

Appendices

Contents

A1. Member List of the Study Team	1-1
(1) Field survey.....	1-1
(2) Explanation of Draft Basic Design Report.....	1-1
A2. Study Schedule	2-1
(1) Field Survey	2-1
(2) Explanation of Draft Final Report.....	2-2
A3. List of Parties Concerned in the Recipient Country	3-1
(1) Field Survey	3-1
(2) Explanation of Draft Final Report.....	3-3
A4. Minutes of Discussions	4-1
(1) Minute of Discussion-1 October 8, 2008	4-1
(2) Minute of Discussion-2 February 20, 2009.....	4-16
A5. Soft Component (Technical Assistance) Plan	5-1
1 Background of Soft Component.....	5-1
(1) Background.....	5-1
(2) Basic Concept	5-1
(3) Operation and Maintenance System.....	5-1
2 Target of Soft Component.....	5-3
(1) Objective.....	5-3
(2) Points to consider for support organization.....	5-4
3 Output of soft component.....	5-4
4 Indicators of output achievement.....	5-6
5 Activities of the soft component (Input plan).....	5-7
(1) Category of Activities	5-7
(2) Role.....	5-9
(3) Contents of Activities	5-10
1) Workshops for Implementing Agency	5-10
2) Formation of resident's organization	5-10
3) Resident participation	5-11
4) Hygiene education	5-11
5) Instruction of O&M	5-12
6 . Method of procurement of implementing resource for Soft Component.....	5-13
7 Implementing schedule for.....	5-13
(1) Content of implementation.....	5-13
8 Output of Soft Component	5-14

9	Role of Implementing Agency	5-14
---	-----------------------------------	------

A6. Other Relevant Data 6-1

(1)	List of References and Documents.....	6-1
-----	---------------------------------------	-----

A7. References 7-1

(1)	Result of Selection of Target Villages.....	7-1
(2)	Flowchart of Selection of Target Villages.....	7-2
(3)	Comparison of Water Quality Standards.....	7-3
(4)	Stratum Faces and Expected Stratum Structure	7-4
(5)	Drilling Method by Faces and Total Length of Drilling by Village.....	7-5
(6)	The Number of Screens and Casings at each target village.....	7-6
(7)	Ground Water Zone Distribution Map	7-7
(8)	Judgment Criteria of Water Quality	7-8
(9)	Result of Social Survey	7-9
(10)	Result of Water Quality Survey	7-10
(11)	Result of Electrical Exploration	7-14
(12)	Letter from Department of Rural Water Supply, Ministry of Rural Development about EIA.....	7-26

A1. Member List of the Study Team

A1. Member List of the Study Team

(1) Field survey

From October 2, 2008 to November 10, 2008

No.	Name	Job title	Occupation
1	Mr. Noriak Nagatomo	Team Leader	Japan International Corporation Agency (JICA)
2	Mr. Noriyuki Ito	Planning Management	Japan International Corporation Agency (JICA)
3	Mr. Satoshi Ishida	Chief Consultant/ Water Supply Plan	Kokusai Kogyo., Ltd
4	Mr. Shoji Masumura	Social Survey/Operation & Maintenance	Kokusai Kogyo., Ltd
5	Mr. Shigeki Kihara	Hydrogeology & water quality/ Geophysical survey	Kokusai Kogyo., Ltd
6	Mr. Takeshi Yoshikawa	Construction & Procurement/ Cost Estimate	Kokusai Kogyo., Ltd

(2) Explanation of Draft Basic Design Report

From February 12, 2009 to February 21, 2009

No.	Name	Job title	Occupation
1	Mr. Kazuhiro Yoneda	Team Leader	Chief Representative, Japan International Corporation Agency (JICA) Cambodia Office
2	Mr. Noriyuki Ito	Planning Management	Japan International Corporation Agency (JICA)
3	Mr. Satoshi Ishida	Chief Consultant/ Water Supply Plan	Kokusai Kogyo., Ltd
4	Mr. Takeshi Yoshikawa	Construction & Procurement/ Cost Estimate	Kokusai Kogyo., Ltd

A2. Study Schedule

A2. Study Schedule

(1) Field Survey

	Date		JICA		Consultant				
			Mr. Nagatomo Team Leader	Mr. Ito Planning Management	Mr. Ishida Chief Consultant/ Water Supply Plan	Mr. Masumura Social Survey/ Operation & Maintenance	Mr. Kihara Hydrogeology & water quality/Geophysical survey	Mr. Yoshikawa Construction & Procurement/ Cost Estimate	
1	2	Thu	Traveling (Tokyo→Phnum Penh)						
2	3	Fri	Courtesy call, Explanation of ICR (JICA, EoJ, MRD, DRWS)			Preparing Social Survey	Preparing Hydrogeology and Geophysical Prospecting		
3	4	Sat	Visit the target villages (Phnum Penh→Memot)						
4	5	Sun	Visit the target villages (Memot)						
5	6	Mon	Discussion of PDRD, DORD, Traveling (Memot→Phnum Penh)					Traveling (Phnum Penh→Memot), Meeting with PDRD	
6	7	Tue	Meeting with Plan International and Foundation of Bill Gates						
7	8	Wed	Discussion of DRWS						
8	9	Thu	Discussion of DRWS						
9	10	Fri	Signing of Minute of Meeting, Reporting, Traveling (Phnum Penh→Bangkok)		Signing of M.M. Reporting				
10	11	Sat	Flight back (Bangkok→Tokyo)					Implementing	
11	12	Sun				Agency·Upper Level Plan· Trend Survey for the Aid	Market survey ,etc		
12	13	Mon							
13	14	Tue							
14	15	Wed							
15	16	Thu				Social Survey· O & M Survey		Geophysical Prospecting /Water Quality Survey	
16	17	Fri							Current state survey for the target district
17	18	Sat							
18	19	Sun							
19	20	Mon							
20	21	Tue				Aid Agency, Water Supply Plan, Water Facility Design Survey		Access Survey for the target villages	
21	22	Wed							
22	23	Thu							
23	24	Fri							
24	25	Sat	Field Investigation	Local Procurement Condition· Execution Plan Survey					
25	26	Sun							
26	27	Mon							
27	28	Tue	Current state survey for the target district	Geophysical Prospecting Results, Analysis of Water Quality Results					
28	29	Wed							
29	30	Thu			Implementing Agency, Budget, Social Economic Survey	Procurement Condition of P.Penh, Implementation Plan Survey			
30	31	Fri							
31	1	Sat	Document Filing	Document Filing·Making Report Reporting to JICA, DRWS Document Filing Traveling (Phnum Penh→Bangkok→Tokyo)					
32	2	Sun	Water Supply Plan· Water Facilities Design Survey						
33	3	Mon							
34	4	Tue							
35	5	Wed							
36	6	Thu							
37	7	Fri							
38	8	Sat							
39	9	Sun							
40	10	Mon							

EoJ: Japanese Embassy in Cambodia

MRD: Ministry of Rural Development

DRWS: Department of Rural Water Supply

PDRD: Provincial Department of Rural Development (Kampong Cham)

DORD: District Office of Rural Development (Memot)

(2) Explanation of Draft Final Report

	Date		JICA		Consultant	
			Mr. Yoneda	Mr. Ito	Mr. Ishida	Mr. Yoshikawa
			Team Leader	Planning Management	Chief Consultant / Water Supply Plan	Construction & Procurement / Cost Estimate
1	12	Thu	/	/	Traveling (Tokyo→P.Penh)	
2	13	Fri			Meeting with DRWS, Collect Information	
3	14	Sat			Visit the target villages (P.Penh→Memot)	
4	15	Sun			Visit the target villages (Memot→P.Penh)	
5	16	Mon	Meeting with JICA, Courtesy Call to MRD	Courtesy Call to MRD, JICA, Discussion with DRWS		Courtesy Call to JICA, Collect Information
6	17	Tue	/	Discussion with PDRD (P.Penh→ Kampong Cham) , Collect Information	Discussion with PDRD (P.Penh→Kampong Cham→P.Penh) , Collect Information	
7	18	Wed		Traveling (Kampong Cham→P.Penh) Collect Information	Collect Information	
8	19	Thu		Discussion with DRWS, Document Filing	Discussion with DRWS, Collect Information	
9	20	Fri	Meeting with JICA, Reporting to EoJ, Signing M/D (MRD)	Meeting with JICA, Reporting to EoJ, Signing M/D (MRD) Traveling (P.Penh→Bangkok→Tokyo)		Collect Information, Signing M/D (MRD) , Traveling (P.Penh→Bangkok→ Tokyo)
10	21	Sat	/	Traveling (Bangkok→Tokyo)		

EoJ: Japanese Embassy in Cambodia

MRD: Ministry of Rural Development

DRWS: Department of Rural Water Supply

PDRD: Provincial Department of Rural Development (Kampong Cham)

DORD: District Office of Rural Development (Memot)

A3. List of Parties Concerned in the Recipient Country

A3. List of Parties Concerned in the Recipient Country

(1) Field Survey

< Cambodia Side >

Ministry of Rural Development (MRD)

H. E. Chea Sophara Minister
H. E. Sao Chivoan State Secretary

Department of Rural Water Supply (DRWS)

Dr. Mao Saray Director

Department of Rural Health Care (DRHC)

Dr. Chea Samnang Director

Provincial Department of Rural Development (PDRD)

Mr. Chea Poly Director
Mr. Lay Chenda Chief, Water Supply
Mr. Chhem Lang Deputy Chief, Water Supply

District Office of Rural Development of Memot (DORD)

Mr. Sam Kim Srea Director

Ministry of Industry, Mines and Energy (MIME)

Mr. Tan Sokchea Director, Department of Potable Water Supply
Mr. Sorn Savnin Deputy Director, Department of Potable Water Supply

Ministry of Land Management, Urban Planning and Construction

Dr. Sareth Boramy Deputy General Director of Land Management and Urban Planning

Cambodian Mine Action Center (CMAC)

Mr. Cheng Rady Eastern Regional Office Manager

< Japanese Side >

Embassy of Japan in Cambodia

Mr. Kenichi Kobayashi Second Secretary

JICA Cambodia Office

Mr. Kazuhiro Yoneda Chief Representative
Mr. Hikoyuki Ukai Senior Representative
Mr. Shingo Morihata Representative
Mr. Meng Chan Vibol Assistant Resident Representative

< Other Parties >

Plan International Cambodia (PIC)

Mr. Oun Syvibola Country Water & Environmental Sanitation Advisor
Mr. Khorn Bola WES Coordinator Kampomg Cham

Asian Development Bank (ADB)

Mr. Wan Maung Team Leader, Tonle Sap Rural Water Supply and Sanitation Project

International Monetary Fund (IMF)

Dr. Renato M. Lee Project Implementation Specialist, Rural Water Supply and Sanitation Project

United Nations Children's Fund (UNICEF)

Mr. Kim Hor Assistant Project Officer, Water and environmental sanitation

Resource Development International Cambodia (RDI)

Mr. Sosamrach Khim Director's Assistant

(2) Explanation of Draft Final Report

< Cambodia Side >

Ministry of Rural Development (MRD)

H. E. Chea Sophara	Minister of MRD
PhD. THENG Cban-Sangvar	Director of Cabinet
Dr. Chan Darong	Director General for Technical Affairs
Mr. CHUOP Samath	General Director of General Department of Administration and Finance

Department of Rural Water Supply (DRWS)

Dr. Mao Saray	Director
PhD. Poutthy SRIN	Deputy Director

Department of Rural Health Care (DRHC)

Dr. Chea Samnang	Director
------------------	----------

Provincial Department of Rural Development (PDRD)

Mr. Chea Poly	Director
Mr. Lay Chenda	Chief, Water Supply

Ministry of Environment (MoE)

Mr. Puth SORITHY	Director of Environmental Impact Assessment Dept. and Representative of MoE in CDC
Mr. Duong SAMKEAT	Deputy Director of EIA Dept.

< Japanese Side >

Embassy of Japan in Cambodia

Mr. Kenichi Kobayashi	Second Secretary
-----------------------	------------------

JICA Cambodia Office

Mr. Kazuhiro Yoneda	Chief Representative
Mr. Shingo Morihata	Representative
Mr. Nobuo Sambe	Senior Advisor
Ms. Kori Nishiyama	Expert (statistics)
Mr. SEAK Pengkeang	Program Officer

< Other Parties >

Asian Development Bank (ADB)

Mr. Wan Maung	Team Leader, Tonle Sap Rural Water Supply and Sanitation Project
---------------	--

International Monetary Fund (IMF)

Dr. Renato M. Lee	Project Implementation Specialist, Rural Water Supply and Sanitation Project
-------------------	--

United Nations Children's Fund (UNICEF)

Mr. Kim Hor	Assistant Project Officer, Water and environmental sanitation
-------------	---

A4. Minutes of Discussion

A4. Minutes of Discussions

(1) Minute of Discussion-1 October 8, 2008

**MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR RURAL DRINKING WATER SUPPLY
IN KAMPONG CHAM PROVINCE (PHASE III)
IN THE KINGDOM OF CAMBODIA**

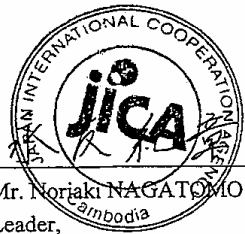
In response to a request from the Government of the Kingdom of Cambodia (hereinafter referred to as "the Cambodia"), the Government of Japan decided to conduct a Basic Design Study on the Project for Rural Drinking Water Supply in Kampong Cham Province (Phase III) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Cambodia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Noriaki NAGATOMO, Senior Advisor to the Director General, Global Environment Department, JICA, and is scheduled to stay in the country from 2nd October to 9th November.

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

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

Phnom Penh, 8th October, 2008



Mr. Noriaki NAGATOMO
Leader,
Senior Advisor to the Director General
Global Environment Department
Japan International Cooperation Agency



H.E. SO Chivoan
State Secretary,
Ministry of Rural development,
The Kingdom of Cambodia

ATTACHMENT

1. Objectives of the Project

The objective of the Project is to supply safe and stable drinking water for villages in Memot District in Kampong Cham Province.

2. Project Site

The sites of the Project are villages in Memot District as shown in Annex-1.

3. Responsible and Implementing Agency

3-1. The Responsible Agency is Ministry of Rural Development (MRD).

3-2. The Implementing Agency is Department of Rural Water Supply (DRWS).

4. Items requested by the Government of Cambodia

After discussions with the Team, the items described below were finally requested by Cambodian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

4-1. Tube wells construction in 72 villages (List of Villages as shown in Annex- 2)

4-2. Soft Components

a) Setting up and guidance of O &M organization

b) Hygiene campaign

5. Japan's Grant Aid Scheme

5-1. Cambodian side understands the Japan's Grant Aid Scheme ~~explained by the Team~~, as described in Annex- 3. The Team explained that there would be some changes on the procedures of Japan's Grant Aid scheme and that the renewed procedures might be explained by the Draft Report Explanation Team around February 2009.

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

6. Schedule of the Study

6-1. The consultants will proceed to further studies in Cambodia until 9th November 2008.

6-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around February 2009.

6-3. In case that the content of the draft report is accepted in principle by the Government of Cambodia, JICA will complete the final report and send it to the Government of Cambodia by April 2009.

7. Other relevant issues

7-1. Selection criteria for villages to be targeted for implementation

Both sides agreed that the targeted 72 villages would be examined by the Team on the conditions of the flowchart in Annex-5 including surveys on natural conditions and social conditions.

7-2. Use of DRWS equipment

The both side agreed that DRWS provide drilling equipment procured through former Japanese Grant Aid as shown in Annex-6 for implementation of the project. The Team explained that other drilling equipment necessary for implementation of the project will be leased from local contractors.

The Team requested the Cambodian side to bear the operation cost for the DRWS owned drilling equipment such as repair and overhaul costs, personnel costs, fuel costs and spare parts supplies costs.

The Cambodian side requested the Team that the said operation cost should be included Japanese Grant and the DRWS owned drilling equipment should be returned same as the present condition.

7-3. Confirmation of water quality standards for successful wells

The water quality standards in Cambodia and the water quality standards for successful wells constructed under this project are as shown in Annex-7.

7-4. Criteria for Water Supply Plan

The criteria for water supply plan of the Basic Design Study are confirmed as follows.

Criteria for Water Supply Plan

Items	Criteria	Reason
Target year	2015	Based on the target year of CMDGs aiming to achieve 50% coverage of water supply in rural area
Water demand (liters/capita/day)	40	Based on "the Project for Rural Drinking Water supply in Kampong Cham Province"
Serving population per deep well with hand pump	210	Based on "the Project for Rural Drinking Water supply in Kampong Cham Province"

7-5. Number of Deep Well with Hand Pump per Village

Both side agreed that the number of deep well with hand pump to be constructed per village shall be limited to five (5) based on "the Project for Rural Drinking Water Supply in Kampong Cham". However, this limitation of the number of deep well with hand pump will not be adopted to the villages which would be selected to have alternative drilling(s).

7-6. Alternative Drilling for Unsuccessful Wells

Both side agreed that the number of alternative drilling shall be only one for each site. In case alternative drilling will be failed, construction of water supply facility shall be cancelled at the same site. Because there is very little probability that the 2nd alternative drilling will be succeeded at the same site where sedimentary

aquifer is distributed horizontally in the certain depth in the target area. Both sides confirmed that Alternative Drilling(s) would be selected through further discussion between the Cambodian side and the Team.

7-7. Tax Payment

Cambodian side agreed to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in THE RECIPIENT COUNTRY with respect to the supply of the products and services under the verified contract.

7-8. Overlapping with other projects

Cambodian side explained that the project would not be overlapped with any other project supported by foreign and/or international donors, NGOs and Domestic official organization.

Annex-1 Project Site

Annex-2 List of Villages

Annex-3 Japan's Grant Aid Scheme

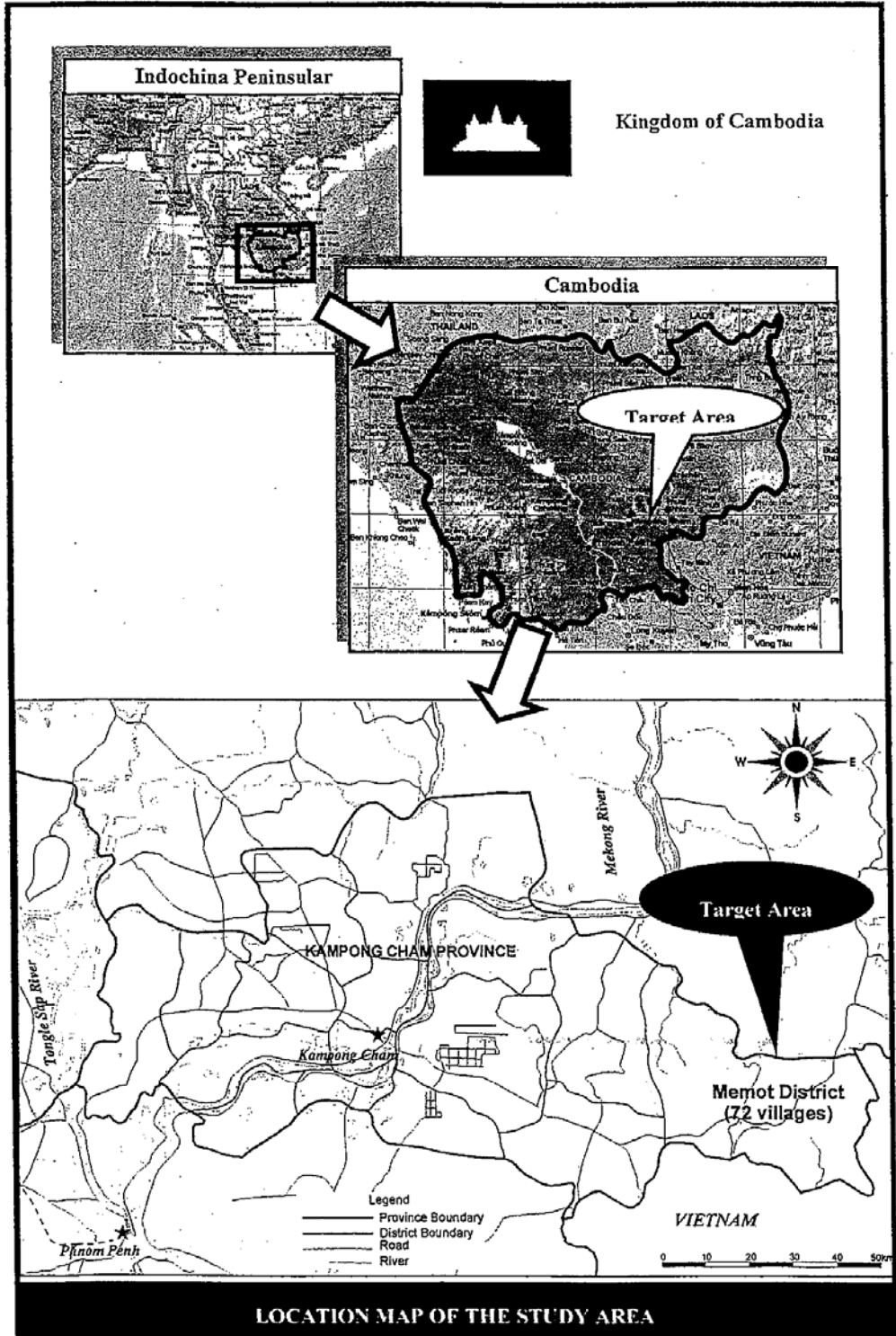
Annex-4 Major Undertakings to be Taken By each Government

Annex-5 Flow Chart of Selection of Target Villages

Annex-6 List of Equipment procured through Japan's Grant Aid

Annex-7 Water Quality Standard to Judge Successful Borehole Well

Annex-1 Project Site .



Handwritten marks: a squiggle and the number 2.

Annex-2 List of Villages

No.	District	Commune	Village	Estimated Population in 2010
1	Memot	Chan Mul	Ta Kaev	379
2	Memot	Chan Mul	Peam	158
3	Memot	Chan Mul	Kalou	124
4	Memot	Chan Mul	Amphol	316
5	Memot	Chan Mul	Khlong Tboung	320
6	Memot	Choam	Choam	326
7	Memot	Choam	Mong	217
8	Memot	Choam	Popoam	278
9	Memot	Choam	Stueng Angkam	231
10	Memot	Choam Kravien	Kravien Thum	1,228
11	Memot	Choam Kravien	Doung	984
12	Memot	Choam Kravien	Thma Ta Daok	65
13	Memot	Choam Kravien	Kbal Slaeng	462
14	Memot	Choam Kravien	Mkhaoh	1,278
15	Memot	Choam Kravien	Mroan	499
16	Memot	Choam Kravien	Thma Da	341
17	Memot	Choam Kravien	Danghet	41
18	Memot	Choam Kravien	Khmuor	497
19	Memot	Choam Kravien	Prei	772
20	Memot	Choam Kravien	Banghaeur Huos	396
21	Memot	Choam Kravien	Robang Chroh	393
22	Memot	Choam Kravien	Chi Plok	348
23	Memot	Choam Ta Mau	Ta Mau Cheung	125
24	Memot	Choam Ta Mau	Ta Mau Kaeut	904
25	Memot	Choam Ta Mau	Tuol Kruos	320
26	Memot	Choam Ta Mau	Srae Ta Pich	579
27	Memot	Choam Ta Mau	Koun Krapeu	348
28	Memot	Choam Ta Mau	Lam Baor	400
29	Memot	Dar	Chamkar Kor	171
30	Memot	Dar	Salang Ti Mouy	2,041
31	Memot	Dar	Salang Ti Pir	3,129
32	Memot	Dar	Kang Keng	841
33	Memot	Kampoan	Srae Kandal	958
34	Memot	Memong	Peuk	389
35	Memot	Memong	Kabbas	390
36	Memot	Memong	Cheach	417
37	Memot	Memong	Sambour	285
38	Memot	Memot	Masin Tuek	986
39	Memot	Memot	Tboung Voat	1,822
40	Memot	Memot	Chhngar Kaeut	344
41	Memot	Memot	Memot Thmei	648
42	Memot	Memot	Special Settlem	125
43	Memot	Memot	Sangkum Meanchey Thmei	779
44	Memot	Rung	Andoung Ta Chou	608
45	Memot	Rung	Doun Roadth Ti Muoy	795
46	Memot	Rumchek	Rumchek	1,072
47	Memot	Rumchek	Thma Dab	774
48	Memot	Rumchek	Srae Pongro	346
49	Memot	Rumchek	Khliech	251
50	Memot	Tramung	Ou Khlout	253
51	Memot	Tramung	Tramaeng Kraom	231
52	Memot	Tramung	Ngeu Thmei	307
53	Memot	Tramung	Trapeang Ngeu	205
54	Memot	Tramung	Doung	321
55	Memot	Tramung	Sambour	861
56	Memot	Tramung	Krouch	358
57	Memot	Tonlung	Kdoi Phsar	1,125
58	Memot	Tonlung	Changkum Ti Muo	679
59	Memot	Tonlung	Spean Changkum	303
60	Memot	Tonlung	Kaoh Thma	681
61	Memot	Tonlung	Mkaor	413
62	Memot	Tonlung	Lvea Leu	340
63	Memot	Tonlung	Sla	533
64	Memot	Tonlung	Special Settlem	499
65	Memot	Treak	Dak Por	1,556
66	Memot	Treak	Bangkov	1,417
67	Memot	Treak	Prei	558
68	Memot	Treak	Khley	467
69	Memot	Treak	Romeas Choul	254
70	Memot	Treak	Preah Ponlea	944
71	Memot	Treak	Samraong	1,454
72	Memot	Kokir	Chamkar Thmei	1,203
		Total		44,462

Annex-3 Japan's Grant Aid Scheme

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

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application (Request made by a recipient country)

Study (Basic Design Study conducted by JICA)

Appraisal & Approval (Appraisal by the Government of Japan and Approval by Cabinet)

Determination of Implementation (The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request. If necessary, JICA send a Preliminary Study Team to the recipient country to confirm the contents of the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted

by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and
- e) estimation of costs of the Project.

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

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates the Study and prepares a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

3. Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution,

conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

3) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"

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

5) Undertakings required to the Government of the recipient country

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
- d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may

be necessary for their entry into the recipient country and stay therein for the performance of their work;

f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and

g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

6) "Proper Use"

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

7) "Re-export"

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

8) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.

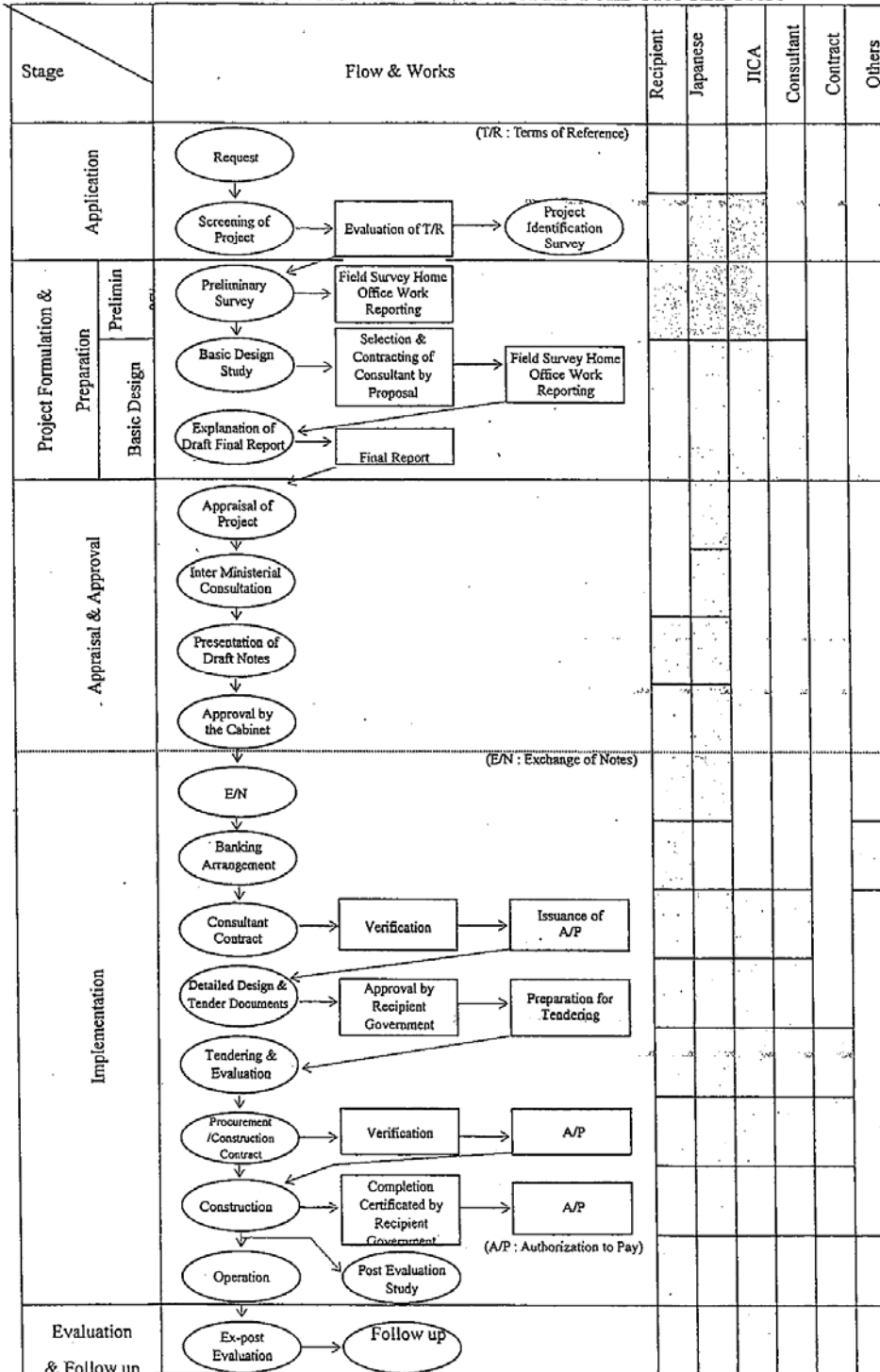
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

9) Authorization to Pay (A/P)

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

[Handwritten signatures]

FLOW CHART OF JAPAN'S GRANT AID PROCEDURES

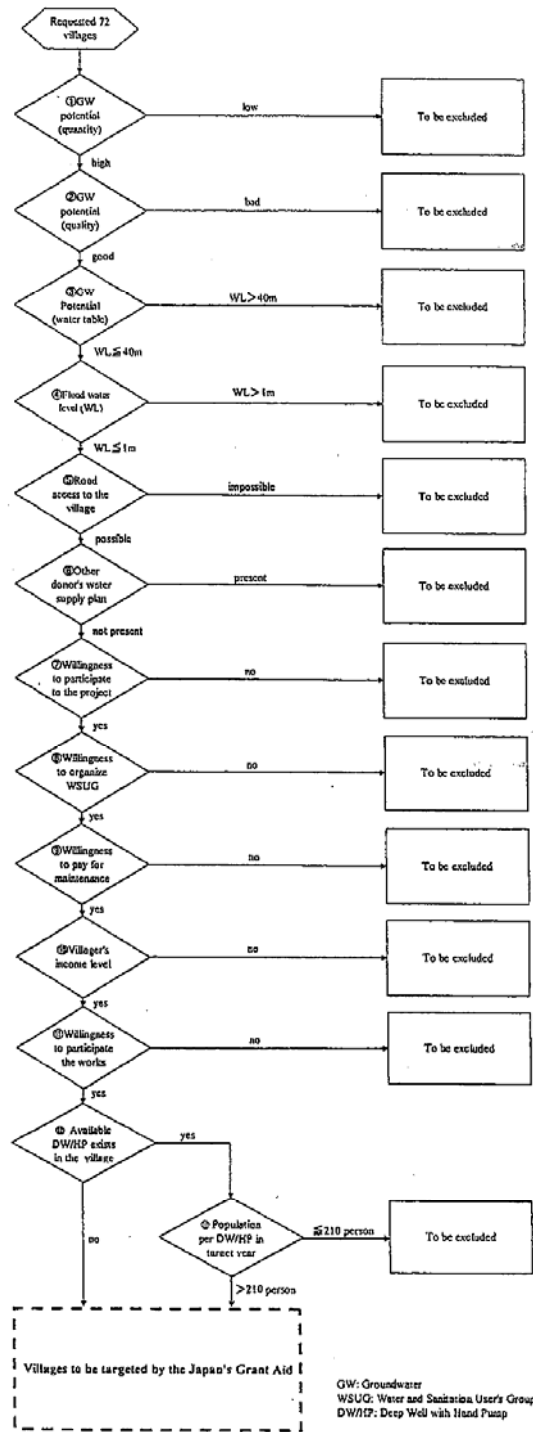


Annex-4 Major Undertakings to be Taken By each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To Bear the following commissions to the Japanese banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
5	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) country Marine (Air) transportation of the products from Japan the recipient	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
6	To accord Japanese nationals whose service may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●
8	To maintain and use properly and effectively the facilities contracted and equipment provided under the Grant		●
9	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

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

Annex-5 Flow Chart of Selection of Target Villages



Annex-6 List of Equipment procured through Japan's Grant Aid

	Items	Q'ty	Specification	Remark
A. Drilling equipment and supporting vehicles				
1	Drilling rig*	1	Truck mounted drilling rig YTD-45B	YBM
2	Drilling tools*	1	drilling bits, rod etc.	YBM
3	High pressure air compressor with Cargo Truck*	1	Discharge air capacity 21.2m ³ /min, Load 6t	Airman/ Nissan Diesel
4	Cargo truck with crane*	1	Load 6t, Lifting capacity 3t	Isuzu/ UNIC
5	Water tank truck*	1	6,000 litter	Isuzu
6	Fuel tank truck*	1	4,000 litter	Isuzu
B. Survey and test equipment				
1	Resistivity survey equipment*	1	Measurable depth not less than 150m	IRIS
2	Borehole logging equipment*	1	Measurable depth 150m	RG LOG
	Ditto**	1	Measurable depth 150m	Oyo
3	Low pressure air compressor*	1	Discharge air capacity 8.5m ³ /min	Airman
	Ditto**	1	Discharge air capacity 8.5m ³ /min	Airman
4	Pumping test equipment*	1	Pumping volume 100 L/min and head 80m, Generator 6.5 KVA	Okamoto/ Airman
	Ditto**	1	Pumping volume 80 L/min and head 80m, Generator 6.5 KVA	Okamoto/ Airman
5	Water analysis instruments*	1	Portable spectrophotometer	HACH
	Ditto**	1	Portable spectrophotometer	HACH
6	Truck with Crane**	2	Load 4 ton, lifting capacity 3 ton	Hino/ UNIC
7	Pick-up truck*	1	4WD, 5 persons, Load 0.5t	Isuzu

* Equipments procured by the Japan's Grant Aid "The Project for Rural Drinking Water Supply in Peri-Urban of Phnom Penh City" in 2003.

** Equipments procured by the Japan's Grant Aid "The Project for Rural Drinking Water Supply in Kampong Cham Province" in 2006

Annex-7 Water Quality Standard to Judge Successful Borehole Well

	WHO Guidelines for Drinking-water Quality (3rd Edition)		Drinking Water Quality Standards, January 2004 (Ministry of Industry Mines and Energy)		Proposed Water Quality Standard to Judge Successful Wells for the Project
	Value (mg/l)	Acceptability Aspect (mg/l) ^{a)}	Standard Value (mg/l)	Small water supply (less than 100 persons, or 100m ³ /day) (mg/l)	Value (mg/l)
1. Microbial aspects					
Total coliform	0 in 100ml sample	-	0 in 100ml sample	0 in 100ml sample	-
Thermotolerant coliform					
E.Coli.					
Faecal streptococques					
2. Naturally occurring chemicals					
Arsenic (As)	0.01	-	0.05	0.05	0.05
Barium (Ba)	0.7	-	0.7	-	-
Boron (B)	0.5	-	-	-	-
Chloride (Cl)	-	250	250	-	250
Chromium (Cr ₆₊)	0.05	-	0.05	-	-
Fluoride (F)	1.5	-	1.5	-	1.5
Hardness	-	-	300	-	-
Hydrogen sulphide (H ₂ S)	-	0.05	0.05	-	-
Manganese (Mn)	0.4	0.1	0.1	-	0.4
Molybdenum (Mo)	0.07	-	-	-	-
pH	-	-	6.5 - 8.5	6.5 - 8.5	-
Selenium (Se)	0.01	-	0.01	-	-
Sodium (Na)	-	200	200	-	-
Sulfate (SO ₄)	-	250	250	-	-
Total dissolved solid (TDS)	-	1000	800	800	800
Uranium (U)	0.015	-	-	-	-
Silver (Ag)	-	-	-	-	-
Aluminium (Al)	-	0.2	0.2	-	-
Iron (Fe)	-	0.3	0.3	0.3	2.0
Zinc (Zn)	-	3	3	-	-
Antimony (Sb)	0.02	-	-	-	-
Copper (Cu)	2	1	1	-	-
Lead (Pb)	0.01	-	0.01	-	-
Nickel (Ni)	0.02	-	0.02	-	-
3. Chemicals from agricultural activities					
Ammonium (NH ₄)	-	1.5	1.5	-	-
Nitrate (NO ₃)	50	-	50	-	50
Nitrite (NO ₂) (long/short term)	3/0.2	-	3	-	-
4. Others					
Taste	-	-	Acceptable	-	-
Color	-	15 TCU ^{b)}	5 TCU	-	-
Odor	-	-	Acceptable	-	-
Turbidity	-	5 NTU ^{c)}	5 NTU	5 NTU	5 NTU
Magnesium (Mg)	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-
Anionic detergent	-	-	-	-	-
Potassium (K)	-	-	-	-	-
Bicarbonate (HCO ₃)	-	-	-	-	-
Carbonate (CO ₃)	-	-	-	-	-
Free carbon dioxide (CO ₂)	-	-	-	-	-
Electric Conductivity	-	-	-	-	-

a) Value is not confirmed. It is valuable depend on the situation.

b) TCU: true colour unit

c) NTU: nephelometric turbidity unit

(2) Minute of Discussion-2 February 20, 2009

**MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR RURAL DRINKING WATER SUPPLY
IN KAMPONG CHAM PROVINCE (PHASE 3)
IN THE KINGDOM OF CAMBODIA
(EXPLANATION ON DRAFT REPORT)**

In October 2008, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Rural Drinking Water Supply in Kampong Cham Province (Phase 3) (hereinafter referred to as "the Project") to Cambodia and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult with the Government of Cambodia on the components of the draft report, JICA sent to Cambodia the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Kazuhiro YONEDA, Chief Representative, JICA Cambodia Office, from February 12th to 21st 2009.

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

Phnom Penh, 20th February 2009



Kazuhiro YONEDA
Leader
Chief Representative
Cambodia Office
Japan International Cooperation Agency



H.E. CHEA Sophara
Minister
Ministry of Rural Development
The Kingdom of Cambodia

ATTACHMENT

1. Components of the Draft Report

The Government of Cambodia agreed and accepted in principle the components of the Draft Basic Design Study Report explained by the Team. The components of the project are shown in Annex-1.

2. Japan's Grant Aid scheme

The Cambodian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Cambodia as explained by the Team and described in Annex-4.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Cambodia by May 2009.

4. Other relevant issues

4-1 . Alternative Drilling for Unsuccessful Wells

The Cambodian side agreed the following conditions in addition to the condition of alternative drilling for unsuccessful wells described in Attachment 7-6 of the Minutes of Discussions signed by both parties on 8th October 2008. Alternative villages are shown in Annex-2.

- 1) One well will be drilled at each village in order from largest population down, with the aim of securing an alternative water source in the case of the loss of the existing well.
- 2) From the 6th well on drilling will take place at the village with the lowest water supply rate, to be calculated by dividing the village population by (210 people multiplied by the number of existing wells). However, there is a maximum of five wells to a village.

4-2. Undertakings of the Cambodian side

The Team requested and the Government of Cambodia agreed on the following undertakings in addition to the major undertakings described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on 8th October 2008.

- 1) To lend equipment of Department of Rural Water Supply (hereinafter referred to as "DRWS") relating to drilling work, as agreed by minutes of discussion, to the Japanese contractor free of charge



- 2) To assign some Counter Part (hereinafter referred to as "C/P") personnel who will work together with Japanese consultant for establishing the operation and maintenance system and conducting hygiene education during the soft component programme (Provincial Department of Rural Development (hereinafter referred to as "PDRD") and District Office of Rural Development (hereinafter referred to as "DORD"))
- 3) To bear the allowances and other expenses related to the activities for C/Ps
- 4) To attend inspections
- 5) To prepare temporal roads, secure well construction sites, and level land enabling trucks with drilling materials to access the sites (by beneficiary)
- 6) To plant grass on the slope faces of the platform (by beneficiary)
- 7) To install fence for prevention of invasion by livestock (by beneficiary)
- 8) To construct terminal drainage channels from the well drainage ditches for water supply facilities (by beneficiary)

4-3. Change of the Project Title

Both sides agreed to change the Project Title from "The Project for Rural Drinking Water Supply in Kampong Cham Province (phase3)" to "The Project for Rural Drinking Water Supply in Memot District of Kampong Cham Province".

4-4. Project Cost estimation

The team explained to the Cambodian side the Project cost estimation as described in Annex-3. The team and the Cambodian side agreed that the Project cost estimation should never be duplicated or released to any outside parties before signing of all the Contract(s) for the Project.

The government of Cambodia understood that the Project cost estimation attached as Annex-3 is not final and is subject to change.

4-5. Overlapping with other projects

The Cambodian side explained that the project would not be overlapped with other projects supported by foreign and/or international donors, NGOs and Domestic official organizations.

Annex-1 : Components of the project

Annex-2: List of alternative villages

Annex-3 : Project Cost Estimation

Annex-4: Japan's Grant Aid Scheme



Annex-1 : Components of the project

(1) Number of Water Supply Facilities to be constructed

No.	Commune	ID	Village	Population*		Number of handpump wells**		Plan for the project
				2008	2015	Operating 2008	Required 2015	
1	Chan Mul	1	Ta Kaev	296	303	0	1	1
2	Choam	6	Choam	245	251	0	1	1
3	Choam	7	Mong	245	251	0	1	1
4	Choam	8	Poploam	321	328	0	2	2
5	Choam	9	Stueng Angkam	289	296	0	1	1
6	Choam Kravien	10	Kravien Thum	1,244	1,272	0	6	5
7	Choam Kravien	11	Doung	1,211	1,238	0	6	5
8	Choam Kravien	14	Mkhaoh	447	457	0	2	2
9	Choam Kravien	15	Mroam	504	515	0	2	2
10	Choam Kravien	17	Danghei	377	386	0	2	2
11	Choam Kravien	18	Khmuor	535	547	0	3	3
12	Choam Kravien	19	Prei	768	785	0	4	4
13	Choam Kravien	20	Banghaeur Huos	364	372	0	2	2
14	Choam Kravien	22	Chi Plok	310	317	0	2	2
15	Choam Ta Mau	23	Ta Mau Cheung	171	175	0	1	1
16	Choam Ta Mau	24	Ta Mau Kacut	790	808	0	4	4
17	Choam Ta Mau	25	Tuol Kruos	344	352	0	2	2
18	Choam Ta Mau	28	Lam Baor	235	240	0	1	1
19	Dar	29	Chamkar Kor	563	576	0	3	3
20	Dar	30	Salang Ti Mouy	1,126	1,151	0	5	5
21	Dar	31	Salang Ti Pir	2,024	2,070	0	10	5
22	Dar	32	Kang Keng	330	337	0	2	2
23	Kampon	33	Srae Kandal	1,246	1,274	1	6	5
24	Memong	34	Penk	406	415	0	2	2
25	Memong	35	Kambas	1,078	1,102	0	5	5
26	Memong	36	Cheuch	358	366	0	2	2
27	Memong	37	Sambour	179	183	0	1	1
28	Memot	39	Tboung Vost	1,907	1,950	0	9	5
29	Memot	40	Chinggar Kaeut	345	353	0	2	2
30	Memot	41	Memot Thmei	271	277	0	1	1
31	Rung	44	Andoung Ta Chou	692	708	2	3	1
32	Rung	45	Doun Roedth Ti Muoy	854	873	0	4	4
33	Rumchek	47	Thma Dab	1,076	1,100	0	5	5
34	Rumchek	49	Khleoch	556	569	0	3	3
35	Tramung	50	Ou Khleut	209	214	0	1	1
36	Tramung	51	Tramaeng Kraom	168	172	0	1	1
37	Tramung	52	Ngeu Thmei	263	269	0	1	1
38	Tramung	53	Trapeang Ngeu	164	168	0	1	1
39	Tonlung	57	Kdol Phsar	1,155	1,181	2	6	4
40	Tonlung	58	Changkum Ti Muo	578	591	0	3	3
41	Tonlung	59	Spenn Changkum	383	392	0	2	2
42	Tonlung	60	Kaoh Thma	679	694	0	3	3
43	Tonlung	61	Mkaor	385	394	0	2	2
44	Tonlung	62	Lvea Leu	397	406	0	2	2
45	Treak	65	Dek Por	1,118	1,143	1	5	4
46	Treak	66	Bangkov	1,102	1,127	4	5	1
47	Treak	67	Prei	493	504	0	2	2
48	Treak	68	Khley	387	396	0	2	2
49	Treak	69	Romeas Choul	213	218	0	1	1
50	Treak	70	Preah Ponlea	816	834	0	4	4
51	Treak	71	Samraong	1,113	1,138	0	5	5
52	Kokir	72	Chamkar Thmei	1,014	1,037	0	5	5
Total				32,344	33,075	10		136

* Annual population growth rate: 0.32% (Source: General Population Census of Cambodia 2008, National Institute of Statistics, Ministry of Planning, August 2008)

** Serving population per handpump well: 210person (round off)

(2) Components of Water Supply Facilities

Type of Work	Specification	Sites	Description of Work	Responsible Organization
Well	4" PVC Screen casing Depth: 30~65m	136	Preparation work (geophysical survey, ground levelling, drilling rig setup), drilling work, well logging, insert casing/ screen, aggregate fillings, cleaning of wells, pumping test, water quality test, backfilling, stopping water, after construction work (clean-up, removal)	Japanese Contractor
Filling soil	30cm above ground level	136	Filling soil and compaction	Japanese Contractor
Platform/drainage	Reinforced concrete	136	Ground levelling, moulding work, reinforcing work, concrete laying/ curing	Japanese Contractor
Hand Pump	Afridev type	136	Procurement and installation	Japanese Contractor
Fore slope planting	Grasses surrounding the sites	136	Protection of fore slope by planting	Residents
Iron removal device	Stainless portable equipment	11	Procurement and setup	Japanese Contractor
Hygiene Education Billboard	Stainless	136	Procurement and setup	Japanese Contractor
Fence		136	Installed with residents' own creativity for prevention of invasion of livestock	Residents

(3) Technical Assistance

Item	Activities	Output
Workshop for PDRD&DORD	A workshop will be held for PDRD and DORD staff in order to determine project contents, and implementation plan and method for soft component activities.	The support system of Operation and Maintenance (hereinafter referred to as "O&M") of PDRD and DORD is strengthened.

Handwritten signature/initials

Item	Activities	Output
Formation of resident organization	<p>The objective and the contents of the project are explained. The residents' participation and cooperation intentions shall be confirmed.</p> <p>The necessity for WSUG is explained and shall be established.</p> <p>The necessity for O&M fund is explained and shall be collected.</p> <p>The bank account to deposit O&M fund shall be established.</p>	Water and Sanitation User's Group (hereinafter referred to as "WSUG") is established as a sustainable O&M organization.
Residents' participation	<p>Construction site for water supply facilities shall be determined through democratic discussion.</p> <p>Residents' responsibilities shall be explained and their intent to cooperate confirmed.</p> <p>Access roads to and the clearing of well drilling sites shall be constructed by residents.</p> <p>Fore slope planting, construction of drainage canal, and livestock protection fence shall be constructed by residents.</p>	Residents will conduct O&M with a sense of ownership.
Hygiene education	Participatory Hygiene and Sanitation Transformation program (PHAST) of Ministry of Rural Development and Department of Rural Health Care, shall be implemented.	Resident's consciousness of health and healthy habits improved.
Instruction of O&M	<p>The role which WSUG should perform shall be explained.</p> <p>Management method of the O&M fund deposited in a bank account shall be explained.</p> <p>Daily Management method shall be instructed.</p> <p>Maintenance of fore slope planting, construction of drainage canal, and livestock protection fence, shall be instructed.</p> <p>Replacement and procurement method of spare parts shall be instructed.</p> <p>Correspondence procedure for the request of maintenance support to DORD shall be instructed.</p> <p>Maintenance method for iron removal device shall be instructed.</p>	WSUG will master the techniques for O&M.

Annex-2. List of alternative villages

Commune	Village	Estimated population in 2015	Number of water supply facilities to be constructed		
			Existing wells	Required wells	Planned wells
Dar	Dar Kandaoul	2,564	1	12	4
Tramung	Khnong Krapeu Kaeut	2,175	1	10	4
Dar	Dar Tboung	1,110	1	5	4
Dar	Dar Cheung	889	1	4	3
Dar	Beng	457	1	2	1

Annex-4 Japan's Grant Aid Scheme

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as part of this realignment, JICA was reborn on October 1, 2008. After the reborn of JICA, following the decision of the GOJ, Grant Aid for General Project is extended by JICA.

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

1. Grant Aid Procedures

Japanese Grant Aid is conducted as follows-

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

2. Preparatory Survey

(1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.

- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

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

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

(2) Selection of Consultants

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

(3) Result of the Survey

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

3. Japan's Grant Aid Scheme

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

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

(2) Selection of Consultants

The consultant firm(s) used for the Survey will be recommended by JICA to the recipient country

to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical consistency.

(3) Eligible source country

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

(4) Necessity of "Verification"

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

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

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex-4 of the Minutes of Discussions signed by both parties on 8th October 2008.

(6) "Proper Use"

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

(7) "Export and Re-export"

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

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making

payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

- b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

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

(10) Social and Environmental Considerations

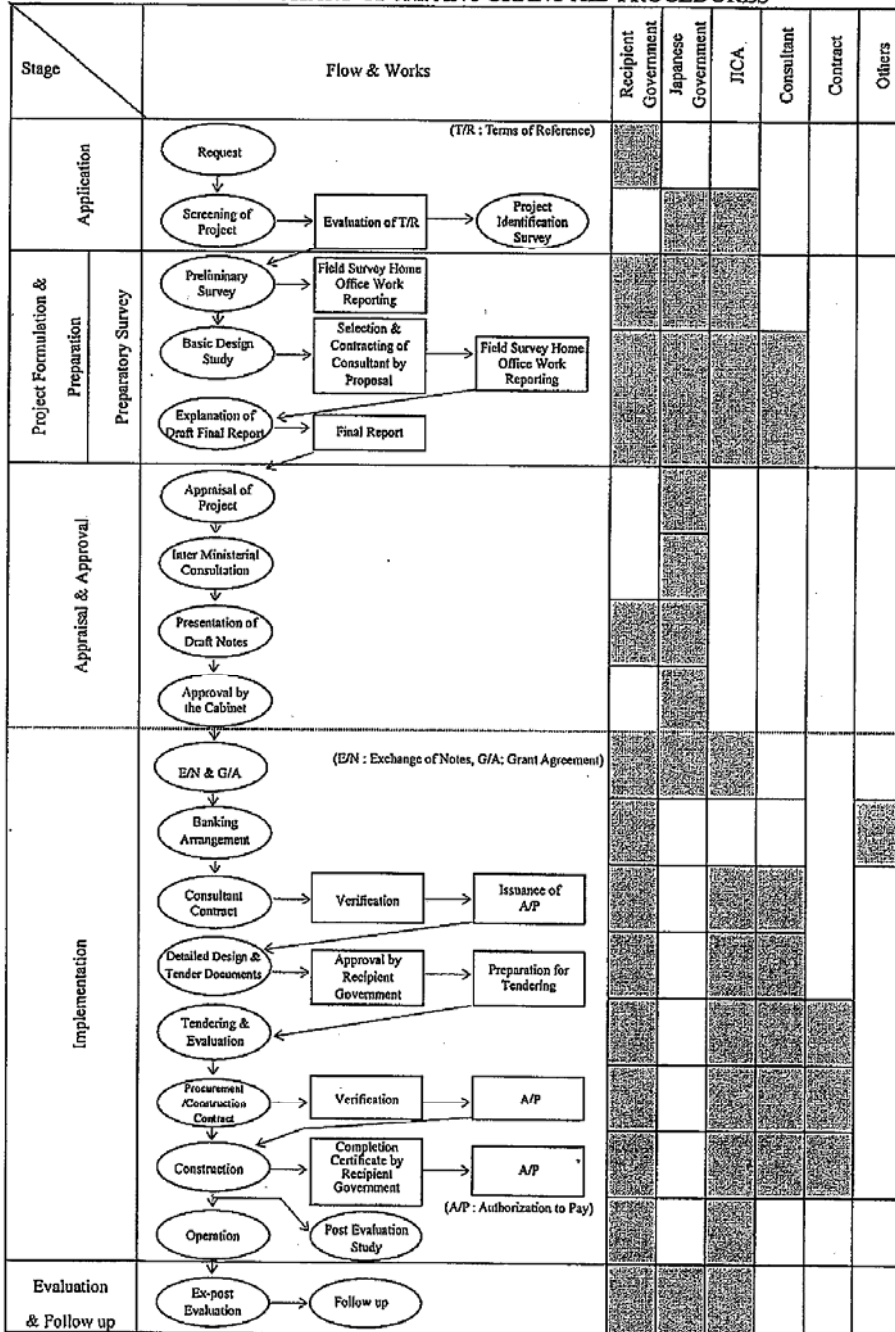
A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.



(End)



FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



Handwritten signature/initials

*A5. Soft Component
(Technical Assistance) Plan*

A5. Soft Component (Technical Assistance) Plan

1 Background of Soft Component

(1) Background

It is prescribed by “National Policy on Water Supply and Sanitation,” and “Guideline on Water and Sanitation User Group,” that O&M of water supply facilities is mainly carried out by WSUG.

In the past donor projects encountered problems such as no WSUG type organization being established, deposit of O&M fund, understanding of repair method, repair tools or spare parts, and no sense of ownership, because of the lack of an O&M organization or training on a village level. For this reason, many wells that broke down were left without being repaired. Only 6 sites are working among 45 sites installed from 2000 to 2001 due to insufficient O&M.

On the other hand, WSUG organized by soft component of previous Grant Aid Project are still continuing activities such as storage of O&M fund, spare part replacement, etc., and the constructed facilities that provide safe water are being used sustainably.

Moreover, although traditional dug wells serve as the main water source, sewage flows into the wells during the rainy season. So residents are forced into a life with unsanitary water. Residents in the target village do not have sufficient knowledge about health issues, so waterborne diseases (diarrhoea, dysentery, typhoid fever, etc.) are widespread.

(2) Basic Concept

Under such circumstance, the following issues should be considered for improving the sustainability of water supply facilities constructed in this project in order to achieve the project goal which is “To supply safe and stable drinking water in target villages.”

- i) Setting up of sustained O&M organization at the village level,
- ii) Improvement of residents’ awareness of ownership,
- iii) Improvement of residents’ awareness of hygiene,
- iv) Enhancement of O&M skills at the village level

A soft component is planned for the purpose of solving these subjects.

(3) Operation and Maintenance System

In this plan, WSUG will be established for each water supply facility and will be conducted O&M actively, in

accordance with “National Policy on Water Supply and Sanitation” and "Guideline on Water and Sanitation User Group in Cambodia”.

DORD, PDRD, DRWS, and a private company support this O&M. Role of concerned parties concerning O&M is shown in Table 1-1. Moreover, structure of WSUG and common duties is shown in Table 1-2.

Table5-1: Segregation of duties for concerned parties concerning O&M

Organization	Duties
WSUG	<ul style="list-style-type: none"> - Maintenance and check of a water supply facilities - Spare parts replacement - Minor repairs of the water supply facilities - Storage of O&M fund - Payment of the spare parts and repair costs - Request technical assistance from DORD
DORD	<ul style="list-style-type: none"> - Inspection tour of water supply facilities - Instruction on WSUG organization - Stock management of spare parts - Management of the spare part payment of WSUG - Procurement support of spare parts - Technical guidance to WSUG on repairs - Repair support of major failures - Request technical assistance from PDRD
PDRD	<ul style="list-style-type: none"> - Supervise and support DORD - Repair support of major failures -Request technical assistance from DRWS
DRWS	<ul style="list-style-type: none"> - Supervise and support PDRD - Repair support of major failures
Private Company	<ul style="list-style-type: none"> - Repair of major failures

Table 5-2: The Structure and Common Duties of WSUG of Members

Member	Duties
Chief	<ul style="list-style-type: none"> - Represents the water and sanitation user group in consultation and discussion with the local authority, the village development committee and the donators, as well as keeping good relationship with representatives of those aid agencies who deal with water and sanitation supply issues. - Leads monthly meeting and other necessary meetings. - Ensure that the properties provided by donators are managed and controlled carefully. - Leads the group in monitoring and evaluating all activities related with water

	<p>and sanitation supply program.</p> <ul style="list-style-type: none"> - Making report to the village development committee and village chief in case any well is broken and can not be repaired by the people in the village etc.
Deputy Chief	<ul style="list-style-type: none"> - Assistant to chief and do all works when a chief is absent - In charge of minor technical works - Effectively keeps spare parts and equipment - Monitors the funds collected from the community - Takes responsibility and completes works delegated by the chief - Participates in all meetings invited by the chief of water and sanitation user group
Member in charge of finance	<ul style="list-style-type: none"> - Encourages villagers to contribute money, materials, or labour before and after drilling the well. - Collects and keeps the budget for repairs and maintenance - Controls and reports on funds collected at each water source to the chief, deputy chief and other members of the WSUG. - Preparing list of income and expenditure of the budget in order to report to chief, deputy chief, the WSUG members and other people living in the village. - Participates in all meetings invited by the chief of the WSUG.
Member in charge of water supply	<ul style="list-style-type: none"> - Collaborates and coordinates with technical officers on the construction of the water supply service system. - Controls and promotes water source protection in the village. - Reports on damage of the water supply service in the village to chief of the WSUG. - Joins in the training regarding the maintenance and repairing of the wells or the water source by technical officer. - Takes responsibility in maintenance and repairing the water source (wells etc.) - Participates in all of the various meetings invited by chief of the WSUG.
Member in charge of sanitation	<ul style="list-style-type: none"> - Collaborates and coordinates with the technical officer on providing sanitation services such as latrines, sewage drainage, removing muddy holes, and digging waste holes etc. - Control and promote implementation of water sanitation and hygiene around the house by making a gate around the well or building bath room etc. - Join in training concerning utilization of water and sanitation, and pass on to other villagers to educate them. - Report on lack of hygiene to the chief of WSUG if there is any member who does not change their habits impacting public health in the community. - Participate in all meetings invited by chief of WSUG.

2 Target of Soft Component

(1) Objective

In order to achieve the project goal of “To supply safe and stable drinking water in target villages,” and the Primary Objective of “To improve living and hygienic environment of the residents in target villages,” the following soft component objectives are given in Table 5-3, and soft component relating to the formation of resident’s organization, resident participation, hygiene education, and to the instruction of O&M will be implemented in this project.

Table 5-3: Objectives of Soft Component

Target 1: The support system of O&M of PDRD and DORD is strengthened.
Target 2: WSUG is established as a sustainable O&M organization.
Target 3: Residents will conduct O&M with a sense of ownership.
Target 4: Residents' hygiene consciousness is improved, supplied safe water is used effectively, and correct habits and actions regarding health are taken.
Target 5: Residents gain village level O&M capability.

(2) Points to consider for support organization

The soft component will be implemented at village level encompassing every WSUG, in order to assure work efficiency. The soft component is actively carried out by PDRD and DORD, and a Japanese and a local consultant lead and supervise this. The soft component activities are actively carried out by PDRD. However, DORD and PDRD staff do not have sufficient English capability, meaning communication with the Japanese consultant and making reports in English is difficult. Therefore, local consultants superintend and manage these activities.

3 Output of soft component

The soft component activities and output are summarized as follows.

Table 5-4: Project Activities and Output

Item	Activities	Output
Workshop for PDRD · DORD	A workshop will be held for PDRD and DORD staff in order to determine project contents, and implementation plan and method for soft component activities.	The support system of O&M of PDRD and DORD is strengthened.
Formation of resident organization	<p>The objective and the contents of the project are explained. The residents' participation and cooperation intentions shall be confirmed.</p> <p>The necessity for WSUG is explained and shall be established.</p> <p>The necessity for O&M fund is explained and shall be collected.</p> <p>The bank account to deposit O&M fund shall be established.</p>	WSUG is established as a sustainable O&M organization.

Item	Activities	Output
Residents' participation	<p>Construction site for water supply facilities shall be determined through democratic discussion.</p> <p>Residents' responsibilities shall be explained and their intent to cooperate confirmed.</p> <p>Access roads to and the cleaning of well drilling sites shall be constructed by residents.</p> <p>Fore slope planting, construction of drainage canal, and livestock protection fence shall be constructed by residents.</p>	Residents will conduct O&M with a sense of ownership.
Hygiene education	Participatory Hygiene and Sanitation Transformation program (PHAST) of MRDs DRHC, shall be implemented.	Resident's consciousness of health and healthy habits improved.
Instruction of O&M	<p>The role which WSUG should perform shall be explained.</p> <p>Management method of the O&M fund deposited in a bank account shall be explained.</p> <p>Daily Management method shall be instructed.</p> <p>Maintenance of fore slope planting, construction of drainage canal, and livestock protection fence, shall be instructed.</p> <p>Replacement and procurement method of spare parts shall be instructed.</p> <p>Correspondence procedure for the request of maintenance support to DORD shall be instructed.</p> <p>Maintenance method for iron removal device shall be instructed.</p>	WSUG will master the techniques for O&M.

Output 1 The support system of O&M of PDRD and DORD is strengthened

It is stipulated in "National Policy on Water Supply and Sanitation," and "Guideline on Water and Sanitation User Group," that PDRD and DORD will support O&M of water supply facilities, which is mainly carried out by WSUG. PDRD and DORD staff will proactively carry out soft component activities so that a system of close cooperation with WSUG will be built, and a support system for O&M will be strengthened in future.

Output 2 WSUG are established as sustainable O&M organizations

As shown in the "National Policy on Water Supply and Sanitation" and "Guideline on Water and Sanitation User Group," WSUG is an O&M organization by residents and should mainly carry out the O&M for water supply facilities. Since establishment of WSUG is indispensable in order to use water supply facility sustainably, it shall be organized as a soft component activity.

Output 3 Residents will conduct O&M with a sense of ownership

In order for residents to sustainably implement O&M activities, it is necessary to enhance their sense of ownership of the project. In order to achieve this, it is important for the residents to be involved in the decision making for the well drilling site, and for residents to participate in construction work.

Output 4 Resident’s consciousness of health and sanitary habits improved

Many shallow wells that are unsanitary exist in the target area, so it is important for water problems in the target area to solve water quality, rather than water volume. Even if good water sources are secured by this project, if the conversion for water supplies is not made from the unsanitary water sources which residents use for drinking, water supply facilities will not be used sustainably, and the aim of decreasing waterborne diseases will not be fully realized. Residents shall have the right health knowledge and fully understand the importance of using safe water with the aim of improving sanitary habits.

Output 5 WSUG will master the techniques for O&M

In order to use facilities sustainably, WSUG needs to master required O&M. Most hand pump breakdowns are slight and can be fixed by the residents themselves. For this reason, WSUG shall master technology required for O&M so that water supply facilities can be used sustainably.

4 Indicators of output achievement

The performance of the soft component is verified using a checklist. The checklist (draft) is as shown below, but it may be added to or amended in line with the actual situation when conducting soft component activities.

Table 5-5: Indicator to achieve output

Output	Indicator	Measurement
The support system of O&M of PDRD and DORD is strengthened.	Are the objectives and contents of the project understood?	Interview
	Is the hygiene education by PDRD carried out?	Interview
	Is the role of support activities of O&M by DORD understood?	Interview
WSUG is established as a sustainable O&M organization.	Is WSUG established?	WSUG by-law
	Is WSUG’s board selected?	WSUG by-law
	Do the members of each WSUG understand their roles?	Interview
	Is the O&M fund deposited in a bank account?	Bank book
Residents will conduct	Is the construction site of the water supply	Interview

Output	Indicator	Measurement
O&M with a sense of ownership.	facility determined democratically by resident consensus?	
	Has fore slope planting, construction of drainage canal, and livestock protection fence been carried out?	Site survey
Resident's consciousness of health and sanitary habits improved.	Is waterborne disease understood?	Questionnaire
	Is the neighbourhood of a water supply facility cleaned?	Questionnaire
	Is safe water used?	Questionnaire
WSUG will master the techniques for O&M.	Is daily usage, rules, and check method for facility understood?	Questionnaire
	Is the management method of the bank account for O&M fund understood?	Interview
	Can hand pump dismantling, raising, and re-installation be performed?	Interview
	Are the tools and spare parts kept?	Interview
	Can replacement of spare parts be performed?	Interview
	Is the procurement method of spare parts understood?	Interview
	Is the maintenance method for iron removal device understood?	Interview
	Is the correspondence procedure for the request of maintenance support to DORD understood?	Interview

5 Activities of the soft component (Input plan)

(1) Category of Activities

The soft component activities are categorized into two sections: formation of resident's organization and resident participation before construction; and hygiene education and instruction of O&M during and after construction. Japanese consultant will supervise and instruct the whole activity using local resources. Category of activities is shown in below.

Table 5-6: Contents of soft component activity

		Activity Items		Contents	Feature	Target Audience		
Community development	A	Workshop for Implementing Agency	A1	Workshop for Implementing Agency	After giving explanation of contents of project, role of implementing organization, implementation method, etc. to PDRD and DRWS staff, a detailed plan for soft component activity is determined. The role of PDRD and DORD in soft component activity is determined, and a consensus reached to carry it out with responsibility.	Workshop	PDRD staff/ DORD staff	
	B	Formation of resident organization	B1	Kick-off meeting (Explanation to village leaders)	The intention of participation and cooperation in this project is confirmed after explanation of the contents of the project to the village chief and the village leader of VDC. Establishment of WSUG, determination of the well construction point in village and arrangement of WSUG is requested.	Workshop	Village chairman/VDC members	
			B2	Workshop for formation of resident's organization-1 (Explanation to villagers)	A resident meeting will be held for all residents in the target villages which will focus on contents of this project, and understanding of the necessity of O&M and an O&M fund. Intention of cooperation for this project is confirmed and explanation of construction work where resident participation is necessary, such as preparation of well construction sites, securing road access, planting on slope faces, protection fence from livestock, and drainage canal. The contents of activities next time, which shall be determined by establishment of WSUG, and criteria for democratically determining well construction point, is explained, and preparation for next activities is requested.	Village meeting	Residents	
			B3	Workshop for formation of resident's organization-2 (Establishment of WSUG)	A resident meeting will be held for all residents in the target villages which will focus on understanding of the necessity and role of WSUG. WSUG members in each village are elected by a democratic method, and internal regulation of WSUG is made. Collection of O&M fund before construction and deposit in a bank will be explained by WSUG, and the amount of collection for O&M fund from each household shall be determined by a democratic method. Moreover, deadline for collection of O&M fund shall be determined. And, an explanation that well construction work will not commence until collection of O&M fund is completed. Moreover, it is requested that the well construction point should be selected by a democratic method for every WSUG by next workshop.	Village meeting	Residents	
			B4	Workshop for formation of resident's organization-3 (Final confirmation of well construction)	A workshop will be held by WSUG members. Collection of O&M fund shall be confirmed, and how to start a bank account, make deposits, and manage deposits is explained to WSUG, and if necessary support of banking procedures is given. The well construction point selected for every WSUG shall be decided after confirming there are no obstacles to the construction work.	Workshop	WSUG members	
	C	Residents' participation	C1	Resident participation-1 (Securing road access)	Securing road access and preparation of well construction site, etc. are practically instructed to WSUG members and residents, and confirmation that there are no obstacles to the well construction work.	On-the-job training	WSUG members/ Residents	
			C2	Resident participation-2 (Neighborhood maintenance of water supply facility)	After completion of well construction, planting on slope faces, construction of protection fence from livestock, and drainage canal by WSUG members and residents is implemented in the form of on-the-job training.	On-the-job training	WSUG members/ Residents	
	Hygiene education	D	Hygiene education	D1	Hygiene education [Participatory Hygiene and Sanitation Transformation (PHAST)]	The PHAST program of DRHC is introduced into the hygiene education of this plan, the improvement activities of sanitary habits by the resident themselves are carried out after their education in health facts and knowledge.	Workshop	WSUG members/ Residents
	Operation and maintenance	E	Instruction of O&M	E1	Instruction of O&M-1 (Classroom lecture)	A workshop will be held for WSUG members, and an explanation given so that they can gain an understanding of their individual responsibilities: O&M of facilities, rules of use, daily checking, cleaning of the neighborhood, the correspondence method in the event of breakdown, procurement method of spare parts, and management method of bank account for O&M fund.	Workshop	WSUG members
				E2	Instruction of O&M-2 (On-the-job training)	A workshop will be held for WSUG members with practical instruction in how to repair hand pumps. An understanding of hand pump structure is given, repair tools distributed, and method of use is explained. Spare parts are distributed and replacement method explained. A hand pump is taken apart, and practical training in how to re-install it after the spare parts have been replaced.	On-the-job training	WSUG members

(2) Role

The role of the parties concerned, including the implementing agency, are shown in Table 5-7

Table 5-7: Role of concerned parties

Concerned Party	Role
Japanese consultant	<p>Overall supervision of soft component</p> <p>Coordination and discussion among DRWS, PDRD, DORD, and local consultant</p> <p>Preparation of execution plan for soft component program</p> <p>Training of local consultants in soft component implementation contents and procedure</p> <p>Holding of workshops for PDRD and DORD</p> <p>Holding of workshops to organize WSUG</p> <p>Technical guidance relating hygiene education</p> <p>Technical guidance relating to repair and O&M of facilities</p>
Local consultant	<p>Overall supervision and implementation of soft component during absence of Japanese consultant</p> <p>Consensus and discussion among DRWS, PDRD, DORD, and local consultant during absence of Japanese consultant</p> <p>Making activity report in English during absence of Japanese consultant</p> <p>Holding of workshops for PDRD, DORD, Village, and WSUG</p> <p>Holding of workshops to organize WSUG</p> <p>Supervision and making activity reports in English relating to hygiene education conducted by PDRD</p> <p>Training relating to repair and O&M of facilities for WSUG</p>
DRWS	<p>Overall management of program with cooperation of Japanese consultant</p> <p>Request for cooperation to PDRD and DORD regarding implementation of program</p>
DRHC	Instruction of the method of hygiene education to PDRD
PDRD	Implementation of hygiene education
DORD	<p>Holding of workshops to organize WSUG</p> <p>Instruction of resident participation activities</p> <p>Training relating to repair and O&M of facilities for WSUG</p>

Concerned Party	Role
VDC/ village chairman	Consensus formation throughout the village about participation in the project Layout plan of water supply facilities of entire village
WSUG/residents	Formation of WSUG organization and election of a board Collection of O&M fund Establishment of a bank account, making deposits into the O&M fund bank account, storage of bank book Determining construction site of water supply facilities Construction work residents are responsible for Participation in hygiene education Participation in training relating to repair and O&M of facilities Storage of a repair tools Storage of a spare parts

(3) Contents of Activities

1) Workshops for Implementing Agency

A1 Workshop for Implementing Agency

After giving explanation of contents of project, role of implementing organization, implementation method, etc. to PDRD and DRWS staff, a detailed plan for soft component activity is determined. The role of PDRD and DORD in soft component activity is determined, and a consensus reached to carry it out with responsibility.

2) Formation of resident's organization

B1 Kick-off meeting (Explanation to village leaders)

The intention of participation and cooperation in this project is confirmed after explanation of the contents of the project to the village chief and the village leader of VDC. Establishment of WSUG, determination of the well construction point in village, and arrangement of WSUG is requested.

B2 Workshop for formation of resident's organization-1 (Explanation to villagers)

A resident meeting will be held for all residents in the target villages which will focus on contents of this project, and understanding of the necessity of O&M and an O&M fund. Intention of cooperation for this project is confirmed and explanation of construction work where resident participation is necessary, such as preparation of well construction sites, securing of road access, planting on slope faces, protection fence from livestock, and drainage canal. The contents of activities next time, which shall be determined by establishment of WSUG, and criteria for determination of well construction point by a democratic method, is explained, and preparation for

next activities is requested.

B3 Workshop for formation of resident's organization-2 (Establishment of WSUG)

A resident meeting will be held for all residents in the target villages which will focus on understanding the necessity and role of WSUG. WSUG members in each village are elected by a democratic method, and internal regulation of WSUG is made. Collection of O&M fund before construction and deposit in a bank will be explained by WSUG, and the amount of collection for O&M fund from each household shall be determined by a democratic method. Moreover, deadline for collection of O&M fund shall be determined. And, an explanation that well construction work will not commence until collection of O&M fund is completed. Moreover, it is requested that the well construction point should be selected by a democratic method for every WSUG by next workshop.

B4 Workshop for formation of resident's organization-3 (Final confirmation of well construction)

A workshop will be held by WSUG members. Collection of O&M fund shall be confirmed, and how to start a bank account, make deposits, and manage deposits is explained to WSUG, and if necessary support of banking procedures is given.

The well construction point selected for every WSUG shall be decided after confirming there are no obstacles to the construction work.

3) Resident participation

C1 Resident participation-1 (Securing road access)

Securing road access and preparation of well construction site, etc. are practically instructed to WSUG members and residents, and confirmation that there are no obstacles to the well construction work.

C2 Resident participation-2 (Neighbourhood maintenance of water supply facility)

After completion of well construction, planting on slope faces, construction of a protection fence from livestock and a drainage canal by WSUG members and residents is implemented in the form of on-the-job training.

4) Hygiene education

D1 Hygiene education [Participatory Hygiene and Sanitation Transformation (PHAST)]

Hygiene education is given to WSUG members and residents. The Participatory Hygiene and Sanitation Transformation (PHAST) involving (i) the spread of toilets, (ii) rigid enforcement of hand-washing, (iii) sanitary use of safe drinking water; is tackled by Department of Rural Health Care, MRD, that assumes National policy on water sanitation in rural areas. DRHC made a PHAST kit which serves as a manual text of activities in cooperation with UNICEF. The PDRD staff, who received instructor training from DRHC, carry out the actual activities using the PHAST kit. Also in projects of other donors or NGOs, such as "Project for rural water supply and sanitation in Tonle Sap," and the project for rural water supply and sanitation in Kampong Cham Province

conducted by NGO "Plan International Cambodia" (PIC), PDRD staff are conducting these activities based on DRHCs plan.

For this reason, the PHAST program of DRHC is introduced into the hygiene education of this plan, the improvement activities of sanitary habits by the residents themselves are carried out after enforcement of the education of health knowledge. Concrete contents of PHAST program activities are shown in below.

Table 5-8: Outline and time schedule of PHAST Program

N0	Content	Time
1	Objectives of Training	10 min
2	PHAST test on health knowledge	30 min
3	General hygiene for health	2 h
4	PHAST Program	
	1. Problem identification (Phase I): –Community stories, and –Health problems in our community.	2 h:50 min
	2. Problem analysis (Phase II): –Mapping water and sanitation in our community, –Good and bad hygiene behaviours, –Investigating community practices, and –How diseases spread.	5 h : 15 min
	3. Planning for solutions (Phase III): –Blocking the spread of disease, –Selecting barriers, and –Tasks of men and women in the community.	3h :10 min
	4. Selecting options (Phase IV): -Choosing sanitation improvements, -Choosing improved hygiene behaviours, –Taking time for questions.	3h :10 min
	5. Planning for new facilities and behaviour change (Phase V): –Planning for change, –Planning who does what, and –Identifying what might go wrong.	4 h : 30 min
	6. Planning for monitoring and evaluation (Phase VI) –Preparing to check our progress	2 h
	7. Participatory evaluation (Phase VII) –Checking our progress	4 h : 50 min
	Total time	28 hours 25 minutes = 4 days

Source : WHO

5) Instruction of O&M

E1 Instruction of O&M-1 (Classroom lecture)

A workshop will be held for WSUG members, and an explanation given so that they can gain an understanding of their individual responsibilities: O&M of facilities, rules of use, daily checking, cleaning of the neighbourhood, the correspondence method in the event of a breakdown, procurement method of spare parts, and management method of bank account for O&M fund.

E2 Instruction of O&M-2(On the job training)

A workshop will be held for WSUG members with practical instruction in how to repair hand pumps. An understanding of hand pump structure is given, repair tools distributed, and method of use is explained. Spare parts are distributed and replacement method explained. A hand pump is taken apart, and practical training in how to re-install it after the spare parts have been replaced.

6 . Method of procurement of implementing resource for Soft Component

Soft component activities shall be conducted mainly by the Japanese consultant, and the activities will take a long time so a local consultant shall be effectively employed. In order to select a suitable local consultant, a Japanese consultant examines specialty, experience, English capability, etc. individually by screening of their curriculum vitae and holding an interview exam.

Request for the dispatch of a staff member who can carry out "hygiene education" is made to PDRD through the implementing agency. Moreover, request is made to DORD for the dispatch of a staff member to carry out "formation of resident's organization," "resident participation," and "instruction of O&M."

7 Implementing schedule for**(1) Content of implementation**

The soft component is divided into three phases conducted by the Japanese and local consultant: "Community development," "Hygiene education," and "Instruction of O&M." A Japanese consultant will be dispatched 3 times. A local consultant works with PDRD and DORD over the whole period of activity, and reports on activity situation to a Japanese consultant in a timely manner. A Japanese consultant manages the whole activity, while keeping close communication with the local consultant, and leading PDRD and DORD through a local consultant so that no disagreements with the overall plan may arise. The local consultant will be active for 19.5 months.

Table 5-9: Duration of Soft Component Activity

	Japanese Consultant	Local Consultant
Community development	0.7 month	6.2 month
Hygiene education	1.1 month	10.2 month
Instruction of O&M	0.4 month	3.1 month
Total	2.2 month	19.5 month

8 Output of Soft Component

The output of the Soft Component Activities is summarized as below.

- Completion report
- Soft component implementation status report (every detachment of Japanese consultant)
- Operation and maintenance manual
- Rules for use of facilities
- O&M training implementation report
- Hygiene education manual
- Hygiene education implementation report

9 Role of Implementing Agency

The implementing agency bears the following responsibility.

- Dispatch of the PDRD staff for hygiene education implementation
- Dispatch of the DORD staff for formation of resident organizations, villager participation, and instruction of O&M.

Table 5-10: PDM for Soft Component

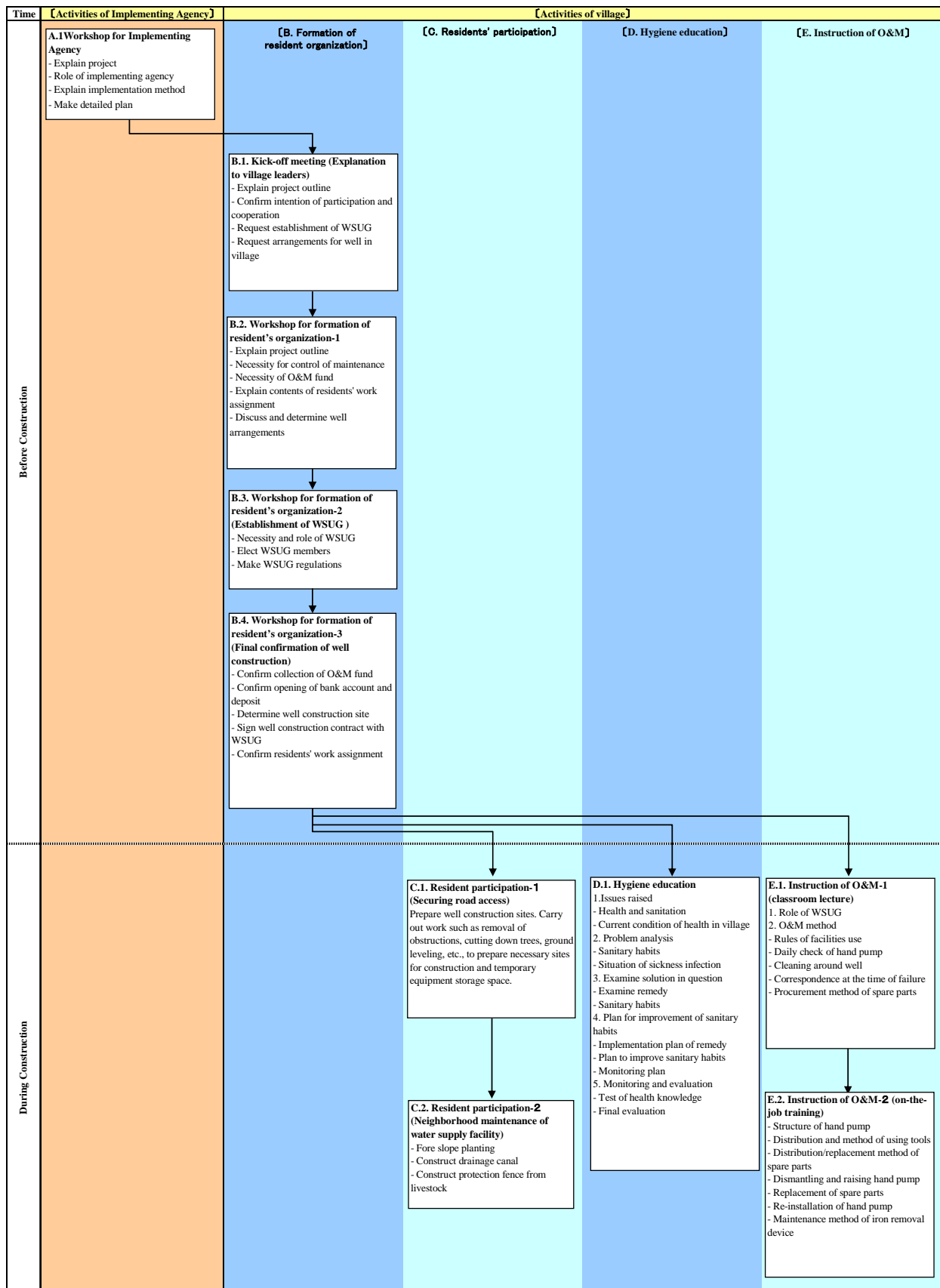
Summary of Project	Indicators	Measurement	External Conditions
Primary Objective To improve living and hygienic environment of the residents in target villages	Amount of medical expenses.....A	Questionnaire survey	
Project Goal To supply safe and stable drinking water in target villages	Breakdown rate of water supply facilities.....B Remaining balance of maintenance fund.....C Number of established WSUG.....D	Site visit Bank account book Site visit	No drastic changes in Cambodia's water and sanitation policy
Output 1. The support system of O&M of PDRD and DORD is strengthened 2. WSUG is established as sustainable O&M organization 3. Residents will conduct O&M with a sense of ownership 4. Resident's consciousness of health and sanitary habits is improved 5. WSUG will master the techniques for O&M	1-1. PDRD and DORD have understanding of the objectives and contents of project 2-1. WSUG is established 2-2. O&M fund is deposited in the bank account 3-1 The neighborhood of water supply facilities is improved 4-1. Residents understand waterborne diseases 4-2. Residents are strictly enforcing health improvement activities 5-1. Repair of facilities becomes possible by residents	1-1. Interview 2-1. WSUG byelaw 2-2. Bank book 3-1. Site survey 4-1. Questionnaire 4-2. Questionnaire 5-1. Questionnaire	No rapid increase or migration of the population
Activity Community development A1 Workshop for implementing agency B1 Explanation to village leaders B2 Explanation to villagers B3 Establishment of WSUG B4 Final confirmation of well construction Resident participation C1 Securing road access C2 Neighborhood maintenance of water supply facility Hygiene education D1 Hygiene education Instruction of O&M E1 Instruction of O&M (classroom lecture) E2 Instruction of O&M (field exercise)	Input		Prerequisite
	Japanese Side	Cambodia Side	
	<ul style="list-style-type: none"> • Dispatch of Experts • Assignment of Local Consultant • Budget measure 	<ul style="list-style-type: none"> • Personnel distribution for soft component (PDRD/DORD staff) 	

Supervising agency: Ministry of Rural Development

Implementing Agency: Department of Rural Water Supply

WSUG: Water and Sanitation User's Group

Table 5-11: Flow chart for soft component activities



A6. Other Relevant Data

A6. Other Relevant Data

(1) List of References and Documents

No.	Name	Forms (Print, Video, Map, Photo etc)	Original/ Copy	Published Organization	Year
1	CAMBODIA MILLENNIUM DEVELOPMENT GOALS REPORT 2003	Print	Original	Ministry of Planning	2003.11
2	ACHIEVING THE CAMBODIA MILLENNIUM DEVELOPMENT GOALS REPORT 2005 UPDATE	Print	Original	Ministry of Planning	2005.10
3	NATIONAL POVERTY REDUCTION STRATEGY 2003-2005	Print	Original	Council for Social Development CDS	2002.12
4	A POVERTY PROFILE OF CAMBODIA 2004	Print	Original	Ministry of Planning	2006.2
5	NATIONAL STRATEGIC DEVELOPMENT PLAN 2006-2010	Print	Original	Ministry of Planning	2006.6
6	PUBLIC INVESTMENT PROGRAMME 2006-2008	Print	Original	Ministry of Planning	2006.1
7	SECTOR INVESTMENT PLAN 2005-2015 RURAL WATER SUPPLY AND SANITATION SECTOR(RWSS)	Print	Copy	Ministry of Rural Development	2005.1
8	NATIONAL WATER SUPPLY AND SANITATION POLICY Part III – Rural Water Supply and Sanitation	Print	Copy	Coordinating Committee for Development of Water Supply and Sanitation Sector	2004.9
9	Arsenic Contamination of Groundwater in Cambodia Strategic Action Plan 2006	Print	Copy	Ministry of Rural Development,	2007.6
10	DRINKING WATER QUALITY STANDARDS	Print	Copy	Ministry of Industry Mines and Energy	2004.1
11	PROVISIONAL POPULATION TOTALS, GENERAL POPULATION CENSUS OF CAMBODIA 2008	Print	Original	National Institute of Statistics, Ministry of Planning	2008.8
12	INFORMED CHOICE MANUAL ON RURAL HOUSEHOLD LATRINE SELECTION	Print	Copy	Department of Rural Health Care, Ministry of Rural Development	2008.7
13	Consumer Price Index, Cambodia (First Semester 2004 to First Semester 2006)	Print	Original	National Institute of Statistics, Ministry of Planning	2006
14	LABOUR LAW	Print	Original	Ministry of Social Affairs, Labour and Veteran Affairs	1998
15	LABOR CODE	Print	Copy	The Cambodia Office of High	1997

A5 Soft Component (Technical Assistance) Plan

No.	Name	Forms (Print, Video, Map, Photo etc)	Original/ Copy	Published Organization	Year
	CODE DU TRAVAIL			Commissioner for Human Right	
16	Cambodian Employment and Labour Law	Print	Original	International Labour Organization, Community Legal Education Center	2005.12
17	Rainfall, Temperature data (Kampong Cham Station, daily data, 2005.1~2008.9)	Soft Data	Original	Department of Meteorology, Ministry of Water Resources & Meteorology	-
18	World Bank Group in Cambodia Working For a Cambodia Free of Poverty	Print	Original	World Bank Cambodia country Office	2006.7
19	STATISTICAL YEARBOOK 2006	Print	Original	National Institute of Statistics, Ministry of Planning	2006.12
20	Cambodia Demographic and Health Survey 2005	CD	Copy	National Institute of Statistics, Ministry of Planning Director General for Health, Ministry of Health	2006
21	National Health Statistics 2004~2008	Print	Copy	Department of Planning and Health Information	2005 ~ 2008

A7. References

A7. References

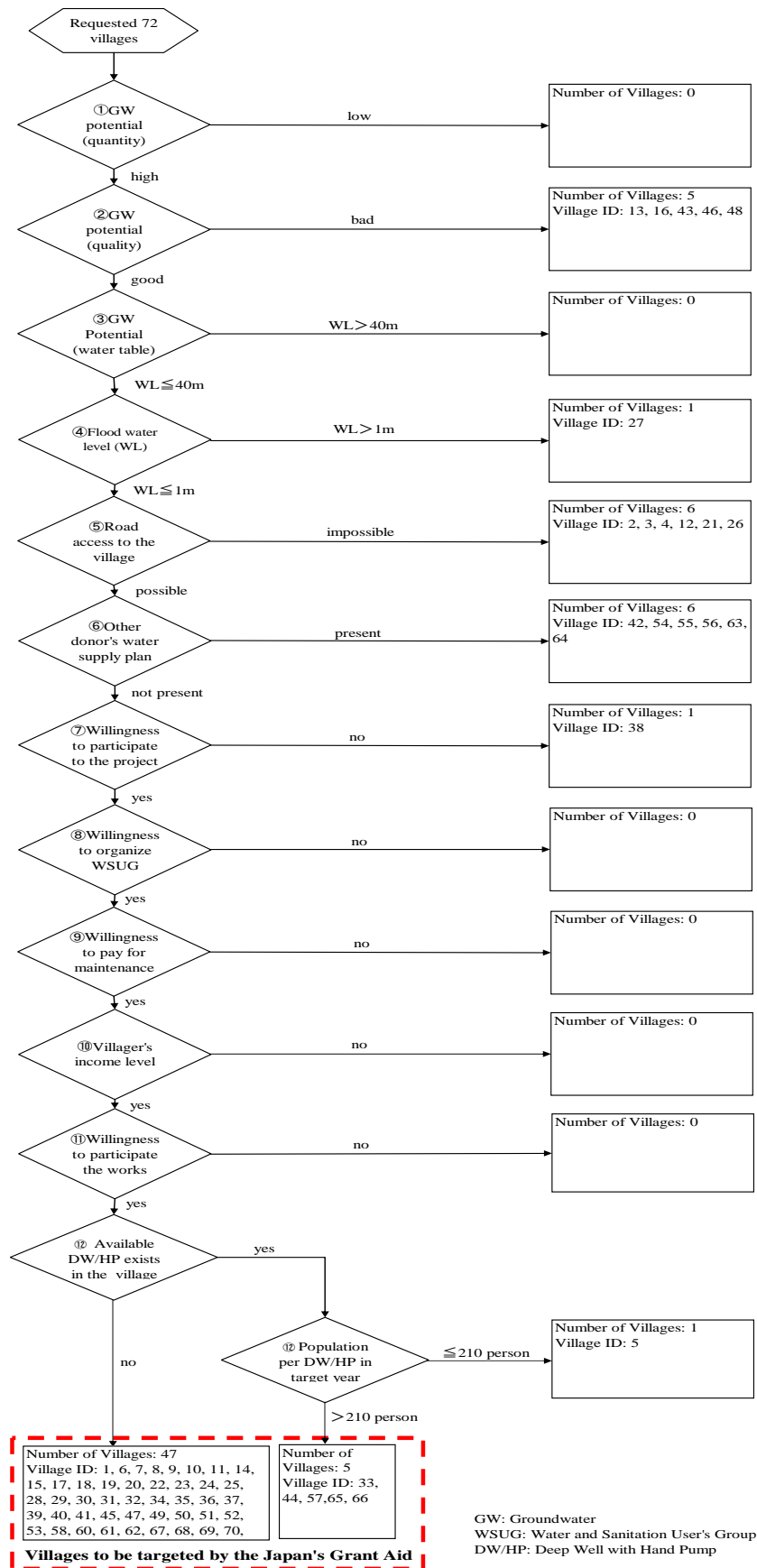
(1) Result of Selection of Target Villages

Commune	ID	Village	Population*		Number of handpump wells**			Result Y: selected N: excluded	Reason
			2008	2015	Operating 2008	Required 2015	Plan for the project		
Chan Mul	1	Ta Kaev	296	303	0	1	1	Y	
Chan Mul	2	Peam	155	159	0	1	0	N	impossible to access
Chan Mul	3	Ta Lou	102	104	0	1	0	N	impossible to access
Chan Mul	4	Amphol			na	na	0	N	impossible to access (in Vietnam)
Chan Mul	5	Khlong Tboung	134	137	1	1	0	N	enough handpump wells
Choam	6	Choam	245	251	0	1	1	Y	
Choam	7	Mong	245	251	0	1	1	Y	
Choam	8	Poploam	321	328	0	2	2	Y	
Choam	9	Stueng Angkam	289	296	0	1	1	Y	
Choam Kravien	10	Kravien Thum	1,244	1,272	0	6	5	Y	
Choam Kravien	11	Doung	1,211	1,238	0	6	5	Y	
Choam Kravien	12	Thma Ta Daok	67	69	0	1	0	N	impossible to access
Choam Kravien	13	Kbal Slaeng	327	334	0	2	0	N	GW quality (much iron)
Choam Kravien	14	Mkhaoh	447	457	0	2	2	Y	
Choam Kravien	15	Mroan	504	515	0	2	2	Y	
Choam Kravien	16	Thma Da	315	322	0	2	0	N	GW quality (much iron)
Choam Kravien	17	Danghet	377	386	0	2	2	Y	
Choam Kravien	18	Khmuor	535	547	0	3	3	Y	
Choam Kravien	19	Prei	768	785	0	4	4	Y	
Choam Kravien	20	Banghaeur Huos	364	372	0	2	2	Y	
Choam Kravien	21	Robang Chroh	420	429	0	2	0	N	impossible to access
Choam Kravien	22	Chi Plok	310	317	0	2	2	Y	
Choam Ta Mau	23	Ta Mau Cheung	171	175	0	1	1	Y	
Choam Ta Mau	24	Ta Mau Kaeut	790	808	0	4	4	Y	
Choam Ta Mau	25	Tuol Kruos	344	352	0	2	2	Y	
Choam Ta Mau	26	Srae Ta Pich	605	619	0	3	0	N	impossible to access
Choam Ta Mau	27	Koun Krapeu	388	397	0	2	0	N	flood level is over 1m
Choam Ta Mau	28	Lam Baor	235	240	0	1	1	Y	
Dar	29	Chamkar Kor	563	576	0	3	3	Y	
Dar	30	Salang Ti Mouy	1,126	1,151	0	5	5	Y	
Dar	31	Salang Ti Pir	2,024	2,070	0	10	5	Y	
Dar	32	Kang Keng	330	337	0	2	2	Y	
Kampoan	33	Srae Kandal	1,246	1,274	1	6	5	Y	
Memong	34	Peuk	406	415	0	2	2	Y	
Memong	35	Kambas	1,078	1,102	0	5	5	Y	
Memong	36	Cheach	358	366	0	2	2	Y	
Memong	37	Sambour	179	183	0	1	1	Y	
Memot	38	Masin Tuek	610	624	0	3	0	N	covered by pipe water supply
Memot	39	Tboung Voat	1,907	1,950	0	9	5	Y	
Memot	40	Chngar Kaeut	345	353	0	2	2	Y	
Memot	41	Memot Thmei	271	277	0	1	1	Y	
Memot	42	Special Settlement (Trapaeng Raem	1,735	1,774	5	8	0	N	covered by the last project
Memot	43	Sangkum Meanchey Thmei	1,005	1,028	0	5	0	N	GW quality (much iron)
Rung	44	Andoung Ta Chou	692	708	2	3	1	Y	
Rung	45	Doun Roadth Ti Muoy	854	873	0	4	4	Y	
Rumchek	46	Rumchek	2,199	2,249	0	11	0	N	GW quality (much iron)
Rumchek	47	Thma Dab	1,076	1,100	0	5	5	Y	
Rumchek	48	Srae Pongro	721	737	0	4	0	N	GW quality (much iron)
Rumchek	49	Khliech	556	569	0	3	3	Y	
Tramung	50	Ou Khlout	209	214	0	1	1	Y	
Tramung	51	Tramaeng Kraom	168	172	0	1	1	Y	
Tramung	52	Ngeu Thmei	263	269	0	1	1	Y	
Tramung	53	Trapeang Ngeu	164	168	0	1	1	Y	
Tramung	54	Doung Pir	365	373	0	2	0	N	water supplied by rubber plantation company
Tramung	55	Sambour	565	578	0	3	0	N	water supplied by rubber plantation company
Tramung	56	Krouch	280	286	0	1	0	N	water supplied by rubber plantation company
Tonlung	57	Kdol Phsar	1,155	1,181	2	6	4	Y	
Tonlung	58	Changkum Ti Muo	578	591	0	3	3	Y	
Tonlung	59	Spean Changkum	383	392	0	2	2	Y	
Tonlung	60	Kaoh Thma	679	694	0	3	3	Y	
Tonlung	61	Mkaor	385	394	0	2	2	Y	
Tonlung	62	Lvea Leu	397	406	0	2	2	Y	
Tonlung	63	Sla	321	328	0	2	0	N	water supplied by rubber plantation company
Tonlung	64	Special Settlement (Pons Tuek)	2,004	2,049	5	10	0	N	covered by the last project
Treak	65	Dak Por	1,118	1,143	1	5	4	Y	
Treak	66	Bangkov	1,102	1,127	4	5	1	Y	
Treak	67	Prei	493	504	0	2	2	Y	
Treak	68	Khley	387	396	0	2	2	Y	
Treak	69	Romeas Choul	213	218	0	1	1	Y	
Treak	70	Preah Ponlea	816	834	0	4	4	Y	
Treak	71	Samraong	1,113	1,138	0	5	5	Y	
Kokir	72	Chamkar Thmei	1,014	1,037	0	5	5	Y	
Total			44,662	45,671	21		136		

* Annual population growth rate: 0.32% (Source: General Population Census of Cambodia 2008, National Institute of Statistics, Ministry of Planning, August 2008)

** Serving population per handpump well: 210/person (round off)

(2) Flowchart of Selection of Target Villages



(3) Comparison of Water Quality Standards

	WHO Guidelines for Drinking-water Quality (3rd Edition)		Drinking Water Quality Standards, January 2004 (Ministry of Industry Mines and Energy)		Proposed Water Quality Standard for Successful Wells for the Project
	Value (mg/l)	Acceptability Aspect (mg/l) ^{a)}	Standard Value (mg/l)	Small water supply (less than 100 persons or 100m ³ /day) (mg/l)	Value (mg/l)
1. Microbial aspects					
Total coliform	0 in 100ml sample	-	0 in 100ml sample	0 in 100ml sample	-
Thermotolerant coliform					
E.Coli.					
Faecal streptocoques					
2. Naturally occurring chemicals					
Arsenic (As)	0.01	-	0.05	0.05	0.05
Barium (Ba)	0.7	-	0.7	-	-
Boron (B)	0.5	-	-	-	-
Chloride (Cl)	-	250	250	-	250
Chromium (Cr ⁶⁺)	0.05	-	0.05	-	-
Fluoride (F)	1.5	-	1.5	-	1.5
Hardness	-	-	300	-	-
Hydrogen sulfide (H ₂ S)	-	0.05	0.05	-	-
Manganese (Mn)	0.4	0.1	0.1	-	0.4
Molybdenum (Mo)	0.07	-	-	-	-
pH	-	-	6.5 - 8.5	6.5 - 8.5	-
Selenium (Se)	0.01	-	0.01	-	-
Sodium (Na)	-	200	200	-	-
Sulfate (SO ₄)	-	250	250	-	-
Total dissolved solid (TDS)	-	1000	800	800	800
Uranium (U)	0.015	-	-	-	-
Silver (Ag)	-	-	-	-	-
Aluminium (Al)	-	0.2	0.2	-	-
Iron (Fe)	-	0.3	0.3	0.3	2.0
Zinc (Zn)	-	3	3	-	-
Antimony (Sb)	0.02	-	-	-	-
Copper (Cu)	2	1	1	-	-
Lead (Pb)	0.01	-	0.01	-	-
Nickel (Ni)	0.02	-	0.02	-	-
3. Chemicals from agricultural activities					
Ammonium (NH ₄)	-	1.5	1.5	-	-
Nitrate (NO ₃)	50	-	50	-	50
Nitrite (NO ₂) (long/short term)	3/0.2	-	3	-	-
4. Others					
Taste	-	-	Acceptable	-	-
Color	-	15 TCU ^{b)}	5 TCU	-	-
Odor	-	-	Acceptable	-	-
Turbidity	-	5 NTU ^{c)}	5 NTU	5 NTU	5 NTU
Magnesium (Mg)	-	-	-	-	-
Calcium (Ca)	-	-	-	-	-
Anionic detergent	-	-	-	-	-
Potassium (K)	-	-	-	-	-
Bicarbonate (HCO ₃)	-	-	-	-	-
Carbonate (CO ₃)	-	-	-	-	-
Free carbon dioxide (CO ₂)	-	-	-	-	-
Electric Conductivity	-	-	-	-	-

a) Value is not confirmed. It is valuable depending on the situation.

b) TCU: true colour unit

c) NTU: nephelometric turbidity unit

(4) Stratum Faces and Expected Stratum Structure

ID	Village	Depth of Well (m)	Depth by Formation Faces				Expected Geological Composition	* Expected Ground-water Level
			Unconsolidated Formation	Soft Rock	Mediumhard Rock	Hard Rock		
			Depth (m)	Depth (m)	Depth (m)	Depth (m)		
1	Ta Kaev	45	35	5	5	0	Silt, Clayey silt, Silty clay, Clay, Basalt	C
6	Choam	45	35	3	4	3	Clay, Sand, Silty clay, Silty sand, Basalt	A
7	Mong	60	60	0	0	0	Sand, Coarse sand, Silt, Clayey silt, Silty sand	A
8	Poploam	60	50	3	4	3	Silt, Silty sand, Laterite, Coarse sand, Clay	A
9	Stueng Angkam	50	20	10	10	10	Clay, Laterite, Silty clay, Basalt	A
10	Kravien Thum	30	30	0	0	0	Silt, Sand, Laterite, Clayey silt, Coarse sand	B
11	Doung	50	50	0	0	0	Clayey silt, Silty clay, Silt, Silty sand, Coarse sand, Sand	A
14	Mkhaoh	40	25	10	5	0	Silty clay, Silt, Clay, Weathered basalt	A
15	Mroan	40	20	5	10	5	Silt, Silty clay, Sand, Basalt	A
17	Danghet	45	40	0	5	0	Coarse sand, Laterite, Clay, Silty sand	A
18	Khmuor	30	10	5	10	5	Silt, Sand, Silty clay, Clay, Basalt	A
19	Prei	45	45	0	0	0	Silty sand, Laterite, Sand, Coarse sand, Clayey silt	C
20	Banghaeur Huos	30	15	10	5	0	Silt, Sand, Clayey silt, Coarse sand, Clay, Weathered basalt	A
22	Chi Plok	45	45	0	0	0	Silty sand, Sand, Silty clay, Clay	A
23	Ta Mau Cheung	45	10	10	15	10	Silt, Laterite, Clay, Basalt	A
24	Ta Mau Kaeut	35	15	5	10	5	Silty clay, Laterite, Clay, Sand, Basalt	A
25	Tuol Kruos	45	10	10	20	5	Silty clay, Clayey silt, Clay, Basalt, Weathered basalt	A
28	Lam Baor	45	42	0	3	0	Laterite, Coarse sand, Sand, Silty sand	D
29	Chamkar Kor	65	60	0	5	0	Silt, Sand, Basalt, Clay, Silty clay, Clayey silt	A
30	Salang Ti Mouy	40	35	5	0	0	Clay, Coarse sand, Weathered basalt	A
31	Salang Ti Pir	55	55	0	0	0	Clay, Sand, Coarse Sand, Silty sand, Sandy silt	E
32	Kang Keng	60	30	20	10	0	Clay, Sand, Clayey silt, Silty clay, Weathered Basalt	B
33	Srae Kandal	35	35	0	0	0	Clay, Sand, Silt, Silty sand	A
34	Peuk	45	35	10	0	0	Clay, Laterite, Weathered basalt, Coarse sand	A
35	Kabbas	30	25	0	5	0	Clay, Silty clay, Silt, Basalt	A
36	Cheach	55	40	8	4	3	Sandy silt, Sand, Laterite, Silt, Weathered basalt, Clay, Basalt	A
37	Sambour	50	36	10	4	0	Silty clay, Sand, Laterite, Silt, Coarse sand, Clay, Weathered basalt	A
39	Tboung Voat	55	30	15	10	0	Silty sand, Coarse sand, Laterite, Clay, Weathered basalt	B
40	Chhngar Kaeut	35	10	15	10	0	Clay, Silt, Sand, Weathered basalt	B
41	Memot Thmei	45	35	0	10	0	Silt, Laterite, Sand, Silty clay, Sand	B
44	Andoung Ta Chou	50	50	0	0	0	Sandy silt, Silty sand, Sand	A
45	Doun Roadth Ti Muoy	45	40	0	5	0	Sand, Laterite, Coarse sand	A
47	Thma Dab	30	30	0	0	0	Clay, Laterite, Sand, Silty clay	B
49	Khliech	35	35	0	0	0	Silty clay, Sand	B
50	Ou Khlout	45	38	0	7	0	Sand, Laterite, Silty sand, Coarse sand	A
51	Tramaeng Kraom	55	55	0	0	0	Laterite, Silt, Clay, Sand, Silty clay	A
52	Ngeu Thmei	45	15	5	15	10	Clay, Sand, Silty clay, Laterite, Basalt	A
53	Trapeang Ngeu	40	38	0	2	0	Clay, Clayey silt, Laterite, Coarse sand, Sand, Clay	A
57	Kdol Phsar	35	10	15	10	0	Clay, Silt, Weathered Basalt	A
58	Changkum Ti Muo	30	12	8	5	5	Clay, Silt, Weathered basalt, Basalt	A
59	Spean Changkum	40	5	15	15	5	Sand, Clay, Clayey silt, Weathered basalt, Basalt	A
60	Kaoh Thma	40	5	20	15	0	Silty clay, Sand, Clay, Weathered basalt	A
61	Mkaor	50	15	20	15	0	Silt, Silty clay, Clay, Weathered basalt	A
62	Lvea Leu	40	40	0	0	0	Coarse sand, Silt, Laterite, Sand	D
65	Dak Por	55	55	0	0	0	Silty sand, Laterite, Silty clay, Clay, Sand	A
66	Bangkok	40	40	0	0	0	Clayey silt, Silty clay, Silty sand, Sand, Sandy silt	A
67	Prei	35	35	0	0	0	Clayey silt, Silt, Laterite, Clay, Coarse sand	A
68	Khley	55	55	0	0	0	Silty clay, Laterite, Clayey silt, Sand, Coarse sand	A
69	Romeas Choul	30	30	0	0	0	Silty clay, Sand, Clayey silt	A
70	Preah Ponlea	65	65	0	0	0	Silty clay, Silt, Laterite, Clayey silt, Sand	A
71	Samraong	65	60	5	0	0	Clay, Sand, Silty clay, Coarse sand, Weathered basalt, Silty sand	B
72	Chamkar Thmei	60	40	15	5	0	Clay, Sand, Silty clay, Silty sand, Sand stone	D

* Expected Ground-water Level

A: depth < 10m, B: 10m ≤ depth ≤ 20m, C: 20m < depth ≤ 30m, D: 30m < depth ≤ 40m, E: depth > 50m

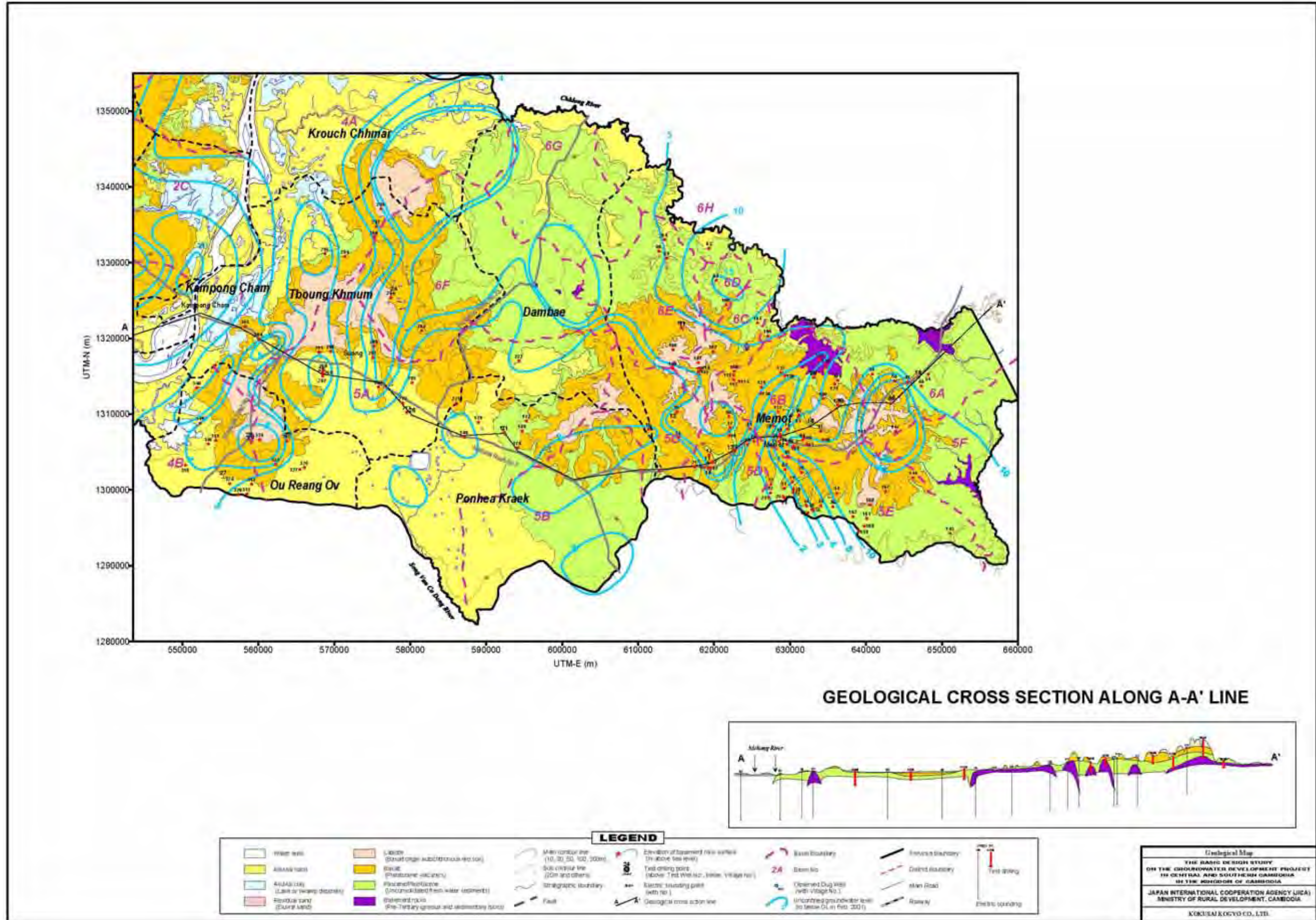
(5) Drilling Method by Faces and Total Length of Drilling by Village

ID	Village	Drilling Method	No. of Wells	Drilling Length		Drilling Length by Formation Faces							
				Depth (m)	Total Length (m)	Unsolidated Formation		Soft Rock		Medium-hard Rock		Hard Rock	
						Depth (m)	Total Length (m)	Depth (m)	Total Length (m)	Depth (m)	Total Length (m)	Depth (m)	Total Length (m)
1	Ta Kaev	MUD	1	45	45	35	35	5	5	5	5	0	0
6	Choam	MUD	1	45	45	35	35	3	3	4	4	3	3
7	Mong	MUD	1	60	60	60	60	0	0	0	0	0	0
8	Poploam	MUD	2	60	120	50	100	3	6	4	8	3	6
9	Stueng Angkam	DTH	1	1	50	50	20	20	10	10	10	10	10
10	Kravien Thum	MUD	5	30	150	30	150	0	0	0	0	0	0
11	Doung	MUD	5	50	250	50	250	0	0	0	0	0	0
14	Mkhaoh	DTH	2	40	80	25	50	10	20	5	10	0	0
15	Mroan	DTH	2	40	80	20	40	5	10	10	20	5	10
17	Danghet	MUD	2	45	90	40	80	0	0	5	10	0	0
18	Khmuor	DTH	3	30	90	10	30	5	15	10	30	5	15
19	Prei	MUD	4	45	180	45	180	0	0	0	0	0	0
20	Banghaeur Huos	DTH	2	30	60	15	30	10	20	5	10	0	0
22	Chi Plok	MUD	2	45	90	45	90	0	0	0	0	0	0
23	Ta Mau Cheung	DTH	1	45	45	10	10	10	10	15	15	10	10
24	Ta Mau Kaeut	DTH	4	35	140	15	60	5	20	10	40	5	20
25	Tuol Kruos	DTH	2	45	90	10	20	10	20	20	40	5	10
28	Lam Baor	MUD	1	45	45	42	42	0	0	3	3	0	0
29	Chamkar Kor	MUD	3	65	195	60	180	0	0	5	15	0	0
30	Salang Ti Mouy	MUD	5	40	200	35	175	5	25	0	0	0	0
31	Salang Ti Pir	MUD	5	55	275	55	275	0	0	0	0	0	0
32	Kang Keng	DTH	2	60	120	30	60	20	40	10	20	0	0
33	Srae Kandal	MUD	5	35	175	35	175	0	0	0	0	0	0
34	Peuk	MUD	2	45	90	35	70	10	20	0	0	0	0
35	Kabbas	MUD	5	30	150	25	125	0	0	5	25	0	0
36	Cheach	DTH	2	55	110	40	80	8	16	4	8	3	6
37	Sambour	MUD	1	50	50	36	36	10	10	4	4	0	0
39	Tboung Voat	DTH	5	55	275	30	150	15	75	10	50	0	0
40	Chngar Kaeut	DTH	2	35	70	10	20	15	30	10	20	0	0
41	Memot Thmei	MUD	1	45	45	35	35	0	0	10	10	0	0
44	Andoung Ta Chou	MUD	1	50	50	50	50	0	0	0	0	0	0
45	Doun Roadth Ti Muoy	MUD	4	45	180	40	160	0	0	5	20	0	0
47	Thma Dab	MUD	5	30	150	30	150	0	0	0	0	0	0
49	Khliech	MUD	3	35	105	35	105	0	0	0	0	0	0
50	Ou Khlout	MUD	1	45	45	38	38	0	0	7	7	0	0
51	Tramaeng Kraom	MUD	1	55	55	55	55	0	0	0	0	0	0
52	Ngeu Thmei	DTH	1	45	45	15	15	5	5	15	15	10	10
53	Trapeang Ngeu	MUD	1	40	40	38	38	0	0	2	2	0	0
57	Kdol Phsar	DTH	4	35	140	10	40	15	60	10	40	0	0
58	Changkum Ti Muo	DTH	3	30	90	12	36	8	24	5	15	5	15
59	Spean Changkum	DTH	2	40	80	5	10	15	30	15	30	5	10
60	Kaoh Thma	DTH	3	40	120	5	15	20	60	15	45	0	0
61	Mkaor	DTH	2	50	100	15	30	20	40	15	30	0	0
62	Lvea Leu	MUD	2	40	80	40	80	0	0	0	0	0	0
65	Dak Por	MUD	4	55	220	55	220	0	0	0	0	0	0
66	Bangkov	MUD	1	40	40	40	40	0	0	0	0	0	0
67	Prei	MUD	2	35	70	35	70	0	0	0	0	0	0
68	Khley	MUD	2	55	110	55	110	0	0	0	0	0	0
69	Romeas Choul	MUD	1	30	30	30	30	0	0	0	0	0	0
70	Preah Ponlea	MUD	4	65	260	65	260	0	0	0	0	0	0
71	Samraong	MUD	5	65	325	60	300	5	25	0	0	0	0
72	Chamkar Thmei	MUD	5	60	300	40	200	15	75	5	25	0	0

(6) The Number of Screens and Casings at each target village

ID	Village	No. of Wells	Drilling Length		Total No. of Planned Screen		Total No. of Planned Casing	
			Depth (m)	Total Length (m)	Pieces/site	Pieces/village	Pieces/site	Pieces/village
1	Ta Kaev	1	45	45	2	2	10	10
6	Choam	1	45	45	2	2	10	10
7	Mong	1	60	60	3	3	13	13
8	Poploam	2	60	120	2	4	14	28
9	Stueng Angkam	1	50	50	2	2	11	11
10	Kravien Thum	5	30	150	2	10	6	30
11	Doung	5	50	250	2	10	11	55
14	Mkhaoh	2	40	80	2	4	9	18
15	Mroan	2	40	80	2	4	9	18
17	Danghet	2	45	90	3	6	9	18
18	Khmuor	3	30	90	2	6	6	18
19	Prei	4	45	180	3	12	9	36
20	Banghaeur Huos	2	30	60	2	4	6	12
22	Chi Plok	2	45	90	3	6	9	18
23	Ta Mau Cheung	1	45	45	2	2	10	10
24	Ta Mau Kaeut	4	35	140	2	8	7	28
25	Tuol Kruos	2	45	90	2	4	10	20
28	Lam Baor	1	45	45	2	2	10	10
29	Chamkar Kor	3	65	195	3	9	14	42
30	Salang Ti Mouy	5	40	200	2	10	9	45
31	Salang Ti Pir	5	55	275	3	15	11	55
32	Kang Keng	2	60	120	2	4	14	28
33	Srae Kandal	5	35	175	2	10	7	35
34	Peuk	2	45	90	2	4	10	20
35	Kabbas	5	30	150	3	15	5	25
36	Cheach	2	55	110	2	4	12	24
37	Sambour	1	50	50	2	2	11	11
39	Tboung Voat	5	55	275	2	10	12	60
40	Chhngar Kaeut	2	35	70	2	4	7	14
41	Memot Thmei	1	45	45	2	2	10	10
44	Andoung Ta Chou	1	50	50	3	3	10	10
45	Doun Roadth Ti Muoy	4	45	180	2	8	10	40
47	Thma Dab	5	30	150	2	10	6	30
49	Khliech	3	35	105	2	6	7	21
50	Ou Khlout	1	45	45	3	3	9	9
51	Tramaeng Kraom	1	55	55	2	2	12	12
52	Ngeu Thmei	1	45	45	2	2	10	10
53	Trapeang Ngeu	1	40	40	2	2	9	9
57	Kdol Phsar	4	35	140	2	8	7	28
58	Changkum Ti Muo	3	30	90	2	6	6	18
59	Spean Changkum	2	40	80	2	4	9	18
60	Kaoh Thma	3	40	120	2	6	9	27
61	Mkaor	2	50	100	2	4	11	22
62	Lvea Leu	2	40	80	2	4	9	18
65	Dak Por	4	55	220	2	8	12	48
66	Bangkov	1	40	40	3	3	8	8
67	Prei	2	35	70	2	4	7	14
68	Khley	2	55	110	2	4	12	24
69	Romeas Choul	1	30	30	2	2	6	6
70	Preah Ponlea	4	65	260	2	8	15	60
71	Samraong	5	65	325	2	10	15	75
72	Chamkar Thmei	5	60	300	3	15	13	65
Total		136		6100		302		1304

(7) Ground Water Zone Distribution Map



(8) Judgment Criteria of Water Quality

Analysis Item	Drinking Water Quality Standards, January 2004 (Ministry of Industry Mines and Energy)		The project Judgment Guideline	Water Quality Test on site		Detailed Water Quality Test by independent organization in Cambodia	
	Standard Value (mg/l)	Small Water supply (less than 100 persons or 100m ³ /day) (mg/l)	Standard Value (mg/l)				
				Relevant	Measurement Method	Relevant	
Judgment category	Arsenic (As)	0.05	0.05	0.05	○	Field Kit	○
	Chloride (Cl)	250	-	250	○	Pack Test	○
	Fluoride (F)	1.5	-	1.5	○	Pack Test	○
	Manganese (Mn)	0.1	-	0.4	○	Pack Test	○
	Total dissolved solid (TDS)	800	800	800	○	Portable EC/TDS Meter	○
	Iron (Fe)	0.3	0.3	2.0	○	Pack Test	○
	Nitrate (No ₃)	50	-	50	○	Pack Test	○
	Turbidity	5 NTU	5 NTU	5 NTU	○	Portable Turbidity Meter	○
Other relevant standards in Cambodia	Total coliform	0 in 100ml sample	0 in 100ml sample	-	○	Coliform testing paper	○
	Themotolerant coliform						
	E.Coli.						
	Faecal streptocoques						
	Barium (Ba)	0.7	-	-	-	-	-
	Chromium (Cr ₆₊)	0.05	-	-	-	-	○
	Hardness	300	-	-	-	-	○
	Hydrogen sulfide (H ₂ S)	0.05	-	-	-	-	-
	pH	6.5 - 8.5	6.5 - 8.5	-	○	Portable pH Meter	-
	Selenium (Se)	0.01	-	-	-	-	-
	Sodium (Na)	200	-	-	-	-	-
	Sulfate (SO ₄)	250	-	-	-	-	○
	Aluminium (Al)	0.2	-	-	-	-	○
	Zinc (Zn)	3	-	-	-	-	○
	Copper (Cu)	1	-	-	-	-	○
	Lead (Pb)	0.01	-	-	-	-	○
	Nickel (Ni)	0.02	-	-	-	-	○
Ammonium (NH ₄)	1.5	-	-	-	-	○	
Nitrate (NO ₂)	3	-	-	-	-	○	
Color	5 TCU	-	-	-	-	○	
reference	Water Temperature	-	-	-	○	Portable pH Meter	-
	Electric Conductivity	-	-	-	○	Portable EC/TDS Meter	-
	Electric oxidation resolution	-	-	-	○	Portable ORP Meter	-

(10) Result of Water Quality Survey

ID.	DISTRICT	COMMUNE	VILLNAME	Type *1	Depth	WL	Temp	pH	EC	ORP	Fe	Mn	F	NO3	NH4	As	Bac *2	Colif *2
1	Memot	Chan Mul	Ta Kaev	D	9.0	6.2	28.3	6.47	2.64	214	< 0.05	< 0.5	0	5	< 0.2	< 0.025	+++	+++
1	Memot	Chan Mul	Ta Kaev	R			28.5	6.41	1.60	206	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
2	Memot	Chan Mul	Pearm	S			27.9	6.35	1.48	295	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
2	Memot	Chan Mul	Pearm	D	7.4	7.4	28.6	6.40	2.93	273	< 0.05	< 0.5	0	2	< 0.2	< 0.025	++	++
3	Memot	Chan Mul	Kalou	D	10.0	4.0	29.8	7.16	2.19	191	1	< 0.5	0.8	< 1	0.2	< 0.025	+++	+++
3	Memot	Chan Mul	Kalou	R			28.5	7.93	1.61	152	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
4	Memot	Chan Mul	Amphol															
5	Memot	Chan Mul	Khlong Tboung	B	49.0		28.2	6.70	2.76	180	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	-
6	Memot	Choam	Choam	D	7.8	4.8	27.6	6.11	4.75	216	< 0.05	< 0.5	0	10	< 0.2	< 0.025	++	++
6	Memot	Choam	Choam	D	10.4	8.5	17.7	5.97	1.82	246	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
7	Memot	Choam	Mong	D	5.0	1.5	29.7	6.69	15.96	156	0.05	< 0.5	0	1	< 0.2	< 0.025	++	++
7	Memot	Choam	Mong	R			28.5	7.31	1.92	115	0.5	< 0.5	0	< 1	< 0.2	< 0.025	+	+
8	Memot	Choam	Poploam	D	11.8	9.2	27.1	7.95	1.73	217	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
8	Memot	Choam	Poploam	D	7.6	5.9	27.4	5.46	7.04	284	< 0.05	< 0.5	0	10	< 0.2	< 0.025	++	++
9	Memot	Choam	Stueng Angkam	B	45.0		28.4	6.39	5.86	113	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	-	-
9	Memot	Choam	Stueng Angkam	D	4.7	3.0	27.9	5.73	2.67	255	< 0.05	< 0.5	0	2	< 0.2	< 0.025	++	++
10	Memot	Choam Kravien	Kravien Thum	D	18.0	14.0	28.8	6.58	1.70	288	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	+
10	Memot	Choam Kravien	Kravien Thum	R			29.1	7.19	2.44	176	0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	+
11	Memot	Choam Kravien	Doung	D	12.0	7.7	28.0	7.06	3.02	207	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
11	Memot	Choam Kravien	Doung	R			29.6	7.31	2.71	194	0.5	< 0.5	0	< 1	0.2	< 0.025	+++	+++
12	Memot	Choam Kravien	Thma Ta Daok	D	10.0	1.7	29.8	6.34	1.86	160	< 0.05	< 0.5	0	0.1	< 0.2	< 0.025	+++	++
12	Memot	Choam Kravien	Thma Ta Daok	R			29.4	7.10	6.41	123	0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	+
13	Memot	Choam Kravien	Kbal Slaeng	B	60.0		28.0	6.81	9.03	-30	10	< 0.5	0.8	< 1	0.2	< 0.025	+	-
13	Memot	Choam Kravien	Kbal Slaeng	D	9.3	6.5	28.0	6.67	11.80	235	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+	+
14	Memot	Choam Kravien	Mkhaoh	D	2.7	0.9	27.4	6.47	6.60	194	< 0.05	< 0.5	0	1	< 0.2	< 0.025	+	+
14	Memot	Choam Kravien	Mkhaoh	R			27.6	7.00	5.90	187	0.5	< 0.5	0	< 1	< 0.2	< 0.025	++	++
15	Memot	Choam Kravien	Mroan	D	6.0	2.0	28.3	6.83	17.20	120	< 0.05	< 0.5	0	10	< 0.2	< 0.025	++	+
15	Memot	Choam Kravien	Mroan	R			28.3	7.13	10.50	121	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
16	Memot	Choam Kravien	Thma Da	D	22.0	18.5	29.7	6.64	12.40	69	5	< 0.5	0.8	< 1	0.2	< 0.025	+++	+
16	Memot	Choam Kravien	Thma Da	R			28.3	6.48	2.80	155	1	< 0.5	0.4	< 1	< 0.2	< 0.025	++	++
17	Memot	Choam Kravien	Danghet	D	8.5	2.3	28.9	6.66	3.59	244	< 0.05	< 0.5	0	2	< 0.2	< 0.025	++	++
17	Memot	Choam Kravien	Danghet	D	11.5	2.5	28.0	6.05	3.87	288	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+	+
18	Memot	Choam Kravien	Khmuor	D	9.0	2.1	28.8	6.75	73.80	162	< 0.05	< 0.5	0	20	0.2	< 0.025	++	++
18	Memot	Choam Kravien	Khmuor	R			29.5	7.52	2.70	143	0.3	< 0.5	0	< 1	< 0.2	< 0.025	+++	+
19	Memot	Choam Kravien	Prei	B	43.0		28.6	5.87	2.13	194	1	< 0.5	0.8	< 1	0.2	< 0.025	-	-
19	Memot	Choam Kravien	Prei	D	20.5	19.0	28.7	6.00	1.49	196	< 0.05	< 0.5	0.4	< 1	< 0.2	< 0.025	++	++
20	Memot	Choam Kravien	Banghaeur Huos	D	10.0	7.7	28.3	6.28	10.10	207	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+++	+++
20	Memot	Choam Kravien	Banghaeur Huos	R			28.4	7.02	7.71	158	0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
21	Memot	Choam Kravien	Robang Chroh	D	6.0	1.2	27.8	6.95	25.40	290	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+++	+++
21	Memot	Choam Kravien	Robang Chroh	R			26.4	7.29	19.10	280	0.05	< 0.5	0	1	< 0.2	< 0.025	+++	+++
22	Memot	Choam Kravien	Chi Pliek	D	8.5	2.5	27.3	6.84	86.90	133	< 0.05	< 0.5	0	45	0.2	< 0.025	+	+

ID.	DISTRICT	COMMUNE	VILLNAME	Type	Depth	WL	Temp	pH	EC	ORP	Fe	Mn	F	NO3	NH4	As	Bac	Colif
22	Memot	Choam Kravien	Chi Plok	R			28.7	7.17	21.50	75	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
23	Memot	Choam Ta Mau	Ta Mau Cheung	D	9.0	3.3	29.8	5.93	6.16	303	< 0.05	< 0.5	0	2	0.2	< 0.025	+	+
23	Memot	Choam Ta Mau	Ta Mau Cheung	R			29.9	7.27	3.16	207	0.05	< 0.5	0	< 1	0.2	< 0.025	+++	++
24	Memot	Choam Ta Mau	Ta Mau Kaeut	D	3.6	4.6	28.6	6.51	15.40	282	< 0.05	< 0.5	0	10	< 0.2	< 0.025	+	+
24	Memot	Choam Ta Mau	Ta Mau Kaeut	D	3.5	1.0	28.7	6.30	11.74	314	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+	+
24	Memot	Choam Ta Mau	Ta Mau Kaeut	R			25.9	6.07	4.46	252	0.3	< 0.5	0	< 1	< 0.2	< 0.025	+	+
25	Memot	Choam Ta Mau	Tuol Kruos	D	5.2	1.5	28.2	6.95	2.92	207	0.3	< 0.5	0	< 1	0.2	< 0.025	+	+
25	Memot	Choam Ta Mau	Tuol Kruos	D	6.0	2.0	28.1	6.98	5.81	192	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
26	Memot	Choam Ta Mau	Srae Ta Pich	D	3.7	1.2	28.8	6.78	7.50	186	< 0.05	< 0.5	0	10	0.2	< 0.025	+++	+++
26	Memot	Choam Ta Mau	Srae Ta Pich	R			28.9	7.16	9.07	118	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
27	Memot	Choam Ta Mau	Koun Krapeu	D	8.7	0.7	30.1	6.53	113.40	125	< 0.05	< 0.5	0	< 1	0.2	< 0.025	+++	+++
27	Memot	Choam Ta Mau	Koun Krapeu	R	37.0		29.1	7.62	11.30	125	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
28	Memot	Choam Ta Mau	Lam Baor	S			28.3	7.39	1.17	198	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
29	Memot	Dar	Chamkar Kor	B	67.0		27.8	8.52	17.07	107	< 0.05	< 0.5	0	< 1	0.5	< 0.025	+	+++
29	Memot	Dar	Chamkar Kor	D	8.0	6.3	27.7	8.90	3.53	127	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+++	++
30	Memot	Dar	Salang Ti Mouy	S			28.4	7.30	14.80	115	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
30	Memot	Dar	Salang Ti Mouy	D	8.5	6.7	27.5	7.27	13.60	163	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	+
31	Memot	Dar	Salang Ti Pir	B	64.0		28.2	8.45	16.17	89	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
31	Memot	Dar	Salang Ti Pir	R			27.9	7.97	1.43	118	0.05	< 0.5	0	1	< 0.2	< 0.025	+	+
32	Memot	Dar	Kang Keng	B	60.0		28.3	8.05		131	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+	+
32	Memot	Dar	Kang Keng	D	10.0	6.6	28.3	6.98		192	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+	+
33	Memot	Kampoan	Srae Kandal	B	27.0		28.3	6.40	17.40	176	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+
33	Memot	Kampoan	Srae Kandal	D	4.3	1.7	28.3	5.95	17.40	204	< 0.05	< 0.5	0	10	< 0.2	< 0.025	+++	+++
34	Memot	Memong	Peuk	D	4.0	1.2		5.72	20.10	242	< 0.05	< 0.5	0	< 1	20	< 0.025	++	++
34	Memot	Memong	Peuk	R			30.4	6.34	6.50	211	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
35	Memot	Memong	Kabbas	D	4.0	1.0	26.8	5.81	33.10	213	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+++	+++
35	Memot	Memong	Kabbas	R			27.5	6.47	8.50	206	0.3	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
36	Memot	Memong	Cheach	D	4.0	0.4	27.8	5.47	3.20	266	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
36	Memot	Memong	Cheach	R			27.4	6.31	11.00	218	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
37	Memot	Memong	Sambour	D	6.6	4.0	26.6	5.20	4.80	269	< 0.05	< 0.5	0	2	< 0.2	< 0.025	++	++
37	Memot	Memong	Sambour	R			28.0	6.48	2.10	223	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
38	Memot	Memot	Masin Tuek	S			27.8	8.60	9.29	108	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+	+
38	Memot	Memot	Masin Tuek	B	25.0	0.5	27.8	8.72	5.36	158	< 0.05	< 0.5	0	5	0.2	< 0.025	-	-
39	Memot	Memot	Tboung Voat	B	32.0		27.5	9.84	4.54	109	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
39	Memot	Memot	Tboung Voat	D	11.5	8.5	26.6	9.68	29.20	60	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+++	+++
40	Memot	Memot	Chhngar Kaeut	D	4.5	2.3	28.2	6.28	8.30	163	< 0.05	< 0.5	0	10	< 0.2	< 0.025	++	+
40	Memot	Memot	Chhngar Kaeut	D	5.0	3.2	28.0	6.19	8.60	160	< 0.05	< 0.5	0	10	< 0.2	< 0.025	+++	++
41	Memot	Memot	Memot Thmei	D	16.7	9.9	27.3	5.94	2.07	224	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
41	Memot	Memot	Memot Thmei	D	16.4	10.0	27.4	6.27	1.92	188	< 0.05	< 0.5	0	1	< 0.2	< 0.025	+++	+++
42	Memot	Memot	Special Settlem															
43	Memot	Memot	Sangkum Meanchey Thmei	B	32.0	23.0	28.4	6.87	5.58	-6	10	< 0.5	0.8	< 1		< 0.025	+	+
43	Memot	Memot	Sangkum Meanchey Thmei	D	9.5	2.2	28.1	6.05	11.65	133	< 0.05	< 0.5	0	5	< 0.2	< 0.025	++	+
44	Memot	Rung	Andoung Ta Chou	B	48.0	3.0	28.7	6.11	0.77	201	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	-	-

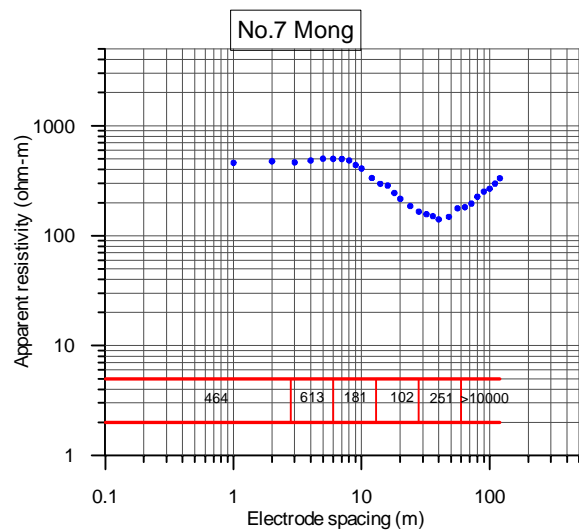
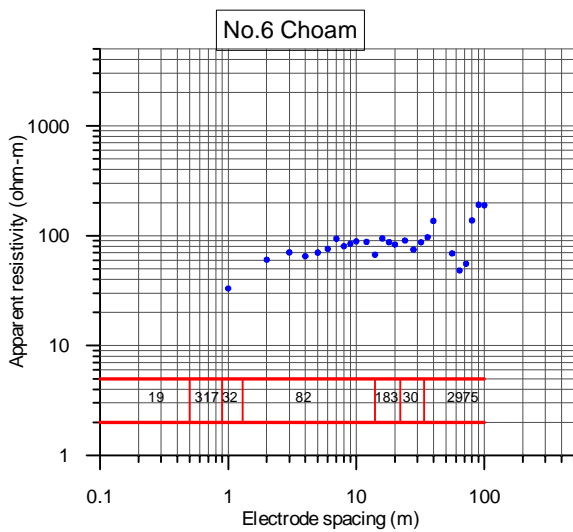
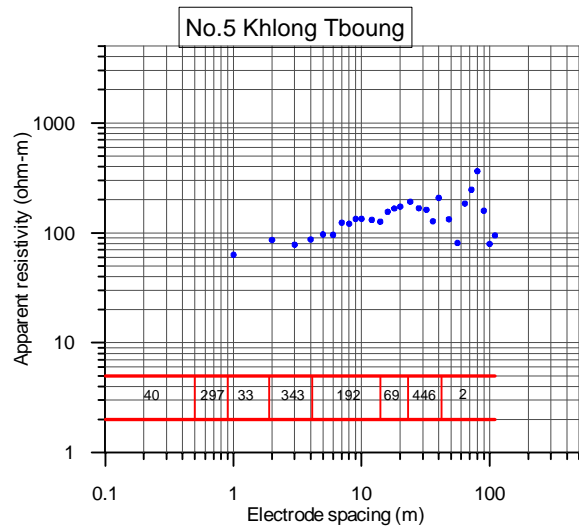
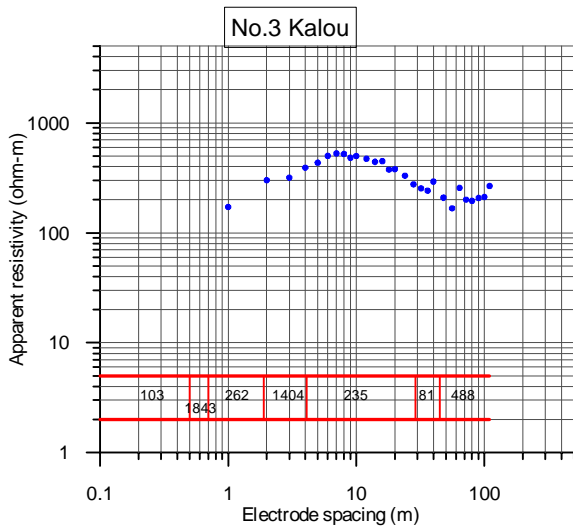
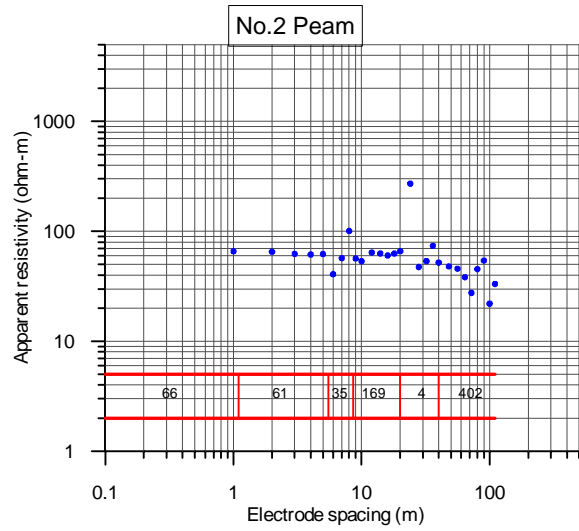
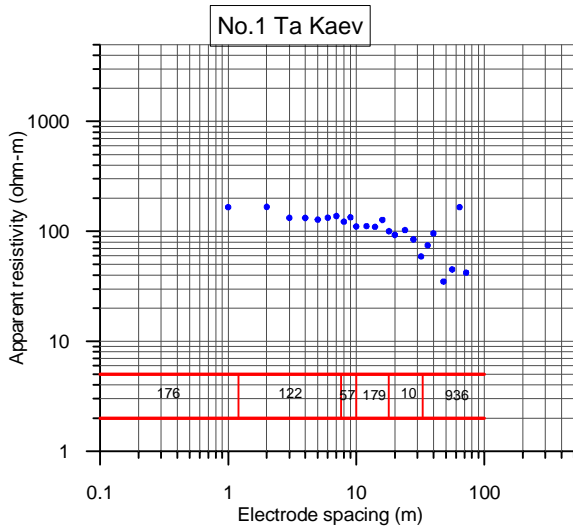
ID.	DISTRICT	COMMUNE	VILLNAME	Type	Depth	WL	Temp	pH	EC	ORP	Fe	Mn	F	NO3	NH4	As	Bac	Colif
44	Memot	Rung	Andoung Ta Chou	D	5.0	3.5	28.6	5.67	6.92	248	< 0.05	< 0.5	0	5	< 0.2	< 0.025	+++	+++
45	Memot	Rung	Doun Roadth Ti Muoy	D	5.0	3.0	27.7	5.30	3.30	304	< 0.05	< 0.5	0	5	< 0.2	< 0.025	+++	+++
45	Memot	Rung	Doun Roadth Ti Muoy	D	4.2	1.7	28.3	5.79	8.81	277	< 0.05	< 0.5	0	1	< 0.2	< 0.025	+++	+++
46	Memot	Rumchek	Rumchek	B	15.0	4.5	28.6	5.68	17.04	250	< 0.05	< 0.5	0	45	< 0.2	< 0.025	-	-
46	Memot	Rumchek	Rumchek	D	9.0	6.0	28.6	6.95	10.13	182	< 0.05	< 0.5	0	2	< 0.2	< 0.025	++	+
47	Memot	Rumchek	Thma Dab	B	22.0	0.7	28.2	6.71	5.68	104	0.05	< 0.5	0	2	< 0.2	< 0.025	++	++
47	Memot	Rumchek	Thma Dab	D	4.6	0.5	27.6	6.76	122.53	101	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
48	Memot	Rumchek	Srae Pongro	B	25.0	0.5	28.5	6.16	8.55	235	0.5	< 0.5	0.8	< 1	0.5	< 0.025	++	++
48	Memot	Rumchek	Srae Pongro	D	25.0	0.5	28.1	7.26	4.73	166	0.05	< 0.5	0	1	0.2	< 0.025	++	+
49	Memot	Rumchek	Khliech	B	20.0	5.5	27.5	6.85	2.91	148	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
49	Memot	Rumchek	Khliech	D	3.9	0.5	26.7	6.31	14.67	177	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	+
50	Memot	Tramung	Ou Khlout	D	3.8	1.5	28.4	6.17	4.78	276	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+++	+++
50	Memot	Tramung	Ou Khlout	D	5.0	1.7	28.3	6.17	2.86	283	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+++	+++
51	Memot	Tramung	Tramaeng Kraom	D	3.5	1.2	27.5	6.14	1.20	327	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
51	Memot	Tramung	Tramaeng Kraom	R			29.5	6.90	0.67	313	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
52	Memot	Tramung	Ngeu Thmei	B	30.0		28.4	6.47	1.63	183	0.5	< 0.5	0.4	< 1	0.2	< 0.025	+	+
52	Memot	Tramung	Ngeu Thmei	D	11.0	7.7	28.8	6.10	1.82	236	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
53	Memot	Tramung	Trapeang Ngeu	D	6.5	3.8	28.4	4.85	28.50	282	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+	+
53	Memot	Tramung	Trapeang Ngeu	R			28.9	6.64	1.43	182	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
54-2			Doung II	B	59.0		28.3	6.63	5.81	120	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
55	Memot	Tramung	Sambour	B	30.0		28.5	6.75	2.62	220	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+	+
55	Memot	Tramung	Sambour	D	6.7	3.6	27.5	5.94	11.07	249	< 0.05	< 0.5	0	20	< 0.2	< 0.025	++	+
56	Memot	Tramung	Krouch	B	55.0	14.0	28.6	6.78	11.72	268	0.3	< 0.5	0	< 1	0.2	< 0.025	-	+
56	Memot	Tramung	Krouch	R			27.4	7.10	2.36	263	0.1	< 0.5	0	< 1	< 0.2	< 0.025	++	++
57	Memot	Tonlung	Kdol Phsar	B	27.5	0.3	27.9	6.64	87.00	57	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
57	Memot	Tonlung	Kdol Phsar	D	4.0	0.6	26.4	6.64	12.80	122	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
58	Memot	Tonlung	Changkum Ti Muo	D	2.0	0.7	26.8	6.56	32.40	172	0.03	< 0.5	0	< 1	0.2	< 0.025	+++	+++
58	Memot	Tonlung	Changkum Ti Muo	D	2.8	1.4	28.2	6.16	79.00	165	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+++	+++
59	Memot	Tonlung	Spean Changkum	B	10.0		29.6	6.11	39.70	169	< 0.05	< 0.5	0	10	< 0.2	< 0.025	+++	+++
59	Memot	Tonlung	Spean Changkum	D	8.0	2.5	28.2	6.84	16.20	198	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+++	+++
60	Memot	Tonlung	Kaoh Thma	D	5.0	1.0	28.1	7.12	28.60	100	0.05	< 0.5	0	1	< 0.2	< 0.025	+++	+++
60	Memot	Tonlung	Kaoh Thma	R			32.4	7.83	3.90	65	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
61	Memot	Tonlung	Mkaor	D	3.0	0.2	27.4	6.27	14.70	194	< 0.05	< 0.5	0	10	< 0.2	< 0.025	++	++
61	Memot	Tonlung	Mkaor	R			27.7	7.17	3.80	61	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	++
62	Memot	Tonlung	Lvea Leu	S			27.9	6.85	2.60	240	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
62	Memot	Tonlung	Lvea Leu	D	26.5	21.5	27.6	6.43	1.50	305	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
62	Memot	Tonlung	Lvea Leu	D	29.0	24.0	27.2	6.56	1.70	254	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
63	Memot	Tonlung	Sla	B	78.0		28.6	6.85	14.70	255	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	+
63	Memot	Tonlung	Sla	R			28.6	7.11	1.40	108	0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
64	Memot	Tonlung	Special Settlement															
65	Memot	Treak	Dak Por	B	33.0		28.3	6.53	8.70	171	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
65	Memot	Treak	Dak Por	D	7.0	2.0	28.7	6.31	9.90	123	< 0.05	< 0.5	0	2	< 0.2	< 0.025	+++	+++

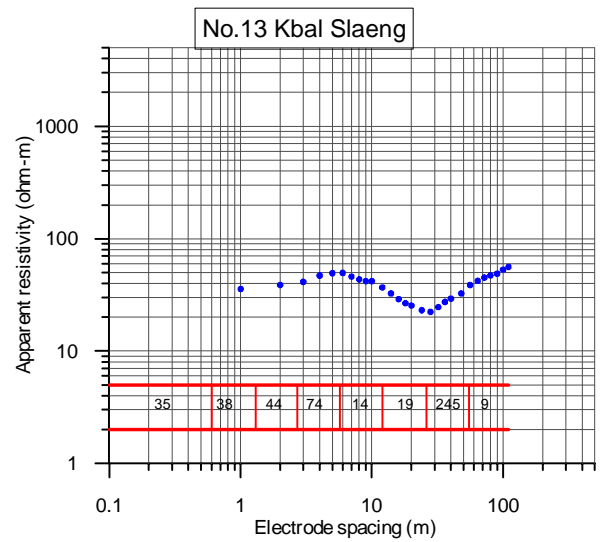
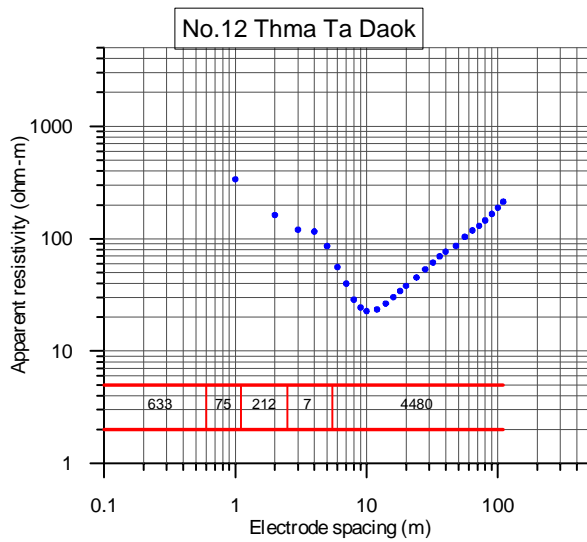
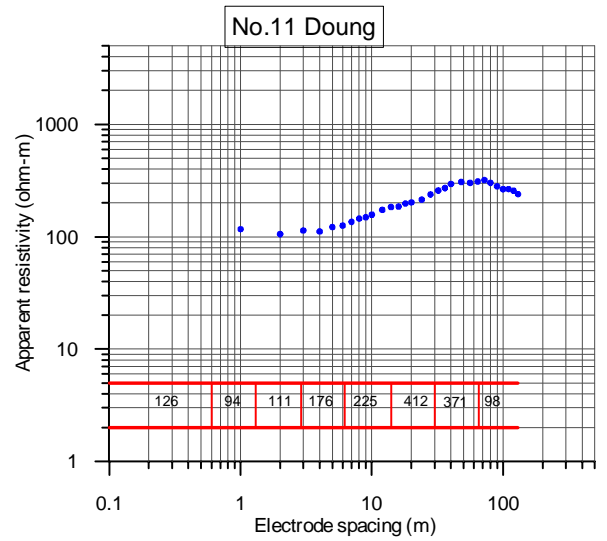
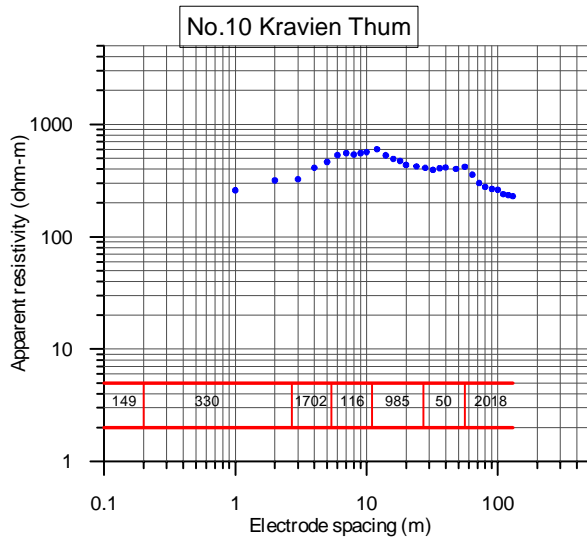
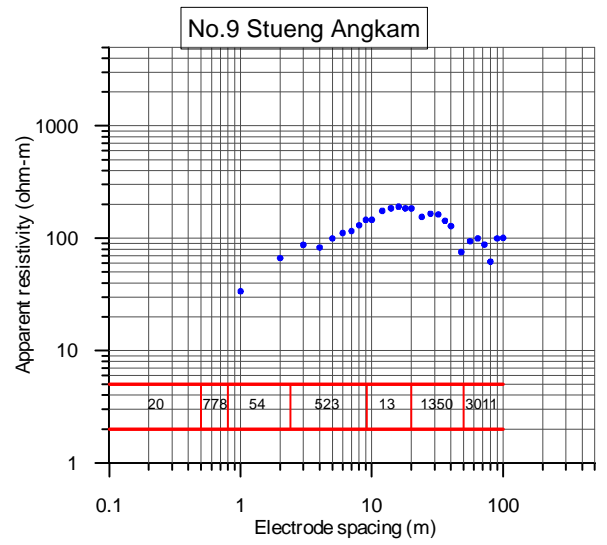
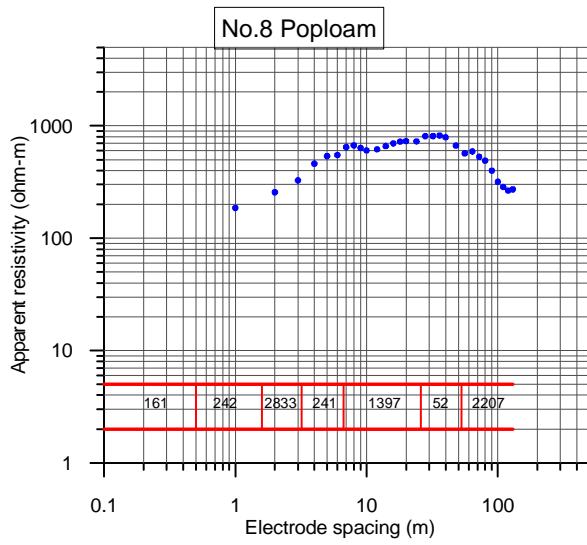
ID.	DISTRICT	COMMUNE	VILLNAME	Type	Depth	WL	Temp	pH	EC	ORP	Fe	Mn	F	NO3	NH4	As	Bac	Colif
66	Memot	Treak	Bangkov	B	38.0		28.8	6.57	1.40	220	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+	-
66	Memot	Treak	Bangkov	D	14.0	13.2	29.1	6.19	1.50	221	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++
67	Memot	Treak	Prei	B	33.0	2.7	27.6	6.55	2.80	162	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
67	Memot	Treak	Prei	D	3.0	1.4	27.5	6.16	3.90	183	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
68	Memot	Treak	Khley	B	35.0		27.3	6.71	4.20	252	< 0.05	< 0.5	0	< 1	0.2	< 0.025	+	+
68	Memot	Treak	Khley	D	5.0	2.5	27.2	6.62	8.30	250	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+
69	Memot	Treak	Romeas Choul	D	6.0	3.0	27.9	6.14	4.30	235	< 0.05	< 0.5	0	1	< 0.2	< 0.025	+	++
69	Memot	Treak	Romeas Choul	R			30.6	6.57	2.10	161	0.05	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
70	Memot	Treak	Preah Ponlea	D	5.4	3.2	28.9	5.52	9.30	265	< 0.05	< 0.5	0	2	0.2	< 0.025	+++	+++
70	Memot	Treak	Preah Ponlea	R			32.5	6.44	3.30	201	0.1	< 0.5	0	< 1	< 0.2	< 0.025	+++	+++
71	Memot	Treak	Samraong	B	17.0		30.2	5.13	20.90	261	< 0.05	< 0.5	0	45	< 0.2	< 0.025	+	+
71	Memot	Treak	Samraong	D	7.0	4.0	27.7	5.63	11.80	231	< 0.05	< 0.5	0	5	< 0.2	< 0.025	+++	+++
72	Memot	Kokir	Chamkar Thmei	D	10.0	5.7	27.7	6.33	5.90	173	< 0.05	< 0.5	0	10	< 0.2	< 0.025	++	+
72	Memot	Kokir	Chamkar Thmei	D	23.0	18.7	27.2	6.41	2.68	200	< 0.05	< 0.5	0	< 1	< 0.2	< 0.025	++	++

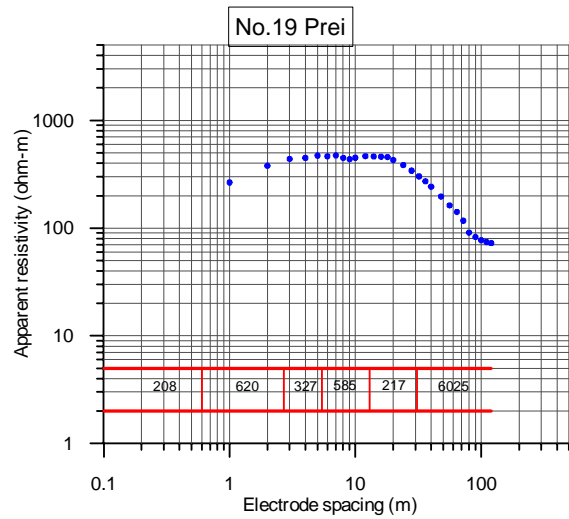
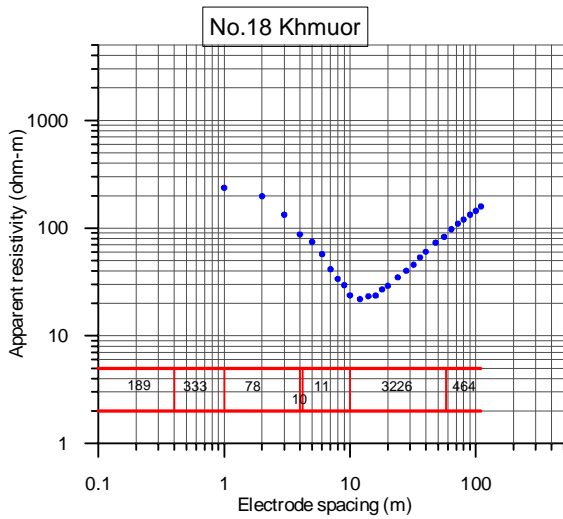
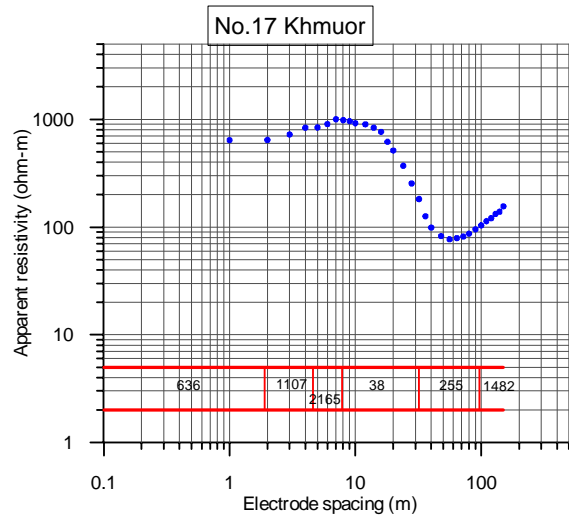
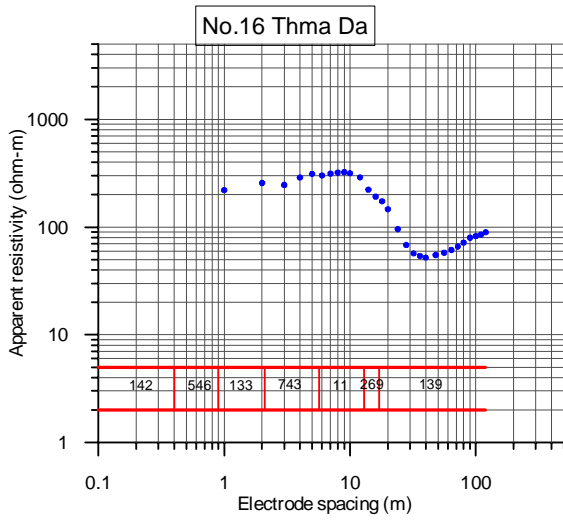
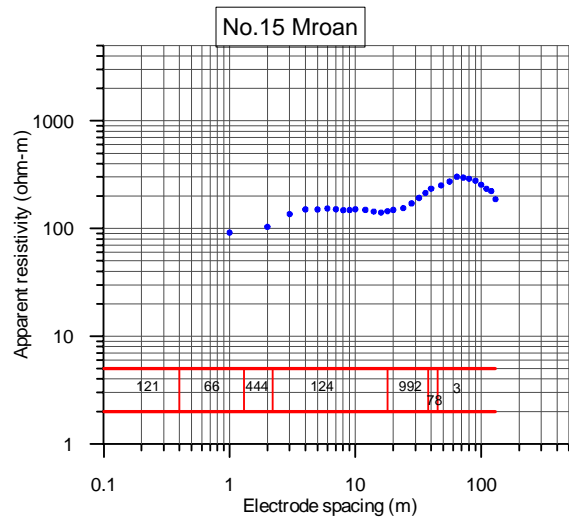
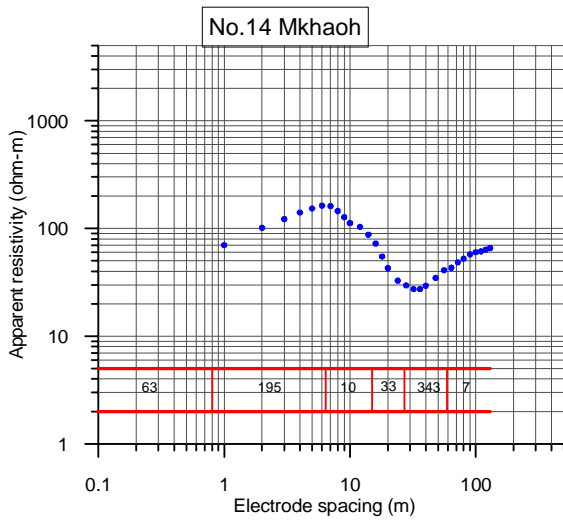
*1 Type: B: Borehole(Deep well), S: Borehole(Shallow well) / Sprong, D: Hand-dug-well, R: Surface water

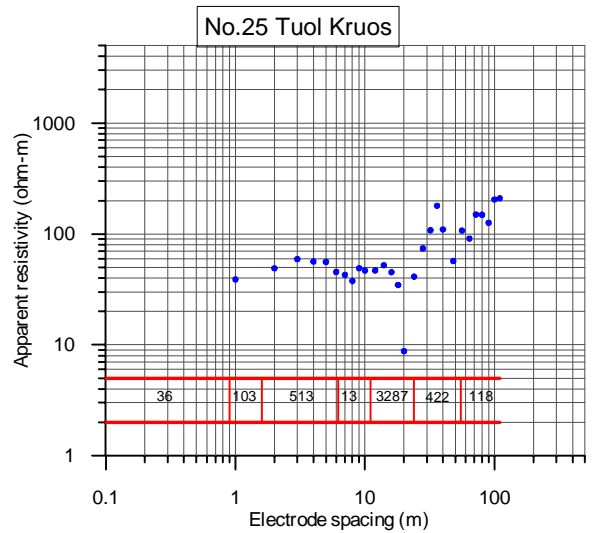
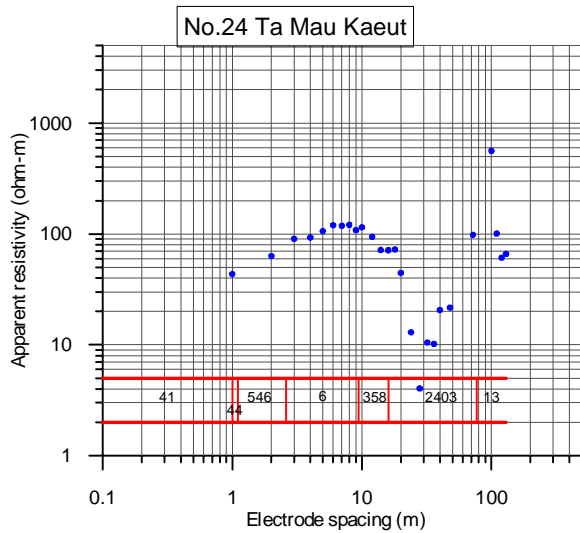
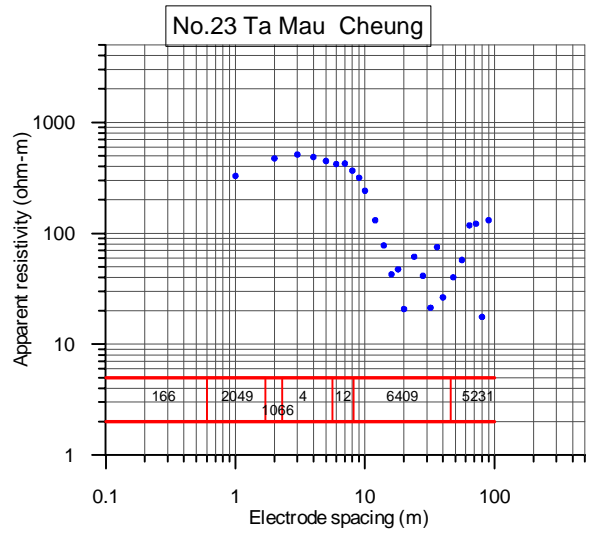
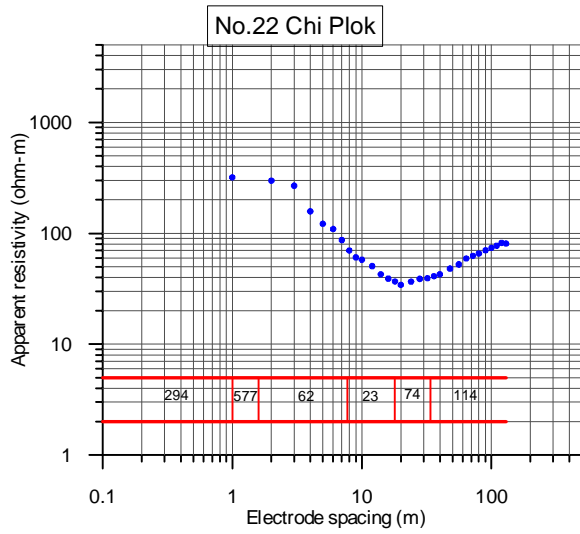
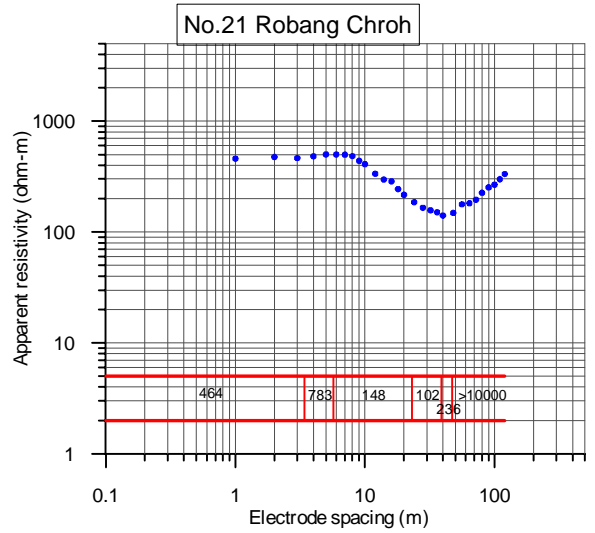
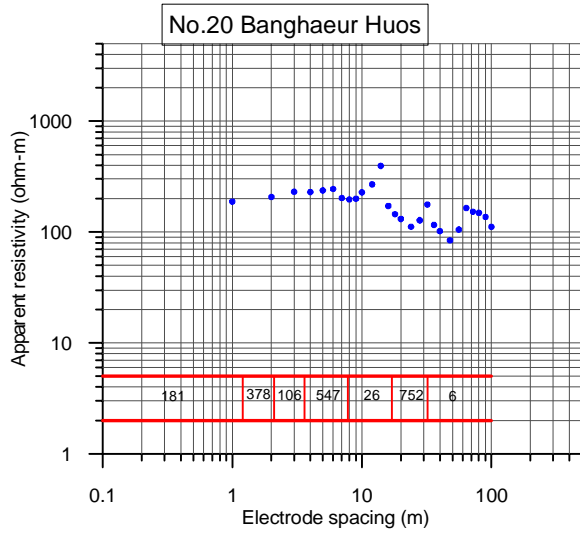
*2 The number of colony: -: 0, +: 1 ≤ number ≤ 10, ++: 11 ≤ number ≤ 30, +++: number ≤ 31

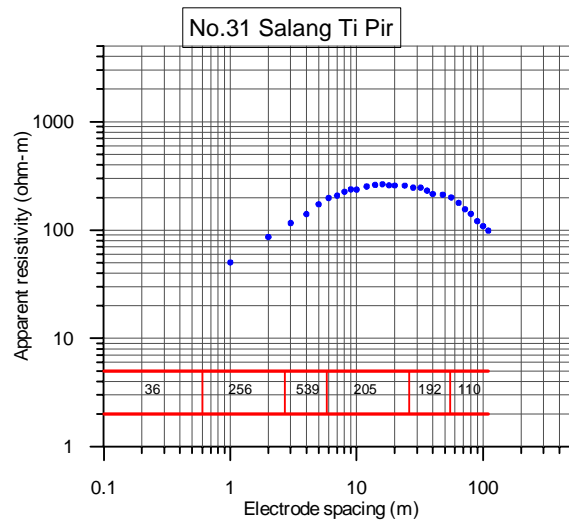
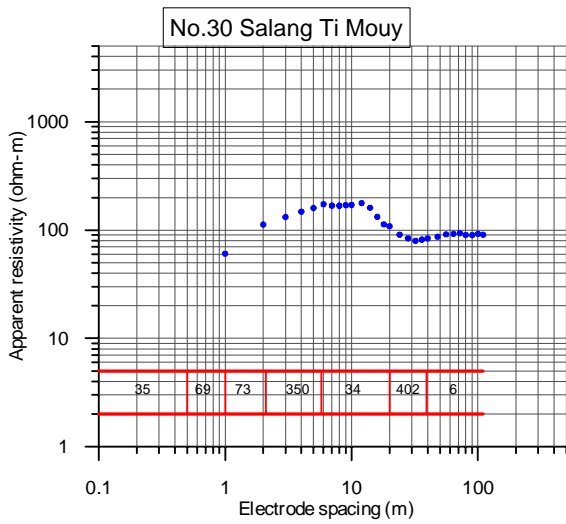
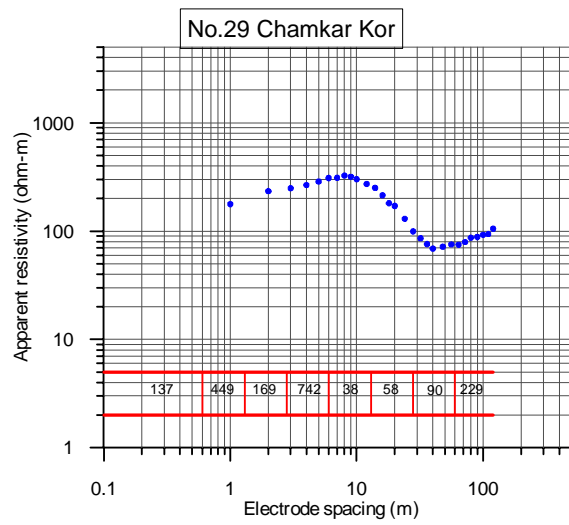
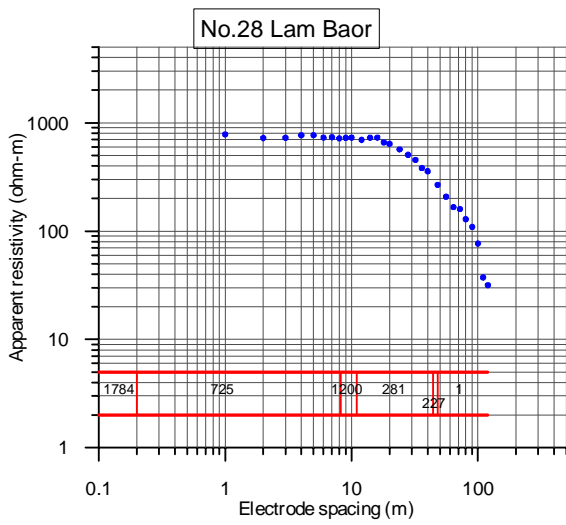
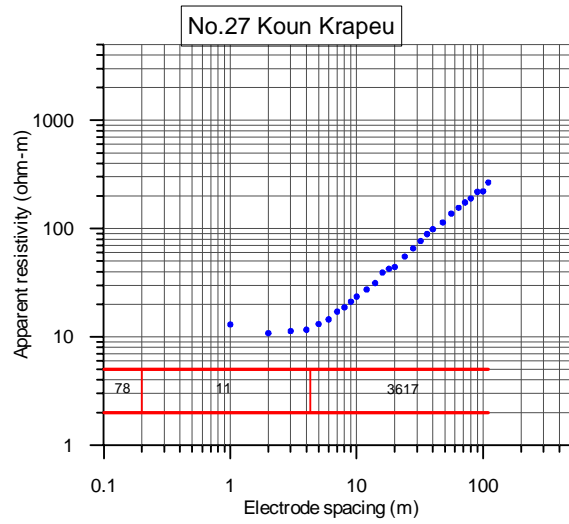
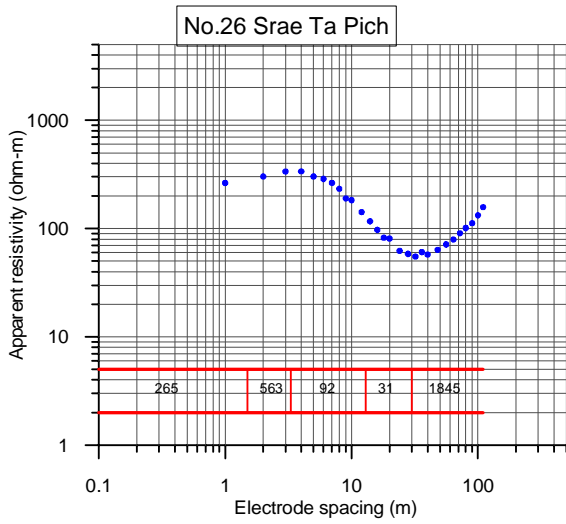
(11) Result of Electrical Exploration

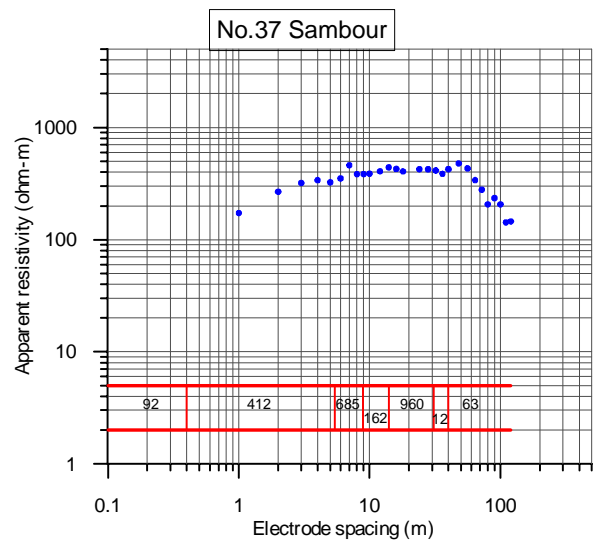
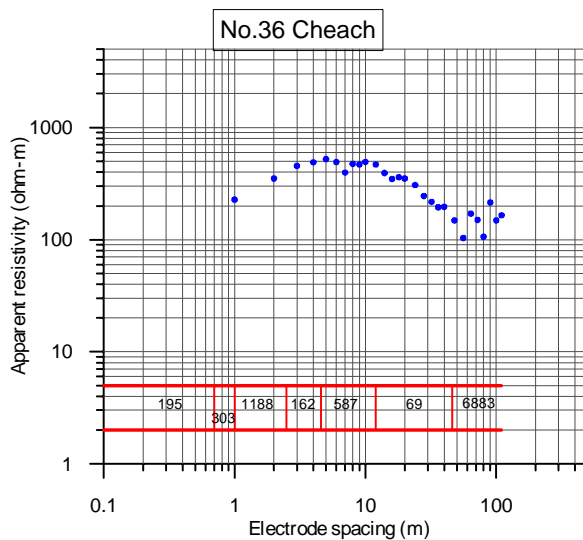
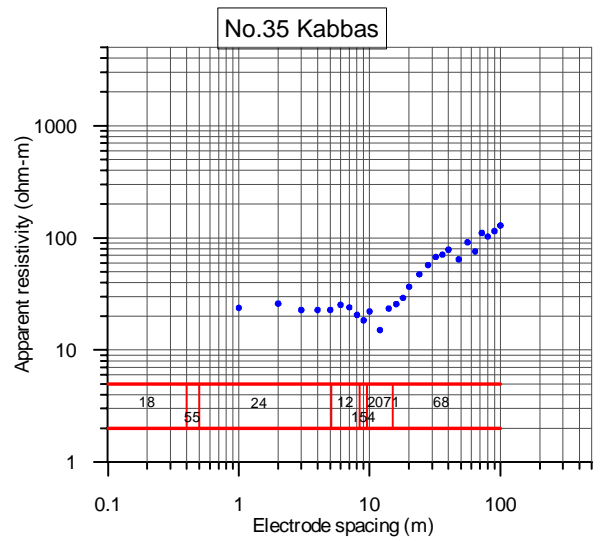
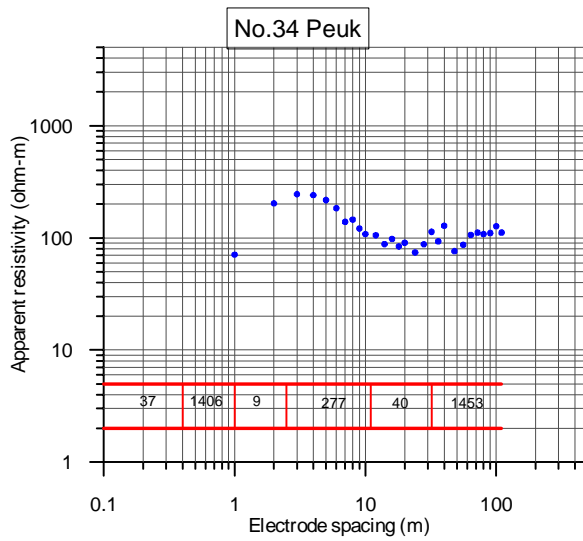
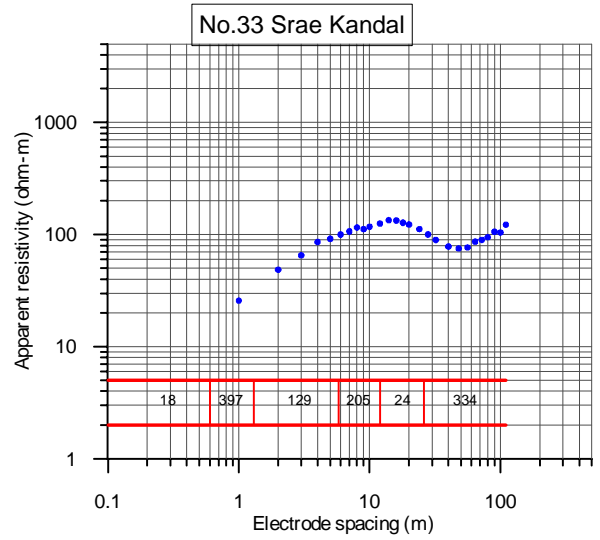
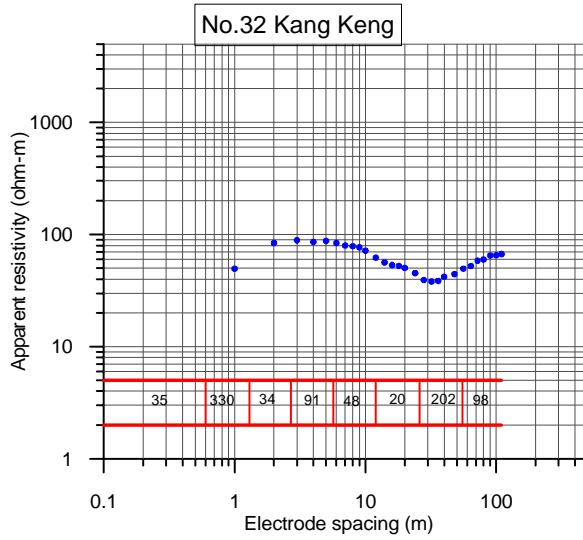


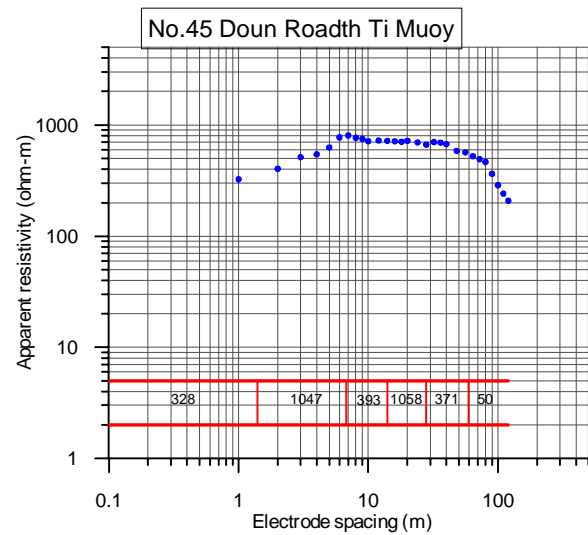
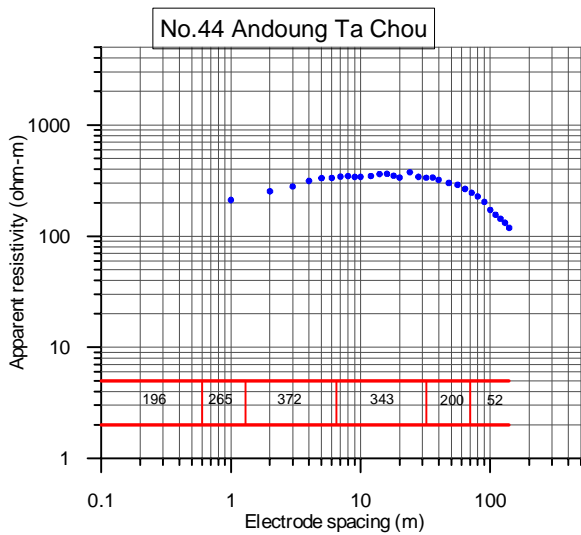
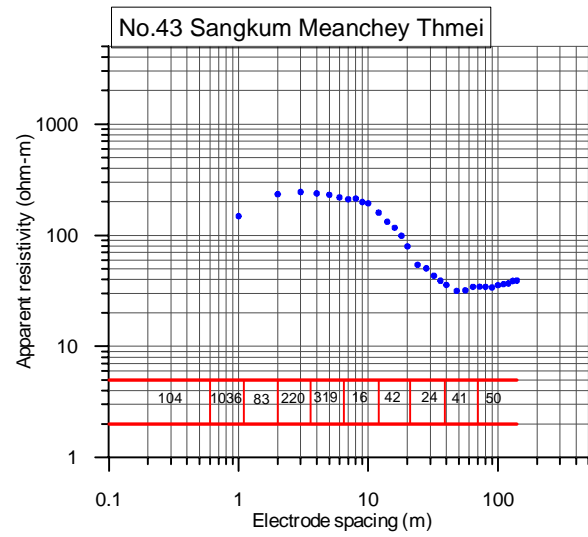
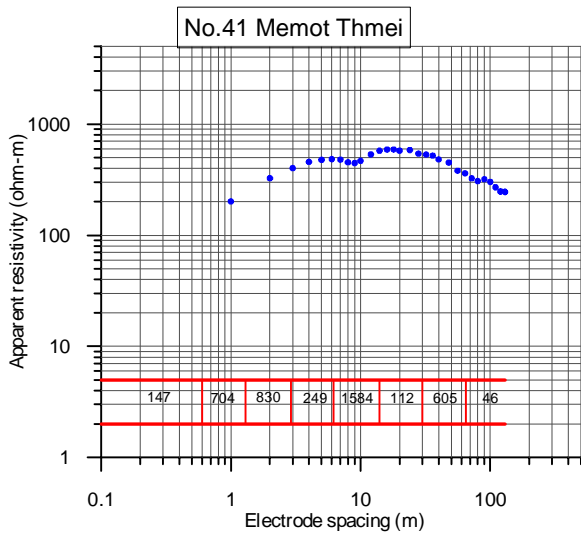
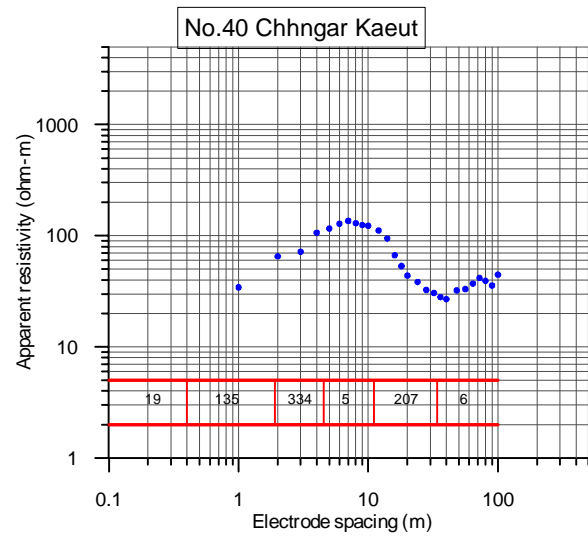
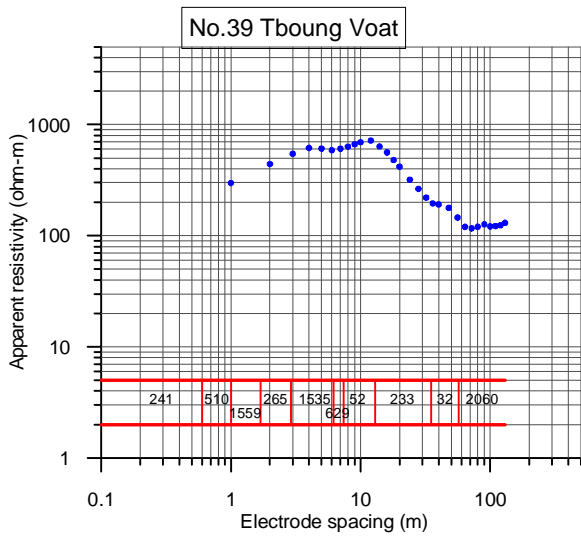


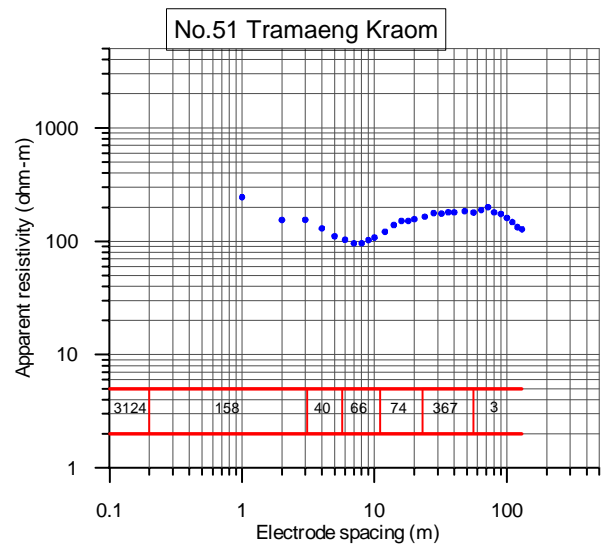
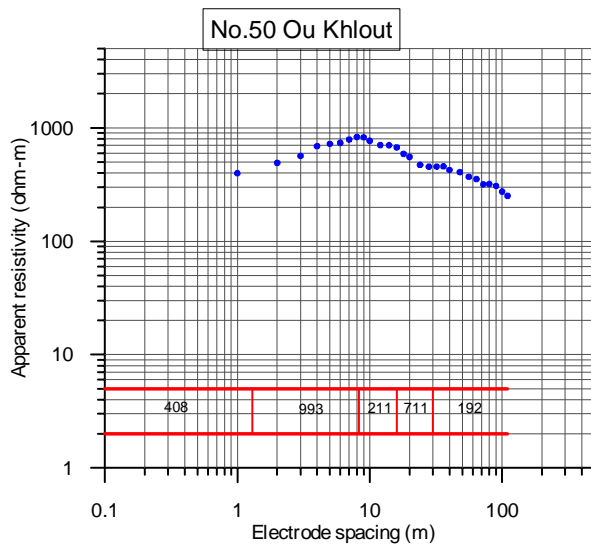
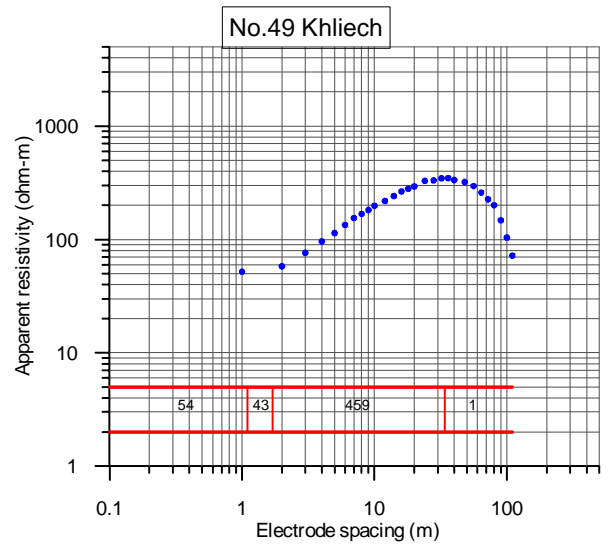
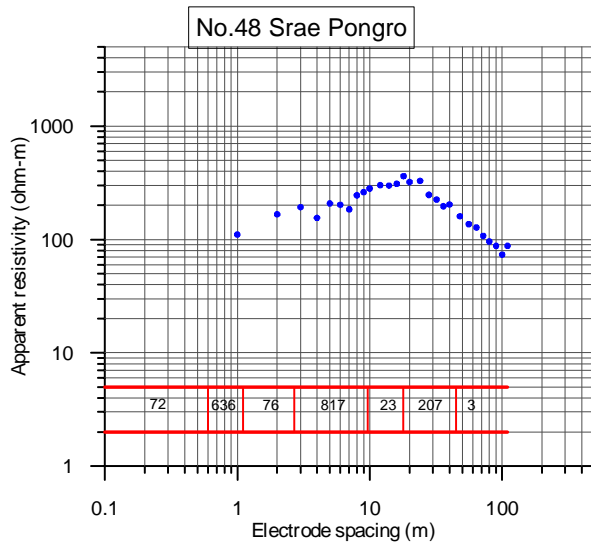
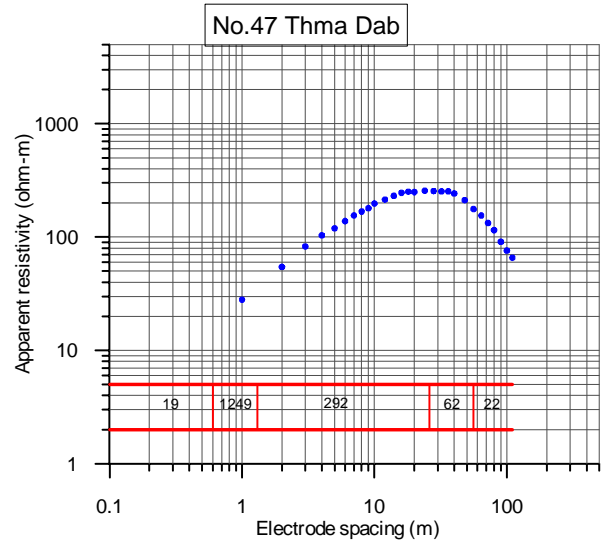
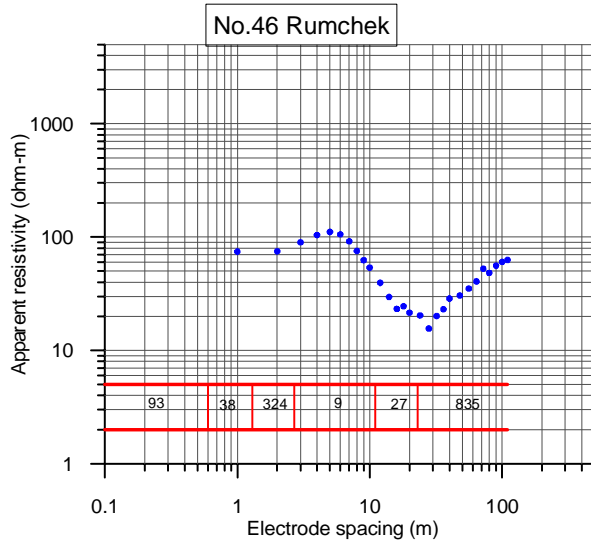


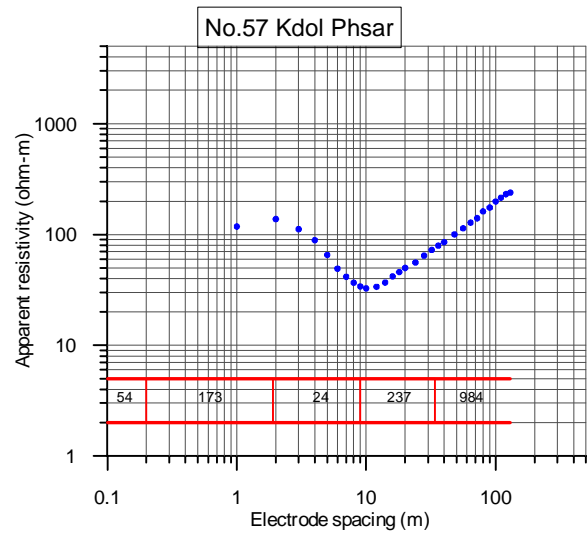
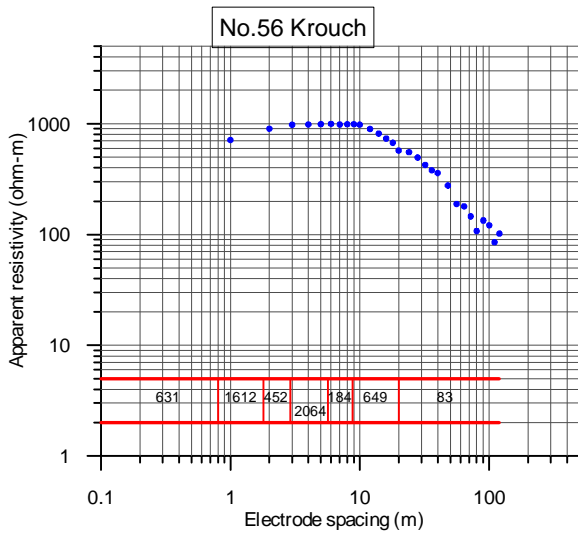
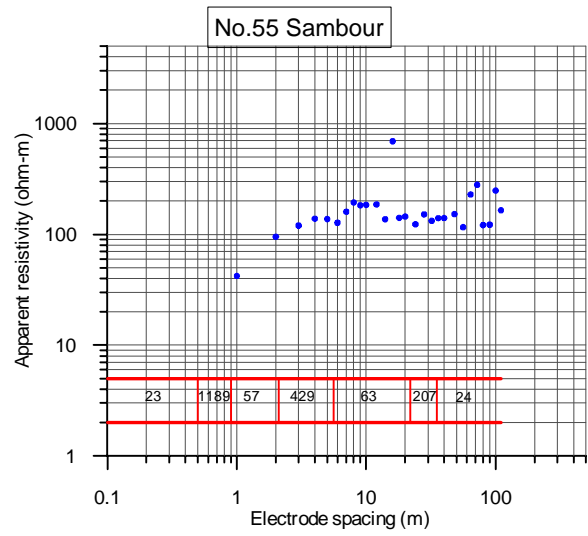
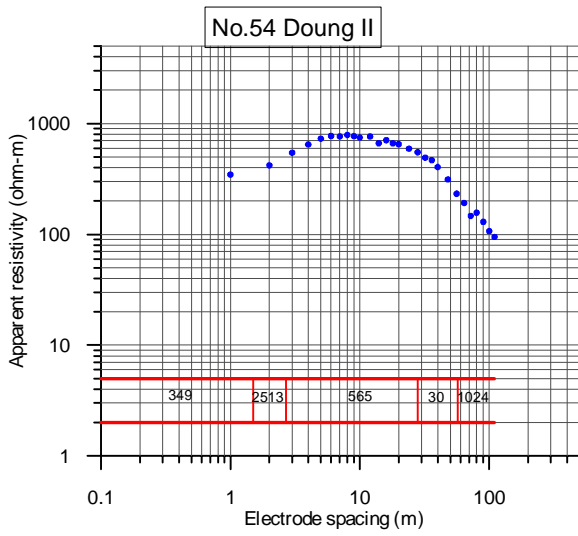
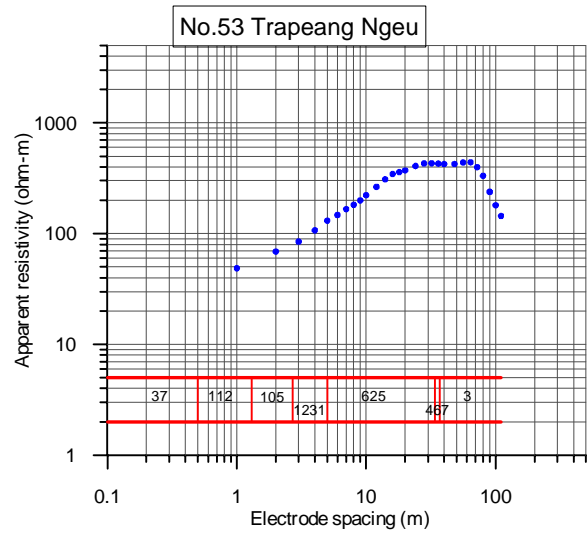
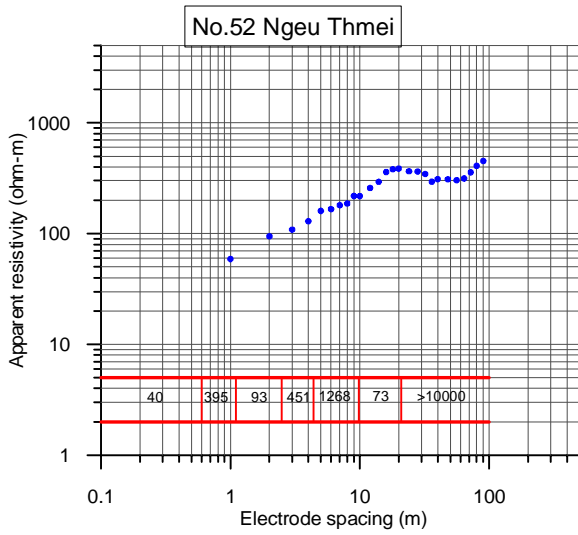


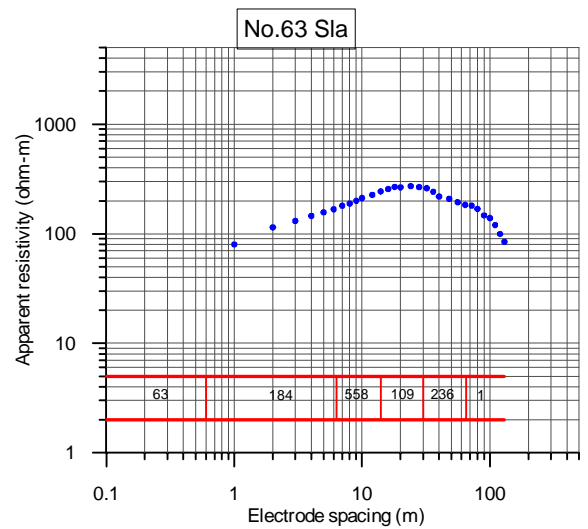
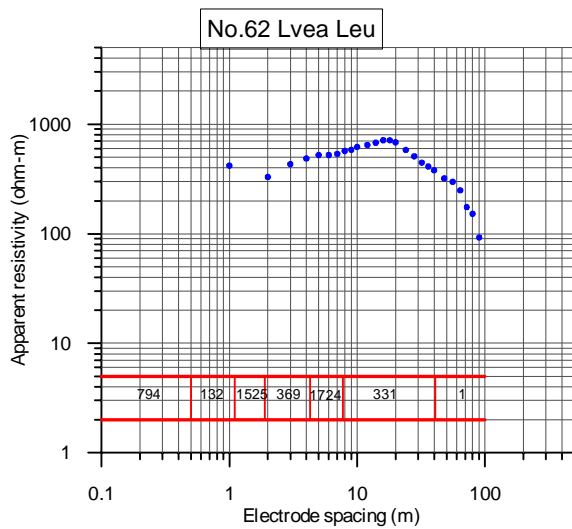
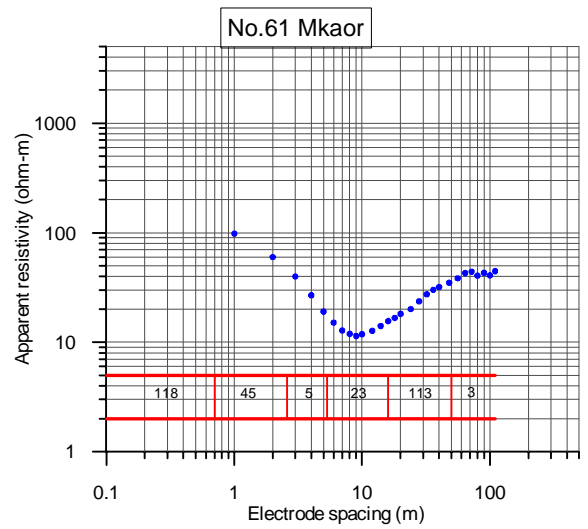
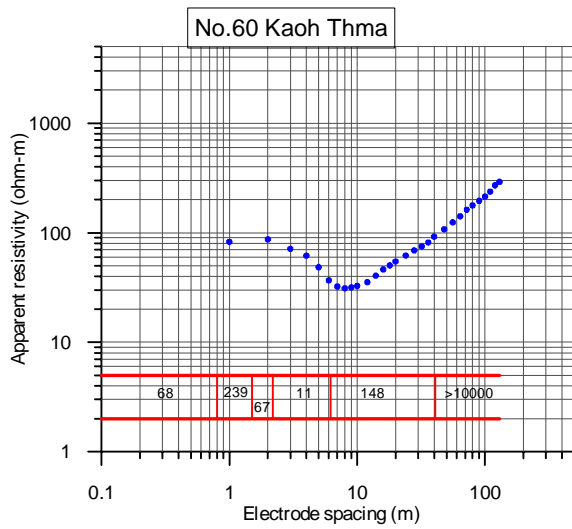
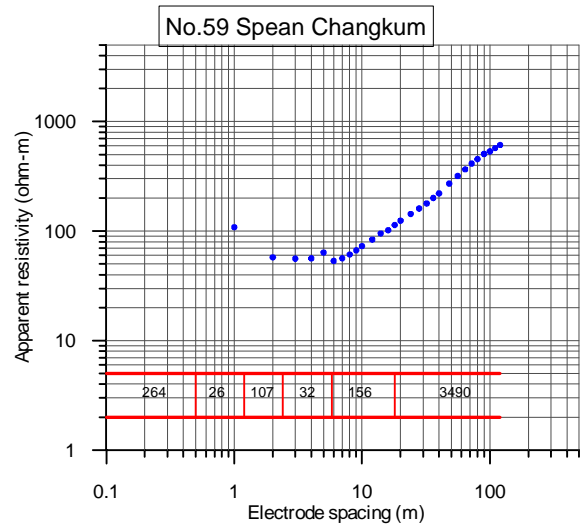
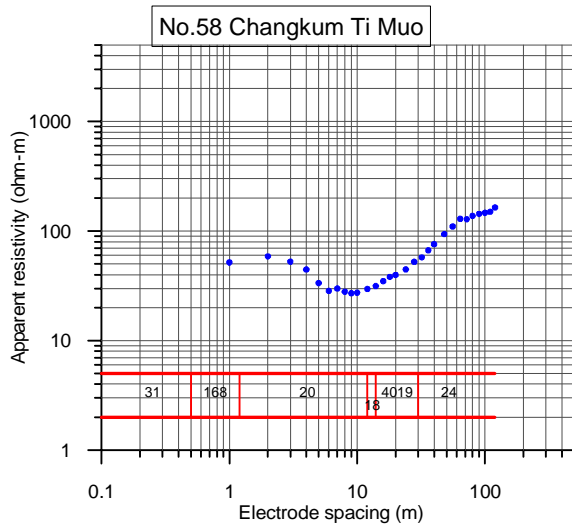


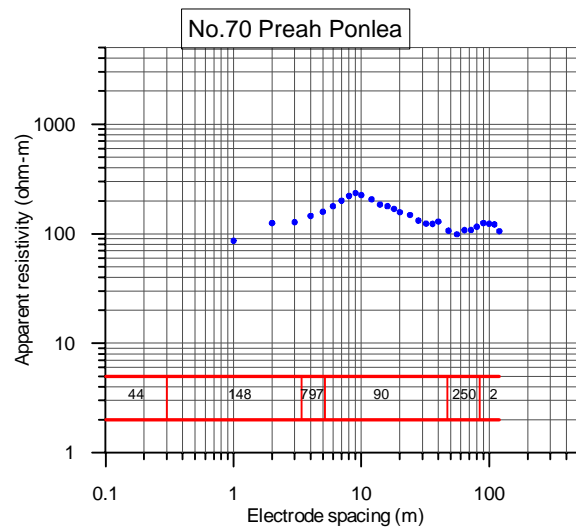
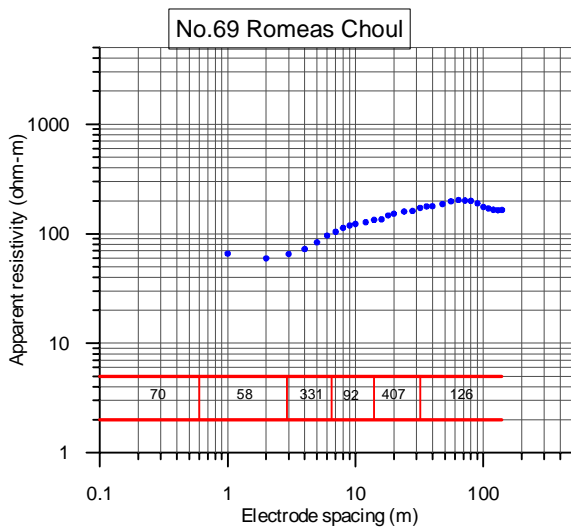
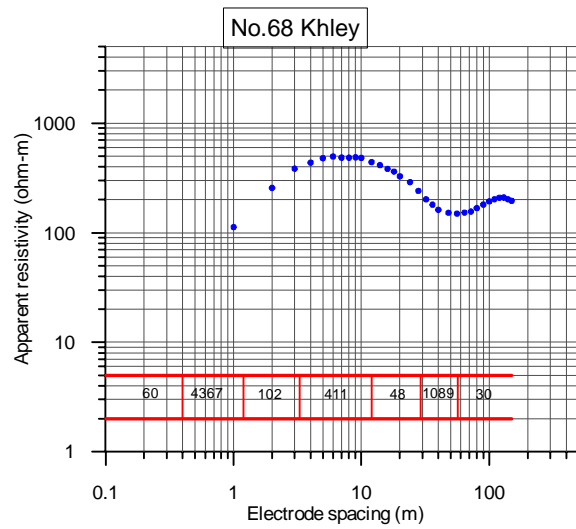
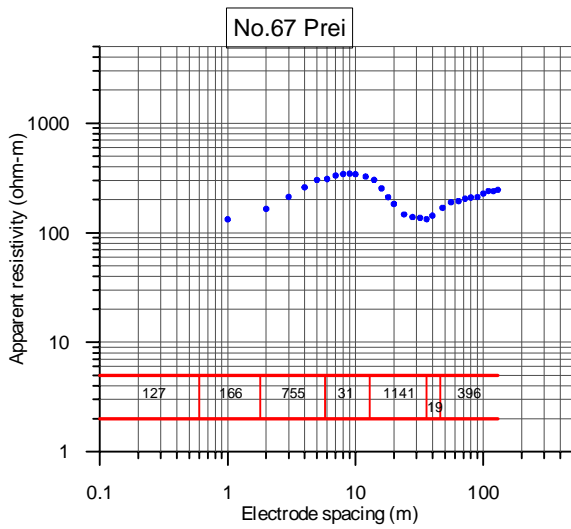
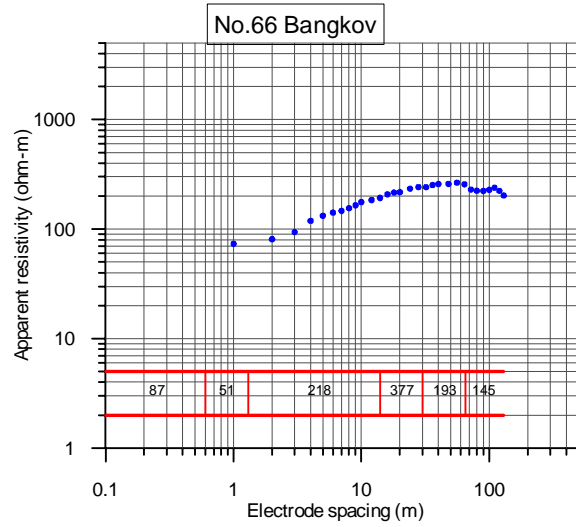
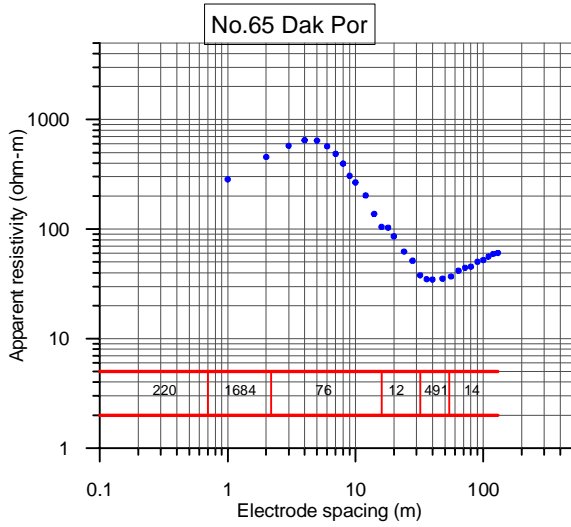


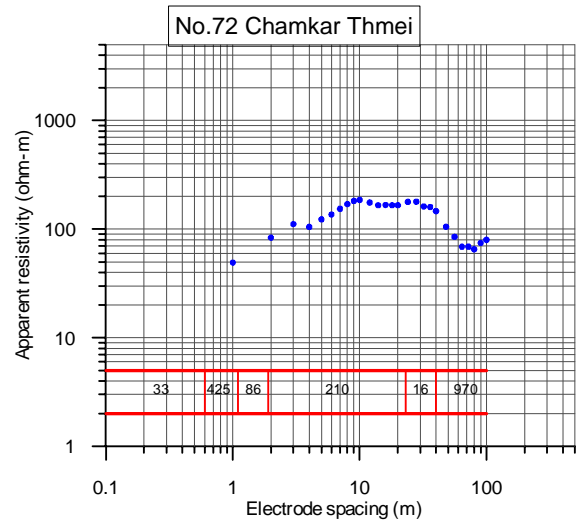
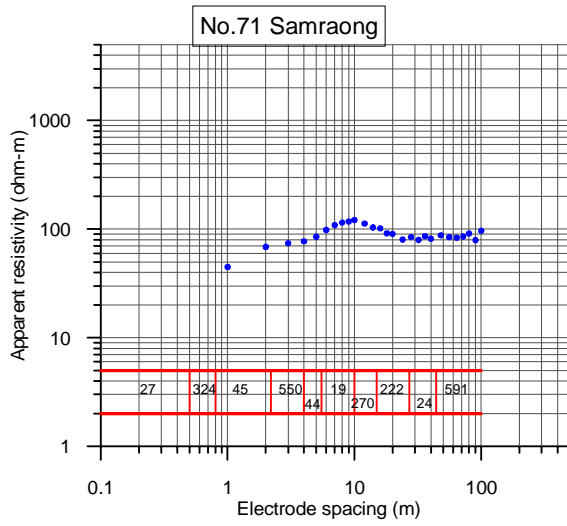












(12) Letter from Department of Rural Water Supply, Ministry of Rural Development about EIA



INGDOM OF CAMBODIA
NATION RELIGION KING

MINISTRY OF RURAL DEVELOPMENT

N :..059/09..MRD.

Phnom Penh, February 25, 2009

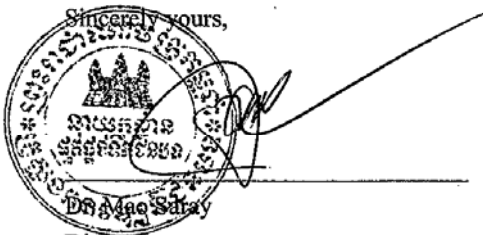
Mr. Satoshi ISHIDA
Chief Consultant/ Water Supply Plan
JICA Basic Design Study Team on the Project
For Rural Drinking Water Supply of Memot district
In Kampong Cham province

Re. EIA on the Project for Rural Drinking Water Supply of Memot district in Kampong Cham province

Dear Sir,

We are pleased to inform you that after studying the Draft Basic Design Study Report on the Project for Rural Drinking Water Supply in Memot District of Kampong Cham province we discovered that the proposed project does not have major adverse impacts on the environment and surrounding community, therefore you do not have to conduct an Environmental Impact Assessment.

Sincerely yours,



Director
Department of Rural Water Supply
Ministry of Rural Development
The Kingdom of Cambodia