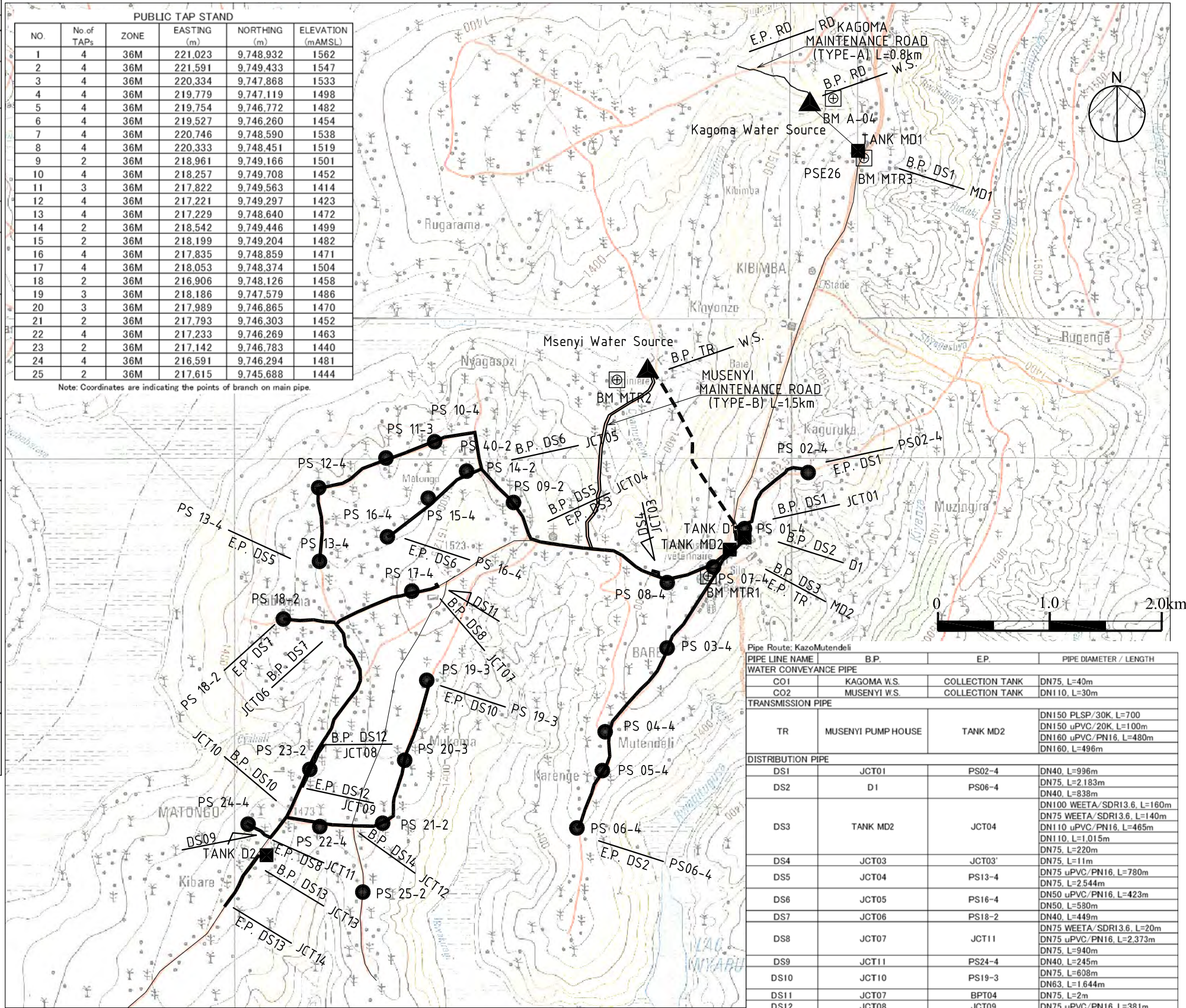


PLATE No.

District: Ngoma	
Sector: Kazo, Mutendeli	
Water Source: Kagoma, Musenyi	Type: Spring
Structure	Data
1. Intake	1 no
2. Water Conveyance Pipe	Material: uPVC(PN10) Dia.: D110mm, Length: L=30m Dia.: D75mm, Length: L=42m
3. Receiving Tank	(1) at Kagoma W.S. Material: Reinforced Concrete Volume: 55m ³ (2) at Musenyi W.S. Material: Reinforced Concrete Volume: 100m ³
4. Transmission Pump	at Musenyi 290L/min x 240mH x 30kw x 400V
5. Generator	(1) at Kagoma W.S. Output: 80 kVA (2) at Musenyi W.S. Output: 125 kVA
6. Transmission Pipe	Material: Polyethylene Lined Steel Pipe(PLSP,30K) Dia.: D150mm, Length: L=700m Material: uPVC(20K) Dia.: D150mm, Length: L=100m Material: uPVC(PN16) Dia.: D160mm, Length: L=480m Material: uPVC(PN10) Dia.: D160mm, Length: L=496m
7. Distribution Reservoir	Material: Reinforced Concrete (MD2) Volume: 140m ³ Existing Distribution Reservoir to be Rehabilitated Number : 2nos
8. Distribution Pipe	Material: Polyethylene Pipe(WEETA,SDR13.6) Dia.: D100mm, Length: L=160m Dia.: D75mm, Length: L=160m Material: uPVC(PN16) Dia.: D110mm, Length: L=465m Dia.: D75mm, Length: L=3,534m Dia.: D50mm, Length: L=423m Material: uPVC(PN10) Dia.: D110mm, Length: L=1,015m Dia.: D75mm, Length: L=6,508m Dia.: D63mm, Length: L=1,644m Dia.: D50mm, Length: L=580m Dia.: D40mm, Length: L=3,038m
9. Break Pressure Tank	Material: Wet Masonry Number: 5nos
10. Public Tap Stand	2 taps x 7 3 taps x 3 4 taps x 15 Existing Stand to be Rehabilitated x 27

NO.	No. of TAPs	ZONE	EASTING (m)	NORTHING (m)	ELEVATION (m AMSL)
1	4	36M	221,023	9,748,932	1562
2	4	36M	221,591	9,749,433	1547
3	4	36M	220,334	9,747,868	1533
4	4	36M	219,779	9,747,119	1498
5	4	36M	219,754	9,746,772	1482
6	4	36M	219,527	9,746,260	1454
7	4	36M	220,746	9,748,590	1538
8	4	36M	220,333	9,748,451	1519
9	2	36M	218,961	9,749,166	1501
10	4	36M	218,257	9,749,708	1452
11	3	36M	217,822	9,749,563	1414
12	4	36M	217,221	9,749,297	1423
13	4	36M	217,229	9,748,640	1472
14	2	36M	218,542	9,749,446	1499
15	2	36M	218,199	9,749,204	1482
16	4	36M	217,835	9,748,859	1471
17	4	36M	218,053	9,748,374	1504
18	2	36M	216,906	9,748,126	1458
19	3	36M	218,186	9,747,579	1486
20	3	36M	217,989	9,746,865	1470
21	2	36M	217,793	9,746,303	1452
22	4	36M	217,233	9,746,269	1463
23	2	36M	217,142	9,746,783	1440
24	4	36M	216,591	9,746,294	1481
25	2	36M	217,615	9,745,688	1444

Note: Coordinates are indicating the points of branch on main pipe.



PIPE LINE NAME	B.P.	E.P.	PIPE DIAMETER / LENGTH
WATER CONVEYANCE PIPE			
CO1	KAGOMA W.S.	COLLECTION TANK	DN75, L=40m
CO2	MUSENYI W.S.	COLLECTION TANK	DN110, L=30m
TRANSMISSION PIPE			
TR	MUSENYI PUMP HOUSE	TANK MD2	DN150 PLSP/30K, L=700 DN150 uPVC/20K, L=100m DN160 uPVC/PN16, L=480m DN160, L=496m
DISTRIBUTION PIPE			
DS1	JCT01	PS02-4	DN40, L=996m
DS2	D1	PS06-4	DN75, L=2,183m DN40, L=838m
DS3	TANK MD2	JCT04	DN100 WEETA/SDR13.6, L=160m DN75 WEETA/SDR13.6, L=140m DN110 uPVC/PN16, L=465m DN110, L=1,015m DN75, L=220m
DS4	JCT03	JCT03'	DN75, L=11m
DS5	JCT04	PS13-4	DN75 uPVC/PN16, L=780m DN75, L=2,544m
DS6	JCT05	PS16-4	DN50 uPVC/PN16, L=423m DN50, L=580m
DS7	JCT06	PS18-2	DN40, L=449m
DS8	JCT07	JCT11	DN75 WEETA/SDR13.6, L=20m DN75 uPVC/PN16, L=2,373m DN75, L=940m
DS9	JCT11	PS24-4	DN40, L=245m
DS10	JCT10	PS19-3	DN75, L=608m DN63, L=1,644m
DS11	JCT07	BPT04	DN75, L=2m
DS12	JCT08	JCT09	DN75 uPVC/PN16, L=381m
DS13	JCT13	JCT14	DN75 uPVC/PN16, L=510m
DS14	JCT12	JCT12'	DN40 uPVC/PN, L=11m

LEGEND

- DISTRIBUTION PIPE
- TRANSMISSION PIPE
- WATER SOURCE/PUMP HOUSE
- PUBLIC STAND
- DISTRIBUTION TANK
- MAINTENANCE ROAD TO BE CONSTRUCTED BY THE CONTRACTOR
- BENCH MARK

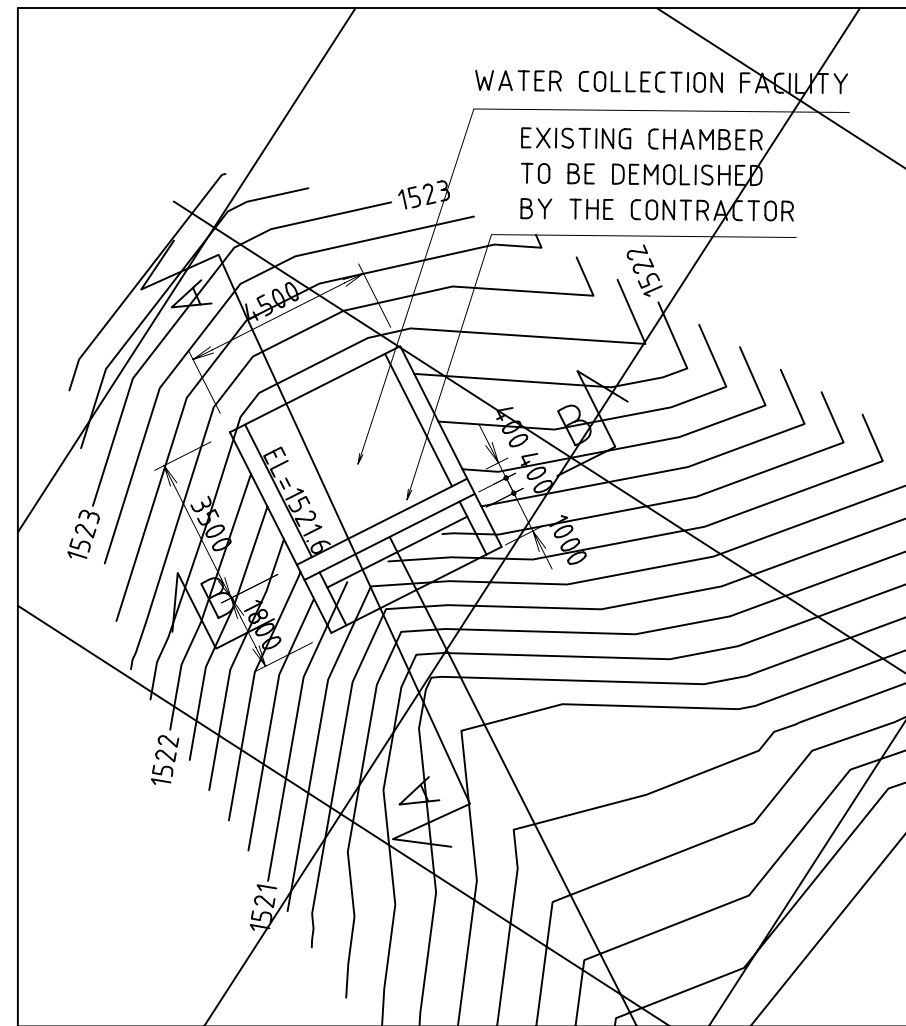
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NO.	EASTING (m)	NORTHING (m)	ELEVATION (m:KazoMutendeli Local)
BM MTR-1	220,751.31	9,748,570.14	1540.45
BM MTR-2	219,865.82	9,750,123.39	1343.26
BM MTR-3	222,019.30	9,752,223.66	1596.16
BM MTR-4	221,595.62	9,752,707.82	1480.30

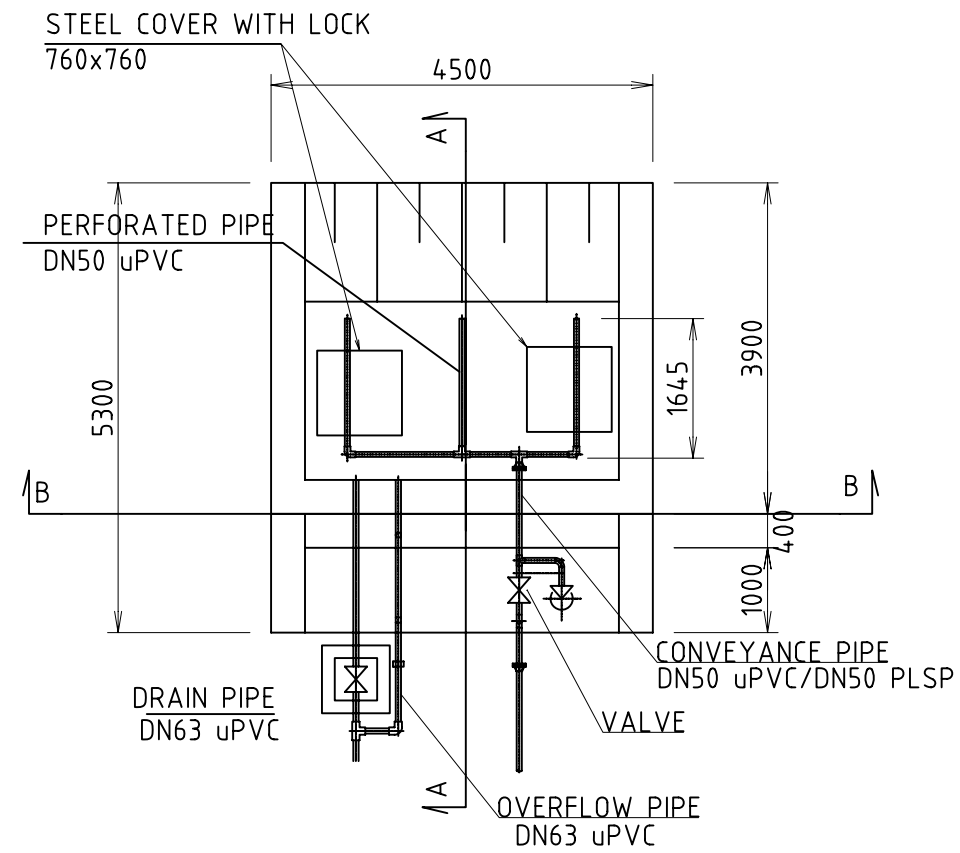
Note: Ellipsoid: WGS1984

PROJECT NAME IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR RURAL WATER SUPPLY			
CLIENT MINISTRY OF INFRASTRUCTURE RWANDA		JAPAN INTERNATIONAL COOPERATION AGENCY	
TITLE KAZO MUTENDELI WATER SUPPLY SCHEME		GENERAL PLAN OF KAZO MUTENDELI SCHEME	
DATE March 2010	SCALE 1:40000	APPROVE	DESIGN
			DRAWING NO. KM_GN_010

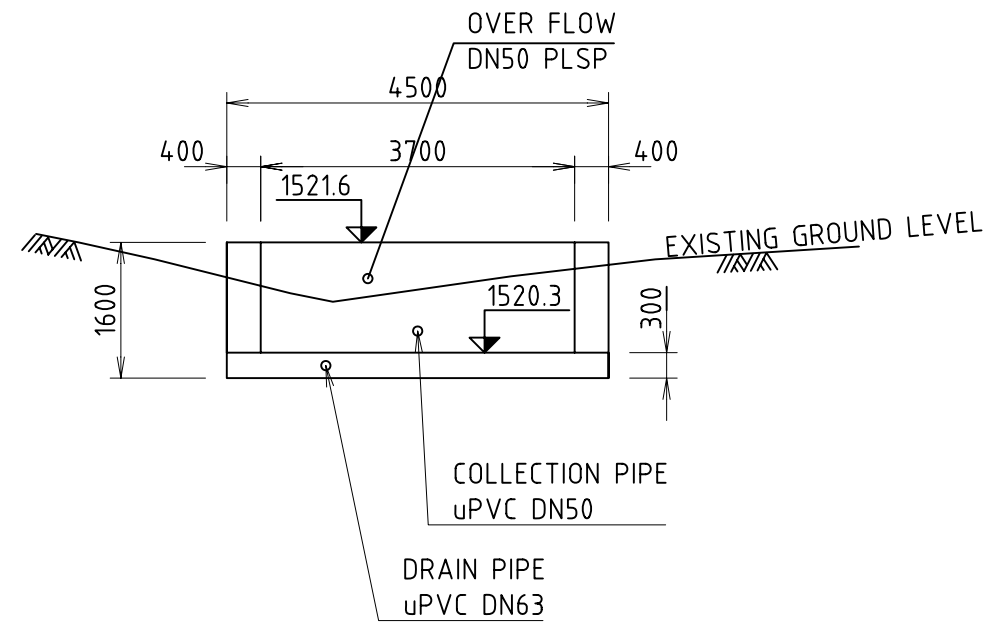
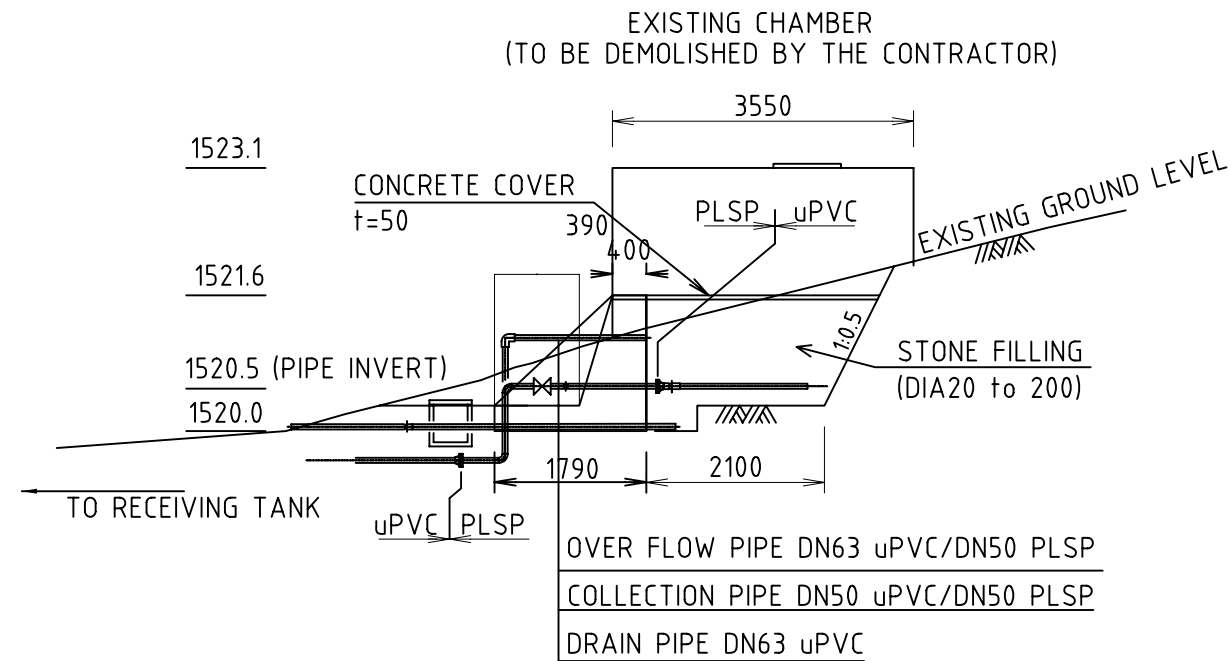
Figure 2-10 General Layout Map of Kazo Mutendeli Site



WATER COLLECTION FACILITY (1:200)

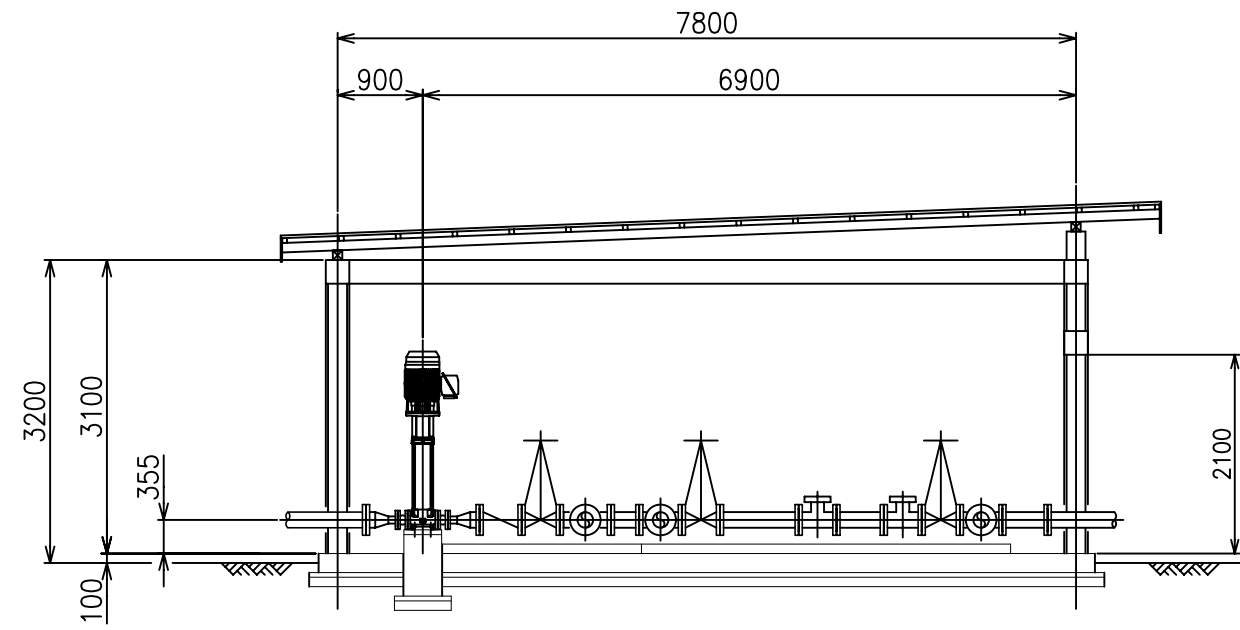
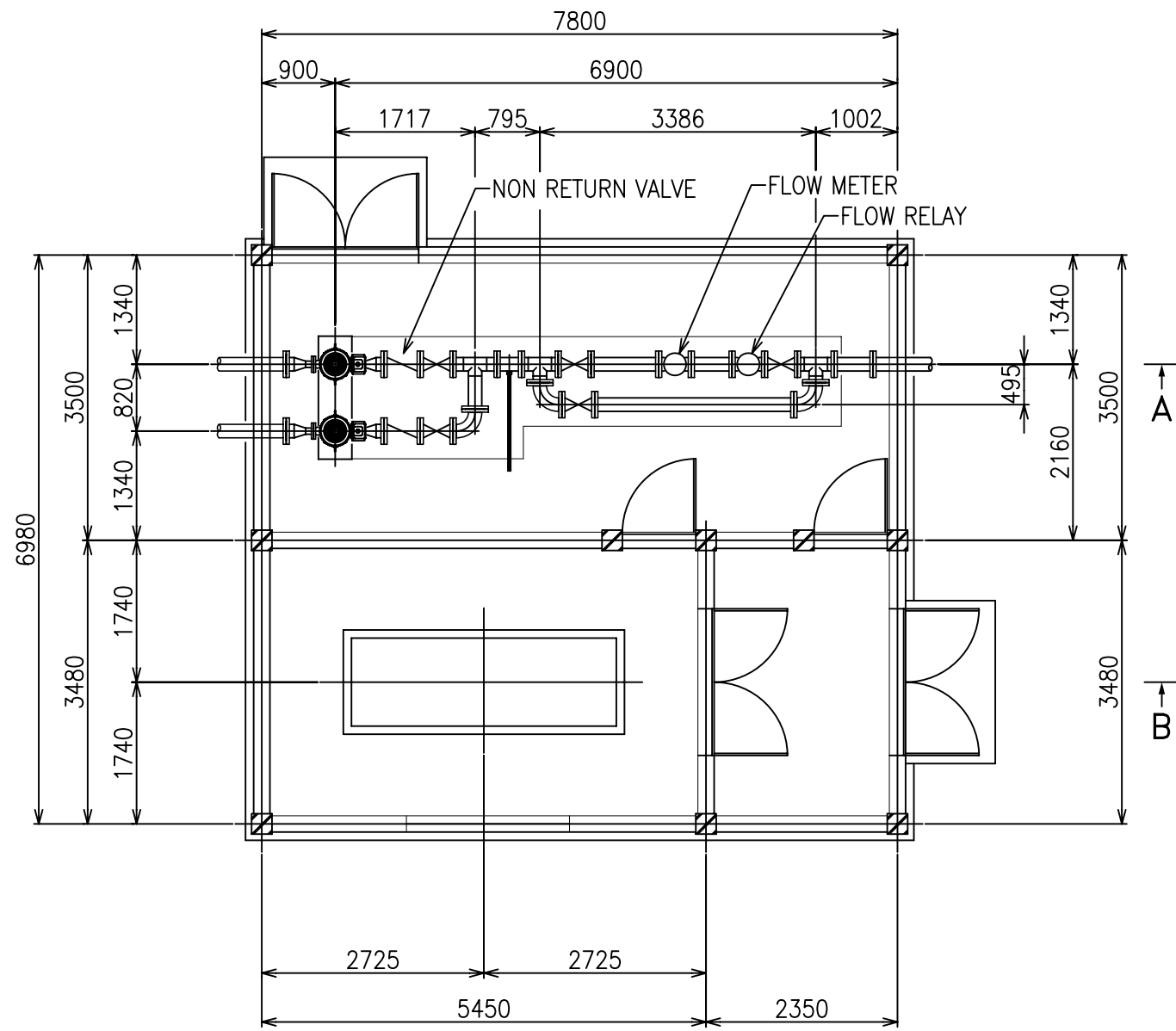


PLAN OF WATER COLLECTION FACILITY (1:100)

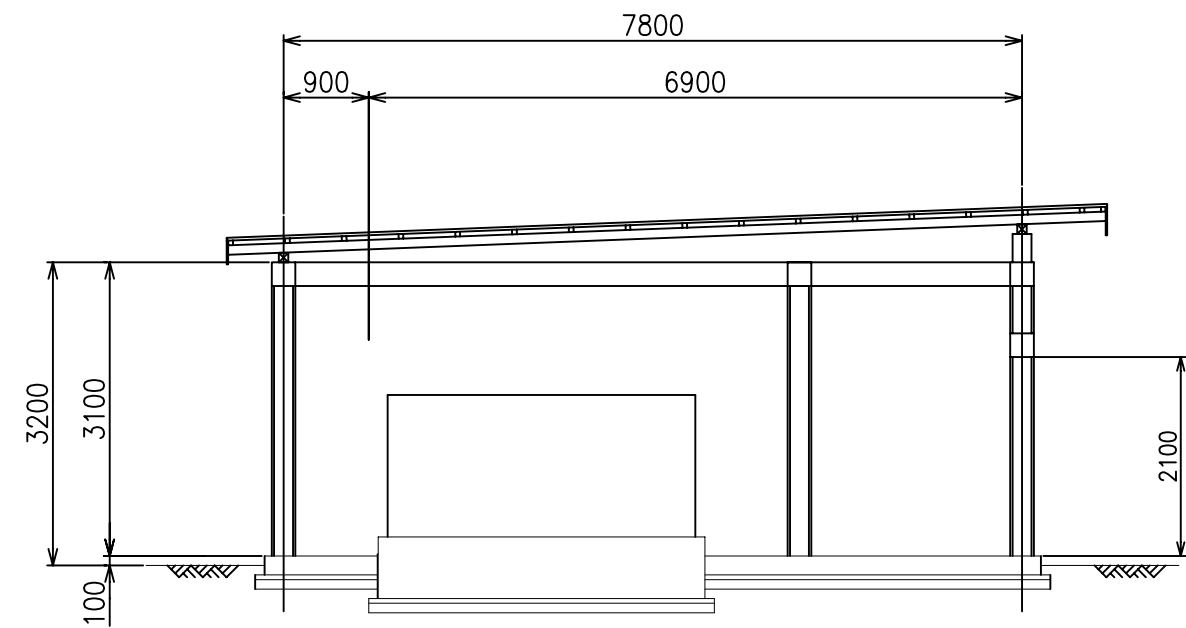


PROJECT NAME IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR RURAL WATER SUPPLY				
CLIENT MINISTRY OF INFRASTRUCTURE RWANDA JAPAN INTERNATIONAL COOPERATION AGENCY				
TITLE KIGINA WATER SUPPLY WATER COLLECTION / PUMPING STATION AT GASEBURA (1 OF 2)				
DATE March 2010	SCALE	APPROVE	DESIGN	DRAWING NO.

Figure 2-11 Structure of Intake Facility



SECTION A-A
SCALE 1:60

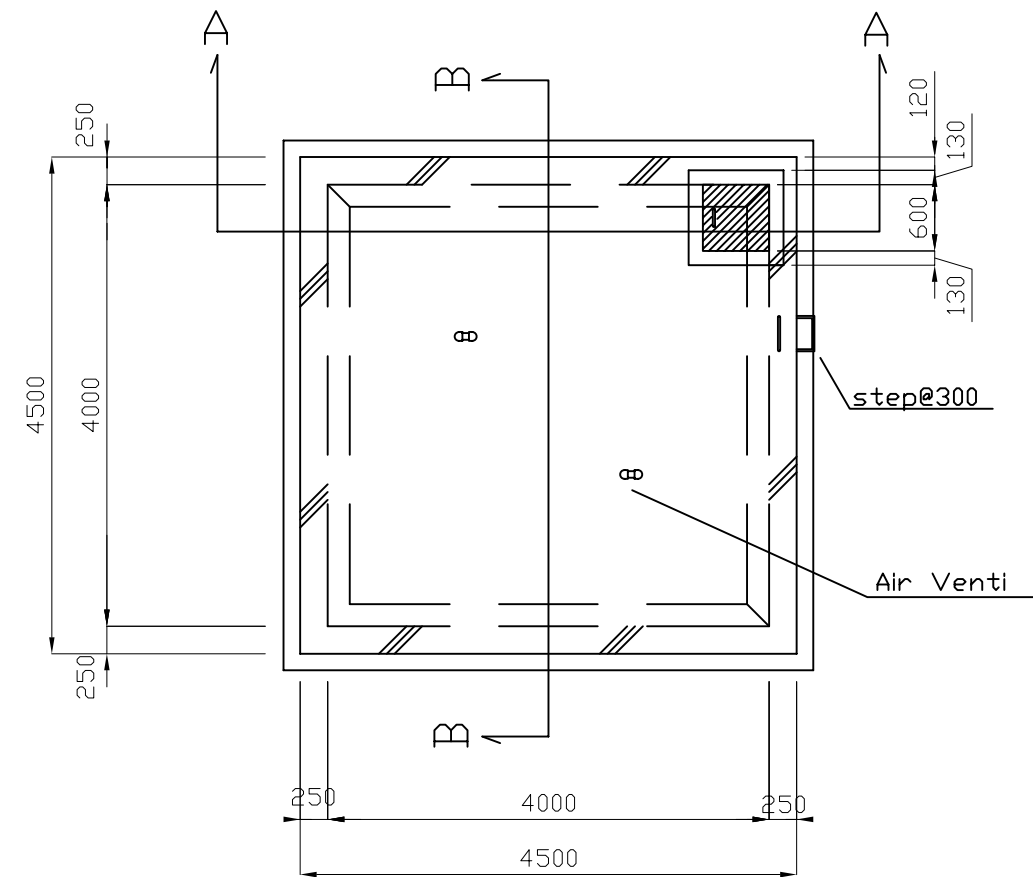


SECTION B-B
SCALE 1:60

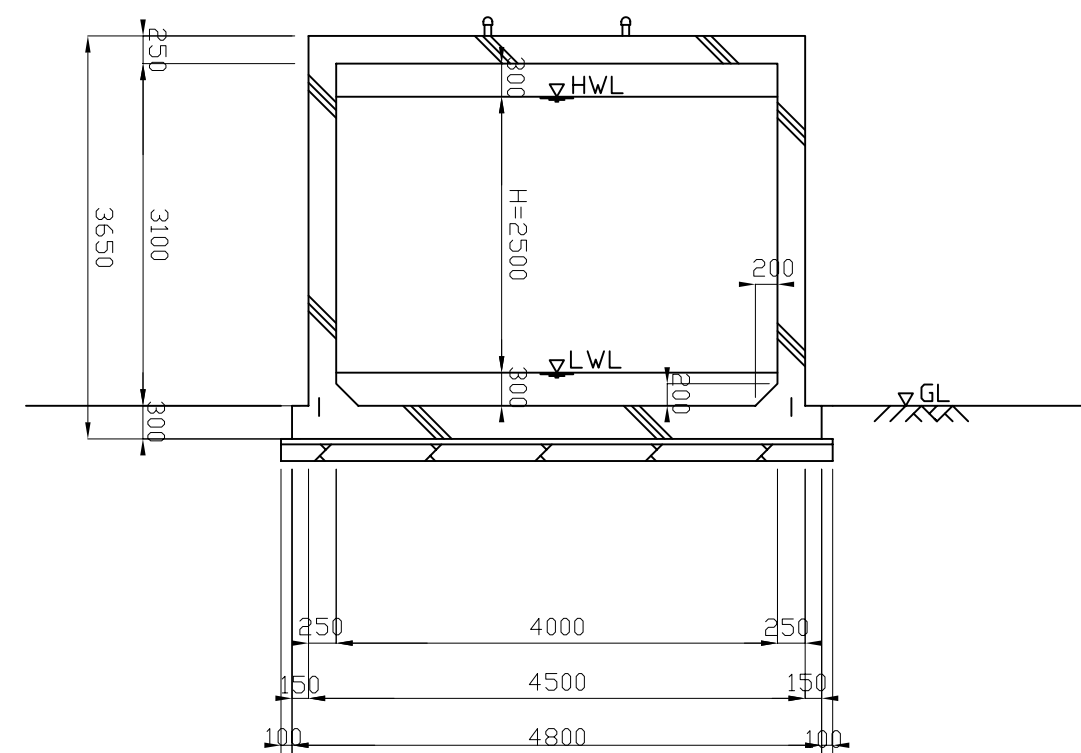
PROJECT NAME				
IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR RURAL WATER SUPPLY				
CLIENT				
MINISTRY OF INFRASTRUCTURE RWANDA			JAPAN INTERNATIONAL COOPERATION AGENCY	
TITLE				
TYPICAL DRAWINGS / CONTROL HOUSE WITH GENERATOR TYPE A				
DATE	SCALE	APPROVE	DESIGN	DRAWING NO.
March 2010				

Figure 2-12 Layout and Cross Section of Control House (Pump and Generator)

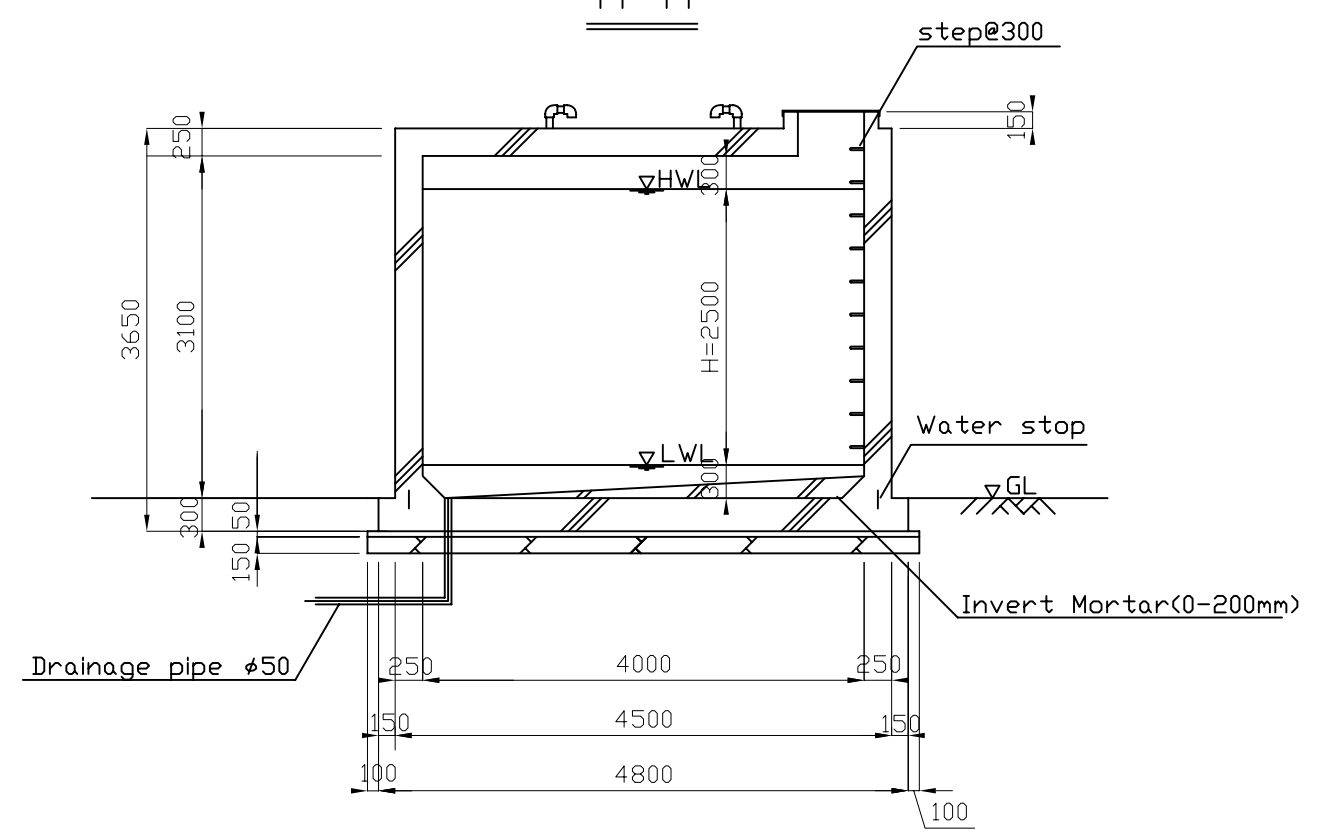
PLAN 1/100



B-B



A-A



PROJECT NAME				
IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR RURAL WATER SUPPLY				
CLIENT				
MINISTRY OF INFRASTRUCTURE RWANDA			JAPAN INTERNATIONAL COOPERATION AGENCY	
TITLE				
Structure of Distribution Reservoir(40m)				
DATE	SCALE	APPROVE	DESIGN	DRAWING NO.
March 2010				

Figure 2-13 Layout and Cross Section of Distribution Reservoir

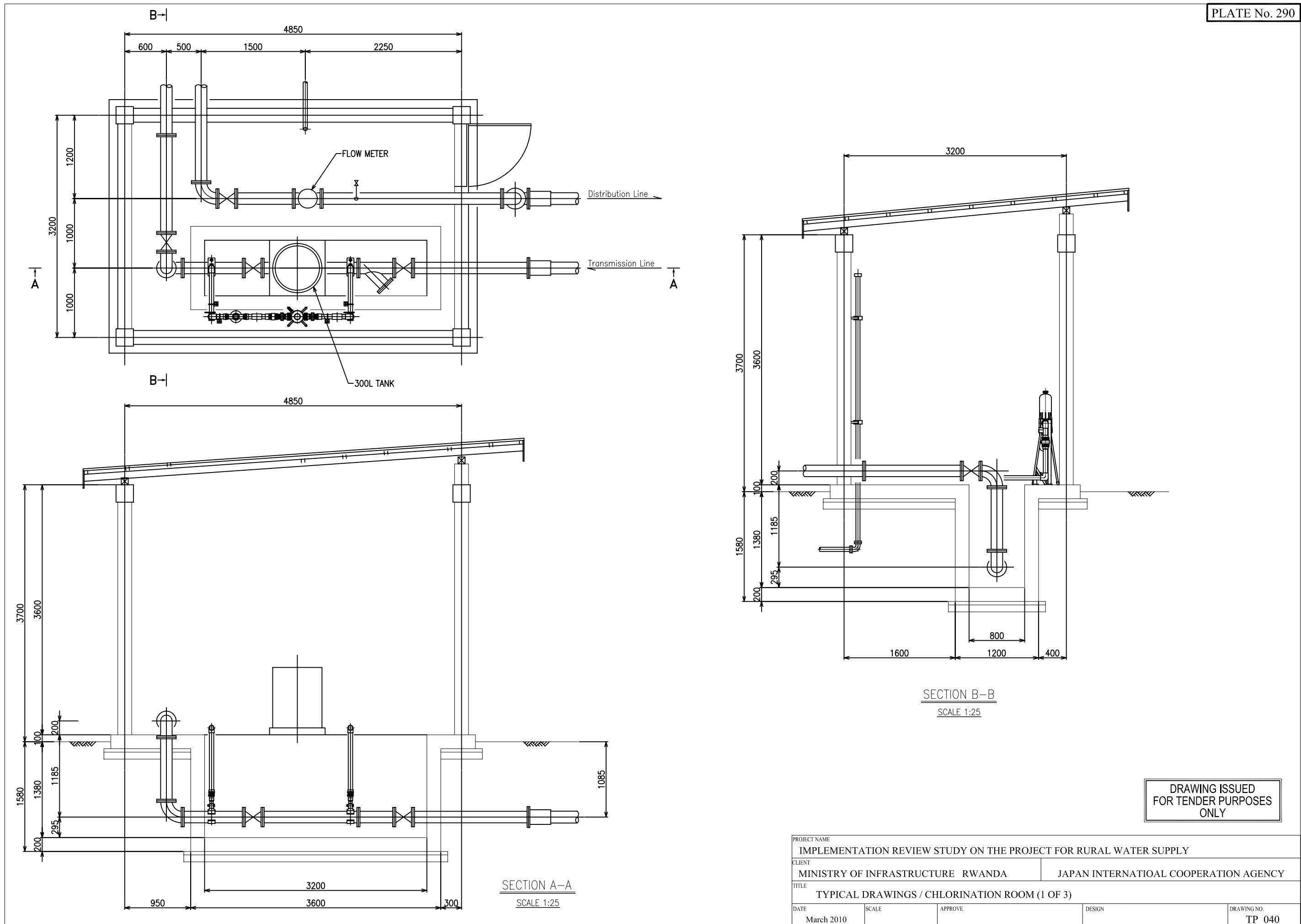
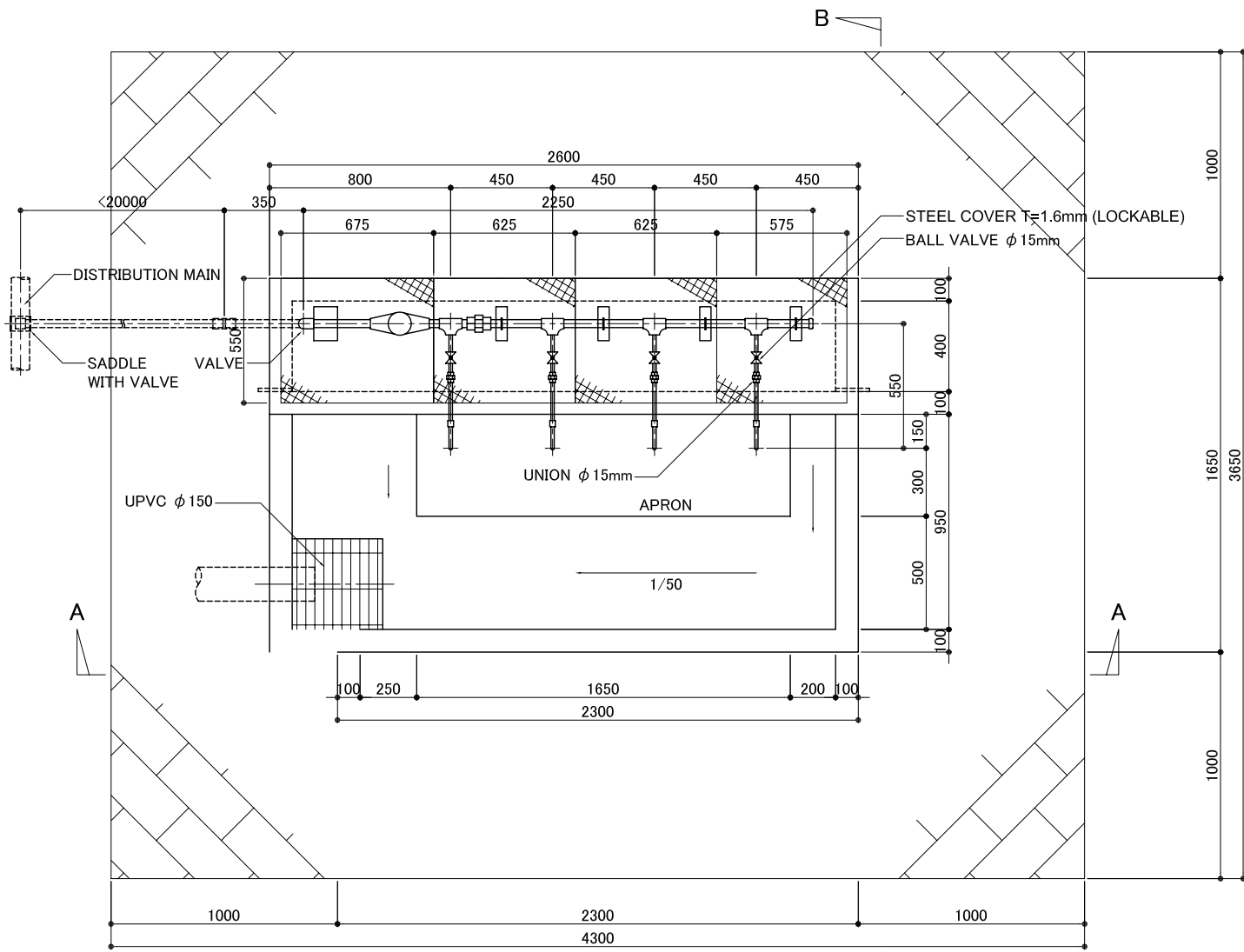
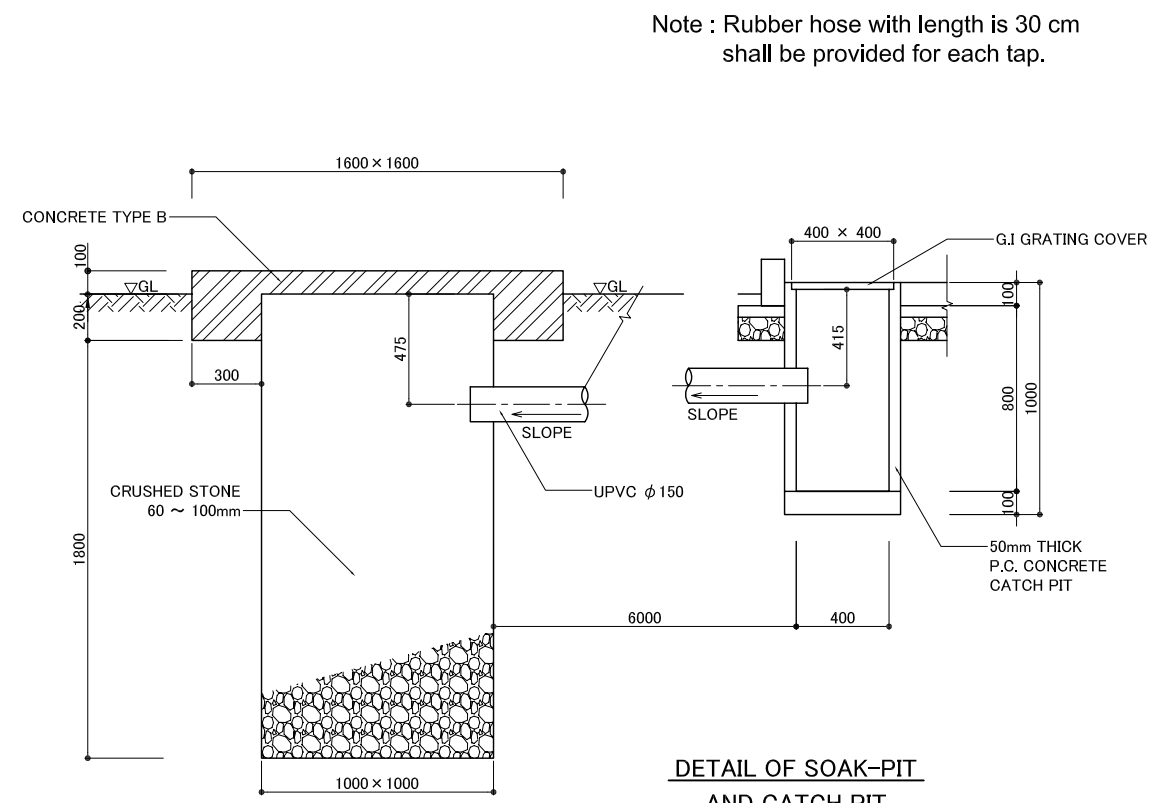


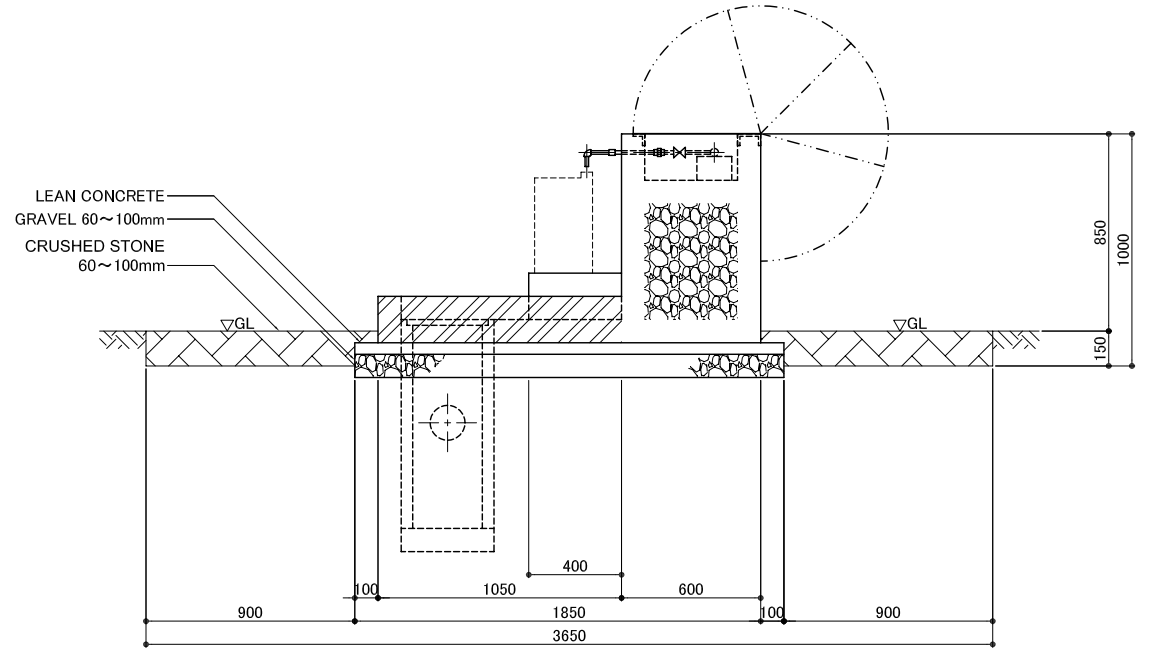
Figure 2-14 Chlorination Facility



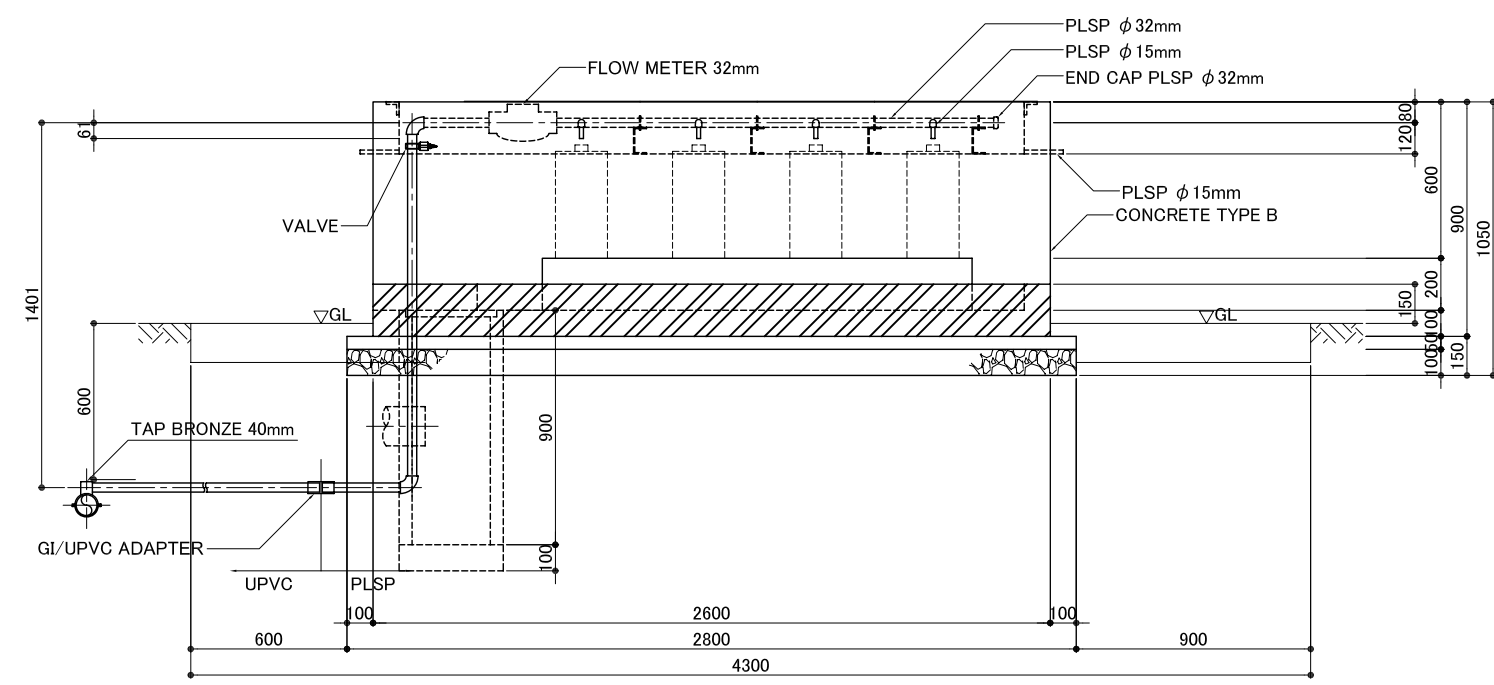
PLAN



DETAIL OF SOAK-PIT AND CATCH PIT



SECTION B-B



SECTION A-A

Note : Rubber hose with length is 30 cm shall be provided for each tap.

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PROJECT NAME IMPLEMENTATION REVIEW STUDY ON THE PROJECT FOR RURAL WATER SUPPLY				
CLIENT MINISTRY OF INFRASTRUCTURE RWANDA		JAPAN INTERNATIONAL COOPERATION AGENCY		
TITLE TYPICAL DRAWINGS / STRUCTURE OF PUBLIC TAP STAND FOR FOUR TAPS (1 OF 2)				
DATE March 2010	SCALE	APPROVE	DESIGN	DRAWING NO.

Figure 2-15 Public Tap Stand

2-2-4 CONSTRUCTION PLAN / PROCUREMENT PLAN

2-2-4-1 CONSTRUCTION POLICY / PROCUREMENT POLICY

The project will proceed as Japan's Grant Aid for General Projects; therefore the Japanese company will be the main Contractor. The Japanese Contractor will complete construction of all the facilities at the designed place in the period, stipulated in the implementation schedule and procure equipment based on the Contract, under the supervision of the Japanese Consultant. The appropriate implementation structure of the project and the construction schedule shall be decided after consideration of the system of Grant Aid, for the design of the project proceeding.

MININFRA will be the responsible body of the project and the Ngoma and Kirehe districts will be the implementing agencies who will bear responsibility on the execution design, the construction of facilities and the management and operation of the facilities. A private organization or WUA will operate the water supply facilities under the management of the districts.

On the other hand, the Consultant assigned in the study will be recommended as the management company to the Rwandan government by JICA, after the E/N will be concluded by both governments and the G/A will be concluded by the Rwandan government and JICA. After the recommendation, the Consultant will contract the Rwandan government, and implement a re-survey of cost of the materials and equipment, prepare the tender document, assist the government in the tender ceremony and manage the construction. After the Contractor will be selected on the Tender process, the Rwandan government will contract the company.

2-2-4-2 POINTS OF CONCERN IN THE CONSTRUCTION AND PROCUREMENT STAGE

Points of concern in the construction of facilities and the procurement of equipment are described as follows:

- (1) A Resident Engineer belonging to the Consultant and some local engineers will be arranged for the structure of the construction management, because the construction shall be conducted efficiently to maintain high quality without delay in widespread target sites. During work in the busiest period, the Consultant shall dispatch Japanese engineers appropriately to support the resident engineer.
- (2) Because most of the roads in the local area are unpaved except for the national road in the target area, the Eastern Province; therefore it is assumed that access by car in the rainy season is difficult. A Minute Construction Plan shall be drafted after access and the road conditions are properly investigated.
- (3) In this project, it is assumed that the work progress will be delayed compared to other projects because of the rainy season, rock outcrops in some sites and other reasons. It is planned that the works will be implemented at maximum three sites in parallel in order to give grant aid to as many people as possible in the limited period. It may be confusing if similar types of work are conducted at the same time; therefore it should be avoided.
- (4) Materials and equipment, which are procured from locals, Japan or other countries, shall be procured stably after their quality and supply ability are confirmed
- (5) Public security of Rwanda is stable now. But the risk of the situation changing completely still remains. The latest safety information shall always be obtained by keeping close contact with the Rwandan government and JICA Rwanda branch office.
- (6) In this project, most of materials and equipment will be procured from Japan and a third country. It was clear that customs clearance was very complicated due to accidental congestions and

frequent demand of bribes in the 1st stage of the project. In this project, however, it was confirmed the congestions have been dissolved at the present. When the materials and equipment will be imported, the port, Dar es Salaam, will be used as the main port, because there is little habit of bribes and Tanzania is close to Rwanda. It was also planned that the procurement management system would be established by an arrangement of local procurement engineers to each site under the supervision of the Japanese procurement manager so as to deal with problems.

2-2-4-3 CLASSIFICATION OF CONSTRUCTION AND PROCUREMENT

Classification of Construction and Procurement from Japan or Rwanda is described as Table 2-14.

Table 2-14 Classification of Construction and Procurement

Classification of Construction and Procurement	Japan	Rwanda
1. Road Construction Work		
1.1 Securing of the Land for Construction		×
1.2 Tree felling and Break off rootages (Preparation of Works)		×
1.3 Road Construction	×	
2. Construction Work of Intake Facility		
2.1 Securing of the Land for Construction		×
2.2 Securing of Temporary Space for Works		×
2.3 Construction of Maintenance Road	×	
2.4 Construction of Intake Facility	×	
2.5 Construction of Collecting Tank	×	
3. Pipeline Work (Water Conveyance, Transmission, Distribution Pipeline)		
3.1 Securing of the Land for Construction		×
3.2 Laying Pipeline (Water Conveyance, Transmission, Distribution Pipeline)	×	
4. Construction Work for Distribution Tank		
4.1 Securing of the Land for Construction		×
4.2 Construction of Distribution Tank	×	
5. Public Stands Construction Work		
5.1 Securing of the Land for Construction		×
5.2 Construction of Public Stands	×	
6. Reinstallation of Hand pump		
6.1 Cleaning around the Borehole		×
6.2 Reinstallation of Hand pump	×	
7. Water Quality Analysis Tools	×	

2-2-4-4 CONSTRUCTION MANAGEMENT PLAN / PROCUREMENT MANAGEMENT PLAN

The project will be implemented as Japan’s Grant Aid for General Projects; therefore, the Japanese Consultant is in charge from the preparation of the Tender Documents to Construction Supervision. The Consultant will investigate the materials’ price to confirm the change of the materials’ price at the same time, when they will prepare the Tender Documents.

According to the result of the investigation, the Tender Documents will be finalized. Based on the discussion with relevant organizations, Tender Opening Day will also be decided. In the Tender Ceremony, the Consultant will support the tender works of the Client, and evaluate the Tender and the contract with the Client and the Contractor.

A resident engineer of the Consultant will treat some matters in the construction stage and manage quality control, schedule control and safety management by communicating with relevant agencies in Rwanda, such as MININFRA. Furthermore the resident engineer and assistant engineers, who will be hired in the third country, will manage the construction of facilities such as determining pipe routes.

2-2-4-5 QUALITY CONTROL PLAN

(1) Quality control of the Materials and Equipments

Some local production, such as concrete blocks and gravel, are going to be distributed as the materials and equipments used in this project. Regarding cement and steel materials/products, import products are circulated in Rwanda. The quality control of the materials shall be executed as follows:

- i) Procurement manager of the Contractor shall order the materials and/or equipment after his confirmation of the quality of materials.
- ii) Contractor’s local Engineer, such as civil or architectural engineers inspects materials after the materials arrival.
- iii) Consultant’s Resident engineer confirms equipment’s condition and quality before the installation.
- iv) Contractor submits the Consultant documents like factory inspection sheet(s) and the strength inspection data, for quality control.

(2) Concrete Works

Compressive strength test of each facility is described as follows:

Table 2-15 Numbers of Times of Compressive Strength Test of Concrete

Facility	Target place	Contents of Inspection
Collecting Tank Distribution Tank	Wall, Slab, Top plate	3 samples per place, 7-day strength and 28-day strength
Control House	Column, Floor	

Concrete shall be mixed at the site. The composition and batching are conducted by manpower and the concrete shall be mixed by a potable mixing machine. A slump test shall be implemented for the mixed concrete at the site.

(3) Reinforcing Bar Works

The contractor shall submit the following documents for the quality control of the reinforcing bar.

- i) Type and manufacture of reinforcing bars
- ii) Certificate of quality or Tension test of reinforcing bars

2-2-4-6 MATERIALS AND EQUIPMENT PROCUREMENT PLAN

(1) Procurement of Materials

Because the local market has not reached maturity, there are many problems in the materials quality. There are also some problems in stable procurement. Considering these matters, the materials in Rwanda, which have no problem in quality and quantity, are adopted and the other materials shall be procured from Japan and a third country. If a local agency can supply the materials, the materials shall be purchased from the local agency prior to the other companies in foreign countries.

The details of procurement are described in Table 2-16.

Table 2-16 Major Materials and Countries

Materials	Rwanda	Japan	Third Country	Reason
Hand pump	×			Available at local agent
Electrically powered pump	×	×		Available at local agent
Generator and Control Panel		×		To keep quality
uPVC Pipe (PN10,PN16)			×	To keep quality
uPVC Pipe (sch80)			×	Manufactured in Taiwan only
Special Polyethylene Pipe		×		Manufactured in Japan only
Water meter, Flow meter, Valve etc.	×	×	×	
Steel materials/products (Steel Plate, Angle Steel)	×			
Reinforced bar, Forms			×	To keep quality
Concrete block	×			
Sand, Gravel, Aggregate	×			
Cement	×			
Doors and Windows	×			
Paint	×			
Water proof material		×	×	To keep quality

(2) Procurement of the Gravel and Sand

As a result of local investigation, it was confirmed that proper construction materials such as, aggregate, gravel and sand, can be procured in Rwanda. After quality, stable supply, price (include transportation fee) were checked, these materials is planned to be purchased from the appropriate quarry/ collected sand factory.

The suppliers of each material are as follows:

- i) Fine aggregate for concrete
 - Rhango District collected river sand factory
- ii) Coarse aggregate for concrete, base coarse material, base gravel
 - Construction company in Kigali
- iii) Coarse sand, sand for pipe protection
 - Quarry/ collected sand factory in Ngoma

(3) Procurement of Construction Machine

To procure a construction machine, two types of procurement were studied. One is from the lease shop dealing with construction machines and the other is from the local contractor. Under the present situation that many hotels and business centers are under construction and local construction companies are extremely reluctant to lease the construction machines. As a result of the investigation of the construction machines lease company in Kigali, the company has only a few construction machines available as of now. If another construction machine was ordered, it is clear that it will take a year and a half to obtain the machine.

The procurement of a construction machines from surrounding countries was also investigated.

According to the investigation, it was found that the fee to borrow them is very expensive.

In this project, there is no Japanese contractor who has a base in Rwanda at the present time and there is a large risk in this project for the Contractor who has no experience in the surrounding countries. Therefore it is assumed that candidate companies, who participate in this bid, are limited to the companies who have experience of construction in surrounding countries. The cost of the construction machines used in this project is accounted as machine's depreciation; furthermore the transportation fee from surrounding countries has been added.

A heavy weight breaker is planned to be transported from Japan, because it is difficult to procure in Rwanda and surrounding countries.

(4) Procurement of Workers

Workers, who do simple works, are available to be employed near the site. Some kinds of workers, who are required to have management ability, are hired from Japan and/or surrounding countries, because Rwandan workers do not have enough experience in management.

2-2-4-7 OPERATION INSTRUCTION PLAN

In this project, Water Supply Facilities which need the instructions for operation are shown as follows:

Table 2-17 Operation Instruction Plan

Target facility	Content of instruction	Instruction method
Intake	Maintenance and operation of the Generator	Contractor and/or Consultant will instruct by using the manufacturer's manual during the commissioning period and/or at the time of hand-over.
	Operation of the transmission pump and control panel	
	Maintenance and operation of the pipe and valves in the control house	
Distribution reservoir	Maintenance and inspection of ball tap	
Chlorine feeding facility	Method of confirmation of the concentration of chlorine	
	Method of the adjustment of chlorine dosage	
Pipeline	Handling of valves	
	Management of water leak	
Public tap stand	Management of water meter	
	Inspection of the water leak caused consumption of packing	
Hand pump	Replacement of a valve for pumping	
	Cleaning around deep well	
Water quality measurement tools	Measurement method and Planning of water quality measurement	

2-2-4-8 SOFT COMPONENT PLAN

(1) Necessity of Soft Component

The Government of Rwanda has requested the construction of the piped water supply facilities with spring water, the replacement of hand pump and support in the establishment of an operation and maintenance system which will be managed by a private organization or WUA under the supervision of the officer in charge of the infrastructure in the district office for smooth and effective operation and

maintenance of the water supply facilities constructed and rehabilitated by the project. In the study, the national plan and policy concerning rural water supply were reviewed, and the current status and challenges of operation and maintenance system managed by the private organization or WUA and the department in charge of water in the district office were scrutinized. As a result, it was concluded that the support of the organization related to the operation and maintenance is indispensable for sustainability of the water supply, in terms of the following points.

- 1) Although the Rwandan Government has encouraged privatization of operation and maintenance, both Ngoma and Kirehe districts were still considering of a better way to introduce privatization. Therefore, the support for establishment of system for operation and maintenance is required in accordance with the policy set in each district.
- 2) The system of support and supervision of private organization or WUA is not appropriately established in the district office. Therefore, the support for establishment of the system in the district office is required.
- 3) The institutional administration system of private organization or WUA for operation and maintenance is not appropriately established. Therefore, the support for establishment of the system is required to be provided by the district office.

(4) Objectives of Soft Component

In order to secure sustainability of effectiveness of the project considering a privatization of operation and maintenance promoted by the Rwandan Government, and achievement of the project purpose of that safe drinking water is supplied to the residents in the project area, objectives of the soft component are set as follows.

- 1) The system of support and supervision of private organization or WUA is established in each district office.
- 2) The institutional administration system of private organization or WUA is strengthened by the support provided by district office.

(5) Activities and Outputs

Activities and outputs of the soft component are as follows.

[Outputs]

- (1) Support and supervision system in the Ngoma and Kirehe district offices for private organization or WUA is strengthened.
- (2) Institutional administration system of private organization or WUA, which are established for operation and maintenance of the water supply system constructed in the project, is strengthened.

[Activities]

- (1) Support for preparation of draft of the contract document and selection of private organization, preparation of training manual and implementation of training, and supervision and monitoring of operation and maintenance, which will be implemented by task force in each district
- (2) Implementation of training of private organization or WUA on operation and maintenance and follow up by the task force

Detailed contents of the soft components such as activities, outputs, targets are described in Table 2-18. The activities related to the selection of private organization in the stage 2 may not be implemented, in case the district decides to utilize WUA for operation and maintenance.

Table 2-18 Plan of Activities of Soft Component Programme (1/3)

Activity	Output	Target	Means of Implementation	Period	Implementer [Responsibility]	Output of Submission
Stage 1 : Preparation for Contract with the Private Organization on O&M of Water Supply System						
1-1) Explanation of strategy of privatization of O&M system to the Districts and Sectors, and encouragement of establishment of the Task Force	Establishment of the Task Force under the initiative of the head of infrastructure department in each district is encouraged by means of explanation of strategy of privatization to the districts and sectors.	Ngoma and Kirehe districts, 11 Sectors	- Consultation with MININFRA, - Request to Districts by MININFRA	3 days/district	Japanese Consultant NGO/Local Consultant [Japanese Side]	- Minutes of Meeting - Activity Report
1-2) Establishment of the Task Force and Follow Up	Preparatory work and its supervision for introduction of the privatization are smoothly implemented by the task force established under the initiative of the head of infrastructure department in each district.	Ngoma and Kirehe districts	- Encouragement from MININFRA and District	0.5 months/district	MININFRA, District [Rwandan Side]	Member List
1-3) Setting the performance indicators for the assessment of achievement of O&M to be conducted by the private organization [Indicators to be Included] <input type="checkbox"/> Amount of water supplied, Water quality standard <input type="checkbox"/> Tariff setting, Tariff collection rate, UFW <input type="checkbox"/> Water supply period <input type="checkbox"/> Standard for Staffing <input type="checkbox"/> Standard for Financing and Accounting <input type="checkbox"/> Standard for Repairs	Performance Indicators for the assessment of activities performed by the private organization are set, and adopted to the selection of the private organization, and supervision and monitoring to be conducted by the district and the sector	Task Force established in Ngoma and Kirehe districts	- Workshop - Seminar	5 days/District	Japanese Consultant NGO/Local Consultant [Japanese Side]	- Training Report - Performance Indicator
1-4) Preparation of draft of the Contract document on O&M services rendered by the private organization	Roles and responsibilities of the district/sector and the private organization become clearly. Draft of the Contract to be concluded between district and private organization is developed.	Task Force established in Ngoma and Kirehe districts	- Workshop - Seminar - Preparation of Final Draft - Encouragement of approval by the district	4 days/district	Japanese Consultant NGO/Local Consultant [Japanese Side]	- Draft of Contract Document

Table 2-18 Plan of Activities of Soft Component Programme (2/3)

Activity	Output	Target	Means of Implementation	Period	Implementer [Responsibility]	Output of Submission
1-5) Development of the training manuals for enhancement of the capacity of private organization or WUA on O&M services [Contents of Manual] <input type="checkbox"/> Institutional Administration <input type="checkbox"/> Development of draft of regulation for institutional administration and operation of water supply facility <input type="checkbox"/> Operation and maintenance of water supply facility <input type="checkbox"/> Financing and accounting <input type="checkbox"/> Accountability <input type="checkbox"/> Publicity	Training manuals for enhancement of the capacity of the private organization or WUA on O&M is developed and utilized in the training	Task Force established in Ngoma and Kirehe districts	- Assessment of training needs - Preparation of Training Manual	10 days	Japanese Consultant NGO/Local Consultant [Japanese Side]	- Training Manual
Stage 2 : Selection of the Private Organization (Tendering)						
2-1) Explanation about introduction of the privatization of O&M system and the indicators for evaluation of the private organization to the target sectors	Introduction of the privatization of O&M system is explained and agreed by the community. Framework of monitoring to be conducted by the community is established by giving explanation of the performance indicator set in the item 1-3 above.	Communities of 11 Sectors	- Meeting	2 days/sector	Japanese Consultant NGO/Local Consultant Task Force [Japanese Side]	- Minutes of Meeting - Handout
2-2) Selection of the Private Organization <input type="checkbox"/> Preparation of tendering document <input type="checkbox"/> Preparation of tender announcement <input type="checkbox"/> Tender announcement <input type="checkbox"/> Tender opening <input type="checkbox"/> Contract negotiation, setting performance indicator <input type="checkbox"/> Conclusion of the contract and its notification to the community	The private organization is selected following necessary procedures such as tender announcement, tendering, evaluation of tender, contract negotiation and conclusion of contract.	7 schemes	-Preparation of Tendering Document -Preparation of Tender Announcement -Tender Announcement -Tender opening -Negotiation -Agreement of the Contract -Notification to the Community	15 days/scheme	Japanese Consultant NGO/Local Consultant Task Force [Japanese Side]	- Tender Document - Minutes of Meeting - Report of Result of Tendering

Table 2-18 Plan of Activities of Soft Component Programme (3/3)

Activity	Output	Target	Means of Implementation	Period	Implementer [Responsibility]	Output of Submission
Stage 3: Enhancement of Capacity of the Local Government and the Private Organization or WUA by the Local Government						
3-1) Providing training with private organization or WUA to enhance the capacity for O&M, and on-the-job training of the Task Force [Contents of Training] <input type="checkbox"/> Institutional Administration <input type="checkbox"/> Development of draft of regulation for institutional administration and operation of water supply facility <input type="checkbox"/> Operation and maintenance of water supply facility <input type="checkbox"/> Financing and accounting <input type="checkbox"/> Accountability <input type="checkbox"/> Publicity	Capacity of private organization or WUA on O&M is enhanced by providing training in O&M from the district with manuals developed in the item 1-5 above. Capacity of the Task Force in each district on training private organization and WUA is enhanced by conducting the on-the-job training.	Private Organization or WUA, Task Force of each District	- Workshop - Training	5 day/scheme	NGO/Local Consultant Task Force [Japanese Side]	- Training Report
3-2) Follow up on the activities mentioned on item 3-1)	Follow up activities for the enhancement of capacity of the private organization or WUA are conducted, based on the perception of the current status of the O&M performed by the private organization	Private Organization or WUA	-Assessment of Training needs - Workshop - Training	3 days/scheme	NGO/Local Consultant Task Force [Japanese Side]	Training Report
Stage 4: Supervision and Monitoring by the Local Government						
4-1) Supervision and monitoring of the activities by the task force related to O&M of water supply system	Supervision and monitoring of the activities performed by private organization or WUA are conducted by the district/sector, in accordance with the performance indicator.	Private Organization or WUA	- Monitoring visit - Assessment of the result of monitoring	1 day/2months/scheme	NGO/Local Consultant Task Force [Japanese Side]	- Monitoring Report

2-2-4-9 IMPLEMENTATION SCHEDULE

Implementation of the project is composed of detailed design, tendering, construction of water supply facility, supervision and soft component. The schedule of the implementation is shown in Table 2-19. Prior to the commencement of the construction, the soft component programme is scheduled to be started.

Table 2-19 Implementation Schedule

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Work in Rwanda		[Bar from month 1 to 14]														Total 4.0 Months			
Work in Japan		[Bar from month 1 to 2]																	
Tendering		[Bar from month 2 to 4]																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Construction and Procurement Work	Supervision	[Solid black bar from month 1 to 18]																	
	Preparation Work	[Bar from month 1 to 14]														Total 18.0 Months			
	Nyamugari/Mahama	[Solid black bar from month 3 to 5]																	
	Gatore	[Solid black bar from month 6 to 10]																	
	Kazo/Mutendeli	[Solid black bar from month 11 to 17]																	
	Kigina	[Solid black bar from month 3 to 8]																	
	Mushikiri	[Solid black bar from month 9 to 17]																	
	Kirehe	[Solid black bar from month 3 to 7]																	
	Karembo/Zaza/Mugesera	[Solid black bar from month 8 to 17]																	

2-3 OBLIGATION OF THE GOVERNMENT OF RWANDA

The undertakings of the Government of Rwanda for the implementation of the project are the items described in section 2-2-4-3 and the items mentioned below.

- 1) To secure land necessary for construction of an intake facility, distribution reservoir and road to be used for maintenance
- 2) Tree felling and rootage removal for the construction of maintenance roads.
- 3) To construct fences for water facilities
- 4) To explain to users of water sources to be developed for the project and get their agreements in writing
- 5) To take necessary procedures for Environmental and Social Considerations
- 6) To secure safe drinking water for the people during the rehabilitation of existing water supply facilities
- 7) To provide data and information necessary for the implementation of the project
- 8) To provide storage space for equipment and materials, and for temporary work space during the period of the implementation of the project
- 9) To maintain security in and around the project site
- 10) To provide and cost burden for banking arrangements and Authorization to Pay for the project
- 11) To arrange tax exemptions and smooth custom clearance for importing of equipment and materials necessary for the project
- 12) To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which would be imposed in Rwanda with respect to the supply of the products and services under the verified contract
- 13) To implement appropriate operation and maintenance of the water supply facilities constructed and rehabilitated under Japan's Grant Aid
- 14) To assign necessary number of counterpart personnel for the activities in the "soft component" during the implementation stage

The Ministry of Infrastructure as the responsible organization for the project has implemented the projects under Japan's Grant Aid and the assistance from other donors, therefore the undertakings of the Government of Rwanda described above will smoothly be implemented. However, the assistance for preparation of necessary information for the procedure of the Environmental and Social Considerations shall be given by the Japanese side.

2-4 PROJECT OPERATION PLAN

2-4-1 OPERATION AND MAINTENANCE SYSTEM

(1) Approach for Operation and Maintenance in Rwanda

As described in section 2-2-1-6 operation and maintenance, the Rwandan Government has decided to make use of private sectors in line with the policy of Public Private Partnership for the operation and maintenance system, reflecting the result of the assessment of the operation and maintenance system by the Rwandan Government in collaboration with the World Bank, AfDB and other development partners. The Kayonza district, which is one of the target districts in the study, has already adopted privatization for operation and maintenance, while the Ngoma and Kirehe districts have already scheduled adopting privatization by the end of 2010. However both districts were still considering of a better way to introduce privatization.

The operation and maintenance in the Kirehe district is being operated by the water users association in the sector level, which was shifted from the water users association in the district level in March 2009. The Kirehe district has planned to transfer the water users association to the cooperative as a private organization by the end of December, 2010. However, the district is still under consideration to find out approaches to be taken towards privatization, including transition from WUA to private organization after enhancement of capacity of WUA.

As for the Ngoma district, a total of 7 water users associations are currently operating water supply facilities in the district. Though the district has scheduled to introduce privatization by July, 2010, activities to be taken and the time framework towards privatization have not been prepared yet, and the district is still under consideration to find out better approaches towards privatization.

As it is mentioned above, both Ngoma and Kirehe districts are still under consideration of a better way to introduce privatization, and the time framework for this process was not prepared. Both districts have not yet decided to introduce privatization. Even though operation and maintenance is conducted by WUA, the required basic capacity of WUA is similar to that of private organization. Therefore, support to enhance the capacity of the district office, including establishment of a management system for privatization, and establishing institutional administration system in private organization or WUA by the district office are designed to be conducted in the soft component programme.

(2) Challenges Identified in Operation and Maintenance

The entrusted private organization for operation and maintenance is given the responsibility to manage the collected water tariffs in accordance with the condition of the contract. Therefore, the collected tariffs can be utilized not only for operation and maintenance but also for the sensitization of communities for the purpose of improvement of services. Introducing the new system, it is expected to secure the reliance on water supply services by giving the responsibility of repair of the facilities to private organizations.

In the study, the challenges in the operation and maintenance conducted by a private organization are identified as mentioned below. In order to establish the operation and maintenance system, these should be addressed properly.

- i) In the current contract between the district and private organization, there is no provision about responsibility of the replacement and expansion of the facilities. As a result, it is a concern that a stable water supply will not be secured.
- ii) In the case of the Kayonza district, a cooperative was selected for operation and maintenance of the facility. Most of the members of the cooperative consisting of the president, vice president, treasurer, secretary, operator, technician and security guard, are member of the former water

users association in other areas. However, it was reported that the maintenance plan of the decrepit facilities was inappropriately formulated due to insufficient experience of the members. Though the collected water tariff is able to cover the operation and maintenance cost such as personnel cost, fuel cost and minor repair, the cost for the expansion and replacement of the network in the future is not able to be covered. Besides, a system of communication with the communities and the sector offices has not been properly established. Judging from the current status of the private organizations, further improvement of capacity of operation and maintenance is required.

- iii) In the current tendering procedure, the tenderers are regarded to agree with the contents of the tender document composed of the instruction to tenderers, the form of contract and the list of water supply facilities, once they participate in the tendering. The water tariff is uniformly set in the Kayonza district by the type of facility such as 20 Rwf/jerrican for pumped up piped facility, 10 Rwf/jerrican for gravity piped facility, which does not reflect the necessary cost for operation and maintenance. It is reported that the private organization has faced difficulties to manage water supply facilities which was caused by insufficient perception of the condition of the facilities.

(3) Operation and Maintenance System

In order to carry out operation and maintenance sustainably and effectively, improvement of the management system for private organization or WUA in the district is indispensable. While private organization or WUA is required not only to enhance capacity of the organization but also improve communication with communities and sector offices. In this context, establishment of the operation and maintenance system shall be effectively approached in the project as described in the following:

1) Support and Supervision System for Private Organization and WUA in the District Office

i) Selection of Private Organization

The tender document may need to include the description to make the client understand to what extent the tenderer perceives the current condition of the water supply in the target area, and how the tenderer is going to approach the challenges. In addition, enhancement of the capacity of the district on preparation of the tender documents and the assessment of the capacity of tenderer is a key factor to select the eligible private organization.

ii) Monitoring and Support System for Operation and Maintenance in Private Organization or WUA

The district is required to support establishment of the system of institutional administration of private organization or WUA, to monitor and advice on the private organization or WUA as the owner of the water supply facilities. Under the current system, the district assesses the performance of the private organization and decides on the continuation of the contract with the private organization. Therefore, it is also necessary to enhance the capacity to assess the relevance of the evaluation criteria and revise it, if necessary.

2) Institutional Administration System in the Organization for O&M

An Institutional administration system in the private organization will be established by strengthening the operation skills of facilities, the capacities of financing and accounting, communication with district office and sector offices and public relations with the communities, under the support from the district office. Even though the enhancement of capacity of WUA is addressed, establishment of institutional administration system in WUA is to be supported.

In the Kirehe district, the current water users association at sector level are planned to be transferred to

the private organization by the end of December 2010. Therefore, the situation of transfer during the transition period shall be monitored and reflected in the plan of activities.

In the Ngoma district, it is still not clear if the current water users association will be transferred to the private organization. Therefore, the approaches to privatization in the district shall be carefully monitored and effective activities for the establishment of the institutional administration system shall be carried out.

2-4-2 PLAN OF ESTABLISHMENT OF OPERATION AND MAINTENANCE SYSTEM OF THE PROJECT

(1) Lessons Learnt from other Districts concerning Privatization

The Kirehe and Ngoma districts have not experienced privatization of operation and maintenance, therefore, lessons learnt from other districts which have already adopted privatization, are effective in their approach towards privatization. Therefore the issues identified during the privatization in the Kayonza district should be reflected to privatization in the Ngoma and Kirehe districts.

- i) In the case of the Kayonza district, a cooperative was selected for the operation and maintenance of the facility. Most members of the cooperative are members of the former water users association in other areas. However, it was reported that the maintenance plan of the decrepit facilities was inappropriately formulated due to insufficient experience of the members.
- ii) In principle, the water tariff is set in the discussion between the district and the private organization, and is stipulated in the contract document. However, the tariff is mainly set by the district. Even after the agreement of the contract, there is a room for revision of the water tariff, however the revision has not been conducted yet. In addition, operation and maintenance cost is covered by the collected water tariff, but the replacement of facilities and expansion is not able to be covered.
- iii) The communication gaps between the private organization and communities, and the sector offices were observed during the field investigation.
- iv) The district shall implement the major rehabilitation of the water supply facilities in accordance with the agreement between the district and the private organization. However the criteria of the major rehabilitation have not been clearly stipulated.

(2) Support for Establishment of Operation and Maintenance System by the Soft Component

In case the district office decides to introduce privatization, the operation and maintenance of the water supply facilities to be constructed and rehabilitated by the Japanese assistance will be carried out by the entrusted private organization after completion of construction and rehabilitation. Therefore, prior to the completion of construction and rehabilitation, the system for selection of private organization including preparation of the tender document shall be established in the district. After the selection of the private organization, the district is required to establish a monitoring system of the private organization. For the selected private organization, the institutional administration system shall be established under support from the district as soon as possible after the conclusion of the contract.

The necessary activities for the establishment of the operation and maintenance system of the project mentioned above are scheduled to be supported by the soft component programme to be input by the Japanese side as described below.

- Stage 1: Preparation of the contract with the private organization on operation and maintenance of the water supply facility
- Stage 2 : Selection of private organization (tendering)

- Stage 3 : Enhancement of capacity of the district office and enhancement of the private organization or WUA by the district office
- Stage 4 : Supervision and monitoring by the district office

The contents of support are composed of (1) activities for the enhancement of capacity of the private organization or WUA, and improvement of communication with the communities and the district offices and the sectors, and (2) activities for the enhancement of capacity of the district on the selection of a private organization and monitoring and evaluation. As mentioned in section 2-2-4-8 Soft Component Plan, activities related to the selection of private organization and its preparation may not be conducted, in case the district office decided to utilize the WUA for operation and maintenance.

Furthermore, the districts and private organizations or WUAs are required to continue these activities conducted in the soft component programme, even after the completion of the project, in order to secure the sustainable water supply to the communities.

(3) Collaboration with Technical Assistance

In the technical cooperation project, capacity of the districts and private organization or WUAs on O&M is designed to be enhanced so that the both organizations are able to manage water supply systems whether O&M is conducted by a private organization or WUA.

It is, therefore, concluded that making use of outputs from the activities in the technical cooperation project such as revised manual of operation and maintenance and lessons learnt obtained from activities related to establishment of operation and maintenance system are an effective means to optimize the implementation of the project.

2-5 PROJECT COST ESTIMATION

2-5-1 INITIAL COST ESTIMATION

In case the project is implemented, the project cost borne by the Rwandan side is estimated approximately 23.2 million Rwf (approximately 40.3 thousand US\$).

(1) Rwandan Side

- Tree felling and rootage removal for the construction of maintenance roads
: 6.1 million Rwf (approximately 10.6 thousand US\$)
- To construct fences for water facilities
: 8.5 million Rwf (approximately 14.8 thousand US\$)
- To bear the cost for Banking Arrangement (commissions for Authorization to Pay and Payment commissions)
: 8.6 million Rwf (approximately 14.9 thousand US\$)

(2) Condition of Estimation

- (i) Date of Cost Estimation : August 2009
- (ii) Exchange Rate : 1 US\$ = 97.20 Japanese Yen
: 1 Rwf = 0.1692 Japanese Yen
- (iii) Construction Period : Implementation schedule for detailed design and construction works are shown in Table 2-19.
- (iv) Others : The cost estimation is implemented in accordance with the regulations and system of Japan's Grant Aid system

2-5-2 OPERATION AND MAINTENANCE COST

(1) Condition of Cost Estimation

The operation and maintenance cost estimated for the project is composed of the operation cost, the management cost, the maintenance cost and cost for the replacement of the pipes. The condition of the cost estimation is summarized in Table 2-20.

Table 2-20 Condition of Cost Estimation

Item		Condition
Operation Cost	- Fuel, Electricity - Chlorination	- Cost for fuel, electricity and chlorination depends on the designed facilities
Management Cost	- Payment to district water fund (15% of collected tariff) - Personnel cost for member of the private organization, Operator, Technician, Security guard, Tap manager	- Payment to the district water fund is not included because the amount to be paid is depending on collected amount - Personnel cost is the average of one water supply system - The amount to be paid to tap manager is calculated in accordance with quantity of water to be supplied
Maintenance Cost	- Overhaul of generator and pump - Minor repair of piping	- Overhaul of Generator: every 2.5 years - Overhaul of Pump: every 3 years - Minor repairs at new construction scheme: 0.2% of total length of piping - Minor repairs at rehabilitation scheme: 0.4% of total length of piping
Replacement Cost	- Replacement of piping	- the target period of replacement is estimated at 10 years after the completion of the project
Cost for the water board	- Payment to the Water Board	- 15% of income

(2) Operation and Maintenance Cost

Estimated operation and maintenance cost in accordance the conditions described above is shown in Table 2-21.

Table 2-21 Operation and Maintenance Cost

District	Scheme	Served Population in 2014	i	ii	iii	iv	v	vi	vii	viii
			Annual Cost of Operation and Maintenance(Rwf)	Monthly Cost of Operation and Maintenance (Rwf/capita)	Daily Cost of Operation and Maintenance (Rwf/capita)	Cost of Replacement of Pipes after 10 years from the completion of the project	Average Served Population in 5 years from 2009 to 2014	Monthly Cost of Replacement of Pipes (Rwf/capita for 10 years)	Daily Cost of Replacement of Pipes (Rwf/capita for 10 years)	Cost of Operation and Maintenance + Cost of Replacement of Pipes (Rwf/day/capita)
Kirehe	Mushikiri	7,776	41,135,938	460	15.3	531,634,646	7,488	592	19.5	34.8
	Kirehe	5,012	29,093,955	505	16.8	518,081,501	4,800	899	29.6	46.4
	Nyamugari/Mahama	7,910	10,336,084	114	3.8	876,491,395	7,576	964	31.7	35.5
	Kigina	6,998	31,734,024	395	13.2	361,737,985	6,703	450	14.8	28.0
	Gatore	4,666	32,731,247	610	20.3	260,179,717	4,469	485	16	36.3
Ngoma	Karembu/Zaza/Mugesera	13,420	95,652,756	620	20.7	1,777,867,090	12,853	1,153	37.9	58.6
	Kazo/Mutendeli	13,219	68,232,007	449	15.0	927,535,047	12,662	610	20.1	35.1

- (i) Annual cost of O&M composed of the operation cost, management cost and maintenance cost
(ii) Annual cost of O&M (i) is divided by 12 months and average served population in 5 years from 2009 to 2014(v)
(iii) Monthly cost of O&M (ii) is divided by 30 days
(iv) Cost of replacement of pipes including works after 10 year from the completion of the project
(v) Average served population in 5 years from 2009 to 2014
(vi) Monthly cost of replacement of pipes per capita with the assumption of that the average served population in 5 years (v) continues 10 years
(vii) Monthly cost of replacement of pipes per capita is divided by 30 days
(viii) Total amount of the daily cost of O&M (ii) and the daily cost of replacement of pipes (vii)

(3) Evaluation of Affordability to Pay

The ratio of the cost of operation and maintenance to be borne per capita to the income per capita was evaluated. For the project of JICA, the ratio of 5%, which is recommended by the World Bank, is adopted as the critical point for the evaluation of the affordability to pay.

The amount to be borne per capita, the income per capita and the ratio of the amount to be borne per capita to the income per capita in each scheme are shown in Table 2-22.

The composition of the cost of operation and maintenance is shown in Table 2-20. The average cash income (median) is obtained by utilizing the questionnaire in the socio-economic survey in the study. Since the question about income is limited to cash income, the self-consumption of agricultural production is not counted in the income.

With regard to the estimation of the cost of self-consumption of agricultural products, analysis of available information was carried out as described below.

According to the statistical data¹, the average expenditure of the person engaged in agriculture amounts to 63 Rwf/day and its 98% is the cash expenditure and 53% is the expenditure on foods (self-consumption of the agricultural products is not included). Considering the situation mentioned

¹ WFP(2006), Comprehensive Food Security

above, the poverty line with 250 Rwf/capita/day and the cash income data obtained in the study, the ratio of self-consumption is estimated at half of the amount to be spent for food. According to the result of interviews with the sector office, assuming that most food is from self-consumption, the cost for food per day corresponds to 3,500Frw per family (700Frw per capita) at the market price.

Given the above circumstances, the cost of self-consumption is estimated at 350 Rwf/capita/day. Therefore, the ratio of the cost of operation and maintenance to be borne per capita to income per capita is evaluated by adding 350 Rwf/capita/day to the cash income.

Table 2-22 Ratio of the Cost of Operation and Maintenance to be borne per capita to Income per capita

District	Scheme	Cost of operation and maintenance (Rwf/capita/day)	Cash income (Rwf/capita/day)	Total amount of estimated amount of self-consumption and cash income (Rwf/capita/day)	Ratio of the cost of operation and maintenance to be borne per capita to income per capita (%)
Kirehe	Mushikiri	15.3	106	456	3.3
	Kirehe	16.8	167	517	3.2
	Nyamugari/Mahama	3.8	167	517	0.7
	Kigina	13.2	117	467	2.8
	Gatore	20.3	172	522	3.8
Ngoma	Karembo/Zaza/Mugesera	20.7	122	472	4.3
	Kazo/Mutendeli	15.0	157	507	2.9

The ratios of the cost of operation and maintenance to be borne per capita to income per capita are estimated at between 0.7% and 4.3%, and it is therefore judged to be sustainable for these schemes.

The ratio at Nyamugari/Mahama scheme is estimated at 0.7% which is much lower than the ratios of other schemes. This is because of applying the gravity system to the scheme.

2-6 OTHER RELEVANT ISSUES

For smooth implementation of the project, the Rwandan side is requested to take necessary action for the following issues.

(1) To Secure the Land Necessary for Construction of Water Supply Facilities

In line with the “Law relating to expropriation in the public interest”, the district which is the implementation organization of the project is required to submit the necessary document to the Land Commission in the district for evaluation. The district is instructed to make necessary compensation to the landlord, if the land expropriation is approved by the Land Commission. With regard to the project, lands for the distribution reservoir, intake facilities and roads to be used for maintenance are needed to be secured before the commencement of the construction. In this context, both Ngoma and Kirehe districts are requested to take necessary procedures for land expropriation so as to secure the land.

(2) To Take Necessary Procedures for Environmental and Social Considerations

In accordance with the “Guideline of Environmental Impact Assessment” prepared in 2006, MININFRA, the responsible organization of the project has submitted the “Project Brief” to RDB/REMA. As of early March 2010, the document is still in the process of screening in RDB/REMA. When the screening is completed, MININFRA is required to take the necessary procedures, in conformity with the results of screening. Since the project is necessary to be commenced after the completion of all required procedures for Environmental and Social Considerations, MININFRA is required to take necessary action immediately as soon as the result of screening has been notified.

(3) To Assign Necessary Number of Counterpart Personnel for the Activities in the “Soft Component” during the Implementation Stage

During the project implementation period, support for establishment of operation and maintenance system is provided as the “Soft Component”. Target groups are the district officer in charge of infrastructure and private organization/water users association. In this activity, the officer in charge of infrastructure is the main actor for providing support for establishment of institutional administrative system of private organization/water users, and full time participation is indispensable for effective implementation of activities. It is observed that the officer in charge of infrastructure covers not only the water sector but also other infrastructure sectors. In order to implement the activities smoothly, establishment of a task force composed of officials of the units in the district is necessary, and the district is requested to assign the members of the task force.

CHAPTER 3
PROJECT EVALUATION AND
RECOMMENDATIONS

CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

3-1 PROJECT EFFECT

The composition of the project is designed to implement construction and rehabilitation of 7 piped water supply schemes with public tap stand, replacement of the hand pump of 1 borehole and support for establishment of operation and maintenance system in 11 sectors of the Ngoma and Kirehe districts so that the water supply coverage of the target area is improved. The expected effects of implementation of the project are summarized in Table 3-1.

Table 3-1 Current Status and Issues, and Effects and Improvement

Current Status and Issues	Countermeasures to be taken by the Project	Direct Effects and of Improvements	Indirect Effects and Improvements
<ol style="list-style-type: none"> Water supply coverage in the target area is 41.8% in 2008, and still remains as a little more than 60% of the national average. Those who live on the top of hills are forced to go up and down the steep slope to fetch water from springs located at the bottom of the valley. Time and labour for fetching water are an overburden for women and children. Those who live in the areas where water quality control of existing water supply is not appropriately conducted, and where rivers and lakes are the only available water source, are forced to drink unsafe water. This fact causes the spread of water-borne diseases. 	<p>Construction and rehabilitation of 5 water supply systems in 6 sectors of Kirehe district, and 2 water supply systems in 5 sectors of Ngoma district</p>	<ol style="list-style-type: none"> Water supply coverage in 11 sectors will be improved from 41.6% in 2008 to 57.4% in the target year of 2014. Most of 55 thousand people will be able to access safe water within 500m in maximum distance from their residences. Total of 55 thousand people will be able to get 20 litre/capita/day of safe water which satisfies WHO drinking water standards. 	<ol style="list-style-type: none"> Improvement of quality of drinking water is expected to contribute to reducing the infant mortality rate Improvement of quality of drinking water is expected to contribute decreasing the frequency of suffering from water-borne diseases such as diarrhea, bilharziasis, trachoma, skin disease. Women and children, who were forced to fetch water by going up and down the steep sloop with the elevation of 100 to 200m taking 40 minutes, will be able to get clean water within 500m on the flat area. Surplus time generated by reducing time to fetch water can be allocated for housekeeping and agricultural activities for women, and study for children.
<p>Water supply facilities have not been continuously operated, since the capacity of organizations in charge of the O&M of water supply system is not sufficient.</p>	<p>The support for establishment of O&M system will be provided by the following interventions:</p> <ol style="list-style-type: none"> Enhancement of capacity of the district to manage an organization for O&M Enhancement of capacity of an organization for O&M, under their initiative of the district office. 	<ol style="list-style-type: none"> The system of supervision and monitoring of an organization for O&M will be improved by establishing a task force in each district. The capacity of an organization for O&M will be enhanced by support from a task force of each district. 	<ol style="list-style-type: none"> The capacity of organization for O&M that is not the target one in the project is expected to be enhanced, as the enhancement of capacity of the district offices is attained.

3-2 RECOMMENDATION

3-2-1 ISSUES TO BE CONSIDERED BY THE RWANDAN SIDE

The cost for O&M estimated in the study is composed of operational cost, management cost and maintenance cost, excluding the cost for major repair and expansion of the facilities. In the district, which has already introduced privatization of O&M system, 15% of the total amount of collected water fees is paid monthly to the district water fund, in order to cover the cost for major repair of the water supply system. In the study, it was observed that the fund was not yet utilized for major repairs, since the district water fund was just established. In the district, which has applied O&M by WUA, the collected water user fee is managed by WUA established in each sector or WUA of each water supply system. However, the cost for major repair and extension is not covered by the collected amount. In consideration of the current status of O&M, the Rwandan side is recommended to address the following issues so that the effects of the project will be achieved, and sustainability of the project will be secured.

- (1) O&M by private organization: Strategic planning of the disbursement from the district water fund, and introduction of subsidy system to cover a shortage of funds in the private organization for the major repair and expansion of the facility in future.
- (2) O&M by WUA: Introduction of a subsidy system for major repair and extension of the facility in future.

3-2-2 COLLABORATION WITH TECHNICAL ASSISTANCE

In the Eastern province, where both target districts are located, the technical cooperation project funded by JICA has been under process since April 2007, aiming at improvement of the O&M system and hygiene and sanitation promotion system in the province. In the technical cooperation project, the capacity of the districts and WUAs on O&M is designed to be enhanced so that the both organizations are able to manage water supply systems whether O&M is conducted by a private organization or WUA. By implementing these activities, enhancement of capacity of supervision on the rural water supply project, strengthening the linkage between private organization or WUA and district office and communities, and establishment of operation system by utilizing private organization have been attained.

It is, therefore, concluded that making use of outputs from the activities in the technical cooperation project such as revised manual of operation and maintenance and lessons learnt obtained from activities related to establishment of operation and maintenance system are an effective means to optimize the implementation of the project. In addition, active participation of the district officials who have been involved in the said technical cooperation project is indispensable.