

The Detailed Design Review Survey For Spl VI
Water Supply
(SAPI)
for
Small-Scale Pro Poor Infrastructure
Development Project (III)

FINAL REPORT

NOVEMBER 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

YACHIYO ENGINEERING CO.,LTD.

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PREFACE

The Ministry of Planning and Investment of Vietnam (MPI) and the Japan International Cooperation Agency (JICA) agreed that the Detailed Design Review Survey for SPL VI Water Supply Subprojects should be conducted as per the Minutes of Meeting on the Preparatory Meeting dated 29/January/09.

JICA selected and dispatched a study team headed by Mr. Kazushi Hashimoto of Yachiyo Engineering Co, Ltd. between August 2010 and October 2010.

The team held discussions with the officials concerned of MPI and conducted field surveys for 16 subprojects and prepared this final report.

I hope that this report will contribute to the smooth and effective implementation of SPL VI water supply components and contribute to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of MPI, DPIs, Districts, Water Supply Companies and all other entities and their staffs concerned, for their close cooperation extended to the study.

November 2010

Kazuhiro YONEDA
Southeast Asia Department 2
Japan International Cooperation Agency

November 2010

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

Dear Sir,

We are pleased to submit to you the final report of the Detailed Design Review Survey For Spl IV Water Supply (SAPI) for Small-Scale Pro Poor Infrastructure Development Project (III) which contains the review results of 16 water supply subprojects and the conclusion and recommendations.

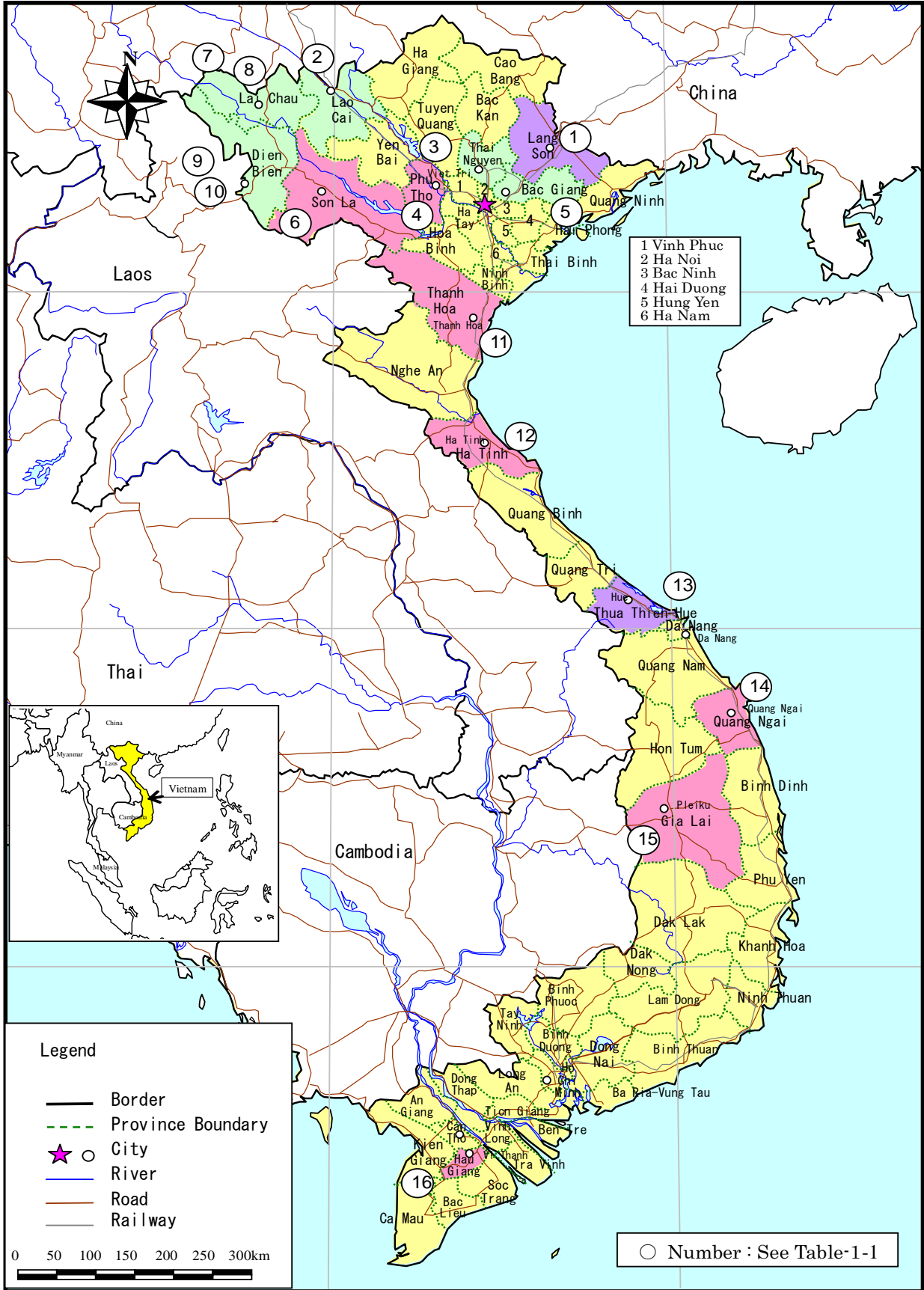
We wish to take this opportunity to express our sincere gratitude to your Agency. We also wish to express our deep gratitude to the Ministry of Planning and Investment of Vietnam and other relevant organizations for close cooperation and assistance extended to us during our investigation and study.

Very truly yours,

Kazushi HASHIMOTO
Team Leader

The Detailed Design Review Survey For Spl VI Water Supply (SAPI) for
Small-Scale Pro Poor Infrastructure Development Project (III)

LOCATION MAP



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Exchange Rate (As of OCT 2010)

USD 1 = 83.67JPY

VND 1 = 0.0043JPY

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ABBREVIATION

Abbr.	Name
CPC	Commune People committee
D/D	Detailed Design
DPI	Provincial Department of Planning and Investment
DPC	People's Committee of District
F/S	Feasibility Study
JICA	Japan International Cooperation Agency
MPI	Ministry of Planning and Investment
O&M	Operation and Maintenance
PO	Project Owner
PMU	Project Management Unit
PPC	People's Committee of Province
PVC	Polyvinyl-chloride Pip
WACO	Water Company
WSC	Water Supply Company
WTP	Water Treatment Plant

SUMMARY

BACKGROUND AND OBJECTIVES

“Eighth Five year Social-economic Development Plan (2006-2010)” of the Vietnamese government sets target to facilitate infrastructure development especially in rural areas, aiming the improvement of living standards, hunger elimination and continuous reduction of the number of the poor. From this background, the Government of Vietnam has requested the Government of Japan Yen Loan for the “Small-scale Pro Poor Infrastructure Development Project (III)” which aims to improve the infrastructures in Vietnam. The Government of Vietnam and the Government of Japan through Japan Intentional Cooperation Agency (JICA) concluded the Loan Agreement in November 2009.

Concerning the water supply sub-projects, it was required by JICA to conduct the review of the quality of the detailed design so that efficiency, effectiveness and sustainability of the project could be maximized. The JICA dispatched the SAPI Study Team to conduct the survey in accordance with “The Implementation Arrangement and the Minutes of Meeting” agreed and signed between JICA and Ministry of Planning and Investment, the Government of Vietnam in January 29, 2010.

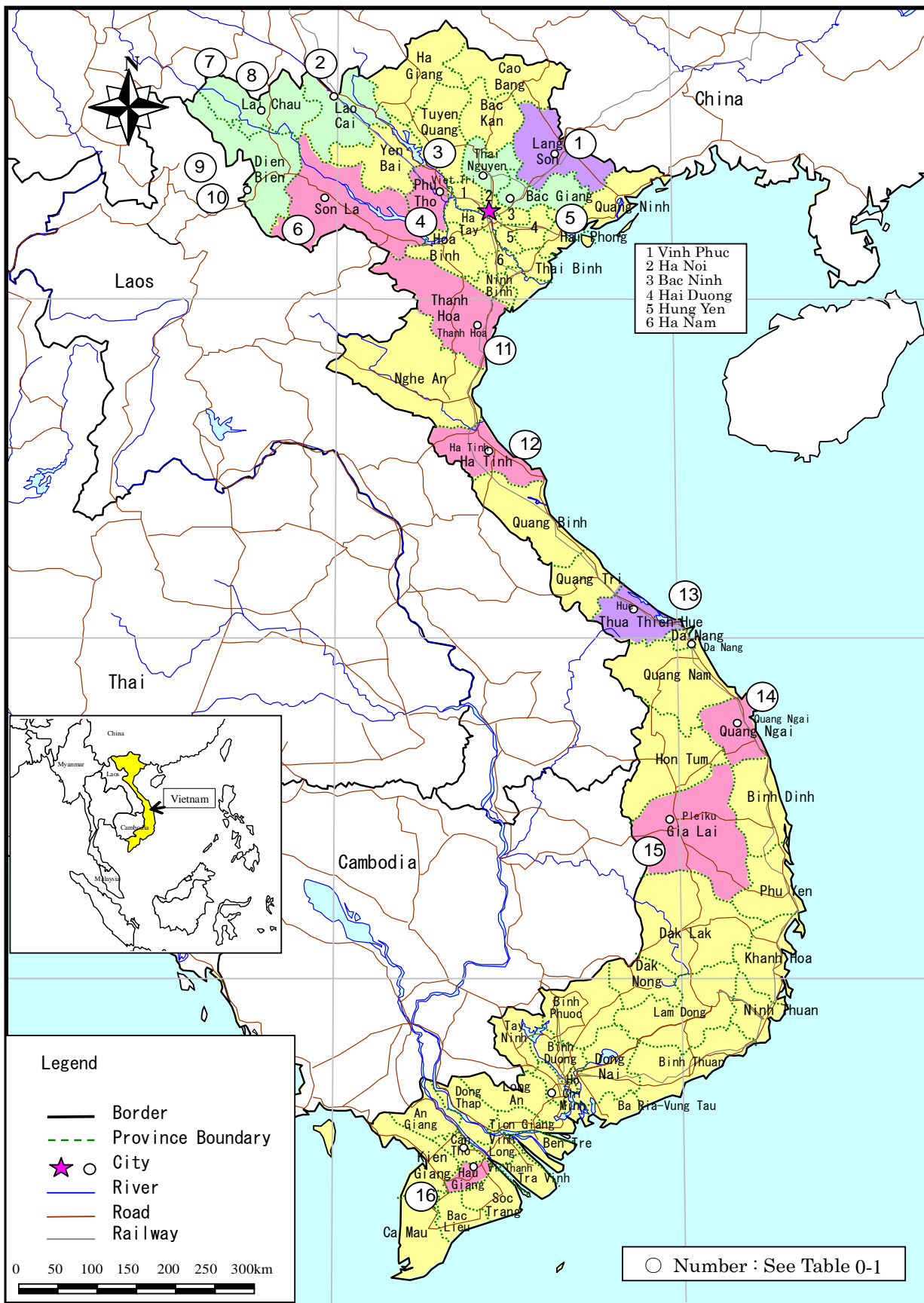
a) SURVEY AREA

Table 0-1 represents the 16 water supply sub-projects.

Table 0-1 16 Water Supply Sub-projects

No	Province	District	Name of the Project
①	Lang Son	Dinh Lap	Water Supply System for Dinh Lap town
②	Lao Cai	Bao Thang	Rehabilitation and expansion of water supply system for Lu town (Continuous SPL)
③	Thai Nguyen	Pho Yen, Phu Binh	South Area Water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District
④	Phu Tho	Tam Nong	Water Supply Project for Hung Hoa Town
⑤	Bac Giang	Luc Nam	Water Supply System Construction Project for Doi Ngo town
⑥	Son La	Song Ma	Water Supply System for Chieng Khuong cluster communes
⑦	Lai Chau	Muong Te	Water Supply System for Muong Te town
⑧	Lai Chau	Tam Duong	Dong Pao Water Supply system
⑨	Dien Bien	Dien Bien Dong	Dien Bien Dong Water Treatment Plant
⑩	Dien Bien	Tuan Giao	Water Supply System in Pilot project of SPL VI
⑪	Thanh Hoa	Yen Dinh	Water Supply System for Quan Lao town
⑫	Ha Tinh	Ky Anh	Water Supply for Ky Trink, Ky Ha, Ky Ninh of Vung Ang Economic area
⑬	Thua Thien Hue	Phu Loc	Water Supply System for Phu Loc town and 5 surrounding communes
⑭	Quang Ngai	Son Ha	Water Supply System for Di Lang town
⑮	Gia Lai	Krong Pa	Water Supply System for Phu Tuc town
⑯	Hau Giang	Chau Thanh A	Water Supply Network Expansion from Ngy Bay town to Tan Phu Thanh for Cai Tac town

The location map of the study area is as represented below.



APPROACH AND METHODOLOGY

Though the Vietnamese regulation was applied as the standard, it was necessary to meet the requirements of JICA. However, with respect to the Water source and the laboratory, the SAPI Study Team considered the followings also, which has the basis of the Professional Judgment of the SAPI Study Team.

a) WATER SOURCE

(1) Water Quantity

Out of 16 projects, only 7 projects satisfied the JICA requirement of 12 months data for the water quantity in the water source. For 8 projects, there is only minimum flow dry season data. For the most cases, however, the river flow of 12 month can be estimated based on the rainfall and basin area analysis hydro-geological analysis. The water source monitoring report is not available for the water supply pilot project of capacity of $Q = 103 \text{ m}^3/\text{day}$ for the Tuan Giao District in Dien Bien Province. The villagers who are largely minorities have been using the water source since long long time. According to the villagers, there is no history of draught in this water source. In case of the two water sources (Hue and Lai Chau), the water sources are considered to be inaccessible during the rainy season.

The SAPI Study Team conducted the review of the detailed design and evaluated the water source based on actual field surveys and interviews. In the case of river as intake point of water source, even if the 12 month is not available, if the historical data on the minimum water level at the intake point of the water source is available and the intake pipe level is designed below the minimum water level, we can assume that there will be no problem of availability of water source. In the case of spring as intake point of water source, if the intake pipe is designed at the bottom of the proposed dam, which is to store the water and raise the water level, we can also assume that there will be no shortage in water source all the year around. In such a way, the Study Team evaluated that the flow in the water source for all the projects is higher than the water demand until the target year of the project.

Therefore, in the opinion of the SAPI Study Team even 12 months data for most of the projects to fulfill the JICA requirement have not been obtained by Project owner (PO) and or Waste Supply Company (WSC), the reliable supply of water is ensured for all the projects.

(2) Water Quality

Out of 16 projects, only 6 projects satisfied the JICA requirement of 12 months data for the water quality of the water source. The remaining 10 projects have water quality data for 3 to 5 months only. These data have been obtained mostly during the dry season.

The SAPI Study Team conducted the review of the detailed design and evaluated the water source based on actual field surveys and interviews. The water quality of the water source in general deteriorates due to lack of water during the dry season. We found out the cases in which, due to human & agricultural activity and high flow during the rainy season, E-Coli and turbidity in the water increases in the rainy season. In such cases, the Survey Team checked the water quality of the treated water from the existing water purification plants nearby which is operated by the same water supply company and is using the same water source (same river) and is utilizing the similar purification technology. It was found out that the treated water of the existing plant meets the Vietnam drinking water quality standard in both dry and rainy seasons. Therefore, in such cases, we concluded that the proposed water source fulfills the raw water quality standards.

There are even cases where the water sources are inaccessible particularly in rainy season. In such cases, the intakes are usually located in the upstream forest area where there is no human activity around. There is no site for contaminating the source. In such cases, we can assume that the water quality will remain sufficiently clean all year around and the Survey Team concluded that there is no problem of water source quality.

Therefore, in the opinion of the SAPI Study Team even 12 months data to fulfill the JICA requirement have not been obtained by the PO and or WSC, reasonable quality of water is ensured for all the projects.

b) PROVISION OF THE LABORATORY IN THE PROJECT FOR THE WATER QUALITY MONITORING

Out of 16 projects, 4 projects are for pipelines and booster pumping stations to expand the coverage of the existing water supply system. Out of 12 remaining projects, only 6 projects had provision of laboratories in the water purification plants. For other projects, there are provision of sending samples for the water quality testing to the laboratory of the Water supply Company and the Provincial Health Department. However, there is case where there is no laboratory with the water supply company like Lang Son. In this case, only Provincial Health Department can conduct the water quality analysis. However, some PO and or WSC does not collect samples in the existing water purification plants regularly and send for the detail examination to the Provincial Health Department. Moreover, the daily monitoring of water quality for the Plant is not feasible to be conducted by the Provincial Health Department.

The project water purification plants are small in size. If these are equipped with formal laboratories with equipments and qualified personnel, it will increase the cost of the O&M. The increased O&M cost may not be sustainable for such small plants. In the case of pilot project for the Tuan Giao District in Dien Bien Province, it is not feasible to have even a small laboratory while the O&M is community based and the “Willingness to Pay” of users is very-very low. Except for Tuan Giao, for the remaining 5 project water purification plants also, PO and or WSC have included the provision of laboratory. In the case of Tuan Giao, Tuan Giao district informed that they are committed to testing the water quality periodically every month.

In the opinion of the SAPI Study Team although provision have been made in all the project water purification plants except Tuan Giao for the laboratory room, analysis of all the parameters, according to Vietnam Standard, in the plant laboratory is not feasible at this stage.

STUDY TEAM AND SCHEDULE

The Study has been undertaken by the SAPI Study Team consisting of both international as well as local experts. The Team includes five (5) international experts and four (4) local experts required for this Study. The SAPI Study Team conducted the Survey from August 2010 to October 2010.

PROJECT OVERVIEW

Table 0-2 represents the basic projects information and table 0-3 represents the projects specifications.

Table 0-2 Basic Project Data

PJ No.	Province/ District	Project Owner (PO)	O&M Agency	Water Source	Project Cost/ JICA portion (mln VND)	Scope of Work
1	Lang Son/ Dinh Lap	Lang Son Water Supply and Drainage Company	Lang Son Water Supply and Drainage Company	Ky Cung river	37,655/ 20,000	Raw water intake with 2 pumps, booster pumping station with 2 pumps, water treatment plant, transmission pipeline, distribution pipeline network in the town and fire hydrants
2	Lao Cai/ Bao Thang	Lao Cai State One member water supply business company Ltd.	Lao Cai One member water supply business company Ltd.	Hong river/ Lu stream	33,851/ 19,978	Construction of raw water pump station, water purification plant (pre-sedimentation, mixing & flocculation, secondary sedimentation, filtration, treated water pump station) capacity of 3,000m ³ /day and rehabilitation & upgrade of water purification facility including intake, raw water transmission pipeline and water purification plant, pipeline network from 1,200m ³ /day to 2,000m ³ /day
3	Thai Nguyen/ Pho Yen, Phu Binh	Thai Nguyen Water Supply Company	Thai Nguyen Water Supply Company	Existing Song Cong WTP, which would be upgraded under Norway fund (Song Cong river)	24,475/ 16,363	To construct booster pumping station with capacity Q=5,500 m ³ /day (phase 1, 2010) and Q=9,000 m ³ /day (Phase 2, 2015), which also includes reservoir, administration house, gate & fence, transforming station, pipe network with total length of 49360 m.
4	Phu Tho/ Tam Nong	Tam Nong District People Committee	Pho Thu Water Supply JSC	Existing intake and WTP (Da river)	38,941/ 25,296	Construction of one reservoir tank (V=500 m ³), booster pumping station (Q=2,000 m ³ /day), transmission pipe and distribution pipe line.
5	Bac Giang/ Luc Nam	Luc Nam District people committee	A new water supply enterprise will be established.	Luc Nam river	29,946/ 19,569	Construction of intake, pumping station, raw water transmission pipe, WTP(Q=3,500 m ³ /day), distribution pipe line
6	Son La/ Song Ma	Son La Clean water and Rural Environmental Sanitation Center	Son La Clean water and Rural Environmental Sanitation Center	Le Stream	26,517 /17,311	Construction of intake, pumping station, raw water transmission pipe and WTP (Q=2,400 m ³ /day) and distribution pipe
7	Lai Chau/ Muong Te	Muong Te District People's Committee	Lai Chau Waco	Huoi Sang spring/ Nam Cau spring (in case of dry season)	27,376/ 14,900	To build Water supply system with capacity of 1,000 m ³ /day including the Surface raw water intake (from 2 water sources), raw water transmission pipes, Water treatment plant, Distribution network and service pipes

PJ No.	Province/ District	Project Owner (PO)	O&M Agency	Water Source	Project Cost/ JICA portion (mln VND)	Scope of Work
8	Lai Chau/ Tam Duong	Tam Duong District project management	Lai Chau Waco	Chao San spring	24,280/ 21,600	To build Water supply system with capacity of 1,000 m ³ /day including: Surface raw water intake, raw water transmission pipes, Water treatment plant, Distribution network and service pipes
9	Dien Bien/ Dien Bien Dong	Dien Bien water supply company	Dien Bien water supply company	Nam Son spring	35,834 /13,579	Construction of intake facility, pump station, WTP (Q=1,500 m ³ /day), raw water transmission pipe and ditribution pipe.
10	Dien Bien/ Tuan Giao	Tuan Giao District People Committee	Water supply unit of Nam Din Minority village	Local spring	1,749 /1,749	Construction of intake, raw water transmission pipe, WTP(Q=100 m ³ /day), reservoir 90 m ³ , and distribution pipeline.
11	Thanh Hoa/ Yen Dinh	Yen Dinh District People's Committee	Yen Dinh District People's Committee	3 drilled wells (H=46.5m)	28,449/ 11,932	Construction of 3 drilled wells, 3 well pumping stations, water treatment plant, raw water pipeline, reservoir, treated water pumping station, transmission & distribution network, and secondary & tertiary distribution network
12	Ha Tinh/ Ky Anh	PMU of Vung Ang economic area	Clean Water Center for Vung Ang Economic Area	Existing Vung Ang WTP, (Kim Son lake)	32,356/ 21,179	To build booster pumping station, distribution network and service of 3,000 m ³ /day
13	Thua Thien Hue/ Phu Loc	Hue Water Supply Company	Hue Water Supply Company	Area I:Khe Su Stream/Area II:Troui river	64,402/ 28,982	Area I: Construction of intake, raw water transmission pipeline, WTP (Q=2,000 m ³ /day), reservoir tank and distribution pipeline. Area II: Construction of intake, pump station, raw water transmission pipeline, WTP (Q=8,000 m ³ /day), reservoir tank and distribution pipeline.
14	Quang Ngai/ Son Ha	Son Ha People's Committee	Son Ha People's Committee	Ta Mang Spring	37,733/ 24,000	To build a water supply system with capacity of 3,000 m ³ /day including: Surface raw water intake, raw water transmission pipes, Water treatment plant, Distribution network and service pipes
15	Gia Lai/ Krong Pa	Krong Pa District People's committee	Krong Pa District People's committee	Ia Mlah lake	36,919/ 23,670	Construction of raw water transmission main pipe (D=400,L=15km/PVC), one reservoir tank (V=200 m ³), water treatment facility (sedimentation tank, filter tank), distribution pipe .Rehabilitation of existing water treatment facility (transmission pumps etc.) and distribution pipe.
16	Hau Giang/ Chau Thanh A	Hau Giang Water supply & drainage (Urban Work Company)	Hau Giang Water supply & drainage (Urban Work Enterprise No.3 and 4)	Existing WTP Q=5,000m ³ /day (Cai Con river)	38,560/ 22,810	Construction of one reservoir tank (V=500 m ³), one booster pump station (Q=100 m ³ /h), transmission pipe and distribution network (Total length = 20.5 km),

Table 0-3 Project Specifications

PJ No.	Province/ District	(1)Target year	(2)Proposed Capacity (m3/day)	(3)Estimated No. of Served Population (Nos.)	(4) Estimated No. of Total Population (Nos.)	(5)=(3)/(4) Service Ratio (%)
1	Lang Son/ Dinh Lap	2010 (phase I) 2020 (phase II)	1,200 (phase I) 2,400 (phase II)	5,220 (phase I) 7,500 (phase II)	5,800 (phase I) 7,500 (phase II)	90% (phase I) 100% (phase II)
2	Lao Cai/ Bao Thang	2015 (phase I) 2025 (phase II)	5,000 (phase I) 8,000 (phase II)	19,935 (phase I) 24,200 (phase II)	22,150 (phase I) 24,200 (phase II)	90% (phase I) 100% (phase II)
3	Thai Nguyen/ Pho Yen, Phu Binh	2010 (phase I) 2015 (phase II)	5,500 (phase I) 9,000 (phase II)	31,504 (phase I) 43,276 (phase II)	48,468 (phase I) 61,823 (phase II)	65% (phase I) 70% (phase II)
4	Phu Tho/ Tam Nong	2010 (phase I) 2020 (phase II)	3,000 (phase I) 6,000 (phase II)	23,816 (phase I) 36,497 (phase II)	36,915 (phase I) 39,569 (phase II)	65% (phase I) 92% (phase II)
5	Bac Giang/ Luc Nam	2015 (phase I) 2025 (phase II)	3,500 (phase I) 7,000 (phase II)	13,004 (phase I) 22,544 (phase II)	18,578 (phase I) 25,061 (phase II)	70% (phase I) 90% (phase II)
6	Son La/ Song Ma	2025	2,400	12,316	13,684	95%
7	Lai Chau/ Muong Te	2015 (phase I) 2020 (phase II)	1,000 (phase I) 1,500 (phase II)	7,276 (phase I) 8,396 (phase II)	8,084 (phase I) 8,838 (phase II)	90% (phase I) 95% (phase II)
8	Lai Chau/ Tam Duong	2020	1,000	1,502	1,582	95%
9	Dien Bien/ Dien Bien Dong	2020	1,500	5,680	6,311	90%
10	Dien Bien/ Tuan Giao	2030	100	820	820	100%
11	Thanh Hoa/ Yen Dinh	2010 (phase I) 2015 (phase II)	1,750 (phase I) 2,000 (phase II)	7,266 (phase I) 7,682 (phase II)	7,266 (phase I) 7,682 (phase II)	100% (phase I) 100% (phase II)
12	Ha Tinh/ Ky Anh	2015	3,000	15,428	15,428	100%
13	Thua Thien Hue/ Phu Loc	2020	Area I:4,000 (2,000 in the Project) Area II:8,000	Area I:22,270 Area II:41,740	Area I:22,285 Area II:43,937	Area I: 95% Area II: 95%
14	Quang Ngai/ Son Ha	2020	3,000	9,092	10,102	90%
15	Gia Lai/ Krong Pa	2015 (phase I) 2025 (phase II)	4,000 (phase I) 6,000 (phase II)	14,872 (phase I) 23,727 (phase II)	18,590 (phase I) 23,727 (phase II)	80% (phase I) 100% (phase II)
16	Hau Giang/ Chau Thanh A	2012	2,700	18,360	20,400	90%

SCOPE OF SURVEY

The scope of survey is as shown in Table 0-4.

Table 0-4 List the Scope of the Survey

No.	Scope of the Survey
1. Water Source	
1-1	Securing the required volume of water source
1-2	Securing the water quality for drinking water
2. Construction Plan	
2-1	Demand forecast
2-2	Water supply volume and purification volume
2-3	Water purification method
2-4	Civil structure of each facility
2-5	Plans for raw water transmission, water distribution, water supply systems and pipe laying
2-6	Securing the power supply
2-7	Electrical machinery facility specifications
2-8	Land acquisition plan
3. Operation Plan	
3-1	Placement of personnel & manpower secure plan
3-2	O&M facility plan
3-3	Water quality control plan
3-4	House connection's promotion plan
3-5	Sludge drainage plan

RESULT OF THE SURVEY

The summary of the review result is as shown in Table 0-5.

Table 0-5 Summary of Review Result

PJ No.	Province	District	1. Water Source		2. Construction Plan								3. Operation Plan				
			1-1	1-2	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	3-1	3-2	3-3	3-4	3-5
1	Lang Son	Dinh Lap	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
2	Lao Cai	Bao Thang	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
3	Thai Nguyen	Pho Yen, Phu Binh	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
4	Phu Tho	Tam Nong	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
5	Bac Giang	Luc Nam	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
6	Son La	Song Ma	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
7	Lai Chau	Muong Te	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
8	Lai Chau	Tam Duong	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
9	Dien Bien	Dien Bien Dong	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
10	Dien Bien	Tuan Giao	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
11	Thanh Hoa	Yen Dinh	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
12	Ha Tinh	Ky Anh	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
13	Thua Thien Hue	Phu Loc	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
14	Quang Ngai	Son Ha	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
15	Gia Lai	Krong Pa	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
16	Hau Giang	Chau Thanh A	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Note: 1. “○” mark means “Appropriate”
2. Each survey item number applies to Table 0-4.

CONCLUSIONS AND RECOMMENDATIONS

a) OPERATION AND MAINTENANCE (O&M)

There is no sub-project of which the organization responsible for O&M has not been decided.

Out of 16 sub-projects, the O&M of the majority (10 subprojects) will be taken care of the provincial water supply company, which indicates that The Government Decree No. 117/2007/ND-CP by dated July 11th 2007 ON CLEAN WATER PRODUCTION, SUPPLY AND CONSUMPTION, is being understood and followed by the provincial governments.

6 sub-projects of which the provincial water supply company is not taking over the responsibility for O/M are, Luc Nam in Bac Gian, in, Yen Dinh in Thanh Hoa, Ky Anh in Ha Tinh, Krong Pa in Gia Lai, Son Ha in Quang Ngai and Tuan Giao in Dien Bien,. In case of Luc Nam in Bac Giang, two options (O&M by the provincial water supply company or establishment of a new company for O&M) were considered and the District People's Committee (DPC) decided to establish a new company. Son Ha in Quang Ngai also decided to establish a new company, though the reason is unknown.

Yen Dinh in Thanh Hoa, Ky Anh in Ha Tinh and Krong Pa in Gia Lai already established their own water supply companies for the existing water supply facilities and these existing companies will operate the SPL6 facilities, though the capabilities of these existing (non-provincial) companies varies. The Survey Team is particularly concerned of the weak management capability of the existing company in Krong Pa in Gia Lai.

The case of Tuan Giao in Dien Bien is different. The water supply system to be built in Tuan Giao is similar to the 'Small Scale Water Supply System' in Japan, which has the characteristics of the 'rural water supply system' different from other sub-projects under SPL6, which are, in principle, the 'urban water supply system'. Such a rural water supply system as the one in Tuan Giao does not fit to the management by the provincial water supply companies who are in principle the urban water supply company. Therefore, it is inevitable that the provincial water supply company does not take over the responsibility of O&M of such system. It is, however, also not certain whether the water utility to be established at the village level can operate the system properly, even though the system is relatively simple one. Social approach involving NGOs would be needed to make the sub-project sustainable. It applies to the part of the sub-project in Tam Duong in Lai Chau.

In view of above, the SAPI Survey Team has recommendations as below:

- 1) Strengthen the monitoring and training under the SPL6 of the sub-projects for which the provincial water supply company is not taking over the O&M responsibility, namely, Luc Nam in Bac Giang, Son Ha in Quang Ngai, Yen Dinh in Thanh Hoa, Ky Anh in Ha Tinh, Krong Pa in Gia Lai and Tuan Giao in Dien Bien.
- 2) For the other sub-projects for which the provincial water supply companies are taking over the O&M, strengthening the O&M capacity of the provincial water companies is considered to have the positive effects on the O&M of the sub-projects. Since, among the provincial water supply companies, such company as the Hue WSC which can be a good model for other WSC has been appearing, it is recommendable that the Ministry of Planning & Investment, Government of Vietnam will take necessary steps, with the support of the SPL6 Consultant, to promote the exchange of experience and know-how among provincial water supply companies.

b) HOUSE CONNECTION

Depending on the local conditions in each 16 project area, there are types of House Connections Promotion Plans. In most of the project, there is provision of service pipelines and water meters free of charge, except in Ha Tinh and Lang Song. According to the PO and or WSC in Lang Son, there is serious demand of water so households can pay themselves for the service lines and water meters. In the case of Ha Tinh, it seems there is constraint of the local budget to provide free of charge service pipelines and water meters, so the PO and or WSC asked to the SAPI Study Team to request to the

Ministry of Planning & Investment, Government of Vietnam and JICA to allow them to use 20% contingency fund to realize the House Connections promotion Plan. To increase the coverage ratio, the PO and or WSC of Thai Nguyen requested to the SAPI Study Team to allow to use 20% contingency fund. In all the projects, there is planned or to be planned free of water upto 2-3 m³/month for the poor category of the households. In Thanh Hoa and Muong Te in Lai Chau, there is existing water supply so only new households are required to be connected with the piped water. There is concern of the SAPI Study Team in Quang Ngai, Muong Te in Lai Chau and Dong Pao/ Tam Duong in Lai Chau where “Willingness to Pay” ability of most of the households is very low although service pipelines and water meters would be provided free of charge to each household.

In general the clean water is immediate necessity in all the projects area. However, in several cases there is lack of affordability to pay for water use particularly in Quang Ngai, Muong Te in Lai Chau and Dong Pao/ Tam Duong in Lai Chau even house connections are provided free of charge.

In view of above, the SAPI Survey Team has recommendations as below:

There is necessity to implement Community Awareness and Participation Activities to explain the linkages between water, environmental sanitation and improved health particularly in Quang Ngai, Muong Te in Lai Chau and Dong Pao/ Tam Duong in Lai Chau. Until the PO and or WSC successfully market the health benefits of using the potable water for drinking, cooking and improved hygiene, the decisions-makers and households are unlikely to be convinced to increase the water tariffs in the future.

c) WATER QUALITY MONITORING

The SAPI Survey Team has recommendations as below:

- 1) If there is laboratory at the existing water purification plants nearby, only provision of a small space and some equipments (testing kits) for the daily water quality testing (pH, Turbidity, residual-chlorine and Jar test) at the project water purification plant would be required for the efficient operation of the Plants. These testing can be done by the Plant operators themselves.
- 2) There shall be arrangement for regular sampling and sending to the Provincial Health Department for the detail examination.
- 3) The capacity of the laboratory of the provincial water supply companies shall be gradually strengthened reducing dependency on the Provincial Health Department.

Summary of Survey

<p>No.1 Lang Son Province Dinh Lap district Project : Water Supply System for Dinh Lap town</p>	
Diagram	
Comment	<p>The water supply volume is 2,400m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met regarding the water quantity, memorandum with EVN and laboratory room for the water quality control except of quality for the drinking water.</p> <p>The submitted data of quality for the drinking water include the conditions of the rainy season and dry season. In addition, there is no human activity in the vicinity of water source. Thus, there is no contamination of water source expected in the future. Therefore, the team assumed that the water quality is suitable against the JICA requirement.</p>
<p>No.2 Lao Cai Province Bao Thang district Project : Rehabilitation and expansion of water supply system for Pho Lu town (Continuous SPL)</p>	
Diagram	
Comment	<p>1-New construction facility The water supply volume is 3,000m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met.</p> <p>2-Rehabilitation & upgradation There is memorandum with EVN for the existing plant, therefore, the memorandum with EVN for this rehabilitation project is not required.</p>
<p>No.3 Thai Nguyen Province Pho Yen , Phu Binh district Project : South Area water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District</p>	
Diagram	
Comment	<p>This project is for the expansion of reservoir, pumping station and pipeline network. Therefore, the items of the JICA requirement are not necessary to be applied. The existing water plant will be rehabilitated and expanded to 20,000m³/day with different fund.</p>

Summary of Survey

No.4 Phu Tho Province Tam Nong district Project : Water Supply Project for Hung Hoa town	
Diagram	
Comment	<p>The existing water treatment plant constructed with the provincial budget has been operation since last 3 months.</p> <p>This project is the construction of reservoir, pumping station and pipeline network.</p> <p>Therefore, the items of the JICA requirement for this expansion project of 3,000m³/day are not necessary to be applied.</p>
No.5 Bac Giang Province Luc Nam district Project : Water Supply System Construction Project for Doi Ngo town	
Diagram	
Comment	<p>The water supply volume is 3,500m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met.</p>
No.6 Son La Province Song Ma district Project : Water Supply System for Chieng Khuong cluster communes	
Diagram	
Comment	<p>The water supply volume is 2,400m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met.</p>
No.7 Lai Chau Province Muong Te district Project : Water Supply System for Muong Te town	
Diagram	
Comment	<p>The water supply volume is 1,000m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met regarding the memorandum with EVN and laboratory room for water quality control except of the quantity and quality for the drinking water.</p> <p>Regarding the water source, there are two water sources for this project. The submitted data of the quality for the drinking water include the conditions of the rainy season and dry season. Thus, the team assumed that the water quantity and quality are suitable against the JICA requirement.</p>

Summary of Survey

<p>No.8 Lai Chau Province Tam Duong district Project : Dong Pao Water Supply System</p>	
Diagram	<p>The diagram shows a cross-section of the water supply system. On the left, a 'Chao San spring' is depicted with a water level symbol. A pipe leads from the spring to a 'Water treatment plant' which consists of two rectangular boxes: 'Vertical sedimentation' and 'Gravity filtration'. A pipe then leads to a 'Reservoir' box, and finally to a 'Distribution pipeline' box.</p>
Comment	<p>The water supply volume is 1,000m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met regarding the water quantity, memorandum with EVN and laboratory room for water quality control except of quality for the drinking water. The submitted data of the quality for the drinking water is for the month of September only. However, the water source is in the mountain where there is no human activity. Thus, there is no contamination of water source. Therefore, the team assumed that the water quality is suitable against the JICA requirement.</p>
<p>No.9 Dien Bien Province Dien Bien Dong district Project : Dien Bien Dong Water Treatment Plant</p>	
Diagram	<p>The diagram shows a cross-section of the water supply system. On the left, 'Nam Son stream' is shown with a water level symbol. A pipe leads to a 'Pump' box, then to a 'Booster pump' box, and then to a 'Transmission pipe' box. The pipe then enters a 'Water treatment plant' which contains two boxes: 'Mixing-sedimentation' and 'Rapid filtration'. From there, the pipe goes to a 'Pressure pumping station' box, then to another 'Booster pump' box, then to a 'Reservoir' box, and finally to a 'Distribution pipeline' box.</p>
Comment	<p>The water supply volume is 1,500m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met.</p>
<p>No.10 Dien Bien Province Tuan Giao district Project : Water Supply System in Pilot project of SPLVI</p>	
Diagram	<p>The diagram shows a cross-section of the water supply system. On the left, a 'Spring' is shown with a water level symbol. A pipe leads to a 'Water treatment plant' which contains one box: 'Gravity filtration'. From there, the pipe goes to a 'Pressure pumping station' box, then to a 'Reservoir' box, and finally to a 'Distribution pipeline' box.</p>
Comment	<p>The water supply volume is 103m³/day. The water purification method is simple method because of good quality of the water source. The items of the JICA requirement are met regarding the memorandum with EVN and laboratory room for the water quality control except of water quantity and quality for the drinking water. The submitted data of the water quantity and quality for the drinking water is for the month of March only. However, the intake of water source is located upstream of barrage and the condition of spring water is constant all the year around including dry and rainy season by interview of residents. Thus, the team assumed that the water quantity and quality are suitable against the JICA requirement.</p>

Summary of Survey

No.11 Thanh Hoa Province Yen Dinh district Project : Water Supply System for Quan Lao town	
Diagram	
Comment	The water supply volume is 1,500m ³ /day. The water source is ground water. The water purification method is the general method in Vietnam. The items of the JICA requirement are met regarding the memorandum with EVN and laboratory room for the water quality control except of water quantity and quality for the drinking water. Regarding the water source, there are three wells in which one is standby. The submitted data of the quality for the drinking water include the conditions of the rainy season and dry season. In addition, aeration tank for removing iron will be installed the water plant. Thus, the team assumed that the water quantity and quality are suitable against the JICA requirement.
No.12 Ha Tinh Province Ky Anh district Project : Water Supply for Ky Trink, Ky Ha, Ky Ninh of Vung Ang Economic area	
Diagram	
Comment	This project is the construction of pumping station and pipeline network. Therefore, the items of the JICA requirement for the expansion project of 3,000m ³ /day are not necessary to be applied.

Summary of Survey

<p>No.13 Tuan Thien Hue Province Phu Loc district Project : Water Supply System for Phu Loc town and 5 surrounding communes Doi Ngo town</p>	
<p>Diagram</p>	
<p>Comment</p>	<p>The water supply volume is 2,000m³/day(Area I) and 8,000m³/day(Area II) . The water purification method is the general method in Vietnam. Area I : The items of the JICA requirement are met regarding the memorandum with EVN and laboratory room for water quality control except of water quantity and quality for the drinking water. Area II : The items of the JICA requirement are met regarding the water quantity, memorandum with EVN and laboratory room for water quality control except of the quality for the drinking water. However, the water source is located upstream at very high ground level (for Area I) and in the National park (for Area II) where there is no human activity. Thus, there is no contamination of water source. Therefore, the team assumed that the water quantity and the water quality are suitable against the JICA requirement..</p>
<p>No.14 Quang Ngai Province Son Ha district Project : Water Supply System for Di Lang town</p>	
<p>Diagram</p>	
<p>Comment</p>	<p>The water supply volume is 3,000m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met regarding the water quantity, memorandum with EVN and laboratory room for water quality control except of quality for the drinking water. The submitted data of the quality for the drinking water is for the month of May only. However, the water source is in a forest area where there is no human activity. Thus, there is no contamination of water source. Therefore, the team assumed that the water quality is suitable against the JICA requirement..</p>

Summary of Survey

No.15 Gia Lai Province Krong Pa district Project : Water Supply Project for Phu Tuc town	
Diagram	<p>The diagram for No.15 shows a water supply system starting from 'Ia M'lah lake' on the left. A 'Transmission pipe' leads to a 'Reservoir'. From the reservoir, the water flows through a 'Water treatment plant' consisting of 'Vertical sedimentation' and 'Rapid filtration' stages. This is followed by a 'pumping station', which then feeds into a 'Distribution pipeline' on the right.</p>
Comment	<p>The water supply volume is 2,000m³/day. The water purification method is the general method in Vietnam. The items of the JICA requirement are met only the laboratory room for the water quality control.</p> <p>The water capacity of Ia M'lah lake is comparatively large. The existing source of the water treatment plant is located in the downstream of lake. The capacity of the existing transformer is enough for this project. Thus, the team assumed that the water quantity, water quality and power supply are suitable against the JICA requirement..</p>
No.16 Hau Giang Province Chau Thanh A district Project : Water Supply Network Expansion from Ngy Bay town to Tan Phu Thanh for Cai Tac town	
Diagram	<p>The diagram for No.16 shows a water supply system starting from 'Cai Con river' on the left. A 'Transmission pipe' leads to a 'Pump'. From the pump, the water flows through an 'Existing water treatment plant' (indicated by dashed lines). This is followed by a 'Booster pumping station', which then feeds into a 'Distribution pipeline' on the right.</p>
Comment	<p>This project is the construction of pumping station and pipeline network. Therefore, the items of the JICA requirement for the expansion project of 2,720m³/day are not necessary to be applied.</p>

Review Result of JICA Requirement of Survey

Project No.		①	②	③	
Province		Lang Son	Lao Cai	Thai Nguyen	
District		Dinh Lap	Bao Thang	Pho Yen , Phu Binh	
Name of the Project		Water Supply System for Dinh Lap town	Rehabilitation and expansion of water supply system for Pho Lu town (Continuous SPL)	South Area water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District	
1. Water Source					
1-1. The volume of water source	Water Source	Ky Cung river	1- Hong river (Red river)	2- Lu stream	
	Required volume	2,400m ³ /day	3,000m ³ /day	2,000m ³ /day (existing upgarade 1,200→2,000m ³ /day)	
	Minimum volume of water source	120,000m ³ /day	10,454,400m ³ /day	5,616m ³ /day	
	Dry or Rainy season	Dry Rainy Dry	Dry Rainy Dry	Dry Rainy Dry	
	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
	JICA requirement	○	○	○	○
Opinion of Team	○: JICA requirment is met.	○: JICA requirment is met.	○: JICA requirment is met.	○: JICA requirment may not be applicable for only the distribution networks.	
1-2. The water quality for drinking water	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	
	JICA requirement	×: There aren't the 12months data.	○	○	
	Opinion of Team	○: The team travelled to the water source (intake point), which is 20 km far-off from the Dinh Lap town. The upstream of the water source is mountain in the forest near the border of China and Vietnam. There is no human activity in the vicinity. Therefore, the team confirm the water quality is suitable.	○: JICA requirment is met. (The number of test are 17 parameters)	○: JICA requirment is met. (The number of test are 17 parameters)	○: JICA requirment is met. (The number of tested parameter are 15 parameters)
2. Construction Plan					
2-1. Demand forecast	Submitted the data	The growth rate of population is not according to the population statistics book. It is based on the mechanical increasing rate (moving resident from another area).	The revised F/S and actual population (The population statics)		
	Opinion of Team	○: The team visited the site as well as interviewed some people in Dinh Lap town. The estimation of water supply demand is reasonable. Therefore, team confirmed that assumptions are reasonable and demand forecast is realistic.	○: The estimation of the demand forcast is suitable.		
2-2. Water supply volume and purification	Submitted the data	F/S	F/S		
	Opinion of Team	○: The volume of plan for the water supply volume and purification are matched the F/S.	○: The volume of plan for the water supply volume and purification are matched the F/S.		
2-3. Water purification method	Submitted the method	The technology for the plant which is suitable for the small scale plant and is based on the vertical mixing-sedimentation & rapid sand filtration	The water purification method is the same existing treatment tecnology.		
	Opinion of Team	○: The water purification method is based on the existing same technologu. Therefore, Team assessed that the Dinh lap town water purification plant can be sufficiently operated and maintained by the Lang Son Water Supply and Drainage Company.	○: The water purification method is based on the existing same technologu. Therefore, Team assessed that the Pho Luc town water purification plant can be sufficiently operated and maintained by Lao Cai Waco.		
				Calculation of the demand forecast	
				○: Except coverage ratio, assumptions of demand forecast appered to be reasonable.	
				F/S	
				The existing Song Cong water treatment plant would be rehabilitated and expanded to 20,000m ³ /day under the Norway fund.	
				The water purification method is the same existing treatment tecnology.	
				The team assessed that the new Song Cong water purification plant can be sufficiently operated and maintained by the Thai Nguyen water supply company.	

Review Result of JICA Requirement of Survey

Project No.		①	②	③
Province		Lang Son	Lao Cai	Thai Nguyen
District		Dinh Lap	Bao Thang	Pho Yen , Phu Binh
Name of the Project		Water Supply System for Dinh Lap town	Rehabilitation and expansion of water supply system for Pho Lu town (Continuous SPL)	South Area water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District
2-4. Civil structure of each facility	Observations of Team	The team reviewed the F/S and D/D reports. There is no provision of laboratory room in the water purification plant.	The team pointed out the lacking of drawings/documents and no provision of laboratory room in the water purification plant.	
	JICA requirement of Laboratory room	○ : The PO/WSC agreed to the requirement of JICA for including the laboratory in the DD.	○ : The PO/WSC agreed to the requirement of JICA for including the laboratory in the DD.	
	Opinion of Team	○ : The team confirm that the civil structure of each facility is suitable	○ : The team confirm that revised drawings and documents are suitable.	
2-5. Plan for pipe laying	Observations of Team	The team reviewed the F/S and D/D reports including hydraulic analysis for phase I and II.	The team reviewed the F/S and D/D reports including hydraulic analysis. After that, The team recommended the providing 250mm diameter pipe for raw water transmission in phase I and keep the provision for phase II .	
	Opinion of Team	○ : It is appropriate.	○ : It is appropriate.	
2-6. Power supply	Memorandum for JICA requirement	○	○	The existing volume of transformer is sufficient for upgrading. Therefor, It isn't necessary to obtain the memorandum from EVN.
	Opinion of Team	○ : JICA requirment is met.	○ : JICA requirment is met.	Not necessary
2-7. Electrical machinery facility specifications	Observations of Team	The team reviewed the F/S and D/D reports.	The electric materials of circuit are too small. There is no mention of inverter on the drawing.	All detailed design for system is lacking.
	Opinion of Team	○ : The team found the specifications of the electrical machinery appropriate and informed	○ : The team confirmed that it was suitable after revised the drawings.	
2-8. Land acquisition plan	Observations of Team	The site of intake and booster pumping station in the agriculture field, which has been already acquired. The site for the water treatment plant is under the District management, which has no objection to construct the water treatment plant on this land.	All of the land for water supply facility which are intake, pumping station and water treatment plant are under the District management.	No land acquisition is required for upgrading.
	Opinion of Team	○ : The team is obtained the copy of land acquisition plan.	○ : The team is obtained the minutes of meeting for agreement to construct water supply facility.	No mention because of existing facility.
3. Operation Plan				
3-1. Placement of personnal & manpower secure plan	Observations of Team	There is no plan for the placement of personnel and manpower secure.	There is no plan for the placement of personnel and manpower secure.	No observation because of existing facility.
	Opinion of Team	○ : The team presented to the PO/WSC the copies of O&M manual prepared under the JICA Technical assistance programme in Hue Province. The PO/WSC agreed to team's recommendation.	○ : The team presented to the PO/WSC the copies of O&M manual prepared under the JICA Technical assistance programme in Hue Province. The PO/WSC agreed to team's recommendation.	No mention because of existing facility.
3-2. O&M facility plan	Observations of Team	According to the Government Decree 117, the O&M of the urban water supply would be transferred to the Lang Son Water Supply and Drainage Company for the operation and maintenance.	The existing 12 water treatment plants are operated satisfactorily. In addition, the PO/WSC has proposed 22 person's team for O&M of JICA proposed water supply project.	
				The team recommended that there shall be enough capacity building of the personnel who will be assigned for the JICA project for O&M before the operation of the water supply system.

Review Result of JICA Requirement of Survey

Project No.		①	②	③
Province		Lang Son	Lao Cai	Thai Nguyen
District		Dinh Lap	Bao Thang	Pho Yen , Phu Binh
Name of the Project		Water Supply System for Dinh Lap town	Rehabilitation and expansion of water supply system for Pho Lu town (Continuous SPL)	South Area water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District
	Opinion of Team	○ : An enterprise under the Lang Son water supply and drainage company would be set up for the JICA project for operation and maintenance of the water supply system of Dinh Lap town similar to other towns/districts in Lang Son Province.	○ : The PO/WSC has the organization chart for O&M. Therefore, O&M facility plan is suitable.	
3-3. Water quality control plan	Observations of Team	The PO/WSC does not have such arrangement to conduct in their facilities.	F/S doesn't mention the water quality control plan. The PO/WSC send the samples of treated water of these plants to the laboratory of the Health of Prevention Centre of the Health Department of the Provincial for all examination. The pH, turbidity, residual chlorine and Jar test are tested at existing laboratory of water treatment plant.	
	Opinion of Team	○ : The PO/WSC agreed to the requirement of JICA for making of Water Quality Control Plan.	○ : The PO/WSC agreed to the requirement of JICA for making of Water Quality Control Plan.	No mention because of existing facility.
3-4. House connection's promotion plan	Observations of Team	The PO/WSC does not have the house connection's promotion plan.	Out of scope	Free of charge 6.5m service line and water meter
	Opinion of Team	○ : The team informed that under Hue and Nguyen projects of JICA, the PO/WSC is providing water meter free of charge to promote the house connections.	No mention	○ : The PO/WSC has the house connection's promotion plan.
3-5. Sludge drainage plan	Observations of Team	The sludge from the sedimentation tank and back washing would be drained to a lagoon. And in 3 to 6 minths time, the settled sludge would be disposed off in the designated landfill.	There is no provision of sludge drainage plan in both the proposed plants. The team discussed the sludge drainage plan with the PO/WSC. The team suggested the PO/WSC to include the sludge drainage plan in the D/D.	
	Opinion of Team	○ : It is appropriate.	○ : The PO/WSC submitted the revised the D/D which was considered the sludge drainage plan.	
				○ : The team assessed that the revised plan was appropriate.
				F/S does not mention the water quality control Plan.
				○ : The PO/DPC agreed to the requirement of JICA for making of Water Quality Control Plan.
				The Lai Chau Waco had special policies to promote people such as free of charge service pipelines and flow meters, or only free of charge flow meter.
				○ : The PO/DPC has the house connection's promotion plan.
				There was no such provision in the F/S and D/D for the sluge drainage plan.
				○ : The submitted revised document is appropriate.

Review Result of JICA Requirement of Survey

Project No.		④	⑤	⑥	⑦
Province		Phu Tho	Bac Giang	Son La	Lai Chau
District		Tam Nong	Luc Nam	Song Ma	Muong Te
Name of the Project		Water Supply Project for Hung Hoa town	Water Supply System Construction Project for Doi Ngo town	Water Supply System for Chieng Khuong cluster communes	Water Supply System for Muong Te town
1. Water Source					
1-1. The volume of water source	Water Source	Da river	Luc Nam river	Le stream	Huoi Sang spring(main), Nam Cau spring(back up)
	Required volume	3,000m ³ /day	3,500m ³ /day	2,400m ³ /day	1,000m ³ /day
	Minimum volume of water source	The team is convinced the enough volume of water because of large river	215,136m ³ /day	76,377m ³ /day	950.4m ³ /day(Huoi Sang) , 79.401m ³ /day(Nam Cau)
	Dry or Rainy season		Dry Rainy Dry	Dry Rainy Dry	Dry Rainy Dry
	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
	JICA requirement	× : There aren't the 12months data.	○	○	× : There aren't the 12months data.
Opinion of Team	○ : Under the scope of this project, only investment for the clean water transmission and distribution pipelines; therefore, requirements of JICA is not applied for this item.	○ : JICA requirement is met.	○ : JICA requirement is met.	○ : The water source is prepared 2 site. Thus, the team confired that the volume of water source is enough.	
1-2. The water quality for drinking water	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
	JICA requirement	× : There aren't the 12months data.	○	○	× : There aren't the 12months data.
	Opinion of Team	○ : Thanh Thuy water treatment plant officially started operation since June 2010. Thus, submitted data are sufficient of all operation manths.	○ : JICA requirement is met. (The number of tested parameter are 25 parameters)	○ : JICA requirement is met. (The number of tested parameter is 24 parameters)	○ : JICA requirement isn't met. However, The submitted data is sufficient between rainy and dry season. Thus, the team assume that water quality is suitable. (The number of tested parameter is not sufficient. There are 32 parameters; Water quality meets the VN standard)
2. Construction Plan					
2-1. Demand forecast	Submitted the data	The total population was calculated based on the questionnaires conducted by the project. District statistic book 2009 and socio-economic development plan of Tam Nong District until 2020 were also provided to the team	The parameter used for water demand calculation in the F/S.	Population served is mention in F/S. the team requested the DPI to provide the base data of population calculated (including the latest statistical year book) and make clear how the population was calculated.	Revised F/S
	Opinion of Team	○ : The calculated water demand for the project is suitable.	○ : The calculated water demand for the project is suitable.	○ : The parameters used for water demand calculation is suitable.	○ : The team confirm that the demand forecast is suitable.
2-2. Water supply volume and purification	Submitted the data	F/S and D/D	F/S	F/S and D/D	Revised F/S
	Opinion of Team	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.
2-3. Water purification method	Submitted the method	This plant is based on the mixing tank-chemical tank-sedimentation tank- rapid sand filtration technology.	The technology applied for the WTP is water surface - pre-sedimentation tank - vertical sedimentation tank in combination with the central reaction - gravity filtration tank, and reservoir.	The technology applied for the WTP is water surface - pre-sedimentation tank - mixing tank - sedimentation Lamella tank - gravity filter tank-reservoir.	The water purification method is flocculation - vertical sedimentation - rapid filtration.

Review Result of JICA Requirement of Survey

Project No.		④	⑤	⑥	⑦
Province		Phu Tho	Bac Giang	Son La	Lai Chau
District		Tam Nong	Luc Nam	Song Ma	Muong Te
Name of the Project		Water Supply Project for Hung Hoa town	Water Supply System Construction Project for Doi Ngo town	Water Supply System for Chieng Khuong cluster communes	Water Supply System for Muong Te town
	Opinion of Team	○ : The water purification method is suitable.	○ : The water purification method is suitable.	○ : WTP is a conventional process for treatment.	○ : The water purification method is suitable.
2-4. Civil structure of each facility	Observations of Team	The team reviewed the F/S and D/D reports. The team pointed out the issues and missing data on F/S and D/D.	The team reviewed the drawings. The team pointed out the issues and missing of that and no provision of the laboratory room on D/D.	The team reviewed the drawings. The team pointed out the issues and missing of that and no provision of the laboratory room on D/D.	The team reviewed the D/D and pointed out the issues of drawings. There is laboratory room in D/D.
	JICA requirement of Laboratory room	○ : The laboratory room has already installed.	○ : DPI and district PC agreed to add the Lab in the project.	○ : DPI and district PO agreed to add the Lab in the project.	○ : JICA requirement is met.
	Opinion of Team	○ : The team confirm that the civil structure of each facility is suitable	○ : The team confirm that the revised the drawings are suitable.	○ : The team confirm that the revised the drawings are suitable.	○ : The team confirm that the revised the D/D is suitable.
2-5. Plan for pipe laying	Observations of Team	No D/D calculation reports for transmission pipelines and water distribution. The team requested the revised D/D.	No hydraulic calculation reports for raw water pipe laying. The team requested the revised D/D.	The report for pipeline network D/D drawings do not mentioned the pipe laying draw and connection flow distribution table.	The team recommends that the receiving basin should be planned before the sedimentation basin. The raw water from 2 sources should flow directly into the basin respectively. It's hard to operate the water quantity and/or quality because both pipes from 2 sources are connected before the sedimentation basin in D/D drawing.
	Opinion of Team	○ : The submitted revised D/D is suitable.	○ : The submitted revised D/D is suitable.	○ : The submitted revised D/D is suitable.	○ : The submitted revised D/D is suitable.
2-6. Power supply	Memorandum for JICA requirement	○	○	○	○
	Opinion of Team	○ : JICA requirement is met.	○ : JICA requirement is met.	○ : JICA requirement is met.	○ : JICA requirement is met.
2-7. Electrical machinery facility specifications	Observations of Team	The team reviewed the F/S and D/D reports and found that the drawings were missing.	The team reviewed the D/D reports and found that the drawings were missing.	The team reviewed the reports and found that the drawings were missing.	The team reviewed the D/D reports and found that the drawings were missing.
	Opinion of Team	○ : The revised the drawings are suitable.	○ : The revised the drawings are suitable.	○ : The revised the drawings and electrical machinery facility specification are suitable.	○ : The revised the drawings are suitable.
2-8. Land acquisition plan	Observations of Team	The location of booster pumping station is existing pond. Thus, it is easy to acquire the land.	The Land acquisition plan is included in the F/S Report.	The Land acquisition plan is not mentioned in the F/S Report. Thus, the team request the DPI, PO to clarify and to explain about this matter.	The lands for the acquisition area are under the District management.
	Opinion of Team	○ : The team is obtained the copy of land acquisition plan.	○ : The team is obtained the copy of land acquisition agreement.	○ : The team is obtained the copy of land acquisition agreement.	○ : The team is obtained the agreement of land acquisition.
3. Operation Plan					
3-1. Placement of personnel & manpower secure plan	Observations of Team	There is no plan for the placement of personnel and manpower secure on F/S and D/D profile. The team requested the plan for that.	The team pointed out that the Placement of personnel & manpower secure plan was weak on report. Thus, the team requested to revise the plan like a Hue WSC.	The Placement of personnel & manpower secure plan is not mentioned in the F/S. The team request the DPI, PO to make clear this matter.	There is no plan for the placement of personnel and manpower secure.

Review Result of JICA Requirement of Survey

Project No.		④	⑤	⑥	⑦
Province		Phu Tho	Bac Giang	Son La	Lai Chau
District		Tam Nong	Luc Nam	Song Ma	Muong Te
Name of the Project		Water Supply Project for Hung Hoa town	Water Supply System Construction Project for Doi Ngo town	Water Supply System for Chieng Khuong cluster communes	Water Supply System for Muong Te town
	Opinion of Team	○ : After submitted plan, the team confirm that placement of personnel & manpower secure plan is suitable.	○ : After submitted plan, the team confirm that placement of personnel & manpower secure plan is suitable.	○ : After submitted plan, the team confirm that placement of personnel & manpower secure plan is suitable.	After the rehabilitation and expansion of the Song Cong water purification plant would be used the same plan of Tich Luong water purification plant. The team assessed that the placement of personnel and man power secure plan was appropriate.
3-2. O&M facility plan	Observations of Team	There is no plan for O&M facility on F/S and D/D profile. The team requested the plan for that.	The team pointed out that the O&M facility plan was weak on report. Thus, the team requested to revise the plan.	The O&M facility plan is mentioned in the F/S but not detail. The team requested DPI, PO to prepare a detail plan.	The team studied the plan for the placement of personnel and man power at existing Tich Luong water purification
	Opinion of Team	○ : After submitted plan, the team confirm that O&M facility plan is suitable.	○ : After submitted plan, the team confirm that the O&M facility plan is suitable.	○ : After submitted plan, the team confirm that the O&M facility plan is suitable.	○ : The team assessed that the existing plant is well operated. Therefore, O&M facility plan is suitable.
3-3. Water quality control plan	Observations of Team	Phu Tho WSC is responsible agency for water quality control of the project site.	There is no provision of the laboratory room on D/D. The team requested DPI/PC to add this item into project.	The Laboratory for water quality control is not prepared in the F/S and D/D. The team requested DPI/PC to add this item into project.	The PO/WSC has the same water quality plan of existing Tich Luong water purification plant.
	Opinion of Team	○ : The submitted plan is suitable.	○ : The submitted revised plan is suitable.	○ : The submitted revised plan is suitable.	JICA requirement is met.
3-4. House connection's promotion plan	Observations of Team	The connection from main pipe to meter in front of households within 6 communes. Households located far from the main supply network in Di Nau and Tho Van communes will get 10% subsidized support cost and they pay 90% cost for connection pipe installation from main pipe to household.	In case of the poor, the district PC will prepare a tap after the meter for their use.	The detail promotion plan for connection by households (with consideration of supportive policy for the poor and targeted social welfare families) should be prepared.	WSC set a rule that they connect the houses within 30m from the transmission line, taking into consideration the limited financial resources.
	Opinion of Team	○ : The plan is suitable.	○ : The plan is suitable.	○ : The revised plan is suitable.	○ : The PO/WSC has the house connection's promotion plan.
3-5. Sludge drainage plan	Observations of Team	The disposal of sludge will be sent to river through the nearest channel in rainy season and pumping in dry season. In addition, drying bed was installed in the existing WTP.	The sludge drainage plan already available in D/D.	The sludge drainage plan available in the detail design.	This plant has proper system for the sludge treatment and recycle of muddy water.
	Opinion of Team	○ : The drainage plan of the WTP is suitable.	○ : The drainage plan is suitable.	○ : The drainage plan is suitable.	○ : It is appropriate.

Review Result of JICA Requirement of Survey

Project No.		⑧	⑨	⑩	⑪
Province		Lai Chau	Dien Bien	Dien Bien	Thanh Hoa
District		Tam Duong	Dien Bien Dong	Tuan Giao	Yen Dinh
Name of the Project		Dong Pao Water Supply System	Dien Bien Dong Water Treatment Plant	Water Supply System in Pilot project of APL VI	Water Supply System for Quan Lao town
1. Water Source					
1-1. The volume of water source	Water Source	Chao San spring	Nam Son stream	Spring	Ground water
	Required volume	1,000m ³ /day	1,500m ³ /day	103m ³ /day	1,500m ³ /day
	Minimum volume of water source	1,468m ³ /day	1,814m ³ /day	1,728m ³ /day	691m ³ /day(G1) , 1,252m ³ /day(G2)
	Dry or Rainy season		Dry Rainy Dry	Dry Rainy Dry	Dry Rainy Dry
	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
	JICA requirement	○	○	× : There aren't the 12months data.	× : There aren't the 12months data.
Opinion of Team	○ : JICA requirement is met.	○ : JICA requirement is met.	○ : Even during the draught, there is enough water for the daily water use of the residents in the long history. In addition, the project site is in the remote area difficult for transportation/traffic. Therefore, water monitoring data cannot be obtained.	○ : The water source is prepared 2 well. Thus, the team confired that the volume of water source is enough.	
1-2. The water quality for drinking water	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
	JICA requirement	× : There aren't the 12months data.	○	× : There aren't the 12months data.	× : There aren't the 12months data.
	Opinion of Team	○ : The water source is in the mountain where there is no human activity so there is no chance of contamination.	○ : JICA requirement is met. (The number of tested parameter are 18 parameters)	○ : Actual site visit and interview of residents, the condition of spring water is constant i.e. colorless and transparent all the year around including dry and rainy season. The team assumes that the quality of the water source is eligible to supply water for the water supply facility. (The number of tested parameter is 17 parameters)	○ : JICA requirement isn't met. However, The submitted data is sufficient between rainy and dry season. Thus, the team assume that water quality is suitable. (The number of tested parameter is 26 parameters)
2. Construction Plan					
2-1. Demand forecast	Submitted the data	The basic data, 500m ³ /day for workers and the population estimation for the year 2020 are not clear in F/S.	Hourly water demand in F/S is mentioned but calculation report is missing for the water demand.	F/S	The team informed that the project report was prepared in year 2005 with target year 2010, therefore, many conditions might have changed in five years. The PO/DPC revised the demand forecast with the target year 2010 and 2015.
	Opinion of Team	○ : The demand forecast of revised F/S is suitable.	○ : The re-estimation data on water demand and the demand calculation table are suitable.	○ : Water use criteria of this study area are relatively low compared to other areas. This is the ethnic minorities' area with such conditions of living, habits and customs; therefore, the water service ratio mentioned and calculating water demand are reasonable.	○ : The team confirm that the devised F/S is suitable.
2-2. Water supply volume and purification	Submitted the data	F/S	F/S	F/S	Revised F/S
	Opinion of Team	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.	○ : The water supply volume and the capacity of water purification plant are appropriate.
2-3. Water purification method	Submitted the method	The technology applied for the WTP is water surface - vertical sedimentation tank - sand filter-chemical including PAC and chlorine.	The technology applied for the WTP is water surface - pumping station I - PAC - mixing tank with rapid gravity tank - disinfection - reservoir - pumping station II - supply network.	Technology applied for the water supply facility (domestic water) is very simple. The water from the water source flows by gravity to the filter and then it is pumped to the reservoir from where water is supplied in the network through gravity.	The technology is based on aeration - mixing trough - vertical sedimentation tank - rapid filter.

Review Result of JICA Requirement of Survey

Project No.		⑧	⑨	⑩	⑪
Province		Lai Chau	Dien Bien	Dien Bien	Thanh Hoa
District		Tam Duong	Dien Bien Dong	Tuan Giao	Yen Dinh
Name of the Project		Dong Pao Water Supply System	Dien Bien Dong Water Treatment Plant	Water Supply System in Pilot project of APL VI	Water Supply System for Quan Lao town
	Opinion of Team	○ : This water treatment technology has been applied commonly for small scale WTP in Vietnam. Thus, The water purification method is suitable.	○ : The water purification method is suitable.	○ : Water treatment technology is appropriate.	○ : The water purification method is same existing operated WTP. Thus, The water purification method is no problem.
2-4. Civil structure of each facility	Observations of Team	The team reviewed the D/D reports and drawings.	There are many missing data which are transmission pipeline and supply pipeline. Laboratory room is not mentioned in the D/D.	The team reviewed the drawings. The team pointed out the issues and missing of that and no provision of the laboratory room on D/D.	Team obtained the missing documents (Geotechnical survey report, Structure calculation, function of each room of administrative building). There is no provision of laboratory room in the water purification plant.
	JICA requirement of Laboratory room	○ : The laboratory room has been arranged already in administration house.	○ : The water sample will bring to the laboratory of Dien Bien water supply company for analysis.	○ : The water sample will bring to the Nam Din Tuan Giao district clinic periodically ever month for analysis.	○ : The revised D/D is provision of the laboratory. Thus, JICA requirement is met.
	Opinion of Team	○ : The team confirm that the civil structure of each facility is suitable	○ : The team confirm that the devised D/D and plan are suitable.	○ : The team confirm that the revised the D/D is suitable.	○ : The team confirm that the revised the D/D is suitable.
2-5. Plan for pipe laying	Observations of Team	The team reviewed the F/Sand D/D reports including hydraulic analysis.	There are lack of pipe network hydraulic calculation and lack of general layout drawing of water supply network.	The drawing and document of pipeline are missing.	The team reviewed the F/S and D/D reports including hydraulic analysis. There is no issue.
	Opinion of Team	○ : The team recommends to install the valve before mixer for each raw water transmission line, considering O&M	○ : The submitted revised D/D is suitable.	○ : The submitted revised D/D is suitable.	○ : It is suitable.
2-6. Power supply	Memorandum for JICA requirement	○	○	○	○
	Opinion of Team	○ : JICA requirement is met.	○ : JICA requirement is met.	○ : JICA requirement is met.	○ : JICA requirement is met.
2-7. Electrical machinery facility specifications	Observations of Team	It is available of D/D drawings and technical explanation for electricity	The team reviewed the D/D reports and found that the drawings were missing.	The team reviewed the reports and found that the drawings were missing.	The electric cables as selected for the project can meet the technical requirements.
	Opinion of Team	○ : It is suitable.	○ : The revised the drawings are suitable.	○ : The revised the drawings are suitable.	○ : It is appropriate.
2-8. Land acquisition plan	Observations of Team	The PO/DPC has already confirmed with the farmer to acquire the land to construct water treatment plant	The Land acquisition plan is mentioned in the D/D. It takes about three months to complete the land profile, land acquisition plan approval from The Center for Natural Resources and Environment.	Land acquisition plans are not mentioned in the explanation of the investment project construction.	The land acquisition requires only the compensation for the crops planted.
	Opinion of Team	○ : The team is obtained the copy of land acquisition agreement.	○ : The team understand the actual situation.	○ : According to DPI/PO, The project is very small and is a water supply project for the ethnic minorities, it would be very easy and convenient to acquire the land. In addition, The People's Committee has approved the construction and land acquisition.	○ : The Town Master plan, which indicates the land for the wells and water treatment plant.

Review Result of JICA Requirement of Survey

Project No.		⑧	⑨	⑩	⑪
Province		Lai Chau	Dien Bien	Dien Bien	Thanh Hoa
District		Tam Duong	Dien Bien Dong	Tuan Giao	Yen Dinh
Name of the Project		Dong Pao Water Supply System	Dien Bien Dong Water Treatment Plant	Water Supply System in Pilot project of APL VI	Water Supply System for Quan Lao town
3. Operation Plan					
3-1. Placement of personnel & manpower secure plan	Observations of Team	PO/DPC have no plan for the placement of personnel and manpower secure. The team presented to the PO/DPC the Plan of Hue and Thai	The deployment plan of personnel, who will conduct the water quality monitoring, has not yet been mentioned.	DPI has "Arrangements to recruit and ensure manpower plans"	The deployment plan of personnel has no mention. The team presented to the DPI/ PO the Plan of Hue and Thai
	Opinion of Team	○ : After submitted plan, the team confirm that placement of personnel & manpower secure plan is suitable.	○ : After submitted plan, the team confirm that placement of personnel & manpower secure plan is suitable.	○ : The team assume that the placement of personnel & manpower secure plan is suitable with the current conditions.	○ : After submitted plan, the team confirm that placement of personnel & manpower secure plan is suitable.
3-2. O&M facility plan	Observations of Team	The F/S mentioned about O & M facility plan in detail.	Dien Bien water supply company will operate and maintain the water supply project.	Phinh Sang commune and PMU of Nam Din mountain village will operate and maintain the facility after completion. Tuan Giao district would be responsible for the monitoring; in addition the district will arrange a portion of the budget for the maintenance.	F/S mention about O&M plan for the facility. The O&M would be conducted by the Yen Dinh District People's Committee, who is also the Project Owner. They have set up an enterprise named "Environment Sanitary and Clean Water" under the PO/DPC.
	Opinion of Team	○ : It is appropriate.	○ : The team confirm that the O&M facility plan is suitable.	○ : The management plan is appropriate considering the real local situation.	○ : O&M facility plan is suitable.
3-3. Water quality control plan	Observations of Team	In the F/S mentions about the water quality control plan clearly. However, F/S did not mention regarding provision of human resources and their capacity building to implement the water quality control plan.	There is no provision of the laboratory room on D/D. The team requested DPI/PO to add this item into project.	The water sample will bring to the Nam Din Tuan Giao district clinic periodically ever month for analysis.	There is no provision of the laboratory room on D/D. The team requested PO/DPC to add this item into project.
	Opinion of Team	○ : The submitted revised F/S and D/D are appropriate.	○ : The plan of the laboratory room will be used the existing Lab room of Dien Bien water supply company.	○ : It is suitable plan of the current conditions..	○ : The submitted revised F/S and D/D are appropriate.
3-4. House connection's promotion plan	Observations of Team	They do not have house connection promotion plan.	The plan for connection from supplying pipe to each household (including counter meter, taps, connecting pipe) has included the a specific connection plan.	Each household would be provided service pipe, tap and water meter free of charge.	The poor households would be provided free of charge service line and water meter. All other households would be required to pay for the service line and water meter.
	Opinion of Team	○ : The PO/DPC revised the F/S and D/D which were the proposal of the team to prepare the plan for the promotion of house connection in collaboration with Lai Chau water supply company to achieve the targeted coverage.	○ : The plan is suitable.	○ : It is suitable plan of the current conditions..	○ : The PO/DPC has the house connection's promotion plan.
3-5. Sludge drainage plan	Observations of Team	The sludge drainage plan available in the detail design.	The sludge drainage plan is not clear in D/D.	The sludge will be discharged downstream of the stream.	There was no such provision in the F/S and D/D.
	Opinion of Team	○ : It is appropriate.	○ : After submitted the document is suitable.	○ : This method is easily implemented under the existing conditions.	○ : After submitted the revised document is suitable

Review Result of JICA Requirement of Survey

Project No.		⑫	⑬	⑭	
Province		Ha Tinh	Tuan Thien Hue	Quang Ngai	
District		Ky Anh	Phu Loc	Son Ha	
Name of the Project		Water Supply for Ky Trink, Ky Ha, Ky Ninh of Vung Ang Economic area	Water Supply System for Phu Loc town and 5 surrounding communes	Water Supply System for Di Lang town	
1. Water Source					
1-1. The volume of water source	Water Source	Kim Son Lake	Khe Su stream (Area I)	Truoi river (Area II)	
	Required volume	3,000m ³ /day	2,000m ³ /day	8,000m ³ /day	
	Minimum volume of water source	The volume of Kim Son lake is 17 × 10 ⁶ m ³	6,705m ³ /day	32,780m ³ /day	
	Dry or Rainy season		Dry Rainy Dry	Dry Rainy Dry	
	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
	JICA requirement	× : There aren't the 12months data.	× : There aren't the 12months data.	○	○
Opinion of Team	○ : Water volume of lake is sufficient to meet the design capacity of 3,000 m ³ /day	○ : Water volume of strem is sufficient.	○ : JICA requirment is met.	○ : JICA requirment is met.	
1-2. The water quality for drinking water	Month data	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.	
	JICA requirement	○	× : There aren't the 12months data.	× : There aren't the 12months data.	
	Opinion of Team	○ : JICA requirment is met. (The number of tested parameter are 14 parameters)	○ : The Khe Su stream doesn't have any pollution because the water source is located upstream at very high ground level. In addition, The water source is accessible only by walking in the stream. It looks very difficult to obtain the water quality data of the water source location in the rainy season.	○ : The water source is located in Back-Mi National Park is no human activity around. Thus, This is considered to be a very good water source from the quantity and quality view point.	
2. Construction Plan					
2-1. Demand forecast	Submitted the data	The water demand estimation is based on actual population, observation and available detailed master plan.	The parameter used for water demand calculation in the F/S.	F/S	
	Opinion of Team	○ : The calculated water demand for the project is suitable.	○ : The calculated water demand for the project is suitable.	○ : Quang Ngai province is located has comparatively higher socio-economic growth than the other zones of Vietnam. Assumption for per capita per day drinking water use is reasonable.	
2-2. Water supply volume and purification	Submitted the data	F/S	F/S and D/D	F/S	
	Opinion of Team	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.	○ : The volume of plan for the water supply volume is suitable.	
2-3. Water purification method	Submitted the method	The existing WTP is based on the Mixer-lamelian - sedimentation tank- filter technology.	The water purification method is flocculation - vertical sedimentation - rapid filtration.	The water purification method is vertical mixing - reaction and sedimentation - gravity rapid filtration.	

Review Result of JICA Requirement of Survey

Project No.		⑫	⑬	⑭
Province		Ha Tinh	Tuan Thien Hue	Quang Ngai
District		Ky Anh	Phu Loc	Son Ha
Name of the Project		Water Supply for Ky Trink, Ky Ha, Ky Ninh of Vung Ang Economic area	Water Supply System for Phu Loc town and 5 surrounding communes	Water Supply System for Di Lang town
	Opinion of Team	○: This item may not be applicable for only the distribution networks.	○: The water purification method is suitable.	○: The purification method is suitable for the water quality & quantity and is simple for operation & maintenance.
2-4. Civil structure of each facility	Observations of Team	The team reviewed the drawings. The team pointed out missing of that and no provision of the laboratory room at existing WTP.	The team reviewed the drawings. The team pointed out the issues and missing of that and provision of the laboratory room in D/D.	The team reviewed the D/D and pointed out the issues of drawings. There is no provision of the laboratory room in D/D.
	JICA requirement of Laboratory room	○: The laboratory room will be prepared at the existing WTP.	○: JICA requirement is met.	○: The laboratory room will be prepared at the WTP.
	Opinion of Team	○: The team confirm that the civil structure of each facility is suitable.	○: The team confirm that the revised the drawings are suitable.	○: The team confirm that the revised the D/D is suitable.
2-5. Plan for pipe laying	Observations of Team	The team reviewed F/S report, D/D drawings and the hydraulic analysis in D/D report.	Some results of the effective pressure do not satisfy the standard of the Ministry of construction. The team requested the revised D/D.	Team reviewed the F/S and D/D reports including hydraulic analysis.
	Opinion of Team	○: It is suitable.	○: The submitted revised D/D is suitable.	○: The submitted F/S and D/D are appropriate.
2-6. Power supply	Memorandum for JICA requirement	○	○	○
	Opinion of Team	○: JICA requirement is met.	○: JICA requirement is met.	○: JICA requirement is met.
2-7. Electrical machinery facility specifications	Observations of Team	The team reviewed the D/D.	No information in the Feasibility Study and Basic Design reports regarding the electrical machinery facility specifications.	Team reviewed the D/D and drawings.
	Opinion of Team	○: The D/D is appropriate.	○: The revised the report is suitable.	○: It is suitable.
2-8. Land acquisition plan	Observations of Team	The farmers have agreed for the land acquisition.	The actual processing of the land acquisition has not been started yet.	The lands for the acquisition area are under the District management. The land acquisition requires the compensation for the planted trees and PO/DPC have already confirmed with the farmer to acquire the land to construct water treatment plant.
	Opinion of Team	○: Location of the booster pumping station was confirmed and making commitment for land acquisition was signed by Vung Ang PMU.	○: After PO's explanation and site survey, the team assume that the land acquisition plan is suitable.	○: The team is obtained the agreement of land acquisition.
3. Operation Plan				
3-1. Placement of personal & manpower secure plan	Observations of Team	In the revised FS, it mentioned about Plan for personnel including persons for the water quality control.	The Limited liability Company construction and Supply Water Thua Thien Hue (Huewaco) will be taking over, operation and maintenance.	PO/DPC have no plan for the placement of personnel and manpower secure. The team presented to the PO/DPC the Plan of Hue and Thai .

Review Result of JICA Requirement of Survey

Project No.		⑫	⑬	⑭
Province		Ha Tinh	Tuan Thien Hue	Quang Ngai
District		Ky Anh	Phu Loc	Son Ha
Name of the Project		Water Supply for Ky Trink, Ky Ha, Ky Ninh of Vung Ang Economic area	Water Supply System for Phu Loc town and 5 surrounding communes	Water Supply System for Di Lang town
	Opinion of Team	○ : Placement of personnel & manpower secure plan is suitable.	○ : The placement of personnel & manpower secure plan is suitable.	○ : The PO/DPC will prepare the manpower Plan and include it in the F/S and D/D.
3-2. O&M facility plan	Observations of Team	In the existing water supply system there are 57 O&M personnel, who have developed ability to O&M.	It was already decided by the Provincial People's Committee that the Phu Loc Project will be implemented by the Hue Waco at all stage from the construction to the operation and maintenance.	PO/DPC does not have experience of O&M of the water supply system and recommended that they should appoint the Quang Ngai water supply company as an O&M agency for this project.
	Opinion of Team	○ : O&M facility plan is suitable.	○ : O&M facility plan is suitable.	○ : The submitted revised O&M facility plan is suitable.
3-3. Water quality control plan	Observations of Team	The existing WTP has no laboratory. The team requested DPI/PC to add this item into project.	The water quality control plan will be used the existing laboratory of Hue WSCO.	F/S does not mention the water quality control Plan. The team explained that they should conduct the laboratory of the water purification plant under the JICA project.
	Opinion of Team	○ : The laboratory room will be prepared at the existing WTP.	○ : The water quality control plan is suitable.	○ : It is appropriate because of the laboratory room prepared the submitted documents.
3-4. House connection's promotion plan	Observations of Team	At present, households have been connected free of charge with the connection pipes and flow meters and will get water free of charge in the first 2 years for using clean water.	1. Hue Waco will provide the water meter and the water tap at the gate of the house for free of charge. 2. For the poor households, the water tariff for the water usage up to 2m ³ will be exempted.	Households residing along the main road would be provided the service line and water meter free of charge.
	Opinion of Team	○ : The plan is suitable.	○ : The project has the sound connection strategy.	○ : The plan is suitable.
3-5. Sludge drainage plan	Observations of Team	There is a sludge lagoon in the existing WTP.	According to the explanation of Hue Waco, the sludge treatment facilities will commence the operation together with the JICA Phu Loc project.	There is no mention how the sludge would be collected and disposed off in environmentally safe manner. Thus, the team requested to prepare the plan and included it in the F/S and D/D.
	Opinion of Team	○ : The existing drainage plan is suitable.	○ : The sludge drainage plan is suitable.	○ : It is appropriate.

Review Result of JICA Requirement of Survey

Project No.		⑮	⑯																						
Province		Gia Lai		Hau Giang																					
District		Krong Pa		Chau Thanh A																					
Name of the Project		Water Supply Project for Phu Tuc town		Water Supply Network Expansion from Ngy Bay town to Tan Phu Thanh for Cai Tac town																					
1. Water Source																									
1-1. The volume of water source	Water Source	Ia M'lah lake		Cai Con river																					
	Required volume	2,000m ³ /day		2,720m ³ /day																					
	Minimum volume of water source	25.29 × 10 ⁹ m ³ /day (average lake capacity)		The team is convinced the enough volume of water because of large river																					
	Dry or Rainy season	Rainy			Dry																				
	Month data	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	JICA requirement	× : There aren't the 12months data.		× : There aren't the 12months data.																					
	Opinion of Team	○ : The team confirm that water volume of the Ia M'lah lake is much enough for the project.		○ : The team confirm that water volume of Cai Con river is much enough for the project.																					
1-2. The water quality for drinking water	Month data	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	JICA requirement	× : There aren't the 12months data.		○																					
	Opinion of Team	○ : The team visit the Ia M'lah lake and watch the water. The existing WTP is using the intake water source from downstream of Ia M'lah lake. The team is convince that water quality for water source is better than that of existing. Thus, it is appropriate for water source. (The number of tested parameter are 16 parameters)		○ : JICA requirment is met. (The number of tested parameter are 15 parameters)																					
2. Construction Plan																									
2-1. Demand forecast	Submitted the data	The team request to clarify the difference between water demand of the F/S and DD report (population, year calculating parameter standard)		There is many missing items in the F/S. Thus, the team requested to provide the missing data.																					
	Opinion of Team	○ : The submitted revised documents, data , and site survey, the team confirm that demand calculation for the project purification capacity is suitable.		○ : The submitted revised document, the demand calculation is suitable																					
2-2. Water supply volume and purification	Submitted the data	F/S and D/D		F/S																					
	Opinion of Team	○ : The submitted revised F/S and D/D for water supply volume and purification volume is suitable.		○ : The submitted revised F/S for water supply volume and purification volume is suitable.																					
2-3. Water purification method	Submitted the method	The technology applied for the WTP is water surface - receiving - sedimentation tank - quick filtration tank, and reservoir.		The technology applied for the existing WTP is water surface - mixing tank - reaction tank - vertical sedimentation tank - rapid gravity filtration tank.																					

Review Result of JICA Requirement of Survey

Project No.		⑮	⑯		
Province		Gia Lai	Hau Giang		
District		Krong Pa	Chau Thanh A		
Name of the Project		Water Supply Project for Phu Tuc town	Water Supply Network Expansion from Ngy Bay town to Tan Phu Thanh for Cai Tac town		
	Opinion of Team	○ : The water purification method is suitable.	○ : The water purification method is suitable.		
2-4. Civil structure of each facility	Observations of Team	The team reviewed the drawings. The team pointed out the issues and missing of that and no provision of the laboratory room on D/D.	The team reviewed the drawings. The team pointed out the issues and missing of that.		
	JICA requirement of Laboratory room	○ : The water sample will bring to the province Health and Preventive Center to conduct the monthly analysis parameter.	○ : The water sample will be tested at existing Nga Bay WTP.		
	Opinion of Team	○ : The team confirm that the civil structure of each facility is suitable.	○ : The team confirm that the revised the drawings are suitable.		
2-5. Plan for pipe laying	Observations of Team	There is a difference in pipe diameter between F/S and D/D. DPI/PO explained that there is a new concrete road from district town to Ia M'lah lake and the pipeline will go along this road.	No hydraulic calculation reports for transmission and distribution pipeline. The team requested the revised D/D.		
	Opinion of Team	○ : The submitted revised D/D is suitable.	○ : The submitted revised D/D is suitable.		
2-6. Power supply	Memorandum for JICA requirement	×	○		
	Opinion of Team	○ : JICA requirement is not met. However, capacity of the existing transformer is enough for the project WTP. Therefore, there is no need to execute an new agreement with the power company EVN.	○ : JICA requirement is met.		
2-7. Electrical machinery facility specifications	Observations of Team	The team reviewed the D/D reports and found that the drawings were missing.	The team reviewed the D/D reports and found that the drawings were missing.		
	Opinion of Team	○ : The revised the drawings are suitable.	○ : The revised the drawings are suitable.		
2-8. Land acquisition plan	Observations of Team	Expansion area of about 1,051m ² in the existing WTP needs land acquisition.	The lands for the acquisition area are under the District management.		
	Opinion of Team	○ : The team is obtained the copy of land acquisition plan.	○ : The team is obtained the copy of land acquisition agreement.		
3. Operation Plan					
3-1. Placement of personnel & manpower secure plan	Observations of Team	There is the placement of personnel & manpower secure plan in the F/S.	The project facility will be managed by the Water Supply Enterprise No.3 and No.4 under the WSC.		

Review Result of JICA Requirement of Survey

Project No.		⑮	⑯		
Province		Gia Lai	Hau Giang		
District		Krong Pa	Chau Thanh A		
Name of the Project		Water Supply Project for Phu Tuc town	Water Supply Network Expansion from Ngy Bay town to Tan Phu Thanh for Cai Tac town		
	Opinion of Team	○ : Placement of personnel & manpower secure plan is suitable.	○ : Placement of personnel & manpower secure plan is suitable.		
3-2. O&M facility plan	Observations of Team	There is plan for O&M facility in F/S.	There is plan for O&M facility in F/S and D/D.		
	Opinion of Team	○ : O&M facility plan is suitable.	○ : The plan is suitable. In addition, the team provided and explained PO the O&M handbook of Hue WACO as reference and request PO to consider the guidebook.		
3-3. Water quality control plan	Observations of Team	There is no provision of the laboratory room in D/D.	The Water Supply Enterprise No.4 is responsible for the water quality control of the Nga Bay WTP in cooperation with the WSC in Vi Thanh Town.		
	Opinion of Team	○ : The submitted plan is suitable.	○ : The existing plan is suitable.		
3-4. House connection's promotion plan	Observations of Team	In the F/S mention that connection and installation of meter to household with two alternatives that to pay total cost after installation or meter rent basis.	Within the project scope, pipeline will be installed to households of about 20m from the main pipeline with free meter and a tap. For households further than 20m from the main pipeline, the connection will be considered and cost negotiation case by case.		
	Opinion of Team	○ : The plan is suitable with current condition.	○ : The plan is suitable.		
3-5. Sludge drainage plan	Observations of Team	In F/S, sludge is designed to be discharged to river directly	Water after from drying bed is collected and discharge to river and dried sludge is used as soil for tree plantation.		
	Opinion of Team	○ : The drainage plan is suitable for time being.	○ : The drainage plan is suitable.		

1. INTRODUCTION

1.1 Background of the Survey

The poverty rate in Viet Nam declined about 21% from 37.4% to 16.0% in 1998 to 2006 mainly due to the high economic growth in 90's. However, it remains prominent disparity between urban and rural areas. The poverty rate in rural areas still remains high at 20.4%, on the other hand, the poverty rate in urban areas declined to 3.9 % in 2006. Geographic (living in a topographically disadvantageous area) and social capital (insufficient infrastructure services) factors are considered to be main causes of the disparity.

“Eighth Five year Social-economic Development Plan (2006-2010)” of the Vietnamese government sets target to facilitate infrastructure development especially in rural areas, aiming the improvement of living standards, hunger elimination and continuous reduction of the number of the poor. According to the country by country assistance program (2004) of the government of Japan for Viet Nam, the assistance of development and management of livelihood and production infrastructure puts emphasis on the importance through water supply system, village road, electricity distribution , irrigation and water management, etc. in poverty areas.

From this background, the government of Vietnam has requested JICA's Yen Loan in 2009 for “Small-scale Pro Poor Infrastructure Development Project (III)” which aims to improve infrastructure.

The government of Vietnam and JICA concluded Loan Agreement in 2009 November. Concerning the water supply, the detailed design should be elevated demand forecast, water source, designing of facilities and cost estimation. It is necessary to examine the fair scope, beneficial and adverse effects, fair operation/maintenance and construction estimation. Therefore, the quality of the detailed design should be affirming the maximizing benefits of effectiveness, efficiency and sustainability.

1.2 Objectives of Survey

The detailed designs of 16 water supply subproject which were designed by People's Committee of Province are reviewed. The purpose of review affirms the technical appropriateness of implementation plan.

1.3 Survey Area

Subproject Site; 16 sites in 14 provinces (Lai Chau*, Dien Bien*, Son La, Lao cai, Phu Tho, Lang Son, Thai Nguyen, Bac Giang, Thanh Hoa, Ha Tinh, Thua Thien-Hue, Quang Ngai, Gia Lai, Hau Giang). (* : Provinces with two subproject)

1.4 Scope of the Survey

Following 16 water supply subprojects will undergo the survey.

Table 1-1 Project Title

No	Province	District	Project Title
①	Lang Son	Dinh Lap	Water Supply System for Dinh Lap town
②	Lao Cai	Bao Thang	Rehabilitation and expansion of water supply system for Lu town (Continuous SPL)
③	Thai Nguyen	Pho Yen, Phu Binh	South Area Water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District
④	Phu Tho	Tam Nong	Water Supply Project for Hung Hoa Town
⑤	Bac Giang	Luc Nam	Water Supply System Construction Project for Doi Ngo town
⑥	Son La	Song Ma	Water Supply System for Chieng Khuong cluster communes
⑦	Lai Chau	Muong Te	Water Supply System for Muong Te town
⑧	Lai Chau	Tam Duong	Water Supply system

No	Province	District	Project Title
⑨	Dien Bien	Dien Bien Dong	Dien Bien Dong Water Treatment Plant
⑩	Dien Bien	Tuan Giao	Water Supply System in Pilot project of SPL VI
⑪	Thanh Hoa	Yen Dinh	Water Supply System for Quan Lao town
⑫	Ha Tinh	Ky Anh	Water Supply for Ky Trink, Ky Ha, Ky Ninh of Vung Ang Economic area
⑬	Thua Thien Hue	Phu Loc	Water Supply System for Phu Loc town and 5 surrounding communes
⑭	Quang Ngai	Son Ha	Water Supply System for Di Lang town
⑮	Gia Lai	Krong Pa	Water Supply System for Phu Tuc town
⑯	Hau Giang	Chau Thanh A	Water Supply Network Expansion from Ngy Bay town to Tan Phu Thanh for Cai Tac town

1.5 Implementation and Methodology

The SAPI Study Team applied the following operation principles to verify the validity of the D/D reports of 16 water supply sub-projects:

- 1) The SAPI Study Team implemented the site investigation and D/D review efficiently utilizing the local consultants.
- 2) The SAPI Study Team was divided into two Teams (Team 1 and Team 2) and each team consisted of two Japanese experts, one local consultant and one translator.
- 3) Two local consultants were assigned at Hanoi, HQ of the SAPI Study Team, for reviewing the documents and back up support.
- 4) To oversee consistency and quality of the evaluation of the D/D reports, the Mission Leader accompanied both the Teams for some of the projects.
- 5) Both the Teams under the supervision of the Mission Leader surveyed the Thua Thien Hue Water Supply System for Phu Loc town and 5 surrounding communes jointly for common understanding of the evaluation criteria.
- 6) The SAPI Study Team developed the uniform check list for the survey so that both the Team can share a standard of evaluation criteria. The Survey Team used the check list to evaluate the D/D reports.
- 7) Though the Vietnamese regulation was applied as the standard, it is necessary to meet the requirements of JICA. Therefore, if the plans do not meet the Vietnamese or Japanese standard, the survey team will propose alternative plans with criteria including those data which are not sufficient.
- 8) The SAPI Study Team collected the necessary information for the survey beforehand through the local consultants and reviewing the documents which had been received from the Ministry of Planning & Investment (MPI). The SAPI Study Team received the Feasibility, Basic Design, Detailed Design, investigation reports, etc beforehand for each of 16 water supply sub-projects.
- 9) The SAPI Study Team prepared their observations based on the survey items and review of the submitted documents by the MPI and sent to the PO/WSC/DPI in advance for their necessary preparation before the actual project site visit by the SAPI Study Team.
- 10) Most of the project site was visited for three days. The PO/WSC/DPI and their consultants accompanied with the SAPI Study Team for the site visit. The following procedure was adopted during visit of each of the project site by the SAPI Study Team:

First day:

- The meeting was conducted with the PO/WSC/DPI soon upon arrival of the SAPI Study Team at the project site to confirm the observations of the SAPI Study Team and availability of the missing documents.
- After the meeting, the project site which included water source, intake point, treatment plant site, pumping station site, booster pumping site, pipeline route, etc was actually visited by the SAPI Study Team.
- The SAPI Study Team visited the existing system (if there was) and carried out the household survey to understand the capability of the PO/WSC.
- The SAPI Study Team carried out the household survey in the proposed project area to understand the expectations and “Willingness to Pay” Ability of the households. .
- After the site visit, the SAPI Study Team collected the missing documents from the PO/WSC/DPI.
- The SAPI Study Team reviewed the missing documents.
- The SAPI Study Team prepared the Report for the 2nd meeting.

Second day:

- The remaining portion of the site was visited (if any) and the second day 2nd meeting was carried out in the morning hour with the PO/WSC/DP for the clarifications and remaining missing documents.
- The SAPI Study Team collected the missing documents from the PO/WSC/DPI and reviewed them.
- The SAPI Study Team prepared the Draft Final Report for the Conclusion meeting.

Third day: Conclusion Meeting

- The Conclusion meeting was carried out based on the Draft Final Report.
 - Draft final report was finalized incorporating the comments of the meeting (if any).
 - The Draft Final Report was sent to the PO/WSC/DPI and MPI after being checked by the Mission Leader.
 - The SAPI Study Team departed for the next project site.
- 11) The PO/WSC/DPI submitted the final documents i.e. revised F/S, D/D and other required documents to the SAPI Study Team.
 - 12) The SAPI Study Team carried out the final check of the revised F/S, D/D and other required documents. The PO/WSC/DPI was required to submit the missing document or revised the submitted document if it was required from the review.
 - 13) The SAPI Study Team carried out the Final check of the documents and accepted them if all the requirements were met.
 - 14) The SAPI Study Team proposes as the criteria and shall be examined by the MPI and JICA.
 - 15) The SAPI Study Team made efforts to write the report objectively.
 - 16) The same procedure was followed for each project site.

1.6 Water Quality of Vietnam

1.6.1 For Drinking Water

“National technical regulation on drinking water quality, 2009/BYT” is compiled by Department of Preventive Medicine & Environment and promulgated by MOH’s Minister at the Circular No.04/2009/TT-BYT data 17th June 2009.

Table 1-2 Limits of Quality Parameters (For Drinking Water)

Standard of Vietnam				Reference	
				WHO Guidelilne	(Standard of Japan)
No.	Parameter	Unit	Maximum limit	Maximum limit	Maximum limit
I . Perceptible parameters and inorganic constituents					
1	Color(*)	TCU	15	15	5
2	Taste and odor(*)	—	No strang taste & odor	No strang taste & odor	No strang taste & odor
3	Turbidity(*)	NTU	2	5	2
4	PH(*)	—	Within 6.5 - 8.5	-	Within 5.8 - 8.6
5	Hardness,calculated by CaCO ₃ (*)	mg/l	300	-	300
6	Total Dissolved Solid(TDS)(*)	mg/l	1000	1000	Not mentioned
7	Aluminum(*)	mg/l	0.2	0.2	0.2
8	Ammoniac(*)	mg/l	3	1.5	Not mentioned
9	Antimony	mg/l	0.005	0.005	0.015
10	Total Arsenic	mg/l	0.01	0.01	0.01
11	Barium	mg/l	0.7	0.7	Not mentioned
12	Boron and boric acid	mg/l	0.3	0.5	1 (as Total Boron)
13	Cadmium	mg/l	0.003	0.003	0.01(as Total Cadmium)
14	Chloride(*)	mg/l	250 300(*)	250	200
15	Total Chromium	mg/l	0.05	0.05	0.05
16	Total Copper(*)	mg/l	1	1	1
17	Cyanide	mg/l	0.07	0.07	0.01(as Total Cyanide)
18	Flouride	mg/l	1.5	1.5	0.8(as Total Flourine)
19	Hydrogen sulfide(*)	mg/l	0.05	0.05	Not mentioned
20	Total Iron(Fe ²⁺ +Fe ³⁺)(*)	mg/l	0.3	0.3	0.3
21	Lead	mg/l	0.01	0.01	0.01
22	Total Manganese	mg/l	0.3	0.5	0.05
23	Total Mercury	mg/l	0.001	0.001	0.0005
24	Molybdenum	mg/l	0.07	0.07	Not mentioned
25	Nickel	mg/l	0.02	0.02	0.01
26	Nitrate	mg/l	50	50	
27	Nitrite	mg/l	3	3	
28	selenium	mg/l	0.01	0.01	0.01
29	Sodium	mg/l	200	200	200
30	Sulfate(*)	mg/l	250	250	
31	Zinc(*)	mg/l	3	3	1
32	Permanganate	mg/l	2		
II .Content of organic substances					
a. Chlorinated alkenes					
33	Carbon tetrachloride	µg/l	2	2	2
34	Dichloromethane	µg/l	20	20	20
35	1,2 Dichloroethane	µg/l	30	30	4
36	1,1,1-Trichloroethane	µg/l	2000	2000	
37	Vinyl chloride	µg/l	5	5	
38	1,2 Dichloroethene	µg/l	50	50	40
39	Trichloroethene	µg/l	70	70	30
40	Tetrachloroethene	µg/l	40	40	10

Standard of Vietnam				Reference	
No.	Parameter	Unit	Maximum limit	WHO Guidelilne Maximum limit	(Standard of Japan) Maximum limit
b. Aromatic hydrocarbons					
41	Phenol and derivatives of Phenol	µg/l	1		
42	Benzen	µg/l	10	10	10
43	Toluene	µg/l	700	700	
44	Xylenes	µg/l	500	500	
45	Ethyl benzene	µg/l	300	300	
46	Styrene	µg/l	20	20	
47	Benzo(a)pyrene	µg/l	0.7	0.7	
c. Chlorinated benzenes					
48	Monochlorobenzens	µg/l	300	300	
49	1,2- Dichlorobenzene	µg/l	1000	1000	
50	1,4- Dichlorobenzene	µg/l	300	300	
51	Trichlorobenzene	µg/l	20	20	
d. Groups of complex organic substances					Not mentioned
52	Di(2-ethylhexyl)adipate	µg/l	80	80	
53	Di(2-ethylhexyl)phtalat	µg/l	8	8	
54	Acrylamide	µg/l	0.5	0.5	
55	Epiclorohydrin	µg/l	0.4	0.4	
56	Hexaclaro butadiene	µg/l	0.6	0.6	
III. Pesticides					
57	Alachlor	µg/l	20	20	
58	Aldicarb	µg/l	10	10	
59	Aldrin/Dieldrin	µg/l	0.03	0.03	
60	Atrazine	µg/l	2	2	
61	Bentazine	µg/l	30	300	
62	Carbofuran	µg/l	5	7	
63	Chlordane	µg/l	0.2	0.2	
64	Chlorotoluron	µg/l	30	30	
65	DDT	µg/l	2	2	
66	1,2- Dibromo- 3 Chloropropane	µg/l	1	1	
67	2,4- D	µg/l	30	30	30
68	1,2- Dichloropropane	µg/l	20	40	
69	1,2- Dichloropropene	µg/l	20	20	
70	Heptachlor & heptachlor epoxide	µg/l	0.03	0.03	
71	Hexachlorobenzene	µg/l	1	1	
72	Isoproturon	µg/l	9	9	
73	Lindane	µg/l	2	2	
74	MCPA	µg/l	2	2	
75	Methoxychlor	µg/l	20	20	
76	Methachlor	µg/l	10	10	
77	Molinate	µg/l	6	6	
78	Pendimetalin	µg/l	20	20	
79	Pentaclorophenol	µg/l	9	9	
80	Permethrin	µg/l	20	20	
81	Propanil	µg/l	20	20	
82	Simazine	µg/l	20	2	
83	Trifuralin	µg/l	20	20	
84	2,4 DB	µg/l	90	90	
85	Dichloprop	µg/l	100	100	
86	Fenoprop	µg/l	9	9	
87	Mecoprop	µg/l	10	10	
88	2,4,5- T	µg/l	9	9	

Standard of Vietnam				Reference	
No.	Parameter	Unit	Maximum limit	WHO Guidelilne Maximum limit	(Standard of Japan) Maximum limit
IV. Disinfectants and disinfectant by-products					
89	Monochloramine	µg/l	3	3	
90	Chlorine residue	µg/l	Within		
			0.3 - 0.5		
91	Bromate	µg/l	25	25	10
92	Chlorite	µg/l	200	200	
93	2,4,6 Trichlorophenol	µg/l	200	200	
94	Formaldehyde	µg/l	900	900	80
95	Bromoform	µg/l	100	100	
96	Dibromchlorometane	µg/l	100	100	
97	Bromodichlorometane	µg/l	60	60	
98	Chloroform	µg/l	200	200	
99	Dichloroacetic acid	µg/l	50	50	
100	Trichloroacetic acid	µg/l	100	100	
101	Chloral hydrate (trichloroacetaldehyde)	µg/l	10	10	
102	Dichloroacetonitrile	µg/l	90	90	
103	Dibromoacetonitrile	µg/l	100	100	
104	Trichloroacetonitrile	µg/l	1	1	
105	Cyano chlorite (as CN ^{**})	µg/l	70	70	
V. Radioactive constituents					
106	Gross α activity	pCi/l	3	0.1(Bq/l)	
107	Gross β activity	pCi/l	30	1(Bq/l)	
VI. Micro-organism					
108	Total Coliform	Bacteria l/100ml	0	0	0
109	E.coli or thermo- tolerant coliform	Bacteria l/100ml	0	0	0

NOTE:

- (*) Perceptible parameters.
- (**) Applicable to maritime areas and islands.

1.6.2 For Water Source (on Surface Water)

“National technical regulation on surface water source quality, 2008/BTNMT” is compiled by Ministry of National Resources & Environment Department.

Table 1-3 Limits of Quality Parameters (For Water Source (on Surface Water))

Standard of Vietnam				Reference (Standard of Japan)
No.	Parameter	Unit	Maximum limit	Maximum limit
I. Perceptible parameters and inorganic constituents				
1	pH	—	Within 6.5 - 8.5	Within 6.5 - 8.5
2	Dissolved Oxygen	mg/l	5	River:5/Lake:7.5
3	Total Suspended Solids	mg/l	30	River:25/Lake:5
4	COD	—	15	River:-/Lake:3
5	BOD	mg/l	6	River:3/Lake:-
6	N-NH ₄	mg/l	0.2	River:-/Lake:0.4(as Total nitrogen)
7	Chloride	mg/l	400	-
8	Fluoride	mg/l	1.5	0.8
9	N-NO ₂	mg/l	0.02	N-NO ₂ + N-NO ₃ :10

Standard of Vietnam				Reference (Standard of Japan)
10	N-NO ₃	mg/l	5	N-NO ₂ + N-NO ₃ :10
11	P-PO ₄	mg/l	0.2	River:-/Lake:0.03(as Total Phosphate)
12	Cyanide	mg/l	0.01	No detection
13	Total Arsenic	mg/l	0.02	0.01
14	Cadmium	mg/l	0.005	0.01
15	Lead	mg/l	0.02	0.01
16	Chromium (Cr ³⁺)	mg/l	0.1	-
17	Chromium (Cr ⁶⁺)	mg/l	0.02	0.05
18	Copper	mg/l	0.2	-
19	Zinc	mg/l	1.0	-
20	Nickel	mg/l	0.1	-
21	Total Iron(Fe ²⁺ +Fe ³⁺)*	mg/l	1	-
22	Total Mercury	mg/l	0.001	0.0005/Arkyl mercury: No detection
23	Surfactant	mg/l	0.2	-
24	Oil&Greese	mg/l	0.02	-
25	Phenol	mg/l	0.005	-
26	Pesticide (Organic chlorine)			Not mentioned
	Aldrin+Dieldrin	mg/l	0.0004	
	Endrin	mg/l	0.012	
	BHC	mg/l	0.1	
	DDT	mg/l	0.002	
	Endosulfan (Insecticide)	mg/l	0.01	
	Lindane	mg/l	0.35	
	Chlordane	mg/l	0.02	
	Heptachlor	mg/l	0.02	
27	Pesticide (Organic phosphate)			Not mentioned
	Paration	μ g/l	0.2	
	Mlotion	μ g/l	0.32	
28	Herbicides			
	2,4D	μ g/l	200	Thiurmu:0.006
	2,4,5T	μ g/l	100	Simazine:0.003
	Paraquat	μ g/l	1200	Tiobencarb:0.02
29	Gross α activity	mg/l	0.1	-
30	Gross β activity	mg/l	1.0	-
31	E.Coli	MPN/10 0ml	50	-
32	Coliform	MPN/10 0ml	5,000	River:5,000/Lake:1,000
	Others:			
	Organochlorine compounds			
	Dichloromethane	mg/l		0.02
	Carbon Tetrachloride	mg/l		0.002
	1,2 Dichloroethane	mg/l		0.004
	1,1 Dichloroethylene	mg/l		0.1
	Cis-1,2 Dichloroethylene	mg/l		0.04
	1,1,1-Trichloroethane	mg/l		1
	1,1,2-Trichloroethane	mg/l		0.006
	Trichloroethylene	mg/l		0.03
	1,3-Dichloropropene	mg/l		0.01
	Benzene	mg/l		0.01

Standard of Vietnam				Reference (Standard of Japan)
	PCB	mg/l		No detection
	Heavy metals			
	Selenium	mg/l		0.01
	Boron	mg/l		1
	1,4-Dioxane	mg/l		0.05

1.6.3 For Water Source (on Underground Water)

“National technical regulation on underground water quality, 2008/BTNMT” is compiled by Ministry of National Resources & Environment Department.

Table 1-4 Limits of Quality Parameters (For Water Source (on Underground Water))

Standard of Vietnam				Reference (Standard of Japan)
No.	Parameter	Unit	Maximum limit	Maximum limit
I. Perceptible parameters and inorganic constituents				
1	pH	—	Within 5.5 - 8.5	-
	Hardness, calculated by CaCO ₃	mg/l	500	-
	Total dissolved solids(TDS)	mg/l	1,500	-
	COD	—	4	-
	N-NH ₄	mg/l	0.2	-
	Chloride	mg/l	250	-
	Fluoride	mg/l	1.5	0.8
	N-NO ₂	mg/l	0.02	N-NO ₂ + N-NO ₃ :10
	N-NO ₃	mg/l	5	N-NO ₂ + N-NO ₃ :10
	Sulfate	mg/l	400	-
	Cyanide	mg/l	0.01	No detection
	Phenol	mg/l	0.005	-
	Total Arsenic	mg/l	0.05	0.01
	Cadmium	mg/l	0.005	0.01
	Lead	mg/l	0.02	0.01
	Chromium (Cr ⁶⁺)	mg/l	0.05	0.05
	Copper	mg/l	1.0	-
	Zinc	mg/l	3.0	-
	Manganese	mg/l	0.5	-
	Total Mercury	mg/l	0.001	0.0005/Arkyl mercury: No detection
	Total Iron(Fe ²⁺ +Fe ³⁺)	mg/l	5	-
	Selenium	mg/l	0.01	0.01
	Gross α activity	mg/l	0.1	-
	Gross β activity	mg/l	1.0	-
	E.Coli	MPN/10 0ml	No detection	-
	Coliform	MPN/10 0ml	3	-
2	Dissolved Oxygen	mg/l	5	River:5/Lake:7.5
3	Total Suspended Solids	mg/l	30	River:25/Lake:5
4	COD	—	15	River:-/Lake:3
5	BOD	mg/l	6	River:3/Lake:-
6	N-NH ₄	mg/l	0.2	River:-/Lake:0.4(as Total nitrogen)
7	Chloride	mg/l	400	-

Standard of Vietnam				Reference (Standard of Japan)
8	Fluoride	mg/l	1.5	0.8
9	N-NO ₂	mg/l	0.02	N-NO ₂ + N-NO ₃ :10
10	N-NO ₃	mg/l	5	N-NO ₂ + N-NO ₃ :10
11	P-PO ₄	mg/l	0.2	River:-/Lake:0.03(as Total Phosphate)
12	Cyanide	mg/l	0.01	No detection
13	Total Arsenic	mg/l	0.02	0.01
14	Cadmium	mg/l	0.005	0.01
15	Lead	mg/l	0.02	0.01
16	Chromium (Cr ³⁺)	mg/l	0.1	-
17	Chromium (Cr ⁶⁺)	mg/l	0.02	0.05
18	Copper	mg/l	0.2	-
19	Zinc	mg/l	1.0	-
20	Nickel	mg/l	0.1	-
21	Total Iron(Fe ²⁺ +Fe ³⁺)	mg/l	1	-
22	Total Mercury	mg/l	0.001	0.0005/Arkyl mercury: No detection
23	Surfactant	mg/l	0.2	-
24	Oil&Greese	mg/l	0.02	-
25	Phenol	mg/l	0.005	-
26	Pesticide (Organic chlorine)			Not mentioned
	Aldrin+Dieldrin	mg/l	0.0004	
	Endrin	mg/l	0.012	
	BHC	mg/l	0.1	
	DDT	mg/l	0.002	
	Endosulfan (Insecticide)	mg/l	0.01	
	Lindane	mg/l	0.35	
	Chlordane	mg/l	0.02	
	Heptachlor	mg/l	0.02	
27	Pesticide (Organic phosphate)			Not mentioned
	Paration	μ g/l	0.2	
	Mlation	μ g/l	0.32	
28	Herbicides			
	2,4D	μ g/l	200	Thiurmu:0.006
	2,4,5T	μ g/l	100	Simazine:0.003
	Paraquat	μ g/l	1200	Tiobencarb:0.02
29	Gross α activity	mg/l	0.1	-
30	Gross β activity	mg/l	1.0	-
31	E.Coli	MPN/10 0ml	50	-
32	Coliform	MPN/10 0ml	5,000	River:5,000/Lake:1,000
	Others:			
	Organochlorine compounds			
	Dichloromethane	mg/l		0.02
	Carbon Tetrachloride	mg/l		0.002
	1,2 Dichloroethane	mg/l		0.004
	1,1 Dichloroethylene	mg/l		0.1
	Cis-1,2 Dichloroethylene	mg/l		0.04
	1,1,1-Trichloroethane	mg/l		1
	1,1,2-Trichloroethane	mg/l		0.006
	Trichloroethylene	mg/l		0.03

Standard of Vietnam			Reference (Standard of Japan)
	1,3-Dichloropropene	mg/l	0.01
	Benzene	mg/l	0.01
	PCB	mg/l	No detection
	Heavy metals		
	Selenium	mg/l	0.01
	Boron	mg/l	1
	1,4-Dioxane	mg/l	0.05

1.7 Survey Items and Methodology

1.7.1 Water Source

- 1) Securing the required volume of water source
 - To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.
 - Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.
 - The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.
- 2) Securing the water quality for drinking water
 - The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.
 - Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.
 - In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.
 - The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.
- 3) If data is not sufficient, the survey team should propose as the criteria.

1.7.2 Water Quantity (Subject to the approval of JICA)

Out of 16 projects, only 7 projects satisfied the JICA requirement of 12 months data for the water quantity in the water source. For 8 projects, there is only minimum flow dry season data. For the most cases, however, the river flow of 12 month can be estimated based on the rainfall and basin area analysis hydro-geological analysis. The water source monitoring report is not available for the water supply pilot project of capacity of $Q = 103 \text{ m}^3/\text{day}$ for the Tuan Giao District in Dien Bien Province. The villagers who are largely minorities have been using the water source since long long time. According to the villagers, there is no history of draught in this water source. In case of the two water sources (Hue and Lai Chau), the water sources are considered to be inaccessible during the rainy season.

The SAPI Study Team conducted the review of the detailed design and evaluated the water source based on actual field surveys and interviews. In the case of river as intake point of water source, even if the 12 month is not available, if the historical data on the minimum water level at the intake point of the water source is available and the intake pipe level is designed below the minimum water level, we can assume that there will be no problem of availability of water source. In the case of spring as intake point of water source, if the intake pipe is designed at the bottom of the proposed dam, which is to

store the water and raise the water level, we can also assume that there will be no shortage in water source all the year around. In such a way, the Study Team evaluated that the flow in the water source for all the projects is higher than the water demand until the target year of the project. Therefore, in the opinion of the SAPI Study Team even 12 months data for most of the projects to fulfill the JICA requirement have not been obtained by the DPI/PO, the reliable supply of water is ensued for all the projects.

1.7.3 Water Quality (Subject to the Approval of JICA)

Out of 16 projects, only 6 projects satisfied the JICA requirement of 12 months data for the water quality of the water source. The remaining 10 projects have water quality data for 3 to 5 months only. These data have been obtained mostly during the dry season.

The SAPI Study Team conducted the review of the detailed design and evaluated the water source based on actual field surveys and interviews. The water quality of the water source in general deteriorates due to lack of water during the dry season. We found out the cases in which, due to human & agricultural activity and high flow during the rainy season, E-Coli and turbidity in the water increases in the rainy season. In such cases, the Survey Team checked the water quality of the treated water from the existing water purification plants nearby which is operated by the same water supply company and is using the same water source (same river) and is utilizing the similar purification technology. It was found out that the treated water of the existing plant meets the VN drinking water quality standard in both dry and rainy seasons. Therefore, in such cases, we concluded that the proposed water source fulfils the raw water quality standards.

There are even cases where the water sources are inaccessible particularly in rainy season. In such cases, the intakes are usually located in the upstream forest area where there is no human activity around. There is no site for contaminating the source. In such cases, we can assume that the water quality will remain sufficiently clean all year around and the Survey Team concluded that there is no problem of water source quality. Therefore, in the opinion of the SAPI Study Team even 12 months data to fulfill the JICA requirement have not been obtained by the DPI/PO, reasonable quality of water is ensured for all the projects.

1.7.4 Construction Plan

- 1) Demand forecast
 - The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc
- 2) Water supply volume and purification volume
 - The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.
- 3) Water purification method
 - The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.
 - The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors.
- 4) Civil structure of each facility
 - The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.
 - The Survey Team will confirm the appropriateness of civil structure of each facility.

- As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.
- 5) Plans for raw water transmission, water distribution, water supply systems and pipe laying
 - The Survey Team needs to confirm the appropriateness of these plans.
- 6) Securing the power supply
 - The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.
 - If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as a criteria.
- 7) Electrical machinery facility specifications
 - The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.
- 8) Land acquisition plan
 - The Survey Team comprehends the site conditions of land acquisition and residents.
 - The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.

1.7.5 Operation Plan

- 1) Placement of personnel & manpower secure plan
 - The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan.
 - Review the deployment plan of personnel, who will conduct the water quality monitoring.
- 2) O&M facility plan
 - The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.
 - The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.
- 3) Water quality control plan
 - The Survey Team needs to review the implement ability of water quality control plan.
 - If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.
 - The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.
 - When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.
- 4) House connection's promotion plan

- To review the problems concerning the promotion plan for house connections in the area.
 - If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.
- 5) Sludge drainage plan
- The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.
 - If the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.

2. SUMMARY OF THE PROJECT

2.1 Project Summary

The summary of each project is as shown in Table 2-1 and Table 2-2.

Table 2-1 Basic Project Data

PJ No.	Province/ District	Project Owner	O&M Agency	Water Source	Project Cost/ JICA portion (mln VND)	Scope of Work
1	Lang Son/ Dinh Lap	Lang Son Water Supply and Drainage Company	Lang Son Water Supply and Drainage Company	Ky Cung river	37,655/ 20,000	Raw water intake with 2 pumps, booster pumping station with 2 pumps, water treatment plant, transmission pipeline, distribution pipeline network in the town and fire hydrants
2	Lao Cai/ Bao Thang	Lao Cai State One member water supply business company Ltd.	Lao Cai One member water supply business company Ltd.	Hong river/ Lu stream	33,851/ 19,978	Construction of raw water pump station, water purification plant (pre-sedimentation, mixing & flocculation, secondary sedimentation, filtration, treated water pump station) capacity of 3,000m ³ /day and rehabilitation & upgrade of water purification facility including intake, raw water transmission pipeline and water purification plant, pipeline network from 1,200m ³ /day to 2,000m ³ /day
3	Thai Nguyen/ Pho Yen, Phu Binh	Thai Nguyen Water Supply Company	Thai Nguyen Water Supply Company	Existing Song Cong WTP, which would be upgraded under Norway fund (Song Cong river)	24,475/ 16,363	To construct booster pumping station with capacity Q=5,500m ³ /day (phase 1, 2010) and Q=9,000m ³ /day (Phase 2, 2015), which also includes reservoir, administration house, gate & fence, transforming station, pipe network with total length of 49360 m.
4	Phu Tho/ Tam Nong	Tam Nong District People Committee	Pho Thu Water Supply JSC	Existing intake and WTP (Da river)	38,941/ 25,296	Construction of one reservoir tank (V=500m ³), booster pumping station (Q=2,000m ³ /day), transmission pipe and distribution pipe line.
5	Bac Giang/ Luc Nam	Luc Nam District people committee	A new water supply enterprise will be established.	Luc Nam river	29,946/ 19,569	Construction of intake, pumping station, raw water transmission pipe, WTP(Q=3,500m ³ /day), distribution pipe line
6	Son La/ Song Ma	Son La Clean water and Rural Environmental Sanitation Center	Son La Clean water and Rural Environmental Sanitation Center	Le Stream	26,517 /17,311	Construction of intake, pumping station, raw water transmission pipe and WTP (Q=2,400m ³ /day) and distribution pipe
7	Lai Chau/ Muong Te	Muong Te District People's Committee	Lai Chau Waco	Huoi Sang spring/ Nam Cau spring (in	27,376/ 14,900	To build Water supply system with capacity of 1,000 m ³ /day including the Surface raw water intake (from 2 water sources),

PJ No.	Province/ District	Project Owner	O&M Agency	Water Source	Project Cost/ JICA portion (mln VND)	Scope of Work
				case of dry season)		raw water transmission pipes, Water treatment plant, Distribution network and service pipes
8	Lai Chau/ Tam Duong	Tam Duong District project management	Lai Chau Waco	Chao San spring	24,280/ 21,600	To build Water supply system with capacity of 1,000 m ³ /day including: Surface raw water intake, raw water transmission pipes, Water treatment plant, Distribution network and service pipes
9	Dien Bien/ Dien Bien Dong	Dien Bien water supply company	Dien Bien water supply company	Nam Son spring	35,834 /13,579	Construction of intake facility, pump station, WTP (Q=1,500m ³ /day), raw water transmission pipe and ditribution pipe.
10	Dien Bien/ Tuan Giao	Tuan Giao District People Committee	Water supply unit of Nam Din Minority village	Local spring	1,749 /1,749	Construction of intake, raw water transmission pipe, WTP(Q=100m ³ /day), reservoir 90m ³ , and distribution pipeline.
11	Thanh Hoa/ Yen Dinh	Yen Dinh District People's Committee	Yen Dinh District People's Committee	3 drilled wells (H=46.5m)	28,449/ 11,932	Construction of 3 drilled wells, 3 well pumping stations, water treatment plant, raw water pipeline, reservoir, treated water pumping station, transmission & distribution network, and secondary & tertiary distribution network
12	Ha Tinh/ Ky Anh	PMU of Vung Ang economic area	Clean Water Center for Vung Ang Economic Area	Existing Vung Ang WTP, (Kim Son lake)	32,356/ 21,179	To build booster pumping station, distribution network and service of 3,000m ³ /day
13	Thua Thien Hue/ Phu Loc	Hue Water Supply Company	Hue Water Supply Company	Area I :Khe Su Stream/Area II :Troui river	64,402/ 28,982	Area I :Construction of intake, raw water transmission pipeline, WTP(Q=2,000m ³ /day), reservoir tank and distribution pipeline. Area II :Construction of intake, pump station, raw water transmission pipeline, WTP(Q=8,000m ³ /day), reservoir tank and distribution pipeline.
14	Quang Ngai/ Son Ha	Son Ha People's Committee	Son Ha People's Committee	Ta Mang Spring	37,733/ 24,000	To build a water supply system with capacity of 3,000 m ³ /day including: Surface raw water intake, raw water transmission pipes, Water treatment plant, Distribution network and service pipes
15	Gia Lai/ Krong Pa	Krong Pa District People's committee	Krong Pa District People's committee	Ia Mlah lake	36,919/ 23,670	Construction of raw water transmission main pipe (D=400,L=15km ,PVC,), one reservoir tank (V=200m ³), water treatment facility (sedimentation tank, filter tank), distribution pipe .Rehabilitation of existing water treatment facility (transmission pumps etc.) and distribution pipe.

PJ No.	Province/ District	Project Owner	O&M Agency	Water Source	Project Cost/ JICA portion (mln VND)	Scope of Work
16	Hau Giang/ Chau Thanh A	Hau Giang Water supply & drainage (Urban Work Company)	Hau Giang Water supply & drainage (Urban Work Enterprise No.3 and 4)	Existing WTP Q=5,000m ³ /day (Cai Con river)	38,560/ 22,810	Construction of one reservoir tank (V=500m ³), one booster pump station (Q=100m ³ /h), transmission pipe and distribution network (Total length = 20.5km),

Table 2-2 Summary of Project Specification

PJ No.	Province/ District	(1)Target year	(2)Proposed Capacity (m3/day)	(3)Estimated No. of Served Population (Nos.)	(4) Estimated No. of Total Population (Nos.)	(5)=(3)/(4) Service Ratio (%)
1	Lang Son/ Dinh Lap	2010 (phase I) 2020 (phase II)	1,200 (phase I) 2,400 (phase II)	5,220 (phase I) 7,500 (phase II)	5,800 (phase I) 7,500 (phase II)	90% (phase I) 100% (phase II)
2	Lao Cai/ Bao Thang	2015 (phase I) 2025 (phase II)	5,000 (phase I) 8,000 (phase II)	19,935 (phase I) 24,200 (phase II)	22,150 (phase I) 24,200 (phase II)	90% (phase I) 100% (phase II)
3	Thai Nguyen/ Pho Yen, Phu Binh	2010 (phase I) 2015 (phase II)	5,500 (phase I) 9,000 (phase II)	31,504(phase I) 43,276 (phase II)	48,468 (phase I) 61,823 (phase II)	65% (phase I) 70% (phase II)
4	Phu Tho/ Tam Nong	2010 (phase I) 2020 (phase II)	3,000 (phase I) 6,000 (phase II)	23,816(phase I) 36,497(phase II)	36,915(phase I) 39,569(phase II)	65%(phase I) 92% (phase II)
5	Bac Giang/ Luc Nam	2015 (phase I) 2025(phase II)	3,500 (phase I) 7,000 (phase II)	13,004(phase I) 22,544(phase II)	18,578(phase I) 25,061(phase II)	70%(phase I) 90% (phase II)
6	Son La/ Song Ma	2025	2,400	12,316	13,684	95%
7	Lai Chau/ Muong Te	2015 (phase I) 2020 (phase II)	1,000 (phase I) 1,500 (phase II)	7,276 (phase I) 8,396 (phase II)	8,084 (phase I) 8,838 (phase II)	90% (phase I) 95% (phase II)
8	Lai Chau/ Tam Duong	2020	1,000	1,502	1,582	95%
9	Dien Bien/ Dien Bien Dong	2020	1,500	5,680	6,311	90%
10	Dien Bien/ Tuan Giao	2030	100	820	820	100%
11	Thanh Hoa/ Yen Dinh	2010 (phase I) 2015 (phase II)	1,750 (phase I) 2,000 (phase II)	7,266 (phase I) 7,682 (phase II)	7,266 (phase I) 7,682 (phase II)	100% (phase I) 100% (phase II)
12	Ha Tinh/ Ky Anh	2015	3,000	15,428	15,428	100%
13	Thua Thien Hue/ Phu Loc	2020	Area I :4,000 (2,000 in the Project) Area II :8,000	Area I :22,270 Area II :41,740	Area I :22,285 Area II :43,937	Area I :95% Area II :95%
14	Quang Ngai/ Son Ha	2020	3,000	9,092	10,102	90%
15	Gia Lai/ Krong Pa	2015 (phase I) 2025 (phase II)	4,000 (phase I) 6,000 (phase II)	14,872(phase I) 23,727(phase II)	18,590(phase I) 23,727(phase II)	80%(phase I) 100%(phase II)
16	Hau Giang/ Chau Thanh A	2012	2,700	18,360	20,400	90%

Table 2-3 List of Survey Items

No.	Survey items
1. Water Source	
1-1	Securing the required volume of water source
1-2	Securing the water quality for drinking water
2. Construction Plan	
2-1	Demand forecast
2-2	Water supply volume and purification volume
2-3	Water purification method
2-4	Civil structure of each facility
2-5	Plans for raw water transmission, water distribution, water supply systems and pipe laying
2-6	Securing the power supply
2-7	Electrical machinery facility specifications
2-8	Land acquisition plan
3. Operation Plan	
3-1	Placement of personnel & manpower secure plan
3-2	O&M facility plan
3-3	Water quality control plan
3-4	House connection's promotion plan
3-5	Sludge drainage plan

2.2 Overview of the Project

The summary of the review result is as shown in Table 2-4.

Table 2-4 Summary of Review Result

PJ No.	Province	District	1. Water Source		2. Construction Plan								3. Operation Plan				
			1-1	1-2	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	3-1	3-2	3-3	3-4	3-5
1	Lang Son	Dinh Lap	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
2	Lao Cai	Bao Thang	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
3	Thai Nguyen	Pho Yen, Phu Binh	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
4	Phu Tho	Tam Nong	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
5	Bac Giang	Luc Nam	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
6	Son La	Song Ma	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
7	Lai Chau	Muong Te	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
8	Lai Chau	Tam Duong	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
9	Dien Bien	Dien Bien Dong	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
10	Dien Bien	Tuan Giao	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
11	Thanh Hoa	Yen Dinh	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
12	Ha Tinh	Ky Anh	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
13	Thua Thien Hue	Phu Loc	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
14	Quang Ngai	Son Ha	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
15	Gia Lai	Krong Pa	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
16	Hau Giang	Chau Thanh A	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Note: 1. “○” mark means “Appropriate”.

2. Each survey item number applies to Section 1.4 ”Scope of the Survey” and Table 2-3.

3. RESULT OF REVIEW

3.1 Project No. 01: Lang Son (Dinh Lap)

A. Project Summary

1. **Project Title:** Water Supply System for Dinh Lap town
 2. **Province:** Lang Son
 3. **District:** Dinh Lap
 4. **Project Site:** Dinh Lap town
 5. **Project Objectives:** To build a water supply system for Dinh Lap town in order to meet water demand up 2020, with capacity of 2,400 m³/day contributing to improve the people's health, livelihood, and environmental sanitation for Dinh Lap town
 6. **Scope of Project:** Raw water intake with 2 pumps, booster pumping station with 2 pumps, water treatment plant, transmission pipeline, distribution pipeline network in the town and fire hydrants.
 7. **Project Owner:** Lang Son Water Supply and Drainage Company
 8. **Operation and Maintenance Agency:** Lang Son Water Supply and Drainage Company
 9. **Project Investment decider:** Lang Son People's Committee
 10. **Project cost:** 37,655,831,000 VND
 11. **JICA Portion:** 25,000,000,000 VND
- Documents received by the SAPI Study Team:** F/S report, Detailed Design drawings, detailed design calculations

B. Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/WSC, made the visit of the project site, discussed and clarified issues with the DPI, PO/DPC and WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Water source to the water purification plant is from the Ky Cung river. Based on the Hydro-Geological Monitoring of Lang Son station from 1970 – 1984, the average flow is from 4.94m³/s (in dry season) to 73.96m³/s (in rainy season) (According to the F/S report). The minimum flow is 1.4m³/s (on May 7th 1972) and the maximum flow is 2,800m³/s (on July 24th 1980).</p> <p>The minimum flow in the river during the dry season is 1.4m³/s (120,000 m³/day), which far exceeds the water purification plant capacity (2400 m³/day).</p> <p>The SAPI Study Team also visited the water source. The Ky Cung river at the intake point is not a stream but a real river which is about 50m wide and deep. Water appeared to be flowing with current in the river.</p> <p>To fulfill the JICA requirement, 12 months data are required.</p>	<p>The PO/WSC provided the hydro geological data for 12 months.</p>	<p>JICA requirement is met.</p>
1-2. Securing the water quality for drinking water	<p>acceptable</p>	<p>There are five samples tested, 3 in the dry season (April 2008 and March 2006, Oct 2005), and 2 in the rainy season (July 2008, June 2010) which meet QCVN 08-2008 standard and TCDX 233-1999 standard by the Ministry of Construction, Government of Vietnam. The dry season is from October to April and the rainy season is from May to September.</p> <p>The SAPI Study Team studied the data of 5 months. It was found that all the parameters including</p>	<p>The PO/WSC will try to provide the remaining water quality data before the commencement of construction works, if required.</p> <p>The water quality dated 20th Sep 2010 of Ky cung river at intake point was received.</p>	<p>From the data obtained and the result of the site visit, the SAPI Study Team concludes that there is already sufficient evidence indicating that there is no problem with the quality of water source.</p>

3-4

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
		<p>Turbidity, E-coli, COD, Ammonia, etc. are within the standard value. From the report of July 2008, which is rainy season, it was found that all the heavy metals are also well within the standard value.</p> <p>The SAPI Study Team travelled to the water source (intake point), which is 20 km far-off from the Dinh Lap town. The upstream of the water source is mountain in the forest near the border of China and Vietnam. There is no human activity in the vicinity.</p> <p>So, there is no contamination of water source expected in the future.</p> <p>To fulfill the JICA requirement strictly, the remaining (January to March, May to June and Aug to Dec) 7 months data are required.</p>		<p>After checking the water quality result, the team confirm the water quality is suitable</p>
2. Construction Plan				
<p>2-1. Demand forecast</p>	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.</p>	<p>Population in 2010 is 5,800 persons Population in 2020 is 7,500 persons</p> <p>Water supply Criteria in F/S is 100 l/per/day (2010) and 150 l/per/day (2020).-Service ratio is 90% (2010) and 100% (2020).</p> <p>-Water for public is 10% of domestic for both the phases. -Water for commercial and service is 10% of the domestic for both the phases. - Water for industry area is 22m³/ha/d for both phases. -Water loss is 20% for both the phases; water use for WTP is 5% for both the phase.</p> <p>The parameter used for the water demand estimation is not as the Vietnam guideline, but they are suitable with the master plan of the Dinh Lap town. The</p>	<p>The DPI also explained that the growth rate of population is not according to the population statistics book. It is based on the mechanical increasing rate (moving resident from another area).</p>	<p>The SAPI Study Team visited the site as well as interviewed some people in Dinh Lap town. The demand of clean water is very high. The estimation of water supply demand is reasonable.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
		PO/WSC explained to the SAPI Study Team rationale of assumptions for estimating the demand forecast. The SAPI Study Team concluded that their assumptions are reasonable and demand forecast is realistic.		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	FS mentioned water demand in the first phase as 1200 m ³ /day and in the second phase as 2400 m ³ /day. The minimum flow in the Ky Cung river (intake point) during the dry season is 1.4m ³ /s (120,000 m ³ /day), which far exceeds the water purification plant capacity (2400 m ³ /day). The SAPI Study Team concluded that the water supply volume and the capacity of water purification plant are appropriate.		
2-3. Water purification method	The Survey Team will confirm the long term cost & benefit efficiency of the water purification method. -The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors	The water source for the water purification plant is Ky Cung River. The F/S refers to the description on the two options for the water purification method. The F/S proposed the technology for the plant which is suitable for the small scale plant and is based on the vertical mixing-sedimentation & rapid sand filtration technology. The Lang Son Water Supply and Drainage Company is operating the water supply systems of Lang Son, Trang Dinh, Loc Binh, Bac Son, Binh Gia, Dong Dang and Do Thi Dong Mo. The SAPI Study team visited the Loc Binh water purification plant which was constructed in year 2003 and commissioned in year 2004 under ADB fund and is based on the same technology as proposed under the JICA project. The water source for the plant is a stream located at high ground level in the mountain. The Lang Son Water Supply and Drainage Company is operating other plants also. The SAPI Study Team assessed that the plants are satisfactorily operated by the Lang Son water supply and drainage company. The SAPI Study Team assessed that the Dinh Lap town water purification plant can be sufficiently operated and maintained by the Lang Son Water		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>Supply and Drainage Company.</p> <p>The PO/WSC explained that option 1 was found to be only site for the water treatment plant, however, area is limited. Therefore, access road and facilities are not so wide but these are appropriate for the proper operation of the water supply facility.</p> <p>The SAPI Study Team reviewed the F/S and D/D reports. The SAPI Study Team found it appropriate and informed to the PO/WSC that if there is any comment from the detail review after returning back to Hanoi, team will inform to the PO/WSC.</p> <p>There is no provision of laboratory room in the water purification plant, which is one of the requirements of JICA. The SAPI Study Team requested the PO/WSC to prepare the design and cost estimate for the water quality monitoring room and include it in D/D.</p>	<p>The PO/WSC agreed to the requirement of JICA for including the laboratory in the DD.</p> <p>The PO/WSC informed that the Chairman of WSC has agreed to setting up a laboratory in the JICA water purification plant of Dinh Lap Town and proposed for setting up a Central Laboratory in Lang Son Year 2011.</p> <p>The DPI and PO/WSC submitted lacking documents and the completed D/D including provision of laboratory to the SAPI Study Team on 20th of September 2010.</p>	After checking the submitted documents, the survey team confirm that the civil structure of each facility is suitable
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	The SAPI Study Team reviewed the F/S and D/D reports including hydraulic analysis for phase I and II. The SAPI Study Team found it appropriate and informed to the PO/WSC that if there is any comment from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the PO/WSC.		It is appropriate.
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.	The PO/WSC have already executed an agreement with EVN (Power Company) to provide power supply to the JICA project.	The PO/WSC provided a copy of the agreement to the SAPI Study Team.	JICA requirement is met.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
	-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.			
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	The SAPI Study Team reviewed the F/S and D/D reports. The SAPI Study Team visited the sites of intake, booster pumping station and water purification plant. The team found the specifications of the electrical machinery appropriate and informed that if there is any comment from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the PO/WSC.		
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The SAPI Study Team visited the sites of Intake, booster pumping station and water treatment plant. The site of intake and booster pumping station in the agriculture field, which has been already acquired. There is no resettlement involved here. The site for the water treatment plant is under the District management, which has no objection to construct the water treatment plant on this land. There is a community centre which would be relocated to elsewhere in the town by the District management.	The PO/WSC provided a copy of the land acquisition to the SAPI Study Team.	
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	The PO/WSC confirmed to the SAPI Study Team that they have no plan for the placement of personnel and manpower secure. The Study team presented to the PO/WSC the Plan of Hue and Thai Nguyen water supply company. The Study Study Team also presented to the PO/WSC the copies of O&M manual prepared under the JICA Technical assistance programme in Hue Province. The SAPI Team recommended that personnel of PO/WSC can be sent to the plant of Hue water supply company for the training and study of their Plan.		
3-2.	-The Survey Team is required to confirm the	The existing water supply system of Dinh Lap town	The PO/WSC informed	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
O&M facility plan	<p>appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>and the proposed JICA water supply system for the Dinh lap town are under the District management. According to the Government Decree 117, the O&M of the urban water supply would be transferred to the Lang Son Water Supply and Drainage Company for the operation and maintenance. The Lang Son Water Supply and Drainage Company is operating the water supply system of Lang Son (capacity 15,000 m³/day, connections 20,000 nos., coverage 98%), Trang Dinh (capacity 1200 m³/day, connections 1000 nos., coverage 65%), Loc Binh (capacity 1000 m³/day, connections 1100nos., coverage 75%), Bac Son (capacity 1000 m³/day, connections 1200nos., coverage 85%), Binh Gia (capacity 1200 m³/day, connections 900nos., coverage 80%), Dong Dang (capacity 1200 m³/day, connections 2200nos., coverage 90%) and Do Thi Dong Mo (capacity 1000 m³/day, connections 1800nos., coverage 85%). The SAPI Study Team visited the Loc Binh water purification plant which constructed in year 2003 and commissioned in year 2004 under ADB fund. The SAPI Study Team assessed that the ADB plant is satisfactorily operated. The SAPI Study Team asked the PO/WSC why there is only 75% coverage under the coverage area of Loc Binh plant. The PO/WSC confirmed that such houses where there are no connections are very scattered and far from the distribution network which is laid along the roads. The WSC set a rule that they connect the houses within proximity to the distribution network, taking into consideration the limited financial resources and financial viability of their investment. The PO/WSC informed that these households get water from the stream directly or have their wells with support from the District management.</p> <p>The below Water tariff decision was approved by the</p>	<p>that an enterprise under the Lang Son water supply and drainage company would be set up for the JICA project for operation and maintenance of the water supply system of Dinh Lap town similar to other towns/districts in Lang Son Province.</p>	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
		<p>Lang Son People's Committee:</p> <p>-Domestic water: For first 10m3 is 3,700 VND/m3; After 10m3 is 4,700 VND/m3 -Public and district office is 5,000VND/m3 - Industries is 6,000 VND/m3</p> <p>The average water tariff is 5,059 VND/m3 and the water production cost is 3,457 VND/m3.</p> <p>So, the SAPI Study Team concluded that the project is financially sustainable.</p>		
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity</p>	<p>The PO/WSC informed that they send monthly sample of water source and treated water to the laboratory of the Health Department of the district for all examination. The PO/WSC does not have such arrangement to conduct in their facilities. The SAPI Study Team informed that it is very necessary that they develop their capacity with regard to daily water quality control. The SAPI Study Team presented to the PO/WSC the Plan of Hue and Thai Nguyen water supply company. The SAPI Study Team also presented the copies of the O&M manual including water quality control prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Study Team informed that making of Water Quality Control Plan is one of the requirements of JICA before the commencement of construction works.</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall-management and NRW reduction under the JICA Technical Cooperation Programme. As a result, the Hue water company monitors water quality on hourly basis and</p>	<p>The PO/WSC agreed to the requirement of JICA for making of Water Quality Control Plan.</p> <p>The DPI and PO/WSC agreed to provide the completed D/D including Plan for Water Quality Control to the SAPI Study Team by 20th of September 2010.</p> <p>The PO/WSC informed that the Chairman of WSC has agreed to setting up a laboratory in the JICA water purification plant of Dinh Lap Town and proposed for setting up a Central Laboratory in Lang Son in Year 2011.</p> <p>DPI/PO submitted the</p>	After checking the obtained document, the SAPI team confirms the plan is appropriate.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
	Strengthening Plan.	declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.	revised documents on 20 th Oct 2010	
3-4. House connection's promotion plan	To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	<p>In the report, 90% coverage in phase I (2010) and 100% in phase II (2020) is planned. So, the SAPI Study Team expressed concern on the viability of such high coverage plan. The PO/WSC explained that the project is in the mountainous region and there is serious demand for the clean water. So, the planned target would be achieved. They also informed that particularly in this project area there is already coverage of 65% with the existing water supply system of capacity 400 m³/day where clean water from the stream is directly supplied through a storage tank (without treatment). However, during the dry season of 6-7 months, there is not enough water in the stream and most of the households do not get the water during this period through the piped water supply system. The SAPI Study Team visited the existing area where there is 65% coverage and additional area under the JICA project. Through interview of the households in this area the SAPI Study Team understood that there is serious and immediate demand for the fresh water. Presently, residents get water from the stream for their daily use with the support of the District management or have tube wells. During the dry weather season, they have difficulty in securing that water also.</p> <p>The SAPI Study Team informed that under Hue and Nguyen projects of JICA, the PO/WSC is providing water meter free of charge to promote the house connections. The PO/WSC informed that there is no such need of providing water meter free of charge in</p>		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
		this project as there is already serious demand for the clean water in this mountainous region and said that 100% coverage is assured. Under the JICA project, the PO/WSC would provide only service line up to the individual households and the households would have to purchase water meter from the PO/WSC to install it.		
3-5. Sludge drainage plan	-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge. -If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	The SAPI Study Team studied the drainage plan. It is appropriate. According to the plan, the sludge from the sedimentation tank and back washing would be drained to a lagoon. The PO/WSC informed to the SAPI Study Team that in 3 to 6 months time, the settled sludge would be disposed off in the designated landfill.		

PHOTOS Lang Son/Dinh Lap



Meeting
with Lang Son DPI/ PO



Location of Proposed Intake Facility
located at the left bank of Ky Cung River
(view from upstream)



Location of Proposed BP/S
Q=50m³/h, H=60m, 2nos.



Location of proposed WTP
Q=1,200m³/day (phase I)



Interview
for resident of proposed service area



Road condition
along proposed raw water transmission line

3-13

3.2 Project No. 02: Lao Cai (Bao Thang)

A. Project Summary

1. **Project Title:** Rehabilitation and Expansion of Water Supply System for Lu Town (Continuous SPL)
2. **Province:** Lao Cai
3. **District:** Bao Thang
4. **Project Site:** Lu town
5. **Project Objectives:** To build a water supply system for Lu town in order to meet water demand up 2015, with capacity of 5,000 m³/day contributing to improve the people's health, livelihood, and environmental sanitation for Lu town
6. **Scope of Project:** Construction of raw water pump station, water purification plant (pre-sedimentation, mixing & flocculation, secondary sedimentation, filtration, treated water pump station) capacity of 3,000m³/day and rehabilitation & upgradation of water purification facility including intake, raw water transmission pipeline and water purification plant, pipeline network from 1,200m³/day to 2,000m³/day
7. **Project Owner:** Lao Cai State One member water supply business company Ltd.
8. **Operation and Maintenance Agency:** Bao Thang water supply company enterprise under Lao Cai one member water supply business company Ltd.
9. **Project Investment decider:** Lao Cai Province People's Committee
10. **Project cost:** 31,787,158,948 VND
11. **JICA Portion:** 24,442,620,339 VND
12. **Documents received by the SAPI Study Team:** Feasibility Study Report, Revised F/S, Technical Construction Drawings, water quality & quality monitoring data

B. Review Result

SAPI study team reviewed the documents provided by Lao Cai DPI/PO/WSC, made visits of the project sites, discussed and clarified issues with the DPI & PO/WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>The Surface water has been chosen as water source for both the plants.</p> <p>1- Water source from Hong river (Red river) will be used to supply for the proposed new plant with the capacity of 3,000m³/day. The PO/WSC explained that before selecting the Hong river as water source, they have evaluated My stream and Mu spring as candidate water sources. However, these water sources were found not suitable and also have problem of insufficient water during the dry season.</p> <p>Regarding Hong river, the annual average quantity is 2,640m³/s (228,096,000m³/day). The lowest flow is 700m³/s (60,480,000m³/day) and the highest flow in the rainy season is 30, 000 m³/s (2,592,000,000 m³/day).</p> <ul style="list-style-type: none"> - The highest level at Lu bridge (in 1971):72,92 m - The lowest level at Lu bridge (in 1957): 60,39 m <p>The minimum water flow is 121 m³/s (10,454,400 m³/day) in April 2006, it exceeds the required capacity for the W.T.P. (3,000 m³/day).</p> <p>The SAPI Study Team also visited the water source. The Hong river at the intake point is a huge river which is about 300m wide and deep. Water</p>	<p>The PO/WSC provided the hydro geological data from Lao Cai Gauging station for 12 months from January to December for the year 2005 to 2009.</p> <p>The PO/WSC included the explanation in the revised F/S.</p>	<p>JICA requirement is met.</p>

3-18

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>appeared to be flowing with full current in the river.</p> <p>The SAPI Study Team also asked to provide the explanation for the selecting the intake point on the Right side of the river from the points of view of technical, financial environmental aspects.</p> <p>2- The existing treatment plant capacity of 1,200m³/day (under SPL II) will be upgraded to 2,000 m³/day.</p> <p>The minimum flow in Lu stream in the dry season (from October to March) is 0.065 m³/s (5,616 m³/day) which is enough for 2,000 m³/day plant capacity.</p> <p>The SAPI Study team visited the Lu stream. There was flowing water in the stream and appeared to be sufficient for the total plant capacity (2000 m³/day in which 1200 m³/day is the existing capacity and 800 m³/day is the extra capacity proposed under the JICA project).</p> <p>As requirement of JICA, 12 months of monitoring data is required.</p>	<p>The DPI/PO provided the hydro geological data of Lu stream for 12 months.</p>	
<p>1-2. Securing the water quality for drinking water</p>	<p>-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p>	<p>1. There is one water quality result dated 10/11/2008 for the Hong river with 17 parameters. The water quality parameters (although numbers of parameters are not sufficient according to the standard) conform to the VN Standard except turbidity which is 1,110 NTU (standard <500 NTU) and total of suspended solids, which is 1,980 mg/l (standard 30 mg/l).</p> <p>The SAPI Study Team received the water quality monitoring data of year 2008 (from January to December) of Hong river at Pho Lu town (intake</p>		<p>The JICA requirement is met.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>location) for 17 parameters. The water source had turbidity from 1110 to 1650 NTU compared with standard <500 NTU and TSS from 1550 to 2080 mg/l compared with standard 30mg/l. The river flow and turbidly changes significantly in two weathers i.e. dry season and rainy season. The other parameters conform to the VN standard.</p> <p>The SAPI Team requested to provide the basis of selecting the Hong river as water source since it's turbidity and total suspended solids are much higher than that of the standard value. Since water treatment plant is only of 3,000 m³/day capacity, the study team asked the PO/WSC about the availability of ground water in this area.</p> <p>The Hong river originates in China and the intake Point is about 30 km downstream of China-Vietnam border. In the upstream of this river where several streams joins this river, on one of the stream (named Namthi) there are two water purification plants. One is on the China side and the other is in the Vietnam side, which has capacity of 14,000 m³/day and was constructed with the assistance of AFD (French assistance). The quality of this stream also changes with the season and there is high turbidly in the rainy reason, however, it is less than the Hong river.</p> <p>The technology of the proposed JICA plant is same as constructed under the French assistance.</p> <p>During the discussions with the DPI/PO/WSC it came out that there is possibility of existing or future factories on China side of river. The SAPI Study team recommended that the strict quality monitoring programme shall be implemented and</p>	<p>Regarding ground water, based on Natural Resources and Environment, VN, in the Pho Lu area the ground water source is scare. The PO/WSC also informed that there was an UNICEF funded project to provide drinking water through dig well. However, this project was not successful due to insufficient ground water especially in the dray season.</p> <p>The PO/WSC appreciated the recommendation of the SAPI Study team.</p>	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>there shall be full communication with the concerned agencies which has mandate for the water quality check. The intake is only 30 km downstream of China border.</p> <p>2. We received the raw water quality from Lu stream for 12 months (from January 2009 to December 2009) with 17 parameters. These data conform to VN standard. Even COD, nitrate, nitrite, coliform (from 1,682 to 3,876 MPN/100ml) meet the standard.</p> <p>The SAPI Study Team was also provided with water quality result after treatment of the existing Pho Lu W.T.P with 16 parameters conforming to the standard (QCVN01 by Ministry of Health).</p> <p>The SAPI Study team expressed the concern that the Lu stream is prone to contamination so they should prepare water quality protection plan and implement it during the construction of the project. Although coli forms in water source are lower than the VN standard, it indicates there is enough scope of contamination of the water source in the future unless measures are taken. The SAPI Study Team recommended for the regular quality check of the water source.</p> <p>As requirement of JICA, 12 months of monitoring data is required.</p>	<p>The PO/WSC would provide additional data of treated water quality, which were analyzed by Health and Prevention Centre under the Health Department.</p> <p>They agree to the recommendation of the SAP Study team. During the construction of the project at least the area near by the intake would be improved from environmental points of view.</p>	
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>Demand forecast is estimated for 2 phases</p> <ul style="list-style-type: none"> - Phase 2015: Capacity 5,041 m³/day - Phase 2025: capacity 8,077m³/day <p>Up to 2015, population will be 22,150 people</p>		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<ul style="list-style-type: none"> - Water supply criteria in F/S is 110L/person/day - Service ratio is 90%. - Water for public is 10% of domestic. - Water for industrial and service demand is 15% of domestic. - Watering and road washing is 10% of domestic. - Water loss and contingency is 25% - Water for WSP is 6% <p>Up to 2025, population is expected 24,200 people.</p> <ul style="list-style-type: none"> - Water supply criteria in F/S is 140L/person/day - Service ratio is 100%. - Water for public is 10% of domestic. - Water for industrial and service demand is 15% of domestic. - Watering and road washing is 10% of domestic. - Water loss and contingency is 20% - Water for WSP is 6% <p>Based on the revised FS, actual population and site visit, the estimation of the demand forecast for the Project is suitable.</p>		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<ol style="list-style-type: none"> 1. The purification volume water for the proposed new water purification plant is 3,000 m³/day. 2. The existing treatment plant with capacity of 1,200 m³/day will be upgraded to 2,000m³/day. <p>For both the plants, the water supply volume in both the respective water source is sufficient and the total design capacity is satisfied and suitable with demand.</p>		
2-3.	The Survey Team will confirm the long term cost & benefit	The Feasibility Study Report refers to the	The DPI/PO agreed with	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
Water purification method	<p>efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>description on the two options for the water purification method. And proposed a method as in option 1, which is based on Vertical sedimentation (pre-sedimentation), mixing, flocculation, lamella sedimentation, rapid filtration.</p> <p>The SAPI Study Team asked to provide the analysis of long term cost & benefit efficiency of the water purification method.</p> <p>The SAPI team received the revised FS in including above information The selected technology has comparatively lower O&M cost.</p> <p>In the downstream of Hong river, there are water treatment plants using the same water source. These are:</p> <ul style="list-style-type: none"> - Phu Tho W.T.P capacity of 6,000 m3/day (SPL II) - Thai Binh W.T.P - Nam Dinh W.T.P - Hung Yen W.T.P. <p>The Director of WSC informed that he had contacted company of the above plants. They informed that the operations of these plants are satisfactory and treated water quality conforms to the VN standard.</p> <p>For the existing water treatment plant which will be upgraded from 1,200m3/day to 2,000m3/day also using lamella sedimentation technology, however, pre-sedimentation is not required as turbidity in the water source is low.</p> <p>The Laocai Waco is operating the water supply systems of LaoCai, Coc San, and Tang Loong with</p>	<p>the observations of the SAPI Study Team.</p>	

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		<p>the same treatment technology as the JICA project. The SAPI team visited LaoCai W.T.P, the facility funded by AFD with capacity of 14,000m³/day using water source from NamThi stream (upstream of Hong river). The SAPI Study Team assessed that the PhoLu town water purification plant can be sufficiently operated and maintained by the LaoCai Waco.</p>		
<p>2-4. Civil structure of each facility</p>	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.44</p>	<p>The PO/WSC explained that they found only one suitable site for the water treatment plant. The Plant would be located on a hill top and have limited area. Therefore, access road and facilities are not so wide but these are appropriate for the proper operation of the water supply facility. The PO/WSC suggested that during revision of F/S and D/D, they will re-look the provisions for the necessary and sufficient construction of facilities for the operation of the water supply facility.</p> <p>SAPI Study Team informed the PO that the profile of construction designs is not enough to review. The SAPI received the civil structure drawings which was revised but not have structure calculation.</p> <p>The SAPI Team requested to:</p> <ul style="list-style-type: none"> -Consider the gate and fence around the treatment plant land for the security. -Consider the protection of river bank against erosion and circular slip at intake place -Consider rainwater drainage system around the treatment plant land. -Consider enough protection of pumping stations and slopes of hill on which treatment plant would be constructed. <p>The team will have recommendation after</p>	<p>The PO/WSC agreed with the suggestions of the SAPI Study Team.</p> <p>Revised D/D and report was submitted on 29th September 2010.</p> <p>They will submit the revised document including laboratory.</p>	<p>After checking the received documents which they revised, the SAPI team confirms that the D/D calculation and reservoirs is suitable.</p> <p>The PO/DPI should complete the remaining D/D drawings and submit to the SAPI Study team as soon as possible.</p>

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		<p>checking the report. The report on topographic investigation and the geotechnical investigation report were provided by the PO/WSC.</p> <p>There is no provision of laboratory room in the water purification plant, which is one of the requirements of JICA. The team requested the PO/WSC to prepare the design and cost estimate for the water quality monitoring room and include in D/D.</p> <p>The revised D/D and lacking documents was submitted include:</p> <ul style="list-style-type: none"> - Topo survey and geotechnical survey report - Almost D/D drawings include sufficient items of facilities but not satisfy for D/D drawings (only satisfy for basic detailed design). <p>The SAPI team required the DPI/PO to submit the lacking drawings as required as per standard. Regarding adding sludge lagoon, the thickness of wall and bottom of the lagoon is too high exceeding required load.</p> <p>-Detailed design for structure pipelines have not yet been provided</p>		
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	<p>The SAPI Study Team reviewed the F/S and D/D reports including hydraulic analysis.</p> <p>1) Regarding the distribution main, the SAPI Study Team found it appropriate and informed to the DPI and PO/WSC that if there are any comments from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the DPI and PO/WSC.</p> <p>2) Regarding the raw water transmission main for 3,000m³/day, the study team recommends to the</p>	<p>The PO/WSC agreed with the suggestion of the SAPI Study Team for providing 250 mm diameter pipe for raw water transmission in phase I and keep the provision for phase II.</p> <p>The PO/WSC would submit revised D/D on</p>	It is appropriate.

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		<p>DPI and PO/WSC that the header pipe of the raw water pumps should be devised for the future expansion (phase-2).</p> <p>3) Regarding the raw water transmission main for upgrading the existing plant to 2,000 m³/day, the revised F/S has the hydraulic analysis; however D/D doesn't have it.</p>	<p>24th of September 2010 to the SAPI Study Team.</p> <p>The SAPI Study team received the revised D/D.</p>	
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>The PO/DPC has already executed an agreement with Lao Cai electricity for the new plant to provide power supply to the JICA project. The detailed design drawings of the transformer sub-station and the medium voltage line are available. The detailed calculation report for power supply is available.</p> <p>Upgrading the existing W.T.P to 2,000 m³/day: There is no need of new power agreement. The agreement Lao Cai electricity stipulates the average daily as $P_{tb} \leq 30KW$ and maximum supply as $P_{max} \leq 80KW$. There are existing transformer and medium voltage, which would be used.</p> <p>Based on the revised F/S, power consumption when plant is upgraded is 39,37 KW (Lao Cai electricity maximum supply as 80KW). Therefore, the requirement of power supply to the plant is satisfied.</p>	<p>The PO/WSC will submit the revised D/D on 24th September.</p> <p>The PO/WSC informed that the capacity of the existing power supply would be sufficient for upgrading the existing W.T.P to 2,000m³/day.</p>	
2-7. Electrical machinery facility specifications	<p>- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.</p>	<p>Water treatment plant- 3000m³/day:</p> <ul style="list-style-type: none"> - Single line diagram of pumping station: Re-check the parameters of the circuit breakers, contactors, ammeters, overload relays and disconnectors. They are too small. - According to F/S, the water pumps, which are to be installed in the pumping station 2 shall be controlled by frequency inverter, but there is no 	<p>The PO/WSC will submit the revised D/D on 24th September.</p> <p>The PO/DPI submitted on 29th September.</p>	It is suitable.

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		<p>mention of inverter on the drawing.</p> <p>- In the next time, the voltage to supply to the transformer station: will be changed from 10KV to 22KV. They will use transformer could control by 2 levels -According to F/S the capacity of transformer is 180KVA</p> <p>- The specifications for the electrical machinery are missing.</p> <p>Regarding upgrading W.T.P, all detailed design for the system is lacking.</p>		
2-8. Land acquisition plan	<p>-The Survey Team comprehends the site conditions of land acquisition and residents.</p> <p>-The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.</p>	<p>The SAPI Study team visited the sites of intake, pumping station and water treatment plant for Hong river. The water treatment plant is located on a small hill. These lands are under the District management.</p> <p>The residents in the commune have planted trees on this land. No house is built on these lands and no resettlement is involved. According to the explanation of the PO/WSC, the land acquisition requires only the compensation for the trees planted. The Minutes of Meeting between Lao Cai construction Department Bao Thang DPC and Lao Cai Waco has been signed on 23.06.2009 for their agreement to construct intake, pumping station and water purification plant on their designated land.</p> <p>For the existing plant upgrade, no land acquisition is required. The tanks of the existing Plants would be upgraded by changing the technology.</p> <p>The distribution network will be laid along the road and buried under the ground so no land acquisition is required.</p>	The PO/WSC presented copy of the Minutes of Meeting to the SAPI Study Team.	
3. Operation Plan				

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-1. Placement of personnel & manpower secure plan	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan.</p> <p>-Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>The PO/WSC confirmed to the SAPI Study Team that they have no plan for the placement of personnel and manpower secure. The Study team presented to the PO/WSC the Plan of Hue and Thai Nguyen water supply company. The Study Team also presented to the PO/WSC the copies of O&M manual prepared under the JICA Technical assistance programme in Hue Province.</p> <p>FS mentioned about detailed Placement of personnel & manpower secure plan</p> <p>The SAPI Team recommended that personnel of PO/WSC can be sent to the plant of Experienced water supply company for the training and study of their Plan.</p>	<p>The PO/WSC proposed that they will recruit the personnel who will be doing the water quality monitoring. They also proposed to send them to the Experienced water supply company for the training and study of their Plan before the operation of the JICA project for Lu Town.</p> <p>The PO/WSC agreed to the requirement of JICA for making of Placement of personnel & manpower secure plan and will include it in the D/D.</p>	
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>The PO/WSC has proposed 22 person's team for the O&M of the JICA proposed water supply project. In which there will be 1 drainage engineer, 2 College technicals and remaining 19 workers will be divided into 3 teams (First, operation team for water treatment, Second, customer management & account team, and Third, repairing and installing team.).</p> <p>The Lao Cai Water Supply business company State 1 member Co., Ltd. (Lao Cai Waco) is PO and also is the operation and Maintenance agency in the province. At present, the PO/WSC is operating 12 water treatment plants (LaoCai, Coc san, Cam Duong, Sapa, Bao Thang, Bao Yen, Van Ban,SiMaCa, Bat Xat, Muong Khuong, Bac Ha, Tang Loong, capacity from capacity 300, 1000,</p>	<p>Bao Thang water supply company enterprise under Lao Cai one member water supply business company Ltd. was set up for operation and maintenance of the water supply system of proposed JICA project similar to other towns/districts in Lao Cai Province.</p> <p>The PO/WSC understood the necessity of capacity building for the JICA project and</p>	

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		<p>1500, to 14,000 m³/day with service coverage 75% to 95%) in the province.</p> <p>The SAPI Study Team visited the Lao Cai water purification plant which was constructed and commissioned 15 years before under French Assistance. The SAPI Study Team also visited the existing Bao Thang water treatment plant of capacity 1,200 m³/day using Lu Stream as water source. This Plant was constructed and commissioned under SPL II assistance of JICA. The existing Bao Thang Plant is being operated and maintained by Bao Thang water supply Branch. The Branch has 12 persons.</p> <p>The SAPI Study Team assessed that these plants are operated satisfactorily. The SAPI Study Team recommended that there shall be enough capacity building of the personnel who will be assigned for the JICA project for O&M before the operation of the water supply system.</p> <p>In the revised FS mentioned organization chart for O&M is suitable.</p> <p>Financial report was revised in which mentioned Production cost is 3,189 VND/m³ Water tariff is 3,500 VND/m³ It is acceptable.</p>	<p>agreed to the recommendation of the SAPI Study Team. They informed that they will implement the capacity building programme during the construction of the project.</p> <p>The PO/WSC agreed to include the details of the Plan in the D/D.</p> <p>The PO/WSC provided the details plan in the D/D report.</p>	
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality</p>	<p>F/S does not mention the water quality control Plan. The PO/WSC is operating 12 water treatment plants in the province. They send the samples of treated water of these plants to the laboratory of the Health of Prevention Centre of the Health Department of the Provincial for all examination. They informed that they have laboratories at their existing plants where they conduct the pH, turbidity, residual chlorine and Jar test. The SAPI</p>	<p>The PO/WSC agreed to the requirement of JICA for making of Water Quality Control Plan and will include it in D/D.</p> <p>The PO/DPC also agreed to the observations of the SAPI Study Team. They</p>	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>Study Team visited the existing water treatment plant of capacity 1200 m³/day using Lu Stream as water source and 14,000 m³/day capacity plant (Lao Cai WTP) using Namthi stream (upstream of Hong river) as water source. At both the plants the study team inspected the laboratory where above tests are carried out. The laboratory at Lao Cai WTP functions as central laboratory where 16 parameters are analyzed. The laboratory at the existing plant (Bao Thang) can analyze parameters such as pH, residual chlorine, turbidity, and Jar test.</p> <p>The SAPI Study Team informed to the PO/DPC that it is very necessary that they develop their capacity with regard to daily water quality control. The SAPI Study Team presented to the PO/DPC the Plan of Hue water supply company. The SAPI Study Team also presented the copies of the O&M manual including water quality control prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Study Team informed that making of Water Quality Control Plan is one of the requirements of JICA before the commencement of construction works.</p> <p>The revised F/S mentioned about water quality control program. .</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall-management and NRW reduction under the JICA Technical Cooperation Programme. As a result, the Hue water company monitors water</p>	<p>understood to develop their capacity with regard to daily water quality control. They agreed to send their staffs to the Experienced water supply company for the training and study of their Plan.</p>	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>quality on hourly basis and declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.</p>		
<p>3-4. House connection's promotion plan</p>	<p>To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>In the report, 90% coverage in phase I (2015) and 100% in phase II (2025) is planned. The SAPI Study Team expressed concern on the viability of such high coverage plan. The PO/WSC explained that at present, all the population along the main and distribution pipeline on road would be provided free of charge 6.5 m service line and water meter by the LaoCai Waco supply company. Regarding the householders who are far from the distribution, Lao Cai Waco will provide free of charge service line and water meter but households would have to contribute their labour to install the service pipe line. The PO/WSC also informed that the PR/Community participation & awareness activity would be implemented to ensure the target coverage.</p> <p>The revised FS mentioned plan for promotion of house connections.</p>	<p>The PO/DPC considered the suggestion of the SAPI Study Team for House Connection Campaign and informed that there is provision of the local budget for this purpose. They informed that they will prepare the "House Connection promotion Plan" and implement it during the construction of the project.</p> <p>The DPI/PO/WSC informed that Pho Lu town will be upgraded to level IV town in 2015. The residents need urgently clean drinking water. This will improve the people's health, livelihood, and environmental sanitation for Pho Lu town. It will create for improved environment for the investment and infrastructures in the town.</p>	<p>The PO/WSC is operating 12 water treatment plants in the province with coverage ratio from 75% to 95%. Therefore, the SAPI Study Team concluded that their 90% coverage plan for phase I is achievable. They have Plan to achieve 100% coverage until phase II.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>There is no provision of sludge drainage Plan in both the proposed plants. The SAPI Study Team discussed the sludge drainage Plan with the PO/WSC. In the Hong Water Purification Plant, there is pre-sedimentation which sludge would be discharged back to the river. Other sludge in both the Plants would be appropriately drained, treated and disposed off in the designated landfill. Since there is space constraint in the Hong water purification plant, which is located on the top of a hill, the SAPI Study team suggested to prepare the Plan at the near bottom of the hill, if required.</p> <p>In the revised F/S they mentioned drainage plan for Sludge</p>	<p>The PO/WSC agreed to the suggestion of the SAPI Study Team and informed that they will include the sludge drainage Plan in the D/D and submit to the SAPI Study Team by 24th September 2010.</p> <p>The PO/DPI received on 29th September 2010.</p>	It is acceptable.

PHOTOS Lao Cai/Bao Thang

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Meeting
with Lao Cai DPI/ PO



Interview
for resident of proposed service area



Location of proposed New WTP
Q=3,000m³/day, located behind hill



Location of Proposed New Intake Facility
located at the right bank of Hong River
(view from downstream)



Exist. WTP
would be upgraded from Q=1,200 to 2,000m³/day



Exist. Intake Facility
located at the right bank of Lu Stream, capacity would be upgraded
(view from upstream)

3.3 Project No. 03: Thai Nguyen (Pho Yen, Phu Binh)

A. Project Summary

1. **Project Title:** South Area Water Supply System of Pho Yen District and Diem Thuy area of Phu Binh District
2. **Province:** Thai Nguyen Province
3. **District:** Pho Yen District and Diem Thuy District
4. **Project Site:** South Pho Yen District and Diem Thuy District
5. **Project Objectives:** Supply clean water to satisfy domestic, commercial demands for Pho Yen and Diem Thuy areas, contributing to improve living standard, people's health as well as to develop socio-economic
6. **Scope of Project:** To construct booster pumping station with capacity $Q=5,500\text{m}^3/\text{day}$ (phase 1 2010) and $Q=9,000\text{m}^3/\text{day}$ (Phase 2 2015), which also includes reservoir, administration house, gate & fence, transforming station, pipe network with total length of 49360 m.
7. **Project Owner:** Thai Nguyen Water Supply Company
8. **Operation and Maintenance Agency:** Thai Nguyen Water Supply Company
9. **Project Investment decider:** Thai Nguyen People's Committee
10. **Project cost:** 30,000,000 VND
11. **JICA Portion:** 24,750,000VND
12. **Documents received by the SAPI Study Team:** F/S report, Detailed Design drawings, detailed design calculations.

B. Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/WSC, made the visit of the project site, discussed and clarified issues with the DPI, PO/DPC and WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>The Treated water from the Song Cong water treatment plant would be used as water source for the JICA project. The Study team visited the plant and Cong river which is water source for the plant. There was sufficient water volume flowing in the river under the dry season condition.</p>	<p>PO/WSC provided 12 months data of water quantity to the study team.</p>	<p>Since this SPL sub-project is only the distribution networks, JICA requirement may not be applicable. Anyway, the JICA requirement is met.</p>
1-2. Securing the water quality for drinking water	<p>acceptable</p>	<p>The team obtained 12 months data of both the raw water and the treated water which confirms to the raw water standard and the drinking water standard of Vietnam.</p> <p>There are 2 samples for raw water of Sep 2003 and Jan 2002 (20 parameters). However, the number of parameters is not sufficient. In case of the drinking water, there are 15 parameters.</p> <p>There is no laboratory at the exiting Song Cong water purification plant. There is provision of laboratory in new the purification plant, which would be constructed under Norway fund. The laboratory of Tich Luong water purification plant function as a central laboratory. The team visited this laboratory and confirmed the records of maintenance of water quality equipments.</p>	<p>PO/WSC provided 12 months data of water quality to the study team.</p> <p>DPI and PO/WSC agreed to the observations of the SAPI Study Team.</p> <p>The PO/WSC provided the water quality test of remaining 9 parameters on 22th Sept 2010</p>	<p>SAPI Survey Team considers that the JICA requirement is met as far as the frequency of data and laboratory is concerned. SAPI Survey Team recommended PO/WSC to introduce the drinking water testing of remaining 9 parameters (currently uncovered) twice a year according to VN standard.</p> <p>After checking the submitted data of the remaining parameters, the</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/WSC	Opinion of Team
				survey team confirms that data of water source quality meets the JICA requirement.
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	PO/WSC explained the team background on the assumptions for calculating the demand forecast. Except coverage ratio, all other assumptions appeared to be reasonable. The team would recommend PO/WSC to re-check population and households for the exiting and forecasted figures.		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	FS mentioned water demand in first phase as 5500 m ³ /day and in the second phase as 9000 m ³ /day. The existing capacity of the plant is 15,000 m ³ /day, which would be rehabilitated and expanded to 20,000 m ³ /day under the Norway fund. So, there is sufficient water for the JICA project.	PO/WSC confirmed that only 50% of the treated water from the Song Cong water purification plant could be used for the existing service area and the remaining treated water would be available for the JICA project, which has water demand of 9000 m ³ /day only (phase II /year 2015).	
2-3. Water purification method	The Survey Team will confirm the long term cost & benefit efficiency of the water purification method. -The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors	The Treated water from the Song Cong water treatment plant would be used as water source for the JICA project. The existing capacity of the plant is 15,000 m ³ /day. This plant was constructed in 1975 and commissioned in 1978 with the assistance of Russia. This plant is already spent its life and its technology has also become outdated. This plant would be rehabilitated and expanded to 20,000 m ³ /day capacity under the Norway fund and would be based on the same technology as in the Tich Luong water purification plant. Thai Nguyen Water Supply company is a provincial company and	According to DPI/PO/WSC, the agreement between the Government of Norway and the Government of Vietnam (Ministry of Finance) will be signed on November, 2010.	

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		<p>operating and maintaining both the plants. The team assessed that the new Song Cong water purification plant can be sufficiently operated and maintained by the Thai Nguyen Water Supply company.</p> <p>JICA project includes only booster pumping station, distribution network and house connections.</p>		
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>The Study Team reviewed the D/D Drawings and structural calculation for the reservoir in the Booster P/S. PO/WSC also provided the study team the D/D report including the geotechnical survey result and structural calculation for the Booster P/S. The team found it appropriate and informed that if there is any comment from the detail review after returning back to Hanoi, team will inform to PO/WSC.</p> <p>The Study Team confirmed the laboratory room in D/D report for the expansion project of Song Cong WTP.</p> <p>The SAPI Study team has comments on the obtained documents.</p>	<p>The PO/DPI will submit revised documents on 7th October 2010.</p> <p>The PO/DPC submitted the revised document on 6th Oct 2010</p>	<p>After checking document, the SAPI team confirm that the D/D is suitable</p>
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	<p>-The Survey Team needs to confirm the appropriateness of these plans.</p>	<p>The study Team reviewed F/S report, D/D drawings and the hydraulic analysis in D/D. Pipe length and/or diameter in D/D drawings don't correspond to the hydraulic analysis. The Study Team recommended that the hydraulic analysis shall be rechecked. PO/WSC also explained that the connectivity of the existing network and to be rehabilitated & expanded new network under Norway fund including raw water transmission, pumping stations have been studied and there is no technical issues in connecting them to the JICA project's network.</p>	<p>PO/WSC will recheck the hydraulic analysis according to the SAPI Survey Team's recommendation.</p> <p>The PO/DPC submitted the revised document on 5th Oct 2010</p>	<p>After checking document, the SAPI team confirm that the D/D is suitable</p>
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the</p>	<p>PO/WSC have already executed an agreement with EVN to provide power supply to the JICA project.</p>	<p>PO/WSC provided a copy of agreement to the team.</p>	<p>JICA requirement is met.</p>

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	memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.			
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	PO/WSC explained that the detailed design for electricity up to the transformer station has been done by the EVN. Regarding the specifications of electrical machinery facility inside the plant, the team studied the documents provided by PO/WSC and found it appropriate.	DPI and PO/WSC agreed to the observations of the SAPI Study Team.	JICA requirement is met.
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The land for the booster pumping station is already acquired from the provincial fund. The distribution network will be laid along the road and buried under the ground so no land acquisition is required. The team visited the land for the booster pumping station, Which has already been developed for the construction of pumping station.	PO/WSC provided a copy of the land acquisition to the team.	.
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	The study team visited the Tich Luong water purification plant, which was constructed and commissioned in year 2002 under ADB. This plant is operated and maintained by the Thai Nguyen Water Supply company. The team assessed that the placement of personnel and man power secure plan is appropriate.	They informed that after the rehabilitation and expansion of the Song Cong water purification plant, the same plan would be used here and assured the team that they will further improve it based on their experience with the Tich Luong water purification plant for the water quality monitoring.	
3-2. O&M facility plan	-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.	The O&M agency for the JICA project is Thai Nguyen Water Supply company. Thai Nguyen Water Supply company is a provincial company O&M for the entire water supply system of urban areas in the province. The team visited the Tich Luong water purification plant, which was constructed and	They informed that an enterprise under the Thai Nguyen Water Supply company would be especially formed for the JICA project for	

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		<p>commissioned in year 2002 under ADB. The team assessed that the plant is well operated.</p> <p>Currently water tariff for the domestic supply which was approved by Thai Nguyen PPC is 5000 VND/m³ for Thai Nguyen city. Regarding Trai Cau WTP (under SPL V) water tariff is 4300 VND/m³. Based on calculation of FIRR for the project, the total production cost is 3656 VND/m³. So, the project is financially sustainable.</p>	<p>operation and maintenance of the booster pumping station, distribution network and house connection. They presented their plan to the study team. .</p>	
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>The O&M is for the JICA project is Thai Nguyen Water Supply company. They are also operating the Tich Luong water purification plant, which was constructed and commissioned in year 2002 under ADB. The study team visited the plant and the laboratory of the plant to study the water quality control plan. The laboratory was equipped with the testing equipments for the basic water quality testing. They have experienced staff for the water quality control. They take 6 samples per day at the outlet of each unit from intake to clear water well and analyze those samples in their laboratory. Twice a month they take sample of water source, clear water well and from the taps (which they say select randomly) and send to the laboratory of the Health Department of Thai Nguyen Province for the more detailed examination.</p> <p>The team assessed that water quality control is well implemented in this plant.</p>	<p>DPI/PO/WSC confirmed that the same water quality control plan would be adopted for the Song Cong water purification plant when it will be rehabilitated and expanded under the Norway fund. Also, the plant under Norway fund would be based on same technology as in Tich Luong water purification plant. They have planned to construct a small laboratory also under the Norway fund. However, the laboratory of Tich Luong water purification plant would function like a central laboratory.</p>	
3-4.	To review the problems concerning the promotion plan	JICA project has coverage of 65% in phase I and	They stated that they	The request of

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House connection's promotion plan	<p>for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>70% in phase II. The SAPI Team expressed their concern to DPI/PO/WSC on the low coverage in this project and visited those sites where connections cannot be provided. The team found those houses very scattered and far from the distribution network which is laid along the roads. WSC set a rule that they connect the houses within 30m from the transmission line, taking into consideration the limited financial resources. The team understood the situation but still expressed their concerned that 100% households should be provided with the safe drinking water.</p>	<p>provide the water meters to the household free of charge, There is fund constrained to connect those houses but assured the team that if the proposed plan found to be efficient in the future they will consider to connect those houses also.</p> <p>They requested to JICA to allow them to utilize 20% contingency fund which can be used to increase the service coverage from 65% to 75%.</p> <p>Regardless, they confirmed that all the schools, hospitals and public institutions would be provided with the connections regardless of their location from the distribution network.</p>	<p>PO/WSC will be conveyed to JICA.</p>
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>The survey team visited the exiting Song Cong water purification plant, where sludge is drained to a lagoon nearby. However, this plant would be rehabilitated and expanded under the Norway fund and will adopt the same technology as in Tich Luong water purification plant, which was constructed and commissioned in year 2002 under ADB fund. This plant has proper system for the sludge treatment and recycle of muddy water.</p>	<p>PO/WSC confirmed that the same technology would be applied in the Song Cong water purification plant when it will be rehabilitated and expanded under the Norway fund.</p>	

PHOTOS Thai Nguyen/Pho Yen, Phu Binh

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Meeting
with Thai Nguyen DPI/ PO



Exist. Laboratory
in the exist. WTP in Thai Nguyen



Location of proposed BP/S
Q=200m³/h, H=48m, 2nos.



Proposed Supply Area



Exist. WTP
would be upgraded under Norway fund from Q=15,000 to 20,000m³/day, which is water source of this Project



Exist. Intake Facility
located at the left bank of Song Cong River, capacity would be upgraded under Norway fund (view from downstream)

3.4 Project No. 04: Phu Tho (Tam Nong)

A. Project Summary

1. Project Title: **Water Supply System for Hung Hoa Town**
2. Province: Phu Tho
3. District: Tam Nong
4. Project Site: Hung Hoa Town, Tam Nong District
5. Project Objectives: Construction of a clean water supply system for Hung Hoa Town and neighboring communes , Hong Da, Dau Duong, Tho Van, Di Nau, Huong Non, Thuong Nong and Co Tiet meeting water supply demand until 2020 with phase I (2010) 3,000m³/day and phase II (2020) 6,000 m³/day capacity to contribute to improvement of health, life and environmental sanitation for Hung Hoa Town and 7 neighboring communes.
6. Scope of Project: a reservoir 500m³, a booster pressure pumping station capacity 2,000m³/day, transmission and distribution pipelines system
7. Project Owner: Tam Nong District People Committee
8. Operation and Maintenance Agency: Phu Tho Water Supply JSC
9. Project Investment decider: Phu Tho Provincial People's Committee
10. Project cost: 38,941,930,000 VND
11. JICA Portion: 30,000,000,000 VND
12. Documents provided by DPI & PO: DD, FS, Project construction investment report

Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility. -Taking into consideration the difference between dry and wet season, data for 12 months of water quantity. -The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data. -If data is not sufficient, the survey team should propose as the criteria.	Water source for the project is the treated water from Thanh Thuy WTP located in Xuan Loc Commune with capacity for phase I is 8,000m ³ /day using surface water of Da river operated since early 2009 (base on the investment project on water supply for Hung Hoa-La Phu area, Phu Tho Province Phase I until 2010 capacity 8,000m ³ /day) 12 month water quantity monitoring data of water source, treated water, and real quantity of supply water of the Xuan Loc WTP is requested to be provided to the survey team.	DPI, PO, WSC clarified the following items; 1. DPI, PO, WSC requested the project, which are composed of transmission pipe, booster pumping station, reserve tank and distribution pipe to supply water to project area., Therefore it is natural that DPI guarantees to supply required water to the project area. and to submit agreement to connect treated water to the transmission pipe of the project. 2. DPI, PO, WSC agreed to provide survey team the 12 month raw water quantity data.	Under the scope of this project, only investment for the clean water transmission and distribution pipelines; therefore, requirements of JICA is not applied for this item. The survey team assume that water quantity of the water source meets JICA requirement.
1-2. Securing the water quality for drinking water	-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam. -Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam. -In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source. -The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data. If data is not sufficient, the survey team	Missing 12 month water quality analysis reports for water source and treated water of the Thanh Thuy WTP in the F/S. DPI, PO are requested to provide survey team the full 12 month data on water quality of water source and treated water in accordance to QCVN 08-2008/BTNMT on surface water quality and QCVN 01-2009/BYT on drinking water quality.	DPI, PO provided the water quality data of Da river raw water for two typical months of dry season (November) and raining season (May) and treated water for 4 months after starting operation. The WSC agreed that missing parameters on water quality of raw water and treated water in accordance to QCVN 08-2008/BTNMT and QCVN 01-2009/BYT will be checked	- After checking the provided data (4 month treated water quality), the survey team assume that the water quality meets Vietnamese standard for drinking water

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	should propose as the criteria.			
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>Two target investment phases in F/S is phase I 2008-2010 and phase II until 2020 with parameters below:</p> <ul style="list-style-type: none"> - Demand forecast was calculated for 8 communes with total population for domestic supply is 36,918 persons (2010) and 39,569 persons (2020). - Water supply Criteria in F/S is 60 l/cap/day (2010) and 100l/cap/day (2010). Only for Hung Hoa Town is 90l/cap/day (2010) and 140l/cap/day (2020). - Service ratio is 30% - 100% (2010) and 90% - 100% (2020) depending on the main supply area and neighboring areas. - Water for public is 10% of domestic for both phases. - Water for commercial and service is 20% of the domestic. - Water loss is 20% (2010) and 15% (2020). <p>Comments:</p> <ul style="list-style-type: none"> - Generally, the parameter used for water demand calculation is suitable for each investment phase - Population was calculated with forecast for the project. However, the DPI and PO should provide the base data of population calculated (including the latest statistical year book) 	<p>DPI, PO explained that the total population was calculated based on the questionnaires conducted by the project. Copies of questionnaires were provided on 20/9/2010.</p> <p>District statistic book 2009 and socio-economic development plan of Tam Nong District until 2020 were also provided to the team on 20/9/2010.</p> <p>PO submitted the team the revised DD report on 29 Sept 2010</p>	<p>After checking the provided data, reports, and site visit, the survey team assume that calculated water demand for the project is suitable</p>
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification	Water demand forecast result for 8 communes with total capacity of WTP is 3,000m ³ /day for phase I (2010) and 6,000m ³ /day (2020) with a booster pressure pumping station capacity of	The project target year is 2020, thus, the transmission pipeline should be calculated requirement volume of 2000m ³ /day to provide 5 communes. Submitted reports to survey team	After checking the submitted documents, the team confirm that the supply volume and purification volume is

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	plant, existing and planned.	<p>2,000m³/day (2010) for water supply for 5 communes which the capacity of the pumping station of the WTP can not cover.</p> <p>The booster pressure pumping station is mentioned for phase I – 2010 and now the year is already 2010. It may take 1 year after the project construction start to complete construction of the booster pressure pumping station. Therefore, calculated capacity of the booster pressure pumping station can be enough for water supply for the 5 communes?</p> <p>Clean water from the WTP 8,000m³/day is used for water supply for the project, but this WTP is not within the scope of the project investment. But, the F/S does not mention whether the WTP is in operation now or under construction and its water supply plan. In the F/S, agreement on water supply for the project targeted areas with capacity of 3,000m³/day (2010) but not mention whether the WTP will continue to supply clean water capacity 6,000m³/day for the targeted project. Though the hydraulic calculation is missing in the F/S, but after checking the main pipelines DN400, this pipeline is enough capacity for water supply for phase II (2020)</p> <p>DPI, PO are requested to provide following data:</p> <ol style="list-style-type: none"> 1. Check and explain more clearly the capacity of the booster pressure pumping station can supply enough water for 5 targeted communes after construction completion. 	<p>describes equivocate project scope and investment capacity. Thus, the PO amended F/S and submit to the survey team by 29/9/2010.</p> <p>The booster pumping station 2,000m³/day has already calculated the capacity until 2020, thus secure the water supply for the 5 communes by the booster pumping station until 2020</p>	suitable

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		<p>2. Provide information and water supply plan of the 8,000m³/day WTP. In case this WTP is not yet constructed, construction plan of this WTP should be provided to the team.</p> <p>Check the water supply agreement for the project areas 3000 m³/day and the proposed transmission pipeline D400 for 6000 m³/day. Whether the 8000 m³/day WTP will continue to supply water for the project areas until 2020 (6000 m³/day)? If not, the pipe diameter should be readjusted to fit it.</p>		
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>Within the scope of project, no investment for water treatment plant; instead, treated water from a WTP located in Xuan Loc commune is used for the project. To evaluate quality of the treated water providing for the project, DPI, PO is requested to arrange site visit to the WTP in Xuan Loc commune and explain more about the current condition of the WTP.</p> <p>The survey team visited the Thanh Thuy WTP and found that it officially started operation since June 2010 with capacity of phase I is 8,000m³/day with treatment process as follows: Raw water – mixing tank – chemical tank – horizontal sedimentation tank – rapid gravity filter tank.</p> <p>Base on the raw water quality data of Da river surface water, the water treatment technology of the WTP is suitable.</p>	<p>The water treatment technology of the Thanh Thuy WTP is the popular technology in Vietnam and Phu Tho province</p> <p>DPI, PO, WSC assure that the water treatment plant, which has been already constructed and operated by themselves, supply clean water to the whole project area continuously and stably.</p>	<p>After checking the Thanh Thuy WTP, the survey team assume that the technology is suitable, the Phu Tho WSC is capable for operation and management</p>
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the</p>	<p>Construction items of the project water supply system consists of 01 500m³ reservoir, transmission pipe network D400 of composite material, distribution pipe network of HDPE material, and a 250m² booster pressure pumping station.</p>	<p>Department of Planning and Investment, the project owner agree to supplement the missing data and revise the F/S and DD as requested</p> <p>PO submitted revised DD to the team on September 29, 2010</p>	<p>After checking the submitted documents, the team confirm that civil structure is suitable</p>

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	<p>appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>Topography, Geology and Hydrology in the construction project area are mentioned only briefly in the project report without specific inspection reports. Documents explaining civil structural design is not available</p> <p>Survey team detected that only D/D for reservoir is available and D/D for booster pressure pumping station is incomplete, lack of civil structure drawing for foundation and roof of the station.</p> <p>The composite transmission pipelines D400 with many large bending angles (from 20o to 89o) was not designed with bend supports.</p> <p>DPI, PO/consultant are requested to supplement the structural calculations and detail drawings of the deficit mentioned above.</p>		
<p>2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying</p>	<p>-The Survey Team needs to confirm the appropriateness of these plans.</p>	<p>No D/D calculation reports for transmission pipelines and water distribution. The attached drawings are design documents for the entire water supply system project for Hung Hoa – La Phu, Phu Tho province. This JICA funded project just cover the clean water supply for Hung Hoa town, Tho Van commune, Di Nau commune, Huong Non and Co Tiet commune with calculated capacity of 3,000m³/day. Thus, DPI, PO are requested to clarify and to provide following related data:</p> <p>Based on DD (no D/D report) we received from the Ministry of Planning and Investment, no objection for the designing form, pipe installation method, and drawing form. But, to evaluate the compliance between pipe diameter and</p>	<p>Department of Planning and Investment, the project owner submitted the survey team the revised DD for pipeline, hydraulic calculation, intersection excavation drawings on September 29, 2010</p>	<p>After checking the submitted documents, the team confirm that plans for raw water transmission, water distribution, water supply systems and pipe laying are suitable</p>

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		<p>capacity of booster pressure pumping stations of 3000m³/day or 2000m³/day, followings are requested to provide the team:</p> <ul style="list-style-type: none"> - Hydraulic calculation for transmission and distribution pipelines within the project scope (including the flow division and the calculation method). - to supplement the transaction drawings on excavation work of the transmission and distribution pipelines. - Drawing of transmission and distribution pipelines (the final version with stamp) 		
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>The memorandum/agreement with the EVN is missing.</p> <ul style="list-style-type: none"> - The detailed design drawings of the 75KVA-22/0.4KV transformer sub station and the medium voltage line 22KV are available 	<p>Department of Planning and Investment, the Project owner provided the survey team the Minutes of agreement on power supply relating to the Hung Hoa booster pumping station on 20/09/2010</p>	<p>After checking the plan, the team confirm that the memorandum on securing power supply plan is suitable</p>
2-7. Electrical machinery facility specifications	<p>- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.</p>	<p>After checking the F/S and D/D the Survey team found that the following drawings are missing:</p> <ul style="list-style-type: none"> - The lighting plan of the booster pressure booster pressure pumping station and the outdoor lighting plan. - The arrangement plan of the power cables in the booster pumping station. - The control diagram of the pumps. - The list of main electrical equipments of booster pressure pumping station. - The earthing plan of the booster pressure pumping station.. - The specifications of the electrical 	<p>Department of Planning and Investment, the project owner submitted the revised F/S and DD to the survey team on September 29, 2010</p>	<p>After checking the submitted documents and site survey, the survey team confirm that electrical machinery facility specifications of the project is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>machinery. Furthermore, there are no signatures of the designer on the drawings</p>		
2-8. Land acquisition plan	<p>-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.</p>	<p>Land acquisition plan for the project booster pressure pumping station and pipelines is missing in the project F/S and D/D profile. DPI, PO are requested to clarify this plan.</p>	<p>DPI, PO explained that the transmission pipelines installation areas is within the 3m space of the existing irrigation ditch, the distribution pipelines is within the protection space of the national road; this is the public land. The land acquisition is needed for the crossing road, dam, and for the booster pumping station. Though the location of booster pumping station is existing pond, it is easy to acquire the land. DPI, PO provided the land acquisition plan to the survey team on 20/9/2010</p>	<p>After reviewing the submitted land acquisition plan and site visit, the survey team assume that this plan is suitable</p>
3. O&M Plan				
3-1. Placement of personnel & manpower secure plan	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>Placement of personnel & manpower secure plan for the project booster pressure pumping station and pipelines is missing in the project F/S and D/D profile. DPI, PO are requested to clarify this plan.</p>	<p>DPI, PO explain that the Phu Tho WSC will operate and manage the project after completion. The PO submitted the plan to the survey team on September 29, 2010</p>	<p>After checking the submitted plan, the survey team confirm that placement of personnel & manpower secure plan is suitable</p>
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>O&M plan for the project booster pressure pumping station and pipelines is missing in the project F/S and D/D profile. DPI, PO are requested to clarify this plan.</p>	<p>DPI, PO submitted the supplemental O&M plan for the booster pumping station, pipelines in F/S to the survey team on September 29, 2010</p>	<p>After checking the submitted documents, the team confirm that the O&M facility plan is suitable</p>
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan. -If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not</p>	<p>Base on the F/S and D/D, the team understand that the booster pressure pumping station, transmission and distribution pipelines of this project is included in the overall water supply system of Hung Hoa - Phu La (including</p>	<p>Phu Tho WSC is responsible agency for water quality control of the project site DPI convinces that the capacity of Phu Tho WSC for water quality control including analysis of required</p>	<p>The survey team confirm that the submitted plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>water treatment station). But, the water quality control plan is not covered in the project construction investment profile. DPI, PO are requested to provide followings:</p> <ul style="list-style-type: none"> - The responsible agency for water quality control for both water source and treated water. - Availability of a Labo in the water treatment plant located in Xuan Loc Commune; how many parameters are checked for raw water and treated water. - Water quality control plan at water treatment station, and booster pressure pumping station. 	<p>items of raw water and treated water is enough to supply safe water to the project area.</p> <p>DPI, PO submitted the water quality control plan for the project including organization staff, frequency of analyzing items and etc. on September 29, 2010</p>	
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>House connection's promotion plan is missing in the project F/S and D/D profile. DPI, PO are requested to clarify following items:</p> <ul style="list-style-type: none"> - connection plan from supply pipeline to the households (who is responsible for pipe, tap, meter), - The scope of water supply distribution plan; how many meters of pipe from main supply pipeline will be provided. - any incentive policy for water connection to households under social welfare support 	<p>The PO also informed that connection from main pipe to meter in front of households in 6 communes, Hoang Da, Thuong Nong, Dau Duong, Huong Non, Co Tiet and Hung Hoa town will be invested by the national program on rural clean water and sanitary environment of the province in accordance to the Paper No. 2679/UBND-VXI dated Aug 3 2010. Households located far from the main supply network in Di Nau and Tho</p>	<p>After checking the provided connection plan and site visit, the survey team assume that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>- plan on water tariff under this project investment area.</p> <p>- The actual connection ratio of the area near the project site; data on poor families</p>	<p>Van communes will get 10% subsidized support cost and they pay 90% cost for connection pipe installation from main pipe to household (attached district Decision).</p> <p>Water tariff will be applied according to the Decision No.1638/QD-UBND, Phu Tho Province issued for Phu Tho WSC.</p> <p>Incentive support for social welfare families will be applied in accordance to provincial policy.</p>	
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>Within the scope of the project, only booster pressure pumping station and transmission and distribution pipe network are covered, therefore, sludge drainage plan for the current WTP is requested to be provided the survey team.</p>	<p>The sludge drainage system is available in the Thanh Thuy WTP.</p> <p>The disposal of sludge will be sent to river through the nearest channel in rainy season and pumping in dry season.</p>	<p>As result of site survey, the survey team confirm that drying bed was installed in the existing WTP, and the drainage plan of the WTP is suitable</p>

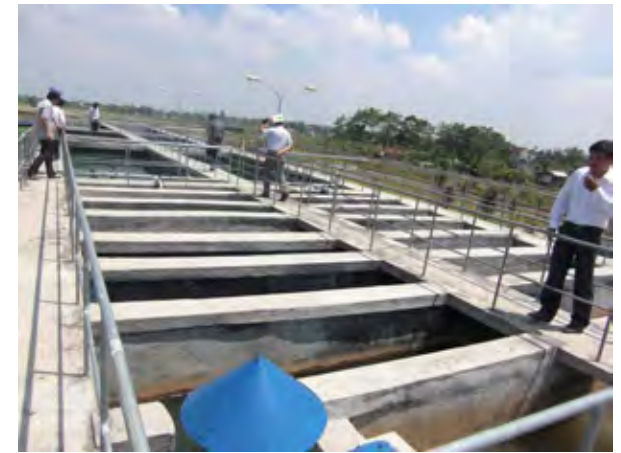
PHOTOS Phu Tho/Tam Nong



Meeting
with Phu Tho DPI/ PO



Existing intake facility
located at Da river



Existing water treatment plant
Q=8,000m³/day



Water Laboratory
Located in existing water treatment plant



Location of proposed pumping station
Q=2,000m³/day



Interview
Water supply is not served in the area currently. Most of people use water in the shallow well polluted by sewage.

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3.5 Project No. 05: Bac Giang (Luc Nam)

A. Project Summary

1. **Project Title:** Water Supply system for Doi Ngo Town, Luc Nam District
2. **Province:** Bac Giang
3. **District:** Luc Nam
4. **Project Site:** Doi Ngo Town, Luc Nam District
5. **Project Objectives:** Construction of a water supply system to supply clean water for Doi Ngo Town and some neighboring communes contributing to improve people life in the project area.
6. **Scope of Project:** Construction of a water supply system with capacity of 3,500m³/day including Intake, Pumping station I, raw water transmission pipeline, water treatment plant, distribution pipeline
7. **Project Owner:** Luc Nam District People Committee
8. **Operation and Maintenance Agency:** Water Supply Enterprise under management of Luc Nam DPC
9. **Project Investment decider:** Bac Giang Provincial People's Committee.
10. **Project cost:** 29,946,360,000 VND
11. **JICA Portion:** 19,569,000,000 VND
12. **Documents received by the SAPI Study Team:** F/S, D/D, D/D construction drawings report

Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility. -Taking into consideration the difference between dry and wet season, data for 12 months of water quantity. -The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data. -If data is not sufficient, the survey team should propose as the criteria.	The water source is used from Luc Nam river for the project. The SAPI team has reviewed the profile of investment construction project on Doi Ngo water supply system in Luc Nam Dist. Bac Giang Province, confirmed that missing in hydrology 12 month monitoring data/ in Luc Nam-Bac Giang. It was mentioned general information about the river width from 100m to 200m, the average depth of the river in the dry season from 2m to 5m, maximum level of water is 14.4m and the minimum level of water is 5.71m, therefore, the DPI is requested by the SAPI team to provide with fully monitoring data about hydrographic investigation of water source in 12 months from the Luc Nam river in the project site..	Water flow 12 month data 2009 of the Luc Nam river measured by Chu Hydrology/Gauging Station with $Q_{min} = 215,136m^3/day$ (Dec 25th 2009 – dry season)	Reviewing FS, DD, new provided data and after site survey to the intake point (pumping station I), we assumed that water quantity of the Luc Nam river is enough for the Doi Ngo WTP phase I 3,500m ³ /day and phase II 7,000m ³ /day
1-2. Securing the water quality for drinking water	-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam. -Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam. -In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source. -The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data. If data is not sufficient, the survey team should propose	In this area (around Hanoi Area), rainy season is May-September, and the Luc Nam river flow is lowest in December. The water result of Luc Nam river had only two sample tested in May 2008 with 12 parameters and in August 2008 with 25 parameters which meet MOH standard 1329/2002/BYT. To compare with the QCVN 08/2008, only 3 parameters were checked: turbidity = 200mg/l (the standard is 100mg/l), phosphate PO ₄ = 50mg/l (0.5mg/l), and Ecoli = 1050MPN/100ml (200MPN/100ml). - The turbidity will decrease 70% after	Luc Nam river is big river; from the pumping station 1 upstream, there are no pollutive facilities, only forest.. Near the pumping station 1, there are 2 water treatment plants using the water of Luc Nam river, upstream 2km the Cuong Son water supply plant, downstream 2km the Luc Nam Town WTP (for 900 households) and at the moment the	After reviewing FS, DD, new provided data and site survey to the intake point (pumping station I), we assume that the surface water of Luc Nam river can be used as water source for Doi Ngo WTP.

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	as the criteria.	<p>retention pond and meet the QCVN 08-2008 then</p> <ul style="list-style-type: none"> - PO4 will be oxidized in the mixing tank, retention pond, and will be turbiditised at the retention pond, vertical sedimentation pond, and gravity filtration tank. - E-coli is quite high; disinfection need to pay much attention <p>This water source can be used as take-in water for the Doi Ngo WTP. To fulfill the JICA requirement strictly, water quality monitoring tests needs to be conducted for January-April, Jun-July, and Sept-Dec and analysis result reports shall be provided then.</p>	<p>water quality resident using now is still good Water quality analysis report of Luc Nam river for 12 months (from Oct 2008 to September 2009) was submitted to the study team.</p>	
2.O&M Facility Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>Water supply Criteria in FS is 80 l/per/day (2015) and 100l/per/day. Service ratio is 70% (2015) and 90% (2025). Water public is 10% domestic for both phases. Water commercial and service is 10% domestic for both phases. Watering and road washing is 10% domestic for both phase. Water for small industrial sector is 10% domestic for both phases. Water loss is 25%, water use for WTP is 5%. Population in phase 1 – 2015 is 18,578 persons and 25,061 persons in phase 2 – 2025. General: the parameter used for water demand calculation in the FS is suitable except the water supply criteria and</p>	DPI, PO provided the survey team the adjusted water demand calculation on 29 th Sept 2010	After checking the submitted data and site survey, the survey team confirm that the water demand calculation for the project is suitable

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>service ratio for both phases. They are seemed smaller than Vietnamese standard. The adjust water demand calculation for Doi Ngo town is suitable.</p> <p>Population is mention in FS used base on the Doi Ngo town adjustment general construction master plan is suitable.</p>		
2-2. Water supply volume and purification volume	<p>The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.</p>	<p>Phase 1 in 2015: Q = 3,500m³/day. Phase 2 in 2025: Q = 7,000m³/day. Capacity is suitable with water demand calculation.</p> <p>The FS is not mention hydrology and drainage so that the DPI should provide date to make clear water quantity source.</p> <p>With the provided hydrology and drainage data, it is assumed that capacity of water source is suitable with Capacity of WTP.</p>	<p>DPI provided the survey team the data of Luc Nam river hydrology investigation report.</p>	<p>After checking the submitted data and site survey, the survey team confirm that the water supply volume and purification volume for the project is suitable</p>
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>The technology applied for the WTP is water surface - pre-sedimentation pond - vertical sedimentation tank in combination with the central reaction - gravity filtration tank, and reservoir.</p>	<p>DPI, PO explain that it is very easy to operate the water treatment plant because its technology is popular.</p>	<p>After review, the survey team confirm that the technology applied for Doi Ngo water treatment plant is acceptable based on appraisal component such as water source, the appropriateness of the plant capacity, construction cost.</p>
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey</p>	<p>1- Raw water transmission pipe laying: There is a difference in pipe material between DD and FS; in the DD, steel pipe D250 with L=3,112 in length from pump station 1 to the purification plant; meanwhile in FS, material of the pipe is uPVC-PN8, L=2,525m . DPI, PO are requested to clarify this difference.</p> <p>In the DD, pressure capacity of the pipe</p>	<p>The revised drawing of the raw water transmission pipe using uPCV material was submitted to the study team. The revised D/D was submitted to the survey team on 29 Sept 2010</p>	<p>After checking the submitted D/D and site survey, the survey team confirm that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	Team will confirm the laboratory room.	<p>should be described clearly (how much bar?) If pipe material is uPVC is used, 11.4° bend supporters should be prepared calculation of the 90° bend supporters need reconsideration</p> <p>2- Raw water pump station: Report on topographic investigation is available However, only one drilling test is not enough to evaluate land layer for the 2 raw water pump stations- intake and water treatment plant (3 km distance). It is necessary to re-check</p> <p>- Lack of reinforcement plan for protecting river bank for the pump station 1 to avoid erosion</p> <p>3 - Water Treatment plant: Detail design includes construction drawings and general plan for construction work inside the treatment plant is available. However, It is necessary to consider the path running around the TBII, chemical room,, and operation room To comply with the TCXD 33-2006, the location for pumping station I should be located toward the upstream about 100m-220m from the current location to secure the distance between the intake water for the pumping station location and the existing factory</p>	<p>Other geographic investigation reports of other drillings which was missed to attach to FS and DD were submitted to the study team fully.</p> <p>Reinforcement of the river bank to protect intake area (pumping station I): the DPI, district PC – PO, agree to add in the project and the plan was submitted to the SAPI team on 27 September. DPI, PO, district PC agreed to add in the path running around the Pumping station II, chemical room, and operation room and it will be implemented at the construction process. DPI, PO explained that they measured and found that the actual distance is more than 200m already so no need to relocate the pumping station</p>	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	Hydraulic calculation for raw water pipelines is requested to be provided. Based on the consultant's submitted data, the pipe laying is suitable	Hydraulic calculation for raw water pipe laying was submitted to SAPI team	After checking, the survey team confirm that it is suitable
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.	-Detailed design drawings of transformer 75kva-35/0.4kv for the raw water pumping station and 250kva-35/0.4kv transformer to supply power to the water treatment plant are available - The Memorandum with the EVN is available		The survey team confirm that the memorandum of the project meets JICA requirement
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	1. Raw water pumping station - According to the Detailed design report the pumps are to be operated in two modes: Manual/Auto. But on the control diagrams the manual/auto selector switches are missing. - hour counting meter need to be prepared for maintenance monitoring for the pumps - In the detailed design report, the electric valves on the transmission pipes are mentioned, but on the drawing they are missing. 2. Treated water pumping station: At control panel MCC2 - indicating lamps for pumps and valves are missing.	The pumping station will be operated only by hand, therefore, the detail design report will be revised accordingly. Lacking in electrical drawings will be revised and submitted by end of September. DPI, PO submitted the revised DD and missing data to the survey team on 29 Sept 2010	After checking the submitted DD and data, the survey team confirm that electrical machinery facility specifications is suitable
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The Land acquisition plan is included in the F/S Report.	District PC confirmed that the area for construction of the pumping station II (purification plant) is temporarily used as office for the blind association	After checking the submitted plan, the survey team confirm the plan is suitable

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
			during the period of preparing new office in other place for them. This area will be taken back by district PC any time after the project of WTP is agreed for construction. In addition, the chairman of the blind association also confirmed that they are ready to return the area to the project any time once receiving request form district PC.	
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	The Placement of personnel & manpower secure plan had to propose on the Report on Investment Construction Project is weak,	DPI, district PC informed that a management enterprise for the WTP under district PC using the staffs evolved in project management and the 2 staffs of the existing WTP of the town in parallel with the commencement of the project, and trainings will be prepared for the staffs based on the experience of the water supply company of Bac Giang city and other provinces Placement of personnel & manpower secure plan was submitted to the survey team on 27 September 2010 (Decision No.1284/KH-UBND dated 27/9/2010)	After checking the submitted plan, the survey team confirm that the plan is suitable
3-2.	-The Survey Team is required to confirm the	The O&M facility plan had to propose on	DPI, PO submitted to the	After checking the





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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
O&M facility plan	<p>appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>the Report on Investment Construction Project is weak,</p>	<p>survey team the plan on 29 September 2010 (Decision No.1284/KH-UBND dated 27/9/2010)</p> <p>Water tariff will be applied same as the Decision No.59/2009/QD-UBND of the Bac Giang PPC, in which the support to the social targeted people as the poor have been included already.</p>	<p>submitted plan, the survey team confirm that the plan is suitable</p>
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity</p>	<p>The SAPI Study Team studied the D/D, but can not found any where have the item Laboratory room in side of Water treatment plant for water quality control plan, water quality monitoring, we Request the OP/DPI to add construct the item Laboratory room in to project.</p> <p>Water monitoring plan for raw water, and treated water is not found in the FS and DD</p>	<p>DPI and district PC agreed to add the Lab in the project. Cost for this item will be used from the project auxiliary cost and/or the reduction cost from the bidding.</p> <p>District PC committed that if the cost from the project is not enough, they will allocate budget from district local budget for the establishment of the Lab.</p> <p>The detail plan for establishment of the Lab was prepared and submitted to the team on 4th September.</p>	<p>DPI, PO submitted to the survey team the plan on 27 September 2010 (Decision No.1284/KH-UBND dated 29/9/2010). After checking the submitted plan, the survey team confirm that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-4. House connection's promotion plan	<p>Strengthening Plan.</p> <p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	DD mentioned the plan for connection from supplying pipe to household with counter meter meets the project requirement.	<p>According to the explanation of district PC and also site investigation, most of the households in the town has their own pipe system in side their house waiting ready for the water supply pipe; therefore, the project just prepare pipelines to the gate of the households.</p> <p>In case of the poor, the district PC explained that they will prepare a tap after the meter for their use.</p>	After explanation of the district PC-PO, the survey team assume that the house connection is conducted promptly in the project
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	the sludge drainage plan already available in D/D.	District PC-PO is planning and designing sludge drainage facilities in the project	Survey team confirm that the designing sludge drainage plan was appropriate

PHOTOS Bac Giang/Luc Nam

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<p>Meeting with Bac DPI/ PO</p>	<p>Water source in the project located at Lum Nam river</p>	<p>Location of proposed water treatment plant Existing facilities (above photo)is demolished and new water treatment plant (Q=3,500m3/day) is constructed in the project</p>
		
<p>Interview</p>		

3.6 Project No. 06: Son La (Song Ma)

A. Project Summary

1. **Project Title:** Water Supply system for Chieng Khuong Commune, Song Ma District
2. **Province:** Son La
3. **District:** Song Ma
4. **Project Site:** Chieng Khuong Commune, Song Ma District, Son La Province
5. **Project Objectives:** Construction of a water supply system to supply clean water for Chieng Khuong Commune contributing to improve people life in the project area.
6. **Scope of Project:** Construction of a water supply system with capacity of 2,400m³/day including Intake, Pumping station I, raw water transportation pipeline, water treatment plant, distribution pipeline
7. **Project Owner:** Son La Clean water and Rural Environmental Sanitation Center
8. **Operation and Maintenance Agency:** Son La Clean water and Rural Environmental Sanitation Center
9. **Project Investment decider:** Son La Provincial People's Committee.
10. **Project cost:** 26,516,905,703 VND
11. **JICA Portion:** 21,639,000,000 VND
12. **Documents received by the SAPI Study Team:** F/S, D/D, D/D construction drawings report, geology investigation report

Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Surface water of Le Stream is used for the project WTP. The project F/S and D/D report the calculation method of water quantity of surface water of Le Stream (water source) for 12 months, flow $Q_{min} = 76,377m^3/day$ (in March), $Q_{max} = 1,261,440m^3/day$ (in August), but do not attach hydrographic investigation report of Le Stream for re-check, therefore the survey team (SAPI) recommended DPI, PO provide the hydrographic investigation report as a basis for inspection.</p>	<p>DPI, PO submitted the hydrology investigation report to the survey team on 8th on 8th September</p>	<p>After reviewing the F/S and D/D and site investigation, the survey team consumed that the water quantity of the Le Stream is enough for the capacity of the WTP</p>
1-2. Securing the water quality for drinking water	<p>-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>In this area project, rainy season is May to September, and dry season is October to April. One water quality analysis report is attached in the F/Sand D/D for June 2008 with 24 parameters.</p> <p>To compare with the QCVN 08/2008, only 2 parameters were checked: Total suspended solids = 1120mg/l (the standard QCVN-08-2008 is 30mg/l) and Ecoli = 550MPN/100ml (QCVN 08-2008 is 50MPN/100ml).</p> <p>According to the project selected technology in F/S and D/D, the Total suspended solids will decrease 70% to 80% after retention pond/tank and meet the QCVN 08-2008 then.</p> <p>E-coli is quite high; disinfection need to pay much attention in the WTP; and secure the residual chlorine compliant to QCVN 01:2009/BYT (from 0.3 to 0.5mg/l)</p>	<p>DPI, PO submitted some treated water quality analysis reports of the WTP in Son Ma town, Son Ma district and of some other clean water supply using Song Ma river surface water and streams in the province. The result reports show the E-coli parameter meets the current standard. DPI and PO submitted the survey team all of the 12 months missing water quality analysis result reports of Le Stream and water quality analysis of the water source of Son La Water Supply Company was provided to the</p>	<p>After checking the submitted data, the survey team confirm that 12 month data of water source quality meets JICA requirements</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		To fulfill the JICA requirement strictly, water quality monitoring tests need to be conducted for January to May, July to Dec and analysis result reports shall be provided to the survey team then.	survey team for comparison on 25 September 2010	
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>Target year for initial phase in the FS is 2025 with parameters below:</p> <ul style="list-style-type: none"> - Population is 13,684 persons. - Water supply Criteria is 110L/per/day. - Service ratio is 95%. - Water for commercial and service is 10% of the domestic. - Water loss is 15%. - Water use for WTP is 10%. <p>Population served is mention in F/S. However the DPI should provide the base data of population calculated (including the latest statistical year book) and make clear how the population was calculated. The Study team would like to hear about water loss in the existing system.</p>	DPI, PO submitted Son La province statistic books 2008, 2009 and reports on project area, Chieng Khuong Commune socio-economic development until September 2010 As investigation to Song Ma WTP, the survey team was informed that the water loss ratio of the plant is from 17-18%.	Based on the submitted reports and supplemental data by DPI, PO and after the site investigation, the survey team assume that the parameters used for water demand calculation is suitable.
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	Capacity of WTP until 2025 is 2,400m ³ /day. The F/S mentions the water quantity of water source with Q.max and Q.min of Le Stream. The capacity of WTP is suitable with water source quantity. However the DPI should provide us water source quantity data of Le stream. DPI should provide us data of Ban Bo existing water supply system (intake, network, house connection).	Quantity of the water source – Le Stream is mentioned in the hydrology investigation report submitted by DPI, PO on 8 th September 2010. DPI, PO explained that under the Rural clean water supply program 134, Ban Bo water supply facility is to collect water from an upstream to a water tank with some house holds collection only (untreated	Water quantity calculated is suitable with the capacity of the project WTP.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>The selected water process for the WTP is as follows: Surface water - pre-sedimentation tank - mixing tank - sedimentation Lamella tank - gravity filter tank - reservoir. Abovementioned process of the WTP is a conventional process for treatment of raw water in Le Stream</p>	<p>water supply).</p> <p>DPI, PO explained that the water treatment process is popular in Vietnam and it is appropriate with the design of the WTP</p>	<p>The survey team confirm that the process and design of the WTP is suitable</p>
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>The necessary documents for D/D were made comprising topographical investigation report, geological investigation report. Results show the project area is qualified for construction. Warning on land erosion of the area is found in the F/S.</p> <p>Intake area: Intake dam, pre-sedimentation pond, pumping station I.</p> <p>The civil structural of these items was calculated in accordance with the design of strength bearing requirements. But the survey team propose to PO to design the top of embankments constructed connecting to ground for limiting land-slip.</p> <p>The D/D report missed the calculation for Intake dam, pre-sedimentation pond/tank, pumping station I and reinforcement of the stream at the intake point. The survey team request DPI, PO to submit this calculation.</p> <p>Water treatment plant area: The civil structure calculation report for pumping station II, Chemical house, Administrative house are missed in the DD. The civil structure calculation for reservoir is not suitable because the design of reservoir is circle but its calculation is</p>	<p>DPI, PO agreed to follow the recommendation of the team and will do it at the construction phase</p>	<p>After checking the submitted documents, the survey team confirm that the civil structure of each facility is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>for rectangle design.</p> <p>In F/S and D/D, the Le Stream water max-level is not reported. The survey team request DPI, PO to provide data as basis for the calculation and plan of excavation work for level of floor ground for the WTP construction</p> <p>Pipeline: steel pipes and HPDE pipes is used. Some important items on the pipe laying should be designed following calculation results such as support bend 90⁰, and 45⁰ were not mentioned. And the survey team found that all of the support piles tee, bend for various diameter sizes with different pressures are the same dimension/ size. The survey team request DPI, PO to calculate, design the pile strength supporter to be suitable with each type of pile dimension/size.</p> <p>Laboratory room was not mentioned in the project F/S and D//D. DPI and PO are requested to add this item to the project</p>	<p>DPI, PO submitted the lacking documents and revised drawings as requested to the survey team on 25 September 2010</p>	
<p>2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying</p>	<p>-The Survey Team needs to confirm the appropriateness of these plans.</p>	<p>Plan for raw water transmission, water distribution, water supply network are mentioned in the F/S and D/D. However, the report for pipeline network D/D drawings do not mentioned the pipe laying draw and connection flow distribution table. DPI, PO are requested to provide following data:</p> <ul style="list-style-type: none"> - Calculation method of the connection flow distribution table (hard and soft copy) - Hydraulic calculation (soft data) 	<p>DPI, PO submitted the requested documents to the survey team on 9th September 2010</p>	<p>After reviewing the submitted data and documents and site investigation, the survey team consume that the pipe laying design and calculation is suitable</p>
<p>2-6. Securing the power supply</p>	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of</p>	<p>The memorandum/agreement with EVN is missing. The survey team request DPI, and PO to provide this item following JICA requirement.</p>	<p>DPI, PO submitted the power supply memorandum with EVN (Decision No.304/QD-PCSL dated</p>	<p>The survey team confirm that the submitted memorandum meet JICA requirement</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.		15 th June 2010)	
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	Pumping station II: - Re-check the technical parameters of circuit breakers for each pump and for in coming feeder. The parameters as shown on the single line diagram are too small. - The calculation of electric cable selection is missing. - The control panel for outdoor lighting system is missing. - Missing the Drawing of electrical work number: 17/17 (power supply plan for pumping station I)	DPI, PO submitted the lacking documents and revised drawings as requested to the survey team on 25 September 2010	After checking the submitted documents, the survey team confirm that the electrical machinery facility specifications is suitable
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The Land acquisition plan is not mentioned in the F/S Report. The SAPI Survey Team request the DPI, PO to clarify and to explain about this matter.	DPI, PO submitted the approved detail plan on land acquisition. DPI, PO will execute this plan at once when the WTP is approved for start construction	
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	The Placement of personnel & manpower secure plan is not mentioned in the F/S. The SAPI Survey Team request the DPI, PO to make clear this matter.	DPI, PO submitted the detail placement of personnel & manpower secure plan to the survey team on 25 September 2010.	After checking the submitted plan, the survey team confirm that the plan is suitable
3-2. O&M facility plan	-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.	The O&M facility plan is mentioned in the F/S but not detail. DPI, PO are requested to prepare a detail plan.	Water tariff will be applied the same as the approved water tariff for Son La province by Son La PPC DPI, PO submitted the detail O&M facility plan to the survey team on 25 September 2010	After checking the submitted plan, the survey team confirm that the plan is suitable

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	The Laboratory for water quality control is not prepared in the F/S and D/D. DPI, PO are requested to add this item in to project.	DPI, PO submitted the amended D/D and detail plan for the Labo using the local budget 187,704,000VND to the survey team on 25 September 2010	After checking the submitted plan, the survey team confirm that the plan is suitable
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>Calculation for the water supply pipeline to household gate (included meter) is available in the F/S; however, the related drawing is missing in the D/D. DPI, PO are requested to prepare this drawing in the D/D.</p> <p>The detail promotion plan for connection by households (with consideration of supportive policy for the poor and targeted social welfare families) should be prepared.</p>	DPI, PO submitted the amended drawing including meter in the D/D and detail plan to survey team on 25 September 2010	After checking the submitted plan, the survey team confirm that the plan is suitable

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	The sludge drainage plan available in the detail design.		

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PHOTOS Son La/Song Ma

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Meeting
with Son La DPI/ PO



Location of intake for proposed water treatment plant
Intake facility and water treatment plant (Q=1,500m³/day) plan to be constructed near water source (above photo).



Interview
Water supply is not served in the project area, Cheing Khuong Commune. Most of people take water from river near the area currently.



Central laboratory
Central laboratory is Located in Son La Clean water and rural environmental sanitation center

3.7 Project No. 07: Lai Chau (Muong Te)

A. Project Summary

1. **Project Title:** Water Supply System for Muong Te Town
2. **Province:** Lai Chau
3. **District:** Muong Te
4. **Project Site:** Muong Te Town
5. **Project Objectives:** Building Water supply system to supply enough clean water for Muong Te town and Bum Tua, Bum Nua communes up to 2015. with capacity of 1,000 m³/day contributing to improving the people's health, livelihood, environmental sanitation and socio-economic for Muong te town.
6. **Scope of Project:** To build Water supply system with capacity of 1,000 m³/day including the Surface raw water intake (from 2 water sources), raw water transmission pipes, Water treatment plant, Distribution network and service pipes.
7. **Project Owner:** Muong Te District People's Committee
8. **Operation and Maintenance Agency:** Muong Te water Supply enterprise under Lai Chau Waco
9. **Project Investment decider:** Lai Chau Provincial People's Committee.
10. **Project cost:** 27,248,000,000 VND
11. **JICA Portion:** 14,900,000,000 VND
12. **Documents received by the SAPI Study Team:** D/D report. D/D/ drawings, revised F/S, geotechnical survey report,

B. Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI, PO/DPC and WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Two water sources would be used to supply the water to the water purification plant.</p> <p>- The main water source is Huoi Sang spring from where water would be conveyed by gravity to the water purification plant. During 4 months of dry season, the capacity of Huoi Sang water source is not sufficient. During this period, water from the Nam Cau spring would be pumped to the water purification plant to make up the short fall. This spring has enough water for all the season, however, to save the operational cost (pumping cost), Huoi Sang spring water is used as main water source and to make up the short fall water from Nam Cau spring would be used when required.</p> <p>Based on hydrographic calculation data:</p> <p>Regarding Huoi Sang Spring: at level +408.74m $Q_{min} = 0.011 \text{ m}^3/\text{s}(90\%) = 950,4 \text{ m}^3/\text{day}$ $Q_{max} = 23,17 \text{ m}^3/\text{s} (0,2\%)$</p> <p>Regarding Nam Cau Spring: at level +297m $Q_{min} = 0.919 \text{ m}^3/\text{s}(90\%) = 79,401 \text{ m}^3/\text{day}$ $Q_{max} = 1981,4 (0,2\%)$ The W.T.P. at level +385m Therefore, the water from the Huoi Sang spring could be conveyed by gravity to the W.T.P. The SAPI Study Team requested to include explanation for the long term cost & benefit in the revised F/S for selecting the two water sources</p>	<p>The PO/DPC agreed to submit the revised F/S and D/D.</p> <p>The PO/DPC provided the Hydrographic data of water for dry and rainy season.</p> <p>The DPC/PO informed that the monitoring of 12 months data of Huoi Sang spring is not feasible.</p> <p>The DPI/PO will provide the hydro geological data for 12 months.</p>	<p>After receiving the documents of the water quantity monitoring data for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA.</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>instead of Nam Cau spring, who has sufficient water for all the season. .</p> <p>There is no practice of using groundwater in this area.</p> <p>As requirement of JICA, the result of water quantity for 12 months should be provided.</p>		
1-2. Securing the water quality for drinking water	acceptable	<p>There is one water quality result dated in July 2009 (rainy season) and another dated December 2009 (dry season). Based on these results, water quality meets the VN standard. The water quality test was conducted at the intake point of Nam Cau spring where water from Huoi Sang water source also meets.</p> <p>Dry season is from October to March, rainy season is from April to September.</p> <p>As requirement of JICA, water quality result for 12 month data should be analyzed.</p>	<p>The PO/DPC will monitor the quality of water of both the intakes water point for this month and will provide the documents to the SAPI Study Team by this month.</p> <p>The PO/DPC will continue to conduct the monitoring during the dry season after the monitoring for the month of September 2010 if required.</p> <p>The water quality result on 10th May 2010 was provided for 2 intake locations (Huoi Sang and nam Cau Springs)</p>	<p>After receiving the documents of the water quality monitoring for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA.</p> <p>After checking the new water quality result, the team confirms that water quality is suitable.</p>
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>The Target year in the revised F/S is 2015 and 2020 with following parameters:</p> <p>- Demand forecast is estimated for two phases, population is 8,084 people (2015) and 8,838 persons (up to 2020)</p>	The PO/DPC agreed to prepare the explanation for the demand forecast and include it in the revised F/S.	After checking the data which was received, the team confirm that the demand forecast is suitable.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>- Water supply criteria is 80l/person/day (2015) - Service ratio is 90% (phase 1) and 95% (phase 2) - Water demand for commercial entities and small business industry is 15% (for both phases). - Water loss is 18%, water for WTP is 5% (for both phases)</p> <p>- Capacity Q(2015)=1,000m3/day - Capacity Q(2020) =1,500 m3/day</p> <p>Regarding current water supply system, it is gravity water supply without treatment and unhygienic.</p> <p>Observations from SAPI study team: In the revised F/S in discussions with the SAPI Study team criteria and assumptions for the estimation of the demand forecast have been revised and appeared to be suitable.</p> <p>In the revised F/S they included population for Muong Te town and Bum To & Bum Nua communes.</p> <p>However, the PO/DPC have been requested to explain the basis and to provide the basic data and documents used to calculate the population (including the population statistics book and the existing population of the town).</p>	<p>The population statistic of was provided on 4th Oct 2010</p>	
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and	In the revised F/S they mentioned water demand in the first phase as 1000 m3/day. Two water sources would be used to supply the water to the water purification plant. There is sufficient water		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	planned.	in these two water sources to supply the water demand for phase I (1000 m ³ /day) and phase II (1500 m ³ /day).		
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>The revised D/D Report refers to the description on the two options for the water purification method</p> <ul style="list-style-type: none"> - Option 1: vertical mixing, sedimentation with suspended solid layer, rapid filtration with gravity. - Option 2: Flocculation and vertical sedimentation, rapid filtration. <p>They selected option 2. In the revised F/S they mentioned the advantages and disadvantages of both the options.</p> <p>It is necessary to provide the detailed analysis on rationale of options such as cost and benefit efficiency in operation, maintenance, and compare running cost, management cost.</p>	The PO/DPC agreed to submit the revised F/S and D/D.	
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>In the revised D/D, area for general plan of the plant (36 x 26.6), it necessary to design an appropriate general plan, consider to arrange technical pipes, service road to ensure the operation.</p> <p>The topographic investigation and geotechnical investigation reports were submitted</p> <p>All items of Profiles of D/D were provided. The SAPI Study Team requested the consultants to re-check the thickness of bottom of sedimentation, filtration tanks and reservoirs, which are too thick (Sedimentation, 50cm filtration tank, 40cm reservoirs). To arrange for steel reinforced 385.0 gutters were placed against the bearing dimensions.</p> <p>The provision of Laboratory room to monitor water quality is mentioned in the F/S and D/D.</p>	The PO/DPC agreed to submit the revised F/S and D/D.	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		The remaining facilities is designed to satisfy the technical requirements before the plant construction.		
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	<p>The SAPI Study Team reviewed the F/S and D/D reports including hydraulic analysis.</p> <p>1) Regarding the distribution main, the SAPI Study Team found it appropriate and informed to the DPI and PO/DPC that if there are any comments from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the DPI and PO/DPC.</p> <p>2) Regarding the raw water transmission main, the study team recommends that the receiving basin should be planned before the sedimentation basin. The raw water from 2 sources should flow directly into the basin respectively. It's hard to operate the water quantity and/or quality because both pipes from 2 sources are connected before the sedimentation basin in D/D drawing. The SAPI Study Team requested to study both the options from technical points of view and include the explanations for the selection.</p>	The PO/DPC agreed to submit the revised F/S and D/D.	After checking the revided D/D the SAPI team recommends to install the valve before mixer for each raw water transmission line, considering O&M
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>The PO/DPC presented a copy of the agreement with EVN to supply power to the project.</p> <p>The detailed design drawings of the transformer sub-station and the medium voltage line, the detailed calculation report are missing</p>	<p>The PO/DPC agreed to submit the revised F/S and D/D.</p> <p>The agreement was received.</p>	It is Ok.
2-7. Electrical machinery facility	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	- Check the parameters of electric power cables in the layout drawings to fix the power for the pump station. These parameters are not the same as the	The PO/DPC agreed to submit the revised F/S and D/D.	It is appropriate.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
specifications		<p>parameters stated in a single line diagram power supply. - At lighting ground outside: The drawing shows in 04 statistic lights but in the check list displays only 03 pieces. A principle of power supply single line diagram: Surface of cables for the lighting inside and outside too large. Indoor lighting doesn't need a belt of steel cable protection. In addition, the pressure for the cool factor three-phase motors must use shell casting (MCCB), pressure mini car cooler (MCB) is not allowed. - Check capacity parameters of pumps, especially, washing pumps, it might be too small.</p> <p>- Lack of safe grounding system for electrical control.</p> <p>- It is necessary to show the location of the compression control panels in place on the drawings.</p> <p>- Lack of detailed explanation of the electrical design.</p>	They submitted revised documents.	
2-8. Land acquisition plan	<p>-The Survey Team comprehends the site conditions of land acquisition and residents.</p> <p>-The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.</p>	<p>The SAPI Study team visited the sites of intakes, pumping stations. The water treatment plant is located on a hill, which is covered with forest. These lands are under the District management. No house is built on these lands and no resettlement is involved. The PO/DOC presented minutes of agreement to construct intakes, pumping stations and water purification plant on their designated land.</p> <p>The distribution network will be laid along the road and buried under the ground so no land acquisition is required.</p>	The PO/DPC presented copy of the Minutes to the SAPI Study Team.	
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan.</p> <p>-Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	The PO/DPC confirmed to the SAPI Study Team that they have no plan for the placement of personnel and manpower secure. The Study team presented to the PO/DPC the Plan of Hue and Thai Nguyen water supply company. The Study Team also presented to the PO/DPC the copies of O&M	The PO/DPC proposed that they will recruit the personnel who will be doing the water quality monitoring. They also proposed to send them to	<p>The SAPI Study team requested to involve the Laichau Waco in preparing the Plan.</p> <p>It is appropriate.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>manual prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Team recommended that personnel of PO/DPC can be sent to the plant of Experienced water supply company for the training and study of their Plan during the construction of the JICA project.</p> <p>After the project is completed, the Lai Chau Water supply and drainage company will be O&M agency (Laichau Waco).</p> <p>The SAPI Study Team requested the PO/DPC to prepare the manpower Plan and include it in the revised F/S and D/D.</p>	<p>the Experienced water supply company for the training and study of their Plan before the operation of the JICA project of Muong Te town.</p> <p>The PO/DPC agreed to the requirement of JICA for making of Placement of personnel & manpower secure plan and will include it in the revised F/S and D/D.</p> <p>They submitted revised documents.</p>	
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>There is an existing water supply system in the town, which is being operated by PO/DPC. In this system, water from a stream is stored in a tank and supplied to the households without any treatment.</p> <p>The SAPI Study Team interviewed the households who have service connections using the existing system. Although there was no complain regarding the water quality, the supply of water itself was erratic. It is reported that there is more than 50% leakage of water in the system. They are merely able to recover the salary of the labors who are engaged in the system.</p> <p>The PO/DPC informed that Muong Te water supply enterprise will be established under Laichau Waco including 10 persons: 1 Director, 2</p>	<p>The PO/DPC agreed to the observations of the SAPI Study Team.</p> <p>The PO/DPC understood the necessity of capacity building for the JICA project and agreed to the recommendation of the SAPI Study Team. They informed that they will implement the capacity building programme during the construction of the project.</p> <p>The PO/DPC agreed to include the details of the</p>	<p>The SAPI Study team requested to the PO/DPC/DPI to involve the Laichau Waco for checking the Operation plan, tariff Plan and House Connection promotion Plan.</p> <p>It is appropriate.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>sales and accountants.</p> <ul style="list-style-type: none"> - 2 general managers - 5 persons who are responsible for operation and maintenance. <p>After the project is completed, the Lai Chau Water supply and drainage company will be O&M agency (Laichau Waco). The company will cooperate with the PO and would provide the assistance to the PO during the construction implementation. Now the LaiChau Waco is operating 5 water supply systems (Lai Chau town, Muong Te, Than Uyen, Phong Tho, Sin Ho).</p> <p>The SAPI Study Team recommended that there shall be enough capacity building of the personnel who will be assigned for the JICA project for O&M before the operation of the water supply system.</p> <p>The cost of water Production is estimated as 2,495 VND/m³ Service water tariff is 3,000VND/m³</p> <p>Water tariff for industrial entities and services is 5,000VND/m³.</p> <p>The current tariff under the existing water supply system for the household's use is 500 VND/m³ and for other use it is 700 VND/m³. The SAPI Study Team expressed their concern that the households may not be willing to pay higher tariff under the JICA project and asked the PO/DPC to conduct the survey to assess their "Willingness to Pay" capacity and then prepare the appropriate tariff plan.</p>	Plan in the revised F/S and D/D.	
3-3. Water quality	-The Survey Team needs to review the implement ability of water quality control plan.	F/S does not mention the water quality control Plan. There is an existing water supply system in	The PO/DPC agreed to the observations of the	The SAPI Study team requested to involve

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
control plan	<p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>the town, which is being operated by the PO/DPC. In this system, water from a stream is stored in a tank and supplied to the households without any treatment. The PO/DPC informed that they believe that the supplied water is clean without treatment and they do not monitor the water quality of the water.</p> <p>The SAPI Study Team explained that they should conduct the monitoring of certain parameters (pH, turbidity, residual-chlorine and Jar test) daily at the laboratory of the water purification plant under the JICA project. They should collaborate with the Health Department for the remaining examination according to VN standard.</p> <p>The SAPI Study Team presented to the PO/DPC the Plan of Hue water supply company. The SAPI Study Team also presented the copies of the O&M manual including water quality control prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Study Team informed that making of Water Quality Control Plan is one of the requirements of JICA before the commencement of construction works.</p> <p>The SAPI Study Team informed to the PO/DPC that it is very necessary that they develop their capacity with regard to daily water quality control according to VN standard.</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall management and NRW reduction under the JICA</p>	<p>SAPI Study Team. They understood to develop their capacity with regard to daily water quality control and proposed to send staffs to the Experienced water supply company for the training and study of their Plan during the construction of the JICA project.</p> <p>The PO/DPC agreed to the requirement of JICA for making of Water Quality Control Plan and will include it in revised F/S and D/D.</p> <p>Regarding the Laichau Waco, they informed that they have laboratory at the Company to control the water quality.</p> <p>They submitted revised documents.</p>	<p>the Laichau Waco in preparing the Plan.</p> <p>It is appropriate.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>Technical Cooperation Programme. As a result, the Hue water company monitors water quality on hourly basis and declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.</p>		
<p>3-4. House connection's promotion plan</p>	<p>To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>In the F/S report, in phase I (2010) 85% (7,650) would be supplied with clean water and in Phase II (2015) the population supplied with clean water would be increased to 11,900 people. There are 1012% (80-90) households are poor. The PO/DPC informed that there is existing water supply, which would be abandoned when JICA project is in operation. The existing households would be supplied with the JICA water. The other households who have no connection with the existing water supply would be willing to take new connection. Since, there is no practice of using groundwater by the households in this town. So, they assured the SAPI Study Team that the target coverage would be achieved. There is serious demand of clean water in the town.</p> <p>The SAPI Study team explained to the PO/DPC about the practices in other provinces for the service line and water meter for the poor and normal category of households. The SAPI Study Team also proposed to prepare "the Stakeholders' Participation Programme" to promote the House Connections.</p> <p>The LaiChau Waco also explained that they had special policies to promote people such as free of charge service pipelines and flow meters, or only free of charge flow meter.s Regarding the households who are too far, the WSC discuss</p>	<p>The PO/DPC agreed to the proposal of the JICA Study Team to prepare the Plan for the promotion of house connection to achieve the targeted coverage. They will include the Plan in the revised F/S and D/D and would implement it during the construction of the JICA project to achieve the target as soon as JICA project comes in operation.</p> <p>They submitted revised documents.</p>	<p>It is appropriate.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>together to contribute.</p> <p>The SAPI Study Team checked the F/S and D/D for the sludge drainage Plan in the water purification plant facility. It was found there was no such provision in the F/S and D/D. The SAPI Study Team discussed the Plan with the PO/DPC and requested the PO/DPC to prepare the Plan and include it in the D/D. The SAPI Study team suggested that the sludge treatment facility can be constructed at the bottom of the hill since there is limitation of space on the hill.</p> <p>The SAPI received the revised D/D drawings already indicated the sludge drainage plan</p>	<p>The PO/DPC agreed to provide the completed D/D including the sludge drainage Plan to the SAPI Study Team by the end of September 2010.</p> <p>They submitted revised documents.</p>	It is appropriate.

PHOTOS Lai Chau/Muong Te

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Meeting
with Lai Chau DPI/ POs



Location of proposed New WTP
Q=1,000m³/day, located behind hill
(subocular river is Nam Cau Spring)



Location of proposed Intake Facility
located at the right bank of Huoi Sang Spring,
Q=600m³/day, by gravity (view from downstream)



Location of proposed Intake Facility
located at the right bank of Nam Cau Spring,
Q=42m³/h, H=60m, 2nos (view from upstream)



Proposed Supply Area



Interview
for resident of proposed service area

3.8 Project No. 08: Lai Chau (Tam Duong)

B. Project Summary

1. **Project Title:** Dong Pao Water Supply system
2. **Province:** Lai Chau
3. **District:** Tam Duong
4. **Project Site:** Ban Hon Commune, Tam Duong District
5. **Project Objectives:** Building Water supply system to supply enough clean water for Ban Hon Commune up to 2020. with capacity of 1,000 m³/day contributing to improving the people's health, livelihood, environmental sanitation and socio-economic for Ban Hon Commune.
6. **Scope of Project:** To build Water supply system with capacity of 1,000 m³/day including the Surface raw water intake, raw water transmission pipes, Water treatment plant, Distribution network and service pipes.
7. **Project Owner:** Tam Duong District People's Committee
8. **Operation and Maintenance Agency:** Dong Pao water supply enterprise under Lai Chau Water Supply Company
9. **Project Investment decider:** Lai Chau Provincial People's Committee
10. **Project cost:** 28.598.000.000 VND
11. **JICA Portion:** 21.000.000.000 VND
12. **Documents received by the SAPI Study Team:** D/D Report, D/D Technical drawings, D/D construction drawings, D/D medium voltage and Sub-Station, Geotechnical investigation report, survey investigation drawings and cost estimate document.

B. Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI, PO/DPC and WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Water source is taken from Chao San spring, at elevation of +963m.</p> <p>According to hydraulic analysis mentioned in the F/S Qmin=0,017m³/s (1,468m³/day)</p> <p>According to the residents, the dry weather flow of this spring is much higher than the Dong Pao spring, which was earlier selected as the water source. Due to human activity nearby, this water source was ultimately not selected.</p> <p>The PO/DPC would provide to the SAPI Study team the pictures of the water source. The PO/DPC cautioned the SAPI Study Team to visit the water source as the access is very difficult and risky. The SAPI Study team had to abandon the idea of climbing to visit the water source. The weather was also too bad and it was raining.</p> <p>As requirement of JICA, the result of water quantity for 12 months should be provided.</p>	<p>The PO/DPC will monitor the quantity of water of Chao San spring for this month and will provide documents to the SAPI Study Team by this month.</p> <p>The PO/DPC will continue to conduct the monitoring during the dry season after the monitoring for the month of September 2010 if required.</p> <p>The DPI/PO will provide the hydro geological data for 12 months.</p>	<p>After receiving the documents of the water quantity monitoring data for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA.</p>
1-2. Securing the water quality for drinking water	acceptable	<p>The Result of water quality analysis on June 2009 is available and parameters of raw water conform to Vietnam standard.</p> <p>The water source is in the mountain where there is no human activity so there is no chance of contamination.</p> <p>As requirement of JICA, water quality result for 12 month data should be analyzed.</p>	<p>The PO/DPC will monitor the quality of water of Chao San spring for this month and will provide the documents to the SAPI Study Team by this month.</p> <p>The PO/DPC will continue to conduct the</p>	<p>After receiving the documents of the water quality monitoring for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA.</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
			<p>monitoring during the dry season after the monitoring for the month of September 2010 if required.</p> <p>The water quality submitted on 4th Oct 2010.</p>	<p>After receiving the water quality data, the team confirm that water quality is satisfactory.</p>
2. Construction Plan				
<p>2-1. Demand forecast</p>	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.</p>	<p>Target year in FS is 2020 with parameters as bellows:</p> <ul style="list-style-type: none"> - Population is 1582 people, worker is 500 people. - Water supply criteria is 80L/per /day and 65L/per/day for workers. - Service ratio is 95% . - Water for public is 20% domestic. - Water loss is 20%, water use for WTP is 10% . <p>Observations of SAPI Study Team :</p> <ul style="list-style-type: none"> - In the water demand calculation in the D/D report is mentioned about water for Industry with the capacity of 500 m3/day, but without calculation. - The current population in the D/D report in 2008 is 2216 people (for all communes) not only for our Project, the water demand calculation in 2020 are only 1582 people. <p>Please explain and provide us :</p> <ol style="list-style-type: none"> 1. Basic data and parameters used for Industrial water demand calculation with capacity of 500 m3/day. 2. the current population and latest population statistics year book. Explain the population estimation for the year 2020. 	<p>The PO/DPC agreed to prepare revision and explanation for the demand forecast and will provide as supplemental report to the F/S.</p> <p>The PO explained that population currently is 943 persons (190 householders), up to 2020 population of 1,582 persons with population growth rate is 5% (proposed for mine developing area)</p> <p>Regarding 500m3/day for workers and production for Dong Pao mine, it is calculated based on proposed plan for the mine.</p>	<p>After checking the data which was received, the team confirm that the demand forecast is suitable.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>3. F/S report and drawings.</p> <p>The demand forecast estimation should be revised.</p>		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<p>Capacity of WTP up to 2020 is 1000 m3/day.</p> <p>Raw water source for WTP will be taken from Chao San stream. After receiving the documents of the water quantity monitoring data for the month of September 2010, the SAPI Study Team will confirm the appropriateness.</p>		
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>Raw water source for WTP will be taken from Chao San stream; the D/D report proposed the water treatment process with vertical sedimentation and sand filter, chemical including PAC and chlorine. This water treatment technology has been applied commonly for small scale WTP in Viet Nam. Therefore, it is advantageous for operation and maintenance since experience in O & M from other WTPs is confirmed.</p> <p>However, the study team requested for the O&M cost comparison of this process compared to other process.</p>	The PO/DPC agreed to prepare explanation for the O&M cost comparison and will provide as supplemental report to the F/S.	
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>The profile of D/D was provided include:</p> <ul style="list-style-type: none"> - Geotechnical Investigation Report - Calculation explanation - Construction drawings <p>The geotechnical Investigation Report confirmed that the project has been implemented, necessary data for D/D was provided fully.</p> <p>Calculation explanation and the project D/D of each item have been performed fully, clearly, appropriately in accordance with civil structure as well as architecture.</p>		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>The laboratory and equipments have been arranged already in administration house.</p> <p>The SAPI Study Team confirms that this profile with high quality is eligible for project construction.</p>		
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	<p>The SAPI Study Team reviewed the F/S and D/D reports including hydraulic analysis.</p> <p>1) Regarding the raw water transmission main, the study team recommends that D/D shall be mentioned the applied pressure type of HDPE pipe. In accordance with D/D, the study team assumes PN10. In addition, regarding the calculation for typical bend support, the design water pressure shall be applied to 1MPa.</p> <p>2) Regarding the distribution main, the SAPI Study Team found it appropriate and informed to the DPI and PO/WSC that if there are any comments from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the DPI and PO/DPC. However, the study team recommends that D/D shall be mentioned the applied pressure type of HDPE pipe. In accordance with D/D, the study team assumes PN16</p>		After checking the revided D/D the SAPI team recommends to install the valve before mixer for each raw water transmission line, considering O&M
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>Dong Pao area</p> <ul style="list-style-type: none"> - D/D drawings of transformer station 50KVA-35/0,4KV and medium voltage cable 35KV are available. - Electricity supply agreement has not yet been done with EVN. 	The PO/DPC will provide the copy of agreement by end of this month.	It is Ok.
2-7. Electrical machinery	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the	<p>Water supply system in Dong Pao area.</p> <ul style="list-style-type: none"> - Availability of D/D drawings and technical 		It is appropriate.

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facility specifications	alternative specifications.	explanation for electricity is confirmed		
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The Study Team visited the site of the water purification plant, which is located at a higher level. There is tea plantation on this land. The PO/DPC has already confirmed with the farmer to acquire the land to construct water treatment plant who has been doing tea planting on this land. The SAPI team requested for the agreement to acquire the land.	The PO/DPC will provide the copy of the agreement by end of this month. The PO/DPI submitted the agreement.	
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	The PO/DPC confirmed to the SAPI Study Team that they have no plan for the placement of personnel and manpower secure. The Study team presented to the PO/DPC the Plan of Hue and Thai Nguyen water supply company. The Study Team also presented to the PO/WSC the copies of O&M manual prepared under the JICA Technical assistance programme in Hue Province. The SAPI Team recommended that personnel of PO/WSC can be sent to the plant of Experienced water supply company for the training and study of their Plan. After the project is completed, the Lai Chau Water supply and drainage company will be O&M agency (Laichau Waco). The SAPI Study team suggested the PO/DPC to Placement of personnel & manpower secure plan in collaboration with Lai Chau water supply company, who is expected to be O&M agency for this project.	The PO/DPC proposed that they will recruit the personnel who will be doing the water quality monitoring. They also proposed to send them to the Experienced water supply company for the training and study of their Plan before the operation of the JICA project. The PO/DPC agreed to the requirement of JICA for making of Placement of personnel & manpower secure plan in collaboration with lai Chau water supply company and will submit as supplement to F/S and D/D. The PO/DPI provide the additional documents.	The SAPI Study team requested to involve the Laichau Waco in preparing the Plan. After checking, it is appropriate.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>The F/S mentioned about O & M facility plan in detail.</p> <p>Make plan O & M for each facility:</p> <ul style="list-style-type: none"> - Intake –WTP Team - Team specializing in pipeline control, preparing records, monitoring working pipelines, and arranging maintenace. - <p>It is planned to establish Dong Pao water supply enterprise under Lai Chau water supply company.</p> <p>After the project is completed, the Lai Chau Water supply and drainage company will be O&M agency (Laichau Waco). The company will cooperate with the PO and would provide the assistance to the PO during the construction implementation. Now the LaiChau Waco is operating 5 water supply systems (Lai Chau town, Muong Te, Than Uyen, Phong Tho, Sin Ho).</p> <p>The SAPI Study team visited the water purification plant managed by Dong Pao water supply enterprise under Lai Chau water supply company. This plant was constructed under SPL3. After visiting the Plant, The SAPI Study Team recommended that there shall be enough capacity building of the personnel who will be assigned for the JICA project for O&M before the operation of the water supply system.</p> <p>Production cost is 4,424 VND/m³ Tentative water tariff 4,785 VND/m³</p> <p>The residents under Tam Duong service area pay only 1700 VND/m³ while proposed tariff for JICA project is much higher than this. The SAPI Study Team expressed their concern that the households</p>	<p>The PO/DPC agreed to the observations of the SAPI Study Team.</p> <p>The PO/DPC understood the necessity of capacity building for the JICA project and agreed to the recommendation of the SAPI Study Team. They informed that they will implement the capacity building programme during the construction of the project.</p> <p>The PO/DPC agreed to include the details of the Plan in the revised F/S and D/D.</p> <p>The PO/DPI provide the additional documents..</p>	<p>The SAPI Study team requested to the PO/DPC/DPI to involve the Laichau Waco for checking the Operation plan, tariff Plan and House Connection promotion Plan.</p> <p>After checking, it is appropriate.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>may not be willing to pay higher tariff under the JICA project and asked the PO/DPC to conduct the survey to assess their “Willingness to Pay” capacity and then prepare the appropriate tariff plan.</p>		
<p>3-3. Water quality control plan</p>	<p>-The Survey Team needs to review the implement ability of water quality control plan. -If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices. -The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments. -When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>In the F/S mentions about the water quality control plan clearly including record & report, periodic check analysis samples daily, monthly, quarterly at the intake, the treated water and the tap water. However, F/S did not mention regarding provision of human resources and their capacity building to implement the water quality control plan.</p> <p>The SAPI Study team explained that they should conduct the monitor of certain parameters (pH, turbidity, residual-chlorine and Jar test) daily at the laboratory of the water purification plant under the JICA project. They should collaborate with the Health Department for the remaining examination according to VN standard.</p> <p>The SAPI Study Team presented to the PO/DPC the Plan of Hue water supply company. The SAPI Study Team also presented the copies of the O&M manual including water quality control prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Study Team informed that making of Water Quality Control Plan is one of the requirements of JICA before the commencement of construction works.</p> <p>The SAPI Study Team informed to the PO/DPC that it is very necessary that they develop their capacity with regard to daily water quality control according to VN standard.</p>	<p>The PO/DPC agreed to the observations of the SAPI Study Team. They understood to develop their capacity with regard to daily water quality control and proposed to send staffs to the Experienced water supply company for the training and study of their Plan during the construction of the JICA project.</p> <p>The PO/DPC agreed to the requirement of JICA for making of Water Quality Control Plan and will submit to supplement F/S and D/D.</p> <p>Regarding the Laichau Waco, they informed that they have laboratory at the Company to control the water quality.</p> <p>The PO/DPI provides the additional documents.</p>	<p>The SAPI Study team requested to involve the Laichau Waco in preparing the Plan.</p> <p>After checking, it is appropriate.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>The SAPI Study team suggested the PO/DPC to prepare such plan in collaboration with Lai Chau water supply company, who is expected to be O&M agency for this project.</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall management and NRW reduction under the JICA Technical Cooperation Programme. As a result, the Hue water company monitors water quality on hourly basis and declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.</p>		
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>In the F/S it is mentioned 80% of coverage in 2010 and 95% coverage in 2020. The PO/DPC informed that at present they do not have house connection promotion plan. The SAPI Study Team expressed their concern on the viability of such high coverage plan, where several households are scattered, poor and are using water from stream for their daily use. The PO/DPC explained that the project is in the mountainous region and there is serious demand for the clean water. During the dry weather season, residents have difficulty in securing sufficient water.</p> <p>The SAPI Study team explained to the PO/DPC about the practices in other provinces for the service line and water meter for the poor and normal category of households. The SAPI Study Team also informed that some of the provinces have introduced free water upto certain volume per month (2-3 m³/month) for the poor households.</p>	<p>The PO/DPC agreed to the observations of the SAPI Study Team.</p> <p>The PO/DPC agreed to the proposal of the JICA Study Team to prepare the Plan for the promotion of house connection in collaboration with Lai Chau water supply company to achieve the targeted coverage. They will include the Plan as supplement to F/S and D/D and would implement it during the construction of the JICA project to achieve the</p>	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>The PO/DPC informed that they plan to install water tanks for the scattered households (2-3 households one tank) and it will be managed by the community. Other households would be provided with service line and meters.</p> <p>There are 26 new community-tanks. The SAPI Study Team suggested that instead house connection should be provided. There are examples where community-tanks are ultimately not used. Or he SAPI Study team suggested that the Operation plan should be mentioned in the D/D. The Operation plan should be prepared for each tank service community. The community shall be involved in the preparation of the Plan. The community should also be given regular training for operating and managing the water tanks efficiently. The residents should be informed for the policy that they would not be charged for the tank water use.</p> <p>The SAPI Study team suggested the PO/DPC to prepare viable Plan in collaboration with Lai Chau water supply company, who is expected to be O&M agency for this project.</p> <p>The SAPI Study Team also proposed to prepare “the Stakeholders’ Participation Programme” to promote the House Connections.</p>	<p>target as soon as JICA project comes in operation.</p> <p>Regarding the water tanks, the DPC was of the view to keep the water tanks, because it is difficult to get money for poor area.</p> <p>The Lai Chau Waco, which is designated O&M organization, was of the view that using the public water tank it is very difficult to manage and is not so efficient.</p>	
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	The SAPI Study Team studied the drainage plan.		It is appropriate.

PHOTOS Lai Chau/Tam Duong

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Meeting
with Lai Chau DPI/ POs



Interview
for resident of proposed service area



Location of proposed New WTP
Q=1,000m³/day



Location of proposed Intake Facility
located at the right bank of Chao San Stream,
Q=1,000m³/day, by gravity (view from downstream)



Proposed Supply Area



Proposed Supply Area
(existing reservoir, which storages stream water)

3.9 Project No. 09: Dien Bien (Dien Bien Dong)

A. Project Summary

1. **Project Title:** Water Supply system for Dien Bien Dong Town, Dien Bien District
2. **Province:** Dien Bien
3. **District:** Dien Bien Dong
4. **Project Site:** Dien Bien Dong Town, and Na Son A and NA Son B communes, Dien Bien Dong District, Dien Bien Province
5. **Project Objectives:** Construction of a water supply system to supply clean water for Dien Bien Dong Town and Na Son A and NA Son B communes contributing to improve people life in the project area.
6. **Scope of Project:** Construction of a water supply system capacity of 1,500m³/day including intake, pumping station I, water treatment plant 1,500m³/day, raw transmission pipeline and distribution pipeline
7. **Project Owner:** Dien Bien water supply company
8. **Operation and Maintenance Agency:** Dien Bien water supply company
9. **Project Investment decider:** Dien Bien Provincial People's Committee.
10. **Project cost:** 35,834,470,000 VND
11. **JICA Portion:** 13,579,000,000 VND (as of MPI information) (project report 26,097,864,340 VND)
12. **Documents received by the SAPI Study Team:** F/S, D/D, D/D construction drawings report, and cost estimate document,

Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Surface water of Nam Son Stream is used for the WTP. The hydrology investigation report mentions 12 months data of water flow. The lowest flow under the most adverse condition is $Q_{min} = 1,814m^3/day$. In combination with the capacity of the dam, the water source quantity is enough to supply water for the WTP of capacity $1,500m^3/day$. (year 2020)</p>	<p>The hydrology report and explanation on the water quantity evaluation method of Nam Son Stream would be submitted to the survey team by 09/24/2010</p>	<p>Based on review of F/S, D/D, provided documents and actual field survey, the survey team assumes that the water volume of Nam Son stream is enough for the water treatment plants. However, DPI and PO need to supplement the hydrology report.</p>
1-2. Securing the water quality for drinking water	<p>-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>In the project area, the rainy season is from May to September, and the dry season is from October to April. In F/S and D/D, there is raw water analysis result of Nam Son stream showing 18 parameters (monitoring month is not mentioned) conforming to the QCVN 08-2008. However, according to VN standard, 32 parameters are required to be monitored.</p> <p>The survey team requested to provide the monitoring data of above water quality report.</p> <p>When compared with the new standard, two parameters, color and turbidity of Nam Son stream raw water cannot meet the standard. The survey team recommended the Department of Planning and Investment and PO to provide the missing 11 months raw water quality testing data of Nam Son stream.</p>	<p>DPI/PO submitted 7 reports of Nam Son stream raw water quality analysis data for the dry season (October, 11, 12, 1, 2, 3, 4). The missing analysis data for the rainy season (May, 6, 7, 8, 9) will be supplemented by DPI/PO by 09/24/2010</p>	<p>PO provided the survey team the Nam Na water analysis result report for May, Jun, Jul, Aug, and Sept and other missing data on 29th Sept 2010. After checking, the survey team confirm that quality of water source of Nam Son stream meet requirement (QCVN 08-2008) to be used as water source of the project</p>
2. Construction Plan				
2-1. Demand forecast	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per</p>	<p>Target year is 2020 with parameters as below:</p>	<p>DPI/PO has re-estimated the water</p>	<p>Agree with the re-estimation data on</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	capita volume, population served, usage patterns, the current water supply systems, etc.	<ul style="list-style-type: none"> - Population is 6,311 persons. - Water supply Criteria in F/S is 120 l/person/day. - Water supply Criteria in hospitals is 300 l/person/day. - Service ratio is 90%. - Water for public is 10% of domestic. - Water for commercial and service is 20% of the domestic. - Watering and road washing is 8% domestic. - Water loss is 25%. <p>Please provide us following explanation:</p> <p>In F/S hourly water demand is mentioned but calculation report is missing for the water demand. Please provide us water demand calculation report.</p> <p>The parameter used for the water demand calculation is not as the Vietnam guideline (TCVNXD-33/2006). The Water supply criteria are higher, the water supply criterion for hospital is mentioned but normally the water supply criteria for hospitals are included in water for public.</p> <p>Population is mentioned in F/S. However the DPI should provide the base data of population estimation (including the latest statistical year book) and make clear how the population was calculated.</p>	demand according to TCXD 33-2006, the Capacity of the WTP 1,500m ³ /day is suitable. The re-estimation explanation report will be submitted to the survey team on September 24, 2010	water demand and the demand calculation table The survey team confirm this plan is suitable
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<p>Capacity of WTP is 1,500m³/day.</p> <p>Raw water reservoir will be built to hold raw water from the Nam Son stream which has minimum flow of 0.021 m³/s (1,814 m³/day), ensuring the adequate supply of raw water to the treatment plant.</p>		The estimated water volume of the water source is suitable for capacity of the project water treatment plant.

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2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>In the F/S & D/D report, the selected technology: raw water – pumping station I – chemical mixing tank (PAC) – Mixing tank combined with lamella and rapid gravity filter tank – disinfection – reservoir – pumping station II – supply network.</p> <p>Base on the 7 supplemental raw water analysis reports, this treatment technology is assumed to be suitable.</p> <p>It is requested to supplement the general layout drawing of the purification plant, technical pipeline, and treatment technology chart.</p> <p>It is requested to confirm the capacity of the existing reservoir where treated water from the new treatment plant would also be stored.</p> <p>It is requested to check again the pipeline from purification tank to reservoir tank, pressure of the pumping station II based on the hydrology calculation of the transmission pipeline from the purification plant to the existing reservoirs.</p> <p>DPI/PO is requested to supplement the missing data and submit to the survey team</p>	<p>DPI/PO submitted the revised DD as commented by the team on 29 Sept 2010</p>	<p>After checking the submitted document, the survey team confirm that water purification method is suitable</p>
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>Civil structure calculation explanation report for the work items in the purification plant, access road to the purification plant is missing.</p> <p>Request to supplement: 1/ Transmission pipeline and supply pipeline -Transmission pipeline: HPDE d200, d180, d160 pipe is used In the profile, there are many big bands 45°, 90° but no support band -Supply pipeline: HPDE D75 is used. The part crossing a bridge at note T12-T17 of the pipeline 1-2 use pipe D50.</p>	<p>DPI/PO agreed to supplement the missing data and submit to the survey team. The revised DD and data were submitted to the team on September 29, 2010</p>	<p>After checking the submitted documents, the survey team confirm that civil structure of each facility is suitable</p>

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		<p>D/D of this part needs revision: no need support band inland but need support band for the pipe crossing 9.77m ditch and steel pipe should be used</p> <p>2/ Intake dam: comprising main dam, sub-dam, flood releasing dam Construction drawing is available</p> <p>Pumping Station I: Need to check the push-known water channels.</p> <p>3/Purification plant: -Sedimentation filtration: construction drawing is available.</p> <p>4/ Reservoir: Construction drawings are available</p> <p>5/ Operation house Construction drawings and reports are available But the foundation column size 320x320mm is too small, should review calculations Upper layer of roof with steel bar $\phi 6a300$ is not enough intensity. Need recheck Lab is not found in the F/S, D/D. Title of reach room in the operation house need clarified in the overall layout drawing.</p> <p>6/ Auxiliary facilities Construction drawings and reports are available</p> <p>7/ Path running around Construction drawings and reports are available</p> <p>8/ Detail explanation on water intake cannel of pumping station I, this plan is difficult for operation, maintenance; more intake gate at the upper part, lower level of the water overflow level of the dam can be considered, and method of water intake using pipe in combination with backward pipe from raw water pump or change into open with stone reinforced bank and penstock water gate is recommended</p>		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	<p>Detailed Design documents for the transmission pipeline and supply pipeline with diameter from D200 - D32 - HDPE, after study we have comments as following:</p> <ul style="list-style-type: none"> - Lack of pipe network hydraulic calculation.- Re-check the high pressure of pumps in the pumping station II based on the pipe network hydraulic calculation - There is a difference between the outlet pipe of the pump D150 and the treated water transmission pipe on water supply network D200. - In profile drawing of transmission pipes and distribution pipes have not shown the depth and slope of pipes., the pipes is designed to go up or down at random by the natural elevation of the ground, this would not be effective and can reduce life of the pipes. - Lack of general layout drawing of water supply network. <p>In view of above, please provide and explain as following:</p> <ol style="list-style-type: none"> 1. To supplement the hydraulic network calculation for the pipeline from the pumping station II to the 2 existing reservoirs and the gravity pipeline from the reservoir at the purification plant to the new supply areas, Na Son A and Na Son B villages. 2. Check and recalculate the flow and pressure pump 3. Edit diameter of rising pipe at the pumping station or the transmission pipe of the network to suit each other and consistent with the results of 	<p>DPI/PO agreed to supplement the missing data and submit to the survey team.</p> <p>The hydraulic calculation, DD of the pipelines was revised and submitted to the team on September 29, 2010</p>	<p>After checking the submitted documents, the team confirm that plans for raw water transmission, water distribution, water supply systems and pipe laying are suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		hydraulic calculations. 4. Should consider the deep and slope to prevent pipes up and down erratically. 5. Additional drawings of general layout drawing of water supply network. 6. Check the elevation of treated water supply pipe from the filter tank to reservoirs to secure better work.		
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.	- The memorandum/agreement with EVN is not available in F/S and D/D. Request to submit survey team - Lack of detailed design drawings of transformer and cable connecting to WTP.	DPI/PO explained that they have talked to the Electric Power Company. Minutes of agreement on power supply connection for the project's water treatment plant of the Dien Bien Power company (EVN) was submitted to the survey team on 14/09/2010	The survey team confirm it is suitable
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	1. Pumping station I - Drawings are missing. 2- Pumping station II - Lack of electrical drawings. In the D/D report mentioned an electric equipment control panel. Calculation for power supply and electrical equipments is requested to provide to the team (D/D report for power supply component. - Lack of power supply one cable drawing for the whole WTP - Lights need to be prepared for the outside area of the purification plant. - No Lightning Protection System Grounding. Proposed additional submit	DPI/PO submitted updated drawings. After reviewing, findings are as follows: - Electrical drawing for pumping station I is missing, - Wrong indicator between the detailed electrical drawings and electrical explanation report. DPI/PO explained that: - Lighting system of high walt lights was calculated to have enough capacity for	After checking the submitted documents, the team confirm that electrical machinery facility specifications of project are suitable

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
			lighting the filter areas, - Will supplement the technical electrical explanation including electrical equipments' capacity table to the explanation report of construction drawings DPI, PO supplemented the missing items and data as commented by the survey team and submitted on 29/9/2010	
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	Land acquisition is mentioned in the project D/D explanation report; in which, targeted items, cost estimates and commencement phase were calculated and prepared. However, the land acquisition normally takes time; therefore, DPI/PO is requested to explain about the current status of the land acquisition for this project.	DPI, the project has a contract with the Center for Information Technology Natural Resources and Environment, Department of Natural Resources and Environment of Dien Bien province to conduct land profile for land acquisition of the project (Contract No. 19/HD on 08/02/2010). It takes about three months to complete the land profile, land acquisition plan approval and site clearance commencement.	Survey team understand the actual situation and will explain to JICA fully the DPI & PO explanation
3. Operation Plan				
3-1. Placement of	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure	Placement of personnel & manpower secure plan is mentioned in the project D/D explanation	DPI/PO supplemented the plan and submitted	After checking the submitted documents,

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
personnel & manpower secure plan	<p>plan.</p> <p>-Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>report; but the deployment plan of personnel, who will conduct the water quality monitoring, has not yet been mentioned. DPI/PO is requested to prepare the supplemental plan for it.</p>	<p>to the survey team on September 29, 2010</p>	<p>the team confirm that placement of personnel & manpower secure plan is suitable</p>
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>O&M plan is mentioned in the project explanation report; but this plan focus into the O&M for Intake pumping station – I. DPI, PO are requested to prepare more detail O&M plan for the reservoir (gravity tank) and water supply pipeline.</p> <p>Dien Bien water supply company will operate and maintain the water supply project. They are PO also.</p> <p>Water tariff is mentioned briefly in the project report and calculation for capital recovery of the investment was not mentioned. Water tariff plan/regulation is requested to be provided to the survey team.</p>	<p>DPI/PO supplemented the O&M plan (for pumping station I, pipe network, reservoirs...) and submitted to the survey team on September 29, 2010</p> <p>DPI, PO has provided the Decision relating to water-tariff of Dien Bien province in 2009 as a basis to calculate the water tariff later.</p>	<p>After checking the submitted documents, the team confirm that O&M facility plan will continue to be evaluated after receiving the supplemental O&M plan</p>
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water</p>	<p>Laboratory is not mentioned in the project D/D. DPI, PO is requested to add this item.</p> <p>DPI,/PO are requested to prepare a detail plan for water quality control based on experience of Dien Bien water supply company and/or refer to the guidebook of Hue WACO (a copy and explanation will be provided by the study team)</p>	<p>DPI/PO explained that they will prepare a tool-kit for checking parameters needed for daily monitoring (turbidity, pH, residual chlorine) at the site of the treatment plant; the parameters need to periodically check (weekly, monthly and yearly) will be sampled and bring to the laboratory of Dien Bien water supply company for analysis</p>	<p>After reviewing the additional documents and visit to the laboratory of Dien Bien water supply company, the survey team assumes that the water quality control plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>			
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>D/D mentioned the plan for connection from supplying pipe to each household (including counter meter, taps, connecting pipe) Plan on water connection promotion (with consideration on targeted social welfare households) should be prepared and add in project report.</p>	<p>DPI/PO explained that they have developed a specific connection plan for connecting to each household (including water meter, 6m connecting pipe into the house and a tap water). Water price will be applied for the whole area; for poor households or families seeking to water subsidy policy must apply to the water supply company for settlement consideration</p>	<p>After reviewing the provided documents, field survey and interviews of the residents, the survey team assumes that the connection promotion plan is suitable.</p>
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge. -If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>The sludge drainage plan is not available in D/D. DPI, PO are requested to clarify the D/D</p>	<p>DPI/Po explained that the backwash and surface storm water will be drained to the downstream of Na Son stream, along the operation road</p>	<p>After reviewing the provided documents and field survey, the survey team assumes that the Sludge drainage plan is suitable</p>

PHOTOS Dien Bien/Dien Bien Dong



Meeting
with Dien Bien DPI/ POs



Intake for proposed water treatment plant



Location of proposed water treatment plant
Water treatment plant (Q=1,500m³/day), which is consisted of sedimentation tank and rapid sand filter, plan to be constructed

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Interview

3.10 Project No. 10: Dien Bien (Tuan Giao)

A. Project Summary

1. **Project Title:** Water Supply system for Nam Din Minority Village
2. **Province:** Dien Bien
3. **District:** Tuan Giao
4. **Project Site:** Nam Din Minority Village, Phinh Sang Commune, Tuan Giao District
5. **Project Objectives:** Construction of a water supply system to supply clean water for Nam Din Minority Village contributing to improve people life in the project area.
6. **Scope of Project:** Construction of a water supply system with capacity of 103.22m³/day comprising Intake water system, Preliminary treatment facility, reservoir 90m³, raw water pipeline, Distribution network and a reservoir 15m³.
7. **Project Owner:** Tuan Giao District People's Committee
8. **Operation and Maintenance Agency:** Water supply Unit of Nam Din Minority Village and Tuan Giao District People's Committee is responsible for supervision
9. **Project Investment decider:** Dien Bien Provincial People's Committee.
10. **Project cost:** 1,749,116,335 VND
11. **JICA Portion:** 1,749,116,335 VND
12. **Documents received by the SAPI Study Team:** F/S, D/D construction drawings report, and cost estimate document,

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Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility. -Taking into consideration the difference between dry and wet season, data for 12 months of water quantity. -The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data. -If data is not sufficient, the survey team should propose as the criteria.	According to the D/D report, water source is from a spring, which originates in the mountain. However, the catchment of the water source cannot be defined. The water source monitoring report is not available. The SAPI Study Team conducted the interviews of the residents living nearby the water source. They confirmed that spring has water all the year around including dry and rainy season. The lowest flow is in March (approximate $Q_{min} = 20l/s$ (1,728 m^3/day)). However, the Water quantity is not defined clearly. The SAPI Study Team requested the DPI/PO to provide the monitoring data for the designated water source for 12 months.	The designated spring has water flow all the year around. Even during the draught, there is enough water for the daily water use of the residents. In the long history, minority living in Nam Din village have never experienced draught in this spring. In addition, this is the only water source in the area. The PO informed that the total water quantity was estimated based on the site observations and interviews of the local residents. The PO informed that this is a small project of capacity = 103 m^3/day ; moreover, the project site is in the remote area difficult for transportation/traffic. Therefore, water monitoring data cannot be obtained.	After checking the records and the result of the actual site visit, the SAPI Study Team concludes that there is no problem with the quantity of water source. The intake is located upstream of barrage. The quantity of water source is enough for the capacity of water supply. It is not necessary to obtain water quantity data for 12 months.
1-2. Securing the water quality for drinking water	-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam. -Taking into consideration the difference between dry season and wet season, the Survey Team needs to review	In this project area, the rainy season is from May to September, and dry season is from October to April. There is a water quality report dated March 2010 with 17 parameters in the F/S and D/D. Nitrate is	The Department of Planning and Investment, the Project Owner explained that the goal of this project is to help the households not to travel	Based on the F/S, D/D, actual site visit and interview of residents, the condition of spring water is constant i.e. colorless

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>over the standard limit (QCVN 08/2008). There is no result mention against E-coli.</p> <p>According to QCVN Standard 01:2009/ BYT, the water source meets the quality requirements to supply water for the water supply facility in Nam Din Village.</p> <p>To fulfill JICA requirement, the remaining data for the months from January to February and from April to December are required.</p>	<p>long distance to collect water for their daily use from the water source especially to women and children.</p> <p>Through interview of the residents it was confirmed that the quality of stream water does not change with the season and their health is good with this water.</p> <p>The PO informed that being remote area and difficulty of transportation/traffic in this area, it is very difficult to obtain the remaining 11 months data as required by the JICA and it will extend the project.</p>	<p>and transparent all the year around including dry and rainy season. The survey team assumes that the quality of the water source is eligible to supply water for the water supply facility for Nam Din Village.</p> <p>The Survey team will explain to JICA the opinion of DPI.</p>
2.Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>The target year in the F/S is 2030 with the parameters as below:</p> <ul style="list-style-type: none"> - Population for the domestic water supply is 820 persons with water supply Criteria as 80 l/person/day; Service ratio is 100% - Supply water for the Commune PC with supply criteria is 30 persons; water use standard is 20 l/person/day; Service ratio is 100%. - Water supply to the commune health care center with supply criteria is 20 persons; water use standard is 20l/per/day; service ratio is 100% - water supply to the kindergarten with supply criteria is 40 persons; water 		Based on the review of data and actual site visit, the survey team assumes that the parameters used in calculating water demand is reasonable

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>use standard is 20 l/person/day; service ratio is 100%</p> <p>- water supply to the school with criteria for stay-in pupils is 100 persons; water use standard is 80 l/person/day; service ratio is 100%.</p> <p>- Water supply to the school with criteria for stay-out pupils is 200 persons; water use standard is 20 l/person/day; service ratio is 100%.</p> <p>Comments: Current population (2010) is 550 people with annual population growth rate of approximately 2%. This is the mountainous area therefore the productivity is higher than the project area. Therefore, until 2030, the estimated approximate population is 820 persons.</p> <p>Water use criteria of this study area are relatively low compared to other areas. This is the ethnic minorities' area with such conditions of living, habits and customs; therefore, the water service ratio mentioned above is appropriate.</p>		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<p>The Capacity of the treatment plant (103m³/day) is enough for the water demand of the region until 2030.</p> <p>Water source with a minimum capacity (Q_{min} = 20L / s (1,728m³/day)) ensures the supply of raw water to the water treatment plant for the immediate future and long-term demand.</p>		The estimated water volume meet the capacity of the water supply facility
2-3. Water purification	The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.	Technology applied for the water supply facility (domestic water) is very simple, as		Based on the analysis of source water quality,

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
method	-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors	water quality is relatively good. The water from the water source flows by gravity to the filter and then it is pumped to the reservoir from where water is supplied in the network through gravity. The disinfection/chlorination is not used.		power station, and construction costs, the proposed water treatment technology is appropriate. The O&M of the facility will be conducted by the ethnic minority households in the Nam Din. There is urgency of water supply to these minorities.
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>After reviewing the F/S and D/D, findings are as follows:</p> <p>1. Water dam: dossier includes design drawings of construction; however survey team recommended to increase protection thickness of reinforced concrete to 4cm to avoid corrosion and penetration.</p> <p>2. Pumping Station: After checking the documents, drawing D/D. The survey team request to the DPI, PO to revise the D/D as following:</p> <p>Bottom slap of pumping stations should not be listed/direct on the beams; it should be sat directly on the compacted soil. The thick of bottom slap and wall of the pumping station should be increased to 22cm.</p> <p>The bottom slap needs to be broadened 20cm more to reduce pressure.</p> <p>The protection thickness of reinforced concrete increase to 4cm for part under water.</p>	<p>The investor explained that the reduction in concrete volume is not significant and request keeping as designed</p>	PO provided the revised DD to the team on 21 Sept 2010. After checking, the team confirm that the civil structure of each facility is suitable

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		<p>Check the main way rebar of cover slab's pumping station, and check the rebar of wall pumping station, it should be increased to diameter 12 a150 to ensure enough pressure.</p> <p>3. Water tank 90m3: Survey team suggested that e the documents should be checked by other consultants before the construction.</p> <p>4. Water tank 15m3: Survey team suggests that for the water tank outside the courtyard reinforced concrete grade 200 should be used.</p>	<p>DPI/Po will complement the missing items, prepare documents required by the survey team, and will submit it on September 20, 2010.</p>	
<p>2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying</p>	<p>-The Survey Team needs to confirm the appropriateness of these plans.</p>	<p>Related to the raw water pipeline, pipeline distribution, we have the following comments:</p> <ul style="list-style-type: none"> - Having the hydraulic calculations for a pipeline - Raw water pipeline proposed to diameter, but no mention of pressure pipe work. - Line pipe distribution has mentioned both pressure and diameter of the pipe work, however the pressure of the pipe are proposed for different categories such as: PN6, PN8, PN10, PN12.5. - No layout found residues or exhaust valves on the pipe. <p>We explain and suggest additional issues as outlined below:</p> <ol style="list-style-type: none"> 1. Calculate the additional testing and working pressure of raw water pipeline. 	<p>Already calculated the hydraulic transmission pipe for choice pump, and will mention on transmission pipeline/raw water pipeline drawing.</p> <p>The PO/Consultants will check and choose the pressure of pipe suitable on the basis of existing local condition.</p> <p>DPI/Po will provide the revised documents to the survey team on September 20, 2010</p>	<p>PO provided the team the revised DD. After checking, the team confirm that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		2. Check and explain the differences between working pressure of the pipeline.		
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.	-The Memorandum / agreement with EVN is missing. The team requested the DPI/ PO to provide the survey team	DPI/PO has provided the written commitments dated September 13 th , 2010 of Tuan Giao district EVN to supply power to the water works of Nam Din.	
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	Pumping station : - The detailed design of control panel is missing. - On the single line diagram, the voltage meter with selector switch for incoming feeder is missing. - The magnetic contactor and the overload thermal relay for each pump motor are missing. - Recheck the parameters of the circuit breaker of each pump. They are too small. - The capacity of the pump motor is about 7.5kw. Therefore, the cross section area of the power cable of each pump as shown on the drawing is too big.	DPI/PO will complement the missing items, prepare documents required by the survey team, and will submit on September 20 th , 2010	PO provided the team the revised DD and missing data. After checking, the team confirm that the specifications are suitable
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	Land acquisition plans are not mentioned in the explanation of the investment project construction. The delegation proposed DPI/PO to clarify the issue	DPI/PO submitted the Phing Sang commune PC's commitment regarding the plan for arrangement of land for construction of water works in Nam Din mountain village on September 13 in 2010. DPI/PO also explained on the basis of this	Agree with DPI and PO.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
			<p>commitment, when project is formally approved by the People's Committee for the construction, land acquisition will be conducted immediately. Since the project is very small and is a water supply project for the ethnic minorities, it would be very easy and convenient to acquire the land.</p>	
3. Operation Plan				
<p>3-1. Placement of personnel & manpower secure plan</p>	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>The personnel and human resources Plan is not specified in the notes to the investment project construction. The survey team proposed to the DPI/PO to clarify the issue.</p>	<p>DPI informed that the project after completion will be handed over to the community for the management and operation and Tuan Giao district would be responsible for the supervision. DPI submitted to the survey team "Arrangements to recruit and ensure manpower plans" on September 14, 2010.</p>	<p>The survey team assume that the placement of personnel & manpower secure plan is suitable with the current conditions</p>
<p>3-2. O&M facility plan</p>	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>The operations and maintenance Plan is not specified in the notes of the investment project construction. The delegation proposed DPI/PO to clarify this issue.</p> <p>The delegation proposed to the DPI to prepare rules and regulations to collect water use fee.</p>	<p>DPI/PO informed that the project after completion will be handed over to Phinh Sang commune and to PMU of Nam Din mountain village for the operation and maintenance. Tuan Giao district would be responsible for the monitoring; in</p>	<p>After reviewing the additional documents, the survey team concluded that the management plan is appropriate considering the real local situation.</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
			<p>addition the district will arrange a portion of the budget for the maintenance of the projects.</p> <p>DPI/PO explained that the amount of money is fixed on the basis of power consumptions used in water supply, and will be divided according to actual water consumption by each household.</p>	
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the</p>	Laboratory for water quality control was not reflected in the detail design. The survey team requested the DPI/PO to add laboratory in the project.	DPI/PO informed that they are committed to testing the water quality of the water supply of the Nam Din Tuan Giao district clinic periodically every month	<p>Survey team understands that this project doesn't include Lab room because of size of supply volume, conditions of location and manpower.</p> <p>Survey team confirms that it is suitable plan of water quality control.</p> <p>The Survey team will explain to JICA the opinion of DPI.</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	preparation of Water Quality Control Capacity Strengthening Plan.			
3-4. House connection's promotion plan	To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	Each household would be provided service pipe, tap and water meter free of charge. The costs of these items are part of the total project cost.	DPI, PO explained that pipe, tap, meter is free and that people will pay only a small electricity and operation free so they are happy and ready to use the water	After hearing checking the detailed design and site survey, the survey team assume that the house connection's promotion plan is suitable with actual conditions.
3-5. Sludge drainage plan	-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge. -If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	Not available in the D/D.	Because of the scale of the project, which is too small, the sludge will be discharged downstream of the stream.	The survey team noted that this method is easily implemented under the existing conditions.

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PHOTOS Dien Bien/Tuan Giao

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Meeting
with Dien Bien DPI/ POs



Water source in the project
Water is supplied from water source (above photo.) in the project, which is used by people in the area currently.



Bamboo vessel for carrying water
People in high land area take water from the spring using bamboo vessel every day.



Location of proposed distribution tank
Q=90m³



Interview 1



Interview 2

3.11 Project No. 11: Thanh Hoa (Yen Dinh)

A. Project Summary

1. **Project Title:** Water Supply System for Quan Lao town
2. **Province:** Thanh Hoa
3. **District:** Yen Dinh
4. **Project Site:** Quan Lao town
5. **Project Objectives:** To build a water supply system for Quan Lao town in order to meet water demand up 2010, with capacity of 1500 m³/day contributing to improve the people's health, livelihood, and environmental sanitation for Quan Lao town
6. **Scope of Project:** Construction of 3 drilled wells, 3 well pumping stations, water treatment plant, raw water pipeline, reservoir, treated water pumping station, transmission & distribution network, and secondary & tertiary distribution network
7. **Project Owner:** Yen Dinh District People's Committee
8. **Operation and Maintenance Agency:** Yen Dinh District People's Committee
9. **Project Investment decider:** Thanh Hoa Provincial People's Committee
10. **Project cost:** 11,190,470,000 VND revised 28,449,000,000 VND (based on decision by Thanh Hoa PPC on August 17th 2010)
11. **JICA Portion:** 9,252,200, 00 VND
12. **Documents received by the SAPI Study Team:** F/S, D/D drawings, Geotechnical survey report, D/D report (calculations), exploratory drilling report to evaluation ground water quantity, water quality of the existing Water Supply System

B. Review Result

SAPI study team reviewed the documents provided by Thanh Hoa DPI/PO/DPC, made visits of the project sites, discussed and clarified issues with the DPI & PO/DPC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility. -Taking into consideration the difference between dry and wet season, data for 12 months of water quantity. -The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data. -If data is not sufficient, the survey team should propose as the criteria.	Water source is from the Ground Water. Based on the exploratory drilling report to evaluate the ground water quantity, the total capacity from the 2 test drilling wells were as bellow: QG1(from well No1)=8l/s (691m3/day) QG2 (from well No2)=14.5l/s (1,252 m3/day) The SAPI Study Team informed that these data were obtained in year 2006 and also there is wide difference in the capacity of two wells, although these wells are not very far apart (less than 200 m). The SAPI Study Team also visited the site of 2 test drilling wells, which are located in the agriculture land. There is a Man Dinh river, which is only 600 m from the proposed wells for the JICA project. This is used to be a river. Now this functions like a pond and store rainwater for the irrigation. This river will be upgraded to regulate as reservoir and also to preserve its water quality. The SAPI Study Team checked the catchment & surrounding areas of the wells. It appeared from the topography that there could be abundant Ground water available in this area. In the F/S, there is mention of one existing drilling well of Q= around 400 m3/day with depth 43 m, which is in operation since 1994. Due to limitation	The PO/DPC will check the water quantity from the test drilling wells G1 and G2 within 2 weeks and will provide the documents to the SAPI Study Team. The PO/DPC will also conduct the similar tests during the dry season after the test of September 2010 if required. The PO/DPC submitted the drilled test for ground water pumping on 27 th Sep 2010	After receiving the documents of the test drilling wells for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA. After checking the additional documents, the SAPI team confirms that the water quantity from drilling test is suitable.

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>of filtration capacity only 250 m³/day of water is utilized for supplying as drinking water.</p> <p>Adjacent to Quan Lao town, there is a JICA Grant-in-aid Dinh Tuong water supply project, which has capacity of 600 m³/day. This project is in operation since 2006. The water purification plant receives 600 m³/day Ground Water as water source using 1 well only. The quality and quality of water source is very stable. This Ground Water source is only 1 km away from the proposed JICA water source location. The SAPI Study Team visited the above plant.</p> <p>There is total requirement of 1500 m³/day for this project, which could be sufficiently obtained from the two wells; moreover, according to VN standard there will be a third well as stand by.</p> <p>From the above information, it appears that there is sufficient Ground water quantity available in this area. However, the SAPI Study Team would like to recommend the PO/DPC to obtain sufficient evidence of quantity of the Ground Water of this particular location, which will be used as a water source for the JICA project.</p> <p>Ma River is the biggest river in the province and is only about 6 km from the proposed JICA water purification plant location. However, the river flow and turbidly changes significantly in two weathers i.e. dry season and rainy season and thus cannot be used as water source for the JICA project.</p> <p>To fulfill the JICA requirement, 12 months data are required.</p>		

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1-2. Securing the water quality for drinking water	<p>-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>There is one water quality result (August 2006) from the test drilling wells with 26 parameters, which conform to the VN Standard except that Fe which is higher than the Standard.</p> <p>There are three samples of the water quality result of the existing well. The water quality parameters (although numbers of parameters are not sufficient according to the standard) conform to the VN Standard except Fe. Fe is 18.54 mg/l (April 2005), 31.5 mg/l (July 2005), and 31 mg/l (June 2004) which exceeded the standard (<10 mg/l). However, the water quality after treatment (sedimentation + filtration) meet the VN drinking water standard (June 4th 2009 with 11 parameters, July 2005 with 15 parameters and June 2004 with 15 parameters) The VN standard required that 24 parameters should be analyzed.. The treated water quality meets the Fe standard in the drinking water. The Plant is in operation since 1994 and has no complain of water quality. This plant is located only 400 m far from the proposed Ground Water source of the JICA project.</p> <p>The SAPI Study Team also checked 1 result of raw water quality of the JICA Grant-in-aid Dinh Tuong water supply project (reference D/D report of November 2004) which conforms to the Ground Water use as per VN standard for the drinking purpose after treatment. The SAPI Study Team also checked 7 samples of water quality results after the treatment (July 2008, Nov 2008, Dec 2009, July 2010, March 2010) which also conform to the drinking water standard. The Plant is in operation since 2006 and has no complain of water quality. This plant is located only 1 km from the proposed Ground Water source of the JICA</p>	<p>The PO/DPC will check the water quality (26 parameters) from the test drilling wells G1 and G2 within 2 weeks and will provide the documents to the SAPI Study Team. The PO/DPC will also conduct the similar tests for the subsequent months i.e. from October 2010 if required.</p> <p>The PO/DPC will also conduct the similar tests from September 2010 for the raw ground water Source of the Yen Dinh existing water treatment plant (250 m3/day).</p> <p>The PO/DPC sent water quality data.</p>	<p>After receiving the documents of the test drilling wells for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA.</p> <p>It is appropriate.</p>

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		<p>project.</p> <p>The rainy season is from April to October and the dry season is from November to March.</p> <p>From the above information, it appears that the Ground water quality in this area conform to the VN standard except Fe. However, the SAPI Study Team would like to recommend the PO/DPC to obtain sufficient evidence of quality of the Ground Water of this particular location, which will be used as a water source for the JICA project.</p> <p>To fulfill the JICA requirement strictly, 12 months data are required.</p>		
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>The SAPI Study Team informed that the target year for the project was 2010 and the project is not implemented until 2010, which is the current year. By the time project is implemented population will increase. Also, the SAPI Study team informed that the project report was prepared in year 2005 with target year 2010, therefore, many conditions might have changed in five years. The PO/DPC revised the demand forecast with the target year 2010 and 2015. The population (actual) for year 2010 is 7,266 persons and estimated for year 2015 is 7,682 persons (growth rate of 1.4%/year).</p> <p>The following criteria have been proposed in the revised demand forecast/F/S.</p> <ul style="list-style-type: none"> - Water supply Criteria is 110 l/per/day. - Service ratio is about 100%. - Water for public is 10% of domestic. - Water for commercial and service is 15% of the domestic 		

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		<p>- Watering and road washing is 9% domestic. - Water loss is 15% . - Water use for WTP is 5%.</p> <p>The PO/DPC provided the justifications in the revised F/S for the changed conditions. The SAPI Study Team is satisfied with the revised demand forecast as estimated by the PO/DPC.</p> <p>Regarding current water supply, operating capacity is only 250m³/day and pumps, transmission pipelines, distribution networks are too old, pipe pressure is very low, while water supply demand is very high (1,750m³/day).</p>		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<p>FS mentioned water demand as 1750 m³/day (2010) and 2,000m³/day (2015) (according to the revised F/S). There is an existing the WTP with the capacity 250m³/day in Quan Lao Town. The capacity of the proposed JICA WTP is 1500 m³/day. In the D/D, 3 well pumping stations, including: G1 well pumping station with capacity as 21m³/h (500 m³/day) and G2, G3 as 43m³/h (1000 m³/day) for each well have been designed. To cover the target year 2015, the PO/DPC informed that they will expand the existing water purification plant capacity from 250m³/day to 500 m³/day.</p> <p>The SAPI Study Team concluded that the water supply volume and the capacity of water purification plant are appropriate.</p>		
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method. -The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the</p>	The Feasibility Study Report refers to the description on the two options for the water purification method. And proposed a method as in option 1. The capital cost is almost same for both the options. However, O&M cost for the option 1 is lower than the option 2. Therefore, the option 1		

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	<p>quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>was selected as it has the Lowest Life Cycle Cost. The proposed technology is based on aeration, mixing trough, vertical sedimentation tank to remove iron from the water followed by rapid filter and chlorination.</p> <p>The exiting water purification plant in Quan Lao Town, which is in operation since 1994, also uses Ground water as the water source and is being operated by the PO/DPC. The raw water contains higher Iron content than the Vietnam Standard. However, treated water quality conforms to the drinking water standard including Fe. This plant is also based on aeration, sedimentation and filtration technology to remove Fe. This plant is located only 400 m far from the proposed Ground Water source of the JICA project.</p> <p>Adjacent to Quan Lao town, there is a JICA Grant-in-aid Dinh Tuong water supply project, which as capacity of 600 m³/day. This project is in operation since 2006. The water purification plant also uses the Ground Water as water source. This plant is also based on aeration, sedimentation and filtration technology to remove Fe. This Ground Water source is only 1 km far from the proposed JICA water source location.</p> <p>The Ground Water quality of the proposed JICA project should be of similar quality as above since locations of all above Ground Water Sources are in proximity. The proposed technology for the JICA project is comparable to above technologies with some improvements to remove iron efficiently.</p> <p>The SAPI Study Team concluded taking into consideration of quality and quantity of water</p>		

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		<p>source, technical experience of the PO/DPC that water purification technology is appropriate.</p> <p>The SAPI Study Team observed that the proposed wells are located in the agriculture land where some farmers use the pesticides. The pesticides may pollute the Ground Water (although chances are very rare as the wells are very deep in the ground.). There is a river (appeared as if water is stagnant) near the wells. There are scattered households along the river. The water of the river appeared to be contaminated. The SAPI Study Team recommended that the farmers and residents shall be made aware that the proposed wells for the drinking water are in the vicinity and their activity may pollute the drinking water source.</p> <p>The SAPI Study Team proposed to the PO/DPC that the existing plant shall be rehabilitated since the distribution system of the JICA project will supply the water from this plant also. There is need to replace pumps and upgrade the filtration system of the existing water purification plant.</p>	<p>The PO/DPC considered the suggestion of the SAPI Study Team and informed to launch the awareness campaign during the construction of the project.</p> <p>The PO/DPC informed that they planned to rehabilitate the Plant and confirmed that the work will be completed during the construction of the proposed JICA project.</p>	
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>The SAPI Study Team discussed the layout plan for each facility to confirm its appropriateness for O&M. The facilities are appropriate for the proper operation of the water supply facility.</p> <p>The SAPI Study Team obtained the missing documents (Geotechnical survey report, Structure calculation, function of each room of administrative building). The SAPI Study Team reviewed the F/S and D/D reports including above missing documents. The SAPI Study Team found it appropriate and informed to the PO/DPC that if there is any comment from the detail review after returning back to Hanoi, team will inform to the</p>	<p>The PO/DPC agreed to the requirement of JICA for including the laboratory in the D/D and agreed to provide the completed D/D including provision of the laboratory to the SAPI Study Team by 27th of September 2010.</p> <p>They submitted the revised documents.</p>	It is appropriate.

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		PO/DPC. There is no provision of laboratory room in the water purification plant, which is one of the requirements of JICA. The SAPI Study Team requested the PO/DPC to prepare the design and cost estimate for the water quality monitoring room and include it in D/D.		
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	The SAPI Study Team reviewed the F/S and D/D reports including hydraulic analysis. The SAPI Study Team found it appropriate and informed to the PO/DPC that if there is any comment from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the PO/DPC. Regarding the raw water transmission main, it is proposed in series. Considering the O&M, we recommended the parallel line, if possible.	The PO/DPC agreed with the suggestion of the SAPI Study Team. However, the project was approved and the pumps in series are also technically acceptable and are practiced.	
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.	The detailed design drawings for the 100kva-35/0.4kv sub station to supply power to the pumping station 1 and pumping station 2 are available. The PO/DPC has already executed an agreement with EVN (Power Company) to provide power supply to the JICA project.	The PO/DPC provided a copy of the agreement to the SAPI Study Team.	JICA requirement is met.
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	The survey team found the specifications of the electrical machinery appropriate. The electric cables as selected for the project can meet the technical requirements (the total voltage drop at the terminal of the pump motor is not exceeded 15% during starting period).	They submitted the revised documents.	It is appropriate.
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of	The SAPI Study Team visited the project site and confirmed the fact that the lands, on which wells and water treatment plant will be built, are District own and are currently being used for Agriculture.	The PO/DPC showed the Town Master plan, which indicates the land for the wells and water	

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	appropriateness of the process to obtain the consent of the residents.	<p>The residents in the commune are doing farming on this land. No house is built on these lands and no resettlement is involved. According to the explanation of the PO/DPC, the land acquisition requires only the compensation for the crops planted. The PO/DPC has already conducted the well-drilling test on this land.</p> <p>The distribution network will be laid along the road and buried under the ground so no land acquisition is required.</p>	treatment plant.	
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan.</p> <p>-Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>The PO/DPC confirmed to the SAPI Study Team that they have no plan for the placement of personnel and manpower secure. The SAPI Study Team presented to the PO/DPC the Plan of Hue water supply company. The Study Study Team also presented to the PO/DPC the copies of O&M manual prepared under the JICA Technical assistance program in Hue Province.</p> <p>The SAPI Team recommended that the personnel of PO/DPC can be sent to the plant of Hue water supply company for the training and study of their Plan.</p>	<p>The PO/DPC proposed that they will recruit the personnel who will be doing the water quality monitoring. They also proposed to send them to the Experienced water supply company for the training and study of their Plan before the operation of the JICA project of Quan Lao.</p> <p>The PO/DPC agreed to the requirement of JICA for making of Placement of personnel & manpower secure plan.</p> <p>They submitted the revised documents.</p>	It is appropriate.
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after</p>	F/S mention about O&M plan for the facility. The O&M would be conducted by the Yen Dinh District People's Committee, who is also the Project Owner. They have set up an enterprise	The PO/DPC understood the necessity of capacity building for the JICA project and agreed to the	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	construction facilities.	<p>named “Environment Sanitary and Clean Water” under the PO/DPC. There will be 15 personnel including 10 personnel who are operating and maintaining the existing water supply system.</p> <p>The SAPI Study Team visited the exiting well, water purification plant, distribution network, service line and connections. The SAPI Study Team also interviewed the households who have service connections using the existing system. Although there was no complain regarding the water quality, the supply of water itself was erratic. The water source for the water treatment plant is from the Ground Water, which is only 400 m from the proposed JICA well and water purification plant. The existing plant was constructed in 1994 and the conditions of the pumps and filter-system were not good. This plant does not use the chemical for the sedimentation of iron-sludge; therefore, frequent backwash is required in this plant. Moreover, the filter capacity is limited.</p> <p>The SAPI Team Study observed that there was scope of improvement in the O&M of the existing water supply system. So, the SAPI Study Team recommended that there shall be enough capacity building of the personnel who will be assigned for the JICA project for O&M before the operation of the water supply system. It was also recommended that these staffs shall be involved during the implementation of the project for the On-the Job-Training (OJT).</p> <p>The cost of water production is estimated as 4,047 VND/m3 in the revised FS, The water tariff proposed is as 5,000 VND/m3.</p> <p>The SAPI Study Team concluded that the project is</p>	recommendation of the SAPI Study Team. They informed that they will implement the capacity building programme during the construction of the project.	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>financially sustainable.</p> <p>F/S does not mention the water quality control plan. The PO/DPC informed that they send sample of treated water to the laboratory of the Health Department of the district for all examination. However, the SAPI Study Team found out that the PO/DPC does not send the samples regularly as per the Vietnam drinking water Standard. The SAPI Study Team informed to the PO/DPC that it is very necessary that they develop their capacity with regard to daily water quality control. The SAPI Study Team presented to the PO/DPC the Plan of Hue water supply company. The SAPI Study Team also presented the copies of the O&M manual including water quality control prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Study Team informed that making of Water Quality Control Plan is one of the requirements of JICA before the commencement of construction works.</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall management and NRW reduction under the JICA Technical Cooperation Programme. As a result, the Hue water company monitors water quality on hourly basis and declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.</p>	<p>The PO/DPC agreed to the observations of the SAPI Study Team. They understood to develop their capacity with regard to daily water quality control. They agreed to send their staffs to the Experienced water supply company for the training and study of their Plan.</p> <p>The PO/DPC agreed to the requirement of JICA for making of Water Quality Control Plan.</p> <p>They submitted the revised documents.</p>	It is appropriate.
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the</p>	The PO/DPC explained that there are 100 households in Quan Lao project service area who are under the poor category. These households would be provided free of charge service line and water meter. All others households would be	The PO/DPC revised the coverage from 80 % to 100%.	It

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	points necessary to make such plan by introducing good practices.	<p>required to pay for the service line and water meter. They also explained they have target to achieve the 100% coverage, however, due to constraint of budget they have considered only 80% coverage under the JICA project. The SAPI Study Team asked the PO/DPC for their tangible Plan to achieve the remaining 20% coverage. The SAPI Study Team also expressed their concern that 100% households should be provided with the safe drinking water under the JICA project. The SAPI Study Team informed that the target year for the project was 2010 and the project is not implemented until 2010, which was the target year. By the time project is implemented population will increase and thus coverage ratio would further decrease. And the remaining population would be still using the unreliable water under the JICA project area.</p> <p>The SAPI Study Team also proposed to prepare “the Stakeholders’ Participation Programme” to promote the House Connections and implement it during the construction of the JICA project.</p>	The PO/DPC considered the suggestion of the SAPI Study Team for House Connection promotion Campaign and informed that there is provision of the local budget for this purpose. They informed that they will prepare the “House Connection promotion Plan” and implement it involving NGO during the construction of the project. They informed there are NGOs who would be very useful for this programme.	
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	The SAPI Study Team checked the F/S and D/D for the sludge drainage Plan in the water purification plant facility. It was found there was no such provision in the F/S and D/D. The SAPI Study Team discussed the Plan with the PO/DPC and requested the PO/DPC to prepare the Plan and include it in the D/D.	<p>The PO/DPC agreed to provide the completed D/D including the sludge drainage Plan to the SAPI Study Team by 27th of September 2010.</p> <p>PO/DPC submitted the lacking documents for D/D of the sludge lagoon including report of calculation and drawings on 27th Sep 2010</p>	After checking the revised documents, the team confirm that the design is suitable

PHOTOS Thanh Hoa/Yen dinh

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Meeting
with Thanh Hoa DPI/ PO



Exist. WTP
would be upgraded from Q=250 to 500m³/day



Location of proposed New WTP
Q=1,750m³/day



Location of proposed drilled well (G1)
located the distance of 60m from proposed WTP,
Q=21m³/h, H=33m (submerged pump)



Proposed Supply Area



Interview
for resident of proposed service area

3.12 Project No. 12: Ha Tinh (Ky Anh)

A. Project Summary

1. **Project Title:** Water Supply System for Ky Trinh, Ky Ha and Ky Ninh of Vung Ang Economic Area
2. **Province:** Ha Tinh
3. **District:** Ky Anh
4. **Project Site:** Ky Trinh, Ky Ha and Ky Ninh of Vung Ang Economic Area
5. **Project Objectives:** Building Water supply system to supply enough clean water for Vung Ang economic area contributing to improving the people's health, livelihood, and environmental sanitation.
6. **Scope of Project:** To build booster pumping station and distribution network for 3,000 m³/day water supply
7. **Project Owner:** PMU of Vung Ang economic area
8. **Operation and Maintenance Agency:** Clean Water Center for Vung Ang Economic Area.
9. **Project Investment decider:** Ha Tinh Provincial People's Committee.
10. **Project cost:** 33,634,900,000 VND
11. **JICA Portion:** 21,179, 000, 000 VND
12. **Documents received by the SAPI Study Team:** D/D Report, D/D construction drawings

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B. Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO, made visit of the project site, discussed and clarified issues with the DPI & PO.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility. -Taking into consideration the difference between dry and wet season, data for 12 months of water quantity. -The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data. -If data is not sufficient, the survey team should propose as the criteria.	The Treated water from the existing water treatment Plant would be used as water source. The Study Team visited the Plant, which has capacity of 9000 m ³ /day, which was upgraded one year before under SPL V (the first Plant was with capacity 5000 m ³ /day was constructed under SPL III, which was upgraded to 9000 m ³ /day under SPL V). The Kim Son Lake is the water source for this Plant. The Lake is located upstream (about 7 km from the Plant) in the mountain. The existing consumption of water is about 5,000 m ³ /day and the remaining water volume (4000 m ³ /day) is sufficient to meet the design capacity of 3,000 m ³ /day to be built under SPL VI. Based on the documents of Irrigation Works Management Unit of Ky Anh District, the volume of Kim Son lake is 17.10 ⁶ m ³ , which is sufficient for the required volume of the Plant. This water source is designated for exclusive use of drinking water (not to be used for Irrigation purpose). However, the DPI/PO have been requested to include in the F/S actual records of production and consumption of water of the existing W.T.P..	The DPI/PO agreed with the SAPI Study Team's requirement to include the information of water production and consumption in the F/S.	There is sufficient capacity of the water purification plant to meet the design capacity of 3,000 m ³ /day to be built under SPL VI
1-2. Securing the water quality for drinking water	-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam. -Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.	The existing W.T.P Q=9,000m ³ /day to supply for the project was taken from Kim Son Lake. The PO was requested to collect the water quality monitoring data of Kim Son Lake and treated water quality data of the existing WTP. The water quality test results of Kim Son lake,	DPI and PO agreed to the suggestions of the SAPI Study Team.	The SAPI Survey Team considers that the JICA requirement is met as far as quality of the treated water of

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
	<p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>which includes 14 parameters meet the standard.</p> <p>The treated water quality results (with 11 parameters) for 12 months meet the standard.</p> <p>There is a small laboratory at the 3000 m³/day water treatment plant, which was constructed under the JICA fund and is located near the existing water treatment plant of capacity 9000 m³/day. The SAPI Study Team suggested to prepare a laboratory in the existing Plant of 9000 m³/day.</p> <p>The SAPI Study Team also suggested to analyze the remaining parameters in the future.</p>		<p>the existing water treatment plant, which would be used as the water source for this project.</p>
2.Construction Plan				
<p>2-1. Demand forecast</p>	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.</p>	<p>Water supply target mentioned in the revised F/S until 2015 with the following parameters:</p> <ul style="list-style-type: none"> - Population is 17,879 people - Water supply criteria is 100L/person/day - Service ratio is 100% - Water demand for public and service is 10% of domestic - Water for industrial production is 10% of domestic - Water for tree and road cleaning is 10% of domestic - Water loss is 15% - Water for WTP is 1% (in case without W.T.P) <p>Demand total is 3,000m³/day</p> <p>The SAPI team visited the service area which have many potentials for economic & tourist development such as nice & long sea beach, spirit relic of Nguyen Thi Bich Chau - Hero woman (from 14th century) belong Ky Ninh commune.</p>	<p>The PO agreed with the observations and revised the F/S covering 100% population in.</p> <p>The population and related data was provided on 4th Oct 2010</p>	<p>Based on the submitted reports and supplemental data by DPI, PO and after the site investigation, the survey team assume that the parameters used for water demand calculation is suitable.</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
		<p>There is detailed approved plan for the Ky Ninh area including development of eco-villages, high-class resorts near the sea beach so that the prospect of Ky Ninh area is very large.</p> <p>Based on actual population, observation and available detailed master plan which was approved, the water demand estimation of 3,000 m³/day is suitable.</p> <p>Currently, Vung Ang Economic zone was invested with the water supply system with capacity of 9,000 m³/day. However there is lack of distribution and service pipelines to utilize the full capacity of the WTP.</p> <p>Therefore, the expansion of the distribution and service pipelines is necessary and appropriate with the development plan of the area.</p> <p>Based on the site visit of the area, they SAPI Study Team had requested to cover 100% as this area is being developed as tourist destination.</p> <p>The SAPI Study Team interviewed the residents of Ky Ninh, where most of the households use pump wells for the daily water use. However, there is increasing problem of water quality in the ground water. They have several kind of health problem (like water borne diseases, skin diseases, brackish water). They immediately need clean piped water.</p>		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	- Water demand until 2015 is 3,000 m ³ /day Vollume of the proposed reservoir is higher compared with the actual demand of Ky Ninh. The existing WTP has been upgraded to 9,000 m ³ /day and the consumption capacity is only about 5,000m ³ /day, therefore the remaining	The DPI/PO explained that this reservoir capacity was designed to supply contingent water to residents in case of maintenance.	

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
		capacity of the Plant (~4000 m ³ /day) is sufficient to satisfy to supply the water to the proposed project under SPL VI.		
2-3. Water purification method	The Survey Team will confirm the long term cost & benefit efficiency of the water purification method. -The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors	The existing W.T.P. capacity of 9,000 m ³ /day is based on the Mixer--lamelian sedimentation--filter technology. It is widely used technology in Vietnam and Plants are operating satisfactorily using this technology. The SAPI Study Team visited the existing W.T.P with total capacity is 9,000m ³ /day, which is now operating with about 5,000m ³ /day.		
2-4. Civil structure of each facility	The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not. -The Survey Team will confirm the appropriateness of civil structure of each facility. -As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.	Detailed design reports and geotechnical survey reports have been submitted and are appropriate. The SAPI study team proposed the brick retaining wall built on the lid of the tank should be replaced by reinforced concrete to prevent rain water from leaking degrading the beauty of the facility. The study team suggests that reinforced concrete columns at the pumping station shaft should be fixed in the foundation stone to stop horizontally moving forces. Apart from the above shortcomings, the construction design profile is appropriate satisfying the project requirement.Plan	DPI/PO agreed with SAPI team opinion and will revised. DPI, PO submitted the lacking documents and revised drawings as requested to the survey team on 4 th Oct 2010	After checking the submitted documents, the survey team confirm that the civil structure of each facility is suitable
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	The SAPI Study Team reviewed F/S report, D/D drawings and the hydraulic analysis in D/D report. In the hydraulic analysis report, the input hydraulic pressure at the branch point is 46m. The Study Team studied the basis of this pressure and found it appropriate and informed to the PO/PMU that if there is any comment from the detail review after returning back to Hanoi, the Study Team will inform to the PO/DPI. Actual elevation of W.T.P is 62m. Elevation of connection point with the existing pipe DN300 is 7.7m. Regarding the existing facilities including raw water transmission and distribution main up to		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
		branch point have no technical issues in connecting with the proposed project.		
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.	- Design drawings of transformer sub-station 75KVA-35/0,4KV and voltage medium line is available and sufficient. However, if there is any comment from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the PO/DPI. The memorandum/agreement with EVN to supply the electricity to the booster pumping station was provided.		
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	- Design drawings of booster pumping station are available. - Detail design report is appropriate.		
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The SAPI team visited to the site of booster pumping station & reservoir, which is a farmland. The farmers have agreed for the land acquisition. The D/D was approved and location of the booster pumping station was confirmed and making commitment for land acquisition was signed by Vung Ang PMU		
3.Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	In the revised FS, it mentioned about Plan for personnel including persons for the water quality control. The Vung Ang Clean Water Center is operating Ky Anh W.T.P capacity of 3,000 m ³ /day and 9000 m ³ /day. There is a small laboratory at the 3000 m ³ /day water treatment plant. The SAPI Study Team suggested to prepare a laboratory in the existing Plant of 9000 m ³ /day		The SAPI Study Team requested to include in the F/S overall plan combining the existing and proposed system.
3-2. O&M facility plan	-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after	In the existing water supply system there are 57 O&M personnel, who have developed ability to O&M. The Clean Water Center for Vung Ang Economic Area, which is O&M agency for this	The PO/DPC agreed to prepare the appropriate financial plan including tariff plan.	After checking the submitted documents, the

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
	construction facilities.	<p>project, would mobilize 5 persons for this project having total strength of personnel as 57.</p> <p>In the revised F/S it mentioned about the proposed tariff of 5,478 VND/m3, which is higher compared with the Willingness to Pay ability of many households.</p> <p>Currently, there is different water tariff in city and district based on the actual condition. The water tariff is from 2,800 VND/m3 to 3,500 VND/m3.</p> <p>The SAPI Study team mentioned that even house connections are provided free of charge, many households do not have ability to pay. However, they immediately need the clean water for their living and their willingness to pay ability would increase with the improvement in their living.</p>	<p>The DPI/DPC provided for revised D/D include financial with explanation of average water tariff is 4,943VND/M3</p>	<p>survey team confirm that the plan is suitable</p>
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the</p>	<p>For this project water is taken from the existing WTP, which has no laboratory. The SAPI Study Team requested to prepare the laboratory for monitoring of daily parameters at the Plant itself. Currently, they have small laboratory at the 3000 m3/day plant. However, placement of experienced personnel for the existing WTP is indispensable to control regularly water quality as required. They included the provision of manpower in the revised F/S.</p>	<p>They agreed to prepare laboratory at the existing WTP. They made the contract with the Health Department for regular monitoring of the water quality for the detailed examination. .</p> <p>DPI/PO submitted water quality control plan included parameters for daily, monthly and Yearly was mentioned in D/D report on 4th Oct 2010</p>	<p>After checking the submitted plan, the survey team confirm that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
	Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.			
3-4. House connection's promotion plan	To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	<p>In the report, it is expected to obtain 80% of coverage in Ky Trinh commune, 90% of coverage in Ky Ha and Ky Ninh communes. Based on the site visit of the area, they SAPI Study Team requested to cover 100% as this area is being developed as tourist destination.</p> <p>In this project the cost estimate does not include provision of service pipelines and water meters. The SAPI is worried about the efficiency without the service pipelines.</p> <p>In the revised FS they mentioned about some policy to promote plan, such as campaign, education to increase residents 'awareness in using the clean water.</p> <p>However, DPI/PO also needs to establish the program for water tariff increase plan, program to reduce water loss for the existing and proposed water supply system.</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall management and NRW reduction under the JICA Technical Cooperation Programme. As a result, the Hue water company monitors water quality on hourly basis and declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.</p>	<p>The PO agreed with the observations and revised the F/S covering 100% population in.</p> <p>They requested to JICA to allow them to utilize 20% contingency fund which can be used for service pipelines and water meters.</p> <p>The DPI/PO committed to ensure to establish programs and policies to promote connections and free of charge water use in the initial period for poor people.</p> <p>At present, there are 2300 households who have been connected free of charge with the connection pipes and flow meters and will get water free of charge in the first 2 years for using clean water.</p>	<p>The SAPI team requested to prepare the overall plan combining the existing and proposed.</p> <p>The request of PO/WSC will be conveyed to JICA.</p>
3-5. Sludge drainage plan	-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.	There is a sludge lagoon in the existing WTP, which is located 100m at lower level compared		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO	Opinion of Team
	-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	with the W.T.P level.		

PHOTOS Ha Tinh/Ky Anh

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Meeting
with Ha Tinh DPI/ PO



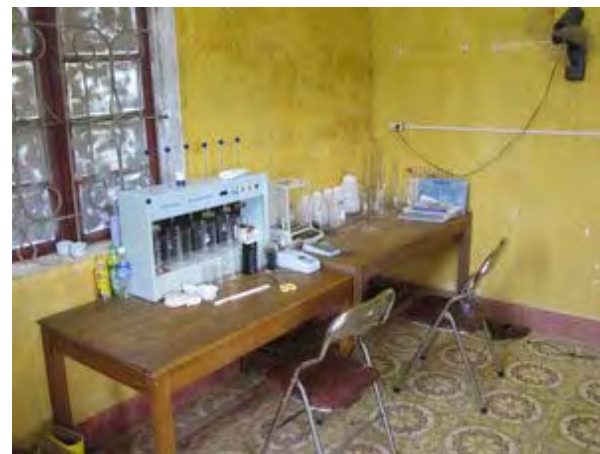
Exist. Vung Ang WTP
Q=9,000m³/day, which is water source of this Project



Location of proposed BP/S
Q=53m³/h, H=45m, 3nos.



Location of proposed branch point of distribution main
located the distance of around 5km from exist Vung Ang WTP



Exist. Laboratory
in the exist. WTP in Ha Tinh



Interview
for resident of proposed service area

3.13 Project No. 13: Thua Thien Hue (Phu Loc)

YACHIYO ENGINEERING CO., LTD.

A. Project Summary

1. Project Title: Water Supply System for Phu Loc town and 5 surrounding communes
2. Province: Thua Thien Hue
3. District: Phu Loc
4. Project Site: Phu Loc town, Loc Tri, Loc Son, Loc An, Loc Hoa, Loc Dien communes.
5. Project Objectives: Supply clean water for Phu Loc town and surrounding communes, improving health and economic-socio condition
6. Scope of Project: Loc Tri W.T.P (2,000m³/day), Loc An W.T.P (8,000m³/day) include raw water intake, raw water pipelines, water treatment facility (flocculation + DAF –filter), distribution pipelines, service pipelines
7. Project Owner: Hue Water Supply Company
8. Operation and Maintenance Agency: Phu Bai Operation and Management Enterprise under Hue Water Supply Company
9. Project Investment decider: Thua Thien Hue Provincial People Committee
10. Project cost: 64,402,405,000 VND
11. JICA Portion: 28,982,000,000 VND
12. Documents received by the SAPI Study Team: F/S report, basic design drawings and report, civil D/D drawings and report, electrical D/D drawings, technical drawings of raw water transmission pipes and distribution pipes, geological survey report. (Missing technical and electrical report, technical drawings of Raw water intake and WTP).

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Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility. -Taking into consideration the difference between dry and wet season, data for 12 months of water quantity. -The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data. -If data is not sufficient, the survey team should propose as the criteria.	Area I: In hydro-geological calculation report, the minimum flow (Qmin) in Khe Su stream as described is 5.03m ³ /s (about 400,000m ³ /day). In FS mentioned minimum flow is 6,705m ³ /day. Both the figures far exceed the water purification plant capacity (2,000m ³ /day). Data for 8 months from January 2009 to August 2009 are available, which covers almost all of dry season and a part of rainy season (According to the topographical data in F/S, the dry season in the Hue region is from march to September). To fulfill the JICA requirement strictly, the remaining (September to December) 4 months data are required. The water source is located upstream of the Khe Su stream, which is accessible only by walking in the stream. It looks very difficult to obtain the water quality data of the water source location in the rainy season. Area II: Truoi river Qmin=32,780m ³ /day (Based on lowest flow in dry reason), which far exceeds the capacity of the water treatment plant (8,000 m ³ /day). This figure comes from hydro-geological calculation report based on rain fall data of 12 months.	Area I: DPI, PO will try to provide more documents as commented by the team	Area I: Based on the data obtained and the result of the actual site visit, SAPI Survey Team concludes that that quantity of water source meets requirement. SAPI Study Team considers that to require the water quantity data for the rainy season before the commencement of the construction is not realistic. Area 2: The water quantity data of Truoi river fulfills the JICA requirement.
1-2. Securing the water quality for drinking	-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of	Area 1: The water result had only one sample tested in the dry season (June 2010), which meet QCVN 08-2008 standard. To	DPI, PO will try to provide the remaining water quality data before the commencement of construction	Area I: From the data obtained and the result of the site visit, the SAPI

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water	<p>Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>fulfill the JICA requirement strictly, the remaining (January to May and July to December) 11 months data are required.</p> <p>The SAPI mission visited the water source and found that it is located in Bach-Mi National Park where there is no human activity around. There is no site for contaminating the source. In such a water source location, the water quality during rainy season is not expected to be worse than the dry season. In Vietnam, the upstream of the Back-Mi National Park is considered to be a very good water source from the quantity and quality view point.</p> <p>Area 2: Data from May to October 2009, July 2007, December 2008, and February 2007 which meet QCVN 08-2008 standard. These data covers both rainy season and dry season. To fulfill the JICA requirement strictly, the remaining (January, March, April and November) 4 months data are required.</p> <p>After checking Hue Waco Laboratory, they had main equipments to analyze the water quality and they maintain the records of the maintenance of the equipments.</p>	<p>works, if required.</p> <p>Area 1: They confirmed that the Khe Su stream doesn't have any pollution because the water source is located upstream at very high ground level.</p> <p>-Area 2: They will provide more data if necessary.</p>	<p>Survey Team Concludes that it is apparent that there is no problem with quality of water source. The SAPI Survey Team considers that to require the water quality data for the rainy season before the commencement of the construction is not realistic.</p> <p>Area 2: The reasonable amount of data is already available to judge the water quality. The water of this source also comes from upstream where Bach-Mi National Park is located. So, we can assume that there is no problem with the water quality of this source.</p>
2. Construction Plan				
2-1. Demand forecast	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.</p>	<p>Area 1: Water supply Criteria in FS is 120l/per/day (Vietnamese Design Standard is 100l/per/day).</p> <p>- Population served in year 2009 is 21,041 persons; in the target year 2020 is 22,285 persons is realistic.</p> <p>- Usage pattern is domestic and water loss (15%) and water for treatment plant (10%) is realistic.</p> <p>- FS does not mention calculation for the commercial and Public demand.</p>		<p>Area 1: Based on the calculation by the SAPI Study Team, the capacity is acceptable as difference is only 10%.</p>

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		<p>Based on the calculation by the SAPI Study Team, the capacity is acceptable as difference is only 10%.</p> <p>Area 2: Water supply Criteria in FS is 120l/per/day (in Vietnamese Design Standard is 100l/per/day).</p> <ul style="list-style-type: none"> - Population in year 2009 is 41,484 persons, in the target year 2020 is 43,937 persons is realistic. - Usage pattern is domestic and water loss (15%) and water for treatment plant (10%) is realistic. - FS does not mention calculation for the commercial and Public demand. 		<p>Area 2:</p> <p>Based on the calculation by the SAPI Study Team, the capacity is acceptable as difference is only 10%.</p>
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<p>Area 1:</p> <p>Phase 1 in 2015: Q = 2,000m³/day.</p> <p>FS does not mention calculation for the demand. Based on the calculation by the SAPI Study Team, it is estimated that the demand would exceed by 2015 so expansion plan (Phase 2 in year 2020: Q = 4,000m³/day) of PO/WSC is realistic.</p> <p>Area 2 – Q= 8,000 m³/day.</p> <p>Based on the calculation of the water demand by the SAPI study team, the capacity of the plant is realistic for 2020.</p>		<p>Area 1:</p> <p>Taking into consideration of water source and demand forecast the plant capacity is acceptable.</p> <p>Area 2:</p> <p>Taking into consideration of water source and demand forecast the plant capacity is acceptable.</p>
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>The Feasibility Study and Basic Design reports refer to the description on the two options for the water purification method. The F/S compares the Life Cycle Cost for the two options and proposed the technology for both the plants which is based on the dissolved air flotation tank combine with gravity tank. The proposed purification method has advantage over the other method in terms of less land, less capital cost, less O&M cost and superior drinking water quality. The requirement of</p>	DPI and PO/WSC submitted the revised D/D to the SAPI Study Team on 5 Oct 2010, but the drawing and report for technology design are missing	<p>Based on the BD and F/S, survey team assume that the Water purification method is suitable. However, PO is requested to provide the missing technology DD and report for the two WTP to be attached to the review report</p>

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		<p>VN standard for turbidity (NTU) is 2, after passing the dissolved air flotation tank, the NTU downs to 0.1 NTU. The O&M of the proposed plants are simpler and do not need frequent backwashing.</p> <p>The SAPI Study Team studied the water quality and quantity of the water source and the technical level of the O&M agency, which is in this case, is Huewaco. The SAPI Study Team confirmed that the capability of the Water Supply Company (Huewaco) is sufficient to operate & maintain the proposed water purification plants. Huewaco is currently operating and maintaining all the water purification plants in the Hue Province. The SAPI Study Team visited the 82,000 m³/day water purification plant laboratory.</p> <p>However, the SAPI Study Team mentioned that there is no D/D for the water purification plants.</p>		
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>After checking the D/D, the SAPI Study team found that there are missing reports such as geotechnical investigation, explanation of the structure calculation for the Intake, pumping station, and water treatment plant of both the areas.</p> <p>For facility Loc Tri (Area I): There are some items missing such as general plan, steel reinforcement section and structure details. The section and architectural details are available, but not fully provided for 1500m³ reservoir, administration office, dump, filtration and sedimentation tank.</p> <p>-Facility Loc An (area II): There are some items missing such as general plan, steel reinforcement section and structure details.</p>	DPI and Huewaco already submitted the documents, D/D of civil structure following the comments of SAPI Study team on 5 October 2010 (include the laboratory room in each WTP)	After checking the submitted documents, the SAPI Study team assume that the Civil structure is suitable.

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		<p>The section and architectural details are available, but not fully provided for 3000m³ reservoir, 2000m³ reservoir, pump station I, filtration and sedimentation tank. Items missing for Administration office and Chemical room are general plan, steel reinforcement section and structure details.</p> <p>-Team doesn't confirm foundation of civil structure because of lack of geotechnical data.</p> <p>-Team could not confirm how the chemical tanks would be placed on the floor of the Administration building. Therefore, SAPI team requested for the additional drawings.</p> <p>The SAPI Team requested to:</p> <p>-Consider the gate and fence around the treatment plant land for the security.</p> <p>-Consider the protection of river bank against erosion and circular slip at intake place</p> <p>-Consider rainwater drainage system around the treatment plant land.</p> <p>The SAPI team commented that the distance between treatment tank and distribution tank should be narrow than as proposed in the layout of treatment plant for Area II compared with Area I.</p> <p>-About the laboratory room already available/include on the D/D design for each water treatment plant.</p>		
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	<p>Raw water transmission and Water Distribution Main:</p> <p>The pipe material, diameter and length are mentioned in F/S and D/D. The hydraulic analysis is also executed in D/D. However,</p>	DPI and PO/WSC already submitted the hydraulic analysis report to SAPI Study team on 5 October 2010.	After checking the submitted documents, SAPI Study team assume that the Plans for raw water transmission, water distribution, water supply

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		some results of the effective pressure do not satisfy the standard of the Ministry of construction (TCXDVN33.2006). So, the Study Team recommended that the hydraulic analysis shall be rechecked.		systems and pipe laying is suitable
2-6. Securing the power supply	-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply. -If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.	DPI and PO/WSC explained to the SAPI Study Team that it is mandatory for the power supply company to provide the electricity to the water supply project even during the construction stage. The SAPI Study Team requested for the memorandum with EVN.	DPI and PO/WSC reconfirmed that there is regulation to provide the electricity to the water supply project by the Power Company. DPI, PO provided the SAPI Study Team a copy of the agreement between WSC and EVN on 6/10/2010.	Survey team confirm the memorandum meet JICA requirement
2-7. Electrical machinery facility specifications	- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.	The SAPI Study Team finds no information in the Feasibility Study and Basic Design reports regarding the electrical machinery facility specifications.	DPI and PO/WSC already submitted the D/D and design report of electrical work for Loc An WTP, Loc Tri WTP to SAPI Study team on 5 October 2010.	After checking the submitted documents, SAPI Study team assume that the D/D and D/D report is suitable.
2-8. Land acquisition plan	-The Survey Team comprehends the site conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	The SAPI survey team visited the project site and confirmed the fact that the both lands, on which 2 water treatment plants will be built, are commune own and are currently being used as the commune forests. The residents in the commune can plant trees there. No house is built on these lands and no resettlement is involved. According to the explanation of Hue Waco, the land acquisition requires only the compensation for the tree thus planted and, therefore, easy to process. The actual processing of the land acquisition has not been started yet, since the project is yet to be approved by the Provincial People's Committee (PCC) which is forthcoming in the very near future.	DPI and PO/WSC agreed to the observations of the SAPI Study Team.	After PO's explanation and site survey, SAPI Study team assume that the land acquisition plan is suitable.

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3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	The Limited liability Company construction and Supply Water Thua Thien Hue (Huewaco) will be taking over, operation and Maintenance, after taking over, they will handing over to Phu Bai Branch for operation and maintenance include the items as placement of personnel plan and manpower secure plan and the water quality monitoring for the water source, water quality monitoring in WTP, and on the tap of resident's house. The SAPI Team requested the Phu Bai Branch to apply the management system of same style for the new two water supply facilities.	DPI and PO/WSC agreed to the observations of the SAPI Study Team.	After PO's explanation and site survey, SAPI Study team assume that the placement of personnel & manpower secure plan is suitable.
3-2. O&M facility plan	-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.	It was already decided by the Provincial People's Committee that the Phu Loc Project will be implemented by the Hue Waco at all stage from the construction to the operation and maintenance. The Hue Waco is one of the best water utilities in Vietnam (Hue Waco ranked themselves as No.3, Haiphong as No.1 and Vung Tau as No.2). The NWR of Hue Waco is 14-15% which is surprisingly good figure compared to the average water utilities in the developing countries. FS mentions Plan for O& M. The Phu Loc water supply system using gravity system based on topography condition, it is more convenient and simple for O &M Water Cost (for O&M) of is about 1,600VND/m3. Water tariff is proposed as 5,160 VND/m3. Now, water tariff is 3,750 VND is applied for all Province.	DPI and PO/WSC agreed to the observations of the SAPI Study Team.	SAPI Survey Team concluded that the O&M structure of this sub-project is sound one.

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3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>SAPI team visited 82,000 m³/day capacity purification plants, which is being operated by the Water Supply Company. This plant has laboratory which has all the necessary equipment and staffs to monitor the Quality of source water and drinking water. Under the capacity building program, JICA prepared the manual for water treatment plant operation, which has been followed for this plant also. We observed that WSC using the water quality monitoring room, controls efficiently daily water quality. With regard to Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments, they follow the JICA manual and regular training is provide to the existing and new recruitments.</p>	<p>DPI and PO/WSC confirmed to the SAPI Study Team that they will follow the same course of action as they are following for the other water supply projects and agreed with the observations of the SAPI Study Team.</p>	<p>After PO's explanation and checking the existing Labo of Hue WACO, SAPI Study team assume that the water quality control plan is suitable.</p>
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate,</p>	<p>In the Phu Loc District, 11.3% of total population belongs to the poor households. Their average water use is 4m³/household/month. The Hue provincial People's Committee decided the policy to promote the house connection to</p>	<p>DPI and PO/WSC agreed to the observations of the SAPI Study Team.</p>	<p>From the information obtained, the SAPI survey team concluded that the project has the sound connection strategy.</p>

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	<p>the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>the poor as follows;</p> <ol style="list-style-type: none"> 1. Hue Waco will provide the water meter and the water tap at the gate of the house for free of charge. 2. For the poor households, the water tariff for the water usage up to 2m³ will be exempted. For the water usage above 2 cubic meters, the water tariff is 3,750VND (20JPYen)/m³ which is the same as for the ordinary households. <p>The SAPI survey team visited the existing water supply area of Hue Waco near the service area of the Phu Loc project and actually saw the connection to the poor household as stipulated in the new policy. The SAPI survey team also made interviews with 2 residents in the project area, who incidentally came across the study team and confirmed their willingness to receive water from Hue Waco and to pay the water tariff.</p> <p>Hue Waco has already achieved 60% of connection coverage in Hue Province including the rural area, which is much higher than the national average.</p>		
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>The SAPI Study Team studied the F/S and Basic Design Reports. In the layout drawings of the water purification plants, construction of sludge treatment facility is mentioned as the future expansion. The SAPI Study Team requested for the D/D of the sludge treatment facility.</p>	<p>DPI and PO/WSC reported that the D/D on the sludge treatment facility will be completed in September 2010 under another fund project. According to the explanation of Hue Waco, the sludge treatment facilities will commence the operation together with the JICA Phu Loc project.</p>	<p>After PO's explanation and checking the actual condition, SAPI Study team assume that the sludge drainage plan is suitable.</p>

PHOTOS Thua Thien Hue/Phu Loc

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Meeting
with Hue DPI/ PO



Exist. Laboratory
in the exist. WTP in Hue



Location of proposed Loc Tri Intake Facility
located at the right bank of Khu Su Stream,
Q=2,000m³/day, by gravity (view from downstream)



Location of proposed Loc Tri WTP
Q=2,000m³/day (phase I)



Location of proposed Loc An Intake Facility
located at the left bank of Truoi River,
Q=8,000m³/day (view from upstream)



Interview at proposed Loc An WTP
for resident of proposed service area
(Capacity of proposed Loc An WTP is Q=8,000m³/day)

3.14 Project No. 14: Quang Ngai (Son Ha)

A. Project Summary

1. **Project Title:** Water Supply system for Di Lang Town
2. **Province:** Quang Ngai
3. **District:** Son Ha
4. **Project Site:** Di Lang Town
5. **Project Objectives:** Building a water supply system to supply enough clean water for Di Lang Town contributing to improving the people's health, livelihood, environmental sanitation and socio-economic development.
6. **Scope of Project:** To build a water supply system with capacity of 3,000 m³/day including Raw water intake, Raw water transmission pipes, Water treatment plant, Distribution network and service pipes & water meters.
7. **Project Owner:** Son Ha District People's Committee
8. **Operation and Maintenance Agency:** Son Ha District People's Committee
9. **Project Investment decider:** Quang Ngai Provincial People's Committee.
10. **Project cost:** 37,733,523,000 VND
11. **JICA Portion:** 30,000,000,000 VND
12. **Documents received by the SAPI Study Team:** F/S Report (English), Basic D/D Report,, D/D Technical drawings, D/D construction drawings and cost estimate document.
Detailed design report, detailed design drawings, geotechnical survey report.

B. Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI, PO/DPC and WSC.

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1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Water source is taken from Ma Tang Spring (up stream of Di Lang lake)</p> <p>Based on hydrographic data Qmin = 0.1047 m³/s (frequency P=90%) Qmax= 84m³/s (P=10%) The actual minimum water quantity from Ma Tang Spring in dry season is 0.1047 m³/s (9,046 m³/day). It exceeds the required capacity for the WTP (3,000 m³/day). The SAPI team visited the intake of the water source. Now it is dry season, there was sufficient water flowing in the stream and is sufficient for the Plant capacity of 3000 m³/day.</p> <p>As requirement of JICA, 12 months of monitoring data is required.</p>	<p>The DPI/PO provided the hydrographic data of the minimum and maximum flow.</p> <p>The DPI/PO will also provide the hydrographic data for 12 months.</p> <p>The PO/DPC will monitor the quantity of water of the spring for this month and will provide the documents to the SAPI Study Team by 2nd of October 2010.</p> <p>The PO/DPC will continue to conduct the monitoring during the dry season after the monitoring for the month of September 2010 if required.</p>	<p>After receiving the documents of the water quantity monitoring data for the month of September 2010, the SAPI Study Team will have conclusion and their opinion to JICA.</p>
1-2. Securing the water quality for drinking water	acceptable	<p>There is one water quality result dated in May 2008 with 9 parameters such as pH, NO₂⁻, NO₃⁻, Cl⁻, Mn, Fe, SO₄³⁻, hardness, E.coli and other is dated in June 2008 with 9 parameters such as COD, H₂S, PO₄³⁻, NH₄⁺, F⁻, CN⁻, As, Zn, Phenol)</p> <p>Based on the above results, water quality meets the VN standard.</p>	<p>The PO/DPC will monitor the quality of water of the spring for this month and will provide the documents to the SAPI Study Team by October 5th 2010.</p>	<p>After receiving the documents of the water quality monitoring data for the month of September 2010, the SAPI Study Team</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		<p>The SAPI Study Team visited the intake of the water source. The water source at intake location is forest area. There is no human activity in the vicinity.</p> <p>The Prevention Centre of the Health Department of the Province has not conducted the water quality test of this spring so far.</p> <p>As requirement of JICA, 12 months of monitoring data is required.</p>	<p>The PO/DPC will continue to conduct the monitoring during the dry season after the monitoring for the month of September 2010 if required.</p>	<p>will have conclusion and their opinion to JICA.</p>
2. Construction Plan				
2-1. Demand forecast	The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.	<p>Water supply target of the project was mentioned in F/S up to 2020 with following parameters:</p> <ul style="list-style-type: none"> - Population is 10,102 people. - Water supply criteria is 150L/person /day. - Clean Water coverage ratio is 90% (9,091 people) - Water for commercial :10% of domestic - Water for industry is 270m3/day - Watering for trees 120 m3/day. - Water for washing road: 150 m3/day. - Water loss is 20%, water for WTP is 5%. <p>- water demand total: 3.000 m3/day</p> <p>In the revised FS, the water demand calculation is acceptable however for some scattered area (where community water tanks would used to supply the drinking water), the estimation of water use seems to be higher.</p>	The PO/DPC informed that in the central zone of Viet Nam where Quang Ngai province is located has comparatively higher socio-economic growth than the other zones of Vietnam. In view of target year as 2020, assumption for per capita per day drinking water use (150L/person /day) is reasonable.	
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<p>The purification volume water for the proposed water purification plant is 3,000 m3/day for 2020.</p> <p>The water supply volume in the water source is sufficient and the total design capacity is satisfied and suitable with the water demand.</p>		

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
		Until now, there is no existing water supply system in the area. The residents have to use the lake water directly for their daily use.		
2-3. Water purification method	The Survey Team will confirm the long term cost & benefit efficiency of the water purification method. -The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors	The Feasibility Study Report refers to the description on the two options for the water purification method: - Option 1: Vertical mixing, Reaction and sedimentation and Gravity rapid filtration - Option 2: Vertical mixing and rapid sand filter And proposed a method as in option 1, which is based on Vertical mixing, Reaction and sedimentation and Gravity rapid filtration. The purification method is suitable for the water quality & quantity and is simple for operation & maintenance. The SAPI Study Team explained to the PO/DPC about the analysis of long term cost & benefits efficiency of the water purification method and requested to prepare accordingly.	The PO/DPC agreed to include the explanation in the F/S report and submit to the SAPI Study Team by 2 nd of October 2010. The PO/DPC submitted the revised document on 5 th Oct 2010	After checking the SAPI team confirm that the selection method is appropriate
2-4. Civil structure of each facility	The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not. -The Survey Team will confirm the appropriateness of civil structure of each facility. -As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.	The facilities plan is sufficient for the operation and maintenance. . - The revised D/D includes D/D report and D/D drawings. Almost the calculations and drawings are suitable. The dam drawings are sufficient. However the calculation for the dam is lacking. The laboratory room is also missing. During site survey, the team received some revised drawings, remaining is lack and should be revised as below: Regarding sedimentation-filter: - Should be revised reinforcement protection layer of slab bottom is 40mm. - Should be combined collume E and F become 1 collume belong E. - Soild foundation of filter bottom should be	The DPI/PO will revise and add in the F/S report & D/D and will send to the SAPI Study Team before October 2nd 2010 The PO/DPC provided requirement documents on 5 th Oct 2010	After checking the documents revised, the team confirm that all D/D document is appropriate.

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		<p>strengthen by coarse sand follow technical require. There are mistake between 2 reservoir 60m³ and 700m³. It is the same distance for 2 reservoirs.</p> <ul style="list-style-type: none"> - Bottom of regular reservoir should be reduce thickness as collecting sludge tank. - in the administration house should be revised function of each room in the one 		
<p>2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying</p>	<p>-The Survey Team needs to confirm the appropriateness of these plans.</p>	<p>The SAPI Study Team reviewed the F/S and D/D reports including hydraulic analysis. The SAPI Study Team found it appropriate and informed to the PO/DPC that if there is any comment from the detail review after returning back to Hanoi, the SAPI Study Team will inform to the PO/DPC.</p> <p>Regarding the raw water transmission main, intake volume is 5,700m³/day compared to planning of 3,000 m³/day. The D/D report should mention the reason for such provision.</p> <p>Regarding the distribution main, there are 13 proposed reservoirs as 60 m³ respectively. Each reservoir has 32 taps to provide to the residents as the stand pipe. The D/D report should mention the reason for such provision.</p> <p>The study team also recommended as follows,</p> <ol style="list-style-type: none"> 1. 2 or 3 taps with bigger size instead for 32 small taps should be set to avoid the leakage risk in the future. 2. Operation plan should be mentioned in the D/D. The Operation plan should be prepared for each tank service community. The community shall be involved in the preparation of the Plan. The community should also be given regular training for 	<p>Regarding raw transmission pipeline, and remaining issue, the DPI/PO will revise and add in the F/S report and D/D and will send to the SAPI Study Team before October 2nd 2010</p> <p>The DPI/PO provided the revised documents on 5th Oct 2010</p>	<p>After checking the documents revised, the team confirm that all D/D document is appropriate.</p>

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		<p>operating and managing the water tanks efficiently. The residents should be informed for the policy that they would not be charged for the tank water use.</p> <p>Each thrust block against bend pipes should be calculated in D/D report because there is only one typical drawing for 45 degree bend pipe in D/D drawings.</p> <p>Regarding raw water pipelines, it should be checked if there need of more bends at the big curve angle.</p>		
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>- The detailed design drawings of the transformer sub-station and the medium voltage line are suitable.</p> <p>- The memorandum/agreement with the power company EVN was submitted.</p>		
2-7. Electrical machinery facility specifications	<p>- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.</p>	<p>- In the revised D/D almost Electrical machinery facility specifications are provided.</p> <p>- The SAPI Study Team found it appropriate and informed to the PO/DPC that if there is any comment from the detail review after returning back to Hanoi</p>		
2-8. Land acquisition plan	<p>-The Survey Team comprehends the site conditions of land acquisition and residents.</p> <p>-The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.</p>	<p>The SAPI Study team visited the sites of intake and water treatment plant. The Plant is located on a small hill covered with the plants. No house is built on these lands and no resettlement is involved. These lands are under the District management. According to the explanation of the PO/DPC, the land acquisition requires the compensation for the planted trees and they have already confirmed with the farmer to acquire the</p>	<p>The PO/DPC agreed to provide the approval copy to acquire the land.</p> <p>The PO submitted land acquisitions agreement and confirmation of the farmers.</p>	<p>After checking the document, it is suitable.</p>

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		<p>land to construct water treatment plant.</p> <p>The SAPI Study Team requested for the agreement to acquire the land.</p> <p>The distribution network will be laid along the road and buried under the ground so no land acquisition is required. Tanks would require only very small area and would be constructed on the community land for which land acquisition is not required.</p>		
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan.</p> <p>-Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>The PO/DPC confirmed to the SAPI Study Team that they have no plan for the placement of personnel and manpower secure. The Study team presented to the PO/DPC the Plan of Hue and Thai Nguyen water supply company. The Study Team also presented to the PO/WSC the copies of O&M manual prepared under the JICA Technical assistance programme in Hue Province.</p>	<p>The PO/DPC agreed to make the provision of the manpower for water quality in their in the O&M organization. They informed that the Quang Ngai water supply company will be engaged for the training the personnel of water quality monitoring. The PO/DPC informed that they will prepare the manpower Plan and include it in the F/S and D/D.</p>	
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>A Di Lang water supply enterprise will be established under DPC with 25-27 people. The SAPI Study Team expressed their concerns that PO/DPC does not have experience of O&M of the water supply system and recommended that they should appoint the Quang Ngai water supply company as an O&M agency for this project.</p> <p>The SAPI Study Team discussed with the</p>	<p>The PO/DPC/DPI informed that the services of the Quang Ngai water supply company would be taken for comprehensive training to the O&M personnel in the beginning and</p>	<p>The SAPI Study team requested to the PO/DPC/DPI to engage the Quang Ngai water supply company also for checking the Operation plan, tariff Plan and House</p>

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		<p>PO/DPC/DPI regarding the issues related to water account. The PO/DPC should estimate the unit cost of water production and water tariff in view of change in design where pumping would not be applied at any stage and all gravity system is planned.</p> <p>The SAPI Study team also mentioned that even house connections are provided free of charge, many households do not have ability to pay for the piped water use. However, they immediately need the clean water for their living and their willingness to pay ability would increase with the improvement in their living.</p>	<p>subsequently time to time. They also informed that the Quang Ngai water supply company will be engaged for the training the personnel of water quality monitoring.</p> <p>The PO/DPC agreed to prepare the appropriate financial plan including tariff plan for the next five years.</p> <p>They submitted the revised documents.</p>	<p>Connection promotion Plan besides training of the personnel,</p> <p>They should also be engaged to monitor the efficiency of the Plans. The PO/DPC/DPI has agreed to the recommendation of the SAPI Study team.</p> <p>It is appropriate.</p>
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed</p>	<p>F/S does not mention the water quality control Plan. The SAPI Study Team explained that they should conduct the monitoring of certain parameters (pH, turbidity, residual-chlorine, Jar test, etc) daily at the laboratory of the water purification plant under the JICA project. They should also collaborate with the Health Department for the remaining examination according to VN standard.</p> <p>The SAPI Study Team presented to the PO/DPC the Plan of Hue water supply company. The SAPI Study Team also presented the copies of the O&M manual including water quality control prepared under the JICA Technical assistance programme in Hue Province.</p> <p>The SAPI Study Team informed that making of Water Quality Control Plan is one of the requirements of JICA before the commencement</p>	<p>The PO/DPC agreed to the observations of the SAPI Study Team. They understood to develop their capacity with regard to daily water quality control.</p> <p>They proposed to train their staffs of O&M by the Quang Ngai water supply company.</p> <p>They also proposed to make the contract with the Health Department for regular monitoring of the water quality.</p> <p>The PO/DPC agreed to</p>	<p>After checking the document, it is suitable.</p>

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	to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.	<p>of construction works.</p> <p>The SAPI Study Team informed to the PO/DPC that it is very necessary that they develop their capacity with regard to daily water quality control according to VN standard.</p> <p>The SAPI Study Team informed that the Hue water supply company received the technical assistance for laboratory, capacity building, overall management and NRW reduction under the JICA Technical Cooperation Programme. As a result, the Hue water company monitors water quality on hourly basis and declared that their water is drinkable. They managed to reduce the NRW from 20% to 14%. The SAPI Study Team informed that the experience of the Hue water supply company would be useful for other provinces also.</p>	<p>the requirement of JICA for making of Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments and will include it in the F/S and D/D.</p> <p>The PO/DPC provided requirement documents on 5th Oct 2010</p>	
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>In the F/S it is mentioned 90% of coverage in 2020. The PO/DPC explained that households residing along the main road would be provided the service line and water meter free of charge. For the scattered households, they plan to install water tanks, which would be managed by the community themselves.</p> <p>The SAPI Study Team visited the project area and interviewed the residents of both the categories (those who would be provided service line and water meter and those who will receive water through tanks). Currently, these households use water from the streams and they have to spend more than 3-4 hours a day in carrying water for their daily use. In rainy season stream water contains high turbidity and also it carries the animal waste. The households have no choice but to use this water and drink after filtering &</p>	<p>The PO/DPC appreciated the findings of the SAPI Study Team. They informed that they will prepare the Plan according to the suggestions of the SAPI Study Team and submit to the SAPI Study Team by 2nd of October 2010. They also informed that they will start promoting the Plan soon after the approval of the project for the implementation to achieve the efficiency of the project.</p> <p>For poor households, the</p>	After checking the document, it is suitable.

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		<p>boiling. The Study Team understood that the clean water is immediate necessity for these households. However, several households have no ability to pay at all. Even house connections are provided free of charge to the households, many of them do not have ability to pay for the piped water use.</p> <p>Therefore, the SAPI Study Team expressed their concern on the viability of such high coverage plan, where several households are scattered and poor. The SAPI Study Team also suggested that there is necessity for the community participation program to encourage the community to use the clean piped water supply.</p> <p>The SAPI Study Team explained to the PO/DPC about the practices in other provinces where poor households are provided with water free of charge up to a certain amount per month.</p> <p>Considering above matters, the SAPI Study Team asked the PO/DPC to develop an appropriate House connection's promotion Plan in discussion with the community and other stakeholders of the project.</p>	<p>DPC will have policy to free of charge for the first 2-3 m³ per month for the use of the piped water.</p> <p>The PO/DPC provided requirement documents on 5th Oct 2010</p>	
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>The SAPI Study Team discussed the Plan with the PO/DPC and requested the PO/DPC to prepare the Plan and include it in the F/S and D/D.</p> <p>In the D/D there is mention of drainage tank; however, there is no mention how the sludge would be collected and disposed off in environmentally safe manner.</p>	<p>The PO/DPC agreed to provide the completed F/S and D/D including the sludge drainage Plan to the SAPI Study Team by 2nd of October 2010.</p> <p>They submitted the revised documents.</p>	It is appropriate.

PHOTOS Quang Nhai/son Ha

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Meeting
with Quang Ngai DPI/ PO



Location of proposed Intake Facility
located at the left bank of Ma Tang Spring,
Q=3,000m³/day, by gravity (view from upstream)



Location of proposed New WTP
Q=3,000m³/day, located behind the house



Location of proposed reservoir for scattered community
located the end of distribution line



Interview
for resident of proposed service area



Interview
for scattered resident of proposed service area

3.15 Project No. 15: Gia Lai (Krong Pa)

A. Project Summary

1. Project Title: Water Supply System for Phu Tuc Town
2. Province: Gia Lai Province
3. District: Krong Pa District
4. Project Site: Phu Tuc Town , Krong Pa District, Gia Lai Province
5. Project Objectives: water supply to Phu Tuc town to contribute to improve people' health, environment and life.
6. Scope of Project: Raw water transmission pipeline D400 PVC, L=15,549m, Improve the vertical sedimentation tank, gravity filter tank, backwash pump of the old WTP capacity 2,000m³/day, construction of new facilities: a reservoir 200m³, filter tank with automatic backwash 2,000m³/day, Pumping g station II, operation house, administrative house, guard house, fence and auxiliary facilities, distribution pipeline network (new installation and change old existing pipes)
7. Project Owner: Krong Pa District People's Committee
8. Operation and Maintenance Agency: A water supply enterprise under management of Krong Pa District People's Committee
9. Project Investment decider: Gia Lai Provincial People's Committee
10. Project cost: 36,919,451,000 VND (Project Approval PPC Decision No.1450/QD-UBND dated 01 Dec 2008)
11. JICA Portion: 29,587,000,000.00 VND
12. Documents provided by DPI & PO: Project F/S, D/D, cost estimation and total construction cost estimation report in Vietnamese.

Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Surface water of the Ia M'lah irrigation lake Krong Pa district is used as raw water for the project WTP. The F/S mentions the decision No.1344 QD / BNN-XDCB approving the feasibility study report on Ia M'lah irrigation lake dated May 8th 2003. Domestic water supply was calculated for around 36,000 people in 2010 in the town. To evaluate the actual volume of domestic water of Ia M'lah lake, DPI, PO are requested to provide and clarify the following items:</p> <ul style="list-style-type: none"> - Provide the Decision No. 1344 QD / BNN-XDCB dated May 8th 2003 and the feasibility report of Ia M'lah irrigation lake. - water volume monitoring report of the Ia M'lah for 12 months. - Information on other projects also use water of Ia M'lah lake if any (<i>projects using water from the Ia M'lah lake without plans/projects on water supply from the lake if any</i>) 	<p>DPI, PO provided the Decision No.1344/QD/BNN-XDCB to the team on 28/9/2010</p> <p>DPI, PO explained that Ia M'lah lake started operation as a water reservoir since Dec 2009, average water level is 206.5 equal to lake capacity of 25,290,000,000m³. Record data on water level of the lake from Jan – Sept 2010 was provided to the team on 29/9/2010</p> <p>Management board of the Ia M'lah Lake informed the Team that water of the lake is used for irrigation and domestic water supply</p>	<p>After checking the submitted documents, data, and site survey, the survey team confirm that water volume of the Ia M'lah lake is enough for the project</p>
1-2. Securing the water quality for drinking water	<p>-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water</p>	<p>Three Ia M'lah raw water analysis result reports, March, May and June are attached in the F/S. Results show that the three raw water samples ranked Class B for surface water sources under TCXD 233-1999 meeting requirement as water source for domestic water supply.</p> <p>DPI, PO are requested to provide the missing water quality data of the Ia M'lah lake for Jan, Feb, April, Jul-Dec under standards as QCVN 08-2008/BTNMT for</p>	<p>DPI, PO confirmed that dry season is from Sept to Dec, and raining season is from Jan to Aug.</p> <p>Two more water quality analysis report of the Ia M'lah lake for Aug and Sept 2010 (raining season) were provided to the team</p> <p>The existing WTP is using the intake water source from downstream of Ia M'lah lake. Water quality of raw water and treated water of the</p>	<p>After checking the submitted documents, data, and site survey, the survey team confirm that water quality of the Ia M'lah lake can be used as intake water source for the project WTP</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>surface water (as required by JICA). DPI, PO are requested to clarify the period of raining season and dry season (from what month to what month)</p>	<p>existing WTP is checked every 3 month by the Health and Preventive Medicine Center, and analysis reports for Jan, Apr, Nov 2007; Mar, Aug 2008; Jun, Dec 2009; Mar, May, Jul 2010 was provided to the team. 16 parameters of the surface water (raw water) are checked and results show that the checked parameters meet standard QCVN 08-2008/BTNMT for surface water. Also 15 parameters of the treated water are checked at reservoir of WTP and at tap of households and results show that checked parameters meet standard QCVN 09-2009/BTNMT for drinking water</p>	
2.Construction Plan				
2-1. Demand forecast	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.</p>	<p>Water supply target in F/S is until 2015 and oriented until 2025, with the following indicators:</p> <ul style="list-style-type: none"> - Population domestic water supply is 18,590 people (2015) and 23,727 people (2025). - Water supply criteria for commune is 100l/cap/day (2015) and 120l/cap/day (2020). - Water supply criteria for town is 120l/cap/day (2015) and 150l/cap/day (2025). - The water supply rate is 80% (2015) and 100% (2025). - Commercial and business water supply is 10% domestic water for both phases. - Water service supply for administrative agencies is 10% domestic water for both phases 	<p>DPI, PO explained that data on the F/S is wrong. Amendment of the PPC approval decision confirming capacity of the project for phase I until 2015 with capacity of 4,000m3/day and phase II until 2025 with capacity of 6,000m3/day will be issued and submitted to the team by end of Oct 2010.</p> <p>Report on difference in demand and capacity between FS and DD was submitted to the team on 30/9/2010</p> <p>Statistical book 2009 was provided to the team on 28/9/2010</p>	<p>After hearing the explanation and checking the submitted documents, data , and site survey, the survey team confirm that demand calculation for the project purification capacity is suitable</p>

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		<ul style="list-style-type: none"> - Public water is 10% domestic water for both phases - Water loss is 20% for both phases. - Water used for the pumping station itself is 10% for both phases. - Total demand in 2015 is 2,665 m3/day - Total demand in 2025 is 5,250 m3/day - In D/D report, the calculation for demand forecast is not same as in the F/S (both in population as well as parameters and year for calculation). Thus the total water demand mention in the DD report is 3,951.1m3/day (2015) and 5,549.5m3/day (2020). <p>DPI, PO are requested to clarify and provide:</p> <ul style="list-style-type: none"> - Clarify the difference between water demand of the F/S and DD report (population, year calculating parameter standard) - population is mentioned in the F/S and D/D; however, DPI, PO are requested to provide the basic data used for population calculation and the latest statistical book of the project area 		
2-2. Water supply volume and purification volume	The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.	<ul style="list-style-type: none"> - Existing water supply system with capacity of 2,000 m3/day - the F/S proposed to improve capacity of the existing water supply system to 3,000 m3/day (2015) and 6,000 m3/day (2025). D/D report proposed to improve the existing water supply system to 4,000m3/day (2015) and 6,000 m3/day(2020) 	<p>DPI, PO submitted the report on difference in demand and capacity between FS and DD to the team on 30/9/2010</p> <p>DPI, PO provided the team the report and drawings of the existing water supply system on 29/9/2010</p> <p>DPI, PO provided the team the report on operation and production water of the existing WTP for Jan-Sept 2010</p>	After checking the supplement documents, data, the survey team confirm that water supply volume and purification volume is suitable

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		<p>- The FS mentioned raw water of Ia M'lah will be used for the WTP; but water volume of the lake is not mentioned.</p> <p>Please explain and provide:</p> <ol style="list-style-type: none"> 1. Explanation of the difference between capacity in the FS and in the DD. 2. Provision of drawings and information of the existing WTP 3. Provision of 12 month data of water source including Qmax and Qmin 4. Provision of the treated water volume providing to the supply network of the existing WTP. 5. Provision of decision on change of DD comparing with BD 	on 29/9/2010	
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>In the project, total capacity of the WTP calculated by the data of the population in 2010 to 2015 is 4,000 m³/day; improvement of water treatment system of the existing WTP of 2,000m³/day using technology: raw water - chemicals mixing tank – vertical sedimentation tank combined with central reaction tank - rapid gravity filter tank - reservoir.</p> <p>Construction of new WTP capacity of 2,000m³/day using technology: raw water - quick filter tank – reservoir.</p> <p>As raw water source of the WTP is surface water, turbidity, suspended sediment concentration is changed / much difference between the dry and rainy seasons. In rainy season, the suspended solids of water source increase dramatically, to secure the constant operation of the new WTP, a vertical sedimentation tank in combination with central reaction tank is recommended</p>	<p>DPI, Po explained that the Ia M'lah lake is like the preliminary sedimentation tank and the water quality of the lake is better than the water of the Ia M'lah stream which is being used as raw water for the existing WTP.</p> <p>Water quality of the lake can be evaluated by the team after the site survey.</p> <p>DPI, PO explained that they understand the necessary of the receiving and sedimentation tank in the purification system of the project and revised the DD, DD report and cost estimation report and submitted to the team during the stay in the district.</p> <p>DPI, PO also explained that the cost for receiving and sedimentation tank is not so much, and cost for construction of the tank will be from</p>	After hearing the explanation and checking the submitted documents, DD, and site survey, the survey team confirm that water purification method is suitable

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			the local counterpart budget (Auxiliary budget of the project), thus do not affect the total investment of the project.	
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p> <p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>Construction DD provided to the team are:</p> <ul style="list-style-type: none"> - Project F/S. - Topographical, geological investigation reports - construction DD report - Construction Drawings <p>Missing the civil work calculation report (request to supplement)</p> <p>After examining the project provided reports/data, the survey team have comments as follows:</p> <ul style="list-style-type: none"> - Treatment area: New civil work including 2 storey operation house and concrete reservoir 200m³. <p>The operation house DD is available; civil structure is suitable</p> <p>Laboratory room is missing</p> <p>The reservoir is designed with reinforced concrete grade 220 #. However, the support column designed for from reservoir lid to bottom shall cause water loss. Survey team recommends using bottom reinforcement as foundation for the column.</p> <p>At least two vents on the lid of the reservoir for temperature convection. There should be a soil with grass layer on top of the reservoir for heat-resistant to keep temperature inside the reservoir. Once this layer is considered, recalculation of the steel core for the concrete covering layer should be checked.</p> <p>Missing civil structure calculation report for the reservoir</p>	<p>DPI, PO agreed to modify the DD and supplement the missing data as commented by the team.</p> <p>PO, submitted the revised DD, DD report on civil structure calculation for the pumping station II and reservoir to the team on 30/9/2010</p>	<p>After checking the supplement documents, data, the survey team confirm that civil structure of each facility is suitable</p>

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		<p>Guard house and fence DD are available</p> <p>- Raw water pipeline: Bend support D400 bearing pressure 9bar should be calculated civil structure. Dimensions of support for 45 °bend as indicated on the drawings are not sufficient to withstand slipping forces may break the bend. Request to design and calculate each type of bending angles and horizontal quail or vertical quail Distance between concrete supports for pipes running through lower topography should be provided to the survey team for calculation of the steel pipe D400 whether stand the allowed deflection Missing DD for pipelines crossing bridges, culverts. Request to provide: Distribution Pipeline: this pipeline has small diameter (= <150) and DD is available.</p>		
2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying	-The Survey Team needs to confirm the appropriateness of these plans.	<p>Raw water pipeline:</p> <p>- There is a difference in pipe diameter between FS and BD and DD; need to be approved by the authorities for the abovementioned changes.</p> <p>- Should adjust the pipeline slope level with the appropriate slope level to ensure effectiveness of the air valve. Steel pipes should be used for the parts crossing ditches or stream.</p> <p>- In some drawings, pipes are designed to be installed crossing people' houses as drawing number: Krong PA-NT-04/70 ... and crossing electricity poles as Krong PA-NT-11/70. Request to check again.</p>	<p>DPI, PO explained that hydraulic calculation of inner diameter pipe D350 is acceptable but the uPVC pipe D350 is not available in market now, thus uPVC pipe outside D400 is selected. This selection was clarified in the report which was submitted to the team on 30/9/2010 DPI, PO submitted latest DD of the intake water transmission pipelines to the team on 28/9/2010 and explained that the intake water transmission pipelines is changed (compared with the submitted DD to MPI) as there is a new concrete road from district town to Ia M'lah lake and the pipeline</p>	After checking the supplement documents, DD, the survey team confirm that the plans for raw water transmission, water distribution, water supply systems and pipe laying is suitable

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		<p>- On the raw water pipeline, request to clearly describe locations of raw water pipe installed on concrete supports as at support No.4 to 10, 18 to 20, 24 to 25, and 28 to 29.</p> <p>- pipeline should be on the bridge, or at the side of the bridge for the pipe node 286 to 297.</p> <p>- Request to supplement the DD for raw water pipelines crossing underground facilities such as box culverts, drainage ditches.</p> <p>Distribution pipeline:</p> <p>- Please check the return section of pipeline, black sand layer should be compacted around the pipe; depend on pipe diameter, at least 100mm to 150mm.</p> <p>- Lack of detailed DD for the pit stop valves.</p> <p>- In some drawings, pipes are designed to be installed crossing people' houses as drawing number: Krong Pa-TRD 12, Krong Pa TRD 14-, Krong Pa-TRD 16 and TRD Krong Pa-16, and some other drawings crossing electricity.</p> <p>Please check and provide:</p> <p>- The written decision/paper approving change of raw water transmission pipe diameter.</p> <p>- The missing drawings</p> <p>- Install additional sediment discharge valves at necessary positions to facilitate the operation and repair process.</p> <p>- Adjust the pipeline located in the appropriate locations to avoid crossing through other works, especially the</p>	<p>will go along this road.</p> <p>PO also explained that findings in the former DD by the team are not existed in the new submitted DD now</p> <p>PO also explained that land property in the area is like sand, thus, it can be used to compacting the pipes. The team can check land property at the site on site survey.</p> <p>PO, consultant agreed to modify the DD as commented and the modified DD was submitted to the survey team on 30/9/2010</p>	

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		<p>people's house.</p> <p>After checking the new submitted DD for intake water transmission pipeline and site survey, the team found that pipe slope, air valves, sediment valves location are not suitable; need recheck</p> <p>For better O&M, pipeline should be installed along the side of the existing bridges.</p>		
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>- The water treatment plant will be supplied with power from the existing transformer sub station, which is located in the water treatment plant area. Therefore, there is no need to execute an new agreement with the power company EVN.</p> <p>- However, the capacity of the existing transformer is not mentioned on the drawing. Re- check the capacity of the transformer, whether it can cover all the loads of the 4,000m³/day 2015 and 6,000m³/day 2025 of the water treatment plant in the future.</p>	<p>PO, explained that capacity of the existing transformer sub-station in the WTP is 160KVA. The actual power demand for the operation of the existing WTP is 30KW and the calculated power demand for operation of the new water treatment plant is 78KW for phase I 2015. Thus, capacity of the existing transformer is enough for the project WTP</p>	<p>After checking the information and site survey, the team confirm that capacity of the existing transformer is enough for the project WTP</p>
2-7. Electrical machinery facility specifications	<p>- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.</p>	<p>- The safety earthing system of the control panel of the pumping station 2 and the chemical house are to be supplemented.</p> <p>- Re-check the parameters of the main circuit breakers to protect the cables supplying power to the control panels TD1 and TD2.They are too big.</p> <p>- Re-check the maximum load of the pumping station 2. The mentioned calculation is small than the real load.</p> <p>- The capacity of the existing transformer is not mentioned on the drawing. Recheck the capacity of the transformer, whether it can cover all the loads of the 2,000m³/day water treatment plant.</p>	<p>PO agreed with the comments and submitted the modified DD and supplement data to the team on 30/9/2010</p>	<p>After checking the information and site survey, the team confirm that project electrical machinery facility specifications are suitable</p>
2-8.	-The Survey Team comprehends the site	In the FS, land acquisition plan for raw	PO explained that raw water	After checking the

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
Land acquisition plan	conditions of land acquisition and residents. -The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.	water pipeline is available. DPI, PO are requested to clarify this plan	transmission pipelines is along the new road and the distribution pipelines is on the pavements and public land; only expansion area of about 1,051m ² in the existing WTP needs land acquisition. Detail plan was submitted on 30/9/2010	submitted plan and site survey, the team confirm that the project land acquisition plan is suitable
3. Operation Plan				
3-1. Placement of personnel & manpower secure plan	-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan. -Review the deployment plan of personnel, who will conduct the water quality monitoring.	In the FS, the placement of personnel & manpower secure plan is available But, this project is improvement/upgrade and new construction on the basis of existing water supply system. Thus, DPI, Po are requested to clarify the personnel & manpower preparation for the existing system and the new system	PO explained that all 16 experienced staffs of the existing WTP will be employed for the O&M of the project WTP in the future and if it is needed, PO will take in more staffs then. Detail plan including preparation of staff for the Labo in the WTP was submitted to the team on 30/9/2010	After checking the submitted plan and site survey, the team confirm that the project placement of personnel & manpower secure plan is suitable
3-2. O&M facility plan	-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility. -The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.	In the FS, O&M plan is mentioned that the existing WTP will be assigned to operate and manage the facility after completed. 14 experienced staffs of the existing WTP will continue their work in the project WTP in the future But, this project is improvement/upgrade and new construction on the basis of existing water supply system. Thus, DPI, Po are requested to clarify the O&M preparation for the existing system	O&M including plan for the Labo was prepared and submitted to the team on 30/9/2010	After checking the submitted plan and site survey, the team confirm that O&M facility plan is suitable
3-3. Water quality control plan	-The Survey Team needs to review the implement ability of water quality control plan. -If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	Water quality control plan is missing in the FS. DPI, PO are requested to clarify following items: - what agency is responsible for water quality control for raw water and treated water - Is there a Labo in the existing WTP, how many parameters are checked for raw water and treated water.	DPI, PO agreed to arrange a Labo in the project WTP to check basic parameters of raw and treated water. PO will request the provincial Health and Preventive Center to conduct the monthly analysis parameters. Detail plan was submitted to the team on 30/9/2010	After checking the submitted plan and site survey, the team confirm that project water quality control plan is suitable

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	<p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.</p>	<p>- Water quality control plan.</p>		
3-4. House connection's promotion plan	<p>To review the problems concerning the promotion plan for house connections in the area.</p> <p>-If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>In the FS mention that connection and installation of meter to household with two alternatives that to pay total cost after installation or meter rent basis. DPI, PO are requested to clarify following items:</p> <ul style="list-style-type: none"> - connection plan from transmission, distribution pipeline to the households (who is responsible for pipe, tap, meter), - The scope of water supply distribution plan; how many meters of pipe from main supply pipeline will be provided. - any incentive policy for water connection to households under social welfare support - plan on water tariff under this project investment area. 	<p>DPI, PO explained that households shall sign water supply memorandum with the WSC and pay for the meter, pipe, tap for connection from main distribution pipelines to their house (payment rate is for the current market price then)</p> <p>For the households living far from the regulated basic distribution pipelines, the WSC will provide supply pipe and those houses will support the installation work by contribute labor.</p> <p>Water tariff will follow the decision of the PPC which was provided to the team on 30/9/2010</p>	<p>After checking current condition of the target area, the existing water supply network and interview residents, the team confirm that house connection's promotion plan is suitable with current condition</p>

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		<p>- The actual connection ratio of the area near the project site; data on poor families</p> <p>- plan for connection to the existing water supply system of the town</p>	<p>Support to the poor/difficult households will follow the support policy of the PPC</p> <p>At present, water supply coverage is 1,998 households</p> <p>Water loss of the existing WTP is 37.2%. This is a high rate. The reason is old distribution pipeline</p> <p>Within the project scope, some old pipelines will be changed and develop the network to reduce water loss ratio</p>	
3-5. Sludge drainage plan	<p>-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p>	<p>In FS, sludge is designed to be discharged to river directly</p> <p>DPI, PO are requested to clarify this item</p>	<p>DPI, PO explained that as this is difficult remote mountainous district, therefore, for the time being, the sludge water is discharged to the river directly, but in the future, DPI, PO will prepare a sludge water collection and treatment for the WTP securing technical matter</p>	<p>After checking the current condition of the WTP, the survey team confirm that the sludge drainage plan is suitable for the time being</p>

PHOTOS Gia Lai/Kron Pa

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Meeting
with Gia Lai DPI/ POs



Water source in the project
Water is supplied from water source, Ia Mlah lake (above photo.), located in approx.15km away from project site.



Water quality of water source in the project
Water quality condition in the project area will be improved by changing water source in the project,



Water quality of current water source



Proposed raw water transmission line
L=15km



Interview

3.16 Project No. 16: Hau Giang (Chau Thanh A)

A. Project Summary

1. Project Title: Water Supply Network Expansion from Nga Bay town to Tan Phu Thanh commune
2. Province: Hau Giang Province
3. District: Nga Bay Town – Phung Hiep District - Chau Thanh A District
4. Project Site: Hiep Loi, Tan Long, Long Thanh, Thanh Hoa, Tan Phu Thanh, Cai Tac town
5. Project Objectives: water supply to about 20,400 people in Tan Phu Thanh commune, 3 resettlement areas (Thanh Hoa, Tan Long, and Tan Phu Thanh) and Thanh Hoa, Long Thanh, Cai Tac markets using treated water from Nga Bay WTP.
6. Scope of Project: a reservoir 500m³, a booster pumping station capacity 100m³/h, (total area 1,400m²), transmission and distribution pipelines network (steel pipe D400 L=2,000m, D300 L=500m; PVC pipe D200 L=13,000m, PCV pipe D114 L=3,000m, D60 L=2,000m)
7. Project Owner: Hau Giang Water supply & Drainage – Urban Work Company
8. Operation and Maintenance Agency: Hau Giang Water supply & Drainage – Urban Work Enterprise No.3 and 4
9. Project Investment decider: Hau Giang Provincial People’s Committee
10. Project cost: 38,560,000,000 VND
11. JICA Portion: 22,810,000,000 VND (this is construction cost based on the Decision No.1511/QD-BKH dated 14 Oct 2009. DPI, PO requested JICA and MPI to clarify the calculation basis of the construction cost that JICA recalculated in the Decision)
12. Documents provided by DPI & PO: Project F/S, D/D, cost estimation and total construction cost estimation report in Vietnamese.

Review Result

The SAPI Study Team reviewed the documents provided by the DPI/PO/DPC, made the visit of the project site, discussed and clarified issues with the DPI & PO/DPC/ WSC.

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
1. Water Source				
1-1. Securing the required volume of water source	<p>-To confirm that required volume of water source is at appropriate level compared with the purification capacity of the facility.</p> <p>-Taking into consideration the difference between dry and wet season, data for 12 months of water quantity.</p> <p>-The Survey Team needs to actually visit to point of water source in order to understand the reliability of water data.</p> <p>-If data is not sufficient, the survey team should propose as the criteria.</p>	<p>Treated water of the Nga Bay WTP, which has current capacity of 5,000m³/day (40% of real capacity), is used to supply for the project 2,720m³/day (period is not clear).</p> <p>F/S mentioned the capacity of Nga Bay WTP is 5,000m³/day, not mention how many m³/day will supply for the project until what year. Besides, F/S mentioned generally that if the supply volume is not enough, they will improve the capacity of the Nga Bay WTP to 10,000m³/day as phase II, but not mention until what year.</p> <p>The capacity of the booster pumping station is very general, yet not clear if water supply flow is lower than demand, they will improve capacity of the booster pumping station to meet requirements.</p> <p>- the survey team request DPI, PO to provide 12 months quantity data of raw water, treated water, real volume of service water. of the WTP</p> <p>- Clarify water supply capacity, phase of the project.</p> <p>- Plans to improve capacity of Nga Bay WTP.</p>	<p>DPI, PO explained that the calculated project capacity of 2,720m³/day is for the target year 2012.</p> <p>Also DPI, PO confirmed that this project is to address the issue of output water of Nga Bay WTP. For Phase II of the Nga Bay town, the WTP has a plan to improve its capacity to 10,000m³/day.</p> <p>The Nga Bay WTP use the Cai Con river surface water. PO has provided the survey team the 12 months data on river water level based on the monitoring report Phung Hiep monitoring Station. River water volume data for 12 months is not available.</p> <p>PO also provided the survey team the treated water production and supply for 12 months of the Nga Bay WTP on 09/23/2010</p>	<p>After reviewing the supplemental documents and site inspection, the survey team assume that water volume of Cai Con river is enough for the Nga Bay WTP for both phases.</p> <p>Data on current treated water production shows that capacity of the WTP is enough to supply water for the project 2,700m³/day until 2012, but in the near future, the PO should consider to improve the capacity of the WTP in Phase II after 2012</p>
1-2. Securing the water quality for drinking water	<p>-The Survey Team needs to review the water quality standard for drinking water and water source under the domestic standard of Vietnam.</p> <p>-Taking into consideration the difference between dry season and wet season, the Survey Team needs to review the water quality data for 12 months to confirm whether</p>	<p>Missing 12 month water quality analysis reports for water source and treated water of the Nga Bay WTP in the F/S.</p> <p>DPI, PO are requested to provide survey team the full 12 month data on water quality of water source and treated water in accordance to QCVN 08-2008/BTNMT on surface water quality, QCVN</p>	<p>The PO (water supply company – WSC) informed that the WTP's Labo daily check the turbidity of raw water (Cai Con river water) and three parameters of the treated water, turbidity, pH and residual chlorine. The monthly 12 parameter is checked by the WSC's Labo in Vinh</p>	<p>Based on the supplemental data provided by the PO and after site investigation, the survey team assume that water quality of the WTP meets Vietnam standards for drinking</p>

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Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	<p>the data fulfill the domestic standard of Vietnam.</p> <p>-In order to confirm the reliability of the water quality data, the Survey Team needs to actually visit the water source.</p> <p>-The Survey Team needs to obtain records on maintenance of water quality equipment and confirm the water quality data.</p> <p>If data is not sufficient, the survey team should propose as the criteria.</p>	<p>09-2008/BTNMT for under ground water and QCVN 01-2009/BYT on drinking water quality.</p> <p>The survey team checked the Labo in the WTP and confirmed that basic parameters for water quality control are checked by the WTP and result record book is also fully fulfilled and kept at the site.</p>	<p>Thanh Town.</p> <p>PO has provided the survey team test results of raw water quality and treated water quality of the Nga Bay WTP for 12 months,</p>	<p>water</p>
2.Construction Plan				
2-1. Demand forecast	<p>The Survey Team will confirm the appropriateness of the method of forecast and assumptions such as per capita volume, population served, usage patterns, the current water supply systems, etc.</p>	<p>Parameter calculations:</p> <ul style="list-style-type: none"> - Population is 5,100 household (20,400 persons). - Water supply criteria is 4m3/per/month. <p>Observation of SAPI study team:</p> <ul style="list-style-type: none"> - The FS do not mention target year and investment phase. - Population is mention, but not clearly what year population is. - Water supply criteria is not clearly (Domestic; water for offices, schools, hospitals; water loss...) <p>Please explain and provide:</p> <ol style="list-style-type: none"> 4. Target year and Investment phase. 5. Base data used calculate population, the latest statistic year book. <p>Explanation the water supply criteria applied for water demand calculation</p>	<p>DPI, PO explained that target year of the project is 2012. DPI, PO agreed to check the calculation basis of the water demand forecast in accordance to the TCXD 33-2006.</p> <p>The recalculation result was provided to the team on October 4th, 2010.</p> <p>The PO provided the provincial statistical book 2009 to the team</p>	<p>After checking the submitted document, the team confirm that the demand calculation is suitable</p>
2-2. Water supply volume and purification volume	<p>The Survey Team will confirm the appropriateness of the forecasted water supply volume and water purification volume based on demand forecast, capacity of water source and capacity of water purification plant, existing and planned.</p>	<p>Water demand calculated is 2,720 m3/day</p> <p>Treated water from Nga Bay WTP with capacity of 5,000m3/day will be used to supply to the project areas. This WTP is supplying 40% of capacity (2,000m3/day)</p>	<p>PO confirmed that project target year is 2012 and will check and recalculate the water demand forecast</p> <p>PO provided the team the revised document on 4/10/2010</p>	<p>After checking the submitted document, the team confirm that the calculation volume is suitable</p>

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		<p>up to now. The FS mentioned plan for expansion capacity up to 10,000m³/day in the future; however, the expansion year, supply areas and the current population and future population of the supply areas is not clearly mentioned.</p> <p>Please explain and provide:</p> <ol style="list-style-type: none"> 1. Explanation of the target year the water distribution capacity of 2720 m³/day will be provided. 2. Existing WTP water supply plan (areas, capacity of each area) 3. Expansion plan of existing WTP (Capacity, and the time...) 4. Data of existing WTP (Water source, Water treatment process, water quality after treated, customer, water loss...). 		
2-3. Water purification method	<p>The Survey Team will confirm the long term cost & benefit efficiency of the water purification method.</p> <p>-The Survey Team will confirm that the proposed water purification method is technically appropriate or not taking into consideration such factors as the quality and quantity of water source, technical level of the O&M body and other related factors</p>	<p>Within the scope of project, no investment for water treatment plant; instead, treated water from a Nga Bay WTP is used for the project. To evaluate quality of the treated water proving for the project, DPI, PO is requested to arrange site visit to the Nga Bay WTP and explain more about the current condition of the WTP.</p> <p>The Nga Bay WTP, which will supply water for the project, was put into official operation since early 4 / 2006 with Phase I capacity is 5.000m³/day, using technology: raw water - mixing tank - reaction tank – vertical sedimentation tank – rapid gravity filter.</p>	Water purification method of the Nga Bay WTP is the most popular technology in Vietnam.	After site investigation to the Nga Bay WTP, the survey team assume that the water purification technology is suitable.
2-4. Civil structure of each facility	<p>The Survey Team will confirm whether the necessary and sufficient construction of facilities for the operation of the water supply facility is planned or not.</p>	<p>After checking the project F/A and D/D, we have the following comments:</p> <ul style="list-style-type: none"> - No report on geological inspection report. - No structural works calculation report. <p>Survey team has no basis to assess the</p>	The PO and consultant explained that the civil structure of the project was calculated and designed based on data of geological investigation report of an other construction facility near the	After checking the submitted documents, the team confirm that the civil structure is suitable

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	<p>-The Survey Team will confirm the appropriateness of civil structure of each facility.</p> <p>-As for the water supply sub-projects which includes water purification facility as a component, The Survey Team will confirm the laboratory room.</p>	<p>suitability of the civil structure of the work. But when we examine the drawings along with estimates record, we see the irrational need to clarify:</p> <p>wall for the operation house is 3.4m high, 4.0m long, 100mm thick brick building would not withstand the forces to ensure horizontal wind, earthquake. Meanwhile, the fence pillars were designed very solidly with concrete and steel, under the application of reinforced concrete foundation. Some nail head fences are reinforced concrete piling. These things need to be reviewed by using the geological investigation results and structure calculation results.</p> <p>Transmission and distribution pipelines: No construction design for civil work of the pipeline, i.e. valve part, pipe supports. DPI, PO are requested to supplement the missing documents and items sooner so as basis for the survey team to judge F/S, D/D</p>	<p>booster pumping station. The PO, consultant provided this geological report to the survey team on 04 Oct 2010.</p> <p>PO explained that the concrete pillars are needed for fence reinforcement because the fence in on an existing ditch. The civil structure calculation report for the project facilities was provided to the team on 04/10/2010.</p> <p>The D/D was revised as requested by the survey team and submitted to the team on 04/10/2010</p>	
<p>2-5. Plans for raw water transmission, water distribution, water supply systems and pipe laying</p>	<p>-The Survey Team needs to confirm the appropriateness of these plans.</p>	<ul style="list-style-type: none"> - Lack of project design calculation. - Missing hydraulic calculation table for transmission and distribution pipelines. - Lack of traffic distribution node. - Lack of distribution pipeline drawings. - Missing air exhaust valve, sediment exhaust valve on the transmission pipelines - The transmission pipeline is designed to be installed under the cannel/river for the parts canals/river. The survey team found that DPI, PO should consider the installation of the transmission pipelines through the existing bridges to save installation cost and for better operation and maintenance in the future. - Lack of overall/general lay-out drawings 	<ul style="list-style-type: none"> - PO, consultant agreed with the comments of the survey team and submitted the amended D/D to the team on 24/9/2010. - The hydraulic calculation table for transmission and distribution pipelines was submitted to the team on 04/10/2010 - DPI, PO explained that they have discussed and negotiate with the bridge administration agencies about the permission for pipeline installation through the bridges, but the bridge administration agencies disagreed with the proposed plan (as the bridges are under 	<p>After checking the F/S, D/D and site survey, the survey team confirm that the current D/D is acceptable. But the DPI, PO should consider the installation of the pipelines through the bridges during construction commencement</p>

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		<p>of pipe networks.</p> <ul style="list-style-type: none"> - drawings placed along the slope is 0, not meet standard design TCXD 33-2006, the pipe slope design should consider to be suitable for placement of air-valve and backwash valve. - Some depth of pipe installation do not match, most pipe is installed on the pavement depth from 1 meter up to 2m. request to check and refer to design standard TCXD 33-2006 - Please check capacity of booster pump. Pump capacity of 100m³/h do not meet water demand 2,720m³/day. 	<p>construction/upgrading process). Therefore, DPI, PO request to keep the current D/D and will continue to negotiate with the bridge administration agencies and consider the team's recommendation in the project construction commencement.</p>	
2-6. Securing the power supply	<p>-The Survey Team needs to take into consideration of the administrative procedure of securing the power supply, which may differ province by province. The Survey Team needs to confirm the appropriateness of the plans for securing the power supply.</p> <p>-If the Implementing Agency does not have the memorandum with the Vietnam power company, the Survey Team needs to describe the signing of such memorandum as criteria.</p>	<p>The memorandum/agreement with the EVN is missing.</p>	<p>DPI, PO submitted the memorandum to the team on 24/9/2010</p>	<p>The survey team confirm that the memorandum meets JICA requirement</p>
2-7. Electrical machinery facility specifications	<p>- The Survey Team needs to confirm the specifications of electrical machinery facility and if necessary propose the alternative specifications.</p>	<p>1. Single line diagram:</p> <ul style="list-style-type: none"> - The circuit breakers , which are installed at the control panel TD-TB2 must be of Molded Case Circuit Breaker (MCCB), and not Miniature Circuit Breaker (MCB) - The parameters of the circuit breakers and magnetic contactors for the pumps are too big. - The parameter of the condenser (75KVAR) is too big. - Re-check the capacity of the transformer. There are 02 pumps in the pumping station.(The parameters of each pump are as follows : Q=100m³/h ; H= 41.5m ; 	<p>PO amended the D/D, DD report and submitted to the team on 04/10/2010.</p>	<p>After checking the revised DD, the team confirm that electrical machinery facility specifications is suitable</p>

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		<p>N~15kw; one duty/one standby). The total load of the other building facilities like operator house, store, guard house, lighting etc. is not very much, and therefore, the transformer with the capacity of 160kva is too big.</p> <p>2. Control diagram for the pumps: - According to the control diagram as mentioned on the drawing, the pumps can not be started. Furthermore, the soft starter is not mentioned in the control diagram.</p> <p>3. Discharge valve: - For each motorized valve, one (1) power cable 4x2.5mm² and one (1) control cable 10x1.5mm² are to be provided. The cable with 7x2.5mm² is unsuitable.</p> <p>4. Others - The specifications of the electrical machinery are missing. - The earthing system of the control panel is not mentioned on the drawing</p>		
2-8. Land acquisition plan	<p>-The Survey Team comprehends the site conditions of land acquisition and residents.</p> <p>-The Survey Team needs to confirm the appropriateness of the land acquisition plan taking into consideration of appropriateness of the process to obtain the consent of the residents.</p>	<p>Land acquisition plan for the project booster pumping station and pipelines is available in the project F/S and D/D , but it is not clear DPI, PO are requested to clarify this plan.</p>	<p>The PO explained that the district PC has issued a Decision on handing over the land area for the booster pumping station construction. The PO submitted the decision to the team on 24/9/2010. The PO also obtained the agreement for pipe laying and provided the agreement to the team on 23/9/2010.</p>	<p>After checking the provided land acquisition plan, and site survey, the survey team confirm that the plan is suitable</p>
3. O&M Plan				
3-1. Placement of personnel & manpower secure plan	<p>-The Survey Team will confirm the appropriateness of the Placement of personnel plan and manpower secure plan.</p> <p>-Review the deployment plan of personnel, who will conduct the water quality monitoring.</p>	<p>Placement of personnel & manpower secure plan for the project booster pressure pumping station and pipelines is missing in the project F/S and D/D profile. DPI, PO are requested to clarify this plan.</p>	<p>DPI, PO explained that the project facility will be managed by the Water Supply Enterprise No.3 and No.4 under the WSC. Detail plan was submitted to the team on 24/9/2010</p>	<p>After checking the provided submitted plan, and site survey, the survey team confirm that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
3-2. O&M facility plan	<p>-The Survey Team is required to confirm the appropriateness of the O&M plan of the facility.</p> <p>-The Survey Team is required to confirm the water account, collection of water fee and decision of water fee after construction facilities.</p>	<p>O&M plan for the project booster pumping station and pipelines is missing in the project F/S and D/D profile.</p> <p>DPI, PO are requested to clarify this plan.</p>	<p>PO provided the overall O&M plan to the team on 24/9/2010. The detail plan will be prepared together with the commencement of construction.</p>	<p>After checking the provided O&M plan, and site survey, the survey team confirm that the plan is suitable.</p> <p>The survey tem provided and explained PO the O&M handbook of Hue WACO as reference and request PO to consider the guidebook.</p>
3-3. Water quality control plan	<p>-The Survey Team needs to review the implement ability of water quality control plan.</p> <p>-If the Implementing Agency or Maintenance Agency has not prepared the water quality control plan or if the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.</p> <p>-The Survey Team needs to review the capacity of the maintenance agency with regard to daily water quality control utilizing the water quality monitoring room. By doing so /reviewing so, the Survey Team needs to support the Implementing Agency or Maintenance Agency for making the Water Quality Monitoring Capacity Building Plan which includes the capacity strengthening of their existing staffs or new recruitments.</p> <p>-When making of such additional plan for the water quality control is necessary, the Survey Team needs to establish the following two items: 1. making of Water Quality Control Capacity Strengthening Plan; 2. parameters to be confirmed to judge the quality of the Plan, as the criteria. During the survey, the Survey</p>	<p>Base on the F/S and D/D, the team understand that the booster pressure pumping station, transmission and distribution pipelines of this project is included in the overall water supply system of Nga Bay WTP (including water treatment station). But, the water quality control plan is not covered in the project construction investment profile. DPI, PO are requested to provide followings:</p> <ul style="list-style-type: none"> - The responsible agency for water quality control for both water source and treated water. - Availability of a Labo in the Nga Bay water treatment plant; how many parameters are checked for raw water and treated water. - Water quality control plan at the WTP and for the booster pumping station. 	<p>The PO explained that the Water Supply Enterprise No.4 is responsible for the water quality control of the Nga Bay WTP in cooperation with the WSC in Vi Thanh Town.</p> <p>The existing Labo in Nga Bay WTP will check the 3 basic parameter daily and the monthly parameters will be checked by the existing Labo in Vi Thanh WTP.</p> <p>The PO has a plan to improve the existing Labo in Vi Thanh WTP to be able to check 32 parameters meeting new QCVN by 2012 in order to control water quality for the whole Hau Giang province. The initiative plan was submitted to the team on 24/9/2010</p>	<p>After checking the provided plan, and site survey, the survey team confirm that the plan is suitable</p>

Item	Terms of Reference of SAPI Team	Observations of SAPI Study Team	Clarifications of DPI/PO/DPC	Opinion of Team
	Team needs to make together with the Implementing Agency or Maintenance Agency an action plan towards the preparation of Water Quality Control Capacity Strengthening Plan.			
3-4. House connection's promotion plan	To review the problems concerning the promotion plan for house connections in the area. -If in case the Implementing Agency or Maintenance Agency has not prepared the plan or the existing plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	House connection's promotion plan is found in the project F/S and D/D, however, in the D/D is 5,100 households but in cost estimate is only 1,000. DPI, PO are requested to clarify following items: - connection plan from transmission, distribution pipeline to the households (who is responsible for pipe, tap, meter), - The scope of water supply distribution plan; how many meters of pipe from main supply pipeline will be provided. - Any incentive policy for water connection to households under social welfare support - plan on water tariff under this project investment area. - The actual connection ratio of the area near the project site; data on poor families	The PO explained that within the project scope, pipeline will be installed to households of about 20m from the main pipeline with free meter and a tap. For households further than 20m from the main pipeline, the connection will be considered and cost negotiation case by case incentive policy for water connection to households under social welfare support will be applied in accordance to provincial regulation Water tariff will be applied the same as the decision of PPC, Decision No.385/QD/UBND dated 9 Feb 2010.	After checking the plan and site survey, the team confirm that the plan is suitable. However, DPI, PO should consider the support policy and plan for connection promotion of the households living further than 20m from the main pipelines in order to assure water supply to all people living in the project areas
3-5. Sludge drainage plan	-The Survey Team is required to confirm the appropriateness of the drainage plan for sludge. -If the Implementing Agency or Maintenance Agency has not prepared the plan or the exiting plan is not appropriate, the Survey Team is required to inform the points necessary to make such plan by introducing good practices.	Within the scope of the project, only booster pumping station and transmission and distribution pipelines are covered. DPI, PO are requested to clarify the sludge drainage plan in the current Nga Bay WTP.	Sludge collection pond and drying bed is available in the WTP. Water after from drying bed is collected and discharge to river and dried sludge is used as soil for tree plantation.	After site survey, the team confirm that the plan is suitable

PHOTOS Hau Giang/Chau Thanh A



Meeting
with Hau Giang DPI/ POs



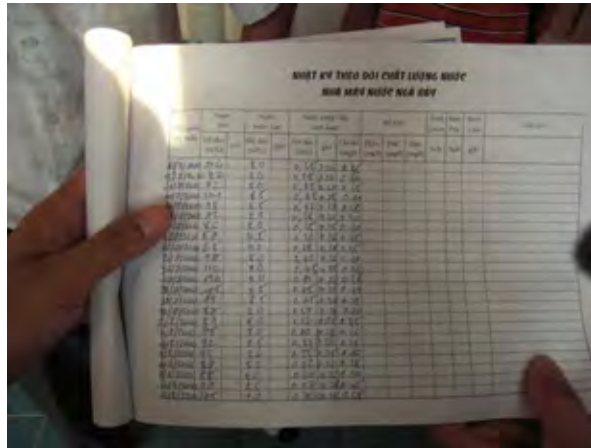
Water source
Raw water in the water source is treated in existing water treatment plant and supplied to project area.



Location of proposed pumping station
Q=2,400m³/day



Water quality laboratory in the existing water treatment plant



Current condition of water quality control
Raw water and treated water is checked daily by water company.



Interview

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4. RECOMMENDATION (SUBJECT TO THE APPROVAL OF JICA)

4.1 Relevance of the laboratory room

Out of 16 projects, 4 projects are for pipelines and booster pumping stations to expand the coverage of the existing water supply system. Out of 12 remaining projects, only 6 projects have provision of laboratories in the water purification plants. For other projects, there is provision of sending samples for the water quality testing to the laboratory of the Water supply Company and the Provincial Health Department. However, there is case where there is no laboratory with the water supply company like Lang Son. In this case, only Provincial Health Department can conduct the water quality analysis. However, some PO/WSC do not collect samples regularly and send for the detail examination to the Provincial Health Department. Moreover, the daily monitoring of water quality for the Plant is not feasible to be conducted by the Provincial Health Department.

The project water purification plants are small in size. If these are equipped with formal laboratories with equipments and qualified personnel, it will increase the cost of operation and maintenance. The increased O&M cost may not be sustainable in the future for such small plants. In the case of pilot project for the Tuan Giao District in Dien Bien Province, it is not feasible to have even a small laboratory as the O&M is community based and the “Willingness to Pay” of users is very-very low.

In view of above, the SAPI Study Team has following recommendations:

- 1) If there is laboratory at the existing water purification plants nearby, only provision of a small space and some equipments (testing kits) for the daily water quality testing (pH, Turbidity, residual-chlorine and Jar test) at the project water purification plant would be required for the efficient operation of the Plants. These testing can be done by the Plant operators themselves.
- 2) There shall be arrangement for regular sampling and sending to the Provincial Health Department for the detail examination.
- 3) The capacity of the laboratory of the provincial water supply companies shall be gradually strengthened reducing dependency on the Provincial Health Department.

4.2 O/M plan

- There is no sub-project of which the organization responsible for O&M has not been decided.
- Out of 16 sub-projects, the O&M of the majority (10 subprojects) will be taken care of the provincial water supply company, which indicates that The Government Decree No. 117/2007/ND-CP by dated July 11th 2007 ON CLEAN WATER PRODUCTION, SUPPLY AND CONSUMPTION, is being understood and followed by the provincial governments.
- 6 sub-projects of which the provincial water supply company is not taking over the responsibility for O/M are, Luc Nam in Bac Giang, Yen Dinh in Thanh Hoa, Ky Anh in Ha Tinh, Krong Pa in Gia Lai, Son Ha in Quang Ngai and Tuan Giao in Dien Bien., In case of Luc Nam in Bac Giang, two options (O/M by the provincial water supply company, establishment of a new company for O/M) were considered and the District PC decided to establish a new company. Son Ha in Quang Ngai also decided to establish a new company, though the reason is unknown.
- Yen Dinh in Thanh Hoa, Ky Anh in Ha Tinh and Krong Pa in Gia Lai already established their own water supply companies for the existing water supply facilities and these existing companies will operate the SPL6 facilities, though the capabilities of these existing (non-provincial) companies varies. The Survey Team is particularly concerned of the weak management capability of the existing company in Krong Pa in Gia Lai.
- In general, in order to realize the scale merit of the water supply system, it is desirable that

the provincial water company operates and maintains the water supply facilities in the province integrally. It is particularly true for the water quality control. For the concrete case, however, we need to judge case by case depending on the management capability of each provincial water supply company. Since the survey team did not have the enough time to conduct the detailed assessment of the management capacity of each provincial water supply company, we did not make it (taking-over of O&M responsibility by the provincial water supply company) as the criteria for the commencement of construction of each sub-project.

- The case of Tuan Giao in Dien Bien is different. The water supply system to be built in Tuan Giao is similar to the ‘Small Scale Water Supply System’ in Japan, which has the characteristics of the ‘rural water supply system’ different from other sub-projects under SPL6, which are, in principle, the ‘urban water supply system’. Such a rural water supply system as the one in Tuan Giao does not fit to the management by the provincial water supply companies who are in principle the urban water supply company. Therefore, it is inevitable that the provincial water supply company does not take over the responsibility of O&M of such system. It is, however, also not certain whether the water utility to be established at the village level can operate the system properly, even though the system is relatively simple one. Social approach involving NGOs would be needed to make the sub-project sustainable. It applies to the part of the sub-project in Tam Duong in Lai Chau.
- The recommendations on the O&M for SPL6 water supply portion by the SAPI Survey Team is as follows;
 - 1) Strengthen the monitoring and training under the SPL6 of the sub-projects for which the provincial water supply company is not taking over the O&M responsibility, namely, Luc Nam in Bac Gian, Son Ha in Quang Ngai, Yen Dinh in Thanh Hoa, Ky Anh in Ha Tinh, Krong Pa in Gia Lai and Tuan Giao in Dien Bien.
 - 2) For the other sub-projects for which the provincial water supply companies are taking over the O&M, strengthening the O&M capacity of the provincial water companies is considered to have the positive effects on the O&M of the sub-projects. Since, among the provincial water supply companies, such company as the Hue WaCo which can be a good model for other WaCo has been appearing, it is recommendable that MPI will take necessary steps, with the support of the SPL6 Consultant, to promote the exchange of experience and know-how among provincial water supply companies.

4.3 House connection’s promotion plan

Depending on the local conditions in each 16 project area, there are types of House Connections Promotion Plan. In most of the project, there is provision of service pipelines and water meters free of charge by the DPI/PO, except in Ha Tinh and Lang Son. According to the DPI/PO in Lang Son, there is serious demand of water so households can pay themselves for the service lines and water meters. In the case of Ha Tinh, it seems there is constraint of the local budget to provide free of charge service pipelines and water meters, so the DPI/PO asked to the SAPI Study Team to request the MPI/JICA to allow them to use 20% contingency fund to achieve fully House Connections promotion Plan. To increase the coverage ratio in Thai Nguyen, the DPI/PO requested the use of 20% contingency fund. In the projects, there is planned or to be planned free of water upto 2-3 m³/month for the poor category of households. In Thanh Hoa and Muong Te in Lai Chau, there is existing water supply, so only remaining households are required to be connected with the piped water. There is concern in Quang Ngai, Muong Te in Lai Chau and Dong Pao/ Tam Duong in Lai Chau, where even service pipelines and water meters are provided free of charge to each households, their “Willingness to Pay” ability is very low.

Currently, most of the households in the project area use water from the streams or tube wells. These households have to spend several hours a day in carrying water for their daily use. In rainy season stream water contains high turbidity and also it carries the animal waste. The households have no choice but to use this water and drink after filtering & boiling. There are cases of ground water contamination also. The Study Team understood that the clean water is immediate necessity for these

households. However, several households do not have enough ability to pay even house connections are provided to them free of charge.

In view of above, there is necessity to implement Community Awareness and Participation Activities to explain the linkages between water, environmental sanitation and improved health. Until the DPI/PO successfully market the health benefits of using potable water for drinking, cooking and improved hygiene, households are unlikely to be convinced to increase the water tariffs in the future.

Appendix

Ax-1 Member of Study Team and Affiliation

Name	Position	Affiliation
Kazushi HASHIMOTO	Team Leader/ Water Supply Planning-3	Yachiyo Engineering Co., Ltd.
Agrawal LALITKUMA	Facility Planning-1	Yachiyo Engineering Co., Ltd.
Tsuyoshi ONOZATO	Water Supply Planning-1	Yachiyo Engineering Co., Ltd.
Norihiro OBITSU	Facility Planning-2	Yachiyo Engineering Co., Ltd.
Hideyuki IGARASHI	Water Supply Planning-2	Yachiyo Engineering Co., Ltd.

Ax-2 Survey Schedule

No.	Date		Survey Team No.1				Survey Team No.2		
			Team Leader/ Water Supply Planning-3	Facility Planning-2	Water Supply Planning-1	Hotel	Facility Planning-1	Water Supply Planning-2	Hotel
			Mr. Kazushi HASHIMOTO	Mr. Norihiro OBITSU	Mr. Tsuyoshi ONOZATO		Mr. Agrawal LALITKUMA	Mr. Hideyuki IGARASHI	
1	23Aug, 2010	Mon	Japan(Narita)→Vietnam(Hanoi)			Hanoi	Japan(Narita)→Vietnam(Hanoi)		Hanoi
2	24Aug, 2010	Tue	(Morning)Meeting with local consultants [1400]JICA Vietnam office			Hanoi	(Morning)Meeting with local consultants [1400]JICA Vietnam office		Hanoi
3	25Aug, 2010	Wed	[0900]Kick off meeting with CPMU, MPI			Hanoi	[0900]Kick off meeting with CPMU, MPI		Hanoi
4	26Aug, 2010	Thu	Data arrangement			Hanoi	Data arrangement		Hanoi
5	27Aug, 2010	Fri	(Morning)Hanoi →Hue [1400]Meeting with DPI of Thua Thien Hue Province together with DPI of Phu Loc District, Visit of Phu Bai WS Branch of HueWACO			Hue	(Morning)Hanoi →Hue [1400]Meeting with DPI of Thua Thien Hue Province together with DPI of Phu Loc District, Visit of Phu Bai WS Branch of HueWACO		Hue
6	28Aug, 2010	Sat	No.13 Phu Loc survey (Water Supply System for Phu Loc town and 5 surrounding communes)			Hue	No.13 Phu Loc survey (Water Supply System for Phu Loc town and 5 surrounding communes)		Hue
7	29Aug, 2010	Sun	Data arrangement			Hue	Data arrangement		Hue
8	30Aug, 2010	Mon	[0800]Meeting with Hue WACO			Hue	[0800]Meeting with Hue WACO		Hue
9	31Aug, 2010	Tue	Conclusion of No.13 Phu Loc survey (Water Supply System for Phu Loc town and 5 surrounding communes) [1430]Hue→Hanoi			Hanoi	Conclusion of No.13 Phu Loc survey (Water Supply System for Phu Loc town and 5 surrounding communes) [1430]Hue→Hanoi		Hanoi
10	01Sep, 2010	Wed	[0900]Meeting with DPI of Bac Giang province together with DPI Luc Nam District (Afternoon) No.5 Bac Giang survey (Water Supply System Construction project for Doi Ngo town)			Hanoi	Data arrangement		Hanoi
11	02Sep, 2010	Thu(National Day)	Data arrangement			Hanoi	Data arrangement		Hanoi

No.	Date		Survey Team No.1				Survey Team No.2		
			Team Leader/ Water Supply Planning-3	Facility Planning-2	Water Supply Planning-1	Hotel	Facility Planning-1	Water Supply Planning-2	Hotel
			Mr. Kazushi HASHIMOTO	Mr. Norihiro OBITSU	Mr. Tsuyoshi ONOZATO		Mr. Agrawal LALITKUMA	Mr. Hideyuki IGARASHI	
12	03Sep, 2010	Fri	Data arrangement			Hanoi	Data arrangement	Hanoi	
13	04Sep, 2010	Sat	Data arrangement			Hanoi	Data arrangement	Hanoi	
14	05Sep, 2010	Sun	[Joining Team-2] [0900]Meeting with DPI of Thai Nguyen Province together with of DPIs of Pho Yen District. (Afternoon)No.3 Thai Nguyen survey (South Area Water Supply System of Phu Yen District and Diem Thuy area of Phu Binh District) (Stay in Thai Nguyen)	Data arrangement			[0600]Leaving at Hanoi Hotel [0900]Meeting with DPI of Thai Nguyen Province together with of DPIs of Pho Yen District and Phu Binh District (Afternoon)No.3 Thai Nguyen survey (South Area Water Supply System of Phu Yen District and Diem Thuy area of Phu Binh District)	Thai Nguyen	
15	06Sep, 2010	Mon	[0800]Conclusion of No.3 Thai Nguyen survey(South Area Water Supply System of Phu Yen District and Diem Thuy area of Phu Binh District PM Thai Nguyen-Hanoi (Stay in Hanoi)	Conclusion of No.5 Bac Giang survey (Water Supply System Construction project for Doi Ngo town)	Japan(Narita)→Vietnam(Hanoi)	Hanoi	[0800]Conclusion of No.3 Thai Nguyen survey (South Area Water Supply System of Phu Yen District and Diem Thuy area of Phu Binh District) (Afternoon) Thai Nguyen→Hanoi	Hanoi	
16	07Sep, 2010	Tue	[0900]Team meeting at VIWASE Office [1300]Leaving at Hanoi hotel->Lang Son [1700]Meeting with DPI of Lang Son Province together with DPI of Dinh Lap District. (Stay in Lang Son	[0900]Team meeting at VIWASE Office Data arrangement		Hanoi	[0900]Team meeting at VIWASE Office [1300]Leaving at Hanoi hotel -> Lang Son [1700]Meeting with DPI of Lang Son Province together with DPI of Dinh Lap District	Lang Son	
17	08Sep, 2010	Wed	[0600]No.1 Lang Son Survey (Water Supply System for Dinh Lap town) -Data collection (stay in Lang Son))	(Morning) Hanoi→Son La (Afternoon)Meeting with DPI of No.6 Son La		Son La	[0600]No.1 Lang Son Survey (Water Supply System for Dinh Lap town) - Data collection	Lang Son	
18	09Sep, 2010	Thu	[1400]Conclusion of No.1 Lang Son Survey (Water Supply System for Dinh Lap town)	No.6 Son La Survey (Water Treatment Plant and Water Supply System for Chieng Khuong communes)		Son La	[1400]Conclusion of No.1 Lang Son Survey (Water Supply System for Dinh Lap town)	Lang Son	

No.	Date		Survey Team No.1				Survey Team No.2		
			Team Leader/ Water Supply Planning-3	Facility Planning-2	Water Supply Planning-1	Hotel	Facility Planning-1	Water Supply Planning-2	Hotel
			Mr. Kazushi HASHIMOTO	Mr. Norihiro OBITSU	Mr. Tsuyoshi ONOZATO		Mr. Agrawal LALITKUMA	Mr. Hideyuki IGARASHI	
19	10Sep, 2010	Fri	AM: Lang Son → Hanoi (Night)Hanoi→	Meeting with DPI of No.6 Son La Conclusion of No.6 Son La Survey	Son La	AM:Lang Son→Hanoi		Hanoi	
20	11Sep, 2010	Sat	→Japan(Narita)	(Morning) Son La→Dien Bien (Afternoon) Meeting with DPI of No.10 Tuan Giao No.10 Tuan Giao survey	Dien Bien	Data arrangement		Hanoi	
21	12Sep, 2010	Sun		Data arrangement	Dien Bien	[1200] Leaving at Hanoi Hotel → Thanh Hoa		Thanh Hoa	
22	13Sep, 2010	Mon		No.9 Dien Bien Dong Survey (Water Treatment Plant and Water Supply System)	Dien Bien	[0800] Meeting with DPI of Thanh Hoa Province together with DPI of Yen Dinh District (Afternoon)No.11 Thanh Hoa Survey (Water Supply System for Quan Lao town)		Thanh Hoa	
23	14Sep, 2010	Tue		(Morning) Meeting with DPI of No.10 Tuan Giao District (Afternoon) Meeting with DPI of No.9 Bien Dien Dong District	Dien Bien	[0900]Meeting with Yen Dinh DPC (Afternoon) No.11 Thanh Hoa Survey (Water Supply System for Quan Lao town) - Data arrangement		Thanh Hoa	
24	15Sep, 2010	Wed		Conclusion of No.10 Tuan Giao and No.9 Dien Bien Dong Survey	Dien Bien	[0900]Conclusion of No.11 Thanh Hoa Survey (Water Supply System for Quan Lao town) (Afternoon) Thanh Hoa→Hanoi		Hanoi	
25	16Sep, 2010	Thu		Dien Bien → Hanoi	Hanoi	(Morning)Team meeting at VIWASE (Night) Hanoi →Lao Cai		Train	
26	17Sep, 2010	Fri		Data arrangement	Hanoi	[0500]Arriving at Lao Cai (Morning) Meeting with DPI of Lao Cai Province together with DPI of Bao Thang District (Afternoon) No.2 Lao Cai survey (Rehabilitation and expansion of water supply system for Pho Lu town (Continuous SPL))		Lao Cai	
27	18Sep, 2010	Sat		(Morning) Meeting with DPI of Phu Tho (Afternoon)No.4 Phu Tho survey (Water Supply Network Expansion)	Hanoi	Data arrangement		Lao Cai	
28	19Sep, 2010	Sun		Data arrangement	Hanoi	Data arrangement		Sa Pa	
29	20Sep, 2010	Mon		Conclusion of No.4 Phu Tho survey	Hanoi	(Morning) Conclusion of No.2 Lao Cai survey (Rehabilitation and expansion of water supply system for Pho Lu town (Continuous SPL)) (Afternoon) Lao Cai → Lai Chau		Lai Chau	
30	21Sep, 2010	Tue		Data arrangement	Hanoi	[0600]Moving to Muong Te (09hours in the car) (Afternoon) No.7Lai Chau(Muong Te) survey (Water Supply System for Muong Te town) [1830]Meeting with Muong Te DPC		Muong Te	
31	22Sep, 2010	Wed		Hanoi →Can Tho	Can	(0800) Meeting with DPI of Lai Chau		Lai	

No.	Date		Survey Team No.1				Survey Team No.2		
			Team Leader/ Water Supply Planning-3	Facility Planning-2	Water Supply Planning-1	Hotel	Facility Planning-1	Water Supply Planning-2	Hotel
			Mr. Kazushi HASHIMOTO	Mr. Norihiro OBITSU	Mr. Tsuyoshi ONOZATO		Mr. Agrawal LALITKUMA	Mr. Hideyuki IGARASHI	
	2010					Tho	Province together with Muong Te DPC [1100]Moving to Lai Chau (09 hours in the car) [2100] Stay in Hotel -Data arrangement	Chau	
32	23Sep, 2010	Thu		(Morning) Meeting with DPI of Hau Giang Province (Afternoon) No.16 Hau Giang survey (Water Supply Network Expansion)		Can Tho	[0800]Meeting with Lai Chau DPI and together with Tam Duong DPC [1300] No.8 Tam Duong Survey (Water Supply system)	Lai Chau	
33	24Sep, 2010	Fri		Conclusion of No.16 Hau Giang survey		Can Tho	[0800]Conclusion Meeting with No.07 Muong Te survey and No.08 with Dong Pao survey (Afternoon) Lai Chau → Lao Cai (Night) Lao cai → Hanoi	Train	
34	25Sep, 2010	Sat		Can Tho →Hanoi		Hanoi	[0430]Arriving at Hanoi Station [0500]Data arrangement at VIWASE	Hanoi	
35	26Sep, 2010	Sun		Data arrangement		Hanoi	Data arrangement	Hanoi	
36	27Sep, 2010	Mon		Hanoi → Pleiku		Pleiku	[0600]Leaving at Hanoi Hotel (Morning) Hanoi →Da Nang → Quang Ngai [1500] Meeting with DPI of Quang Ngai Province together with DPI of Son Ha District	Quang Ngai	
37	28Sep, 2010	Tue		(Morning) Pleiku→Krong Pa (Afternoon) Meeting with DPI of Krong Pa District		Krong Pa	No.14 Quang Ngai survey (Water Supply System for Di Lang town)	Quang Ngai	
38	29Sep, 2010	Wed		No.15 Gia Lai survey (Expansion of Water Treatment Plant and Water Supply System)		Krong Pa	(Morning) Conclusion of No.14 Quang Ngai survey (Water Supply System for Di Lang town) (Afternoon) Quang Ngai → Da Nang → Ho Chi Minh City	Ho Chi Minh City	
39	30Sep, 2010	Thu		Conclusion of No.15 Gia Lai survey (Water Supply System for Phu Tuc town)		Krong Pa	(Morning) Ho Chi Minh City →Vinh [1500]Meeting with DPI of Ha Tinh Province together with DPI of Ky Anh District	Ha Tinh	
40	01Oct, 2010	Fri		Pleiku → Hanoi		Hanoi	[0700]No.12 Ha Tinh survey (Water Supply for Ky Trinh, Ky Ha, Ky Ninh of Vung Ang Economic area) (Afternoon) Data arrangement	Ha Tinh	
41	02Oct, 2010	Sat	Japan(Narita)→Vietnam(Hanoi)	Data arrangement		Hanoi	[0730]Conclusion meeting of No.12 Ha Tinh survey (Water Supply System for Ky Trinh, Ky Ha, Ky Ninh of Vung Ang Economic Area) (Afternoon) Ha Tinh → Vinh (Evening) Vinh→Hanoi	Hanoi	
42	03Oct, 2010	Sun		Data arrangement		Hanoi	Data arrangement	Hanoi	
43	04Oct, 2010	Mon		Data arrangement		Hanoi	Data arrangement	Hanoi	
44	05Oct, 2010	Tue		Data arrangement		Hanoi	Data arrangement	Hanoi	

No.	Date		Survey Team No.1				Survey Team No.2		
			Team Leader/ Water Supply Planning-3	Facility Planning-2	Water Supply Planning-1	Hotel	Facility Planning-1	Water Supply Planning-2	Hotel
			Mr. Kazushi HASHIMOTO	Mr. Norihiro OBITSU	Mr. Tsuyoshi ONOZATO		Mr. Agrawal LALITKUMA	Mr. Hideyuki IGARASHI	
	2010								
45	06Oct, 2010	Wed	[1400]Discussion with MPI			Hanoi	[1400]Discussion with MPI		Hanoi
46	07Oct, 2010	Thu	Data arrangement			Hanoi	Data arrangement		Hanoi
47	08Oct, 2010	Fri	[1400]Explanation on DF/R to JICA Vietnam (Hanoi) →	[1400]Explanation on DF/R to JICA		Hanoi	[1400]Explanation on DF/R to JICA		Hanoi
48	09Oct, 2010	Sat	→Japan (Narita)	Data arrangement Vietnam (Hanoi) →		Hanoi	Data arrangement Vietnam (Hanoi)		Hanoi
49	10Oct, 2010	Sun		→Japan (Narita)			→ Japan (Narita)		-

Ax-3 Attendance List

Name

Affiliation

JICA Vietnam Office

Mr. Shohei Matsuura	Senior Project Formulation Adviser
Ms. Nguyen Thi Van Anh	Senior Program Officer

Ministry of Planning and Investment (MPI)

Mr.Luu Quang Khanh	Director General, Services Sector Dept, MPI Director of CPMU
Mr. Vu Dai Thang	Deputy General Director, MPI
Mr. Nguyen Quoc Anh	Specialist of General, Services Sector Dept, MPI Member of CPMU
Mr. Hoang Anh Phu	Specialist of General, Services Sector Dept, MPI Member of CPMU
Ms. Nguyen Thuy Nhi	Specialist of General, Services Sector Dept, MPI Member of CPMU
Ms.Nguyen Thi Hoa	Specialist of General, Services Sector Dept, MPI Member of CPMU
Mr.Hoang Anh Phu	Specialist of General, Services Sector Dept, MPI Member of CPMU
Mr.Nguyen Anh Tuan	Specialist of General, Services Sector Dept, MPI Member of CPMU

Project No.01; Lang Son/Dinh Lap

Mr. Duong Van Chieu	Vice- Director of DPI
Ms. Hua Thi Hang	Officer of Lang Son DPI
Ms. Pham Thi Thanh Nga	Expert of ICR of DPI
Ms. Duong Thi Hong Van	Expert of Investment cooperation Division, DPI
Mr. Nguyen Van Canh	Vice-Director of Lang Son Water Supply Company
Mr. Phuong Manh Hao	Officer of Lang Son Water Supply Company
Mr. Dinh Van Ngoc	Consultant

Project No. 02; Lao Cai/Bao Thang

Mr. Pham Toan Thang	Vice-Director of DPI
Ms. Pham Bich Thuy	Head of Foreign Economic Relations Division, DPI
Mr. Nguyen Thanh Lan	Expert of DPI
Mr. Ngo Thanh Phuong	Director of LAWACO
Mr. Pham Hong Quang	Vice-Director of LAWACO, Chief of PMU

Mr. Tran Ngoc Chien	Vice -committee of PMU
Ms. Pham Thi Hang	Accountant of PMU
Mr. Le Kim Cuong	Engineer of PMU
Mr. Hua Van Minh	Engineer of PMU
Mr. Nguyen Phan Anh	Team Leader of LAVIC(consulting)
Mr. Le Viet Thanh	Engineer of LAVIC
Mr. Vu Manh Tien	Engineer of LAVIC
Mr. Nguyen Quang Huy	Engineer of LAVIC
Ms. Dao Thi Trang Nhung	Engineer of LAVIC

Project No.03; Thai Nguyen/Pho Yen, Phu Binh

Mr. Duong Van Loc	Vice-Director of DPI
Mr. Dam Van Yen	Manager of foreign affairs Division of DPI
Mr. Duong Thai Son	Manager of Planning and Investment Division, DPI
Ms. Nguyen Thi Nhung	Officer of foreign affairs Division of DPI
Mr. Tran Quang Han	Director cum Chairman of Management Board
Mr. Nguyen Van Luc	Vice-Director-Chief of PMU
Mr. Pham Dang Ba	Vice-Director of Thai Nguyen WSC
Mr. Truong Dinh Thuc	Vice-Director of Thai Nguyen WSC
Ms. Nguyen Ngoc Anh	Staff of PMU, Thai Nguyen WSC
Mr. Pham Thanh Ngan	Staff of PMU, Thai Nguyen WSC
Mr. Ma Dinh Ly	Staff of PMU, Thai Nguyen WSC
Mr. Nguyen Van Con	Staff of PMU, Thai Nguyen WSC
Mr. Trinh Thanh Nguyen	Staff of PMU, Thai Nguyen WSC
Mr. Ta Ngoc Son	Vice-Director of consulting center
Mr. Do Thanh Tung	Staff of consulting center

Project No.04; Phu Tho/Tam Nong

Mr.Luong Van Tuoc	Manager of International Economic relation Devison, Phu Tho DPI, Vice Chairman of Provincial JICA Project Management Unit
Mr.Nguyen Ngoc Son	Vice Manager of International Economic relation Devison, Phu Tho DPI, Member of Provincial JICA Project Management Unit
Mr.Trieu Quan Ket	Chairman of Tam Nong District People Committee, Chairman of District JICA Project Management Unit
Ms.Thieu Thi Huong	Manager of Economic&Infrastructure, Tam Nong District People Committee, Member of District JICA Project

	Management Unit
Mr.DO Van Huong	Chairman of Hung Hoa Town People Committee, Member of District JICA Project Management Unit
Mr.Tran Van Quy	Chairman of Tho Van Commune People Committee, Member of District JICA Project Management Unit
Mr.Pham Ngoc Lam	Vice of Hong Da Commune People Committee, Member of District JICA Project Management Unit
Mr.Pham Ngoc Thai	Chairman of Di Noi Commune People Committee, Member of District JICA Project Management Unit
Ms.Nguyen Thi Thuy Hien	Manager of Planning and Fiance Division, Tam Nong District People Committee Member of District JICA Project Management Unit
Mr.Dao Quang Thanh	Chairman of Huong Commune People Committee, Member of District JICA Project Management Unit
Mr.Nguyen Dinh Tuyen	Vice Director Genral of Phu Tho Water Supply Company
Ms.Doan Thi Kim Quy	Director Genral of Phu Tho Water Supply Company
Mr.Nguyen Huu Thai	Chairman of Dau Duong Commune People Committee, Member of District JICA Project Management Unit
Mr.Phan Duc Tai	Manager of Agriculture and Rural Development Division, Tam Nong District People Committee, Member of District JICA Project Management Unit
Mr.Nguyen Phan Anh	Director of Consultant Company LAVIC

Project No.05; Bac Giang (Luc Nam)

Mr.Hop	Chairman of Luc Nam District, Chairman of project steering committee
Mr.Tuan	Director of Bac Giang Project Management Unit, Bac Giang DPI
Mr.Nhan	Manager of Doi Ngo Town Water Supply Project (PO)
Mr.Nhu Y	Head of Project Designing Consultant

Project No.06; Son La/Son Ma

Mr.Võ Văn An	Director of Son La DPI
Mr.Nguyễn Huy Du	Manager of General Affair Devison, Son La DPI, Member of Provincial JICA Project Management Unit
Mr.Hà Đình Hưng	Specialist Son La DPI, Member of Provincial JICA Project Management Unit
Mr.Nguyễn Tường Thuật	Director of Clean Water - Sanitation Environment Center, Son La DARD, Director of Chieng Khuong water supply plant (Project Owner), JICA Project
Mr.Hoàng Việt Dũng	Vice Director of Chieng Khuong water supply plant (Project

	Owner), JICA Project
Mr.Nguyễn Bằng Giang	Designing Consultant for Project Vice Director of Environmental Technology Institute
Mr.Nguyễn Chiêu Dương	Manager of the Designing Consultant Division, Environmental Technology Institute
Mr.Cao Việt Thịnh	Director of Son La Rural Infrastructure Construction, Investment and Consultant JSC.
Mr.Tùng Văn Phong	Secretary General of the Communist Party of Chieng Khuong Commune People Committee
Mr.Nguyễn Trung Vực	Chairman of Chieng Khuong Commune People Committee
Mr.Nguyễn Bá Khang	Senior Vice Secretary General of the Communist Party of Chieng Khuong Commune People Committee
Mr.Luu Văn Cường	Vice Chairman of Chieng Khuong Commune People Committee
Mr.Nguyễn Văn Lý	Chairman of Farmer Association of Chieng Khuong Commune People Committee
Mr.Trần Mạnh Dân	Power supply and Electrical Engineering consultant

Projects No.07 & 08; Lai Chau/ Muong Te, Dong Pao

Mr. Dang Van Chau	Vice-Director of DPI
Ms.Nguyen Thi Thanh Phuong	Manager of Foreign Economic Relations Division
Ms.Bui Tu Mai Quynh Trang	Member of Province PMU-DPI
Mr. Nguyen Duc Hanh	Member of Province PMU-DPI
Mr. Vi Van Chung	Vice-Director of Lai Chau WSC
Mr. Ha Quang Huy	Vice-Chairman of Muong Te DPC
Mr. Nguyen Van Thach	Manager of PMU Muong Te Dist.
Mr. Nguyen Quang Vinh	Deputy Manager of Muong Te PMU
Mr. Vu Van Boi	Technician of Muong Te PMU
Mr.Lo Van Chung	Technician of Muong Te PMU
Mr. Tran Van Cuong	Director of JSC T & V
Mr.Tran Ngoc Thanh	Director of consulting JSC Viet Y
Mr. Nguyen Truong Giang	Associate office of Muong Te DPC
Mr. Vu Duc Thoai	Viet Y Consultant
Mr. Hoang Cao Ben	Viet Y Consultant
Mr. Ha Van Phong	Vice-Head of Tam Dong Pao PMU
Mr.Tran Tuan Kien	Technician of Dong Pao PMU

Projects No.09; Dien Bien/ Dien Bien Dong

Mr.Nguyen Huu Tinh	Chairman of Tuan Giao District PC, Vice Chairman of Provincial JICA Project Steering Committee
Mr. Vu Van Duc	Director of District Project Management Unit
Mr.Pham Duc Toan	Manager of General Affair Devison, Dien Bien DPI, Member of Provincaial JICA Project Management Unit
Mr.Tran Minh Nam	Specialist of Dien Bien DPI, Member of Provincaial JICA Project Management Unit
Mr.Ngo Cuong Quyet	Director of the Techincal Consultant Company, Designing Engineer

Projects No.10; Dien Bien/ Tuan Giao

Mr. Vu Van Duc	Director of District Project Management Unit
Ms.Nguyen Thi Thuy	Vice manager of General Affair Devison, Dien Bien DPI, Member of Provincaial JICA Project Management Unit
Mr.Tran Minh Nam	Specialist of Dien Bien DPI, Member of Provincaial JICA Project Management Unit
Mr.Ngo Cuong Quyet	Director of the Techincal Consultant Company, Designing Engineer

Project No.11; Thanh Hoa/Yen Dinh

Mr. Hoang Anh Tuan	Head of Foreign Economic Relations Division DPI
Mr. Nguyen Van Khoat	Expert of Thanh Hoa DPI
Ms. Ngo Thi Hoa	Chairwoman of Yen Dinh People' Committee
Mr. Nguyen Van Xo	Vice- chairman of Yen Dinh PC
Mr. Nguyen Tien Hieu	Manager of Industry and Trade Division
Mr. Hoang Van Dong	Deputy manager of ITD
Mr. Phung Xuan Anh	Expert of Industry and Trade Division
Mr. Nguyen Ngoc Ho	Chairman of Quang Lao Town
Mr. Nguyen Anh Cuong	Director of Vinaconsult
Mr. Dang Quoc Viet	WS Engineer of Vinaconsult
Ms. Trinh Thi Thanh Nhan	WS Engineer of Vinaconsult

Project No.12; Ha Tinh/Vung Ang Economic Area

Mr. Tran Dinh Hoa	Vice-Director of Ha Tinh DPI
Mr. Le Duc Anh	Secretary of JICA Project, DPI
Mr. Duong Dinh Ha	Expert of Ha Tinh DPI
Mr. Duong Duc Thanh	Vice-head of Vung Anh Economic Area PMU

Mr. Nguyen Van Khoa	Vice-head of PMU
Mr. Luong Sy Duong	Deputy manager of Planning & Financial Division
Mr. Mai Van Ha	Vinaconex consulting company
Mr. Dang Quoc Viet	Vinaconex consulting company

Project No.13; Hue/Phu Loc

Mr. Ton That Ba	Director of Hue DPI
Mr. Nguyen Quang Cuong	Vice-Director of Hue DPI
Mr. Truong Cong Nam	Director of Hue Waco
Mr. Truong Van Tan	Deputy Manager of Inv. & Development Division, DPI
Mr. Phan Canh Huy	Manager of Foreign Relation Division, DPI
Mr. Hoang Mai Lan	Deputy Manager of Agricultural Division, DPI
Mr. Nguyen Thanh Phu	Specialist of Investment & Development Division, DPI
Mr. Tran Van Tho	Vice-Director of Construction & Water Supply Company
Mr. Nguyen Phu	Design Consultant Company No.1
Mr. Cao Huy Tuong Minh	Officer of Huewaco
Mr. Ngo Doan Thang	Officer of Huewaco

Project No.14; Quang Ngai/Son Ha

Mr. Le Tan Hung	Director of Quang Ngai DPI
Mr. Tran Minh Hoa	Vice-Director of Quang Ngai DPI
Mr. Tran Hoai Thu	Expert of Quang Ngai DPI
Ms. Dinh Rug A	Vice-Chairman of Son Ha DPC
Mr. Tran Dinh Su	Chief Department of Irrigation of Son Ha DPC
Mr. Huynh Day	Vice Department of P & I of Son Ha DPC
Mr. Nguyen Minh Thu	Consultant
Mr. Tran Thanh Cong	Consultant

Project No.15; Gia Lai / Krong Pa

Mr. To Van Chanh	Vice Chairman of Krong Pa District PC
Mr. Chu Van Hien	Vice Manager of District PMU
Mr. Nguyen Dinh Khoa	Director Consultant company (Designing consultant)
Mr. Nguyen Van The	Vice Manager of Consultant Company (Inspection consultant)
Mr. Nguyen van Quang	Vice Manager of the existing District WTP
Mr. Nguyen An	Manager of the existing District WTP
Mr. Dao Van Thang	Manager of District PMU

Mr.Nguyen Van Tuan	District Police
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Project No.16; Hau Giang / Chau Thanh A

Mr.Pham Hong Thai	Vice Director of Hau Giang DPI
Mr.Nguyen Viet Bac	Vice Manager of Economic Devison, Hau Giang DPI
Mr.Nguyen Thanh Thuan	Officer, Hau Giang DPI
Ms.Le Diem Trang	Officer, Hau Giang DPI
Mr.Duong Van Tho	Director of Hau Giang WSC, PO
Mr.Bui Trong Luc	Manager of Technical Division, Hau Giang WSC, PO, Director of Provincial JICA PMU
Mr.Bui Le Van	Consultant company
Mr.Vo Thanh Quang	Consultant company

Ax-4 List of Collected Data

Survey Name: The Detailed Design Review Survey For Spl VI Water Supply (SAPI) for Small-Scale Pro Poor Infrastructure Development Project (III)

No.	Document Name	Published Organization	Copy/ Size
PJ-01	Lang Son/Dinh Lap		
1.1	Water quantity Result Data for 12 months (from Jan to Dec 2009)	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.2	Water quality result of Ky Cung river for 3 months (June 2010, Oct 2005, March 2006)	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.3	Power Supply Agreement of Lang Son Electricity	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.4	Land acquisition Plan	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.5	Construction Investment Project Report	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.6	Detailed design report (version 1)	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.7	Detailed design report (reveised)	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.8	Detailed design report + cost estimation for electricity	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.9	Detailed design report of power electricity	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.10	Detailed cost estimation of water supply system	Lang Son Water Supply and Drainage Joint Stock Company	Copy (A4)
1.11	Detailed design Drawings of pipeline network	Lang Son Water Supply and Drainage Joint Stock Company	02Copy A2

No.	Document Name	Published Organization	Copy/ Size
1.12	Detailed design Drawings of intake and water treatment plant	Lang Son Water Supply and Drainage Joint Stock Company	02Copy A2
PJ-02	Lao Cai/Bao Thang		
2.1	Water quantity Result Data of Hong river and Pho Lu Stream for 12 months (from Jan to Dec 2009)	Lao Cai State 1 member Clean water business	Copy A4
2.2	Water quality result of Hong river for 12 months	Lao Cai State 1 member Clean water business	Copy A4
2.3	Water quality result of Lu stream for 12 months	Lao Cai State 1 member Clean water business	Copy A4
2.4	Power Supply Agreement of Lao Cai Electricity	Lao Cai State 1 member Clean water business	Copy A4
2.5	Land acquisition Plan	Lao Cai State 1 member Clean water business	Copy A4
2.6	Investment project construction	Lao Cai State 1 member Clean water business	Copy A4
2.7	Investment project construction (additional revised)	Lao Cai State 1 member Clean water business	Copy A4
2.8	Detailed design report	Lao Cai State 1 member Clean water business	Copy A4
2.9	Detailed design report (revised)	Lao Cai State 1 member Clean water business	Copy A4
2.10	Geological survey report	Lao Cai State 1 member Clean water business	Copy A4
2.11	Additional documents for JICA (include water quality, quantity, power supply...)	Lao Cai State 1 member Clean water business	Copy A4
2.12	Detailed design Drawings	Lao Cai State 1 member Clean water business	Copy A2
2.13	Detailed design Drawings (revised and additional)	Lao Cai State 1 member Clean water business	Copy A2

No.	Document Name	Published Organization	Copy/ Size
PJ-03	Thai nguyen/Pho Yen		
3.1	Water quality result of Cong river W.T.P from July 2009 to march 2010	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.2	Water quality result for 9 parametters of Song Cong W.T.P on 14 th Sep 2010	Thai Nguyen Envionment Monitoring Center	Copy A4
3.3	Construction Investment Project report (English version)	Thai Nguyen Clean Water Business Joint Stock Company	Copy&Copy A4
3.4	Updated and revised Report	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.5	Detailed Design report	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.6	Topo survey report	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.7	Inspection result report of Cost estimation	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.8	Geologycal Surey Report	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.9	Calculation report for network and hydraulic calculation	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.10	Approved Decisions by Thai Nguyen Province for the Project	Thai Nguyen Clean Water Business Joint Stock Company	Copy A4
3.11	Detailed Design Report (old and new version)	Thai Nguyen Clean Water Business Joint Stock Company	Copy&Copy A3
3.12	Toposurvey for Pipeline and Booster pumping station	Thai Nguyen Clean Water Business Joint Stock Company	Copy A3
3.13	Transmission pipelines Layout Drawings	Thai Nguyen Clean Water Business Joint Stock Company	Copy A0
PJ-04	Water Supply Project for Hung Hoa Town Phutho		

No.	Document Name	Published Organization	Copy/ Size
4.1	Water quality result for 12 months	Tam Nong District People Committee	A4
4.2	Memorandum of Power Supply Agreement	Tam Nong District People Committee	A4
4.3	Point connection of water supply	Tam Nong District People Committee	A4
4.4	Land acquisition plan	Tam Nong District People Committee	A4
4.5	Water quality result	Tam Nong District People Committee	A4
4.6	Construction Investment Project Report (Eng and Vn)	Tam Nong District People Committee	Copy&Copy A4
4.7	Construction Investment Project Report (additional)	Tam Nong District People Committee	Copy A4
4.8	Planning the overall economic development of households	Tam Nong District People Committee	Copy A4
4.9	Detailed design report	Tam Nong District People Committee	Copy A4
4.10	Geological Survey Report	Tam Nong District People Committee	Copy A4
4.11	Operation Monitoring Result of Thanh Thuy W.T.P	Tam Nong District People Committee	Copy A4
4.12	Statistical Yearbook 2009	Tam Nong District People Committee	Copy A4
4.13	The minutes of the shift of WTP Thanh Thuy	Tam Nong District People Committee	Copy A4
4.14	Detailed design Drawings	Tam Nong District People Committee	02 Draft A2
4.15	Detailed design Drawings of transmission and distribution pipelines for package 01 to 7	Tam Nong District People Committee	07 Copy A2

No.	Document Name	Published Organization	Copy/ Size
4.16	Detailed design Drawing of manhole valve (additional)	Tam Nong District People Committee	Copy A2
PJ-05	Water Supply System Construction Project for Doi Ngo town		
5.1	Average water flow table	Luc Nam District People Committee	A4
5.2	Water quality result	Luc Nam District People Committee	A4
5.3	Water quality result	Luc Nam District People Committee	03 mẫu A4
5.4	Water quality result of 35 existing WTP	Luc Nam District People Committee	3 pape A4
5.5	Land acquisition plan	Luc Nam District People Committee	1 papeA4
5.6	Water quality result	Luc Nam District People Committee	Copy A4
5.7	Construction Investment Project Report (Eng + VN version)	Luc Nam District People Committee	Copy&Copy A4
5.8	Topo Survey Report	Luc Nam District People Committee	Copy&Copy A4
5.9	Geological Survey Report	Luc Nam District People Committee	Copy&Copy A4
5.10	Detailed detail Report	Luc Nam District People Committee	Copy&Copy A4
5.11	Total cost estimation of electrical item.	Luc Nam District People Committee	Copy&Copy A4
5.12	Total inspection cost estimation.	Luc Nam District People Committee	Copy&Copy A4
5.13	Report Inspection for Detailed design and cost estimation	Luc Nam District People Committee	Copy&Copy A4

No.	Document Name	Published Organization	Copy/ Size
5.14	Report Additional Project Report	Luc Nam District People Committee	Copy&Copy A4
5.15	Project Report (additional)	Luc Nam District People Committee	02Copy A4
5.16	Statistical Yearbook 2008	Luc Nam District People Committee	Copy A4
5.17	Construction Investment Project Report	Luc Nam District People Committee	Copy&Copy A4
5.18	Geological Survey Report	Luc Nam District People Committee	Copy A4
5.19	Topo Survey Report	Luc Nam District People Committee	Copy A4
5.20	Overall Master planning of socio-economic development of Luc Nam District stage 2008-2020.	Luc Nam District People Committee	Copy A4
5.21	Detailed design drawing of raw water transmission pipeline (adjust)	Luc Nam District People Committee	Copy A2
5.22	Document of Detailed design drawings	Luc Nam District People Committee	Copy&Copy A2
5.23	Detailed design drawings of electrical item	Luc Nam District People Committee	Copy&Copy A3
PJ-06	Water Supply System for Chieng Khuong cluster communes		
6.1	Water quality result	Son La Clean water and Rural Environmental Sanitation Center	8 papeA4
6.2	Construction Investment Project Report	Son La Clean water and Rural Environmental Sanitation Center	02Copy& Copy A4
6.3	Basic Design document	Son La Clean water and Rural Environmental Sanitation Center	Copy&Copy A4
6.4	Hydrography report	Son La Clean water and Rural Environmental Sanitation Center	Copy A4

No.	Document Name	Published Organization	Copy/ Size
6.5	Water quality result	Son La Clean water and Rural Environmental Sanitation Center	Copy A4
6.6	Statistical Yearbook 2008, 2009	Son La Clean water and Rural Environmental Sanitation Center	02 quyển
6.7	Topo Survey Report	Son La Clean water and Rural Environmental Sanitation Center	Copy&Copy A4
6.8	Geological Survey Report	Son La Clean water and Rural Environmental Sanitation Center	Copy&Copy A4
6.9	Detailed design report	Son La Clean water and Rural Environmental Sanitation Center	02Copy A4
6.10	Total Cost Estimation	Son La Clean water and Rural Environmental Sanitation Center	Copy&Copy A4
6.11	Payment dossier test water samples	Son La Clean water and Rural Environmental Sanitation Center	Copy A4
6.12	Land acquisition plan	Son La Clean water and Rural Environmental Sanitation Center	Copy A4
6.13	Report (following the content working with survey team) attached the revise drawings.	Son La Clean water and Rural Environmental Sanitation Center	03Copy& Copy A4
6.14	Drawings of geological section	Son La Clean water and Rural Environmental Sanitation Center	Copy& Copy A3
6.15	Detailed design drawing for pipeline.	Son La Clean water and Rural Environmental Sanitation Center	Copy& Copy A3
6.16	Detailed design drawing	Son La Clean water and Rural Environmental Sanitation Center	Copy& Copy A3
PJ-07	Lai Chau/Muong Te	Muong Te People's Committee	
7.1	Water Quantity Result of Nam Cau and Huoi Sang Spring (Qmin and Qmax)	Muong Te People's Committee (Consultant)	Copy A4

No.	Document Name	Published Organization	Copy/ Size
7.2	Water quality result of - Nam Cau Spring and Huoi Sang on May 2010 - Nam Cau Spring on July and Dec 2009	Muong Te People's Committee	Copy A4
7.3	Agreement for Power Supply	Muong Te People's Committee	Copy A4
7.4	Minute of Land Acquisition Plan	Muong Te People's Committee	Copy A4
7.5	Construction Investment Project report (English version)	Muong Te People's Committee	Copy & Copy A4
7.6	Topo survey report	Muong Te People's Committee	Copy A4
7.7	Geological survey report	Muong Te People's Committee	Copy A4
7.8	Geological cost estimation	Muong Te People's Committee	Copy A4
7.9	Detailed Design report	Muong Te People's Committee	02Copy A4
7.10	Detailed Design report (revised)	Muong Te People's Committee	Copy A4
7.11	Detailed Cost estimation	Muong Te People's Committee	Copy & Copy A4
7.12	Detailed Cost estimation (revised)	Muong Te People's Committee	Copy A4
7.13	Detailed design Drawings	Muong Te People's Committee	Copy & Copy A2
7.14	Detailed Topo Drawings	Muong Te People's Committee	Copy A2
7.15	Construction Investment Project report (additional)	Muong Te People's Committee	Copy A4

No.	Document Name	Published Organization	Copy/ Size
7.16	Detailed Design Drawings (revised)	Muong Te People's Committee	Copy A2
PJ-08	Lai Chau/Tam Duong		
8.1	Water Quantity Result of Chao San Spring	Tam Duong People's Committee	Copy A4
8.2	Water quality result of Chao San Spring on Oct 2009 and Oct 2010	Tam Duong People's Committee	Copy A4
8.3	Agreement for Power Supply	Tam Duong People's Committee	Copy A4
8.4	Land Acquisition Plan	Tam Duong People's Committee	Copy A4
8.5	Construction Investment Project Report	Tam Duong People's Committee	Copy A4
8.6	Geological Survey Report (Eng)	Tam Duong People's Committee	Copy & Copy A4
8.7	Detailed Design Report for Construction Stage (Eng & Vietnames)	Tam Duong People's Committee	Copy A4
8.8	Detailed Design Report for Dong Pao Irrigation ((for reference) of	Tam Duong People's Committee	Copy A4
8.9	Detailed Design Report for Power Supply	Tam Duong People's Committee	Copy A4
8.10	Detailed Design Drawings for Power Supply (medium voltage line and transformer)- Eng -Viet	Tam Duong People's Committee	Copy & Copy A4
8.11	Detailed Cost Estimation	Tam Duong People's Committee	Copy & Copy A4
8.12	Detailed Design Drawings for technical	Tam Duong People's Committee	Copy A2
8.13	Detailed Design Drawings for construction, electricity, road	Tam Duong People's Committee	Copy A2

No.	Document Name	Published Organization	Copy/ Size
8.14	Detailed Design Drawings for medium voltage line and transformer	Tam Duong People's Committee	Copy A2
8.15	Additional and revisional Report for SAPI team (JICA)	Tam Duong People's Committee	Copy A4
PJ-09	Dien Bien Dong Water Treatment Plant		
9.1	Water quality result	Dien Bien water supply company	07 pape A4
9.2	Point connection of Power	Dien Bien water supply company	01 pape A4
9.3	Memorandum of Power Supply Agreement.	Dien Bien water supply company	03 pape A4
9.4	Overall planning of socio-economic development 2006-2020.	Dien Bien water supply company	Copy A4
9.5	Statistical Yearbook of Dien Bien province 2008, 2009	Dien Bien water supply company	Copy A4
9.6	Main Project Report	Dien Bien water supply company	Copy A4
9.7	Hydrography calculation reports	Dien Bien water supply company	Copy A4
9.8	Topo Survey Report for detailed design (additional)	Dien Bien water supply company	Copy A4
9.9	Geological Survey Report	Dien Bien water supply company	Copy A4
9.10	Geological Survey Report (Final)	Dien Bien water supply company	Copy A4
9.11	Detailed detail Report	Dien Bien water supply company	Copy A4
9.12	Detailed detail Report (Final)	Dien Bien water supply company	Copy A4

No.	Document Name	Published Organization	Copy/ Size
9.13	Report survey Power supply for WTP	Dien Bien water supply company	Copy A4
9.14	Detailed design drawing of power supply for WTP	Dien Bien water supply company	Copy A4+A3
9.15	Quantity and Cost Estimation	Dien Bien water supply company	Copy A4
9.16	Total Cost Estimation	Dien Bien water supply company	Copy A4
9.17	Construction Investment Project Report	Dien Bien water supply company	Copy A4
9.18	Explanation and additional Report (after receiving SAPI's opinion)	Dien Bien water supply company	Copy A4
9.19	Topo Survey Report	Dien Bien water supply company	Copy A3
9.20	Detailed design drawing of raw water intake work	Dien Bien water supply company	Copy A3
9.21	Detailed design drawing for main distribution and service pipeline	Dien Bien water supply company	Copy A3
9.22	Detailed design drawing for WTP	Dien Bien water supply company	Copy A3
9.23	Detailed design drawings (additional) after meeting with survey team	Dien Bien water supply company	Copy A3
9.24	Topo Survey Report (additional)	Dien Bien water supply company	Copy A3
9.25	Detailed design drawing of raw water intake work (additional)	Dien Bien water supply company	Copy A3
9.26	Detailed design drawings for distribution pipeline (additional)	Dien Bien water supply company	Copy A3
9.27	Detailed design drawing for WTP (additional)	Dien Bien water supply company	Copy A3

No.	Document Name	Published Organization	Copy/ Size
9.28	General layout intake	Dien Bien water supply company	Copy & cobby A0
PJ-10	Dien Bien/Tuan Giao		
10.1	Memorandum of Power Supply Agreement.	Tuan Giao District People's Committee	A4
10.2	Written commitment to provide land (Land acquisition plan)	Tuan Giao District People's Committee	A4
10.3	Written commitment to water quality control activities	Tuan Giao District People's Committee	A4
10.4	Minutes of selected water	Tuan Giao District People's Committee	A4
10.5	Topo Survey Report	Tuan Giao District People's Committee	Copy A4
10.6	Construction Investment Project Report	Tuan Giao District People's Committee	Copy A4
10.7	Detailed design report	Tuan Giao District People's Committee	Copy A4
10.8	Total Cost Estimation	Tuan Giao District People's Committee	Copy A4
10.9	Topo Survey drawings	Tuan Giao District People's Committee	Copy A3
10.11	Detailed design drawings	Tuan Giao District People's Committee	02Copy A3
PJ-11	Thanh Hoa/ Yen Dinh		
11.1	Water source survey result report on Oct 2006	Yen Dinh People's Committee	Copy A4

No.	Document Name	Published Organization	Copy/ Size
11.2	Drilling testing pumping on Sep 2010	Yen Dinh People's Committee	02Copy A4
11.3	Water quality result of drilling test pumping of QL1, QL2 on Oct 2006	Yen Dinh People's Committee	02Copy A4
11.4	Water quality result of drilling test pumping of QL1, QL2 on Sep 2010	Yen Dinh People's Committee	02Copy A4
11.5	Geological survey report	Yen Dinh People's Committee	Copy & copp A4
11.6	Operation and Maitanence Instruction Manual	Yen Dinh People's Committee	Copy A4
11.7	Construction Investment Project Report	Yen Dinh People's Committee	Copy A4
11.8	Revised and Added Project	Yen Dinh People's Committee	Copy & copp A4
11.9	Detailed Design Report	Yen Dinh People's Committee	Copy A4
11.10	Inspection Report of Detailed Design Drawings and Cost estimation	Yen Dinh People's Committee	Copy A4
11.11	Inspection Report of Detailed Design Drawings and Cost estimation for Service pipeliens	Yen Dinh People's Committee	Copy A4
11.12	Detailed Design Drawings	Yen Dinh People's Committee	Copy A2
11.13	Detailed Design Drawings (revised and added)	Yen Dinh People's Committee	Copy A3
PJ-12	Ha Tinh / Ky Anh		

No.	Document Name	Published Organization	Copy/ Size
12.1	Construction Investment Project Report	PMU of Vung Ang Economic Area	Copy A4
12.2	Operation and Maitanence Instruction Manual	PMU of Vung Ang Economic Area	Copy & copy A4
12.3	Geological survey report	PMU of Vung Ang Economic Area	Copy A4
12.4	Summary C/E for booster pumping station and pipelines	PMU of Vung Ang Economic Area	Copy A4
12.5	Summary C/E	PMU of Vung Ang Economic Area	02Copy A4
12.6	Summary C/E for 35KV medium voltage over head line and transformer	PMU of Vung Ang Economic Area	Copy A4
12.7	Topo survey result report and C/E	PMU of Vung Ang Economic Area	Copy A4
12.8	Revised and added Project Report	PMU of Vung Ang Economic Area	Copy A4
12.9	Water Treatment Plan Layout	PMU of Vung Ang Economic Area	Copy A1
12.10	Detailed Design Drawings	PMU of Vung Ang Economic Area	Copy A3
12.11	Detailed Design Drawings (revised and added)	PMU of Vung Ang Economic Area	Copy A3
12.12	Detailed Design Drawings for 35KV medium voltage line overhead and transformer 75 KVA	PMU of Vung Ang Economic Area	Copy A3
PJ-13	Hue / Phú Lộc		
13.1	Construction Investment Project Report	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4

No.	Document Name	Published Organization	Copy/ Size
13.2	Design Report	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.3	Statistic Book of year 2006	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.4	Monitoring and Operation Manual of Quangr Te W.T.P	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.5	Pipeline, network pipe Phu Loc District to 2011.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A0
13.6	Pipeline, network pipe Loc Dien District to 2011.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A0
13.7	Pipeline, network pipe Loc Hoa District to 2011.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A0
13.8	Pipeline, network pipe Loc Tri District to 2011.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A0
13.9	Basic design drawings	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
	WTP Loc Tri		
13.10	Geological Survey Report area 1: WTP Loc Tri	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.11	Construction Detailed Design Report for term treatment	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.12	Construction detail design report for Operator house	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.13	Construction report reservoir 1500m3.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.14	Detailed design drawing for Khe Su Dam	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.15	Detailed design drawing for clear water supply pipes.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3

No.	Document Name	Published Organization	Copy/ Size
13.16	Detailed design drawings for sandy soil back fill	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.17	Detailed design drawings for term treatment.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.18	Detailed design drawings for Operator house	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.19	Detailed design drawing for reservoir 1500m3	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.16	Power and Control system for WTP and Chemical house.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.17	Detailed design drawing for out site lighting system	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.18	Detailed design drawing for Sludge drying and Fence of WTP	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
	Loc An WTP	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	
13.19	Geological Survey Report area 2: WTP Loc An	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.20	Construction Detailed Design Report for term treatment	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.21	Construction detail design report for Operator house	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.22	Construction report reservoir 3000m3.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.23	Construction report reservoir 2000m3.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.24	Construction report pumping station I	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4
13.25	Construction Report Warehouse	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A4

No.	Document Name	Published Organization	Copy/ Size
13.26	Detailed design drawing for pumping station I	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.27	Detailed design drawing for clear water supply pipes.	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.28	Detailed design drawings for sandy soil back fill	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.29	Detailed design drawings for water treatment Plant items	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.30	Detailed design drawings for Operator house	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.31	Detailed design drawing for reservoir 3000m3	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.32	Detailed design drawing for reservoir 2000m3	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.33	Detailed design drawings for Chemical house	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.34	Power and Control system for WTP and Chemical house	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.35	Detailed design drawing for out site lighting system, pumping station I	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.36	Drawings of Power and Control system for Pumping station I	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
3.37	Detailed design drawing for out site lighting system of WTP	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
13.38	Detailed design drawing for Suldge lagoon	The Limited liability State 1 member Company construction and Supply Water Thua Thien Hue	Copy A3
PJ-14	Quang Ngai/Son Hà		
14.1	Hydrography Calculation Appendix fò 12 months	Son Ha People's Committee	Copy A4

No.	Document Name	Published Organization	Copy/ Size
14.2	Water quality result of Ta Mang on May, June 2008 and Oct 2010	Son Ha People's Committee	6 pages A4
14.3	Agreement for Power Supply	Son Ha People's Committee	Copy A4
14.4	Inspection Report of 22 KV medium voltage and transformer	Son Ha People's Committee	Copy A4
14.5	Water source intake position Agreement	Son Ha People's Committee	1 page A4
14.6	Community Meeting Minute	Son Ha People's Committee	8 pages A4
14.7	Basic design report (Eng-Vie)	Son Ha People's Committee	Copy & copy A4
14.8	Detailed Design Report and Detailed design drawings for medium voltage 22 KV (power supply part)	Son Ha People's Committee	Copy & copy A4
14.9	Population Statistic Book in 2009	Son Ha People's Committee	Copy A4
14.10	Detailed Design Report	Son Ha People's Committee	Copy A4
14.11	Detailed Design Report (revised and additional)	Son Ha People's Committee	02 Copy A4
14.12	Cost Estimation	Son Ha People's Committee	Copy A4
14.13	Detailed Design Drawings of package 6	Son Ha People's Committee	02 Copy A3
14.14	Detailed Design Drawings of package 8 for main pipelines	Son Ha People's Committee	Copy & copy A3

No.	Document Name	Published Organization	Copy/ Size
14.15	Detailed Design Drawings of package 9 for distribution pipelines	Son Ha People's Committee	Copy & copy A3
PJ-15	Gia Lai/Krong Pa		
15.1	Construction Investment Project Report	Krong Pa District People's Committee	Copy A4
15.2	Topo Survey Report, Geological Survey Report	Krong Pa District People's Committee	Copy A4
15.3	Detailed Design Report	Krong Pa District People's Committee	Copy A4
15.4	Cost estimation construction for raw water transmission (volume 1)	Krong Pa District People's Committee	Copy A4
15.5	Cost estimation of water treatment plant's rehabilitation part (volume 2)	Krong Pa District People's Committee	Copy A4
15.6	Detailed cost estimation of raw water transmission, distribution, pipeline network (volume 3)	Krong Pa District People's Committee	Copy A4
15.7	Total cost estimation	Krong Pa District People's Committee	Copy A4
15.8	Statistical Year book 2009	Krong Pa District People's Committee	Copy
15.9	Topo Survey Report, Geological Survey Report (additional)	Krong Pa District People's Committee	Copy A4
15.20	Detailed design report.	Krong Pa District People's Committee	Copy A4
15.21	Detailed design drawings for network water supply	Krong Pa District People's Committee	Copy & copy A0

No.	Document Name	Published Organization	Copy/ Size
15.22	Topo Survey Report drawings for network water supply	Krong Pa District People's Committee	02 Copy A3
15.23	Detailed design drawing for raw water transmission.	Krong Pa District People's Committee	02Copy A3
15.24	Detail design drawing for water treatment plant	Krong Pa District People's Committee	Copy A3
PJ-16	Hau Giang/		
16.1	Construction Investment Project Report	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4
16.2	Topo Survey Report for detailed design	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4
16.3	Statistical Yearbook 2009	Hau Giang Water supply & Drainage – Urban Work Company	Quyển
16.4	Cost estimation for transmission and distribution pipeline network	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4
16.5	Cost estimation booster pumping station.	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4
16.6	Total Cost estimation	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4
16.7	Detailed design drawings for raw water transmission, distribution pipeline network.	Hau Giang Water supply & Drainage – Urban Work Company	02Copy A3
16.8	Topo Survey drawings for the pipeline network Expansion from Nga Bay town to Tan Phu Thanh commune	Hau Giang Water supply & Drainage – Urban Work Company	Copy A3
16.9	Detailed design drawing of boosterbooster pumping station.	Hau Giang Water supply & Drainage – Urban Work Company	Copy A3

No.	Document Name	Published Organization	Copy/ Size
16.10	Detailed design drawings for raw water transmission, distribution pipeline network. (additional)	Hau Giang Water supply & Drainage – Urban Work Company	Copy A3
16.11	Construction Investment Project Report (additional)	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4
16.12	Detailed design report	Hau Giang Water supply & Drainage – Urban Work Company	Copy A4