any fluctuations in electricity price shall be covered by PPWSA according to the Price Formula for Bulk Water Supply.
<b>Electricity availability risk</b>		O	In case the electricity is not supplied to the facility due to blackout, neither SPC has obligation to supply water to PPWSA, nor PPWSA must pay SPC for the period. SPC does not have a right to claim operating loss caused by such blackout to PPWSA.
<b>Inflation risk (during O&amp;M period)</b>	O	O	off-take price is reviewed and adjusted at the end of third year, sixth year and ninth year from the effective date of O&M period according to inflation fluctuation.
<b>Foreign exchange rate risk</b>		O	Foreign exchange rate risk associated with SPC equity and profit/dividend shall borne by SPC.
<b>Raw water quality risk</b>	O		Additional cost of production due to change in quality of raw water shall be covered by PPWSA and compensated to the SPC.
<b>Licensing risk</b>	O		IEIA/EIA or any other permit/authorization necessary for the SPC to operate the facility shall be obtained by PPWSA.
<b>Legal risk (change of project specific law)</b>	O		Additional cost caused by a change in law that specifically affects the project (e.g. upgrade of national quality standard for drinking water) shall be covered by PPWSA and compensated to the SPC.
<b>Legal risk (change of general law)</b>		O	Additional cost caused by a change in general law that would affect the whole economy (e.g. VAT) shall be covered by the SPC.
<b>Force Majeure</b>	O	O	A Force Majeure is an event that is external, unpredictable,

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<p><b>risk</b></p>		<p>and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for a certain period (based on practice of water utilities). Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets. The value of the assets shall be net book value of the assets.</p>
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*mw* *sp*

1.6 Project Schedule

Item	2020												2021											
	Term-1						Term-2						Term-3											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Cabinet Meeting	▲																							
E/N, G/A																								
Contract / Approval of Consultant																								
Bidding Document Preparation																								
Agreement and Approval of Bidding Document																								
PQ Announcement																								
PQ Evaluation																								
Announcement of Bidding and Distribution of Bidding Document																								
Tender Period																								
Bid Opening																								
Bid Evaluation																								
Contract Agreement																								

Legend:  Work in Cambodia  Work in Japan

Item	2021												2022												2023												2024				
	Term-3						Term-4						Term-5																												
	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5			
Site Preparation and Surveys	■																																								
Outline Design / Detailed Design	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Import / Transportation of Equipment and Machines	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Preparation and Temporary Work	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Headworks Construction							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Water Treatment and Distribution Facilities Construction							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Administration Facilities Construction												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Plant Mechanical and Electrical Work												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Associated Facilities and Equipment Work												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Piping												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Landscaping and Finishing																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Preparation for Operation and Maintenance																						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Test Operation																																									

The schedule above is based on the Comparator facilities (the Consultants plan) and SPC may propose shorter construction duration in the tender.

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1.7 Tender Evaluation

- The prime contractor(s), namely, SPC and the prime consulting firm, which enter into contracts with PPWSA, are limited to "Japanese nationals", in principle.
- Quality and Cost Based Selection (QCBS) that includes technical, commercial, financial and legal evaluation will be applied for the bidding of SPC.

Evaluation methodology

Note: This shall be reviewed and concurred by JICA.

Comprehensive Evaluation Score = Technical Score \* X + Price Score \* (1-X)

where X is a weight factor  $1 > X > 0$  (In this stage the Consultants propose 0.5 as X. Please refer the separate sheet for the analysis of the weight factor X of Price score)

Tentative Technical Score

	Category	Score
1	Tenderers experience with respect to comparable projects;	TBA
2	Proposed Organization	TBA
3	Experience of key staff in relation to the scope of work;	TBA
4	Proposed design by SPC for bidding	TBA
5	Construction Work Plan	TBA
6	Operation and Maintenance and Monitoring Plan	TBA
	Maximum possible score	100

Tentative Price Score

The tenderer bids on 10-year Life Cycle Cost (LCC) where

10-year LCC = EPC price + Net present value of O&M costs discounted at 4.5%

(SPC submit EPC price, 10-year average O&M Cost(  $\alpha$  ), 10-year average fixed volume of electricity usage(  $\beta$  ), and the margin rate at bidding to calculate 10-year LCC)

Price score = Lowest Price / Price of the Tenderer \* 100

Note that

- (1) EPC price shall be below the Grant budget applicable to the EPC contract, and
- (2) O&M cost will be reflected in the contract price of bulk water

## 2. Requirements

### 2.1. Preconditions

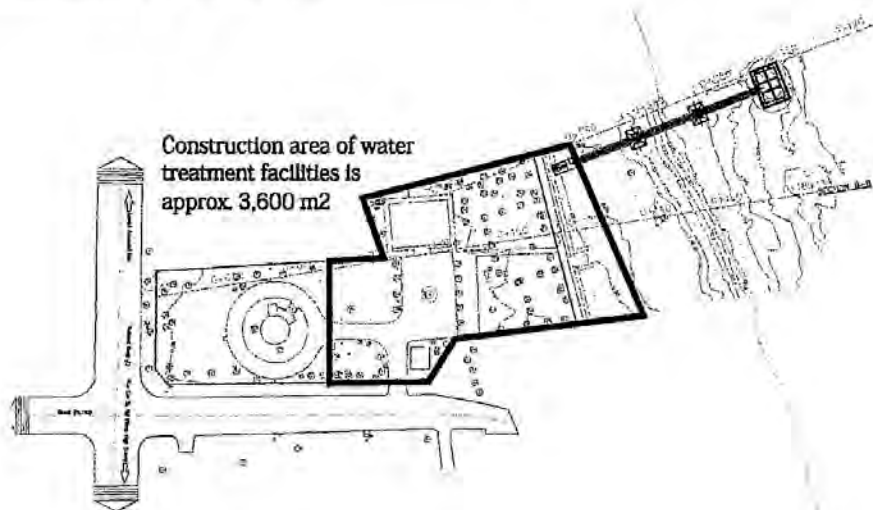
#### 2.1.1. Construction Area

There are an existing elevated tank and a tariff collection station as major facilities within the PPWSA's property where the new WTP shall be constructed. The available construction area of water treatment facilities (WTFs) excluding headworks (intake and raw water transmission facilities) is approximately 3,600 m<sup>2</sup>.

Headworks shall be constructed in the river outside of PPWSA's property.

There is unlevelled land along the river that are PPWSA's property but outside of existing fence. This area could be levelled as part of SPC's EPC work.

Existing tariff collection station shall be shifted to outside of construction area by PPWSA before commencement of the design-build work.



The site area is limited therefore, stockyard, workshop, temporary office etc. required for the construction shall be provided by PPWSA.

Topographic and geotechnical features will be provided to SPC by PPWSA in later stage.

#### 2.1.2. Raw Water Quality

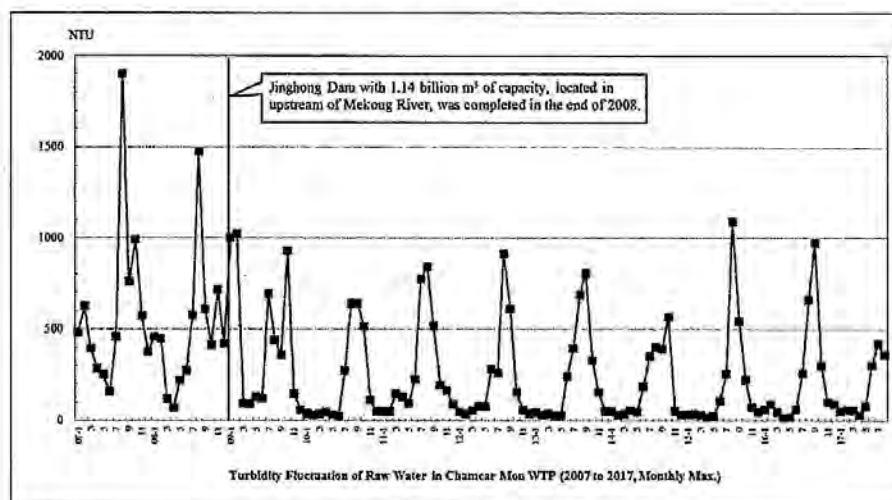
Raw water source shall be Bassac River.

The raw water quality recorded at intake of Chamcar Mon WTP located at upstream of Ta Khmau site along Bassac River during 2009-2017 after Jinghong dam was commenced operation in 2008 shows following characteristics.

- Turbidities are quite different in dry season and wet season. Minimum turbidity in dry season was 7NTU, average turbidity in wet season is 250 NTU and maximum turbidity was 1088NTU.
- pH is generally high in wet season and low in dry season, average pH is 7.4, Minimum pH was 6.7.
- Color is a bit high, average color is approximately 30TCU.
- Average Ammonium (MH4) is approximately 0.5mg/l in wet season and approximately 0.2mg/l in dry season. However Ammonium (NH4) has been on the rise from 2016 and maximum was 1.81.

Followings are summary of raw water turbidity at intake of Chamcar Mon WTP during 2009-2016.

- Average Turbidity in Dry Season: 40NTU
- Average Turbidity in Wet Season: 245NTU
- Average Turbidity over 8 years: 115NTU
- Maximum Turbidity over 8 years: 1088NTU
- Minimum Turbidity over 8 years: 7NTU



The result of monthly raw water quality analysis of March-May 2017 at intake location of Ta Khmau Site carried out under our Survey will be provided separately.

#### Emergency Response against Unexpected Raw Water Quality

- a) In case turbidity becomes higher than 1000NTU, intake amount shall follow PPSA's instruction

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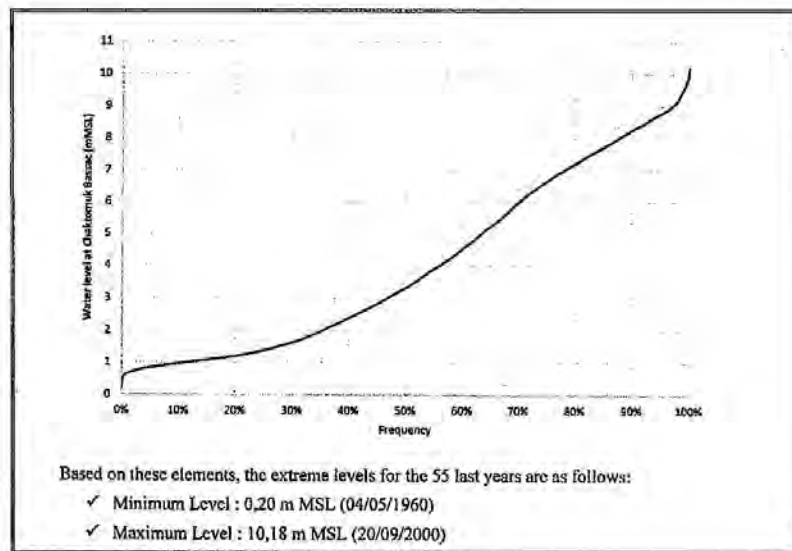
as same as other PPWSA's treatment plants.

- b) In case serious issue (such as toxic substance or oil discharge) happens, SPC can autonomously reduce or stop intake operation to avoid serious damage on WTP facilities and contaminated water supply to customers, and report to and discuss with PPWSA as soon as possible.

If above restricted intake conditions continue until remaining water in the service reservoir is empty, both parties do not have responsibilities to suspend water supply.

### 2.1.3. Water Level of Bassac River

The feasibility study for expansion of Chamca Mon WTP gives minimum river water level and maximum river water level, as MSL+0.20m and MSL+10.28m respectively as shown below.



## 2.2. Output requirements

### 2.2.1. Requirement for the Facilities

#### 2.2.1.1. Requirement of Treated Water Quantity

Water Treatment Capacity of nominal 30,000 m<sup>3</sup>/day.

#### 2.2.1.2. Laboratory for water quality test in WTP

The layout and equipment of the laboratory attached to WTP should be in accordance with ISO9001 and ISO17025. The laboratory in WTP should be equipped with enough equipment to analyze daily test items in the National Drinking Water Quality Standards.

#### 2.2.1.3. Intake Type

Intake facility shall be intake tower type.

#### 2.2.1.4. Disinfection

Disinfection shall be by On-Site Electro-Chlorination System (OSEC System).

#### 2.2.2. Requirements for the Operation

- WTP capacity of nominal 30,000m<sup>3</sup>/day
- 10 years O&M period
- Intake tower type
- On-site chlorination system
- Volume of service reservoir of 5,000 m<sup>3</sup> or more
- Pressure of 4 bar at off-take point
- 24 hours supply
- Water quality standards described in Annex 13
- O&M manual in both Khmer Language and English
- Prevention against adhesion of shell inside raw water transmission pipe
- 5 % of production loss ratio from intake to the bulk meter
- prevention of oil inflow into the WTP

#### 2.3. Work to be done by SPC

SPC shall work for followings.

##### 1. Design of New WTP

- (a) Basic Design
- (b) Detailed Design
- (c) Application Work for Design
- (d) Laws and Regulations to be complied.

##### 2. Construction of New WTP

- (a) Civil and Equipment Works
- (b) Plant Mechanical Work
- (c) Plan Electrical Work
- (d) Application Work for Construction

##### 3. Operation and Maintenance of New WTP

- (a) Water Quality Control
- (b) Treated Water Volume Control in case required by PPWSA
- (c) Monitoring and Control of Water Treatment
- (d) Maintenance and Repair
- (e) Procurement of Fuel, Chemical and Other Consumables

- (f) Management of Power Receiving, Water Use and Fuel / Chemical Storage and Safety
  - (g) Cleaning
  - (h) Security and Safety
  - (i) Emergency Action
4. Hand-Over Work at the End of the O&M period
- (a) Performance Test of WTP
  - (b) Asset Check and Evaluation

2.4. Cost to be borne by SPC

Following cost shall be borne by SPC.

Design and Build Stage:

- (a) Head office over-head cost related to construction work

Operation Stage

- (b) Head Office over-head cost related to the operation and maintenance work
- (c) Any other cost which is not directly related with operation of the new WTP

2.5. Reporting Obligations

Following submittals shall be provided by SPC. Detail shall be provided in later stage

- (a) At the time of work commencement
  - (i) Work commencement application
  - (ii) Design, Construction and Operation Plan
  - (iii) Organization structure for the operation
- (b) Design and Build period
  - (i) Report related to construction works including progress record
  - (ii) Draft of Operation and Maintenance Manual
  - (iii) Draft of Self-monitoring Report
  - (iv) Modification and additional work confirmation report
  - (v) Commissioning reports
- (c) At the time of hand-over
  - (i) Completion report or substantial completion certificate and list of outstanding works
  - (ii) Final operation and maintenance manual
  - (iii) Final self-monitoring reports template
- (d) During operation period
  - (i) Monthly report including self-monitoring report
- (e) At the time of hand-back
  - (i) Performance check list of the facilities.
  - (ii) Remaining book value calculation and confirmation sheet.
  - (iii) Purchase agreement of SPC's facilities, if any.
  - (iv) Letter of Waiver of claims and liens and release of rights relating this project from PPWSA



to SPC.

- (f) At the time of Expiration of warranty against defect period
  - (i) Report on Expiration of Warranty against Defect Period

### 3. Contract Terms

Draft O&M contract shall be prepared based on the following items. Draft EPC contract shall be prepared separately in accordance with JICA's standard form of contract.

1	<b>O&amp;M period</b>	After the completion of the new WTP, the ownership of the WTP will be transferred from SPC to PPWSA, then PPWSA and SPC will agree the O&M contract for 10 years after commencement (definition is to be agreed) of O&M on the facilities owned by PPWSA.
2	<b>Production of bulk water</b>	Production of bulk water is fundamentally a responsibility of the SPC.
3	<b>Payment mechanism and price of bulk water</b>	On a separate sheet
4	<b>Repairment</b>	During O&M period, SPC may use leased facilities free of charge, however, the SPC shall be responsible for any repairment of the facilities at its own cost. SPC shall keep good conditions of the facility and equipment in accordance with PPWSA's Standard Operation Procedure (SOP).
5	<b>Conditions for the hand-back</b>	<ul style="list-style-type: none"> <li>- After the end of O&amp;M period, PPWSA has the right to be handed back the leased WTP facilities from the SPC under certain requirements (e.g. the result of the motor vibration test is within 5% of initial specification).</li> <li>- The SPC shall remove any additional facilities or equipment installed for its operation and restore the WTP to its initial condition at its own cost, if required by PPWSA.</li> <li>- PPWSA has the right to purchase any remaining inventories (e.g. raw materials) at their book value.</li> </ul>
6	<b>Private investment</b>	The SPC may invest in some additional facilities, software, or any other equipment necessary for the operations. PPWSA has the right to purchase the private investments from the SPC at their residual value (net book value) at the end of O&M period.
7	<b>Self-monitoring</b>	SPC shall monitor and report to PPWSA its operation. Monitoring requirements shall be studied.
8	<b>Operation data and financial information</b>	The SPC shall record and report all the operation data and financial information in a required format. PPWSA may utilize the data to continue operation of the WTP after hand-back.
9	<b>Early termination / compensation events</b>	<ul style="list-style-type: none"> <li>- Termination for convenience (Unilateral termination)</li> </ul> PPWSA has the right to terminate the contract early for public

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		<p>interest. In this case the SPC shall be compensated in full, for all the private investments, inventories and additional costs incurred by the termination of the contract, and opportunity costs for the equity. Opportunity costs for the equity shall be a sum of net profit for the remaining contract period based on the SPC's initial financial plan initially agreed in the contract.</p> <ul style="list-style-type: none"> <li>- Termination for default by PPWSA</li> </ul> <p>The termination condition shall be in line with the case of the termination for convenience.</p> <ul style="list-style-type: none"> <li>- Termination for default by SPC</li> </ul> <p>PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets and inventories. The value of the assets and inventories shall be net book value of the assets minus cost of damages and losses suffered by PPWSA due to the termination of the contract.</p> <ul style="list-style-type: none"> <li>- Termination for Force Majeure</li> </ul> <p>A Force Majeure is an event that is external, unpredictable, and irresistible and has a significant impact on the project. Both parties may terminate the contract if the impact of a Force Majeure lasts for 180 days. Neither party has any obligation to each other for the cost of mitigation measures to prevent increasing loss caused by Force Majeure. PPWSA shall have the option to require SPC to transfer to PPWSA all of its right, title and interest in and to the assets and inventories. The value of the assets and inventories shall be net book value of the assets.</p>
10	<b>Invoice settlement</b>	<p>SPC shall report and charge to PPWSA by the 10<sup>th</sup> day of each month for the bulk water produced in the previous month. PPWSA shall in return review the invoice and make payment within 30 days after the invoice receiving date.</p> <p>Currency to be used for the invoice settlement shall be Cambodian Riel.</p>
11	<b>Staff Employment</b>	<p>1) PPWSA shall take over the employment contracts from the SPC at the end of O&amp;M period.</p> <p>2) PPWSA intends to dispatch about 5 staff to SPC and bear their salary. PPWSA staff shall report to SPC in daily operation. Relative salaries shall be subtracted from the off-take price.</p>

**Payment mechanism – Price Formula for Bulk Water Supply**

In the bidding documents, SPC shall submit EPC price, 10-year average O&M Cost(  $\alpha$  ), 10-year average fixed volume of electricity usage(  $\beta$  ), and the margin rate at bidding to calculate 10-year LCC

SPC Invoice (PPWSA payment to SPC) = (1) sales of bulk water + (2) additional services – (3) penalties

(1) Sales of bulk water = (4) volume of water delivered \* (5) unit price of bulk water

(4) volume of water delivered shall be confirmed by a volume meter just after distribution pump

(5) Unit price of bulk water =  $\alpha$  \* (6) inflation index +  $\beta$  \* (7) electricity price  
+ (8) additional production costs + (9) agreed margin for SPC

$\alpha$  is a fixed (agreed) basis for O&M costs excluding electricity defined in the contract

(6) Inflation index shall be All Item Index of Consumer Price Index published by National Institute of Statistics.

$\beta$  is a fixed (agreed) volume of electricity usage per m<sup>3</sup> defined in the contract

(7) Electricity price shall be the price determined in the contract between PPWSA and the electricity supplier.

(8) applies if and only if quality deterioration of raw water or change in water quality standard cause additional production costs.

(9) = agreed margin rate \* ( $\alpha$  \* (6) +  $\beta$  \* (7) + (8))

Agreed margin rate is a fixed (agreed) rate defined in the contract

(2) Additional services include deeper analysis of water quality or site visit tour or any other services that are not included in the ordinary O&M activities defined in the contract.

(3) In case the water delivered by SPC does not comply with required water quality, PPWSA will not pay for the delivered water by SPC. In addition, SPC shall compensate for any damage (e.g. compensation to end-customers) suffered by PPWSA as a result of the such poor operation of SPC.

## Insurance or limited liability

In the private hearing carried out in Aug-Oct by JICA, we found that most of the private companies responded that they would need Company Comprehensive Insurance to cover the facilities and third party compensation during O&M.

This is the reasonable requirements from the tender participants because following cases could be happened.

- 1) Electrical leakage may cause fire, and such fire may damages monitoring system and electrical equipment.
- 2) Equipments could be soaked and damaged by the water of fire fighting activities
- 3) Visitors may be injured during their site visit; this project will be a model case of privately operated water purification plant, so a lot of plant visitors may be expected to come.

In actual situation, PPWSA does not use insurance, however no other third parties are involved in the operation, so any damage caused by any accident will be repaired or compensated by PPWSA.

However once the outsource the WTP operation to other company(SPC), such company must have an obligation of the duty of care on their operation.

In order to assure competitive bidding and to avoid "no participants to the tender", we need to modify the contract terms.

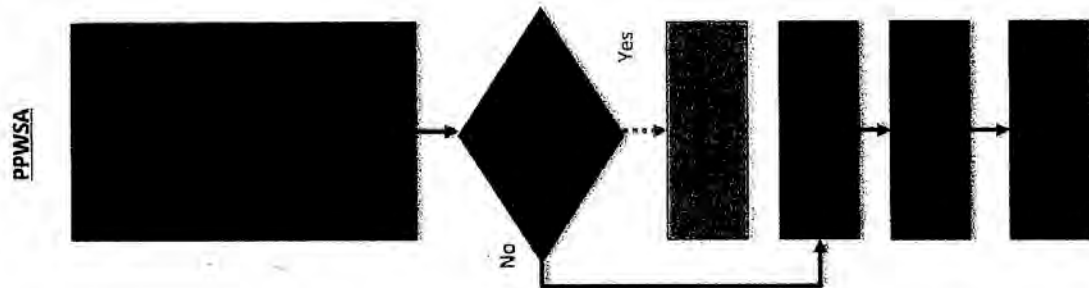
We propose either;

1. PPWSA accepts to include insurance cost in the price of bulk water, or
2. PPWSA accepts that SPC will compensate the damage to the facilities or third party liabilities only to the extent of its equity whether or not it is caused by SPC's breach of the duty of care or Force Majeure.

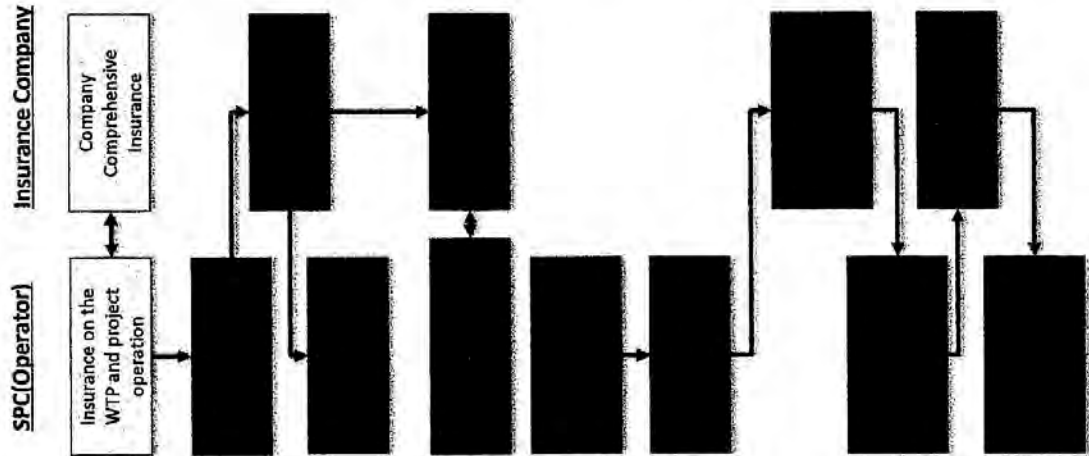
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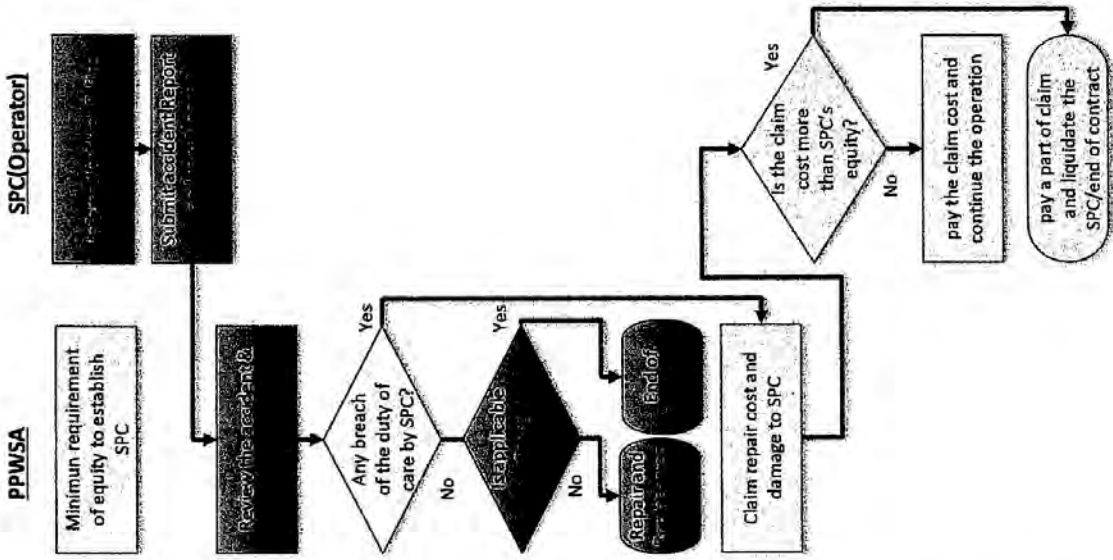
**Actual Operation**



**Recommendation 1: Insurance Coverage**



**Recommendation 2: Small equity and limited liability**



rw  
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### **Recommendation 1: Insurance Coverage**

According to our research on the insurance cost, it will be USD38,500~79,000/year, or KHR15.5~31.7/m3 as additional bulk water charge. Risk category will be assessed by insurance company, and accident prevention system may reduce the risk of the project and modify the risk category.

risk category	Insurance Value (USD)	Insurance USD/year	m3/year	USD/m3	Riel/m3
low risk	27,270,000	38,500	10,950,000	0.003516	15.5
high risk	27,270,000	79,000	10,950,000	0.007215	31.7

Source: Estimation of Cambodian Insurance company, Forte Insurance

### **Recommendation 2: Small equity and limited liability**

#### **1) SPC will take limited guarantee**

PPWSA accepts that SPC will compensate the damage to the facilities or third party liabilities only to the extent of its equity whether or not it is caused by SPC's breach of the duty of care or Force Majeure.

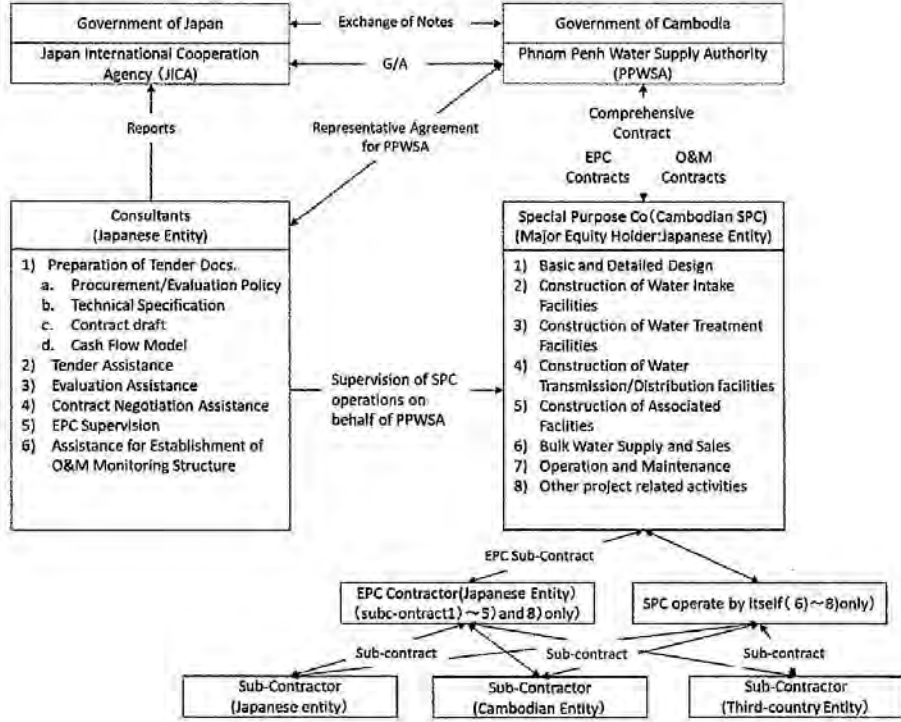
#### **2) Minimum equity contribution required to SPC**

When we draft tender documents, we have to decide minimum equity contribution, for example, a working capital for 3 months of operation gives about JPY30,000,000, or USD272,700.- this is equivalent to 1% of total value of construction.

(3)

✓

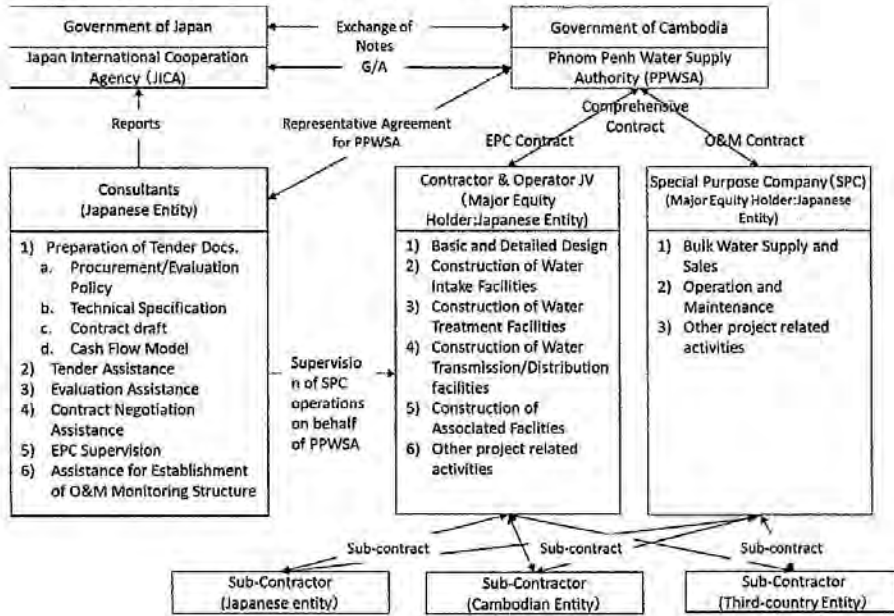
Option A (local SPC for EPC and O&M)



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vs



Option B (Consortium for EPC+ local SPC for O&M)



rw \$

## 1. Governing law of disputes and lawsuit and contracts

According to the procedure for preparing the contract for JICA grant aid, the disputes and lawsuit and governing law of contracts are as follows.

### 17. Dispute and lawsuit

Following procedure shall be indicated; Firstly, try to settle problems, and if they cannot be resolved with the best effort, then necessary procedures can be taken through an international arbitration institution such as the Japan Commercial Arbitration Association (JCAA) or the International Chamber of Commerce (ICC).

### 18. Contract law

Consult with the client to determine the country of the contract law.

Since the general grant aid is only for the facility construction, and the funds for facility construction payments are secured, no disputes or lawsuit related to the loss of the procurement agent are envisaged. Even if the governing law is Japanese law, the Cambodian government (the beneficiary government) may accept it.

However, considering the signing of O&M and bulk water sales contracts with the responsibility to pay for the purchase of bulk water, including facility maintenance and operation costs, Cambodia law will be required as applicable governing law of the contract.

The situation in Cambodia regarding litigation and arbitration is as follows.

- In 1960, Cambodia joined the New York Convention (the Convention on the Approval and Enforcement of Foreign Arbitration Judgments), but the law on the implementation of the New York Convention was enacted in 2001.
- The Arbitration Law was enacted in May 2006, and the Civil Procedure Law was enacted in July.
- Although the National Commercial Arbitration Center (NCAC) was established in the same year, the official operation of NCAC started in January 2013. In July 2014, the NCAC internal rules and NCAC rules were established at the first general meeting. Although it has been adopted, there are not many cases where NCAC is selected as an arbitration institution because not many days has passed after the establishment.

The following six international arbitration institutions will be alternatives to select:

(14) 20

1. **ICC (International Court of Arbitration)**  
Handles more than 21,900 arbitration cases since its establishment in 1923 (in recent years, about 1,000 cases per year). It has offices in Afghanistan, Australia, Bangladesh, China, Taiwan, Hong Kong, India, Indonesia, Japan, Korea, Macau, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka and Thailand.
2. **The London Court of International Arbitration(LCIA)**  
Established in 1892. It is said that over 80% of cases referred to LCIA include non-UK parties, but due to confidentiality laws, LCIA has not disclosed facts and statistics regarding matters to be determined. In addition to headquarters in London, there are branches in India, Dubai and Mauritius.
3. **The American Arbitration Association-International Centre for Dispute Resolution(AAA-ICDR)**  
Established in 1996. In addition to the New York headquarters, it has regional offices throughout the United States and offices in Mexico City, Singapore and Bahrain.
4. **The Hong Kong International Arbitration Centre(HKIAC)**  
Established in 1985. In addition to Hong Kong headquarters, there is a branch in Seoul. Approximately 65% of all HKIAC arbitration cases are related to international disputes. Strong in China-related projects.
5. **The Singapore International Arbitration Centre (SIAC)**  
Established in 1990. They have a strategy to be international dispute resolution center in Asia. Established Maxwell Chambers, a complex dispute settlement facility, in 2009. The facility has offices of major European and American arbitration institutions such as ICC and AAA-ICDR and law firms specializing in arbitration. There are branch offices in Singapore and Mumbai.
6. **The Japan Commercial Arbitration Association (JCAA)**  
Established in 1953. There are offices in Tokyo and Osaka, handling both domestic and international arbitration.

Although this case is grant aid, since O&M and bulk water sales in Cambodia are included in the contract, the governing law is considered to be Cambodian law, and it is unlikely that the arbitration institution will be JCAA. .

It is considered necessary for PPWSA to adopt Cambodian law as a governing law, however choosing NCAC as an arbitration institution is not the best option for both parties because NCAC has a little experience in arbitration. Considering the geographical factors of Cambodia, it would be desirable for PPWSA and private operators to choose Singapore ICC or SIAC as the applicable arbitration institution.

② ③

Table 5-1: Urban water system parameters

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
		Unit	Permissible limite			A	B	C
			National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
<b>Microbial</b>								
	E.Coli or thermoteloerant	CFU or MPN / 100 ml	0	0			B	
<b>Chemical</b>								
	Aluminium (Al)	mg/l	0.2	0.2	in the case that alum is used		B	
	Ammonia (NH <sub>3</sub> )	mg/l	1.5	1.5			B	
	Arsenic (As)	mg/l	0.05	0.05	for the case of groundwater source			C
	Barium (Ba)	mg/l	0.7	0.7				C
	Cadmium (Cd)	mg/l	0.003	0.003				C
	Chloride (Cl <sup>-</sup> )	mg/l	250	250			B	
●	Chlorine Cl <sub>2</sub> * (free residual)	mg/l	0.1-1.0	0.1-1.0	for the case of using chlorine for disinfectant	A		
	Chromium (Cr)	mg/l	0.05	0.05				C

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter		Exception	Formal Monitoring Examination level			
		Unit	Permissible limite		A	B	C	
			National Drinking water Standard		Requirement for Ta Khmau WTP	Daily	Quarterly	Annually
Copper (Cu)	mg/l	1	1	for the case that household plumbing uses copper pipes			C	
Fluoride (F)	mg/l	1.5	1.5	for the case of groundwater source			C	
Total hardness as CaCO <sub>3</sub>	mg/l	300	300	For the case of groundwater source		B		
Iron (Fe)	mg/l	0.3	0.3	case of groundwater		B		
Lead (Pb)	mg/l	0.01	0.01				C	
Manganese (Mn)	mg/l	0.1	0.1	case of groundwater		B		
Mercury (Hg)	mg/l	0.001	0.001				C	
Nitrate (NO <sub>3</sub> <sup>-</sup> )	mg/l	50	50			B		
Nitrite (NO <sub>2</sub> <sup>-</sup> )	mg/l	3	3			B		
Sodium (Na)	mg/l	250	250	case at coastal areas			C	
Sulfate ion (SO <sub>4</sub> <sup>2-</sup> )	mg/l	250	250			B		
Zinc (Zn)	mg/l	3	3				C	

mw  
V

Items to be Analyzed and Recorded in Ta Khmau WTP	Parameter	Parameter			Exception	Formal Monitoring Examination level		
		Unit	Permissible limits			A	B	C
			National Drinking water Standard	Requirement for Ta Khmau WTP		Daily	Quarterly	Annually
<b>Physical</b>								
●	Colour	TCU	5	5		A		
●	pH	n/a	6.5-8.5	6.5-8.5		A		
●	TDS or Conductivity	mg/l or $\mu$ S/cm	800 or 1600	800 or 1600		A		
●	Turbidity	NTU	5	1		A		
●	Taste and Odour	-	Acceptable	Acceptable		A		

\*Residual chlorine must be daily analysed in production system and fortnightly (two weeks) at end points of networks (water supply system with more than 3001 connections). The number of samples is dependent on situations of end points of networks of each unit or service provider. We can analyse thermotolerant coliform bacteria for E Coli.

\*\*Conductivity is an acceptable alternative to TDS. The above limits assume that Conductivity is twice TDS, but this relationship should be confirmed at each site if conductivity is used.

\*\*\* Whether the analysis of taste and odour by operators is acceptable depends on users.

Source: National Drinking Water Quality Standard (MIH)

*(Handwritten initials)*