Ministry of Public Works and
Ministry of Agriculture and Fishery
Democratic Republic of Timor-Leste

PREPARATORY SURVEY ON PROGRAMME FOR URGENT REHABILITATION OF FLOOD DAMAGED INFRASTRUCTURE IN TIMOR-LESTE

Final Report

November 2022

JAPAN INTERNATIONAL COOPERTAION AGENCY
(JICA)
IDEA Consultants, Inc.
Sanyu Consultants Inc.
INGEROSEC Corporation
NTC International Co., Ltd

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Preface

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to Consultant Survey Team consists of IDEA consultants, Inc., Sanyu Consultants, Inc., INGEROSEC Corporation, NTC International Co., Ltd.

The Survey team held a series of discussions with the officials concerned the Government of Timor-Leste and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Timor-Leste for their close cooperation extended to the survey team.

November, 2022

Akihito SANJO
Director General,
Financial Cooperation Implementation Department
JICA

Summary

1. Timor-Leste country profile

The Democratic Republic of Timor-Leste (hereinafter referred to as “Timor-Leste”) is an island county covering the eastern half of Timor Island which is located at the eastern edge of the Lesser Sunda Islands in Southeast Asia. The Population of Timor-Leste is approximately 134 million in (2021, Source: World Development Indicators, World Bank) and its area is approximately 14,900 km2.

About 60% of the country is composed of the mountainous area whose geography is hilly and variegated typified by Rameau Crests running through the center of Timor-Leste, and about the half of the country composes of steep slopes whose gradient is more than 40%.

Geologically, Timor-Leste belongs to the Australian Continental Plate where accumulated limes form the foundation rock, and base material of the foundation rock forming the coastal area and Comoro River Basin is phyllite. Phyllite is fragile and has a characteristic to be erodible under weathering.

Timor-Leste belongs to the Tropical Savanna Climate region, and rainy season and dry season are identified clearly. In the rainy season in the northern area at which Dili is located, annual average precipitation for 5 months from December to April is approximately between 1,000mm and 1500mm, and November is the transitional phase from dry season to rainy season.

As for the temperature in Dili, minimum temperature is between 18 and 23 degrees C, and Maximum temperature is between 28 and 33 degrees C.

Timor-Leste had been independent in 2002. It was the first new sovereign country in 21 century and continued economic growth despite riots in 2006, recording 4.4% of the GDP growth rate in 2021. GDP per capita in 2021 was 1,457 USD. Main industry in Timor-Leste is agriculture, oil and natural gas. Major agricultural products are rice, corn and coffee beans.

2. Project background, circumstances and summary

Timor-Leste has a mountainous terrain covering most of the country and a steep topography along the coast, resulting in landslides and flooding disasters every year. Dili Municipality, the capital, has population of about 300,000 people, but its drainage facilities have not caught up with the growing urban population. In recent years, local heavy rains and extreme weather conditions have led to repeated flooding, seriously affecting the region's economic and social activities.

In April 2021, heavy rains that had continued for several days across Timor-Leste caused severe damage to infrastructure such as roads, bridges, riverbank protections, water supply system, etc. in Dili. small rivers and drainage channels in Dili to overflow predawn morning on April 4, and the overflowed water far exceeded the drainage in Dili.

In rural areas, there were reports of damage to agricultural infrastructure due to flooding. In particular, in Manatuto and Bobonaro municipalities, which are major rice production areas, the country's staple food, irrigation facilities have been damaged, and the irrigation water supply and stable rice production have been difficult.

Slope failures and landslides make it difficult to travel between local cities and to promptly access damage situation. The floods in April 2021 have killed 48 people and affected more than 30,000 households and 2,600ha farmland. In addition, there were temporarily 14 thousand refugees in Dili, it drove up the spread of Covid-19.

The Government of Timor-Leste has sent the Government of Japan and JICA an official letter of technical cooperation to support the government's efforts for Build Back Better.

In response to the above official letter, JICA has conducted "The Post Situation and Data Collection Survey for The Flood Countermeasures in Dili" (August 2021 - December 2022) to collect information necessary for the formulation of future cooperative projects regarding disaster resistant urban development in Dili. Based on the survey result, "The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures" was conducted.

3. Summary of survey results and contents of the project

JICA Survey Team confirmed existing facilities, damage situation, river flow, access roads, etc. trough discussions with relevant organizations and field reconnaissance in the 1st survey in Timor-Leste from April 26 to June 4 in 2022.

And the team confirmed and studied the priority for rehabilitation of damaged facilities, progress of rehabilitation work by other donors, concept and method of rehabilitation based on Build Back Better, the component of rehabilitation, etc.

The team planed the project component shown in Table 1 through the above survey in Timor-Leste and work in Japan. The survey team explained the project component with Timor-Leste side and obtained their consensus on it through the discussion on outline design in the 2nd survey in Timor-Leste from September 29 to October 8, 2022. In this discussion, Timor-Leste side agreed that the component of R5 site will be cut in the implementing stage after this survey stage because of the current exchange of rate of the Japanese Yen.

Table 1 Project Component

Component [Implementing Agency]	Outline of the component	Description of the work	Reparks
1. Rehabilitation for Comoro River Retaining Wall [Ministry of Public Works / Directorate of Road, Bridge and Flood Control (MPW-DRBFC)]	・ Urgently rehabilitation for retaining wall will be carried construct at most dangerous places where were collapsed by the April 2021 floods, in terms of	・ Restoration of revetment R5 site (110m) and R6 site (120m) ・ Rehabilitation of National Road No2 Bypass (top of revetment of R5 and R6, total length 230m)	・ Timor-Leste side agreed that the component of R5 site is cut because of the current exchange of rate of the Japanese Yen, in

	people's life. ・ This work will be a pilot project, and the technology will be transferred to other restoration works that will be carried out by Timor-Leste side.		the implementing stage after this survey satage.
2. Rehabilitation for Bemos Water Supply System [Ministry of Public Works / Bee Timor-Leste (MPW-BTL)]	・ The existing water intake facilities have been collapsed and spilled due to the April 2021 floods, and it is in a situation where it cannot be operated safely. ・ Emergency restoration of facilities that are particularly severely damaged, and reinforcement of strength in preparation for floods.	・ Intake facilities (front wall, side wall, inlet, gate facilities, etc.) ・ Intake Weir (surface of weir, revetment, side wall, etc.) ・ Grit Chamber (revetment, bottom of grit chamber, etc.) ・ Retaining Wall (left bank of grit chamber, upper left bank of downstream) ・ Connecting Canal (upper part of connecting channel, upper part of side wall, etc.)	・ Australia support plan is in progress (repair of water pipe). ・ Temporary road construction is required.
3. Rehabilitation for Buluto/Maliana Irrigation Facilities [Ministry of Agriculture and Fishery / National Department of Irrigation and Water Management (MAF-NDIWM)]	・ Due to the April 2021 floods, damage is spreading at the deteriorated parts of existing facilities. ・ Repair and restore the above damaged facilities.	A. Buluto Irrigation Facility ・ Rehabilitation of retaining wall downstream of the headwork ・ Installation of foot protection works along the retaining wall ・ Installation of foot protection works downstream of apron ・ Crack repair of trunk canal (high embankment section) B. Maliana Irrigation Facility ・ Rehabilitation of fixed weir ・ Rehabilitation of scouring sluice channel ・ Reinforcement of retaining wall of administrative corridor Rehabilitation of administrative corridor	・ Including the stone masonry walls which were rehabilitated under the follow-up grant aid.

Source: JICA Survey Team

4. Project implementation period and outline project cost estimation

The project cost is estimated 991 million Japanese Yen (Construction cost: 856 million Japanese Yen and Consulting service: 135 million Japanese Yen). And the period required for the implementation of design, bidding assistance services and construction shall be 25.5 months (detailed design/bidding: 7.5 months and construction: 18.0 months.

5. Project evaluation

The relevance and effectiveness of the Project is as follows.

(1) Relevance

1) Beneficiaries: The beneficiary population and the number of households at each target site are shown in the table below. Since the beneficiary population of 290,000 is equivalent to 22% of Timor-Leste's population of approximately 1.34 million (2021, source: World Bank World Development Indicators), the relevance of the project is high.

Table 2 Beneficiary Population and Household

Component	Location		Population (person)	Household (household)
	Municipality	Administrative post		
Comoro River revetment	Dili	Dom Aleixo	194,332	28,838
		Vera Cruz	38,965	5,992
Bemos water supply facility	Aileu	Laulara	8,766	1,493
Buluto irrigation facility	Baucau	Vemasse	10,182	1,931
	Manatuto	Laclo	8,541	1,697
Maliana irrigation facility	Bobonaro	Maliana	32,685	6,346
Total			293,471	46,297

2) Consistency with Japan's aid policy: One of Japan's assistance policies for Timor-Leste is the development and improvement of economic and social infrastructure. This project aims to restore river facilities, water supply facilities and irrigation facilities that were damaged by the flood disaster and is consistent with Japan's assistance policy.

3) This project will contribute to the recovery and development of the livelihoods and economy of the affected areas through rehabilitation of infrastructure damaged flood. Since it will contribute to SDGs Goal 9 (Build resilient infrastructure), Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable), and Goal 13 (Take urgent action to combat climate change and its impacts), relevance of the project is high.

(2) Effectiveness

(2-1) Quantitative Effect

Table 3 Indicators of Quantitative Effect

Indicator	Baseline (2022)	Target Value (2027) [3 years after completion]
Comoro River Retaining Wall Necessary rehabilitation works for important section	- Riverbank protection work (3 sites, L=372 m)[*1] - 1 lane of National Road No.2 Bypass	- 0 site[*2] - 0 site[*2]

	(3 sites, L=372 m) *1	
Bemos Water Supply System Necessary works for rehabilitation and strengthening resilience	Headworks*3 - Intake facility: 1 set - Intake weir: 1 set - Grit chamber: 1 set - Retaining wall: 1 set - Connecting canal: 35 m	 - 0 set - 0 set - 0 set - 0 set - 0 m
Buluto/Maliana Irrigation Facilities Necessary work for rehabilitation and strengthening resilience	(Buluto) - Retaining wall (L=32 m) - Riverbed protection work (B=157m) - Main canal at the high embankment section (total crack length = 108 m)	 - 0 m - 0 m - 0 m
	(Maliana) - Fixed weir: 1 set - Channel and apron at downstream of scouring sluice: 1 set - Administrative corridor: (area of hole = 22.24 m2)	 - 0 set - 0 set - 0 m2

(*1)

Important section is from Comoro Bridge to the outlet of mountain area, and target sites are R5, R6, R7 sites.

(*2)

The component of the Programme is R6 site. Remaining R5 and R7 sites will be rehabilitated by DRBFC-MPW in 2023.

(*3)

The component of the Programme is headworks. Water pipe from the headworks to River crossing No.2 is under reconstruction supported by Australia and water pipe from River crossing No.2 to No.3 will be reconstructed by BTL.

(2-2) Qualitative Effect

1) Comoro River retaining wall

- Safety will be ensured even if a flood of the same scale as the April 2021 flood occurs.
- Congestion on the National Highway No. 2 Bypass will be resolved, and the punctuality of logistics will be ensured.
- Economic development along the bypass will be promoted.
- The riverbank protection method adopted in this project will be applied to the other projects.

2) Bemos water supply facility

- Even if a flood of the same scale as the April 2021 flood occurs, the water intake function will be secured.

- The above will enable stable water supply even in the event of a flood. This will eventually lead to the improvement of water supply and sanitation in Dili.
- By stabilizing the water supply, it will be possible to systematically manage the operation of water supply facilities, which will contribute to the establishment of the water tariff collection system that BTL is responsible for, and the sound management of BTL.

3) Buluto/Maliana Irrigation Facility

- Rehabilitation of damaged intake weirs and ancillary facilities will make it possible to secure stable irrigation water and increase rice production in the target area. In addition, the livelihood of farmers will improve.
- Compared to other sections of the main canal, restoration and strengthening of the main canal in the high embankment section, which is more prone to deformation, will reduce the maintenance and repair work for that section.
- By restoring the maintenance passageway at Maliana irrigation weir, the quality of daily inspection and maintenance will be improved, and early repair will be possible.

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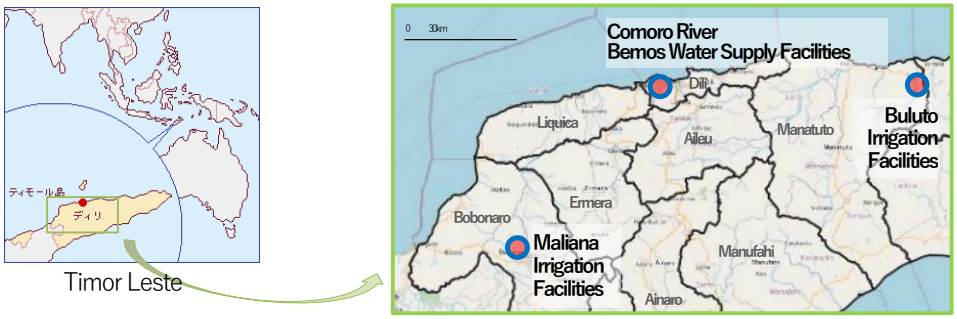
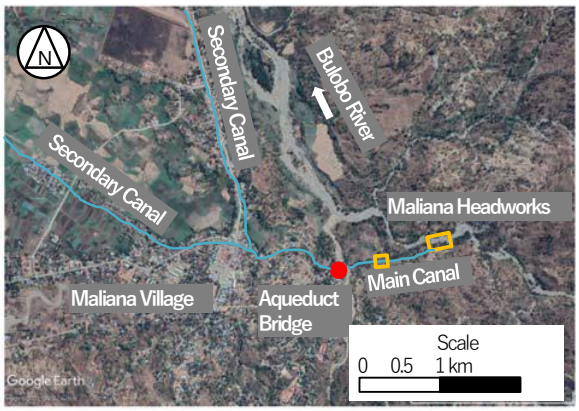
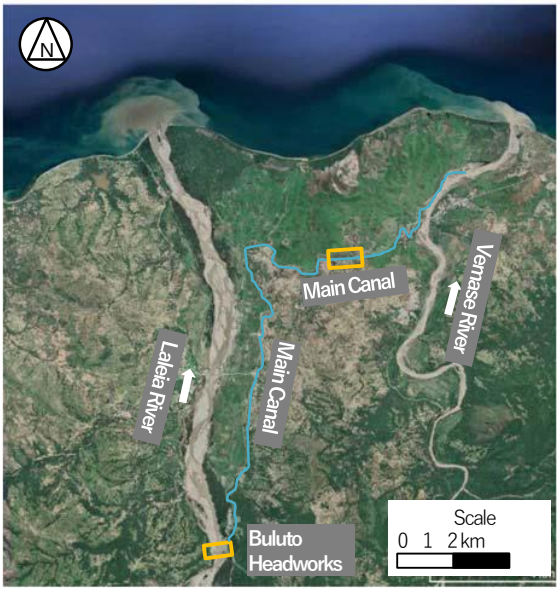


Comoro River Revetment, Bemos Water Supply Facilities



Maliana Irrigation Facilities



Buluto Irrigation Facilities

Source: Based on Google Earth by JICA Survey Team

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Abbreviations

ADB	Asia Development Bank
ADN	National Development Agency
AdP	Aqua de Portuguese
BTL	Bee Timor-Leste
CBDRM	Community-based Disaster Risk Management
CIGD	Inter-Ministerial Commission for Disaster Risk Management
CPA	Civil Protection Authority, Ministry of Interior
CVTL	Timor-Leste Red Cross
DDIUP	Dili Drainage Improvement Upgrading Project
DFAT	Department of Foreign Affairs and Trade, Australia
DGPC	Directorate General of Civil Protection
DNGRD	National Directorate of Disaster Risk Management
DNMG	National Directorate of Meteorology and Geophysics
DNSA	National Directorate of Water Supply (Predecessor of BTL)
DRBFC	Directorate of Road, Bridge and Flood Control
EDTL	National Electricity Company
EU	European Union
EWB	Engineers Without Border (Australia)
EWS	Emergency Warning Signal
FAO	The Food and Agriculture Organization of the United Nations
FB	Facebook
GoTL	Government of Timor-Leste
GPDRR	Global Platform for Disaster Risk Reduction
GSMaP	Global Satellite Mapping of Precipitation
ICHARM	International Centre for Water Hazard and Risk Management under the auspices of UNESCO
IFAS	Integrated Flood Analysis System
IPG	Institute of Petroleum and Geology
JMA	Japan Meteorological Agency
JPY	Japanese Yen
KBA	Key Biodiversity Areas
KOICA	Korea International Cooperation Agency
MAF	Ministry of Agriculture and Fishery
MNEC	Ministry of Foreign Affairs and Cooperation (Ministro dos Negócios Estrangeiros e Cooperação)
MoF	Ministry of Finance
MPS	Secretariat for Major Project Service
MPT	Ministry of Planning and Territory
MPW	Ministry of Public Works
NGO	Non-governmental organizations
NOAA	National Oceanic and Atmospheric Administration

OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PDNA	Post Disaster Needs Assessment
SEPC	Secretary of State for Civil Protection
SMS	Short Message Service
UNDP	United Nations Development Programme
UNITAR	The United Nations Institute for Training and Research
UNRCO	The United Nations Resident Coordinator Office
UNTL / FEST	National University of Timor Lorosae / Faculty of Engineering, Science and Technology
USAID	United States Agency for International Development
USD	United States Dollars

Chapter 1 Background of the Project

1-1 Background, History and Outline of Japan's Grant Aid

The Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste") has a mountainous terrain covering most of the country and a steep topography along the coast, resulting in landslides and flooding disasters every year. Dili Municipality, the capital, has population of about 300,000 people, but its drainage facilities have not caught up with the growing urban population. In recent years, local heavy rains and extreme weather conditions have led to repeated flooding, seriously affecting the region's economic and social activities.

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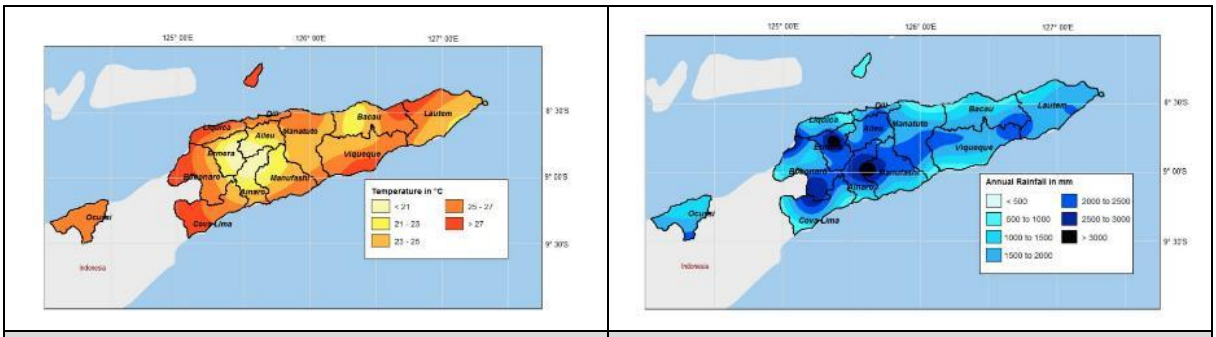
Source: JICA Survey Team

1-2 Natural Conditions

(1) Climate Condition

Figure 1-2-1 shows the distribution of annual mean temperature and annual precipitation in Timor-Leste. Annual mean temperature ranges from 19°C to 28°C, with most of the coastal areas above 27°C. Annual precipitation is less than 1,000 mm in the coastal areas, but ranges from 1,500 mm to 2,000 mm in the relatively high elevation areas in the central region.

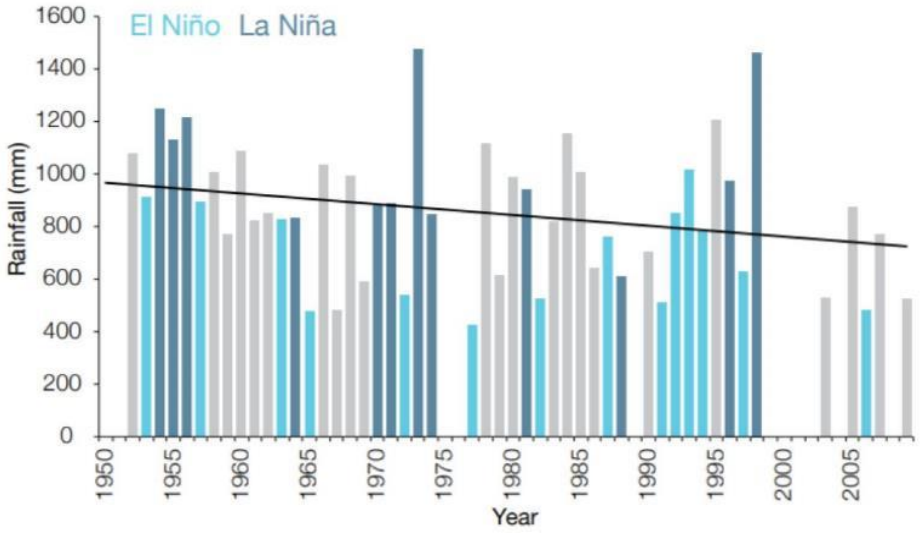


Annual mean temperature	Annual rainfall

Source：COUNTRY REPORT/CLIMATE RISK MANAGEMENT IN TIMOR-LESTE
(UNDP, September 2013)

Figure 1-2-1 Distribution of annual mean temperature and annual rainfall in Timor-Leste

Figure 1-2-2 shows the interannual variability of annual precipitation at Dili Airport. During the El Niño period, convective activity is inactive in Timor-Leste, resulting in relatively little precipitation. In contrast, precipitation is higher during La Niña periods.



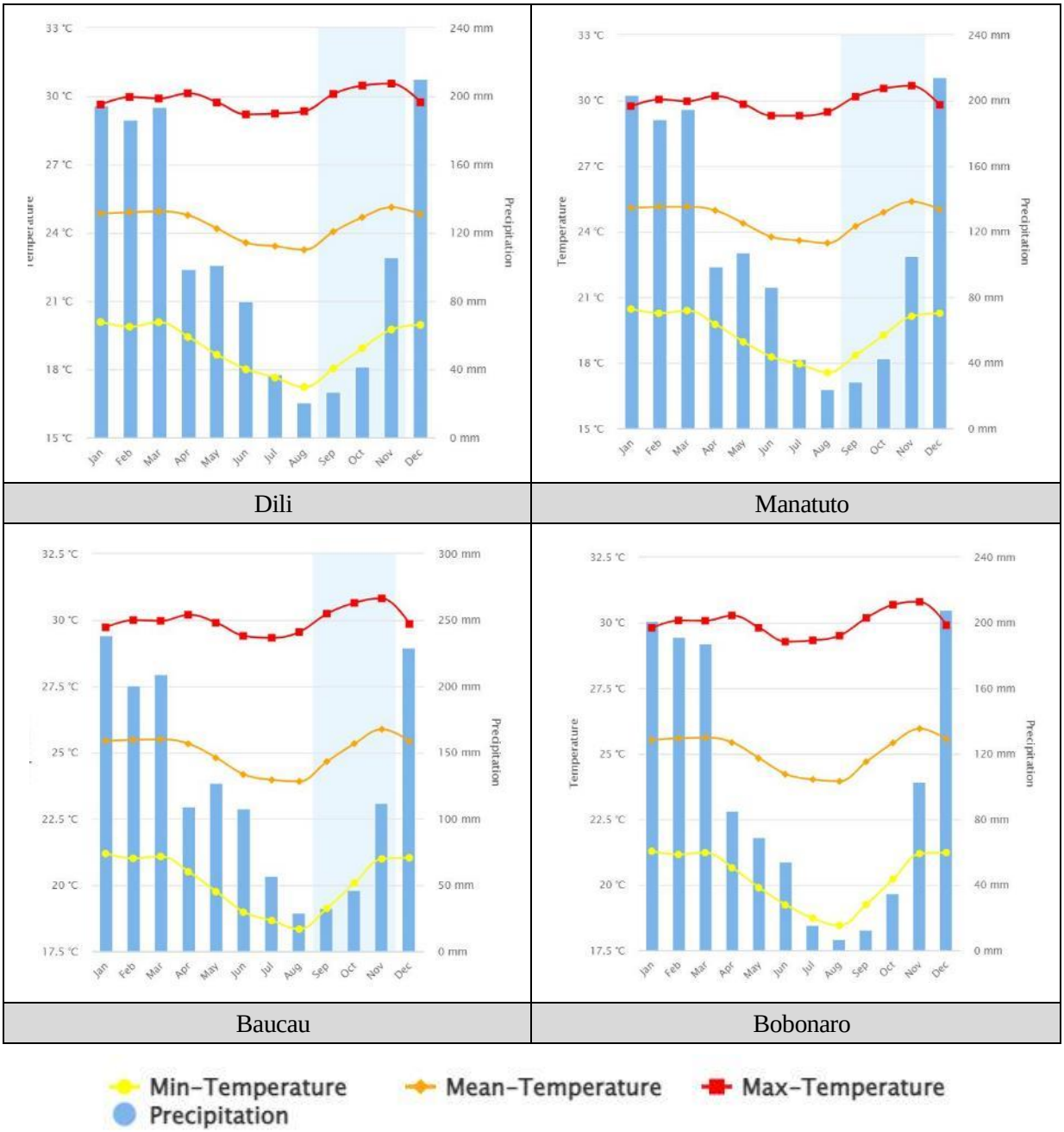
Source：GCF Documentation/Concept Note Timor-Leste |UNEP(5 September 2019)

Figure 1-2-2 Interannual variability of annual precipitation at Dili Airport.

Figure 1-2-3 shows the monthly changes in temperature and precipitation in Dili, Manatuto, Baucau, and Bobonaro. Monthly average temperatures in all areas range from 23°C to 26°C. Precipitation is around

200 m in all areas from December to March. On the other hand, from July to October, monthly precipitation is below 70 mm in all regions.

In Timor-Leste, the rainy season usually begins from December to April, the dry season from June to October, and the transition period from May to November, but it is assumed to vary from year to year.

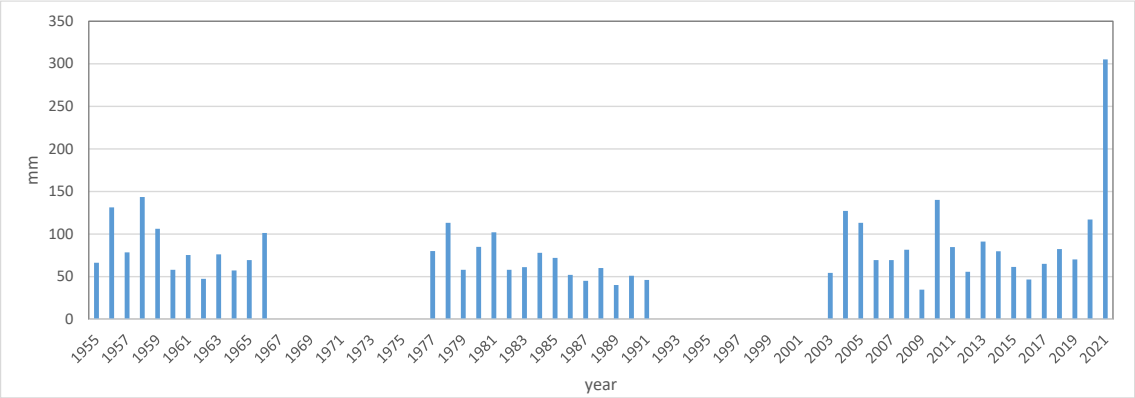


Source：Climate Change Knowledge Portal
(https://climateknowledgeportal.worldbank.org/country/timor-leste)

Figure 1-2-3 Monthly temperature and precipitation changes (averages for 1991-2020)

Meteorological station in Dili airport has daily rainfall data from 2003 to today. Besides, there are annual maximum daily rainfall records from 1955 to 1966 and from 1977 to 1991.

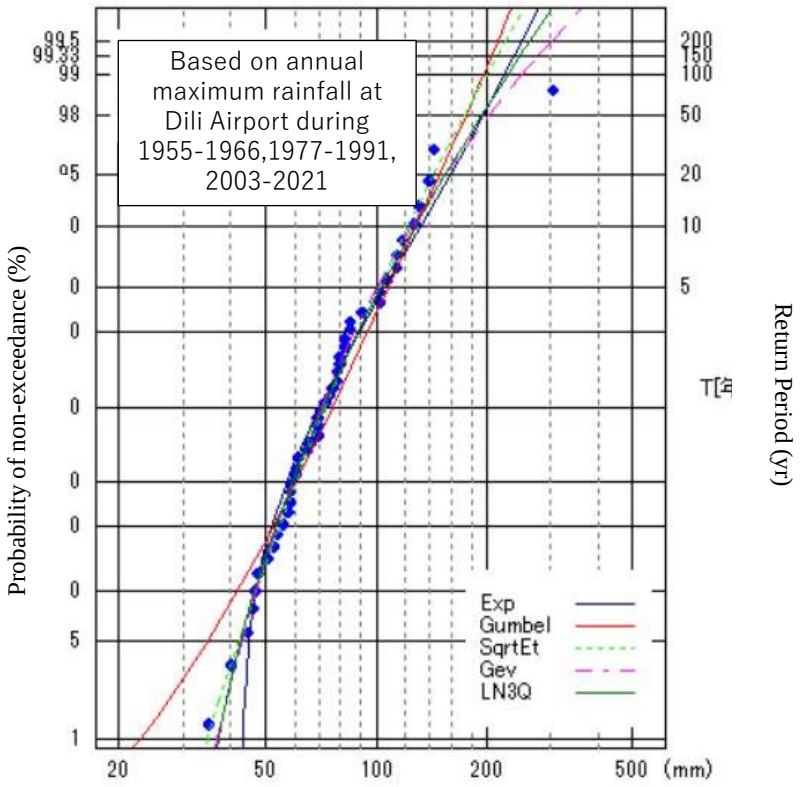
According to this record, there was 305mm of rainfall for 24 hours by 6:00 AM on April 4th at the station.



Source: The Post Situation and Data Collection Survey for the Flood Countermeasures in Dili

Figure 1-2-4 Annual maximum daily rainfall record in Dili airport (1955-2021)

The probable rainfall using the annual maximum values for these periods is shown in Figure 1-2-5.



Source: The Post Situation and Data Collection Survey for the Flood Countermeasures in Dili

Figure 1-2-5 Probable rainfall in Dili airport

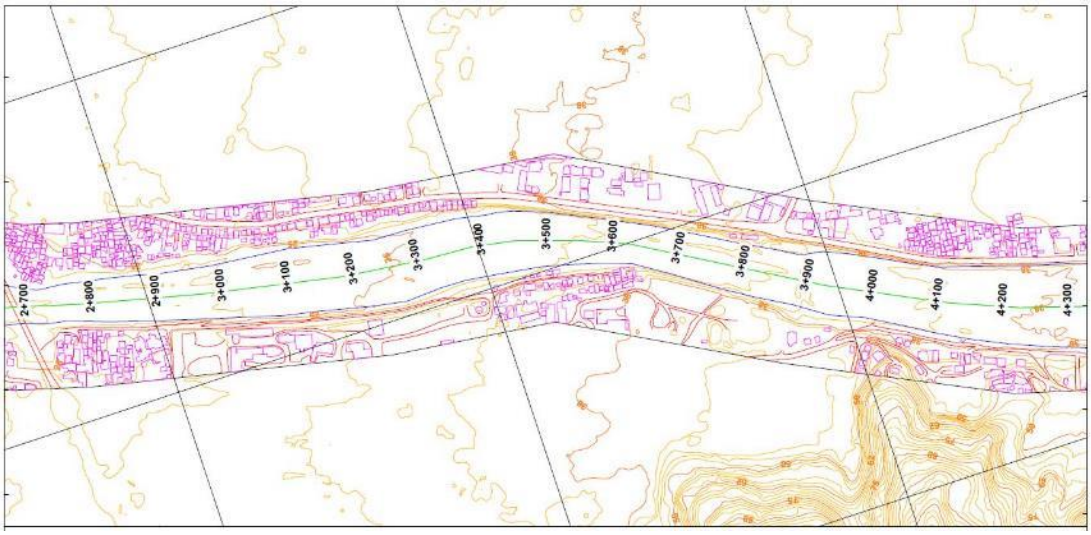
(2) Topography / Geographical Features

Timor-Leste is located at 123-127 degrees east longitude and 8-10 degrees south latitude, with a length of 265 km and a width of 92 km. The Lamerau Mountains line up in the center of the island, and the highest peak is Tatamailau (elevation 2,963m). The slopes of this mountain range are often approaching to the north-south coastline. In the northern part of the island, there are many terrains where the steep

slopes of the mountainous areas are the coastline of the cliffs that are in contact with the sea. There are also lowlands.

The R5 and R6 sites of the Comoro River are located at around 40m above sea level on the alluvial fan of the Comoro River.

The Bemos intake weir is located at an altitude of about 230m on the Bemos River. The Bemos River is a rapid stream with a longitudinal profile of 1/20-1/90, and is located in a valley with steep slopes. Furthermore, outcrops of highly weathered sedimentary rocks are found on the cliffs on both banks, and there are many big rocks on the riverbed.



Source：The Post Situation and Data Collection Survey for the Flood Countermeasures in Dili

Figure 1-2-6 Annual maximum daily rainfall record in Dili airport (1955-2021)

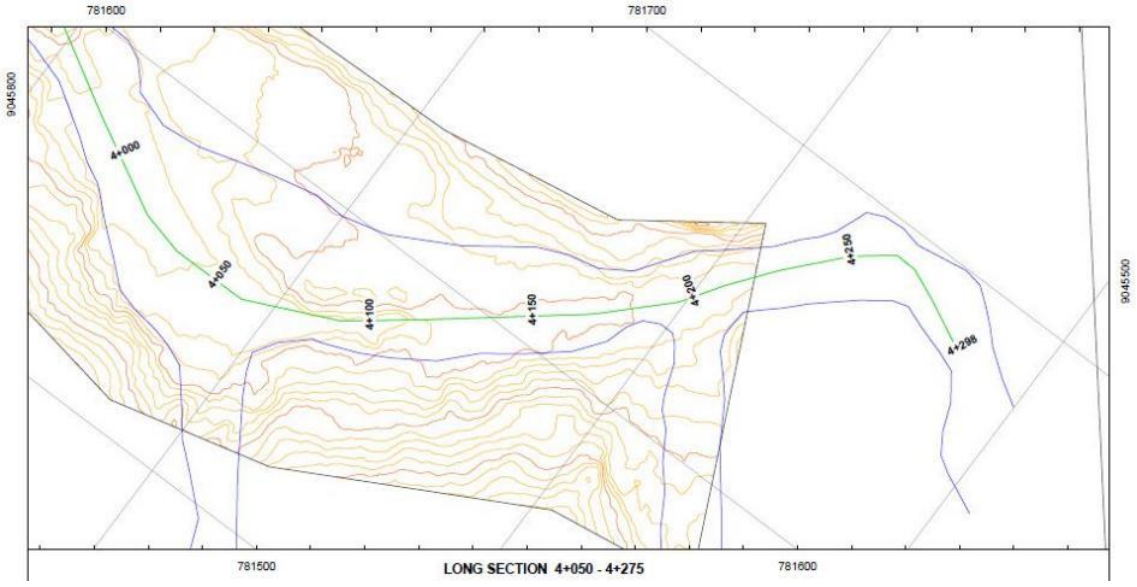


Figure 1-2-7 Topographic Features near the Bemos intake weir

The Buluto irrigation facility is located on the right bank near the mouth of the Laleia River, on a gently sloping area with an elevation of less than 100 m.

Source：JICA Survey Team

Figure 1-2-8 Topographic Features near the Buluto Irrigation Area

The Maliana Irrigation area is located in the western hill of Mt.Leolaco, which has an elevation of 1,920 m.

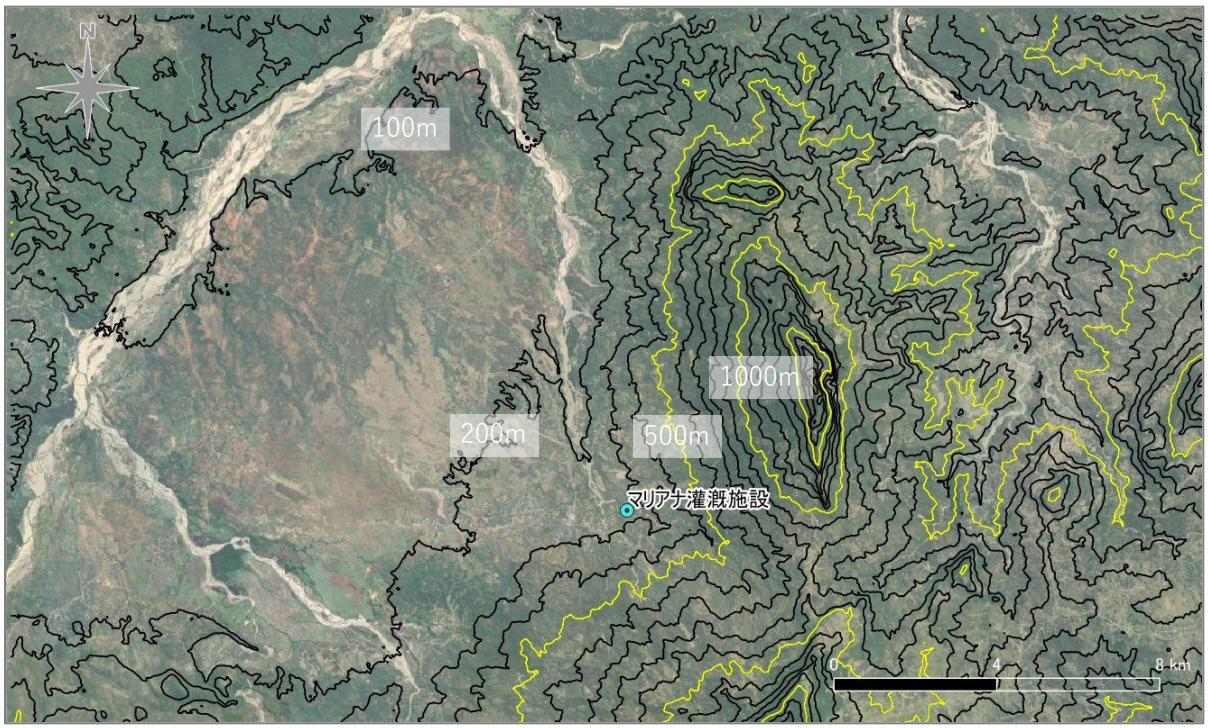
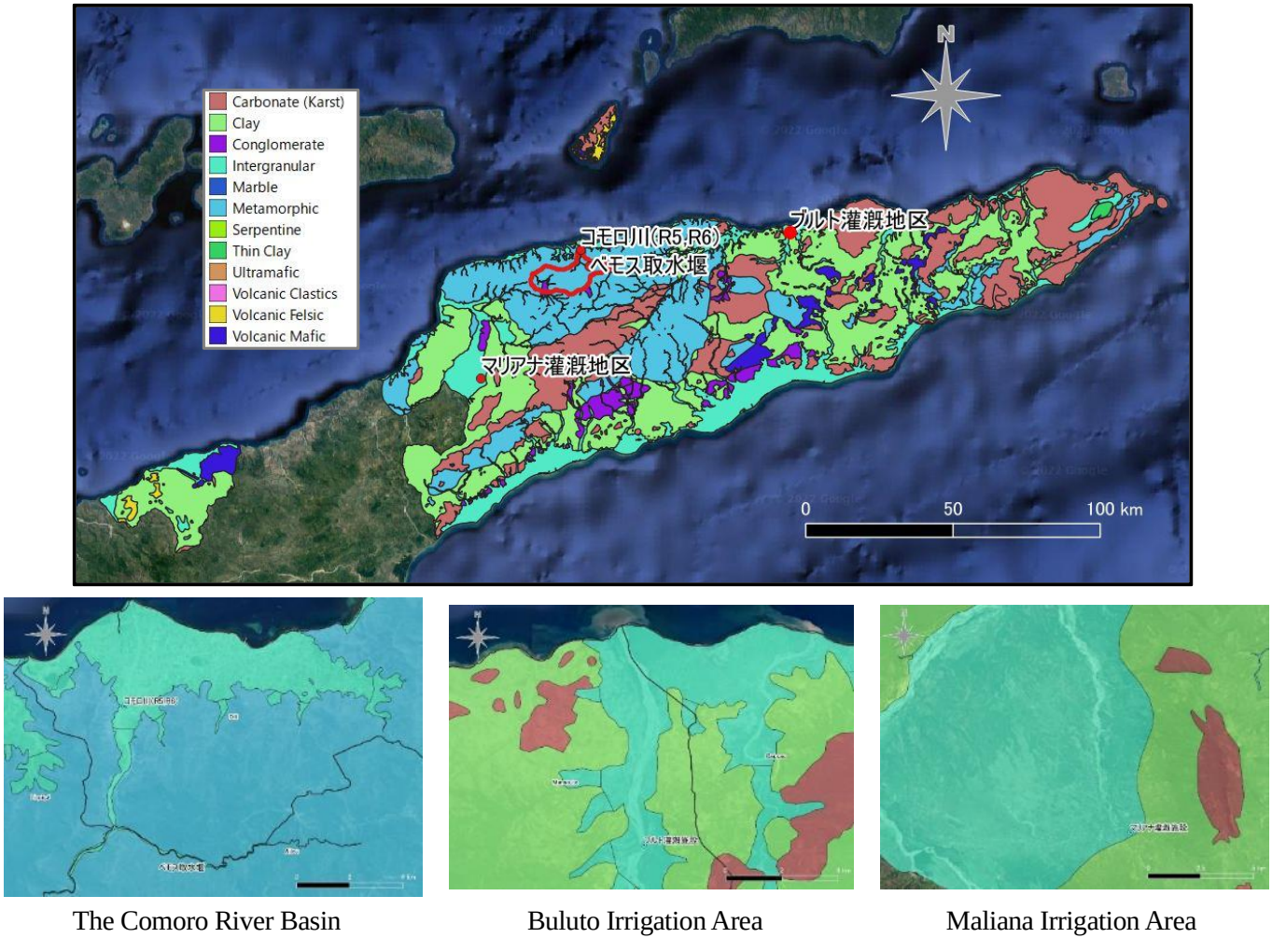


Figure 1-2-9 Topographic Features near the Maliana Irrigation Area

A geological map of Timor-Leste and the vicinity of the project site is shown in Figure 1-2-10. The bedrock of the project sites is mostly composed of weathered and mechanically deposited sedimentary rocks.



The Comoro River Basin

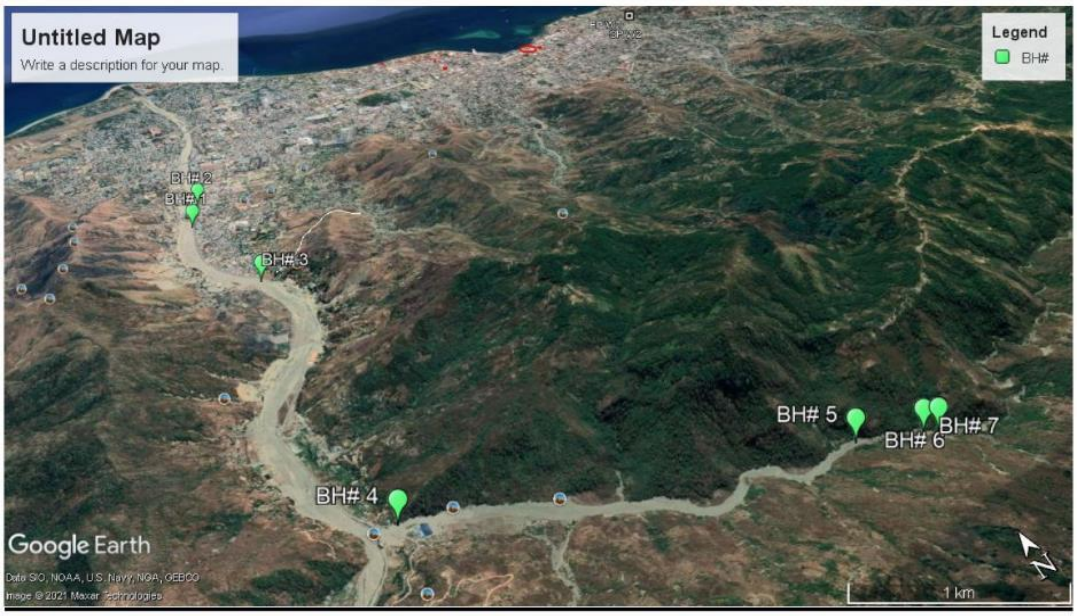
Buluto Irrigation Area

Maliana Irrigation Area

Source: JICA Survey Team based on the material provided by Major Project Secretary

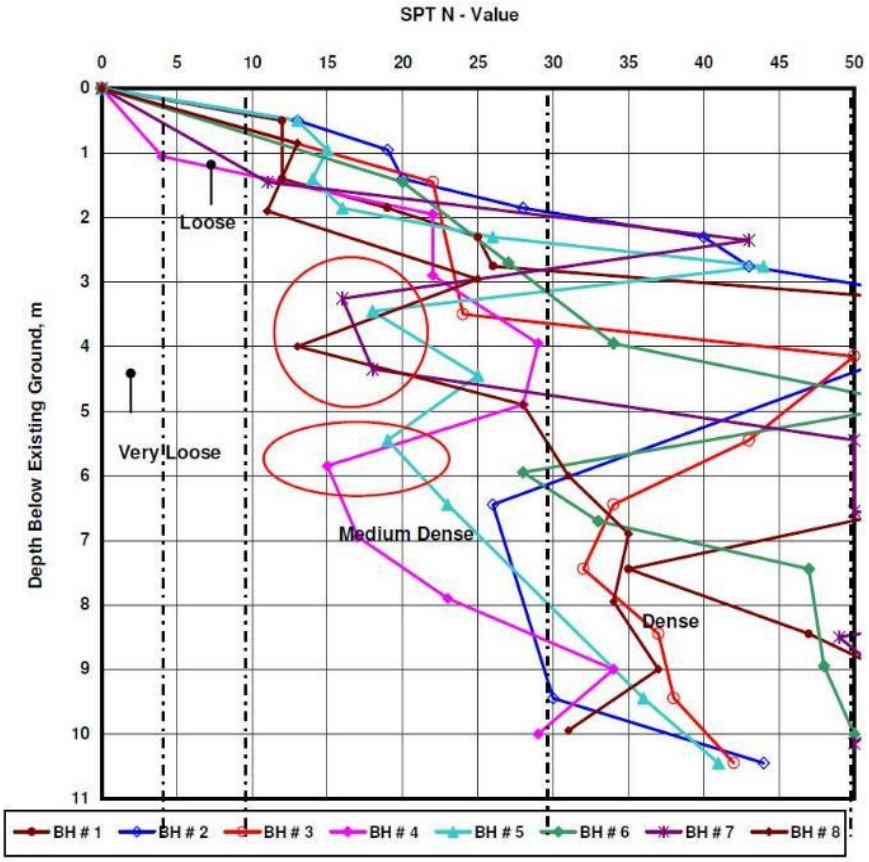
Figure 1-2-10 Geological map of Timor-Leste and the area near the Project Site

Survey for natural condition is not conducted for this Preparatory Survey, but Basic Survey conducted Boring surveys at the location in Figure 1-2-11. N-value based on boring survey is shown in Figure 1-2-12.



Source: Material provided by JICA Basic Survey Team

Figure 1-2-11 Monitoring Station for boring survey



Source: Material provided by JICA Basic Survey Team

Figure 1-2-12 Boring Survey result(N-value)

(3) Flora and Fauna ／Protected Area

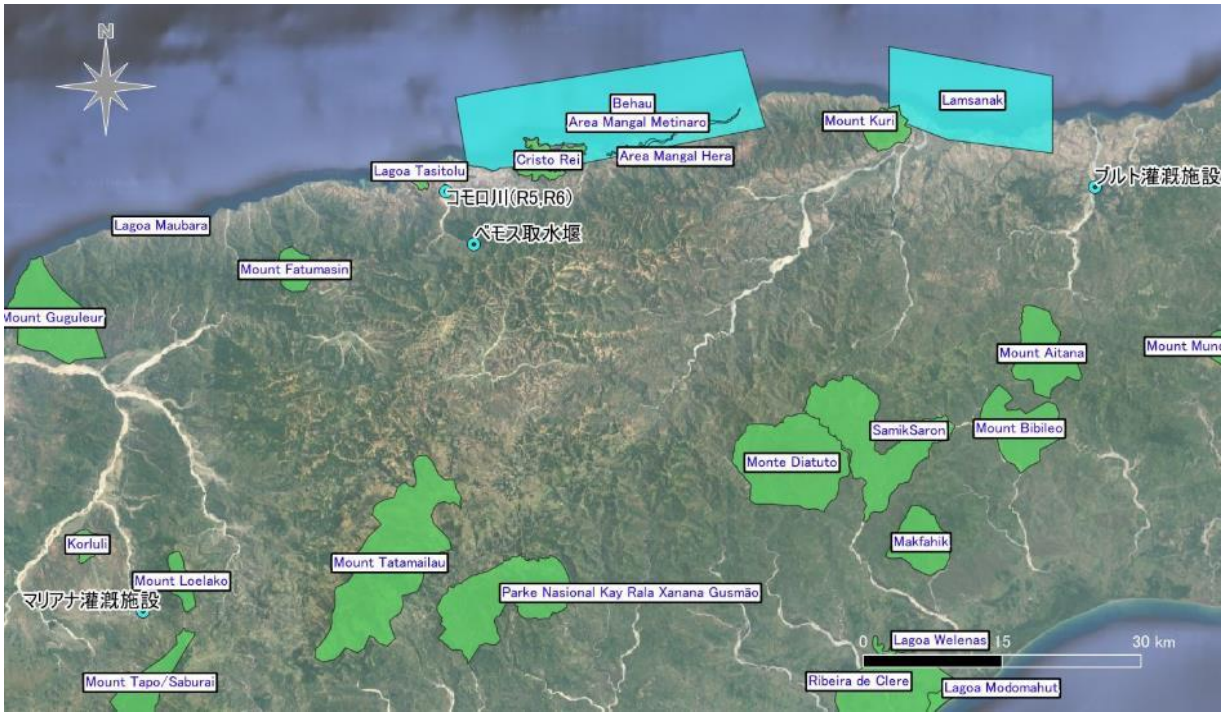
1) Flora and Fauna

Timor-Leste is located within a biogeographical division called Warresia, which has never been connected to the continent in its long history, and is home to many endemic species that contribute to biodiversity. On the other hand, in Timor Island and Timor-Leste, the implementation of census and checklists by modern flora methods have not been reported, and the loss of ecosystems due to deforestation, hunting and development is accelerating.

According to the Convention on Biological Diversity, there are 983 species on Timor Island, with 15 to 20 amphibian species and more than 40 insect species. In particular, 50% of frogs, 25% of lizards, and 25% of geckos are endemic to Timor Island. 34 species of bats have been identified, including 12 fruit bats. In addition, there are at least 7 species of Muridae and 5 species of Shrews.

2) Protected area

Decree No. 5/2016 defines 2 ocean protected areas and 44 land protected areas. The Project Sites are not located within protected areas as shown in Figure 1-2-13.



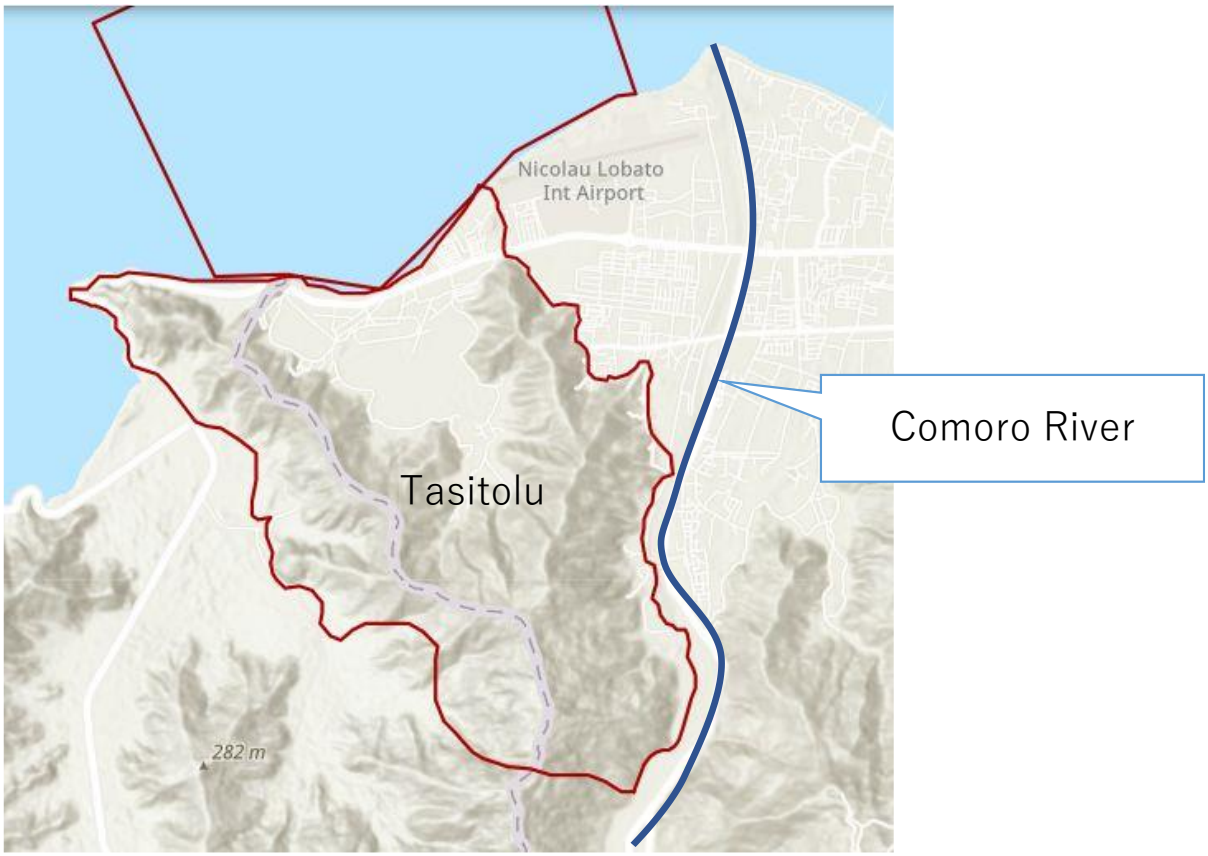
Source: JICA Preparatory Survey Team based on the material released by Protected Planet (https://www.protectedplanet.net/country/TLS)

Figure 1-2-13 Protected Areas in Timor-Leste

3) Key Biodiversity Areas

The “Tasitolu” area, shown in which includes the Lake Tasitolu watershed on the left bank of the Comoro River , is a Key Biodiversity Area(hereinafter referred to as “KBA”).The birds shown in Table 1-3-1 have been confirmed to inhabit the area. Some birds are classified as “VU”(Vulnerable) in the IUCN Red List Category.

The impact on these birds will be extremely limited, because the project does not affect the surrounding environment.



Source：JICA Survey Team based on the Information from KBA's page (https://www.keybiodiversityareas.org/)

Figure 1-2-14 KBA near by the Comoro River

Table 1-2-1 Birds inhabiting the Tasitolu Area

Scientific name	Common name	IUCN Red List Category
Aprosmictus jonquillaceus	Jonquil Parrot	NT
Calidris tenuirostris	Great Knot	VU
Dicaeum maugei	Red-chested Flowerpecker	LC
Ducula rosacea	Pink-headed Imperial-pigeon	NT
Gerygone inornata	Plain Gerygone	LC
Lichmera flavicans	Yellow-eared Honeyeater	LC
Meliphaga reticulata	Streaky-breasted Honeyeater	LC
Myzomela vulnerata	Red-rumped Myzomela	LC
Nectarinia solaris	Flame-breasted Sunbird	LC
Numenius madagascariensis	Far Eastern Curlew	VU
Oriolus melanotis	Olive-brown Oriole	LC
Pachycephala orpheus	Fawn-breasted Whistler	LC
Padda fuscata	Timor Sparrow	NT
Philemon inornatus	Plain Friarbird	LC
Saxicola gutturalis	White-bellied Bushchat	NT
Trichoglossus euteles	Olive-headed Lorikeet	LC
Turacoena modesta	Black Cuckoo-dove	NT
Rusa timorensis	Javan Rusa	VU

Source : JICA Survey Team based on the Information from KBA's page (https://www.keybiodiversityareas.org/)

There are no KBAs in the vicinity of other project sites.

1-3 Environmental and Social Considerations

1-3-1 Overview of Projects that Affect the Environment

Table 1-3-1 shows components plans of this Comprehensive Grant Aid Project Plan. Regarding respective components sit, there is location map at the beginning of this report.

Table 1-3-1 Contents of this Comprehensive Grant Aid Project Plan

Municipality/ Post-Administration/ Soco	Components	Construction details
Dili/ Don・Aleixo and Vera・Crus/ Comoro River	①-1 Revetment restoration ①-2 Road restoration	① -1 Revetments restoration • Site No. R5（L=110m） • Site No. R6（L=120m) ① -2 Road restoration that run along the revetments mentioned above • L=110m+120m=Total 230m
Aileu/ Laurala/ Bemos River	② Water intake weir restoration	• Water intake restoration (1 location) • Water intake gates restorations (2 locations) • Fixed weir (sediment removal, re-installing high-strength concrete L=28m) • Hydrostatic pond (sediment removal, installing revetment A=115m2)

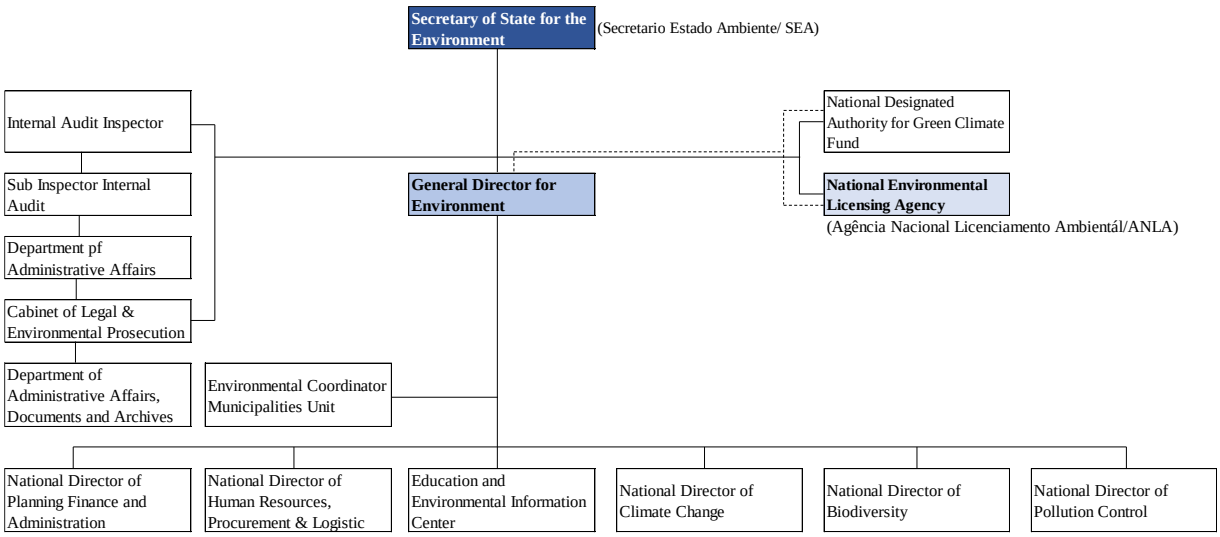
		• Slope protection works of upper side of intake, etc.
Manatuto/ Lareia/ Sumase River (intake), and Baukau/ Bemase (channel)	③ Irrigation facility restoration	• Revetment restoration of downstream side bed protective works（L=140m） • Installing new apron of downstream side bed protective works（A=192.9m×18m=3,472m2） • Restoration works of cracks of water channels at embankment section（L=400m）
Bobonaro/ Maliana/ Bulobo River	④ Irrigation facility restoration	• Rehabilitation of fixed weir and scouring sluices with concrete and reinforced concrete • Restoration of managing passages • Rehabilitation of constricted part of drainage channel (including restoration of drainage pipe of embankment of irrigation canal)

Source: JICA survey team

1-3-2 Environmental and Social Consideration System/Organization in Timor-Leste

The environmental and social consideration system in Timor-Leste is under the jurisdiction of the Secretario Estado Ambiente (hereinafter referred to as SEA). Previously, National Directorate of Environment of Ministry of Economic Development was in charge of all affairs that related environmental, in 2019, SEA reformed organization structures and established several departments for responding climate change aspects, corresponding judicial aspects, conducting environmental education, and responding issuance of environmental licenses.

To date, National Environmental Licensing Agency / Agência Nacional Licenciamento Ambientál (hereinafter referred to as ANLA) is responsible body for environmental license including scoping, categorizing of impacts, and issuance of license. Below figure shows current Organization Chart of Secretary of State for the Environment.



Source: JICA survey team

Figure 1-3-1 Organization Chart of Secretary of State for the Environment

The main laws related to environmental aspects in Timor-Leste and the legislative bills currently under draft are as follows.

【Environment related】

- Constitution of the Democratic Republic of Timor-Leste
- Laws of the National Parliament No.10/2011 15th September, Approves the Civil Code
- Government Decree Law No. 26/2012 4th July, Basic Law on Environment
- Government Decree Law No.5/2011 9th February, Environmental Licensing

The Environmental License Law stipulates the procedure for environmental impact assessment in Timor-Leste.

According to this law, regarding categorizing of impacts of the projects, there are three categories that similar with the JICA Environmental and Social Consideration Guidelines (hereinafter referred to as JICA GL). Category A is one of classification of impacts for projects that will be expected to have a significant negative impact on the environment and society, and Category B is middle classification for projects that are expected to have a certain negative impact. And projects that are expected to have little impact will be classified Category C (Table 1-3-2).

Regarding existence of "significant negative impact" in the definition of the category will be determined by comprehensive evaluation such as the scale of the project site, the presence or absence of involuntary relocation of residents, and whether or not target project includes socio-economic impact. All development project planners are required to submit a project document describing the project plan to the ANLA before implementing the project, in order to clarify environmental impact.

Projects categorized into category A and B are obliged to obtain environmental license. Moreover, project categorized into category A to be required Environmental Impact Assessment (EIA), while category B project will be required Environmental Management Plan (EMP) and Simplified Environmental Impact Statement (SEIS) in the process of environmental license issuance.

Table 1-3-2 Comparison of EIA process of JICA guideline and TL laws

Categorizing of impacts and criteria of environmental impact assessment	EIA process based on Timor-Leste law	EIA based on JICA GL
Category A: Projects could have a significant negative impact	Environmental Management Plan （EMP） and Environmental Impact Statement(EIS)	Environmental impact assessment (EIA)
Category B: Projects could have a certain negative impact	Environmental Management Plan （EMP） and Simplified Environmental Impact Statement(SEIS)	Initial Environmental Examination （IEE）
Category C: Projects could have a negligible slight negative impact	Project Document（PD）	

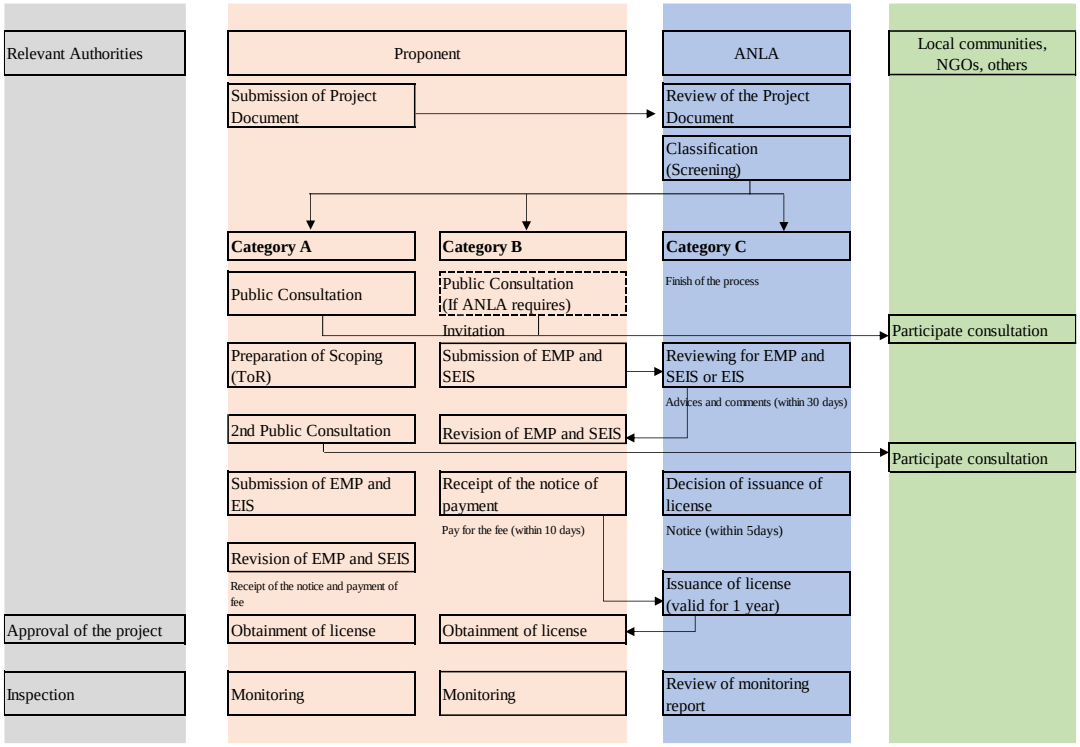
Source: JICA survey team

As descriptions below, the required contents for the project document do not differ depending on the category classification.

1. Name and contact information of the project proponent
2. Location of project and scale of project
3. Municipality and Suco of project site
4. Plans and technical drawing of proposed project
5. Report of feasibility studies of proposed project
6. Status of land and water use in the project area
7. Environmental impacts
8. Records of public consultations
9. Records of consultations with other authorities
10. Proposed classification of project
11. Project executive summary

Regarding the license expiration date can be extended up to twice the original period. However, license that has been exceeded maximum extension period or license that expiration of a term will be lost its effect, and even for continuation same project, project should have a new category evaluation process (Environmental License Law, Article 22 and 41).

Figure 1-3-2 shows the process of environmental licensing of Timor Leste on respective category project.



Source: JICA survey team

Figure 1-3-2 Process of environmental licensing on respective category project

The main laws related to social consideration in Timor-Leste and the legislative bills currently under draft are as follows.

【Social consideration related】

- Constitution of the Democratic Republic of Timor-Leste
- Laws of the National Parliament No.10/2011 15th September, Approves the Civil Code

- Laws of the National Parliament No.13/2017 5th June, Special Regime for the Definition of Ownership of Real Estate
- Laws of the National Parliament No.8/2017 26th April, Expropriation for Public Utility
- Draft of the Government Decree Law No./2018, Legal Regime of Real Estate in the Private Domain of the State
- Draft of the Government Decree Law No./2018, Legal Regime of Real Estate in the Public Domain of the State
- Draft of the Government Decree Law No./2021, Land Registry Code

In addition, the Government ordinance stipulates compensation targets such as plants and their acquisition prices. The replacement price of TL Government was based on market price, and it includes income tax and bank remittance fee, it is the same as the compensation level based on the JICA GL.

Currently, the government of Timor-Leste is developing a Land Registry Code for the purpose of granting real estate ownership to the people, and land will be covered by compensation in the future. For this reason, the expropriation of real estate on private land or the acquisition of them that will be occurred after implementation of Land Registry Code, have to be carried out based on close consultation in order to obtain consensus with the residents who are the right holders.

1-3-3 Gaps between Timor-Leste Legal Framework and JICA Guidelines

Below table presents some gaps that were identified between the Timor-Leste legal framework and the JICA Guidelines for Environmental and Social Considerations (2010) (hereinafter referred to as JICA GL).

Table 1-3-3 Comparison between JICA GL and Timor-Leste Legal Framework

JICA GL/ World Bank OP 4.12	Laws of the Timor-Leste	Gaps and Project Policy to bridge the Gaps
(1)Underlying Principles		
1. Environmental impacts that may be caused by projects must be assessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan.	Government Decree Law No.5/2011 9th February, Environmental Licensing, Article 4, Article 8~14	In EIA process, EIA project is required to consider alternatives and mitigation measures, and IEE project is required to consider mitigation measures. There is no gap compared to the provisions of law of Timor-Leste. This project does not correspond to either EIA or IEE, but alternatives and mitigation measures will be considered.

2. Such examinations must be endeavored to include an analysis of environmental and social costs and benefits in the most quantitative terms possible, as well as a qualitative analysis; these must be conducted in close harmony with the economic, financial, institutional, social, and technical analyses of projects.	Government Decree Law No.5/2011 9th February, Environmental Licensing, Preamble	In EIA process, TL law required consideration of projects with social and economic aspects to harmonize those relations of project, but there is no requirement of quantitative evaluation of project. There is a slight gap compared to the provisions of the law in Timor-Leste. In this project will be conducted quantitative and qualitative evaluations, if there is relevant issue.
3. The findings of the examination of environmental and social considerations must include alternatives and mitigation measures, and must be recorded as separate documents or as a part of other documents. EIA reports must be produced for projects in which there is a reasonable expectation of particularly large adverse environmental impacts.	Government Decree Law No.5/2011 9th February, Environmental Licensing, Article 1, y.	In EIA process of TL, there are provisions of necessary reports such as EIA, IEE and scoping for projects that be categorized EIA or IEE level. And those reports should be prepared by accessible language, and generally, English or Portuguese are used. There is basically no gap compared to the provisions of Timor-Leste. This project does not correspond to either EIA or IEE, therefore, EIA or IEE report will not be required. However, scoping, environmental management plan, and environmental monitoring plan will be prepared in English.
4. For projects that have a particularly high potential for adverse impacts or that are	Government Decree Law No.5/2011 9th February, Environmental Licensing,	IA process of TL requires establishment of evaluation committee consisting two

highly contentious, a committee of experts may be formed so that JICA may seek their opinions, in order to increase accountability.	Article 10, 12, 13	unspecified experts of relevant project areas and government members that correspond with pollution control, tourism/commerce/industry, health, culture, and infrastructure. The superior environmental authority of evaluation commission is responsible for presenting the results of technical analysis based on the IEE, EIA, EMP proposals and result of public consultations. There is basically no gap compared to the provisions of Timor-Leste. In this project as well, environmental management plan and monitoring plan will be established, and implementations of environmental managements both construction and operation phases will be considered.
(2) Examination of Measures		
1. Multiple alternatives must be examined in order to avoid or minimize adverse impacts and to choose better project options in terms of environmental and social considerations. In the examination of measures, priority is to be given to	Government Decree Law No.5/2011 9th February, Environmental Licensing, Article 1, j.	In EIA process of TL, in order to avoid and minimize undesirable impacts, it is required examination of Zero-option that not to carry out the project as an alternative plan. And appropriate compensation should be indicated when

avoidance of environmental impacts; when this is not possible, minimization and reduction of impacts must be considered next. Compensation measures must be examined only when impacts cannot be avoided by any of the aforementioned measures.		undesirable impacts cannot be avoided. There is no gap compared to the law in Timor-Leste.
2. Appropriate follow-up plans and systems, such as monitoring plans and environmental management plans, must be prepared; the costs of implementing such plans and systems, and the financial methods to fund such costs, must be determined. Plans for projects with particularly large potential adverse impacts must be accompanied by detailed environmental management plans.	Government Decree Law No.5/2011 9th February, Environmental Licensing, Article 4, Paragraph 4	EIA and IEE projects are required to prepare environmental management plan and monitoring plan. In this project, it is consideration that setting up an environmental management plan and monitoring plan. In addition, although this project does not categorize to EIA or IEE, environmental management and monitoring plans will be prepared in accordance with JICA GL.
(3) Scope of Impacts to be assessed		
1. The impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including	Government Decree Law No.5/2011 9th February, Environmental Licensing, Article 1, f.,k.,o.,q.,s.,u.,x., Article 2, Paragraph 2	In EIA process of TL, EIA and IEE projects have to consider the ecological, physical, social, economic, health, cultural, etc. impacts of all affected target areas at all stages of the project. Also, any potential negative impacts and risks arising from the project should be evaluated. Not all items described in JICA GL are covered, and there are some gaps.

migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.		In this project, environmental impact assessments will be conducted for all items listed in the JICA GL.
(4) Compliance with Laws, Standards, and Plans		
1. Projects must comply with the laws, ordinances, and standards related to environmental and social considerations established by the governments that have jurisdiction over project sites (including both national and local governments). They must also conform to the environmental and social consideration policies and plans of the governments that have such jurisdiction.	Government Decree Law No.5/2011 9th February, Environmental Licensing, Laws of the National Parliament No.8/2017 26th April, Expropriation for Public Utility	Although there are no laws, regulations, observance, standards, etc., that specifically address environmental and social considerations, the Environmental Licensing Act stipulates environmental considerations in development projects. In addition, the Law of Expropriation for Public Utility stipulates indemnification for affected person by land acquisition, such as involuntary resettlement. Although this project does not envisage involuntary resettlement, land

		expropriation, or land reacquisition, it is based on these related laws and other related policies of Timor-Leste.
2. Projects must, in principle, be undertaken outside of protected areas that are specifically designated by laws or ordinances for the conservation of nature or cultural heritage (excluding projects whose primary objectives are to promote the protection or restoration of such areas). Projects are also not to impose significant adverse impacts on designated conservation areas.	United Nations Transitional Administration in Timor-Leste Regulation No. 19 of 2000 Conservation Area (UNTAET / REG / 2000/19, PROTECTED PLACES)	The United Nations Transitional Administration of East Timor Regulations regulate protected areas, including protected areas, endangered species and cultural heritage. There is basically no gap compared to the provisions of Timor-Leste. This project will respect this rule. However, the target areas of this project are not within the area for nature conservation or cultural heritage protection.
(5) Social Acceptability		
1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of	Government Decree Law No.5/2011 9th February, Environmental Licensing , Article 3, 11,15	In EIA process of TL, EIA projects and some IEE projects are obliged to hold public consultations. And, it is requirement for all projects to prepare project document and, when preparation of this document, it is required to disclose information of plan to any interested party as communities, citizens, including responsible government and non-governmental organizations. There is basically no gap

such consultations must be incorporated into the contents of project plans.		compared to the provisions of Timor-Leste. This project will comply this law.
2. Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, the poor, and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision-making processes within society.	Government Decree Law No.5/2011 9th February, Environmental Licensing , Article 1, e., Article 4, 15	EIA process of TL, it is required assessment on potential negative impacts and risks arising from a project when adverse impacts on residents or resettlement of residents be concerned. However, there are no provisions regarding consideration for vulnerable citizens and children, and consideration for their social participation in decision-making. There is a slight gap compared to the provisions of Timor Leste. Although this plan does not envisage involuntary resettlement, land expropriation, or reacquisition, this provision will be taken into consideration.
(6) Monitoring		
1. After projects begin, project proponents etc. monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction. They then take appropriate measures based on the results	Government Decree Law No.5/2011 9th February, Environmental Licensing , Article 1, r., Article 17,18, 31,31,33	There is basically no gap compared to the provisions of Timor-Leste. Although this project does not correspond to IEE and EIA projects, it is considered that the contractor will prepare a monitoring report, and each related organization will review these reports. And NDRBFC will coordinate the

of such monitoring.		three organizations.
3. Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.	Government Decree Law No.5/2011 9th February, Environmental Licensing , Article 38	In EIA and IEE process of TL, records of environmental assessment procedures and status of issuing environmental licenses have to be divulgated to general citizens through official gazettes. There is basically no gap compared to the provisions of Timor-Leste. This project does not correspond to IEE and EIA projects. The consultant will check the monitoring report prepared by the contractor and consider disclosing it to local stakeholders.

Source: JICA survey team

1-3-4 Screening of Components

Below Table 1-3-4 shows impacts categorization and standard values of Timor-Leste environmental licensing law. In this project, there are four (4) components of restorations of existing facilities, but neither construction contents no those scales are not required EIA process.

Components include restoration works of road that associated with revetment works, but scale of planned constructions is small. With the consideration of its scale, it will not be categorized sector that expected to create significant impact mentioned in JICA GL. Also, all components do not correspond to areas or characteristics that have high potentials of creation of impacts.

Table 1-3-4 Categorization and standard values of the Environmental License Law of TL

Classification No.	Type of project	(1) Project that required of EIA	Standard values for (1)	(2) Project that required of IEE	Standard values for (2)
Annex I, V-1	V. Transport sector	Road construction in the metropolitan city / major	≥5km	N/A	N/A
Annex I, V-2	V. Transport sector	National and regional road construction	≥10km	N/A	N/A
Annex I, V-3	V. Transport sector	Rural road construction	≥30km	N/A	N/A

Annex II, V	V. Transport sector	N/A	N/A	Rehabilitation of existing road (excluding community road)	All rehabilitation works
Annex I, VIII-8, Annex II, VIII-7	VIII. Water sector	Aqueduct and sewer networks construction	≥3km	Aqueduct and sewer networks construction	<3 km
Annex I, VIII-4 ; Annex II, VIII-5	VIII. Water sector	Marine dredging / coastal or river protection works (including works to combat sea erosion, such as dams, pontoons, jetties and other works that modify the coast)	≥20 Ha	Marine dredging / coastal or river protection works (including works to combat sea erosion, such as dams, pontoons, jetties and other works that modify the coast)	<20 Ha
Annex I, II, IX-1	IX. Agriculture, Livestock and Forestry sector	Irrigation systems (includes irrigation and drainage infrastructure)	≥100Ha	Irrigation systems (includes irrigation and drainage infrastructure)	<100Ha

Source: Government Decree Law No.5/2011 9th February, Environmental Licensing

1-3-5 Evaluation of Alternative Plan

All planned works for this project are restoration or rehabilitation works of existing facilities. For this reason, zero option was set as an alternative plan to evaluate by comparing two options as "Zero option as Plan-0" and "Project implementation as Plan 1".

In result of examination, if zero option is selected for all components of this project, the problems on current situations will not be resolved. In this case, risks for unpredictable irrigation water interruption and negative influences caused by bank protection collapse will not be eliminated. When the irrigations water and life road are interrupted for a longer time, the economical productivity may decrease. Since negative impacts are large, the zero option is not recommendable.

Table 1-3-5 Result of examination of alternative plan

Items to be compared	Zero option/no project implementation as Plan-0	Project implementation as Plan 1
Aspects of Technology and Cost	N/A • Since the project is not implemented, technical and financial situations cannot be evaluated.	Excellent ・ Technologies required in this project were already existing and common in Timor-Leste. ・ However, the local contractors do not have enough experience and know-how for proper construction management. Construction supervision and management is required to be carried out

		by foreign contractors that has skill and experience. ・ In all restoration plans of respective components, appropriate scales of works were selected. ・ For all plans were set up to prioritize using of domestic materials and equipment. ・ Financial difficulties are minimized.
Natural environment	Negative impact: None Positive impact: None ・ Both negative and positive changes on the natural environment will not be created.	Negative impact: Small Positive impact: None ・ Negative impacts may temporarily increase during construction. ・ Project sites are not located within a nature conservation or cultural heritage protection area, and there are no plans to be caused large-scale pollution.
Social environment	Negative impact: Small Positive impact: None ・ Positive changes on the social environment will not be created. On the other hand, if the target facilities are left, further damage could increase potential risks of significantly disfigurement of function of the entire facility.	Negative impact: None Positive impact: Large • This project does not include involuntary resettlement, land acquisition and reacquisition. The following positive impacts will be generated as a result of project effects.
Effects created by project implementation	None/poor • The project effect will not be created.	Excellent • Restoration works of retaining wall improve accessibility of neighbors and populations of south and west of Aileu Municipality. • Restorations works of Bemos intake weirs and damaged two irrigation facilities will improve the availability of water for domestic users and rice farmers.
Project cost	Zero/excellent	Average
Evaluation	Not recommendable • Since no project costs are incurred, there is no economic burden, but this	Recommendable • Effects created by project implementation is very high, due to improvement

	selection does not solve the current problems.	of access to water and reduction of water and mobility interruptions. • In addition, the technical and financial difficulty of the project is low, and the negative impact for the social aspect of this project plan is less. • It is conclusion that the implementation of the project is appropriate.

Source: JICA survey team

1-3-6 Environment and Social Considerations

Considering nature, capacity and characteristics of the proposed facilities and site conditions, scoping was conducted in accordance with JICA Guideline for Environmental and Social Considerations (April, 2010).

In general, this project will have positive impacts by maintenance of water supplies and mobilities stable.

On the other hand, according to the result of initial scoping for environmental and social impacts, this project could cause adverse impacts on air pollution, water pollution, waste, noise/vibration, water use, local economy, social infrastructure and social services, working environment and safety, and accident. Therefore, further examination was carried out for the mentioned items that negative impacts were anticipated.

Consequently, it was evaluated that these negative impacts were limited at the Project site and could be minimized by application of ordinal mitigation measures.

The results of scoping and initial examination are summarized in Table 1-3-6.

Table 1-3-6 Scoping and Survey result

Classification	**No.**	**Item**	**Impact evaluation of based on scoring**		**Impact evaluation of based on survey**		**Remarks**
			Before and during construction	**Operation stage**	**Before and during construction**	**Operation stage**	
Pollution	1	Air pollution	B-	D	B-	D	During construction: :(Comoro,Bemos, Buluto, Maliana) Exhaust gas and dust will be generated by construction machines and vehicles. Temporary negative impacts could be occurred. Operation stage: (Comoro,Bemos, Buluto, Maliana)

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
							This project is a restoration works of existing structures; therefore, significant traffic increase and particular factors or circumstances that increase air pollution will not be expected.
	2	Water pollution	B-	D	B-	D	During construction: (Comoro,Bemos, Buluto, Maliana) Due to the restorations of water intakes and canals, small scale water turbidity will be occurred. Operation stage: (Comoro,Bemos, Buluto, Maliana) Condition that causes water pollution will not be assumed.
	3	Waste	B-	D	B-	D	During construction: (Comoro,Bemos, Buluto, Maliana) Small scale construction waste as dredged soil and removal of existing pavement will be generated. Operation stage: (Comoro,Bemos, Buluto, Maliana) Waste to causes impact for surrounding environment will not be expected.
	4	Soil contamination	D	D	D	D	During construction and operation stage: (Comoro,Bemos, Buluto, Maliana) Chemical pollutant will not be discharged from water supply facilities. Plan to cause soil contamination is not identified.
	5	Noise and vibration	B-	D	B-	D	During construction: (Comoro,Bemos, Buluto, Maliana) Noise and vibration will be generated by heavy machinery and other construction vehicles. Operation stage: (Comoro,Bemos, Buluto,

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
							Maliana) This project is restorations works of existing structures. Therefore, factors or situations cause affect noise and vibration, such as increased traffic is not identified.
	6	Land subsidence	D	D	D	D	<u>During construction and operation stage:</u> (Comoro,Bemos, Buluto, Maliana) Restoration works to cause subsidence will not be expected.
	7	Odor	D	D	D	D	<u>During construction:</u> (Comoro,Bemos, Buluto, Maliana) Based on the nature of the works, activities to cause of odors will not be identified. <u>During construction:</u> (Comoro,Bemos, Buluto, Maliana) Activity related to odor is not identified.
	8	Sediment	D	D	D	D	<u>During construction and operation stage:</u> Deterioration of bottom sediment related to this project will not be expected.
Natural environment	9	Protected areas	D	D	D	D	<u>During construction and operation stage:</u>(Comoro,Bemos, Buluto, Maliana) Particular factors or circumstances that cause negative impacts on ecosystems and protected areas will not be expected. In addition, all project sites are outside (Comoro, Bemos, Buluto, Maliana) Important Bird Areas (IBAs) and Key biodiversity areas (KBAs).
	10	Hydrometer	D	D	D	D	<u>During construction:</u>(Comoro,Bemos, Buluto, Maliana) This restoration works will

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
							repair existing structures, and planned works are small scale. All works will be done during dry season. Work that cause river discharge or flow conditions changes is not identified. Operation stage:(Comoro,Bemos, Buluto, Maliana) Conditions related to river discharge or flow conditions changes will not be expected.
	11	Coast and sea area	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) Activity will generate impacts on coasts and sea areas will not expected.
	12	Topography and geology	D	B	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) Plans will generate impacts on topography and geology will not be expected.
Social environment	13	Resettlement	D	D	D	D	Before construction, during construction and operation stage:(Comoro,Bemos, Buluto, Maliana) Resettlement or land acquisition will not be expected.
	14	Poverty	D	D	B+	A+	During construction:(Comoro,Bemos, Buluto, Maliana) Due to opportunities of day laborer, certain positive impacts will be generated. Operation stage: Due to improvement of mobilities and stabilities of water access, positive impacts will be expected.
	15	Indigenous people	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana)

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
							There are no minorities or indigenous people around project sites.
	16	Local economy (livelihoods)	B±	B+	B±	A+	During construction: (Buluto, Maliana) Negative impacts on livelihoods will be generated due to inability of water use during works on irrigation channels. On the other hand, positive impacts will be expected by increase of employment opportunities as day laborer. Operation stage: (Bemos, Buluto, Maliana) Water access and mobilities will be improved by this project. In result, positive impacts as stable economic and livelihoods activities will be expected.
	17	Land and resource use	D	B+	D	A+	Before construction:(Comoro,Bemos, Buluto, Maliana) Resettlement or land acquisition will not be expected. Operation stage: (Comoro) There are private houses along the Comoro River. Existing road and embankments will be protected by retaining wall constructions, and in result, positive impacts will be generated due to stabilization of land and resource use.
	18	Water use	B-	A+	B-	A+	During construction: (Buluto, Maliana) Negative impacts on water use will be generated due to inability of water use during works on irrigation channels and water intake. Operation stage: (Bemos, Buluto, Maliana) Restoration works of Bemos

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
							intake weir and irrigation facilities will be generated positive impacts on stabilities of water use.
	19	Existing social infrastructures and services	D	B+	B-	A+	During construction:(Comoro,Bemos, Buluto, Maliana) Traffic congestions will be generated by paving works associated with Comoro retaining wall construction. Operation stage:(Comoro,Bemos, Buluto, Maliana) Improvement of road access and stable water supplies will be generated positive impacts.
	20	Social decision-making bodies and social capital	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) Particular factors or circumstances to generate significant changes of social capital and local decision-making will not be expected.
	21	Uneven distribution of damages and benefits	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) All targets of restoration works are existing facilities. Therefore, significant changes of users will not be assumed.
	22	Cultural heritage	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) There is no cultural heritage sites around the project sites.
	23	Landscape	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) All planned restoration works

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
							scales are small. Factors and conditions to generate significant changes of landscape will not be expected.
	24	Gender and right of children	B-	B+	D	A+	During construction: (Buluto, Maliana) Factors to affect gender and child rights are not identified. Operation stage: (Bemos, Buluto, Maliana) Due to improvement of road access and stable water supplies, positive impacts will be expected.
	25	Public health and HIV/AIDS	B-	D	D	B+	During construction:(Comoro,Bemos, Buluto, Maliana) Current number of HIV/AIDS cases is very low. And unspecified number of people will not enter to project sites. Operation stage:(Comoro,Bemos, Buluto, Maliana) Factors and conditions to generate significant changes of HIV/AID case will not be expected. Due to improvement of water supplies, positive impacts will be expected.
	26	Working environment and safety	B-	D	B-	D	During construction:(Comoro,Bemos, Buluto, Maliana) Due to tight schedules or inability of allocation workers, working environment deterioration could be occurred. Operation stage:(Comoro,Bemos, Buluto, Maliana) Impact related working environment will not be expected.

Classification	No.	Item	Impact evaluation of based on scoring		Impact evaluation of based on survey		Remarks
			Before and during construction	Operation stage	Before and during construction	Operation stage	
Other	27	Accident	B-	D	B-	D	During construction:(Comoro,Bemos, Buluto, Maliana) Accident risks in the project sites and surrounding areas could be increased by construction work and construction vehicles. Operation stage:(Comoro,Bemos, Buluto, Maliana) Impact related increase of accidents will not be expected. Factors that cause changes in traffic volume and speed on the road along Comoro retaining wall is not identified. (Comoro)
	28	Trans boundary impacts and climate changes	D	D	D	D	During construction and operation stage:(Comoro,Bemos, Buluto, Maliana) All target components are existing structures and scales of works are small. Cross-border impacts or climate change impacts will not be expected.

A+/-: Significant positive / negative impact is expected.

B+/-: A certain degree of positive / negative impact is expected.

C+/-: The positive / negative impact is unknown. (requires further investigation.)

D：Effect is not expected

Source: JICA Survey Team

1-3-7 Mitigation Measures

Regarding items evaluated as "B- (not as much as A) negative impact is expected" of assessment results, mitigation measures for both stages of construction and operation were considered. After considerations, it is finding that negative impact factors were not identified for operation stage. If unexpected negative impacts will be identified during monitoring, respective responsible institutions will consider mitigation measures and take actions. In addition, the contractor will implement mitigation measures during constructions.

Table 1-3-7 Mitigation measures for environmental impacts

Classification	No	Impact	Mitigation measures (During construction)	Implementation body	Responsible institutions	Cost

Pollution	1	Air pollution	・To sprinkle water when dust occurred residential area ・To limit speed of construction vehicles（20Km/h）	Contractor	NDRBFC	Construction cost
	2	Water pollution	・To treat turbid water before discharging into the river. ・To encourage ready-mixed concrete suppliers to ensure neutralization treatment of alkaline wastewater	Contractor	NDRBFC	Construction cost
	3	Waste	・To consider re-cycle of wastes before disposal ・To store waste temporarily where appropriate place that determined by TL responsible institutes, and dispose them properly	Contractor	DNRBFC	Construction cost
	5	Noise and vibration	・To limit using heavy equipment to daytime hours ・To perform proper maintenance of heavy equipment	Contractor	DNRBFC	Construction cost
Social environment	16	Local livelihoods	・To consider employment of neighborhood residents for day labore and light works	Contractor	DNRBFC	Construction cost
	18	Water use	・To develop appropriate construction plans to minimize impact on water interruptions ・To inform construction plans for water users in advance	Contractor	NDRBFC, NDIWM, BTL	Construction cost
	19	Existing social infrastructures and services	・To dispatch traffic control personnel	Contractor	DNRBFC	Construction cost
	26	Working environment and safety	・To develop appropriate construction plans ・To provide safety education for workers	Contractor	DNRBFC	Construction cost
other	27	Accident	・To dispatch traffic control personnel ・To limit speed of vehicles at project sites ・To provide safety education for workers ・To conduct safety patrols within construction areas	Contractor	DNRBFC	Construction cost

Source: JICA Survey Team

1-3-8 Monitoring Plan

EIA process of TL requires that EIA and IEE projects that determined to have significant or certain impact by SEA have to draft Environmental Management Plan in accordance with domestic standards or equivalent international standards, and implement monitoring.

This project is a rehabilitation of existing facilities and does not correspond to EIA and IEE. Moreover, the results of water quality and noise/vibration environment initial value survey conducted in this project

did not exceed the domestic standard or the equivalent international standard. The results and details of initial environmental survey were annexed in this report.

Regarding air quality, there is no domestic company that owns the equipment, and according to SEA instructions, in the nearest past, this kind of survey was conducted using equipment imported from Australia at capital development plan on cargo port construction project (Tibar port, 2017 Oct). And the results were below the standard values of the WHO Ari quality guideline 2021.

This project sites are located away from main roads and rehabilitation works scale are small-scale, therefore, dust generation that causes serious environmental and human impacts is not expected.

With reason mentioned above, in this project, dust will be target for monitoring, and based on visual observation and requests from local residents, and measures such as sprinkling of water will be taken as necessary. Water quality and noise/vibration will be surveyed during construction and the end of construction, and those results will be compared with baseline data.

Table 1-3-8 shows the monitoring plan. Respective responsible persons of contractor will conduct monthly monitoring and report monitoring results to the respective institutes as DNIWA, BTL and NDBRFC. After receiving monitoring report, NDIWM and BTL shall explain the monitoring results to NDRBFC and submit a copy of monthly report that made by contractor.

Regarding EIA procedure of Timor-Leste, projects that categorized category A or B will be required submission of an environmental monitoring report to the National Environmental Licensing Agency (ANLA) every six months. If there is component classified to category A or B, respective responsible institutions of Timor-Leste will report to ANLA. Moreover, component corresponding to category B under JICA GL shall prepare and submit required report to JICA.

Cost of monitoring during construction will be included in the construction cost and it will be borne by contractor. Detailed Environmental Management and Monitoring Plan are annexed in this report.

Table 1-3-8 Monitoring plan

Before constructions					
Impacts category	Items	Method	Locations	Frequency	Implementing institutions
Approval and Permissions	Permissions for implementation plan and environmental aspects	Explain to have permissions for project plans and obtainments of environmental license	N/A	Before constructions	NDRBFC, BTL, NDIWM
Social environment	Stakeholder consultation and information disclosure	Explanation of plans, hearing opinions of local authorities	Each sub-projects site	Before constructions	NDRBFC, BTL, NDIWM
During constructions					
Impacts category	Items	Method	Locations	Frequency	Implementing institutions
Social environment	Safety and public health	Selection of site managers	Each sub-projects site	Start of construction	Contractor
Social environment	Work environment	Health check of workers	Each sub-projects site	If necessary	Contractor
Social environment	Natural disasters	Records of natural disaster	Each sub-projects site	When incident occurred	Contractor
Social environment	Water use	Records of complaints	Each sub-projects site	When complaints	Contractor

				occurred	
Social environment	Traffic congestions	Visual inspection	Each sub-projects site	If necessary	Contractor
Social environment	Accidents	Accident reports	Each sub-projects site	When accidents occurred	Contractor
Air pollutions	Dust	Visual inspections and complaints records	Each sub-projects site	Once a month, or when complaints occurred	Contractor
Water pollutions	Turbidity	Visual inspections and complaints records	Each sub-projects site	Once a month, or when complaints occurred	Contractor
Waste pollutions	Waste disposal	Records of waste collections and transports	Each sub-projects site	When collecting and transporting waste	Contractor
Noise and Vibrations	Noise	complaints records	Each sub-projects site	when complaints occurred	Contractor

Source: JICA Survey Team

1-3-9 Environmental Management Implementation System

Tentative monitoring report structure is following. Based on this plan, JICA Survey Team will explain to respective related organizations.

All mitigation measures shall be implemented by the contractor and reported to the respective institutes and the consultant.

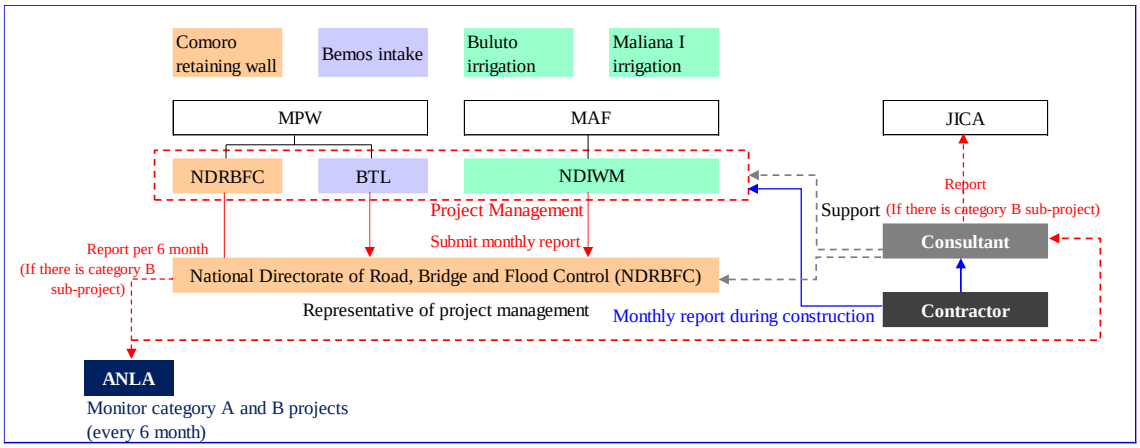
Consultant will support the NDRBFC to evaluate of monitoring reports, and review results of the monitoring. If there is necessary, consultant will assist NDRBFC to take corrective and preventive measures in appropriate.

Table 1-3-9 Monitoring structure and roles of entities

Implementation period	Implementing institutions	Roles and tasks
During construction	Consultant	➢ Inspection of mitigation measures and monitoring conducted by contractor; ➢ Support the NDRBFC to evaluate of monitoring reports
	Contractor	➢ Implementation of mitigation measures, monitoring; ➢ Preparation and submission of monitoring reports
	Respective responsible institutions of TL	➢ Confirmation of monitoring results submitted by contractor; ➢ Explanation of monitoring results to NDRBFC; ➢ Submission of a copy of the report to NDRBFC
Operation stage	Respective responsible institutions of TL	➢ Reporting of project completion to ANLA; ➢ Inspection of structures constructed and repaired

Source: JICA Survey Team

Tentative monitoring report structure is following. Based on this plan, JICA Survey Team will explain to respective related organizations.



Source: JICA Survey Team

Figure 1-3-3 Monitoring report structure

1-3-10 Monitoring Form

The monitoring form proposed to relevant TL responsible institutions are shown in Appendix-9.

1-3-11 Stakeholder Meeting

Due to COVID-19 pandemic, proponents of each sub-project refrained gathering general people as public consultation or stakeholder meeting. In October 2022, as the situation of COVID-19 has become relatively calm, proponents held stakeholder meeting with representatives of residents and water user associations in order to explain of project plans and potential impacts.

The status of each stakeholder meeting and an outline of its content are as follows.

Name of Sub-Project： Rehabilitation plan for Comoro River Retaining wall
Meeting host： NDRBFC
Date and Time： 28th, October, 2022 11:30～12:30
Participants: Total of 8 people, including chiefs of villages (Socos) from 6 Socos around the project area (please refer attachment)

Summary：

NDRBFC explained project plan and confirmed cooperation system of local authorities in order to make proper communications and promote cooperation by local communities during construction. There were many positive comments expressed by participants, such as their expectations for the rehabilitation works. And local authorities requested job opportunities for residents living near the project site, if there is necessary recruiting daily workers or security staff during construction.

NDRBFC will coordinate with contractor including this matter.

In addition, chief of Socos will post this project plan on the bulletin boards of each village office, and some of villages that have SNS and community radio will use these media to spread widely information of this project to residents.

Name of Sub-Project： Rehabilitation of the Bemos Water Supply
Meeting host： Bee Timor Leste, Empresa Pública/ BTL
Date and Time： 28th, October, 2022 10:30～11:30
Participants： Total of 17 people, including chiefs of villages (Socos) from 6 Socos around the project area (please refer attachment)

Summary：

BTL explained project plan and confirmed cooperation system of local authorities in order to make proper communications and promote cooperation by local communities during construction. BTL obtained understanding that 1) temporary pipes will be installed during construction to continue water supply, 2) it will be removed at the end of construction, and 3) the possibility of temporary water outages around 3 days due to the installation and removal of temporary pipes.

Up to now some villages do not obtain 24-hour water supply, and Motael village gets water supply 3 times a week only. For this reason, chief of Soco of Motael requested to install a potable water supply tank during water outages. Director of maintenance department of BTL corresponded that BTL have experience to supply water by installation of potable water tank during water outages in 2021 April flooding. And BTL will secure water supply with same method for this rehabilitation plan.

During the meeting, there were requests that apart from this project regarding stable water supply. Regarding this rehabilitation plan, there were many opinions that welcomed this project.

Local authorities participated this meeting will post this project plan on bulletin boards at each village office, and some village offices that have social media and community radio will use of these media to inform widely residents.

In addition, participants reconfirmed that when plan of work that will be caused water outages or turbid water, the contractor will inform to BTL in advance, and BTL will inform the residents widely through chief of Sucos.

Picture 1

Explanation by BTL

Picture 2

Discussion with chiefs of Sucos

Name of Sub-Project： Rehabilitation plan for Buluto Irrigation
Meeting host： NDIWM
Date and Time： 24th, October, 2022 10:00～11:30
Participants： Total of 11 people, including chiefs of village (Sucos) from 2 Sucos around project area, and council members of water user associations (WUA) (please refer attachment)

Summary：

Local staff of JICA survey team explained the outline of this project, and officer in charge of irrigation in MAF Baucau municipality office supplemented the explanation. This plan includes the repair of the waterway, and the council members of water user association and local authorities agreed water outage plan around 10days during the repair work. Based on the annual farming plan of the surrounding rice farmers who are using Buluto irrigation, October to November farmers of Buluto irrigation area will not use water. With this reason, council members of water user association requested that waterway repairing works could be done from early October to the end of November 2023. MAF Baucau municipality officer of irrigation and JICA survey team agreed to this proposal.

In addition, two people out of five council members of the WUA are concurrently serving as chiefs of Socos. During construction, if there is a plan of work that will be caused water outages or turbid water, the contractor will inform to president of WUA (Mr. Vicente) via telephone, and then, president of WUA would disseminate the information widely to residents through five council members.

October 2022, in accordance with the decentralization policy of TL, the administrative jurisdiction, functions, and responsibilities of Ministries including MAF in Municipalities have been transferred from the central government to local governments.

NDIWM as MAF central ministry has jurisdiction of this project. In order to consider this change, participants advised that when the contractor procurement is completed and contractor enters the site, it is better to have opportunity to visit courteously in prefectural office, which is the highest organ of the local government for smooth implementation.

Since the project site is located in the center of Manatuto and Baucau Municipality, it was decided that plan of this project and this meeting minutes would be reported to the respective municipality government through the both irrigation officers of MAF.

Picture 1

Picture 2

Discussion of waterway repairing timing	Explanation by JICA survey team

Name of Sub-Project： Rehabilitation plan for Maliana I Irrigation
Meeting host： NDIWM
Date and Time： 21st, October, 2022 9:00～11:30
Participants： Total of 10 people, including extension staff of MAF from 4 Villages (Sucos) around project area, gate keeper of Maliana I irrigation, council members of water user associations (WUA) , local media of local radio (please refer attachment)

Summary：

Local staff of the JICA survey team explained plan of this project, and officer in charge of irrigation of the MAF Bobonaro municipality office requested cooperation of relevant parties. The participants welcomed this project plan and declared that they would cooperate as much as possible through on-site coordination.

After explanation, there was request to add scope of irrigation canal that had been repaired last year using WUA funds that out of scope of this project by WUA council member as representative of the farmers. MAF Bobonaro municipality officer who in charge of irrigation explained again that it would not be included in the project, and the farmer representatives agreed his explanation.

The participants suggested when construction company entered the site, it is better that gathering the municipality government that is the highest organ of the local government, and other local authorities to disseminate project plan again. MAF Bobonaro municipality officer of irrigation agreed to hold meeting.

In addition, participants had discussion of waste management. And it is conclusion that during construction, contractor will consult with MAF Bobonaro municipality officer and gatekeeper of Maliana I irrigation regarding the reuse of waste, and after that, remaining waste will be disposed appropriately in disposal site where designated by Bobonaro municipality. (Maumali area)

Picture 1

Explanation by JICA survey team

Picture 2

Discussion with gatekeeper and WUA

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

(1) Project purpose

This project aims to restore public services in the capital Dili and agricultural production infrastructure in rural areas by rapidly restoring basic infrastructure and agricultural infrastructure that were severely damaged by floods and landslides. This will contribute to the recovery and development of the region's necessary infrastructure and economy.

(2) Project overview

In order to achieve the above purpose, this project will use grant aid to reconstruct two of the Comoros River revetments, the water intake weir of the Bemos irrigation facility, and the revetment, riverbed protection of the headworks and main canal of the Buluto irrigation facility, and the intake weir of the Maliana irrigation facility that were damaged by the April 2021 flood.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Policy

The basic policy for the design of each component is as follows.

(1) Comoro River revetment rehabilitation work

- The plan alignment, cross-sectional geometry and planned height of the revetment should be consistent with the river plan under consideration in the foundation study.
- Active gravel quarrying in the river channel may lead to continued riverbed degradation. The design should consider local scouring in front of the revetments.
- The revetment shall be designed to ensure stability.

(2) Rehabilitation Work for Bemos Intake Facilities

The rehabilitation of Section 1 (Bemos Intake Facilities) will be implemented in this project. The Bemos intake facilities will be restored to its original structures without changing the structures of the existing facility.

- In the upstream section of the damaged intake structures, not only the rehabilitation but also new protection walls should be installed to prevent the impact of rock and gravel collisions from directly reaching the original structures. However, if a new structure is to be constructed in the river, it shall be limited to the existing structure’s area. This is because the structure will cause an obstruction to the water flow in the river, resulting in a scour on the back side of the structure, and repeated rock strikes may damage or collapse the newly structures and its debris can damage existing structures.
- The embankment slope of the upper side of the left bank in the downstream was damaged by the flood in April 2021. It will be newly constructed made by wet masonry to prevent erosion in this project.

- In the areas damaged by the flood in April 2021, other than those mentioned above, will be rehabilitated to their original condition.

(3) Rehabilitation Work for Buluto and Maliana Irrigation Facility

1) Rehabilitation Work for Buluto Irrigation Facility

- Replace the gabion basket revetment, which was urgently restored immediately after the April 2021 Flood, with a permanent inverted-T shape retaining wall.
- Lay foot protection blocks in front of the masonry retaining wall(L=31.2m), whose foundation is scoured, to prevent scouring.
- Foot protection blocks will be laid at the end of the apron downstream of the weir, where the riverbed is declining.
- For main canals in high embankment sections, the sections with vertical cracks in the center of the base will be replaced with concrete base. At that time, a wire mesh sheet is sandwiched between the bottom concrete to prevent cracks from expanding in the future. Other cracks in the waterway transverse direction and gaps between the side wall and the bottom slab are closed with mortar.

2) Rehabilitation Work for Maliana Irrigation Facility

- In principle, the areas damaged by the April 2021 Flood will be restored to their original state.
- Due to restoration work on the apron downstream of the scouring sluice, the scouring spit gate that cannot be opened will be repaired as temporary work. The contents of the restoration consisted of replacing the rack bars and opening/closing devices of the 2 scouring gates.
- The materials and equipment will be procured or scheduled to be procured for the Project for Increasing Farmers Households' Income through Strengthening Domestic Rice Production in Timor-Leste.

2-2-1-2 Policies for natural conditions

The climate of Timor-Leste belongs to the tropical savanna climate and is divided into a rainy season and a dry season. The maximum daytime temperature is in the 30°C range throughout the year, except in mountainous areas. The rainy season is from December to April, the dry season is from June to October, and May and November are transitional months. Many rivers, such as the Comoro and Bemos rivers, do not flow during the dry season, but the Lareia River, which has the Buluto Irrigation Weir, and the Burobo River, which has the Maliana Irrigation Weir, have water flowing during the dry season and are used for irrigation purposes.

All of the target components will be constructed in the river. In order to ensure safety during the construction period, the construction plan will avoid the rainy season (from December to April). In addition, as mentioned above, the Laleia River and the Burobo River, where the Buluto and Maliana irrigation weirs exist, have water flow even in the dry season, so sufficient safety measures will be taken against sudden floods.

At the Bemos intake facility, a temporary road of about 2.7 km will be constructed in the river channel. Riverbed material (gravel) will be used for embankment.

2-2-1-3 Policies for socioeconomic conditions

The Route 2 bypass runs along the right bank of the Comoros River. The bypass is an important route connecting the capital Dili and the southern part of the country, but the rehabilitation of the Comoro River revetment will require restrictions on vehicle traffic. The construction plan and safety measures will ensure traffic and safety during the construction period by setting detour routes, installing information boards, and assigning safety inspectors. Post-disaster safety measures have not been adequately implemented, in affected areas. It is necessary to ensure the safety of passage by implementing measures to prevent falls, warning about slope failure, enforcing traffic control, etc.

Restoration of the main irrigation canal of the Buluto Irrigation Facility requires stopping water supply for about a week during the construction period. Appropriate date and time to stop water supply will be decided by consulting with the irrigation association in advance not to affect the crops.

2-2-1-4 Policy on Construction/Procurement Circumstances

(1) Basic matters

This cooperation project is scheduled to be implemented under the framework of Japan's grant aid system. The contract form for project implementation is planned to be a comprehensive contract system.

(2) Construction circumstances

Currently, Timor-Leste has construction companies operated by locals, as well as foreign construction companies from Australia, Malaysia, and other countries. Most of the local contractors are small-scale, and many of them are contracted for road construction, river-related embankment construction, building construction, etc., mainly in the capital city of Dili.

We have a reasonable amount of construction machinery and construction technicians and are able to handle earthwork and concrete work. Therefore, it is judged possible to utilize it as a subcontractor.

(3) Procurement circumstances

This project is for the rehabilitation of existing infrastructure and is planned not to require relatively special materials and equipment.

Construction materials that can be procured locally are sand and stone, and cement and other construction materials are imported. In Timor-Leste, general construction materials such as cement and reinforcing bars are distributed in the domestic market, but the sales stock is small. These are imported from Indonesia, Australia and Singapore.

This is an emergency restoration of infrastructure damaged by flooding, and since the construction period is limited due to the dry season construction, priority will be given to procurement from local suppliers in terms of procurement quantity, delivery date, and economic efficiency. The policy is to procure from Japan or third countries.

2-2-1-5 Policy on utilization of local contractors

Currently, there are about 5-6 construction companies in Timor-Leste that are managed by locals and foreigners. It is a medium-sized construction company, which is called a major company locally, and is

active mainly in the capital city of Dili. It is thought that it can be used as a subcontractor for this project because it has a reasonable number of engineers and construction machinery.

2-2-1-6 Policies for capability of operation and maintenance

After the completion of the programme, the operation and maintenance of the rehabilitated facilities will be handled by the MPW-DRBFC for the Comoro River revetment and national route No.2 bypass road, MPW-BTL for the Bemos water supply facility, and MAF-DIWM for the Buluto/Maliana irrigation facility. These facilities had been maintained and managed by their respective organizations before 2021 April flood. In addition, it does not involve special techniques or construction methods for restoration. Therefore, it can be said that it is possible to maintain and manage with the same system as before.

2-2-1-7 Policies for setting the scope

The programme for urgent rehabilitation of flood damaged infrastructure supports the rapid restoration of facilities with a high degree of urgency, and JICA's ongoing technical cooperation is also necessary to achieve Build Back Better in the medium to long term. It is intended to cooperate with each other.

Comprehensive Grant Aid scheme is applied for this rehabilitation project, and the three components ((1) the Comoro River bank protection work, (2) Bemos intake weir restoration work, (3) Buluto/Maliana irrigation facility restoration work) were combined into one project (one construction contract).

The outline of the scope of facilities to be restored is shown in the table below.

Table 2-2-1 Outline of facilities to be restored

Components (Implementing Agency)	Outline of Construction	Contents	Notes
1．Rehabilitation for Comoro River Retaining Wall 【MPW-DRBFC】	・Construction the revetments urgently that can withstand the level of the April 2021 floods, especially in areas where the current floods have caused collapse and are particularly dangerous for residents' lives. ・This work will be used as a pilot construction project to transfer the technology to other restoration work that will be done on a self-help basis. ・	(1) Restoration of revetment R5 and R6 (2) Rehabilitation of National Road No2 bypass road (top of revetment of R5 and R6)	
2．Rehabilitation for Bemos Water Supply System 【MPW-BTL】	・ The existing intake weir has collapsed and spilled out due to the current flooding, making safe operation impossible. ・ Urgent rehabilitation of damaged facilities and reinforcement of flood	・Rehabilitation of existing intake weirs (water intakes, intake gates, fixed weirs, still water ponds, water channels, etc.) ・Reinforcement for flood control	・Australia support plan is underway (repair of water conduit pits). Be careful not to duplicate support. ・Temporary road construction is

	preparedness.		required.
3．Rehabilitation for Buluto/Maliana Irrigation Facilities 【MAF-DIWM】	・The current flooding has caused extensive damage to existing facilities in aging areas. ・The existing facilities will be repaired and restored.	A.Buluto Irrigation Facility (1) Rehabilitation of revetment downstream of the headwall (2) Construction of new revetment downstream of the headwall apron (3) Crack repair of trunk canal (embankment section) (4) Repair crackes in the main canal (embankment section)	・Repair and reinforcement of the entire headworks including the cage-mat revetment section that was temporarily restored without any follow-up cost.
		B. Maliana Irrigation Facility (1) Headworks rehabilitation	

2-2-1-8 Policies for construction methods, procurement methods and construction periods

The project is required to be implemented urgently, safely and reliably in order to contribute to disaster recovery. Therefore, the following should be considered when developing the project implementation plan.

・For work in rivers, the construction plan should avoid the rainy season to ensure safety.

・Major works in the river for all components shall be carried out in the dry season with concurrent construction plans for shorter construction periods.

・Tendering and other contract work shall be carried out during the rainy season and construction shall start immediately after the rainy season.

The policies for construction methods and procurement methods are set out below.

(1) Construction methods

1) Comoro River revetment rehabilitation work

①The revetments shall be concrete leaning retaining walls with high stability. An embedment depth of at least 1 m below the existing riverbed level shall be ensured because the existing riverbed level is lower than the planned riverbed level.

②Foot protection blocks shall be installed on the riverbed in front of the revetment to protect the revetment from scouring. The weight of each protection block shall be at least 3 tonnes considering the foot protection blocks of the Hinode Bridge, which has already been constructed, and the flow velocity of the river.

③The existing roads shall be rehabilitated to their original condition and, as the road is partially collapsed, the specifications shall be equivalent to those of the existing road. The road pavement shall be asphalt concrete, the footpath pavement shall be interlocking blocks and guardrails shall be installed along the riverside.

2) Bemos Intake Facility

① Restoration work for the water intake facility will basically be carried out to the original structure at the time of completion without changing the structural cross-section of the current facility based on the local topographical conditions.

② In addition to restoring the severely damaged upstream part of the intake, a reinforcing wall, etc. will be installed in the upstream part so that the impact caused by the collision of rocks and gravel does not directly reach the structure.

③ When constructing a new structure in the river, installation of reinforcing walls, etc. shall be limited to the installation range of the existing structure.

3) Buluto and Maliana Irrigation Facilities

a) Buluto Irrigation Facilities

① For the headworks downstream revetment, the temporary restoration revetment (futon basket revetment) will be removed and a reinforced concrete retaining wall revetment (L = 32m) will be newly installed. As a measure to prevent scouring of the reinforced concrete retaining wall, a 1.2m long embedded concrete is installed in front of the retaining wall from the current deepest riverbed height. In front of the unaffected masonry retaining wall revetment downstream, we will install a bed protection block to prevent scouring and reinforce it.

② The apron downstream of the headworks will be equipped with bed protection blocks to cope with riverbed fluctuations. The installation range of bed protection blocks in the transverse direction shall be up to the point where the proposed bed protection work crest height (EL.43.3m) and the current river bed ground height on the left bank intersect.

③ For the main canal (embankment section), fill the three types of cracks in the bottom slab (gap between the side wall and the bottom slab, cracks in the canal crossing report, and vertical crack in the center of the canal) confirmed by the survey with mortar. Cracks will be chipped off and concrete will be placed, and the bottom slab concrete will be replaced. The basic policy for this construction work is to stop the flow of water.

b) Maliana Irrigation Facilities

① The headwork fixed weir, scouring gate canal, and maintenance passage will be basically rehabilitated to the original design state using plain and reinforced concrete.

(2) Procurement Method

Materials that are distributed in Timor-Leste such as reinforcing bars, sand, gravel, stones etc. will be procured locally. Other imported materials will be procured from neighboring third countries or Japan as necessary through local agents and subcontractors. Construction machinery such as backhoes, bulldozers, dump trucks, etc. will be procured locally since there are rental companies and they can be procured in Timor-Leste.

2-2-2 Basic Plan (Construction Plan)

2-2-2-1 Comoro River revetment rehabilitation work programme

The revetment rehabilitation work programme will be considered for application to other Comoros River revetment improvements other than this project and to revetment rehabilitation in Timor-Leste.

(1) Estimation of the damage cause

Instability of the revetment on R5 due to the installation of 11 mattress baskets to an excessive height of about 10 m was a contributing factor to the damage to the structure. In sections other than the recently damaged gabion mattress, protruding mattress baskets were observed, which were due to loosening of the deteriorated steel wires, and there is a risk of collapse. In Japan, rigid steel gabion mattress are used for installations of gabion mattress on revetments like R5.

View of devastated

Protruding gabion mattress

Example of rigid steel gabion mattress in Japan

Figure 2-2-1 Situation of damaged R5 revetment

The existing revetment on R6 is a gravity retaining wall made of crushed stone and concrete. The height of the retaining wall was estimated to be approximately 6 m. Gravity retaining walls with a height of 6 m are not included in the Japanese standard collection of drawings, and the existing revetment is structurally unstable. Furthermore, the cobbles are not bonded to each other by the concrete, as shown in Figure 3.2, which further contributes to the instability of the retaining wall. The reason for the aggregates not being bound by the cement was judged to be that head-sized aggregates were put into the fresh concrete and that the cement did not fill the gaps between the aggregates, as shown in Figure 3.3. It was concluded that the cause of the damage to the revetment was due to the instability of the structure and problems with the construction of the retaining wall.

	
Cracks caused by mortar on surface of retaining wall	Cracks caused by mortar on surface of retaining wall
	
Separation of cobble and concrete (poor concrete quality)	Separation of cobble and concrete (poor concrete quality)

Figure 2-2-2 Situation of damaged R5 revetment

	
Laying head-sized cobbles	Putting in concrete

Figure 2-2-3 Construction status of revetments in Timor Leste similar to R6 revetments

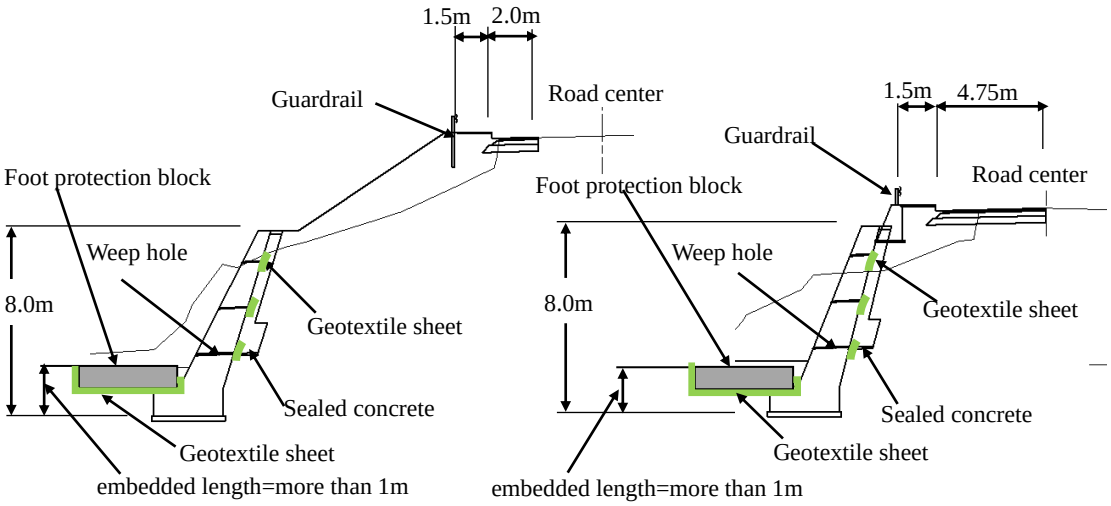
(2) Design plan

1） Revetment design

Revetments shall be made of highly stable concrete leaning retaining walls to minimise the effect on flow velocity or flow rate of the river and ensure scour protection and the function of the road. Revetments shall have a minimum embedment depth of 1 m below the planned riverbed level. However, it is necessary to ensure embedment of at least 1 m below the existing riverbed level because the existing riverbed level is lower than the planned riverbed level. The design method of the revetment shall take into consideration the following

- Ensuring the stability (sliding, transfer, support) of the revetment structure
- Ensuring sufficient embedded length (more than 1m)
- Ensuring scour prevention (installation of foot protection blocks)

The front of the revetments shall be protected from scouring by bed protection work consisting of foot protection blocks. The foot protection blocks shall have a weight of at least 3 tonnes per block considering the foot protection blocks of the already constructed Hinode Bridge, the post-construction condition survey of the Hinode Bridge and the flow velocity of the river.



Plan of R5 Plan of R6

Figure 2-2-4 Plan of countermeasure construction

2）Road design

The existing roads shall be rehabilitated to their original condition and, as the road is partially collapsed, the specifications shall be equivalent to those of the existing road. The road pavement shall be asphalt concrete, the footpath pavement shall be interlocking blocks and guardrails shall be installed along the riverside.

- The following is the pavement configuration provided by the DRBFC.
- Surface course: 4 cm

Figure 2-2-5 Existing road conditions

- Binder course: 6 cm
- Base course: 25 cm

Subbase course: 35 cm

(3) Construction method

1) Construction method

The construction method will allow the existing road to remain open to traffic by alternating one-way traffic and will allow pedestrians use the existing footpath on the residential side. After that, the work will be conducted according to the procedure shown in Figure 2-2-6, and the foot protection blocks and retaining walls, which would affect the river, shall be completed before the rainy season.

The design method of the revetment will be proposed for application to other Comoros River revetment improvements other than this project and to revetment rehabilitation in Timor-Leste.

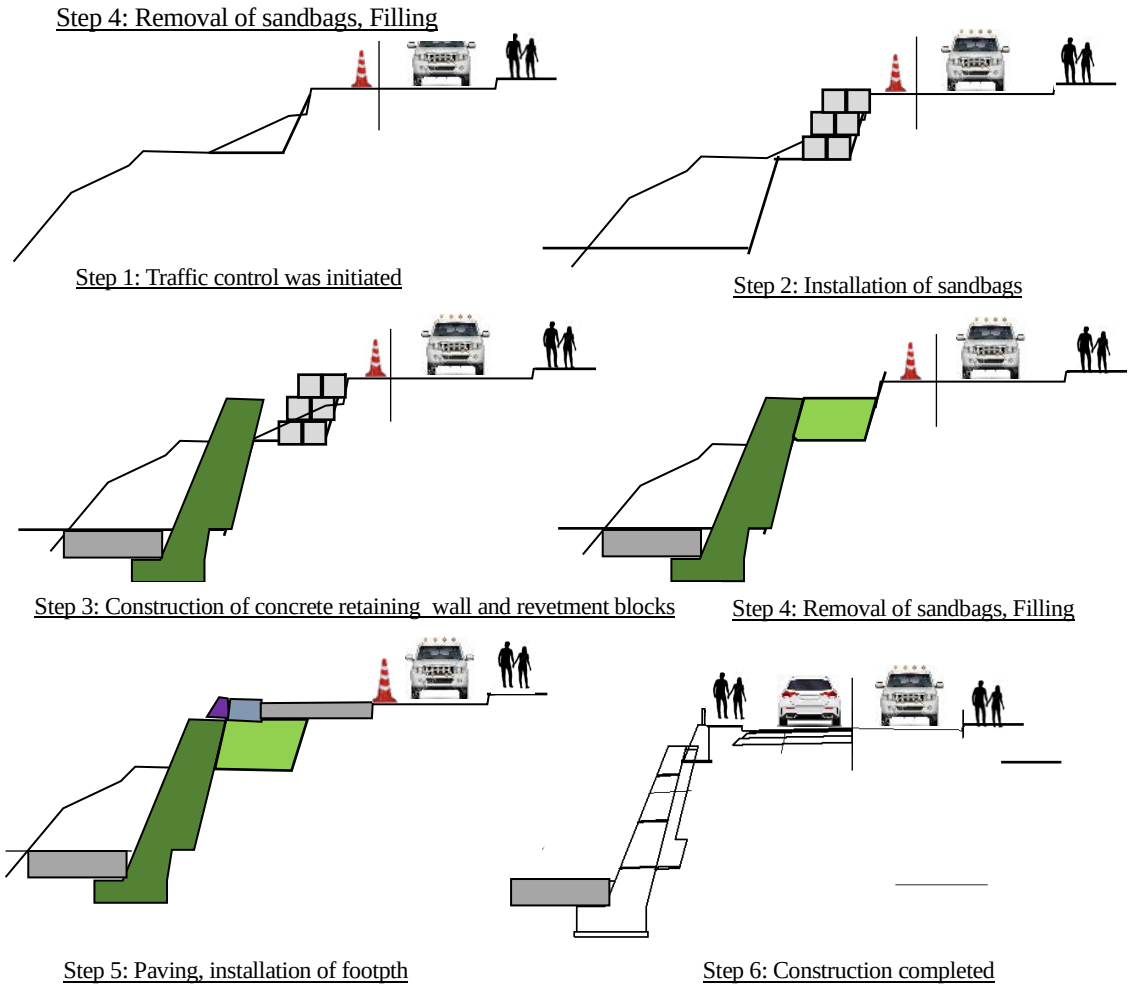


Figure 2-2-6 Construction procedures for R6 revetment

2) Safety Management

The road is used as a residential road, for transporting materials to nearby factories, for transporting sand and aggregate, and as a bypass for National Highway 2, so it is difficult to close it to traffic. Therefore, it will remain open during construction and traffic will be restricted to alternating one-way traffic. During construction, one side of the road on the residential side will be used for one-way traffic, traffic will be guided by traffic control officers before and after the construction area, and safety equipment will be deployed. In addition, lighting and other nighttime safety equipment will be deployed for nighttime construction.

During construction, construction machinery that minimises noise and vibrations will be adopted because the neighbouring area has housing and other living environments in proximity.

(4) Beneficiary effects

The affected revetment is along a 20 km bypass road (known as X Japan Road or officially as *Rua de Lesibutak II*) that branches off from the Hinode Bridge and connects to National Road No. 2 in Aileu Municipality. The road is paved from the mouth of the Comoro River to around 12 km, with the exception of some damaged sections, but it remains mostly unpaved in Aileu Municipality where sections of the road subbase are under construction.

About 30% of the road has revetment alongside the Comoro River and the remaining 70% is a mountain road, which is used by motorbikes, passenger cars and small public buses as a shortcut to National Highway No. 2. Furthermore, there are residential areas and secondary concrete product plants along the road between the Hinode Bridge and around 6 km (at the confluence of the Comoro and Bemos rivers). From the above, the beneficiaries of the rehabilitation will be the people using National Road No. 2, the people associated with the public bus service, the residents living near the road and the commuters to the secondary concrete product plants. The benefits of repairing the revetment and road as a residential road are high.

2-2-2-2 Rehabilitation for Bemos Water Supply System

(1) Outline of Rehabilitation Plan

The rehabilitation plan is roughly divided into Reconstruction, Reinforcement and Repair.

Reconstruction is the process of removing deteriorated areas to restore the damaged area to its original condition. Reinforcement is intended to protect critical parts of the structure, making it less susceptible to major damage from a flood of the same magnitude as the flood in this time. Repair is a minor repairs such as surface repairs.

In this disaster, the direct cause of the damage to the facilities is thought to be the large amount of rocks and gravel that flowed down from the upper reaches of the river. The intake facilities are located at the point where the channel of the river makes a gradual turn to the right bank (opposite the intake facilities), where rocks and other debris from upstream have been deposited. The intake facilities at this location were particularly badly damaged and will be the main structure for the rehabilitation.

In addition to damage caused by rock and boulders runoff, it is presumed that the backfill sediment was sucked out of the structure due to the rising water level behind the structure caused by flooding, so it is important to properly install weep holes to reduce the rising water level behind the retaining wall.

The rehabilitation plan is shown below.

Table 2-2-2 Rehabilitation Plan for the Bemos Water Supply system

No.	Facilities		Situation	Type of works	Target Facilities
	Structure	Portion			
1	Intake facilities	Front Wall	Damaged	Reconstruction	Front wall
2	Intake facilities	Retaining wall	Damaged	Removal	Retaining wall in front of the Front wall
3	Intake facilities	In front of Intake facilities	—	New Construction	Protection wall for the Front wall
4	Intake facilities	Side wall	Damaged	Reconstruction	Side wall in the river side
5	Intake facilities	In front of Intake facilities	—	New Construction	Protection concrete in front of the Protection wall
6	Intake facilities	In front of Intake facilities	—	New Construction	Protection boulders in front of the Protection concrete
7	Intake facilities	Facing Intake facilities	—	Removal	Rock on the right bank
8	Intake facilities	Upper left bank of Intake facilities	—	Removal	Rock on the upper left bank
9	Intake facilities	Inlet	Damaged	Reconstruction	Inlet facilities (including Screen)
10	Intake facilities	Side wall	—	New Construction	Protection concrete around the Inlet and Side wall
11	Intake facilities	Gate facilities	Damaged	Reconstruction	Gate facilities
12	Intake facilities	Around gate facilities	Damaged	New Construction	Steps around the Gate facilities
13	Intake facilities	Side wall	Cracks	Reconstruction	Cracks on the side wall in the river side
14	Intake facilities	Top of Side wall	Damaged	Repair	Top of the wall of the Intake Facilities
15	Intake Weir	Surface of Intake weir	scraped	Repair	Intake Weir
16	Intake Weir	Side wall	scraped	Repair	Side wall of the Intake Weir
17	Intake Weir	Right bank Revetment	scraped	Repair	Defective areas of the upper side on the high waterbed of the right bank
18	Intake Weir	Right bank Revetment	scraped	Repair	Protection concrete outside of the high waterbed of the right bank
19	Intake Weir	Right bank Revetment	Damaged	New Construction	Defective areas of the upper side on the high waterbed of the right bank
20	Grit Chamber	Right bank Revetment	scraped	Repair	Defective areas of the Retaining wall of the right bank of the Grit Chamber
21	Grit Chamber	Bottom of Grit Chamber	Deposited	Repair	Dredging in the Grit Chamber
22	Retaining Wall	Right bank Revetment	Damaged	Removal	Defective areas in the right bank of the riverbed
23	Connecting Canal	Upper part of Connecting Canal	Damaged	Repair	Upper Wall of the Connecting Canal
24	Connecting Canal	Upper part of Connecting Canal	—	Reconstruction	Protection wall for the Upper Wall of the Connecting Canal
25	Connecting Canal	Upper part of Side wall	scraped	New Construction	Top of the side wall of the Connecting Canal, and Installation of the concrete covers
26	Retaining Wall	Upper left bank of Grit Chamber	Damaged	Repair	Defective areas in the left bank on the high waterbed of the Grid Chamber
27	Retaining Wall	Upper left bank of downstream	Damaged	New Construction	Protection wall of the upper side of the left bank of the riverbed
28	Retaining Wall	Left bank Revetment	Damaged	Repair	Defective areas in the left bank of the riverbed

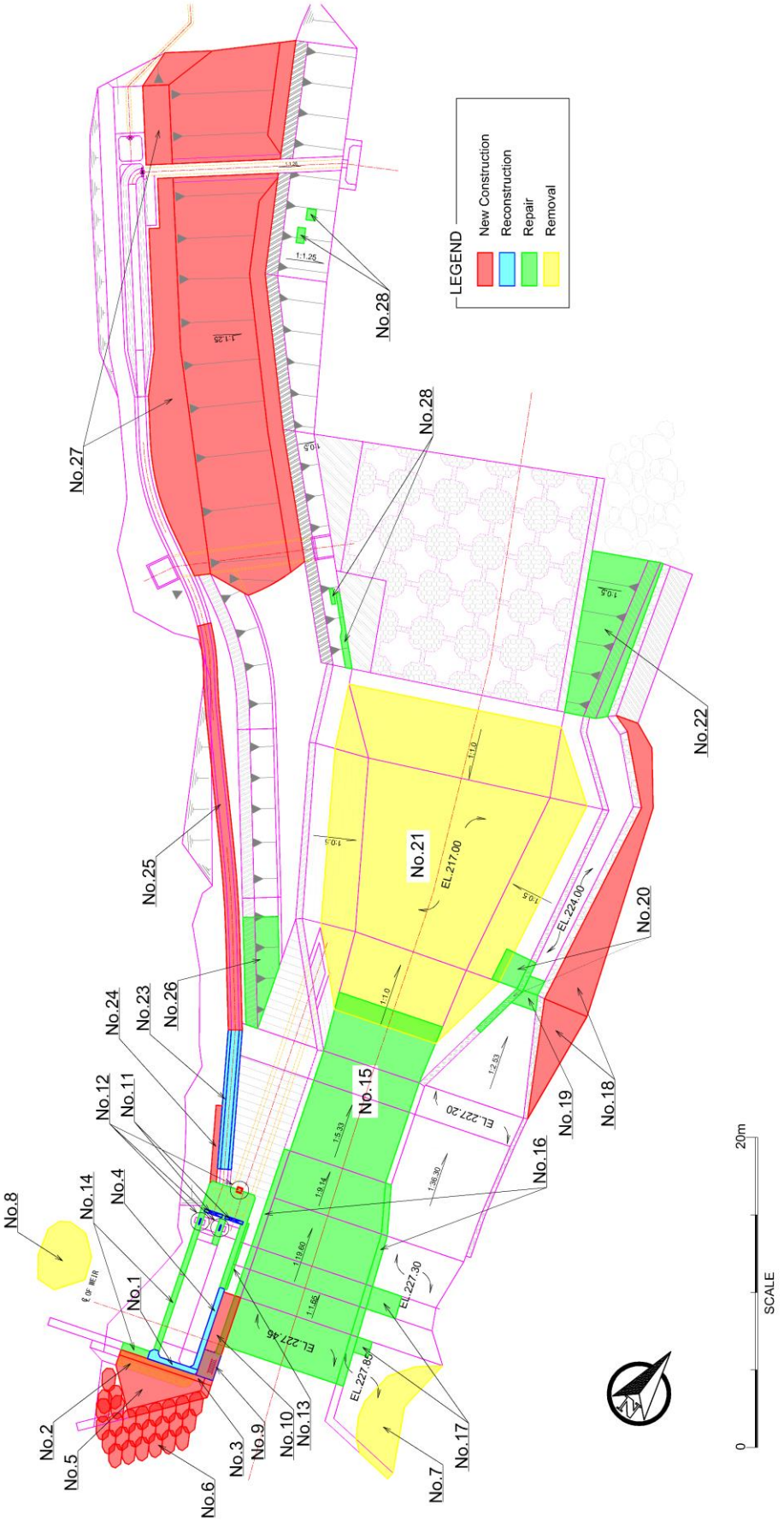


Figure 2-2-7 Rehabilitation Plan for the Bemos Water Supply system

(2) Rehabilitation Plan

No.1 : Partial removal and reconstruction of front wall of the intake facilities
No.2 : Partial removal of gravity retaining wall
No.3 : Reinforcement of the front wall of the intake facilities
(installation of reinforced concrete wall)
No.4 : Partial removal and reconstruction of side wall of the intake facilities (river side)

The damaged intake walls (front wall: No.1, side wall: No.4) will be reconstructed. Each walls were severely damaged by repeated rock impacts and will be protected from direct impacts by installing a reinforced concrete wall (No.3). The existing gravity retaining wall (No.2) will be partially removed in order to install the wall No.3.

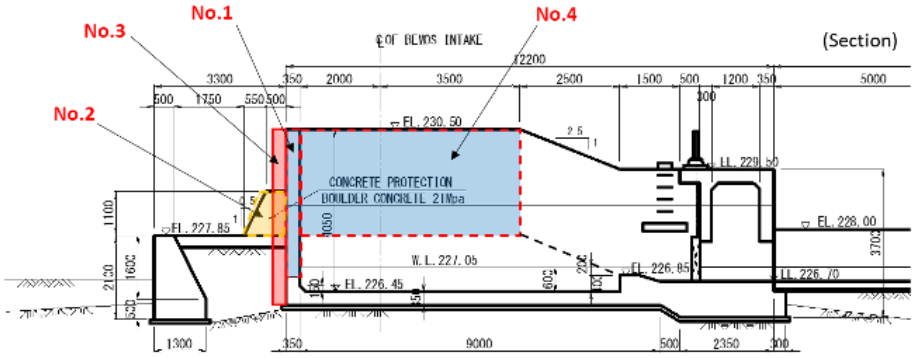


Figure 2-2-8 Rehabilitation Plan from No.1 to No.4

No.5 : Protection in front of the No.3 Reinforced concrete wall (Casting plain concrete)
No.6 : Placement of boulders

Protective concrete (No.5) is placed in front of the protection wall (No.3). It is presumed that the protective concrete will be damaged and gradually destroyed by long-term operation. In order to keep this protective concrete as long as possible, boulders in the river are piled up around it to reduce direct damage (No.6).

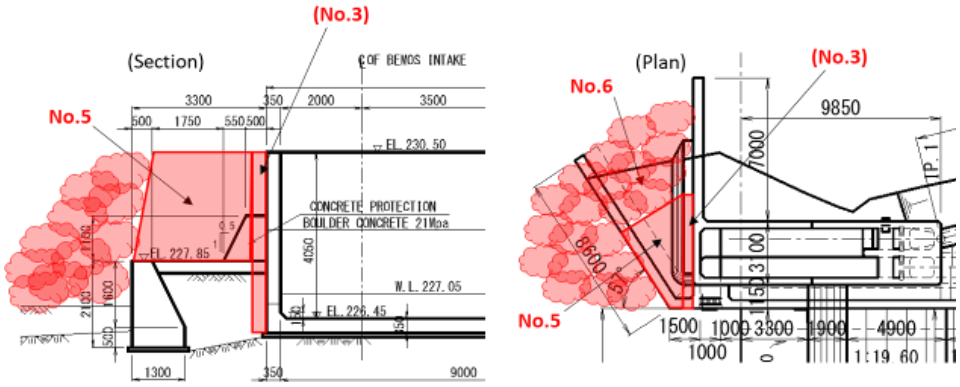


Figure 2-2-9 Rehabilitation Plan from No.5 to No.6

No.7 : Cutting a rock on the Right bank
No.8 : Cutting a rock on the upper Left bank

Cutting a rock on the right bank revetment (No.7) to secure a wider cross-section for water passage.

In addition, there is an unstable rocks (No.8) above the left bank of intake facilities. The rock will be cut to prevent them from falling into the intake facilities due to collision with the flowing rocks and boulders during flooding.

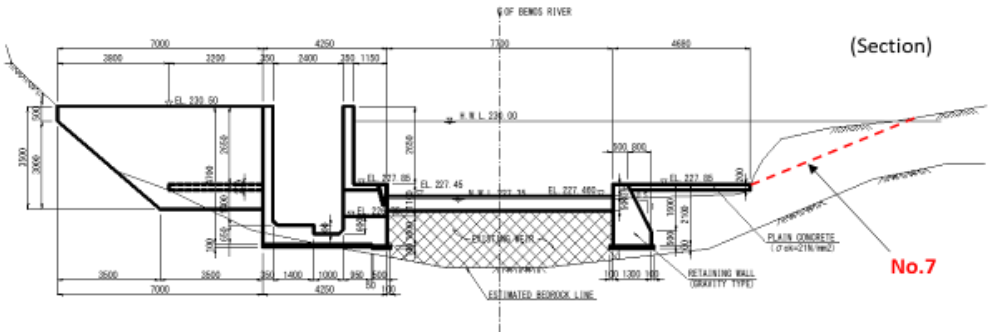
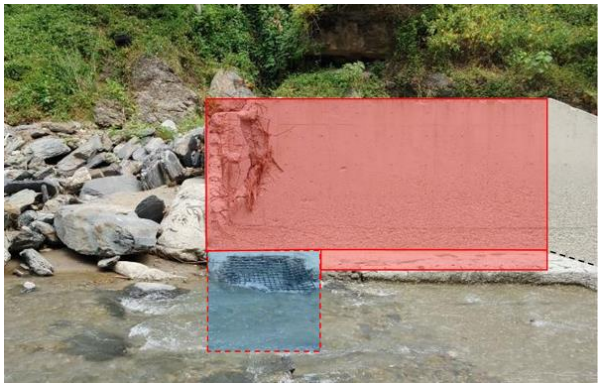


Figure 2-2-10 Rehabilitation Plan from No.7 to No.8

No.10 : Reinforcement of the Inlet and surrounding area (casting plain concrete)



Reconstruction will be implemented for the damaged inlet (No.9). The temporary screen currently in place will be removed.

Protection wall made of plain concrete (No.10) will be installed over the inlet and surrounding area to protect the inlet (No.9) and side wall (No.4) from rocks and boulders flowing in the river.

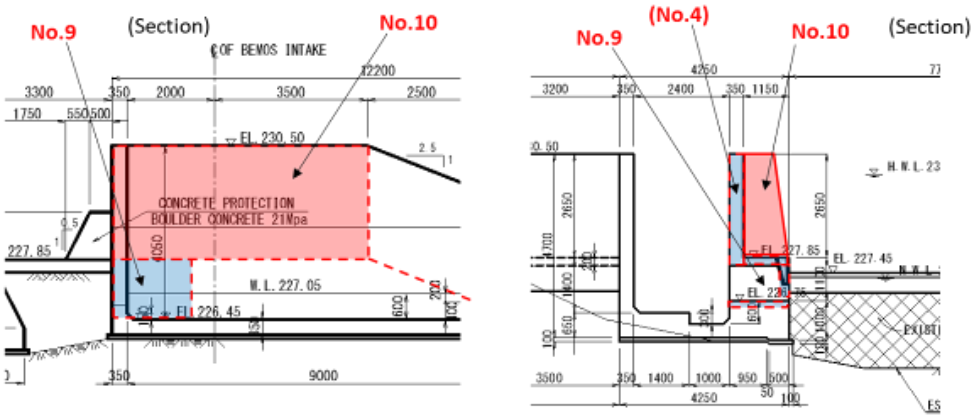


Figure 2-2-11 Rehabilitation Plan from No.9 to No.10

No.11 : Re-installation of Gate facilities (2 gates)
No.12 : Installation of Steps

Figure 2-2-12 Rehabilitation Plan from No.11 to No.12

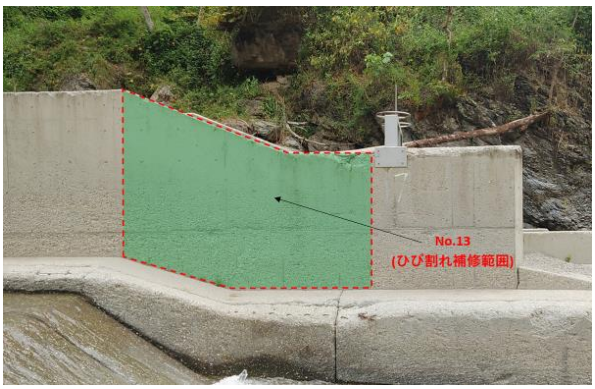
2 sets of the gate facilities will be re-installed including the spindle and hoist (No.11), because they are still in operation with damaged door bodies and doorstops of the currently installed intake and sediment discharge gate due to rock impact.

Also, the administrative steps will be installed downstream of the gate facilities. The damaged old steps (on the land side of the gate facilities) will be left in place without removal (No.12).

No.13 : Repair of cracks in the intake facilities
No.14 : Repair of defective areas of the top surface of the wall of the intake facilities

The upstream side wall of the intake works (No.4) was severely damaged and the inner surface was heavily cracked, so it will be reconstructed. The downstream side wall (No.13) has cracks of 0.3 to 0.6 mm on the river side, so the cracks will be repaired using a low-pressure injection method with a resin-based injection material.

In addition, the top surface of the wall has sectional defects due to the impact of rocks during flooding, so it will be repaired (No.14).



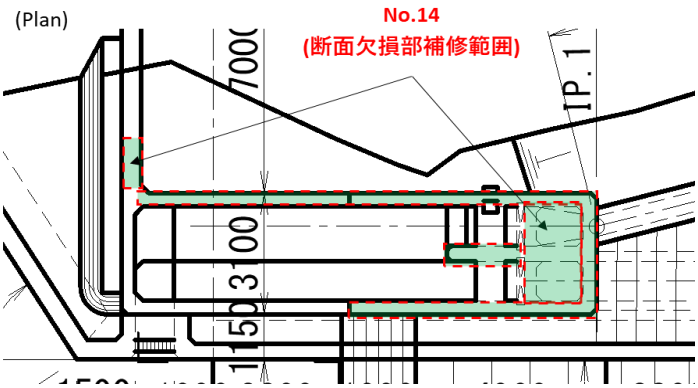


Figure 2-2-13 Rehabilitation Plan from No.13 to No.14

No.15 : Repair of defective areas of the intake weir
No.16 : Repair of defective areas of the top and side of the inversed T-type retaining wall on the left and right banks

The surface of the fixed weir (No. 15) is heavily scraped and damaged by considerable rocks flow during the annual rainy season as well as during flooding. The bottom and sides of the inverted T-type retaining wall (No.16) have exposed rebar. These sections will be repaired with high-strength concrete.

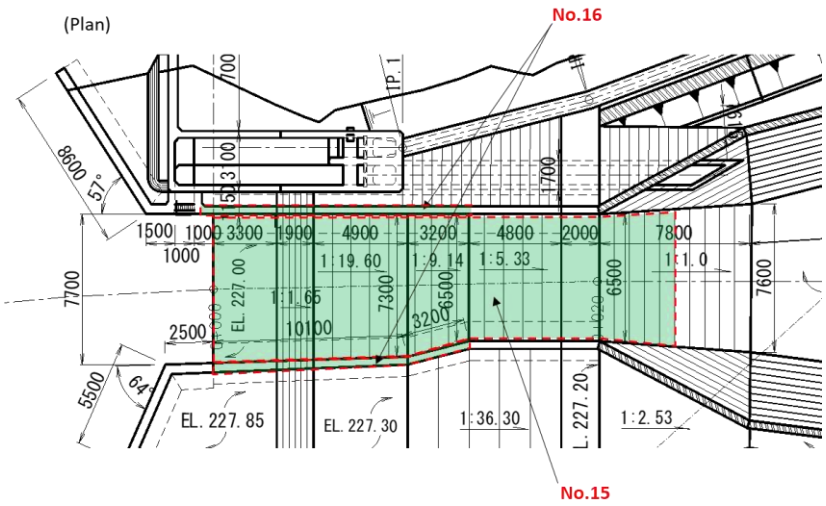
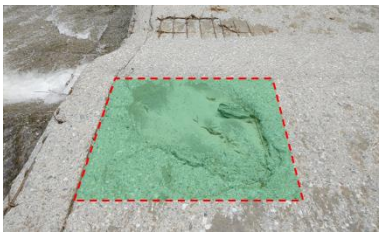


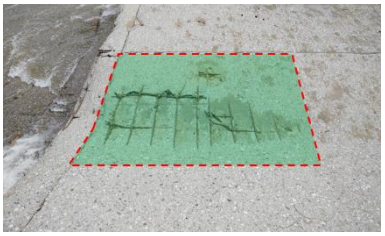
Figure 2-2-14 Rehabilitation Plan from No.15 to No.16

No.17 : Repair of defective areas of the upper side on the high waterbed of the right bank
No.18 : Reinforcement of the outside of the high waterbed of the right bank (boulder concrete)

The surface of the right bank revetment will be repaired (No. 17).

It is presumed that the flood flowed into the back of the high waterbed (outside) of the right bank revetment during the flood, and it was affected that the backfill soil was sucked out of the retaining wall downstream. Therefore, this outside area will be backfilled with concrete (No. 18).





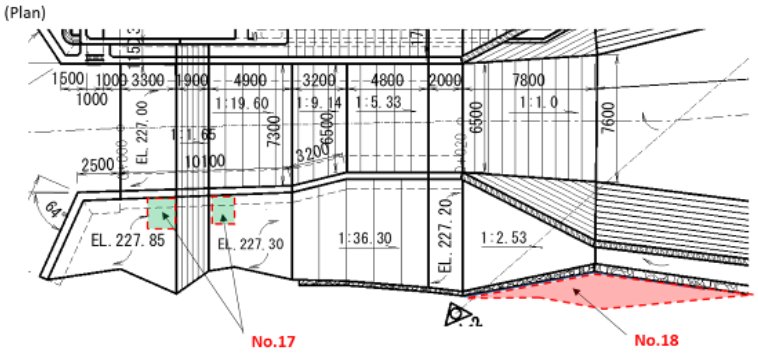
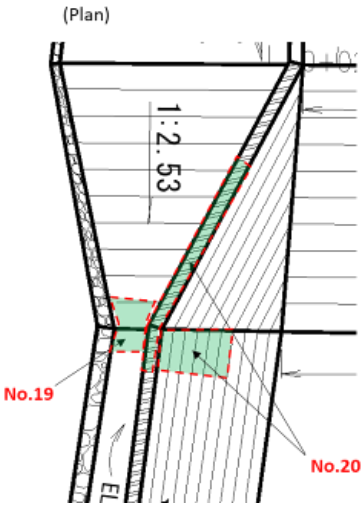


Figure 2-2-15 Rehabilitation Plan from No.17 to No.18

No.19 : Repair of defective areas of the upper side on the high waterbed of the right bank

No.20 : Repair of defective areas of the retaining wall of the right bank of the grit chamber



The surface of the right bank revetment will be repaired (No.19). The structure was constructed avoiding existing rock, so care should be taken with the bedrock when placing the concrete. In addition, a drainage pipe runs under the concrete to drain water from the back of the high waterbed, which will be repaired at the same time.

The retaining wall on the right bank of the Grit chamber(No.20) is severely damaged and the rebar is completely exposed. During the repair, the rust on the surface of the rebar should be carefully stripped and repaired using high-strength concrete.

Figure 2-2-16 Rehabilitation Plan from No.19 to No.20

No.21 : Dredging in the grit chamber

The dredging of the grit chamber will be implemented. The depth of the grit chamber is 4.5m, but sediments have accumulated up to the full water level. The dredging is planned to be carried out at the end of the construction process because it will serve as a scaffold for the repair of the retaining wall (No.20).

Figure 2-2-17 Rehabilitation No.21

No.22 : Repair of defective areas of the retaining wall in the right bank of the riverbed

In the right bank of the riverbed, in addition to damage caused by rock and boulders runoff, it is presumed that the backfill sediment was sucked out of the structure due to the rising water level behind the structure caused by flooding, so it is important to properly install weep holes to reduce the rising water level behind the retaining wall.

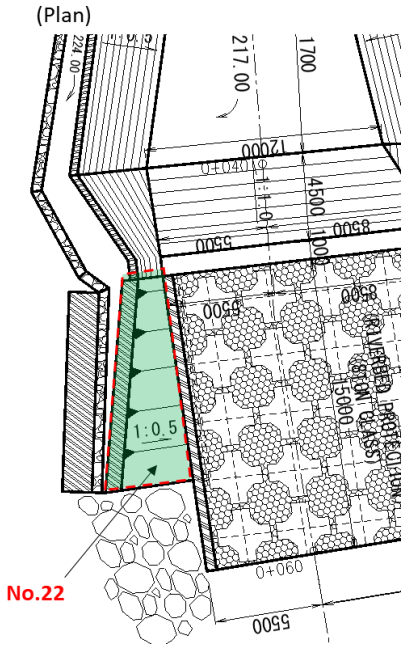


Figure 2-2-18 Rehabilitation No.22

No.23 : Partial removal and reconstruction of the upper wall of the connecting canal
No.24 : Reinforcement of the upper wall of the connecting canal (outside)

The upper wall of the connecting canal (No.23) was damaged by rocks and boulders that went around the back of the intake facilities. The intake facilities is located at the narrowest point of the river cross-section, and there is concern that rocks and boulders may pass through the back of the intake facilities in the same manner if a flood of this magnitude were to occur again. As a countermeasure, the protection wall made of concrete (No.24) will be constructed.

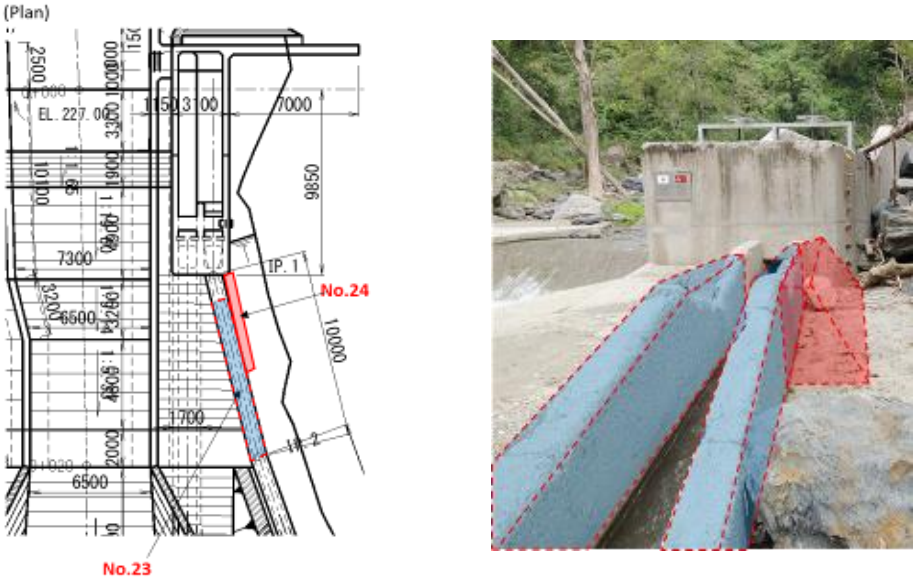


Figure 2-2-19 Rehabilitation Plan from No.23 to No.24

No.25 : Repair of the top of the side wall of the Connecting Canal, and Installation of the concrete covers

The top of the sidewall of the connecting canal was damaged by rocks and boulders. Currently, it is operating at maximum volume of intake water in the Beamos water supply system, so that water is being lost from the damaged portion of the canal. The top of the side wall will be repaired with the objective of reducing water intake loss. In addition, the concrete covers of the canal were lost by the flood, which is deteriorating water quality at the water treatment plant, so the covers will be installed.

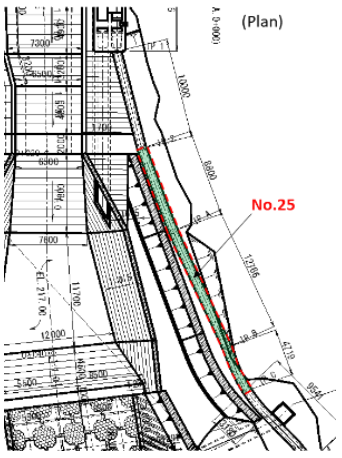


Figure 2-2-20 Rehabilitation No.25

No.26 : Repair of defective areas of the retaining wall in the left bank on the high waterbed of the grit chamber

The top-end concrete has been damaged by rocks and boulders that flowed around the back of the intake facilities, and the retaining wall itself is also damaged. The top-end concrete will be removed and reconstructed, and the retaining wall section will be repaired.

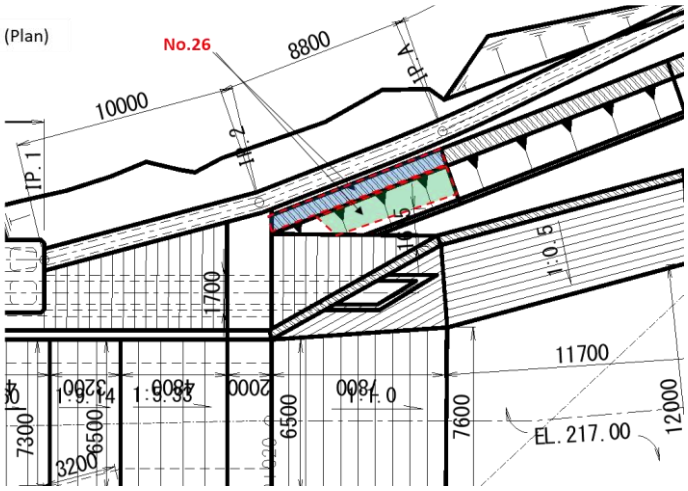


Figure 2-2-21 Rehabilitation No.26

No.27 : Installation of the protection wall of the upper side of the left bank of the riverbed (backfill and wet masonry)

The embankment slope of the upper side of the left bank in the downstream was damaged by the flood. It will be newly constructed by made of wet masonry to prevent erosion.

Below the connecting canal is hollow due to soil runoff, exposing a steel pipe that has been left unused. During the construction, the backfill must be carefully compacted.

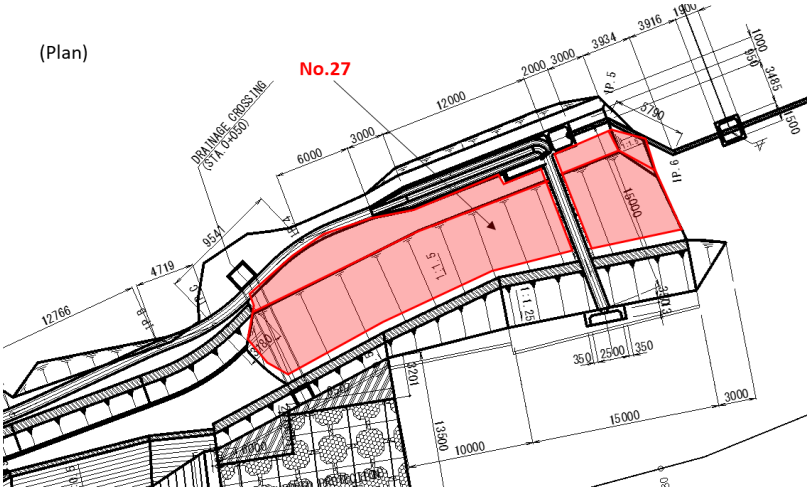


Figure 2-2-22 Rehabilitation No.27

No.28 : Repair of defective areas of the left bank of the riverbed

It is presumed to have been damaged by rock impact. This repair will prevent the damage from progressing.

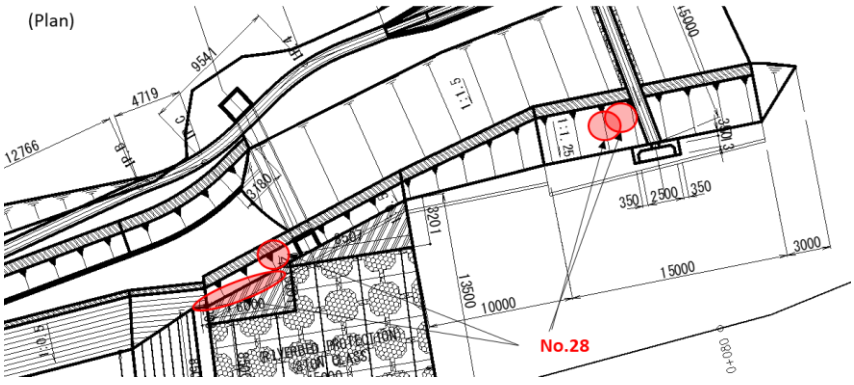


Figure 2-2-23 Rehabilitation No.28

2-2-2-3 Rehabilitation for Buluto／Maliana Irrigation Facilities

(1) Buluto Irrigation Facility

1) Organizing Existing Documents

The Laleia River originates in the mountains of southern Manatuto Municipality and flows north through the mountains to the Banda Sea, with a basin area of 497 km^2 and a channel length of 46 km. The Buluto Headworks is located approximately 8 km from the mouth of the river.

The natural conditions of the Laleia River are summarized in the table below, based on "THE PREPARATORY SURVEY REPORT ON THE PROJECT FOR REHABILITATION AND IMPROVEMENT OF BULUTO IRRIGATION SCHEME IN THE DEMOCRATIC REPUBLIC OF TIMOR-LESTE (September 2013)" and the "FOLLOW-UP STUDY FOR THE PROJECT FOR REHABILITATION AND IMPROVEMENT OF BULUTO IRRIGATION SCHEME IN TIMOR-LESTE (February 2020)".

Table 2-2-3 Natural conditions of the Laleia River

Overview of the river and its basin	
Location of rivers	The Laleia River is located near the central border between Baucau and Manatuto Municipality. The headworks is located approximately 8 km upstream from the mouth of the river in Laleia , Manatuto Municipality.
River length, basin area	River length: 45,557 m, Basin area: 497 km^2
Topography and geology of the watershed	The geology of the basin is mainly limestone and metamorphic marine clay. The topsoil is prone to erosion. Therefore, soil erosion often occurs during the rainy season in steeply sloping mountainous areas.
Hydrology	
Rainfall characteristics	Annual precipitation in Dili is 891 mm, and in Manatuto Municipality, a season is divided into a rainy season from December to May and a dry season from June to November. Rainfall is largely influenced by the monsoon.
precipitation	The rainfall observation data at Dili Airport (25 years: 1977-1992 and 2002-2012) was used to calculate the probable flood volume. Because it is the only observation record with a high degree of confidence over a long period of time.
drought Flow	The drought flow that occurs once every five years was calculated as the drought flow during the dry season from the flow observation records of the Laleia River (1952-1972). The Laleia River shows its peak flow in May, with an average water volume of 7.2 m^3/s in May. The low water period is in November, when the water volume drops to 1.5 m^3/s.
Planned flood flow	The duration and accuracy of flow observation data for the Lareia River is insufficient, as there are only 20 years of data available from the period of Indonesian rule. In the preparatory study, the flood volume was calculated based on the longitudinal cross-sectional survey of the river, water level traces and interviews with local residents in the vicinity.

	The design flood discharge was calculated to be 1,500 m^3/s, assuming a once-in-100-year event.
River characteristics	
River gradient	1/230 (river bed slope downstream of the headworks after construction of the facility, from aerial photogrammetric survey)
Riverbed materials	At depths deeper than 3 m below the existing riverbed, the sand and gravel mixed with cobble stones are strong enough to serve as the foundation of the structure.
Typical grain size of riverbed materials	dm = 10 mm (from Table 2-3 Particle size analysis results in the 2020 report)
Maximum grain size subject to sediment discharge	dmax = 40 mm (from design plan of sediment discharge)
Coefficient of roughness	n=0.050 (natural channel, streambed is large boulders)
Segment classification	Segment 1 (based on riverbed gradient and channel conditions)
Geotechnical Characteristics of Intake Site	
Geological features	Sand and gravel are deposited from the surface (EL. 44 m) to a depth of 2 to 3 m in the entire riverbed. Therefore, it is necessary to pay attention to the possibility of scouring up to 2 m below the surface during a flood, as well as to the phenomenon of suction out at the base of the revetment. The beds deeper than 3 m from the riverbed are composed of cobbles, and are expected to be strong enough for the foundation of the structure.
Ground stress	The cobble-mixed sand and gravel layer near EL. 40 m can be judged as "compacted sand-mixed gravel" (Soil and Foundation Design Calculation Exercise, Japanese Society of Soil Mechanics and Foundation Engineering, p.221), and can be evaluated to have an N value of 50 based on the same data.
Coefficient of permeability	The hydraulic conductivity from the riverbed (EL. 44 m) to 3-4 m was 2×10^{-3}m/s, with high permeability values measured.

2) River Characteristics

Based on the topographic survey map of the downstream section of the Buluto headworks prepared during the "THE POST SITUATION AND DATA COLLECTION SURVEY FOR THE FLOOD COUNTERMEASURES IN DILI Final Report (August 2022)" the riverbed gradient and deepest riverbed elevation were summarized.

The deepest riverbed height in the section of the retaining wall to be restored downstream of the headworks (between NO. 0+150 and the fixed weir) is EL. 41.232 m at the downstream point NO. 0+150. Therefore, the current deepest riverbed height used for the design conditions of the retaining wall rehabilitation work downstream of the headworks is EL. 41.2 m.

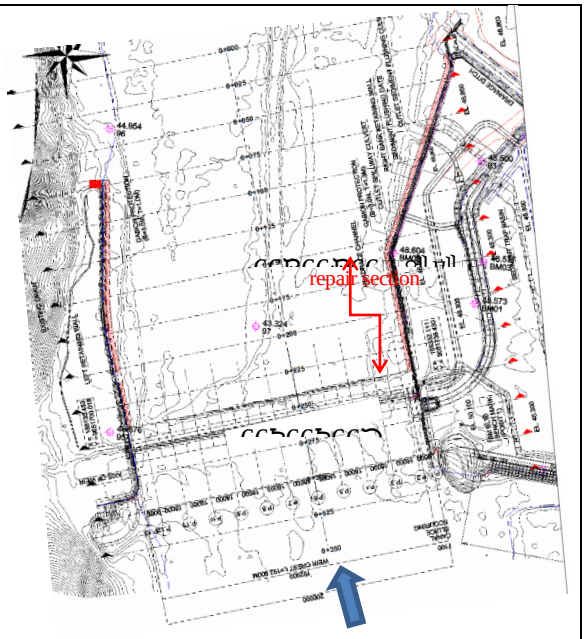
The riverbed slope downstream of the headworks is 1/250 based on the deepest riverbed height longitudinal profile.

Table 2-2-4 Channel characteristics downstream of the headworks

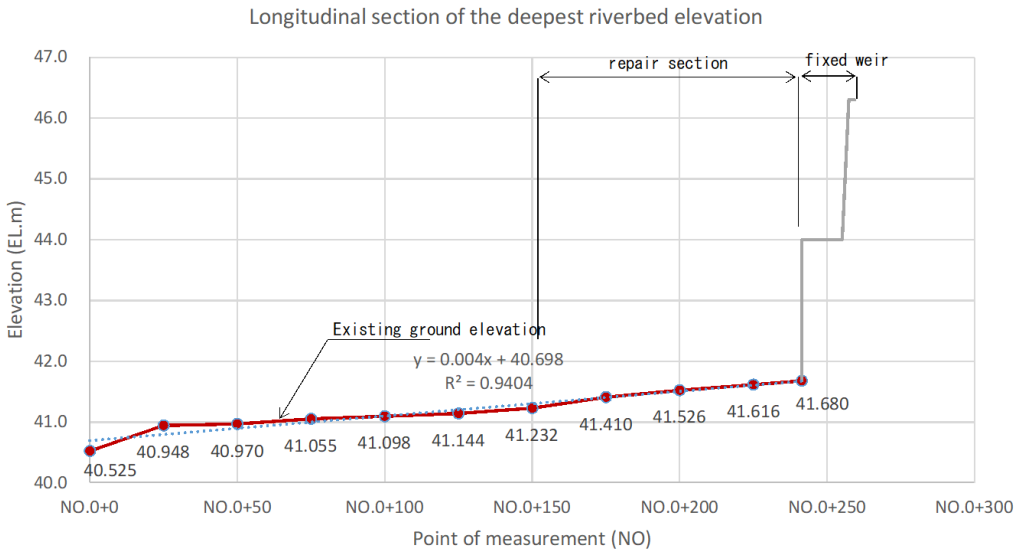
Item	Various factors or elements
River gradient	1 / 250
Deepest riverbed height (NO. 0+150 to fixed weir)	EL. 41.232 ～ EL. 41.616

Table 2-2-5 Laleia River aerial photogrammetric survey plan / longitudinal section

Aerial photo (from UAV)



Aerial photogrammetry map



Longitudinal section of deepest riverbed height

3) Flow characteristics

Based on the topographic survey map of the downstream section of the Buluto headworks prepared in "THE POST SITUATION AND DATA COLLECTION SURVEY FOR THE FLOOD COUNTERMEASURES IN DILI Final Report (August 2022)", the flow characteristics downstream of the headworks was summarized as follows when the planned flow rate of 1,500 m^3/s was applied.

The flow velocity in the section downstream of the headworks where the retaining wall is to be restored (between NO. 0+150 and the fixed weir) is 2.591 m/s to 2.403 m/s with the planned flow rate of 1,500 m^3/s.

The energy gradient of the stream downstream of the headworks is 1/244 at the planned flow rate.

Table 2-2-6 Flow characteristics downstream of the headworks (Q=1500 m^3/s)

Item	Various factors or elements
Energy gradient	1 / 244
Flow velocity (NO. 0+150 to fixed weir)	2.591 m/s ～ 2.403 m/s

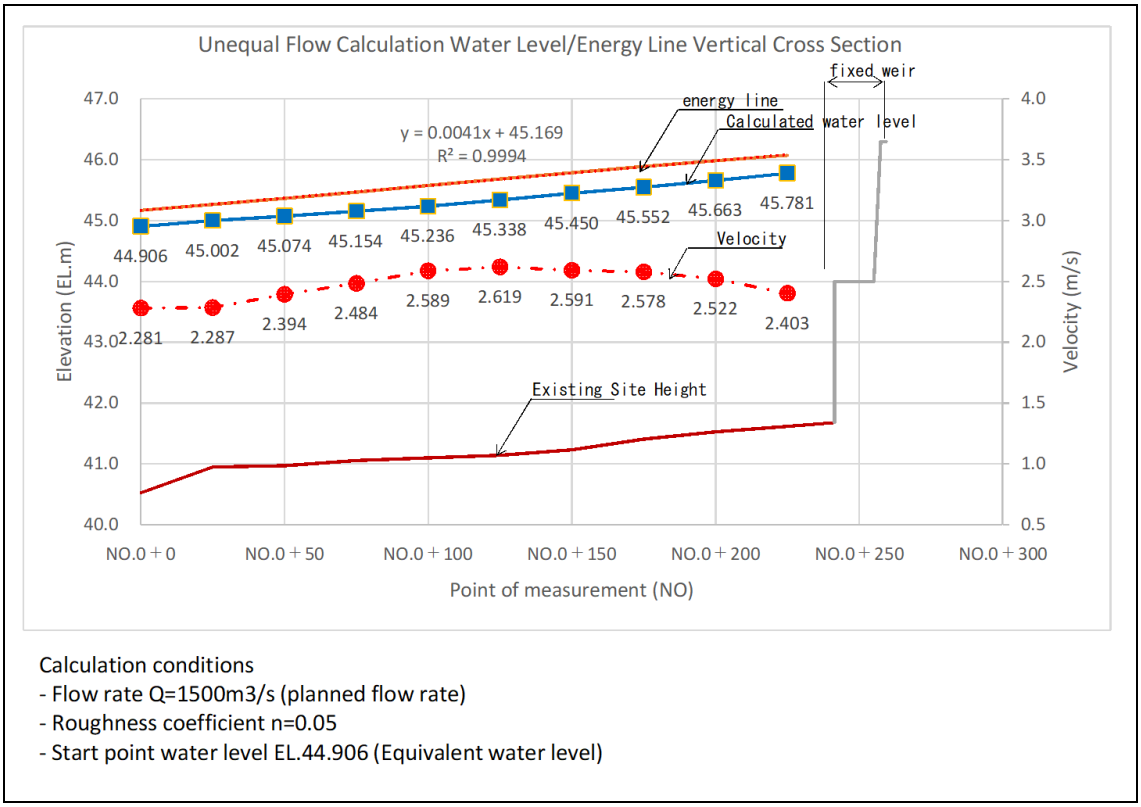
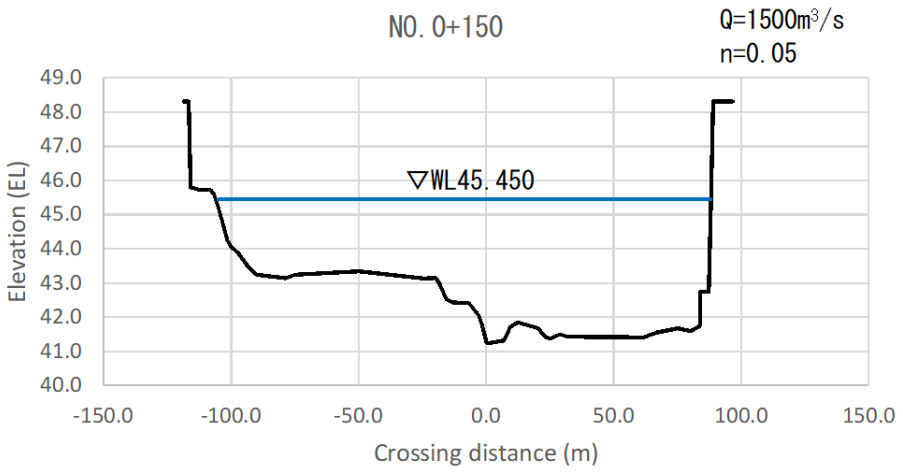
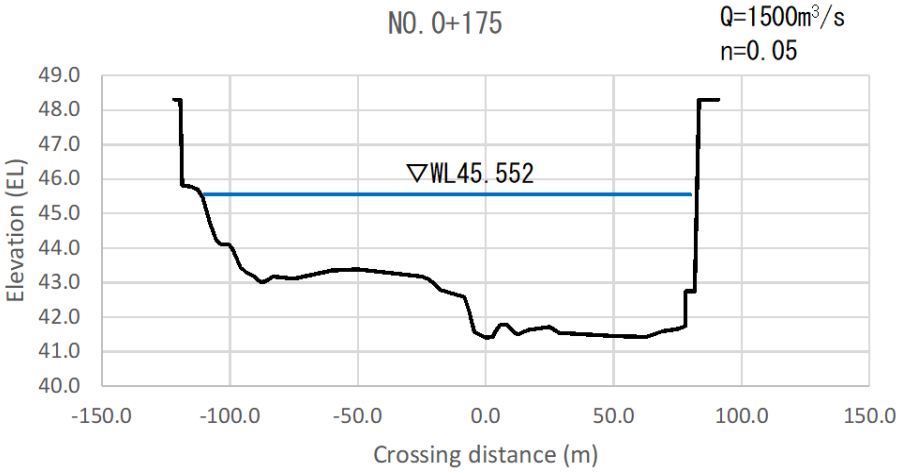


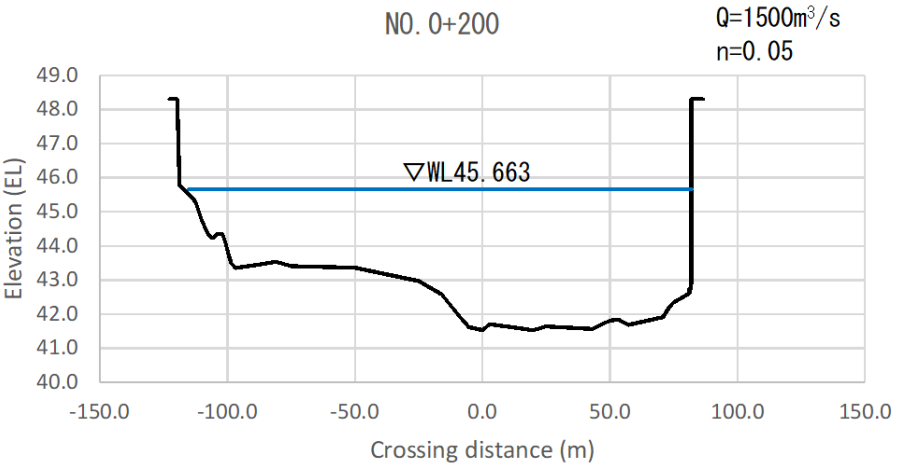
Figure 2-2-24 Laleia River unequal flow calculation longitudinal section



NO.0+150



NO.0+175



NO.0+200

Figure 2-2-25 Laleia River Cross Section

4) Design plan

(a)The masonry wall at downstream of the headworks will be rehabilitated.

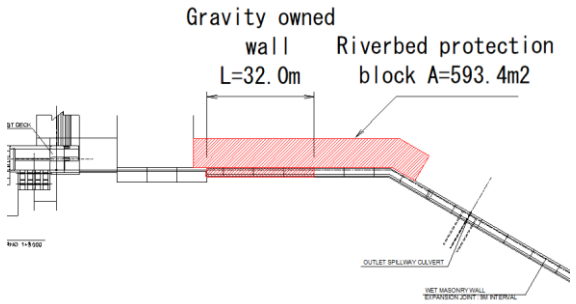
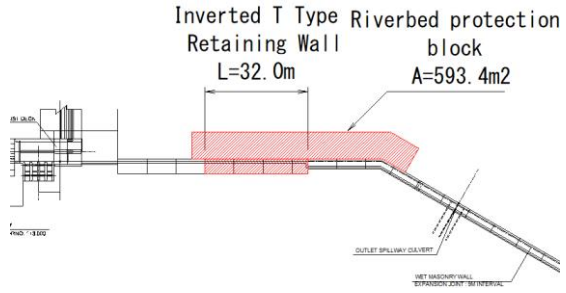
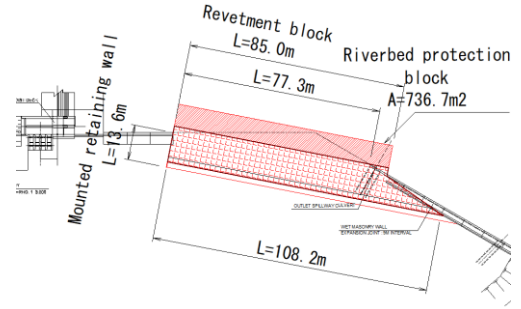
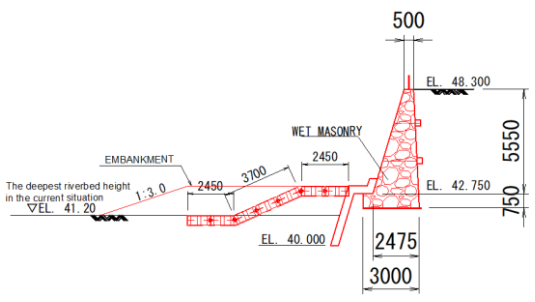
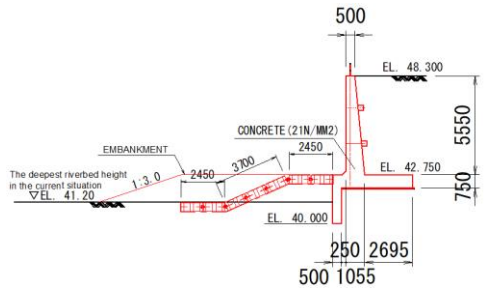
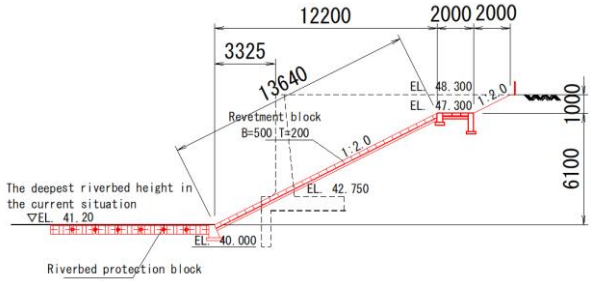
① Retaining wall structure

The retaining wall revetment made of masonry was damaged in the downstream section of the headworks by the April 2021 flood. Currently, emergency restoration has been completed by laying a steel wire cage revetment over the collapsed portion.

As a result of the comparative study shown in comparison table, the revetment restoration plan proposes the Rehabilitation plan (2) Inverted-T retaining wall + Embedment + Root fixing. In this proposal, a 32 m section of the emergency restored steel cage revetment is replaced with a reinforced concrete retaining wall, and in front of the concrete retaining wall, embedment concrete is installed to a depth of 1.2 m below the current deepest river bed level as a scour prevention measure. In the 31.2 m section downstream, which was not affected by the flood, revetment blocks will be installed in front of the masonry retaining wall as a scour prevention measure.

Figure 2-2-26 Provisional retaining wall

Table 2-2-7 Comparison chart for the rehabilitation of the revetment downstream of headworks

Plan	Rehabilitation plan(1) Gravity type wall + Root grafting + Root fixing	Rehabilitation plan (2) Inverted-T shape retaining wall + Embedment+ Root fixing	Rehabilitation plan (3) Concrete block pitching revetment + Root fixing
Rehabilitation method	The temporary restoration revetment (steel wire cage revetment) will be removed and a gravity-type retaining wall revetment will be newly constructed. As a measure to prevent scouring of the gravity-type retaining wall, a root grafting will be installed in front of the retaining wall with the length of 1.2 m (EL. 40.0 m) from the current deepest river bed height (EL. 41.2 m). The front face of the gravity-type retaining wall that was not damaged downstream will be reinforced by installing rooting blocks as a measure to prevent scouring.	The temporary restoration revetment (steel wire cage revetment) is to be removed and a new reverse T-shaped retaining wall revetment is to be constructed. In order to prevent scouring of the inverted T-shaped retaining wall, a 1.2 m (EL.40.0 m) length concrete embedment will be placed in front of the retaining wall from the current deepest river bed level (EL. 41.2 m). The front face of the gravity-type retaining wall revetment that was not damaged downstream will be reinforced with rooting blocks as a measure to prevent scouring.	A provisional revetment (steel wire cage revetment) and a gravity-type retaining wall downstream will be removed, and a new concrete block pitching revetment with a gentle slope of 1:2.0 will be constructed. As a measure to prevent scouring, a foundation will be installed at a depth of 1.2 m (EL. 40.0 m) from the current deepest riverbed level (EL. 41.2 m), and in front of the foundation, a rooting structure will be installed as a scouring prevention measure.
Alignment Plan	Same as current structure. Extension of rehabilitation: L=32.0 m (32 m out of 32 m of provisional revetment extension). 	Same as current. Extension of rehabilitation L=32.0 m (32 m out of 32 m of provisional revetment extension). 	Revise the plane alignment and make the bending angle gentler. Extension of revetment L=92.8 m (average length). 
Rehabilitation Plan			
Structure	The wet masonry structure is not strong enough to withstand external forces. Although root grafting are installed, the resistance to scour at the root grafting is not strong because the structure is not integral structure.	Reinforced concrete retaining wall is excellent in stability and durability.	The modification is made to a plane alignment parallel to the flood flow, thus stabilizing it against the flood flow.
Economy	The short repair extension gives it an economic advantage. 【Estimated direct construction costs】 Retaining wall (gravity type) : 4,891.00 USD/m × 32.0 m = 156,512.00 USD Protective protection block : = 157,111.74 USD Total 313,623.74 USD	The short repair extension gives it economic advantage, but it is more expensive than gravity-type retaining wall. 【Estimated direct construction costs】 Retaining wall (inverted T type) : 7,461.02 USD/m × 32.0 m = 238,752.64 USD Protective floor block : = 157,111.74 USD Total 395,864.38 USD	Economic efficiency is inferior due to longer extensions to be renovated. 【Estimated direct construction costs】 Concrete block pitching revetment : 2,620.85 USD/m × 92.8 m = 243,214.88 USD Protective floor block : = 194,782.93 USD Fitting retaining wall : 7,461.02 USD/m × 13.0 m = 96,993.26 USD Total 534,991.07 USD
Evaluation	×	○	△

② Evaluated height of deepest riverbed and design flow velocity

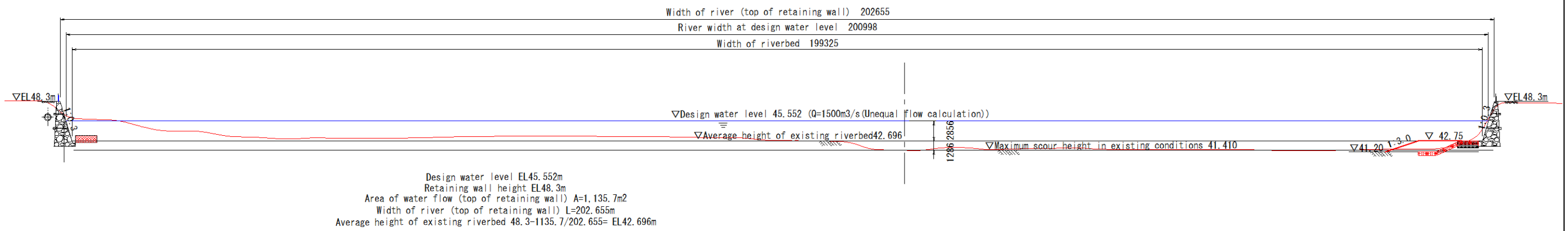
The design flow velocity calculation table (Table B) of the "Basic Policy for Disaster Restoration to Protect Beautiful Mountains and Rivers (Japanese Standards)" was prepared as a reference for calculating the design flow velocity to be used as the external force for selecting the rooting works.

The study was conducted using sections of NO 0+175 and NO 0+200 as the cross-sections to be calculated.

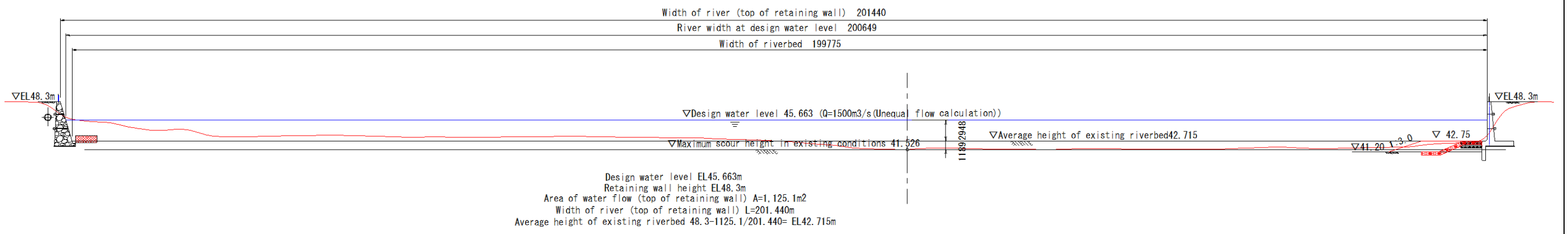
The results of the study are shown below.

Table 2-2-8 Evaluated height of deepest riverbed and design flow velocity

Item	Factors or elements
Planned flow rate	1500 m^3/s
Average height of existing river bed	EL 42.7 m
Maximum scour depth	1.3 m
Evaluated height of deepest riverbed	EL 41.4 m (In the design, the safe side, EL 41.2 m of NO 0+150 downstream of NO 0+175 is adopted.)
Design flow velocity	2.9 m/s



NO.0+175



NO.0+200

Figure 2-2-27 Cross-section to be designed

③ Calculation of the weight of riverbed protection blocks

i. Calculation Method

The weight of the revetment block shall be designed based on the "Dynamic Design Method for Seawalls (Japanese Standard)".

The basic formula is shown below.

$$W > \alpha \left(\frac{\rho_W}{\rho_b - \rho_W} \right)^3 \frac{\rho_b}{g^2} \left(\frac{V_d}{\beta} \right)^6$$

W : Block weight (kgf)
ρ_w : Water Density 102 ($kgfs^2/m^4$)
ρ_b : Block Density 207 ($kgfs^2/m^4$)
g : Gravity acceleration 9.8 (m/s^2)
V_d : Design flow velocity 2.9 (m/s)
α : Dimensionless constant
β : Group Coefficient

Table 2-2-9 Values of coefficients α and β for differently shaped concrete blocks of flat type

$\alpha \times 10^{-3}$		0.54
β	Stand-alone	1.0
	In case of random stacking	1.2
	In case of layering	2.0

ii. Calculation Result

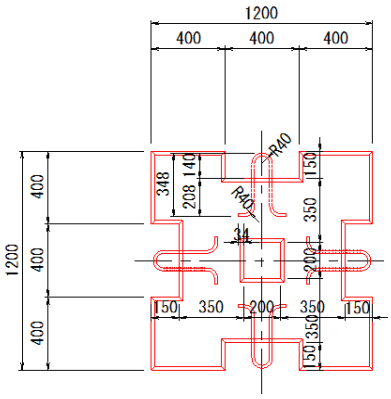
Calculations were made as a stand-alone unit.

$$W > 0.54 \times 10^{-3} \times \left(\frac{102}{207-102} \right)^3 \times \frac{207}{9.8^2} \times \left(\frac{2.9}{1.0} \right)^6 = 0.635\ tf \fallingdotseq 1.0\ tf$$

iii. Dimensions

Since the Japanese design standards for revetment blocks do not describe shapes, etc., the structure was determined based on the dimensions of the manufacturer's product.

The plan dimensions are 1.20 m x 1.20 m x 0.50 m, which is based on a square shape and can secure a prescribed block weight (1.0 t) or more.



$A = 1.2 \times 1.2 - 0.4 \times 0.15 \times 4 - 0.2 \times 0.2 = 1.16\ m^2$

$V = 1.16 \times 0.5 = 0.58\ m^3$

$W = 0.58 \times 2.35\ tf/m^3 = 1.3\ tf > 1.0\ tf$ ..... OK

Figure 2-2-28 Dimensions

(b) River protection block at the apron downstream of the headworks

① Scouring of river bed

The apron section downstream of the Buluto headworks is lowering by a large scour of 2 to 3 m. This is a section where the flow is disturbed by high velocity currents during floods, and there is concern that unpredictable upstream and downstream riverbed fluctuations may occur in the future. In order to cope with unpredictable river bed fluctuations, it is necessary to install revetment blocks downstream of the apron. The following is a study of the necessary revetment blocks.

Taken May 4, 2022

Figure 2-2-29 Scour downstream of the apron of the headworks

② Length of revetment

The length of the revetment is determined by Bly's formula, which is an empirical formula.

$$L = L_B - l_a$$

$$L_B = 0.67C\sqrt{H_a \cdot q \cdot f}$$

L：Length of riverbed protection block (m)

L_B：Total length of protection works including apron length la and length of riverbed protection block L (m)

la：Length of apron (m)

Ha：Height from water level to top of weir due downstream during drought (m)

q：Discharge per unit width of design flood volume ($m^3/s/m$)

f：Safety factor, 1.5 for movable weirs, 1.0 for fixed weirs

C：Bry's coefficients for different types of foundation soils

i. Fixed weir downstream

The length of the block protecting the revetment bed to be installed downstream of the fixed weir shall be L=18.4m from the table.

Table 2-2-10 Length of block protecting the riverbed

Item	Unit	Calculation
la	m	16.0 m
Ha	m	2.3 m
q	$m^3/s/m$	$1500m^3/s$ ／ 200m = 7.5 $m^3/s/m$
f	—	1.0
C	—	12 (Coarse sand)
L_B	m	$0.67\times12\times\sqrt{2.3\times7.5}\times1.0$ = 33.4 m
L	m	33.4 – 16 = 17.4 m → From block placement interval　L = 18.4 m

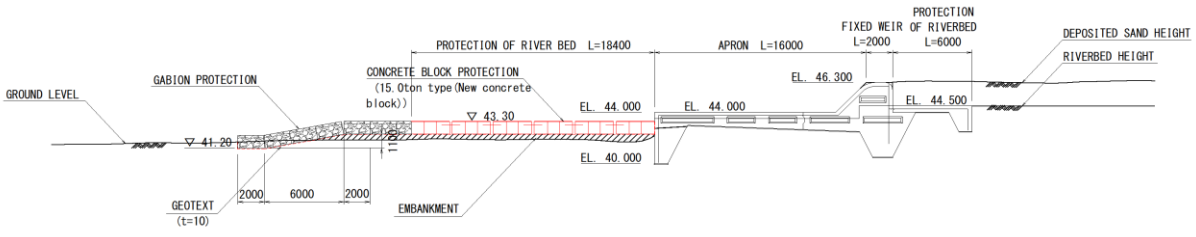


Figure 2-2-30 Vertical section of fixed weir

ii. Downstream of scouring sluice channel

The length of the Blocks protecting the riverbed to be installed downstream of the scouring sluice channel shall be the length planned in the "THE FOLLOW-UP COOPERATION

FORTHE PROJECT FOR REHABILITATION AND IMPROVEMENT OF THE BULUTO IRRIGATION SCHEME IN TIMOR-LESTE （REHABILITATION WORKS）(January 2022)".

The length of the Blocks protecting the riverbed shall be L = 21.5 m.

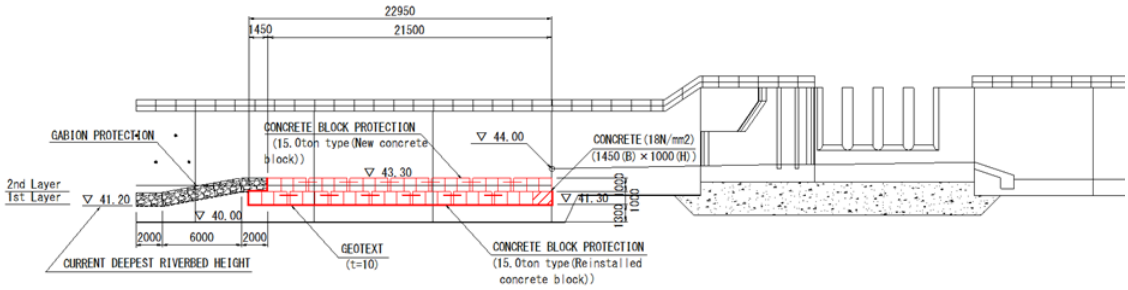


Figure 2-2-31 Scouring sluice channel

③ Width of riverbed protection blocks

The width of the revetment block in the transverse direction shall be up to the point where the planned top edge height of the revetment block, EL.43.3 m, intersects the existing riverbed ground level on the left bank side. The planned top edge height of the revetment block EL. 43.3 m shall be the same as the planned height of "THE FOLLOW-UP COOPERATION FORTHE PROJECT FOR REHABILITATION AND IMPROVEMENT OF THE BULUTO IRRIGATION SCHEME IN TIMOR-LESTE (REHABILITATION WORKS) (January 2022)".

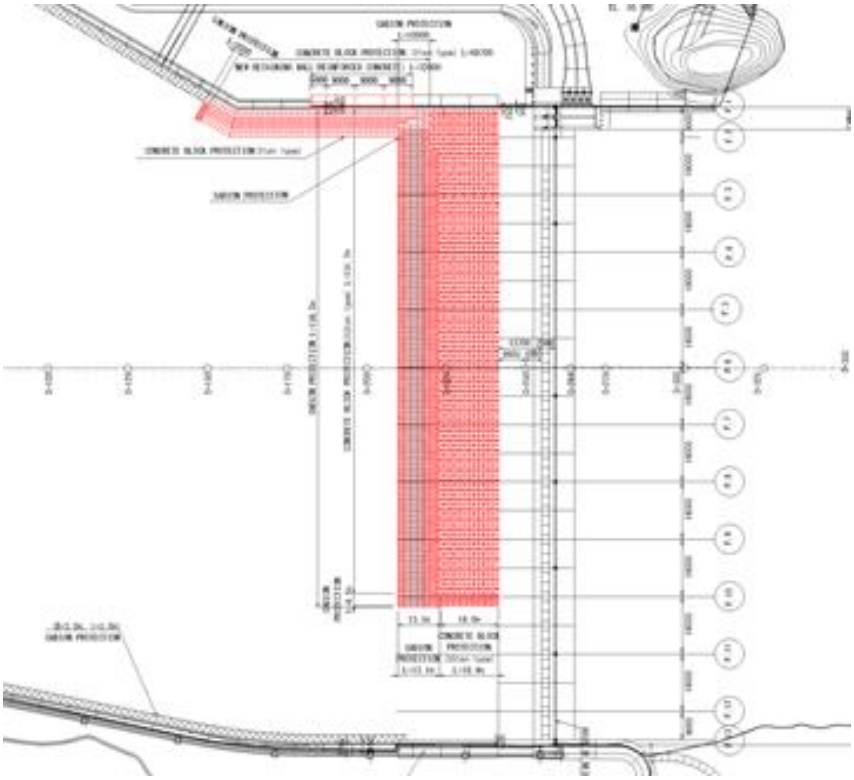


Figure 2-2-32 Plan view of the planned installation of riverbed protection blocks in front of the apron of the headworks

④ Calculation of the weight of riverbed protection blocks

Find the weight of the block to prevent it from moving against the flow velocity that occurs directly downstream of the main body.

i. Design flow velocity concept

A conceptual diagram of the flow generated directly downstream of the main body and the method of obtaining the design flow velocity are shown in the table below.

Table 2-2-11 Conceptual diagram of the flow in section A of the riverbed protection block and how to take the design flow velocity

L1: Section flowing downstream in the projectile flow from the time of fall to the occurrence of water jump
L2: Section where water jump occurs

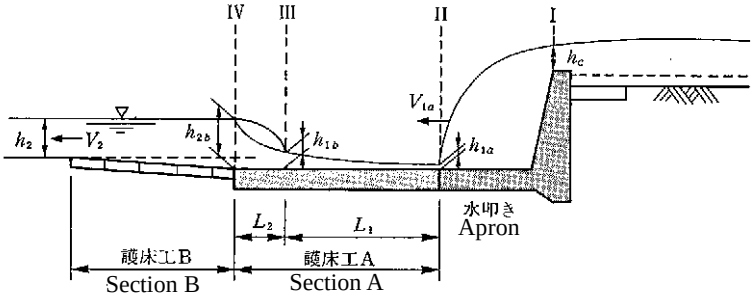


図 2-36 護床工 A 区間での流れの概念図
Figure. Conceptual diagram of the flow in section A of the riverbed protection block

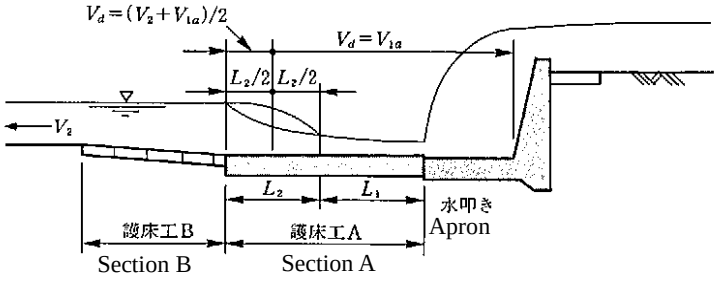


図 2-46 設計流速の取り方
Figure. How to obtain design flow velocity

ii. Velocity V_{1a} at the point of overflow fall (Cross section II)

（Flow Rate Conditions）

Planned flow rate : Q = 1500 m^3/s

Unit-width flow : q = Q／B = 1500 / 200 = 7.5 m^3/s

Critical depth : $h_C = \left(\frac{q}{\sqrt{g}}\right)^{\frac{2}{3}} = \left(\frac{7.5}{\sqrt{9.8}}\right)^{\frac{2}{3}}$ = 1.79 m

Critical flow velocity : $V_C = \sqrt{g \cdot h_c}$ $=\sqrt{9.8 \times 1.79}$ = 4.19 m/s

（Depth of water at overflow fall）

$$\frac{V_C^2}{2g} + \Delta Z + h_c = \frac{V_{1a}^2}{2g} + h_{1a}$$

$$V_{1a} = \frac{q}{h_{1a}}$$

$$\therefore \frac{V_C^2}{2g} + \Delta Z + h_c = \frac{1}{2g} \times \frac{q^2}{h_{1a}^2} + h_{1a}$$

$$h_{1a}^3 - \left(\frac{V_C^2}{2g} + \Delta Z + h_c\right) \times h_{1a}^2 + \frac{q^2}{2g} = 0$$

$$h_{1a}^3 - \left(\frac{4.19^2}{2\times 9.8} + 3.0 + 1.79\right) \times h_{1a}^2 + \frac{7.5^2}{2\times 9.8} = 0$$

$$h_{1a}^3 - 5.69\, h_{1a}^2 + 2.87 = 0$$

$$h_{1a} = 0.764$$

（Velocity at the point of overflow fall）

$$V_d = V_{1a} = \frac{q}{h_{1a}} = \frac{7.5}{0.764} = 9.817 \text{ m/s}$$

iii. Block weight

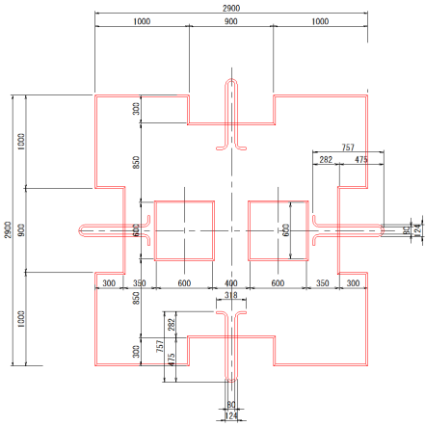
Calculations were made as installed in layers.

$$W > \alpha \left(\frac{\rho_W}{\rho_b - \rho_W}\right)^3 \frac{\rho_b}{g^2} \left(\frac{V_d}{\beta}\right)^6$$

$$W > 0.54 \times 10^{-3} \times \left(\frac{102}{207-102}\right)^3 \times \frac{207}{9.8^2} \times \left(\frac{9.8}{2.0}\right)^6 = 14.76\ tf \fallingdotseq 15.0\ tf$$

iv. Dimensions

The basic plan dimensions should be square. A block size of 2.90 m x 2.90 m x 1.00 m should be adopted, which can secure a prescribed block weight (15.0 t) or more.



A = 2.9×2.9 - 0.9×0.3×4 - 0.6×0.6×2 = 6.61 m^2

V = 6.61×1.0 = 6.61 m^3

W = 6.61×2.35 tf/m^3 = 15.5 tf > 15.0 tf ..... OK

Figure 2-2-33 Dimensions

(c) Main canal (in the section of embankment)

Cracks have developed in the bottom slab of the canal at approximately 400 m of the rectangular canal section downstream of the water users' association meeting place neighborhood.

The structure of the canal is a wet masonry retaining wall structure, in which the sidewalls are built up with stones integrated with cement and mortar. The bottom slab is constructed using plain concrete (t=10cm thick).

The stone masonry irrigation canal is a standard structure for irrigation canals in Timor-Leste, and therefore, the structure is considered to have no problem. In this section, since the canal is constructed on top of the embankment, a rectangular cross section was adopted to minimize the width and volume of the embankment as much as possible.

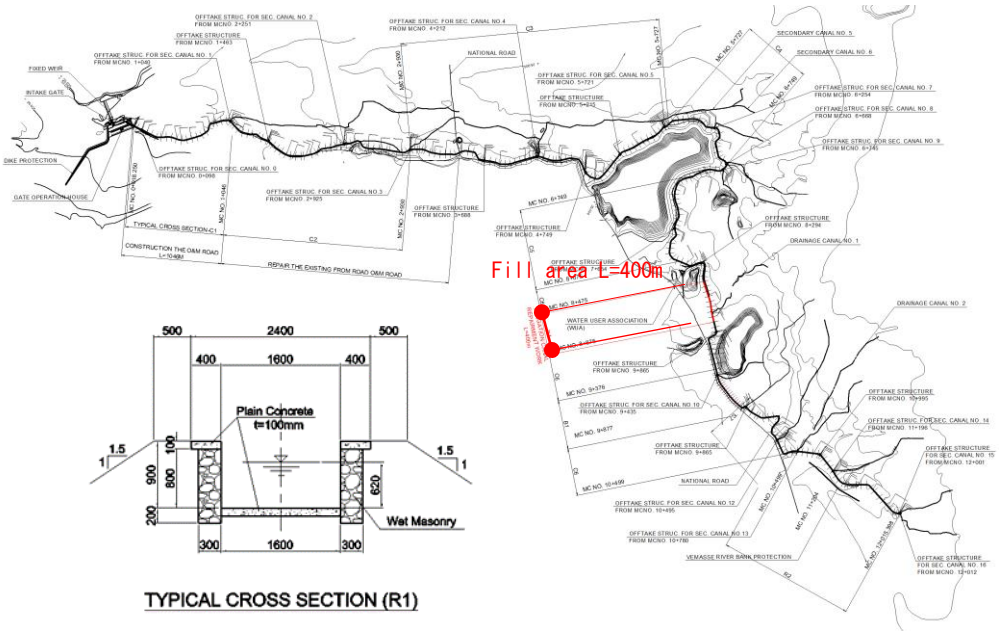


Figure 2-2-34 Location map of embankment section, typical cross section of canal

① Prerequisites for Restoration

The followings are prerequisites for undertaking the restoration

i. Timing of construction

Although the trunk canal is watered all year round, construction should be carried out during the dry season (May-October) whenever possible, since the area under cultivation during the dry season is half of that during the rainy season.

Temporary Construction Plan

Currently, the trunk canal is watered all year round, but according to interviews with the water users' union, it is possible to stop water flow during the construction period for the dry season irrigation phase by informing farmers of the construction process as early as possible.

Our basic policy is to carry out this construction work without the water flow.

② History of cracks and repair methods

The following three types of cracks were identified in this preparatory survey.

i. Type A (gap between sidewall and bottom slab)

Loosening of the embankment due to insufficient compaction of the back of the sidewall caused the sidewall to tilt slightly outward, resulting in a gap. The embankment is now stable and the gap between the sidewall and base slab is not expected to develop further.

(Photo taken May 7, 2022)

The cracks will be repaired as follows

Clean and remove sand and clay clogging between the slab and wall.

Mortar/cement shall be placed 100 mm thick.

Mortar shall be placed in a cement/sand ratio of 1:3 in gaps of 50 mm or less.

Concrete shall be placed in a gap of 50 mm or more.

If there is a cavity under the gap, the mortar/cement should be placed to fill the cavity.

Type B (Cracks in the transverse direction of the canal)

It is assumed that the cracks were caused by the concrete joints that formed where continuous placement of concrete was not possible for some reasons during the concrete placement of the bottom slab.

(Photo taken May 7, 2022)

The repair method for the cracks will be as follows.

a) Use a pick hammer to remove 150 mm wide concrete from the cracked area.

Clean the concrete surface. (Remove clay soil from the concrete surface.)

Place concrete.

Wet cure the concrete for 3 days after placing to prevent shrinkage.

Type C (Cracks in the longitudinal direction in the center of the canal)

The sidewall settled slightly due to own weight of the sidewall concrete, and the stress was transferred to the bottom slab, causing a bending moment to act on the bottom slab in the opposite direction of the sidewall settlement, resulting in cracks on the top surface of the center of the bottom slab which is the tension side.

(Photo taken May 7, 2022)

The repair method for the bottom slab is not to add strength to the bottom slab, but to prevent cracks from forming in the bottom slab by installing reinforcing wire mesh.

The method of repairing cracks shall be as follows

a) The existing concrete slab shall be broken and removed. The ground shall then be compacted and leveled. If the ground beneath the bottom slab has settled, backfill and compaction with soil shall be done.

φ6mm rebar wire mesh shall be set on the bottom slab. At that time, install spacers so that the rebar is set at the center of the concrete thickness.

Place concrete.

Wet cure the concrete for 3 days after placing to prevent shrinkage.

The span of the bottom slab shall be 9.0 m, and joints and waterstop plates shall be installed every 9.0 m.

(2) Maliana Irrigation Facility

1) Organizing Existing Documents

The Propo River, which is the water source for the Maliana I Irrigation District, is a tributary of the Roes River. The Roes River is the largest river in Timor-Leste, with a total length of 116 km and a basin area of 2,028 km^2, accounting for 14% of the 14,610 km^2 of Timor-Leste's land area and 26% of the national total annual runoff.

The Propo River, with a basin area of 95 km^2, accounts for about 5% of the total 2,028 km^2 of the Roes River, while at the Maliana I intake weir, the basin area is 19.8 km^2 accounts for less than 1% of that.

The natural conditions of the Propo River under study are shown in the table below.

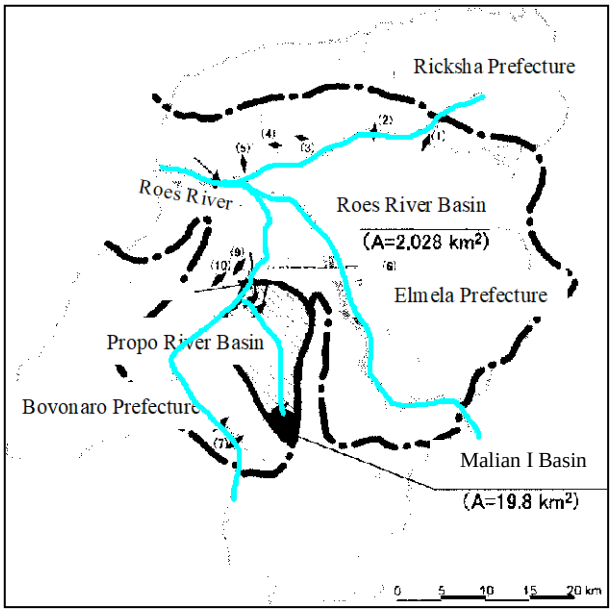


Figure 2-2-35 Roes River Basin Map

Table 2-2-12 Natural conditions of the Propo River

Overview of the river and its basin	
Location of rivers	The Propo River is a tributary of the Roes River and is located in the southern part of the Bobonaro Municipality, with the headworks location in the Maliana sub-municipality of Bobonaro.
Catchment area	Basin area: 19.8 km^2
Watershed topography.	The Maliana I intake site is located near the pivot point of the alluvial fan and the river there is a swift-flowing river (river gradient: approx. 1/50), so that in the dry season when water flow is even low, the river water flows as surface water without infiltrating. However, at approximately 5 km downstream from the weir, the gradient of the Propo River becomes gentler (river gradient: 1/150), and during the dry season when water flow is small, all river water flows underground and no surface water is seen (intermittent river).
Hydrological	
Rainfall characteristics	The annual rainfall of the Propo River is 1,943 mm. The season is divided into a rainy season from November to April and a dry season from May to October. Precipitation is largely influenced by the monsoon.
Water shortage flow	The Propo River shows a peak flow in February with an average water flow of 2.5 m^3/s. The low water period is in October, with a 3-year drought of 0.19 m^3/s and a 5-year drought of 0.16 m^3/s.
Planned flood volume	The 100-year probable flood flow at the headworks site is assumed to be around 310 m^3/s.
River characteristics	
River gradient	1/86 (upper part of intake weir)
Grain size of drifting sand	Estimated to be 0.1-40 mm.

2) Design plans

(a) Rehabilitation of the Maliana headworks

In order to operate the headworks sustainably, it is necessary to rehabilitate the headworks fixed weir, scouring sluice channel, and administrative corridors that have been repeatedly damaged by flooding. Basically, the rehabilitation shall be carried out to the original design condition.

① Rehabilitation of fixed weir

The unreinforced concrete (high strength concrete σ=35N/mm^2) of the fixed weir shall be demolished and replaced with new unreinforced concrete (same high strength). The new concrete shall be anchored with adhesive anchor bars (D22 L=1.0m) at 0.5 m intervals.

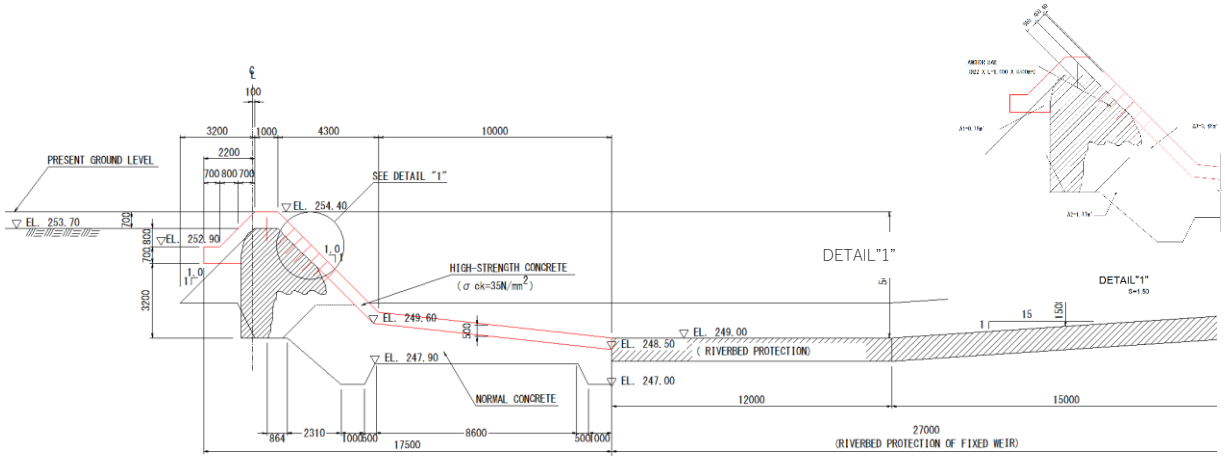


Figure 2-2-36 Fixed weir cross-sectional view

② Rehabilitation of scouring sluice channel

The unreinforced and reinforced concrete (high-strength concrete σ = 35 N/mm^2) in the downstream portion of the scouring sluice channel will be demolished and replaced with new unreinforced and reinforced concrete (same high strength). The apron section is damaged and has washed away, so it will be newly constructed.

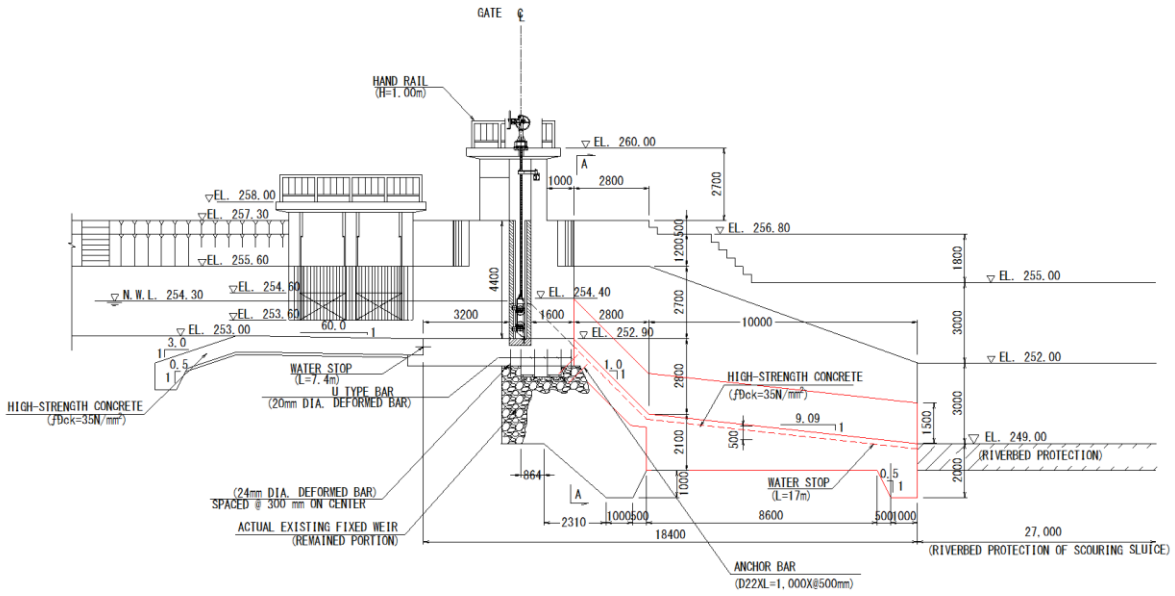


Figure 2-2-37 Scouring sluice channel cross-sectional view

③ Reinforcement of retaining wall of administrative corridor

The wall of the retaining wall will be reinforced by installing steel plates on the wall of the retaining wall of the administrative corridor, which is worn by the impingement of the gravel-mixed runoff from the sediment discharge.

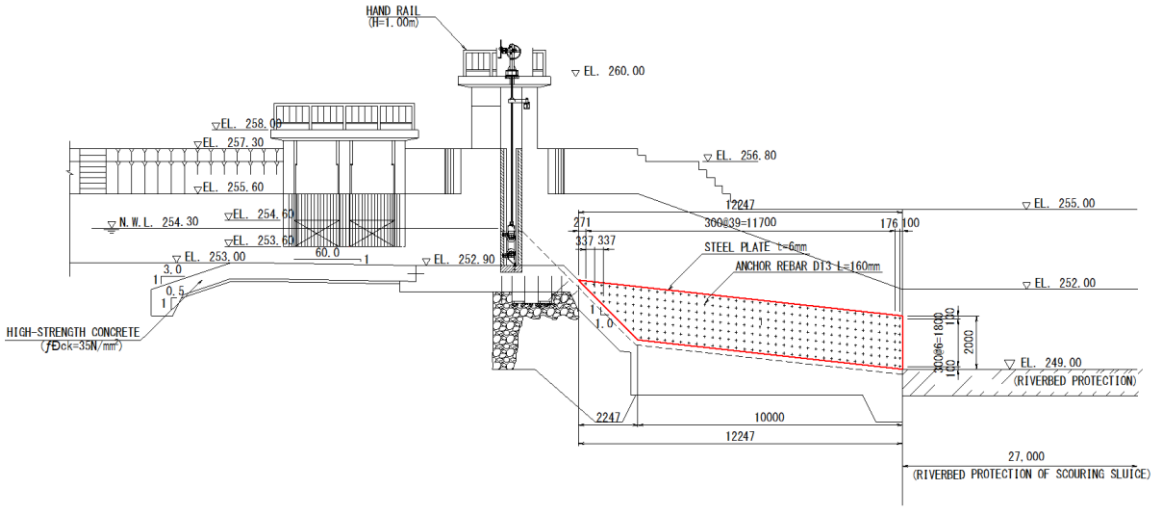


Figure 2-2-38 Reinforcement drawing of retaining wall of administrative corridor

④ Rehabilitation of administrative corridor

Backfill the sunken management corridor that was damaged by scouring and suction of the ground due to the damage and outflow of the apron downstream of the scouring sluice channel, and repair the management corridor with unreinforced concrete.

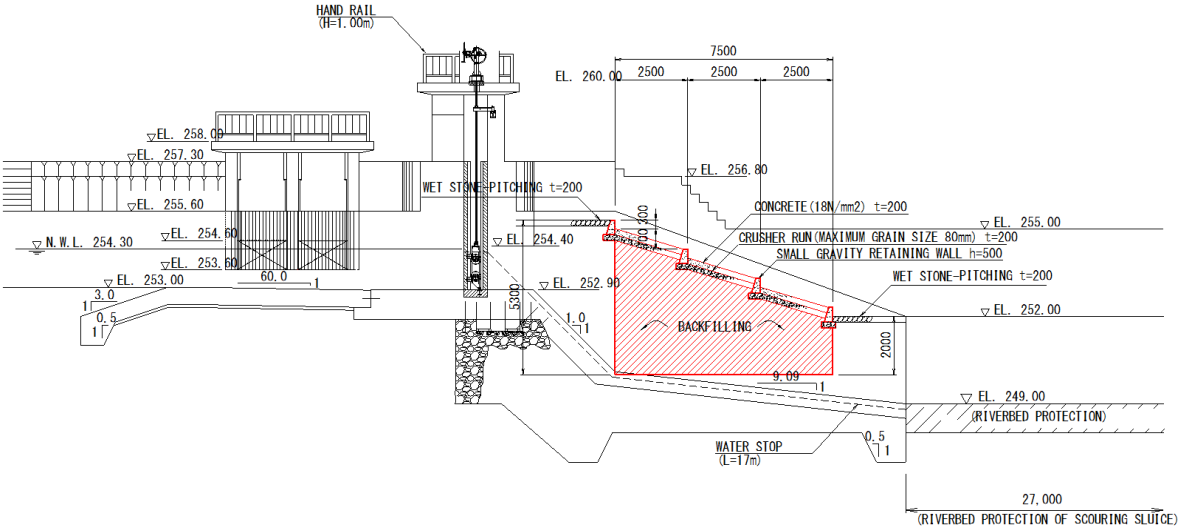


Figure 2-2-39 Administrative corridor rehabilitation map

(b) Rehabilitation of the drainage

The drainage channel constriction part that intersects the main canal (at STA.0+435) was further widened at the damaged section upstream of the drainage channel when flooding occurred in February of this year. The Irrigation Department of Bovonaro Municipality determined that the irrigation canal was in danger of collapsing during this season's rice cultivation period (January to June 2022). Therefore, farmers in the irrigation area, the water users' association, MAF, and the JICA Domestic Rice Project jointly undertook the repair work.

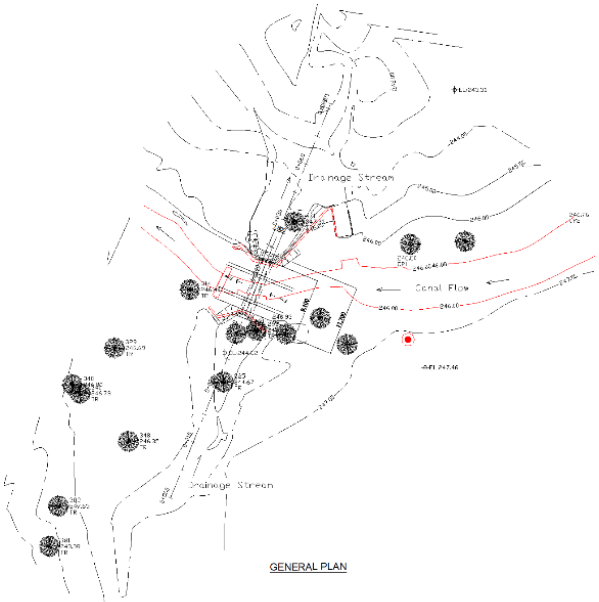


Figure 2-2-40 The location of the constriction part of the drainage channel

The repairs were properly implemented and the irrigation canal was no longer in danger of collapsing.

The farmers and the water users' association have restored this facility through their self-help efforts, which should be respected and no new repair work is necessary. We hope that this case can be used as a model for similar cases in the future, and that farmers and water users' associations will jointly participate in maintenance and management to solve the problem.

Taken October 2021

Taken May 2022

(c) Administrative corridor damaged by flooding in February of this year.

The flooding that occurred in February of this year caused new damage to the Administrative corridor on the left bank of the headwall.

Since the damaged administrative corridor will be an obstacle during the construction work, we propose to backfill the damaged administrative corridor as a temporary work and repair it with unreinforced concrete to ensure the safety of the construction work.

	
Taken October 2021	Taken May 2022

(d) Facilities planned for rehabilitation by MAF

Currently, the drive units and rack bars of eight gates installed in the Maliana I headworks and trunk canal are planned for replacement.

Two of the gates planned for replacement in the next fiscal year are scouring sluice channel gates installed in the headworks.

In the Preparatory Study for the Flood Damage Infrastructure Emergency Rehabilitation Plan, the repair of the apron downstream of the scouring sluice channel gate is planned in the next fiscal year. In order to ensure the safety of the apron during the repair work (prevention of falling rocks from upstream) and the effectiveness of the repair work (prevention of falling rocks onto the apron) after the completion of the repair work, it is necessary to operate the two scouring sluice channel gates during the repair work.

The following temporary works are proposed for the implementation of the Maliana I Headworks to ensure the safety of the work

① Receive equipment from MAF and replace the gate winder and rack bar to make the gate ready to open and close.

② Remove sediment accumulated upstream of the sediment discharge gate.
Figure shows a temporary plan of the upstream side of the sediment discharge gate of the removal of sediment (draft).

	
Scouring sluice channel gate (upstream side)	Winder

Taken October 21, 2021

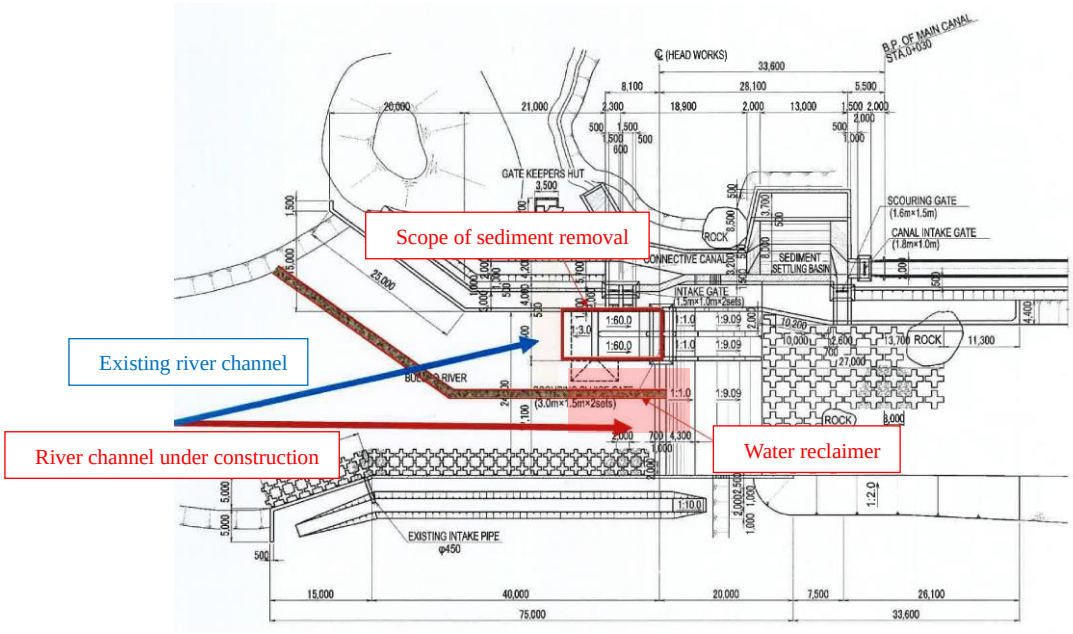


Figure 2-2-41 Temporary construction plan of the headworks (draft)

2-2-3 Outline Design Drawing

2-2-3-1 Rehabilitation for Comoro River Retaining Wall

The following table is the list of outline design drawings prepared based on the basic plan. Each drawing is attached as a reference section.

Table 2-2-13 List of outline design drawings

Drawing contents	Number of drawings
General notes	3
Plan	2

Typical Cross section	2
Cross Section	4
Detailed Plan	5

2-2-3-2 Rehabilitation for Bemos Water Supply System

The following table is the list of outline design drawings prepared based on the basic plan. Each drawing is attached as a reference section.

Table 2-2-14 List of outline design drawings

Drawing contents	Number of drawings
General notes	3
Location Map	1
Plan of the Rehabilitation	1
Detailed Plan	16

2-2-3-3 Rehabilitation for Buluto／Maliana Irrigation Facilities

A drawing inventory of the drawings prepared shall be noted on the matter page.

The prepared drawings shall be attached to the Documentation Section.

DRAWING INDEX

DRAWING NO.	DRAWING TITLE	SCALE	DRAWING NO.	DRAWING TITLE	SCALE
DRAWING INDEX					
C-00	Location map				
1. BULUTO IRRIGATION FACILITY			2. MALIANA IRRIGATION FACILITY		
1.1 INTAKE STRUCTURE			2.1 INTAKE STRUCTURE		
C-01	General plan	1:1000	C-16	General plan	1:200
C-02	Plan	1:600	C-17	Plan	1:150
C-03	General plan of the Riverbed protector downstream of the apron (fixed weir)	1:200	C-18	General drawing of restoration work for fixed Weir	1:100
C-04	General plan of the Riverbed protector downstream of the apron (Scouring sluice channel)	1:200	C-19	General drawing of restoration work for Scouring sluice channel	1:100
C-05	Structural drawing of a reverbed block(15ton type)	1:20	C-20	General plan of the Pathways to manage	1:100
C-06	General plan of the restoration work of the right bank retaining wall	1:20	C-21	Drawings for reinforcement of left bank retaining wall	1:100
C-07	Standard cross section of right bank retaining wall rehabilitation	1:20			
C-08	Structural drawing of retaining wall	1:50	2.2 PROVISIONAL DRAWING		
C-09	Structural drawing of a reverbed block(1ton type)	1:20	C-22	Pathways to manage / Scouring sluice channel gate	1:100
C-10	Retaining wall reinforcement drawing (Standard Section)(1)	1:60			
C-11	Retaining wall reinforcement drawing (End Section)(1)	1:60			
1.2 MAIN CANAL					
C-12	General plan	1:30000			
C-13	Plans and longitudinal sectional	1:2000			
C-14	Location of Cracks	-			
C-15	Repair method drawing	-			

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Basis

This project is planned to be implemented within the framework of the Grant Assistance Scheme of Japan. The contract form for project implementation shall be a comprehensive contracting method. The basic construction policies for the project are as follows.

(i) The construction method and process shall reflect the natural conditions, such as local weather, topography and regional characteristics, and the conditions of use of the subject facilities. A suitable plan shall be developed for these.

(ii) Considering the maintenance capacity of Timor-Leste agencies, a general construction method shall be adopted that does not require special technology after rehabilitation shall be planned.

(iii) Due consideration shall be given to the social environment when formulating construction plans.

(iv) Materials and equipment that can be procured locally without relying on imports shall be used as much as possible because this emergency rehabilitation project will be implemented mainly within the short period of one dry season.

(v) There is a medium-sized construction company, known locally as a major construction company, that is active mainly in the capital city of Dili and has a reasonable number of engineers and construction equipment, so employing it as a subcontractor for the project shall be considered.

(vi) Use of civil engineers from third countries (i.e. countries other than Timor-Leste and Japan) shall be considered because there are few engineers and technicians in Timor-Leste with sufficient knowledge and skills in relevant construction work.

(vii) Close coordination with the three implementing agencies, MPW -DRBFC, MPW-BTL and MAF-DIWM, is necessary because three project components will be implemented in a comprehensive manner.

(2) Construction road

Of the three target components, the facility that does not have an access road and requires a road to be constructed is the Bemos intake weir. For this, the following are envisaged.

The area to be rehabilitated by the Works is located along the Bemos River at a point upstream of the confluence of the Bemos and Comoro rivers. Access from Dili city to the confluence of the Comoro and Bemos rivers is possible by public road, but there is no public road for the 3 km section of the Bemos River upstream of that point. A road is planned to be constructed on the river terraces and in the river channel to transport equipment and materials to the facilities to be rehabilitated.

In the Bemos River section, the construction road will pass along the river terraces on both sides of the river as far as possible. In sections where it is not possible to construct the road by levelling the river terraces, the road will be constructed on the river terraces on an embankment with a height of 0.3 m made of gravel fill. In sections where it is not possible to construct the road on river terraces, the road will be constructed in the river channel on an embankment with a height of 0.5 to 1.0 m made of gravel fill. As the river flow would block vehicular traffic at the beginning and end of the dry season, the embankment will have corrugated pipe culverts and other means to ensure water passage. The width of the construction road will be 4.5 m. As the visibility of the site is poor, appropriate passing places will be provided to allow vehicles to pass each other. The fill material will be transported from the surrounding river terraces or excavated from the riverbed of the Bemos River.

(3) Demolition of existing structures

Demolition of existing structures, such as damaged concrete structures, will be carried out by a combination of crushing using large breakers and manual labour using concrete breakers. The concrete debris generated will be transported to a disposal location designated by the implementing organisation in Timor-Leste.

(4) Concrete work

The main works for all three components will be concrete structures and their rehabilitation.

For the Comoro River revetment and the Bemos intake weir, the concrete will be purchased from a local contractor (with Australian capital) with a concrete plant in Dili and transported to the construction site by concrete mixer truck.

For the Buluto/Maliana irrigation facility, the concrete will be produced locally near the site using a concrete mixer.

As the concrete is expected to be placed under high temperature conditions, the concrete will be placed using hot weather concreting methods when the average daily temperature is above 25°C. Particular attention shall be paid to slump control during concrete mixing and watering and curing to prevent cracking due to drying shrinkage and temperature changes after placing.

(5) River bed protection and revetment construction

The face of the revetment will be made of masonry. Concrete blocks manufactured in the river or in a yard near the construction site will be lifted by a rough terrain crane and installed. Large revetment blocks will manufactured at the installation location.

2-2-4-2 Implementation Conditions

(1) Compliance with labour standards

Consideration shall be given to ensure that the current construction laws and regulations of Timor-Leste are complied with, that appropriate working conditions and customs associated

with employment are respected, that disputes with workers are prevented and that safety is ensured.

(2) Social and environmental considerations during construction

(i) Sewage and waste generated during construction shall be properly treated and disposed of to reduce and mitigate the impact on the environment as much as possible.

(ii) Measures shall be taken to reduce the generation of dust, noise and vibration, and monthly monitoring shall be carried out to continuously monitor and improve the situation.

(3) Ensure safety during construction.

(i) Safety equipment (barricades, coloured cones, revolving lights) and guides shall be placed at major traffic points.

(ii) As the traffic will increase due to construction vehicles, no-entry signs and construction information boards shall be installed at the construction sites to ensure safety and prevent problems from occurring by informing residents.

(4) Securing means of communication on the sites

(i) As mobile phones can be used in the project section, construction workers shall have mobile phones.

(ii) A traffic safety management system shall be established with traffic guides carrying portable walkie-talkies to ensure the safety of general traffic and residents.

(5) Respect for local customs

When planning the construction project, the work schedule shall take local customs into consideration.

(6) Customs clearance

The number of days required for import, unloading and customs clearance procedures shall be considered when formulating the construction plan.

(7) Restrictions on irrigation and domestic water distribution

The supply of irrigation water will be interrupted during the rehabilitation of the main canal in the Buluto irrigation area. Any interruption shall be reported to and agreed with the water users' association in advance. Water distribution will resume as soon as the works are completed.

2-2-4-3 Scope of Works

The division of the burden between Japanese and Timorese stakeholders in the case of implementing the Plan shall be as follows

(1) Scope of the burden for Japanese stakeholders

(i) Necessary temporary works and main restoration works for the restoration of each facility

(ii) Establishment of temporary facilities (base camps, offices, warehouses, etc.)

(iii) Procurement of labour, construction materials and construction equipment required for the works

(iv) Safety management and measures for construction implementation

(v) Detailed design, preparation of bidding documents and contracts, assistance in bidding and supervision of construction works

(2) Scope of the burden for Timorese stakeholders

(i) Securing the land for the base camps and providing it free of charge

(ii) Provision of access roads to the planned construction sites, and publicising the use of existing roads to the surrounding community

(iii) Securing disposal sites for waste and surplus soil generated during construction

(iv) Inform beneficiaries of the suspension of irrigation water supply during the construction period

(v) Prompt customs clearance and duty exemption at the port of unloading of materials and equipment

(vi) Granting permission and facilitation of procedures for Japanese nationals engaged in the project to enter and stay in the country

(vii) Designate counterparts and secure the budget for personnel costs and related expenses.

2-2-4-4 Consultant Supervision

The implementation of the Project is subject to the signing of an Exchange of Notes (E/N) between the Governments of Japan and Timor-Leste for the Grant Assistance under the Project, and the signing of a Grant Agreement (G/A) between JICA and the Government of Timor-Leste after the Exchange of Notes is signed. Following the conclusion of the Exchange of Notes and the Grant Agreement, the Consultant will enter into a Consultancy Agreement with the MPW, the implementing agency representative of the Government of Timor-Leste, based on a letter of recommendation issued by JICA and in accordance with the scope and procedures of the Japanese Grant Assistance. Following the conclusion of the contract, the consultant will carry out the detailed design, bidding assistance services and construction supervision.

The main tasks included in the consultancy contract are listed below.

(1) Detailed design and bidding documents preparation stage

The consultant shall review the bidding documents and reference documents for each facility prepared by the preparatory study and prepare new design drawings for inclusion in the bidding documents if any are missing. The consultant shall prepare the necessary documents for the bidding work and obtain approval from Timorese stakeholders.

Table 2-2-15 Assignment of roles and their responsibilities for design to bidding stages

Role	Area of Responsibility
Head of Mission	Overall supervision of the detailed design and bidding work
Design Engineer for Comoro River Revetment and Road Rehabilitation	Detailed design for rehabilitation of Comoro River revetment and road
Design Engineer for Bemos Intake Weir Rehabilitation	Detailed design for rehabilitation of Bemos intake weir
Design Engineer for Buluto and Maliana Irrigation Facilities Rehabilitation	Detailed design for rehabilitation of Buluto/Maliana irrigation facilities
Construction Planner and Cost Estimator	Review of procurement plan and project costs, and consolidation of survey prices
Specialist for Environmental and Social Considerations	Social conditions survey and support for IEE application procedures
Specialist for Bidding Document Preparation	Preparation of bidding documents, and assistance with pre-qualification and bidding
Civil Engineer for Facility Design	Bidding specifications and explanation of the contents related to civil engineering facilities

(2) Construction supervision organisation (on-site by the Consultant)

After the contract for the contractor is signed, the consultant shall issue instructions for the start of construction work and shall be stationed at the site to start construction supervision work. The construction supervision work includes reporting on the progress of the construction work to the Timorese stakeholders and providing the contractor with information on work progress, quality, safety and payment, as well as suggestions for improvement of the construction work. In addition, regular reports will be made to the Embassy of Japan and the JICA Timor-Leste office. Furthermore, a completion (defect) inspection shall be carried out one year after the completion of the work.

A civil engineer with experience in grant aid will be dispatched as the resident construction supervisor. In addition, a head of mission will be dispatched at each stage of the construction phase to coordinate work and supervise the construction work. Furthermore, specialist engineers of each type of construction are dispatched at the main construction stage to provide spot supervision to ensure that no technical discrepancies arise. The roles related to construction supervision and their areas of responsibility are listed in Table 2-2-16.

Table 2-2-16 Assignment of roles and their responsibilities for construction supervision

Role	Area of responsibility
Head of Mission	Coordination and technical management for execution of construction works
Resident Supervisory Engineer	Daily management and process management
Construction Supervisor for Comoro River Revetment Rehabilitation	Management of the rehabilitation work for the Comoro River revetment
Construction Supervisor for Bemos Intake Weir Rehabilitation	Management of the rehabilitation work for the Bemos intake weir
Construction Supervisor for Buluto and Maliana Irrigation Facilities Rehabilitation	Management of the rehabilitation work for the Buluto and Maliana irrigation facilities
Construction Supervisor for Tax Exemption and Agency Coordination	Coordination and management of tax exemptions and relevant agencies
Construction Supervisor for Defect Inspections	Final inspection of completed facilities prior to handover

In addition to the Japanese engineers mentioned above, a Timorese engineer hired as a construction supervisor to assist the Resident Supervisory Engineer, an office clerk to handle miscellaneous office work and a driver will be assigned.

2-2-4-5 Quality Control Plan

For the control of workmanship and quality, the quality control measures shown in Table 3.6 shall be implemented, and inspection results shall be recorded for each type of work to ensure that they are in accordance with the specifications, structure and function stipulated in the contract. It is envisaged that the concrete will be procured from a contractor in Dili for rehabilitation work of the Comoro River revetment and the Bemos Intake Weir and mixed on-site in drum mixers for rehabilitation work of the Buluto and Maliana Irrigation Facilities, and quality inspections shall be carried out for each part of the structure, taking into account the importance of the structure.

Table 2-2-17 List of quality control items

Item		Test method	Test frequency
Base course（granular material）	Mixing material	Liquid Limit, Plasticity Index	every mixture
		Grain Size Distribution	
		Aggregate Strength Test	
		Unconfined Compression Test（Regeneration Method Material）	
		Compaction Test	

	Laying		Density Test (Compaction Rate)	1time/day
			Pavement Thickness	By Spec./ standards
Prime coat	Material	Bituminous material	Quality Certificate	Every material
			Temperature and amount during storage / spraying	Every distribution
Pavement surface	Material	Bituminous material	Quality Certificate/Component Analysis Table	every material
		Aggregate	Grain Size Distribution	Every mixture, 1time/Month
			Water Absorption rate	Every material
			Aggregate Strength Test	
	Paving installation		Bitumen Spraying Amount	By Specification standards
			Crushed Stone Spraying Amount	By Specification standards
			Spreading, leveling, and rolling	As required
Concrete	Material	Cement	Quality Certificate, Chemical / physical test result	Every material
		Water	Component Test Results	Every material
		Admixture	Quality Certificate/Component Analysis Table	Every material
		Fine aggregate	Absolute Dry Specific Gravity	Every material
			Grain Size Distribution, fineness modulus	
			Lump of Clay, Soft Mote Rate	
		Coarse aggregate	Absolute Dry Specific Gravity	Every material
			Grain Size Distribution	
	Compounding test time		Compressive Strength Test	Every mixture
	Installation time		Slump, Air Volume, Temperature	Every material
	Strength		Compressive Strength Test（7 days, 28 days）	Every material
Reinforcing bars	Material		Quality Certificate, Tensile Test Results	Per lot

2-2-4-6 Procurement Plan

(1) Construction materials

General materials (aggregates, timber, etc.) used for the works are produced in Timor-Leste. Imports of ordinary cement, bitumen and rebar are available on the market and can be procured. The following table shows the procurement categories of the main construction materials.

Table 2-2-18 Procurement categories of main materials

Name of material	Procurement distinction			Note
	Local	Japan	Third country	
＜General materials＞				
Concrete	●			
Ordinary cement	●		●	
Sand	●			
Fine aggregate, coarse aggregate	●			
Reinforcing bar	●			
Admixture	●			
Timber	●			
Formwork material	●		●	
Asphalt	●			Indonesia, Singapore

Asphalt emulsion	●			
Watertight boards, jointing materials	●		●	
Geotextiles	●		●	
Gabion wire	●		●	
Large sandbags	●		●	
Fuel	●			

(2) Construction machinery

With regard to the leasing of machinery owned by local private construction companies as construction machinery, it is possible to procure general equipment such as that used in the main works in Timor-Leste. Some machinery that can be procured from local construction companies may be ineligible for leasing under the Scheme due to inadequate state of maintenance. Procurement of construction machinery is shown in Table 3-2 8, taking into account the envisaged construction process and the local procurement situation.

Table 2-2-19 Procurement categories of main construction equipment

Equipment name	Procurement source			Note
	Local	Japan	Third country	
Bulldozer	●			Leasing available locally.
Back hoe	●			Ditto
Wheel loader	●			Ditto
Dump truck	●			Ditto
Truck crane	●			Ditto
Rough terrain crane	●			Ditto
Crawler crane（less than 50ton）	●			Ditto
Motor grader	●			Ditto
Road roller	●			Ditto
Tire roller	●			Ditto
Vibratory roller	●			Ditto
Asphalt finisher	●			Ditto
Asphalt distributor	●			Ditto
Chip Spreader	●			Ditto
Concrete cutter	●			Ditto
Tamper	●			Ditto
Tamper	●			Ditto
Line marker	●			Ditto
Submersible pumps	●			Ditto
Generator	●			Ditto
Concrete Mixer	●			Ditto
Concrete pump	●			Ditto
Dissolution tank	●			Ditto
Concrete plant	●		●	Smaller types can be procured locally.

(3) Procurement considerations

Procurement considerations for this plan are as follows.

(i) Procurement plans should be drawn up that are not unreasonable for the construction process.

(ii) Procure locally produced goods as far as possible to contribute to the revitalisation of the local economy.

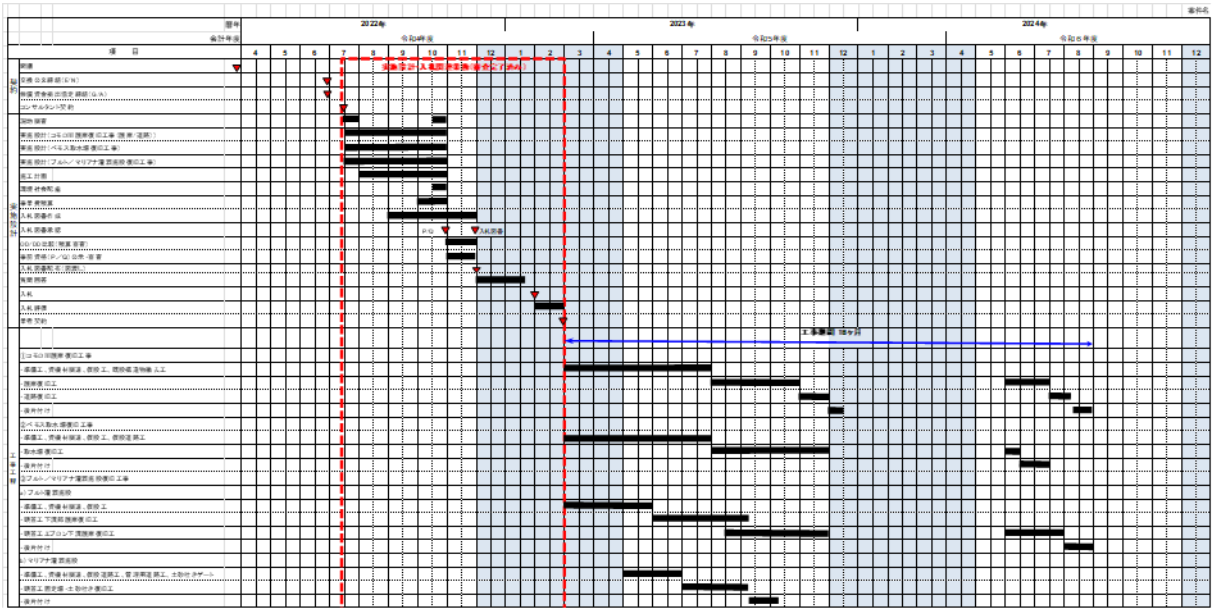
(iii) For construction materials and equipment that are difficult to procure locally, consider procurement from Japan or a third country, paying attention to the certainty of quality, ease of procurement, securing of quantities and economic efficiency.

(iv) Japanese or third-country procured goods are planned to be unloaded at the port of Dili. As unloading and customs clearance procedures take a lot of time, a transport and procurement plan with a sufficient margin is necessary.

2-2-4-7 Implementation Schedule

A draft implementation timetable, assuming implementation under the Japanese grant aid procedure, is shown in Table 3-29. The estimated overall construction period is approximately 25.5 months in total, consisting of detailed design and bidding-related activities (approximately 7.5 months) and construction works (approximately 18.0 months). It should be noted that no construction work will be carried out in the river area during the rainy season, and the impact of the rainy season has been taken into account in the process chart below.

Table 2-2-20 Draft work implementation timetable



2-3 Security Plan

2-3-1 Security Management Plan

2-3-2 Measures for Security Management

2-4 Obligations of Recipient Country

The following is an overview of the share of the Timor-Leste side's work required for the smooth operation and maintenance of the facilities and equipment to be constructed during the preparation stage and during construction, if the project is to be implemented as grant aid.

(i) To secure the land necessary for the construction and installation of equipment and materials.

(ii) Pay the necessary fees to the bank in accordance with the bank-agreement (B/A). Issue Authorisation to pay (A/P).

(iii) Promptly carry out customs clearance and other procedures for equipment and materials.

(iv) Exempt or bear any customs duties, domestic taxes and other fiscal charges levied in Timor-Leste in connection with the procurement of equipment and materials and the provision of services by Japanese nationals.

(v) Provide Japanese nationals providing services for the implementation of the Program with the necessary facilities to enter and stay in Timor-Leste to carry out their work.

(vi) To properly and effectively maintain and operate the facilities and equipment established under the Program. In addition, the project will report to the Japanese stakeholders on the operational status of the facilities and equipment, as requested by the Japanese side.

(vii) To bear all other necessary expenses not included in the grant aid by Japan.

(viii) In the implementation of the project, environmental and social considerations shall be taken into account.

2-5 Project Operation Plan

2-5-1 Rehabilitation for Comoro River Retaining Wall

The maintenance of the revetment and road after rehabilitation is the responsibility of the Maintenance Department of the DRBFC. Other affected revetments, aside from the revetment targeted by this Project, are being designed by an ad hoc team within the DRBFC (co-ordinator: Mr Vital, DRBFC Advisor) and will be maintained by the Maintenance Department once the works have been completed. Improving the capacity of the Maintenance Department for road operation and maintenance is possible through JICA's road maintenance capacity project and training in Japan. However, capacity for comprehensive river-related design, construction and maintenance, including river revetments, is considered necessary because there are many rivers in Timor-Leste.

2-5-2 Rehabilitation for Bemos Water Supply System

(1) Operation and Maintenance systems

Maintenance of the Bemos Intake Weir is carried out by Operation and Maintenance Department in BTL as the responsible department. At the Bemos Intake Weir, management personnel is stationed at a dormitory located upstream of the facility. There are plans to construct a dormitory in the vicinity of the Bemos Intake Weir this fiscal year. Once completed it, daily maintenance and emergency response to problems will be easier than before.

Table 2-5-1 Operation and Maintenance system and Staffing in the Bemos Intake Weir

Level	Daily cleaning and inspection Routine maintenance work	Repair work in case of accident or disaster
Administrative Department	Water Supply Facility Operation and Maintenance Department	Operation and Maintenance Department
In charge of maintenance	Resident Operator 1 person	Water Supply Facility Operation and Maintenance Department

(2) Contents of Operation and Maintenance

The following tasks will be carried out under the system indicated in the above.

Daily cleaning and inspection: cleaning of intake screen, intake gate management (closed when turbidity rises)

Routine maintenance work: cleaning in connecting canal, management of the sediment discharge gate, dredging of the grit chamber

2-5-3 Rehabilitation for Buluto／Maliana Irrigation Facilities

The operation and maintenance structure of the Buluto-Maliana Irrigation Facilities is as follows.

The overall management of the Project will be carried out by the National Department of Irrigation and Water Management (NDIWM) within the Ministry of Agriculture and Fisheries (MAF), which is the implementing agency of the project. The budget application for the maintenance and management of the Buluto-Maliana irrigation facilities will be made by the NDIWM. The chain of command from the center to the field is as follows; the Irrigation and Water Management Bureau gives orders to the regional offices of agriculture, which is a subordinate agency of MAF with jurisdiction over Manatuto, Baucau and Bobonaro municipality, and the regional agricultural offices coordinate with the municipality agricultural offices. The roles of the regional agricultural offices (subordinate to MAF since FY2016) are 1) Coordination, 2) Monitoring, 3) Evaluation, and 4) Reporting to the center. The regional agricultural offices coordinate with the municipality agricultural offices within its jurisdiction to monitor the operation and maintenance of facilities at the field level and report to the central government.

The operation and management of the facilities at the field level is carried out by three staff members, including gatekeepers (two from Manatuto, two from Baucau, and one from Maliana)

hired by the municipality agricultural offices. The municipality agricultural offices operate and manage the facilities.

The gatekeepers operate the main facilities around the headworks, such as intake gates and scouring sluice channel gates, and the main diversion facilities of the trunk canal in accordance with the headworks operation regulations and other manuals, and upon request from the water users' association and local farmers. Since the field guidance carried out by JICA experts in June 2019, operation and operation records have been recorded. Routine maintenance of the core facilities and its records have not been implemented to date, but there are plans to implement periodic maintenance (e.g., replenishment of oil and grease in gate hoisting machines) under the guidance of MAF in the future.

The annual budgets of MAF Regional Offices and the municipality agricultural offices in Manatuto, Baucau, and Bobonaro are shown in the table below; the recurring budgets of each MAF Regional Agricultural Office generally range from $300,000 to $500,000/year, with no capital budget for maintenance and management..

Table 2-5-2 Recurrent budgets of MAF-related institutions, 2022

Unit $000

Item	2018	2019	2020	2021	2022	2023	2024	2025	2026
State Budget	1,261,578	1,462,000	1,339,100	1,156,000	2,030,300	1,675,000	2,670,900	2,579,100	2,088,600
MAF Baudget	7,016	14,709	15,287	15,889	29,479	23,592	18,206	18,934	19,692
NDIWM	440	1,093	1,144	1,144	2,142	2,199	623	648	673
Baucau Authority		5,309	2,958	5,309	4,538	4,704	4,877	5,056	5,242
MAF Baucau		529	549	571	505	476	495	515	535
Salary and Wage		403	419	436	418	417	434	451	469
Goods and Service		125	130	135	87	59	61	63	66
Minor Capital		-	-	-	-	-	-	-	-
Capital and Development		-	-	-	-	-	-	-	-
Manatuto Administration			2,093	4,338	3,628	3,761	3,899	4,042	4,191
MAF Manatuto		376	391	407	341	350	364	379	394
Salary and Wage		259	269	280	206	214	223	232	241
Goods and Service		118	122	127	130	136	141	147	153
Minor Capital		-	-	-	-	-	-	-	-
Capital and Development		-	-	-	-	-	-	-	-
Bobonaro Authority			2,477	5,003	4,426	4,590	4,760	4,938	5,122
MAF Bobonaro					445	443	461	479	499
Salary and Wage					366	381	396	412	428
Goods and Service					79	62	65	68	70
Minor Capital					-	-	-	-	-
Capital and Development					-	-	-	-	-

Sources: State Budget 2022; Book 4B/Budget line Item, Book 3A, Book 3B, Ministry of Finance. Book 4; Annual Budget Plan, Ministry of Agriculture and Fishery.

2-6 Project Cost Estimation

2-6-1 Initial Cost Estimation

(1) Expenses to be borne by Timor-Leste: approximately USD 8,700

Fees for AP: 8,700 US dollars

(2) Terms and conditions

1) Exchange rate

USD/JPY: 1 USD = 121.02 JPY

2) Construction period

The construction work shall be carried out by government bonds and the period required for the implementation design, bidding assistance services and construction shall be 25.5 months as indicated in the implementation process.

2-6-2 Operation and Maintenance Cost

As this plan is a rehabilitation project for existing facilities, operation and maintenance tasks such as routine and periodic maintenance are included in the original facility plan and are not separately accounted for here.

For reference, operation and maintenance costs from the previous preparatory study reports are as follows.

+ Inspection and repair of New Comoro (Hinode) Bridge revetment: 4,000USD/5 years
+ Cleaning and inspection of the Bemos intake weir and water pipeline: 2,040USD/year
+ Buluto irrigation facility: USD 44,000/year, entire facility (per government + water user association)
+ Mariana irrigation facility: USD 21,000/year, entire facility (per water user association)

Chapter 3 Project Evaluation

3-1 Preconditions

The preconditions necessary for the Project implementation will be as follows.

1) Acquisition of environmental license
2) Securing and levelling of construction yard and camp yard
3) Extraction approval for the borrow pit and quarry

3-2 Necessary Inputs by Recipient Country

Following inputs by the Timor-Leste's side will be necessary in order to realize and maintain the Project effects.

1) Securing budget and engineer for maintenance of the revetments, water supply facility and irrigation facility

In order for the facilities to be restored in this project to maintain their functions properly even during floods, regular inspections and repairs as required will be important. Therefore, it is required to secure the necessary and sufficient annual maintenance budget, as well as to secure and deploy the engineers involved.

2) Periodic Monitoring around the Project site

Continuous environmental and social monitoring is required to ensure that the project implementation does not have a negative impact on the surrounding area.

3-3 Important Assumptions

Important assumptions to realize and maintain the Project effects enough are as follows.

1) In the Comoros River, sediment mining is carried out on a daily basis. In order to prevent scouring of the revetment foundations restored in this project, the sediment mining around river structures including revetments should be controled or prohibited.
2) Water pipe for the downstream of the Bemos intake weir to be rehabilitated in this project will be restored with assistance from Australia. Appropriate restoration and maintenance of the water pipe are required for the realization and sustainability of the effects of this project.
3) At the Maliana irrigation facility, the scouring sluice gates can't be opened because sediment fully accumulate on the upstream side of the gates. Therefore, gravels and stones flowing during flood overtopped the closed gates, directly dropped on the apron or hit the lack bars and caused severer damage. To prevent such an extra damage, appropriate gate operation during floods should be thoroughly implemented.

3-4 Project Evaluation

3-4-1 Relevance

The relevance of the Project is as follows.

1) Beneficiaries: The beneficiary population and the number of households at each target site are shown in the table below. Since the beneficiary population of 290,000 is equivalent to 22% of Timor-Leste's population of approximately 1.34 million (2021, source: World Bank World Development Indicators), the relevance of the project is high.

Table 3-4-1 Beneficiary Population and Household

Component	Location		Population (person)	Household (household)
	Municipality	Administrative post		
Comoro River revetment	Dili	Dom Aleixo	194,332	28,838
		Vera Cruz	38,965	5,992
Bemos water supply facility	Aileu	Laulara	8,766	1,493
Buluto irrigation facility	Baucau	Vemasse	10,182	1,931
	Manatuto	Laclo	8,541	1,697
Maliana irrigation facility	Bobonaro	Maliana	32,685	6,346
Total			293,471	46,297

2) Consistency with Japan's aid policy: One of Japan's assistance policy for Timor-Leste is the development and improvement of economic and social infrastructure. This project aims to restore river facilities, water supply facilities and irrigation facilities that were damaged by the flood disaster and is consistent with Japan's assistance policy.

3) This project will contribute to the recovery and development of the livelihoods and economy of the affected areas through rehabilitation of infrastructure damaged flood. Since it will contribute to SDGs Goal 9 (Build resilient infrastructure), Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable), and Goal 13 (Take urgent action to combat climate change and its impacts), relevance of the project is high.

3-4-2 Effectiveness

(1) Quantitative Effect

Table 3-4-2 Indicators of Quantitative Effect

Indicator	Baseline (2022)	Target Value (2027) [3 years after completion]
<u>Comoro River Retaining Wall</u> Necessary rehabilitation works for important section	- Riverbank protection work (3 sites, L=372 m)[*1] - 1 lane of National Road No.2	- 0 site[*2] - 0 site[*2]

	Bypass (3 sites, L=372 m) [*1]	
Bemos Water Supply System Necessary works for rehabilitation and strengthening resilience	Headworks[*3] - Intake facility: 1 set - Intake weir: 1 set - Grit chamber: 1 set - Retaining wall: 1 set - Connecting canal: 35 m	 - 0 set - 0 set - 0 set - 0 set - 0 m
Buluto/Maliana Irrigation Facilities Necessary work for rehabilitation and strengthening resilience	(Buluto) - Retaining wall (L=32 m) - Riverbed protection work (B=157m) - Main canal at the high embankment section (total crack length = 108 m)	 - 0 m - 0 m - 0 m
	(Maliana) - Fixed weir: 1 set - Channel and apron at downstream of scouring sluice: 1 set - Administrative corridor: (area of hole = 22.24 m2)	 - 0 set - 0 set - 0 m2

(*1)

Important section is from Comoro Bridge to the outlet of mountain area, and target sites are R5, R6, R7 sites.

(*2)

The component of the Programme is R6 site. Remaining R5 and R7 sites will be rehabilitated by DRBFC-MPW in 2023.

(*3)

The component of the Programme is headworks. Water pipe from the headworks to River crossing No.2 is under reconstruction supported by Australia and water pipe from River crossing No.2 to No.3 will be reconstructed by BTL.

(2) Qualitative Effect

1) Comoro River retaining wall

- Safety will be ensured even if a flood of the same scale as the April 2021 flood occurs.
- Congestion on the National Highway No. 2 Bypass will be resolved, and the punctuality of logistics will be ensured.
- Economic development along the bypass will be promoted.
- The riverbank protection method adopted in this project will be applied to the other projects.

2) Bemos water supply facility

- Even if a flood of the same scale as the April 2021 flood occurs, the water intake function will be secured.

- The above will enable stable water supply even in the event of a flood. This will eventually lead to the improvement of water supply and sanitation in Dili.
- By stabilizing the water supply, it will be possible to systematically manage the operation of water supply facilities, which will contribute to the establishment of the water tariff collection system that BTL is responsible for, and the sound management of BTL.

3) Buluto/Maliana Irrigation Facility

- Rehabilitation of damaged intake weirs and ancillary facilities will make it possible to secure stable irrigation water and increase rice production in the target area. In addition, the livelihood of farmers will improve.
- Compared to other sections of the main canal, restoration and strengthening of the main canal in the high embankment section, which is more prone to deformation, will reduce the maintenance and repair work for that section.
- By restoring the maintenance passageway at Maliana irrigation weir, the quality of daily inspection and maintenance will be improved, and early repair will be possible.

Appendices

Appendix-1 Member List of the Survey Team

Table Members of the Survey Team

Name	Job Role	Affiliation
Mr. KODAMA, MAKOTO	Chief Consultant／River Plan and Sediment Management 1	IDEA Consultants, Inc.
Mr. OKADA YUKI	Deputy Chief Consultant／River Plan and Sediment Management 2 ／Flood Mechanism	IDEA Consultants, Inc.
Mr. HIROSE SUEO	Revetment Plan／ Road Management	INGEROSEC Corporation
Mr. TAKASAKI KAZUNORI	Rehabilitation Plan for Water Supply Facility	SANYU Consultants Inc.
Mr. TAI YUJI	Rehabilitation Plan for Irrigation Facility	NTC International Co., Ltd.
Ms. TSUJIMURA, NAO	Environmental and Social Considerations／Coordinator	IDEA Consultants, Inc. (Katahira & Engineers International)
Mr. NAGANO, SEISHI	Construction Plan 1／ Cost Estimation 1	INGEROSEC Corporation
Mr. KOGA, KOJI	Construction Plan 2／ Cost Estimation 2	INGEROSEC Corporation
Mr. KOMIYA MASATSUGU	Project Implementing Framework	IDEA Consultants, Inc.

Appendix-2 Survey Schedule

This survey is divided into five phases: preliminary preparation, first on-site survey (OD), domestic analysis (design and cost estimation, cost estimation review), second on-site survey (DOD), and domestic organization. The schedule for the first and second on-site surveys are shown in Tables below.

Table Schedule for the first on-site survey(OD)

Date (2022)		Governmental Survey Team		Consultant Survey Team							
		Mr. GOTO KO (Team Leader)	Mr. SAMBE NOBUO (Technical Advisor)	Mr. KODAMA MAKOTO (Chief Consultant／River Plan and Sediment Management1)	Mr. OKADA YUKI (Deputy Chief Consultant／River Plan and Sediment Management 2／Flood Mechanism)	Mr. HIROSE SUEO (Revetment Plan／Road Management)	Mr. TAKASAKI KAZUNORI (Rehabilitation Plan For Water Supply Facility	Mr. TAI YUJI Rehabilitation Plan for Irrigation Facility	Ms. TSUJIMURA NAO Environmental and Social Considerations／Coordinator	Mr. NAGANO SEISHI Construction Plan 1／Cost Estimation 1	Mr. KOMIYA MASATSUGU Project Implementing Framework
1	26 Apr (Tue)	Moving day: Tokyo(NRT)-Kuala Lumpur(KUL)		Basic Survey		Moving day: Tokyo(NRT)-Kuala Lumpur(KUL)					
2	27 Apr (Wed)	Moving day: Kuala Lumpur (KUL)－Dili(DIL) Citilink QG8520 06:50-12:05）				Moving day: Kuala Lumpur(KUL)-Dili(DIL)（Citilink QG8520 06:50-12:05）					
3	28 Apr (Thu)	Team Meeting (online)	The same as right			Courtesy call to JICA Timor-Leste Office Team Meeting(online)					
4	29 Apr (Fri)	The same as right		Courtesy call to C/P（MPW-DRBFC, MPW-BTL, MAF-NDIWM）、MoF、MNEK (Explanation of ICR, discussion of proposed minutes of meeting)							
5	30 Apr (Sat)	The same as right		On-site Survey (Comoro River, Dili Municipality)							
6	1 May (Sun)	－	－	Data and material organization							
7	2 May (Mon)	③On-site Survey (Buluto Irrigation Facility)		③On-site Survey (Buluto Irrigation Facility)		①On-site Survey (Comoro River)	②On-site Survey (Bemos Intake Weir)	③On-site Survey (Buluto Irrigation Facility)	Meeting with SSE Preparation of Stakeholder meeting	③On-site Survey (Buluto Irrigation Facility)	③On-site Survey (Buluto Irrigation Facility)
8	3 May (Tue)	Meeting regarding the contents of Minute, Conclusion of Minutes		Accompanying to govemmental survey team		On-site Survey (Comoro river, Dili Municipality)					Accompanying to governmental survey team
9	4 May (Wed)	Meeting with J EoJ		Accompanying to govemmental survey team		①On-site Survey (Comoro River)	②On-site Survey (Bemos Intake	③On-site Survey (Buluto Irrigation	Meeting with SSE Preparation of	③On-site Survey (Buluto Irrigation	Accompanying to governmental

Date (2022)		Governmental Survey Team		Consultant Survey Team							
		Mr. GOTO KO (Team Leader)	Mr. SAMBE NOBUO (Technical Advisor)	Mr. KODAMA MAKOTO (Chief Consultant／River Plan and Sediment Management1)	Mr. OKADA YUKI (Deputy Chief Consultant／River Plan and Sediment Management 2／Flood Mechanism)	Mr. HIROSE SUEO (Revetment Plan／Road Management)	Mr. TAKASAKI KAZUNORI (Rehabilitation Plan For Water Supply Facility	Mr. TAI YUJI Rehabilitation Plan for Irrigation Facility	Ms. TSUJIMURA NAO Environmental and Social Considerations／Coordinator	Mr. NAGANO SEISHI Construction Plan 1／Cost Estimation 1	Mr. KOMIYA MASATSUGU Project Implementing Framework
							Weir)	Facility)	Stakeholder meeting	Facility)	survey team
10	5 May (Thu)	—	Moving day: Dili(DIL)-Kuala Lmpur(Malindo Air DIL-KUL 09:00-12:10)	①On-site Survey (Comoro River)		The same as above	The same as above	④On-site Survey (Maliana Irrigation Facility)	The same as above	④On-site Survey (Maliana Irrigation Facility)	①On-site Survey (Comoro River)
11	6 May (Fri)	— —	—	Meeting with MPW-DRBFC and Dr. Benjamim			The same as above	④On-site Survey (Maliana Irrigation Facility)	The same as above	On-site Survey (Maliana Irrigation Facility)	Meeting with MPW-DRBFC and Dr. Benjamim
12	7 May (Sat)	—	—	③On-site Survey (Buluto Irrigation Facility)							
13	8 May (Sun)	—	—	Data and Material Organization							
14	9 May (Mon)	—	—	Meeting with MPW-DRBFC	Meeting with ANAS,DNMG,IPG	Meeting with MPW-DRBFC	Meeting with MPW-BTL、EWB	Meeting with MAF-NDIWM	Meeting with SSE	Market Research	Meeting with MPW-DRBFC
15	10 May (Tue)	—	—	Meeting with MPW-BTL	The same as above	The same as above	The same as above	The same as above	The same as above	The same as above	Meeting with MPW-BTL
16	11 May (Wed)	—	—	Meeting with MAF-NDIWM	Meeting with UNTL	The same as above	The same as above	The same as above	The same as above	The same as above	Meeting with MAF-NDIWM
17	12 May (Thu)	—	—	Meeting with MoF, MNEK	The same as above	The same as above	The same as above	The same as above	The same as above	The same as above	Meeting with MoF, MNEK
18	13 May (Fri)	—	—	Meeting with MPW-DRBFC			The same as above	The same as above	The same as above	The same as above	Meeting with MPW-DRBFC
19	14 May	—	—	Data and Material Organization							

Date (2022)		Governmental Survey Team		Consultant Survey Team							
		Mr. GOTO KO (Team Leader)	Mr. SAMBE NOBUO (Technical Advisor)	Mr. KODAMA MAKOTO (Chief Consultant／River Plan and Sediment Management 1)	Mr. OKADA YUKI (Deputy Chief Consultant／River Plan and Sediment Management 2／Flood Mechanism)	Mr. HIROSE SUEO (Revetment Plan／Road Management)	Mr. TAKASAKI KAZUNORI (Rehabilitation Plan For Water Supply Facility	Mr. TAI YUJI Rehabilitation Plan for Irrigation Facility	Ms. TSUJIMURA NAO Environmental and Social Considerations／Coordinator	Mr. NAGANO SEISHI Construction Plan 1／Cost Estimation 1	Mr. KOMIYA MASATSUGU Project Implementing Framework
	(Sat)										
20	15 May (Sun)	—	—	Data and Material Organization							
21	16 May (Mon)	—	—	Joint Meeting with MPW-DRBFC, MPW-BTL, MAF-NDIWM							
22	17 May (Tue)	—	—	Prepare summary of On-Site Survey Results, and report to JICA Timor-Leste Office, /Take PCR test							
23	18 May (Wed)	—	—	Moving Day：Dili(DIL)-Kuala Lumpur(KUL)（Citilink QG8521 13:30-16:30）, Kuala Lumpur(KUL)－Tokyo(NRT)（SQ638 23:55-08:00）							
24	19 May (Thu)	—	—	Moving Day：Kuala Lumpur(KUL)－Tokyo(NRT)（SQ638 23:55-08:00 ）							

Table Schedule for the second on-site survey(DOD)

Date(2022)		Governmental Survey Team	Mr. KODAMA MAKOTO (Chief Consultant／River Plan and Sediment Management 1)	Mr. HIROSE SUEO (Revetment Plan／Road Management)	Mr. TAI YUJI Rehabilitation Plan for Irrigation Facility
1	29 Sep (Wed)	Tokyo～Jakarta(GA875) Jakarta～Denpasar(GA414)	Tokyo～Jakarta(GA875) Jakarta～Denpasar(GA414)	—	Tokyo～Jakarta(GA875) Jakarta～Denpasar(GA414)
2	30 Sep (Thr)	Denpasar～Dili(QZ958) Courtesy call to JICA-TL office Team meeting	Denpasar～Dili(QZ958) Courtesy call to JICA-TL office Team meeting	—	Denpasar～Dili(QZ958) Courtesy call to JICA-TL office Team meeting

3	1 Oct (Wed)	On site Survey (Comoro River)	On site Survey (Comoro River)	Bangkok～Denpasar(TG431)	On site Survey (Comoro River)
4	2 Oct (Wed)	On Site Survey(Bemos Intake Facility)	On Site Survey(Bemos Intake Facility)	Denpasar～Dili(QZ958)	On Site Survey(Bemos Intake Facility)
5	3 Oct (Wed)	Meeting with C/P（MPW-DRBFC, MPW-BTL, MAF-NDIWM）			
6	4 Oct (Wed)	Meeting with MoF, MNEC			
7	5 Oct (Wed)	Meeting regarding the contents of Minute, Conclusion of Minutes			
8	6 Oct (Wed)	Meeting with J EoJ			
9	7 Oct (Wed)	Dili～Denpasar(QZ959) Denpasar～Jakarta(GA403) Jakarta～Tokyo	Detailed Design(- 21 October)		
10	8 Oct (Wed)				

Appendix-3 List of Parties Concerned in the Recipient Country

Affiliation/ Name	Title
Ministry of Finance, MOF	
Mr. Francisco Alves	Director General of External Resources Mobilization and Management
Mr. Elson Martinho da Costa	National Director for Grant
Mr. Liborio Alves	Advisor of Loan Directorate
Ms. Maria Eurosia Ramlah Amaral	Chief Department of Loan
Mr.Diamantino Hanjam	Junior Professional Technical
Director for Loan	Ms. Ilce Mango
Ministry of Foreign Affairs and Cooperation, MNEC	
Mr.Marcos dos Reis da Costa	National Director under National Directorate for West, Central, South and Far-East Asia
Mr.Hernani Magno	Program Officer under National Directorate for West, Central, South and Far-East
Ministry of Public Works, National Directorate of Road, Bridge and Flood Control, MPW DRBFC）	
Mr. Rui Hernani F. Guterres	Director General
Mr. Nene Lobato	National Director
Mr. Vital Nai Quei Pereira Araujo	Coordinator of Adhoc unit
Ministry of Agriculture and Fisheries, MAF	
Mr. Pedro dos Reis	Minister
Ms. Maria Odete do Ceu Guterres	Director General
Mr. Cesar Jose da Cruz	Director General of Cooperation and Institutional Development
Mr. Martinho Laurentino Soares	National Director of Department of Irrigation and Water Management
Ministry of Public Works,Bee Timor Leste, MPW BTL	
Mr. Carlos Peloi dos Reis	President
Mr. Gustavo Da Cruz	Vice President
Mr. Joao Piedade Braz	National Director
National University Timor Lorosae, UNTL	
Dr. Benjamim de Oliveira Hopffer Rego Silveira Martins	Professor
Embassy of Japan	
Mr. KINEFUCHI Masami	Ambassador Extraordinary and Plenipotentiary
Ms. YAMADA Kazumi	Counsellor
Ms. TAKI Misato	Second Secretary

Minutes of Discussions
on the Preparatory Survey for
the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures
in Timor-Leste

In response to the request from the Government of the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste (hereinafter referred to as "the Programme"). The Team held a series of discussions with the officials of the Government of Timor-Leste and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Dili, May 25, 2022

Eng. GOTO Ko
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Dr. Abel Pires da Silva, ST, MIT, PhD
Minister
Ministry of Public Works
the Democratic Republic of Timor-Leste

Eng. Pedro dos Reis, M.Si.,IPU
Minister
Ministry of Agriculture and Fisheries
the Democratic Republic of Timor-Leste

ATTACHMENT

1. Objective of the Programme

The objective of the Programme is to restore public services of the capital city and agricultural production infrastructure by/through rapid rehabilitation of basic infrastructure and agricultural facilities damaged by flood, thereby contributing to revitalization of livelihood and economic activities in the target areas.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste".

3. Project site

Both sides confirmed that the sites of the Programme are in Dili, Buluto and Maliana, which is shown in Annex 1.

4. Responsible authority for the Programme

4-1. Both sides confirmed the Government of Timor-Leste shall establish a consultative committee for the Programme (hereinafter referred to as "the Committee") in order to discuss any matter, at the Programme level.

4-2. The members of the Committee shall be as below.

- Ministry of Foreign Affairs and Cooperation
- Ministry of Finance
- National Directorate of Roads, Bridges and Floods Control, Ministry of Public Works (hereinafter referred to as "MPW")
- Bee Timor-Leste, E.P, MPW
- National Directorate of Irrigation and Water Use Management, Ministry of Agriculture and Fisheries (hereinafter referred to as "MAF") and
- Representative(s) of JICA Timor-Leste Office

4-3. Observer of the Committee shall be as below,

- Representative(s) of Embassy of Japan

4-4. National Directorate of Roads, Bridges and Floods Control, MPW (hereinafter referred to as "MPW-DRBFC") and Ministry of Finance shall be Co-chair of the Committee

4-5. In principle, a regular meeting of the Committee shall be held in Timor-Leste semiannually, and other meetings may be held upon the request of either JICA or the Recipient whenever JICA deems it necessary to call such meetings.

4-6. The terms of reference of the Committee shall be as follows:

(a) to confirm an implementation schedule for the Programme for the smooth and effective disbursement of Japanese Grant (hereinafter referred to as "the Grant");

(b) to discuss modifications of the Programme, including modifications of the allocation of the Grant for the Subprojects;

(c) to identify problems that may delay the implementation of the Programme or the disbursement of the Grant, and to explore solutions to such problems;

(d) to exchange views on publicity related to the Programme; and

(e) to discuss any other matters that may arise from or in connection with the G/A.

4-7. MPW-DRBFC will be the executing agency for the Subproject No. 1 "Rehabilitation of Comoro River Retaining Wall", Bee Timor-Leste, E.P, MPW (hereinafter referred to as "MPW-BTL") will be the executing agency for the Subproject No. 2 "Rehabilitation of Bemos Water Supply Facility" and National Directorate of Irrigation and Water Use Management, MAF (hereinafter referred to as "MAF-DIWM") will be the executing agency for the Subproject No. 3 "Rehabilitation of Buluto and Maliana Irrigation Schemes". The executing agencies shall coordinate with all the relevant authorities to ensure smooth implementation of each Subproject and ensure that the undertakings for the Programme shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-8. Ministry of Finance shall be responsible for

(a) Signing the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Programme.

(b) Issuing the Authorization to Pay (A/P) to the Agent Bank for the payment of the Programme.

(c) Ensuring that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services are borne by the Government of Timor-Leste through counterpart fund secured and managed by the Ministry of Finance.

(d) Receiving import goods and material for the services as consignee

4-9. MPW will be the representative ministry of executing agencies.

4-10. MPW, as the representative ministry, will take responsibility for

(a) Issuing the necessary contractual documents for the Programme, such as contracts, approval letters for design documents, certificate of contracts, etc, in cooperate with other executing agencies

4-11. MPW-DRBFC will be the representative of executive agencies for technical matter of 3 Subprojects.

4-12. Ministry of Foreign Affairs and Cooperation shall be responsible for supervising the Executing Agencies on behalf of the Government of Timor-Leste.

5. Limitation of Grant Amount

Both sides confirmed that limitation of grant amount is 1,000 million Japanese Yen, which was approved by the government of Japan.

6. Tentative Component of the Subprojects

Both sides confirmed that tentative component of each Subproject would be as below.

(a) Subproject No. 1 "Rehabilitation of Comoro River Retaining Wall": MPW-DRBFC

(b) Subproject No. 2 "Rehabilitation of Bemos Water Supply Facility": MPW-BTL

(c) Subproject No. 3 "Rehabilitation of Buluto and Maliana Irrigation Schemes": MAF-DIWM

7. Limitation of overall Grant Amount

Both sides confirmed that if the estimated cost will be over 1,000 million Japanese Yen, it will be necessary to consider some way to reduce overall cost as follow.

(a) Adopting cost effective construction method.

(b) Selecting some components to be narrow and/or cut.

Both sides also confirmed that candidate components of the Program are as follows, with order of priority.

Component (Implementing agencies)	Description of the work
First Priority Group	
1. Rehabilitation plan for Comoro River Retaining wall 【MPW-DRBFC】	a) Rehabilitation of Retaining wall R6 (120m) b) Bypass road of National Road No. 2 (at retaining wall R6)
2. Rehabilitation plan for Bemos Water Supply System 【MPW-BTL】	c) Rehabilitation of Intake facilities (Water Intake gate, pond, waterway, etc.) d) More resilient structural reinforcement against floods

3. Rehabilitation plan for Buluto Irrigation Facilities 【MAF-DIWM】	e) The masonry wall at downstream of the headworks will be rehabilitated. f) Riverbed protection block at the apron downstream for the headworks will be constructed.
Second Priority Group	
4. Rehabilitation plan for Comoro River Retaining wall 【MPW-DRBFC】	g) Rehabilitation of Retaining wall R5 (110m) h) Bypass road of National Road No. 2 (at retaining wall R5)
5. Rehabilitation plan for Buluto/Maliana Irrigation Facilities 【MAF-DIWM】	[Buluto Irrigation Facility] i) The bottom slab concrete in the main canal will be rehabilitated
	[Maliana Irrigation Scheme] j) Rehabilitation of the Maliana headworks k) Rehabilitation of the drainage

8. Procedures and Basic Principles of Japanese Grant

8-1. The Timor-Leste side agreed that the procedures and basic principles of the Grant as described in Annex 3 shall be applied to the Programme.

8-2. The Timor-Leste side agreed to take the necessary measures, as described in Annex 5, for smooth implementation of the Programme. The contents of Annex 5 will be updated and finalized as an attachment to the Grant Agreement.

9. Schedule of the Survey

9-1. The Team will proceed with further survey in Timor-Leste until May 20, 2022.

9-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Timor-Leste in order to explain its contents around the beginning of October, 2022.

9-3. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Programme are fully agreed by the Timor-Leste side, JICA will finalize the Preparatory Survey Report and send it to Timor-Leste around the beginning of December, 2022.

9-4. The above schedule is tentative and subject to change.

10. Environmental and Social Considerations

10-1. The Timor-Leste side confirmed to give due environmental and social considerations during implementation, and after completion of the Programme, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

10-2. The Programme would be categorized as "B" because the project is not considered to be a large scale river/erosion control project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA Guidelines for

Environmental and Social Considerations (April 2010), it is not likely to have a significant adverse impact on the environment

10-3. The Timor-Leste side confirmed to conduct the necessary procedures concerning the environmental assessment (including Initial Environmental Examination (IEE) and information disclosure, etc.) and make IEE report of the Programme.

11. Other Relevant Issues

11-1. Gender Mainstreaming

Both sides confirmed that following gender elements shall be duly reflected in the scope of Preparatory Survey.

(a) Collection of information and gender disaggregated data for assessment of gender needs.

(b) Examination of gender-responsive measures based on the assessment.

[END]

Annex 1 Project Site

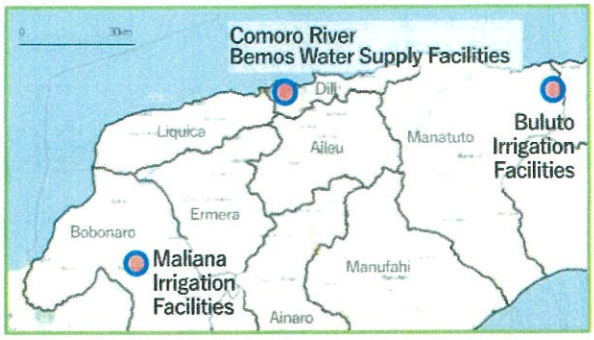
Annex 2 Organization Chart

Annex 3 Japanese Grant

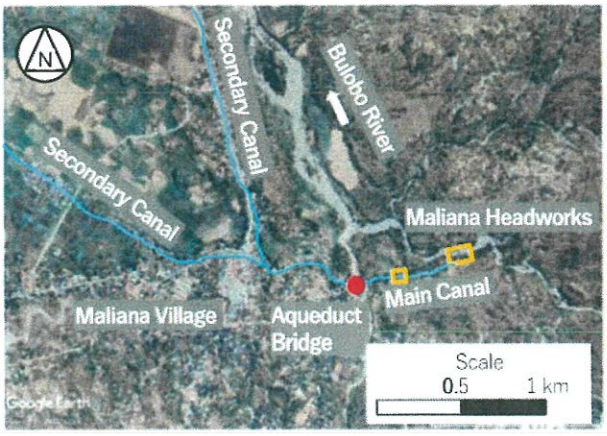
Annex 4 Project Monitoring Report (template)

Annex 5 Major Undertakings to be taken by the Government of Timor-Leste

Timor Leste



Comoro River Revetment, Bemos Water Supply Facilities



Maliana Irrigation Facilities

Buluto Irrigation Facilities

Source: Based on Google Earth by JICA Survey Team

Annex 2 Organization Chart

(1) Ministry of Public Works / Directorate of Road, Bridge and Flood Control (MPW-DRBFC)

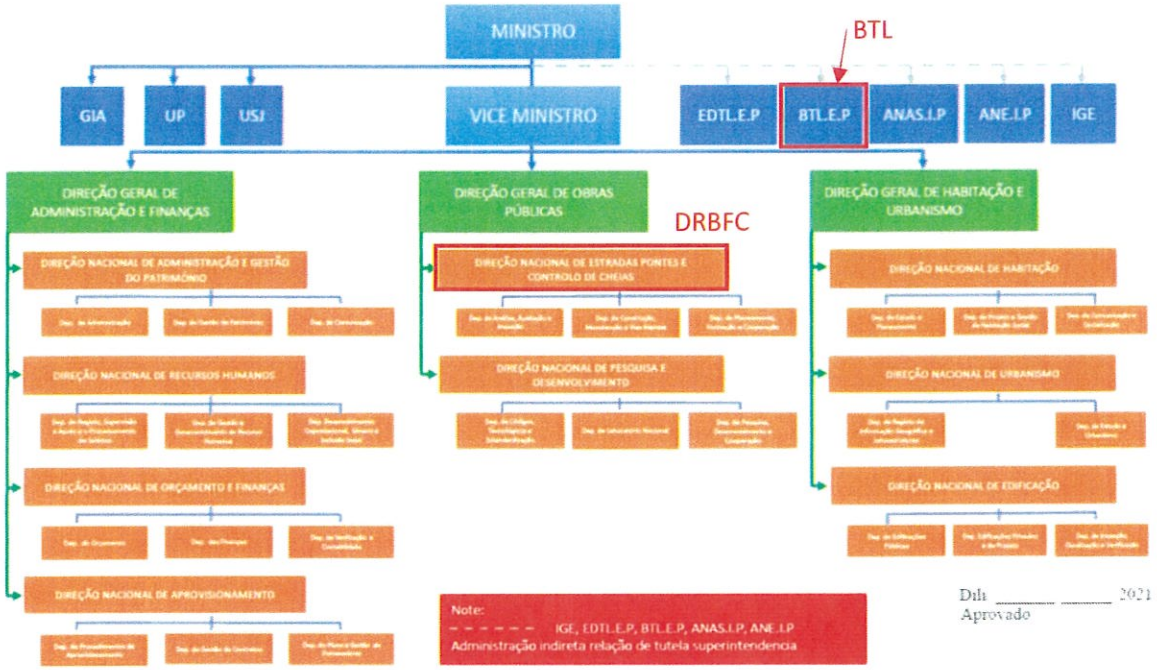


Figure 1 Organization Chart of MPW

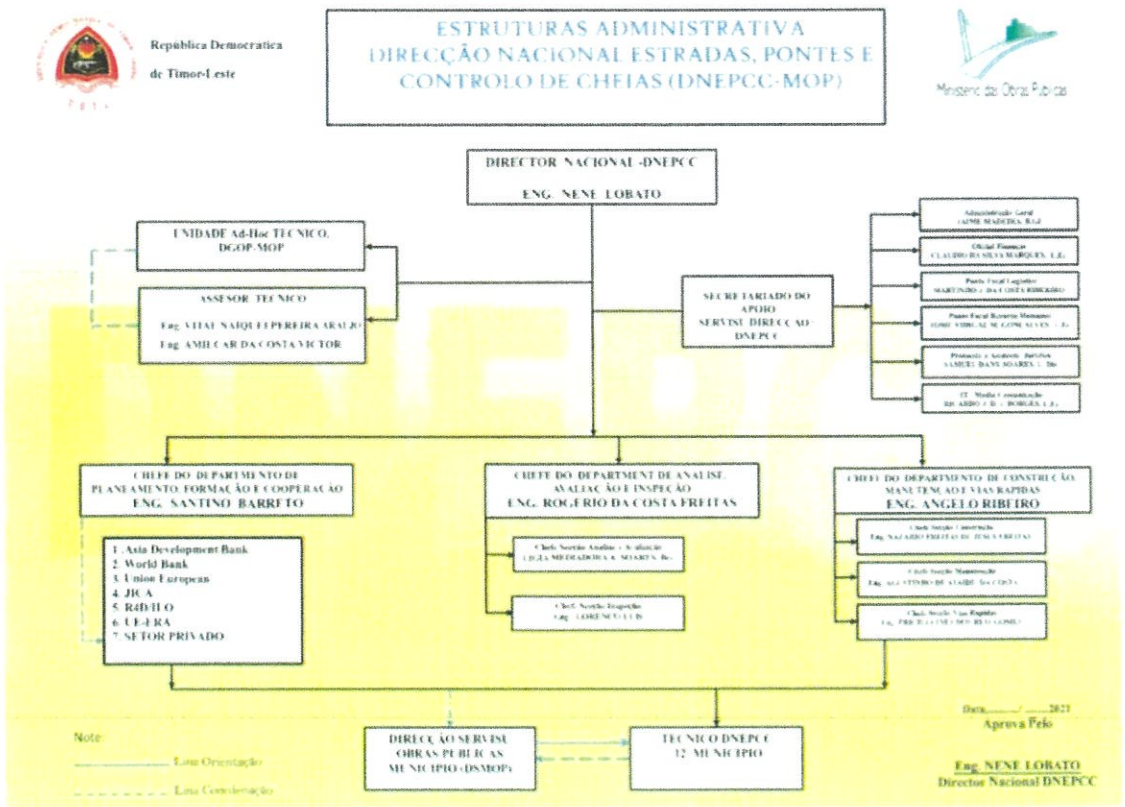


Figure 2 Organization Chart of MPW-DRBFC

(2) Ministry of Public Works / Bee Timor-Leste (MPW-BTL)

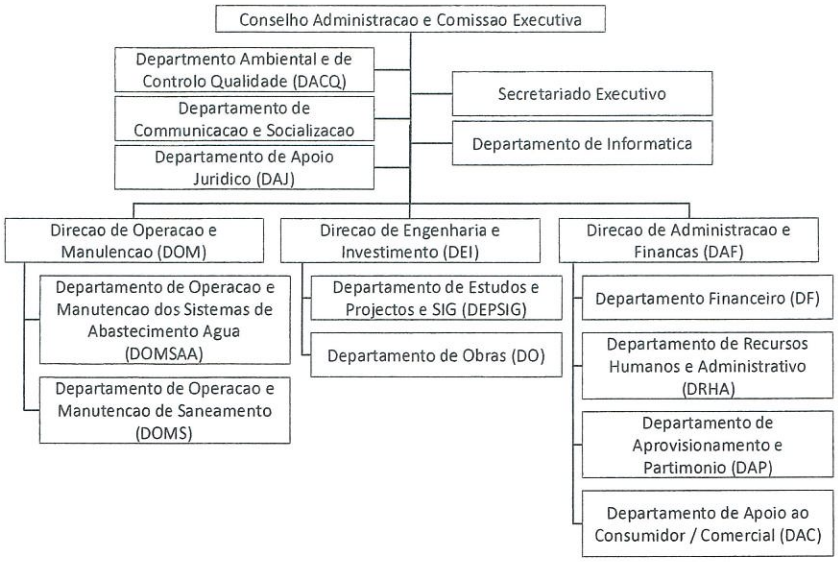


Figure 3 Organization Chart of MPW-BTL

(3) Ministry of Agriculture and Fishery / Department of Irrigation and Water Management (MAF-DIWM)

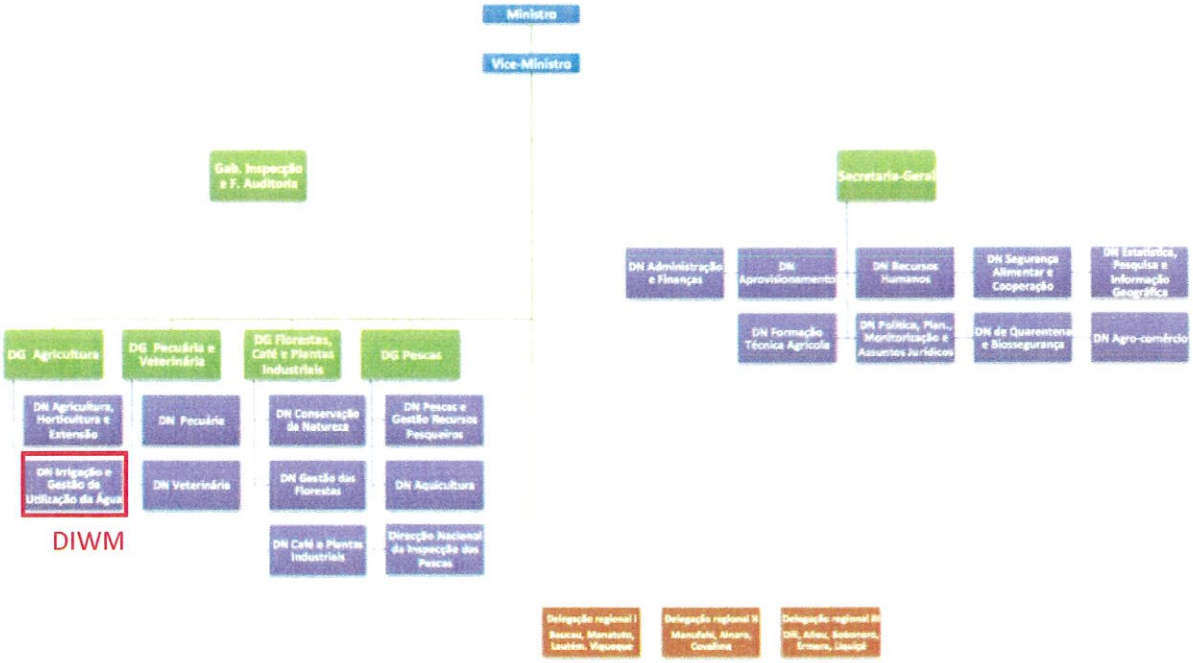


Figure 4 Organization Chart of MAF-DIWM[1]

[1] MAF website: https://www.maf.gov.tl/tl/perfil/organograma

(4) Committee

The Committee for the Programme	
Member	Ministry of Finance (Co-Chair)
	MPW-DRBFC (Co-Chair)
	MPW-BTL
	MAF-DIWM
	Ministry of Foreign Affairs and Corporation
	JICA
Observer	Embassy of Japan

Figure 5 The Coordinating Committee

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or 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. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the 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 necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant 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 an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) 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 feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

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 singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) 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 to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Line Ministry	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*

Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-
-
-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Major Undertakings to be taken by the Government of Timor-Leste

1. Specific obligations of the Government of Timor-Leste which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	Ministry of Finance	
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	Ministry of Finance	
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A			
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	Ministry of Finance	about 6,000 JPY for each A/P
	2) Payment commission for A/P	every payment	Ministry of Finance	about 0.1% of the payment amount
4	To prepare IEE and secure the necessary budget for implementation for EMP and EMoP.	within 1 month after the signing of the G/A	3 Executing Agencies	
5	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with TL regulations.	before notice of the bidding documents	3 Executing Agencies	
6	To establish a consultative committee for the Programme	within 1 month after the signing of the G/A	Ministry of Finance, 3 Executing Agencies and Ministry of Foreign Affairs and Cooperation	
7	To secure and clear the following lands 1) temporary construction yard and stock yard near the Programme area, 2) disposal site near the Programme area.	before notice of the bidding documents	3 Executing Agencies	
8	To obtain the planning, zoning, building permit	before notice of the bidding documents	3 Executing Agencies	
9	To clear, level and reclaim the following sites The riverbeds of the Comoro, Bemos, Laleia rivers will be used as temporary roads, so request permission to use them.	before notice of the bidding documents	3 Executing Agencies	
10	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MPW-DRBFC (in association with other 2 Executing Agencies)	

(B/A: Banking Arrangement, A/P: Authorization to pay, MPW-DRBFC: Directorate of Road, Bridge and Flood Control, Ministry of Public Works, 3 Executing Agencies: MPW-DRBFC, Bee Timor-Leste under MPW and Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries, IEE: Initial Environmental Examination, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

(2) During the Programme Implementation

NO	Items	Deadline	In charge	Estimated Cost
1	To issue A/P to the Agent Bank for the payment to the consultant and the contractor	within 1 month after the signing of the contract(s)	Ministry of Finance	
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A			
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	Ministry of Finance	about 6,000 JPY for each A/P
	2) Payment commission for A/P	every payment	Ministry of Finance	about 0.1% of the payment amount
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Programme	Ministry of Finance	
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Programme	Ministry of Public Works	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services are exempt;	during the Programme	Ministry of Finance	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Programme	during the Programme	3 Executing Agencies	
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	3 Executing Agencies	
8	To submit Project Monitoring Report	every month	MPW-DRBFC (in association with other 2 Executing Agencies)	
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MPW-DRBFC (in association with other 2 Executing Agencies)	
10	To submit a report concerning completion of the Programme	within 6 months after completion of the Programme	MPW-DRBFC (in association with other 2 Executing Agencies)	
11	To construct access roads outside the site (except access road for Bemos Water Intake Facility)	before start of the construction	3 Executing Agencies	

12	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Programme outside the site(s)		3 Executing Agencies	
	1) Electricity The distributing line to the site	before start of the construction	3 Executing Agencies	
	2) Water Supply The city water distribution main to the site	before start of the construction	3 Executing Agencies	
	3) Drainage The city drainage main (for storm, sewer and others) to the site	6 months before completion of the construction	3 Executing Agencies	
13	To provide equipment, furniture, facilities necessary for the implementation of the Programme in the site(s)	before start of the construction	3 Executing Agencies	
14	To ensure the safety of persons engaged in the implementation of the Programme	during the Programme	3 Executing Agencies	
15	To implement EMP and EMoP	during the construction	MPW-DRBFC (in association with other 2 Executing Agencies)	
16	To submit results of environmental and social monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MPW-DRBFC (in association with other 2 Executing Agencies)	

(B/A: Banking Arrangement, A/P: Authorization to pay, MPW-DRBFC: Directorate of Road, Bridge and Flood Control, Ministry of Public Works, 3 Executing Agencies: MPW-DRBFC, Bee Timor-Leste under MPW and Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

(3) After the Programme

NO	Items	Deadline	In charge	Estimated Cost
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MPW-DRBFC (in association with other 2 Executing Agencies)	
2	To submit results of environmental and social monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between the Government of Timor-Leste and JICA.	for 3 years after the Programme	MPW-DRBFC (in association with other 2 Executing Agencies)	
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	3 Executing Agencies	

(3 Executing Agencies: MPW-DRBFC, Bee Timor-Leste under MPW and Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

2. Other obligations of the Government of Timor-Leste funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To rehabilitate following infrastructure - Comoro River Retailing Wall - Bemos Water Intake Facility - Buluto Irrigation Headworks - Maliana Irrigation Headworks		
2	To conduct the following transportation a) Marine(Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the Programme site		
3	To implement detailed design, bidding support and construction supervision (Consulting Service)		
	Total		1,000

Minutes of Discussions
on the Preparatory Survey for
the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures
in Timor-Leste (Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Ministry of Public Works (hereinafter referred to as "MPW"), Ministry of Agriculture and Fisheries (hereinafter referred to as "MAF"), and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on May 25, 2022, and in response to the request from the Government of the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste") dated on September 30, 2021, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste (hereinafter referred to as "the Programme").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Dili, October 6, 2022

Eng. MASUDA Shinichi
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Dr. Abel Pires da Silva, ST, MIT, PhD
Minister
Ministry of Public Works
the Democratic Republic of Timor-Leste

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Minister
Ministry of Agriculture and Fisheries
the Democratic Republic of Timor-Leste

ATTACHMENT

1. Objective of the Programme

The objective of the Programme is to restore public services of the capital city and agricultural production infrastructure by/through rapid rehabilitation of basic infrastructure and agricultural facilities damaged by flood, thereby contributing to the revitalization of livelihood and economic activities in the target areas.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste".

3. Project site

Both sides confirmed that the sites of the Programme are in Dili, Buluto, and Maliana, shown in Annex 1.

4. Responsible authorities for the Programme

4-1. Both sides confirmed that the Government of Timor-Leste shall establish a consultative committee for the Programme (hereinafter referred to as "the Committee") to discuss any matter concerning the implementation and coordination of the Programme.

(1) The members of the Committee shall be as below.

- Ministry of Foreign Affairs and Cooperation
- Ministry of Finance (hereinafter referred to as "MOF")
- National Directorate of Roads, Bridges and Floods Control, Ministry of Public Works (hereinafter referred to as "MPW")
- Bee Timor-Leste, E.P, MPW
- National Directorate of Irrigation and Water Use Management, Ministry of Agriculture and Fisheries (hereinafter referred to as "MAF") and
- Representative(s) of JICA Timor-Leste Office

(2) Observer of the Committee shall be as below,

- Representative(s) of Embassy of Japan

(3) National Directorate of Roads, Bridges and Floods Control, MPW (hereinafter referred to as "MPW-DRBFC") and MOF shall be Co-chair of the Committee

(4) In principle, a regular meeting of the Committee shall be held in Timor-Leste

semiannually. Other meetings may be held upon the request of either JICA or the Recipient whenever JICA deems it necessary to call such meetings.

(5) The terms of reference of the Committee shall be as follows:

(a) to confirm an implementation schedule for the Programme for the smooth and effective disbursement of the Japanese Grant (hereinafter referred to as "the Grant");

(b) to discuss modifications of the Programme, including modifications of the allocation of the Grant for the Subprojects;

(c) to identify problems that may delay the implementation of the Programme or the disbursement of the Grant and explore solutions to such issues;

(d) to exchange views on publicity related to the Programme; and

(e) to discuss any other matters arising from or in connection with the G/A.

4-2. MPW will be the representative ministry of executing agencies responsible for Subprojects as follows. MPW, as the representative ministry, will take responsibility for issuing the necessary contractual documents for the Programme, such as contracts, approval letters for design documents, certificates of contracts, etc., in cooperation with other executing agencies. The executing agencies shall coordinate with all the relevant authorities to ensure smooth implementation of each Subproject and ensure that the undertakings for the Programme shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

- MPW-DRBFC:
  - Subproject No. 1 "Rehabilitation of Comoro River Retaining Wall"
- Bee Timor-Leste, E.P, MPW (hereinafter referred to as "MPW-BTL"):
  - Subproject No. 2 "Rehabilitation of Bemos Water Supply Facility"
- National Directorate of Irrigation and Water Use Management, MAF (hereinafter referred to as "MAF-DIWM")
  - Subproject No. 3 "Rehabilitation of Buluto and Maliana Irrigation Schemes"

4-3. MOF shall be responsible for

(a) Signing the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open a bank account for the Programme.

(b) Issuing the Authorization to Pay (A/P) to the Agent Bank for the payment of the Programme.

(c) Ensuring that customs duties, internal taxes, and other fiscal levies which may

be imposed in the Recipient's country concerning the purchase of the products and the services are borne by the Government of Timor-Leste through counterpart fund secured and managed by the MOF.

(d) Receiving import goods and material for the services as consignee

4-4. MPW-DRBFC will be the representative of executive agencies for technical matters of Subprojects.

4-5. Ministry of Foreign Affairs and Cooperation shall be responsible for supervising the Executing Agencies on behalf of the Government of Timor-Leste.

5. Contents of the Draft Report

After explaining the contents of the Draft Report by the Team, MPW-DRBFC, MPW-BTL, and MAF-DIWM (hereinafter referred to as "Timor-Leste side") agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Timor-Leste side around November 2022.

5-1 Limitation of overall Grant Amount and Cost Estimate

Both sides confirmed that the grant amount of the Programme is one billion Japanese Yen as signed Exchange of Notes between the governments of Japan and Timor-Leste on August 16, 2022. The team explained the possible component of the Programme with the latest provisional cost estimation under the current exchange rate of Japanese Yen and suggested that there might be some possibility to rearrange some components if the economic situation changes drastically.

5-2 Components of the Programme

Summarizing the result of the discussions, both sides confirmed that the components are as follows:

Component (Implementing agencies)	Description of the works
1. Rehabilitation plan for Comoro River Retaining wall【MPW-DRBFC】	a) Rehabilitation of Retaining wall R6 (120m) b) Rehabilitation of the bypass road of National Road No. 2 (at retaining wall R6)
2. Rehabilitation plan for Bemos Water Supply System【MPW-BTL】	a) Rehabilitation of Intake facilities (Water Intake gate, pond, waterway, etc.) withmore resilient structural reinforcement against floods

3. Rehabilitation plan for Buluto/Maliana Irrigation Facilities 【MAF-DIWM】	[Buluto Irrigation Facility] a) Rehabilitation of the masonry wall downstream of the headworks. b) Construction of the riverbed protection block at the apron downstream for the headworks c) Rehabilitation of the bottom slab concrete in the main canal in the section of the high embankment.
	[Maliana Irrigation Scheme] d) Rehabilitation of the Maliana headworks

6. Procedures and Basic Principles of Japanese Grant

The Timor-Leste side agreed that the procedures and basic principles of the Grant as described in Annex 3 shall be applied to the Programme.

7. Schedule of the Survey

The Team explained to the Timor-Leste side that the expected timeline for the project implementation is as attached in Annex 4.

8. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Timor-Leste side will be responsible for achieving the agreed key indicators targeted in 2027 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

Table Indicators of Quantitative Effect

Indicator	Baseline (2022)	Target Value (2027) [3 years after completion]
Comoro River Retaining Wall Necessary works for rehabilitation and strengthening resilience	- Riverbank protection work (3 sites, L*=372 m)*1 - 1 lane of National Road No.2 Bypass (3 sites, L=372 m)*1	- 0 site - 0 site
Bemos Water Supply System Necessary works for rehabilitation and strengthening resilience	Headworks*2 - Intake facility: 1 set - Gate facility: 2 sets - Intake weir: 1 set - Grit chamber: 1 set - Connecting canal: 35 m - Retaining wall: 1 set	 - 0 set - 0 set - 0 set - 0 set - 0 m - 0 set
Buluto/Maliana Irrigation Facilities Necessary work for rehabilitation	(Buluto) - Retaining wall (L=32 m) - Riverbed protection work	 - 0 m - 0 m

and strengthening resilience	(B**=157m) - Main canal at the high embankment section (total crack length = 108 m)	- 0 m
	(Maliana) - Fixed weir: 1 set - Channel and apron at downstream of scouring sluice: 1 set - Administrative corridor: (area of hole = 22.24 m2)	- 0 set - 0 set - 0 m2

*L=Length

**B=Breadth

*1: The target section, located on the right bank of the Comoro River, has increased traffic. Two damaged sites will be rehabilitated by DRBFC-MPW.

*2: Bemos Water Supply System was damaged headworks, water conduit, located along the Comoro River. A part of the water conduit is under reconstruction by Australia's support, and BTL will rehabilitate the rest.

[Qualitative indicators]

1) Comoro River Retaining Wall
   - Improvement of safety under a flood of the same scale as before the April 2021 flood
   - Application of the riverbank protection method in this project to the other projects
   - Ensuring safety and fluidity for traffic on the road along the damaged riverbank

2) Bemos Water Supply System
   - Securing the water intake function under a flood of the same scale as before the April 2021 flood
   - Strengthening the resilience of the Bemos water system by rehabilitation the vulnerability of current damaged intake facilities against flood risk
   - Improvement of water supply and sanitation in Dili through enabling stable water supply

3) Buluto/Maliana Irrigation Facilities
   - Strengthening the resilience livelihood of farmers through stabilizing irrigation water and increasing rice production by rehabilitation of damaged intake weirs and ancillary facilities
   - Reduction of the cost for maintenance and repair work by water users for the main canal in the high embankment section

9. Ex-Post Evaluation

JICA will conduct an ex-post evaluation after three (3) years from the project completion, in principle, concerning five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, and Sustainability). The result of the evaluation will be publicized. The Timor-Leste side is required to provide the necessary support for the data collection.

10. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 5. With regard to exemption of customs duties, internal taxes, and other fiscal levies as stipulated in 1. (2) No.5 of Annex 5, both sides confirmed that such customs duties, internal taxes, and other fiscal levies, which shall be clarified in the bid documents by Timor-Leste side during the implementation stage of the Project.

The Project will be monitored by the Timor-Leste side and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

The Timor-Leste side assured to take the necessary measures and coordination, including allocation of the necessary budget, which are preconditions of implementation of the Project.

11. Environmental and Social Considerations

11-1 General Issues

11-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as "B" because the project is not considered to be a large scale river/erosion control project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA Guidelines for Environmental and Social Considerations (April 2010), it is not likely to have a significant adverse impact on the environment.

11-1-2 Environmental Checklist

The environmental and social considerations, including major impacts and mitigation measures for the Project, are summarized in the Environmental Checklist attached as Annex 7. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Timor-Leste side shall submit the modified version to JICA

in a timely manner.

11-2 Environmental Issues

11-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed that the EIA report is not required for the Program's components in the Timor-Leste legal system.

11-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Programme are as Annex 8. Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

11-3 Environmental and Social Monitoring

11-3-1 Environmental Monitoring

Both sides agreed that the Timor-Leste side would submit the environmental monitoring results to JICA using the attached monitoring form Annex 9. The timing of submission of the monitoring form is described in Annex 5.

11-3-2 Information Disclosure of Monitoring Results

Both sides confirmed that the Timor-Leste side would disclose environmental and social monitoring results to local stakeholders in their field offices and by the distribute of a copy of the monitoring report.

The Timor-Leste side agreed that JICA would disclose the results of environmental and social monitoring submitted by the Timor-Leste side, as the monitoring forms are attached as Annex 9 on its website.

12. Other Relevant Issues

12-1 Gender Mainstreaming

Both sides confirmed that the following gender elements shall be duly reflected in the scope of the Preparatory Survey.

(a) Collection of information and gender-disaggregated data to assess gender needs.

(b)Examination of gender-responsive measures based on the assessment.

12-2 Entire system improvement

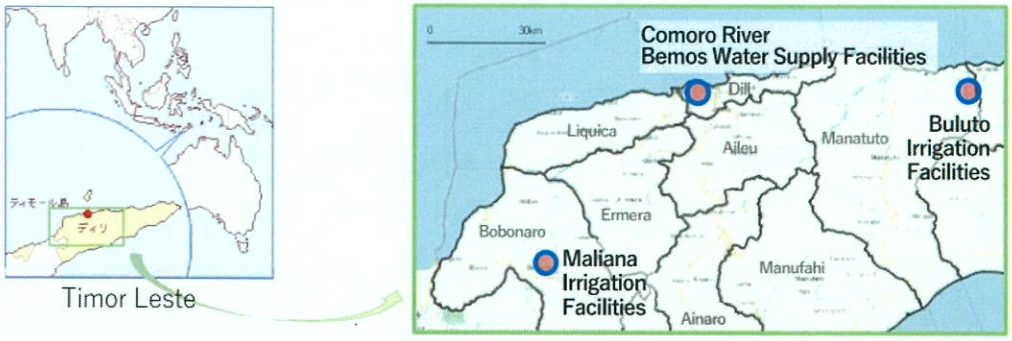
JICA team confirmed that the Timor-Leste side is preparing for the rehabilitation works of related to each Subproject to improve the resilience of facilities damaged by the floods.

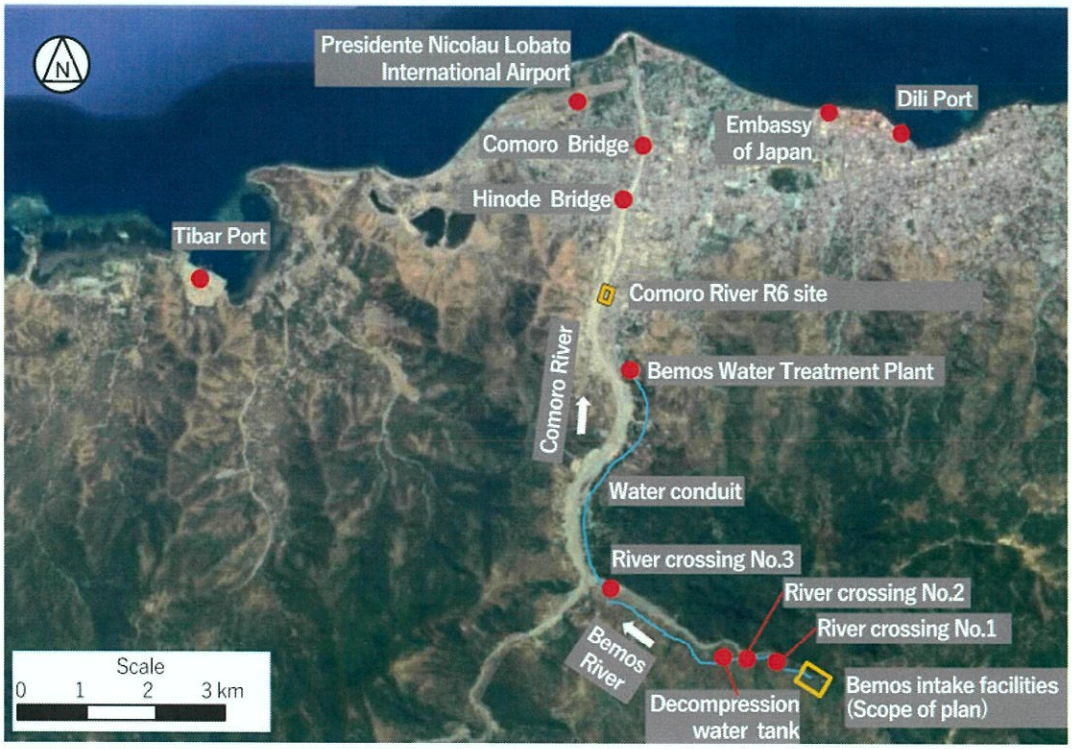
- Comoro River Retaining Walls: MPW-DRBFC is going to rehabilitate the damaged sites of R5 and R7 with their own budget to complete within 2023.

- Bemos Water Supply System (water conduit damaged by the flood):
  Engineers Without Borders (EWB) is working on the reconstruction of part of the water conduit with using Australian funds and it will complete within 2022. BTL is already contracted for the works of the rest part. As the part of the conduit are laid on the ground for urgent rehabilitation, BTL plans to install the pipes underground.
- Buluto/Maliana Irrigation Facilities:
  MAF-DIWM will secure the necessary budget for the maintenance and repair of the irrigation facilities.

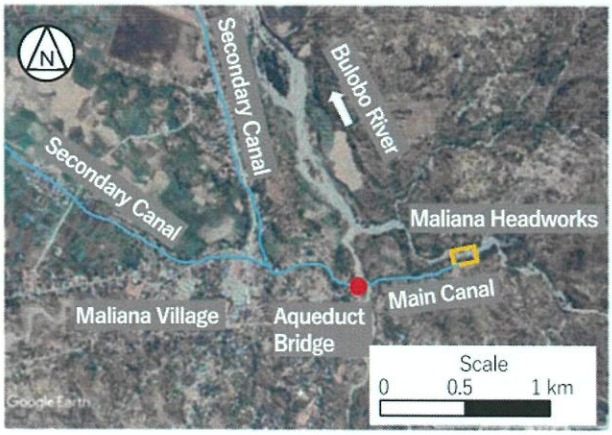
[END]

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 4 Project Implementation Schedule
Annex 5 Major Undertakings to be taken by the Government of Timor-Leste
Annex 6 Project Monitoring Report
Annex 7 Environmental Check List
Annex 8 Environmental Management Plan/Environmental Monitoring Plan
Annex 9 Environmental and Social Monitoring Form

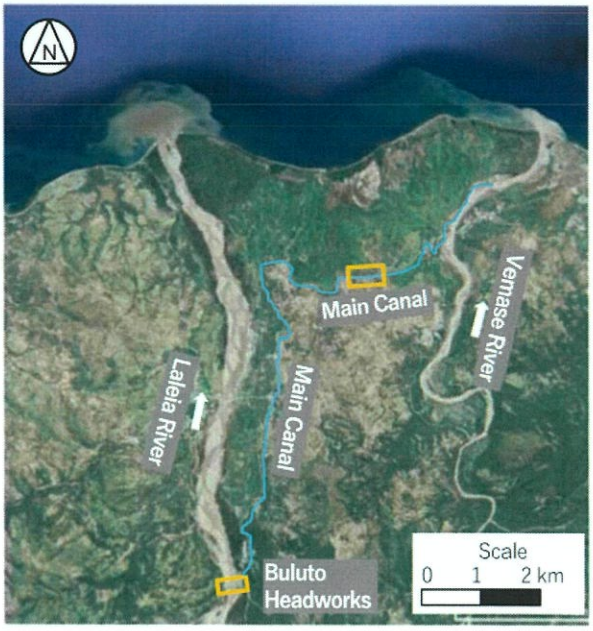




Comoro River Revetment, Bemos Water Supply Facilities



Maliana Irrigation Facilities



Buluto Irrigation Facilities

Project Component

Source: Based on Google Earth by JICA Survey Team

Organization Chart

(1) Ministry of Public Works / Directorate of Road, Bridge and Flood Control (MPW-DRBFC)

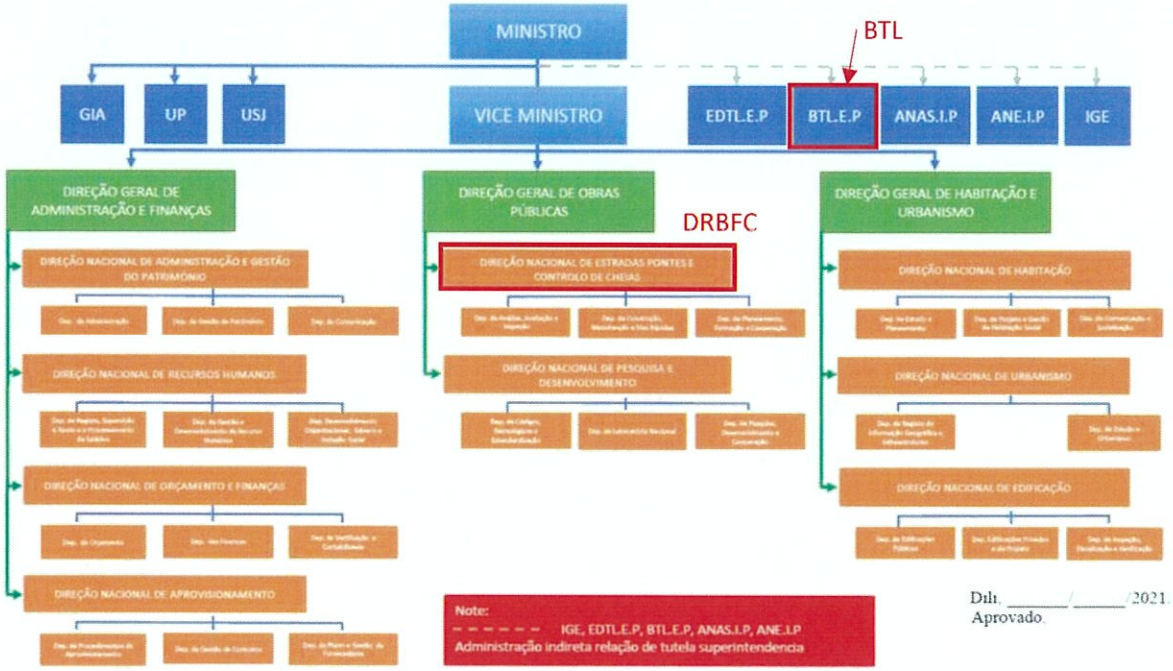


Figure 1 Organization Chart of MPW

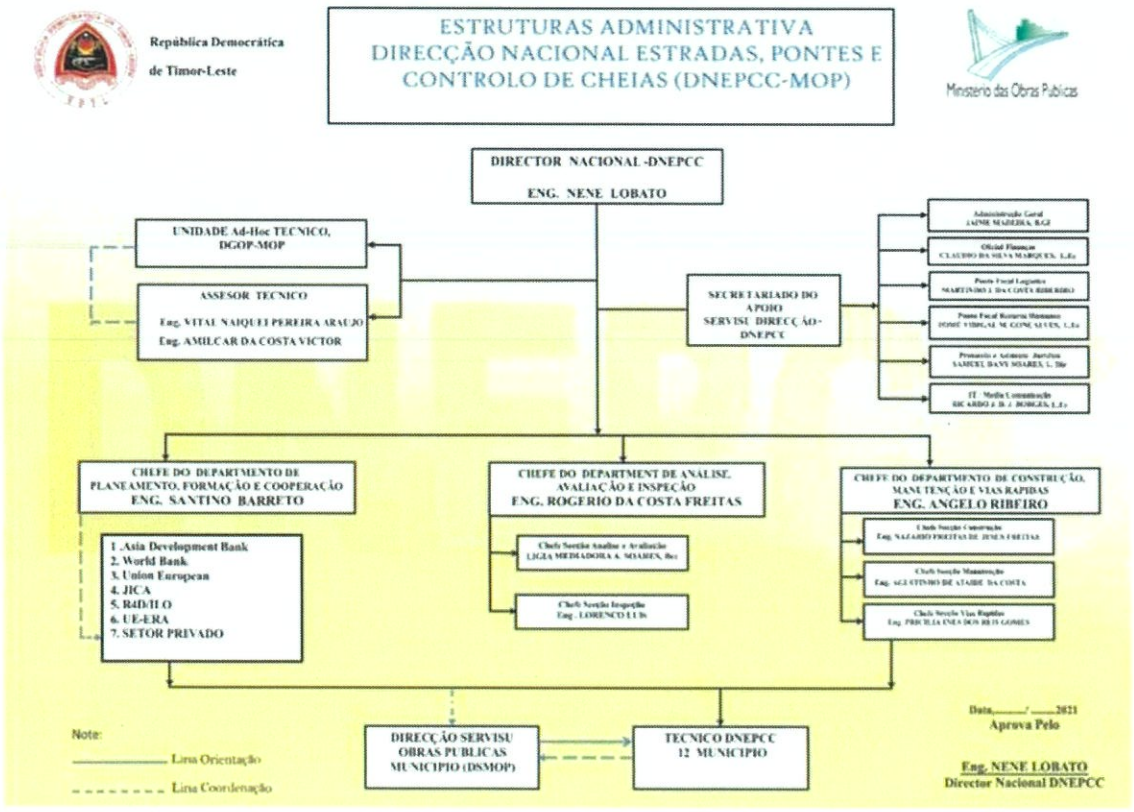


Figure 2 Organization Chart of MPW-DRBFC

(2) Ministry of Public Works / Bee Timor-Leste (MPW-BTL)

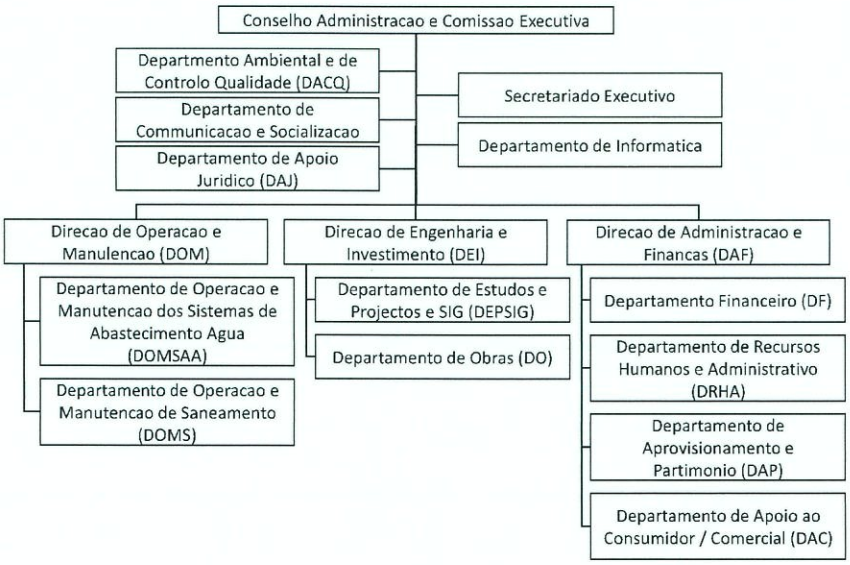


Figure 3 Organization Chart of MPW-BTL

(3) Ministry of Agriculture and Fishery / Department of Irrigation and Water Management (MAF-DIWM)

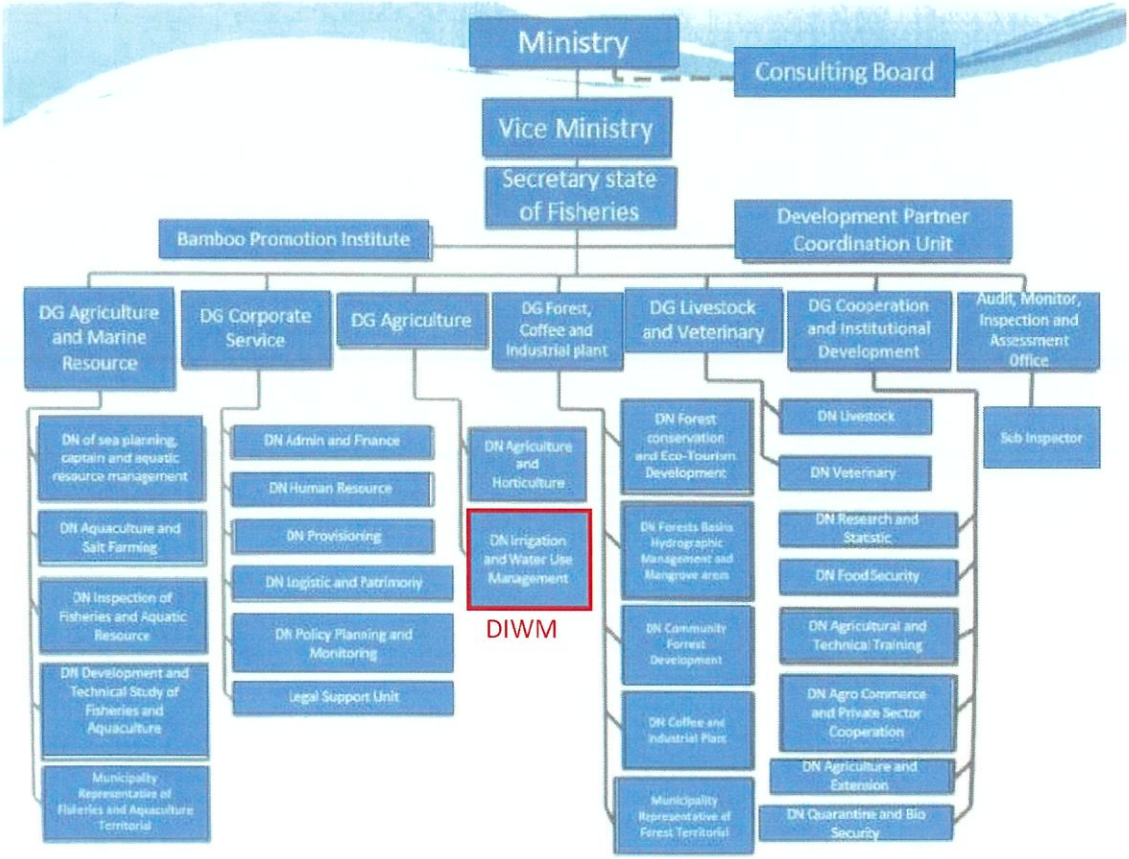


Figure 4 Organization Chart of MAF-DIWM[1]

[1] MAF website: https://www.maf.gov.tl/tl/perfil/organograma

(4) Committee

The Committee for the Programme	
Member	Ministry of Finance (Co-Chair)
	MPW-DRBFC (Co-Chair)
	MPW-BTL
	MAF-DIWM
	Ministry of Foreign Affairs and Corporation
	JICA
Observer	Embassy of Japan

Figure 5 The Coordinating Committee

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or 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. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the 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 necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant 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 an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) 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 feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

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 singed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) 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 to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

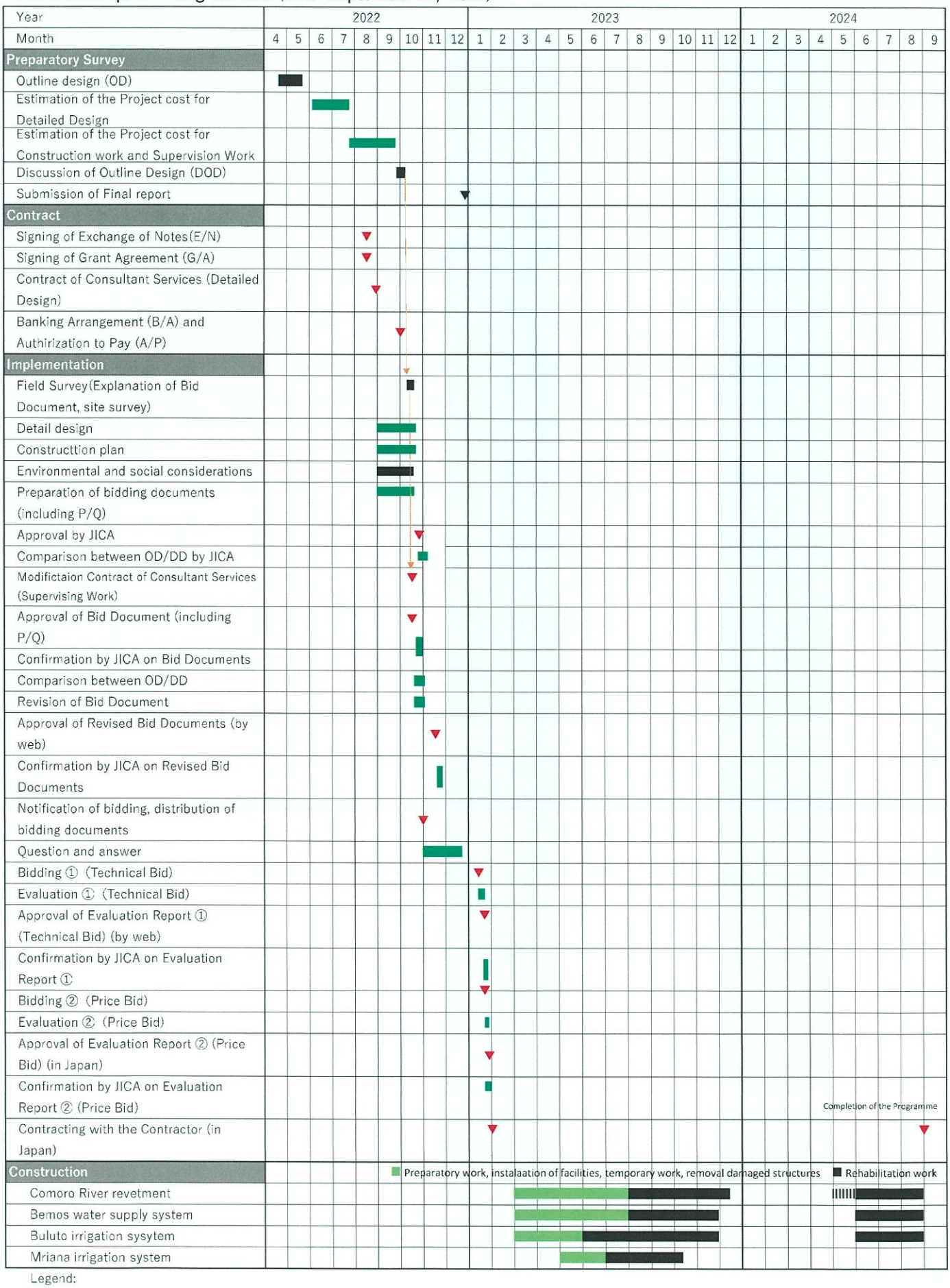
4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Tomor-Leste

Tentative Implementing Schdule (as of September 22, 2022)

Annex 4



Legend:

■: Work in TL

■: Work in Japan

Annex 5

Major Undertakings to be taken by the Government of Timor-Leste

1. Specific obligations of the Government of Timor-Leste which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	Ministry of Finance	
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	Ministry of Finance	
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A			
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	Ministry of Finance	about 6,000 JPY for each A/P
	2) Payment commission for A/P	every payment	Ministry of Finance	about 0.1% of the payment amount
4	To prepare IEE and secure the necessary budget for implementation for EMP and EMoP.	within 1 month after the signing of the G/A	3 Executing Agencies	
5	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with TL regulations.	before notice of the bidding documents	3 Executing Agencies	
6	To establish a consultative committee for the Programme	within 1 month after the signing of the G/A	Ministry of Finance, 3 Executing Agencies and Ministry of Foreign Affairs and Cooperation	
7	To secure and clear the following lands 1) temporary construction yard and stock yard near the Programme area, 2) disposal site near the Programme area.	before notice of the bidding documents	3 Executing Agencies	
8	To obtain the planning, zoning, building permit	before notice of the bidding documents	3 Executing Agencies	
9	To clear, level and reclaim the following sites The riverbeds of the Comoro, Bemos, Laleia rivers will be used as temporary roads, so request permission to use them.	before notice of the bidding documents	3 Executing Agencies	
10	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MPW-DRBFC (in association with other 2 Executing Agencies)	

(B/A: Banking Arrangement, A/P: Authorization to pay, MPW-DRBFC: Directorate of Road, Bridge and Flood Control, Ministry of Public Works, 3 Executing Agencies: MPW-DRBFC, Bee Timor-Leste under MPW and Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries, IEE: Initial Environmental Examination, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

(2) During the Programme Implementation

NO	Items	Deadline	In charge	Estimated Cost
1	To issue A/P to the Agent Bank for the payment to the consultant and the contractor	within 1 month after the signing of the contract(s)	Ministry of Finance	
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A			
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	Ministry of Finance	about 6,000 JPY for each A/P
	2) Payment commission for A/P	every payment	Ministry of Finance	about 0.1% of the payment amount
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Programme	Ministry of Finance	
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Programme	Ministry of Public Works	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services are exempt;	during the Programme	Ministry of Finance	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Programme	during the Programme	3 Executing Agencies	
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	3 Executing Agencies	
8	To submit Project Monitoring Report	every month	MPW-DRBFC (in association with other 2 Executing Agencies)	
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MPW-DRBFC (in association with other 2 Executing Agencies)	
10	To submit a report concerning completion of the Programme	within 6 months after completion of the Programme	MPW-DRBFC (in association with other 2 Executing Agencies)	
11	To construct access roads outside the site (except access road for Bemos Water Intake Facility)	before start of the construction	3 Executing Agencies	

12	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Programme outside the site(s)		3 Executing Agencies	
	1) Electricity The distributing line to the site	before start of the construction	3 Executing Agencies	
	2) Water Supply The city water distribution main to the site	before start of the construction	3 Executing Agencies	
	3) Drainage The city drainage main (for storm, sewer and others) to the site	6 months before completion of the construction	3 Executing Agencies	
13	To provide equipment, furniture, facilities necessary for the implementation of the Programme in the site(s)	before start of the construction	3 Executing Agencies	
14	To ensure the safety of persons engaged in the implementation of the Programme	during the Programme	3 Executing Agencies	
15	To implement EMP and EMoP	during the construction	MPW-DRBFC (in association with other 2 Executing Agencies)	
16	To submit results of environmental and social monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MPW-DRBFC (in association with other 2 Executing Agencies)	

(B/A: Banking Arrangement, A/P: Authorization to pay, MPW-DRBFC: Directorate of Road, Bridge and Flood Control, Ministry of Public Works, 3 Executing Agencies: MPW-DRBFC, Bee Timor-Leste under MPW and Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

(3) After the Programme

NO	Items	Deadline	In charge	Estimated Cost
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MPW-DRBFC (in association with other 2 Executing Agencies)	
2	To submit results of environmental and social monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between the Government of Timor-Leste and JICA.	for 3 years after the Programme	MPW-DRBFC (in association with other 2 Executing Agencies)	
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	3 Executing Agencies	

(3 Executing Agencies: MPW-DRBFC, Bee Timor-Leste under MPW and Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan)

2. Other obligations of the Government of Timor-Leste funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To rehabilitate following infrastructure - Comoro River Retailing Wall - Bemos Water Intake Facility - Buluto Irrigation Headworks - Mariana Irrigation Headworks		
2	To conduct the following transportation a) Marine(Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the Programme site		
3	To implement detailed design, bidding support and construction supervision (Consulting Service)		
	Total		1,000

Project Monitoring Report
on
The Programme for Urgent Rehabilitation of Flood-damaged Infrastructures
Grant Agreement No. 2160380

2022, August

Organizational Information

Signer of the G/A (Recipient)	**Ministry of Finance** Person in Charge: Minister of Finance Contacts: Address: Rua de Baleia, Aitarak Laran, Dili, Timor-Leste Phone/FAX: Email:
Executing Agency (1)	**Ministry of Public Works** Person in Charge: Minister of Public Works Contacts: Address: Rua 5 de Maio, Caicoli, Dili, Timor-Leste Phone/FAX: Email:
Executing Agency (2)	**Bee Timor-Leste, E.P.** Person in Charge: President of Executive Commission of BTL, E.P. Contacts: Address: Av. 20 de Maio, Caicoli, Dili, Timor-Leste Phone/FAX: Email:
Executing Agency (3)	**Ministry of Agriculture and Fishes** Person in Charge: Minister of Agriculture and Fisheries Contacts: Address: Av. Presidente Nicolau Lobato, Dili, Timor-Leste Phone/FAX: Email:

General Information:

Project Title	The Programme for Urgent Rehabilitation of Flood-damaged Infrastructures

E/N	Signed date: August 16, 2022 Duration: from August 16, 2022 to June 30, 2027
G/A	Signed date: August 16, 2022 Duration: from August 16, 2022 to June 30, 2026
Source of Finance	Government of Japan: Not exceeding JPY 1,000 mil.

1: Project Description

1-1 Project Objective

The objective of the Programme is to restore public services of the capital city and agricultural production infrastructure by/through rehabilitation of basic infrastructure and agricultural facilities damaged by flood, thereby contributing to revitalization of livelihood and economy in the target areas.

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.Rehabilitation for Comoro River Retaining Wall	refer to Attachment 1	
2.Rehabilitation for Bemos Water Supply System	refer to Attachment 1	
3.Rehabilitation for Buluto / Maliana Irrigation Facilities	refer to Attachment 1	

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*

1.Rehabilitation for Comoro River Retaining Wall		
2.Rehabilitation for Bemos Water Supply System		
3.Rehabilitation for Buluto ／ Maliana Irrigation Facilities (1) Buluto Irrigation Facilities (2) Maliana I Irrigation Facilities		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Total		

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)*
name:
role:
financial situation:
institutional and organizational arrangement (organogram):
human resources (number and ability of staff):

Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*
Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:

	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)
12. Report on the Management of Safety for Construction Works

Environment Checklists

The contents of environmental and social consideration in the Project and the results of progress confirmation are summarized as shown in the JICA environmental checklist for water supply projects in the table below.

JICA Environmental Checklist for The Programme for Urgent Rehabilitation of Flood Damaged Infrastructure

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the recipient country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the recipient country's government?	(a) N/A (b) N/A (c) N/A (d) N/A	(a) N/A. At construction stage, all sub-components were not categorized to category A. This programme will repair parts of existing components. After sites survey, it was confirmed that there is no resettlement and re-acquisition assets particularly. With this reason, it was consideration that all sub-components of this programme will not be required EIA. (b) same as above (c) same as above (d) same as above
	(2) Explanation to local stakeholders	(a) Have contents of the Project and the potential impacts been adequately explained to the local stakeholders based on appropriate procedures, including information disclosure? Has understanding been obtained from the local stakeholders? (b) Have the comment from the stakeholders (such as	(a) N (b) N	(a) Although several times stakeholder meetings were held in capital with relevant governments members from April to June in 2022, due to COVID situation, those meeting could not be involved local authorities. Explanation of project potential impacts were informed by proponents of each component that participated

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		local residents) been reflected to the Project design?		stakeholder meetings. Moreover, during environmental survey, surveyors explained project outline and expected impacts to proponents of local government. At the same time, surveyors had interviews of local people in each site, to grasp their impressions and intention on this programme. Therefore, it is necessary to provide adequate explanations to local authorities. The next phase, discussions with local authorities will be held in October 2022 in each site. (b) To date, local communities made comments and request for employment of local people for daily worker, but none were critical of programme.
	(3) Examination of Alternatives	(a) Have multiple alternative plans of the Project been examined with social and environmental considerations?	(a) Y	(a) When preparing the scoping report, a comparison was made with the proposal not to implement the Project.
2 Pollution control	(1) Air Quality	(a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Are any mitigating measures taken? (b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards?	(a) N/A (b) N/A	(a) N/A (b) N/A In Timor-Leste, there are no permissible chlorine concentrations in accordance with occupational health and safety standards.
	(2) Water quality	(a) Do pollutants, such as SS, BOD, COD contained in	(a) N/A	(a) In the Programme, all repairing works will be done in dry

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		effluents discharged by the facility operations comply with the country's effluent standards?		season, and it is not expected that the work will cause to be water pollutions. In addition, freshly mixed concrete will be purchased from local supplier that have proper knowledge and facilities of controlling waste water, and local supplier will be done waste water management adequately.
	(3) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations?	(a) N/A	(a) No sludge or other wastes will be generated from the facility activities as no water purification treatment such as sedimentation or filtration will be used.
	(4) Noise and vibration	(a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards?	(a) N/A	(a) N/A There is no plan to install pump building. Timor-Leste does not have national standard for noise and vibration. This programme will be referred International Finance Corporation (IFC) General Environment, Health and Safety Guideline, World Bank Group, April 2002. Sites are away from residential areas, and there are no school or hospital near the sites. Therefore, no vibration or noise impact is expected.
	(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N/A	(a) N/A There no plan to extract large volume of ground water.
3 Natural environ	(1) Protected areas	(a) Is the Project site or discharge area located in protected areas designated by the country's laws or	(a)N/A	(a) N/A Project sites and discharge area are not located in

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		international treaties and conventions? Is there a possibility that the Project will affect the protected areas?		protected areas.
	(2) Ecosystem	(a) Does the Project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the Project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms	(a) N/A (b) N/A (c) N/A (d) N/A	(a) N/A There is no applicable matter. (b) same as above (c) same as above (d) same as above
	(3) Hydrology	(a) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the Project will adversely affect surface water and groundwater flows?	(a) N	(a) This programme will repair parts of existing components. There is no plan to be caused adversely affect surface water and groundwater flows.
	(1) Land acquisition and	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused,	(a) N/A (b) N/A	(a) N/A No physical resettlement will occur in this programme.

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	resettlement	are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, and the elderly people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement?	(c) N/A (d) N/A (e) N/A (f) N/A (g) N/A (h) N/A (i) N/A (j) N/A	(b) same as above (c) same as above (d) same as above (e) same as above (f) same as above (g) same as above (h) same as above (i) same as above (j) same as above

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(j) Is the grievance redress mechanism established?		
4.Social environment	(2) Living and Livelihood	(a) Is there a possibility that the Project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the Project will adversely affect the existing water uses and water area uses?	(a)Y (b)Y	(a) Some farmers will face a restriction of water use during repairing works of waterway. For this measure, local residents will be hired for non-skilled construction jobs, and priority will be given. (b) same as above
	(3) Heritage	(a) Is there a possibility that the Project will damage the local archaeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)N	(a) No cultural heritage has been identified in the target areas of this programme.
	(4) Landscape	(a) Is there a possibility that the Project will adversely affect the local landscape? Are necessary measures taken?	(a)N	(a) This programme will repair parts of existing components. There is no plan to be caused adversely affect local landscape.
	(5) Ethnic minorities, indigenous peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a)N/A (b)N/A	(a) Ethnic minorities and indigenous peoples have not been identified in the target areas of this programme. (b) Same as above
	(6) Working	(a) Is the Project proponent not violating any laws and	(a)Y	(a) Training on safety shall be provided to all workers.

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	conditions	ordinances associated with the working conditions of the country which the Project proponent should observe in the Project? (b) Are tangible safety considerations in place for individuals involved in the Project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the Project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the Project not to violate safety of other individuals involved, or local residents?	(b)Y (c)Y (d)Y	(b) The necessary personal protective equipment shall be provided to all workers with to prevent accidents during construction work. (c) A safety and health plan will be created and regular safety trainings will be conducted. (d) To prevent accidents and problems for local communities around sites, security guards with safety and health training will be assigned.
5.Other	(1)Impact during construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social	(a)Y (b)Y (c)Y (d)Y	(a) Within the IEE report, a project impact assessment was made based on the survey and mitigation measures were planned accordingly (details are provided in the report). (b) Same as above (c) Same as above (d) There is a possibility of increased traffic congestion and traffic accidents, but the duration and scope of the impact

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		environment, are adequate measures considered to reduce impacts? (d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?		will be small. Around sites, traffic control personnel will be assigned in order to control speed of vehicles.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a)Y (b)Y (c)Y (d)Y	(a) Environmental monitoring plans have been prepared for the items covered by the mitigation measures and these monitoring will be carried out by the construction contractor. (b) Monitoring methods and frequency are described in the IEE report. (c) Respective proponents and the contractor are the implementing agency for other environmental and social items. As the responsible agencies, NDRBFC will conduct the monitoring and review the result reports. (d) Submission of monthly environmental monitoring result reports to NDBRFC and consultants is planned.
6. Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked.	(a)N/A	(a) N/A Since this programme will not include dams and river development.
	Note on Using Environmental	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the Project includes	(a)N/A	(a) N/A Since this programme is not expected to have

Category	Environmental Item	Main Check Items	Yes: Y No: N Not Applicable: N/A	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	Checklist	factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).		transboundary issues or global impacts.

Environmental Management and Monitoring Plan

The following Environmental Management Plan and Environmental Monitoring Plan will be implemented in order to monitor mitigation measures before/during construction and during operation.

Environmental Management Plan (EMP)

Category	No.	Impact Item	Mitigation Measures		Implementing Organization	Responsible Organization	Cost
			Under Construction	During Operation			
Pollution Control	1	Air Pollution (Dust)	– Water should be sprayed as necessary at earthwork site, construction machinery operating areas, and temporary roads for vehicles transporting materials.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	2	Water Pollution (Turbidity)	– All repairing work in the sections that require river crossings will be carried out during the dry season when the river flow rate is low.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	3	Waste (construction waste)	– Reuse and recycle waste concrete as much as possible. – Reuse construction waste as roadbed material as much as possible. – Temporary storage areas must be agreed upon in consultation with the community. – Verify that waste disposal contractors handle construction materials and waste in accordance with proper procedures.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	4	Noise	– Minimize work involving vibration near the	-	Japanese	NDRBFC, BTL,	Included in

		and Vibration	boundary with structures and buildings. – Set normal working hours from 7:00 a.m. to 6:00 p.m.		constructor	NDIWM	construction cost
	5	Sediment in Lakes and River Beds	– Dispose construction debris or scrap properly	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	6	Water Use (drinking water, domestic water)	– Detailed construction plans will be developed and coordinated to minimize service disruptions and minimize the impact on public services. – Appropriate information of water outage will be announced at the initiative of the Sede Suku (Village Office) to residents.	-	Japanese constructor/Local authorities/MAF Municipality office	NDRBFC, BTL, NDIWM	Included in construction cost
Social environment	7	Local livelihoods	– Appropriate information of water outage will be announced at the initiative of the Sede Suku (Village Office) to residents. – Priority will be given to local villagers in each site for employment in light work and daily labour. –	-	Japanese constructor /Local authorities/MAF Municipality office	NDRBFC, BTL, NDIWM	Included in construction cost
	8	Working Environment (including	– Detailed construction plans with feasible working volumes will be developed in order to prevent overworks. – Provide training on environmental safety and	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost

		occupational safety)	health to all workers to raise awareness. – Provide all workers with the Personal Protective Equipment they need.				
Other	9	Accident	– For pavement work on the by-pass road of A02, plan and implement one side at a time and secure road traffic on other side. – Around site, traffic control personnel will be assigned in order to control speed of vehicles. – Provide safety training to all workers to raise awareness. – Conduct safety patrols within construction area.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost

Environmental Monitoring Plan (EMoP)

1. Pollution Control

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
Air Pollution (Dust)	Dust control	During construction, once a month or when complaints occurred	Each construction site	Visual inspection and complaints records	Japanese contractor	Included in construction cost
Water Pollution (Turbidity)	Water quality (turbidity/odor)	Ordinary monitoring: During construction, once a month or when complaints occurred Water quality examination: Twice during construction (midterm and after construction)	Ordinary monitoring: Around each construction site Water quality examination: 2 sample points around each construction site	Visual inspection for turbidity, abnormalities, etc. and complaints records	Japanese contractor	Included in construction cost
Waste (Construction waste)	– Confirmation of debris and construction material – Disposal methods and loading capacity	During construction, when collecting and transporting waste	Each construction site	– Visual inspection – Amount of waste (measured as an approximate amount based on the amount loaded on the back of a truck during	Japanese contractor	Included in construction cost

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Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
				transportation)		
Noise and Vibration	Noise and vibration level during the daytime	Ordinary monitoring: During construction, when complaints occurred Noise and vibration examination: Twice during construction (midterm and after construction)	Ordinary monitoring: Around each construction site Water quality examination: 3 sample point around each construction site and residences susceptible to noise	Noise and vibration level dB	Japanese contractor	Included in construction cost
Sediment in River Beds	Disposal method of construction residual soil and sediment	During construction, once a month	Each construction site	Visual inspection	Japanese contractor	Included in construction cost

2. Social Environment

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
Water Use	Notification of water outage plan to residents	When water disruptions are planned	Each construction site	Notification letter of water disruption to local	Japanese contractor	Included in construction cost

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
				authority ,Complaints records		
Local livelihoods	Notification of recruitment for day labour and light works plan to residents	When recruitment for day labour and light works is planned	Each construction site	Notification letter to local authorities	Japanese contractor /Sede suko (village office)	Included in construction cost
Working Conditions (including occupational safety)	Implementation of safety and health education	During construction, once a month	Each construction site	Provision of Personal Protective Equipment and confirmation of training implementation	Japanese contractor	Included in construction cost
Traffic congestions	Displacing traffic control personnel limitation of speed of vehicles at project sites	If necessary	Each construction site			
Accident	Accident occurrence/response records	When accident occurred	Each construction site	Review of accident reports	Japanese contractor	Included in construction cost

Fase konstrusaun (relatóriu mensal)

(Construction phase (monthly report))

Data (Date)	
Repórter nia naran (Name of Reporter)	
Organizasaun no posisaun (Organization name and his/her position)	

Favor resposta perguntas kraik, hodi hato'o rezultadu ba monitorizasaun iha fatin projetu.
(Please answer below questions to provide your observation of monitoring result.)

Item (Item)	Resultadu ba monitorizasaun (Result of monitoring)	Avaliasaun husi DNEPCC (Evaluation by NDRBFC)	Observasaun (Observations)
Polusaun anin (Air pollutions)	Ita hare rai-rahun sae makas no barak tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible dust or air pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Polusaun bee (Water pollutions)	Ita hare mota be sai mean hanesan taho tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible turbidity or water pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Lixu obra (waste)	Ita hare problema kona ba gestaun lixu obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	

	Fulan ida ne'e dala hira tula lixu obra hanesan sedimentus? (hakerek numeru) Dala _____ (Is there problem related waste disposal?) (How many times do you collect and haul waste in this month?)		
Barulhu (noise)	Ita rona reklamasaun husi komunidade kona ba barulhu tanba atividade obra? □ sin (yes) □ lae (no) (Have there been complaints about noise and vibration caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Ambiente servisu no segransa (work environment and sefaty)	Iha badain ka operator ne'be hetan moras? □ sin (yes) □ lae (no) Ita sente risku kona ba seguransa? □ sin (yes) □ lae (no) (Is there any worker in poor health?) (Do you perceive any safety-related risk?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Dezastre naturais no asidente (Natural disasters and accidents)	Akentese dezastre naturais iha fatin obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

	Akentese asidente iha fatin obra? □ sin (yes) □ lae (no) (has an accident occurred?) (has a natural disaster occurred?)		
Reklamasaun ou problema (complains and problems)	Ita nota reklamasaun husi komunidade ka problema ruma ne'ebe akontese iha fatin obra? □ sin (yes) □ lae (no) (Have there been complaints or problems caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

Foto 1 (Picture 1)	Foto 2 (Picture 2)
Esplikasaun foto 1 (Explanation of picture 1)	Esplikasaun foto 2 (Explanation of picture 2)

Note:
Contactor, municipality officer of Ministry of Public Works, and local authorities are considered as reporters. Reporter shall fill up this monitoring form every month, in order to report environmental aspects of project site.

National Directorate of Roads and Bridge, Flood Control (NDRBFC) of the Ministry of Public Works shall evaluate contents of this report. If there is necessary to be confirmed reported items, director of NDRBFC shall request to reporter to do survey in detail.
Moreover, in case of serious problem occurred, director of NDRBFC shall attempt to take countermeasure to solve the problem with relevant entities.

Fase konstrusaun (relatóriu mensal)

(Construction phase (monthly report))

Data (Date)	
Repórter nia naran (Name of Reporter)	
Organizasaun no posisaun (Organization name and his/her position)	

Favor resposta perguntas kraik, hodi hato'o rezultadu ba monitorizasaun iha fatin projetu.
(Please answer below questions to provide your observation of monitoring result.)

Item (Item)	Resultadu ba monitorizasaun (Result of monitoring)	Avaliasaun husi BTL (Evaluation by BTL)	Observasaun (Observations)
Polusaun anin (Air pollutions)	Ita hare rai-rahun sae makas no barak tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible dust or air pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Polusaun bee (Water pollutions)	Ita hare mota be sai mean hanesan taho tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible turbidity or water pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Lixu obra (waste)	Ita hare problema kona ba gestaun lixu obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	

	Fulan ida ne'e dala hira tula lixu obra hanesan sedimentus? (hakerek numeru) Dala _____ (Is there problem related waste disposal?) (How many times do you collect and haul waste in this month?)		
Barulhu (noise)	Ita rona reklamasaun husi komunidade kona ba barulhu tanba atividade obra? □ sin (yes) □ lae (no) (Have there been complaints about noise and vibration caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Ambiente servisu no segransa (work environment and sefaty)	Iha badain ka operator ne'be hetan moras? □ sin (yes) □ lae (no) Ita sente risku kona ba seguransa? □ sin (yes) □ lae (no) (Is there any worker in poor health?) (Do you perceive any safety-related risk?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Dezastre naturais no asidente (Natural disasters and accidents)	Akentese dezastre naturais iha fatin obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

	Akentese asidente iha fatin obra? □ sin (yes) □ lae (no) (has an accident occurred?) (has a natural disaster occurred?)		
Reklamasaun ou problema (complains and problems)	Ita nota reklamasaun husi komunidade ka problema ruma ne'ebe akontese iha fatin obra? □ sin (yes) □ lae (no) (Have there been complaints or problems caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

Foto 1 (Picture 1)	Foto 2 (Picture 2)
Esplikasaun foto 1 (Explanation of picture 1)	Esplikasaun foto 2 (Explanation of picture 2)

Note:
Contactor, municipality officer of BTL, and local authorities are considered as reporters. Reporter shall fill up this monitoring form every month, in order to report environmental aspects of project site.

Empresa Pública Bee Timor Leste (BTL) of the Ministry of Public Works shall evaluate contents of this report. If there is necessary to be confirmed reported items, director of Maintenance of BTL shall request to reporter to do survey in detail.
Moreover, in case of serious problem occurred, director of Maintenance of BTL shall attempt to take countermeasure to solve the problem with relevant entities.

Fase konstrusaun (relatóriu mensal)

(Construction phase (monthly report))

Data (Date)	
Repórter nia naran (Name of Reporter)	
Organizasaun no posisaun (Organization name and his/her position)	

Favor resposta perguntas kraik, hodi hato'o rezultadu ba monitorizasaun iha fatin projetu.
(Please answer below questions to provide your observation of monitoring result.)

Item (Item)	Resultadu ba monitorizasaun (Result of monitoring)	Avaliasaun husi DNIGA (Evaluation by NDIWM)	Observasaun (Observations)
Polusaun anin (Air pollutions)	Ita hare rai-rahun sae makas no barak tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible dust or air pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Polusaun bee (Water pollutions)	Ita hare mota be sai mean hanesan taho tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible turbidity or water pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Lixu obra (waste)	Ita hare problema kona ba gestaun lixu obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	

	Fulan ida ne'e dala hira tula lixu obra hanesan sedimentus? (hakerek numeru) Dala _____ (Is there problem related waste disposal?) (How many times do you collect and haul waste in this month?)		
Barulhu (noise)	Ita rona reklamasaun husi komunidade kona ba barulhu tanba atividade obra? □ sin (yes) □ lae (no) (Have there been complaints about noise and vibration caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Ambiente servisu no segransa (work environment and sefaty)	Iha badain ka operator ne'be hetan moras? □ sin (yes) □ lae (no) Ita sente risku kona ba seguransa? □ sin (yes) □ lae (no) (Is there any worker in poor health?) (Do you perceive any safety-related risk?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Dezastre naturais no asidente (Natural disasters and accidents)	Akentese dezastre naturais iha fatin obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

	Akentese asidente iha fatin obra? □ sin (yes) □ lae (no) (has an accident occurred?) (has a natural disaster occurred?)		
Reklamasaun ou problema (complains and problems)	Ita nota reklamasaun husi komunidade ka problema ruma ne'ebe akontese iha fatin obra? □ sin (yes) □ lae (no) (Have there been complaints or problems caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)
Karta notifikasaun (Notification letter)	Wainhira iha planu hapara bee, ita hato'o karta notifikasaun ba autoridade local ka lae? □ sin (yes) □ lae (no) (When you have a plan of water disruption, have you issued notification letter to local authority?)		Sekarik haruka karta notifikasaun, favor anexa kopia karta notifikasaun. (If you issued notification letter, please attach copy in this monitoring report.)

Foto 1 (Picture 1)	Foto 2 (Picture 2)

Esplikasaun foto 1 (Explanation of picture 1)	Esplikasaun foto 2 (Explanation of picture 2)

Note:
Contactor, municipality officer of Ministry of Agricultures and Fisheries, and local authorities are considered as reporters. Reporter shall fill up this monitoring form every month, in order to report environmental aspects of project site.

National Directorate of Irrigation and Water Management (NDIWM) of the Ministry of Agricultures and Fisheries shall evaluate contents of this report. If there is necessary to be confirmed reported items, director of NDIWA shall request to reporter to do survey in detail.
Moreover, in case of serious problem occurred, director of NDIWA shall attempt to take countermeasure to solve the problem with relevant entities.

UPDATED:25th, November 2022

Information on Tax Exemption in (name of country)

Followings are JICA internal use ONLY

Person in charge in JICA office (Name, Name of the office, E-mail)

Sheet 1 Tax with respect to corporate income (Corporate Tax)

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc.
Corporate Tax of Japanese contractor and consultant	○	Exempt(Advanced)	E/N, Taxes and Duties Act(Decree Law No:8/2008,Section 26 Income tax,27, SCHEDULE VI)	③ will be applied. ① 0%, ② 10% ③ 10%	Annual taxable income: ①：0-6,000$ (not taxable) ②：in excess of 6,000$ (to be calculated with following method) ②：10% of the gross income of the taxpayer ③ If the employee is a non-resident natural person*, 10% of the gross income *non-resident natural person is who doesn't have TL citizenship or Residencial permission.	1) Section 57, there is provision that: Every person making a payment of Timor-Leste source income to a non-resident person, other than a payment to which Section 52* or 53** applies, shall withhold tax, at the rate of 10%, from the gross amount of the company income. *) Section 52: Taxation on the income of a non-resident carrying on business activities in Timor-Leste through a permanent establishment. **)Section 53: Withholding tax on payment for service income to a person who is carrying on construction or buileing activities, construction consulting services, air or sea transportation services, mining or mining support services. It is mean that Tax obligations will be fulfilled by paying either one. (Corporate tax or Withholding tax) 2) TAXES AND DUTIES ACT 8/2008, there is a special provision of Corporate tax of contractors of Petroleum Agreement. However, this provision will no be applicable for JICA project. 3) Submission of Application: Financial statement in Timor Leste Procedure: Declare the tax return amount at zero	
Corporate Tax of third countries company	○	Exempt(Advanced)	E/N, Taxes and Duties Act(Decree Law No:8/2008,Section 26 Income tax,27, SCHEDULE VI)	① 0%, ② 10% ③ 10%	same as above	Submission of Application: Financial statement in Timor Leste Procedure: Declare the tax return amount at zero	
Corporate Tax of local company	N/A	Impossible to be exempted	Taxes and Duties Act(Decree Law No:8/2008,Section 26 Income tax,27, SCHEDULE VI)	① or ② will be applied. ① 0%, ② 10%	same as above	Profit earned in Timor is taxable and it will not be subject of tax exempt in E/N.	-
Withholding Tax of Japanese company (It will be considered that a kind of Corporate tax for person that received designated types of income*. And services that created by local or third country person as sub-contractor will be subject for this tax) * ①construction or building activities, ②construction consulting services, ③provision of air or sea transportation services, and ④mining services.	○	Exempt(Advanced)	E/N, Taxes and Duties Act(Decree Law No:8/2008,PART VI Withholding tax, Section 53 Payment for Services, and Schedule VIII)	①construction or building activities:2% ②construction consulting services：4% ③provision of air or sea transportation services：2.64% ④mining services：4.5%	Multiplying the gross amount(Total project cost) by respective rate in right hand cell.	Procedure: TLGOV especially Ministry as client of grant aid project should be secured budget of exemption 1 year in advance. And implementation phase, Ministry as client of grant aid project will coordinate with Tax authority in MoF of TL. Exp. Year of 2000 : Client ministry will secure budget with line of ministry; Year of 2001 : During implementation, client ministry will pay exemption fee to Tax authority.	NDRBFC as clients of previous grant aid project has not been paid ①2% of Total project cost of the Comoro Upper River Bridge so far. Ministry of Finance advised to Mo PW to allocate budget in order to pay. Withholding tax of the Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste (Japan's Grant Aid) will be secured by TL Gov. The funds for Tax Exemption will be allocated to the "Todo Governu*" which under Ministry of Directorate General of Treasury (MoF) control for disbursement purpose. * "Todo Governu"mean all government, it is one of item of expenditure of TL.
Withholding Tax of Third courtiers company	○	Exempt(Advanced)	E/N, Taxes and Duties Act(Decree Law No:8/2008, Section 53) Withholding Tax Rates Applicable to Services of Section 53	same as above	same as above	same as above	
Withholding Tax of local company	N/A	Impossible to be exempted	E/N, Taxes and Duties Act(Decree Law No:8/2008, Section 53) Withholding Tax Rates Applicable to Services of Section 53	same as above	same as above	Where to be submitted of Application: Financial statement in Timor Leste	

Special Note: Withholding tax, excise tax, and import tax had not been exempted in past grant aid projects, and those were borne by the recipient. Based on discussions with the Ministry of Finance in October 2022, if obtain consensus of the Ministry of Finance on respective project to be subject, taxes mentioned above could be treated as exemption.
Therefore, regarding tax-exempt item that mentioned as Exempt (Advance), in case of tax is imposed in tax processing, it will be borne by the Recipient.

○	Exempt(Advanced)
-	Exempt(borne by the Recipient) Reimburse
N/A	Impossible to be exempted

Sheet 2 Tax with respect to personal income (Personal Income Tax)

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc.
INCOME TAX for Japanese workers (It will be considered a kind of Income tax, and income for person will be subject for this tax)	○	Exempt(Advanced)	E/N	①-1：0% ①-2:10% ②：10%	Monthly taxable wages for resident natural person: ①-1:0-500$ (not taxable) ①-2:Above 500$ (to be calculated with following method) ①-2：10% of the amount of wages above $500 Exp. 600$ income: 100$*10%=10$ ② If the employee is a non-resident natural person*, 10% of the gross income *non-resident natural person is who doesn't have TL citizenship or Residencial permission.	Submission of Application: Financial statement in Timor Leste Procedure: Declare the tax return amount at zero	
Wage income tax and income tax for Third countries workers (Tax payers will be categorized as Non-resident person or Resident person)	○	Exempt(Advanced)	E/N	same as above	same as above	same as above	
Wage income tax and income tax for Local(Timorese) (Tax payers will be categorized as Resident person)	N/A	Impossible to be exempted	Taxes and Duties Act(Decree Law No:8/2008,Section 20, SCHEDULE V)	same as above	same as above	Profit earned in Timor is taxable and it will not be subject of tax exempt in E/N.	

Special Note: Withholding tax, excise tax, and import tax had not been exempted in past grant aid projects, and those were borne by the recipient. Based on discussions with the Ministry of Finance in October 2022, if obtain consensus of the Ministry of Finance on respective project to be subject, taxes mentioned above could be treated as exemption.
Therefore, regarding tax-exempt item that mentioned as Exempt (Advance), in case of tax is imposed in tax processing, it will be borne by the Recipient.

○	Exempt(Advanced)
-	Exempt(borne by the Recipient) Reimburse
N/A	Impossible to be exempted

(Sheet3) indirect tax etc. (such as VAT, Commercial Tax)

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc.
Items							
Services tax on the gross consideration for the provision of designated services (such services as hotel, restaurant and bar, and telecommunication)	N/A	Impossible to be exempted	Taxes and Duties Act (Decree Law No. 8/2008), Chapter II-SERVICES TAX, Section 5-9	(a) 0% (b) 5%	The rate of services tax applies to the total gross consideration received by a person from the provision of designated services during a month. (a) persons with a monthly turnover of designated services of less than $500 (b) persons with a monthly turnover of designated services of $500 or more	Taxes and Duties Act (Decree Law No. 8/2008) regulated Services Tax that a kind of VAT for designated taxable services. Designated objects for Services Tax are: 1) Hotel services, 2) Restaurant and bar services, and 3) Telecommunications services. Profit earned in Timor is taxable, and respective service provider will be taxpayer. It will not be subject of tax exempt in E/N.	VAT on other than designated objects are not applied. However,TLGOv. is drafting VAT Act to apply VAT for general objects that other than designated services.
Excise tax for fuel (Excise tax is a legislated tax on specific goods or services at purchase such as fuel, tobacco, and alcohol.)	N/A	Impossible to be exempted	Taxes and Duties Act (Decree Law No. 8/2008), Chapter III-EXCISE TAX, Section 10-14	US$0.06-per liter	(a) excisable goods imported into Timor-Leste, is the total of the following amounts: (i) the customs value of the goods; (ii) any import duty imposed on the goods under Chapter V Import Duty; (b) excisable goods manufactured by a registered manufacturer in Timor-Leste, is the fair market value of the goods at the time of removal of the goods from manufacturer' s warehouse.	Profit earned in Timor is taxable, and respective vender of excise goods will be taxpayer. It will not be subject of tax exempt in E/N,with exception that when Japanese contractor or consultant imports excise goods to TL as vender.	Excise taxes are national taxes imposed within a government infrastructure rather than international taxes imposed across country borders. Excise taxes are primarily taxes that must be paid by venders, and usually increasing prices for consumers indirectly.
Excise tax for vehicles (Small passenger vehicles with excise values exceeding US$ 70,000 will be subject of this tax)	○	Exempt(Advanced)	Taxes and Duties Act (Decree Law No. 8/2008), SCHEDULE II-Excise Tax, Classification No. 8703)	35% of the excise value above US$ 70,000		It is expected that this item is not applicable for all project. This item will be applicable when the project purchase small passenger vehicles that value above US$ 70,000.	
Excise tax for other than fuels and vehicles: as Drinkable alcohol,Tobaco products, arms and ammunition, cigarette lighters, smoking pipes, pleasure boats and private air craft.	N/A	Impossible to be exempted	Taxes and Duties Act (Decree Law No. 8/2008), SCHEDULE II-Excise Tax, Classification No. 2203,2204-2206,2207,2208,2401-2403,9301-9307,9613,9614,9706)	Respective rates of each objects will be shown in Taxes and Duties Act (Decree Law No. 8/2008), SCHEDULE II-Excise Tax, table in paragraph 1.		It is expected that those items are not applicable for project. (N/A)	
Rent Tax (It may consider a kind of legislated tax for rental of properties.)	N/A	Impossible to be exempted	Taxes and Duties Act (Decree Law No. 8/2008), Section 55, Rent)	10%	Multiplying the gross payment amount of rental by the rate of left hand cell	Depend on status of Lessee, taxpayer will be designated. ① Other than a natural person (Enterprise etc.); Lessee should be tax payer. ② Natural person and United Nations and who belongs with UN Lessor should be tax payer. When natural person rent property, respective lessor will be taxpayer. Paid tax will not be subject of tax exempt of E/N, with exception that when JICA Timor Leste or EoJ in TL rent properties on behalf of this grant aid project.	

Withholding tax, excise tax, and import tax had not been exempted in past grant aid projects, and those were borne by the recipient. Based on discussions with the Ministry of Finance in October 2022, if obtain consensus of the Ministry of Finance on respective project to be subject, taxes mentioned above could be treated as exemption.
Therefore, regarding tax-exempt item that mentioned as Exempt (Advance), in case of tax is imposed in tax processing, it will be borne by the Recipient.

○	Exempt(Advanced)
–	Exempt(borne by the Recipient)
	Reimburse
N/A	Impossible to be exempted
N/A	Impossible to be exempted

(Sheet4) Duties etc.

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate (%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc
Issuance tax of company registration certificate (Obtainment of TIN)	N/A		-	none	-	Application: SERVE (Services for Registration and Verification of Entrepreneurs) Procedure: Received at company registration Time: 1 month	Not collected so far. However, capital will be required for company registration.
Overseas imports (Application for temporary tax exemption emergency collection permit)	○	Exempt(Advanced)	Taxes and Duties Act(Decree Law No:8/2008, Section 19, and SCHEDULE IV)	Import tax: 2.5%	2.5% of the costoms value of the goods	Procedure: TLGOV especially Ministry as client of grant aid project should be secured budget of exemption 1 year in advance. And implementation phase, Ministry as client of grant aid project will coordinate with Tax authority in MoF of TL. Required time: 7to 30 days	Client of project should be secured budget that is resource of exemptions. Tax exemption amount of previous JICA grant aid project (Mora Bridge revetment work)had not paid by client to Custom of Timor Leste; and the other new grant aid project had started. The new JICA grant aid project could not gotten approval for tax exemption smoothly due to pending of past payment. In result, construction schedule of new project had been delay 1 month. (2018) To avoid delay of works, JICA contractor had paid on Client's behalf. However, the refund has been delayed for a while because the Client had not taken budget measures. The JICA office has issued a request letter on this issue, and the refund has been improved little by little. (2018).
Port charges and shipping charge due to delay(exceed of 3 days) of tax exemption process.	N/A	Impossible to be exempted	E/N	① Port charge: 25$ ② Shipping charge:10$	① per day ② per day	It is considered that a kind of additional tax(penalty), and It will not be subject of tax exempt in E/N.	In past JICA grant aid project, in order to get approval of tax exemptions, it had been taken 1week to 1month. Usually, consignee will be given 3 days gratis of port and shipping charges in order to spend time for custom clearance. However 5times out of 15times (30%) had been taken more than 3days.Those charges had been born by JICA contractor.(2019)
Export tax				N/A	-		

Special Note: Withholding tax, excise tax, and import tax had not been exempted in past grant aid projects, and those were borne by the recipient. Based on discussions with the Ministry of Finance in October 2022, if obtain consensus of the Ministry of Finance on respective project to be subject, taxes mentioned above could be treated as exemption.
Therefore, regarding tax-exempt item that mentioned as Exempt (Advance), in case of tax is imposed in tax processing, it will be borne by the Recipient.

○	Exempt(Advanced)
-	Exempt(borne by the Recipient) Reimburse
N/A	Impossible to be exempted

(Sheet 5) Other taxes and levies

【Points of Attention】
【Reference】

Items	Exemption	How to exempt	Applicable Law	rate(%)	How to calculation	Necessary Information	Previous Results, Lessons and Learned, etc.
Obtainment of Working permission of SEPFOPE	N/A		-	-	-		Past JICA grant aid project contractor spent 4 month for obtainment of Working permission of SEPFOPE due to process of interviews and others. Until issuance of Working permission, JICA contractor were levied all workers fines by SEPFOPE. (250$/ per month * No. of workers* 4month) This matter will be obstacle or risk for JICA contractor to have interest of tender, and this kind of risk would not be minimized by JICA contractors' efforts.
Special Stay Authorization(SSA) for ① Japanese contractor ② Japanese consultants ③ Third countries contractors ④ Third countries consultants	N/A		E/N			E/N(abstract) : To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work.	Status of residence for non-resident people had been issue. There are below obstacles. ① It is difficult to obtain visa of proper status of in advance. Example of Japan: Embassy of TL in Tokyo has not issued Working Visa. Japanese citizens who have non- diplomat passport should be obtained Truism Visa on arrival in TL. ② It is take 3-4 month to obtain Working Visa in TL. It is mean that there is no legal measure for workers to get proper visa. And it is difficult to burden costs of vacation of workers until obtain working visa by JICA contractors. (3-4 month) Moreover, if, applicants will be fined during process of obtainment working visa, it is difficult to pay fine of workers by JICA contractors and worker itself. (fine of worker: 200$/once, fine of employer: 750$/once) JICA-TL will discuss with MoPW to take measures that contractor and consultant will be provided SSA.

Special Note: Withholding tax, excise tax, and import tax had not been exempted in past grant aid projects, and those were borne by the recipient. Based on discussions with the Ministry of Finance in October 2022, if obtain consensus of the Ministry of Finance on respective project to be subject, taxes mentioned above could be treated as exemption.
Therefore, regarding tax-exempt item that mentioned as Exempt (Advance), in case of tax is imposed in tax processing, it will be borne by the Recipient.

○	Exempt(Advanced)
-	Exempt(borne by the Recipient)
	Reimburse
N/A	Impossible to be exempted

VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM002A
Requesting Organization : KM CONSULTING
Personal Contact : MR. EMELIANO DE OLIVEIRA Telephone : +67077329534 / +67077161644
Date and time sample was taken : 17/05/2022 . 08:30 OTL
Location : Komoro
Water Source : Bee Kanu
Sampled by : JOANINHA & LUIS FERNANDO Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,01
2	EC	ms	√	Conductivity meter	100-1	70
3	TSS	mg/L	√	Gravimetry	Ns	0,01
4	TDS	mg/L	√	Gravimetry	1000	200
5	Temperature	°C	√	Conductivity meter	+/- 3	27
6	Salinity	%	√	Conductivity meter	NS	0,1
7	Turbidity	NTU	√	Turbidity meter	5	1,8
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,8
2	NO_3-N	mg/L	√	Spectrophotometer	50	50
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,04
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,2
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,4
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,12
7	Cl	mg/L	√	Spectrophotometer	250	0,08
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,02
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	NS
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,20
11	Hardness Total	mg/L	√	Spectrophotometer	200	80
12	Total Alkalinity	mg/L	√	Titration	NS	ND
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	0,01
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	5
2	E. Coli	CFU/100mL	√	MPN	0	5
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS:** not set; 2. **ND:** not detectable; 3. **NT:** not tested; 4. **NR:** not result; 5. **CFU:** Colony Formed Unit; 6. **TNC;** too numerous to count.

Dili, 30/06/2022

Tecnico Laboratório

(Fernando)

VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

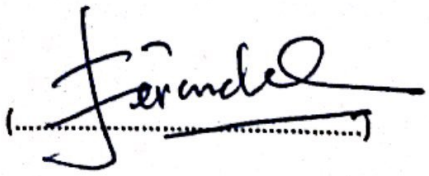
No. Register : KM002B
Requesting Organization : KM CONSULTING
Personal Contact : MR. EMELIANO DE OLIVEIRA Telephone : +67077329534 / +67077161644
Date and time sample was taken : 17/05/2022 . 08:30 OTL
Location : Komoro
Water Source : Bee Rai Leten (Surface water)
Sampled by : JOANINHA & LUIS FERNANDO Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,5
2	EC	ms	√	Conductivity meter	100-1	350
3	TSS	mg/L	√	Gravimetry	Ns	0,23
4	TDS	mg/L	√	Gravimetry	1000	780
5	Temperature	°C	√	Conductivity meter	+/- 3	27,8
6	Salinity	%	√	Conductivity meter	NS	0,1
7	Turbidity	NTU	√	Turbidity meter	5	5,2
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	1,02
2	NO_3-N	mg/L	√	Spectrophotometer	50	65
3	NO_2-N	mg/L	√	Spectrophotometer	3	2,1
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,27
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,4
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,16
7	Cl	mg/L	√	Spectrophotometer	250	0,11
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,04
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	NS
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,30
11	Hardness Total	mg/L	√	Spectrophotometer	200	122
12	Total Alkalinity	mg/L	√	Titration	NS	ND
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	0,31
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	1000
2	E. Coli	CFU/100mL	√	MPN	0	1000
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS:** not set; 2. **ND:** not detectable; 3. **NT:** not tested; 4. **NR:** not result; 5. **CFU:** Colony Formed Unit; 6. **TNC;** too numerous to count.

Dili, 20/06/2022

Tecnico Laboratório



VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM001A
Requesting Organization : KM CONSULTING
Personal Contact : MR. EMELIANO DE OLIVEIRA Telephone : +67077329534 / +67077161644
Date and time sample was taken : 17/05/2022 . 14:25 OTL
Location : Bemos Intake, Komoro Mota ulun
Water Source : Bee Matan, Irrigasaun
Sampled by : EMELIANO & JOANINHA Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,2
2	EC	ms	√	Conductivity meter	100-1	88
3	TSS	mg/L	√	Gravimetry	Ns	0,01
4	TDS	mg/L	√	Gravimetry	1000	194
5	Temperature	°C	√	Conductivity meter	+/- 3	27
6	Salinity	%	√	Conductivity meter	ppm	98
7	Turbidity	NTU	√	Turbidity meter	5	2,3
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,7
2	NO_3-N	mg/L	√	Spectrophotometer	50	34
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,03
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,03
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,3
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,12
7	Cl	mg/L	√	Spectrophotometer	250	0,08
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,02
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	NS
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,22
11	Hardness Total	mg/L	√	Spectrophotometer	200	56
12	Total Alkalinity	mg/L	√	Titration	NS	ND
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	0,01
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	15
2	E. Coli	CFU/100mL	√	MPN	0	4
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS**: not set; 2. **ND**: not detectable; 3. **NT**: not tested; 4. **NR**: not result; 5. **CFU**: Colony Formed Unit; 6. **TNC**; too numerous to count.

Dili, 30 / 06 /2022

Tecnico Laboratório

(.....)

VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM001B
Requesting Organization : KM CONSULTING
Personal Contact : MR. EMELIANO DE OLIVEIRA Telephone : +67077329534 / +67077161644
Date and time sample was taken : 17/05/2022 . 14:25 OTL
Location : Komoro Mota ulun
Water Source : Bee rai leten (surface water)
Sampled by : EMELIANO & JOANINHA Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,23
2	EC	ms	√	Conductivity meter	100-1	90
3	TSS	mg/L	√	Gravimetry	Ns	0,01
4	TDS	mg/L	√	Gravimetry	1000	180
5	Temperature	^{0}C	√	Conductivity meter	+/- 3	28
6	Salinity	%	√	Conductivity meter	ppm	99
7	Turbidity	NTU	√	Turbidity meter	5	5
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,7
2	NO_3-N	mg/L	√	Spectrophotometer	50	33
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,03
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,02
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,3
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,09
7	Cl	mg/L	√	Spectrophotometer	250	0,15
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,02
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	NS
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,40
11	Hardness Total	mg/L	√	Spectrophotometer	200	75
12	Total Alkalinity	mg/L	√	Titration	NS	ND
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	0,01
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	30
2	E. Coli	CFU/100mL	√	MPN	0	5
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS:** not set; 2. **ND:** not detectable; 3. **NT:** not tested; 4. **NR:** not result; 5. **CFU:** Colony Formed Unit; 6. **TNC;** too numerous to count.

Dili, 30 / 06 2022

Tecnico Laboratório

(.....)

VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM004A
Requesting Organization : KM CONSULTING
Personal Contact : MR. EMELIANO DE OLIVEIRA Telephone : +67077329534/+67077094066
Date and time sample was taken : 27/05/2022 . 10:00 OTL
Location : Boluto, Laleia, Manatuto
Water Source : Bee Rai Leten (surface water)
Sampled by : EMELIANO & LUIS Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,8
2	EC	ms	√	Conductivity meter	100-1	523
3	TSS	mg/L	√	Gravimetry	Ns	0,01
4	TDS	mg/L	√	Gravimetry	1000	245
5	Temperature	°C	√	Conductivity meter	+/- 3	26
6	Salinity	%	√	Conductivity meter	ppm	0,3
7	Turbidity	NTU	√	Turbidity meter	5	0,2
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,4
2	NO_3-N	mg/L	√	Spectrophotometer	50	0,1
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,003
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,1
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,1
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,19
7	Cl	mg/L	√	Spectrophotometer	250	0,3
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,01
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	2,2
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,08
11	Hardness Total	mg/L	√	Spectrophotometer	200	140
12	Total Alkalinity	mg/L	√	Titration	NS	30
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	120
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	400
2	E. Coli	CFU/100mL	√	MPN	0	50
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS:** not set; 2. **ND:** not detectable; 3. **NT:** not tested; 4. **NR:** not result; 5. **CFU:** Colony Formed Unit; 6. **TNC;** too numerous to count.

Dili, 11 / 07 /2022

Tecnico Laboratório

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VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM004B
Requesting Organization : KM CONSULTING
Personal Contact : MR. EMELIANO DE OLIVEIRA Telephone : +67077094066 / +67077161644
Date and time sample was taken : 27/05/2022 . 11:20 OTL
Location : Boluto, Laleia, Manatuto
Water Source : Bee Rai Leten (surface water)
Sampled by : EMELIANO & LUIS Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,82
2	EC	ms	√	Conductivity meter	100-1	478
3	TSS	mg/L	√	Gravimetry	Ns	0,01
4	TDS	mg/L	√	Gravimetry	1000	230
5	Temperature	°C	√	Conductivity meter	+/- 3	27,3
6	Salinity	%	√	Conductivity meter	ppm	0,3
7	Turbidity	NTU	√	Turbidity meter	5	0,2
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,3
2	NO_3-N	mg/L	√	Spectrophotometer	50	0,1
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,003
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,1
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,1
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,23
7	Cl	mg/L	√	Spectrophotometer	250	0,3
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,01
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	2,0
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,07
11	Hardness Total	mg/L	√	Spectrophotometer	200	155
12	Total Alkalinity	mg/L	√	Titration	NS	32
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	20
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	660
2	E. Coli	CFU/100mL	√	MPN	0	200
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS**: not set; 2. **ND**: not detectable; 3. **NT**: not tested; 4. **NR**: not result; 5. **CFU**: Colony Formed Unit; 6. **TNC**; too numerous to count.

Dili, 11/07/2022

Tecnico Laboratório

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VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM003A
Requesting Organization : KM CONSULTING
Personal Contact : MR. MAXIMIANO DE OLIVEIRA Telephone : +67077094066 / +67077161644
Date and time sample was taken : 21/05/2022 . 08:30 OTL
Location : Maliana Irrigation
Water Source : Bee Rai Leten
Sampled by : EMELIANO & LUIS Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,05
2	EC	ms	√	Conductivity meter	100-1	100
3	TSS	mg/L	√	Gravimetry	Ns	0,02
4	TDS	mg/L	√	Gravimetry	1000	185
5	Temperature	°C	√	Conductivity meter	+/- 3	26,5
6	Salinity	%	√	Conductivity meter	ppm	15
7	Turbidity	NTU	√	Turbidity meter	5	0,2
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,5
2	NO_3-N	mg/L	√	Spectrophotometer	50	0,12
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,03
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,1
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,1
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,4
7	Cl	mg/L	√	Spectrophotometer	250	17
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,01
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	1,3
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,2
11	Hardness Total	mg/L	√	Spectrophotometer	200	50
12	Total Alkalinity	mg/L	√	Titration	NS	ND
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	0,01
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	300
2	E. Coli	CFU/100mL	√	MPN	0	300
3	ALT	CFU/ml	√	CFU	0	0

Legend: 1. **NS**: not set; 2. **ND**: not detectable; 3. **NT**: not tested; 4. **NR**: not result; 5. **CFU**: Colony Formed Unit; 6. **TNC**; too numerous to count.

Dili, 11 / 07 2022

Tecnico Laboratório

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VII GOVERNO CONSTITUICIONAL
MINISTÉRIO DA SAÚDE
LABORATÓRIO NACIONAL DA SAÚDE TIMOR LESTE
DIRECÇÃO SERIÇOS TOXOCOLOGIA, ANÁLISE DAS ÁGUAS E AMBIENTE

No. Register : KM003B
Requesting Organization : KM CONSULTING
Personal Contact : MR. MAXIMIANO DE OLIVEIRA Telephone : +67077094066 / +67077161644
Date and time sample was taken : 21/05/2022 . 09:35 OTL
Location : Maliana Irrigation
Water Source : Bee Rai Leten
Sampled by : EMELIANO & LUIS Received by : SILVIA M. BABO

No	Parameter	Unit	Test Requirements	Testing Methods	Timor Leste Guideline	Results
Physical						
1	pH	-	√	pH Meter	6,5-8,5	7,1
2	EC	ms	√	Conductivity meter	100-1	102
3	TSS	mg/L	√	Gravimetry	Ns	0,02
4	TDS	mg/L	√	Gravimetry	1000	180
5	Temperature	°C	√	Conductivity meter	+/- 3	26,9
6	Salinity	%	√	Conductivity meter	ppm	15
7	Turbidity	NTU	√	Turbidity meter	5	1
Chemical						
1	NH_3-N	mg/L	√	Spectrophotometer	1,5	0,5
2	NO_3-N	mg/L	√	Spectrophotometer	50	0,9
3	NO_2-N	mg/L	√	Spectrophotometer	3	0,03
4	Iron (Fe)	mg/L	√	Spectrophotometer	0,3	0,1
5	Manganese (Mn)	mg/L	√	Spectrophotometer	0,5	0,1
6	Fluoride	mg/L	√	Spectrophotometer	1,5	0,4
7	Cl	mg/L	√	Spectrophotometer	250	20
8	Free Chlorine	mg/L	√	Spectrophotometer	0,5	0,01
9	Ca. Hardness	mg/L	√	Spectrophotometer	2,5	1,2
10	Mg Hardness	mg/L	√	Spectrophotometer	NS	0,2
11	Hardness Total	mg/L	√	Spectrophotometer	200	65
12	Total Alkalinity	mg/L	√	Titration	NS	ND
13	Sulphate (SO_4)	µg/L	√	Spectrophotometer	250	0,01
14	Arsenic	mg/L	√	Rapid Test	0,1	ND
Microbiology						
1	Total Coliform	CFU/100mL	√	MPN	0	200
2	E. Coli	CFU/100mL	√	MPN	0	80
3	ALT	CFU/ml	√	CFU	0	0

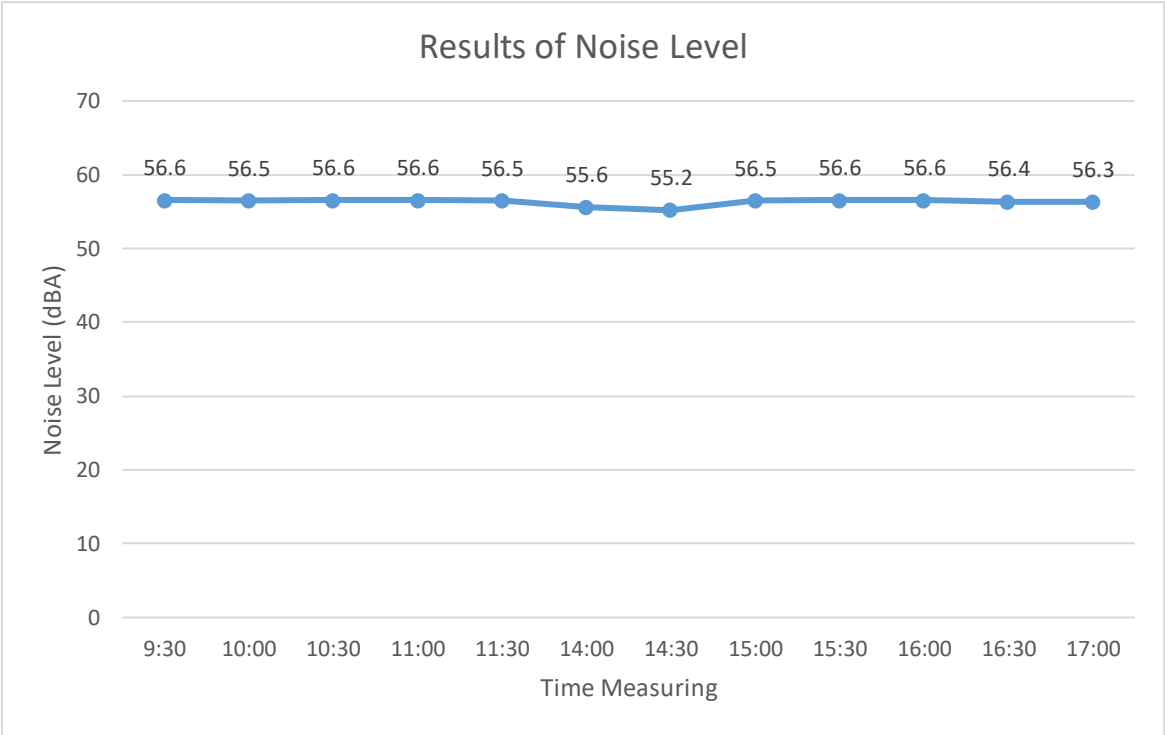
Legend: 1. **NS**: not set; 2. **ND**: not detectable; 3. **NT**: not tested; 4. **NR**: not result; 5. **CFU**: Colony Formed Unit; 6. **TNC**; too numerous to count.

Dili, 11/07/2022

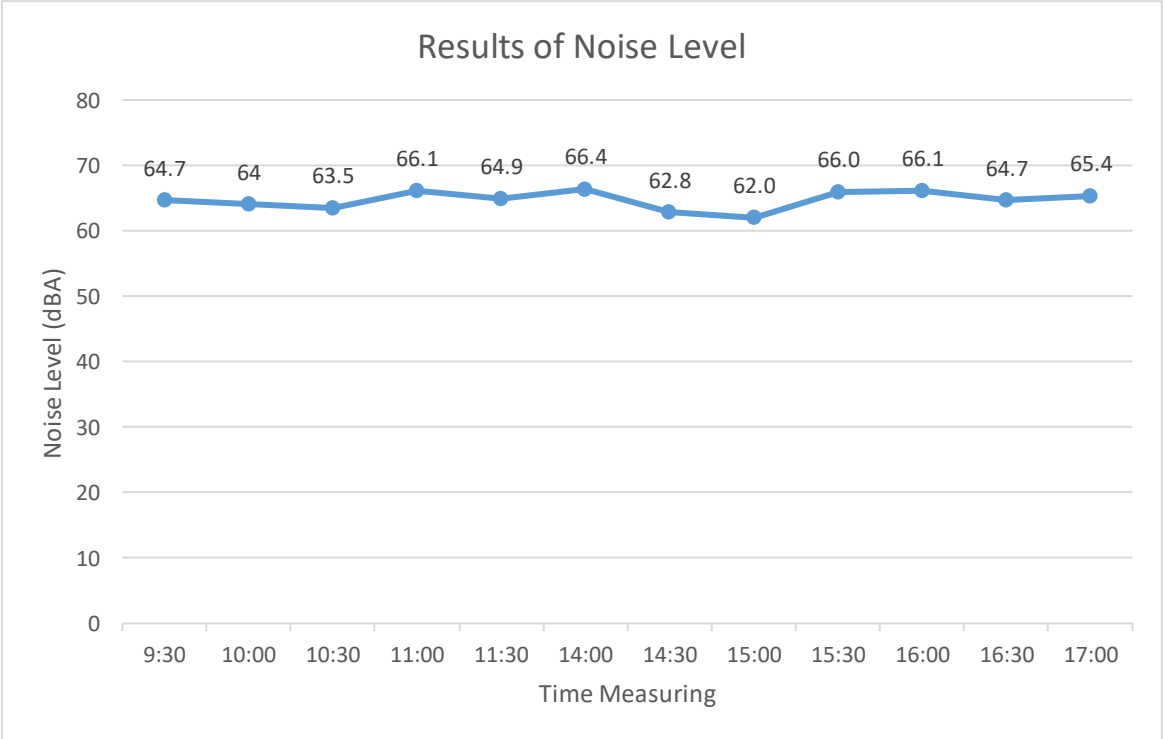
Tecnico Laboratório

(.....)

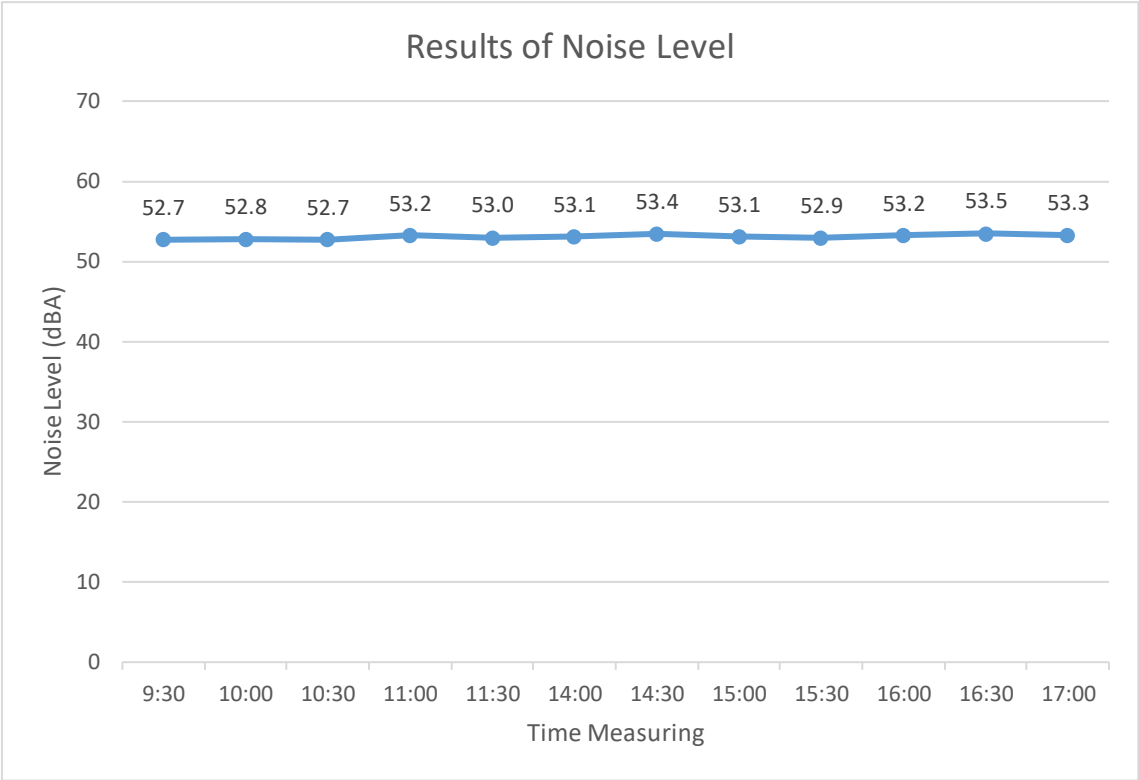
1. Result of noise level in Maliana Irrigation



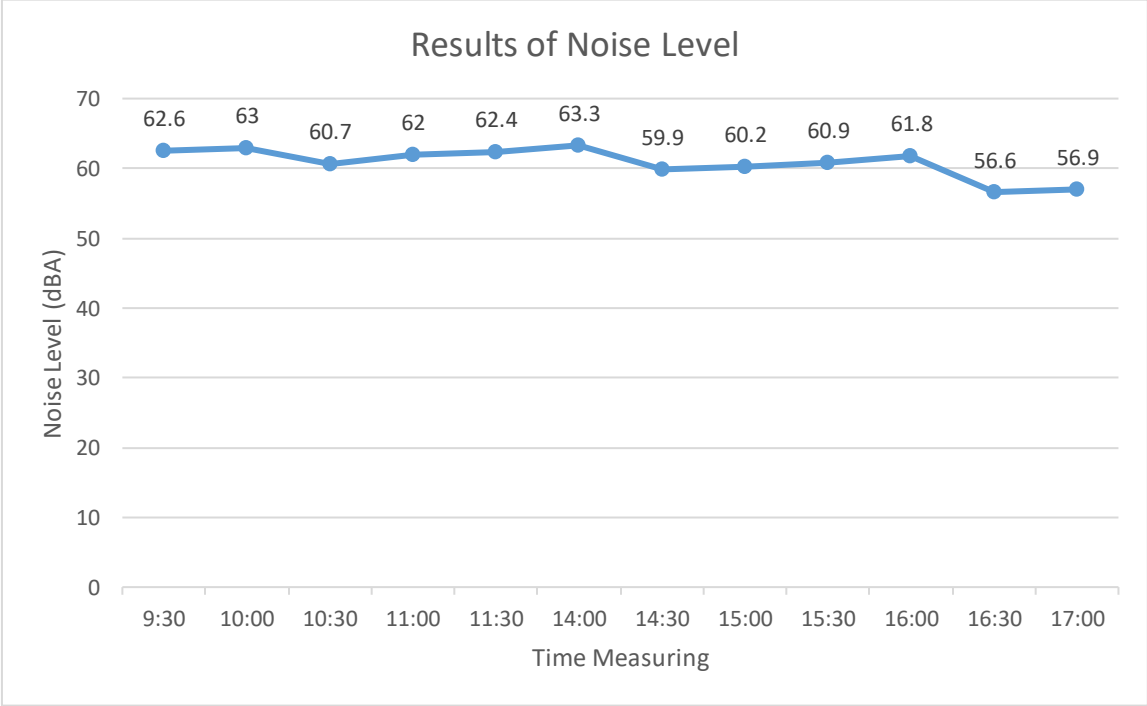
2. Result of noise level in Comoro R5 & R6



3. Result of noise level in Manatuto



4. Result of noise level in Bemos Intake



1. VIBRATION REPORT OF COMORO RIVER RETAINING WALL

Data Collection and measuring of the Vibration that located in Comoro, the project name is **Rehabilitation of Comoro river retaining wall R5 and R6**. In this site have 3 point of data sampling/collection with different time and location point but still the same roads. For details of each point will explain bellow:

Location/sampling point I, take in front of community house in the right hand if we driving to Aileu.

Table 1. Results of measuring data in the point I

Time measuring	Results	Information
09:30am - 10:30am	< 0,01 m/s^2	During the measuring time only mobilization of the motorcycle, medium vehicle and truck
	< 0,02 m/s^2	
	< 0,01 m/s^2	

Location/sampling point II, take in the left hand in the community.

Table 2. Results of measuring data in the point II

Time measuring	Results	Information
01:30pm - 02:00pm	< 0,01 m/s^2	During the measuring time only mobilization of the motorcycle, medium vehicle and truck
	< 0,01 m/s^2	
	< 0,01 m/s^2	

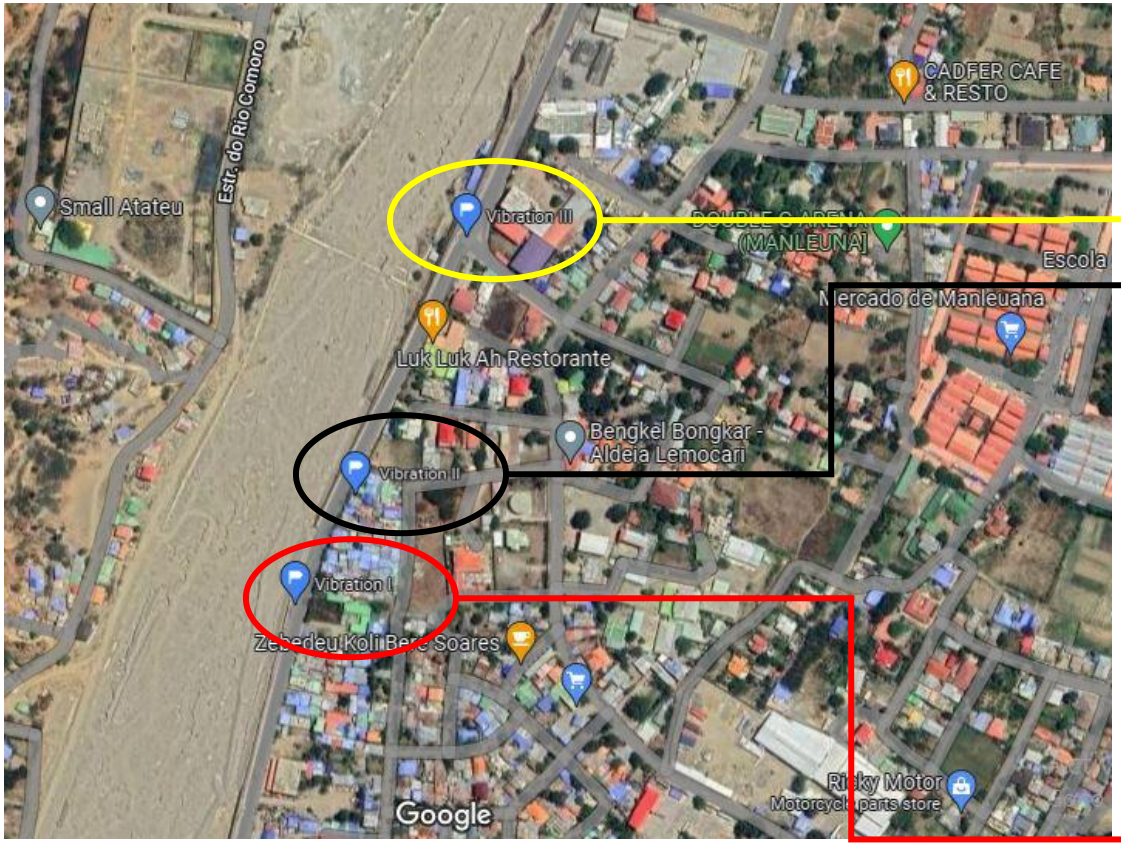
Location/sampling point III, measuring in the T-intersection in the small bridge after the CPLP bridge.

Table 3. Results of measuring data in the point III

Time measuring	Results	Information
02:30am - 03:30pm	< 0,01 m/s^2	During the measuring time only mobilization of the motorcycle, medium vehicle and truck
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Conclusion: For the data collection of the vibration there is no impact and still manageable. This data collected only for the pre-construction phase.

Maps of the measuring vibration in the field



2. VIBRATION REPORT OF BEMOS WATER INTAKE

Data Collection and measuring of the Vibration that located in Comoro Mota-ulun, the project name is **Rehabilitation of Bemos Water Intake**. In this site have 3 point of data sampling/collection with different time and location point but still the same part of the irrigation component. For details of each point will explain bellow:

Location/sampling point I, take or measuring in the top of Bemos facility.

Table 1. Results of measuring data in the point I

Time measuring	Results	Information
09:20am - 10:20am	< 0,01 m/s^2	During the measuring time there is no mobilization of the transportation or any construction activities
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Location/sampling point II, take or measuring in the middle of Bemos facility.

Table 2. Results of measuring data in the point II

Time measuring	Results	Information
11:00am - 12:00pm	< 0,01 m/s^2	During the measuring time there is no mobilization of the transportation or any construction activities
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Location/sampling point III, measuring in the bottom of Bemos facility.

Table 3. Results of measuring data in the point III

Time measuring	Results	Information
03:30am - 04:30pm	< 0,01 m/s^2	During the time only mobilization of the motorcycle, medium vehicle and truck
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Conclusion: For the data collection of the vibration there is no impact and still manageable. This data collected only for the pre-construction phase.

Maps of the measuring vibration in the field

3. VIBRATION REPORT OF BOLUTO IRRIGATION

Data Collection and measuring of the Vibration that located in Boluto, Laleia, Municipality of Manatuto, the project name is **Rehabilitation of Boluto Irrigation Facility**. In this site have 3 point of data sampling/collection with different time and location point but still the same part of the irrigation component. For details of each point will explain bellow:

Location/sampling point I, take or measuring in the top of Boluto Irrigation facility.

Table 1. Results of measuring data in the point I

Time measuring	Results	Information
08:30am - 09:30am	< 0,01 m/s^2	During the measuring time there is no mobilization of the transportation or any construction activities
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Location/sampling point II, take or measuring in the middle of Boluto Irrigation facility.

Table 2. Results of measuring data in the point II

Time measuring	Results	Information
10:00am - 11:00am	< 0,01 m/s^2	During the measuring time there is no mobilization of the transportation or any construction activities
	< 0,01 m/s^2	
	< 0,01 m/s^2	

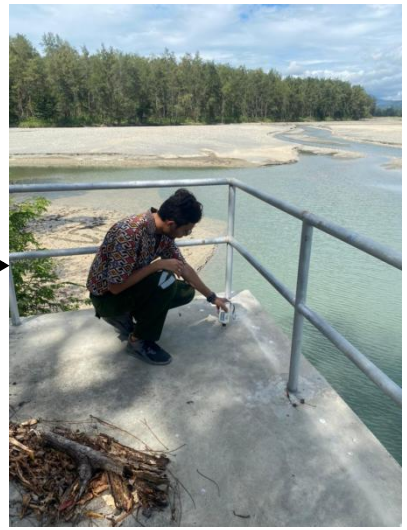
Location/sampling point III, measuring in the bottom of Boluto Irrigation facility.

Table 3. Results of measuring data in the point III

Time measuring	Results	Information
01:00pm - 02:00pm	< 0,01 m/s^2	During the time only mobilization of the motorcycle, medium vehicle and truck
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Conclusion: For the data collection of the vibration there is no impact and still manageable. This data collected only for the pre-construction phase.

Maps of the measuring vibration in the field



4. VIBRATION REPORT OF MALIANA IRRIGATION

Data Collection and measuring of the Vibration that located in Bulobu, Maliana, Municipality of Bobonaro, the project name is **Rehabilitation of Maliana Irrigation Facility**. In this site have 3 point of data sampling/collection with different time and location point but still the same part of the irrigation component. For details of each point will explain bellow:

Location/sampling point I, take or measuring in the top of Maliana irrigation facility.

Table 1. Results of measuring data in the point I

Time measuring	Results	Information
09:20am - 10:20am	< 0,01 m/s^2	During the measuring time there is no mobilization of the transportation or any construction activities
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Location/sampling point II, take or measuring in the middle of Maliana irrigation facility.

Table 2. Results of measuring data in the point II

Time measuring	Results	Information
11:00am - 12:00pm	< 0,01 m/s^2	During the measuring time there is no mobilization of the transportation or any construction activities
	< 0,01 m/s^2	
	< 0,01 m/s^2	

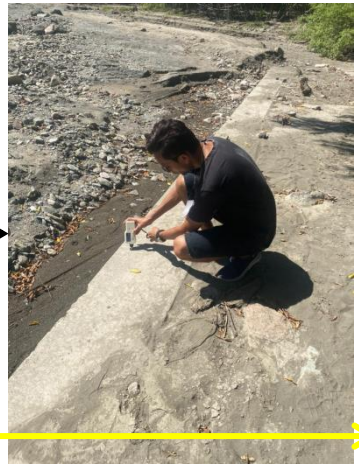
Location/sampling point III, measuring in the bottom of Maliana irrigation facility.

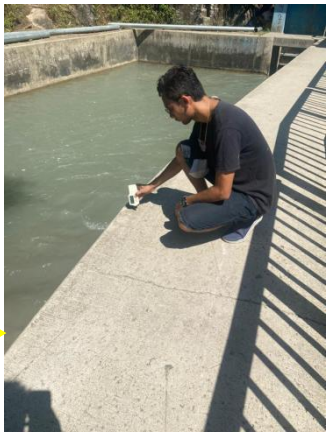
Table 3. Results of measuring data in the point III

Time measuring	Results	Information
02:00pm - 03:00pm	< 0,01 m/s^2	During the time only mobilization of the motorcycle, medium vehicle and truck
	< 0,01 m/s^2	
	< 0,01 m/s^2	

Conclusion: For the data collection of the vibration there is no impact and still manageable. This data collected only for the pre-construction phase.

Maps of the measuring vibration in the field





The following Environmental Management Plan and Environmental Monitoring Plan will be implemented in order to monitor mitigation measures before/during construction and during operation.

Environmental Management Plan (EMP)

Category	No.	Impact Item	Mitigation Measures		Implementing Organization	Responsible Organization	Cost
			Under Construction	During Operation			
Pollution Control	1	Air Pollution	− Water should be sprayed as necessary at earthwork site, construction machinery operating areas, and temporary roads for vehicles transporting materials.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	2	Water Pollution	− All repairing work in the sections that require river crossings will be carried out during the dry season when the river flow rate is low.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	3	Waste (construction waste)	− Reuse and recycle waste concrete as much as possible. − Reuse construction waste as roadbed material as much as possible. − Temporary storage areas must be agreed upon in consultation with the community. − Verify that waste disposal contractors handle construction materials and waste in accordance with proper procedures.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	4	Noise and Vibration	− Minimize work involving vibration near the boundary with structures and buildings. − Set normal working hours from 7:00 a.m. to	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost

			6:00 p.m.				
	5	Sediment in Lakes and River Beds	− Dispose construction debris or scrap properly	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost
	6	Water Use (drinking water, domestic water)	− Detailed construction plans will be developed and coordinated to minimize service disruptions and minimize the impact on public services. − Appropriate information of water outage will be announced at the initiative of the Sede Suku (Village Office) to residents.	-	Japanese constructor/Local authorities/MAF Municipality office	NDRBFC, BTL, NDIWM	Included in construction cost
Social environment	7	Local livelihoods	− Appropriate information of water outage will be announced at the initiative of the Sede Suku (Village Office) to residents. − Priority will be given to local villagers in each site for employment in light work and daily labour. −	-	Japanese constructor /Local authorities/MAF Municipality office	NDRBFC, BTL, NDIWM	Included in construction cost
	8	Working Environment (including occupational	− Detailed construction plans with feasible working volumes will be developed in order to prevent overworks. − Provide training on environmental safety and health to all workers to raise awareness. − Provide all workers with the Personal	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost

		safety)	Protective Equipment they need.				
Other	9	Accident	– For pavement work on the by-pass road of A02, plan and implement one side at a time and secure road traffic on other side. – Around site, traffic control personnel will be assigned in order to control speed of vehicles. – Provide safety training to all workers to raise awareness. – Conduct safety patrols within construction area.	-	Japanese constructor	NDRBFC, BTL, NDIWM	Included in construction cost

Environmental Monitoring Plan (EMoP)

1. Pollution Control

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
Air Pollution	Dust control	During construction, once a month or when complaints occurred	Each construction site	Visual inspection and complaints records	Japanese contractor	Included in construction cost
Water Pollution	Water quality (turbidity/odor)	Ordinary monitoring: During construction, once a month or when complaints occurred Water turbidity test: Twice during construction (midterm and after construction)	Ordinary monitoring: Around each construction site Water turbidity test: 2 sample points around each construction site	Visual inspection for turbidity, abnormalities, etc. and complaints records	Japanese contractor	Included in construction cost
Waste	− Confirmation of debris and construction material − Disposal methods and loading capacity	During construction, when collecting and transporting waste	Each construction site	− Visual inspection − Amount of waste (measured as an approximate amount based on the amount loaded on the back of a truck during	Japanese contractor	Included in construction cost

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
				transportation)		
Noise and Vibration	Noise and vibration level during the daytime	Ordinary monitoring: During construction, when complaints occurred Noise and vibration examination: Twice during construction (midterm and after construction)	Ordinary monitoring: Around each construction site Water quality examination: 3 sample point around each construction site and residences susceptible to noise	Noise and vibration level dB	Japanese contractor	Included in construction cost
Sediment in River Beds	Disposal method of construction residual soil and sediment	During construction, once a month	Each construction site	Visual inspection	Japanese contractor	Included in construction cost

2. Social Environment

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
Water Use	Notification of water outage plan to residents	When water disruptions are planned	Each construction site	Complaints records	Japanese contractor	Included in construction cost

Environment Item	Item	Frequency	Location	Method	Responsible Organization	Cost
Local livelihoods	Notification of recruitment for day labour and light works plan to residents	When recruitment for day labour and light works is planned	Each construction site	Notification letter to local authorities	Japanese contractor /Sede suko (village office)	Included in construction cost
Working Conditions (including occupational safety)	Implementation of safety and health education	During construction, once a month	Each construction site	Provision of Personal Protective Equipment and confirmation of training implementation	Japanese contractor	Included in construction cost
Traffic congestions	Displacing traffic control personnel limitation of speed of vehicles at project sites	If necessary	Each construction site			
Accident	Accident occurrence/response records	When accident occurred	Each construction site	Review of accident reports	Japanese contractor	Included in construction cost

Fase konstrusaun (relatóriu mensal)

(Construction phase (monthly report))

Data (Date)	
Repórter nia naran (Name of Reporter)	
Organizasaun no posisaun (Organization name and his/her position)	

Favor resposta perguntas kraik, hodi hato'o rezultadu ba monitorizasaun iha fatin projetu.
(Please answer below questions to provide your observation of monitoring result.)

Item (Item)	Resultadu ba monitorizasaun (Result of monitoring)	Avaliasaun husi DNEPCC (Evaluation by NDRBFC)	Observasaun (Observations)
Polusaun anin (Air pollutions)	Ita hare rai-rahun sae makas no barak tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible dust or air pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Polusaun bee (Water pollutions)	Ita hare mota be sai mean hanesan taho tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible turbidity or water pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Lixu obra (waste)	Ita hare problema kona ba gestaun lixu obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request	

	Fulan ida ne'e dala hira tula lixu obra hanesan sedimentus? (hakerek numeru) Dala _____ (Is there problem related waste disposal?) (How many times do you collect and haul waste in this month?)	survey in detail)	
Barulhu (noise)	Ita rona reklamasaun husi komunidade kona ba barulhu tanba atividade obra? □ sin (yes) □ lae (no) (Have there been complaints about noise and vibration caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Ambiente servisu no segransa (work environment and sefaty)	Iha badain ka operator ne'be hetan moras? □ sin (yes) □ lae (no) Ita sente risku kona ba seguransa? □ sin (yes) □ lae (no) (Is there any worker in poor health?) (Do you perceive any safety-related risk?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Dezastre naturais no asidente (Natural disasters and accidents)	Akentese dezastre naturais iha fatin obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

	Akentese asidente iha fatin obra? □ sin (yes) □ lae (no) (has an accident occurred?) (has a natural disaster occurred?)	(need to request survey in detail)	
Reklamasaun ou problema (complains and problems)	Ita nota reklamasaun husi komunidade ka problema ruma ne'ebe akontese iha fatin obra? □ sin (yes) □ lae (no) (Have there been complaints or problems caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

Foto 1 (Picture 1)	Foto 2 (Picture 2)
Esplikasaun foto 1 (Explanation of picture 1)	Esplikasaun foto 2 (Explanation of picture 2)

Rezultadu ezaminasaun dadus ambiental intermediáriu e final
Result of environmental intermedial and endline data and survey

Data ezaminasaun:
Date:

1) Observasaun ba rezultadu qualidade bee inklui turbidez e pH:
Observations on result of water quality including turbidity and pH:

Favor, hakerek rezultadu turididez no marka kuadru iha liman loos. (Please, write result of turbidity test and put a check in right-hand cell) Turbidez: _____ NTU	□ Boot liu 5 NTU⇒tenki foti medida (Higher than 5 NTU) ⇒it is need to take measure □ Kiik liu 5 NTU (Lower than 5 NTU)
Favor, hakerek rezultadu pH no marka kuadru iha liman loos. (Please, write result of pH test and put a check in right-hand cell) pH: _____	□ Kiik ou boot liu 6.5~8.5⇒tenki foti medida (Less or higher than 6.5~8.5) ⇒it is need to take measure □ Tama 6.5~8.5 (Within 6.5~8.5)

2) Observasaun ba rezultadu teste ruídu e vibrasaun:
Observations on result of noise and vibration test:

Favor, hakerek rezultadu ruídu no marka kuadru iha liman loos. (Please, write result of noise test and put a check in right-hand cell) Ruídu _____ dB	□ Boot liu 55 dB ⇒tenki foti medida (Higher than 55 dB) ⇒it is need to take measure □ Kiik liu 55 dB (Lower than 55 dB)
Favor, hakerek rezultadu vibration no marka kuadru iha liman loos. (Please, write result of vibration test and put a check in right-hand cell) Vibrasaun _____ dB	□ Boot liu 55 dB ⇒tenki foti medida (Higher than 55 dB) ⇒it is need to take measure □ Kiik liu 55 dB (Lower than 55 dB)

FORMULÁRIU MONITORIZASAUN AMBIENTAL
(ENVIRONMENTAL MONITORING FORM)

Note:
Contactor, municipality officer of Ministry of Public Works, and local authorities are considered as reporters. Reporter shall fill up this monitoring form every month, in order to report environmental aspects of project site.

National Directorate of Roads and Bridge, Flood Control (NDRBFC) of the Ministry of Public Works shall evaluate contents of this report. If there is necessary to be confirmed reported items, director of NDRBFC shall request to reporter to do survey in detail.
Moreover, in case of serious problem occurred, director of NDRBFC shall attempt to take countermeasure to solve the problem with relevant entities.

Water quality test, noise and vibration test will be implemented in intermediate and end line of works. Those tests results shall be attached in this report in order to submit for reference.

Fase konstrusaun (relatóriu mensal)

(Construction phase (monthly report))

Data (Date)	
Repórter nia naran (Name of Reporter)	
Organizasaun no posisaun (Organization name and his/her position)	

Favor resposta perguntas kraik, hodi hato'o rezultadu ba monitorizasaun iha fatin projetu.
(Please answer below questions to provide your observation of monitoring result.)

Item (Item)	Resultadu ba monitorizasaun (Result of monitoring)	Avaliasaun husi BTL (Evaluation by BTL)	Observasaun (Observations)
Polusaun anin (Air pollutions)	Ita hare rai-rahun sae makas no barak tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible dust or air pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Polusaun bee (Water pollutions)	Ita hare mota be sai mean hanesan taho tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible turbidity or water pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Lixu obra (waste)	Ita hare problema kona ba gestaun lixu obra? □ sin (yes) □ lae (no) Fulan ida ne'e dala	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	

	hira tula lixu obra hanesan sedimentus? (hakerek numeru) Dala _____ (Is there problem related waste disposal?) (How many times do you collect and haul waste in this month?)		
Barulhu (noise)	Ita rona reklamasaun husi komunidade kona ba barulhu tanba atividade obra? □ sin (yes) □ lae (no) (Have there been complaints about noise and vibration caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Ambiente servisu no segransa (work environment and sefaty)	Iha badain ka operator ne'be hetan moras? □ sin (yes) □ lae (no) Ita sente risku kona ba seguransa? □ sin (yes) □ lae (no) (Is there any worker in poor health?) (Do you perceive any safety-related risk?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Dezastre naturais no asidente (Natural disasters and accidents)	Akentese dezastre naturais iha fatin obra? □ sin (yes) □ lae (no) Akentese asidente iha fatin obra?	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

	□ sin (yes) □ lae (no) (has an accident occurred?) (has a natural disaster occurred?)		
Reklamasaun ou problema (complains and problems)	Ita nota reklamasaun husi komunidade ka problema ruma ne'ebe akontese iha fatin obra? □ sin (yes) □ lae (no) (Have there been complaints or problems caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

Foto 1 (Picture 1)	Foto 2 (Picture 2)
Esplikasaun foto 1 (Explanation of picture 1)	Esplikasaun foto 2 (Explanation of picture 2)

Rezultadu ezaminasaun dadus ambiental intermediáriu e final
Result of environmental intermedial and endline data and survey

Data ezaminasaun:
Date:

1) Observasaun ba rezultadu qualidade bee inklui turbidez e pH:
Observations on result of water quality including turbidity and pH:

Favor, hakerek rezultadu turididez no marka kuadru iha liman loos. (Please, write result of turbidity test and put a check in right-hand cell) Turbidez: _____ NTU	□ Boot liu 5 NTU⇒tenki foti medida (Higher than 5 NTU) ⇒it is need to take measure □ Kiik liu 5 NTU (Lower than 5 NTU)
Favor, hakerek rezultadu pH no marka kuadru iha liman loos. (Please, write result of pH test and put a check in right-hand cell) pH: _____	□ Kiik ou boot liu 6.5~8.5⇒tenki foti medida (Less or higher than 6.5~8.5) ⇒it is need to take measure □ Tama 6.5~8.5 (Within 6.5~8.5)

2) Observasaun ba rezultadu teste ruídu e vibrasaun:
Observations on result of noise and vibration test:

Favor, hakerek rezultadu ruídu no marka kuadru iha liman loos. (Please, write result of noise test and put a check in right-hand cell) Ruídu _____ dB	□ Boot liu 55 dB ⇒tenki foti medida (Higher than 55 dB) ⇒it is need to take measure □ Kiik liu 55 dB (Lower than 55 dB)
Favor, hakerek rezultadu vibration no marka kuadru iha liman loos. (Please, write result of vibration test and put a check in right-hand cell) Vibrasaun _____ dB	□ Boot liu 55 dB ⇒tenki foti medida (Higher than 55 dB) ⇒it is need to take measure □ Kiik liu 55 dB (Lower than 55 dB)

FORMULÁRIU MONITORIZASAUN AMBIENTAL
(ENVIRONMENTAL MONITORING FORM)

Note:
Contactor, municipality officer of BTL, and local authorities are considered as reporters. Reporter shall fill up this monitoring form every month, in order to report environmental aspects of project site.

Empresa Pública Bee Timor Leste (BTL) of the Ministry of Public Works shall evaluate contents of this report. If there is necessary to be confirmed reported items, director of Maintenance of BTL shall request to reporter to do survey in detail.
Moreover, in case of serious problem occurred, director of Maintenance of BTL shall attempt to take countermeasure to solve the problem with relevant entities.

Water quality test, noise and vibration test will be implemented in intermediate and end line of works. Those tests results shall be attached in this report in order to submit for reference.

Fase konstrusaun (relatóriu mensal)

(Construction phase (monthly report))

Data (Date)	
Repórter nia naran (Name of Reporter)	
Organizasaun no posisaun (Organization name and his/her position)	

Favor resposta perguntas kraik, hodi hato'o rezultadu ba monitorizasaun iha fatin projetu.
(Please answer below questions to provide your observation of monitoring result.)

Item (Item)	Resultadu ba monitorizasaun (Result of monitoring)	Avaliasaun husi DNIGA (Evaluation by NDIWM)	Observasaun (Observations)
Polusaun anin (Air pollutions)	Ita hare rai-rahun sae makas no barak tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible dust or air pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Polusaun bee (Water pollutions)	Ita hare mota be sai mean hanesan taho tanba atividade obra? □ sin (yes) □ lae (no) (Is there visible turbidity or water pollutions caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Lixu obra (waste)	Ita hare problema kona ba gestaun lixu obra? □ sin (yes) □ lae (no)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	

	Fulan ida ne'e dala hira tula lixu obra hanesan sedimentus? (hakerek numeru) Dala _____ (Is there problem related waste disposal?) (How many times do you collect and haul waste in this month?)		
Barulhu (noise)	Ita rona reklamasaun husi komunidade kona ba barulhu tanba atividade obra? □ sin (yes) □ lae (no) (Have there been complaints about noise and vibration caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Ambiente servisu no segransa (work environment and sefaty)	Iha badain ka operator ne'be hetan moras? □ sin (yes) □ lae (no) Ita sente risku kona ba seguransa? □ sin (yes) □ lae (no) (Is there any worker in poor health?) (Do you perceive any safety-related risk?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	
Dezastre naturais no asidente (Natural disasters and accidents)	Akentese dezastre naturais iha fatin obra? □ sin (yes) □ lae (no) Akentese asidente	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)

	iha fatin obra? □ sin (yes) □ lae (no) (has an accident occurred?) (has a natural disaster occurred?)	survey in detail)	
Reklamasaun ou problema (complains and problems)	Ita nota reklamasaun husi komunidade ka problema ruma ne'ebe akontese iha fatin obra? □ sin (yes) □ lae (no) (Have there been complaints or problems caused by construction in the project area?)	□ la iha problema (no problem) □ hare problema, tenki halo peskiza di-diak (need to request survey in detail)	Sekarik hatan sin, favor hakerek ita nia observasaun. (If you answered yes, please mention your observations.)
Karta notifikasaun (Notification letter)	Wainhira iha planu hapara bee, ita hato'o karta notifikasaun ba autoridade local ka lae? □ sin (yes) □ lae (no) (When you have a plan of water disruption, have you issued notification letter to local authority?)		Sekarik haruka karta notifikasaun, favor anexa kopia karta notifikasaun. (If you issued notification letter, please attach copy in this monitoring report.)

Foto 1 (Picture 1)	Foto 2 (Picture 2)

Esplikasaun foto 1 (Explanation of picture 1)	Esplikasaun foto 2 (Explanation of picture 2)

Rezultadu ezaminasaun dadus ambiental intermediáriu e final Result of environmental intermedial and endline data and survey

FORMULÁRIU MONITORIZASAUN AMBIENTAL
(ENVIRONMENTAL MONITORING FORM)

Data ezaminasaun:
Date:

1) Observasaun ba rezultadu qualidade bee inklui turbidez e pH:
Observations on result of water quality including turbidity and pH:

Favor, hakerek rezultadu turididez no marka kuadru iha liman loos. (Please, write result of turbidity test and put a check in right-hand cell) Turbidez: NTU	□ Boot liu 5 NTU⇒tenki foti medida (Higher than 5 NTU) ⇒it is need to take measure □ Kiik liu 5 NTU (Lower than 5 NTU)
Favor, hakerek rezultadu pH no marka kuadru iha liman loos. (Please, write result of pH test and put a check in right-hand cell) pH:	□ Kiik ou boot liu 6.5~8.5⇒tenki foti medida (Less or higher than 6.5~8.5) ⇒it is need to take measure □ Tama 6.5~8.5 (Within 6.5~8.5)

2) Observasaun ba rezultadu teste ruídu e vibrasaun:
Observations on result of noise and vibration test:

Favor, hakerek rezultadu ruídu no marka kuadru iha liman loos. (Please, write result of noise test and put a check in right-hand cell) Ruídu dB	□ Boot liu 55 dB ⇒tenki foti medida (Higher than 55 dB) ⇒it is need to take measure □ Kiik liu 55 dB (Lower than 55 dB)
Favor, hakerek rezultadu vibration no marka kuadru iha liman loos. (Please, write result of vibration test and put a check in right-hand cell) Vibrasaun dB	□ Boot liu 55 dB ⇒tenki foti medida (Higher than 55 dB) ⇒it is need to take measure □ Kiik liu 55 dB (Lower than 55 dB)

Note:
Contactor, municipality officer of Ministry of Agricultures and Fisheries, and local authorities are considered as reporters. Reporter shall fill up this monitoring form every month, in order to report environmental aspects of project site.

National Directorate of Irrigation and Water Management (NDIWM) of the Ministry of Agricultures and Fisheries shall evaluate contents of this report. If there is necessary to be confirmed reported items, director of NDIWA shall request to reporter to do survey in detail.
Moreover, in case of serious problem occurred, director of NDIWA shall attempt to take countermeasure to solve the problem with relevant entities.

Water quality test, noise and vibration test will be implemented in intermediate and end line of works. Those tests results shall be attached in this report in order to submit for reference.

MINISTRY OF PUBLIC WORKS
THE DEMOCRATIC REPUBLIC OF TIMOR-LESTE

PROGRAMME FOR URGENT REHABILTATION
OF
FLOOD DAMAGED INFRASTURUCTURE

DRAWINGS

November 2022

THE CONSORTIUM OF IDEA CONSULTAMTS, INC.
SANYU CONSULTANTS INC.
INGEROSEC CORPORATION
AND NTC INTERNATIONAL CO., LTD, JAPAN

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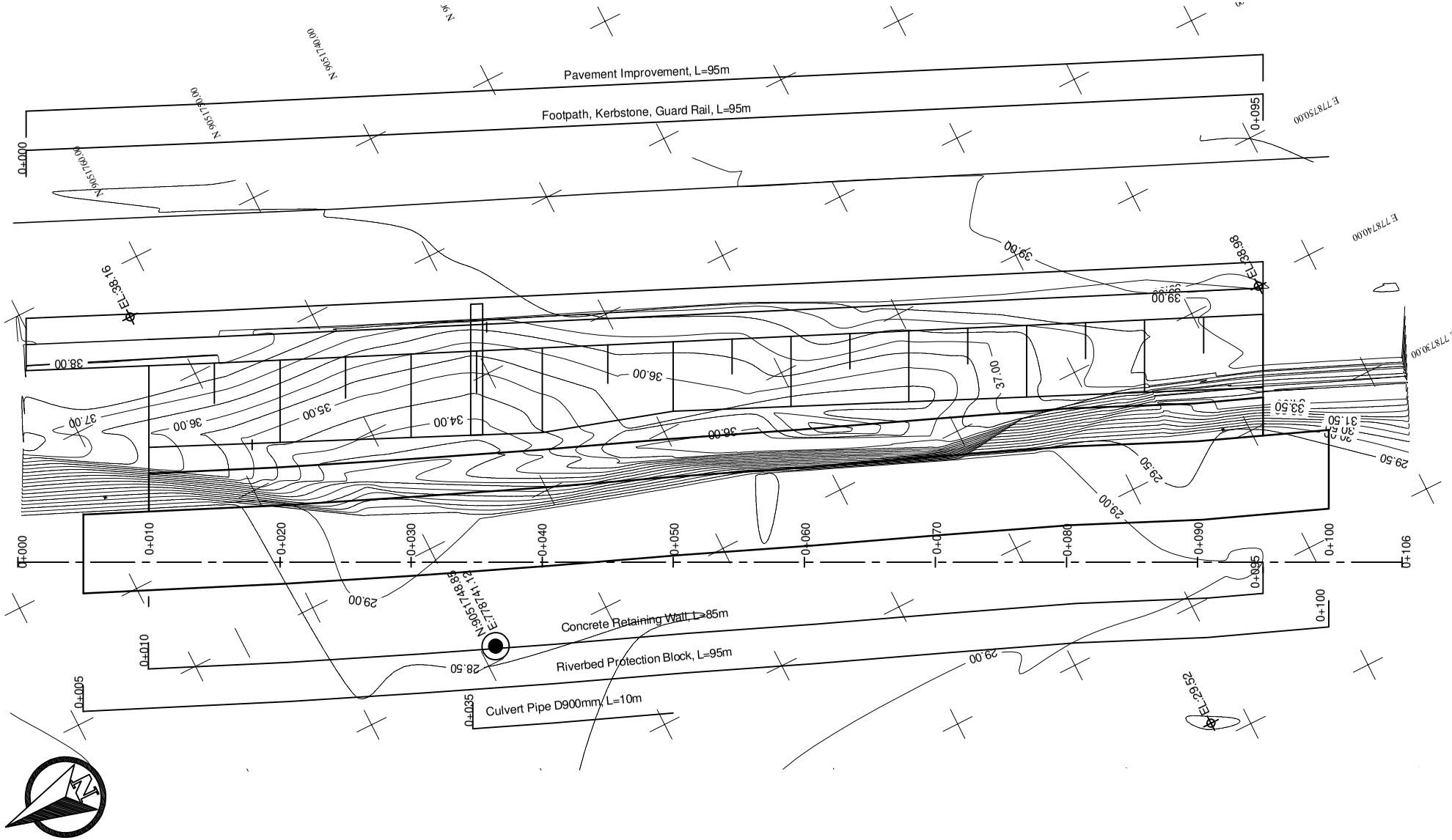
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	DRAWING INDEX	PREPARED BY: CHECKED BY:	

LOCATION MAP

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	LOCATION MAP	PREPARED BY: CHECKED BY:	

PLAN (1) SCALE A3 1:300

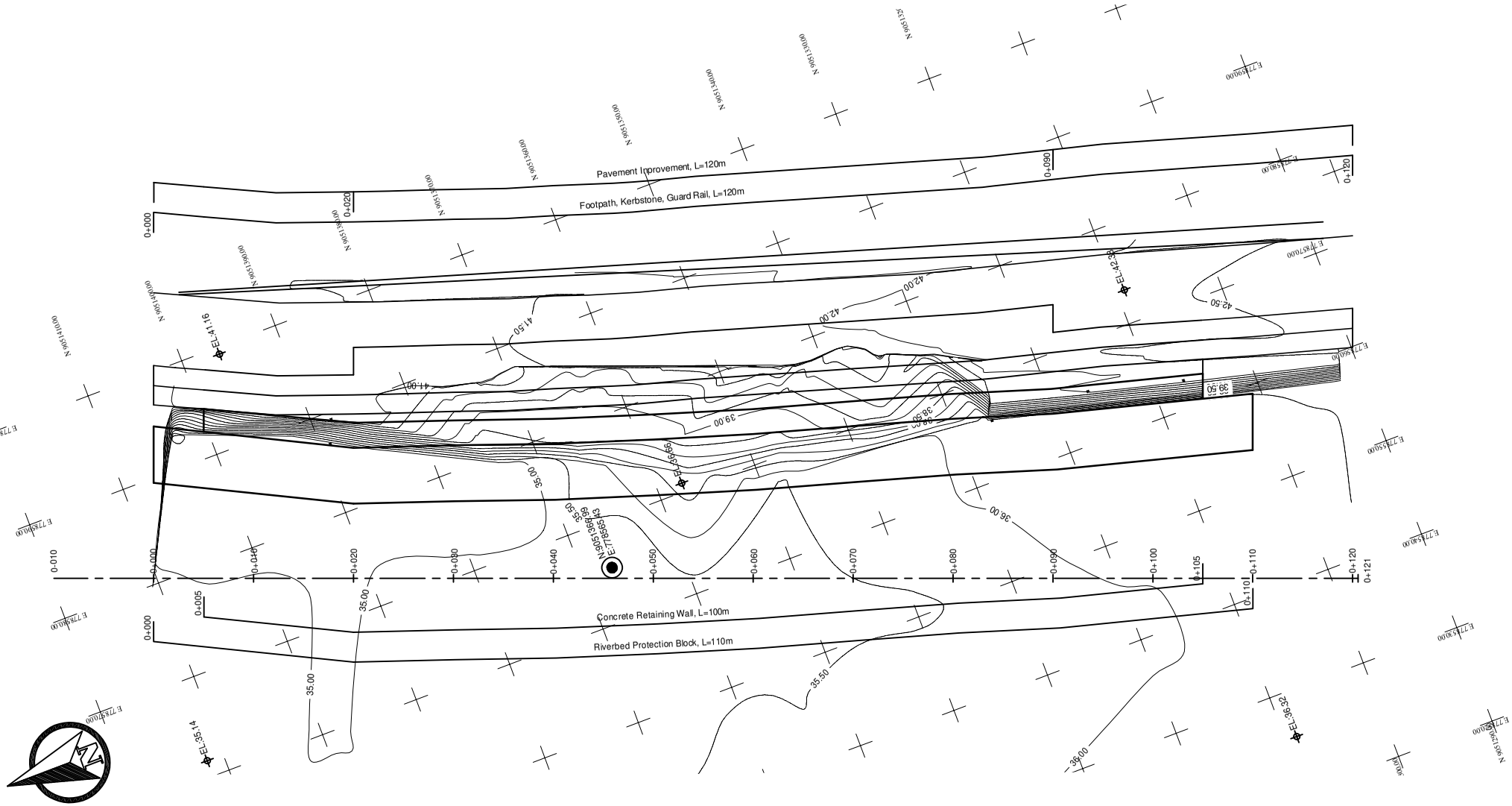
R5



A-83

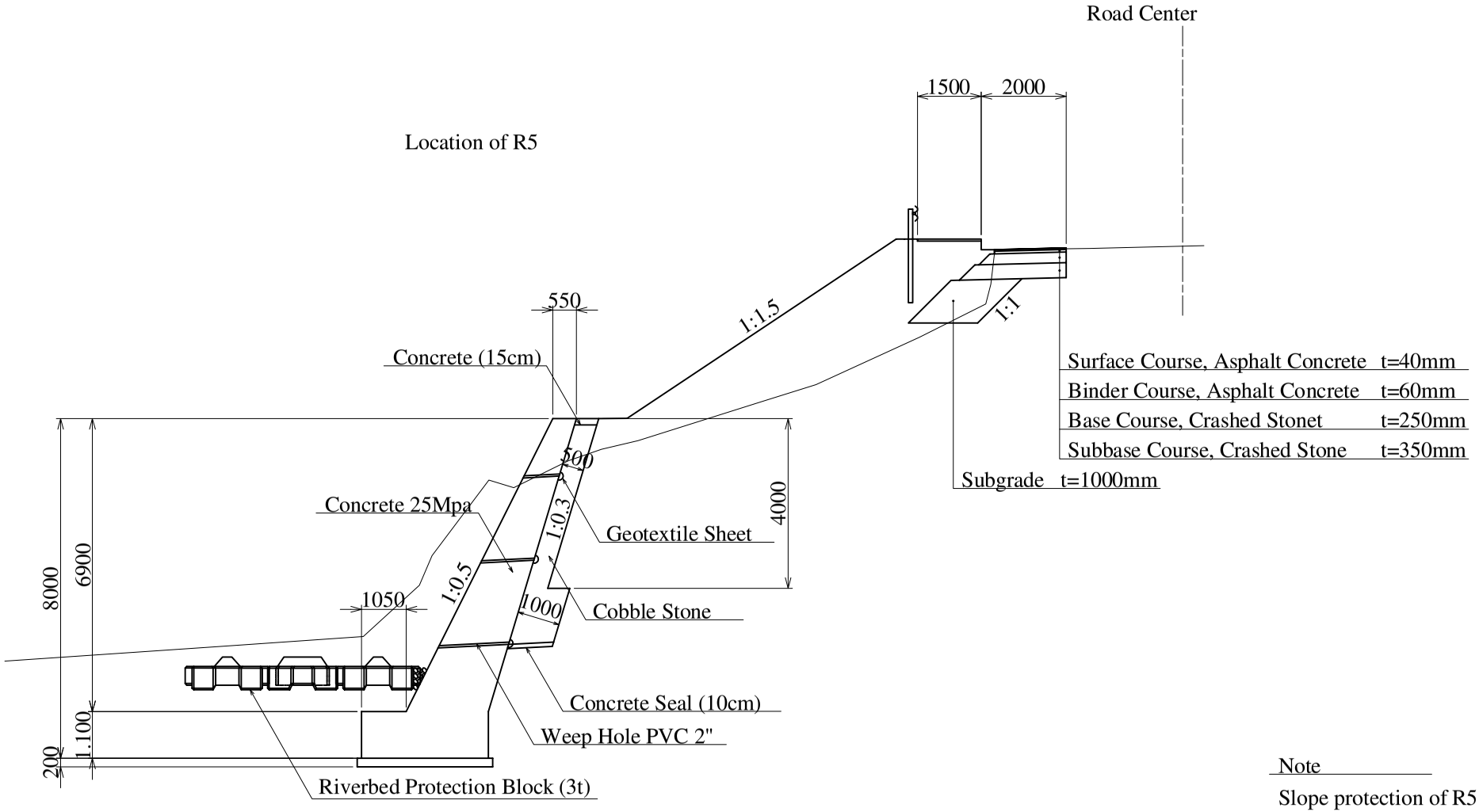
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	PLAN (1) , R5	PREPARED BY: / CHECKED BY:	A- 01

PLAN (2) SCALE A3 1:400
R6



THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	PLAN (2) , R6	PREPARED BY: / CHECKED BY:	A- 02

TYPICAL CROSS SECTION (1) SCALE A3 1:100



A-85

Note

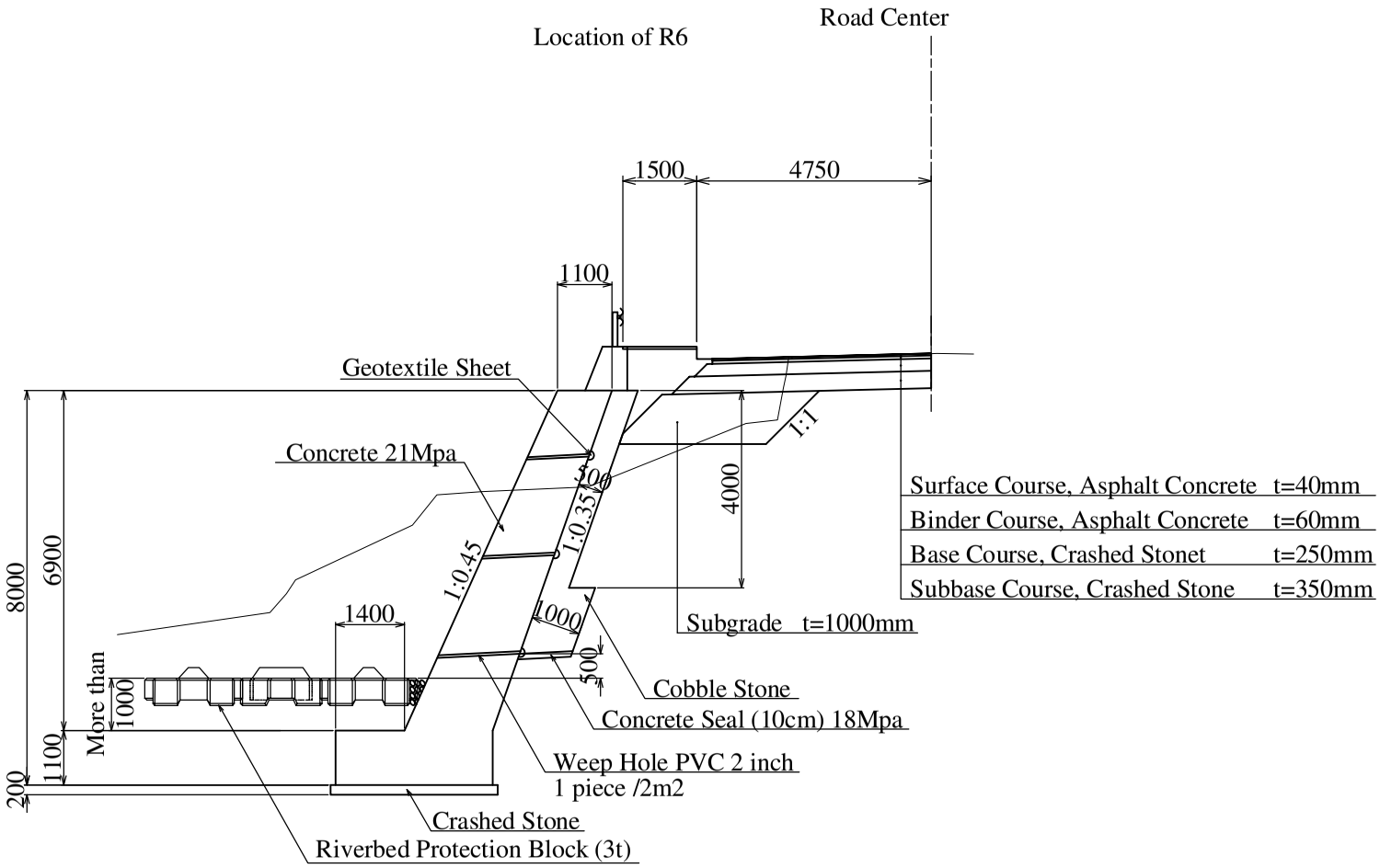
Slope protection of R5

No.0+10~No.0+40 : Truf

No.0+40~No.0+95 : Stone pitching

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	TYPICAL CROSS SECTION (1)	PREPARED BY: / CHECKED BY:	A- 03

TYPICAL CROSS SECTION (2) SCALE A3 1:100

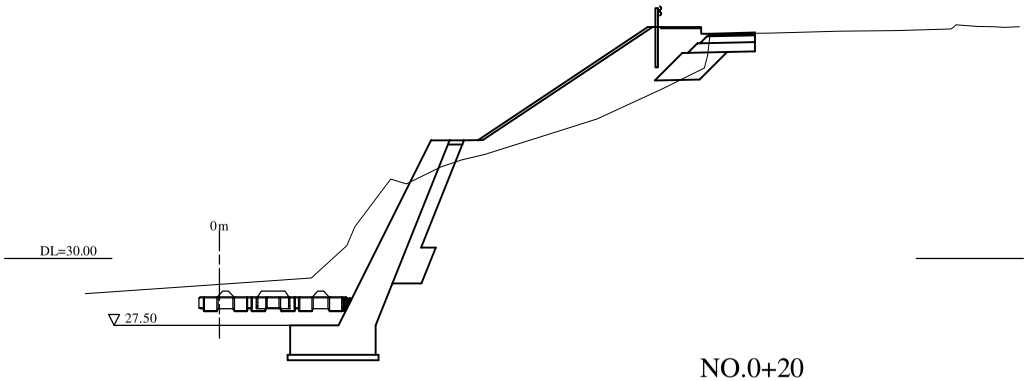


A-86

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	TYPICAL CROSS SECTION (2)	PREPARED BY: / CHECKED BY:	A- 04

CROSS SECTION (1) , R5 SCALE A3 1:200

NO.0+30



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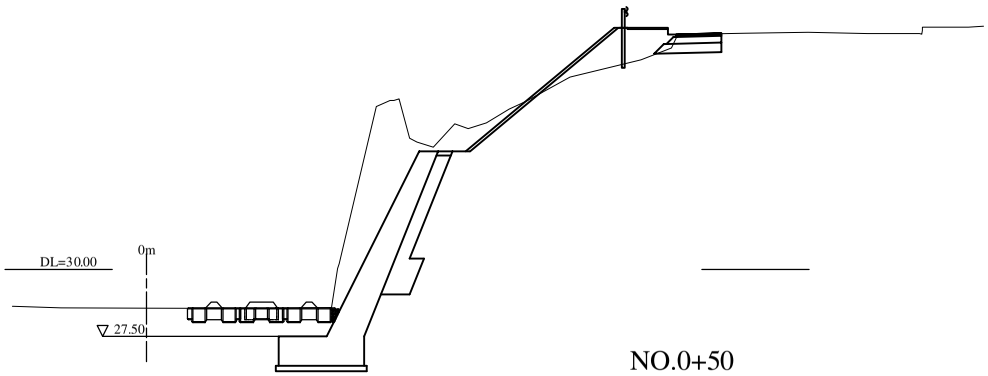

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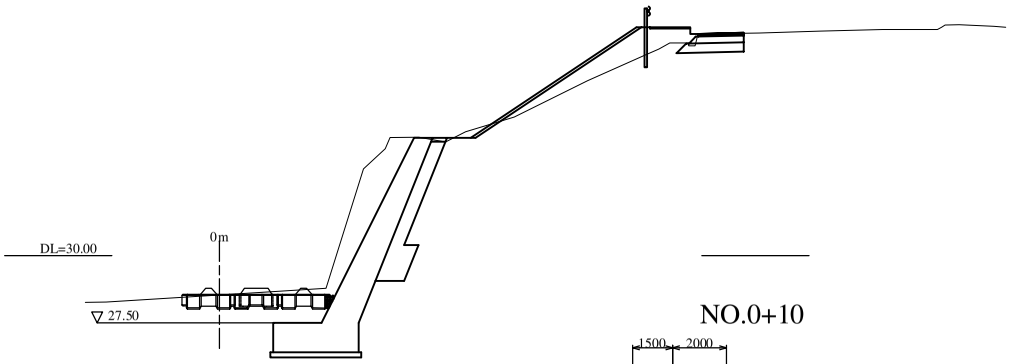

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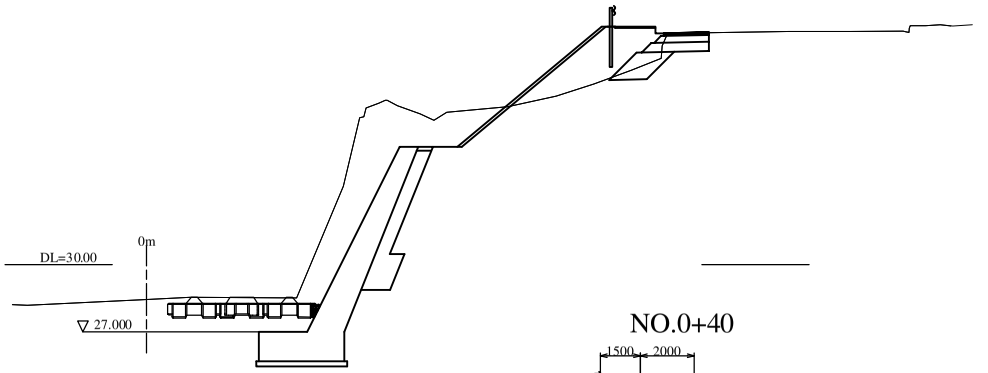

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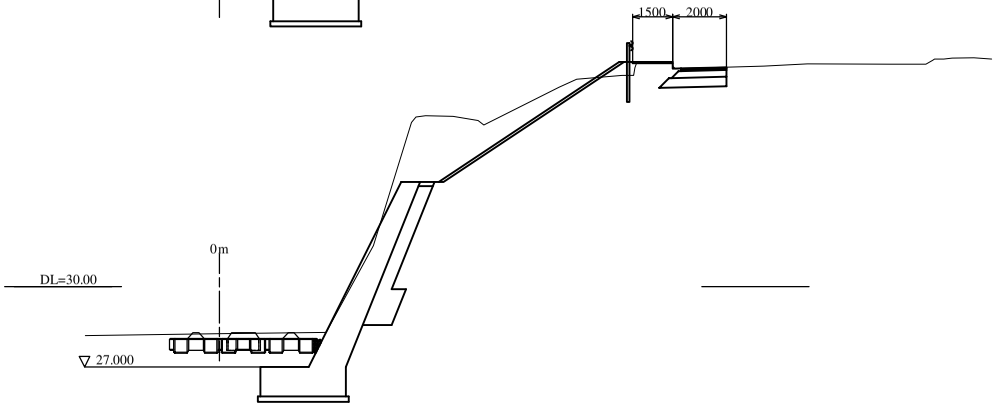

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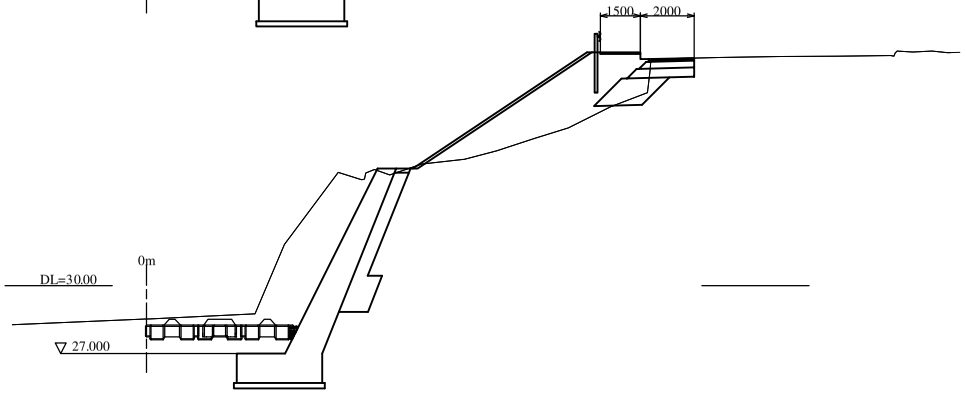
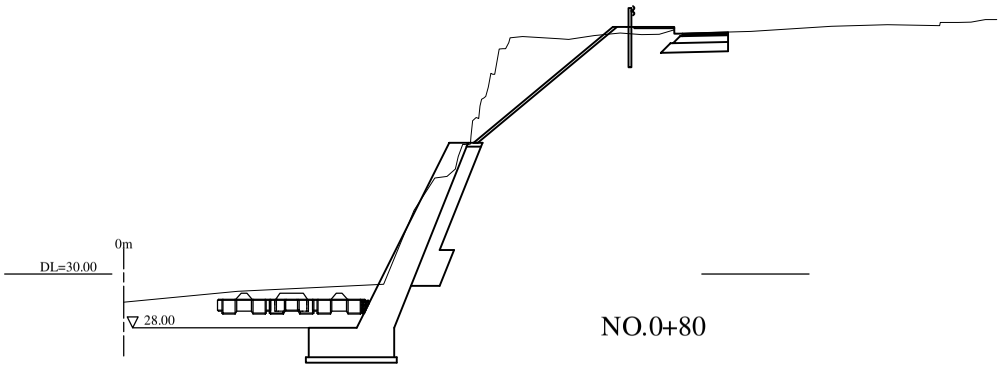


A-87

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	CROSS SECTION (1) , R5	PREPARED BY: / CHECKED BY:	A- 05

CROSS SECTION (2) , R5 SCALE A3 1:200

NO.0+90



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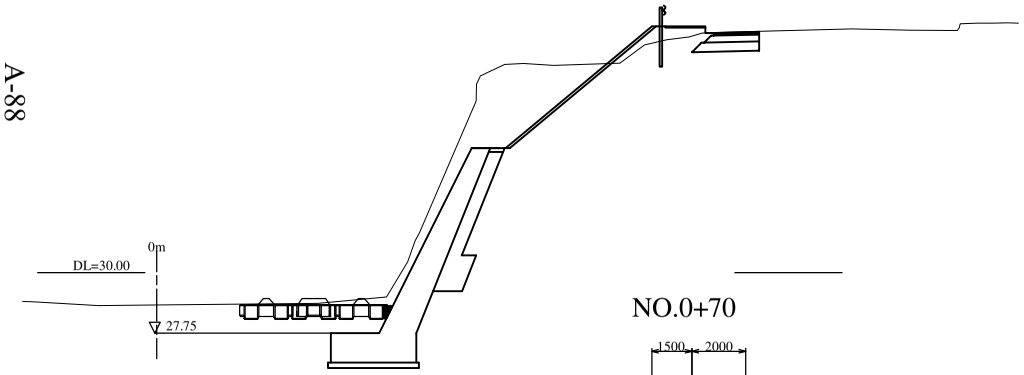

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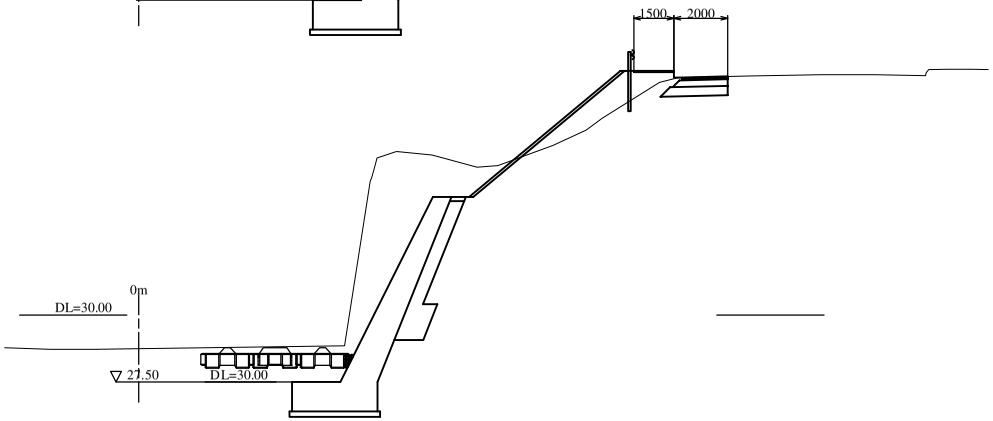

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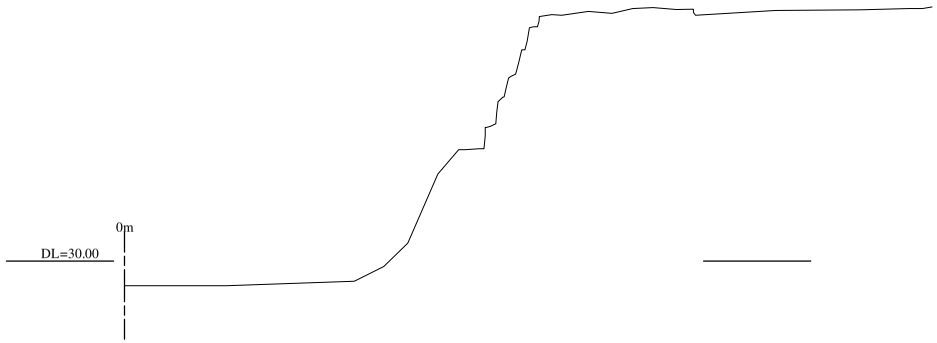

A-88

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	CROSS SECTION (2) , R5	PREPARED BY: / CHECKED BY:	A- 06

CROSS SECTION (3) , R6 SCALE A3 1:200

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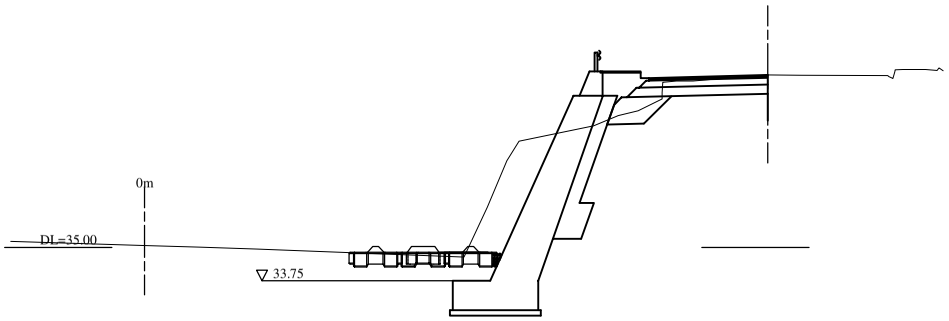

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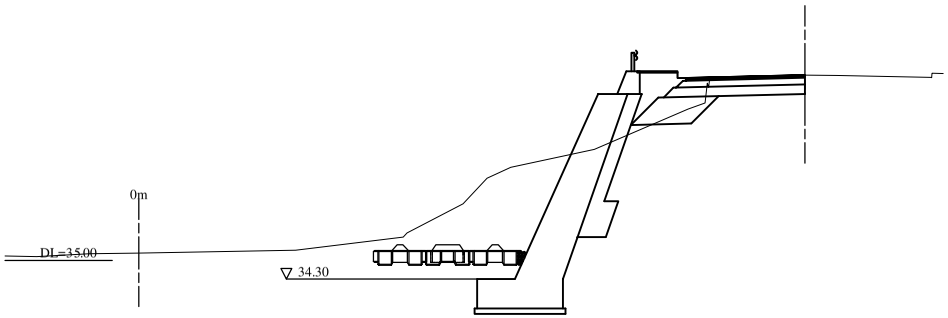

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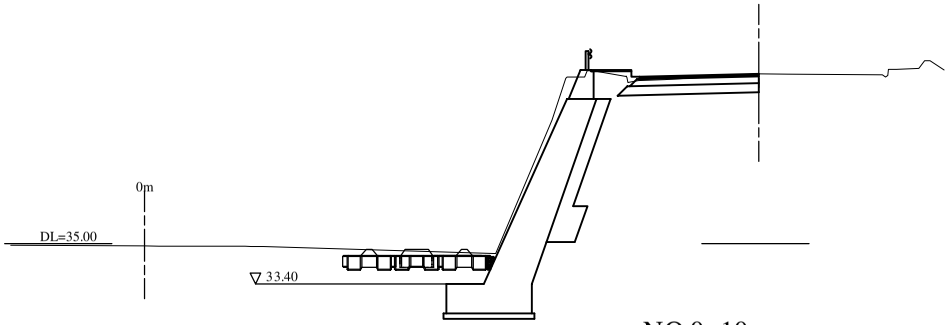

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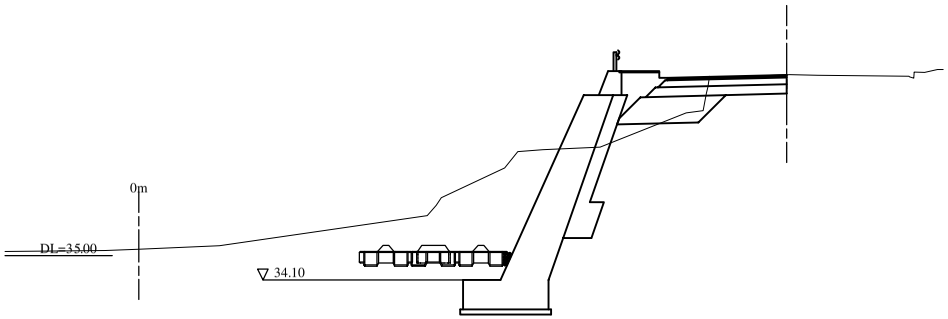

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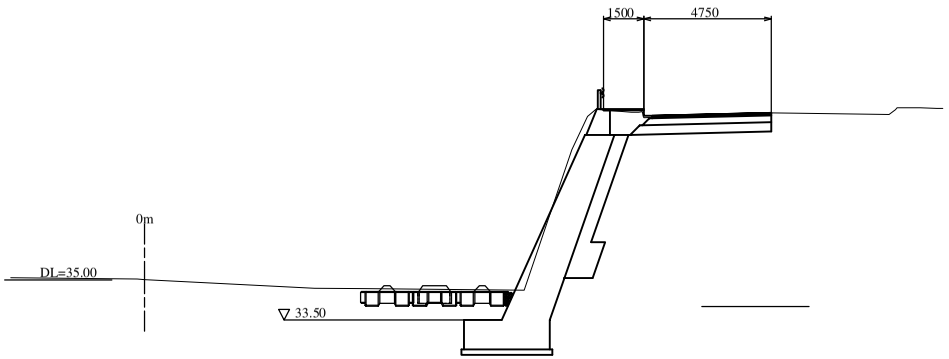

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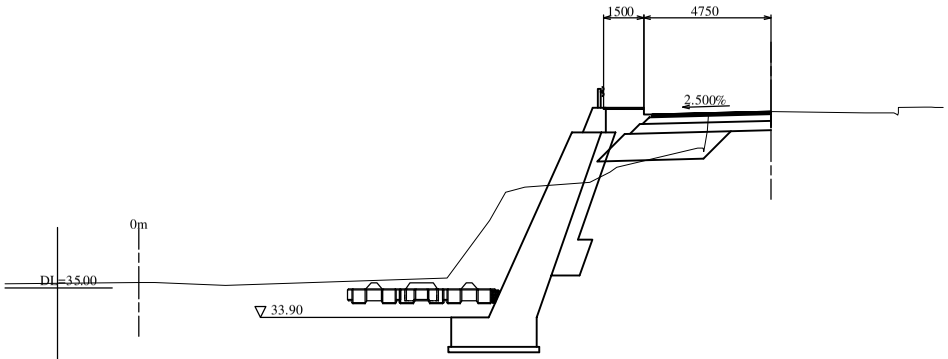
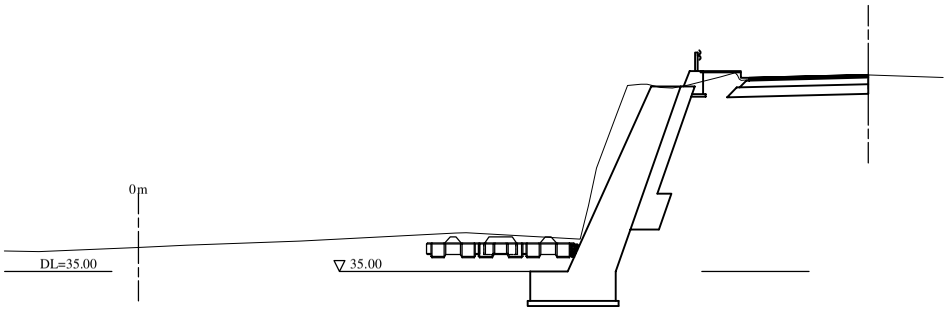


A-89

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	CROSS SECTION (3) , R6	PREPARED BY: / CHECKED BY:	A- 07

CROSS SECTION (4) , R6 SCALE A3 1:200

NO.0+90



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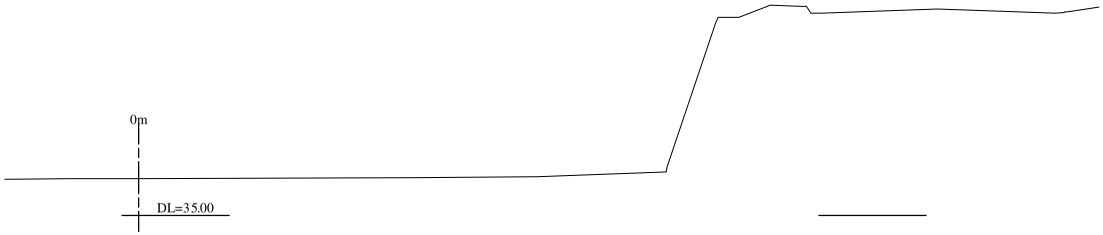

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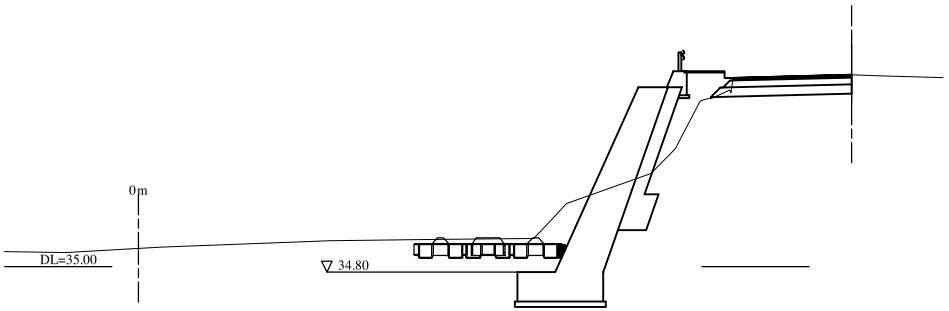

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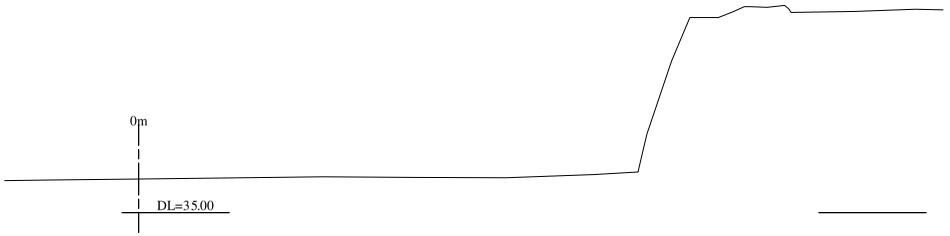

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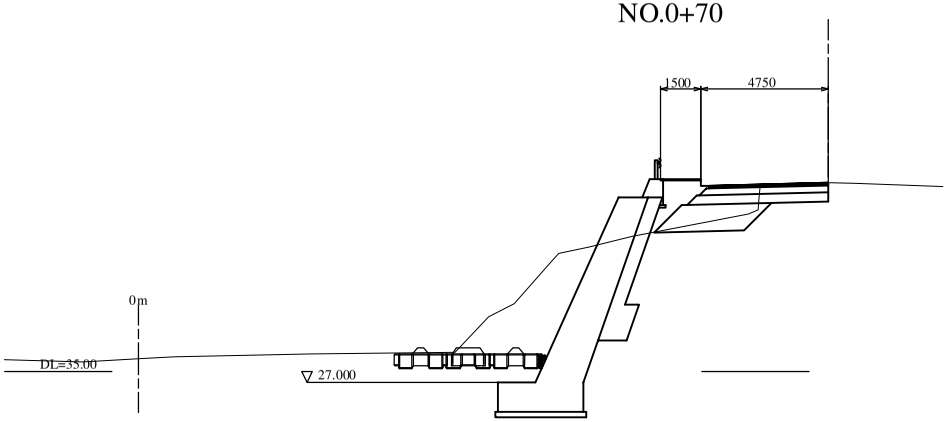

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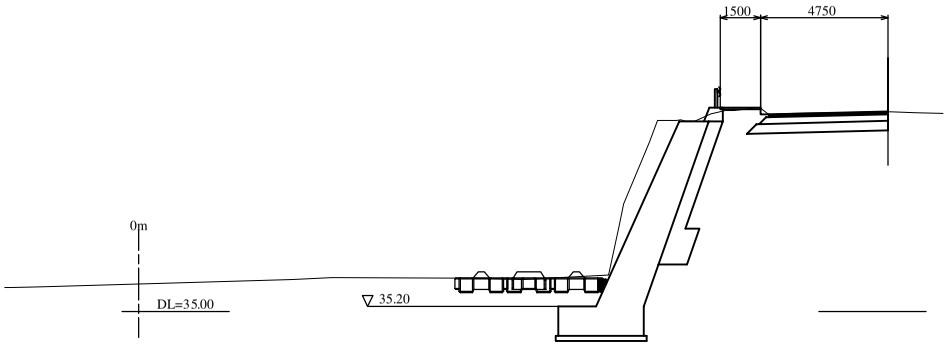


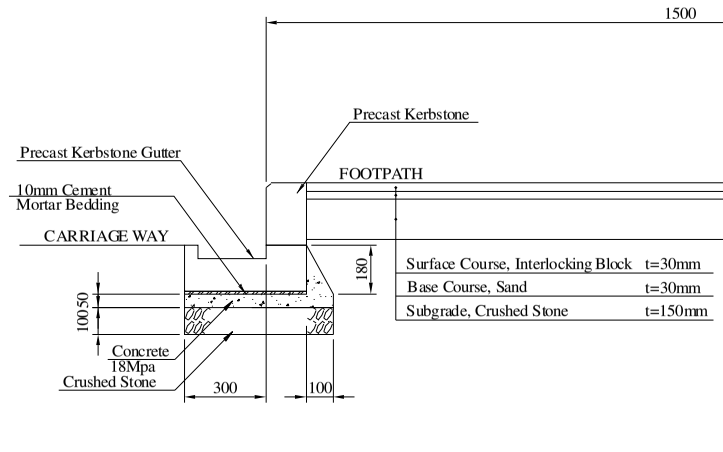
A-90

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	CROSS SECTION (4) , R6	PREPARED BY: / CHECKED BY:	A- 08

STRUCTURE DETAILS (1) SCALE AS SHOWN

KERB STONE SCALE A3 1:20

TYPE1 (PRECAST)



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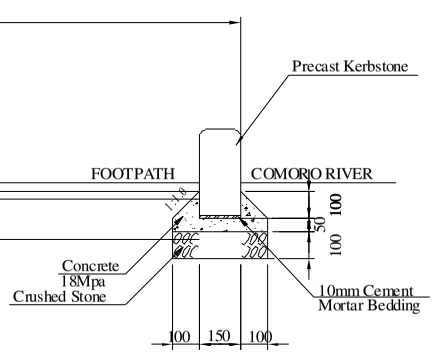
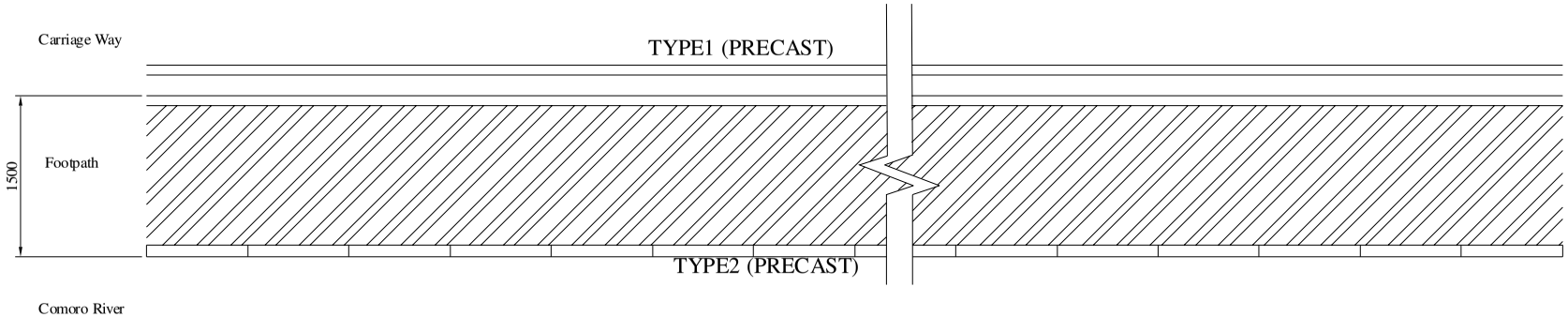


ARRANGEMENT PLAN SCALE A3 1:50



A-91

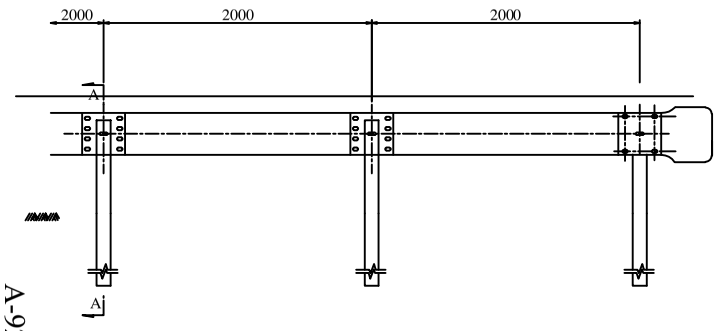
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	STRUCTURE DETAILS (1)	PREPARED BY: CHECKED BY:	A- 09

STRUCTURE DETAILS (2) SCALE AS SHOWN

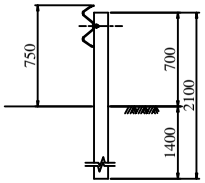
GUARDRAIL DETAILS

UNDERGROUND TYPE SCALE 1:40

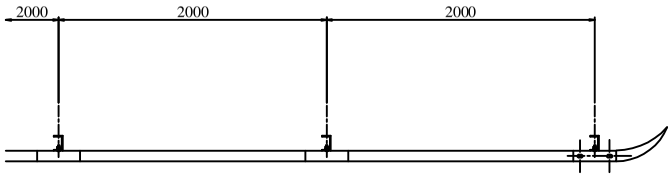
VIEW



A - A



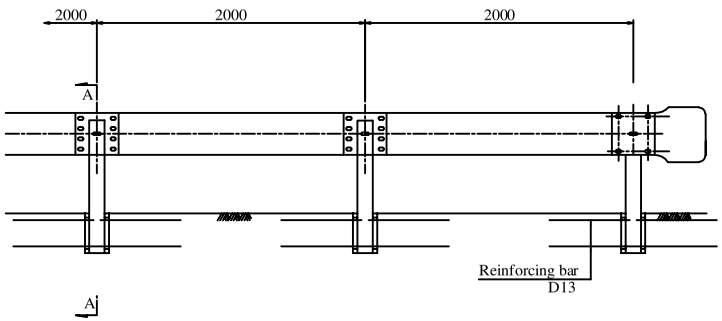
PLAN



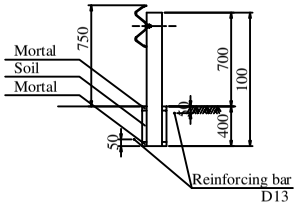
TRAFFIC DIRECTION

CONCRETE TYPE SCALE 1:40

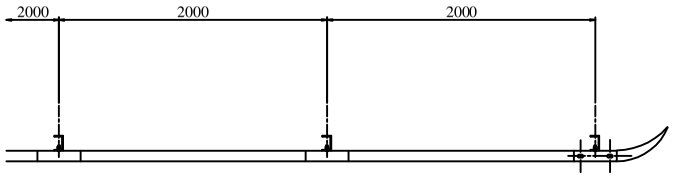
VIEW



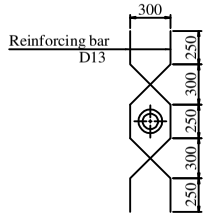
A - A



PLAN



TRAFFIC DIRECTION



A-92

Note :
1) Concrete strength shall be measured by cylinder crushing strength (Cube crushing strength shall be used cylinder crushing strength × 1.25 value)
2) N/mm2 = Mpa
3) Rust free material shall be applied for guard rail and metal guard fence.

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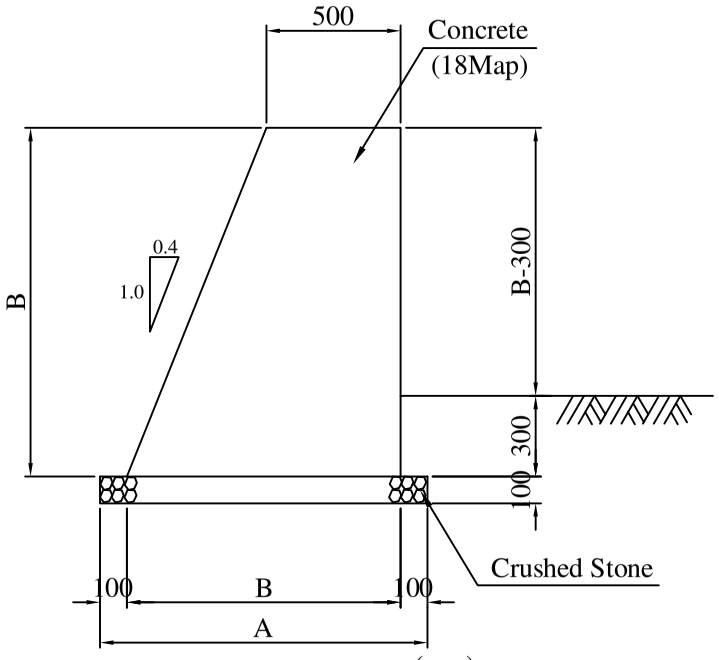
STRUCTURE DETAILS (3) SCALE AS SHOWN

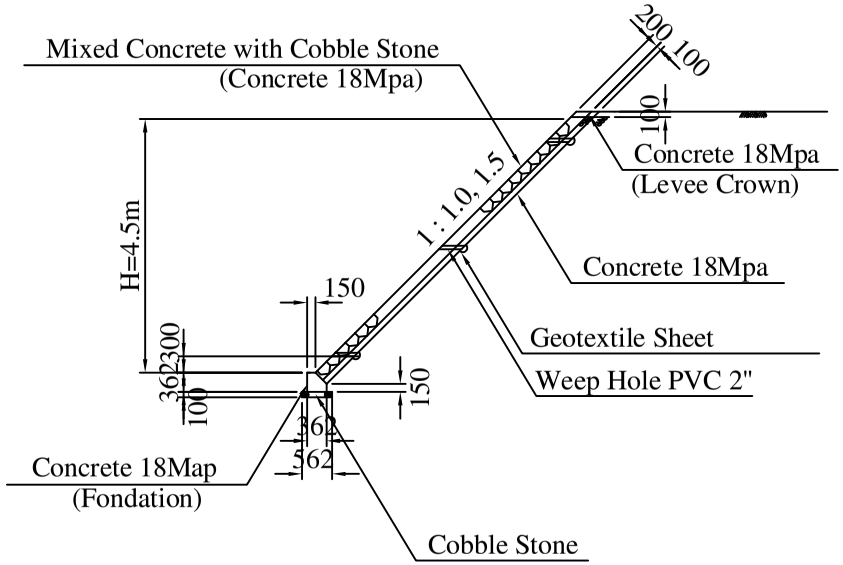
GRAVITY TYPE RETAINING WALL SCALE A3 1:20



(mm)

H	A	B
1.0	1100	900
1.5	1300	1100
2.0	1500	1300

STONE PITCHING SCALE A3 1:100

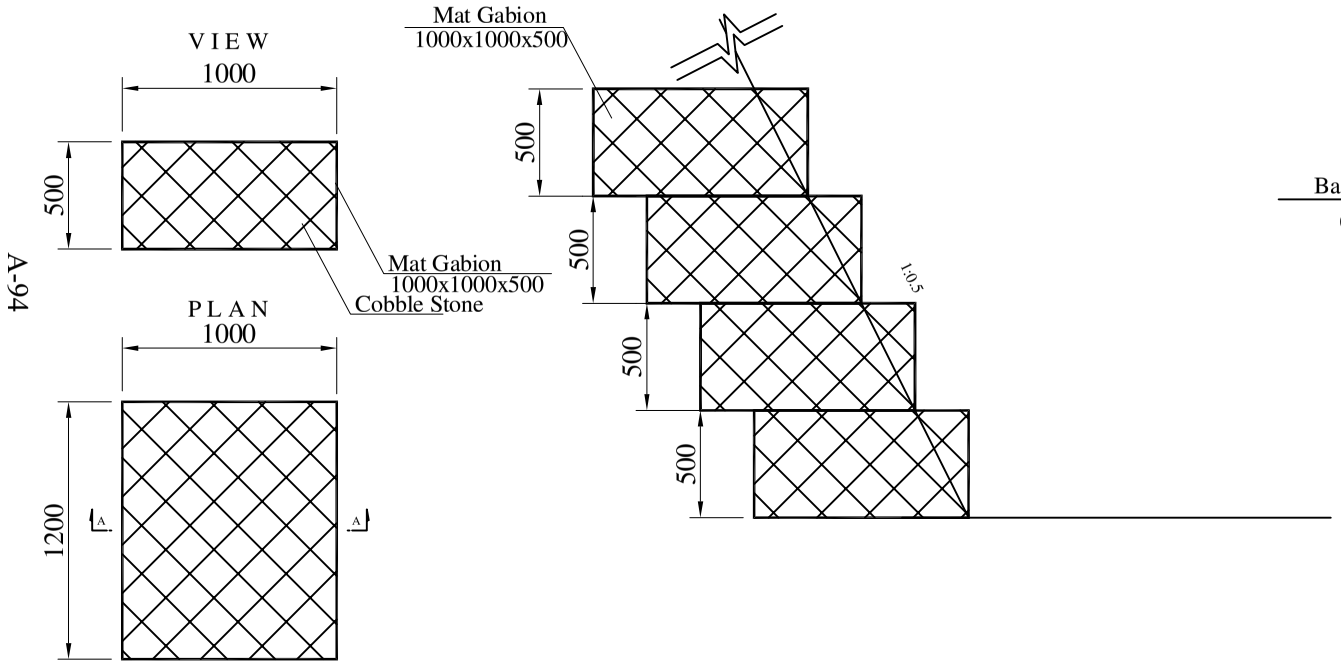


A-93

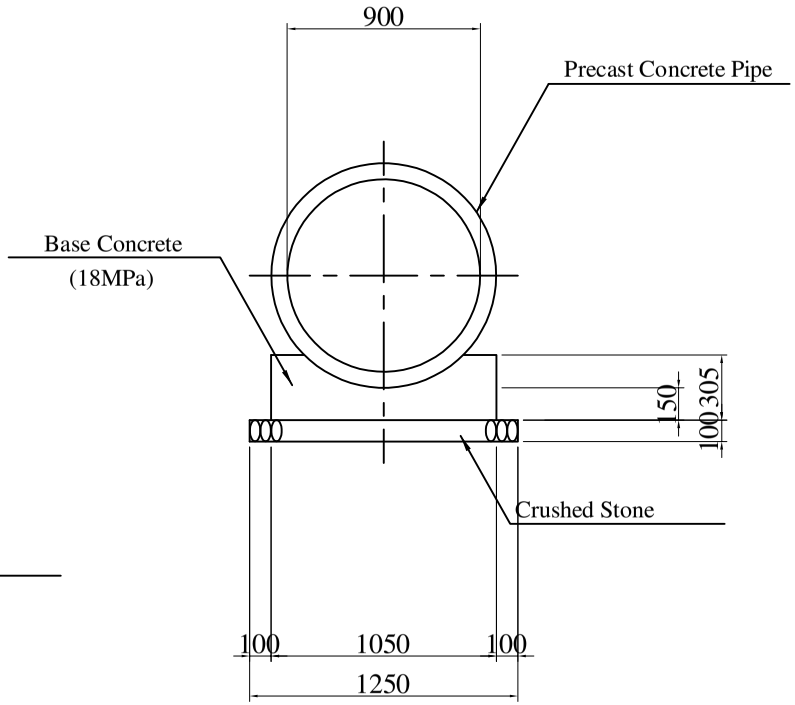
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	STRUCTURE DETAILS (3)	PREPARED BY: / CHECKED BY:	A- 11

STRUCTURE DETAILS (4) SCALE AS SHOWN

MAT GABION SCALE A3 1:25



PIPE CULVERT SCALE A3 1:100



A-94

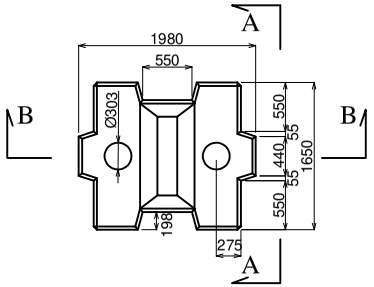
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	STRUCTURE DETAILS (4)	PREPARED BY: / CHECKED BY:	A- 12

STRUCTURE DETAILS (5) SCALE 1:60

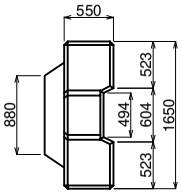
RIVERBED PROTECTION BLOCK (3t)

DIMENSION OF BLOCK

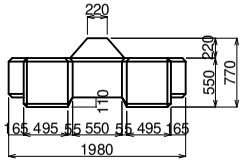
PLAN



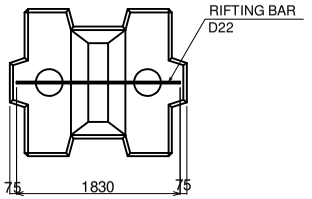
A-A

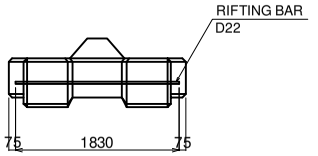


B-B



DETAIL OF RIFTING BAR





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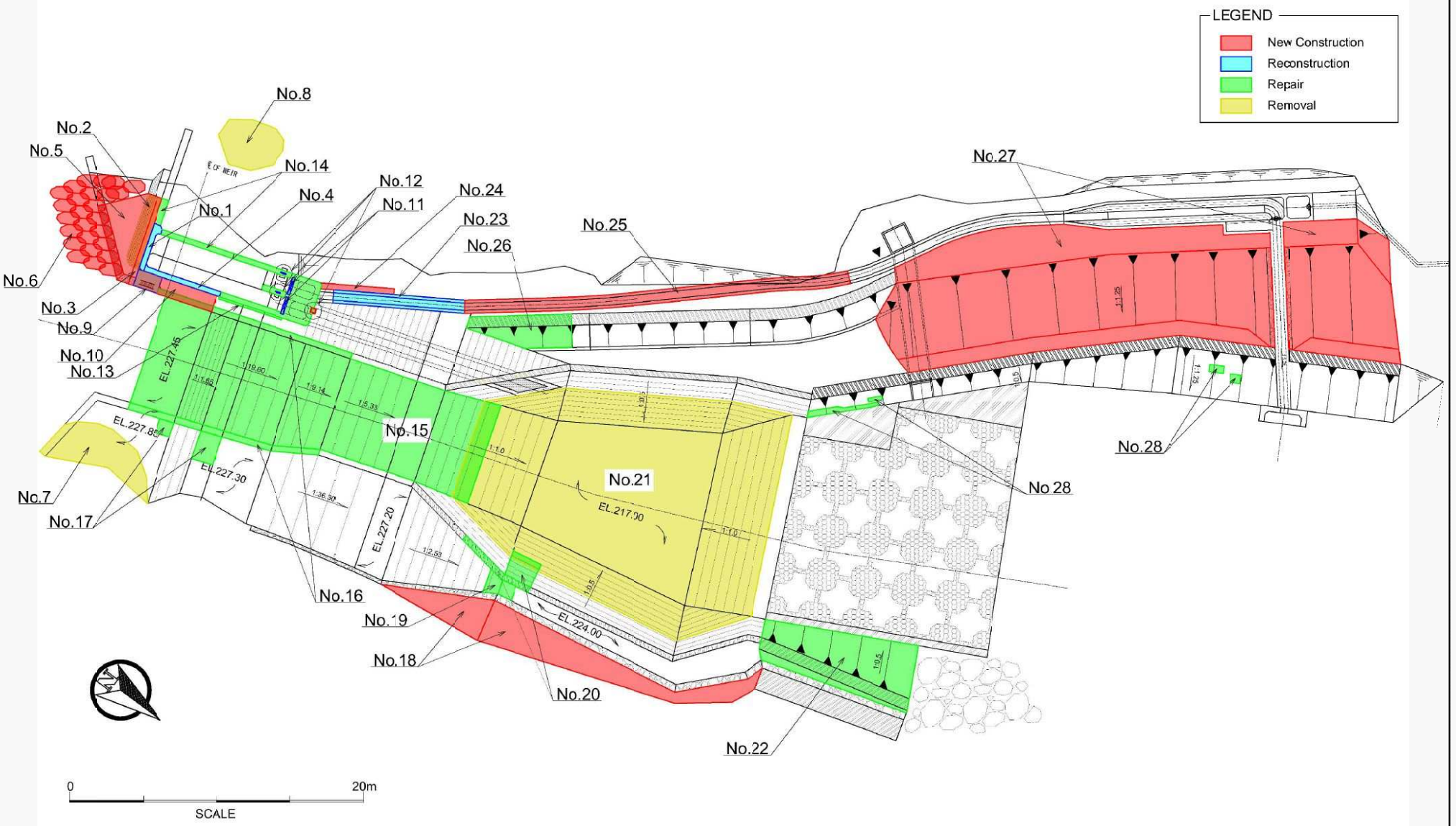
(NOTES)
CONCRETE : CLASS F 18N/mm^2

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: DIRECTORATE OF ROAD, BRIDGE AND FLOOD CONTROL, MINISTRY OF PUBLIC WORKS (MPW-DRBFC)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABILTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.1) REHABILITAION OF COMORO RIVER RETAINING WALL	STRUCTURE DETAILS (5)	PREPARED BY: / CHECKED BY:	A- 13

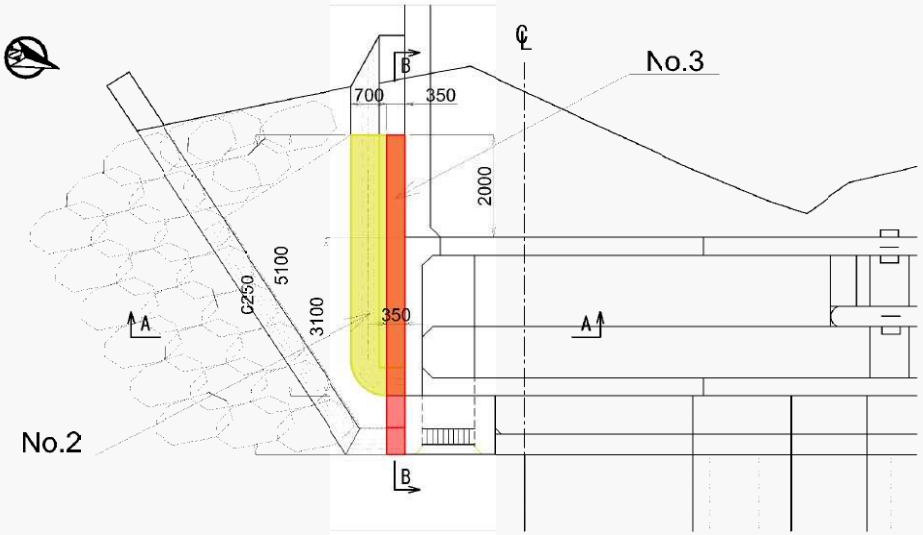
PLAN OF THE REHABILITATION



THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: BEE TIMOR-LESTE, MINISTRY OF PUBLIC WORKS (MPW-BTL)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD., JAPAN	THE PROGRAMME FOR URGENT REHABLTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.2) REHABILITAION OF BEMOS WATER SUPPLY SYSTEM	PLAN OF THE REHABILITATION	PREPARED BY: CHECKED BY:	

DETAILED PLAN for No.2, 3 (1/2)

PLAN SCALE 1:100 (A3)

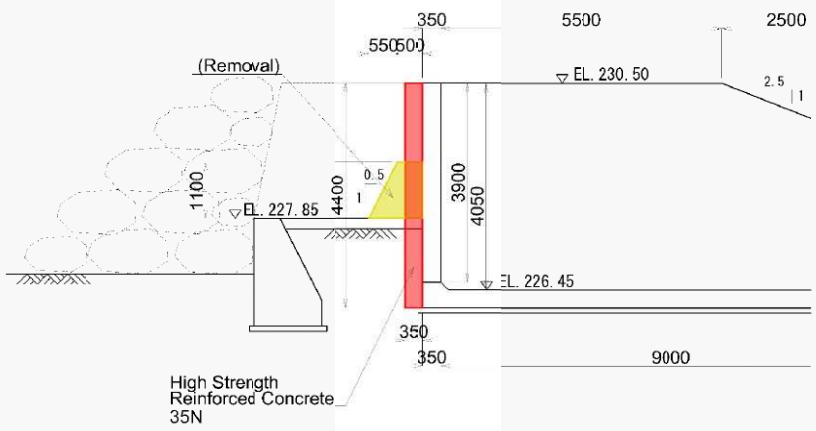


LEGEND

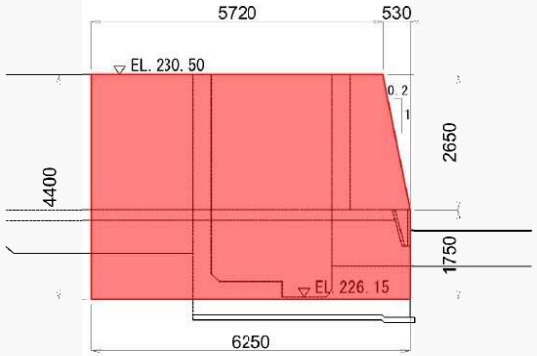
- New Construction
- Reconstruction
- Repair
- Removal

NOTES
No.2: Retaining wall infront of the Front Wall (Removal)
No.3: Protection wall for the Front Wall (New Construction)

SECTION A-A SCALE 1:100 (A3)



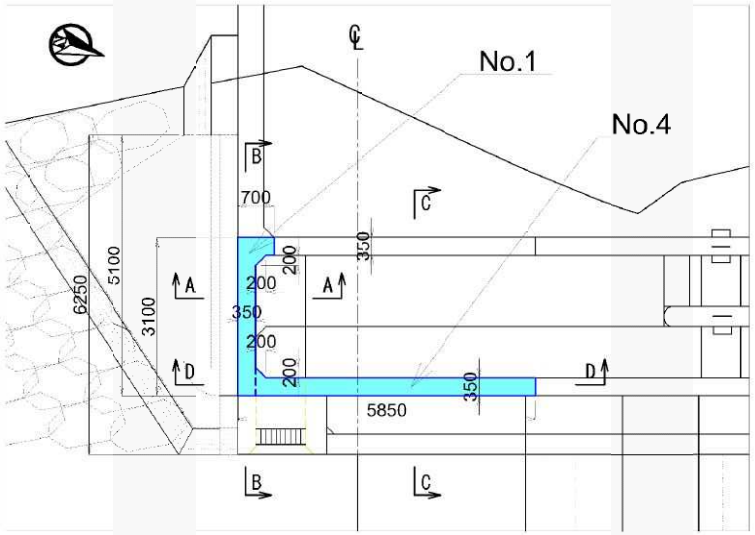
SECTION B-B SCALE 1:100 (A3)



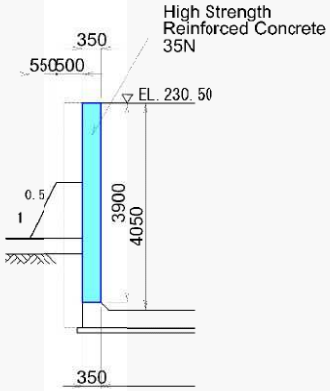
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: BEE TIMOR-LESTE, MINISTRY OF PUBLIC WORKS (MPW-BTL)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD., JAPAN	THE PROGRAMME FOR URGENT REHABLTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.2) REHABILITAION OF BEMOS WATER SUPPLY SYSTEM	DETAILED PLAN for No.2, 3 (1/2)	PREPARED BY: CHECKED BY:	

DETAILED PLAN for No.1, 4 (1/2)

PLAN SCALE 1:100 (A3)



SECTION A-A SCALE 1:100 (A3)



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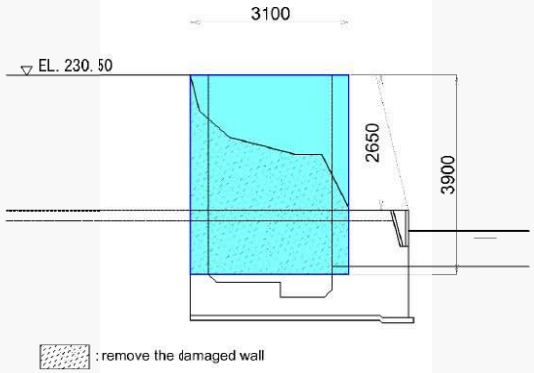
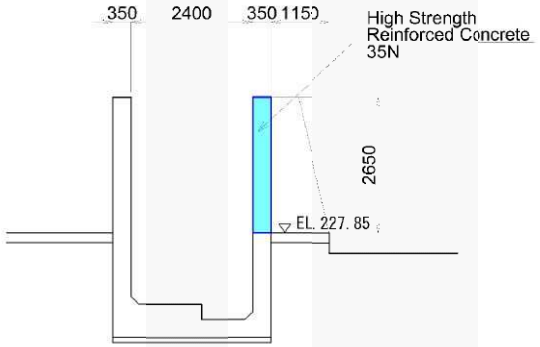


LEGEND

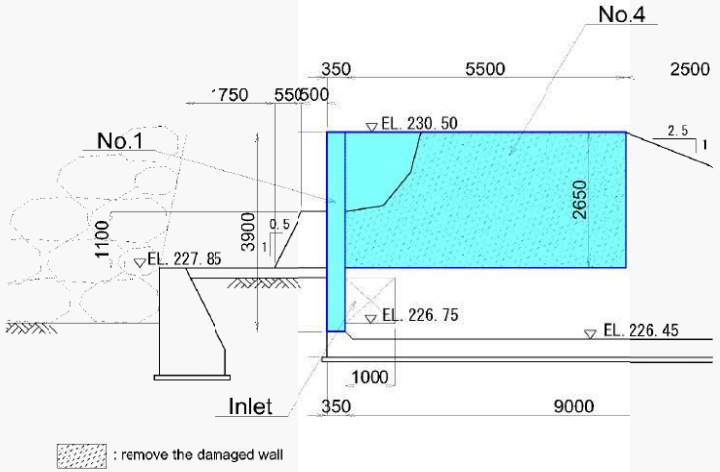
- New Construction
- Reconstruction
- Repair
- Removal

NOTES
No.1: Front Wal (Reconstruction)
No.4: Side Wall(Reconstruction)

SECTION C-C SCALE 1:100 (A3)



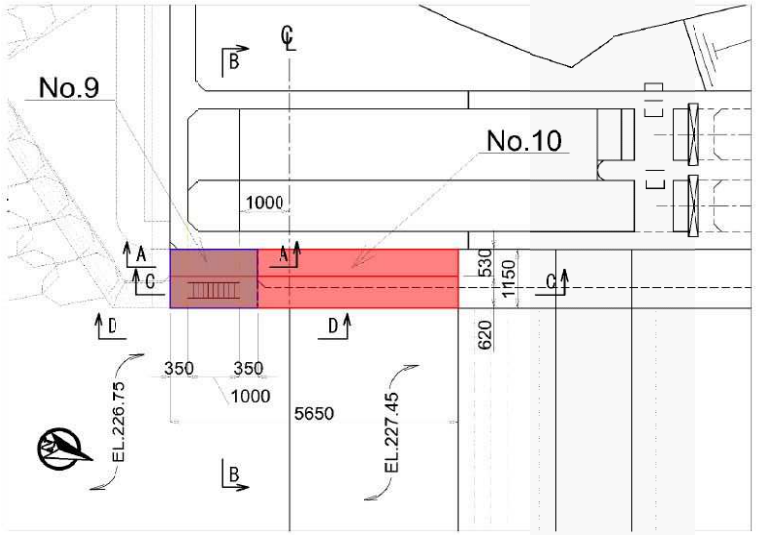
SECTION D-D SCALE 1:100 (A3)



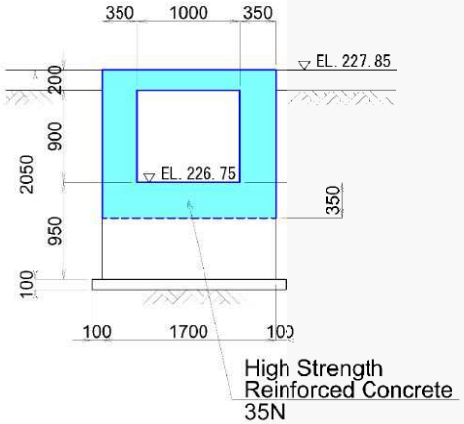
THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: BEE TIMOR-LESTE, MINISTRY OF PUBLIC WORKS (MPW-BTL)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD., JAPAN	THE PROGRAMME FOR URGENT REHABLTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.2) REHABILITAION OF BEMOS WATER SUPPLY SYSTEM	DETAILED PLAN for No.1, 4 (1/2)	PREPARED BY: CHECKED BY:	

DETAILED PLAN for No.9, 10 (1/2)

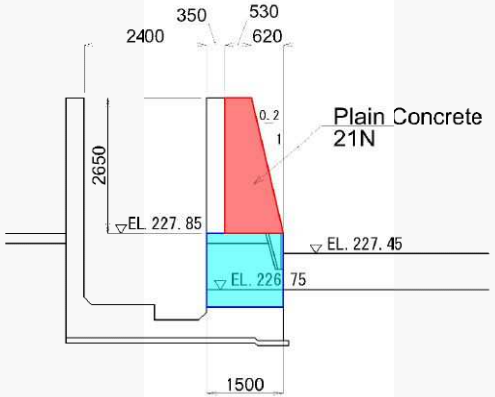
PLAN SCALE 1:100 (A3)



SECTION A-A SCALE 1:50 (A3)



SECTION B-B SCALE 1:100 (A3)



LEGEND

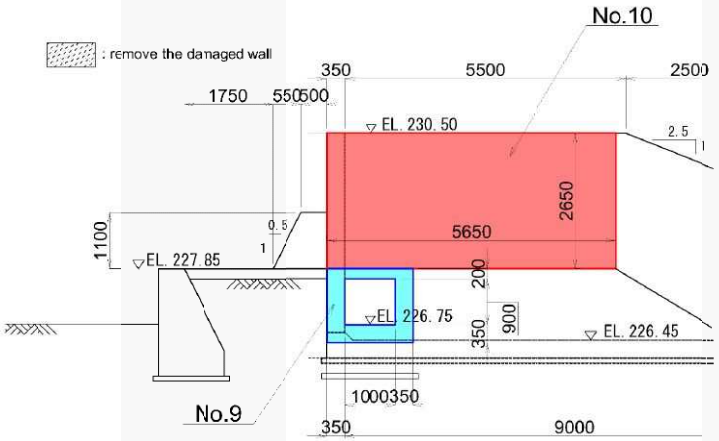
- New Construction
- Reconstruction (Re-instaation)
- Repair
- Removal

NOTES

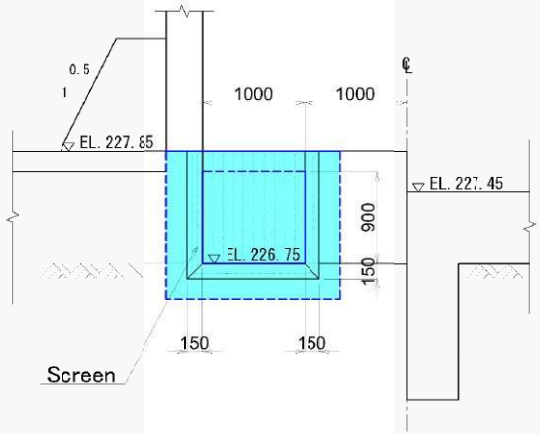
No. 9: Inlet facilities (Re-installation)
- Specifications of the Screenare as follows:
  1) size: W1000*H900
  2) material: SUS (screen bar and frame)
  3) spacing: 30mm
- Screen shouldbe produced n a factory.
- The Contracter shall check he dimensions on site prior to the production.
- The Contracter shall submit the proposal :o the Consultant for his approval.

No.10: Protection concrete around the Inlet and Side Wall (New Construction)

SECTION C-C SCALE 1:100 (A3)



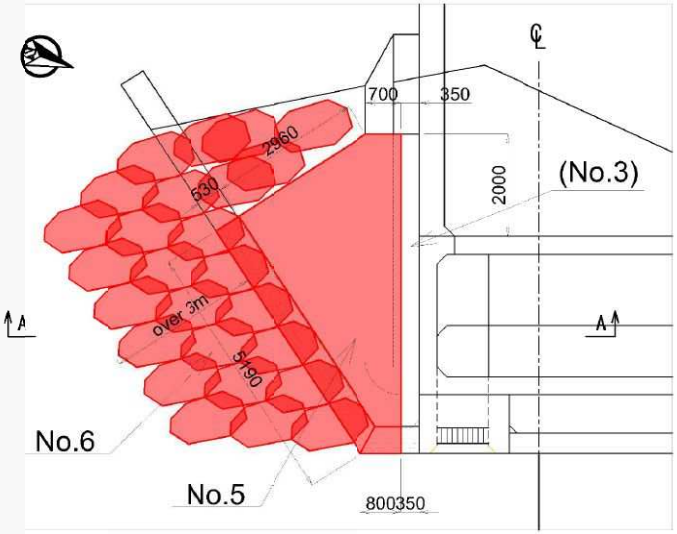
SECTION D-D SCALE 1:50 (A3)



THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: BEE TIMOR-LESTE, MINISTRY OF PUBLIC WORKS (MPW-BTL)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	THE PROGRAMME FOR URGENT REHABLTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.2) REHABILITAION OF BEMOS WATER SUPPLY SYSTEM	DETAILED PLAN for No.9, 10 (1/2)	PREPARED BY: CHECKED BY:	

DETAILED PLAN for No.5, 6

PLAN SCALE 1:100 (A3)



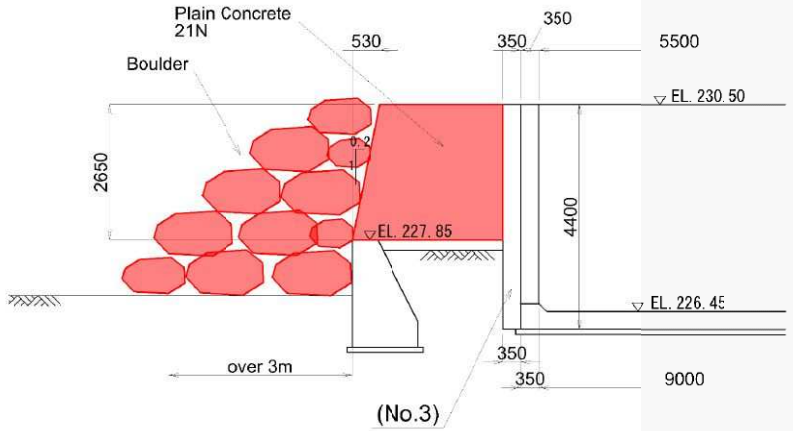
LEGEND

- New Construction
- Reconstruction
- Repair
- Removal

NOTES

No.5: Protection concrete in front of the Protection wall (New Construction)
No.6: Protection boulders in front of the Protection concrete (New Construction)

SECTION A-A SCALE 1:100 (A3)



THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
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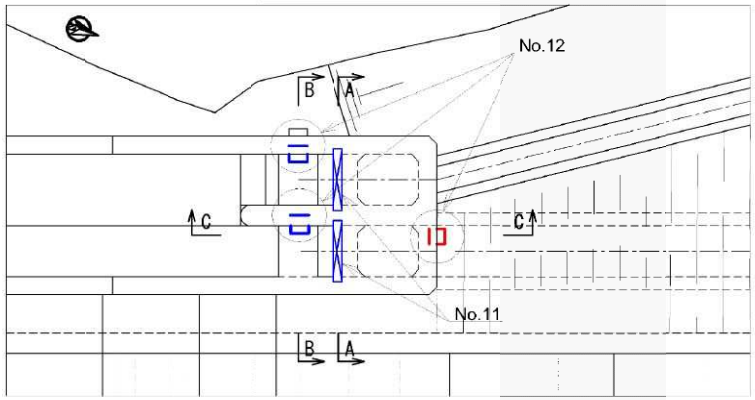
A-100

DETAILED PLAN for No.11, 12

PLAN SCALE 1:100 (A3)



LEGEND

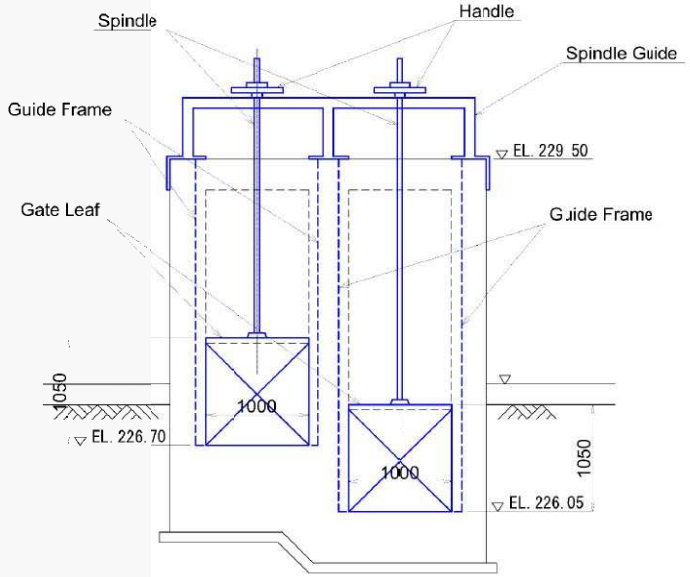
- New Construction
- Reconstruction (Re-instalation)
- Repair
- Removal

NOTES

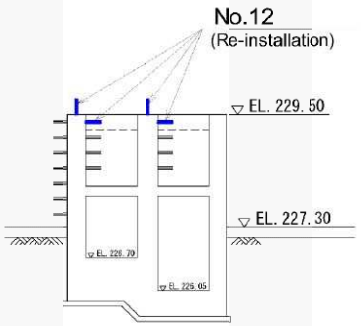
No.11: Gate facilities (Re-nstallation)
- The Contractor shall confirm the dimensions and related specification for existing gate facilitie at the site in advance.
- The Gate facilities should be produced in a factory.
- The Contractor shall submit the propoal to the Consultant for his approval.

No.12: Steps (New Construction / Reconstruction)
- The detailed locations where the stepsare to be installed should be approved by the Consultant.

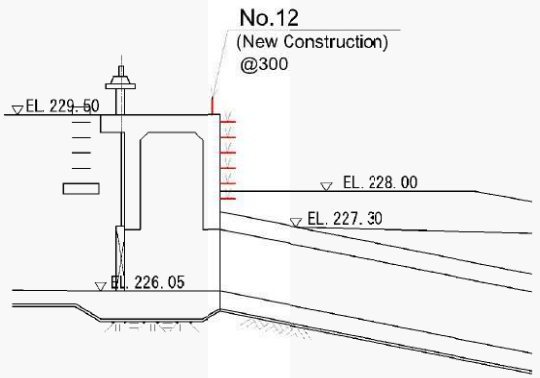
SECTION A-A SCALE 1:50 (A3) (No.11)



SECTION B-B SCALE 1:100 (A3)



SECTION C-C SCALE 1:100 (A3)

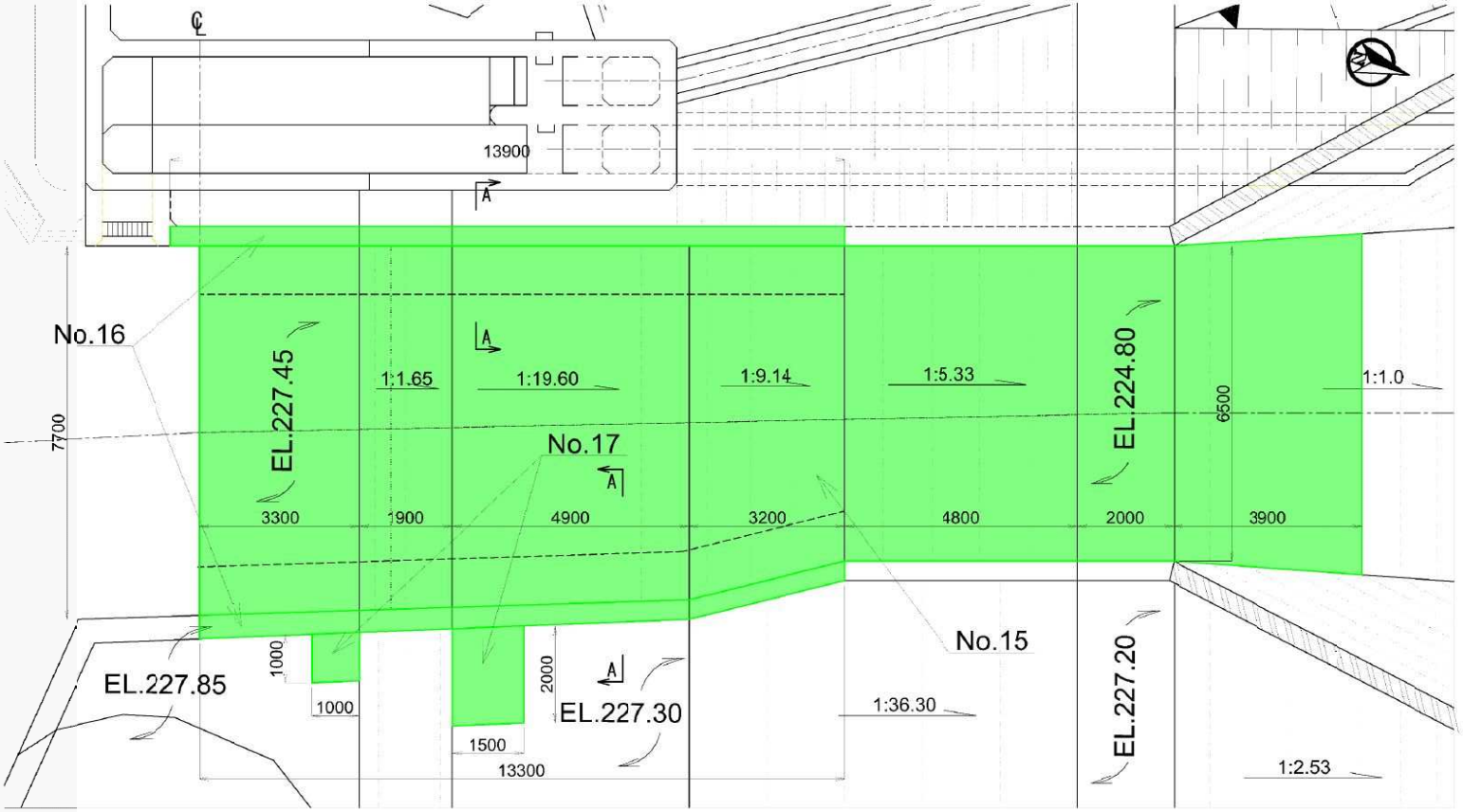


A-101

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
THE EXECUTING AGENCY: BEE TIMOR-LESTE, MINISTRY OF PUBLIC WORKS (MPW-BTL)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD., JAPAN	THE PROGRAMME FOR URGENT REHABLTATION OF FLOOD-DAMAGED INFRASTRUCTURES	(SUB PROJECT No.2) REHABILITAION OF BEMOS WATER SUPPLY SYSTEM	DETAILED PLAN for No.11, 12	PREPARED BY: CHECKED BY:	

DETAILED PLAN for No.15, 16

PLAN SCALE 1:100 (A3)

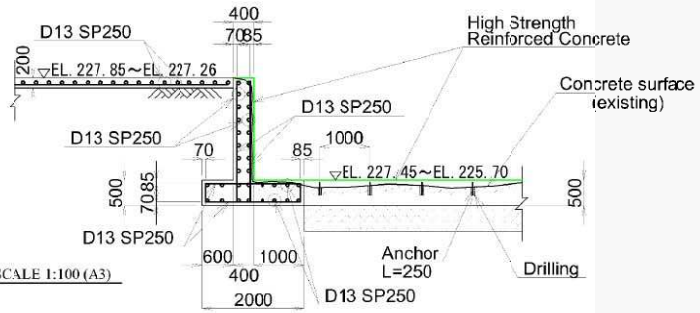


LEGEND

- New Construction
- Reconstruction
- Repair
- Removal

NOTES

No.15: Intake Weir (Repair)
No.16: Side wall of the Intake Weir (Repair)
No.17: Defective areas of the upper side on the high waterbed of the right bank (Repair)
- Reinforcing bar and surface concrete shall be restored to their original condition.
- The minimum thickness of the surface concrete placed in flowing water shall be 10 cm.
- The surface concrete of the Intake Weir (No.15) should be fixed with around one anchor (reinforcing bar) per m2.



SECTION A-A SCALE 1:100 (A3)

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
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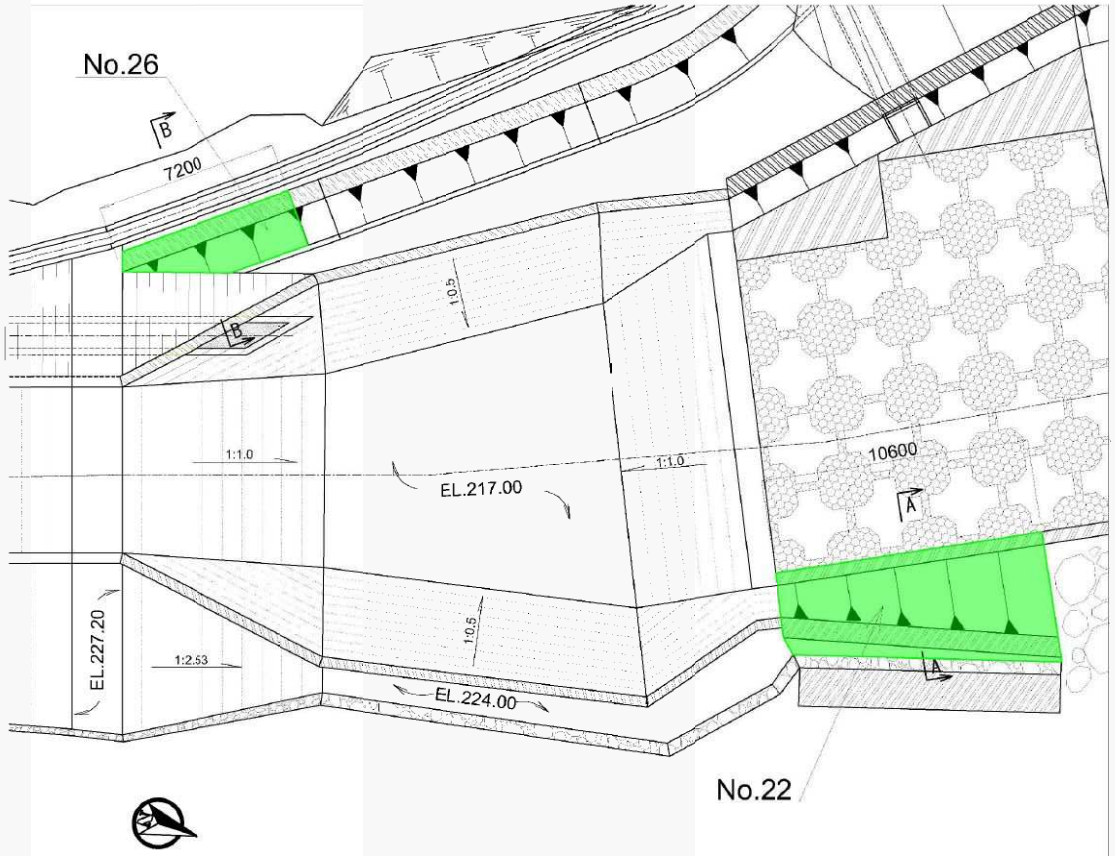
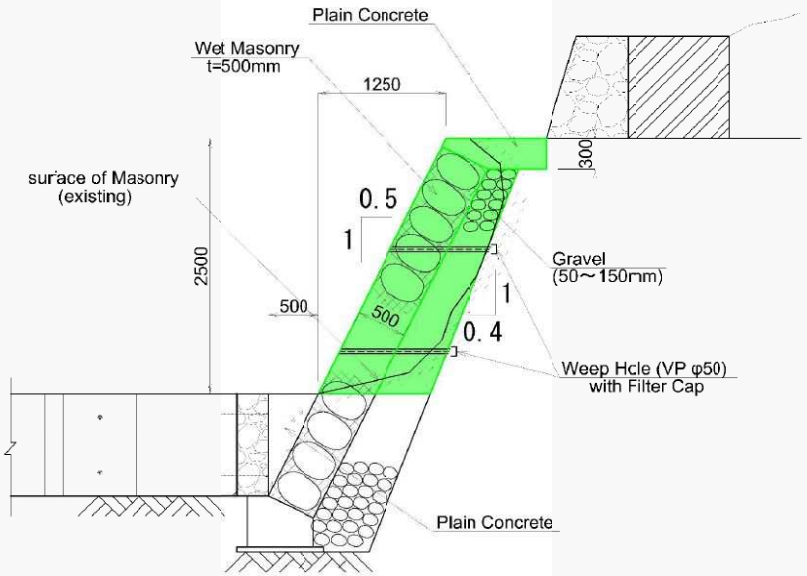
DETAILED PLAN for No.22, 26

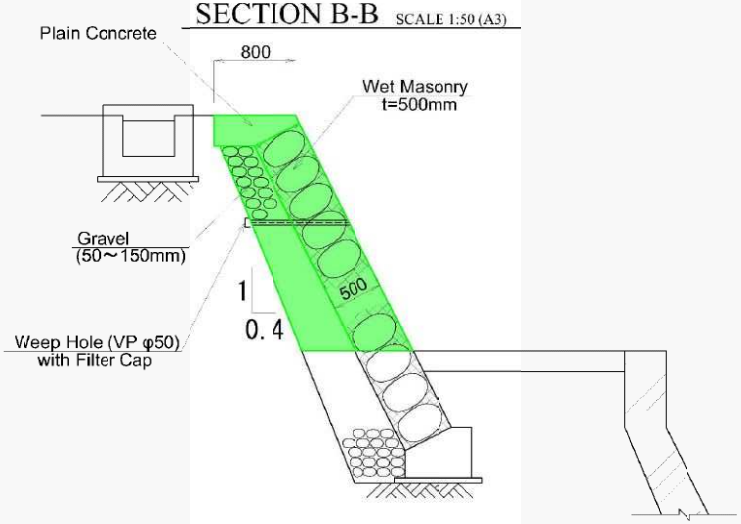
PLAN SCALE 1:200 (A3)



SECTION A-A SCALE 1:50 (A3)



SECTION B-B SCALE 1:50 (A3)



LEGEND

- New Construction
- Reconstruction
- Repair
- Removal

NOTES

No.22: defective area in the right bank of the riverbed (Repair)
No.26: defective area in the left bank onthe high waterbed of the Grit Chamber (IRepair)
- Wet masonry and related facilities shall be restored to their original condition.
- Weep hole should be installed aroundone hole per three m2.
- All defective parts shall be removed.
- The back of the Wet masonry should be ensured to backfill with gravel.

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
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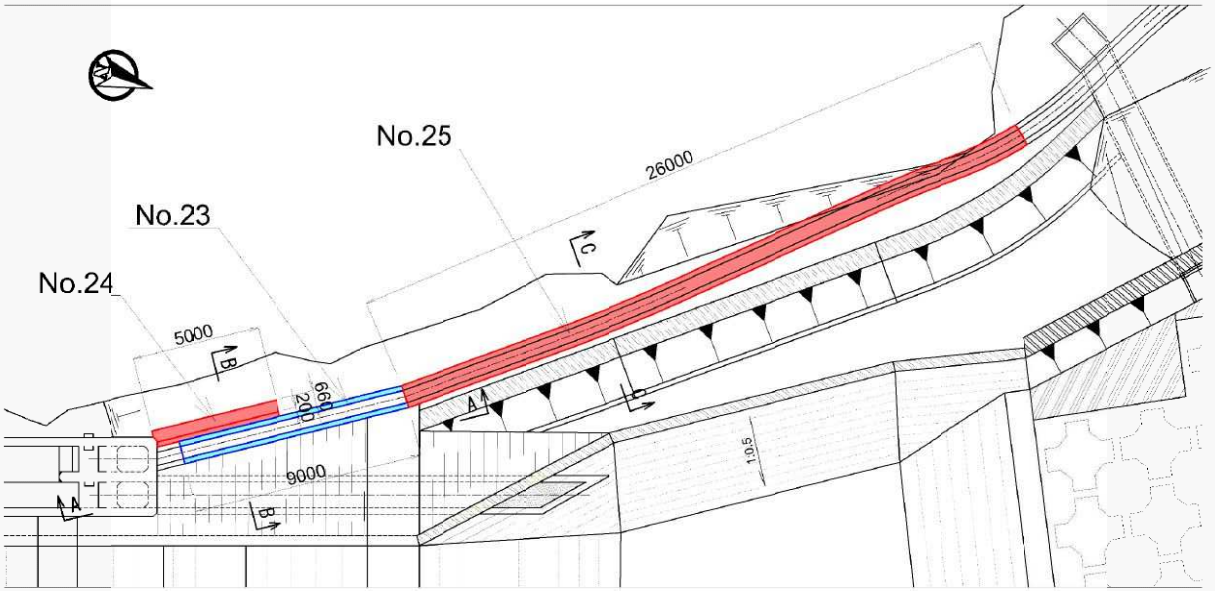
DETAILED PLAN for No.23, 24, 25

PLAN SCALE 1:200 (A3)



LEGEND

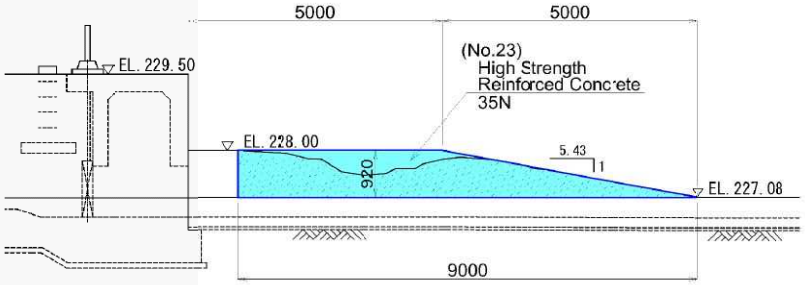
- New Construction
- Reconstruction
- Repair
- Removal

NOTES

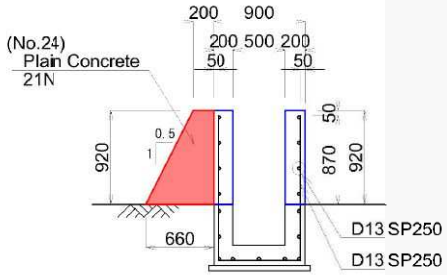
No.23: Upper Wall of the Connecting Canal (Reconstruction)
- Reinforcing bar and concrete shall be restoredto their original condition.

No.24: Protection wall for the Upper Wall of the Connecting Canal (New Construction)
No.25-1: Top of the side wall of the Connecting Canal (Repair)
No.25-2: Installationof the Connecting Canal (Repair)

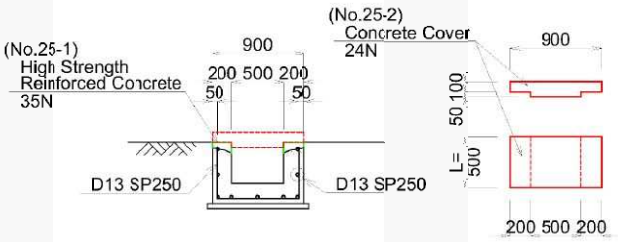
SECTION A-A SCALE 1:100 (A3)



SECTION B-B SCALE 1:50 (A3)



SECTION C-C SCALE 1:50 (A3)



THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
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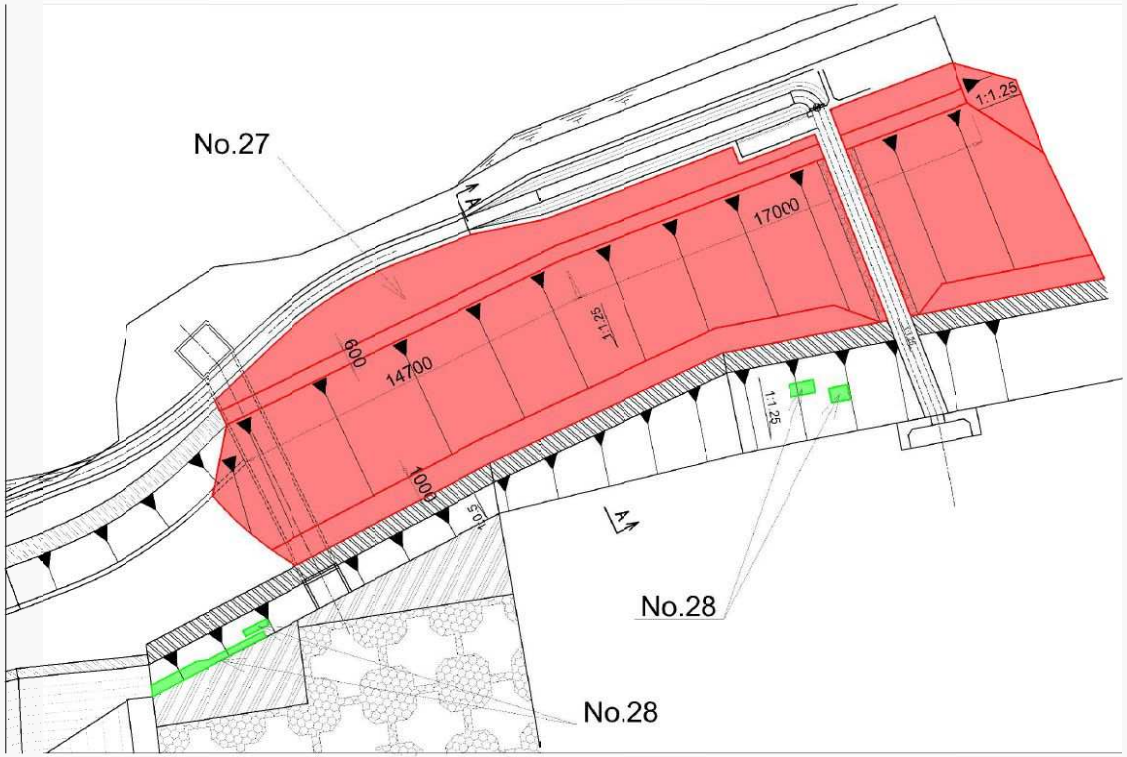
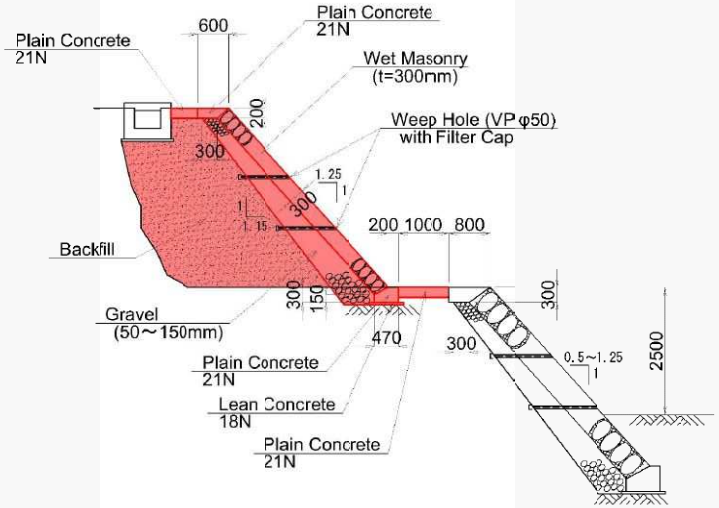
DETAILED PLAN for No.27, 28

PLAN SCALE 1:200 (A3)



SECTION A-A SCALE 1:100 (A3)



LEGEND

- New Construction
- Reconstruction
- Repair
- Removal

NOTES

No.27: Protection Wall of the upper side of the left bank of the riverbed (New Construction)
- Under existing Connecting Canal should be ensured to backfill with appropriate material.

No.28: defective area in theleft bank of the riverbed (Repair)
- Wet masonry shall be restored to their original condition.
- Weep hole should be installed around one hole per three m2.
- All defective parts shall be removed.
- The back of the Wet masonry should be ensured to backfill with gravel.

THE CLIENT: MINISTRY OF PUBLIC WORKS	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
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DRAWING INDEX

DRAWING NO.	DRAWING TITLE	SCALE	DRAWING NO.	DRAWING TITLE	SCALE
DRAWING INDEX					
C-00	Location map				
1. BULUTO IRRIGATION SCHEME			2. MALIANA IRRIGATION SCHEME		
1.1 INTAKE STRUCTURE			2.1 INTAKE STRUCTURE		
C-01	General plan	1:1000	C-16	General plan	1:200
C-02	Plan	1:600	C-17	Plan	1:150
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C-04	General plan of the Riverbed protector downstream of the apron (Scouring sluice channel)	1:200	C-19	General drawing of restoration work for Scouring sluice channel	1:100
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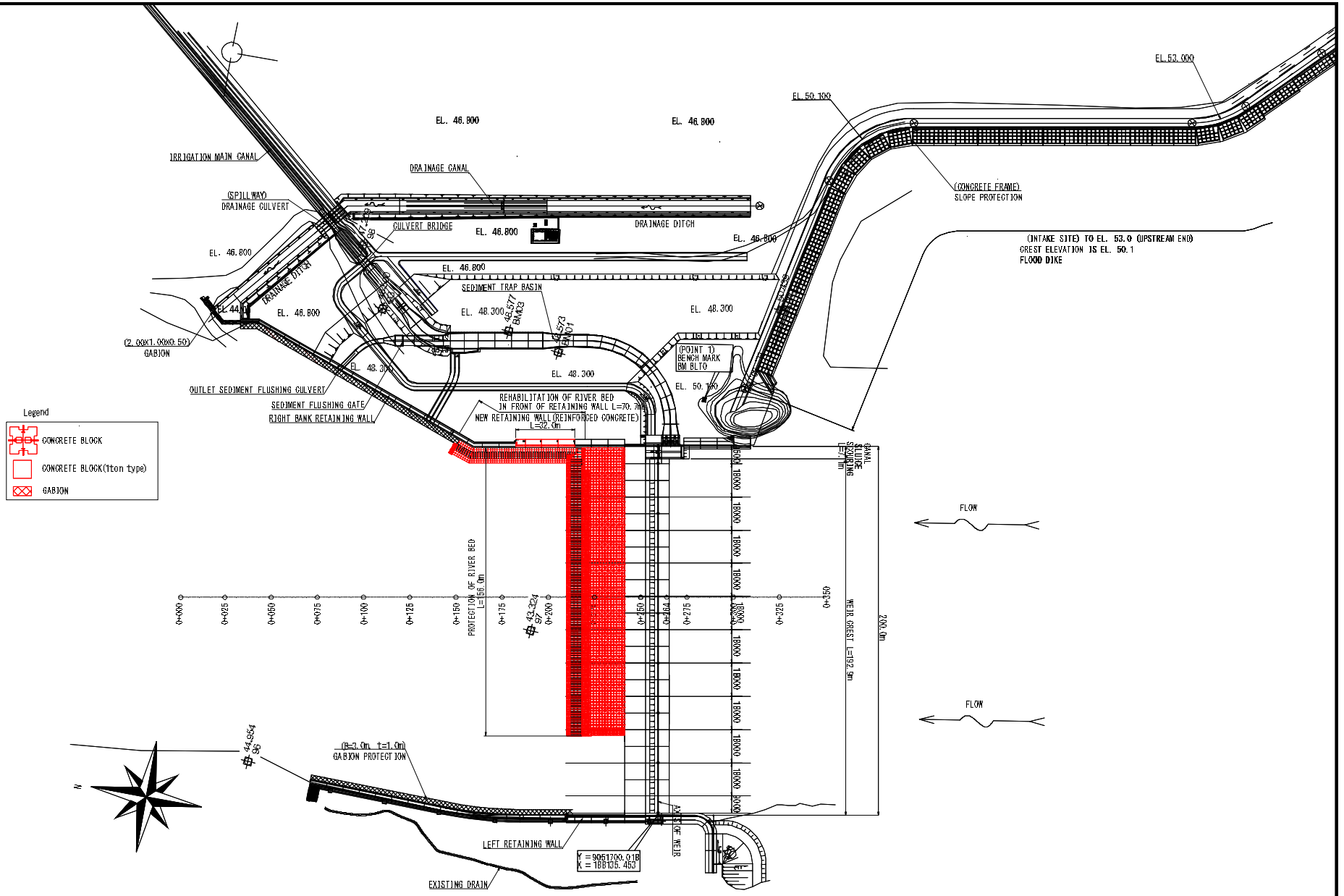
THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	DRAWING INDEX	PREPARED BY: CHECKED BY:	

LOCATION MAP OF PROJECT SITE

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD, JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	LOCATION MAP	PREPARED BY: CHECKED BY:	C-00

1. BULUTO IRRIGATION FACILITY

1.1 INTAKE STRUCTURE

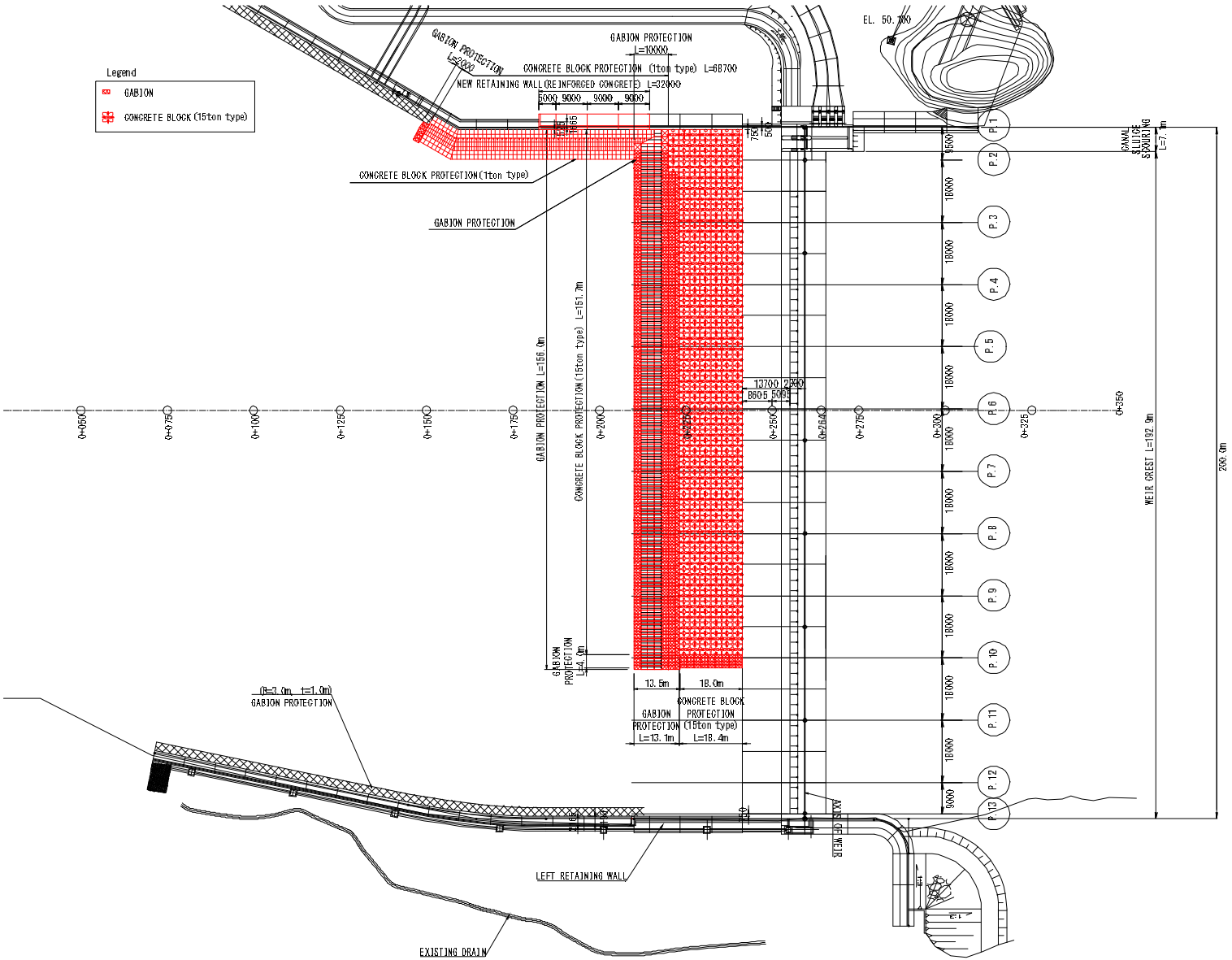


GENERAL PLAN

S=1:1000

Note. The current ground height is the results of aerial survey by UAV in October 2021.

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME General plan	PREPARED BY:	C-01
					CHECKED BY:	



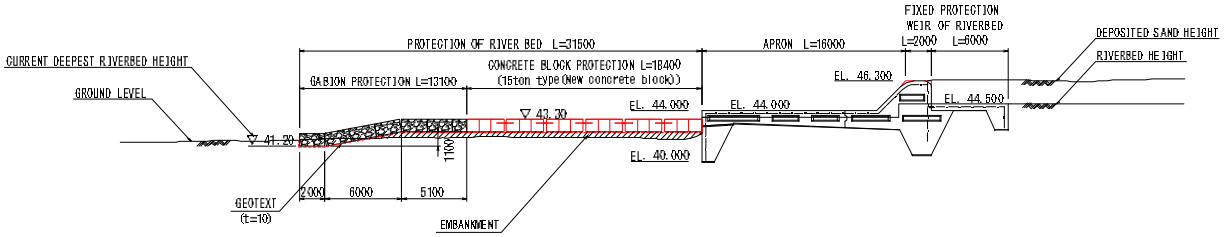
PLAN

S=1:600

Note. The current ground height is the results of aerial survey by UAV in October 2021.

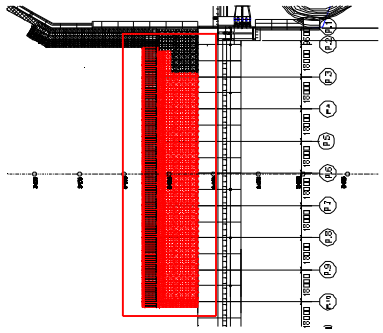
THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME Plan	PREPARED BY: / CHECKED BY:	C-02

A-111

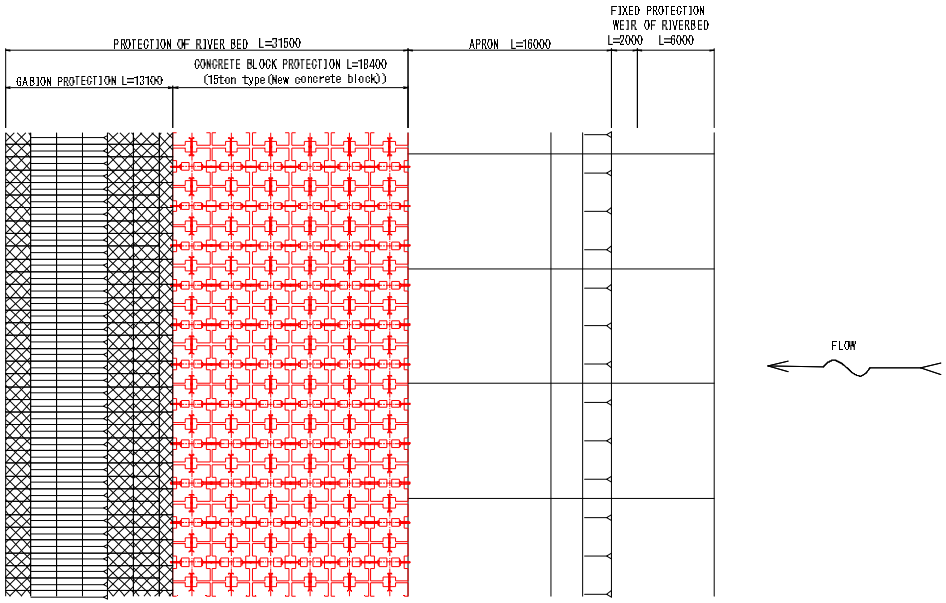


LONGITUDINALSECTION

S=1:200



LOCATION MAP

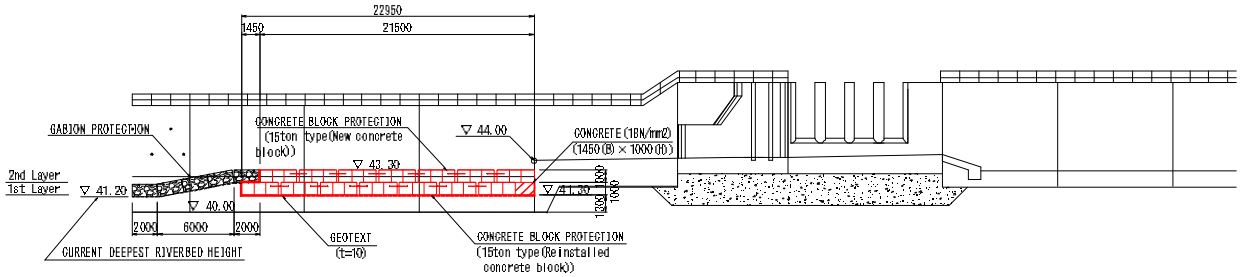


PLAN

S=1:200

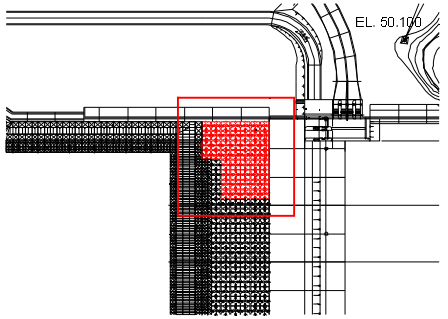
A-112

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME General plan of the Riverbed protector downstream of the apron (fixed weir)	PREPARED BY: CHECKED BY:	C-03

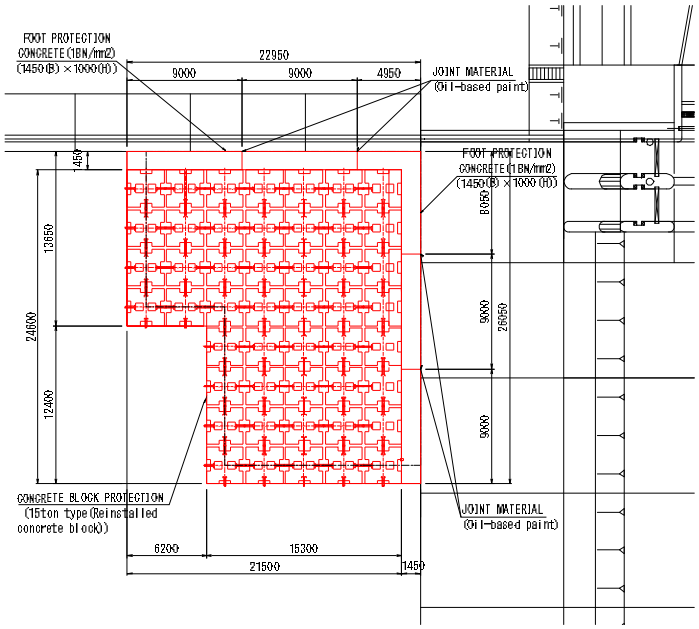


LONGITUDINAL SECTION

S=1:200

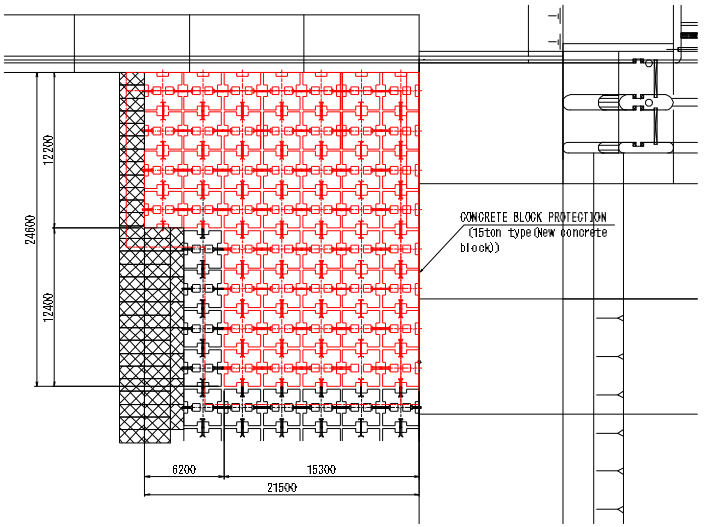


LOCATION MAP



FIRST LAYER PLAN

S=1:200



SECOND LAYER PLAN

S=1:200

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME General plan of the Riverbed protector downstream of the apron (Scouring sluice channel)	PREPARED BY: CHECKED BY:	C-04

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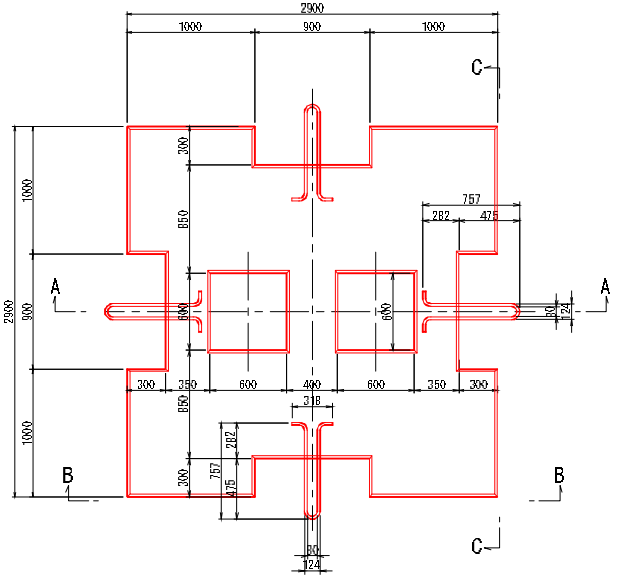
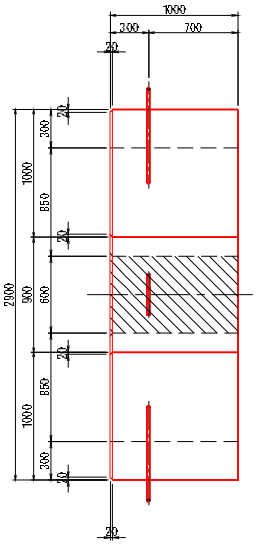
DETAILED DRAWING OF RIVERBED BLOCK
S=1:20

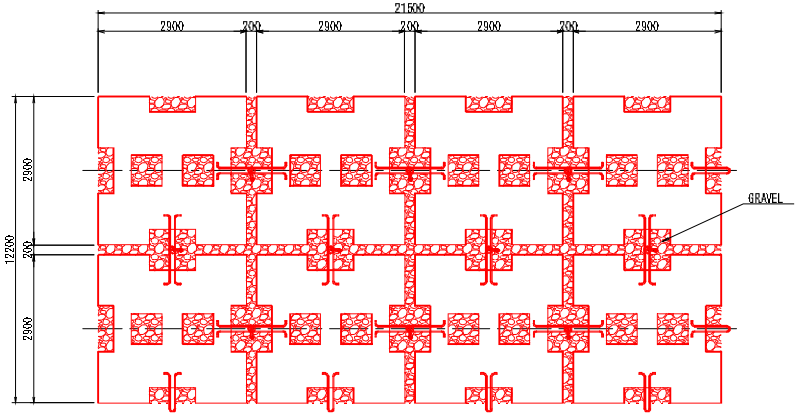


PLAN

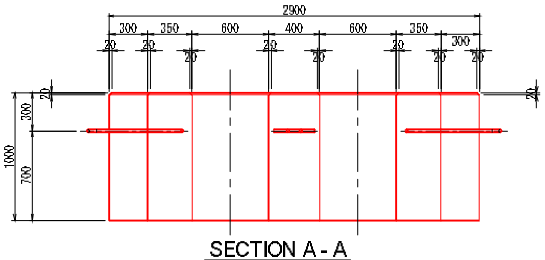


SECTION C - C

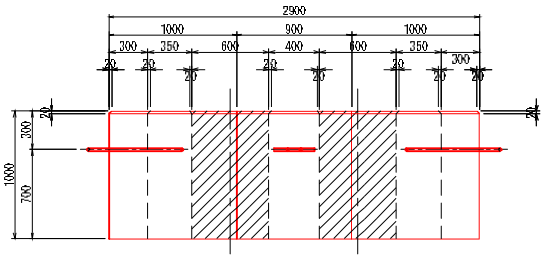
LAYOUT DRAWING OF RIVERBED BLOCK
S=1:50



DETAILED DRAWING OF CONNECTED REBAR
S=1:10

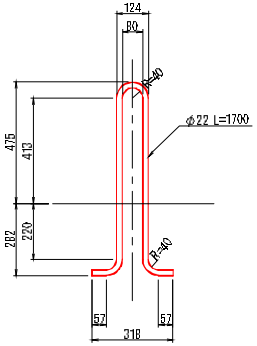


SECTION A - A

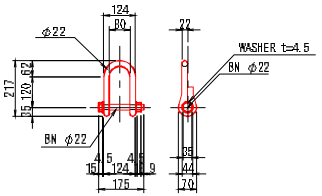


SECTION B - B

Note: The top corner of the block must be chamfered by 2cm.



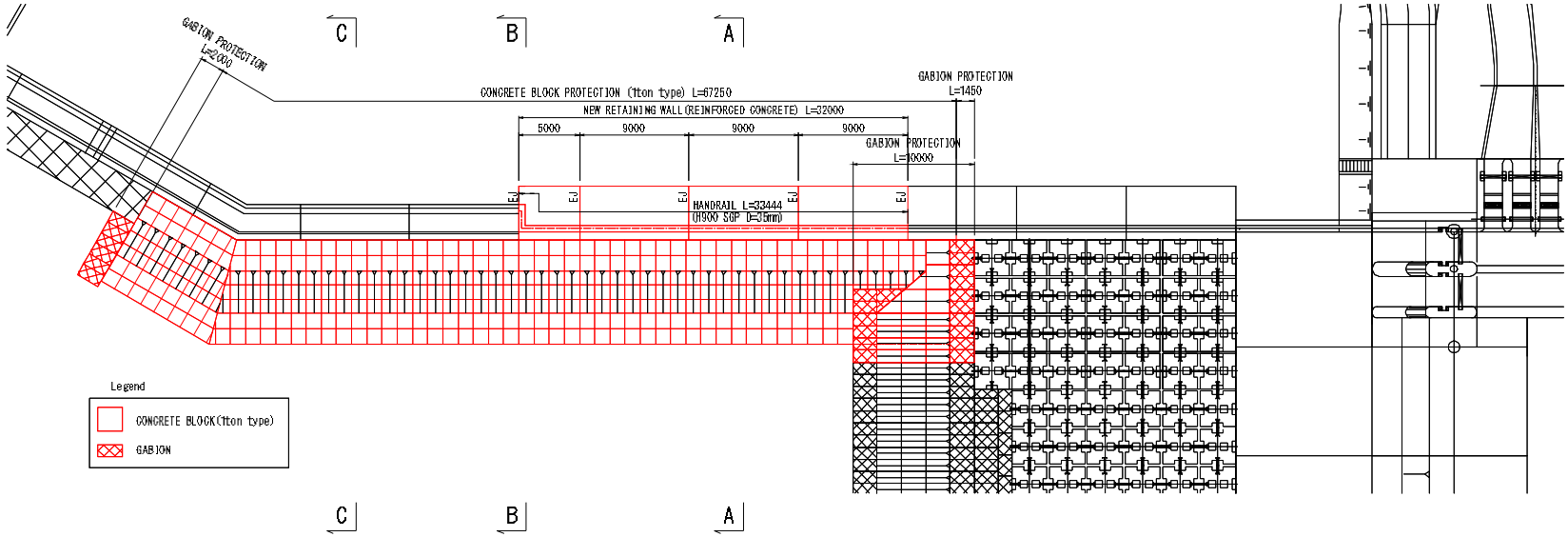
REBAR TO BE INSERTED



FITTINGS FOR CONNECTING

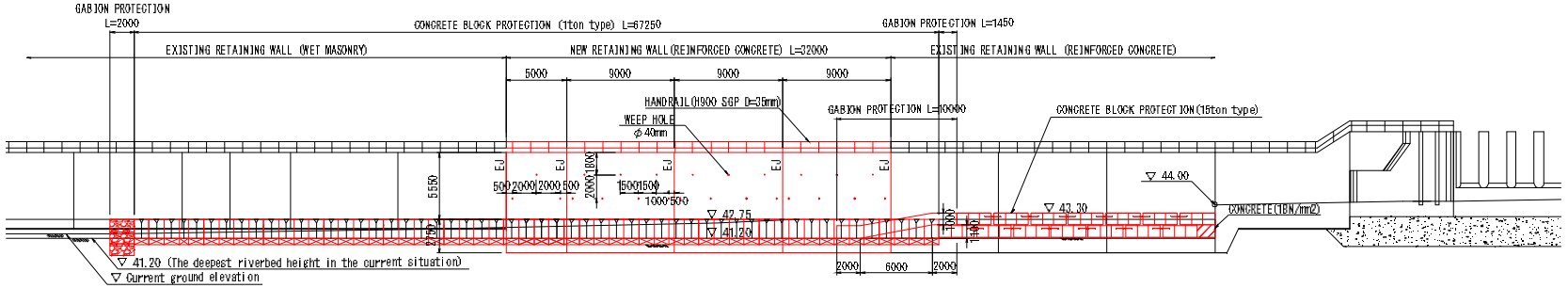
RIVERBED BLOCK DETAILED DRAWING (15ton type)

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME Structural drawing of a riverbed block (15ton type)	PREPARED BY: CHECKED BY:	C-05



PLAN

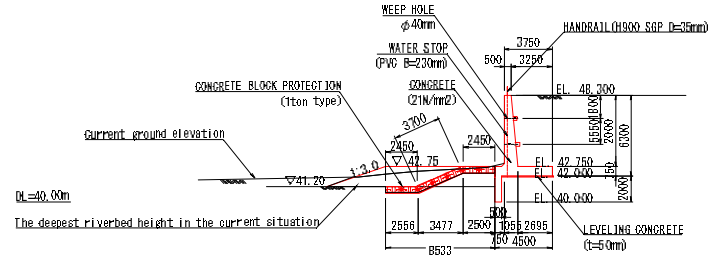
S=1.200



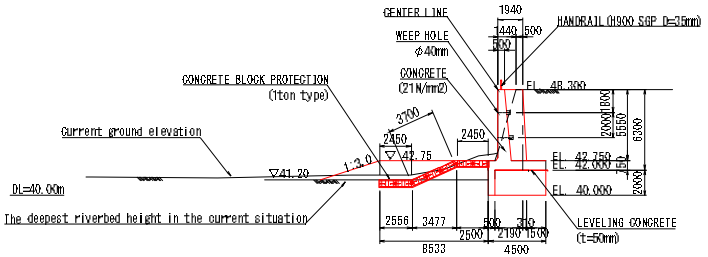
LONGITUDINAL SECTION OF RIGHT BANK RETAINING WALL

S=1.200

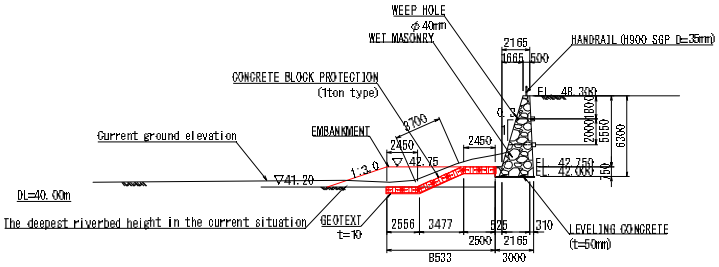
THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME General plan of the restoration work of the right bank retaining wall	PREPARED BY: CHECKED BY:	C-06



SECTION A-A



SECTION B-B

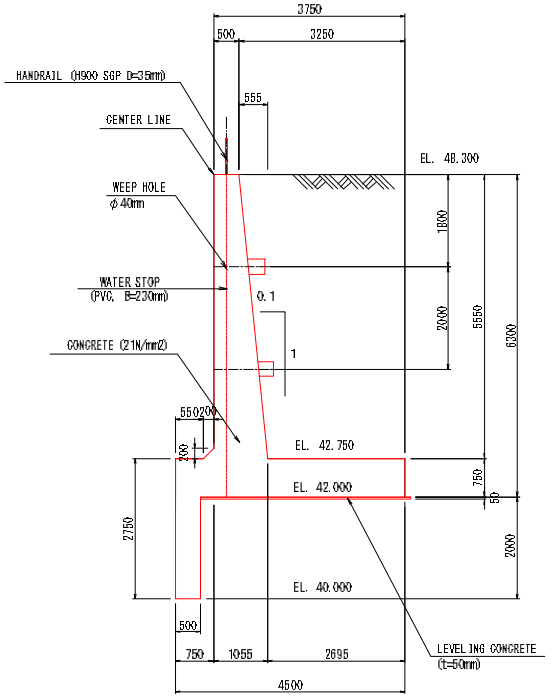


SECTION C-C

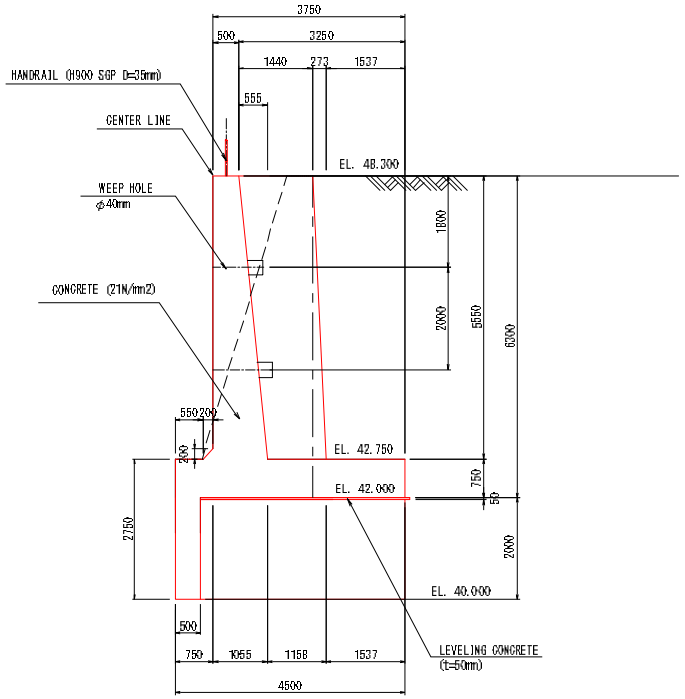
TYPICAL CROSS SECTION

S=1:200

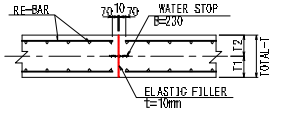
THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME Standard cross section of right bank retaining wall rehabilitation	PREPARED BY: CHECKED BY:	C-07



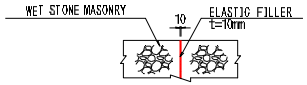
STANDARD SECTION
S=1:50



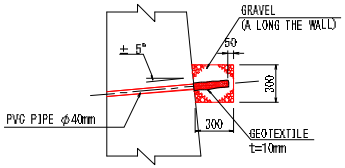
END SECTION
S=1:50



DETAIL OF EXPANSION JOINT (E.J)
S=1:30



DETAIL OF EXPANSION JOINT (E.J)
(WITHOUT WATER STOP)
S=1:30



DETAIL OF WEEP HOLE
S=1:20

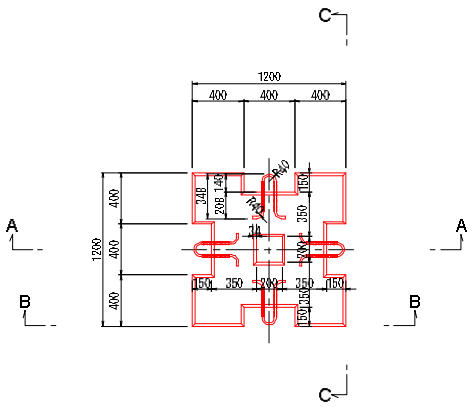
A-117

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC, INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME Structural drawing of retaining wall	PREPARED BY: / CHECKED BY:	C-08

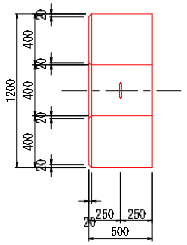
RIVERBED BLOCK DETAILED DRAWING (1ton type)

DETAILED DRAWING OF RIVERBED BLOCK

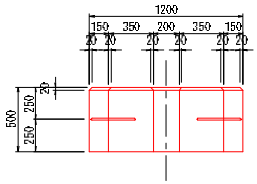
S=1:20



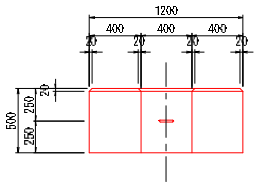
PLAN



SECTION C-C



SECTION A-A

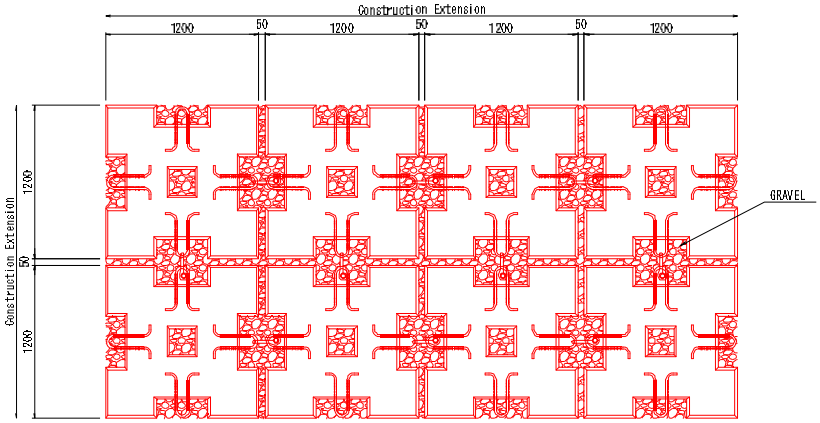


SECTION B-B

Note: The top corner of the block must be chamfered by 2cm.

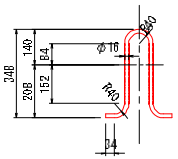
LAYOUT DRAWING OF RIVERBED BLOCK

S=1:20

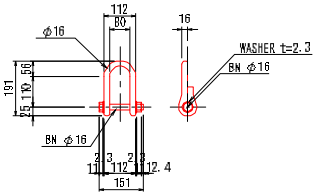


DETAILED DRAWING OF CONNECTED REBAR

S=1:10

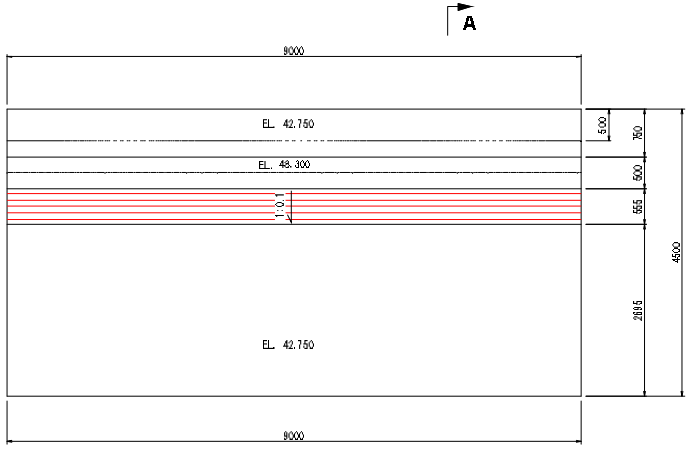


REBAR TO BE INSERTED

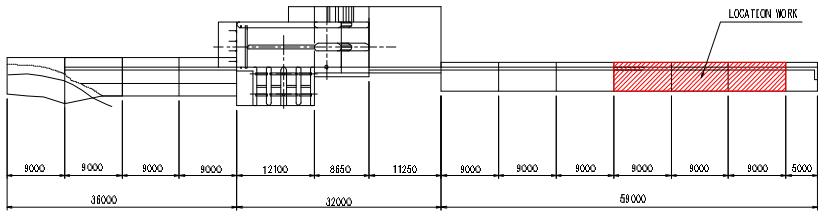


FITTINGS FOR CONNECTING

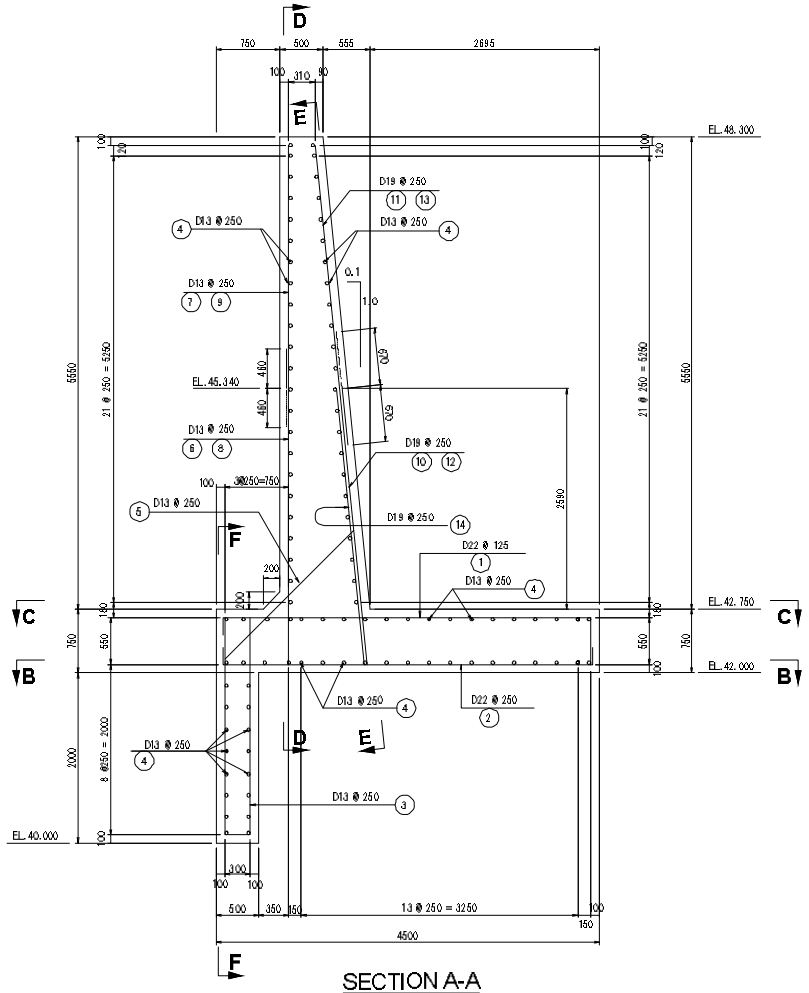
THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME Structural drawing of a riverbed block (1ton type)	PREPARED BY: / CHECKED BY:	C-09



PLAN
S=1:80



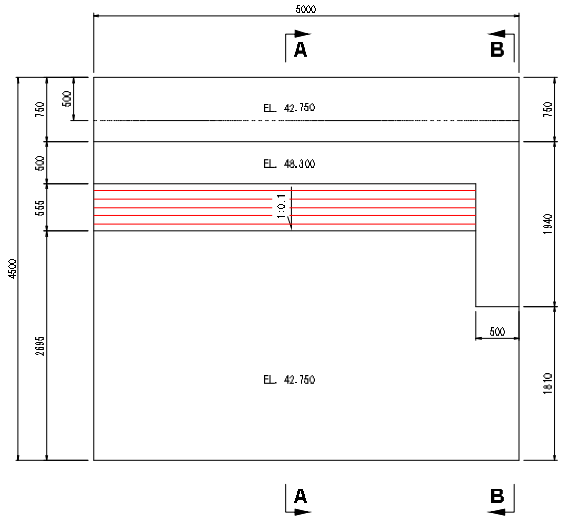
KEY PLAN
S=1:80



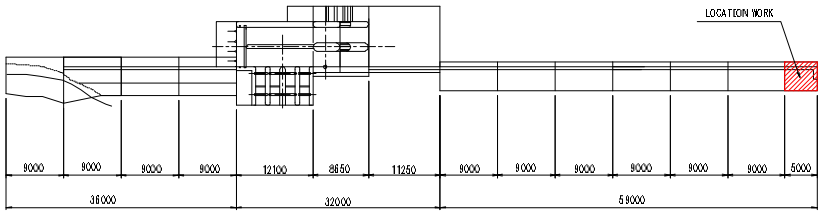
SECTION A-A
S=1:60

STANDARD SECTION

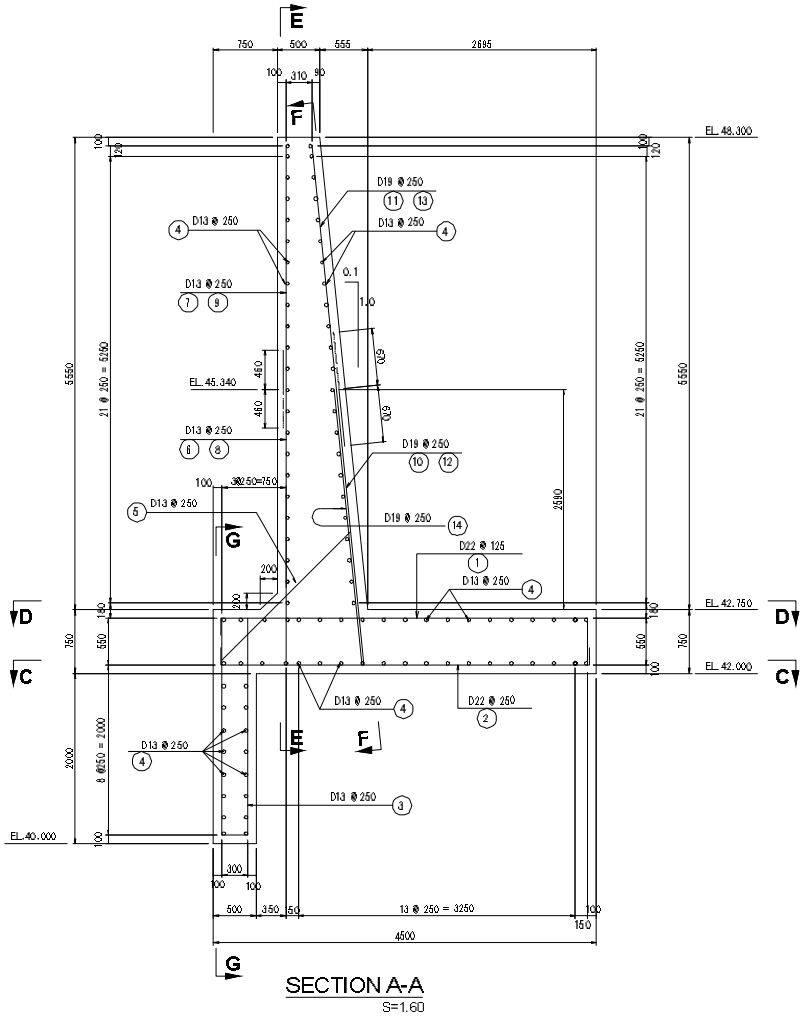
THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC., INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME Retaining wall reinforcement drawing (Standard Section)(1)	PREPARED BY: CHECKED BY:	C-10



PLAN
S=1:80



KEY PLAN
S=1:80



SECTION A-A
S=1:60

END SECTION

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
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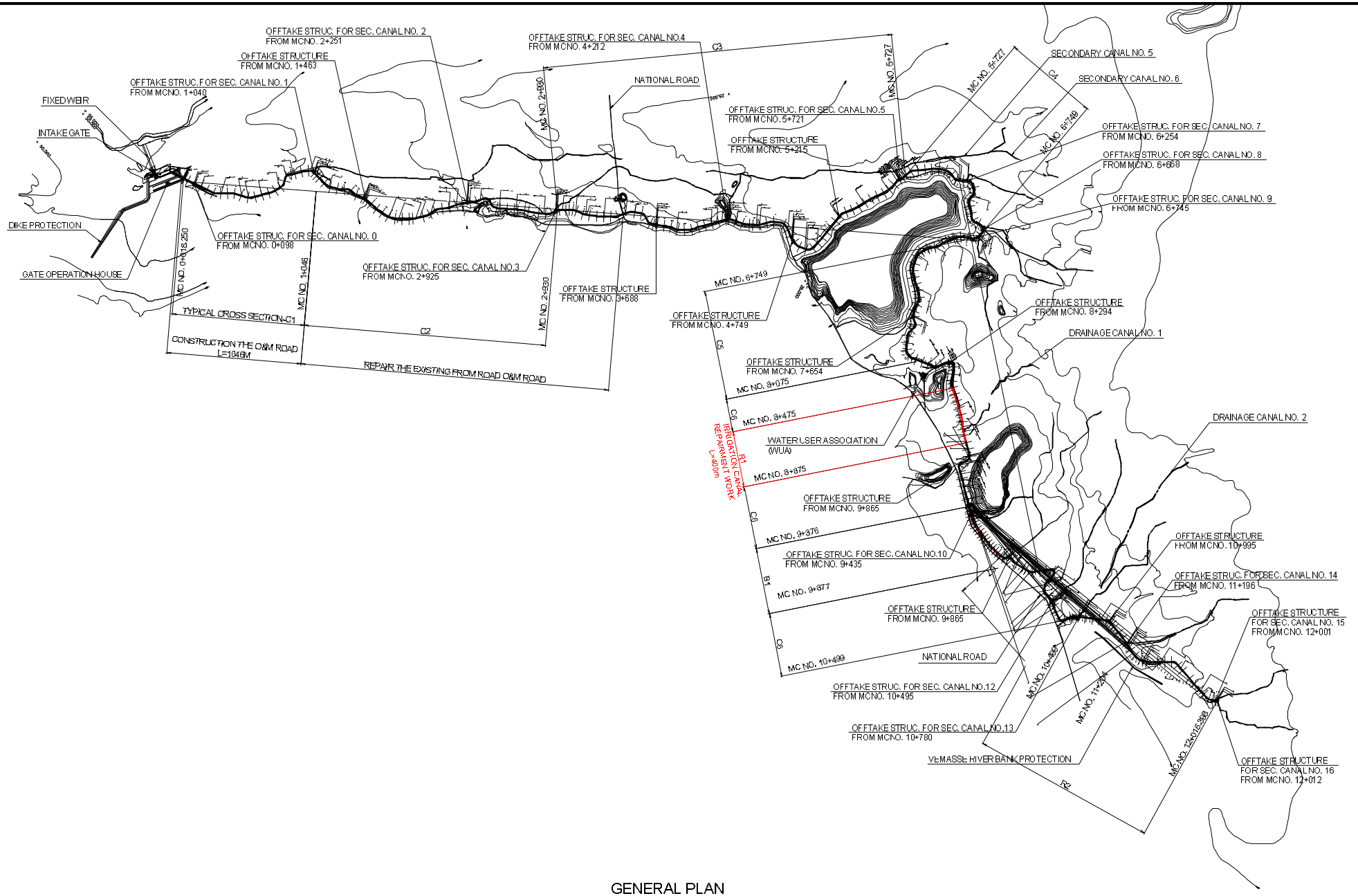
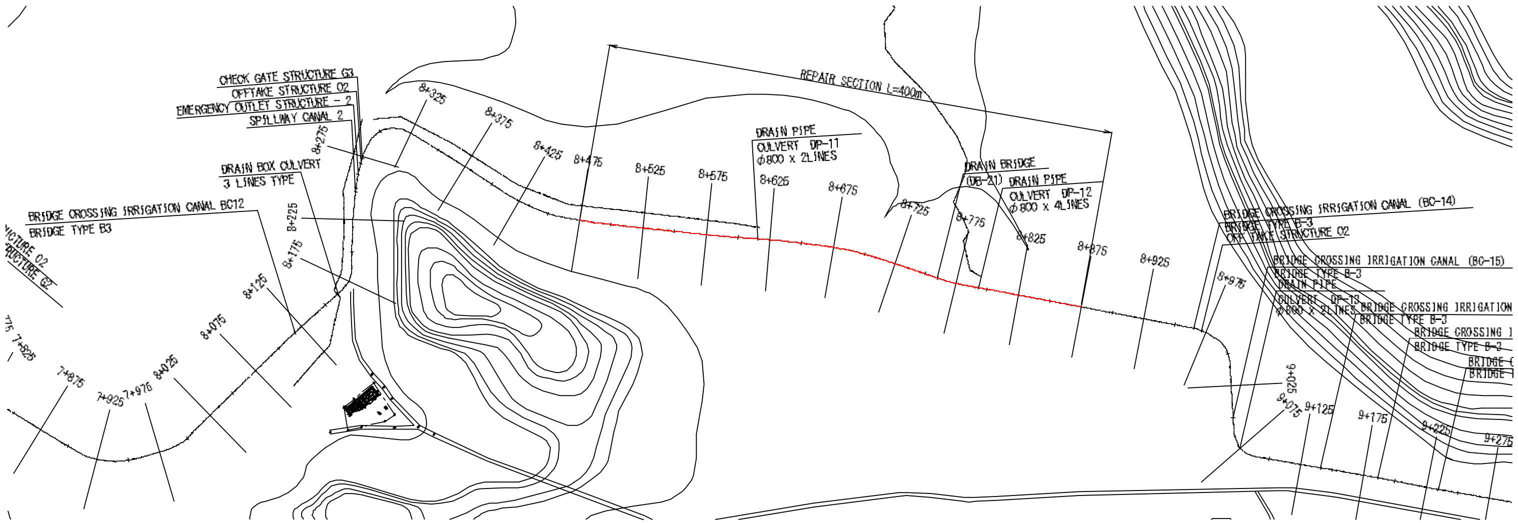
1.2 MAIN CANAL



GENERAL PLAN

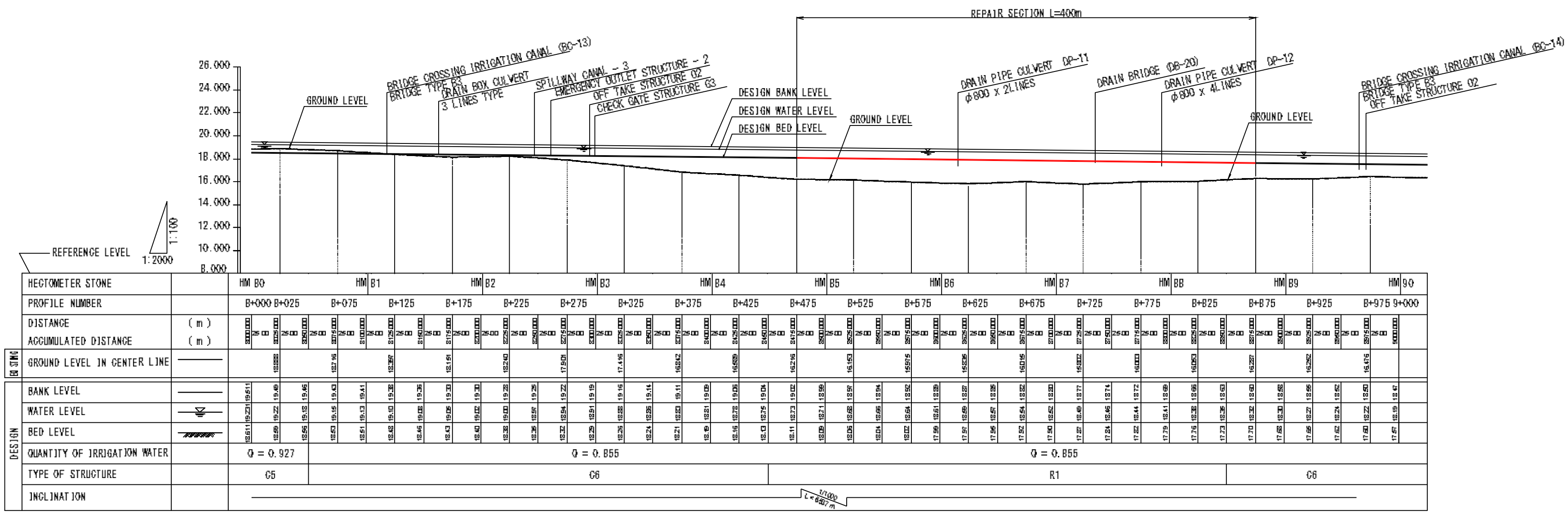
S=1:30000

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
THE EXECUTING AGENCY: Department of Irrigation and Water Management, Ministry of Agriculture and Fisheries (MAF-DIWM)	THE JOINT VENTURE OF IDEA CONSULTAMTS, INC., SANYU CONSULTANTS INC, INGEROSEC CORPORATION, AND NTC INTERNATIONAL CO., LTD. JAPAN	The Programme for Urgent Rehabilitation of Flood Damaged Infrastructures in Timor-Leste	(Subproject No.3) Rehabilitation of Buluto and Maliana Irrigation Shemes	BULUTO IRRIGATION SCHEME General plan	PREPARED BY: / CHECKED BY:	C-12



PLAN (MC NO. 8+000~MC NO. 9+000)

S=1:2000



PROFILE (MC NO.8+000~MC NO.9+000)

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THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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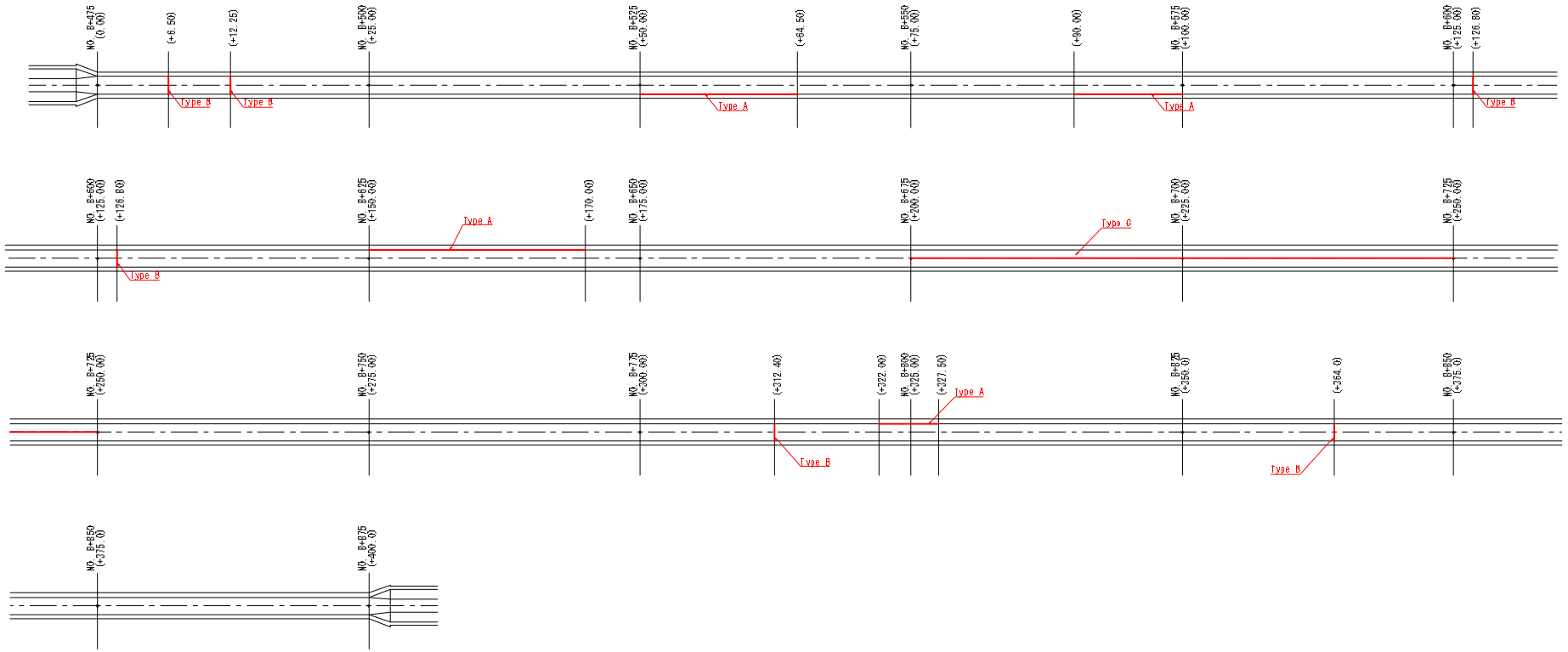
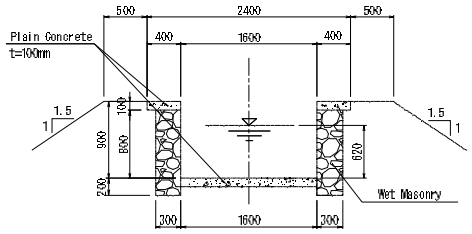


DAMAGE LOCATION PLAN (MC NO. 8+000~MC NO. 9+000)

S=1:200



TYPICAL CROSS SECTION (R1)

MC NO. 8+475 - MC NO. 8+875

S=1:30

Measuring Point	Additional Distance (m)	Crack Direction	Crack Extension (m)	Left Bank / Right Bank	Maximum Crack Width (cm)	Repair Type
No. 8 + 475.00	(+0.00)	–	–	–	–	–
No. 8 + 481.50	(+6.50)	Cross-sectional Direction	1.6	–	2.0	B
No. 8 + 487.25	(+12.25)	Cross-sectional Direction	1.6	–	0.3	B
No. 8 + 525.00	(+50.00)	Vertical Direction	14.5	Right Bank	3.0	A
No. 8 + 565.00	(+90.00)	Vertical Direction	10.0	Right Bank	3.0	A
No. 8 + 601.80	(+126.80)	Cross-sectional Direction	1.6	–	2.0	B
No. 8 + 625.00	(+150.00)	Vertical Direction	20.0	Left Bank	5.0	A
No. 8 + 675.00	(+200.00)	Vertical Direction	50.0	Center	3.0	C
No. 8 + 787.40	(+312.40)	Cross-sectional Direction	1.6	–	1.5	B
No. 8 + 797.00	(+322.00)	Vertical Direction	5.5	Left Bank	1.5	A
No. 8 + 839.00	(+364.00)	Cross-sectional Direction	1.6	–	3.5	B

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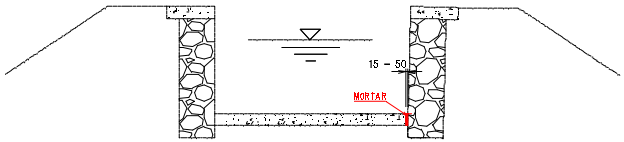
REPAIRE TYPE A



CROSS SECTION
S=1:40

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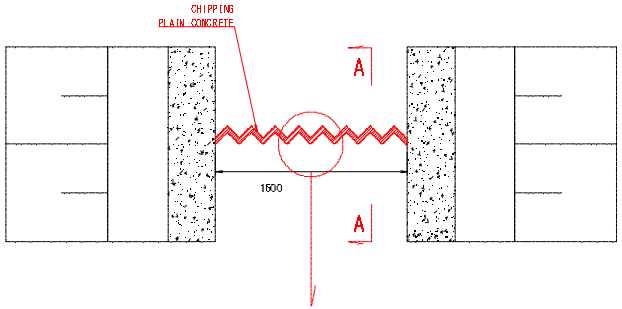
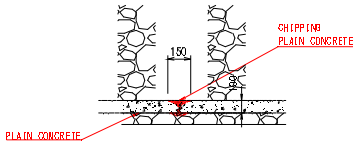
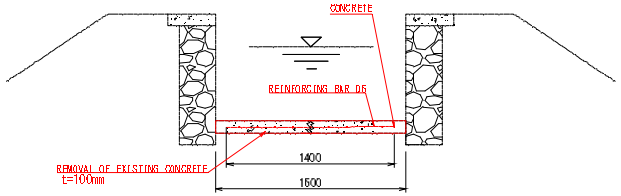


PLAN
S=1:40

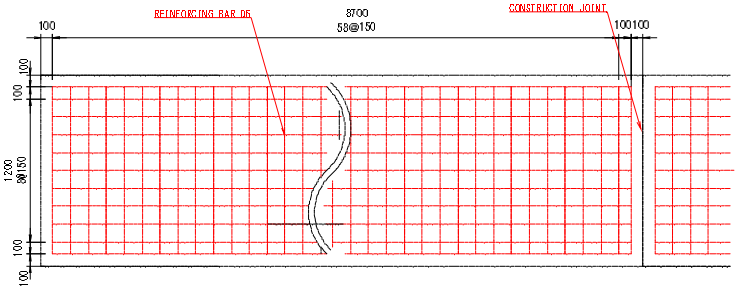


CROSS SECTION A-A
S=1:30

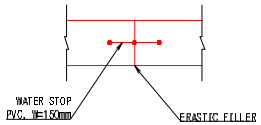
REPAIRE TYPE C



CROSS SECTION
S=1:40



PLAN
S=1:40



CONSTRUCTION JOINT

Note:

1. Type A (Filling space)

Space between the concrete slab and masonry wall is 15 ~ 50mm. Following are work items:

1) Remove clogging of sand and clay between the slab and wall by washing. Water is delivered from the intake.
2) Place mortar/ concrete with its thickness of 100 mm.
3) Mortar is placed with cement and sand ratio of 1 : 3 for the space of 50mm or less.
4) Concrete is placed with cement content of 320 kg/m3 with coarse aggregate (gravel) of 5 ~ 15 mm.
5) In the case a void is found under the space, mortar shall be placed to fill the void.

2. Type B (Filling concrete crack in concrete slab)

1) Vertically break slab concrete by pick hammer with 150 mm.
2) Wash concrete surface. (Remove clayey soil on the concrete surface.)
3) Place concrete with cement content of 320 kg/m3 with coarse aggregate (gravel) of 10 ~ 25 mm.
4) To prevent shrinkage of concrete, perform water curing for 3 days after placing.

3. Type C (Casting concrete with wire mesh)

1) Break and remove the existing concrete slab. After that, compact and flatten the ground. If the ground at the bottom of the canal is subsided, backfill with soil and compact.
2) Set 6mm diameter reinforcing bars and tighten each other as shown in the drawing. At that time, install spacers so that the reinforcing bars are placed in the center of the concrete thickness.
3) Place concrete with a cement content of 320 kg / m3 and a coarse aggregate (gravel) of 10 to 25 mm.
4) To prevent shrinkage of concrete, perform water curing for 3 days after placing.
5) Place joint every 9.0m.

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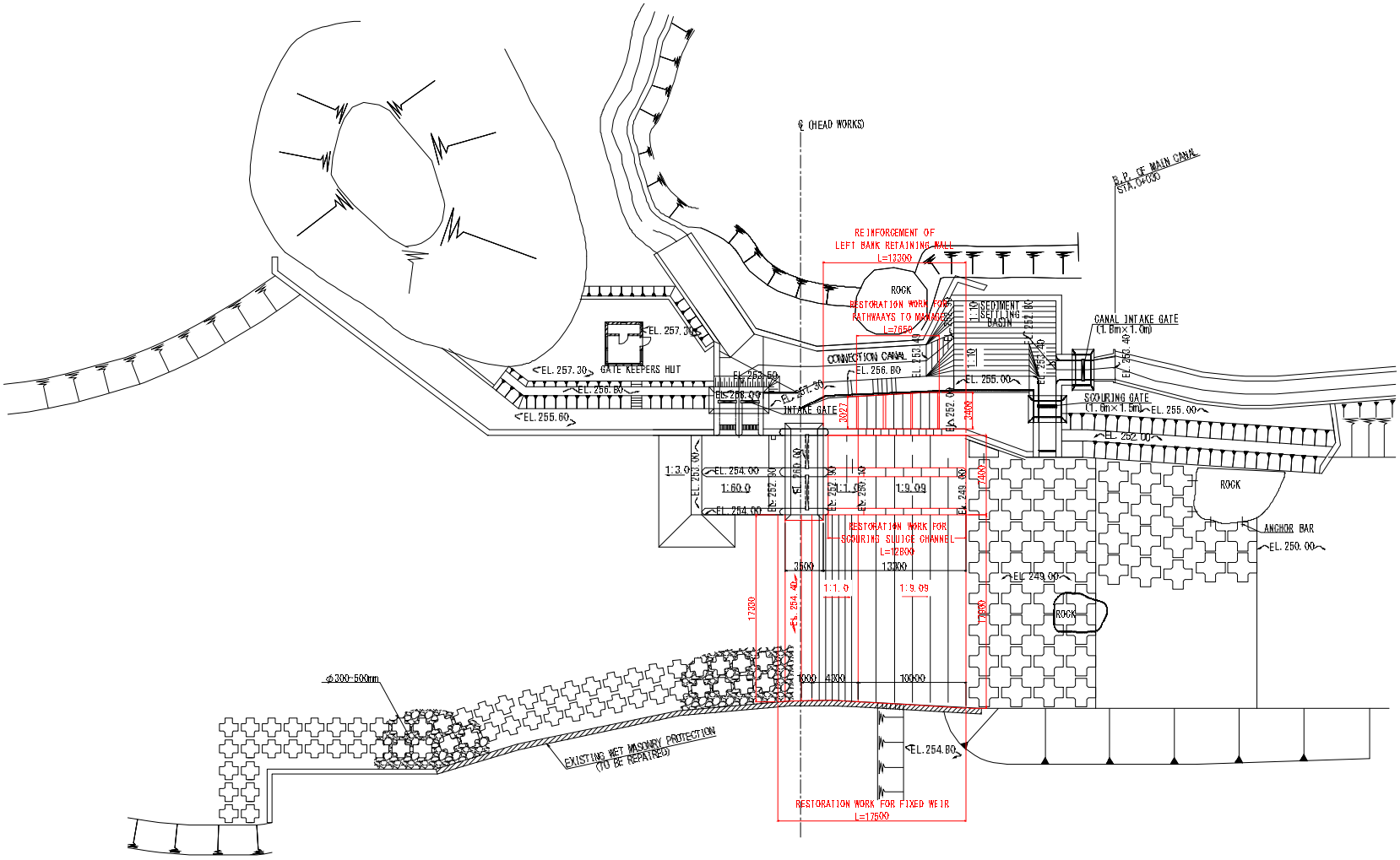
2. MALIANA IRRIGATION FACILITY

2.1 INTAKE STRUCTURE



GENERAL PLAN

S=1:200

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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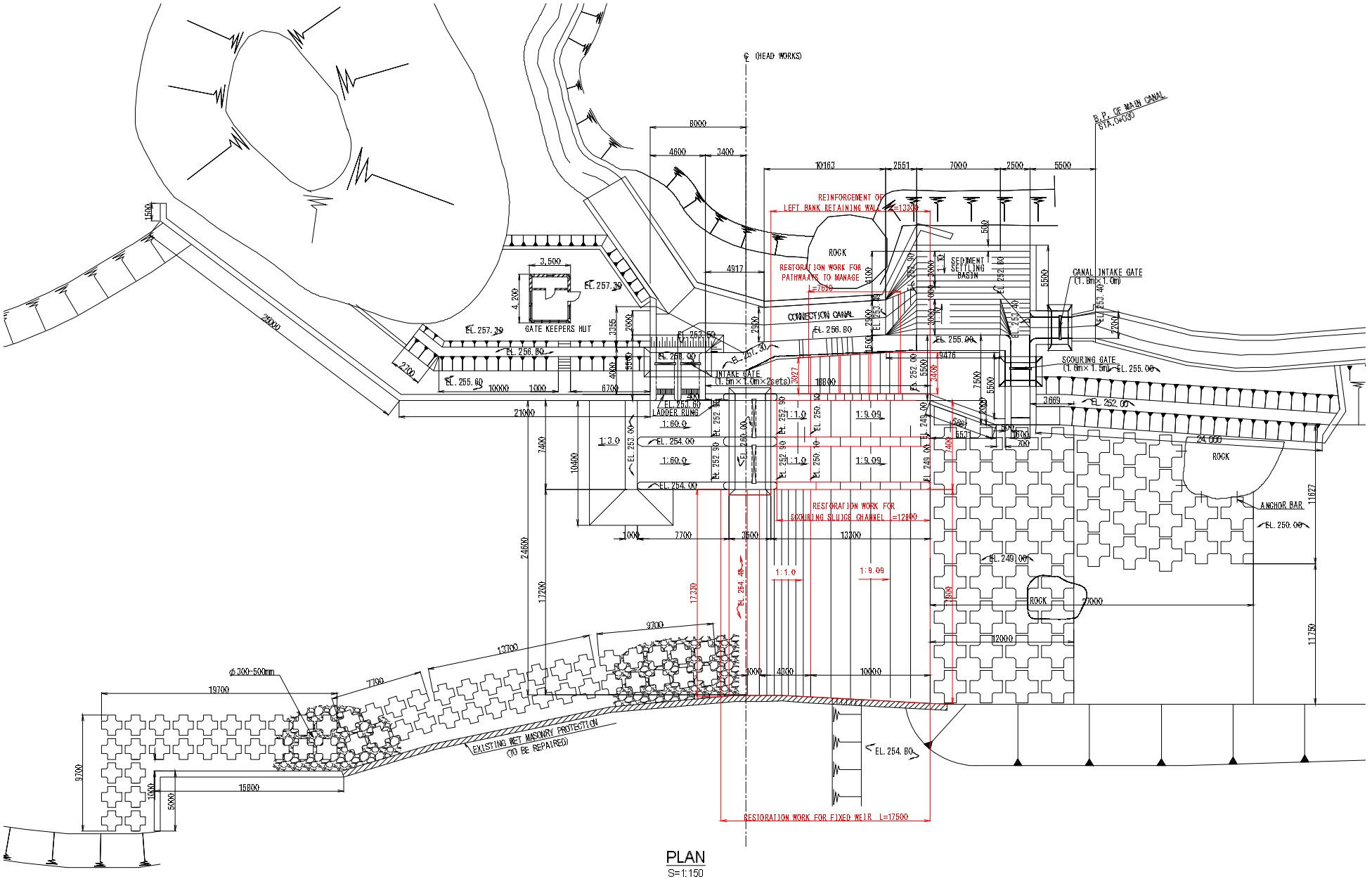
					CHECKED BY:	



PLAN
S=1:150

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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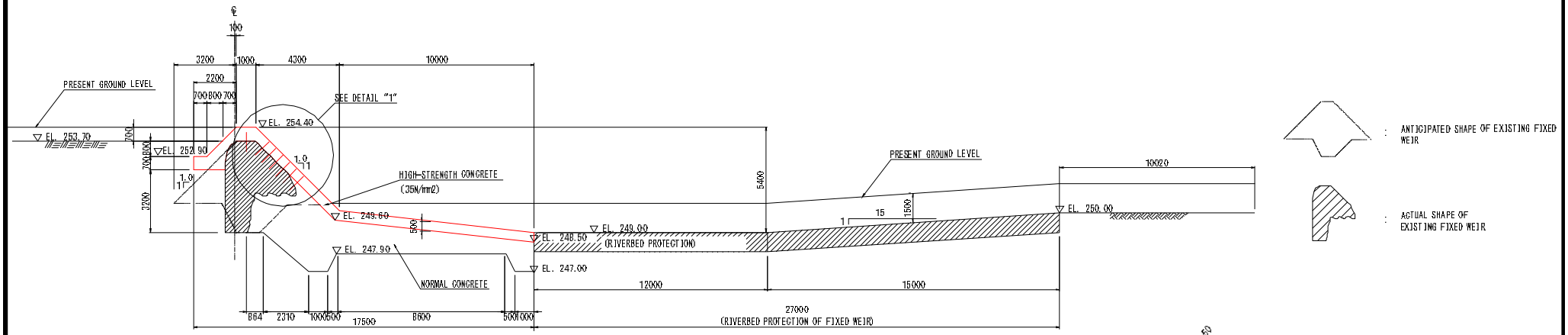
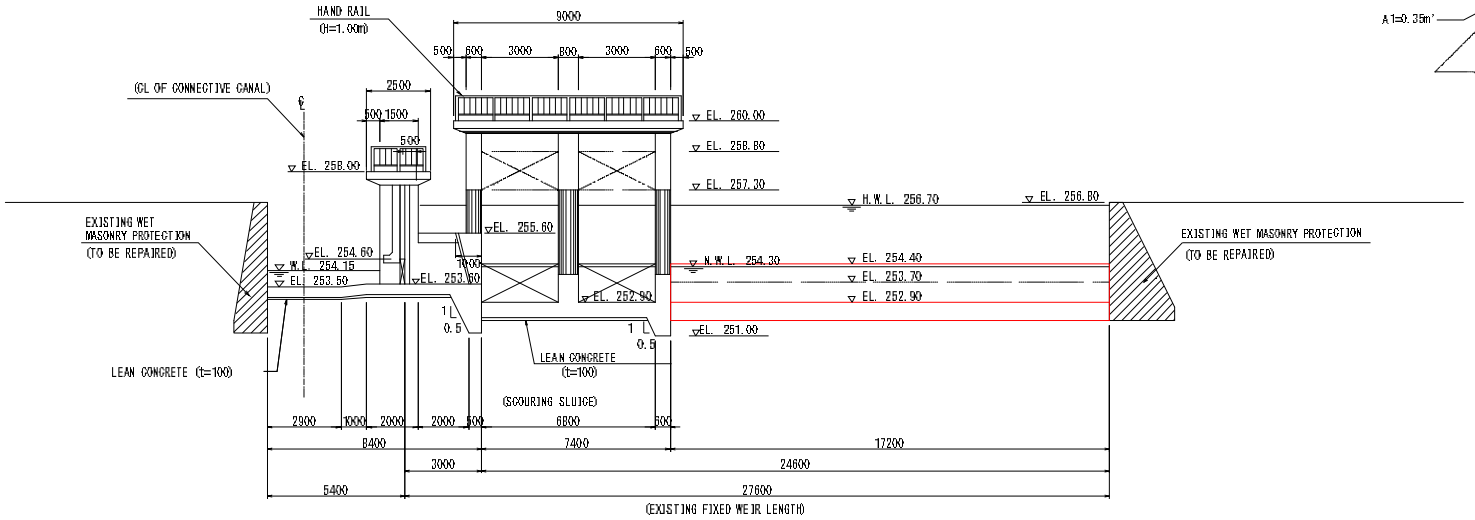


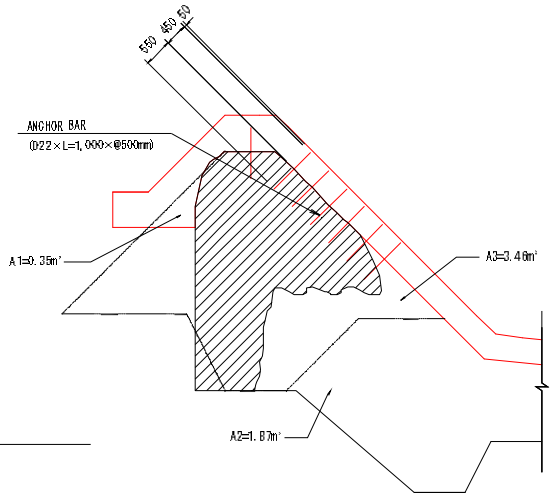
LONGITUDINAL SECTION

S=1:100



CROSS SECTION

S=1.100



DETAIL"1"

S=1.50

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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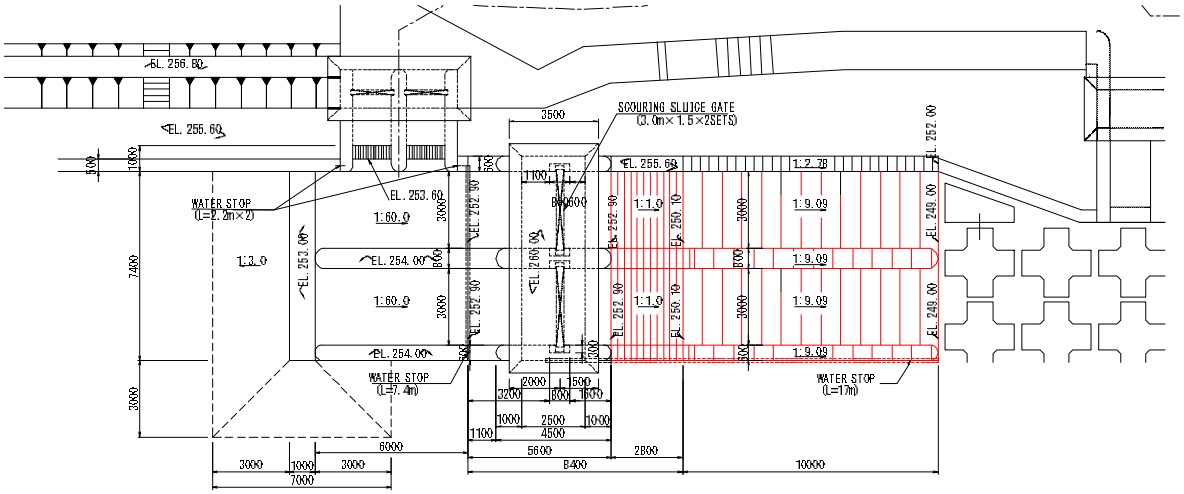
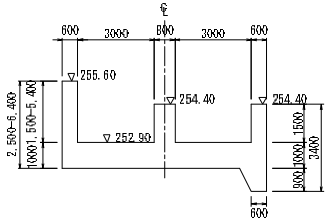
A-130



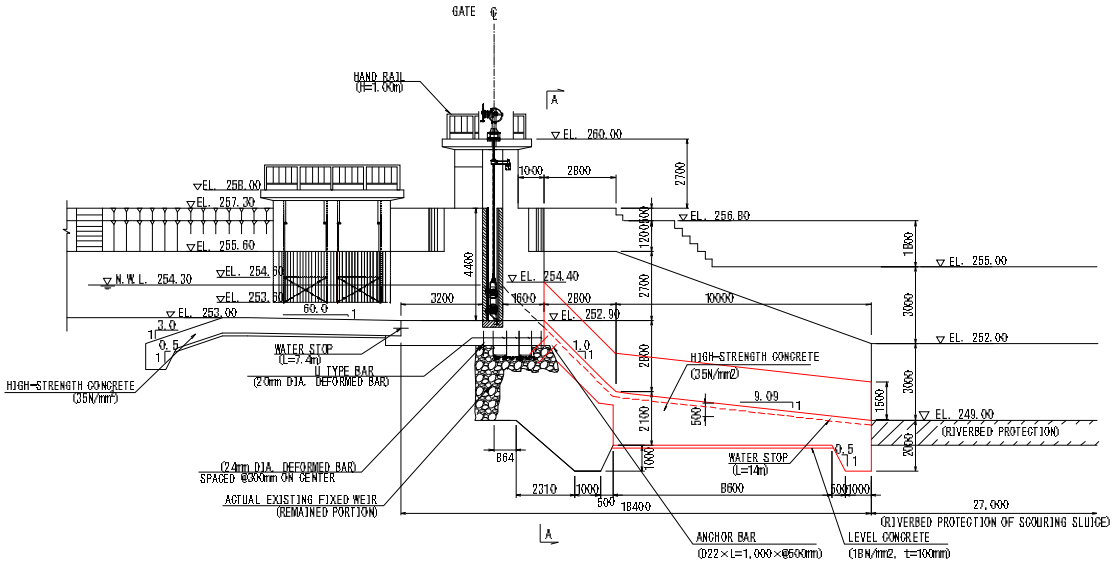
PLAN

S=1:100



SECTION A - A

S=1:100



LONGITUDINAL SECTION

S=1:100

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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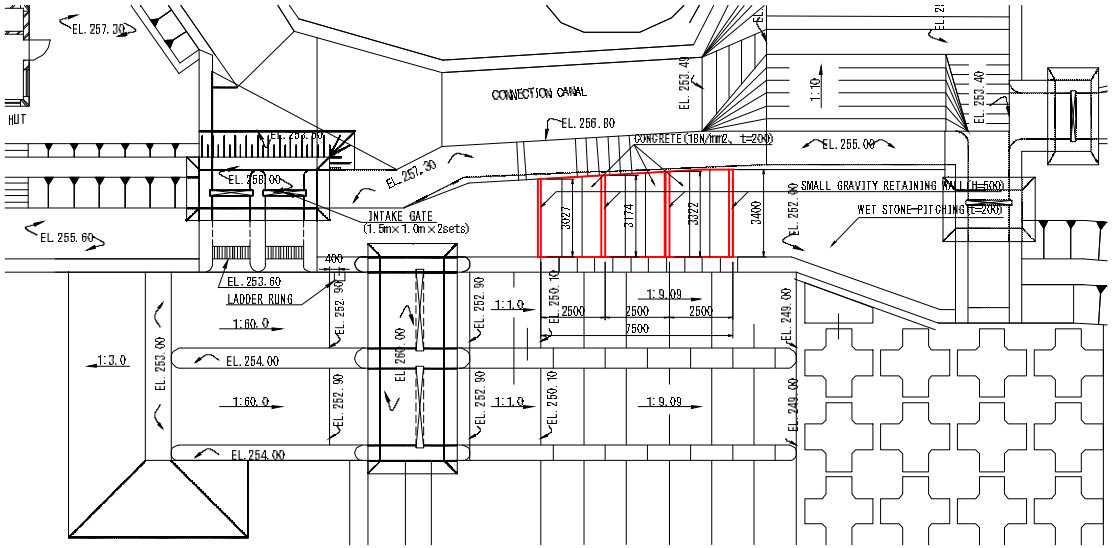
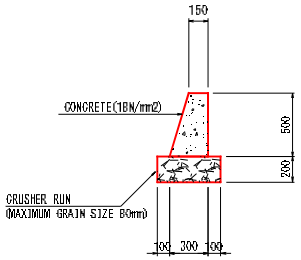


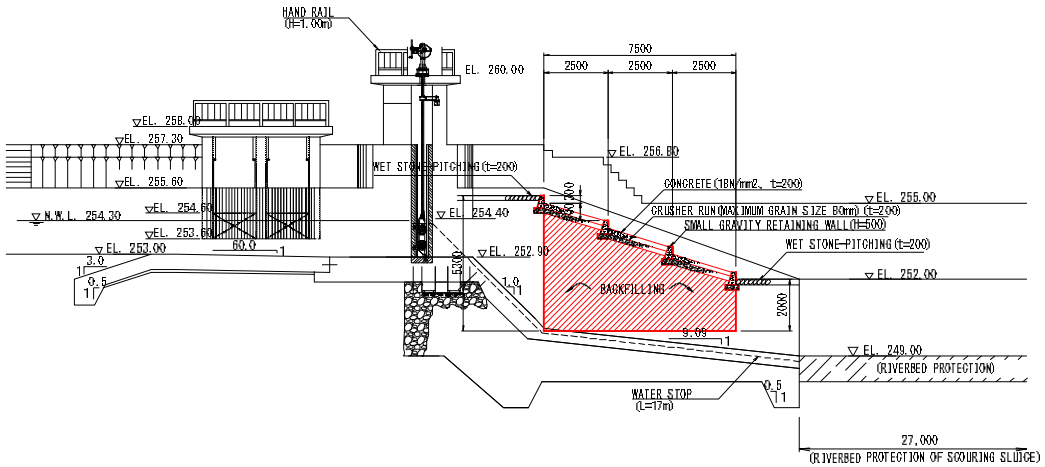
PLAN

S=1:100



SMALL GRAVITY RETAINING WALL

S=1:40



LONGITUDINAL SECTION

S=1:100

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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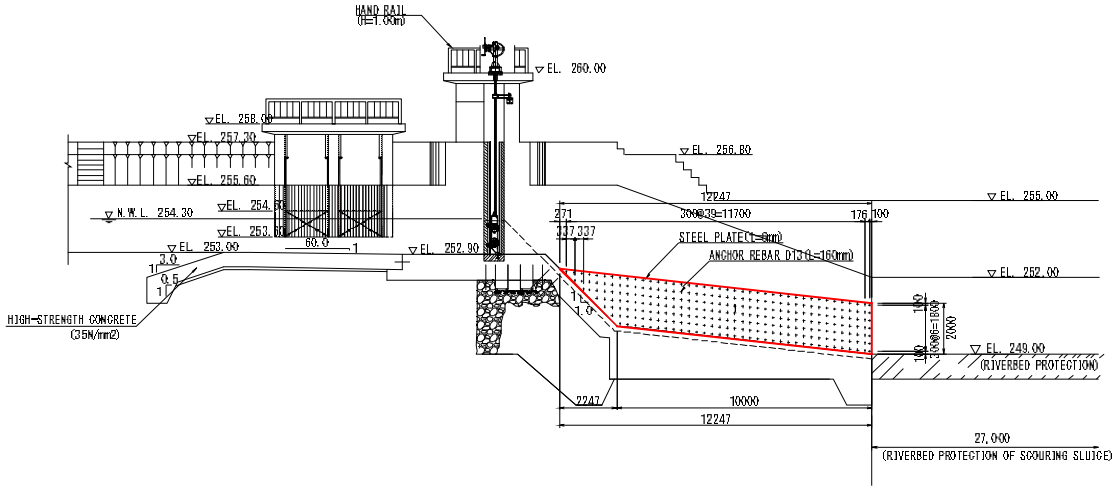
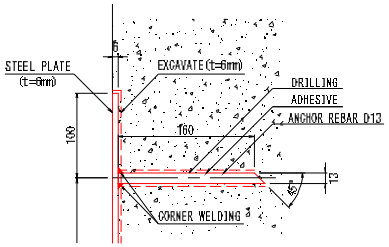


PLAN

S=1:100



LANCHOR REBAR DETAIL DRAWING

S=1:3

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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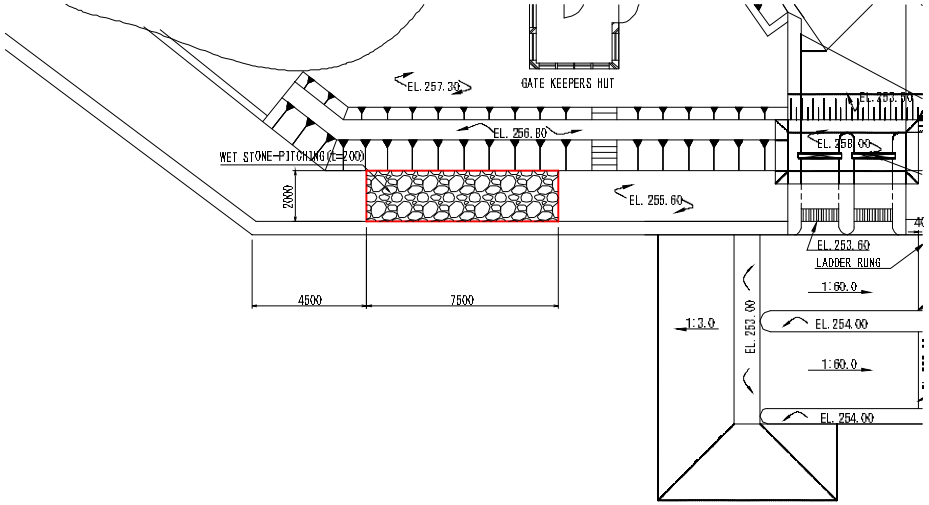
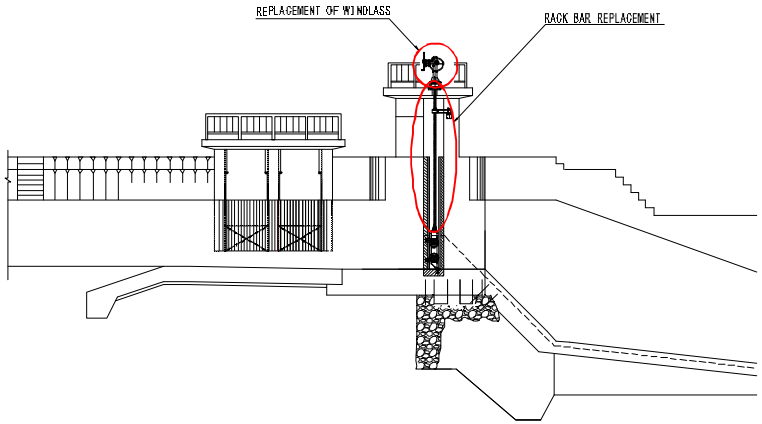
2.2 PROVISIONAL DRAWING

Restoration of administrative corridors



PLAN
S=1:100

Gate facility replacement



PLAN
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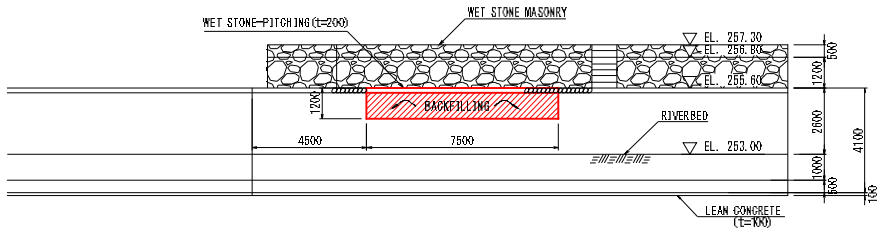
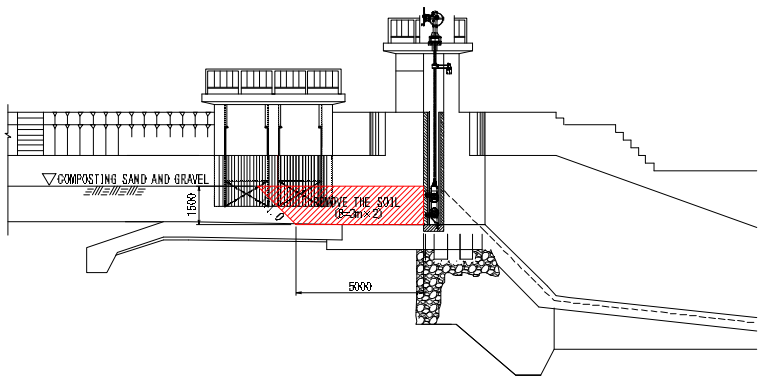


LONGITUDINAL SECTION
S=1:100

Remove the soil



PLAN
S=1:100

THE CLIENT: Ministry of Agriculture and Fisheries	CONSULTANTS:	PROGRAMME NAME:	SUBPROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
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