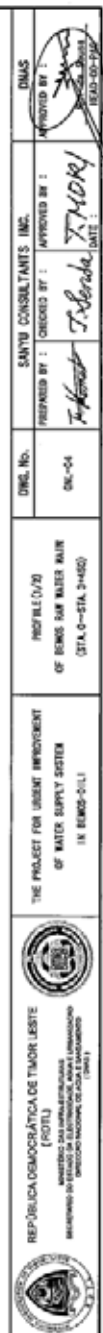
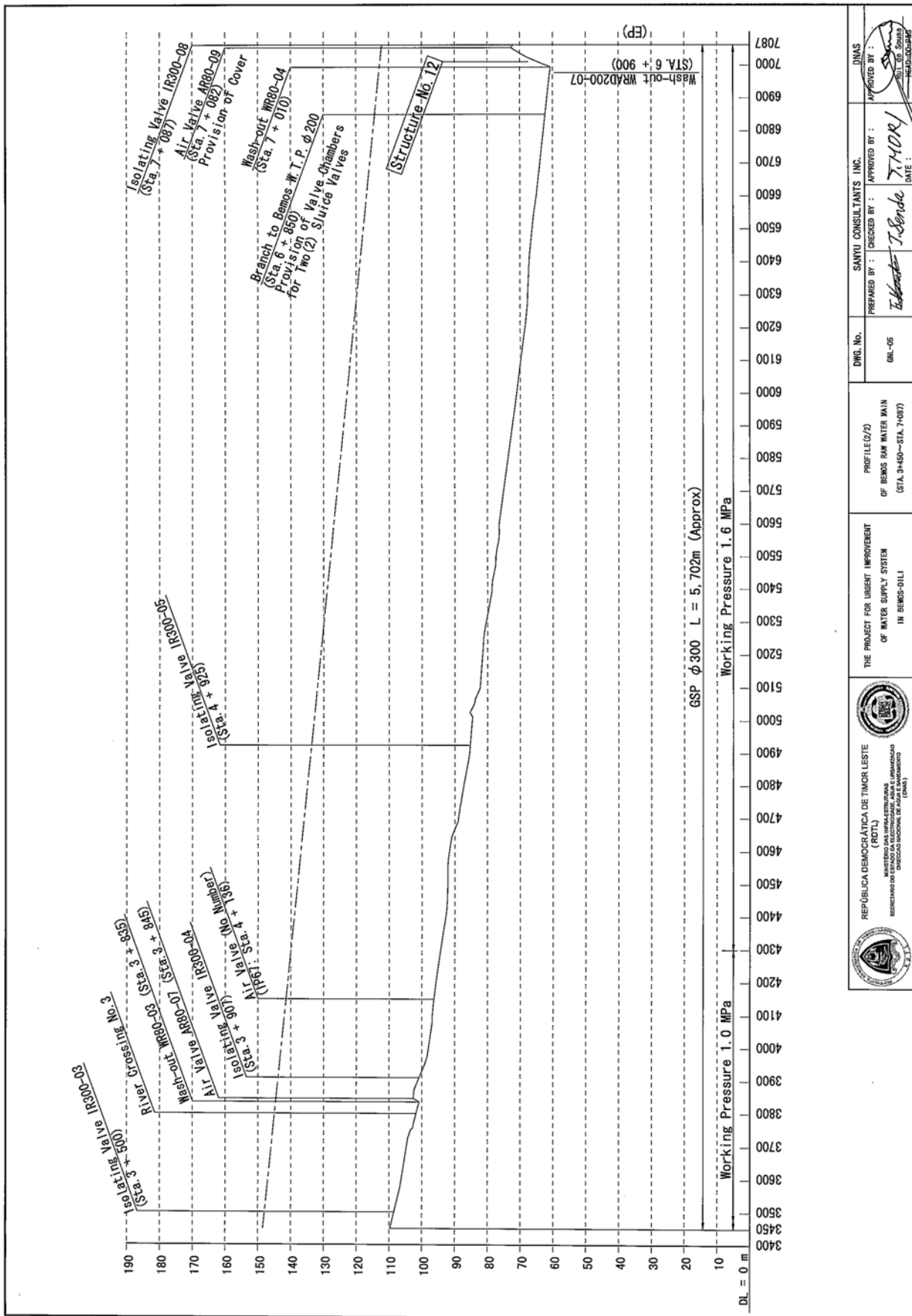


### 2-2-3 Outline Design Drawings

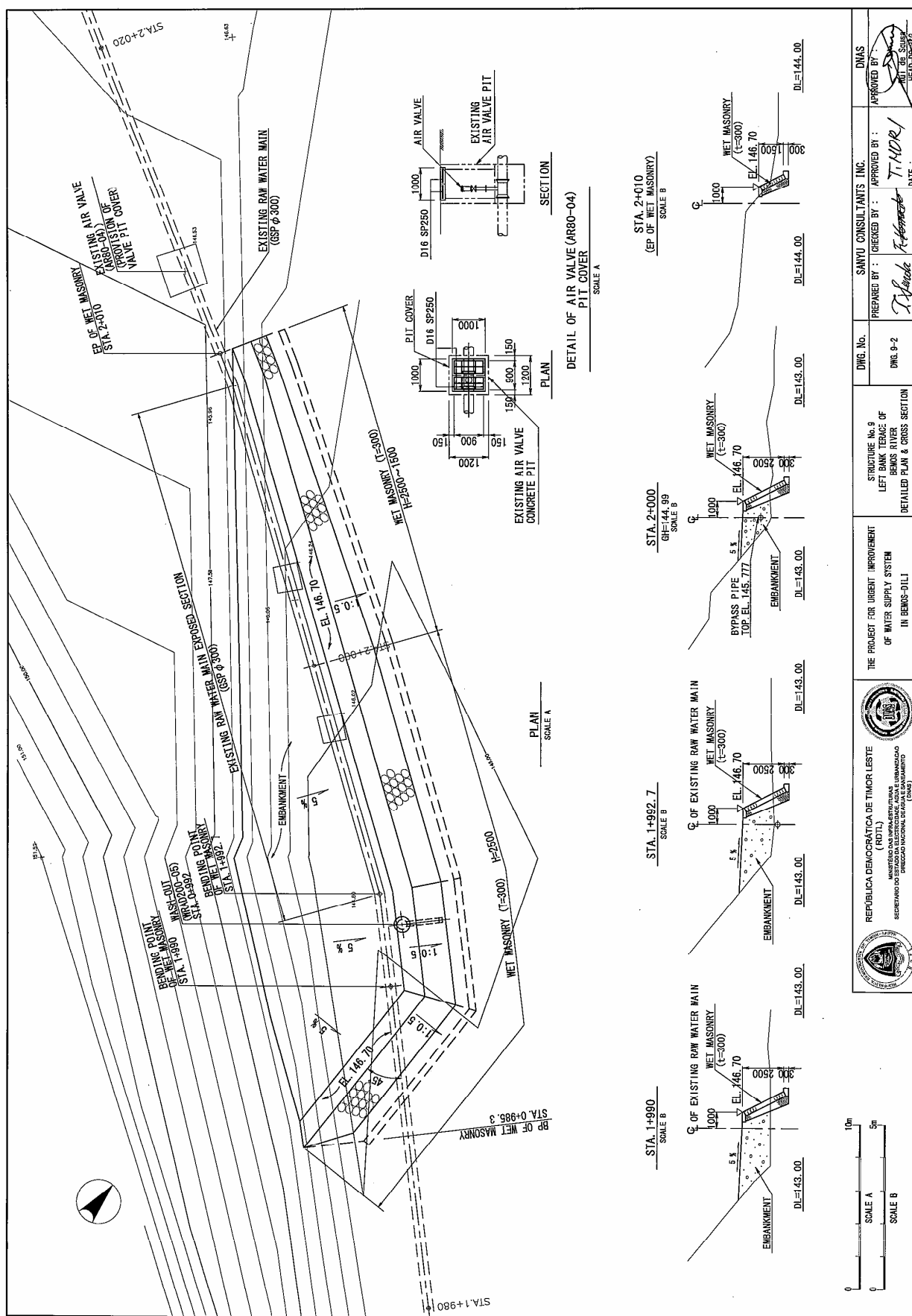
**Table 2-2.31 List of Drawings**

Drawing No.	Drawing Title
DWG 1	Profile (1/2) of Bemos Raw Water Main (Sta.0 ~ Sta.3 + 450)
DWG 2	Profile (2/2) of Bemos Raw Water Main (Sta.3 + 450 ~ Sta.7 + 062)
DWG 3	Structure No. 9 Improvement of Exposed Pipeline (Plan, Profile & Section)
DWG 4	Structure No.11 Improvement of Exposed Pipeline (Plan, Profile No.1)
DWG 5	Structure No.11 Improvement of Exposed Pipeline (Plan, Profile No.2)
DWG 6	Structure No.11 Steep Slope Road (Plan, Profile and Section)
DWG 7	Structure No.14 Layout of Lower Service Reservoir of Bemos WTP
DWG 8	Structure No.14 Section of Lower Service Reservoir of Bemos WTP
DWG 9	Structure No.15Countermeasure for landslide at Access Road to Bemos WTP (Plan)
DWG 10	Structure No.15Countermeasure for landslide at Access Road to Bemos WTP (Section)

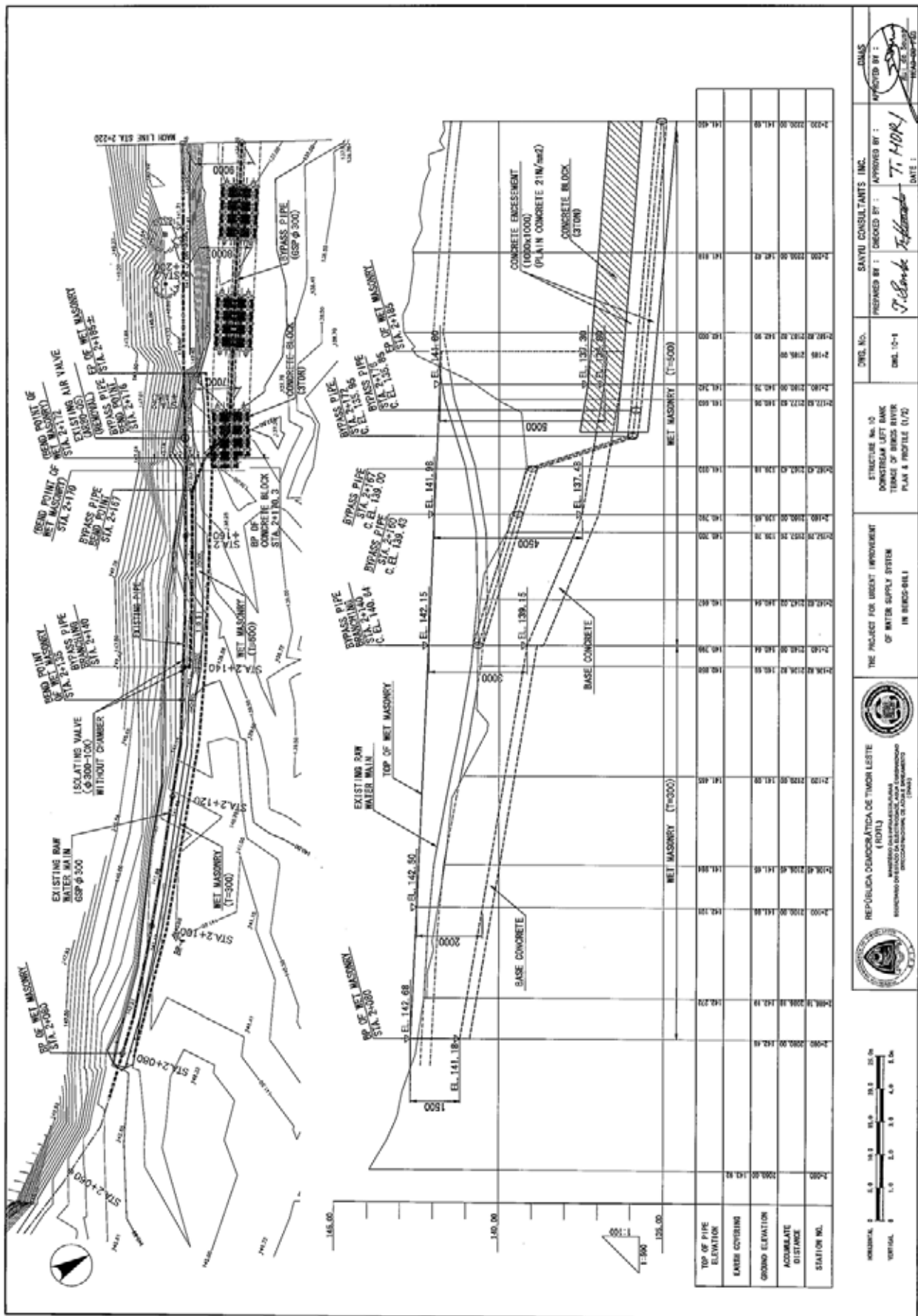




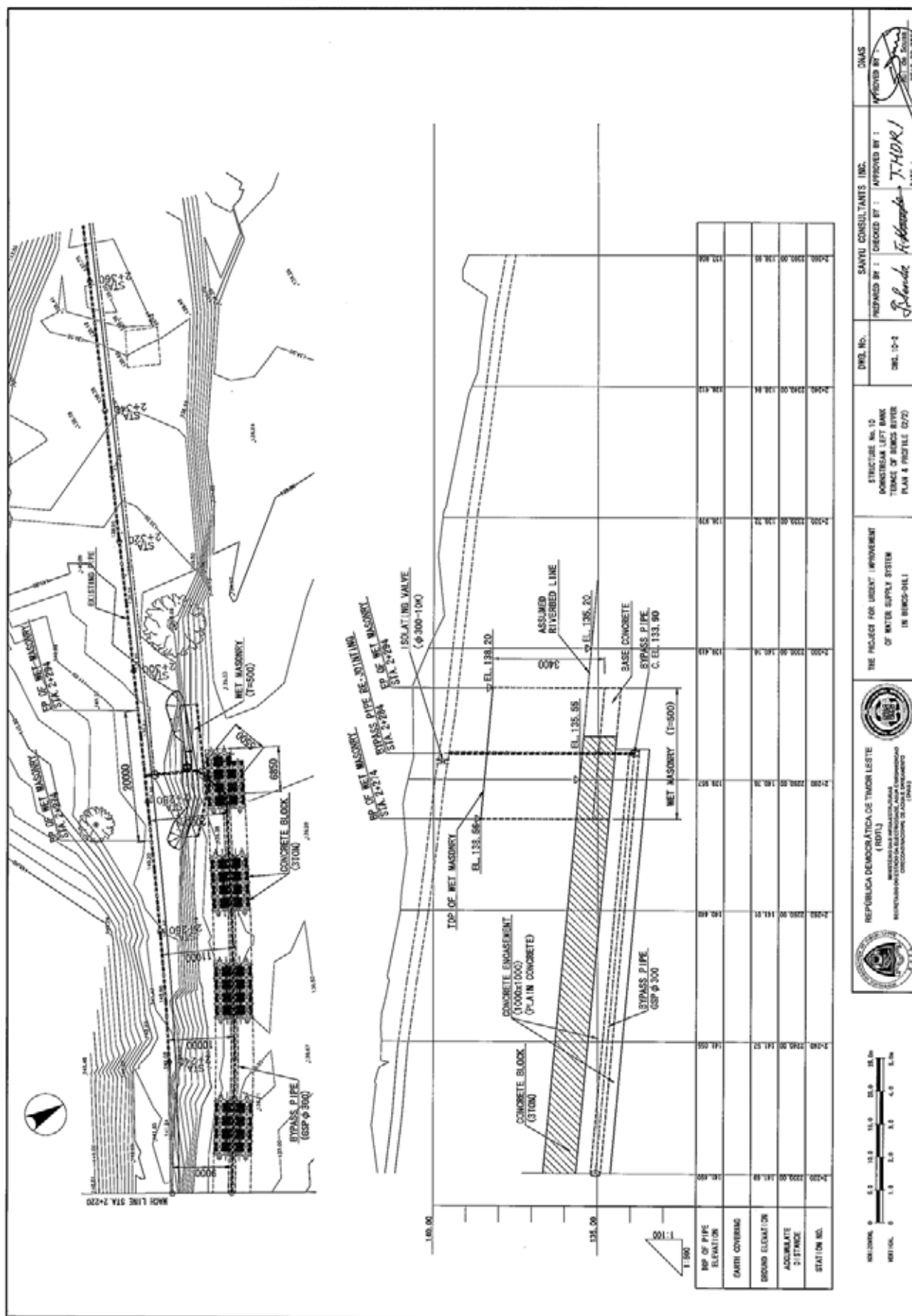
DWG 2 Profile (2/2) of Bemos Raw Water Main (Sta.3 + 450 ~ Sta.7 + 062)



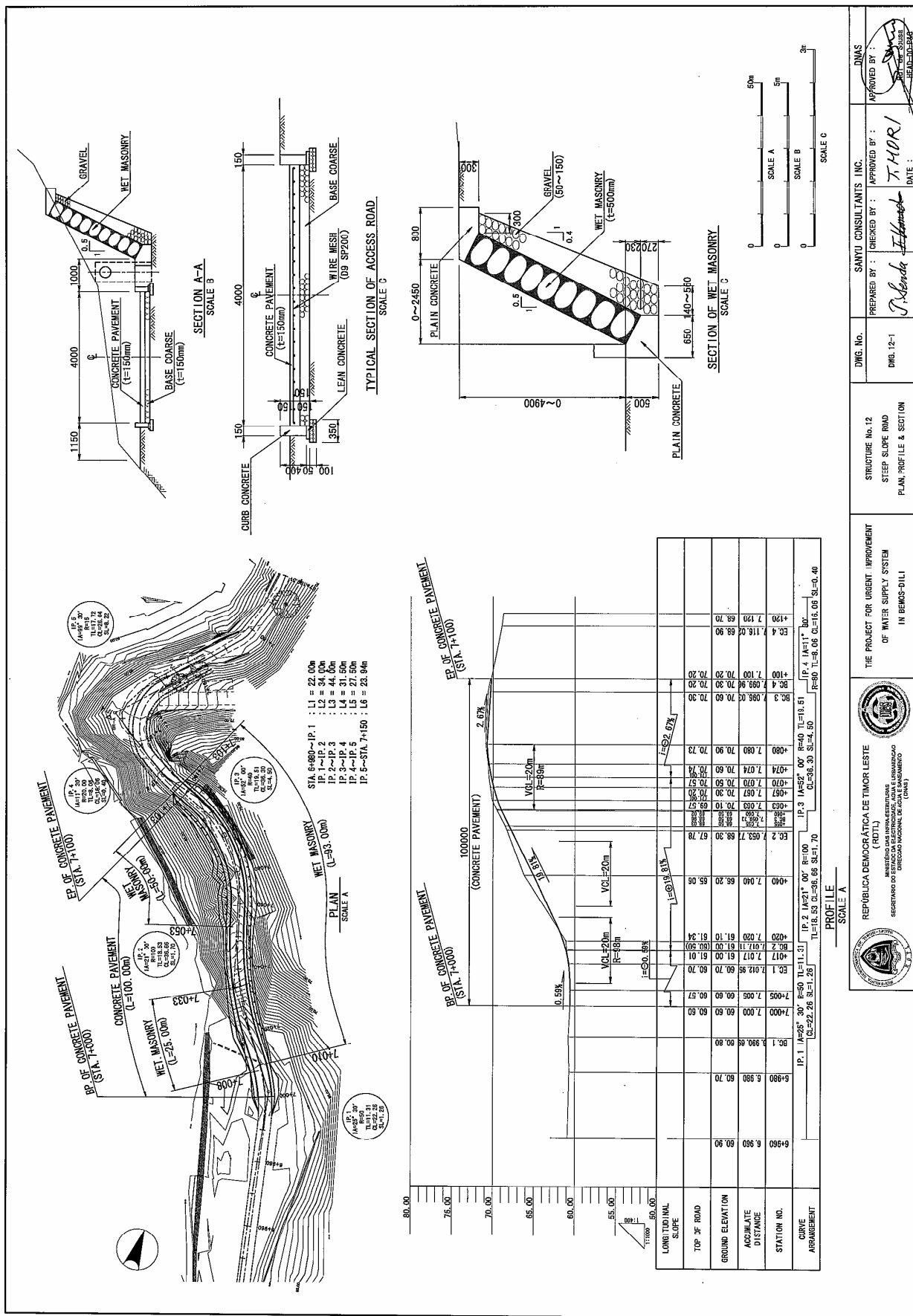
**DWG 3 Structure No. 9 Improvement of Exposed Pipeline (Plan, Profile & Section)**



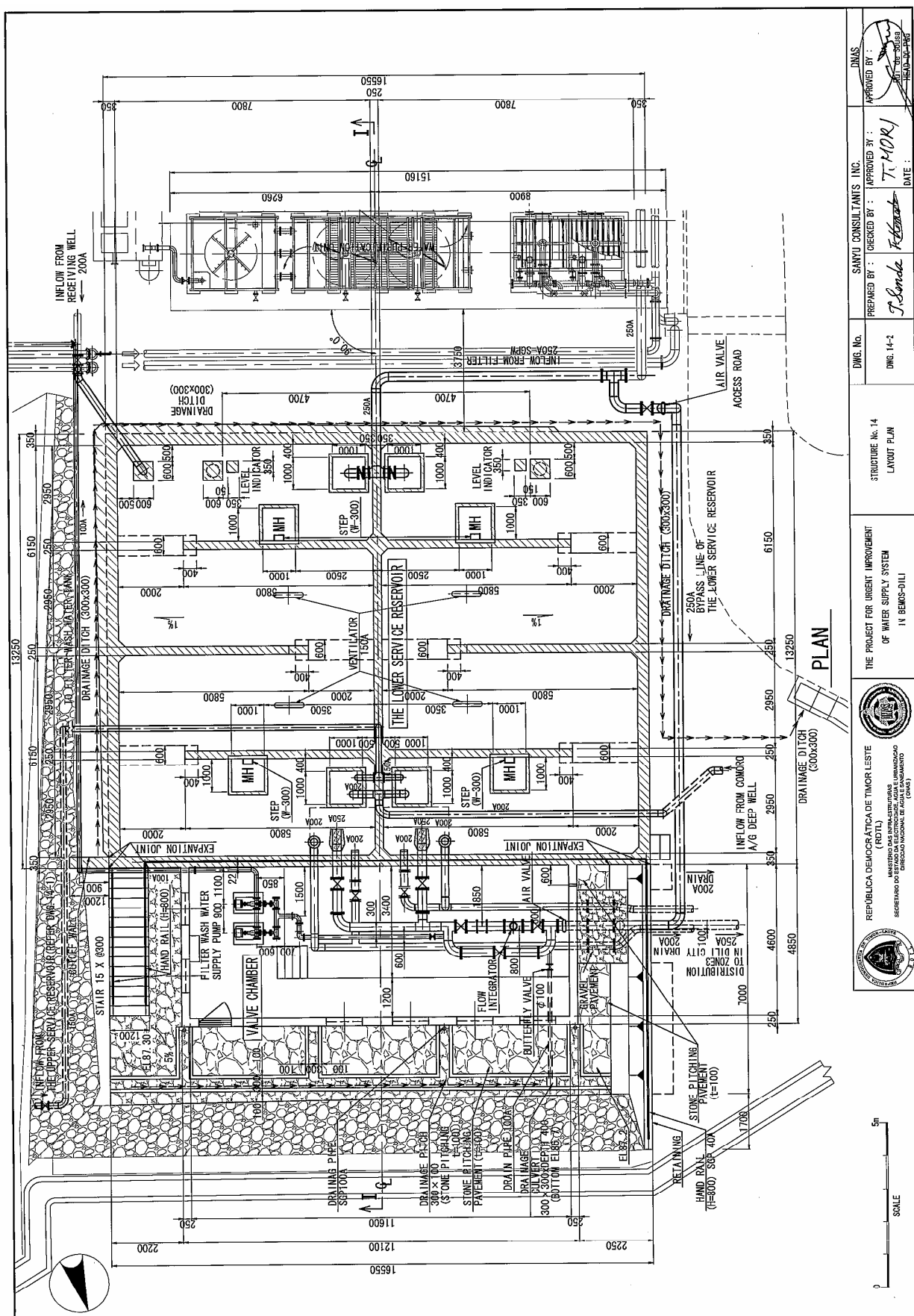
DWG 4 Structure No.11 Improvement of Exposed Pipeline (Plan, Profile No.1)



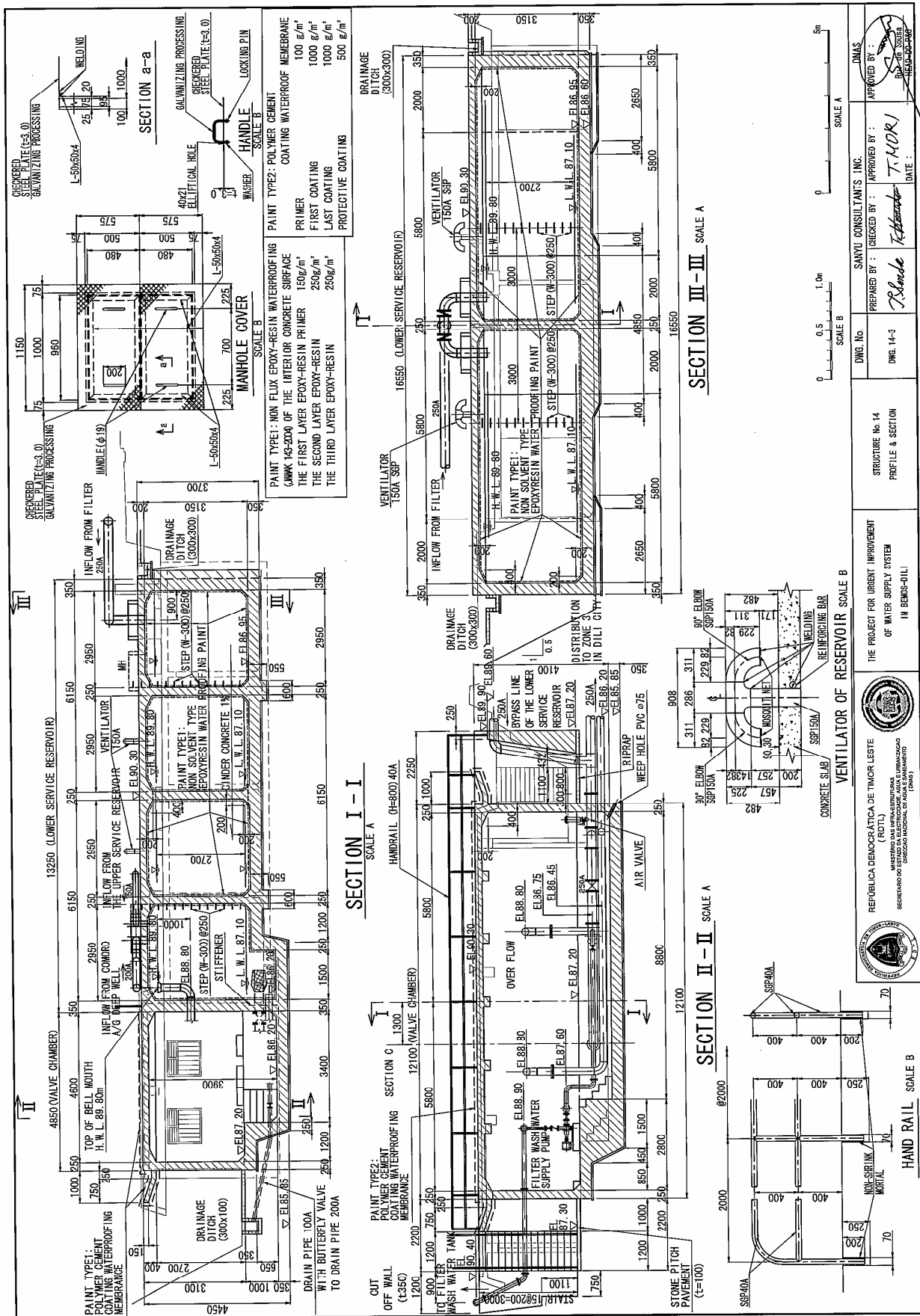
**DWG 5 Structure No.11 Improvement of Exposed Pipeline (Plan, Profile No.2)**



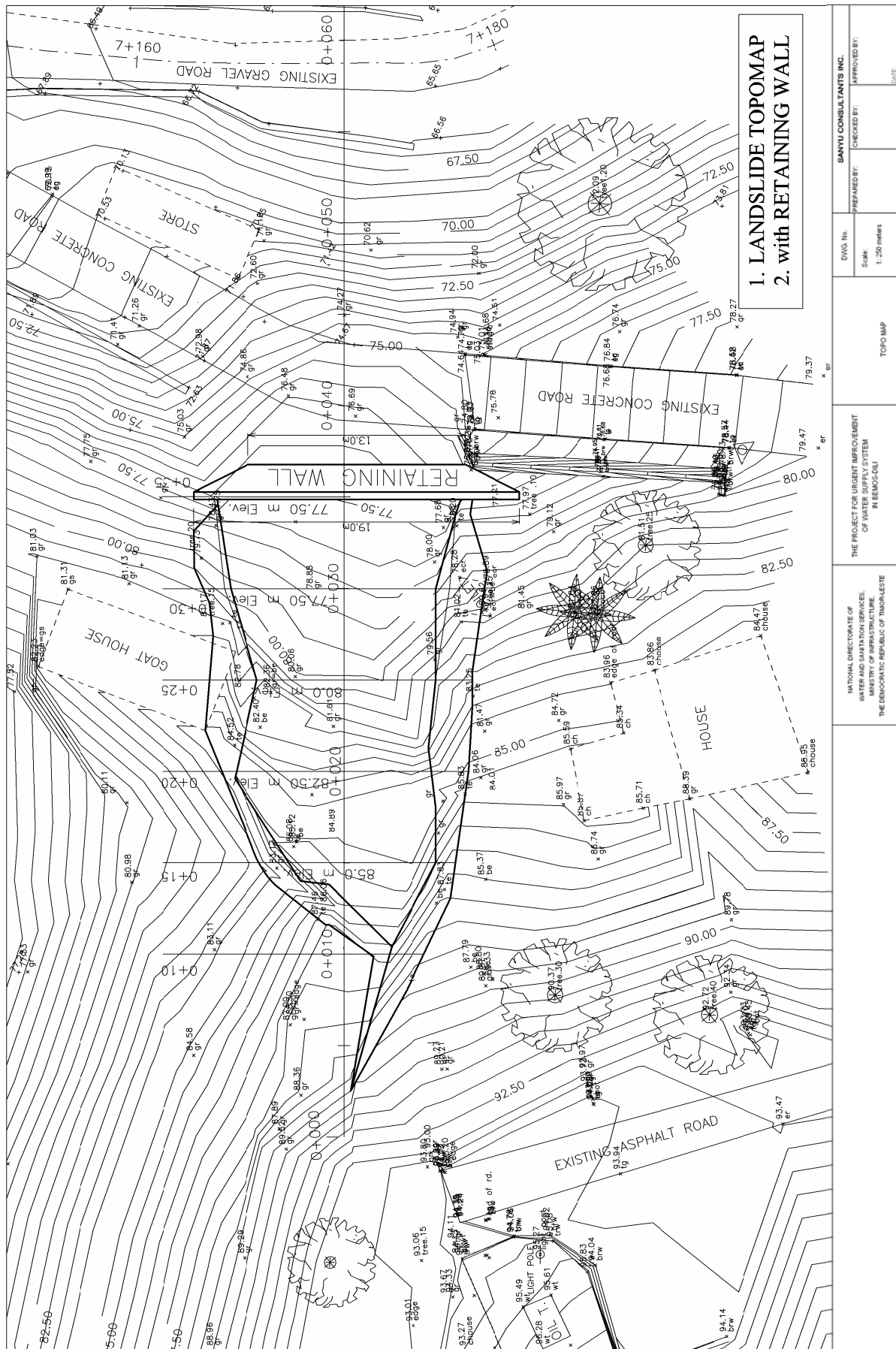
DWG 6 Structure No.11 Steep Slope Road (Plan, Profile and Section)







DWG 8 Structure No.14 Section of Lower Service Reservoir of Bemós WTP



DWG 9 Structure No.15 Countermeasure for landslide at Access Road to Bemos WTP (Plan)



## **2-2-4 Implementation Plan**

### **2-2-4-1 Implementation Policy**

The Phases II Project aims at rehabilitation/improvement of Bemos raw water main which has been damaged by the recent floods and a full renovation of the Lower Service Reservoir of Bemos Water Treatment Plant. Through the said rehabilitation/improvement, it is expected that those water work facilities such as intake facilities, raw water main and water treatment facilities ever constructed under the previous grant aid project may maintain the function stably to be utilized efficiently in the future.

DNSAS is the implementing agency of the project and the project is to be implemented within the framework of the grant aid system of the government of Japan. In case if the implementation of the subject project would be approved by the government of Japan after the due completion of the Implementation Review study, an Exchange of Note (E/N) be got through between the governments of two countries and the project will enter into its implementation stage. Under the project implementation, a single package contract manner will be adopted.

#### **2-2-4-1-1 Construction Policy**

##### **(1) Access Road (For construction)**

The portions/sections to be rehabilitated under the project are scattered over about 7 km distance from the Bemos intake weir to the treatment plant. From the city area of Dili to the treatment plant, it is accessible by public roads but there is no road available to access further upstream area. It is necessary to transport the required equipment/materials to the working sites of rehabilitation, therefore, policy is decided to provide access roads for construction on the lower river water channel and terrace.

From Bemos treatment plant to the confluence point with Bemos river, the water channel of Comoro river can be used as access road with having some leveling works. While for the Bemos river portion, river terraces on both right and left banks will be availed for access as much as possible. In case if the leveling work alone can not make it passable, then about 0.3 m of embankment will be provided with gravel pavement. For the sections where no temporary access road on the river terraces could be made, the road will be planned at the lower water channel with embankment work of 0.5-1.0 m paved by gravel. The access road for construction shall have the total width of 4.5 m (width 3.0 m + shoulder 0.75 m × 2), and be provided with sidetracks to enable facing traffic by vehicles as the sites is not of the clear passage/perspective. Further, there expected to have surface water in the river at the early stage and ending stage of dry season, though there is none during the mid-dry season, it is planned to have such river crossing works as temporary bridge and buried drainage pipes in the river crossing sections.

##### **(2) Demolish/Disposal of Existing Structures**

Demolishing of the existing structures as intake weir and service reservoir etc. shall be made by through crushing by large-size breaker in combination with the manual work by concrete breaker. Rubbish and chips of concrete produced shall be hauled and disposed at the designated place as

DNSAS informed.

### **(3) Rock Excavation and Crushing of Huge Stone and Boulder**

Steep slope mountains lie in close proximity on both banks of the Bemos river, and there found a number of exposed rocks here and there with huge stones scattered in the river bed. Some of them are boulders flown down from the upper stream and it is judged that larger ones are of exposed due to the erosion/scouring on the neighboring grounds. It is also considered that there may be considerable number of huge stones in the river terraces extended on both banks.

The huge stones and boulders existing in the river terraces and riverbed will be crushed by using the large-size breaker. Crushing by using dynamite is not preferable due to the troublesome procedures for importing and stocking and also the possible negative effect on the local people in the area.

### **(4) Concrete Works**

It is estimated that under the project as much as 1,100 m<sup>3</sup> of concrete will be used for various concrete structures and wet masonry etc.

There is a local contractor (Australian finance) who possesses a concrete plant at the area nearby the downstream of Bemos Water Treatment Plant. Policy has been decided that concrete will be procured from this local contractor to be hauled by concrete mixer car and delivered to the construction site.

### **(5) Pipe Works**

Under the project, there is one (1) section where pipeline will be re-routed. For connecting with the existing pipeline, non-suspension method shall be employed as required due to the limited water supply suspension time. Moreover, removal of the existing pipes will not be executed in principle for the re-routing sections. In case of removal, however, the pipes shall be cut into pieces of re-usable length and transferred to DNSAS. Further, in the case of installing air valves, wash-out and isolating valves on the existing pipes for the purpose of improvement in O & M, non-suspension method is necessary as required due also to the limited time of allowable water suspension time.

#### **2-2-4-1-2 Policy to Active Use of Local Contractor**

During the time of Indonesian rule, most of the construction works had been undertaken by Indonesian nationals. While for those construction works under the re-construction program aided by UN, WB, ADB and so forth after the social disorder in 1999, most of the works were carried out by the foreign contractors. Concerning Japanese contractors as many as 5 construction firms have ever participated in the construction works in Timor-Leste for road, irrigation facilities, port, water works and schools, they are Tobishima Corporation, Dai Nippon Construction, Toa Corporation, Wakachiku Corporation and Mirai Construction Co.

In Timor-Leste today, there are construction contractors in 2 manners, one solely by local nature and the other affiliated by foreign companies (Australian and Singapore). Most of the local companies are of small scale without personnel of high technical standard and construction equipment and machineries, thus in many cases tends to procure required technical staff and construction machineries

after contract signing. While some of the foreign-affiliated companies are found capable enough with having a certain number of machineries, resident technicians and engineers (Foreign and local), and are doing some works as sub-contractor of the foreign companies and/or supply construction machineries and concrete.

As these companies are capable as mentioned above and considered that the quality in construction could be secured but the unit costs of the works tend to be higher as compared with the case of local contractors. Those Japanese contractors are usually performing the job through sub-contracting with plural number of the local foreign-affiliated companies depending on the kinds or works.

As is the case, under the subject project, policy is confirmed that appropriate local construction companies be positively employed depending on the kind of works in parallel with the direct work by main contractor which will be undertaken in a manner local technicians engaging the work with due guidance by the experienced technicians from the third countries.

#### **2-2-4-1-3 Policy on Assignment of Technicians and Engineers**

In Timor-Leste, those engineers and technicians who have enough knowledge and techniques on construction works are quite limited. Therefore, it is necessary to arrange the construction crew consisting with experienced technicians from the third countries like the Philippines to guide the local technicians and workers. For the form work, however, higher accuracy is to be secured and it is considered necessary to have Japanese nationals assigned to this job and guide the local technicians and workers. For the anchoring works too, it is considered necessary to assign a Japanese national technician since it is of special technique.

#### **2-2-4-1-4 Procurement Policy**

Construction materials which can be availed at the site are sand and gravel and all the others are imported ones. Price of the construction materials in Timor-Leste is comparatively higher than the neighboring countries. Also in recent years, the price escalation is considerable due to the escalation of transportation cost as caused by the price escalation of crude oil especially since the year 2006. Moreover, those construction materials as cement and reinforcing bar etc. are available in the domestic market, but the stock ready for sale is rather limited. The said materials are imported mainly from Indonesia, Australia and Singapore and direct purchase from these countries may result in more economical purchasing in the case if the quantity exceeds a certain level.

Accordingly, in case if purchasing from Japan and third countries is more advantageous in view of the quantity, delivery period and economic efficiency, materials will be procured from these countries. Further, the policy is to apply the JIS standard for the steel pipes and valves and to procure testing equipment from Japan and the third countries since local suppliers have no experience in handling these materials and equipment.

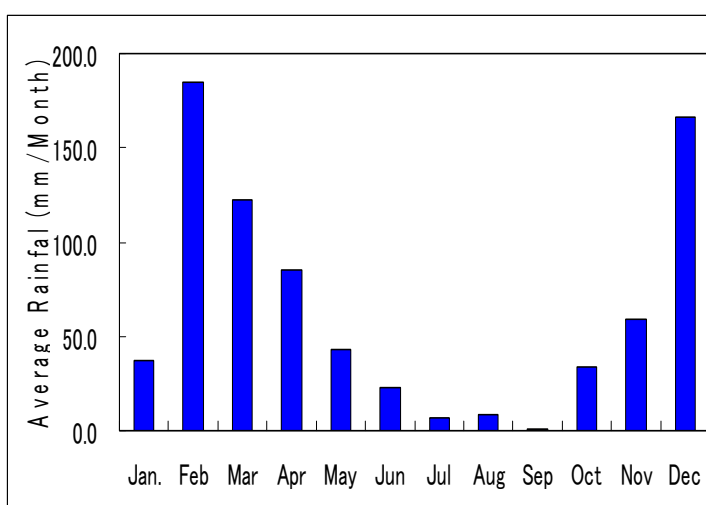
#### 2-2-4-1-5 Policy on Construction Scheduling

The climate of the project site is of tropical monsoon type where rainy season and dry season are clearly demarcated and in the rainy season there are quite intensive rainfalls causing often floods. The project site is surrounded by steep slope mountains also and the run-off speed is very high.

**Table 2-2.32 Duration of Rainy and Dry Seasons and Mean Monthly Rainfall**

Season	Duration	Mean monthly	Year of Data
Rainy	Nov.-Apr.	115 mm-156 mm	1953-1999
Dry	May-Oct.	15 mm-74 mm	1953-1999

The rainy season starts at around early November and lasts till April with the mean monthly rainfall of more than 100 mm. At the mountainous area located upstream basin of Bemos river, the rain starts earlier and records more rainfall amount than Dili city area. As per the interview from the local residents, there have been some big floods even in April, ending period of the rainy season. Further, it is said that the full scale rainy season starts at around December, however, as per the information from the local contractors, they are of the opinion that the construction works at the Bemos river better be completed by the end of October.



**Fig. 2-2.21 Monthly Mean Rainfall at Dili in the Past 5 Years (2003-2007)**

In view of the above, the policy on the construction scheduling may be confirmed that for those construction works to be undertaken in the river bed shall start with the access roads at the early May and followed by the full scale construction to be completed by the end of October.

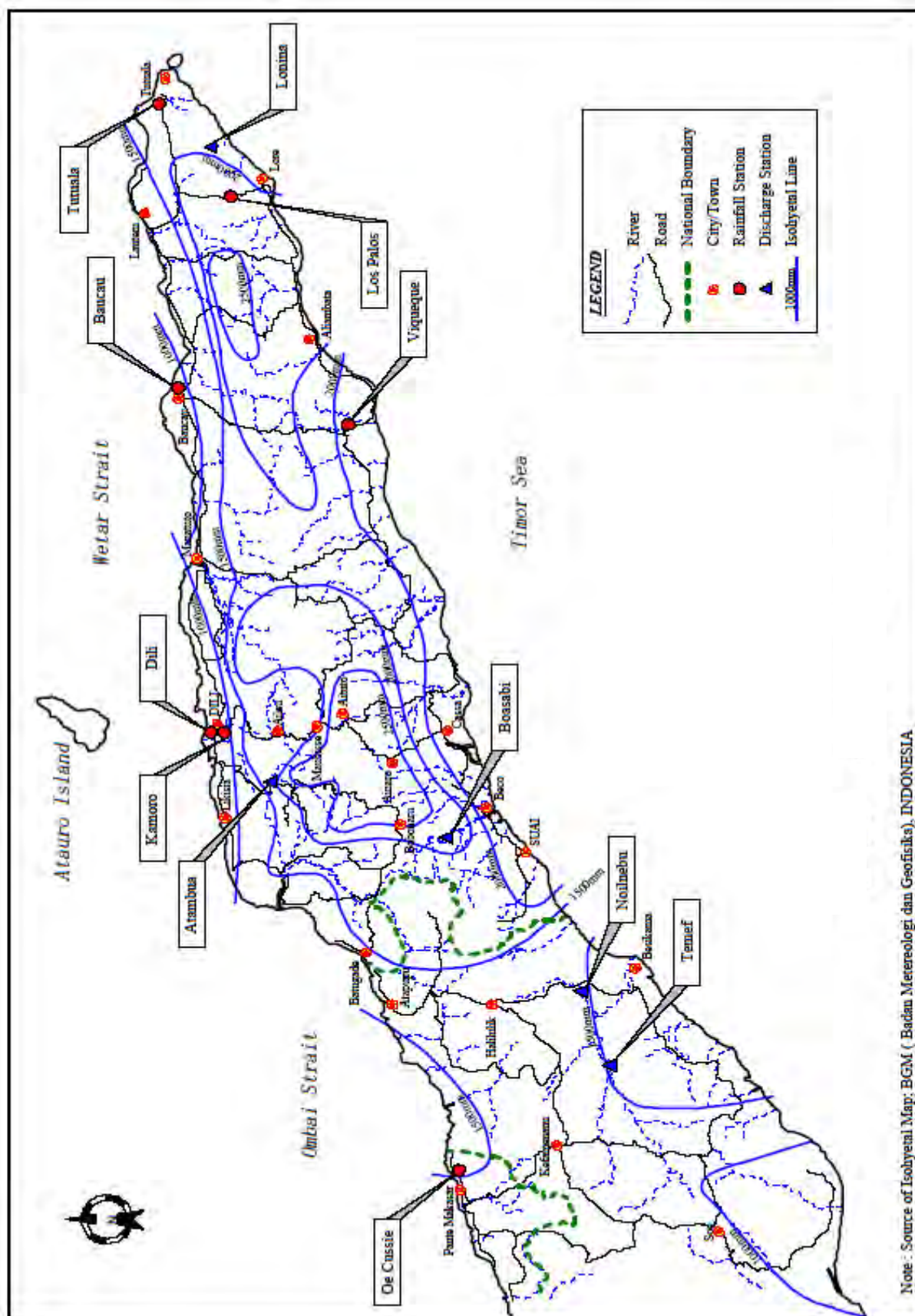


Fig. 2-2.22 Rainfall Stations and Isohyetal Line Map



## 2-2-4-2 Implementation Conditions

### 2-2-4-2-1 Bemos River Discharge

At the upstream of Bemos river, there found surface flow throughout a year, while downstream reach there, sub-surface flow may appear in the full dry season, though early parts of dry and rainy season which are in the scheduled construction period surface flows appear also. Therefore, it is planned that a coffer dam will be built at the upstream of the intake to be rehabilitated and a by-pass channel be provided. Design flood discharge is determined for planning the coffer dam and by-pass channel and taking into account the construction method and construction procedure for each related structure, construction period shall be adequately fixed.

**Table 2-2.33 Records of Rainfall at Dili (2003-2007)**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Max. Monthly (mm/month)	56.7	518.3	224.6	133.4	155.5	72.2	15.9	23.7	3.6	93.8	161.0	245.0
Ave. Monthly (mm/month)	37.3	184.9	122.0	85.6	42.7	22.5	7.1	8.6	0.7	34.0	58.8	166.6
Min. Monthly (mm/month)	12.5	25.4	35.5	30.4	0.4	3.0	0.0	0.0	0.0	2.2	0.0	90.6
Max. Daily (mm/day)	15.1	126.7	113.4	87.0	35.0	39.4	12.5	12.4	3.2	60.2	69.4	76.2

### 2-2-4-2-2 Limitation in Water Supply Suspension Time

Through the consultation meeting with the DNSAS, it was confirmed that water supply suspension is impossible during 6:00AM-10:00AM and 3:00PM-9:00PM each day taking into account the peak time of water demand and also water supply suspension shall be limited only for three (3) days in a week. Therefore, possible suspension time in a day is fixed for 5 hours of 10:00AM-3:00PM and it is necessary to adopt construction/installation methods which enable to finish within the fixed time available for re-routing of pipeline and installation isolated valves and etc. If it is necessary, non-suspension method shall be considered too.

### 2-2-4-2-3 Installation of Temporary Water Supply Facilities for Service Reservoir

For the rehabilitation/improvement of the Lower Service Reservoir, it is planned that water be distributed to the users of Dili city through the Upper Service Reservoir. This requires water supply from the treatment plant to the Upper Service Reservoir. The Upper Service Reservoir is situated at higher level than the treatment plant and temporary pumping facilities are required for this purpose.

**Table 2-2.34 Quantity of Water for Distribution**

Structure No.	Quantity of water for distribution
Structure No. 14: Service reservoir	26 liter/sec

### 2-2-4-2-4 Removing of the Existing Lower Service Reservoir

The existing Lower Service Reservoir is of excavated type with having treatment facilities on the south side, and on the east side the Lower Service Reservoir is located near the foundation works of wet masonry revetment to protect the slope under the Upper Service Reservoir. As is the case, it is

planned that the two (2) side walls as mentioned shall remain as they are during the construction. In order to protect the side walls from collapsing due to earth pressure, some measures like anchoring may be needed.

#### **2-2-4-2-5 Collecting of Aggregate and Stone Materials**

As per the “Environmental Guideline” as effective in Timor-Leste, it is specified as regulations that prohibit stock-yard installation in the river course, prohibit change of river course which may cause river bank erosion, requires clear marking of gravel collecting site and limit collecting gravels in the river and so on. Also it is necessary to have a thorough presentation of the material collecting plan for the local administrations and communities concerned. As the case may be, when the contractors will proceed to aggregate and stone material collecting under the project, they have to obtain necessary permissions for the material collecting from the authorities concerned.

#### **2-2-4-2-6 Compensation for Standing Trees and Land Acquisition**

It is necessary to make compensation for the standing trees and lands required for the project facilities such as grit chamber and access roads for construction. The government of Timor-Leste is requested to take necessary actions to complete required compensation procedures based on the Implementation Review as well as Detailed Design prior to the commencement of construction works under the project.

Access roads for construction are planned basically to pass either river low water channel or river bank terraces, but there are possibilities that the local residents may claim that they own the lands in river terraces. This requires DNSAS to carry out proper orientation/explanation to the local communities concerned, and those facilities temporarily removed for the subject project construction purpose shall be restored as a responsibility of the construction contractors.

#### **2-2-4-2-7 Concrete Placing under the High Temperature Condition**

Under the project, it is expected to have some concrete placing under the condition of high temperature. In case of concrete placing where mean daily temperature may exceed 25°C, the placing shall be performed in conformity with the technical specification of “hot weather concrete”. With this concern, due attention shall be paid by the contractors in practicing proper slump control during concrete mixing and also the curing by water so as not to cause cracking caused by shrinkage and temperature fluctuation. Further, the hauling distance from ready-mixed concrete plant to the placing site via, it is necessary to manage the time needed for mixing and hauling and placing to be within 1.5 hours in case of temperature exceeding 25°C and 2.0 hours in case of lower than 25°C.

#### **2-2-4-2-8 Temporary Stock-yard**

Construction sites are scattered over the river terraces, courses and channels in the mountain areas, and there are possibilities of robbery of equipment and materials if stocked at the sites. Therefore, it is preferable to have a stock-yard provided at the suburb of Dili city and be transported to the construction sites on daily basis. In case if it is necessary to store construction machineries and materials, some counter-measures for prevention of possible robbery shall be worked out.

#### **2-2-4-2-9 Technicians and Labors for Construction Works**

Jobless ratio in the urban area of Timor-Leste is quite high and accordingly the labor market is in the oversupply state. However, since the time of Indonesian rule, those categories of job which requires higher knowledge and techniques have been monopolized by Indonesian nationals and the present situation is that there are very few engineers and technicians locally available.

Based on the past experience in implementing grant aid projects in Timor Leste, it is a customary practice to procure/employ required labors from the communities located nearby the construction sites and many of the local residents are in the jobless state, then, a kind of short term rotation manner is necessary to be adopted. Being different from each locality, but long term employment can not be expected, anyhow (Only 2 weeks rotation), then the productivity of the labor seems to be low.

<Regulations in accordance with the Labor Code, Employment conditions>

The Labor Code consisting of 47 provisions and called “Regulation No.2002/5 on the Establishment of a Labor Code for East Timor” was stipulated and in force since May 1, 2002. The Labor Code regulates the employment conditions as follows and a form of employment agreement is shown. The form was prepared based on the long term employment and considered the conditions therein are of employee’s preference. The form is used to be applied for the employment of labors on project basis.

- Need for informing the discharging in advance (10 days before in case of 3-6 months employment, 15 days before in 6-12 months and 30 days in longer than 1 year case)
- No stipulation about the discharge allowance but pay is customarily practiced.
- Paid leave: 1 day for 1 month working and in case of non-use, to be paid/compensation
- Working hours: 8 hours/day (Maximum 12 hours including over time), 44 hours/week
- Over time: 150% for week days and 200% for holidays

#### **2-2-4-2-10 Transportation and Custom Clearance**

It can be said that the handling/unloading capacity of Dili port is quite limited. Accordingly if there are a number of cargo ships in the port, it will take many days for unloading and for custom clearance. While there expected major parts of equipment/materials needed for project construction are to be procured from Japan and other third countries, it is necessary to make a sound construction scheduling with due time allowances for transportation and custom clearance.

#### **2-2-4-3 Scope of Works**

The subject grant aid project will be implemented and operated with the demarcation of the obligations as shown below.

### 2-2-4-3-1 Obligations of the Government of Japan

**Table 2-2.35 Work Items to be Rehabilitated under GOJ grant**

Work items	Length	Rehabilitation / Improvement manner
1 Structure No.9 Left bank terrace of Bemos river	50 m.	<ul style="list-style-type: none"> <li>Protection of existing pipeline by revetment and re-filling by sand and gravel</li> </ul>
2 Structure No.11 Mountain foot slope of left bank of Bemos river	179 m.	(Pipeline exposed section as per design, but many rock fall and strike the pipeline, so that) <ul style="list-style-type: none"> <li>Shifting of pipeline route and embedding</li> </ul>
3 Structure No.12 Comoro river right bank Steep slope road section	100 m.	<ul style="list-style-type: none"> <li>Construction of dual purpose road and drain (concrete pavement with wheel guard)</li> <li>Construction of road side protection works including pipe supports</li> </ul>
4 Structure No.14 The Lower Service Reservoir & valve chamber of Bemos water treatment Plant	-	<ul style="list-style-type: none"> <li>Renovate the facilities to have the equal capacity and function with the existing ones</li> </ul>
5 Structure No.15 Counter-measure for land slides at the access road to Bemos water treatment plant	-	<ul style="list-style-type: none"> <li>Construction of L-shaped retaining wall</li> <li>Slope protection</li> </ul>

### 2-2-4-3-2 Obligations of the Government of Timor-Leste

In addition to the general matters to be born by the government of Timor-Leste in implementing the grant aid project, some additional work items to be undertaken by the government of Timor-Leste are noted as the followings.

- Pump operation cost for supply of water from treatment plant to the Upper Service Reservoir during the construction of the Lower Service Reservoir
- To secure necessary permission on using the land for landslide countermeasure
- To explain the project detail to the municipalities and communities around project site, and to obtain their consents.
- To ensure that Japanese Contractor can sand and gravel without charge from Bemos and Comoro River for the construction work of Phase II Project
- Payment of commission and A/P handling charges to Japanese bank based on Banking Arrangement
- Exemption of custom duty on the imported equipment/materials at the port of unloading and assistance in custom clearance
- To bear the cost of custom duty on goods and services
- Proper use and O & M on the facilities rehabilitated under the subject grant aid project
- Advanced information to the local residents on the suspension of water supply
- Counter-measures for the damages on the facilities caused by disaster and floods occurred prior to the commencement of construction works under the grant aid, and supplementary measures for protection, if necessary

## **2-2-4-4 Consultant Supervision**

### **2-2-4-4-1 Organizational Set-up for Construction Supervision and Matters of Concern**

In performing the detailed design and construction supervision for the subject project, attention shall be paid on the following matters and due organizational set-up is necessary towards successful accomplishment.

- It is important to fully grasp the content and particulars/circumstances of the Implementation Review Study.
- It is necessary to fully understand the frame and system of the grant aid project by the government of Japan.
- To grasp the content of E/N exchanged by and between both governments
- Necessary to grasp always trend and moves of other aid agencies concerned and policy of DNSAS
- Re-confirm the obligations of the government of Timor-Leste towards the project implementation as requested during the Implementation Review study
- Re-confirm the obligations of the government of Timor-Leste concerning the duty exemption and assistances in custom clearance at the time of importing equipment and materials under the project through due consultation with DNSAS so as not to cause undue delay in the construction progress.

After the E/N is exchanged by and between both governments, the government of Timor-Leste will sign a consulting service agreement with a Japanese consulting firm. The consulting service agreement shall be divided into two phases, one for the detailed design and the other for the construction supervision.

### **2-2-4-4-2 Detailed Design**

Scope of the consulting services under the detailed design phase shall include the followings.

- 1) Field survey as needed for designing and detailed design (including stability analysis of structures as retaining wall, stability analysis of anchor and variety of examination works)
- 2) Preparation of tender documents based on the detailed design
- 3) Estimation of construction cost based on the detailed design (Review on the cost estimate under the Implementation Review Study) and fixing of ceiling price
- 4) Assistances in PQ evaluation, attendance in tender, tender evaluation and assistances in contract negotiation.

It is planned also that the following designated engineers, specialist as well as staff will be assigned as a consultant's team to perform the consulting services as mentioned above.

Project Manager (Chief engineer)

Design Engineer for Landsliding Prevention

Geologist for Landsliding Prevention

Tender Document Specialist

Construction Planning Engineer/Cost estimate

Draftman

#### 2-2-4-4-3 Construction Supervision

Scope of the consulting services under the construction supervision phase shall include the followings.

- 1) Consultation meeting among parties concerned prior to the commencement of construction works
- 2) Processing for the approval of construction drawings
- 3) Supervising works for control of progress, quality and safety in construction works
- 4) Factory inspection on the equipment/materials before shipping, survey on quantities completed, various tests, quality tests and completion inspection
- 5) Preparation of reports during the construction period and reporting to client and JICA
- 6) Issuance of completion certificate for construction works and payment certificate

Concerning the organizational set-up for the construction supervision, the Project Manager will assume the overall responsibility of construction supervision with having a Resident Supervisor assigned at the project site throughout the construction period. Further, the Electrical Engineer will be assigned for the spot-supervising on the electrical restoration works for the service reservoir and an inspector will be assigned to attend the completion inspection at the time of termination of construction works. Under the construction supervision plan for the subject project, a Civil Engineer from the third country (Philippines) is to be assigned as the assistant to the Resident Supervisor.

#### 2-2-4-5 Quality Control Plan

For the control of quality and completed quantity, it is planned to apply the following quality control methods. Inspection/test results shall be recorded for each item of works and such specification, structure and functions as specified in the contract shall be secured. It is expected that concrete is to be procured from the local contractors in Dili and in case of mixing in place quality inspection is necessary to be undertaken for each section of concrete placing depending on the importance of the structures.

**Table 2-2.36 Contents of Quality Control Plan**

Works	Items to be controlled	Method	Frequency
Embankment	Compaction degree	In-site density test	For major parts
Excavation bed	Soil condition Width/height	Visual Measurement of dimension/height	For major parts For major parts
Wet Masonry	Stone, Mortar	Stone size, Mixed proportion between sand and cement	Every 400m <sup>2</sup>
Concrete	Aggregate Cement Concrete	Grain-size analysis test Physical test/Chemical test Slump, air, water/cement ratio and compressive strength test (7days, 28days) Quality Certificate by plant for Ready-mixed concrete	Once Once Every class placement once a day And also each 150 m <sup>3</sup>

Works	Items to be controlled	Method	Frequency
Reinforcement bar	Strength Assembling condition	Tensile strength test Rebar assembling inspection	Once Every parts
Form, Support	Setting Location Strength	Fixing location & method Design & calculation report	Every parts As required
Anchor	Mortar	Compressive strength test Flow-table test	Each day
Structure as built	As built dimension	Measuring dimension	For major parts
Water proofing works	Quality of material Condition of coating Existence of leakage	Check of quality certificate Visual Water impound test	Every certificate Every service reservoir - ditto -
Mechanical equipment	Installation accuracy Function	Installed position measurement Loaded operation test	For all equipment For all equipment on operation test
Pipe material Piping works	Strength, dimension Appearance, dimension Torque Welding Existence of leakage	Check of mill test report Visual, size check Torque wrench Color check Water pressure test	Each approval Every delivery, Every installation As required 5% of welded length Every new alignment

In undertaking the quality control as specified above, the following standards/guidelines are to be applied and during the course of detailed design a consultation meeting with DNSAAS shall be held so that the selected standards be reflected in the tender documents.

- JIS - Japanese Industrial Standards
- JWWA - Japanese Water Works Association
- SNI - Standard National Indonesia
- ACI - American Concrete Institute
- ASTM - American Society for Testing and Materials
- BS - British Standard
- ISO - International Organization for Standardization

Further, concerning the standards for construction supervision, the Resident Supervisor assigned shall prepare them referring to the followings and apply the same with keeping them at the site office.

- Standards for civil work construction supervision, ministry of Land, Infrastructure, Transportation and Tourism, Government of Japan
- Guideline for standard construction supervision under Grant Aid project, JICA

#### **2-2-4-6 Plan for Procurement of Construction Materials**

##### **2-2-4-6-1 Procurement of Materials**

In Timor-Leste, almost all the construction materials are imported ones except sand and rock/stone materials. Due to this there are several liner-ships are on services and several construction materials suppliers are operating the business with imported materials from Indonesia, Singapore and Australia. With this situation, construction materials in general are available in Timor-Leste except some special ones.

In price-wise, however, materials available in the country are comparatively higher than the neighboring countries and also due to the limited quantity of materials handled by the whole-sellers in Dili, direct purchase from the neighboring countries may be advantageous in case of big quantity of materials to be procured.

In view of the above-mentioned situation, whether the materials be purchased from the local dealer or by direct purchase from the neighboring countries shall be judged taking into account the transportation cost, delivery period and the price itself. The following table shows possible sources of materials to be procured.

**Table 2-2.37 Sources of Materials Procurement**

Items	Demarcation			Remarks
	Timor -Leste	Japan	Third country	
1) Concrete	○			
2) Sand	○			
3) Fine aggregate & coarse aggregate	○			
4) Cement	○		○	It is preferable to procure from abroad directly in case of heavy use, though imported ones are in circulation.
5) Reinforcing bar	○		○	
6) Stone	○			
7) Wood / timbers	○		○	It is preferable to procure from abroad directly in case of heavy use, though imported ones are in circulation.
8) Plywood	○	○	○	
9) Steel scaffold & scaffold board		○		
10) Material for form		○		
11) Water stop, joint filler		○		
12) Coating material for waterproof		○		
13) Steel pipe		○		
14) Valves		○		
15) Gate		○		
16) Fuel & lubricant	○			

Note: Third countries assumed are Indonesia, Australia and Singapore.

### **(1) Aggregate / Stone Materials**

Under this project, it is planned to procure the concrete from the local contractor who has a concrete plant in Dili and there expected no need for purchasing aggregate materials in large quantity. While the project requires procuring much stone materials for uses in wet masonry revetment and wet stone pitching works. Aggregate and stone materials are available by collecting from the Comoro river and others and materials dealers purchase the aggregate and stone materials from the local residents. Therefore, such aggregate and stone materials are to be purchased from the local dealers as said.

### **(2) Cement**

Cement is all imported and mainly it is of made in Indonesia generally. In case if a lot of cement is required for construction purpose, cement is either purchased from the domestic whole-seller or local contractor or procured directly from the exporter in Indonesia. The cement price at the time of field survey (1 month period) has been escalated two times due to the global basis price escalation for all the commodities.



There is a report that Indonesian-made cement can not secure 35N/square mm, required strength for the high strength concrete, and due attention shall be paid in case of using the Indonesian-made cement for the high strength concrete.

### **(3) Concrete**

At the downstream area of Bemos Water Treatment Plant, there is a local contractor (Australian finance) who has a concrete plant, and many of the constructors purchase the concrete from this local contractor. Through testing no problem is found in its quality and for the project cement is planned to be procured from the same local contractor. Further, in case if it is necessary to use partially cast-in place concrete, such concrete shall be prepared by using aggregate, cement and water satisfying the specifications and applying the mixing ratio as confirmed satisfactorily in the mixing test.

**Table 2-2.38 Standard for Concretes**

Kind of concrete	Compressive strength
Plain concrete	18N/mm <sup>2</sup>
Reinforced concrete	21N/mm <sup>2</sup>
Pavement concrete	21N/mm <sup>2</sup>

### **(4) Reinforcing Bar**

All the reinforcing bar being availed in the country is imported one. The most are from Indonesia and followed by Australia. The price is even higher than the market price in Japan due to the inclusion of high transportation cost. Under the project, it is estimated that as much as 40 tons of reinforcing bar is required and policy of procurement is to purchase the same made in the third countries which secures the quality standard and available in the local market.

### **(5) Steel Pipes and Valves**

For the existing raw water main from Bemos intake to the treatment plant, steel pipes of JIS standard are used. Under the subject project, steal pipe needed for renovation of lower reservoir in Bemos Water Treatment Plant is planned to be procured from Japan. Isolating valves and air valves too, source of the procurement is planned to be Japan.

### **(6) Materials for Temporary Works**

Such materials for form-work as form-tie, wooden cone and separator are not available in Timor-Leste and planned to be procured from Japan. Also the materials for temporary works as steel-scaffolding and steel supports are not commonly available in the market in Timor-Leste and planned to be procured from Japan. While, such materials used for temporary works as colgate pipes and PVC shall be locally procured.

#### 2-2-4-6-2 Procurement of Construction Machineries

Under the urgent re-construction program implemented with the UN aid, there were high demands for various construction machineries and several local contractors affiliated by foreign contractors own various types of common construction machineries such as backhoe, bulldozer, dump truck and truck crane. As is the case, these machineries are available in Timor-Leste on rental basis.

**Table 2-2.39 Sources of Machineries Procurement**

Items	Demarcation			Remarks
	Timor-Leste	Japan	Third country	
1) Backhoe	○			0.6m <sup>3</sup> class
2) Bulldozer	○			15t class and 3t class
3) Motor grader	○			3.1m class
4) Dump truck	○			10t、 4t
5) Truck with crane	○			4t (2.9t crane)
6) Truck crane	○			10-11t、 25t、 35t
7) Tire roller	○			8-20t class
8) Vibration roller	○			0.8-1.1t class
9) Concrete mixer	○			0.2-0.3m <sup>3</sup>
10) Concrete mixer truck	○			5m <sup>3</sup>
11) Generator	○			2kVA, 5kVA, 45kVA
12) Pump	○			8inch、 2inch、 6inch
13) Welding machine	○			Engine 300A
14) Tamper	○			60~100kg
15) Boring machine		○	○	

Note: Third countries assumed are Indonesia, Australia and Singapore.

It is noted, however, that the rental cost of these machineries remains at very high level similar to the previous case, since these machineries were urgently imported from neighboring countries by local contractors without having any rental market and most of the rental contracts were concluded with very high rate at the time of UN's urgent re-construction program implementation.

In case of construction machineries to be used on long term basis, there are possibilities that the cost of machineries procured from the third countries or Japan can be lower than the rental cost in Timor-Leste, and therefore, procurement of construction machineries shall be determined through examining the assignment period of the machineries and other relevant factors. The following table shows the possible sources of the procurement of major construction machineries.

#### 2-2-4-7 Implementation Schedule

Project implementation schedule is planned with the following period where dry season factor is the key in accomplishing efficiently work progress for such river structures as intake facilities and also the service reservoir of Bemros Water Treatment Plant.

Detailed design : Approx. 3.0 months (Including tendering)

Construction : Approx. 12.0 months (Contract signing to the completion)

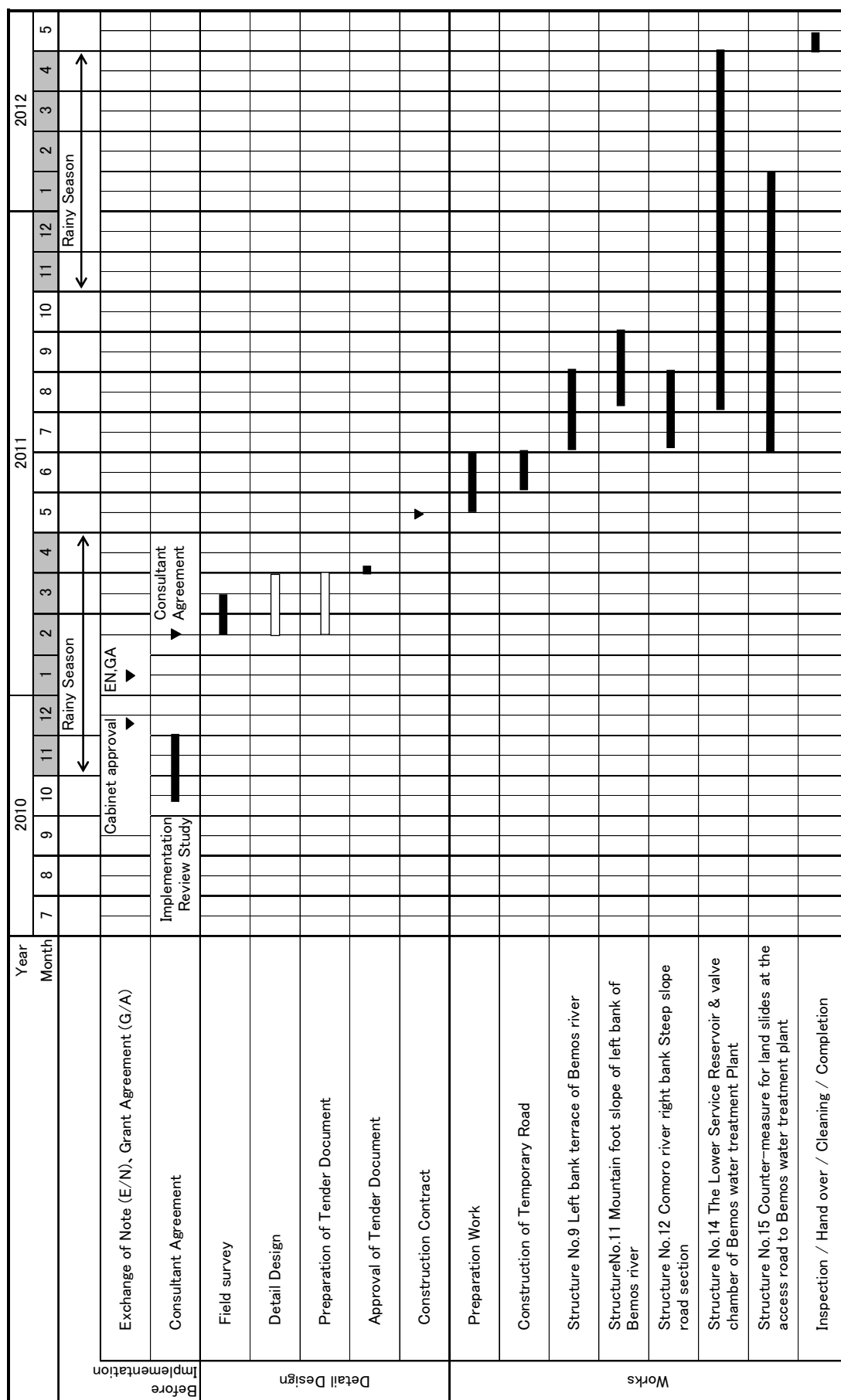


Fig. 2-2.23 Project Implementation Schedule

## **2-3 Obligations of Recipient Country**

In order to secure smooth project implementation and operation and maintenance, obligations of the measures to be undertaken by the Government of Timor-Leste during preparation, procurement of equipment, construction and operation and maintenance under the Grant Aid Project is outlined as follows.

### **(1) General**

- 1) To secure lands necessary for the facilities to be constructed and installation of the materials and equipment,
- 2) To provide facilities of electricity and others needed for the Project implementation at outside the sites,
- 3) To bear the necessary commission to the bank based on the Banking Arrangement,
- 4) To ensure prompt execution of un-loading and customs clearance for the materials and equipment to be brought into under the Project,
- 5) To exempt Japanese nationals from customs duties, internal taxes, and other fiscal levies which will be imposed in Timor-Leste with respect to the supply of materials, equipment and services or to bear the same,
- 6) To accord Japanese nationals who offer services for the Project for their entry into Timor-Leste and stay therein for the performance of their works,
- 7) To operate and maintain the facilities and equipment provided under the Grant Aid properly and effectively, and to inform the condition of the operation and maintenance of the facilities and equipment as requested by the Japanese side,
- 8) To bear all the expenses other than those to be borne by the Grant Aid, necessary for the implementation and operation and maintenance of the Project.

### **(2) Obligations to be Undertaken Prior to and during the Implementation of the Project**

- 1) To bear the necessary pump operation cost required for water distribution for about 6 months during construction in association with the implementation of improvement work of the Lower Service Reservoir and Valve Chamber in the Bemos Water Treatment Plant.
- 2) To inform beneficiary completely through explanation meeting to local residents, newspapers and/or advertising boards regarding interruption of water supply that will continue for five hours from 10:00AM to 3:00PM and three days a week as the maximum due to the improvement work of the Raw Water Main.
- 3) In order to obtain the permission and royalty exemption for mining river stone material, DNSAS shall make arrangement to clear the following procedures in accordance with the on-going the Present Project experience.
  - To obtain the permission from agencies concerned for mining river stone material,
  - To obtain the permission from the Ministry of Infrastructure (MOI) on the aspect of river flow management,

- To obtain the permission from the National Directorate for Environmental Services, Ministry of Economic & Development with regard to environmental aspect,
  - To obtain the right of quarry works from Forestry and Water Resources Department, Ministry of Agriculture, Forestry and Fisheries, and
  - To explain the project details to the municipalities and communities in and around the project sites, and to obtain their consents.
- 4) To make emergency measures and rehabilitate the facilities by the government own budget in case the raw water main would have been damaged by the flood before implementation of Japan's grant aid project.

## 2-4 Project Operation Plan

### 2-4-1 Operation and Maintenance System and Staffing

Production Unit, Dili O&M Division, Dili Water & Sanitation Department is in charge of operation and maintenance work of Bemos raw water main and Bemos water treatment plant. Two contracted caretaker workers living in neighboring village inspect on foot along pipeline to the intake and keep clean the screen everyday. Also other two staffs operate the plant and care for the Lower Service Reservoir. Chief operator is resident in quarters inside the compound.

In the case that facilities are damaged or leakage occurs, if it is a minor nature, the staff belonging to Technical Unit, Dili O&M Division, Dili Water & Sanitation Department repairs it directly. When disaster strikes the facilities or pipe is broken seriously, Dili Water & Sanitation Department requests Planning & Development Department to repair it. Then Planning & Development Department makes survey, design, and cost estimation for tendering and supervises the repair work to be done by a contractor.

**Table 2-4.1 Operation and Maintenance System and Staffing  
for Bemos Raw Water Main and Bemos Water Treatment Plant**

Facilities	Bemos Raw Water Main and Intake		The Lower Service Reservoir in Bemos Water Treatment Plant	
Work level	Daily check, Periodical maintenance	Repair work after accident or disaster	Daily operation, Periodical maintenance	Accident response
Higher-level unit for management	DNSAS Dili water & Sanitation Dept. Dili O&M Div.	DNSAS Planning & Development Dep. Survey Planning & Design Supervision Div.	DNSAS Dili water & Sanitation Dept. Dili O&M Div. / Water Quality Analysis Div.	DNSAS Planning & Development Dep. Survey Planning & Design Supervision Div.
Implementation unit for actual works	DNSAS Dili water & Sanitation Dept. Dili O&M Div. Production Unit Intake keeper 2 persons	DNSAS Dili water & Sanitation Dept. Dili O&M Div. Technical Unit	DNSAS Dili water & Sanitation Dept. Dili O&M Div. Production Unit Plant operator 2 persons	DNSAS Dili water & Sanitation Dept. Dili O&M Div. Technical Unit

### 2-4-2 Contents of Operation and Maintenance Works

DNSAS will be responsible to manage properly the improved facilities with the above O & M system and staffing after the project implementation. Recommended work items are shown on the following tables. The project of human resource developing in waterworks authority in Timor-Leste as a technical cooperation project by Japan is now proceeding with DNSAS. Strengthening of O&M activities in water treatment plant is set up as a result to be accomplished through the project and the expert teams dispatched from JICA will edit the practical O&M manuals and then give technical guidance to DNSAS staff.

**Table 2-4.2 Operation and Maintenance Works on Bemos Raw Water Main**

Work level	Daily check	Periodical maintenance
Management items of High-level unit	Check of logbook	Check of periodical maintenance record Check of record on parts replacement
Assigned Work for implementation unit	Cleaning of intake screen Cleaning of drain and gutter Weeding of maintenance pass	Scouring of sluiceway and grit chamber Covering on the newly exposed pipe Flush out of sludge drain pipe Check of sluice valve and air valve

**Table 2-4.3 Operation and Maintenance Works  
on the Lower Service Reservoir in Bemos Water Treatment Plant**

Work level	Daily check	Periodical maintenance
Management items of High-level unit	Distribution planning Management of flow record Monitoring of water quality control Check of residual chlorine and dosing Management of operation cost	Making Plan of periodical maintenance Historical management of periodical maintenance and repair record
Assigned Work for implementation unit	Outflow valve operation based on distribution plan Surveillance of flow integrator and level meter Recording of flow and keeping logbook Monitoring of chlorination	Leakage check and repair of pipe and valve Operation check and calibration of flow integrator and level meter Drain and cleaning of inside reservoir Touch up paintwork and mortar repair Removal of scale in chlorination pipe Bypass operation

## 2-5 Project Cost Estimation

### 2-5-1 Initial Cost Estimation

On the basis of previously described demarcation of works between Japan and Timor-Leste, itemized shares of cost undertaken by Timor-Leste are estimated as follows.

#### 2-5-1-1 Project Cost to be born by Timor-Leste

Item of Cost	Amount	
① Land acquisition for grit chamber	US\$ ****	***million yen
② Temporary pump operation in Bemos water treatment plant	US\$ 5,000	0.45 million yen
③ Land lease and Cutting tree for temporary road	US\$ ***	*** million yen
④ Charge for Banking Arrangement	US\$ 8,000	0.72 million yen
Total	US\$ 13,000	1.17 million yen

#### 2-5-1-2 Conditions of Estimation

- ① Time of estimation : October, 2010
- ② Exchange rate : 1US\$=89.91yen
- ③ Construction period : as shown in the section 2-2-4-7 implementation schedule
- ④ Others : This project is carried out in compliance with the scheme of Japan's Grant Aid.

### 2-5-2 Operation and Maintenance Cost

The contents of this project are the improvement works for the existing facilities in use and it does not lead a large increase in operation and maintenance cost. Estimated operation and maintenance cost for Bemos raw water main and Bemos water treatment plant is shown in the following table.



**Table 2-5.1 Annual Operation and Maintenance Cost  
for Bemos Raw Water Main and Bemos Water Treatment Plant**

Facilities	Item	Annual Cost (US\$)	Basis
Bemos Raw Water Main	Soil covering for the newly exposed pipe	2,900	estimated as filling soil and compaction covering 30cm × width 2m × length 200m / year
	Cleaning and check for intake and valves	2,040	Level-1 staff <sup>(1)</sup> 85US\$/month × 2 persons
	Sub total	① 4,940	
Bemos Water Treatment Plant	Power	1,272	106US\$/month (average of Jan-May, 2008)
	Chemicals (sub items)	32,448	2,704US\$/month (average of Jan-May, 2008)
	Coagulant		Aluminum sulfate (powder) injection ratio 20mg/L <sup>(2)</sup> × flow volume 77,444 m <sup>3</sup> /month <sup>(3)</sup> × 1.6US\$/kg <sup>(4)</sup> = 2,478US\$/month
	Disinfectant		Calcium hypochlorite (effectiveness 60%) injection ratio 2.5mg/L <sup>(2)</sup> /0.6 × flow volume 77,444 m <sup>3</sup> /month <sup>(3)</sup> × 0.7US\$/kg <sup>(4)</sup> = 226US\$/month
	Plant operation	2,220	Level-1 staff <sup>(1)</sup> 85US\$/month × 1 person Level-2 staff <sup>(1)</sup> 100US\$/month × 1 person
	Sub total	② 35,940	
Repair work and Spare parts		③ 21,248	0.5% of direction construction cost <sup>(5)</sup> 450, million yen × 0.005/105.89US\$/yen
Total		62,128	① + ② + ③
Unit cost for Operation and Maintenance to the distributed water volume from Bemos water treatment plant		0.067US\$/ m <sup>3</sup>	62,128 US\$/year ÷ (77,444m <sup>3</sup> /month <sup>(3)</sup> × 12)

(1): level of public officer in Timor-Leste (2): planned value

(3): Average of distributed water volume from January to May, 2008 recorded by DNSAS

(4): unit price in 2008 (5): Actual finance record of DNSAS from 2005 to 2007 shows that cost for repair work and spare parts in a year is almost five times as much as annual personnel cost. Estimation of repair and spare parts cost for Bemos raw water main and Bemos water treatment plant based on this ratio is nearly equal to the estimation on the above table. (personnel cost(2,040+2,220)US\$/year × 5 = 21,300US\$/year)

## **2-6 Other Relevant Issues**

### **(1) Category Classification on Environmental Impact**

The category of environmental impact by the subject project implementation is classified as C, for which EIA and submission of EMP are not required due to the little impact to the environment. At the time of Implementation Review Study, however, it was found out that the validity of the classification will be effective only up to November 2011, and it was necessary to have the validity extended until the end of the effectiveness. To cope with this, it is confirmed that DNSAS will extended.

### **(2) Procedures for Securing Permission for Sand and Gravel Collection**

For the rehabilitation works for raw water main, it is expected that construction contractor will take sand/gravel material in and around the site for which permissions are required from NDES and the Minister in charge of natural resources. The C category as mentioned above implies the judging by NDES that the subject project will cause a little environmental impact due to the little quantity of sand and gravel materials used for the project and accordingly permitted. However, it is necessary to confirm further that the classification shall be valid and effective until the completion of the subject project implementation.

In the application for permission from the Minister of natural resources, it is necessary to attach information (outline) on construction works under the project and locations showing material collecting as planned, and these information can be available in the construction plan documents which will be submitted to DNSAS after the construction contract becomes effective. After the contract signing, DNSAS is to obtain the construction plan documents soonest possible and proceed to apply for the permission from the Minister, as agreed upon.

## **Chapter 3 Project Evaluation**

## **Chapter 3 Project Evaluation**

### **3-1 Recommendation**

#### **3-1-1 Matters to be Undertaken by the Government of Timor-Leste for Implementation of the Project**

It is noted that the followings are the matters to be undertaken by the Government of Timor-Leste for Implementation of the Phases II Project.

1) Environmental and Social Considerations

The Phases I Project and Phase II Project categorized as Category C, which means that the serious environmental and social impact is not expected during construction and after completion of the project and the project will be implemented based on EIA guideline, by DENS. However, validity of permission of EIA is for one year, so it is necessary for DNSAS to extend the permission until the valid period.

2) Permission for land use related to the Project

It was confirmed that the slope area around landsliding at access road to Bemos Treatment Plant is national property. Moreover, the permission from the concerned authorities for land use related to the Project such as countermeasure for landsliding should be proceed by DNSAS.

3) Cost for Pump Operation during renovation of Lower Service Reservoir

It is necessary to pump up treatment water to upper service reservoir for temporary instead of lower service reservoir during construction in association with the implementation of improvement work of the Lower Service Reservoir and Valve Chamber in the Bemos Water Treatment Plant. The contractor should prepare the temporary pump system. DNSAS should bear operation cost required for water distribution during construction.

4) Notice to water users about schedule interruption of water supply

The Government of Timor-Leste should keep water users informed of schedule interruption of water supply due to the improvement work of Raw Water Main through meeting, newspapers and advertising board.

5) Explanations to municipalities and communities around project site

The Government of Timor-Leste should explain the project detail to the municipalities and communities around project site, and to obtain their consents. Mining river stone material

6) Excavations of River Stone/ Sand

The Government of Timor-Leste should ensure that Japanese Contractor can sand and gravel without charge from Bemos and Comoro River for the construction work of Phase II Project.

#### **3-1-2 Matters to be Undertaken by the Government of Timor-Leste**

It is noted that the followings are the matters to be undertaken by the Government of Timor-Leste and related recommendations to bring about the project effects positively and in sustainable manner.

### **(1) Sand Flushing Works for Intake and Raw Water Main**

With the implementation of the subject grant aid project, a grit chamber and sand sluiceway will be newly provided at the intake facility. Before the project those accumulated sands had been removed from the pipeline on a regular basis, but after the project the same will be deposited at the intake, requiring a regular sand flushing works. Also, the number of wash-out attached along the pipeline be increased considerably. It implies that through the facilities improvement as mentioned, the sand flushing works become much easier as compared with the previous situation. It is, therefore, necessary for DNSAS to secure required O & M personnel and budget and undertake O & M activities systematically in a sustainable manner.

### **(2) Maintenance of Raw Water Main Pipeline in the River Course**

Bemos River is a steep slope river and it is expected that such erosion and sedimentation will be repeated every year during the flooding periods even after the subject rehabilitation/improvement works under the project be completed. Therefore, it is deemed necessary for DNSAS to take regular maintenance/repair works such as earth covering for the newly exposed pipes and repairing of gabions damaged due to erosions. This shall include such preventive measures as required in various aspects so as to avoid any large scale accidents/damages which may cause breaking of pipes and water supply suspension.

### **(3) Operation and Maintenance of Bemós Water Treatment Plant**

Concerning the Bemós Water Treatment Plant, the treatment unit which is the core of the plant, has been lately rehabilitated as the grant aid project by the Government of Japan in 2007, and with the implementation of the subject project, raw water supply for the plant will be stably secured as originally planned and further the sustainable use of service reservoir can be secured for a long term basis, operation of the plant to satisfy a systematic water supply plan could be possible. To this end, DNSAS is requested to secure required staff and budget for practicing the reliable/steady plant operation in addition to regular and timely procurement of chemicals, O & M of electro-mechanical facilities and quality control of the treated water and etc.

### **(4) Collaboration with Technical Cooperation Project and Other Donors**

Under the technical cooperation project of “Human resource development in waterworks authority in Timor-Leste” by JICA, which is to be implemented during the period from September 2008 to March 2011, a variety of guidance and training programs are to be provided for the staff/workers in charge of DNSAS. Accordingly, it is expected that practical O & M manual to be prepared by the said project would be fully utilized for the O & M activities by DNSAS staff/workers for the subject raw water main and related facilities.

Further to mention, it is considered necessary and meaningful if the Engineer/expert in charge of the said technical cooperation project by JICA may have regular meetings and exchange ideas/opinions with ADB/Aus AID/other donors for water supply sector concerning such important topics as project implementation methods, problem areas on O & M of water supply facilities and actual examples of effective countermeasures and etc. further to mention, it is expected that in Zone 3

and Zone 4 of the service area will be adopted with hourly water supply restriction during the construction work for Bemos raw water main and the Lower Service Reservoir, and at the same time in zones 2,4 and 5, it is expected also to have pipe laying works for water supply main and distribution branches under the ADB project. In view of the above, it is quite necessary to have a good coordination among DNSAS, ADB, the above mentioned JICA technical cooperation project and the subject grant aid project concerning the manner how to secure water supply for the people in the relevant zones.

Among others, the subject grant aid project will cause an effect to increase the raw water supply to the Dili water supply system, and it is necessary to materialize the project effect in the form of increased water supply quantity as well as increased supply hours within the service area or in the city area. To cope with this, the following-mentioned associated conditions are to be fulfilled mainly by DNSAS.

- Consolidation of distribution pipe network including main and branches
- Fixing contract for water supply and payment, connecting pipe works and education program for residents
- Making customer registration book and employment of meter-checker

In view of the above requirement, it is considered quite important to have the project effects as derived from ADB supported project be materialized as soon as possible.

## **3-2 Project Evaluation**

### **3-2-1 Relevance of the Project**

- Target beneficiaries of the project are 5.7 million peoples (at 2006), which is 35 % of the population of Dili, in zone 3 and 4 of water supply service area in Dili.
- The project purpose is to secure safety and sustainable water supply to zone 3 and 4 of water supply service area in Dili, and also contribute to the improvement of BHN in Timor-Leste. Improvement of water supply facilities will bring improved people's lives. It is important to improve the water supply condition in order to stabilize people's livelihood considering that riots have occurred in the past in Dili.
- Bemos River, which flows near the target sit of the Project, is steep stream and flood occurred in every rainy season gives the big damage to the water facilities near the river, therefore, it is necessary to rehabilitate the damaged facilities as soon as possible. Lower service reservoir in Bemos water treatment plant has deteriorated, it is possible to collapse in case of no rehabilitation, it is required to rehabilitate soon.
- Intake and pipeline, which will be rehabilitated in the Project, is adapted to gravity flow system. Periodical sediment works become easy by improvement of intake and adding the wash out facilities. It is possible to maintain the facilities by present staff and present budget of DNSAS. Water delivery system of the water treatment plant after the rehabilitation of lower service reservoir is same as present condition, daily peroration and maintenance of the fasciitis can be done by present staff.

The high technology and special equipments will not be used in the Project.

- In Timor-Leste, one of the priority target of national development plan is to improve the nation health , it's strategy is to become that 80 % of urban people can access the safety water during 24 hours. The project contributes to achieve the above purpose.
- The purpose of the Project is to secure the enough water supply in Dili. The Dili water supply system is public service under DNSAS, it is necessary to increase the income of charge in order to secure the labor cost and OM cost. It is required to strength the finance of DNSAS, however, the Project doesn't have high profit which the private sector would invest.
- The amount of drawing water will increase after the Project, but it is assumed on the plan, there will not big influence in human life and agriculture and fishery. During the construction, there will not minus influence to social environment, such as resettlement, traffic obstruction, community interruption, influence of remain and cultural heritage. About consideration of natural environment, there is plan to flow the water treated from construction dirty water in the site.
- The project is general civil works, it is possible to implement by local contractor and/or using local worker and foreign engineer under the Japanese contractor management. The construction material and equipment is planed to procure from Timor, Indonesia and Japan, it is no problem to procure.

### **3-2-2 Effectiveness of the Project**

The following effects are expected after renovation of Bemós – Dili water supply system by the implementation of this project.

#### **(1) Quantitative effect**

It is possible to supply water continuously without damaged by flood after rehabilitation. Water supply volume will increase and it is possible to reduce the stop of the water supply, because maintenance becomes easy after installation of wash out facilities and grid chamber.

**Table3-1.1 Index of Quantitative effectiveness**

Index	Reference on 2009	Target on 2013
Supply water volume	7,800 m <sup>3</sup> /day	8,800 m <sup>3</sup> /day
Number of day to stop water supply per year	7 days	0 days

#### **(2) Qualitative effect**

The qualitative effects are as follows

- After rehabilitation of the water supply system, the supply for raw water to water treatment plant will be stabilized therefore it contributes to improve the water supply and sanitation in Dili.
- By stabilization of raw water supply, it is possible to operate water supply facilities and to supply water deliberately, it contribute to establish water fee collection system.

As mentioned previously, this project contributes to improve sanitation and public health in Dili.

Therefore, it is relevant to carry out project by Japan grant aid. It is possible to operate and maintain the facilities by DNSAS after the rehabilitation, because of enough budget and staff. Thus, it is judged the implementation of Project is high relevant and effective.



## Appendices

Appendix-1: Member List of the Study Team.....	A1-1
Appendix-2:Study Schedule .....	A2-1
Appendix-3:List of Parties Concerned in Timor-Leste .....	A3-1
Appendix-4:Minutes of Discussions .....	A4-1
4-1    At Field Survey of Study.....	A4-2
4-2    At Explanation on Draft Study Report.....	A4-14

## Appendix-1 Member List of the Study Team

### 1-1 Members of the Implementation Review Study Team

Name	Job title	Occupation
Mr. Hiroshi ENOMOTO	Team Leader	Chief Representative, JICA Timor-Leste Office
Mr. Kosuke HIROTA	Chief Engineer	Manger, Project Operation Division No.2, International Department, Sanyu Consultants Inc.
Mr. Osamu MATSUBARA	Civil Engineer for Landsliding Prevention	Chief, Project Operation Division No.2, International Department, Sanyu Consultants Inc.
Mr. Takanori NAKAJIMA	Geologist for Landsliding Prevention	Chief, Project Operation Division No.2, International Department, Sanyu Consultants Inc.
Mr. Asaharu NAGAHARA	Construction Planning / Cost Estimation	Adviser, Project Operation Division No.2, International Department, Sanyu Consultants Inc.
Mr. Takamitsu INOUE	Civil Engineer for River Structure / Construction Planning / Cost Estimation	Chief, Project Operation Division No.2, International Department, Sanyu Consultants Inc.

## Appendix-2 Study Schedule

Date	Mr. Hiroshi ENOMOTO Team Leader	Mr. Kosuke HIROTA Chief Engineer	Mr. Osamu MATSUBARA Civil Engineer for Landsliding Prevention	Mr. Takanori NAKAJIMA Geologist for Landsliding Prevention	Mr. Asaharu NAGAHARA Construction Planning / Cost Estimation	Mr. Takamitsu INOUE Civil Engineer for River Structure / Construction Planning / Cost Estimation
Oct. 14 Thu						☆Request of quotation to local contractor
Oct. 15 Fri.						☆Coordination
Oct. 16 Sat		Trip Tokyo - (11:30am, SQ637, 17:40) - Singapore - (19:00, SQ948, 21:30) - Denpasar				☆Coordination
Oct. 17 Sun		Tripe Denpasar - (10:35, MZ8480, 13:25) - Dili Team meeting				Team meeting
Oct. 18 Mon	☆Meeting at JICA Timor office					
	☆Meeting with DNSAS and explanation on Ic/R and Questionnaire					
Oct. 19 Tue		☆Survey on landsliding and Preparation of sounding test				
		☆Courtesy call to EOJ ☆Site survey on other structure ☆Confirmation of natural condition and social condition ☆Confirmation of development plan and assistance by other donor ☆Survey on environmental and social conditions ☆Confirmation of the obligations of the Government of Timor-Leste		☆Survey on landsliding ☆Sounding test		☆Site survey on other structure ☆Site survey on other structure ☆Market survey on construction material and interview to local contractor ☆Collection of quotation and checking and re-request if need. ☆Survey for safety management
Oct. 20 Wed						
		☆Team discussion about survey result				
Oct. 21 Thu		☆Preparation of a report on the survey result			☆Receiving the quotation	
		☆Discussion with DNSAS about M/D ☆Signing on M/D		☆Making plan on the countermeasure for landsliding		☆Preparation of cost estimation
Oct. 22 Fri		☆Preparation of cost estimation				
		☆Preparation of a report on the survey result				
		☆Report to DNSAS and confirmation of schedule				
	☆Report to EOJ, JICA					
Oct. 23 Sat						
Oct. 24 Sun		Tripe Dili - (15:25, MI295, 18:10) – Singapore Tripe Singapore - (23:45, SQ638, 07:50) – Narita				

### Appendix - 3 List of Parties Concerned in Timor-Leste

No.	Name	Position
<b>Ministry of Infrastructure</b>		
1.	Mr. Arq. Januario da Costa Pereira	Secretary of State on Electricity, Water and Urbanization
<b>National Directorate of Water and Sanitation Services (DNSAS), Ministry of Infrastructure</b>		
1.	Mr. Joao Pereira Jeronimo	Director
2.	Mr. Gustavo da Cruz	Finance Department
3.	Mr. Celso A. S. Pereira	Dill Water Supply Department
<b>Embassy of Japan</b>		
1.	Mr. Iwao Kitahara	Ambassador
3.	Mr. Masamichi Abe	First Secretary
<b>JICA Timor-Leste Office</b>		
2.	Mr. Hiroshi Enomoto	Resident Representative
3.	Mr. Tomoko Uchikawa	Assistant Resident Representative

**Appendix-4 Minutes of Discussions**

Appendix 4-1 At Field Survey of Study (October 21, 2008)..... A4-2

Appendix 4-2 At Explanation on Draft Studt Report (November 8, 2010) ..... A4-14

**MINUTES OF DISCUSSIONS**  
**ON**  
**THE IMPLEMENTING REVIEW STUDY**  
**ON**  
**THE PROJECT FOR URGENT IMPROVEMENT OF**  
**WATER SUPPLY SYSTEM IN BEMOS-DILI (PHASE II)**  
**IN THE DEMOCRATIC REPUBLIC OF TIMOR-LESTE**

In response to a request from the Government of the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste"), the Government of Japan decided to conduct an Implementing Review Study on the Project for Urgent Improvement of Water Supply System in Bemós-Dili (Phase II) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Timor-Leste the Implementing Review Study Team (hereinafter referred to as "the Team"), which is headed by Hiroshi ENOMOTO, Chief Representative, JICA Timor-Leste Office, and is scheduled to stay in the country from October 17 to October 23, 2010.

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


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

Dili, October 21, 2010

榎本 浩

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Mr. Hiroshi ENOMOTO  
Leader  
Implementing Review Study Team  
Japan International Cooperation Agency (JICA)



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Mr. Januario da Costa Pereira  
Secretary of State for  
Electricity, Water and Urban Development  
Ministry of Infrastructure  
The Democratic Republic of Timor-Leste

## ATTACHMENT

### 1. Purpose of the Study

The main purpose of the Study is as follows:

1-1. To review the project cost estimation on the basis of the detailed design earlier prepared for the components\* which were excluded from the present grant project "The Project for Urgent Improvement of Water Supply System in Bemos-Dili".

- \* (1) Protection of pipeline by revetment at left bank terrace No.1,
- (2) Protection of pipeline by revetment at left bank terrace No.2,
- (3) Construction of pipe protection and concrete pavement at Comoro right bank, and
- (4) Renovation of lower service reservoir and valve chamber at Bemos water treatment plant

1-2. To conduct a basic design for the new component\*\*.

\*\* Counter-measure for land slides at the access road to Bemos water treatment plant

1-3. To formulate the entire implementation schedule.

### 2. Project site

The site of the Project is as shown in Annex-I.

### 3. Responsible and Implementing Organization

The Responsible Agency is the National Directorate of Water and Sanitation Services under the Ministry of Infrastructure (hereinafter referred to as "DNSAS").

The organization chart of DNSAS is described in Annex-II.

### 4. Items requested by the Government of Timor-Leste

As the result of discussions, the items described in the following were requested by the Government of Timor-Leste. JICA will assess the appropriateness of the request and will report the findings to the Government of Japan.

- (1) Protection of pipeline by revetment at left bank terrace No.1,
- (2) Protection of pipeline by revetment at left bank terrace No.2,
- (3) Construction of pipe protection and concrete pavement at Comoro right bank, and
- (4) Renovation of lower service reservoir and valve chamber at Bemos water treatment plant
- (5) Counter-measure for land slides at the access road to Bemos water treatment plant

### 5. Japan's Grant Aid Scheme

5-1) The Government of Timor-Leste understood the Japan's Grant Aid Scheme explained by the Team, as described in Annex-III.

5-2) The Government of Timor-Leste side will take the necessary measures and allocate necessary budget properly, as described in Annex-IV, for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

- 5-3) The Team will clarify the necessary undertakings to be taken care by the Government of Timor-Leste besides the undertakings described in Annex-IV based on the result of the study.

## **6. Schedule of the Study**

- 6-1) Consultant members of the Team will proceed to further studies in Timor-Leste until October 23, 2010.
- 6-2) JICA will prepare the draft report in English in the beginning of November 2010.
- 6-3) In case that the contents of the report is accepted in principle by the Government of Timor-Leste, JICA will finalize the report and send it to the Government of Timor-Leste by December 2010.
- 6-4) The Government of Timor-Leste understood that the implementation of the Study is not a commitment of the Project itself.

## **7. Other relevant issues**

### **7-1) Environmental and Social Considerations**

The Government of Timor-Leste explained that Validity of permission of The EIA of the ongoing phase I Project was up to 24 June 2011, and also this permission include Phase II Project.

### **7-2) Permission for land use related to the Project**

The Government of Timor-Leste and the Team confirmed the slope area around landsliding at access road to Bemos Treatment Plant is national property. Moreover, the Government of Timor-Leste agreed that the permission from the concerned authorities for land use related to the Project such as countermeasure for landsliding should be proceed by DNSAS.

### **7-3) Operation and Maintenance**

The Government of Timor-Leste agreed that the water supply facilities belong to DNSAS and the facilities to be rehabilitated by the Project should be maintained by DNSAS with sufficient budget allocation and assignment of necessary personnel.

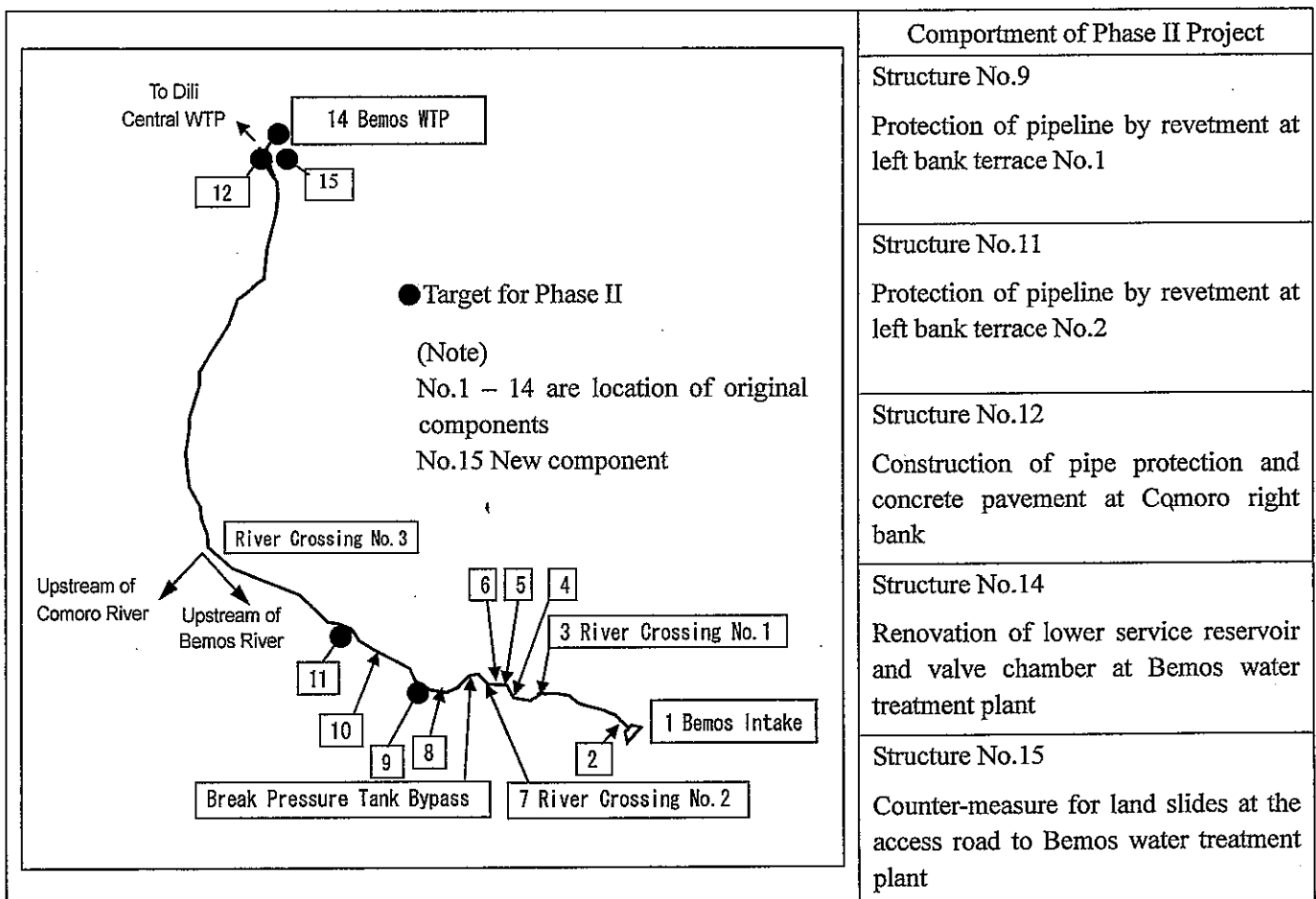
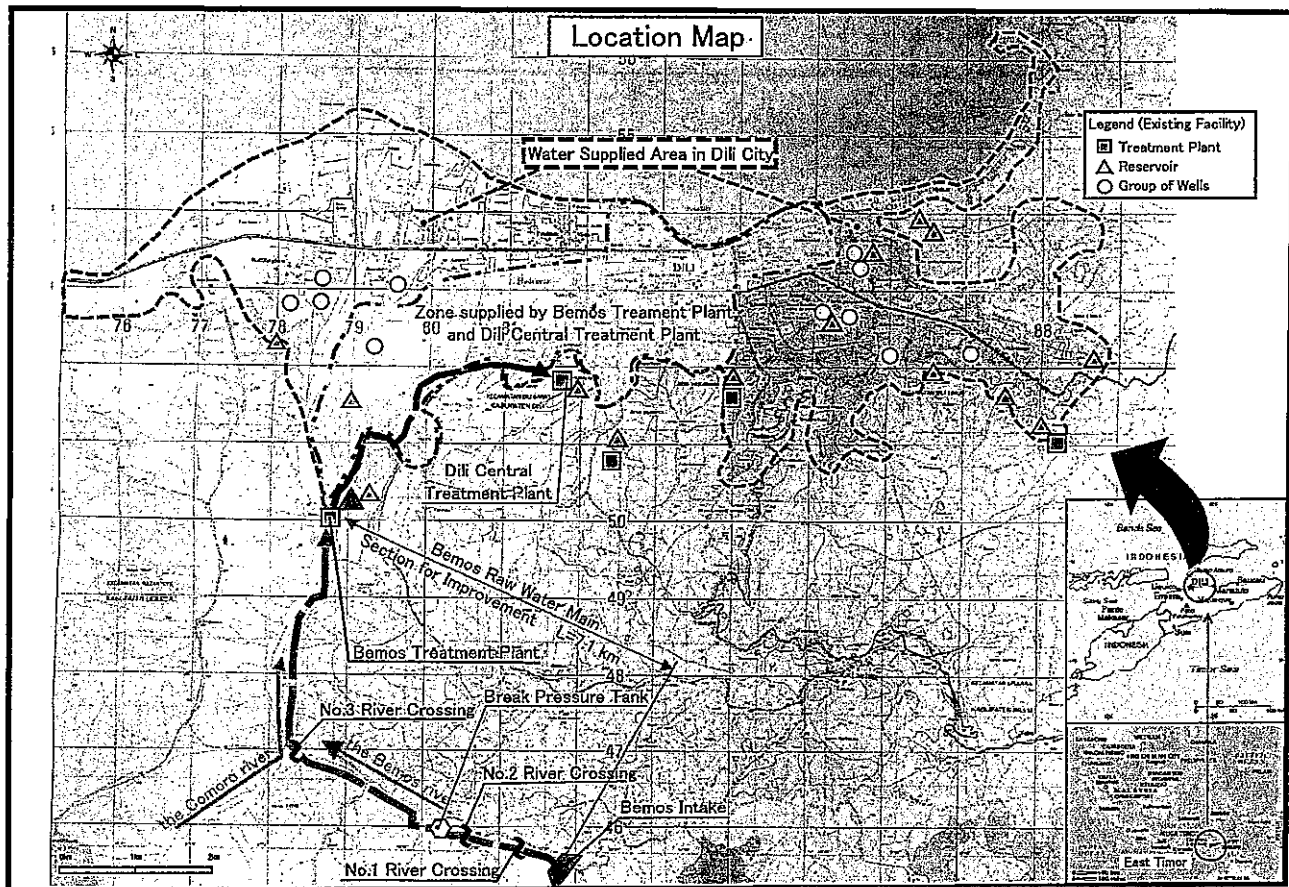
Annex I Project site

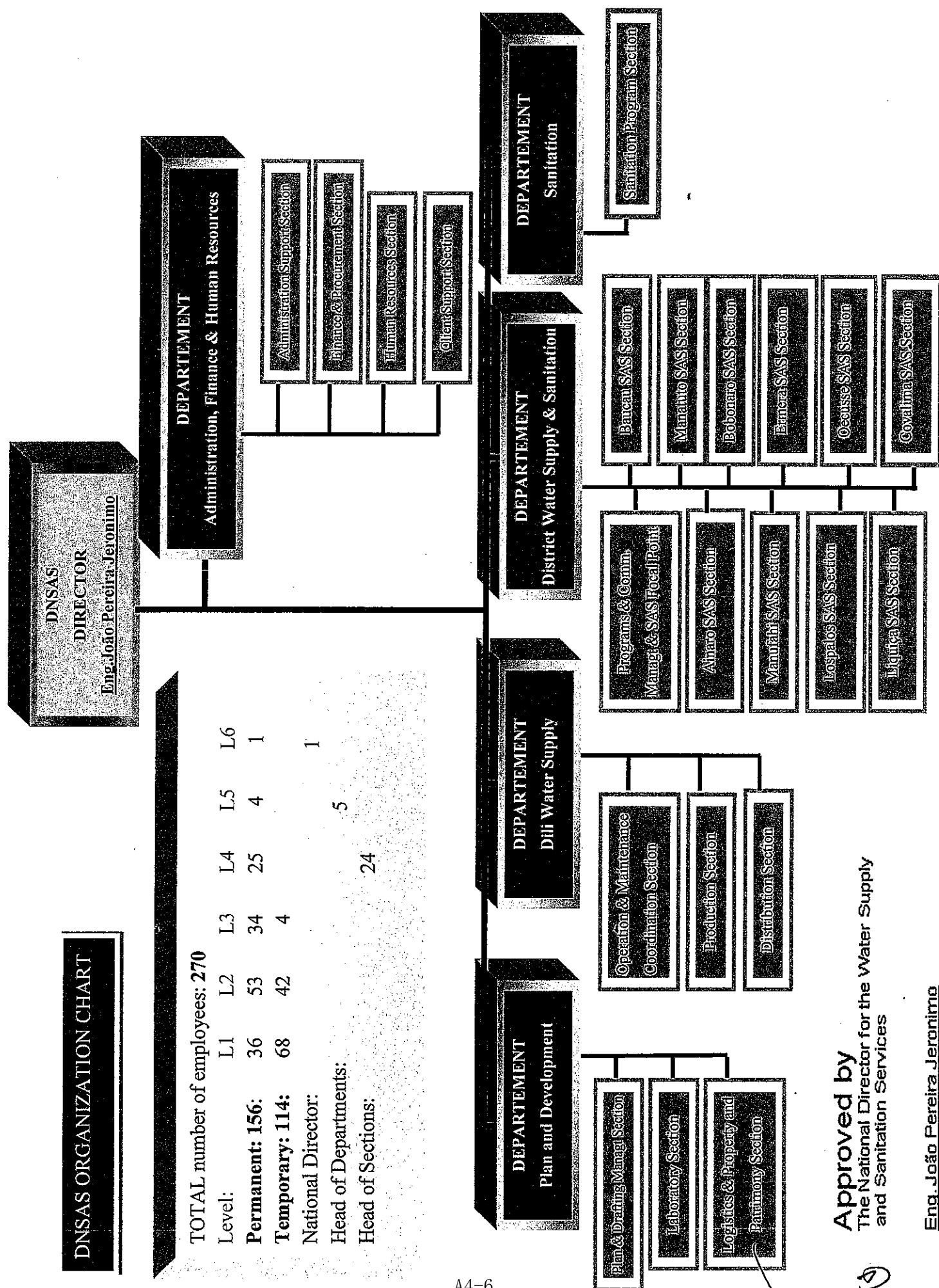
Annex II Organization chart of DNSAS

Annex III Japan's grant aid scheme

Annex IV Undertakings to be taken by the government of the recipient country







## JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as “the GOJ”) is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

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

### 1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

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

### 2. Preparatory Survey

#### (1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a



technical, financial, social and economic point of view.

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

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

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

## (2) Selection of Consultants

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

## (3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

# 3. Japan's Grant Aid Scheme

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

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

## (2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

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

(4) Necessity of "Verification"

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

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

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex IV.

(6) "Proper Use"

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

(7) "Export and Re-export"

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

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

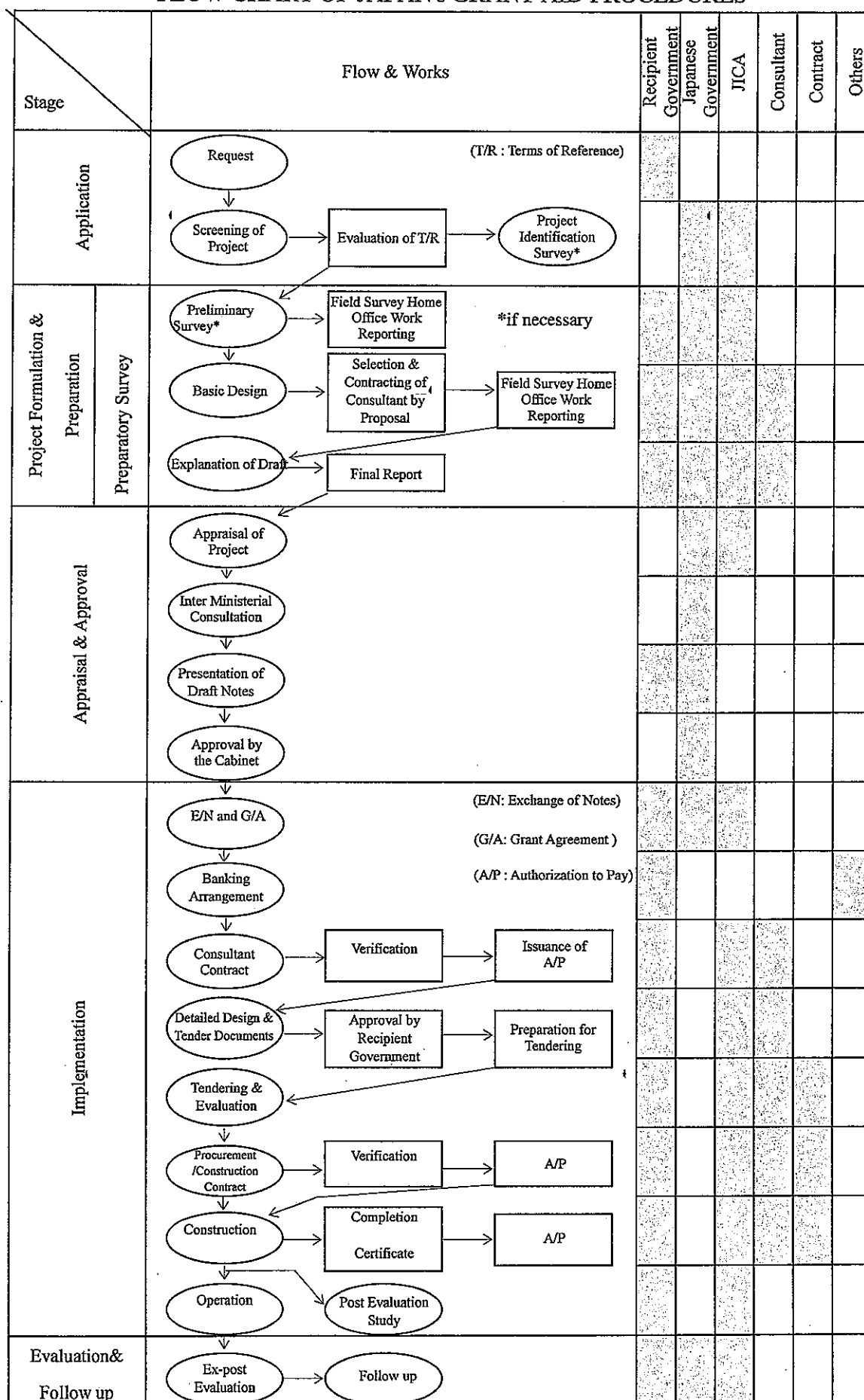
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment

commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

## FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



Undertakings to be taken by the government of the recipient country

1. To secure a lot of land necessary for the Project;
2. To clear and level the site for the Project prior to the commencement of the construction;
3. To provide a proper access road to the Project site;
4. To provide facilities for distribution of electricity, water supply, telephone trunk line and drainage and other incidental facilities outside the sites;
5. To undertake incidental outdoor works, such as gardening, fencing, exterior lighting, and other incidental facilities in and around the Project site, if necessary;
6. To ensure prompt unloading and customs clearance of the products purchased under the Japan's Grant Aid at ports of disembarkation in the recipient country;
7. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
9. To bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);
10. To provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;
11. To ensure that the facilities constructed and equipment purchased under the Japan's Grant Aid be maintained and used properly and effectively for the Project; and
12. To bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project.



### Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To Clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the buildings	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone system		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project Equipment	●	
8	To bear the following commissions to a bank in Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from port of disembarkation to the project site	(●)	(●)
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract.		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

B/A : Banking Arrangement

A/P : Authorization to Pay

A213



**MINUTES OF DISCUSSIONS  
ON  
THE IMPLEMENTING REVIEW STUDY  
ON  
THE PROJECT FOR URGENT IMPROVEMENT OF  
WATER SUPPLY SYSTEM IN BEMOS-DILI (PHASE II)  
IN THE DEMOCRATIC REPUBLIC OF TIMOR-LESTE  
(EXPLANATION OF DRAFT FINAL REPORT)**

In October 2010, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Implementing Review Study Team on the Project for Urgent Improvement of Water Supply System in Bemós-Dili (Phase II) (hereinafter referred to as "the Project") to the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste"), and through discussions, field survey, and technical evaluation of the results in Japan, JICA prepared a draft final report of the study.


Accordingly, Hiroshi ENOMOTO, Chief Representative, JICA Timor-Leste Office explained to the Government of Timor-Leste on the contents of the draft report,

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

Dili, November 8, 2010

榎本 宏

Mr. Hiroshi ENOMOTO  
Chief Representative  
JICA Timor-Leste Office  
Japan International Cooperation Agency  
(JICA)

  
Mr. Januario da Costa Pereira  
Secretary of State for  
Electricity, Water and Urban Development  
Ministry of Infrastructure  
The Democratic Republic of  
Timor-Leste

## ATTACHMENT

### **1. Components of the project**

The Timor-Leste side agreed and accepted in principle the component of the draft final report explained by the JICA side. The project components are shown in Annex I and II.

### **2. Japan's Grant Aid Scheme**

The Timor-Leste side understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Timor-Leste side as explained by the JICA side and described in Annex-III and IV of the Minutes of Discussions signed by both parties on October 21, 2010.

### **3. Schedule of the Study**

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Timor-Leste by December 2010.

### **4. Project Cost Estimation**

The JICA side explained to the Timor-Leste side the project cost estimation as described in Annex-III. Both sides confirmed that this cost estimation was provisional and would be examined further by the Government of Japan for its approval as the grant aid.

Both sides also confirmed that the project cost estimation should never be duplicated in any form nor released to any other party(s) before signing of all the contract(s) for the Project. This confidentiality of the project cost estimation is necessary to ensure fairness of tender procedure.

### **5. Other relevant issues**

#### **5-1) Cost for Pump Operation during Renovation of Lower Service Reservoir**

The Government of Timor-Leste agreed to bear the necessary pump operation cost required for transfer of filtered water to the Upper Service Reservoir for about 9 months during reconstruction work of the lower service reservoir and valve chamber in Bemos Water Treatment Plant.

#### **5-2) Notice to Water Users about Interruption Schedule of Water Supply**

The Government of Timor-Leste agreed to keep water users informed of interruption schedule of water supply due to the improvement work of raw water main through meeting, newspapers and advertising board.

#### **5-3) Explanations to Municipalities and Communities around Project Site**

The Government of Timor-Leste agreed to explain the Project detail to the municipalities and communities around Project site and to obtain their consents.

#### **5-4) Excavation of River Stone/Sand**

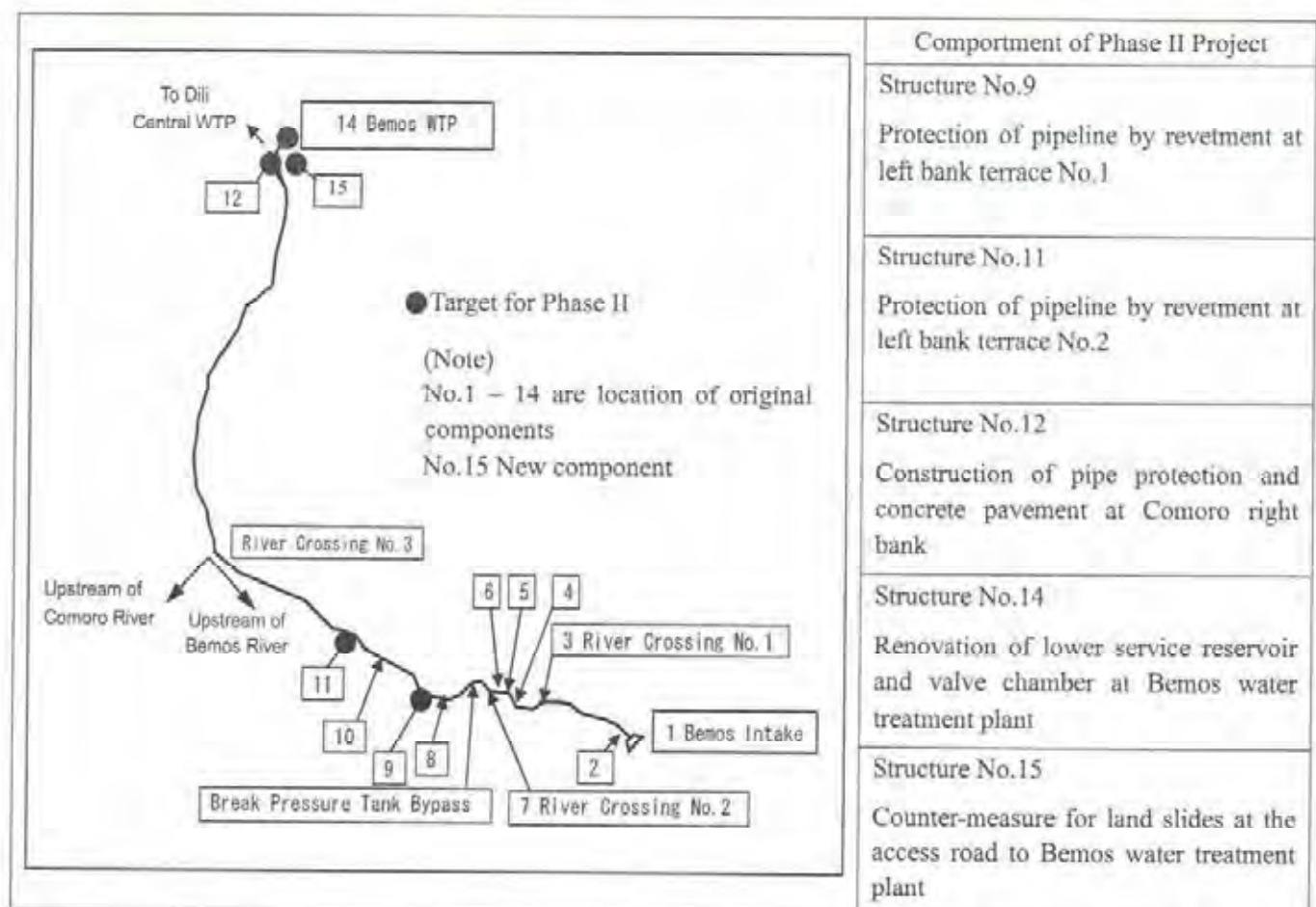
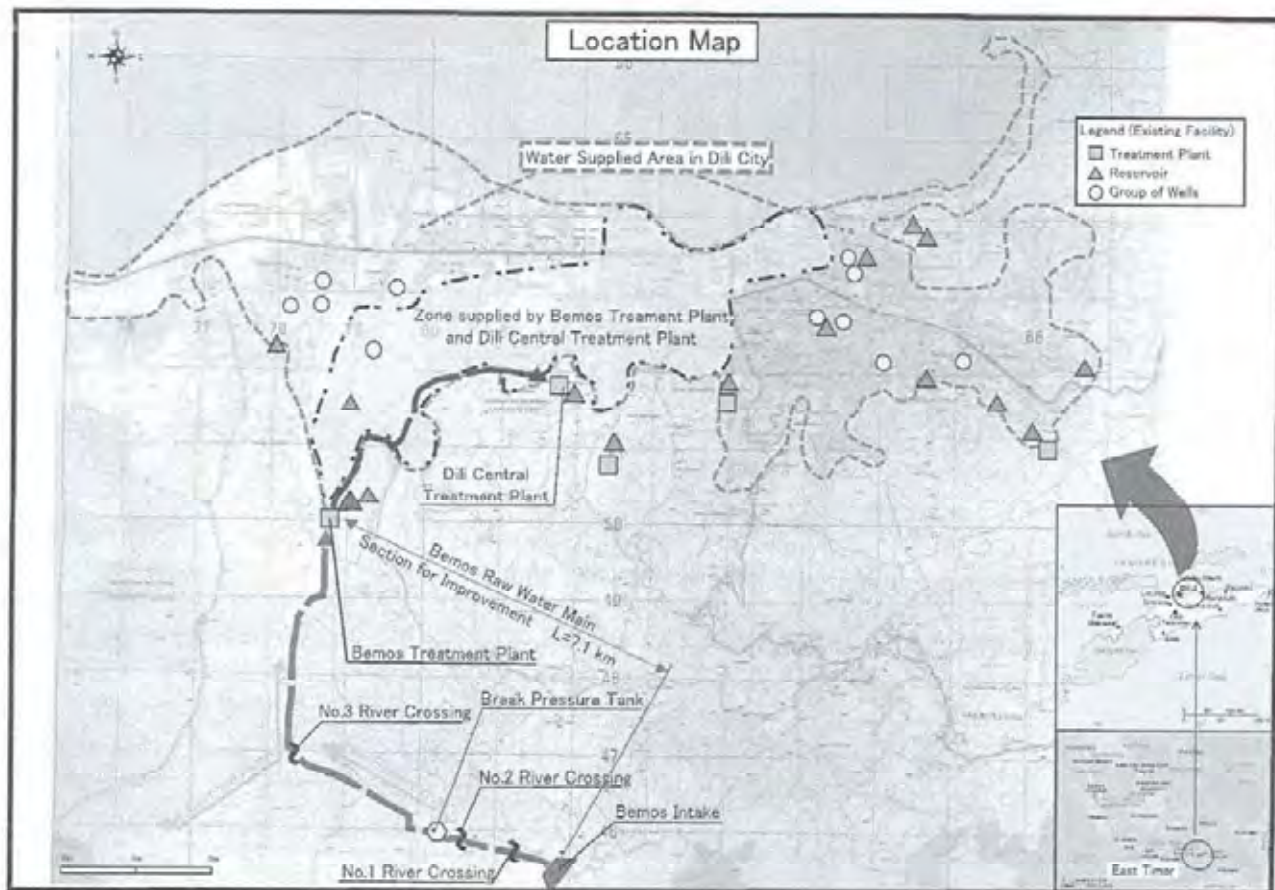
The Government of Timor-Leste agreed to ensure that Japanese Contractor can sand and gravel without charge from Bemos and Comoro River for the construction work of Phase II Project.

Annex I	Project Components
Annex II	Location Map of the Project
Annex III	Project Cost Esti

## Project Component

Item	Location	Rehabilitation / Improvement manner
Structure No.9 Protection of Pipeline by Revetment at Left Bank Terrace No.1	Left bank terrace of Bemos river (1+980 ~ 2+020)	<ul style="list-style-type: none"> <li>- Protection of existing pipeline by revetment and re-filling by sand and gravel</li> <li>- Installation of Wash-out and provision of concrete cover of existing air valve pit</li> </ul>
Structure No.11 Protection of Pipeline by Revetment at Left Bank Terrace No.2	Mountain foot slope of left bank of Bemos river (2+390 ~ 2+600)	<ul style="list-style-type: none"> <li>- Protection of existing pipeline by revetment and re-filling by sand and gravel partially</li> <li>- Installation of Bypass pipe and changing alignment</li> <li>- Shifting of pipeline route and embedding</li> </ul>
Structure No.12 Construction of Pipe Protection and Concrete Pavement at Comoro Right Bank	Comoro river right bank Steep slope road section (7+000 ~ 7+100)	<ul style="list-style-type: none"> <li>- Construction of dual purpose road and drain (concrete pavement with wheel guard)</li> <li>- Construction of road side protection including pipe supports</li> <li>- Construction of wash-out, provision of valve chambers for two sluice valves at the branch pipe to the Bemos water treatment plant,</li> <li>- provision of cover of existing air valve chamber</li> </ul>
Structure No.14 Renovation of Lower Service Reservoir and Valve Chamber at Bemos Water Treatment Plant	Bemos Water Treatment Plant	<ul style="list-style-type: none"> <li>- Renovate the facilities to have the same capacity and function with the existing ones including demolition and removal of the existing facilities and construction of new ones</li> </ul>
Structure No.15 Counter-measure for land slides at the access road to Bemos Water Treatment Plant	Right side at access road to Bemos Water Treatment Plant at Comoro river right bank	<ul style="list-style-type: none"> <li>- Concrete retaining wall for counter-measure for land slides</li> </ul>





This part is closed due to the confidentiality.

## 2. Obligation of the Government of Timor-Leste

### (1) Project Cost

Description	Amount (US\$)
Temporary pump operation in Bemos Water Treatment Plant	5,000
Change of Banking Arrangement	8,000
<b>TOTAL</b>	<b>13,000</b>

### (2) Operation an Maintenance (O&M) Cost

		Amount (US\$)
Bemos Raw Water Main	Soil covering for newly exposed pipe	2,900
	Cleaning and check for intake and valves	2,040
	Sub-total	4,940
Bemos Water Treatment Plant	Power	1,272
	Chemicals	32,448
	Plant operation	2,220
	Sub-total	35,940
Repair work and spare parts		21,248
<b>TOTAL</b>		<b>62,128</b>



REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE  
MINISTÉRIO DA ECONOMIA E DESENVOLVIMENTO  
SECRETÁRIA DE ESTADO DO MEIO AMBIENTE  
DIRECÇÃO NACIONAL DO MEIO AMBIENTE

*Fomento Building, Ground Floor, Mandarin Tlp: +6703339119/9094*

Ba : Sr. João Pereira Jeronimo,  
Director DNSAS

Cc : S. E. Secretário de Estado do Meio Ambiente,  
Sr. Abílio de Deus de Jesus Lima

Data : 05 de Outubro de 2010

Numero : 649 /DNMA/X/2010

Assunto : Prolonga karta rekomendasaun sobre projektu rehabilitasaun  
sistema bé mos

Bazeia ba pedido nebe mak hato'o mai Direcção Nacional do Meio Ambiente (DNMA), iha dia 21 de Outubro de 2010 ho assunto mak hanesan "Prolonga rekomendasaun". Ne'e duni DNMA **prolonga rekomendasaun** hodi kontinua aktividades mak hanesan rehabilitasaun sistema bé mos ho skala aktividades: distansia 1000 m, projektu ne'e ami klasifika hanesan kategoria C.


Tuir monitoring ba area projektu husi equipa tékniku DNMA iha loron 05 de Novembro de 2010, aktividades rehabilitasaun lao hela i iha jestaun diak, maibe DNMA rekomenda ba proponente atu konsidera requizitos mak hanesan tuir mai ne'e:

- Proponente tenki involve departemento seluk nebe iha relasaun ho aktividades projektu.
- Atu proteze labele akontes rai halai/monu, husu atu ateru fali i halo penehan ba fatin nebe ke'e atu hako'i pipa.
- Konstrusaun restu (besi at, pipa at nebe troka) tenki tula i soe iha fatin lixeira Tibar.
- Rekomendasaun ida ne'e ho nia prazu durante tinan ida, komesa husi data karta ida ne'e i sei prolonga fali antes semana rua wainhira prazu ne'e hotu ona.

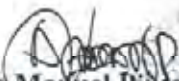
DNMA sei monitoriza no orienta kompanhia nia aktividade bazeia ba dokumentos aplikasaun proposta desenvolvimento husi kompanhia.

Mak ne'e deit ba atensaun hato'o obrigado.

Prepara husi:

  
Francisco Poto  
Tekniku Profesional AIA

Liu husi:

  
Augusto Manuel Pinto, MSc (ERM)  
Director da DNMA

