Appendices

Appendices

1. Member List of the Study Team

1) Period of the basic design study : from September to October 2005

No.	Name	Job Title	Occupation
1	Yoshiki OMURA	Team Leader	Senior Advisor Institute for International Cooperation, JICA
2	Yutaka FUKASE	Planning Management	Water Resources Development and Environment Management Team, Project Management Group III, Grand Aid Management Department, JICA
3	Kazufumi MOMOSE	Chief Consultant/ Water Supply Planner 1	Tokyo Engineering Consultants Co. Ltd.
4	Kazuo HIRAYAMA	Groundwater Development Planner/Hydrogeologist	Kensetsu Jiban Corporation
5	Masaaki SHINDO	Water Supply facilities Planner 1	Tokyo Engineering Consultants Co. Ltd.
6	Kenichiro SUGIYA	Waterworks Management and Operation and Maintenance Planner	Unico International Corporation
7	Katsutoshi IWASAKI	Construction Planner/Cost Estimator	Tokyo Engineering Consultants Co. Ltd.
8	Shiro JIMBO	Water Supply Planner 2	Tokyo Engineering Consultants Co. Ltd.
9	Masashi KAWAMURA	Coordinator／Water Supply facilities Planner 2	Tokyo Engineering Consultants Co. Ltd.

2) Period of the explanation/discussion of the basic design study result : in March 2006

No.	Name	Job Title	Occupation
1	Yoshiki OMURA	Team Leader	Senior Advisor Institute for International Cooperation, JICA
2	Yutaka FUKASE	Planning Management	Water Resources Development and Environment Management Team, Project Management Group III, Grand Aid Management Department, JICA
3	Kazufumi MOMOSE	Chief Consultant/ Water Supply Planner 1	Tokyo Engineering Consultants Co. Ltd.
4	Masaaki SHINDO	Water Supply facilities Planner 1	Tokyo Engineering Consultants Co. Ltd.
5	Kenichiro SUGIYA	Waterworks Management and Operation and Maintenance Planner	Unico International Corporation
6	Masashi KAWAMURA	Coordinator／Water Supply facilities Planner 2	Tokyo Engineering Consultants Co. Ltd.

2. Study Schedule

1) Period of the basic design study : from September to October 2005

No.	Date Year 2005	Day	Schedule										
			Official		Consultant								
			Omura Team Leader	Fukase Planning Management	Momose Chief Consultant/Water Supply Planner 1, C1	Sugiya Operation and Maintenance, C2	Shindo Water Supply Facilities Planner, C3	Iwasaki Construction Planner/ Cost Estimator, C4	Hirayama Groundwater Development Planner/Hydrogeologist, C5	Jimbo Water Supply Planner 2, C6	Kawamura Coordinator/ Water Supply facilities Planner 2 C7
1	9/12	Mon	Arriving at Hanoi								
2	13	Tue	Visiting to JICA Vietnam Office, Japanese Embassy Courtesy call to CERWASS								
3	14	Wed	From Hanoi to Pleiku in Gia Lai								
4	15	Thu	Field survey in Gia Lai								
5	16	Fri	Courtesy call to PPC and field survey in Kon Tum								
6	17	Sat	From Pleiku to Hanoi							Arriving at Hanoi	
7	18	Sun	Material arrangement		Internal Meeting				Internal Meeting		
8	19	Mon	Meeting with CERWASS				Material arrangement		Material arrangement		
9	20	Tue	Meeting with CERWASS, Signing on MD Reporting to JICA Vietnam Office, Japanese Embassy				Same as C5		Moving to Kon Tum from Hanoi		
10	21	Wed	Field survey in Northern Project, leaving for Hanoi				Field survey in K2		Field survey in K2		Preparing for Sub contract
11	22	Thu	Arriving at Tokyo		Collection data in CERWASS		Field survey in K4	Arriving at Hanoi	Field survey in G5	Field survey in K4	Same as above
12	23	Fri			Collection data in CERWASS		Field survey in K3-1	Material arrangement	Field survey in K3-1		Same as above
13	24	Sat			Material arrangement		Field survey in G4	Material arrangement	Field survey in G4		Same as above
14	25	Sun			Moving to Kon Tum from Hanoi		Material arrangement	Moving to Pleiku from Hanoi	Material arrangement		Same as above
15	26	Mon			Collection in P-CERWASS in Kon Tum			Material arrangement			Same as above
16	27	Tue			Field survey in K2		Field survey in G2				Same as above
17	28	Wed			Field survey in K3-1		Field survey in K2,K3-1,K4	Field survey in G3			Same as above
18	29	Thu			Field survey in K4		Field survey in G1				Same as above
19	30	Fri			Collection data in P-CERWASS and DARD etc.		Field survey in G5				Same as above 上
20	10/1	Sat			Material arrangement		Field survey in G5		Material arrangement	Field survey in G2	Moving to Pleiku
21	2	Sun			Material arrangement						
22	3	Mon			Collection data in P-CERWASS in Gia Lai		Material arrangement		Field survey in D2	Material arrangement	
23	4	Tue			Rig company survey	Field survey in G1	Same as C1	Material arrangement	Field survey in D1,D2	Material arrangement	
24	5	Wed			Rig company survey	Field survey in G2	Same as C1	Field survey in D2	Field survey in D1,D2	Field survey in D2	
25	6	Thu			Moving to Hanoi from Pleiku	Field survey in G3	Same as C1	Field survey in D2	Field survey in D2,D4	Field survey in D2	
26	7	Fri			Collection data in CERWASS, Progress report to Embassy of Japan, JICA Vietnam Office	Field survey in G4	Same as C1	Field survey in D1	Field survey in D1,D4	Field survey in D1	
27	8	Sat			Material arrangement	Field survey in G5	Same as C1	Field survey in D3			
28	9	Sun			Internal Meeting						
29	10	Mon			Survey in Public Cooperation of Hanoi Waterworks, Moving to Dak Lak from Hanoi	Material arrangement	Same as C1	Field survey in D4	Field survey in D1, D3, D4	Field survey in D4	

No.	Date Year 2005	Day	Schedule									
			Official		Consultant							
			Omura Team Leader	Fukase Planning Management	Momose Chief Consultant/Water Supply Planner 1, C1	Sugiya Operation and Maintenance, C2	Shindo Water Supply Planner, C3	Iwasaki Construction Planner/ Cost Estimator, C4	Hirayama Groundwater Development Planner/Hydrogeologist, C5	Jimbo Water Supply Planner 2, C6	Kawamura Coordinator/ Water Supply facilities Planner 2 C7	
30	11	Tue			Collection in P-CERWASS in Dak Lak		Field survey		Material arrangement			
31	12	Wed			Field survey in D1		Field survey		Field survey in D6			
32	13	Thu			Meeting with CERWASS	Field survey in D1, D2	Field survey		Field survey in D6			
33	14	Fri			Field survey	Field survey in D3	Field survey		Field survey in D6			
34	15	Sat			Material arrangement	Field survey in D4	Field survey			Field survey in G1		
35	16	Sun			Material arrangement							
36	17	Mon			Collection in P-CERWASS in Dak Nong		Field survey		Rig company survey	Field survey in D1		
37	18	Tue			Collection in P-CERWASS in Dak Nong		Field survey		Survey of water level and water quality monitoring system	Additional field survey		
38	19	Wed			Field survey	Field survey in D6	Field survey		Material arrangement	Additional field survey		
39	20	Thu			Moving to Da nang		Moving to Hanoi			Additional field survey		
40	21	Fri			Survey in vocational school		Material arrangement		Arriving at Tokyo	Additional field survey		
41	22	Sat			Moving to Hanoi		Material arrangement			Additional field survey		
42	23	Sun			Material arrangement					Moving to Hanoi	Additional field survey	
43	24	Mon			Internal Meeting					Same as C1	Additional field survey	
44	25	Tue			Meeting with CERWASS					Material arrangement	Additional field survey	
45	26	Wed			Meeting with CERWASS	Visiting to Northern project				Same as C3	Moving to Hanoi	
46	27	Thu			Visiting to Drilling site					Material arrangement		
47	28	Fri			Report to Embassy of Japan and JICA Vietnam Office					Same as C1	Material arrangement	
48	29	Sat			Material arrangement					Leaving Hanoi	Material arrangement	
49	30	Sun			Leaving Hanoi					Arriving at Kansai	Same as C1	
50	31	Mon			Arriving at Tokyo						Same as C1	

2) Period of the explanation/discussion of the basic design study result : in March 2006

No.	Date Year 2005	Day	Schedule					
			Official		Consultant			
			Omura Team Leader	Fukase Planning Management	Momose Chief Consultant/Water Supply Planner 1, C1	Sugiya Operation and Maintenance, C2	Shindo Water Supply Facilities Planner, C3	Kawamura Coordinator/ Water Supply facilities Planner 2 C7
1	3/13	Mon			Arrival at Hanoi			
2	14	Tues			Courtesy call to MARD, CERWASS			
3	15	Wed			Report Explanation and Discussion with CERWASS and three P-CERWASS			
4	16	Thu			Report Explanation and Discussion with CERWASS and three P-CERWASS			
5	17	Fri			Minutes Discussion with CERWASS and three P-CERWASS			
6	18	Sat						
7	19	Sun	Arriving at Hanoi					
8	20	Mon	Visiting to JICA Vietnam office, Minutes Discussion with MARD, CERWASS and three P-CERWASS					
9	21	Tue	Minutes Discussion with MARD, CERWASS and three P-CERWASS					
10	22	Wed	Minutes Discussion and Signing with MARD, CERWASS and three P-CERWASS					
11	23	Thu	Report to JICA Vietnam office, Leaving Hanoi					
12	24	Fri	Arriving at Tokyo					

3. List of Parties Concerned in the Recipient Country

(1) Parties concerned in Japan side

1) Embassy of Japan

Mr. Takuya TAKIGAWA	Second Secretary

2) JICA Vietnam Office

Mr. Fumio KIKUCHI	Director
Mr. Hiroshi IZAKI	Deputy director
Ms. Sayaka NAKAMURA	Staff

(2) Parties concerned in Vietnam side

1) MARD (Ministry of Agriculture and Rural Development)

Mr. Hoang Thi Dzung	Deputy Director General, Dept. of International Cooperation
Ms. Dao Thi Loc	Program Manager, Dept. of International Cooperation
Mr. Den	Planning Department
Mr. Hai	Water Resources Management
Mr. Ut	Water Supply Engineer

2) CERWASS (Center for Rural Water Supply and Environmental Sanitation)

Dr. Le Van Can	Director
Mr. Pham Duc Nam	Deputy Director
Mr. Le Thieu Son	Deputy Director
Mr. Ha Thann Hang	Chief, Dept. of Planning and International Cooperation
Mr. Le Hong Hai	Dept. of Water Resources
Mr. Ha Duc Chinh	Technical and Technology Section
Mr. Ut	Water Supply Engineer
Mr. Nguyen Thanh Luan	Director, Center for Material Delivery and Technology Transfer

3) CERWASS, Kon Tum

Mr. Trinh Ngoc Dung	Director
Mr. Thuy	Chief, Planning Dept.
Mr. Nam	Engineer

4) CERWASS, Gia Lai

Mr. Bui Van Tam	Director
Mr. Tran Thieu	Water Supply Engineer

5) CERWASS, Dak Lak

Mr. Ngo Van Tuyen	Director
Mr. Pham Phu Bon	Vice Director
Ms. Nguyen Thi Phuong Yen	Head of Administration

6) CERWASS, Dak Nong

Mr. Vo Van Minh	Acting Director

7) DARD (Department of Agriculture and Rural Development), Gia Lai

Mr. Giap Vice Director

8) DARD (Department of Agriculture and Rural Development), Dak Lak

Mr. Nguyen Huu Chung Vice Director

9) Land Department, Gia Lai

Mr. Tliat Director

10) People's Committee, Gia Lai Province

Mr. Le Viet Huong Vice Chairman

11) Hanoi Water Business Company

Mr. Nguyen Hung Vy Deputy Director

12) Hanoi Water Business Company No. 2

Mr. Nguyen Nhu Hai Director

13) DANIDA

Ms. Hellet T. Stoltz IEC Specialist

14) Phuong Dong Economic and Technology Vocational School

Mr. Le Ngoc Viet Head Master

15) People's Committee

Mr.Vu Minh Quang	Land Manager of DPC (G1)
Mr.Le Tuan Nhu	Vice Chief Officer of DPC, G2
Mr.Thanh	Vice Chairman of DPC (G3)
Mr.Thanh	Vice Chief Officer of DPC, G3
Mr.Dang	Chief Officer of DPC, G4
Mr.Him	Chairman of CPC, G4
Mr.Thenh	Land Manager of CPC, G4
Mr.Duc	Chairman of CPC, D2
Mr.Chien	Land Manager of CPC, D2
Mr.Tinh	Traffic & Irrigation Section of DPC, D2
Mr.Le Quang Bong	Chairman of CPC, D1
Mr.Nguyen Duc Thuan	Land Manager of CPC D1
Mr.Hue	Chairman of CPC D3
Mr.Thao	Traffic & Land Manager D3
Ms.H Tlui Mlo	Chairperson of CPC D4
Mr.Y Sau	Vice Chairman of CPC D4
Mr.Pham Ngoc Khai	Vice Chairman of CPC D4
Mr.Y Chuen	Land Manager of CPC D4
Mr.Quan	Vice Chairman of CPC D6
Mr.Le Van Thi	Vice Chairman of DPC D6
Mr.Loc	Land Manager of CPC D6
Mr.Tuan	Vice Manager of water Supply System D6

4. Minutes of Discussions

Minutes of discussions for Inception Report

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE GROUNDWATER DEVELOPMENT PROJECT
IN THE RURAL PROVINCES OF CENTRAL HIGHLANDS
IN THE SOCIALIST REPUBLIC OF VIETNAM

In response to a request from the Government of the Socialist Republic of Vietnam (hereinafter referred to as "the Vietnam), the Government of Japan decided to conduct a Basic Design Study on the Project for Water Supply System in the Provinces of Central Highlands in the Socialist Republic of Vietnam (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 Vietnam the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Yoshiki Omura, Senior Advisor, Institute for International Cooperation, JICA, and is scheduled to stay in the country from September 12, 2005 to October 30, 2005

The Team held discussions with the officials concerned of the Government of Vietnam 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.

Hanoi, September 20, 2005

Omura Yoshiki
Leader
Basic Design Study Team
Japan International Cooperation Agency

Hoang Thi Dung
Deputy Director
International Cooperation Department
Ministry of Agriculture and Rural Development
Vietnam(MARD)

Le Van Can
Director
Center for Rural Water Supply and Environment
Sanitation(CERWASS)
Vietnam

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve water supply in order to improve public health and living environment of the people in the provinces of central highlands through groundwater development and construction of water supply system

2. Project sites requested by the Vietnamese side

The Project sites requested by the Vietnamese side are 13 communes*1 : Dak Su, Dak Ui and Dak Hring in Kon Tum province; Kong Tang, Nhon Hoa, Chu Ty, Thang Hung and Nghia Hoa in Gia Lai province; Krong Nang, Ea Drang, Krong Buk and Ea Drong in Dak Lak province and Kien Duc*2 in Dak Nong province.

*1 One commune i.e. Ia Rsiom commune was omitted in August 2005.

*2 Kien Duc, which belonged to Dak Lak province, belongs to Dak Nong province.

3. Responsible and Implementing Agency

3-1.The Responsible Agency is Ministry of Agriculture and Rural Development (MARD).

3-2.The Implementing Agency is Center for Rural Water Supply and Environmental Sanitation (CERWASS).

4. Items requested by the Government of Vietnam

After discussions with the Team, the Vietnamese side finally requested the items described in Annex-I. JICA will assess the appropriateness of the requests.

(1) Procurement of the Equipment

Details of items are listed in Annex-I (a)

(2) Construction of the Facilities

Details of items are listed in Annex-I (b).

5. Japan's Grant Aid Scheme

5-1.Vietnamese side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex II and Annex III.

5-2.Vietnamese side will take the necessary measures, as described in Annex-IV and Annex V, 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 Vietnam until October 30, 2005.

6-2. JICA will prepare the draft final report in English and dispatch a mission in order to explain its contents around middle of January 2006.

6.3 Based on the Minutes of Discussions and technical examination of the draft final report, JICA will complete the final report and send it to the Government of Vietnam by end of March 2006.

7. Other relevant issues

7-1 Priority of the requested facilities and equipment

The Vietnam side strongly requested both provision of the drilling equipment and construction of water supply facilities in the priority communes. The team agreed to convey the request to the Japanese authorities concerned. The team explained that any commitment could not be made at the moment and it might be difficult to provide drilling equipment unless firmly justified.

The team explained that the 13 communes requested for the Project implementation were to be assessed and prioritized in view of the following factors:

a) Financial and Social sustainability
b) Management and maintenance ability
c) Water resource availability (Amount and Quality)
d) Urgent needs
e) Sufficient Information for justification

7-2 Extent of Service Area

The service area should cover only densely populated area excluding sparsely populated area and isolated area in each commune.

7-3 Solar System

Solar systems are not included in the project taking into consideration of 1) electricity availability and stability, 2) sunshine time in the rainy season and 3) difficulty in operation and maintenance of solar system accessories, 4) vulnerability and vandalization, 5)high cost of replacement

7-4 Environmental and Social Consideration

The team explained that JICA guidelines for environmental and social considerations issued in 2004 stipulate the implementing agency should be responsible for conducting the subject assessments in accordance with the current laws and regulations of the recipient country. In this basic design study, therefore, environmental and social consideration should be conducted to supplement the EIA study done in the 2002 JICA study, which the Team considered to have covered the almost all requirements of the current JICA Guideline. The major supplemental items are 1) risk of lowering of water table in existing wells, 2) risk of groundwater contamination and 3) land acquisition causing forced resettlement.

7-5 Project title

Both side agreed the title of "Groundwater Development Project in the Rural Provinces of Central Highlands in the Socialist Republic of Vietnam" would be modified as "The Project for the Ground Water Development in Rural Part of Central Highlands Provinces in the Socialist Republic of Vietnam".

7-6 The consultant services under the Project

The Vietnamese side requested the consultant services for operation and maintenance as one of the components of the Grant Aid

Annex I : ITEMS REQUESTED BY VIETNAMESE SIDE

(a) Equipment List

Equipment	Specifications	Quantity
Truck mount drilling rig and drilling tools etc.	Rig for rotary and DTH hammer, mud pump equipped. Depth: 250m 300m (Diameter: 12-1/4") Casing pipes, drilling rods, bits and hammer	1
Development of wells etc.	Air compressor, tools and accessories, and spare parts	1
Supporting trucks for field work and test instruments	1 water-tank lorry, 1 crane-truck, 1 truck for field work and spare parts. Electrical logging, Water quality analysis and Pumping test instrument	1
Solar power system and generator for submersible pump	4 sets of solar power systems with pump and generator with pumps	4
Supporting Vehicles	4WD gasoline engine	2

(b) Facility Construction

Province	Number of communes
Kon Tum	3
Gia Lai	5*1
Dak Lak	4*2
Dak Nong	1

*1 Ia Rsion Commune was omitted from the original request because the water supply system was constructed.

*2 Dak Lak is divided into Dak Lak and Dak Nong. Four communes belong to Dak Lak and 1 commune belongs to Dak Nong.

ANNEX II: 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.

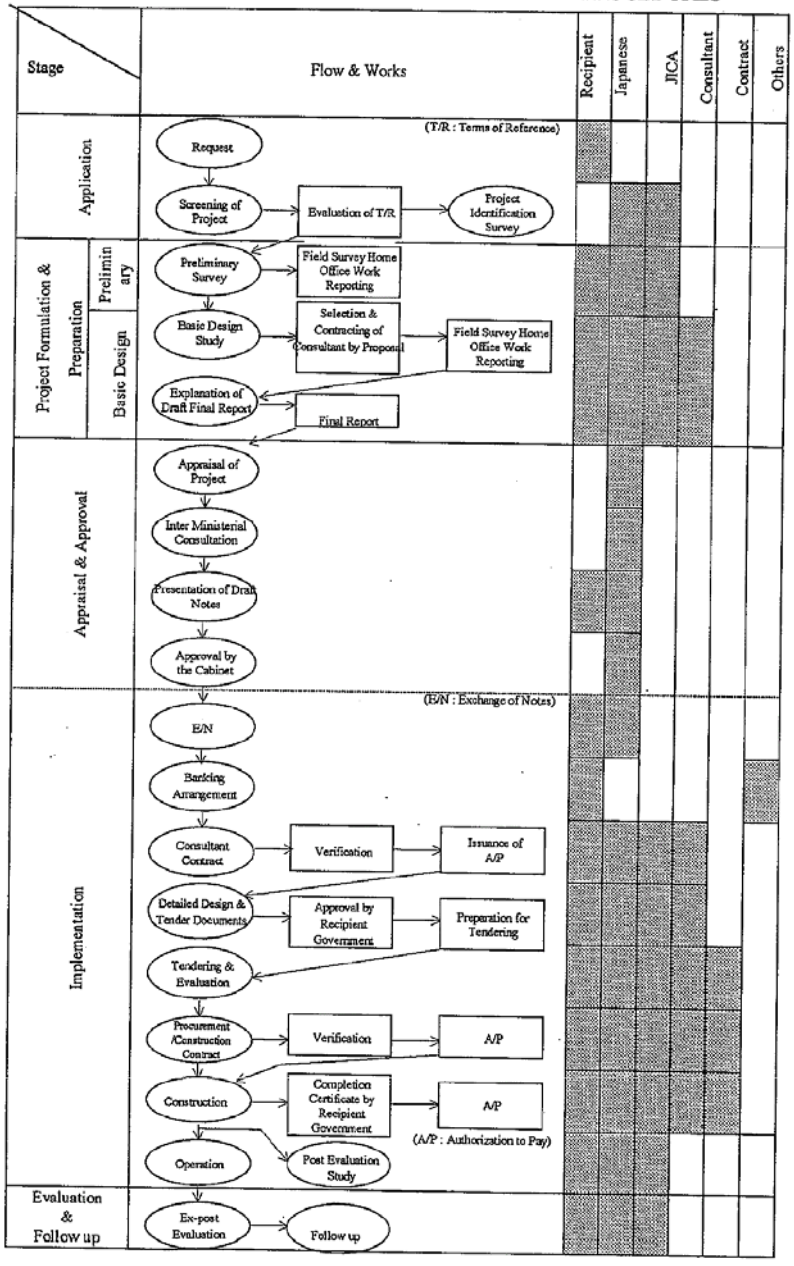
b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

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.

Annex III

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



ANNEX IV: UNDERTAKINGS BY THE GOVERNMENT OF VIETNAM

1. To secure land necessary for the Project;

2. To clear and level the site for the Project prior to the commencement of the construction;

3. To provide a proper access road to the Project site;

4. To provide facilities for distribution of electricity, water supply, telephone trunk line and drainage and other incidental facilities outside the site;

5. To undertake incidental outdoor works, such as gardening, fencing, exterior lighting, and other incidental facilities in and around the Project site, if necessary;

6. To ensure prompt unloading and customs clearance of the products purchased under the Japan's Grant Aid at ports of disembarkation in the Recipient Country;

7. 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;

8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into THE RECIPIENT COUNTRY and stay therein for the performance of their work;

9. To bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);

10. To provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;

11. To ensure that the facilities constructed and equipment purchased under the Japan's Grant Aid be maintained and used properly and effectively for the Project

12. To bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project; and

13. To set up water supply unit in each province and to conduct IEC activities

ANNEX V: 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		•
	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	•	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		•
	3) Internal transportation from the port of disembarkation to the project site	•	
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
7	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		•
8	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		•
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		•

Minutes of discussions for Draft Final Report

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON
THE PROJECT FOR THE GROUNDWATER DEVELOPMENT
IN RURAL PART OF CENTRAL HIGHLASNDS PROVINCES
IN THE SOCIALIST REPUBLIC OF VIETNAM
(EXPLANATION OF DRAFT REPORT)

On September 20, 2005, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on The Project for the Groundwater Development in Rural Part of Central Highlands Provinces in the Socialist Republic of Vietnam (hereinafter referred to as "the Project") to the Socialist Republic of Vietnam (hereinafter referred to as "Vietnam"), 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 the Vietnamese side on the components of the draft report, JICA sent to Vietnam the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Omura Yoshiki, Senior Advisor, Institute for International Cooperation, JICA, from March 14, 2006 to March 23, 2006.

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

Hanoi, March 22, 2006

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ATTACHMENT

1.Components of the Draft Report

The Vietnamese side agreed and accepted in principle the components of the draft report explained by the Team. Major components of draft basic design for Japanese Grant Aid are construction of water supply facilities in five communes and provision of well drilling equipment as referred in table1 and table2.

2.Japan's Grant Aid scheme

The Vietnamese side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Vietnam as explained by the Team and described in Annex II, III, IV and V of the Minutes of Discussions signed by both parties on September 20, 2005.

3.Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Government of Vietnam by the end of April 2006.

4.Other relevant issues

(1) Undertakings required to the Government of Vietnam

- Clearance of unexploded ordnance such as bombs, shells and land mines before the construction starts
- Allocation of counterpart fund before the Project starts
- Installation of service pipes and water meters
- Purchase of five computers for developing customer ledgers, invoicing systems, etc.
- Set-up of Water Management Unit (WMU) in each province in order to strengthen operation and maintenance capabilities
- Establishment of water charge collection system under WMU to recover the operation and maintenance costs, which consists of electrical, chemical, labour and repair costs
- Provision of warehouse to store material such as service pipes and water meters of the Project
- Provision of garage to store and service well drilling equipment before completion of the Project
- IEC (Information Education and Communication) activity

(2) Environmental and Social Considerations

- The Vietnamese side would establish a groundwater monitoring system in order to minimize risks of 1) excessive lowering of water table in the existing well(s) neighboring to the proposed well(s) and 2) groundwater pollution in the proposed well(s) which may result from infiltration of unsanitary water.
- Land required for the planned water supply systems consisting of deep well(s), conveyance pipe, a water treatment plant, distribution reservoir(s) etc. shall be acquired by Vietnamese side without causing involuntary re-settlement.
- Vietnamese side explained that by utilization of result of 'the Study on Groundwater Development in the Rural Provinces of the Central Highlands "(August 2002) supported by JICA, further EIA (Environment Impact Assessment) will not be necessary for the Project according to the Vietnamese regulation (#490/1998/TT-BKHCNMT of 29 April 1998).

(3) Drilling Plan of Deep Wells

The Vietnamese side explained that, in order to achieve the goal of "National Rural Clean Water Supply and Sanitation (NRWSS)", they would set up a "Drilling Team" with assignment of staff (2 engineers, 2 technicians and 5 operators). The Vietnamese side explained that provided rig will be fully utilized to drill wells not only in the planned five communes of the Project but also in other communes as per table3 and also bear the expenditure for operation and maintenance of drilling rig.. The Vietnam side bear the annual operation and maintenance cost of drilling well equipment which is estimated as at least 1% of equipment cost except for the transportation cost and installation cost etc.

(4) Additional Component

The Vietnamese side strongly requested provision of one pick-up truck and one 4WD vehicle. The Japanese side replied that it will be difficult to realize such request.

Table 1. Outline of Proposed Facilities in Communes

		K3-1 Dak Ui	G1 Kong Tang	G2 Nhon Hoa	D2 Ea Drang	D4-1 Ea Drong
Maximum daily water supply (2010,m3/day)		259	636	1,075	1,572	668
Deep well	Existing well*1	1	1	1	-	1
	Proposed well	-	1	6	7	2
Conveyance pipe (m)		Existing	2,200	7,900	5,300	4,900
Water treatment plant*2		Fe, Mn, Ch Medium velocity filtration	Fe, Ch Rapid Sand filtration	Mn, Ch Rapid Sand filtration	pH, Ch	Fe, Ch Rapid Sand filtration
Distribution reservoir		90m3×1	216m3×1	360m3×1	540m3×1	228m3×1
Conveying pump		-	1	1	-	-
Elevated tank		-	38.7m3×1	50m3 ×1	-	-
Distribution pipe (m)		5,000	26,500	38,600	51,800	27,200
No. of service households*3		624	1,738	2,181	3,874	1,583

*1 Existing well was drilled in JICA Development Study and will be utilized in this project.
*2Fe: Iron will be removed. *Mn: Manganese will be removed. *Ch: Chlorination will be conducted.
*3: Service Pipe(average 20m for each household) and water meters will be under Japanese Grant Aid, however installation of service pipes and water meters will be undertaken by the Vietnam Side

Table 2. Main Feature of Well Drilling Equipment

Equipment		No.	Specifications
1. Well Drilling Equipment			
1-1	Drilling Rig	1 Unit	Type & Construction Method: Water well drilling rig, top head drive rotary drilling rig, designed for direct mud circulation and down-the-hole (DTH) drilling. Drilling Depth: upto 200m, Drilling Diameter: 4-3/4"
1-2	High Pressure Air Compressor	1Unit	Output: 30.0m^3/min Rated operating pressure: 2.41MPa
1-3	Miscellaneous	1 Set	-Welder/Generator -Self priming pump Type: 200 liter/min x 20m head -Submersible dewatering pump 200 liter/min x 15m head -Oxygen-acetylene cutting and heating equipment, tool etc.
1-4	Air Lift Equipment	1 Unit	It corresponds to the depth of 200m
1-5	Spare Parts	1 Lot	Relevant to well drilling equipment
2. Supporting Equipment			
2-1	Cab-back Crane Cargo Truck	1 Unit	6x4 drive, P.T.O. (Power Take Off)driven, hydraulic operated cab-back crane of 6 tons capacity, 9.0m. Payload capacity : 12,500 kgf, Cargo space length : 6.2m
2-2	Pumping Test Equipment (Submersible pump, Generator, Triangular weir)	1 Set	Submersible pump: Capacity : 240 liter/min x 70m head Submersible pump: Capacity : 576 liter/min x 50m head Generator: 10kVA, AC380V Accessories
2-3	Well Logging Equipment	1 Set	Measurement item: Normal resistivity, SP, Natural gamma
2-4	Spare Parts	1Lot	Relevant to well drilling equipment.

Table3. Planned Communes where Well Drilled by Supllied Drilling Equipment

No.	Province	District	Commune	Population (Person)	No. of Existing Water Supply Systems	No. of Proposed Water Supply Systems	No. of Proposed Wells	Existing Population Served (Person)
1	Dak Lak	Ea Kar	Ea Nop	12,140	-	1	3	
2	Dak Lak	Cu Mga	Quanh Hiep	11,330	-	1	2	
3	Gia Lai	Ia Pa	Ia Trok	8,373	-	1	3	
4	Gia Lai	Ayun Pa	Phu Thien	15,410	-	1	5	
5	Gia Lai	Ia Grai	Ia Sao	17,656	-	1	6	
6	Gia Lai	Ia Grai	Ia To	10,856	-	1	3	
7	Kon Tum	Dak Ha	Dak La	6,302	-	1	2	
8	Kon Tum	Kon Tum	Ya Chim	9,936	-	2	2	
9	Dak Nong	Dak R'Lap	Nhan Co	13,795	1	1	4	500
10	Dak Nong	Dak Mil	Duc Minh	12,625	1	1	5	475
			Sub-total	118,423	2	11	35	
11	Gia Lai	Duc Co	Chu Ty	8,713	1	1	1	500
12	Gia Lai	Chu Prong	Thang Hung	4,645	-	1	1	
13	Gia Lai	Chu Pah	Nghia Hoa	4,013	-	1	1	
14	Dak Lak	Krong Nang	Krong Nang	11,497	-	1	2	
15	Dak Lak	Krong Pac	Krong Buk	7,465	-	1	1	
16	Dak Nong	Dak R' lap	Kien Duc	9,970	1	1	3	500
			Sub-total	46,303	2	6	9	
			Total	164,726	4	17	44	

Remark: The above estimate is based on the current limited knowledge and information. Accordingly, depending on hydro-geological survey undertaken in future, Project communes and the number of wells are subject to hydro-geological survey to be undertaken in future.

5. Cost Estimation borne by the Recipient Country

Appendix Table 1 Cost Estimation borne by the Recipient Country **(Unit: US$)**

Item	Province	Kon Tum		Gia Lai			Dak Lak			CERWASS	Total	Remark	Total (JPY)
	Commune	K3-1	sub-total	G1	G2	sub-total	D2	D4	sub-total				
		Dak Ui		Kong Tang	Nhon Hoa		Ea Drang	Ea Drong					
Drainage		3,000	3,000	3,000	3,000	6,000	3,000	3,000	6,000		15,000		1,658,100
Incoming Feeder for Well		14,715	14,715	23,409	123,606	147,015	108,410	46,732	155,143		316,873		35,027,125
Incoming Feeder for WTP		14,525	14,525	11,507	14,894	26,401	27,422	46,892	74,314		115,240		12,738,656
Access Road		17,265	17,265	2,511	28,566	31,077	26,055	12,557	38,611		86,954		9,611,900
Land Acquisition for Well		0	0	9,360	56,160	65,520	65,520	18,720	84,240		149,760		16,554,470
Land Acquisition for WTP		15,980	15,980	97,695	106,405	204,100	109,200	98,540	207,740		427,820		47,291,223
Land Acquisition for Pipe		3,000	3,000	17,220	27,900	45,120	34,260	19,260	53,520		101,640		11,235,286
Land for the storage									25,222		25,222	Dak Lak	2,788,040
Fence for Well		2,782	2,782	5,564	19,474	25,038	19,474	8,346	27,820		55,640		6,150,409
Gate for Well		669	669	1,338	4,013	5,350	4,682	2,006	6,688		12,707		1,404,654
Fence for WTP		8,006	8,006	11,074	11,615	22,689	11,769	11,136	22,905		53,600		5,924,894
Gate for WTP		669	669	669	669	1,338	669	669	1,338		3,344		369,646
Disposal of unexploded bombs for Well		0	0	44	132	176	132	88	220		396		43,774
Disposal of unexploded bombs for WTP		434	434	770	834	1,604	854	776	1,630		3,668		405,461
Disposal of unexploded bombs for Pipe		6,753	6,753	38,003	61,572	99,575	75,741	42,637	118,378		224,706		24,839,001
Service Pipe Works and Faucet		18,720	18,720	52,140	65,430	117,570	116,220	47,490	163,710		300,000		33,162,000
Management Cost for IEC		3,000	3,000	3,000	3,000	6,000	3,000	3,000	6,000		15,000		1,658,100
Registration fee, Insurance and Tax for vehicle			0			0			0	15,000	15,000	CERWASS	1,658,100
Computer and Printer		724	724	724	724	1,448	724	724	1,448		3,620		400,155
Management Cost for PMU from CERWASS			0			0			0	30,000	30,000	CERWASS	3,316,200
Banking Fee			0			0			0	40,000	40,000	CERWASS	4,421,600
Sub-total		110,242	110,242	278,027	527,993	806,021	607,132	362,572	994,927	85,000	1,996,190		220,658,792
Price Contingency (10% of sub total)		11,024	11,024	27,803	52,799	80,602	60,713	36,257	99,493	8,500	199,619		22,065,884
Total		121,266	121,266	305,830	580,792	886,623	667,845	398,829	1,094,420	93,500	2,195,809		242,724,677
Management Cost for PMU from P-CERWASS*1		4,821	4,821	6,673	16,276	22,949	19,062	10,730	29,792	0	57,561		6,362,793
Total Cost of Vietnam side		126,087	126,087	312,503	597,068	909,572	686,907	409,559	1,124,212	93,500	2,253,370		249,087,470

*1: 6% of construction cost such as drainage, incoming feeder, access road, fence, gate, service pipe work and faucet

Appendix Table 2 Cost of the Recipient Country (Drainage Work)

Commune		Length (m)	Unit Cost (USD/Unit)	Total Cost
K3-1	Dak Ui	100	30	3,000
G1	Kong Tang	100	30	3,000
G2	Nhon Hoa	100	30	3,000
D2	Ea Drang	100	30	3,000
D4	Ea Drong	100	30	3,000
Total		500		15,000

Appendix Table 3 Cost of the Recipient Country (Incoming Feeder for Well)

Commune		Well	Receiving Power (kVA)	Distance (m)	Elec. Pole (No.)	Cable Size (mm2)	Cable Unit Cost (mil VND/m)	Receiving Panel Cost (mil VND)	Trans-Former Cost (mil VND)	Elec. Pole Cost (mil VND)	Cable Cost (mil VND)	Total Cost (mil VND)
K-3	Dak Ui	J1	11	150	6	14	0.1625	10	169	30	24.4	233.4
G1	Kong Tang	J1	11	10	1	14	0.1625	10	169	5	1.6	185.6
		N1	11	10	1	14	0.1625	10	169	5	1.6	185.6
G2	Nhon Hoa	J1	7.4	10	1	14	0.1093	10	169	5	1.1	185.1
		N1	7.4	110	5	14	0.1093	10	169	25	12.0	216.0
		N2	7.4	10	1	14	0.1093	10	169	5	1.1	185.1
		N3	11	750	28	22	0.1625	10	169	140	121.9	440.9
		N4	7.4	10	1	14	0.1093	10	169	5	1.1	185.1
		N5	7.4	900	32	22	0.1093	10	169	160	98.4	437.4
		N6	11	380	14	14	0.1625	10	169	70	61.8	310.8
D2	Ea Drang	N1	15	10	1	22	0.2216	10	169	5	2.2	186.2
		N2	15	400	14	22	0.2216	10	169	70	88.6	337.6
		N3	15	20	1	22	0.2216	10	169	5	4.4	188.4
		N4	15	20	1	22	0.2216	10	169	5	4.4	188.4
		N5	22	400	14	32	0.325	10	169	70	130.0	379.0
		N6	22	140	6	32	0.325	10	169	30	45.5	254.5
		N7	15	5	1	22	0.2216	10	169	5	1.1	185.1
D4-1	Ea Drong	J1	15	110	5	22	0.2216	10	169	25	24.4	228.4
		N1	15	250	10	22	0.2216	10	169	50	55.4	284.4
		N2	15	110	5	22	0.2216	10	169	25	24.4	228.4

Total cost for Incoming Feeder for Well	mil VND	5,025.4
	JPY	35,027,125
	USD	316,873

Appendix Table 4 Cost of the Recipient Country (Incoming Feeder for WTP)

Commune		Receiving Power (kVA)	Distance (m)	Cable Size (mm2)	Cable Unit Cost (mil VND/m)	U/G Plastic Pipe Cost (mil VND/m)	Cable Cost (mil VND)	Receiving Panel Cost (mil VND)	Trans-Former Cost (mil VND)	Total Cost (mil VND)
K-3	Dak Ui	7.0	150	4C-14	0.3250	0.0174	51.36	10	169	230.36
G1	Kong Tang	23	10	4C-22	0.3250	0.0243	3.49	10	169	182.49
G2	Nhon Hoa	28	160	4C-38	0.3250	0.0326	57.21	10	169	236.21
D2	Ea Drang	80	570	4C-100	0.3610	0.0423	229.90	10	195	434.90
D4-1	Ea Drong	30	1400	4C-100	0.3610	0.0423	564.67	10	169	743.67

Total cost for Incoming Feeder for WTP		
	mil VND	1827.64
	JPY	12,738,656
	USD	115,240

Appendix Table 5 Cost of the Recipient Country (Access Road)

Commune		Length (m)		Total(m)	Unit Cost	Total Cost		
		WTP	Well		(VND/km)	(VND)	(JPY)	(USD)
K3-1	Dak Ui	550		550	500,000,000	275,000,000	1,908,500	17,265
G1	Kong Tang		80	80	500,000,000	40,000,000	277,600	2,511
G2	Nhon Hoa	450	460	910	500,000,000	455,000,000	3,157,700	28,566
D2	Ea Drang	550	280	830	500,000,000	415,000,000	2,880,100	26,055
D4	Ea Drong		400	400	500,000,000	200,000,000	1,388,000	12,557
Total				2770		1,385,000,000	9,611,900	86,954

Appendix Table 6 Cost of the Recipient Country (Land Acquisition for Well)

Commune		Area (m2)	Unit Cost (USD/m2)	Total (USD)
K3-1	Dak Ui	0	20	0
G1	Kong Tang	144	65	9,360
G2	Nhon Hoa	864	65	56,160
D2	Ea Drang	1,008	65	65,520
D4	Ea Drong	288	65	18,720
Total		2,304		149,760

Appendix Table 7 Cost of the Recipient Country (Land Acquisition for WTP)

Commune		Area (m2)	Unit Cost (USD/m2)	Total (USD)
K3-1	Dak Ui	799	20	15,980
G1	Kong Tang	1,503	65	97,695
G2	Nhon Hoa	1,637	65	106,405
D2	Ea Drang	1,680	65	109,200
D4	Ea Drong	1,516	65	98,540
Total		7,135		427,820

Appendix Table 8 Cost of the Recipient Country (Land Acquisition for Pipe)

Commune		Transmission Pipe (km)	Distribution Pipe (km)	Total Length (km)	Required Land Acquisition(20% of Total Length)	Unit Cost (USD/m)	Total Cost (USD)
K3-1	Dak Ui	0	5	5	1.0	3.0	3,000
G1	Kong Tang	2.2	26.5	28.7	5.7	3.0	17,220
G2	Nhon Hoa	7.9	38.6	46.5	9.3	3.0	27,900
D2	Ea Drang	5.3	51.8	57.1	11.4	3.0	34,260
D4	Ea Drong	4.9	27.2	32.1	6.4	3.0	19,260
Total		20.3	149.1	169.4	33.9	3.0	101,640

Appendix Table 9 Cost of the Recipient Country (Fence for Well)

Commune		Area (m2)	Unit Cost (USD/m2)	Total (USD)
K3-1	Dak Ui	126	22.08	2,782
G1	Kong Tang	252	22.08	5,564
G2	Nhon Hoa	882	22.08	19,474
D2	Ea Drang	882	22.08	19,474
D4	Ea Drong	378	22.08	8,346
Total				55,640

Appendix Table 10 Cost of the Recipient Country (Gate for Well)

Commune		Area (m2)	Unit Cost (USD/m2)	Total (USD)
K3-1	Dak Ui	8.8	76.00	669
G1	Kong Tang	17.6	76.00	1,338
G2	Nhon Hoa	52.8	76.00	4,013
D2	Ea Drang	61.6	76.00	4,682
D4	Ea Drong	26.4	76.00	2,006
Total				12,707

Appendix Table 11 Cost of the Recipient Country (Fence for WTP)

Commune		Area (m2)	Unit Cost (USD/m2)	Total (USD)
K3-1	Dak Ui	362.6	22.08	8,006
G1	Kong Tang	501.6	22.08	11,074
G2	Nhon Hoa	526.1	22.08	11,615
D2	Ea Drang	533.1	22.08	11,769
D4	Ea Drong	504.4	22.08	11,136
Total				53,600

Appendix Table 12 Cost of the Recipient Country (Gate for WTP)

Commune		Area (m2)	Unit Cost (USD/m2)	Total (USD)
K3-1	Dak Ui	8.8	76.00	669
G1	Kong Tang	8.8	76.00	669
G2	Nhon Hoa	8.8	76.00	669
D2	Ea Drang	8.8	76.00	669
D4	Ea Drong	8.8	76.00	669
Total				3,344

Appendix Table 13 Cost of the Recipient Country (Disposal of unexploded bombs for Well)

Commune		W1 (m)	W2 (m)	No. of Well	Total Area (m)	Unit Cost (VND/m2)	Total (VND)
K3-1	Dak Ui	10	10	0	0	7,000	0
G1	Kong Tang	10	10	1	100	7,000	700,000
G2	Nhon Hoa	10	10	3	300	7,000	2,100,000
D2	Ea Drang	10	10	3	300	7,000	2,100,000
D4	Ea Drong	10	10	2	200	7,000	1,400,000
Total					900		6,300,000

Appendix Table 14 Cost of the Recipient Country (Disposal of unexploded bombs for WTP)

Commune		W1 (m)	W2 (m)	Area (m2)	Unit Cost (VND/m2)	Total (VND)
K3-1	Dak Ui	26.1	37.7	984	7,000	6,887,790
G1	Kong Tang	39.9	43.75	1,746	7,000	12,219,375
G2	Nhon Hoa	40.5	46.65	1,889	7,000	13,225,275
D2	Ea Drang	41.5	46.65	1,936	7,000	13,551,825
D4	Ea Drong	44.7	39.35	1,759	7,000	12,312,615
Total				8,314		58,196,880

Appendix Table 15 Cost of the Recipient Country (Disposal of unexploded bombs for Pipe)

Commune		W (m)	L (m)	Area (m2)	Unit Cost (VND/m2)	Total (VND)
K3-1	Dak Ui	3	5,100	15,300	7,000	107,100,000
G1	Kong Tang	3	28,700	86,100	7,000	602,700,000
G2	Nhon Hoa	3	46,500	139,500	7,000	976,500,000
D2	Ea Drang	3	57,200	171,600	7,000	1,201,200,000
D4	Ea Drong	3	32,200	96,600	7,000	676,200,000
Total			169,700	509,100		3,563,700,000

Appendix Table 16 Cost of the Recipient Country (Disposal of unexploded bombs for Total)

Item		Cost
(1)	Pipe	3,563,700,000
(2)	WTP	58,196,880
(3)	Well	6,300,000
Total Cost (VND)		3,628,196,880
Total Cost (USD)		228,879

Appendix Table 17 Cost of the Recipient Country (Service Pipe & Faucet)

Commune		Households	Unit Cost (USD/Unit)	Total Cost (USD)
K3-1	Dak Ui	624	30	18,720
G1	Kong Tang	1,738	30	52,140
G2	Nhon Hoa	2,181	30	65,430
D2	Ea Drang	3,874	30	116,220
D4	Ea Drong	1,583	30	47,490
Total		10,000		300,000

6. Reference

List of Materials

Name of study; Basic Design Study Report on the Project for the Groundwater Development in Rural Part of Central Highlands Province in the Socialist Republic of Vietnam

No.	Name	Form Book/Video /Map/Picture	Original/ Copy	Organization	Year
1	STATISCAL YEARBOOK 2004	Book	Original	STATISTICAL PUBLISHING HOUSE	2005
2	STATISCAL YEARBOOK 2004 GIA LAI	Book	Original	GIA LAI Statistical Office	2005
3	STATISCAL YEARBOOK 2004 DAK LAK	Book	Original	DAK LAK Statistical Office	2005
4	STATISCAL YEARBOOK 2004 DAK NONG	Book	Original	DAK NONG Statistical Office	2005
5	STATISCAL YEARBOOK 2004 KON TUM	Book	Copy	KON TUM Statistical Office	2005
6	COMPLETION DOCUMENT (G2)	Book	Copy	GIA LAI CONSTRUCTION & ELECTRIC ASSEMBLY COMPANY	2002
7	TECHNICAL DESIGN DOCUMENT (G2, K3-1)	Book	Copy	GIA LAI CONSTRUCTION & ELECTRIC ASSEMBLY COMPANY	2001

7. Willingness Survey on Water Supply and Water charges to All Households

(1) Outline

Surveys were conducted for participants in the stakeholder meetings held in the thirteen communes, together with interview surveys of randomly selected households, in order to find the current state of water supply, their opinions and requests relating to the modern water supply system planned under the Project, and the willingness to pay (WTP) of water charge and house-connection fee. (See Appendices "Baseline Survey" and "Socioeconomic Survey.") The survey results indicate that most residents are highly interested in the Project and strongly hope the Project to be implemented as early as possible to address the water problem. Also, many communes are ready to accept higher charges than those confirmed during the development study. This seems to reflect the fact that the Kinh tribe that is richer than indigenous residents has moved from north to the area under the government's population relocation policy, and that major crops in the area have shifted to cash crops with relatively high prices, such as rice, coffee and rubber, resulting in higher income.

The results of the surveys at the stakeholder meetings and of interview surveys of the targeted commune residents generally indicate positive reaction to the Project. The water charges and the house-connection fees specified by respondents are satisfactory in amount to cover costs required for operation and maintenance of the completed facility. However, as these responses do not necessarily represent the entire population, an additional survey (attitude survey) was conducted for all residents in the subject communes.

Finally, it was decided to set forth a policy direction relating to project operation and maintenance in overall consideration of the results of all the surveys (baseline, socioeconomic and attitude) in addition to technical aspects of the Project.

(2) Willingness to pay for water charges and house-connection fees

It was anticipated that the question about the WTP for water charges would not obtain a definite response from some residents who did not understand the idea of paying for water supply. Instead, the WTP was confirmed by asking respondents to indicate an amount they can afford to or are willing to pay for water service by choosing from four price ranges shown in Table 1 (as set forth on the basis of water charges adopted in the "The Project for the Groundwater Development in Rural Part of Northern Provinces ").

In addition, the WTP for the house connection fee, which was not surveyed during the development study, was checked in the similar form.

Appendix Table 18 Acceptable Ranges of Payment for Water Charges and House-Connection Fees

（Unit：VND/month/household）

	(a)	(b)	(c)	(d)
Water charge	<10,000	10,000～30,000	30,000～50,000	>50,000
House connection fee	<200,000	200,000～350,000	350,000～500,000	>500,000

(3) Household survey to check their intent to apply for water supply service

This survey covering all the commune residents asked the following two questions in consideration of a relatively short time allowed for collection and a relatively low literacy rate.

①	Do you think a modern facility that can supply water in a safe and stable manner needs to be constructed for your commune? If such facility is completed, do you want to be connected?
②	(For the respondent who has said 'yes' to the previous question) Are you willing to pay for water charges and house-connection fees for the new facility?

Under the survey, a notebook containing the above questions was distributed via CPC to heads of villages in each commune. In each village, the notebook was circulated to all households and was signed by residents who agreed with both questions, together with name and address being written on the notebook. The survey results can therefore be treated as a preliminary application for house connection and water supply service.

As the development study proposed a checkpoint, among others, that "at least 35% of all households that form the basis of calculation of water charges are willing to or can afford to pay for a specified water charge per month and person," the ratio of households that signed the above note to all households in each village was calculated.

(4) Survey Results

a) Water charge and House connection fee

Table 2 in the next page presents the WTP and ATP (ability to pay) for water charges, the

WTP for the house connection fee, and the average household income by commune and province. The ATP was calculated by applying 3%-5% of household income - criteria specified in National Rural Clean Water Supply and Sanitation Strategy up to 2010." Note that data on household income and WTP for water charges, while showing an overall increase compared to those found during the development study, showed some variations, so that the average values between the two data sets were taken and used for further analysis in this study.

In summary, the WTP for every commune was found to be below the respective ATP. Thus, so far as income is concerned, the assumed water charges are considered to be adequate.

Appendix Table 19 Summary of Average Household Income, WTP and ATP Values by Province and Commune

Province/Commune	Average annual income per household and monthly income (VND/hh)				WTP value for water charge (VND/hh/month)				ATP value for water charge (VND/hh/month)		WTP value for house connection fee (VND/hh)	
	This study (a)	Development Study (b)	Average annual (a) + (b) / 2 = (c)	Average monthly (c) / 12 = (d)	This study (e)	Development Study (f)	Average (e) + (f) / 2 = (g)	Percentage share of monthly income (g) / (d)	3% (d) x 3%	5% (d) x 5%	This study (h)	Percentage share of annual income (h) / (c)
Kon Tum												
(K2-3) Dak Su	4,568,966	4,123,333	4,346,150	362,179	20,526	10,267	15,397	4.3	10,865	18,109	275,000	6.3
(K3-1) Dak Ui	13,910,526	5,174,074	9,542,300	795,192	21,316	7,360	14,338	1.8	23,856	39,760	303,846	3.2
(K4-1) Dak Hring	19,440,476	9,230,769	14,335,623	1,194,635	20,000	6,231	13,116	1.1	35,839	59,732	306,875	2.1
Kon Tum provincial average	**12,639,989**	**6,176,059**	**9,408,024**	**784,002**	**20,614**	**7,953**	**14,283**	**2.4**	**23,520**	**39,200**	**295,240**	**3.9**
Gia Lai												
(G1) Kong Tnag	14,846,154	15,783,930	15,315,042	1,276,254	20,000	23,890	21,945	1.7	38,288	63,813	259,615	1.7
(G2) Nhon Hoa	30,269,250	27,040,000	28,654,625	2,387,885	24,688	25,727	25,208	1.1	71,637	119,394	309,821	1.1
(G3) Chu Ty	18,989,130	17,971,000	18,480,065	1,540,005	26,136	30,867	28,502	1.9	46,200	77,000	289,634	1.6
(G4-1) Thang Hung	18,852,564	12,257,143	15,554,854	1,296,238	19,000	25,476	22,238	1.7	38,887	64,812	248,750	1.6
(G5-1) Ngia Hoa	13,086,957	13,948,077	13,517,517	1,126,460	18,478	26,526	22,502	2.0	33,794	56,323	240,625	1.8
Gia Lai provincial average	**19,208,811**	**17,400,030**	**18,304,421**	**1,525,368**	**21,660**	**26,497**	**24,079**	**1.7**	**45,761**	**76,268**	**269,689**	**1.5**
Dak Lak												
(D1) Krong Nang	33,220,652	18,986,667	26,103,660	2,175,305	26,522	14,500	20,511	0.9	65,259	108,765	300,000	1.1
(D2) Ea Drang	34,222,449	13,450,000	23,836,225	1,986,352	33,721	19,615	26,668	1.3	59,591	99,318	378,125	1.6
(D3-1) Krong Buk	24,540,000	16,365,385	20,452,693	1,704,391	31,224	13,692	22,458	1.3	51,132	85,220	321,500	1.6
(D4-1) Ea Drong	16,107,143	13,640,001	14,873,572	1,239,464	20,000	13,516	16,758	1.4	37,184	61,973	275,000	1.8
Dak Lak provincial average	**27,022,561**	**15,610,513**	**21,316,537**	**1,776,378**	**27,867**	**15,331**	**21,599**	**1.2**	**53,291**	**88,819**	**318,656**	**1.5**
Dak Nong												
(D6) Dak Su	23,928,571	18,933,333	21,430,952	1,785,913	32,045	34,433	33,239	1.9	53,577	89,296	310,795	1.5
Dak Nong provincial average	**23,928,571**	**18,933,333**	**21,430,952**	**1,785,913**	**32,045**	**34,433**	**33,239**	**1.9**	**53,577**	**89,296**	**310,795**	**1.5**
Average for four provinces	**20,699,983**	**14,529,984**	**17,614,983**	**1,467,915**	**25,547**	**21,053**	**23,300**	**1.8**	**44,037**	**73,396**	**298,595**	**2.1**

As for the house connection fee, the WTP value in each commune reached at around 30,000VND. Thus, it is desirable to design the house-connection facility that requires cost bearing of this level by residents, which also varies with government subsidy and allocation of the C/P fund.

b) Willingness survey to all households

As shown in Table 4, the results of the survey to confirm residents' intent to apply for water supply service indicate that approximately 74% of all residents, average for the four provinces, want to have safe and stable water supply and agree to pay for water charges and house-connection fees. The figure is at more or less the same level – 75% - found during the basic design study on the "Project for the Groundwater Development in Rural Part of Northern Provinces". This suggests strong expectation of the commune residents for the Project, in consideration of relatively high percentages of minority races, who have difficulties to understand Vietnamese language, in the four provinces, namely 73% of total population in Kon Tum, 29% in Gia Lai, and 38% in Dak Lak (source: the Development Study Report).

Furthermore, as the figure exceeds the target level of 35% specified in the development study report, the Project is considered to be financially viable.

Appendix Table 20 Survey to confirm Residents' intent to apply for Water Service

Province/Commune	# of Households recording in application (a)	# of total households in communes (b)	Rate of applied households(%) (a)/(b)
Kon Tum			
(K2-3) Dak Su	563	614	91.7
(K3-1) Dak Ui	368	485	75.9
(K4-1) Dak Hring	436	717	60.8
Sub-Total	**1,367**	**1,816**	**76.1**
Gia Lai			
(G1) Kong Tnag	1,090	1,437	75.9
(G2) Nhon Hoa	1,722	1,830	94.1
(G3) Chu Ty	1,088	1,764	61.7
(G4-1) Thang Hur	693	1,024	67.7
(G5-1) Ngia Hoa	664	786	84.5
Sub-Total	**5,257**	**6,841**	**76.8**
Dak Lak			
(D1) Krong Nang	1,547	2,119	73.0
(D2) Ea Drang	2,021	3,281	61.6
(D3-1) Krong Buk	608	1,237	49.2
(D4-1) Ea Drong	1,273	1,517	83.9
Sub-Total	**5,449**	**8,154**	**66.9**
Dak Nong			
(D6) Dak Su	1,105	1,472	75.1
Sub-Total	**1,105**	**1,472**	**75.1**
Total	**13,178**	**18,283**	**73.7**

8. Result of Socio-Economic Survey

(1) Result of Socio-Economic Survey of Kon Tum Province

Province		Kon Tum Province		
District		Ngoc Hoi	Dak Ha	Dak Ha
Number of Commune		K2-3	K3-1	K4-1
Commune		**Dak Su**	**Dak Ui**	**Dak Hring**
Water source in rainy season	-	Private well (97%) Spring , River and Pond (3%)	Private well (95%) Spring , River, Pond and others (5%)	Private well (90%) Spring (5%) Others (5%)
Duration of water shortage	Month	6 (Dry season)	6 (Dry season)	6 (Dry season)
Water source in dry season	-	Private well (72%) Spring (26%) River and Pond (2%)	Private well (56%) Spring (41%) River, Pond and Others (3%)	Private well (80%) Spring (14%) Others (6%)
Water quality	-	Color, Turbidity, Smell, Salinity, etc	Color, Turbidity, Smell, Salinity, etc	Color, Turbidity, Smell, Salinity, etc
Number of months affected	Month	12	12	12
Major disease	-	Diarrhea, Dysentery, Schistosoma, Trachoma, Skin-disease, etc	Diarrhea, Dysentery, Schistosoma, Trachoma, Skin-disease, etc	Diarrhea, Dysentery, Schistosoma, Trachoma, Skin-disease, etc
Medical expense	VND/month/hh	28,667	16,850	28,188
Service level required by residents	-	House-connection	House-connection	House-connection
WTP of house-connection (A)	VND	275,000	303,846	306,875
A(VND) /Annual income (VND/hh)	%	6.3	3.2	2.1
WTP of water charge (B)	VND/month/hh	15,397	14,338	13,116
(B) / monthly income (VDN/hh)	%	4.3	1.8	1.1
(B) / Electricity charge	%	43.5	48.9	34.5
Total of public utility charges (water and electricity) (C)	VND/month	50,802	43,638	51,140
(C) / Monthly income (VND/hh)	%	14.0	5.5	4.3
Reference value				
Monthly income	VND/month/hh	362,179	795,192	1,194,635
Electricity charge	VND/month/hh	35,405	29,300	38,024
Risk related to the project site				
Unexploded bomb/mine	-	Yes	Yes	Yes
Indicator				
Satisfactory of water quantity	*1)	A	B	B
Satisfactory of water quality	*2)	A	A	A
Requirement of the new WSS	*3)	A	A	A
WTP of house-connection	*4)	C	B	B
WTP of water charge	*5)	B	C	C
Appropriateness of the project implementation	*6)	A	A	A

Index	Water Quantity*1)	Water Quality*2)
A:	Always in shortage	Always poor (Turbidity, Nasty smell, etc)
B:	Shortage during dry season	Poor during certain period (Turbidity, Nasty smell, etc)
C:	Always sufficient	Always good

Index	Requirement of the Project*3)
A:	All residents request urgent implementation
B:	Some residents request urgent implementation
C:	No requirement by residents

Index	Affordable house-connection fee*4)	Affordable Water Charge*5)
A:	Over 0.5 million VDN (covering all expenses)	Over 30 K VND/month
B:	0.2～0.5 million VDN (covering a part of expenses)	15～30 K VND/month
C:	Less than 0.2 VND (cover a minimal part)	Less than 15 K VND/month

Index	Appropriateness of the implementation*6)
A:	Appropriate
B:	Fair
C:	Inappropriate

(2) Result of Socio-Economic Survey of Gia Lai Province

Province		Gia Lai				
District		Mang Yang	Chu Se	Duc Co	Chu Prong	Chu Pau
Number of Commune		G1	G2	G3	G4-1	G5-1
Commune		**Kong Tang**	**Nhon Hoa**	**Chu Ty**	**Thang Hung**	**Nghia Hoa**
Water source in rainy season	-	Private well (98%) Spring (2%)	Private well (100%)	Private well (100%-including spring)	Private well (93% -including spring)、Spring (7%)	Private well (82%) Spring (18%)
Duration of water shortage	Month	5	4	4	4	5
Water source in dry season	-	Private well (98%) Spring (2%)	Private well (100%-including spring)	Private well (100%-including spring)	Private well (93% -including spring)、Spring (7%)	Private well (82% -including spring)、Spring (18%)
Water quality	-	Taste, Smell, Color, etc.	Smell, Influence of toilet, etc.	Influence of toilet, Color, Turbidity, etc.	Color, Turbidity, Smell	Turbidity, Color, Smell, etc.
Number of months affected	Month	12	4～6 (Rainy season)	12	4～6 (Rainy season)	4～6 (Rainy season)
Major disease	-	Diarrhea, Trachoma, Skin-disease, etc.	Skin-disease, diarrhea, etc.	Trachoma, Skin-disease, Diarrhea, etc.	Schistosoma, Diarrhea, Skin-disease, etc.	Diarrhea, Trachoma, Skin-disease, etc.
Medical expense	VND/month/hh	57,250	67,325	50,525	96,550	95,612
Service level required by residents	-	House-connection	House-connection	House-connection	House-connection	House-connection
WTP of house-connection (A)	VND	259,615	309,821	289,634	248,750	240,625
A(VND) /Annual income (VND/hh)	%	1.7	1.1	1.6	1.6	1.8
WTP of water charge (B)	VND/month/hh	21,945	25,208	28,502	22,238	22,502
(B) / monthly income (VDN/hh)	%	1.7	1.1	1.9	1.7	2.0
(B) / Electricity charge	%	38.3	40.4	50.8	38.3	58.2
Total of public utility charges (water and electricity) (C)	VND/month	68,866	87,533	84,589	78,238	61,186
(C) / Monthly income (VND/hh)	%	5.3	3.7	5.5	6.0	5.4
Reference value						
Monthly income	VND/month/hh	1,276,254	2,387,885	1,540,005	1,296,238	1,126,460
Electricity charge	VND/month/hh	46,921	62,325	56,087	56,000	38,684
Risk related to the project site						
Unexploded bomb/mine	-	Yes	Yes	Yes	No (already removed)	No
Indicator						
Satisfactory of water quantity	*1)	A	B	B	B	B
Satisfactory of water quality	*2)	A	B	B	B	B
Requirement of the new WSS	*3)	A	A	A	A	A
WTP of house-connection	*4)	C	B	C	C	C
WTP of water charge	*5)	B	B	B	B	B
Appropriateness of the project implementation	*6)	A	A	A	A	A

Index	Water Quantity*1)	Water Quality*2)
A:	Always in shortage	Always poor (Turbidity, Nasty smell, etc)
B:	Shortage during dry season	Poor during certain period (Turbidity, Nasty smell, etc)
C:	Always sufficient	Always good

Index	Requirement of the Project*3)
A:	All residents request urgent implementation
B:	Some residents request urgent implementation
C:	No requirement by residents

Index	Affordable house-connection fee*4)	Affordable Water Charge*5)
A:	Over 0.5 million VDN (covering all expenses)	Over 30 K VND/month
B:	0.2～0.5 million VDN (covering a part of expenses)	15～30 K VND/month
C:	Less than 0.2 VND (cover a minimal part)	Less than 15 K VND/month

Index	Appropriateness of the implementation*6)
A:	Appropriate
B:	Fair
C:	Inappropriate

(3) Result of Socio-Economic Survey of Dak Lak and Dak Nong Province

Province		Dak Lak				Dak Nong
District		Krong Nang	Ea Hleo	Krong Puk	Krong Buk	Dac Rlap
Number of Commune		D1	D2	D3-1	D4-1	D6-1
Commune		**Krong Nang**	**Ea Drang**	**Krong Buk**	**Ea Drong**	**Kien Duk**
Water source in rainy season	-	Private well (96%) Spring (2%)、Others (2%)	Private well (98%) Others (2%)	Private well (98%-including other sources)、Spring (2%)	Private well (100%-including spring)	Private well (98%-including other sources)、Spring (2%)
Duration of water shortage	Month	3	5	4	4	5
Water source in dry season	-	Private well (96%) Spring (2%)、Others (2%)	Private well (94%) Spring (4%)、Others (2%)	Private well (100%-including other sources)	Private well (100%-including spring)	Private well (98%-including other sources)、Spring (2%)
Water quality	-	Taste, Smell, Color, Turbidity, etc.	Taste, Smell, Color, Turbidity, etc.	Color, Turbidity, Taste, Salinity, etc.	Smell, Taste, Color, Turbidity, etc.	Smell, Taste, Color, Turbidity, Salinity, etc.
Number of months affected	Month	4～6 (Rainy season)	12	4～6 (Rainy season)	4～6 (Rainy season)	4～6 (Rainy season)
Major disease	-	Diarrhea, Schistosoma, Trachoma, Skin-disease, etc.	Diarrhea, Dysentery, Schistosoma, Trachoma, Skin-disease, etc.	Diarrhea, Trachoma, Skin-disease, Dysentery, etc.	Trachoma, Skin-disease, Diarrhea, etc.	Diarrhea, Skin-disease, Parasite infection, etc.
Medical expense	VND/month/hh	97,625	90,455	97,500	131,829	95,238
Service level required by residents	-	House-connection	House-connection	House-connection	House-connection	House-connection
WTP of house-connection (A)	VND	300,000	378,125	321,500	275,000	310,795
A(VND) /Annual income (VND/hh)	%	1.1	1.6	1.6	1.8	1.5
WTP of water charge (B)	VND/month/hh	20,511	26,668	22,458	16,758	33,239
(B) / monthly income (VDN/hh)	%	0.9	1.3	1.3	1.4	1.9
(B) / Electricity charge	%	31.5	29.6	52.7	37.5	43.5
Total of public utility charges (water and electricity) (C)	VND/month	85,689	116,668	65,018	61,472	109,572
(C) / Monthly income (VND/hh)	%	3.9	5.8	3.8	5.0	6.1
Reference value						
Monthly income	VND/month/hh	2,175,305	1,986,352	1,704,391	1,239,464	1,785,913
Electricity charge	VND/month/hh	65,178	90,000	42,560	44,714	76,333
Risk related to the project site						
Unexploded bomb/mine	-	Yes (no accident, recently)	No	No	No	Yes
Indicator						
Satisfactory of water quantity	*1)	B	B	B	B	B
Satisfactory of water quality	*2)	B	A	B	B	B
Requirement of the new WSS	*3)	A	A	A	A	A
WTP of house-connection	*4)	B	B	B	C	B
WTP of water charge	*5)	B	B	B	B	A
Appropriateness of the project implementation	*6)	A	A	A	A	A

Index	Water Quantity*1)	Water Quality*2)
A:	Always in shortage	Always poor (Turbidity, Nasty smell, etc)
B:	Shortage during dry season	Poor during certain period (Turbidity, Nasty smell, etc)
C:	Always sufficient	Always good

Index	Requirement of the Project*3)
A:	All residents request urgent implementation
B:	Some residents request urgent implementation
C:	No requirement by residents

Index	Affordable house-connection fee*4)	Affordable Water Charge*5)
A:	Over 0.5 million VDN (covering all expenses)	Over 30 K VND/month
B:	0.2～0.5 million VDN (covering a part of expenses)	15～30 K VND/month
C:	Less than 0.2 VND (cover a minimal part)	Less than 15 K VND/month

Index	Appropriateness of the implementation*6)
A:	Appropriate
B:	Fair
C:	Inappropriate

9. Result of Stakeholder Meeting

In the thirteen communes that were covered by the project, stakeholder meetings were held – once per commune, by inviting participation of a broad range of parties relating to waterworks. As stated in Table 1, the main objective of the stakeholder meetings was, by using a participatory approach, to check the current state of water supply in each commune and obtain candid opinions and expectations of local residents with regard to the proposed water supply facilities. In particular, large portions of time were spent on local participation and cooperation in operation and maintenance of the water supply facilities, in light of the fact that many residents believe that "water is the blessings of nature and free," while they have to pay for water and connection charges once the water supply facilities are completed, and they have to be maintained by the WSU including local residents.

Appendix Table 21 Outline of Stakeholder Meetings

Item	Outline	Remarks
Study Area	13 Communes covered by the study	Once in each commune
Participants	Representatives of local residents (Commune People's Committees, PCERWASS, CERWASS, women's associations, youth associations, agricultural cooperative, and representatives of minority races) Number of participants: K2-3 : 40 K3-1 : 23 K4-1 : 39 G1 : 34 G2 : 37 G3 : 42 G4-1 : 31 G5-1 : 45 D1 : 46 D2 : 43 D3-1 : 42 D4-1 : 34 D6-1 : 34	Participation by a broad range of parties was requested to PCERWASS, especially representatives of women and minority races who would be required of special consideration, and owners of land near the facility site, whose cooperation would be essentially.
Agenda	1) Understanding and confirmation of problems relating to existing water sources, areas of improvement, and needs 2) Explanation on proposed water supply facilities and presentation of possible environmental impacts and mitigation measures 3) Exchange of opinions on the operation and maintenance system for proposed facilities and possible local participation and cooperation 4) Confirmation of willing to pay (WTP) and ability to pay (ATP) and affordability for house-connection fee. 1) Socioeconomic survey by means of questionnaire	To ensure open and candid discussions, illiterate persons, minority races, women and other social groups who do not have much voice were encouraged to speak and express their opinions. The study team member acted as facilitator to lead smooth and fruitful discussion.

Schedule and required time	Greeting → Presentation on the purpose of the meeting → Exchange of opinions and explanation → Responses to questionnaire → Questions and answers → Summary (Required time : 2 hours – 2 hours and half)	To sustain participants' concentration, numbers of agendas are discussed in a short period of time.

At the stakeholder meeting in all the communes, most participants actively expressed their opinions, suggesting their high expectations for the project. Also, at all the meetings, no participants expressed an opposition to the payment of water and connection charges after completion of water supply facilities and cooperation in facility maintenance activities. In the following pages, opinions expressed by local residents at the stakeholder meetings are summarized.

(4) K2-3: Dak Su

- Generally, this area experiences deterioration of water quality due to turbidity in the rainy season (June – October) while water volume becomes low in the dry season (Male)
- There was a military airport near the residential area during the Vietnam War, which became a fierce battlefield. Because of this, many unexploded bombs remain in the area and there are many commune people who have health problems caused by the Orange Agent defoliant. In particular, groundwater is contaminated by chemical weapons used during the war. (Female)
  → The study did not find definitive evidence on this alleged groundwater contamination.
- Water intake facilities in the commune are dug wells and public faucets (one per five families). During the dry season where water shortage occurs, surface water stored in the rainy season is used. (Male)
- We have a lot of trouble to secure water during the rainy season. The present water intake facilities do not meet demand. We hope that an alternative water source is developed immediately. (Male)
- To get clean water, we need to dig a deep well, but there is no money. (Female)
- Many people get waterborne diseases, such as diarrhea. (Female)

(5) K3-1: Dak Ui

- This commune experiences water shortage for six months in the dry season, during which we have to use spring water that is not good in quality but we have no choice. In particular, people of the minority people do not boil water and often get waterborne diseases, such as diarrhea. (Deputy chairman of CPC)
- This commune is poor and it is better to use a water supply system from a spring on a nearby mountainside, rather than groundwater that incurs maintenance costs. (Male)

→ However, he faced oppositions from people around him and withdrew the comment

- I want to speak from the position of women who are mostly engaged in carrying water. Some people think about spring water as good water source but it is shared with cattle and water quality is very bad because of it. (Female)
- In the dry season, we have water shortage. In the rainy season, water in dug wells gets muddy and water quality becomes bad. Waterborne diseases such as skin diseases increase. When wells dry up, it is women's job to bring water from a spring and naturally workloads increase. (Female)

  → Her comment on "women's job …." met oppositions from male participants. In fact, when the study team visited a few springs, many men drew and carried water. So it is difficult to say that it is women's job.
- Many poor people live in this commune and cannot afford to pay the water charge. (Male)
- It is pleased to get safe water from a new facility, but it may be difficult to pay the water charge. We hope the facility that can keep the water charge as low as possible. (Male)

(6) K3-1: Dak Hring

- Dug wells are used as water source but water levels drop in the dry season. Water quality is not good throughout the year. (Female)
- The commune mainly has three water sources, dug wells, spring water, and rain water. Their water quality has not been investigated, but they are subject to environmental conditions and supply conditions are very unstable. Dug wells have to be dug deep because their water levels drop during the dry season. (Male)
- In the rainy season, water gets turbid and we cannot drink it. (Female)
- The area around the commune was a battlefield during the War and many unexploded bombs and land mines remain. In fact, around once per year, an accident occurs and people get killed or injured. I am afraid groundwater may be contaminated by the Agent Orange defoliant or chemical weapon. (Male)
- I hope that the Japanese aid will be carried out as soon as possible. Present water resources cannot meet demand. Dug wells of general households are often located near toilets and I am worried about any influence on human health. (Male)
- Our dug well was closed because of turbidity and we are now using spring water that is very poor in quality. If we dug the well more deeply, water quality could have improved. But we have no money. Because of bad water quality, my family often gets waterborne diseases, such as female disorders, diarrhea, and skin diseases.
- This commune has many people of minority races who account for more than half of the total population. More than 60% of today's attendants belong to minority races. As you

can understand from their comments, people in this commune strongly hope that the Japanese project will be realized. (Chairman of People's Committee)

(7) G1: Kong Tang

- I live in Village No.2 that is within the water coverage area under the plan. In my neighborhood, 20 families live and there were 35 dug wells (10m deep on average), which have been closed and are not used now, because their water had oily smell. At present, we share a public deep well (approximately 100m depth) but it is located on TPC's land and will be closed because a building will be built there. After it is closed, we do not know how we get water. (Male)
- I live in Village No.6, which main water sources are dug wells or springs. But water from 10% of dug wells is not drinkable because of oily smell. We always demand TPC to develop a new source. (Female)
- Once, a soil sample was taken and sent to the National Geological Research Institute to find a cause for oily water. Their analysis said that it came from constituents in a sand and gravel layer below, but details are not known. (Male)
- I think soil was contaminated during the War when an oil pipeline laid by Americans was destructed and spilled water into soil. (Male)
- My dug well was also closed and my family drinks rain water during the rainy season. In the dry season, we drink water sent from the public well. (Male)
- I am a resident in Village No.9. Groundwater in this commune is really bad and unsuitable for drinking purpose. In my house, water is passed twice through a filter before use, but I am worried about bad influence on your health. Here, spring water seems to be the safest source. (Female)
- I live in Village No.4. Surely, the spring produces very good water but is 2km away from my village and there is a lot of trouble to get water from there. Other people talk about water quality, but I want to add that, in the dry season, groundwater level drops and we run out of water, especially serious in Village Nos. 2 and 6. (Female)
- I am relieved to hear that the project will dig water from a deep aquifer. As other people have pointed out, in this commune, groundwater drawn from a 20m deep well is contaminated. (Male)
- As you can say from their opinions, this commune lacks a safe water source. I sincerely hope that the Japanese project will be realized soon. Also, in this area, there are many unexploded bombs mired. Last year, in fact, there was a big explosion at the elementary school and several persons were killed. Thus, safety check is required before work. (Deputy Chairperson of TPC)

(8) G2: Nhon Hoa

- In the dry season, groundwater level falls. We cannot get drinking water unless we dig the well deeper or borrow water from a neighboring well. (Male)
- I don't think our commune has a water problem. Water gets muddy in the rainy season. That's all. (Male)
- I do not agree with the opinion that there is no water problem. Water supply is always a problem in this central highland area. In the rainy season, muddy water sometimes comes out even if we dig 30m deep. It is a big trouble. (Male)
- First of all, we have water shortage in the dry season. The school does not have a well and children have to bring their own water. Teachers who live in the school get water from neighboring houses. (Female)
- I am the representative of a minority race. We previously drunk water from springs, but now we are using dug wells that are provided by the government. However, water level falls in the dry season and we often have to borrow water from other wells. (Male)
- To sum up, this commune is characterized by water shortage in the dry season and poor water quality in the rainy season. Especially, this is an agricultural area and I am concerned about groundwater contamination by fertilizer that is applied in large quantities. I am always asked by residents, "when will clean water come?" Also, many unexploded bombs and mines are remained in this area and children often become victims. (Chairman of CPC)
- In the pilot project, the pipeline was laid but was partially damaged when a new road was constructed, and now it is not capable of supplying water to some parts of the service area. If the next project is realized, I hope that you need to discuss with CPC about the proposed pipeline route. If it has to pass private property, we are glad to provide it. The pilot project is supplying water to 20 families. It was originally planned to serve 30 families but the damage in the pipeline prevents supply to the remaining 10 families. The water charge is 2,000VND per month and is collected from all the households, but the small number of connections does not generate enough revenues to repair the damaged pipeline. The collected charge is all used to pay for electricity (300,000 – 350,000VND per month). Very cheap water meters are used and water consumption cannot be measured accurately. The WSU hired four persons at the beginning but I am the only one because of the small scale of operation. (CPC staff in charge of the pilot project)

(9) G3: Chu Ty

- This commune's major water source is dug wells. Around half of them dry up in the dry season (4 – 6 months starting in November) and we have to rely on rainwater or spring

water. In the rainy season, quality of well water becomes bad. (Male)

- Same here. We also have a water shortage problem in the dry season. My house uses around 100 liters per day in the rainy season but can only use around 30 liters in the dry season. It costs around 7 million VND to dig a new well or 20 – 25 million VND if a deeper well is constructed. Moreover, it is difficult to dig a deep well because in this area, we often encounter bedrock below 20m. (Male)
- The dug wells do not have a cover and dust or even a dead animal is found in water. Water quality worries me. We get rainwater flown from the roof and it is not clean, because we cannot clean the roof everyday. (Male)
- The Japanese development study team advised us to separate the toilet and the dug well as far as possible. But it is difficult to relocate them and we are worried about the bad effect on water quality. (Female)
- We are connected to the water supply system built by District PC but we cannot get enough water, so we also use the dug well. In a reservoir for the system, dust, dead animals and leaves are afloat and I am worried about water quality. Also, the system depends on gravity flow and can only serve houses in lowland areas. (Female)
- I invited representatives of minorities to this meeting, but they did not come because few of them speak Vietnamese. As for the dry season, it sometimes started in the period of water shortage seems to get longer. In response to the serious water shortage, District PC constructed the water supply system last year, which draws water from 4 wells. But as some people have already pointed out, it is a very simple system and water is supplied to households without chlorination. At present, the system is connected to 258 households and charges 2,000VND per month. However, many users criticize about deteriorating water quality and shortage. We expect that Japan's aid come as soon as possible. (Chairman of CPC)

(10) G4-1: Thang Hung

- This commune's main water source is dug wells. As the water level drops in the dry season and deep digging is required but it is technically difficult due to presence of bedrock. Water quality is bad throughout the year (color and turbidity). (Male)
- Water from our dug well has not been examined and I am worried about quality. However, a spring is far away and we have to use the well because of no choice. (Female)
- Before 1975, we got water from a public well. After the end of the Vietnam War, each household started to own it dug well. However, as mentioned earlier, the water level drops in the dry season. As a result, it is sometimes difficult to get water with ordinary digging depth of 20m, requiring nearly 40m. Because of financial limitation, not all

residents can dig a deeper well. We therefore wait for the project of the Japanese government. People are glad to pay for the water charge if the new water supply facility is completed.

- I come from a minority race. In this commune, many people are Kinh and Gia Lai. Generally, they are poor and rely on spring water, which also decreases in the dry season, just like dug wells, while it becomes turbid in the rainy season. Many have skin and eye diseases that seem to be caused by unclean water. (Male)
- In this area, the Orange Agent defoliant was spared extensively during the Vietnam War. Although I have not examined groundwater, I am worried that it is affected by that. In this commune, I feel that many people have stomach-related diseases including cancer. Also, in the dry season, Kinh people as well as minorities use spring water, but the spring is located near paddy fields and water is contaminated by fertilizer. (Male)
- I have some doubt about the project, whether its implementation is really good for this commune. The IEC activity is not carried out here and residents do not feel obliged to pay for water supply. In fact, many people will not pay for the new service. Under such circumstances, you cannot maintain the facility and its operation. I think we should better compare the present cost spent for water supply (electricity charge for a small pump, etc.) and the expected water charge and choose a cheaper one. (Male)

(11) G5-1: Nghia Hoa

- The problem in this commune is that water levels in dug wells drop much in the dry season. Solutions are, you save water or dig a well deeper. Because this commune is located higher than others, you cannot get water unless digging fairly deep. Naturally it costs more and poor people have to give up. (Male)
- Water shortage in the dry season is more severe than other communes. In this commune, not only domestic water but also agricultural water is in short supply. (Later, it was explained that the project's scope did not cover agricultural water.) There is no water supply problem during the rainy season. (Male)
- There is a problem in the rainy season, too. Water quality is not bad throughout the year, but it gets turbid in the rainy season. Water from dug wells is bad. Among residents, there was once a rumor that keeping on drinking water from the well would cause cancer. I want to get water from a spring that has good quality, but it is far away. (Female)
- I want to talk about the situation of our minority race. Spring water is very muddy throughout the year. It is also used for a drinking place for water buffaloes and other cattle, and some measures seem to be required to improve water quality. Also, the water level in the spring drops in the dry season, just like the dug wells. (Male)

- In the rainy season, water gets acidic and is a bit colored. My house stores rainwater in a tank but it gives a trouble as wrigglers breed inside the tank. (Male)
- Although I welcome construction of the new water supply system under Japan's aid. In this commune, around 20% of residents belong to the low-income class, so I am worried about whether we can pay water and house-connection charges. Is there any subsidy for poor people or minorities? (Male)

(12) D1: Krong Nang

- There are water problems in both rainy and dry seasons. In the dry season, the groundwater level in dug wells – our main water source – drops, so that we have to get water from a neighbor who has a deeper well or go to a spring. In the rainy season, groundwater gets muddy and we rely more on rainwater, but it is not good either. I really hope that a new water supply system will be established here under Japan's aid. (Male)
- It has been more than three years since Japan's development study mission visited this commune, and I thought there would be no project, so I am really pleased. For residents in this commune, what we need most is clean and safe water. If we can get it, we are glad to pay the water charge. (Male)
- I live in Village No.5. I have not water in the dug wells here examined. I can only tell how it looks like, and I always worry about it. In this village, it seems to me that many children and infants have skin diseases, more than other areas, and many adults seem to have stomach-related diseases. I do not know whether they are caused by water but I suspect some influence. I hope that Japan's aid will save us from the unhealthy condition. (Male)
- In this area, the rainy season gets shorter and shorter, meanwhile, the dry season gets longer and longer. The environment surrounding water gradually deteriorates. Compared to the electricity charge, 30,000 – 40,000VND per month is affordable for most households without any problem. (Female)
- I agree with other people. From women's point of view, poor water quality seems to cause women's diseases and adversely affects health of pregnant women. (Female)
- I want to speak as one resident, rather than the DPC officer. The situation is all the same in eight villages of this commune. We are troubled by water shortage for four to six moths each year. Water supply should be given the highest priority for the sake of commune development and I affirm that all residents are willing to pay the water charge. (DPC officer)

(13) D2: Ea Drang

- The main water source of this commune is dug wells. A major problem with them is, the water level drops or even dries up in the dry season. Then, local residents have to buy bottled water or go to a spring. There is no water shortage in the rainy season. About water quality, I do not know because no examination has been made. But diarrhea or other diseases may be caused by water. It would be very helpful if a new water supply system is constructed in this commune under Japan's aid. (Male)
- I feel the same excitement as I felt when electricity came to our commune. 30 years ago, we were able to get enough water from dug wells of 10 – 15m deep. Now we have to dig 25 – 30m in the dry season. This is because the environment has changed due to deforestation and other causes. Also, most houses have dug wells very close to toilets, only 1-2 m apart, and I am worried about its influence on health. (Male)
- The new water supply system incurs a new cost and I feel this will cause a new problem. For instance, my village can get enough water from as much as ten dug wells even in the dry season. We should keep an option to let several households to share each well. (Male)
- In my neighborhood, the incidence of stomach cancer is higher than other areas. This seems to come from water quality. Once, I intended to have water examined and send a sample to a laboratory in a large city. But I gave up because it would cost a lot. (Male)
- Someone said there was no problem in the rainy season. But actually, water quality deteriorates and turns to yellow during the rainy season, so we drink the water. This commune's housing lots are small and dug wells and toilets are close together. I think this is the reason. (Male)
- I am a representative of a minority people. Recently, we can have information on water from TV or other mass media, more and more of us understand the importance of "clean water." Many houses get drinking water from a spring, but like the dug wells, spring water decreases in the dry season. I do not know about water quality because no examination has been made. I strongly hope that Japan's aid project includes the minority villages in the service area. (Male)
- I have been waiting for this project since three years ago. I was disappointed because there was no progress or information. I want to see the project done, not the survey. Water is really a serious problem for us. (Female)

(14) D3-1: Krong Buk

- The main water source of this commune is dug wells. There is no problem in the dry season, but in the rainy season, water gets muddy and quality becomes bad. As a result, we boil rainwater to drink. (Male)

- I do not agree with what he said about the dry season. In fact, it has more problem than the rainy season. Recently, drought occurs for a long period in the dry season and dug wells sometimes dry up completely. It is a serious problem. Many people try to go through the dry season by saving water consumption. Also, minority people here rarely drink spring or river water. They use it mainly for washing or bathing. (Female)
- I am worried about water quality of dug wells, because they have never been checked. There was a rumor that water from the dug wells contained excess calcium and it may be bad for our health. (Female)
- Opinions about water problems vary among people, but they would agree that the commune's water-related environment is poor. After the end of the Japanese study, residents have been waiting for implementation of the project for three years. I beg you to work on the Japanese government as well as the Vietnamese government for construction of a modern water supply facility as soon as possible. (Male)

(15) D4-1: Ea Drong

- In general, this commune has water problems in the dry season. Dug wells are our main water source but the water level drops severely in the dry season, and residents are troubled by serious water shortage every year. They have to cope with it by saving water consumption or relying on alterative sources such as rivers and rainwater. As for water quality, I have no idea because no examination has been made so far. (Male)
- Major crops in this commune are coffee and rubber. In the dry season, we have shortage of not only drinking water but also agricultural water. (Later, it was explained that the project's scope did not cover agricultural water.) For improvement of our living conditions, our commune needs a new water supply system. (Male)
- In the dry season, river water flow – one of the alternative sources – decreases significantly. Besides, it takes a lot of time to get water from the river. It's women's job, on the other hand, men have to dig a deeper well in the dry season. As a result, we cannot do farming, which is our job. (Female)
- Water from the dug wells has often an oily smell and needs to be boiled before drinking. I suspect that, there was an oil storage facility near this commune during the Vietnam War, and oil may leak from the old facility site or otherwise cause some problems. It worries me. (Male)

(16) D6-1: Kien Duc

- This commune is located at a high altitude and groundwater has to be dug very deep. Recently, the water level in dug wells drops sharply in the dry season, causing a serious

water shortage. Also, water becomes sour and turbid. (Male)

- Water quality of dug wells is pretty bad. It was once examined at a laboratory in Dak Lak and the result said it was not drinkable, containing a lot of cyanuric acid. (The study team was unable to obtain this water examination report). Recently, we have to dig into 40 – 50m in depth to find water in the dry season. This costs around one million VND, so that only rich people can dig a deep well. Ordinary households buy expensive bottled water or water from an owner of a deep well. (Male)
- After the end of the previous study, no progress was made. I thought the project in this commune was considered to be infeasible. Many households obtain water from dug wells but are worried about water quality because it has not been examined. I suspect that a high incidence of cancer is caused by poor water quality. (Female)
- The dry season lasts six month from October to April, and this commune does not have alternative water sources such as river and spring. Also, I think that the reason why many people suffer cancer or gallstone is bad water quality throughout the year. To solve such unhealthy condition, the new water supply facility is essential. (Male)
- In this area, a large amount of Orange Agent defoliant was scattered during the war and I am worried about its effect on groundwater. (Male)
- In this commune, not many rich people live. There are not many minority races or poor people, either, hence, the majority is middle-income people. If the water charge is too high, some cannot afford. Thus, I hope that consideration is given to this respect. (Female)
- I want to dig a deep well to avoid water shortage in the dry season, but a rock layer is encountered at the depth of around 25m and it is very difficult to dig further. Also, dug wells are usually close to toilets and I am worried about its effect on health. When water is stored in a tank for a while, it often turns to a yellowish color. (Male)
- In the dry season, I get water from a well of an acquaintance who lives near a lake by paying 15,000VDN per month. (Male)
- I live in Village No.9, which is not included in the service area under the water supply project. I want to know the reason why we have to bear the hardship while other villages can receive water supply, and I beg you that Village No.9 is included in the water coverage area. (Male)

10. Result of Baseline Survey

(1) Result of Baseline Survey of Kon Tum Province

Commune Name		Dak Su	Dak Ui	Dak Hring
Commune No.		K2-3	K3-1	K4-1
A. Province/District information				
1) Name of concerned Province	-	Kon Tum		
2) Center of concerned Province	-	Kon Tum		
3) Population of the Province*	person	366,100		
4) No. of District in the province*	-	7 + 1 town		
5) No. of communes in the province*	-	76 + 10 precincts + 6 towns under district		
6) Name of the concerned district	-	Ngoc Hoi	Dak Ha	Dak Ha
7) Population of the district**	person	30,870	54,415	54,415
8) No. of communes in the district	-	7	7 + 1town	7 +1 town
B. General condition				
1) No. of villages (Targeted villages for Phase 1)	-	14 (9)	11 (5)	13 (3)
2) Population (pop.)	person	3,967	5,704	6,985
3) Area (total)	km^2	122.2	107.0	98.0
4) Area (residential)	km^2	-	0.5	0.8
5) Pop. density (total area)	pop/ ha	0.3	0.5	0.7
6) Pop. density (residential area)	pop/ ha	-	125	87.3
7) Pop. increasing ratio (K2-3 & K3-1:2001 – 2005, K4-1: 2002 – 2005)	%	5.6	9.1	3.9
8) No. of households (total area)	hh	999	1,118	1,490
C. Natural condition				
1) Rainfall (province average)**	mm/year	1,637.0		
2) Elevation of the targeted area	m	650 - 670	650 - 690	620 - 660
D. Social Condition				
1) Pop. of Ave. household	person/hh	4.0	5.1	4.6
2) Pop. ratio (adult/child)	%	31 / 69	-	50 / 50
3) Pop. ratio (male/female)	%	50 / 50	48 / 52	52 / 48
4) Ratio of disease	%	80	63	-
5) Infant mortality rate (U14MR)	%	-	-	-
6) Under 5 mortality rate (U5MR)	%	(6 died)	(7 died)	-
7) Main product	-	Rice, Cassava	Rice, Cassava	Rice, Cassava, Coffee
8) Income of household	VND/hh/M	362,179	795,192	1,194,635
9) Medical payment	VND/hh/M	28,667	16,850	28,188
10) Electricity charge	VND/hh/M	35,405	29,300	38,024
11) School attendance rate (Primary school)	%	100	100	95
12) School attendance rate (Secondary school)	%	100	79	95
13) School attendance rate (High school)	%	100	10	45
14) School attendance rate (Over high school)	%	20	1	1
E. Accessibility				
1) Distance between capital of province and the commune	km	65	35	30
2) Access way	-	Good	Good	Good
3) Traveling time	minutes	90	45	40
F. Existing infrastructure				
1) Road length	km	25 – 30	21	30
2) Ratio of pavement	%	20	70	10
3) Covered ratio of electricity service	%	100	100	79
4) Condition of solid waste management	-	No Good	No Good	No Good
G. Existing condition on water supply				
1) Existence of water facilities in household	-	Dug well, Spring, Pond	Dug well, Spring, Pond	Dug well Spring, Pond
2) Distance between house and water source	m	870	410	660
3) Water consumption rate	Litre/hh/d	371	307	375
4) Condition in rainy season	-	Bad water quality	Bad quality	Bad quality
5) Condition in dry season	-	Water shortage	Water shortage	Water shortage
H. Consciousness on new water supply				
1) Request of service level (house connection/public stand pipe)	-	House connection	House connection	House connection
2) No. of population to be covered by the water supply project (Pop. of targeted village/total pop.)	%	66	44	44
3) Willingness to connect by household	%	100	100	100
4) Affordability of paying house connection fee by household	VND/hh	275,000	303,846	306,875
5) Affordability of paying water charge by household	VND/hh/M	15,397	14,338	13,116
I. Financial condition of commune				
1) year	-	2004	2004	2004
2) Income	VND/year	412,335,410	370,075,050	424,027,565
3) Outlet	VND/year	393,378,688	353,333,900	401,339,475
4) Balance	VND/year	18,956,722	16,741,150	22,688,090

hh: household
M: month
D: day

* ---- Statistical Year Book 2004
**--- Statistical Yearbook Kon Tum 2004

(2) Result of Baseline Survey of Gia Lai Province

Commune Name		Kong Tang	Nhon Hoe	Chu Ty	Thang Hung	Nghia Hoa
Commune No.		G1	G2	G3	G4-1	G5-1
A. Province/District information						
1) Name of concerned Province	-	Gia Lai				
2) Center of concerned Province	-	Pleiku				
3) Population of the Province*	person	1,095,900				
4) No. of District in the province*	-	13 + 1 town				
5) No. of communes in the province*	-	161 + 14 precincts + 12 towns under district				
6) Name of the concerned district	-	Mang Yang	Chu Se	Duc Co	Chu Prong	Chu Pau
7) Population of the district**	person	44,584	128,008	47,212	77,102	63,629
8) No. of communes in the district**	-	9 + 1 town	15 + 1 town	9 + 1 town	17 + 1 town	13 + 1 town
B. General condition						
1) No. of villages (Targeted villages for Phase 1)	-	13 (13)	14 (14)	8 (8)	7 (5)	6 (5)
2) Population (pop.)	person	6,825	11,298	7,838	5,154	3,925
3) Area (total)	km^2	17.5	58.9	18.3	33.3	21.1
4) Area (residential)	km^2	2.7	0.8	-	0.4	0.3
5) Pop. density (total area)	pop/ ha	3.9	1.9	4.3	1.5	1.9
6) Pop. density (residential area)	pop/ ha	25	144	-	142	131
7) Pop. increasing ratio (G1 & G4-1: 2001 – 2005, G2: 2002 – 2004, G3 & G5-1: 2002 – 2005,)	%	5.2	4.5	3.4	2.1	2.8
8) No. of households (total area)	hh	1,437	1,830	1,764	1,024	850
C. Natural condition						
1) Rainfall (recorded in Pleiku Station)**	mm/year	1,893.3				
2) Elevation of the targeted area	m	670 - 742	378 - 425	377 - 453	576 - 632	655 - 718
D. Social Condition						
1) Pop. of Ave. household	person/ha	4.7	6.2	4.4	5.0	4.6
2) Pop. ratio (adult/child)	%	-	69 / 31	-	-	-
3) Pop. ratio (male/female)	%	49 / 51	48 / 52	52 / 48	44 / 56	49 / 51
4) Ratio of disease	%	25	-	25	7	45
5) Infant mortality rate (U14MR)	%	-	-	-	-	-
6) Under 5 mortality rate (U5MR)	%	0.3	-	10.0	-	0.7
7) Main product	-	Coffee, Pepper, Cassava, Rice	Pepper, Coffee, Rice	Coffee, Pepper, Rubber, Cashew	Coffee, Rubber, Rice, Cashew, Corn	Coffee, Rice
8) Income of household	VND/hh/M	1,276,254	2,387,885	1,540,005	1,296,238	1,126,460
9) Medical payment	VND/hh/M	57,250	67,195	50,525	96,550	95,612
10) Electricity charge	VND/hh/M	46,921	62,325	56,087	56,000	38,684
11) School attendance rate (Primary school)	%	98	100	100	98	100
12) School attendance rate (Secondary school)	%	95	100	100	95	98
13) School attendance rate (High school)	%	85	80	100	70	75
14) School attendance rate (Over high school)	%	15	1	30	3	5
E. Accessibility						
1) Distance between capital of province and the commune	km	30	55	60	30	25
2) Access way	-	Good	Good	Partially paved	Good	Good
3) Traveling time	minutes	40	50	90	35	30
F. Existing infrastructure						
1) Road length	km	24	36	80	30	27
2) Ratio of pavement	%	85	25	80	23	30
3) Covered ratio of electricity service	%	100	100	100	95	100
4) Condition of solid waste management	-	No Good	No Good	Good	No Good	No Good
G. Existing condition on water supply						
1) Existence of water facilities in household	-	Dug well, Spring, Deep well	Dug well, Spring, Deep well	Dug well, Spring	Dug well, Spring	Dug well, Spring
2) Distance between house and water source	m	170	60	350	30	320
3) Water consumption rate	litre/hh/d	674	356	547	417	526
4) Condition in rainy season	-	Bad water quality	Bad water quality	Bad water quality	Bad water quality	Bad water quality
5) Condition in dry season	-	Water shortage	Water shortage	Water shortage	Water shortage	Water shortage
H. Consciousness on new water supply						
1) Request of service level (house connection/public stand pipe)	-	House Connection	House Connection	House Connection	House Connection	House Connection
2) No. of population to be covered by the water supply project (Pop. of targeted village/total pop.)	%	100	100	100	100	91
3) Willingness to connect by household	%	100	100	100	100	100
4) Affordability of paying house connection fee by household	VND/hh	259,615	309,821	289,634	248,750	240,625
5) Affordability of paying water charge by household	VND/hh/M	21,945	25,208	28,502	22,238	22,502
I. Financial condition of commune						
1) year	-	2004	2004	2004	2004	2004
2) Income	VND/year	616,763,140	628,018,494	874,738,967	322,766,187	329,441,697
3) Outlet	VND/year	592,763,140	608,101,900	763,670,500	326,226,187	295,151,280
4) Balance	VND/year	24,000,000	19,916,594	111,068,467	-3,460,000	34,290,417

hh: household
M: month
D: day

* ---- Statistical Year Book 2004
**--- Statistical Yearbook Gia Lai 2004

(3) Result of Baseline Survey of Dak Lak and Dak Nong Provinces

Commune Name		Krong Nang	Ea Drang	Krong Buk	Ea Drong	Kien Duk
Commune No.		D1	D2	D3-1	D4-1	D6-1
A. Province/District information						
1) Name of concerned Province	-	Dak Lak				Dak Nong
2) Center of concerned Province	-	Buon Ma Thuot				Gia Nghia
3) Population of the Province*	person	1,687,700				385,800
4) No. of District in the province*	-	12 + 1 town				6
5) No. of communes in the province*	-	139 + 13 precincts + 13 towns under district				47 + 5 towns under district
6) Name of the concerned district	-	Krong Nang	Ea Hleo	Krong Puk	Krong Buk	Dak Rlap
7) Population of the district**	person	111,206	107,759	211,029	153,590	88,862
8) No. of communes in the district**	-	9 + 1 town	9 + 1 town	15 + 1 town	12 + 1 town	12 + 1 town
B. General condition						
1) No. of villages (Targeted villages for Phase 1)	-	11 (10)	14 (12)	23 (7)	21 (16)	9 (8)
2) Population (pop.)	person	11,102	19,465	14,769	10,120	7,450
3) Area (total)	km^2	24.2	16.3	56.0	47.8	15.6
4) Area (residential)	km^2	-	2.5	1.1	2.0	-
5) Pop. density (total area)	pop/ ha	4.6	11.9	2.6	2.1	4.7
6) Pop. density (residential area)	pop/ ha	-	77.9	136.8	50.6	-
7) Pop. increasing ratio (2001 – 2005)	%	1.7	-	1.2	1.6	-
8) No. of households (total area)	hh	2,215	3,816	2,754	2,011	1,609
C. Natural condition						
1) Rainfall (province average)**	mm/year	1,346.8				2,659.2
2) Elevation of the targeted area	m	600 - 711	545 - 647	460 - 494	598 - 655	650 - 743
D. Social Condition						
1) Pop. of Ave. household	person/ha	5.0	5.1	5.4	5.0	4.6
2) Pop. ratio (adult/child)	%	-	-	40 / 60	-	-
3) Pop. ratio (male/female)	%	49 / 51	46 / 54	55 / 45	49 / 51	52 / 48
4) Ratio of disease	%	-	5	15	15	30
5) Infant mortality rate (U14MR)	%	0.2	-	-	-	0.1
6) Under 5 mortality rate (U5MR)	%	0.5	0.2	0.2	-	0.5
7) Main product	-	Coffee	Coffee, Rubber, Pepper	Coffee, Rice, Corn	Coffee, Corn	Coffee, Pepper, Small business
8) Income of household	VND/hh/M	2,175,305	1,986,352	1,704,391	1,239,464	1,785,913
9) Medical payment	VND/hh/M	97,625	90,455	97,500	131,829	95,238
10) Electricity charge	VND/hh/M	65,178	90,000	42,560	44,714	76,333
11) School attendance rate (Primary school)	%	99	98	98	95	100
12) School attendance rate (Secondary school)	%	90	98	98	95	98
13) School attendance rate (High school)	%	70	85	75	30	50
14) School attendance rate (Over high school)	%	60	20	50	10	5
E. Accessibility						
1) Distance between capital of province and the commune	km	52	82	44	47	24
2) Access way	-	Good	Good	Good	Partially paved	Good
3) Traveling time	minutes	60	100	50	50	30
F. Existing infrastructure						
1) Road length	km	70	35	55	-	25
2) Ratio of pavement	%	24	30	15	-	90
3) Covered ratio of electricity service	%	90	95	70	70	90
4) Condition of solid waste management	-	No but planning	Yes (4%)	No Good	No Good	Yes
G. Existing condition on water supply						
1) Existence of water facilities in household	-	Dug well, Spring, Others	Dug well, Spring, Others	Dug well, Spring, Deep well	Dug well, Spring	Dug well, Rainwater , Deep well
2) Distance between house and water source	m	190	500	20	110	40
3) Water consumption rate	litre/hh/d	462	989	485	383	853
4) Condition in rainy season	-	Bad water quality	Bad water quality	Bad water quality	Bad water quality	Bad water quality
5) Condition in dry season	-	Water shortage	Water shortage	Water shortage	Water shortage	Water shortage
H. Consciousness on new water supply						
1) Request of service level (house connection/public stand pipe)	-	House Connection	House Connection	House Connection	House Connection	House Connection
2) No. of population to be covered by the water supply project (Pop. of targeted village/total pop.)	%	95	85	48	80	98
3) Willingness to connect by household	%	100	100	100	100	100
4) Affordability of paying house connection fee by household	VND/hh	300,000	378,125	321,500	275,000	310,795
5) Affordability of paying water charge by household	VND/hh/M	20,511	26,668	22,458	16,758	33,239
I. Financial condition of commune						
1) year	-	2004	2004	2004	2004	2004
2) Income	VND/year	1,034,093,000	1,519,644,748	1,086,030,213	893,937,092	837,256,000
3) Outlet	VND/year	974,149,000	1,597,439,720	1,028,900,273	709,891,981	780,380,000
4) Balance	VND/year	59,944,000	-77,794,972	57,129,940	184,045,111	56,876,000

hh: household * ---- Statistical Year Book 2004
M: month **--- Statistical Yearbook Dak Lak/Dak Nong 2004
D: day

11. Geophysical Survey

(1) Purpose of Geophysical Survey and Specification

Since there are survey results, conducted during JICA M/P and F/S on physical detection and well drilling in all communes where the construction of new wells are planned, the electrical detection, as physical detection, is carried out supplementary. The purpose of detection and the specification are shown below:

Purpose of Geophysical Survey

Confirmation of the depth of the base rock layer
Clarification of the composition of underground layers
Confirmation of aquifer
Decision of the best drilling point

Specification of Geological Survey

Survey Method: Horizontal Electrical Sounding (HES) in every sites and additionally Vertical measurement is used on the three sites.
Electrode Array: Schlumberger Array
Survey Depth: 40m, 60m and 80m
Survey Site: 28 sites of new wells planned for construction
Survey Line Length: 300m (distance between measurement points 10m) as the basis
Survey Equipment: TD2000 (made in Vietnam)
Results: Location map of measurement lines and Sectional plans of comparative resistively

(2) Topography and Geology of Each Site and Result of Survey

1) K2-3 (Dak Su)

Topography	The North East side and South West side of the site are the hills with the elevations of about 750m and 693m. The site is located in the low land with the elevation of about 640~650m held between these hills.
Geology	According to the K2A boring, the gneiss is the base rock and the younger deposit, consisted of clay and sand, is distributed with the layer thickness of about 17m.
Aquifer	In the weathered zones and developed fractures of the younger deposit and the base rock, the aquifer can be found. (Q=104 L/min)

Result of Survey

The survey was carried out at 3 sites where new 3 wells are planned for construction. In this Basic Study, the target geology is mainly the basalt. However, only in Kon Tum Province, there is little distribution of the basalt and the younger deposit is distributed on the base rock. Therefore, since it is important to specify the depth of the base rock, the vertical measurement was also used only at this site.

Result of Vertical Measurement	The depth of aquifer (including the weathered zone of the base rock) is assumed as follows: K2-3(1)…30m, K2-3(2)…50m, K2-3(3)…50m
Result of Horizontal Electrical Sounding	K2-3(1)…The comparative resistively value in the depth of 40m shows approx. 700～1,000Ωm and it is assumed that the hard rock base is detected. Among them, the planned well site shows the relatively low value of 427Ωm which implies rather developed fractures and indicates the most suitable location for well drilling. The comparative resistively value in the depth of 60m also shows almost the same tendency. K2-3(2)…The comparative resistively value in the depth of 40m shows approx.100～250Ωm from the starting point 70m to the point of planned well site and it is assumed that near here is aquifer. At the side of the finishing point from the point of planned well site, the comparative resistively value is bigger which implies the hard rock base.The comparative resistively value in the depth of 60m also shows almost the same tendency. K2-3(3)…The comparative resistively values in the depth of 40m and 60m show the low value only at the point of planned well site which means the developed fracture zone in the base rock, and show the high value at the other points which means the hard base rock. These data indicate that the position is most suitable for the well drilling.

2) G1 (Kong Tang)

Topography	The commune is located on the relatively flat land with the elevation of about 735m
Geology	In the mountain that is the North side of the planned site, the granite is distributed, but it is confirmed that the basalt is distributed until the depth of 150m.
Aquifer	In the porous basalt and the fractured basalt, the aquifer can be found.(Q=224 L/min)

Result of Survey

The results of the horizontal detection in the depths of 40m, 60m and 80m around the point of planned well site show the values of 100～300Ωm although it is uneven. It is assumed that the aquifer is relatively satisfactory.

3) G2 (Nhon Hoa)

Topography	Towards the 4 directions, the hills with max. elevation of 425m form the lands of gentle slopes.
Geology	According to the JICA well, the basalt is distributed until the depth of 165m and, further deeper, the hard sandstone is distributed.
Aquifer	In the porous basalt and the fractured basalt, the aquifer can be found. (Q=120 L/min) Note: To the South West for 1.4km from the JICA well, there is the monitoring well of LK67T.

Result of Survey

6 locations are planned for well sites in this commune.

G2-1…The comparative resistively values show approx. 20～75Ωm.
It is assumed that the aquifer is relatively satisfactory.

G2-2…The comparative resistively values show approx. 30～100Ωm.
It is assumed that the aquifer is relatively satisfactory.

G2-3…The comparative resistively values show approx. 30～60Ωm.
It is assumed that the aquifer is relatively satisfactory.

G2-4…The comparative resistively values show approx. 100～180Ωm.
It is assumed that the aquifer is relatively satisfactory.

G2-5…The comparative resistively values show approx. 150～320Ωm.
It is assumed that the aquifer is relatively satisfactory.

G2-6…The comparative resistively values show approx. 15～20Ωm.
It shows slightly low values as an aquifer.

4) G3 (Chu Ty)

Topography	The ridge with the elevation 430～450m is extending to the East and the West and the branch of swamp is eroding this ridge from the South to the North. The residential area exists mainly on the ridge.
Geology	According to the JICA well, the basalt is distributed until the depth of 150m.
Aquifer	In the porous basalt mainly, the aquifer can be found. (Q=220 L/min)

Result of Survey

Around the planned well site, the comparative resistively values show approx. 100～300Ωm.

It is assumed that the aquifer is relatively satisfactory.

5) G4-1 (Thang Hung)

Topography	From the North East (elevation 650m) to the South West (elevation 560m), the ridge exists with gentle slope.
Geology	According to the JICA well, the basalt is distributed until the depth of 164m and, further deeper, the granite is distributed.
Aquifer	Mainly, in the porous basalt and the semi-weathered basalt, the aquifer can be found. (Q=180 L/min)

Result of Survey

Around the planned well site, the comparative resistively values show approx. 200～300Ωm.
It is assumed that the aquifer is relatively satisfactory.

6) G5-1 (Nghia Hoa)

Topography	The commune is on the ridge located between the north-side river and the south-side river, both of them flowing to the West. Topographically, its undulation is relatively high.
Geology	According to the JICA well, the basalt is distributed until the depth of 156m and, further deeper, the accumulated rock of Neogene is distributed.
Aquifer	Mainly, in the porous basalt and the semi-weathered basalt, the aquifer can be found. (Q=120 L/min) Note: To the South West for 1.5km from the JICA well, there are the monitoring wells of C2a,C2b,C2c,C2o.

Result of Survey

Around the planned well site, the comparative resistively values show approx. 50～70Ωm.
It is assumed that the aquifer is relatively satisfactory.

7) D1 (Krong Nang)

Topography	The relatively flat land with max. elevation of 710m is extended and eroded by the river flowing to southeastwards.
Geology	According to the JICA well, the basalt is distributed until the depth of 140m.
Aquifer	In the porous basalt and the fractured basalt, the aquifer can be found. (Q=240 L/min) Note: To the West for approx. 450m from the JICA well, there is the deep well (d=85m) of Health S. Center but it is said that the well is dried up in the dry season. Moreover, to the East for approx. 1km from the JICA well, there is the

	spring of which the inhabitants take good care.

Result of Survey

2 locations are planned for well sites.

D1-1…The comparative resistively values show approx. 100～180Ωm.

It is assumed that the aquifer is relatively satisfactory.

D1-2…The comparative resistively values show approx. 30～100Ωm.

It is assumed that the aquifer is relatively satisfactory.

8) D2 (Ea Drang)

Topography	The hill with the elevation of 600 ~ 650m is eroded by 2 rivers and its branch swamp.
Geology	According to the JICA well, the basalt is distributed until the depth of 103m and, further deeper, the granite is distributed.
Aquifer	In the porous basalt, the fractured basalt and the weathered upper zone of the granite, the aquifer can be found. Note: To the South for approx. 200m from the JICA well, there are 3 deep wells of the rubber factory. These 3 wells were drilled before the drilling of JICA well. The drilling depth is 120m and the pump up water volume is approx. 90 ~ 150 L/min. Moreover, to the East for approx. 600 ~ 700m from the JICA well, there are another 2 deep wells (d=120m). According to these existing wells, although the result of pump up water volume from JICA well is as little as 27 L/min., the pump up water volume of this site is assumed as 156 L/min. in the F/S.

Result of Survey

6 ~ 7 locations are planned for well sites.

D2-1…The comparative resistively values at the planned well site show approx. 20～35Ωm.

It is assumed that the aquifer is relatively satisfactory.

D2-2…The comparative resistively values at the planned well site show approx. 35～60Ωm.

It is assumed that the aquifer is relatively satisfactory.

D2-3…The comparative resistively values at the planned well site show approx. 70～300Ωm.

It is assumed that the aquifer is relatively satisfactory.

D2-4…The comparative resistively values at the planned well site show approx. 140～250Ωm.

It is assumed that the aquifer is relatively satisfactory.

D2-5…The comparative resistively values at the planned well site show approx. 20～100Ωm.

It is assumed that the aquifer is relatively satisfactory.

D2-6…The comparative resistively values at the planned well site show approx. 45～70Ωm.

It is assumed that the aquifer is relatively satisfactory.

D2-7…The comparative resistively values at the planned well site show approx. 60～200Ωm.

It is assumed that the aquifer is relatively satisfactory.

9) D3-1 (Krong Buk)

Topography	The site is located on the ridge with the elevation of 500 ~ 470m, sloping gently southwards.
Geology	According to the JICA well, the basalt is mainly distributed until the depth of 61.3m and, further deeper, the Jurassic base rock is distributed.
Aquifer	In the porous basalt, the fractured basalt, the weathered upper zone of the Jurassic rock and the lacustrine sediments among the basalt, the aquifer can be found. (Q=288 L/min)

Result of Survey

1 location is planned for well site.

The comparative resistively values show approx. 20～50Ωm.

It is assumed that the aquifer is relatively satisfactory.

10) D4-1 (Ea Drong)

Topography	The rivers flow down at the both sides of the ridge sloping gently southeastwards. The planned well site is located on the skirt of the east side ridge with the elevation of 600~623m. The JICA well is located on the skirt of the west side ridge with the elevation of 615m.
Geology	According to the JICA well, the basalt is distributed until the depth of 147.5m and, further deeper, the Jurassic base rock is distributed.
Aquifer	In the porous basalt and the fractured basalt, the aquifer can be found. (Q=186 L/min)

Result of Survey

2 locations are planned for well sites.

D4-1…The comparative resistively values show approx. 20～30Ωm.

It is assumed that the aquifer is relatively satisfactory.

D4-2…The comparative resistively values show approx. 50～100Ωm.

It is assumed that the aquifer is relatively satisfactory.

11) D6-1 (Kien Duc)

Topography	The erosion by rivers and branch swamps is developed and its undulation is rich topographically.
Geology	According to the JICA well, the basalt is distributed until the depth of 170m.
Aquifer	In the porous basalt and the fractured basalt, the aquifer can be found. Note: In this commune, 3 deep wells were drilled (d=150m) by DPC and the small-scale water supply system is under operation. The pump up water volume from these 2 wells is 420 L/min. (1 well is not operated due to a trouble.) Moreover, other several deep wells are being used privately. According to these existing wells, although the result of pump up water volume from JICA well is as little as 15 L/min., the pump up water volume of this site is assumed as 180 L/min in the F/S. As mentioned above, since there are many existing deep wells in the central part of the commune, the planned well site is selected on the ridge line extending from the south to the north along the west side of the commune.

Result of Survey

D6-1…The comparative resistively values at the planned well site show approx. 46～162Ωm. It is assumed that the aquifer is relatively satisfactory.

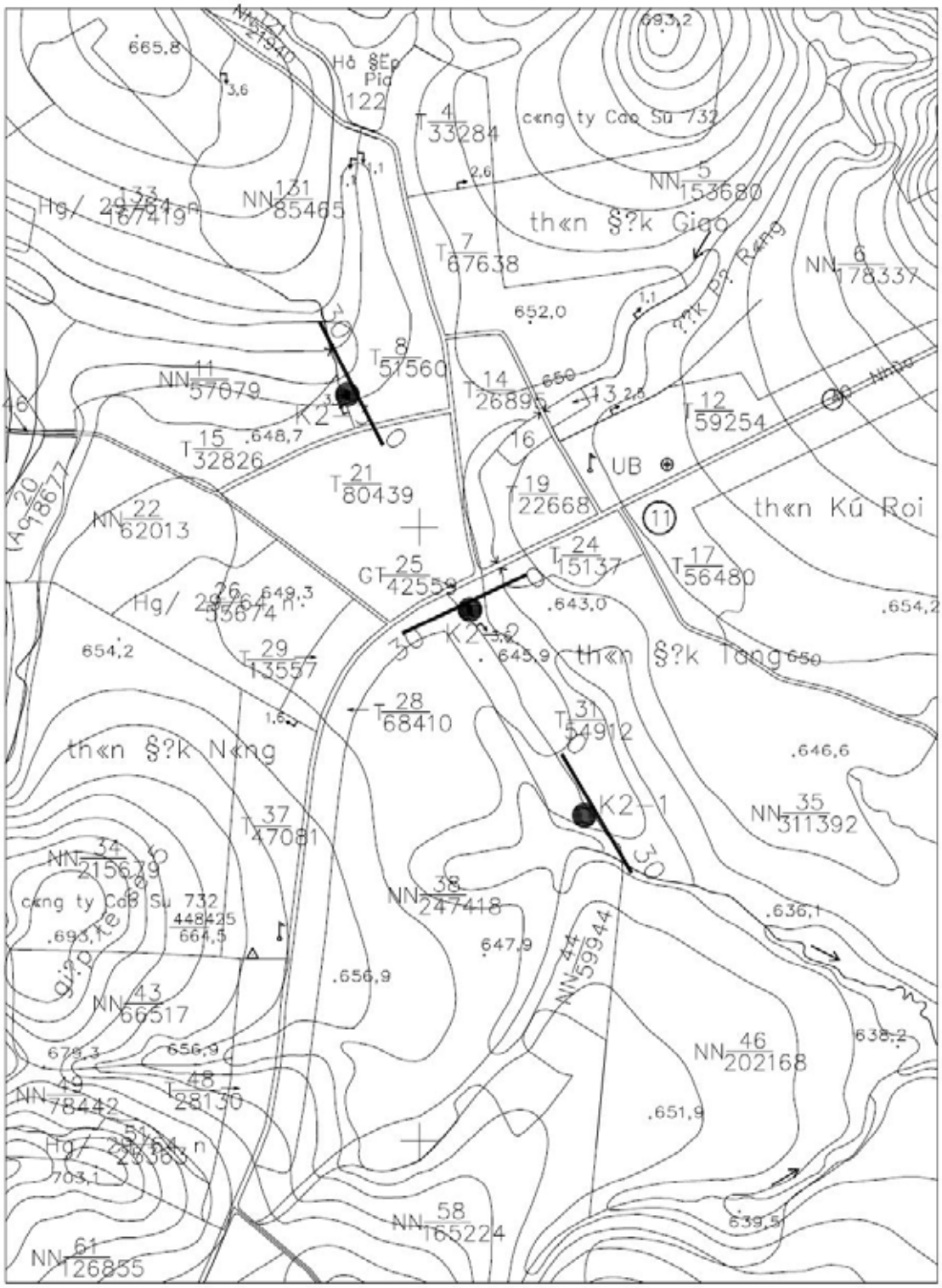
D6-2…The planned well site and its neighborhood are located on the ridge zone.

The comparative resistively values at the depth of 40m show approx. 400～500Ωm that is rather large as the aquifer. Accordingly, the ground water may not be found sufficiently around until here.

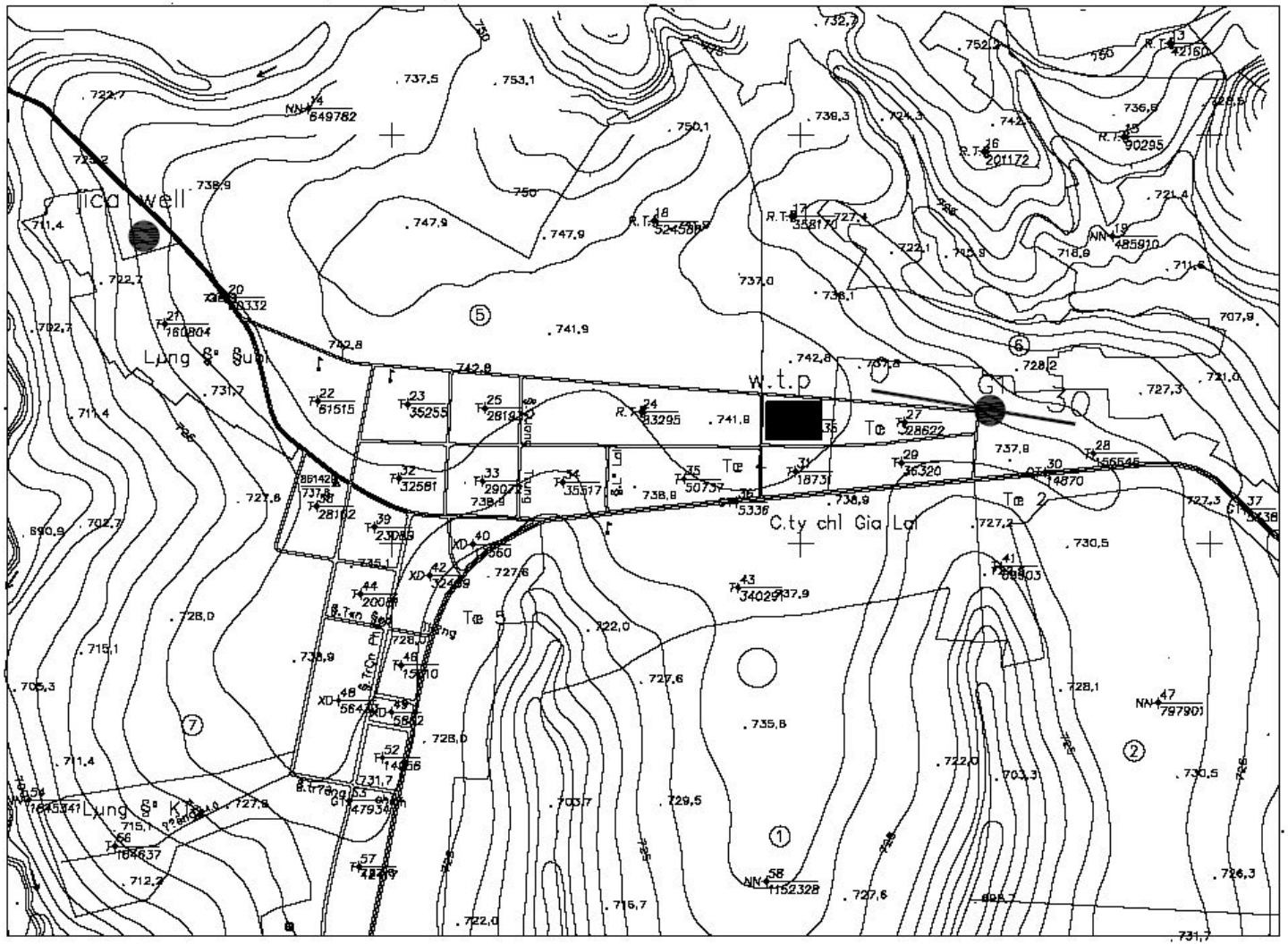
The comparative resistively values at the depth of 60m and 80m show approx. 210～230Ωm and it is assumed that the aquifer is relatively satisfactory.

D6-3…The comparative resistively values at the planned well site show approx. 70～300Ωm. It is assumed that the aquifer is relatively satisfactory.

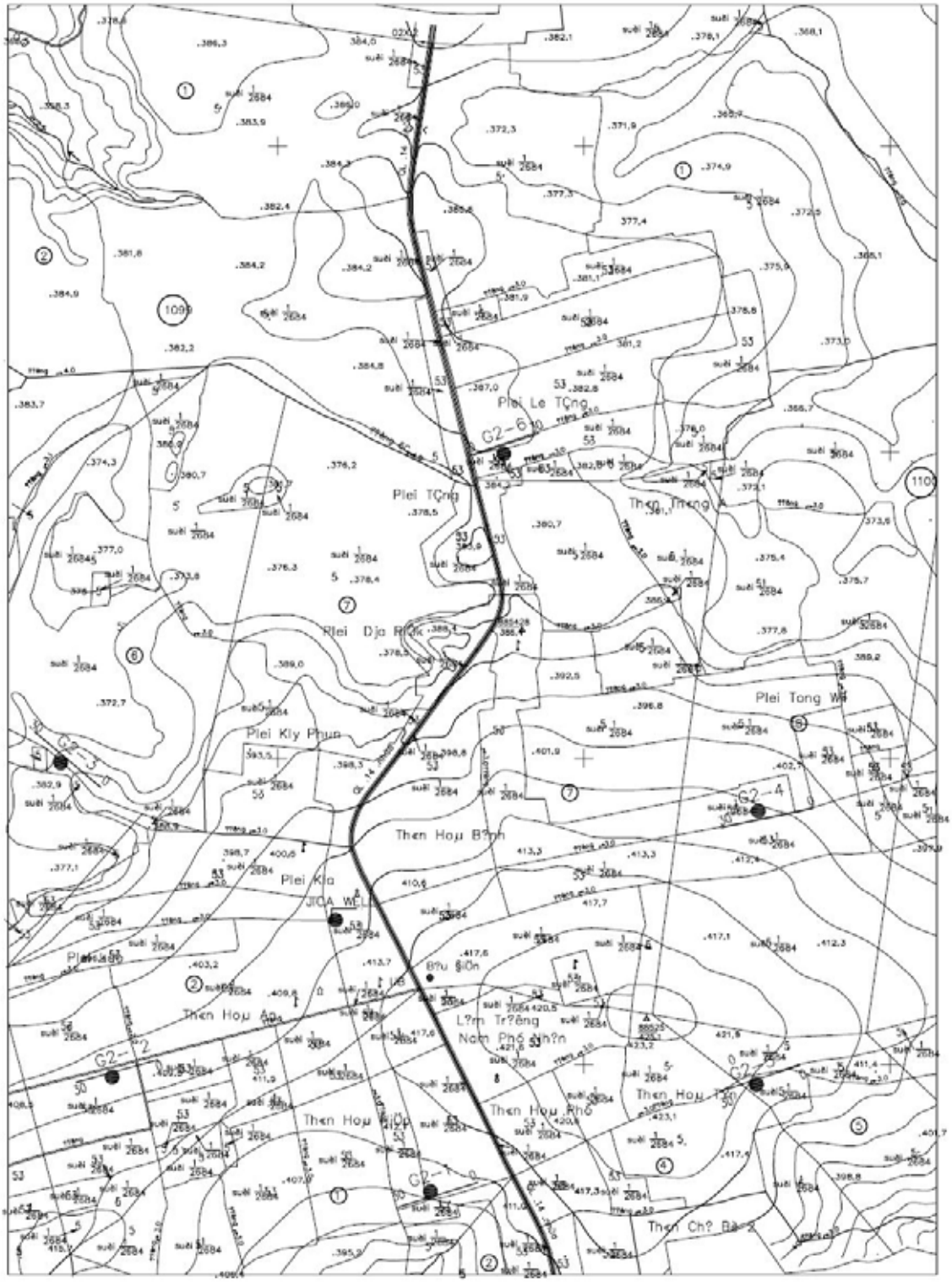
K2–3 DAK SU COMMUNE – NGOCHOI – KONTUM
LINE GEOPHYSICAL SURVEY LOCATIONS MAP



G1 Kong Tang – chuse – Gia Lai
line geophysical survey locations map



G2 Nhon Hoa commune–chuse–Gia Lai
LINE GEOPHYSICAL SURVEY LOCATIONS MAP



G3 Chu Ty town–Gia Lai
line geophysical survey locations map