Ministry of Transport
The United Republic of Tanzania

THE PREPARATORY SURVEY REPORT ON THE PROJECT FOR THE REHABILITATION OF KIGOMA PORT IN THE UNITED REPUBLIC OF TANZANIA

AUGUST 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

ECOH CORPORATION

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to ECOH CORPORATION.

The survey team held a series of discussions with the officials concerned of the Government of United Republic of Tanzania, and conducted a field investigation. 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 Tanzania for their close cooperation extended to the survey team.

August, 2012

Mr. Kiyofumi KONISHI
Director General
Economic Infrastructure Department
Japan International Cooperation Agency

Summary

SUMMARY

(1) Country Brief

United Republic of Tanzania (hereunder called as Tanzania) is located at east Africa and between 1 to 12 degree south latitude and shares common boarders with 8 countries which are Kenya, Uganda, Rwanda, Burundi, Congo Republic, Zambia, Malawi and Mozambique. The land area is 945,000 km^2 and it is about 2.5 times of Japan. About 40% of the land is forest and other areas are savanna or open forest except urban areas. Lake Victoria, Lake Tanganyika and Lake Nyasa which are three largest lakes in Africa are located on the boarders from northwest to southwest. Weather condition is hot and humid tropical climate in coastal zone and temperate dry climate in mountains and dry in plateau area.

The population in 2010 is 44. 84 million consisted of approx. 130 tribes like Sukuma, Makonde, Chagga and Haya. The language is Kiswahili that is widely spoken as well as each tribe language. Concerning the religion, Islam and Christianity are about 40% each and traditional religions are about 20%.

Concerning the economy, the policy has been diverted to the market economy from the socialist economy after the year of 1986 and GDP growth rate of Tanzania in 2009 has attained 6.2 % even under the situation that the influence by world financial market and economic crisis were concerned. And, GNI per capita has been smoothly transitioned from $210 in 1997 to $530 in 2010. However, about 50 to 60% of total population belongs to poverty group who lives with less than US$1/day. The economy is rested with agriculture that brings more than half of GDP, 80% of export and 85% of employment. And tourist industry is continued to progress and now occupies 16% of GDP by the wide variety of resources such as safari in Ngorongoro conservation district, Serengeti national park and etc., claiming to Mt. Kilimanjaro and historic heritage of Zanzibar Island.

Total export amount shows increasing tendency but the total import amount is bigger than that of export and the international balance has been continued to suffer loss.

(2) Background and Summary of the Project

Tanzania becomes the base of important transportation route for inland countries as the gateway of east Africa. Tanzania aims to proceed the corridor development for the efficiency of international transportation picking up 4 important corridors which are Dar es Salaam Corridor, Central Corridor, Mtwara Corridor and Cairo-Gaborone Corridor in "Transport Sector Investment Program (TSIP)". Out of these international corridors, Central Corridor connecting Kigoma Port and Dar es Salaam through railway and roads and expanding to Burundi, Congo Republic and Zambia through Lake Tanganyika takes important roles on national security not only for Tanzania but also neighboring countries as import and export route of commodities such as daily commodities and natural resources.

Kigoma Port located at east coast of Lake Tanganyika is grown its importance as the transportation base for import and export of steel, coffee, food, petroleum products and others as its strategic station and fulfill a function as the base of humanitarian support to Congo Republic.

However, the port facilities of Kigoma Port have been deteriorated and the necessity and urgency of the rehabilitation are pointed out considering future increase of handling cargoes in TSIP. From these situations, the Government of Tanzania has requested "Rehabilitation Plan for Kigoma Port" (the Project) to improve the passenger terminal comprising rehabilitation of passenger wharf, construction of passenger terminal building, construction of cargo shed and pavement of access road in March, 2010.

Considering the above circumstance, JICA has conducted "Data Collection Survey on Transport and Trade around Kigoma Port" in February, 2011 in order to confirm the necessity and urgency of rehabilitation of Kigoma Port and for the collection of the information and data concerning present situation and development plan of east and west transportation route centering Kigoma Port. It has been confirmed that the security of safe and smooth embarkation and disembarkation of passengers and cargo handling operation shall be necessary and the proper improvement shall be implemented as soon as possible, since the existing passenger wharf is made of simple jetty and the concrete piles to support the jetty have been heavily deteriorated and there is possible disruption with that survey.

(3) Summary of Study and Components of Project

The Government of Japan decided to conduct the preparatory survey for the request of Tanzania and dispatched the study team as follows,

Field Survey	: November 5 to December 24, 2011
Explanation survey of Draft Report	: June 9 to June 20, 2012

The Project aims to draw up the rehabilitation plan for the passenger terminal in Kigoma Port. Natural condition surveys and environmental related surveys were made as well as surveying present situation of Kigoma Port including transportations by railway, road and lake. As the result, the urgency of rehabilitation on the passenger wharf was considered to be high for securing safety and efficiency of the wharf since the facilities of passenger wharf are very poor and remarkably deteriorated.

Project components as requested are the following 4 items. The survey results and the contents of each component are as per shown below.

- Rehabilitation of Passenger Wharf
- Construction of Passenger Terminal Building
- Construction of Cargo Shed
- Access Road Pavement

And Beacon to support safety navigation and Lighting Facility to correspond to SOLAS convention for the safety of marine people's life have been added at the time of field survey.

1) Rehabilitation of Passenger Wharf

Rehabilitation plan of the passenger wharf was established to solve the problems of the existing facilities based on the functions required for berthing facility, land facilities and passenger waiting facility and flow lines of passengers and cargoes. Wharf plan was drawn up based on the sizes of ships like MV Liemba that Kigoma Port is her mother port, ships servicing in Lake Tanganyika in addition to the passenger ship being newly introduced. As the result, it planned as 2 berths in main east berth with the length of 130m and the -5.0m of water depth. 50m of wharf width was secured as the necessary width to handle cargoes of passenger ships effectively. Further more, the north berth was planned not to dredge due to consideration of natural environment, but the mooring facility for small boats is allocated. As additional facilities, beacon and lighting facility that were requested in field survey are installed.

2) Construction of Passenger Terminal Building

Passenger Terminal Building was planned based on the number of passenger as 500 from the complement of passenger of MV Liemba as 600 now on service as main passenger ship and the result of field survey. The project facilities were separated as administration and service zone, passenger waiting zone and weighing and storage zone so as to be able reproduce flow lines of passengers and cargoes effectively as well as necessary function and proper size facilities allocation was made for each zone. There allocated CIQ facility comprising immigration, customs and quarantine, ticket booth, ticketing & security office, administration office, toilet, kiosk and etc. in the administration and service zone. Passenger waiting room for common passengers and VIP lounge were allocated in the passenger waiting zone. Weighing and storage zone is the facility to handle cargoes from/to passenger ship and consisted of weighing space, cashier box, cargo storage and etc.

Passenger Terminal Building is flat building with steel beams and the foundation, floor slab and columns are of concrete structures and the total floor area is 1,296 m^2 (54m x 24m).

3) Construction of Cargo Shed

In consideration of present utilization situation of passenger wharf, the necessity of large scaled cargo shed as requested is low and the cargo storage to store cargoes carrying in before departure, lost items or etc. shall be allocated in the above Passenger Terminal Building.

4) Pavement of Access Road

The access road to the passenger terminal is not paved in spite of passing vehicles for passengers and heavy cargo truck for cargo transportation. In addition, no pavement is done at the open space in front of the passenger wharf therefore, many puddles appear during rains and the troubles are occurred for the utilization of passengers and relevant vehicles. Under this situation, concrete pavement with the width of 7.0m (2 lanes) on the access road with the total length of 481m from the passenger wharf to main road shall be made. Concrete pavement shall also be made on the open space in front of the

wharf (949m^2) which is the starting spot of the access road.

Following table is the comparison with the requested components and the project components..

<Planned facilities and Equipment>

Component	Requested	Project	Remark
1. Rehabilitation of Passenger Wharf	140m x 63m (8,820m^2)	130m x 53m (6,500m^2)	East Berth North Berth Land for Wharf
2. Construction of Passenger Terminal Building	25m x 20m (500m^2)	54m x 24m (1,296m^2)	Administration & Service Zone Passenger Waiting Zone Weighing & Storage Zone
3. Construction of Cargo Shed	50m x 20m (1,000m^2)	Allocated in Passenger Terminal Building	Weighing and storage zone (308m^2)
4. Pavement of Access Road	800m x 12m (9,600m^2)	481m x 7.0m (3,367m^2) Open space (949m^2)	Road from Wharf to Main Road Front Open Space of Wharf
5. Beacon and Lighting Facility	Additional Requested	Beacon 1 set Lighting Facility 5 sets	

(4) Estimated Project Cost and Implementation Schedule

The project cost born by Tanzanian side is estimated as approximately 9 million yen in case the implementation by Grant Aid Cooperation of Japanese Government. The implementation period takes 24 months in total, comprising 6 months for detailed design and tender, 18 months for construction and procurement.

(5) Project Evaluation

1) Relevance

Kigoma Port is the international port located at east coast of Lake Tanganyika as a part of Central Corridor and functioning as the hub port of Congo Republic on the other side of the lake and Burundi on the north side and Tanzania Ports Authority is responsible for the operation and management. The wharf facilities are consisted of very poor structures and there are problems such as shallow water depth of mooring facilities, possible collapse due to the deterioration of concrete piles of jetty facilities. And, there are other problems for on land facilities that are poor capacity of passenger shed against the number of passengers and narrow wharf area to handle cargoes from passenger ships.

Tanzania picked up 4 corridors including Central Corridor as the important developing corridor in "Transport Sector Investment Program (TSIP)" and decided to develop corridors for the efficiency of international transportation. And also Tanzania Ports Authority has drawn up "Tanzania Ports Master Plan" and plans the rehabilitation of ports in Lake Victoria, Lake Tanganyika and Lake Nyasa in addition to the rehabilitation of the existing ports facing to the Indian Ocean. Resolving the problems of existing wharf facilities comprising on land passenger facilities and berthing facilities described

above, the relevancy and the urgency to rehabilitate the passenger wharf facilities are confirmed in view of proper function of securing the safety and efficiency of the passenger terminal.

The rehabilitation of Kigoma Passenger Terminal will contribute to strengthen Central Corridor and to provide stable transportation of people and commodities in coastal area of Lake Tanganyika and the service of passenger and cargo transportation shall be upgraded. With the result, the improvement of transportation of people and distribution of cargoes shall be made in coastal area of Lake Tanganyika and its hinterland, which contributes to the vitalization of economic activities and industrial promotion and furthermore, it is expected to contribute to area stability and peace. The direct beneficiaries are considered to be 1.68 million people in Kigoma Region and 1.14 million people in Rukwa Region totaling 2.82 million people. As Central Corridor connects Kigoma and Dar es Salaam, the benefits is considered to enjoyed indirectly by the people living along the corridor and the people in Dar es Salaam, as well as hinterlands of Kigoma Region and Rukwa Region, which corresponds to most of population of Tanzania that is 44.84 million people. Furthermore, when the sailing route will re-opened to main ports of Congo Republic in the course of her political stability, the same benefits is considered to be given to the coastal area of Lake Tanganyika in Congo Republic.

With the above, as the Project widely contributes to the improvement of basic human needs (BHN) and the poverty reduction, the relevance to implement the Japanese Grant Aid Cooperation for the part of the Project is confirmed.

In view of technical aspects, Kigoma Port is in the lake coast of Tanganyika where is located in greater rift valley moving down through north and south of African Continent and many earthquakes are occurred there. Therefore, the steel sheet pile structure with high earthquake resistance is adapted for berth facility and the steel material such as steel sheet piles and H shaped beams shall be procured from Japan.

2) Effectiveness

The outcome of quantitative effects by the Project is shown as follows,

i) Safety Improvement of Passengers at Embarkation and Disembarkation

With the rehabilitation of berth, passenger ship can be moored directly to berth in stead of mooring to prior and existing unsafe barge and the number of passenger to be accessible directly from passenger ship to berth shall be increased from zero to 26,000 passengers per year.

ii) Improvement of Cargo Handling Efficiency

As passenger ship can berth just along the wharf by the rehabilitation, direct loading and unloading of cargoes to/from passenger ship can be possible. Therefore, the cargo transportation at the unstable barge and dangerous jetty portion between passenger ship to the wharf where were used to be unsafe for the cargo handling operation is eliminated and the safety of cargo handling workers as

well as improvement of cargo handling efficiency are secured. Furthermore, the improvement of operability of cargo trucks and congestion mitigation can be attained by the expansion of wharf area, which contributes to shorten cargo handling time. At present, cargo handling duration takes currently 4 days including calling day of passenger ship, but it is expected to be less than 3 days after completion of the Project.

The outcome of qualitative effects by the Project is as shown below.

i) Improvement of People Trip and Commodity Distribution

The cargo handling efficiency is improved by the rehabilitation of the passenger wharf and the frequency of ships buoyage shall be increased. And, people trip and commodity distribution in the coastal area of Lake Tanganyika and its hinterlands shall be accelerated by the increase of sailing frequency of passenger ship. When the sailing service will be re-opened, the people's flow and commodity distribution to Congo Republic will be facilitated.

ii) Improvement of Service Level of Passenger Terminal

Congestion is mitigated significantly by arrangement of passenger flow line in order by the rehabilitation of the passenger terminal. And, the service level as passenger facility is improved distinctly and the comfortable feeling is provided by rehabilitating toilet facility, passenger waiting facility, Kiosk and etc.

iii) Reduction of Distribution Cost

The safety and efficiency of cargo handling operation are improved with the possible introduction of cargo handling equipment as well as mitigating the congestion at the wharf area by the rehabilitation of passenger terminal facilities. Furthermore, the traffic performance of cargo handling vehicles is improved by the pavement of access road, which leads to the reduction of operation cost of the vehicles. As the result, ensuring smooth transportation of commodities, it is possible that the distribution cost becomes cheaper.

iv) Contribution to Peace and Stability of Surrounding Areas

This rehabilitation project shall contribute to the peace and stability of surrounding areas including Congo Republic and Burundi with the vitalization of trade and economic activities, as well as the timely and stable transportation of humanitarian aid commodities around Lake Tanganyika.

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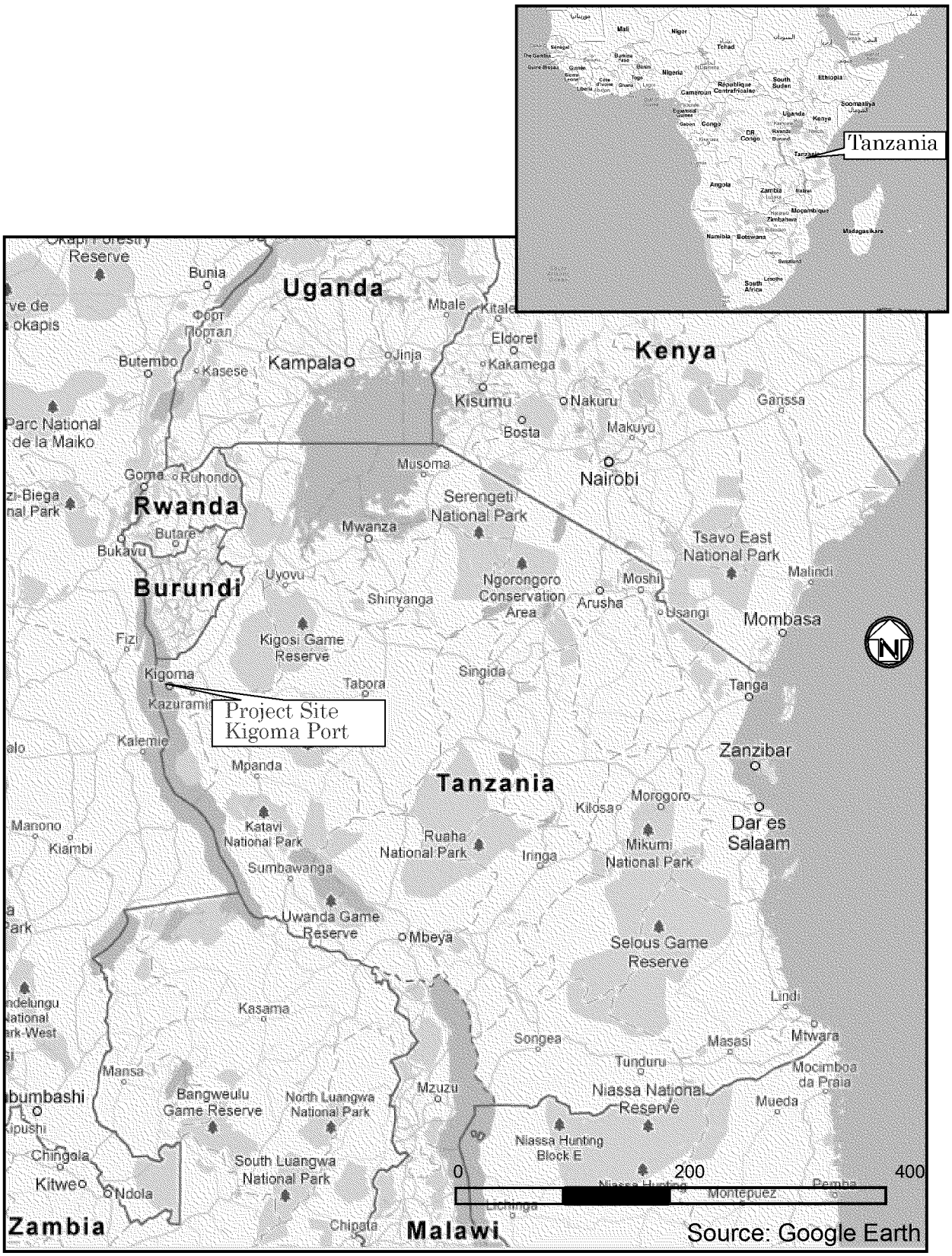
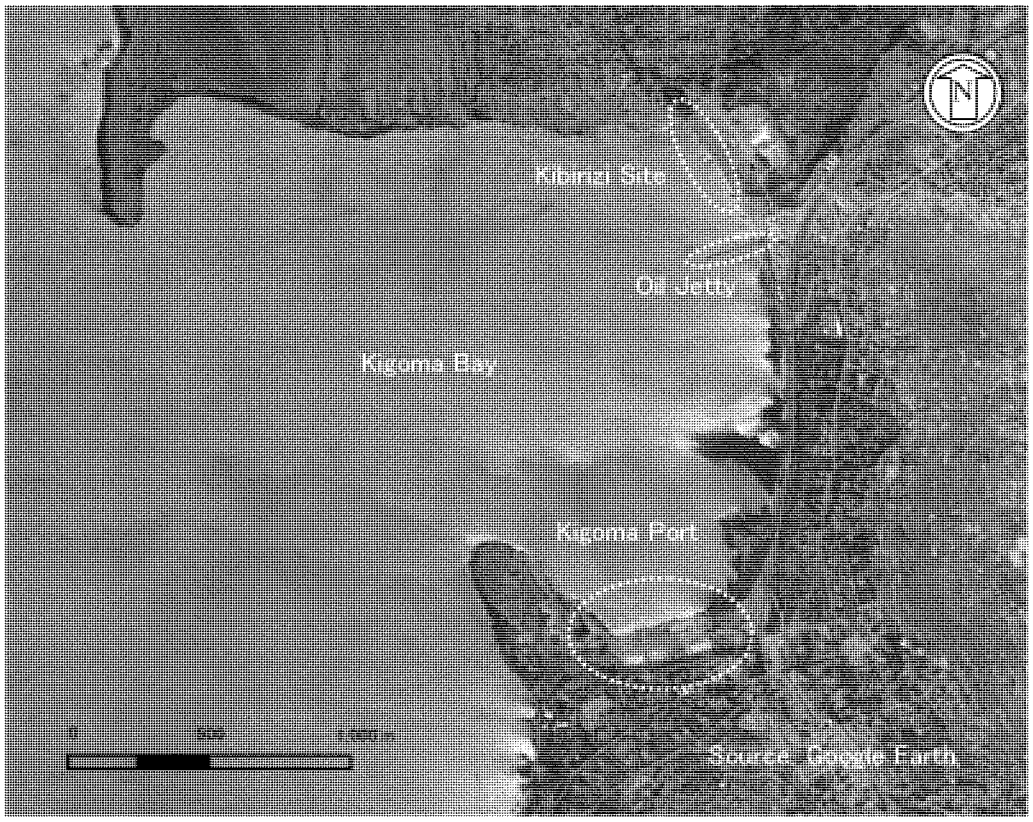
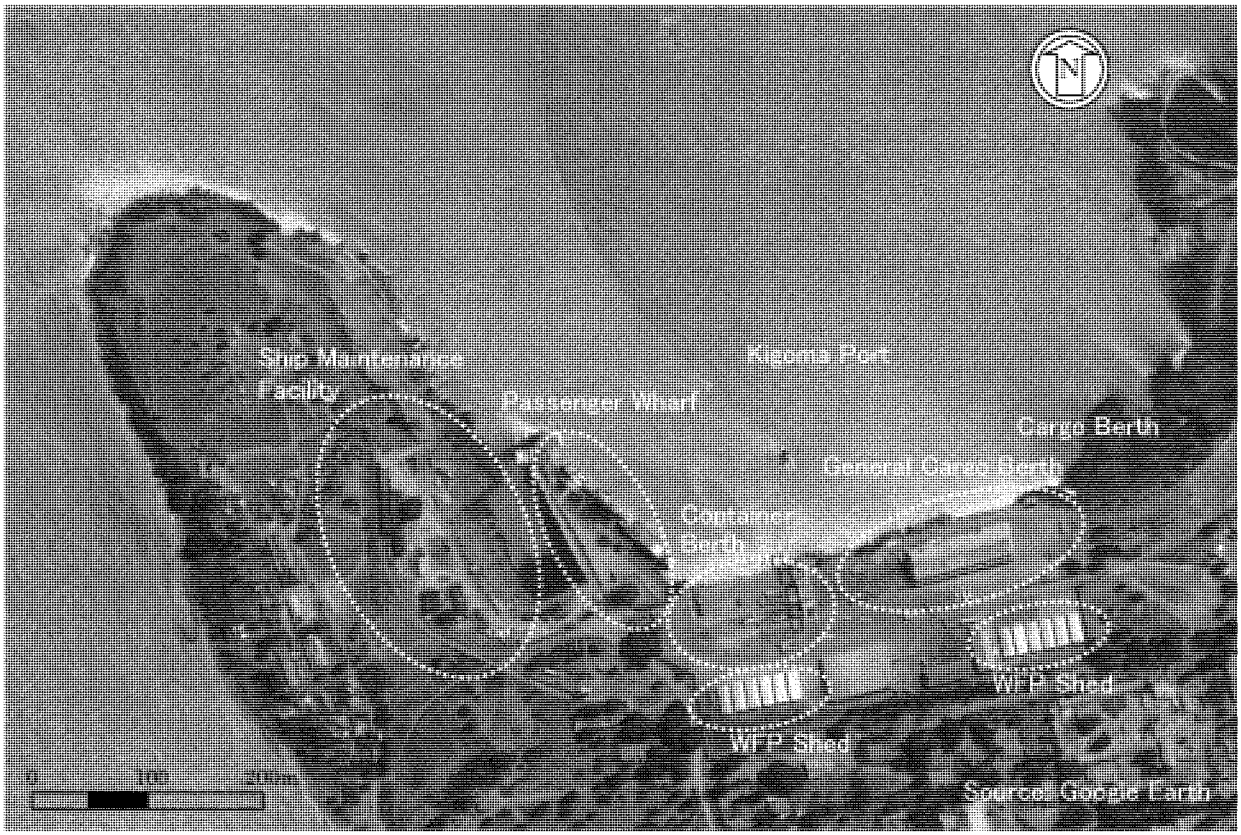


Location Map of Kigoma



Location Map of Passenger Kigoma Port



Location Map of Passenger Wharf of Kigoma Port

Perspective

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■Abbreviations

Abbreviations

A	AP	Authorization to Pay
B	BA	Banking Arrangement
	BD	Basic Design (Outline Design or Preparatory Survey Design)
	B/L	Bill of Lading
C	CDL	Chart Datum Level
	CIF	Cost, Insurance and Freight
	Co	Concrete
	C/P	Counter Part
	CRB	Contractors Registration Board
D	DBSA	Development Bank of Southern Africa
	DD	Detailed Design
	DRC	Democratic Republic of Congo
E	EIA	Environmental Impact Assessment
	EIS	Environmental Impact Statement
	EN	Exchange of Notes
	ERB	Engineers Registration Board
	EU	European Union
F	FAO	Food and Agricultural Organization of the United Nations
G	GA	Grant Agreement
	GDP	Gross Domestic Product
I	IBRD	International Bank for Reconstruction and Development
	ICT	Inland Container Terminal
	IEE	Initial Environmental Examination
	IMF	International Monetary Fund
	IMO	The International Maritime Organization
	IUCN	International Union for Conservation of Nature and Natural Resources
J	JICA	Japan International Cooperation Agency
L	LDC	Less Developed Country
M	MSCL	Marine Services Company LTD.

	MOF	Ministry of Finance
	MOT	Ministry of Transport
N	NEMA	National Environmental Management Act
	NEMC	National Environmental Management Council
	NEPAD	New Partnership for Africa's Development
	NGO	Non-Governmental Organization
O	ODA	Official Development Assistance
P	PAPs	Project Affected Persons
	PIP	Project Investment Plan
	PPP	Public Private Partnership
R	RAHCO	Rail Assets Holding Company
S	SADC	Southern African Development Community
	SEC	Special Economic Zone
T	TANROAD	Tanzania National Roads Agency
	TEU	Twenty-Foot Equivalent Unit
	TPA	Tanzania Ports Authority
	TRA	Tanzania Revenue Authority
	TRL	Tanzania Railways Limited
	Tsh	Tanzania Shilling
U	UN	United Nations
	UNDP	United Nations Development Program
	UNHCR	United Nations High Commissioner for Refugees
	USAID	U.S. Agency for International Development
W	WB	The World Bank
	WFP	World Food Programme

Chapter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Background and Summary of the Project

(1) Background

Tanzania becomes the base of important transportation route for inland countries as the gateway of east Africa where has boarders with 8 countries. Tanzania aims to proceed the corridor development for the efficiency of international transportation picking up 4 important corridors which are Dar es Salaam Corridor, Central Corridor, Mtwara Corridor, Cairo-Gaborone Corridor in "Transport Sector Investment Program (TSIP)". Out of these international corridors, Central Corridor connecting Kigoma Port and Dar es Salaam through railway and roads and expanding to Burundi, Congo Republic and Zambia through Lake Tanganyika takes important roles on national security not only for Tanzania but also neighboring countries as import and export route of commodities such as daily commodities and natural resources.

Kigoma Port located at east coast of Lake Tanganyika is grown its importance as the transportation base for import and export of steel, coffee, food, petroleum products and others as its strategic station and fulfill a function as the base of humanitarian support to Congo Republic. However, the port facilities of Kigoma Port have been deteriorated and the necessity and urgency of the rehabilitation are pointed out considering future increase of handling cargoes in TSIP. From these situations, the Government of Tanzania has requested "Rehabilitation Plan for Kigoma Port" (the Project) to improve the passenger terminal comprising rehabilitation of passenger wharf, construction of passenger terminal building, construction of cargo shed and pavement of access road in March, 2010.

Considering the above circumstance, JICA has conducted "Data Collection Survey on Transport and Trade around Kigoma Port" in February, 2011 in order to confirm the necessity and urgency of rehabilitation of Kigoma Port and for the collection of the information and data concerning present situation and development plan of east and west transportation routes centering Kigoma Port. It has been confirmed that the security of safe and smooth embarkation and disembarkation of passengers and cargo handling operation shall be necessary and the proper improvement shall be implemented as soon as possible, since the existing passenger wharf is made of simple jetty and the concrete piles to support the jetty have been heavily deteriorated and there is possible disruption with that survey.

(2) Summary of Project

1) Upper Goal

Trading and economic activities around Lake Tanganyika shall be vitalized by stable transportation of people and commodities further more, it contributes to the area's peace and stability including Burundi, Congo Republic and Zambia.

2) Project Goal

Rehabilitation of passenger terminal of Kigoma Port is implemented attributing to

improvement of safety and efficiency embarkation and disembarkation of passengers, as well as cargo handling operation.

3) Prospective Outcome

Rehabilitation of passenger terminal of Kigoma Port and construction of cargo shed are made.

4) Project Component

The requested components for the Project are as shown below.

i) Rehabilitation of Passenger Wharf (140m x 70m)
ii) Construction of Passenger Terminal Building (25m x 20m)
iii) Construction of Cargo Shed (50m x 20m)
iv) Access Road Pavement (800m x 12m)

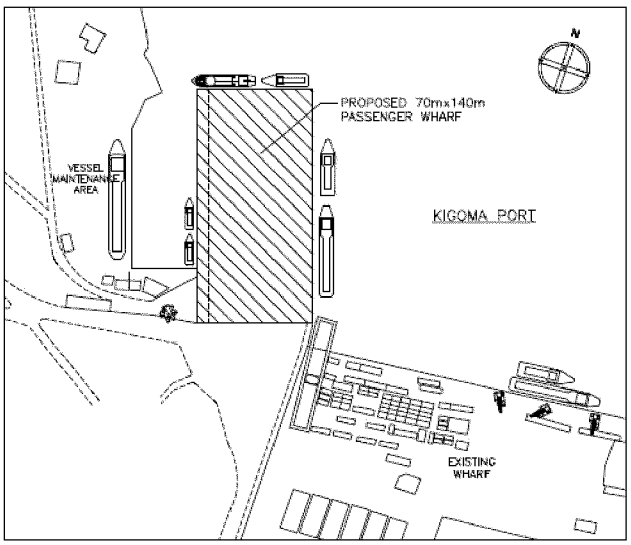


Figure 1.1-1 Location of Requested Facilities

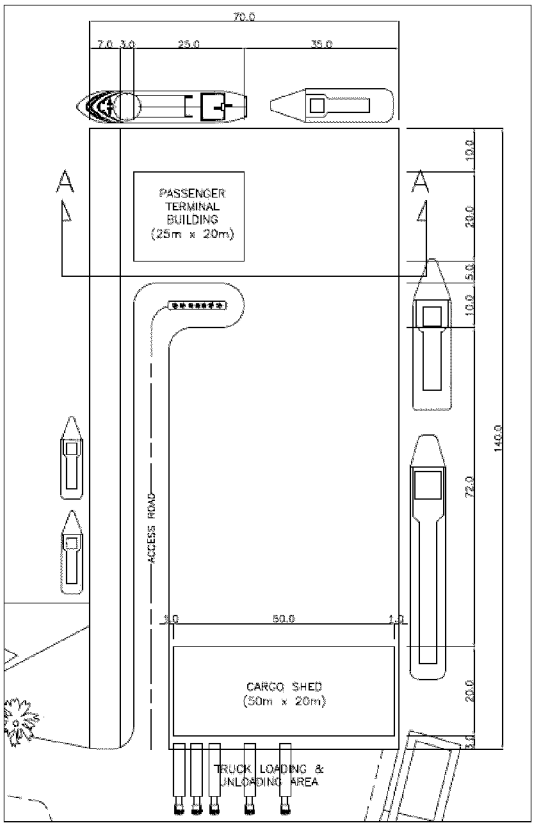


Figure 1.1-2 Layout Plan of Requested Facilities

5) Project Site

Kigoma Port, Ujiji Kigoma District, Kigoma Region

6) Concerned Government Organization

Responsible Agency : Ministry of Transport (MOT)

Implementation Agency : Tanzania Ports Authority (TPA)

7) Beneficial Effects of Project

Operational area of passenger ships in Kigoma and Rukwa Region, where the poverty rate of each state become closer to 40% and the expansion of employment opportunity with the further promotion of agriculture and fishing industries including hinterland in the future is seriously expected. While, development level of transportation infrastructures is still low and road networks are poor and weak and therefore, the regular and low cost lake transportation has been the life line of regional people for the movement of people and distribution of cargoes. In addition, regular voyage service to Congo Republic is considered, in case that the plan to introduce a new passenger ship to Lake Tanganyika is realized.

With the rehabilitation of Kigoma Passenger Terminal, stable transportation of people and commodities in coastal area along Lake Tanganyika shall be possible and in addition, the present fortnightly voyage operation frequency shall be improved by the upgrading of operational efficiency of passenger ship. With the result, the improvement of transportation of people and cargo shall be made in coastal area of Lake Tanganyika and its hinterland, which contributes to the vitalization of economic activities and industrial promotion and furthermore to contribute expectedly to area stability and peace keeping as shown on Figure 1.1-3. When sailing route to Congo Republic is re-opened from Kigoma Port, the same beneficial effects shall be assumed to be given to the coastal area of Lake Tanganyika and its hinterland of Congo Republic.

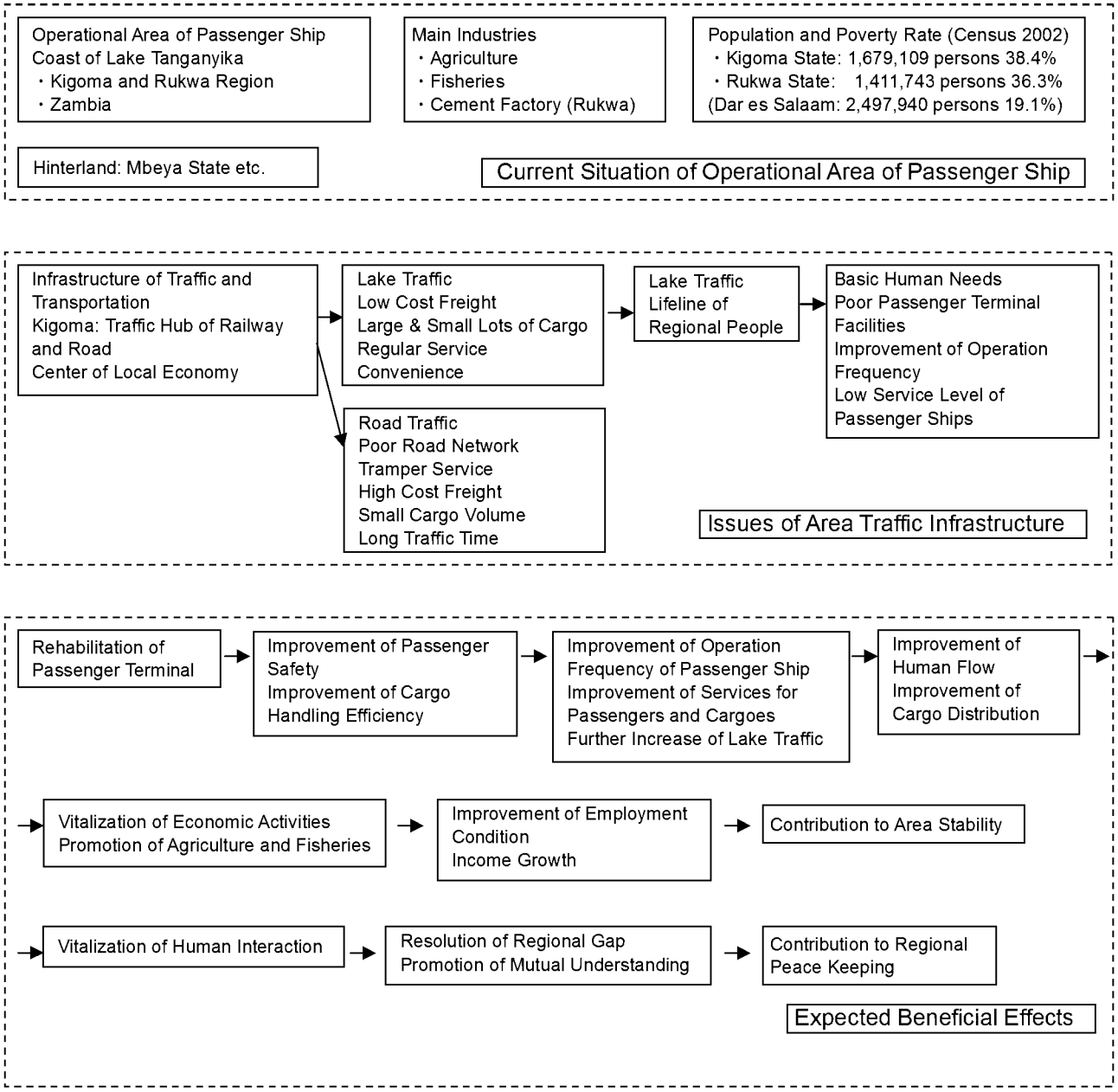


Figure 1.1-3 Beneficial Effects of Project

1-2 Natural Conditions

(1) Geographical Features

Tanzania country located at East African continent and faced to west part of Indian Ocean. While there is a plain part in the eastern part along the coast of Indian Ocean, the high-ground belt has spread from the central part to western part. Along the western border, Great Rift Valley travels through African continent north and south, and the graben lakes which consist of Lake Victoria, Lake Tanganyika and Lake Nyasa were generated by the ground slot belt. Kigoma Port is located at the westernmost tip part of a country, and the distance in a straight line from the capital of Dar es Salaam is 1,100 km, and ground level is about 770 m above sea level.

(2) Climate Condition

Weather data was collected from the Tanzania Meteorological Agency in the Kigoma airport, and conducted arrangement analysis. It is about 5 km in distance between an observation point and the project site; it is thought that the observed value represents the weather condition of a project site. The climate zone of the project site is warm humid climate, and it is divided into two seasons, such as the dry season in November to April and the rainy season in May to October, according to precipitation, temperature and humidity data shown below.

1) Wind Direction and Wind Velocity

Wind feature around Kigoma was analyzed by above wind data which is observed every 3 hours. The wind rose is shown in Figure1.2-1 for yearly and seasonally, and Figure1.2-2 for monthly. Judging from these, in the occurrence ratio of wind directions, E, W, SW are high of about 7 %, and S is following. In addition, wind data is not often indicated especially during night time (from 21:00 to 6:00) as "calmness" in many cases about 60% of the whole. Seasonal fluctuation of wind direction distribution is relatively small, and for the appearance ratio of a strong wind to become high at the dry season comparing with the rainy season is shown. The annual occurrence ratio of exceeding the wind velocity of 5.0m/s in yearly, wet season, dry season are 8.8%, 6.3% and 12.2%, respectively.

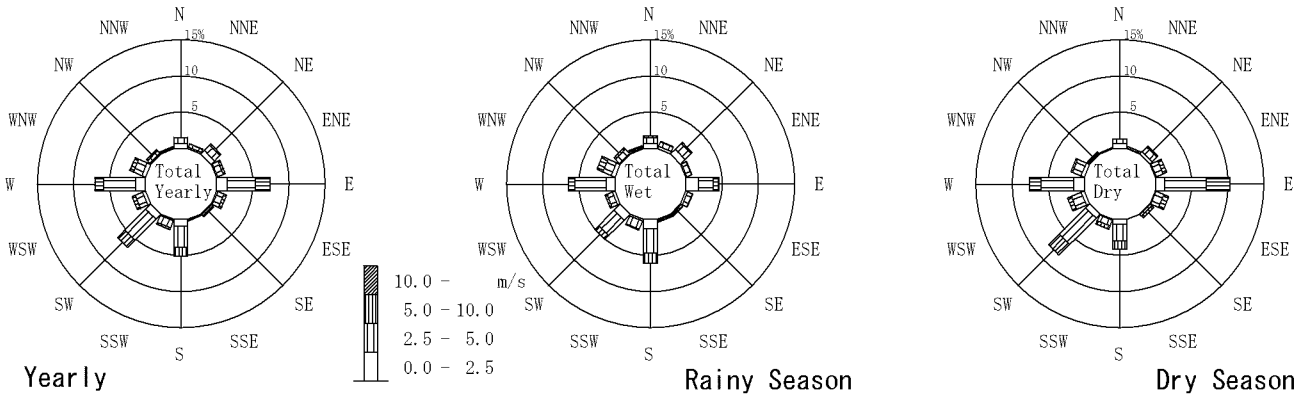


Figure 1.2-1 Wind Rose at Kigoma
(Observed at Kigoma Airport: 2009-2010, yearly and seasonally, every 3 hours)

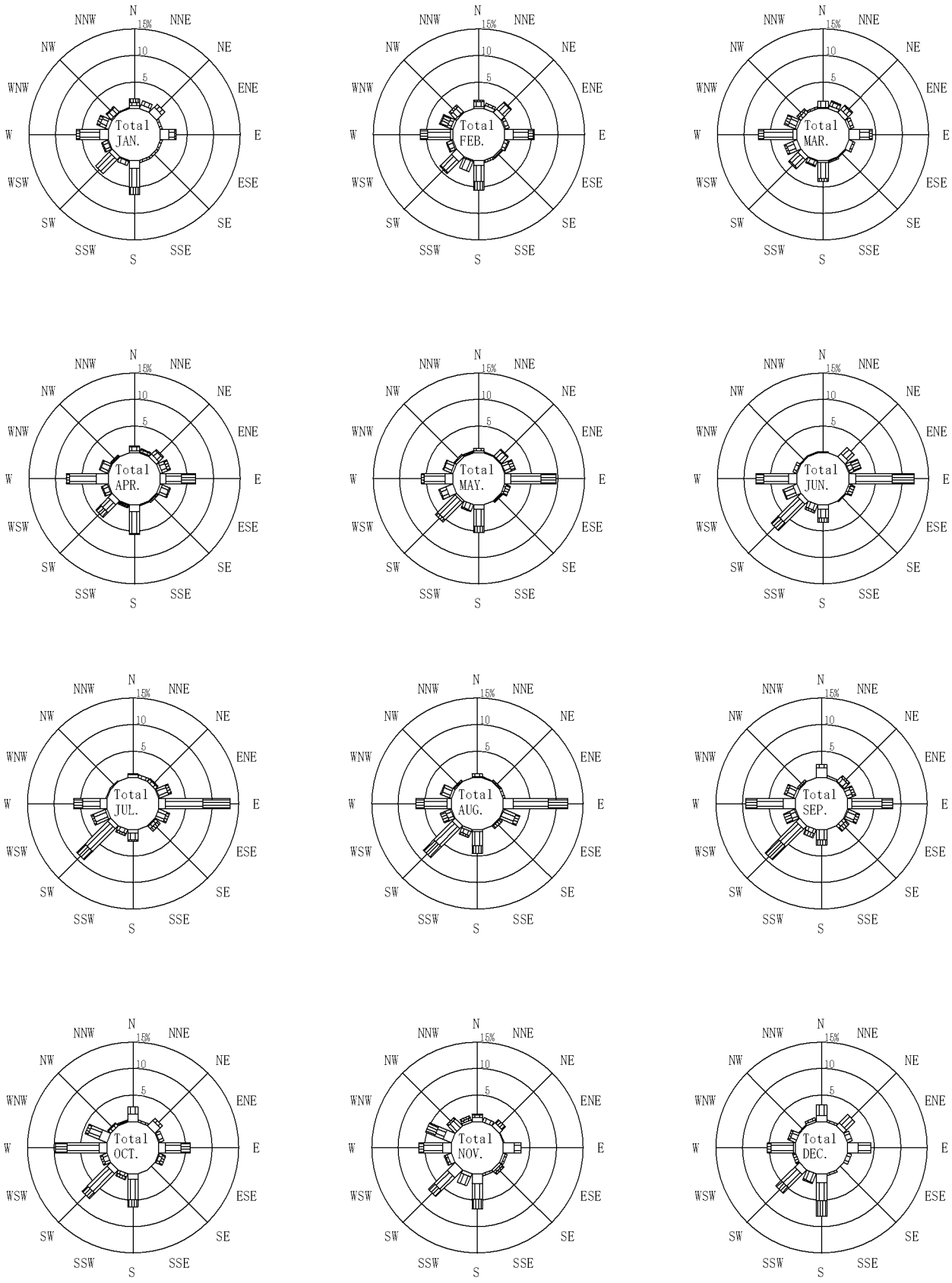


Figure 1.2-2　Wind Rose at Kigoma
（Observed at Kigoma Airport: 2009-2010, monthly, every 3 hours）

2) Temperature

Table1.2-1 shows the average temperature at Kigoma in the year from 2000 to 2010, it is about 26°C. Although there is little fluctuation, as comparatively high at dry season and low at wet season, difference of average temperature of two seasons is almost 3°C at the highest. The observation time of temperature is 4 times per day at 9:00, 12:00, 15:00 and 18:00. It is rare for the maximum temperature to exceed 30 °C, and rare for the minimum temperature being less than 20 °C. As mentioned above, there is little temperature range in Kigoma and it is stable through every year.

Table 1.2-1 Monthly Average Temperature at Kigoma (from 2000 to 2010) (unit:℃)

Mon / Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Average
2000	25.2	25.9	24.6	26.2	26.6	26.0	25.7	26.6	27.5	26.7	24.3	24.8	25.8
2001	24.5	25.4	26.5	25.9	26.1	25.0	25.1	26.2	26.7	26.3	25.6	24.9	25.7
2002	24.6	25.7	25.3	25.2	25.0	25.6	26.0	26.9	28.0	27.6	24.4	24.8	25.8
2003	25.1	25.9	26.8	25.7	26.4	25.1	25.3	26.4	27.5	26.8	25.7	24.9	26.0
2004	25.6	25.0	25.7	25.7	26.0	25.5	25.4	26.9	27.0	27.7	24.9	24.8	25.8
2005	24.8	26.9	26.4	27.2	26.0	25.9	25.5	26.9	28.2	27.6	25.6	25.2	26.3
2006	25.1	25.6	25.5	24.9	25.2	25.6	25.3	26.5	28.0	28.4	24.1	24.4	25.7
2007	25.2	26.0	26.5	26.0	26.6	25.3	25.7	26.7	27.6	26.7	24.5	24.4	25.9
2008	24.4	24.7	26.5	25.8	26.5	24.9	25.8	26.6	27.7	26.6	24.6	25.3	25.8
2009	25.1	25.2	25.1	25.3	25.7	26.0	25.3	26.9	28.1	27.7	24.9	24.9	25.8
2010	26.0	25.1	25.3	26.7	27.0	26.1	26.0	26.4	27.6	27.3	25.1	26.6	26.3
Average	25.0	25.6	25.8	25.9	26.1	25.5	25.5	26.6	27.6	27.2	24.9	25.0	25.9

3) Humidity

The average humidity at Kigoma in the year from 2000 to 2010 is shown in Table1.2-2, and it is about 65%. In view of seasonally change, while the average humidity of the dry season is about 50%, the average humidity of the rainy season is about 75% that is almost 25% higher. Observation time is the same as temperature, as 4 times every day at 9:00, 12:00, 15:00 and 18:00. There is a tendency for the humidity at 9:00 becoming high about 20% in the morning compared with other times.

Table 1.2-2 Monthly Average Humidity at Kigoma (from 2000 to 2010) (unit:%)

Mon. / Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Average
2000	72.5	70.5	74.3	67.3	60.5	52.3	51.0	47.5	56.8	62.8	76.3	75.8	63.9
2001	78.3	74.3	75.3	71.8	66.8	57.8	55.8	53.0	63.0	66.0	73.8	72.5	67.3
2002	78.3	71.0	73.5	74.0	63.0	59.5	54.5	48.5	47.3	56.3	77.3	76.3	64.9
2003	76.0	73.8	73.0	73.8	71.5	62.0	54.0	53.3	54.8	63.0	71.8	77.5	67.0
2004	75.0	73.5	74.3	75.0	67.3	55.5	53.8	49.3	56.5	55.3	74.5	76.3	65.5
2005	77.0	71.5	69.8	67.5	67.0	59.0	53.3	50.0	49.3	56.0	71.5	74.8	63.9
2006	75.5	73.3	70.8	75.0	74.0	57.0	53.5	52.0	49.0	53.3	79.8	80.0	66.1
2007	76.3	71.3	69.3	72.3	65.0	61.3	52.5	48.3	51.8	62.3	75.5	76.5	65.2
2008	76.3	71.3	69.3	72.3	65.0	61.3	52.5	48.3	51.8	62.3	75.5	76.5	65.2
2009	74.3	74.8	74.8	72.8	69.5	58.5	51.5	49.0	49.3	57.8	71.3	76.5	65.0
2010	73.5	72.5	76.8	71.0	65.5	58.0	50.0	46.8	49.3	58.5	68.5	73.8	63.7
Average	75.7	72.5	72.8	72.0	66.8	58.4	52.9	49.6	52.6	59.4	74.1	76.0	65.2

4) Precipitation

The monthly precipitation and the total yearly precipitation at Kigoma in the year of 2000 to 2010 are shown in Table1.2-3. Annual precipitation shows from 750 mm to 1150 mm, and the average value for the past 11 years is about 900 mm. While monthly average precipitation exceeds 100 mm in rainy season from November to April, it is about 50 mm or less at the dry season from May to October. Especially the monthly average precipitation during June to September has decreased very much with about 10 mm or less.

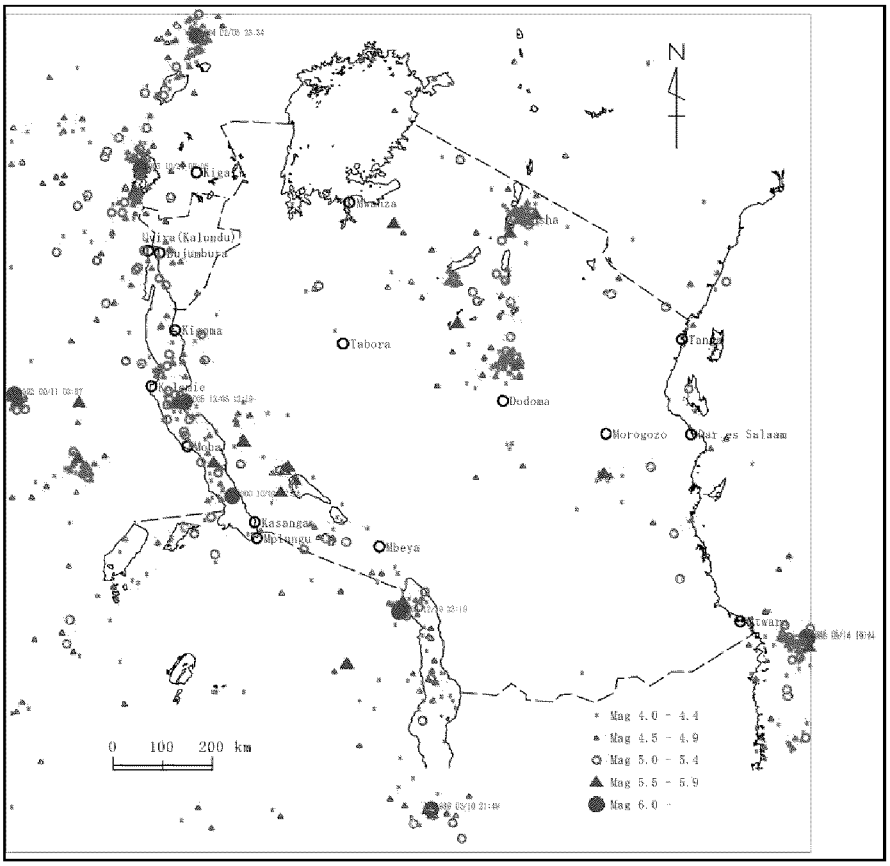
Table 1.2-3 Monthly Precipitating at Kigoma (from 2000 to 2010) (unit:mm)

Mon. / Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
2000	72.5	98.9	156.7	59.9	32.0	0.0	0.0	0.3	2.0	53.5	186.1	150.2	812.1
2001	161.5	65.6	228.3	116.1	39.0	17.7	0.5	22.0	35.6	64.3	71.8	90.8	913.2
2002	272.1	26.3	168.3	241.4	4.3	0.0	0.0	0.0	0.0	29.0	184.4	109.3	1,035.1
2003	164.7	153.1	161.0	170.9	6.0	8.3	0.1	3.8	22.0	73.0	91.8	134.9	989.6
2004	178.6	74.4	160.0	54.4	0.1	0.0	0.0	0.0	47.9	76.6	89.9	183.9	865.8
2005	264.8	29.6	89.3	35.1	81.5	5.5	0.0	0.2	0.0	22.7	153.7	59.8	742.2
2006	105.3	132.7	95.6	181.4	106.1	0.1	4.1	0.7	20.6	31.0	220.2	241.1	1,138.9
2007	96.0	22.2	132.3	123.5	53.1	12.2	0.1	0.3	11.4	56.4	191.9	95.8	795.2
2008	234.8	191.5	135.4	125.2	0.1	13.2	0.2	0.1	4.2	78.3	142.4	145.1	1,070.5
2009	63.8	142.1	190.2	167.0	24.5	18.4	0.0	0.1	1.9	23.3	137.1	86.8	855.2
2010	75.8	56.1	198.5	83.1	112.0	5.8	0.5	0.0	16.0	60.0	100.7	158.1	866.6
Average	153.6	90.2	156.0	123.5	41.7	7.4	0.5	2.5	14.7	51.6	142.7	132.3	916.8

5) Earthquake

According to the information from Kigoma Vice-President Office, about two earthquakes are experienced every year in the Kigoma area. But observation of earthquake is not performed and the detail information such as magnitude of earthquake is not clear. Moreover, although the damage caused by earthquake is not certain, there is no record in particular that there was serious damage in the past.

On the other hand, in the homepage of the United States Geological Survey (USGS), record of the global earthquake which occurred in the past is released, and the influence of the earthquake in the Kigoma area from this information was investigated. Figure 1.2-3 shows the hypocenter of earthquakes focus about 4.0 or more in the magnitude caused around Kigoma point in the year 1973 to 2011. The occurrence time is described by the standard time in this figure in the case magnitude of the earthquake is 6.0 or more. The greatest earthquake in the magnitude in a period is an earthquake of magnitude 6.8 occurred at about 100 km south from Kigoma (Mahale area) on December 5, 2005, and having hypocenter depth of 22 km. Along the west side border in Tanzania there is a Great Rift Valley which travels through African continent north and south. It serves from 35 to100 km wide, the total extension serves as 7,000 km. Many lakes exist in along this ground slot belt and the area of earthquake center as well. The project site is located at west area of the valley, and the earthquake exceeding magnitude 6 has occurred 9 times in the past 38 years.



(Drawing from the Information of USGS homepage)

Figure 1.2-3 Distribution of Earthquakes Hypocenter in 1973 to 2011 (magnitude 4.0 <)

6) Change of Lake Water Level

In the Kigoma Vice-President Office, water level of Lake Tanganyika is observed, and daily average values are recorded by viewing of the scale installed in a Kigoma water intake place. Here, the data of the monthly average in the year from 1995 to 2009 (for 15 years) were collected and analyzed. Table1.2-4 and Figure1.2-4 show change of the monthly average value of lake water level in above sea level. Figure1.2-5 shows the change of monthly average value in whole observation period. The highest monthly water level was 775.86 m in July, 2003, the lowest level was 772.92 m in October, 2006, and maximum level difference was 2.94 m.

According to Dr. Nkotagu who is doing research on Lake Tanganyika in the Vice-President office, the water level of Lake Tanganyika is changing by balance of precipitation, inflow and outflow volume of rivers, and an amount of evaporation.

It is pointed out in the long term viewpoint that the water surface level is reducing, although the water level is fluctuated, the tendency of reducing of water level is confirmed by this observed data. Water level is reduced about 4 cm per year by regression analysis using least-squares method for observed lake level data while correlation coefficient is rather small as 0.4.

On the other hand, to describe monthly fluctuation, water level is the highest in April when the rainy season is finished, and is the lowest in November when the rainy season is started, and the difference of levels in both months is about an average of 60 cm. Moreover, Fig. 1.2-6 shows water level daily value from November, 2011 to January, 2012 at the field survey period of consultant team. It was the early rainy season; water level was rising up at a rate of about 15 to 20 cm in a month.

In addition, although it is observed by above sea level, this water level and standard level for port structures of Kigoma Port established in 1972 which the Kigoma Ports Authority (TPA) showed in the port structure drawings were different each other. Therefore, study team confirmed the difference of both levels by measuring water level and height of top of the rail at Kigoma Port and structures levels. As a result, the relation between observed water level standard and TPA standard for port structures are set up as below. Moreover, the annual average lowest low-water level (773.5 m: described by water level observing standard) shall be called D.L. (datum level for sounding) is set up, and the port structures heights used for structure design and depth of lake is expressed on the basis by this D.L. level.

TPA standard value = Standard Value for Lake Level Observing - 2.40m

Datum-level for sounding (D.L. ±0.0m.)

=773.5m (TPA Standard Value)

=771.1m (Standard Value for Lake Level Observing)

Table 1.2-4 Monthly Change of Lake Tanganyika Water Level (from 1995 to 2009)

Month / Year	1	2	3	4	5	6	7	8	9	10	11	12	Ave.
1995	773.96	774.04	774.24	774.40	774.43	774.33	774.14	773.99	773.83	773.79	773.65	773.75	774.05
1996	773.83	773.87	774.04	774.16	774.30	774.11	773.94	773.74	773.67	773.53	773.46	773.75	773.87
1997	773.59	773.60	773.67	773.77	773.86	773.77	773.55	773.49	773.34	773.34	773.39	773.64	773.58
1998	774.06	773.60	773.67	774.78	773.86	775.27	775.69	774.92	774.77	774.69	774.59	774.60	774.54
1999	774.74	774.73	774.80	775.06	775.00	774.32	774.60	774.43	774.77	774.12	774.11	774.27	774.58
2000	774.39	774.43	774.47	774.53	774.41	774.25	773.90	773.75	773.42	773.57	773.52	773.71	774.03
2001	773.92	774.08	774.26	774.46	774.45	774.34	774.18	774.01	773.89	773.80	773.84	773.89	774.09
2002	774.01	774.21	774.34	774.46	774.58	774.34	774.18	774.01	773.89	773.80	773.84	773.89	774.13
2003	774.01	774.21	774.13	774.22	774.19	774.04	775.86	775.68	773.56	773.46	773.44	773.44	774.19
2004	773.67	773.74	773.77	773.94	773.90	773.72	773.51	773.39	773.56	773.46	773.44	773.44	773.63
2005	773.00	773.55	773.58	773.66	773.65	773.56	773.38	773.39	773.08	773.00	772.97	773.02	773.32
2006	773.18	773.26	773.31	773.45	773.53	773.48	773.31	773.13	773.01	772.92	772.94	773.22	773.23
2007	773.45	773.65	773.75	773.81	773.83	773.77	773.60	773.44	773.35	773.25	773.29	773.42	773.55
2008	773.55	773.74	773.88	774.12	774.15	774.03	773.85	773.73	773.60	773.54	773.55	773.79	773.79
2009	773.81	773.91	774.04	774.22	774.18	774.20	774.05	773.88	773.73	773.65	773.67	773.67	773.92
Ave.	773.81	773.91	774.00	774.20	774.15	774.10	774.12	773.93	773.70	773.59	773.58	773.70	773.90

(unit: m, above sea level)

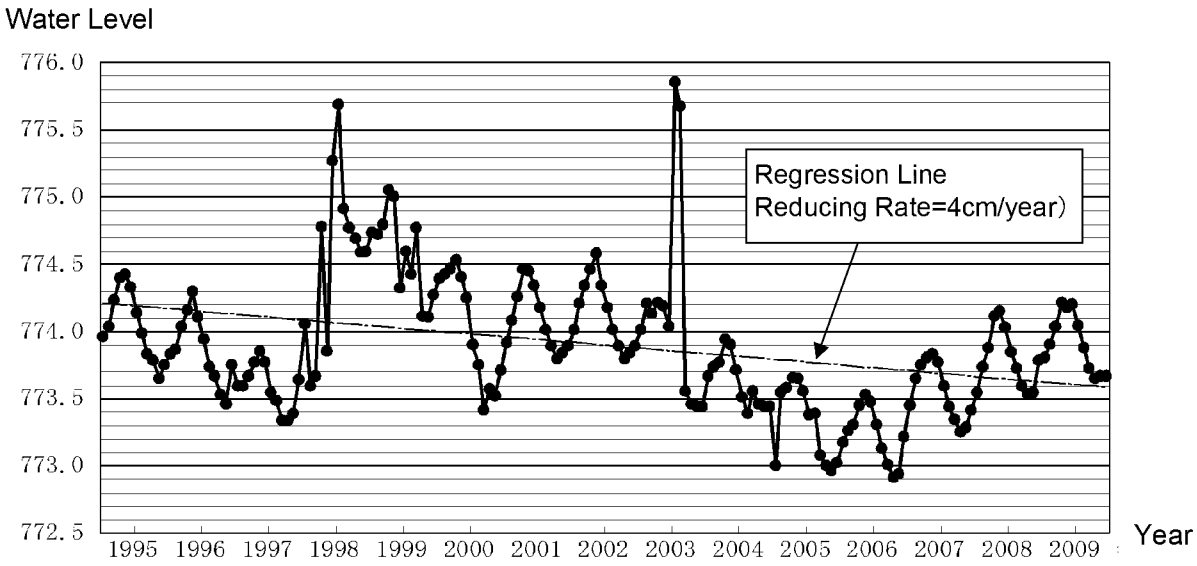


Figure 1.2-4 Monthly Change of Lake Tanganyika Water Level (from 2000 to 2010)

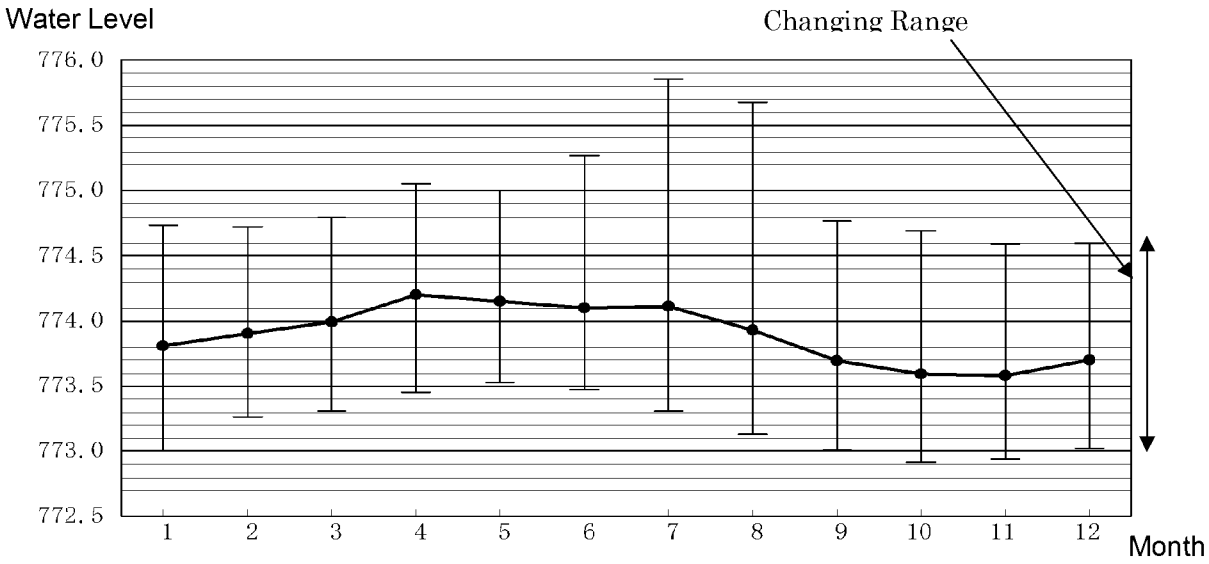


Figure 1.2-5　Average Monthly Change of Water Level

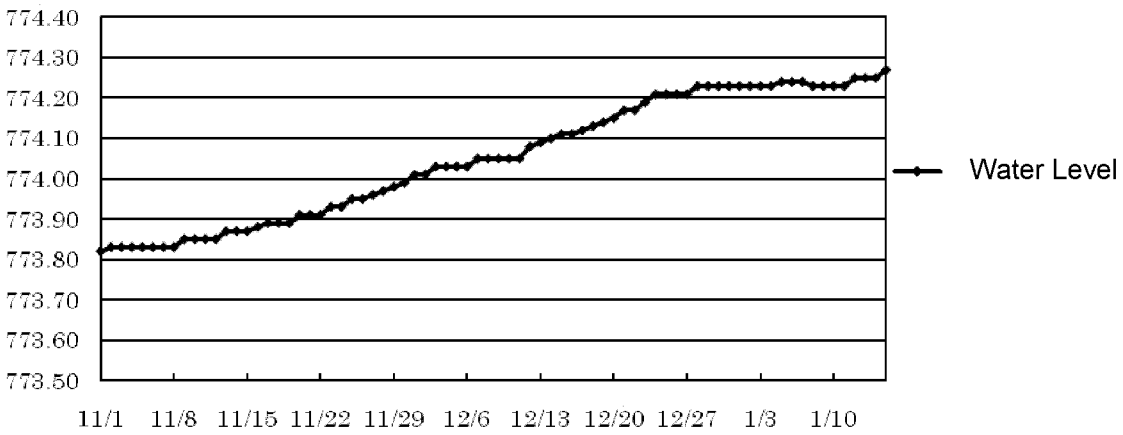


Figure 1.2-6　Daily Water Level Change（from Nov.,2011 to Jan.,2012）

(3) Topographic Survey

Topographic survey was carried out at Kigoma Port and its vicinity by sub-contracted surveyor. Above-mentioned Datum Level (D.L.) shall be used for the standard height in land height, because benchmark point and elevation was not obtained around Kigoma by inquiring survey for Kigoma City Office and Tanzania National Roads Agency (Tanroads). Difference between TPA standard height in the structure drawings and standard height for lake water level observing are compared and confirmed by measuring the height of top of the rail at the port as mentioned above. Structures, such as buildings, rails, trees, etc. were also investigated. Moreover, from the results of the investigation, the land height contour was also figured out at intervals of 0.5 m.

(4) Bathymetric Survey

Bathymetric survey was carried out at around Kigoma Port in Lake Tanganyika. The standard level for the water depth was based on Datum Level (D.L.) as same as the topographic survey.

With the above topographic survey results and bathymetric survey results, and the plan of land height and water depth were made up. Figure1.2-7 shows the plan for whole survey area. And, Figure1.2-8 shows the plan for expanded area around Kigoma Port, Figure1.2-9 shows the plan for access road.

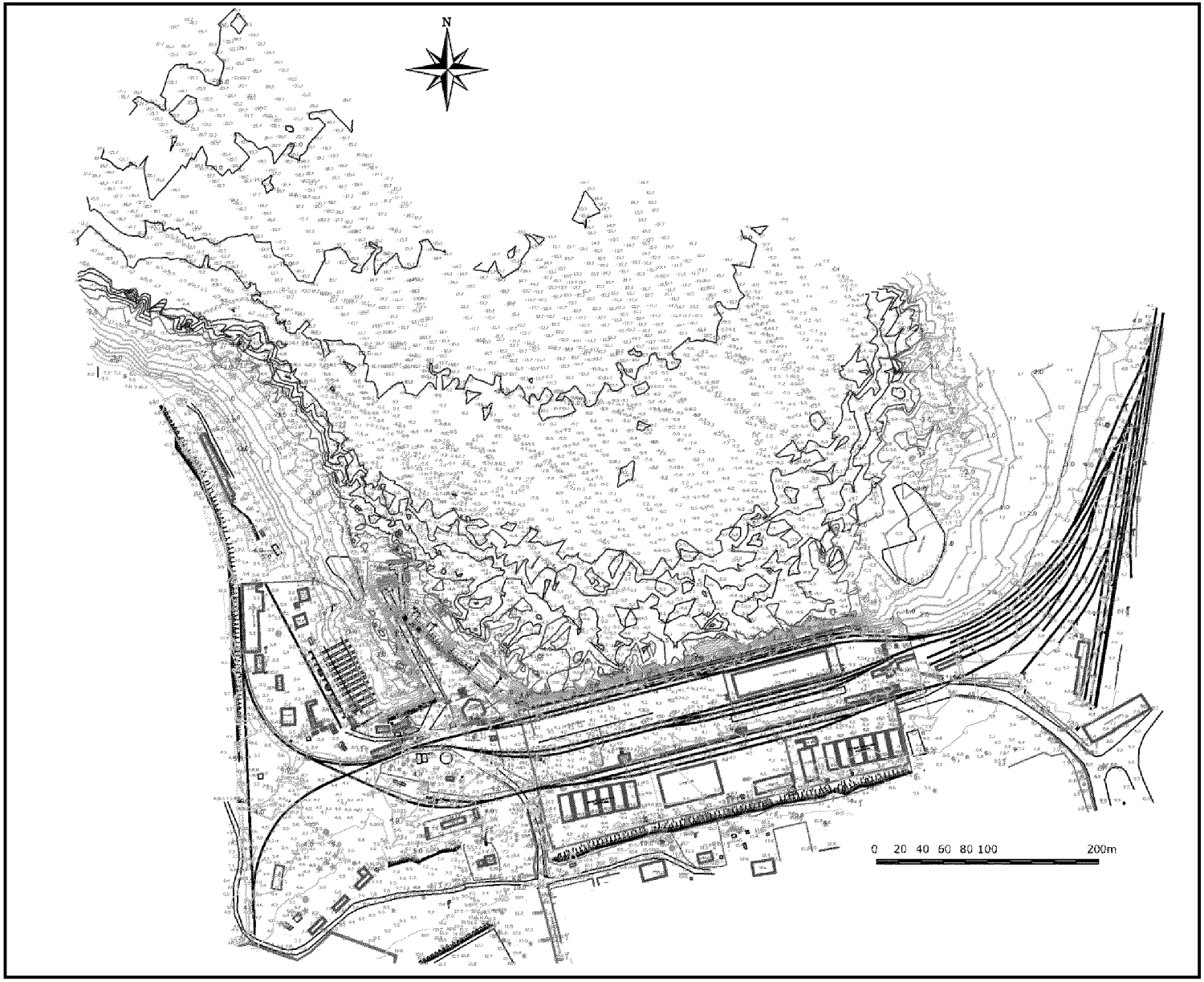


Figure 1.2-7 Result of Topographic and Bathymetric survey (Whole Survey Area)

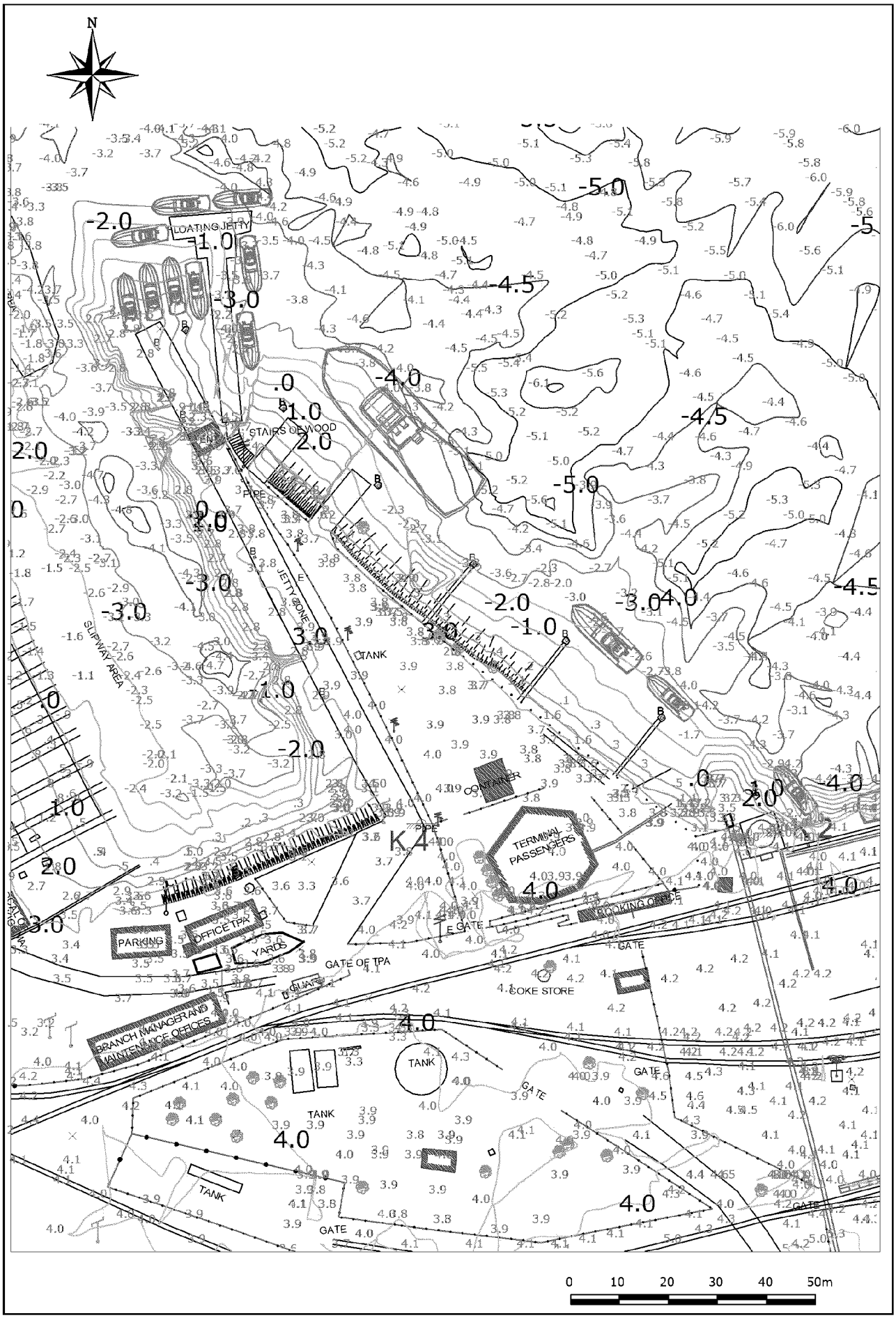


Figure 1.2-8 Result of Topographic and Bathymetric Surveys
(Expanded Map for Kigoma Port)

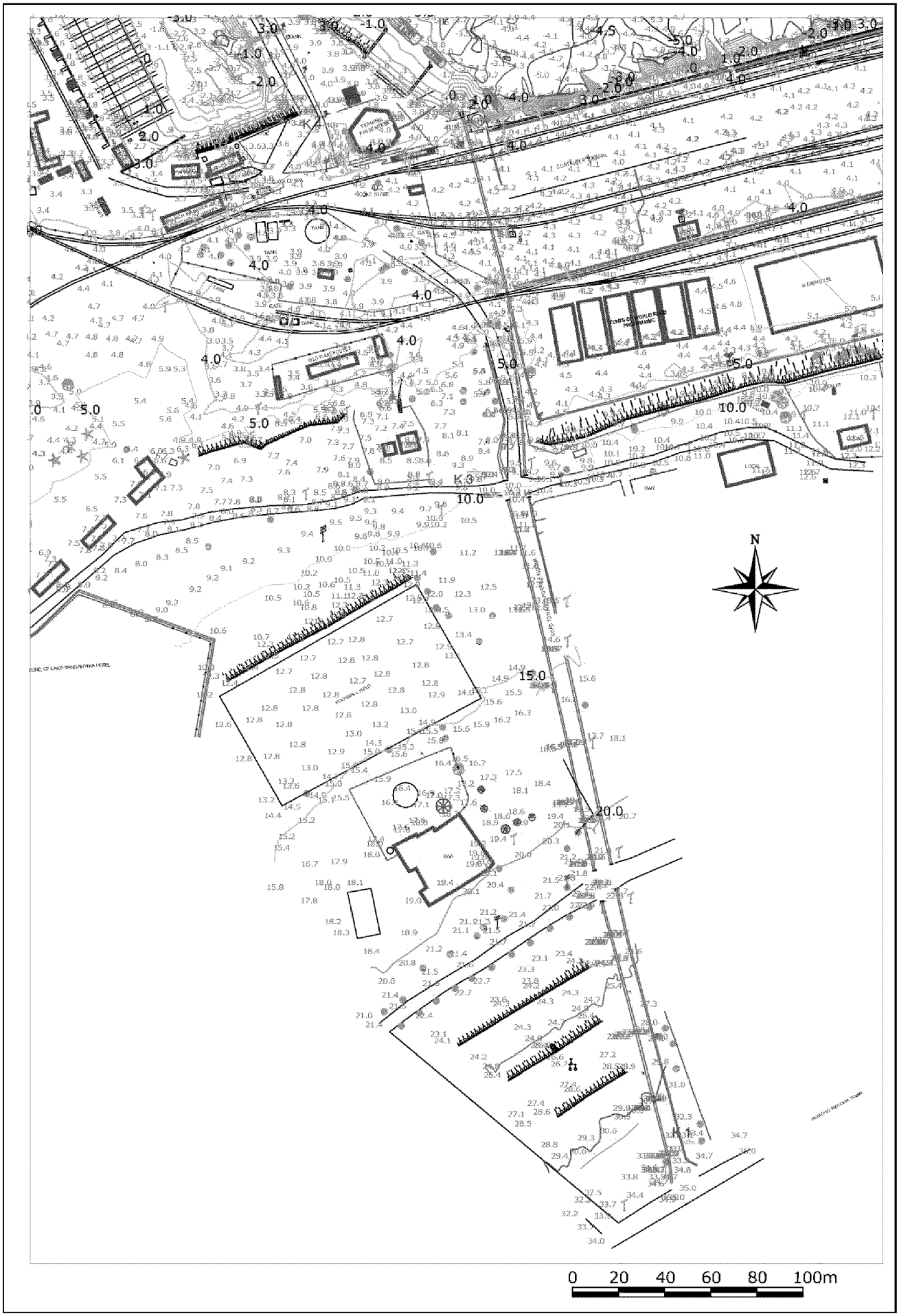


Figure1.2-9 Result of Topographic and Bathymetric Survey
(Expanded Map for Access Road Site)

(5) Plate Bearing Test

Plate bearing tests were carried out at one point in a passenger wharf and 2 points in access road site as shown in Figure1.2-10 to estimate load bearing capacity of site ground by sub-contracted surveyor. The testing machines used in the investigation are shown in Table1.2-5.

Table 1.2-5 Equipment Used in Investigation

Shape of Bearing Plate	Circle
Type of Jack	Hydraulic Jack
Capacity of Load Gauge (kN)	50
Diameter of Plate (cm)	30
Capacity of Jack (kN)	50
Area of Plate (m^2)	7.07×10^{-2}
Counter Force Machine	Full Load of 7t Truck

Table1.2-6 shows the test results. K_{30} values of P.1 point of a passenger wharf is more than 300 N/cm^3, and it shows sufficient bearing capacity. K_{30} value of P.2 and P.3 point are less than 100 N/cm^3. These positions are outside of access road and non compacted area. It is considered that it has sufficient capacity like a passenger wharf since the access road was compacted and has consolidated by traffic load.

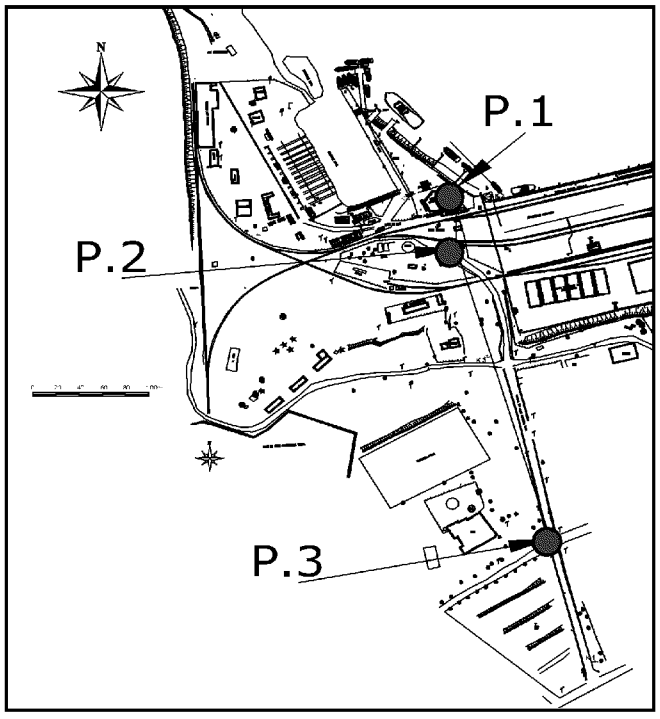


Figure1.2-10 Location of Load Bearing Test

Table 1.2-6 Result of Load Bearing Test (Value of K_{30})

Points	K_{30} (N/cm^3)
P.1	369.2
P.2	14.5
P.3	47.6

(6) Soil Investigation

Boring investigations were carried out at 4 points (BH-1 – BH-4) in passenger wharf construction area. Boring location maps are shown in Figure 1.2-11. Figure 1.2-12 shows the boring logs of N values and Figure1.2-13 shows boring logs of soil characteristics in each point. Figure1.2-14 shows grain size distribution curve representing at BH-3. Other grain size distribution curves are attached in Appendix 6.1. Soil conditions around project construction area are described below. In addition, at BH-2 and BH-4, drilling became difficult, since metal obstacles were found at the depth of 7 to 9 m below D.L.. Therefore, drilling was continued by changing the positions to BH-2b and BH-4b, respectively.

1) Soil Qualities

Soil qualities of surface layer are silty clay up to the depth of 7m below the D.L. and N values are varied from 30 to late 40s. At the layer of deeper than 8m below D.L., the soil condition were weathered sandstone but it shows N value of 50 or more.

The uniformity coefficient and coefficient of curvature coefficient which were obtained among samples are value of 5 or less and from 1 to 3, respectively and the slope of grain size distribution curve are large. From these results, it was confirmed that the grain size of the soil of the site area are uniformed.

As a result of classifying using the triangular coordinate, soils of site area are classified into sandy soil, granule part mixture sand and sand. Result is shown in Figure1.2-15.

2) Engineering Evaluation

Soils of the site area consist of sandy soil generally, and there were no soils such as soft ground, it is judged to be the satisfactory foundation especially in view of construction of passenger wharf. However, since distribution of the comparatively hard foundation with N value of 50 or more are confirmed, in the construction of driving of steel sheet piles, it is necessary to examine the construction method carefully.

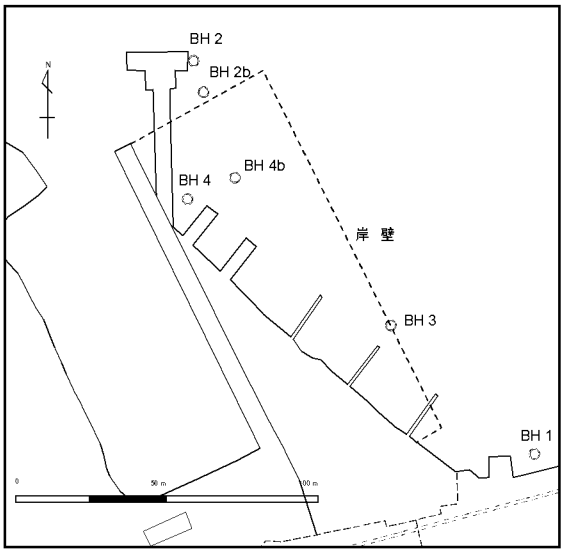


Figure 1.2-11 Location of Soil Investigation

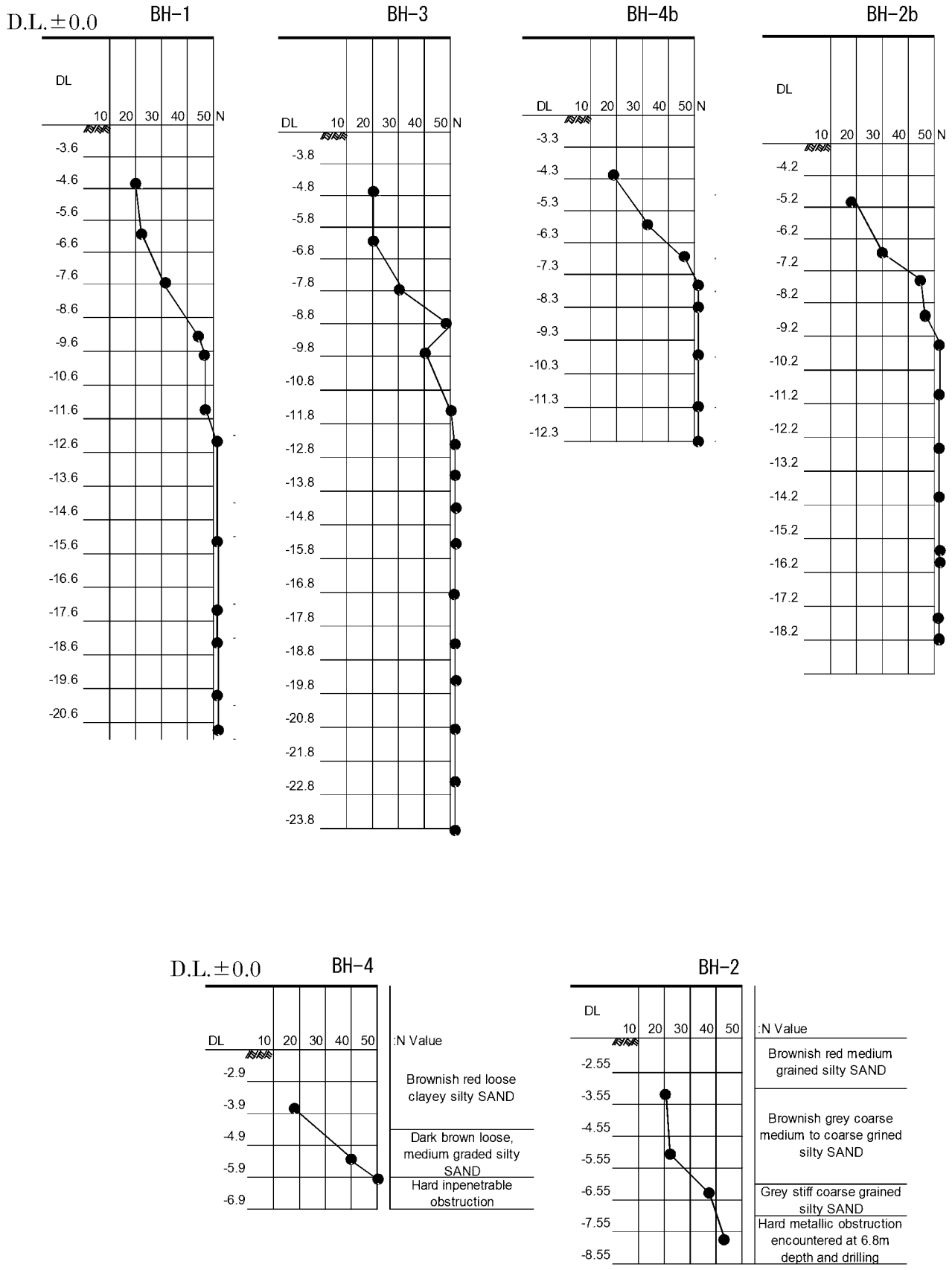


Figure 1.2-12 Boring Logs (N Values)

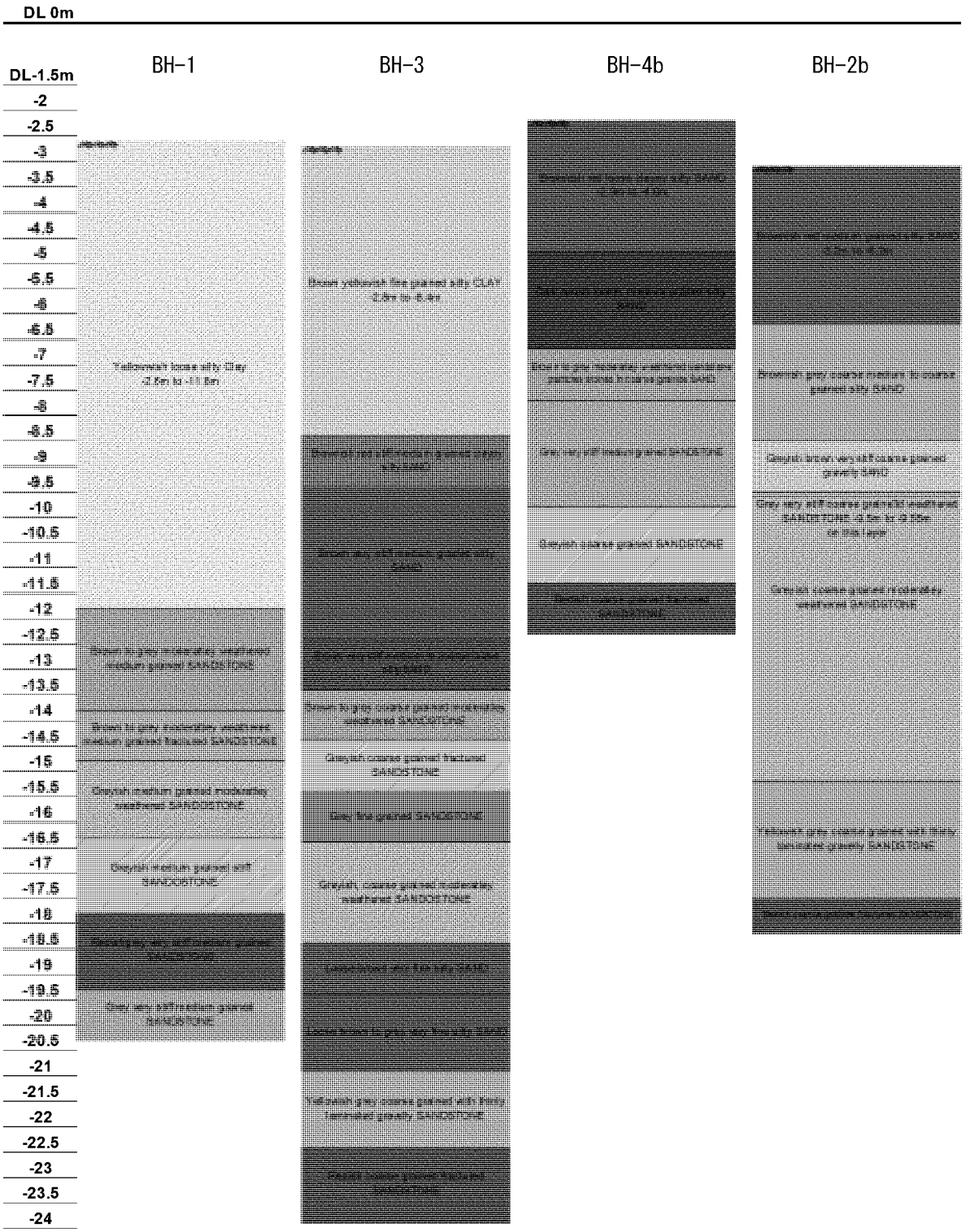
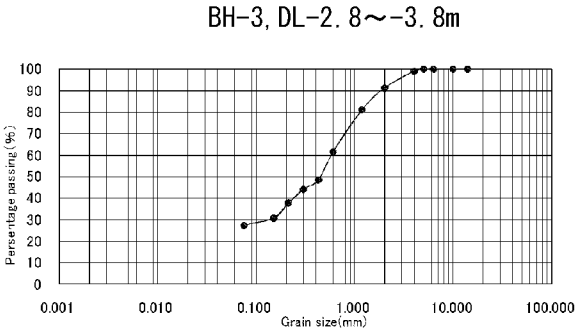


Figure 1.2-13 Boring Logs (Sub-soil Conditions)

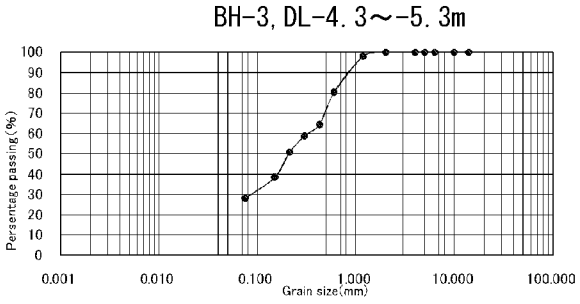
BH3

BH3	0.0m–1.0m		
Initial Dry Mass(g)	2298		
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	20.9	0.9%	99.1%
2mm	179.6	7.8%	91.3%
1.180mm	232.8	10.1%	81.1%
0.600mm	449.8	19.6%	61.6%
0.425mm	298.8	13.0%	48.6%
0.300mm	101.7	4.4%	44.1%
0.212mm	144.2	6.3%	37.9%
0.150mm	162.7	7.1%	30.8%
0.075mm	77.6	3.4%	27.4%
Passing 0.075mm	629.9		
Grading modulus	GM	1.33	
Grading coeficient	GC	50.96	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		



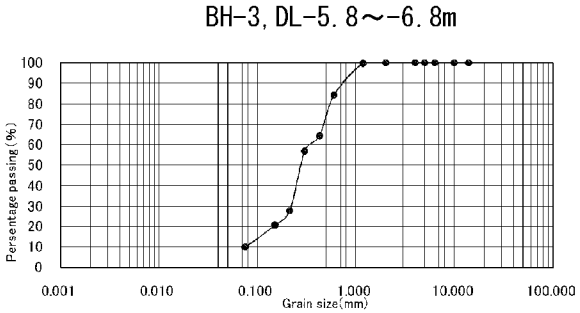
BH3

BH3	1.5m–2.5m		
Initial Dry Mass(g)	1235		
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0	0.0%	100.0%
1.180mm	26	2.1%	97.9%
0.600mm	217.1	17.6%	80.3%
0.425mm	196.2	15.9%	64.4%
0.300mm	68.3	5.5%	58.9%
0.212mm	98.3	8.0%	50.9%
0.150mm	152.2	12.3%	38.6%
0.075mm	130.3	10.6%	28.1%
Passing 0.075mm	346.6		
Grading modulus	GM	1.08	
Grading coeficient	GC	35.57	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		



BH3

BH3	3.0m–4.0m		
Initial Dry Mass(g)	1618		
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0.6	0.0%	100.0%
1.180mm	4.4	0.3%	99.7%
0.600mm	247.3	15.3%	84.4%
0.425mm	325	20.1%	64.3%
0.300mm	121	7.5%	56.8%
0.212mm	469.1	29.0%	27.8%
0.150mm	113.9	7.0%	20.8%
0.075mm	174.2	10.8%	10.0%
Passing 0.075mm	162.5		
Grading modulus	GM	1.26	
Grading coeficient	GC	35.68	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		



BH3

BH3	4.5m–5.5m		
Initial Dry Mass(g)	1284.39		
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0	0.0%	100.0%
1.180mm	20.9	1.6%	98.4%
0.600mm	176.5	13.7%	84.6%
0.425mm	237.3	18.5%	66.2%
0.300mm	90.8	7.1%	59.1%
0.212mm	125.6	9.8%	49.3%
0.150mm	194.9	15.2%	34.1%
0.075mm	163.4	12.7%	21.4%
Passing 0.075mm	274.99		
Grading modulus	GM	1.12	
Grading coeficient	GC	33.84	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		

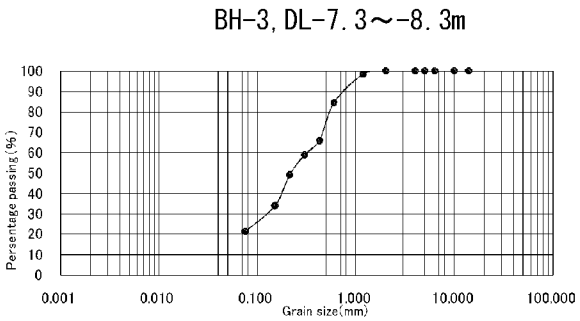


Figure 1.2-14 Grain Size Distribution Curve (BH-3)

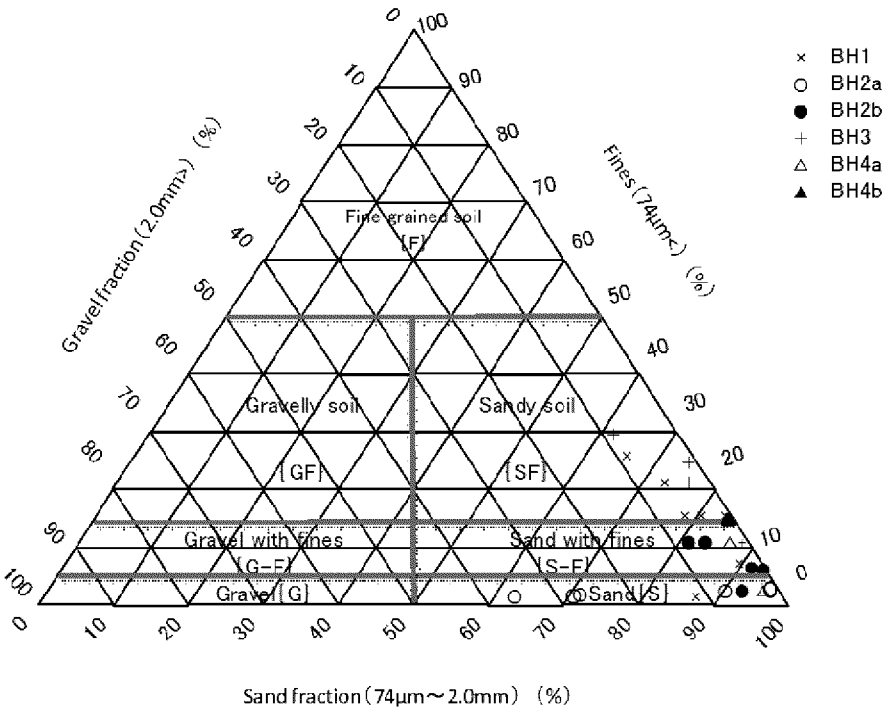


Figure1.2-15　Distribution of Soil Qualities by Triangular Coordinate
（Particle Sizes are Measuring by Sieving）

1-3 Environmental and Social Consideration

1-3-1 Overview on Environmental and Social Consideration Measures

(1) Outline of Project Components influencing the Environmental and Social Impacts

As for the project components, taking note of assumed largest scale development assistance in consistency with below proposed items (kind of facilities, infrastructure and content of assistance) by the Tanzanian government, the Environmental and Social Consideration Study was conducted.

(a) Rehabilitation of Passenger Berth
(b) Construction of Passenger Terminal Building
(c) Construction of Cargo Shed
(d) Pavement of Access Road

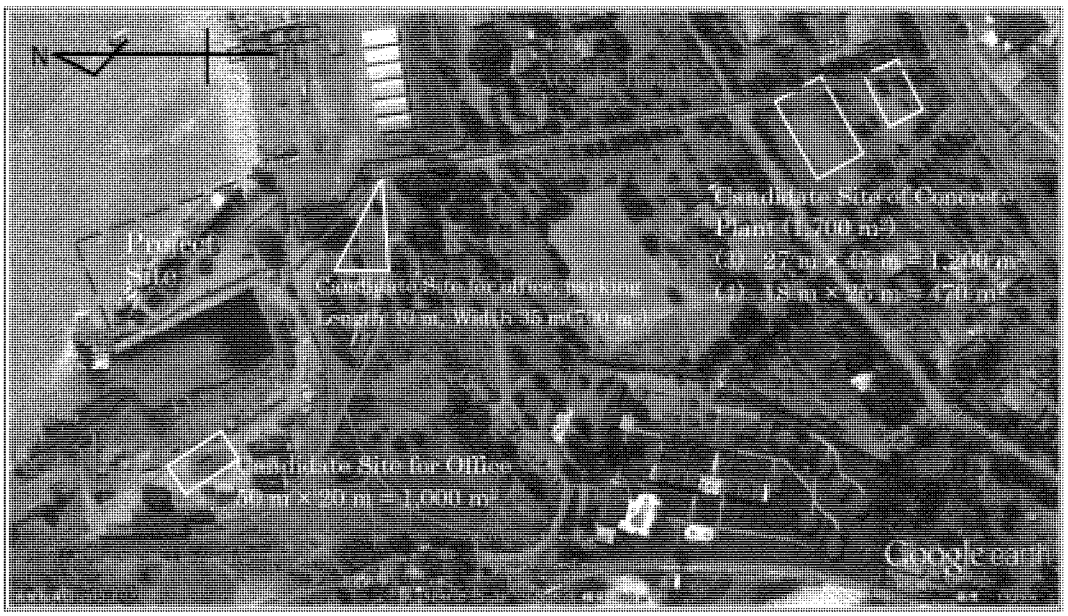


Figure 1.3.1-1 Outline Map of Kigoma Port Passenger Berth Rehabilitation Plan

Among the project components, in terms of above (a) to (c), related to the rehabilitation of the berth area, in accordance with required land reclamation works of the passenger berth and dredging works at frontal water area of the berth for securing its required water depth, the focal point was assumed to be the direct and indirect impacts (as for latter, by probable diffusion of dredged soil/ sand) to the ecosystem and habitat of benthic species at bottom of the lake and to vegetations such as (algae) grass banks and underwater plant beds.

In terms of the above issue, as for the baseline study, sampling analysis of water quality and bottom sediment at nearby water areas was conducted for grasping its baseline conditions, taking in concern also the possibility of re-usage of dredged soil as land reclamation material. The analysis was taken place also for investigation of any contamination by domestic wastewater, regarding usage for probable water, and possible bottom sediment pollution by industrial wastewater discharge; taking note of the monitoring plan of these environmental impact items throughout the planning, construction and operation phase, and to see if implementation of the project may cause pollution or impact towards the ecosystem.

As for above item (d), with regard to the access road, almost no environmental and social

impact was anticipated, since it is only an existing road requiring pavement works.

On the other hand, as for the required land for construction office and tentative yard for construction materials during construction phase, confirmations were made to see if there may be any influence toward the fishermen, encroached at the far top west end of the port premises; or especially on any impact to residential structures and farmlands, etc. at the east side area along the access road (confirming that such impact can be avoided), and that no private land acquisition are necessary.

(2) Baseline Information of Environmental and Social Condition

Table 1.3.1-1 shows part of the baseline information of the environmental and social conditions of the project site area.

Table 1.3.1-1 Baseline Study Result of the Project Site Area

1	Meteorology (including rainfall)	Kigoma Region has a tropical climate with Lake Tanganyika influencing the climate leading to high temperature and humidity. The average temperature ranges between 20 degrees and 30 degrees centigrade. Annual rainfall ranges between 600 and 1,600 mm, mostly distributed along and around the lake and the highlands of Kibondo and Kasulu Districts. The mean rainfall is about 1,100 mm. The pattern of the rainfall is uni-modal with the rainy season lasting from October to May, followed by a prolonged dry season from May to September. Precipitation is reliable and allows a wide range of crops to be grown with some double planting of short season crops. Lowland areas are warm for most part of the year, save for June when the nights are cool.
2	Hydrological situation	Winds move water masses by the wind current. Wind strength and direction determine the currents in the lake in addition to their effects on the vertical and horizontal temperature distribution. The wind regime on Lake Tanganyika is dominated by south winds especially in the dry season from May to September. Although the current systems of the lake have not extensively been studied, there appears to be a clockwise current. A generally north to south current along the east coast has been observed and a westward swing of the Lufubu River at the south-western side of the lake, as it enters the lake. Near shore currents may explain the absence of biogenic sediment of the bottom in shallow water. Internal waves play an important role in the hydro-dynamics and nutrient dynamics in Lake Tanganyika, as turbulence associated with these currents will result in mixing between epilimnion and the deeper water layers and in returning nutrients to the epilimnion. Temperature-depth observations in the lake revealed regular internal wave oscillations with fundamental modes of 25–30 days and amplitudes of 30–40 m. The seiche appears to persist during the rainy season without major interruptions until the onset of the south wind in the following dry season.
3	Ambient Air Quality	Existing ambient air quality monitoring data are very few in number, nationwide, and there are no such existing data of Kigoma City.
4	Water Quality	As a general rule, surface water sources are prone to bacteriological contamination while ground water is usually safe in this respect. In the context of portability the main quality deficiencies encountered on existing sources are coloration, content of solid materials and iron content. Generally there are no prevalence of fluorides and other salts in the water supplies. Ground water sources are generally of better quality compared with surface water sources. <u>Water Quality of Lake Tanganyika (according to JICA Study):</u> a. The survey result shows existence of slight mineral substances in Lake Tanganyika's waters (with Salinity near to 300 mg/l), with rather strong alkalinity (over 9 pH). The strong alkalinity, however, is recognized by past studies, as Lake Tanganyika's natural characteristics from ancient era.

		b. There was notable presence of coliform bacilli (90–100 per 100ml), thus source of pollution can be recognized as bacteriological elements (sewage water). However, the dissolved oxygen (DO) value was near to saturation level (near 6.5ml) and BOD (<0.5 mg/l) and COD (~5 mg/l) values were relatively low. c. The Lake water quality, are incompatible with Tanzanian nor international "potable water" environmental standards (coliform bacilli figures were all unsatisfactory levels at all surveying points, and pH values were also unsatisfactory at most of the points).
5	Soil Quality/ Bottom Sediment	Soil quality: a. Highlands zone: Gentle plain with moderately slopping hills and plateaus; Deep and acidic soil; with rainfall 1,300–1,650 mm per annum. b. Lowlands zone: Gentle plain; Red soil and sandy; with 850–1,100 mm per annum. c. Lake zone: Flat plain; Sandy clay, loam soil; with 650–1,000 mm per annum. Bottom sediment quality: According to JICA Study analysis of bottom sediment of the planned dredging area just east the berth subjected for rehabilitation. As a result, analyzed outcome of all parameters turned out to comply with the French environmental standard of bottom sediment utilized for the assessment, and therefore assumed that no significant problems were detected with regard to possible bottom sediment pollution. <mg/kg> 1. Arsenic (As) 1.2 2. Cadmium (Cd) <0.1 3. Chromium (Cr) 13 4. Copper (Cu) 43 5. Lead (Pb) 21 6. Mercury (Hg) 0.06 7. Nickel (Ni) <2 8. Zinc (Zn) 44 9. Tot. PCB avg.< 1.0 μg/kg/sec (excluding DDT pp': 47.6μg/kg/sec)
6	Population	In 1978 Kigoma region had a total population of 618,950, increasing to 854,817 in 1988; but stood at 1,674,046 in the census year 2002 almost three fold from that of 1978. Besides the fact that Kigoma growth rate is very high compared to most regions in Tanzania, there is an added fact that the influx of refugees from the neighboring countries that took place in the early nineties especially from DRC and Burundi add to the already high growth rate of the population in that region. There was a moderate increase of 31% in 1988 over 1978 figure, but that of 2002 over 1988 is an incredible 96 percent. The refugees started flowing back to their respective countries way back in 2000. It appears that the rate of Burundian repatriation has increased slightly after fruitful negotiations that have resulted into recent elections.
7	Indigenous People, Ethnic minorities	Kigoma region found in the west of Tanzania with its four Districts of Kigoma Urban, Kigoma Rural, Kibondo and Kasulu. Various tribes including the Goma, Rundi, Bwari, Manyema, Bemba and Jiji people have originally habited Kigoma region. Others are Holoholo, Vinza, Nyakaramba, Hangaza, Tongwena and Waha. Among the tribes found in Kigoma region, Waha was previously the biggest tribe in the region. They originated from the Bantu who were living along lakes Tanganyika, Victoria, Kivu and Lake Edward. Going by the information volunteered by elders and historians, it shows that Waha people entered Buha (Kigoma) from the areas outside Buha.
8	Agriculture	The region has abundant fertile soil which its people utilize for agriculture. The people of the region utilize their land for cultivation of food crops especially beans, bananas, potatoes, pineapples, maize, cassava and groundnuts; and cash crops such as palm oil, coffee, cotton and Irish potatoes, to mention but a few. As a region, it is self-sufficient in carbohydrates sources over 95 percent while there appears to be surpluses for self-sufficiency in beans and edible oils type of crops such as groundnuts and palm oil.
9	Fisheries	The main activity of the people living along/close to the shore of Lake Tanganyika is fishing. It is estimated that a total of 10,000 fishermen are engaged in fishing in the

		four countries surrounding the lake; that is Burundi, DRC, Tanzania and Zambia. While the fish potential in the lake is estimated at a little more than 300,000 tons; annual catches for Tanzania stand at between 150,000 and 190,000 tons. Lake Tanganyika's total biomass fluctuates in line with seasonal variations of rather common environmental factors especially levels of annual rainfall, nutrition (plankton, etc.) and related changes, wind and temperature, among other things. Despite the density of the fish varieties in Lake Tanganyika, catches are made primarily of 6 endemic and pelagic species. They are 2 plankton-eating clupeid sardines (Limnothrissa miodon and Stolothrissa tanganicae) locally known as the famous "dagaa" which represent 70% of all the catches, and 4 predating centropomidae all of genus Lates which account for 25% of the catches (Lates stappersii known as "mgebuka", Lates angustifrons known as "ngomba", Lates mariae known as "sangara" and Lates microlepis known as "nonzi". The dagaa are small fish with a short life span but highly productive and nutritious.
10	Health Care, Medical Care	The dominance of Lake Tanganyika to a larger extent dictates the climate, institutional status and the prevalence of various diseases in the region. This is compounded by poor communication system, poor water supplies, poverty, poorly run health services to mention but a few. The mere fact of unintentional isolation to the center (Dar es Salaam) renders smooth delivery of health services to the region impossible. On the other hand the high temperatures influenced by the lake and the dense equatorial forest from the neighboring country could be dictators of the prevalence of diseases in the region.
11	HIV/ AIDS	From the regional total figures below it is vivid that new AIDS cases were on the increase from a total of 2,732 cases in year 2000 to 4,262 in 2004. All through the years, cases in women are higher than those in men except for the year 2002 where men had higher cases at 1,527 compared to the women's 1,333. The fight against HIV/AIDS wages on in that the region does not lag behind in the efforts to fight against HIV/AIDS. These services are expected to expand to encompass participation of hospitals in Kibondo, Kabanga, Heru Mission, Kigoma health center and Baptist hospital. In support of these services training has already been given to the service providers. Overall it appeared that there was a drop in the new AIDS cases in 2005, a drop of more than 70 percent from 4,040 and 4,262 in 2003 and 2004 respectively.
12	Transportation	Kigoma region has a road network with a total length of 2,803 kilometers graded under trunk and regional roads providing easy access to other regions and Burundi border; district roads providing easy access to other districts within the region and feeder roads that normally connect the typical rural areas (villages) and the district roads. They sometimes connect to the trunk/ regional roads. Road transportation in Kigoma region is generally at low scale due to the poor conditions of the roads. The shortest road to Dar es Salaam through Tabora–Manyoni is hardly used. The loop through Dodoma–Singida –Nzega–Nyakanazi takes about three days driving from Dar to Kigoma. Train transports a larger salient of cargo between Dar and Kigoma and the neighboring countries. The same cargo finds its way from Kigoma to the neighboring countries through Lake Tanganyika and part of it is transported by road especially to Burundi through Manyovu.
	Water transport (Lake Tanganyika)	Water transportation in Kigoma region is mainly dominated by transport through Lake Tanganyika which is shared by four countries namely Burundi covering 8 percent of the lake; DRC occupying 45 percent; Tanzania with another 45 percent and Zambia which shares the remaining 2 percent. Both, passenger ships and cargo ships do ply the waters of Lake Tanganyika docking in all the four countries listed above. The passenger and cargo ships are Mv. Liemba with capacity of ferrying 200 tonnes of cargo and 600 passengers and Mv. Mwongozo that has capacity to ferry 80 tons of cargo and 800 passengers. There is only one tanker ship known as Mt. Sangara with capacity of carrying 410 tonnes of fuel. On the Tanzanian side they call at Kigoma and Kasanga ports only.
13	Cross border trade	The location of Kigoma town along Lake Tanganyika is of vital importance as a port for cross border trade among neighboring countries of Burundi, DRC, Rwanda and Zambia. It is estimated that about 15 million people who live around here depend on Kigoma town as their shopping center. There is a great demand for commodities like fish; cereals (maize, pigeon peas, beans, cassava); building materials (cement, roofing

		sheets, iron bars, and lime); petroleum products; electronic products; salt from Uvinza salt mines; plastic materials; livestock; red palm oil and palm kemel. Traditionally the port of Kigoma and the central railway line has been the trades get way for Eastern DRC, Burundi, and Rwanda. Reports from shipping operations by a shipping company, which operates lake port of Kigoma on lease says that, the port has capacity of handling up to 500,000 metric tons of general cargo to these countries per year.
14	Protected area, ecosystem	Lake Tanganyika and its Basin are endowed with exceptionally large and highly diverse heritage of flora and fauna. The lake is a global hotspot of biodiversity, and an extremely valuable aquatic ecosystem containing almost 17% of the global available surface freshwater supply and some of the largest freshwater fisheries on the African continent. Lake Tanganyika is internationally recognized as a global hotspot of biodiversity, representing some of the most diverse aquatic ecosystems in the world (Groombridge and Jenkins, 1998). The lake's valuable aquatic ecosystem and the many natural resources found in its Basin provide essential sources of livelihood and income for over 10 million riparian population around the lake, and contribute to the growing economies of surrounding countries of Burundi, DRC, Tanzania and Zambia. Estimates suggest that Lake Tanganyika harbours at least 1500 species (Coulter, 1991), although species numbers vary according to taxonomic authority. Approximately 600 species are endemic to the lake (Snoeks, 2000; Genner et al., 2004). Lake Tanganyika is unique in harbouring endemic species clusters of bagrids, cyprinids, mastacembelids, and mochokids (Coulter, 1991; Vreven, 2005; Day & Wilkinson, 2006). Moreover, a large diversity of endemic ostracods, gastropods, shrimp, crabs (e.g., Martens, 1994; West et al., 2003; Marijnissen et al., 2004; Fryer 2006), as well as many other taxa can be found in Lake Tanganyika. The lake is valuable not only for the presence of these unique species, but also as a microcosm in which to study the processes of evolution that have led to this diversity. For evaluation of the implementation of the Convention on the Sustainable Management of Lake Tanganyika, an agreement was signed on 12th June 2003 by the riparian countries of Burundi, DRC, Tanzania and Zambia. The convention unites the countries in recognizing that Lake Tanganyika is a shared heritage with unique biological and other diversity. The Convention also recognizes the significance of Lake Tanganyika for the development of the riparian states, and the necessity of establishing a sustainable legal and institutional framework for cooperative management of the lake. (Source: Lake Tanganyika Authority)
15	Flora, fauna	Overview of flora and fauna situation of Lake Tanganyika is as follows: a) Flora Emerged macrophytes: Cyperus papyrus, Thpha, Carex (5). Floating macrophytes: Nymphaea, Trapa, Azolla, Pistia (5). Submerged macrophytes: Potamogeton, Ceratophyllum, Utricularia (5). Phytoplankton (1) Kirchneriella, Treubaria, Chroococcus limneticus, Chrysochromulina parva, Chromulina sp., Nitzschia, Anabaena, Stephanodiscus sp., Strombidium. b) Fauna Zooplankton: Cyclops, Diaptomus simplex, Limnochida tanganika (1). Benthos (5) Mollusca (Grandideria burtoni, Brazzaea anceyi, Tiphobia horei, Bythoceras iridescens, Paramelania domoni), Crustacea (Platytelphusa armata). Fish (5) Stolothrissa tanganikae, Limnothrissa miodon, Lamprichthys tanganicus,

		Engraulicypris minutus, Bathybates minor, Bolengorochromis microlepis, Lates mariae, L. angustifrons, L. stappersi. (Source: International Lake Environment Committee [World Lakes Database])

(3) Focal International Conventions to be paid attention

Among the international conventions and protocols ratified by Tanzania, the first Convention that ought to be noted, shall be the "Convention on Sustainable Management of Lake Tanganyika" signed among Tanzania, Burundi, Democratic Republic of Congo (DRC), and Zambia in 2003 and ratified later on. There are stipulations related to preservation of the environment and on EIA, however, the Convention does not put any restrictions on development projects, though it has the main objective to "sustain the environment and development (ex. development of fisheries etc., in terms of latter)" of Lake Tanganyika in a unified manner among the ratified countries.

For reference, the "Minimum Content of Environmental Impact Assessment Documentation" (Part B of Annex I) stipulated in the Convention, and "List of activities that will be presumed to result in adverse impacts" (Part A of Annex I) subjected to mentioned Part B. However, it should be added that according to Dr. Hudson H. Nkotagu, National Coordinator of "National Coordinating Unit, Lake Tanganyika Project (Environment Dept., Vice President Office, Kigoma)" (the Tanzanian Authority of the Convention), "If requirements stipulated in EMA 2004 and the EIA and Audit Regulations 2005 are fulfilled, then requirements under the Convention will also be satisfied".

Other Conventions to be notified, include the "Convention on Biological Diversity", also connected to preservation of benthic species and their habitat, and since Tanzania is one of its ratified countries it ought to be put into attention. It should be notified that Environmental Officer of "National Coordinating Unit, Lake Tanganyika Project (Environment Dept., Vice President Office, Kigoma)" in particular, pointed out that "Lake Tanganyika is generally known as a very deep lake, and shallow areas suitable for benthic species' habitat are quite limited. It is our duty to place consideration for preservation of such shallow habitats".

Although, the Convention on Biological Diversity requires local authorities to confirm on specifications of what needs to be conserved/ preserved and to properly manage and audit on the condition, in principle on the other hand, the Convention does not place any restriction on development activities, but demands to place proper avoiding or mitigation measures in handling the matter at hand. Therefore, if such measures are suitably adopted, it can be recognized that such projects would not generally violate the Convention.

(4) Consideration of Alternatives (including the Zero-option)

The focal point for "consideration of alternatives" in terms of the subjected Project, can be stated as the designing alternatives of the berth subjected for rehabilitation. The 3 options considered in this regard, are the "Steel Sheet Pile Type", the "Steel Pipe Pile Open Type" (pier type), and the "Concrete Block Gravity Type" designs of the berth, shown in Table 1.3.1-2. Please take note to Chapter 2-2-2, which shows the result of comparative analysis in terms of

constructability, safety and economic efficiency of the alternatives for reference.

First of all, as of "Concrete Block Gravity Type", the option was withdrawn due to reasons such as, by requirement of a large berge and construction vessels that must be procured from third country or from Japan and then to Lake Tanganyika, with high risk of accidents that may occur during construction (accompanied with many sub-water works), with difficulty in quality control management, and impossibility to cope with future deepening measure to accommodate for a leveled down lake surface, etc.

The question laid down then, was the choice between the "Steel Sheet Pile Type" and the "Steel Pipe Pile Open Type" (pier type) options. However, taking note of below reasons, it was assumed that the "Steel Sheet Pile Type" of structure was the most preferable option in the end.

(a) As for the "Steel Pipe Pile Open Type" option, as per shown in Table 1.2.1-2, land reclamation works is also necessary, likewise to the "Steel Sheet Pile Type" option. Therefore, besides possibility of preserving a very limited area, most of the benthic species' habitat area underneath shall be demolished.

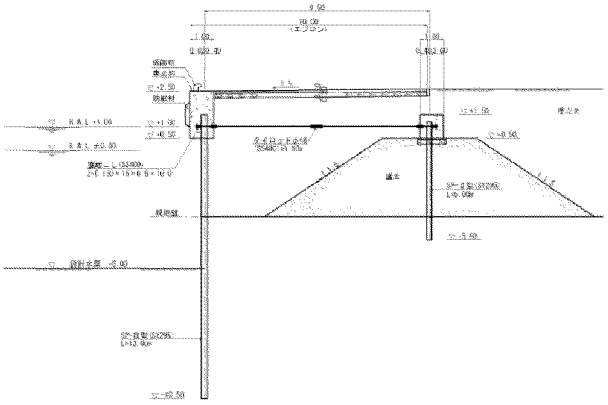
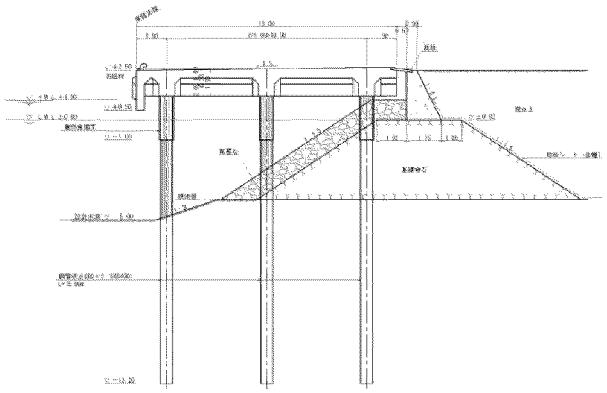
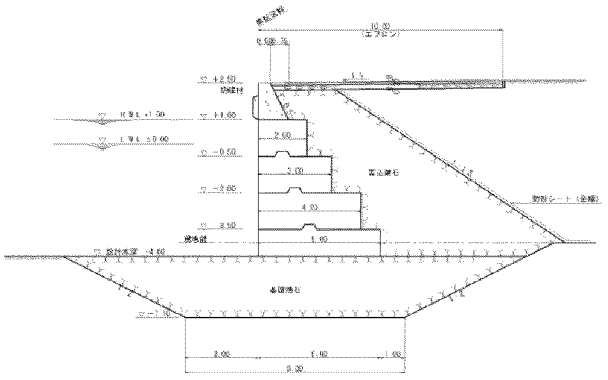
(b) Also, as for the same option, even if a transparent type of pier maybe applied, the structure itself will create a shade at the bottom of the lake, and existing underwater plant beds deprived of present environment for photosynthesis activity, shall not be able to survive and so its impact cannot be neglected.

(c) The "Steel Sheet Pile Type" has its merit in terms of its "very simple construction methodology", thus "constructible within a short period" and "comparatively easy to manage (quality control is easy)" as compared with the "Steel Pipe Pile Open Type" option.

(d) This type is also "secures safety for the construction workers, due to its safe construction aspect", and

(e) also the sole methodology, capable to cope with future deepening measure when the lake surface levels down, due to its long term tendency, without requiring large scale rehabilitation works. With its contribution merit to less future environmental impact, in this sense; as opposed to other options, the "Steel Sheet Pile Type" of structure was considered to be the preferable type.

Table 1.3.1-2　Berth Structure Alternatives

Alternateive-1　Steel Sheet Pile Type

Alternateive-2　Steel Pipe Pile Open Type

Alternateive-3　Concrete Block Gravity Type


For the selection of the "Steel Sheet Pile Type" option, based upon result of comparative analysis of the table shown in Chapter 2-2-2, a quantitative analysis with the weighting method (in consideration of assumed environmental, social impact, along with economic effectiveness) was also conducted. As a result, the selected "Steel Sheet Pile Type" option was proven to have the least adverse impacts, with the least total points, as shown in the table here below.

Table 1.3.1-3 Quantitative Analysis on Consideration of Alternatives

No.	Considering Field	Considering Items	Weighting	Steel Sheet Pile Type	Steel Pipe Pile Open Type	Concrete Block Gravity Type
1	Environmental Impact	Ecosystem, Fauna & Flora	3	3 (9)	2 (6)	3 (9)
2		Future deepening measure (future environmental impact)	3	1 (3)	3 (9)	3 (9)
3	Social Impact	Construction Method	2	1 (2)	2 (4)	3 (6)
4		Construction Safety	2	1 (2)	2 (4)	3 (6)
5		Quality Control	2	1 (2)	2 (4)	3 (6)
6	Social Impact, Economic Aspect	Construction Period	2	1 (2)	2 (4)	1 (2)
7	Economic Aspect	Construction Cost	2	1 (2)	3 (6)	2 (4)
Total			(/16)	9 (22)	16 (37)	18 (42)

Note 1. Weighting: (i) No.1, 2: High importance due to unavoidable environmental imact aspect (3 points), (ii) No. 3-5: Importancy related to social aspect, however, risk can be mitigated by effort (2 points), (iii) No. 6, 7: Due to possible impact on feasibility of the project, though not related to environmental impact issue (2 points).

2. Points: Higher the more impact, lower the less impact.

3. Value in brackets: corrected value after weighting = initially assessed value (value without brackets) x weighting value.

As in the case of the Zero Option, with circumstances remaining the same without implementation of the Project, below adverse effects can be anticipated. And due to this background, the relevancy and urgency of implementation of the Project can be pointed out.

(f) Kigoma Port, for its strategic location for water transportation along the Central Corridor, is an important base, not only for Tanzania, but for other Lake shore countries (namely, Burundi, DRC and Zambia), in terms of people's transportation, as well as in promoting transactions of trading goods, as one of the major livelihood means, including for low income people.

(g) Since the location also has a history during the 1970s through 1990s, in receiving many refugees from other Lake shore countries, Kigoma Port's cargo-passenger ship, is still an important transport means for Burundian and Congolese refugees in returning to their mother country, either permanently or temporarily.

(h) At present, the current pier of the berth subjected for rehabilitation, is almost near to a collapsing state, and other port facilities are also decrepit. It can be assumed that if the berth collapses, large scale environmental destruction cannot be avoided, with significant social and economic impact, not just within the country but also for neighboring lake shore countries as well.

(5) Scoping

Scoping was conducted in light of concerns pointed out in JICA's environmental checklist (7. Roads, and 11. Ports and Harbors), designated environmental and social impact items by JICA according to project sectors, and by observation of the project site accompanied by TPA staff in charge.

The result of scoping for this environmental and social consideration study is as follows:

Table 1.3.1-4 Scoping Worksheet for Kigoma Port Rehabilitation Plan

No.	Check Items	Berth (including passenger terminal building & cargo shed)		Access Road and Temporary Yard for Construction Office and Construction Material	
		Evaluation	Notes	Evaluation	Notes
1	Ambient Air Quality	C	Scale of impact may be limited, due to its rural location. However, construction vehicles and machineries may become a source for air pollution. TOR: Necessity to check on existing monitoring data, if any.	C	Scale of impact may be limited, due to it rural location. However, construction vehicles and machineries may become a source for air pollution. TOR: Necessity to check on existing monitoring data, if any.
2	Water Quality	C	No existing monitoring data are acquired at present. TOR: Necessity to conduct sampling analysis of the lake water quality (planned to sample at 5 points within Kigoma Bay and one other outside of the Bay) to check on baseline condition. Parameters are set to check on possible contamination by domestic wastewater and industrial wastewater discharge into the Lake.	B-	Already installed storm water drainage system leading to Lake Tanganyika, may have slight influence to the turbidity of the Lake, during construction phase.
3	Soil Quality	C	No existing monitoring data are acquired at present. TOR: The soil of the bottom of the Lake, shall be regarded as the "bottom sediment" (same as item "8").	C	Soil runoff may occur due to excavation works for leveling the road before pavement. TOR: Stake of condition should be checked by site investigation.
4	Waste	C	The state of condition including waste disposal and treatment method has not yet been confirmed. TOR: Disposal or treatment system of wastes generated from the port facility needs to be checked, along with such system to be applied for the facilities subjected for rehabilitation and construction.	B-	There are no parking/ service areas along the subjected access road, with no disposal area at both sides of the road. However, wastes generated during construction phase need to be collected and disposed or treated properly.
5	Noise and Vibration	C	No existing monitoring data are acquired at present. TOR: Necessity to check on existing monitoring data, if any. Consideration should be made, in terms of selection, management and maintenance of construction vehicles and machineries.	C	No existing monitoring data are confirmed at present. TOR: Need to check on existing monitoring data, if any. Consideration should be made, in terms of selection, management and maintenance of construction vehicles and machineries.

No.	Check Items	Berth (including passenger terminal building & cargo shed)		Access Road and Temporary Yard for Construction Office and Construction Material	
		Evaluation	Notes	Evaluation	Notes
6	Land Subsidence	C	No existing monitoring data are acquired at present and state of condition at site has not yet been confirmed, also. Degree of plan to intake groundwater during construction has not yet been confirmed. TOR: Necessity to check on existing information of baseline condition including by project site observation. Plan to intake large scale groundwater or not, during construction also needs to be checked.	C	No existing monitoring data are confirmed at present and state of condition at site has not yet been confirmed, also. Degree of plan to intake groundwater during construction has not yet been confirmed. TOR: Necessity to check on existing information of baseline condition including by project site observation. Plan to intake large scale groundwater or not, during construction also needs to be checked.
7	Offensive Odor	C	Baseline condition at the project site has not yet been confirmed. If no maintenance of construction vehicles and machineries are not conducted at regular basis, it could lead to source of offensive odor pollution. TOR: Necessity to check on baseline condition by project site observation, current disposal or treatment system of wastes generated from the port facilities, and tentative plan to be applied to the facilities to be newly rehabilitated and constructed.	C	Baseline condition at the project site has not yet been confirmed. If no maintenance of construction vehicles and machineries are not conducted at a regular basis, it could lead to source of offensive odor pollution. TOR: Necessity to check on baseline condition by project site observation, disposal or treatment system to be applied on wastes generated along the side of the access road and temporary yards.
8	Bottom Sediment	C	No existing monitoring data are acquired at present. Possible contamination by industrial wastewater anticipated. TOR: Necessity to conduct sampling analysis of the bottom sediment of especially dredging area next to the expected land reclamation area of the berth. Parameters are to be set to check on status of possible pollution by heavy metal, etc., due to influence by industrial wastewater discharge. The result may influence on relevancy of dredged soil, for re-usage as land reclamation material.	-	Inapplicable.
9	Protected Areas	C	No protected area by International conventions and protocols were confirmed, however, confirmation in accordance to Tanzanian legislation have not yet been confirmed fully.	C	No protected area by International conventions and protocols were confirmed, however, confirmation in accordance to Tanzanian legislation have not yet been confirmed fully.

No.	Check Items	Berth (including passenger terminal building & cargo shed)		Access Road and Temporary Yard for Construction Office and Construction Material	
		Evaluation	Notes	Evaluation	Notes
			TOR: Necessity to check whether there is any protected area designated by Tanzanian legislation.		TOR: Necessity to check whether there is any protected area designated by Tanzanian legislation.
10	Ecosystem, Fauna and Flora	A- or B-	Possible impact to endemic benthic species and to its habitats anticipated, due to land reclamation and dredging works required for subjected berth for rehabilitation. TOR: Degree of significance (whether A or B) on probable impact to especially endemic benthic species, shall be investigated intensively. First method will be to check on distributional condition of biodiversity level of surrounding water areas of the berth subjected for rehabilitation. Secondly, observed benthic species must each be identified scientifically, with habitat characteristics and confirmation on IUCN Red Data Book categorization. The third will be to estimate possible impact by planned land reclamation and dredging works in terms of the berth, and to set appropriate mitigation measures to minimize impact.	C	Impact on indigenous trees by possible logging for securing land of temporary yard for construction office and construction material, are anticipated. Necessity to check on status at site still remains. TOR: Necessity to check on any existence of rare fauna and flora species in need of protection. If logging of trees is to be involved, the project site condition must be checked, to identify whether any indigenous trees will be subjected for logging or not.
11	Hydrological Situation	C	Hydrological situation of Lake Tanganyika as baseline information have not yet been confirmed. And actual state at project site still unknown before study. TOR: The current hydrological situation of Lake Tanganyika as baseline information should be collected. Observation of current hydrological situation at the project site needs to be checked.	D	Impact towards hydrological situation in terms of inland civil works should not be much of a concern, since no large-scale intake of groundwater will be involved during construction phase.
12	Topography and geology	C	Possible impact by sedimentation or scoring phenomenon that may occur around the berth anticipated. However, basic information on hydrological situation at site have not yet been acquired. TOR: Possible impact by possible sedimentation or scoring phenomenon that may occur around the berth subjected for rehabilitation should be estimated, by	D	The existing access road is only subjected for pavement works, therefore no impact on topography and geology are anticipated.

No.	Check Items	Berth (including passenger terminal building & cargo shed)		Access Road and Temporary Yard for Construction Office and Construction Material	
		Evaluation	Notes	Evaluation	Notes
			confirming scale of area for land reclamation works and the hydrological situation at the site.		
13	Involuntary Resettlement	D	No involuntary resettlement should occur in case of rehabilitation of the berth.	C	No involuntary resettlement should occur in case of pavement of existing access road. Possible impact by securing temporary yard anticipated. TOR: Possible impact by securing temporary yard need to be checked by site investigation.
14	Living and Livelihood, Local Economy	B±	Assumed positive impact by enhanced port convenience, possible negative impact to nearby fishermen TOR: Possibility of negative impact to nearby fishermen in terms of impact towards their fishing area needs to be investigated.	B±	Assumed positive impact by enhanced road convenience. Impact towards surrounding residents and community still unconfirmed. TOR: Evaluation required to check possible negative impact to surrounding residents and community by site investigation required.
15	Cultural Heritages	D	No impact assumed since there are no such structures around the berth.	C	Possible impact towards any cultural TOR: Necessity to check on possible existence and impact toward cultural heritages needs to be confirmed by site investigation.
16	Landscape	D	No significant impact anticipated since the berth is only subjected for rehabilitation. Voices from stakeholders still unconfirmed. TOR: Requirement to check on stakeholders' voices through public hearing still remains.	D	No impact anticipated, since existing road is only subjected for pavement.
17	Indigenous people, minorities and vulnerable people	D	Information on such group of people at Kigoma region was confirmed beforehand, but state of being at the project site was unconfirmed. TOR: Existence of such group of people needs to be confirmed by site investigation.	C	Information on such group of people at Kigoma region was confirmed beforehand, but state of being at the project site was unconfirmed. TOR: Existence of such group of people needs to be confirmed by site investigation.

No.	Check Items	Berth (including passenger terminal building & cargo shed)		Access Road and Temporary Yard for Construction Office and Construction Material	
		Evaluation	Notes	Evaluation	Notes
18	Vocational environment, measures to avoid accidents	B-	There are risks on vocational environment, in any kind of rehabilitation and construction works. TOR: Vocational policy, regulations or guidelines set forth by TPA needs to be checked, along with tentative plan and measures for vocational safety, education to workers in terms of this specific project needs to be confirmed.	B-	There are risks on vocational environment, in any kind of rehabilitation and construction works. TOR: Vocational policy, regulations or guidelines set forth by TPA needs to be checked, along with tentative plan and measures for vocational safety, education to workers in terms of this specific project needs to be confirmed.

Note: A Significant impact foreseen
B Some impact foreseen
C No information at present – observation still required
D No or little impact foreseen

(6) Environmental Prediction, Environmental Assessment and Possible Mitigation Measures

Environmental categorization of the whole project, based on JICA Environmental and Social Consideration Guideline 2004, can be evaluated as "Category B" project, based on below reasons.

Environmental Categorization of the project: Category B (regardless of selection of alternative)

Reasons:

The project is not considered to be a large-scale Ports and Harbors project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA guidelines (April, 2004), therefore, unlikely to cause significant adverse impact on the environment.

The below table shows the result of environmental prediction, environmental assessment and possible mitigation measures in terms of each of the assumed environmental and social impact items.

Table 1.3.1-5 Environmental Prediction, Environmental Assessment and Possible Mitigation Measures of Assumed Environmental and Social Impact Items

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
1	Pollution Measure	Ambient Air Quality	1. Since existing ambient air quality data are very limited even nation wise, there were no official data available of the project site area. However, due to its rural location, baseline condition of air pollution is estimated to be limited. 2. Air pollution caused by exhaust gas to be emitted from construction vehicles and construction machineries can be estimated. 3. As for measures to cope with assumed air pollution caused by ships such as cargo-passenger ship MV Liemba, utilizing the berth, can be assumed as out of scope of the subjected Project. 4. In addition, though also out of scope of the Project, the Marine Service Company (MSC) is planning to introduce a new cargo-passenger ship (name still unknown) from 2007, in addition to the currently operating MV Liemba (continuously to be kept operational). Hence, the state of air pollution caused by related ships may worsen if not coped properly.	C-/D-	1. The Environmental Management Plan (EMP) to be incorporated in the EIS, shall describe whether the Project area's ambient air quality may be sufficient in complying with the domestic environmental standard. The National Environmental Standards Compendium 2005 stipulates the ambient air quality and exhaust gas environmental standard. 2. Low pollution construction vehicles and construction machineries shall be selected **during the planning phase**, and regulatory maintenance shall be conducted **during the construction phase**. 3. Though out of scope of the Project, it can be noted that regular maintenance of cargo-passenger ships should be continuously be conducted abiding the rules stipulated by the port authority.
2		Water Quality	1. Domestic wastewater of Kigoma City is directly discharged into the Lake (aside from treatment by septic tanks, all sewage water are discharged directly into the Lake, through drainage), including those surrounding waters of the subjected berth for rehabilitation. Such influence was confirmed by result of water quality analysis conducted (with notable number of coliform bacilli). 2. **During rehabilitation works and construction phase** of	B-/B-	1. The sewage water of the passenger waiting room, shall be discharged or treated based on standard and by-law set by the Kigoma/Ujiji Municipality. 2. **During construction phase,** proper treatment shall be put in place, so that influence to lake water quality shall be mitigated by impact from possible soil erosion by rehabilitation and construction works. 3. In order to mitigate impact

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			other port facilities, impact by erosion of soil at the project site into surrounding lake waters may occur. 3. Due to expected land reclamation works and dredging works at the east side right next to the berth for rehabilitation, mud or sand particles may spread to surrounding waters, causing turbidity to rise, which may disturb benthic species' migrating activities. 4. The bottom sediment quality at the water area subjected for dredging, was confirmed not significantly polluted by heavy metal nor PCBs, thus re-usage of dredged soil for land reclamation **during construction phase**, should not cause significant impact on water and bottom sediment quality of surrounding waters. 5. Though out of scope of the project, possible water contamination caused by the cargo-passenger ship MV Liemba (due to discharge of sewage water and leakage of diesel fuel, etc.) needs to be noted. This can also be applied to the newly to-be-introduced cargo-passenger ship by MSC, mentioned in item 1 above.		to water quality of surrounding waters, silt protectors shall be installed around dredging works area **during construction phase**,. 4. In terms of bottom sediment quality of the dredging area, no significant pollution by heavy metal nor PCB, etc. were confirmed, therefore reconsideration on initial plan to reuse the dredged soil for land reclamation works **during construction phase**, were found unnecessary (in light of possible impact to water and bottom sediment quality). 5. Conduct monitoring of water quality **throughout the planning, construction and operation phase**, and place proper measures, if necessary. 6. Though out of scope of the project, existing rules for regular maintenance of the Cargo- Passenger Ship, MV Liemba along with the newly to-be-introduced cargo- passenger ship by MSC, should continuously be imposed by the Port Authority.
3		Waste	1. With regard to the dredged soil to be generated, no significant pollution by heavy metal, nor PCBs, etc. of bottom sediment at the planned dredging area were confirmed, in reference to possible pollution by industrial wastewater discharge. 2. Though out of scope of the project, if generated solid and effluent waste are not managed, treated or disposed properly in terms of the cargo-passenger ship MV Liemba, along with the newly	B-/D-	1. Proper treatment or disposal system of solid and effluent waste generated from the port facilities to be constructed should be incorporated in the facility design **during planning phase**, in compliance with the local laws and regulations. 2. As for solid and effluent waste to be generated from the port facilities to be rehabilitated, constructed including the access road **during construction phase**, the Tanzania Port Authority

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			to-be-introduced cargo-passenger ship by MSC mentioned above, environmental condition may deteriorate.		(TPA) Occupational Safety and Environment Regulations (TPA-OSHE) 2010 and Kigoma/Ujiji Municipality's by-law shall be applied for proper treatment or disposal. 3. Dredged soil to be generated shall be reused for land reclamation for the berth's rehabilitation **during construction phase**, as initially planned, so that no solid or effluent waste will be generated in this regard. 4. Although out of scope of the project, TPA should enforce the proper management, treatment or disposal of the generated solid and effluent wastes from the cargo-passenger ships, by applying the TPA-OSHE 2010 and Kigoma/Ujiji Municipality's related by-law.
4		Soil Quality	1. **During rehabilitation works and construction** of port facilities, soil erosions may occur at the site. 2. Scraping works will be required **during construction phase** of the access road and soil runoff could occur in this accord. 3. **During construction and operation phase** of the access road subjected for pavement, oil may spread to surrounding environment from the paved asphalts. 4. Possible leakage of fuel and oil from the construction vehicles and construction machineries may lead to soil pollution **during the construction phase**.	B-/B-	1. Proper measures to mitigate possible soil runoffs shall be put in place **during construction phase.** 2. Less polluting construction vehicles and construction machineries shall be selected during **the planning phase**, and regulatory maintenance shall be conducted **during the construction phase**.
5		Noise and Vibration	1. If construction vehicles and construction machineries with high level of noise and vibration were selected **during the planning phase**, noise and vibration pollution may disturb surrounding residents of the project site.	B-/D	1. Low pollution construction vehicles and construction machineries shall be selected **during the planning phase**, and regulatory maintenance shall be conducted **during the construction phase**. 2. No works that may

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			2. If works were carried out in night times **during construction phase**, surrounding residents shall be disturbed by the noise and vibration even more. 3. Though out of scope of the project, if the cargo-passenger ship MV Liemba, along with the newly to-be-introduced cargo-passenger ship by MSC mentioned above, are not maintained regularly, they could become a source of noise and vibration pollution.		accompany noise and vibration shall be carried out in night time hours **during construction phase**. 3. Though out of scope of the Project, it can be noted that regular maintenance of cargo-passenger ships should be continuously be conducted abiding the rules stipulated by the port authority.
6		Land Subsidence	1. There will be no large scale intake of water required for construction works **during construction phase**, so possible land subsidence are not to be anticipated in this regard. 2. No trace of land subsidence was found at both the berth site nor at the access road.	D/D	1. Monitoring of possible trace of land subsidence will be conducted **during planning, construction and operation phase**, and proper measures shall be taken, in accordance with result of the survey.
7		Offensive Odour	1. If disposal or treatment of solid and effluent construction waste and sewage are not taken care properly **during the construction phase**, this may create a source of offensive odour pollution. 2. If treatment or disposal of solid and effluent wastes generated from the port facilities subjected for construction are not taken care properly **after operation**, this may create a source of offensive odour pollution. 3. If maintenance of construction vehicles and construction machineries are not conducted properly **during construction phase**, this may create a source of offensive odour pollution. 4. Though out of scope of the project, if the cargo-passenger ship MV Liemba, along with the newly to-be-introduced cargo-passenger ship by MSC mentioned above, are not	B-/D-	1. The sewage water from the passenger waiting room, will be **planned to be** discharged or treated based on standard and by-law set by the Kigoma/ Ujiji Municipality. 2. As for solid and effluent waste to be generated **during the construction phase** and from the port facilities to be constructed **after operation**, the TPA Occupational Safety and Environment Regulations (TPA-OSHE) 2010 and Kigoma/ Ujiji Municipality's by-law shall be applied for proper treatment or disposal. 3. Low pollution construction vehicles and construction machineries shall be selected **during the planning phase,** and regulatory maintenance shall be conducted **during the construction phase**. 4. Though out of scope of the Project, it can be suggested that regular maintenance of

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			maintained regularly, they could become a source of offensive odour pollution.		cargo-passenger ships should be regulated by the rules stipulated by the port authority.
8		Bottom Sediment	1. With regard to the dredged soil to be generated, no significant pollution by heavy metal nor PCBs, etc. of bottom sediment at the planned dredging area was confirmed by component analysis, in consideration of possible pollution by industrial wastewater discharge.	B-/B-	1. In terms of bottom sediment quality of the dredging area, no significant pollution by heavy metal nor PCB, etc. were confirmed, therefore reconsideration of initial plan to reuse the dredged soil for land reclamation **during construction phase**, were found unnecessary
9		Protected Areas	1. There are no protected areas designated in Lake Tanganyika. The Magarasi–Muyovozi Wetland located in Kigoma and registered in the Ramsar Convention, is rather a remote area from the project site, therefore should not be of a concern. 2. Lake Tanganyika, however, is subjected for "Convention on Sustainable Management of Lake Tanganyika," of which Tanzania have had already signed and ratified. Therefore, "consideration" for its "sustainable management," including preservation of the environment is necessary. 3. Also, in light of the Convention of Biological Diversity of which Tanzania have had already ratified, the natural habitat of existing endemic benthic species in Lake Tanganyika should be preserved, in such a way in consistency with the Convention.	B-/B-	1. Sustain the initially considered dredging works at Kigodeko frontal water area **from the planning phase**, to avoid any adverse impact to the surrounding environment. 2. In order to mitigate impact caused by possible spreading of mud/ sand particles to surrounding waters, silt protectors shall be installed around the planned dredging works areas, **during construction phase**. 3. Since Tanzania is one of the ratified countries of the Convention of Biological Diversity, there is an obligation to comply with its requirements. 4. Monitoring and assessment will be conducted in terms of the benthic species and their habitats **during planning, construction and operation phase**, and proper measures will be taken in place in accordance with the result of the surveys.
10	Natural Environment	Ecosystem, Fauna and Flora	1. The expected water area for land reclamation and dredging works for the berth rehabilitation, were found as biodiversity level by scale from 1 to 3 (scale 4 is the highest and 1 lowest) and therefore, some extent of impact towards the habitat of endemic benthic species of Lake Tanganyika will be	B-/B-	1. Sustain initially considered dredging works at Kigodeko frontal water area **from the planning phase**, to avoid any adverse impact. 2. In order to mitigate impact caused by possible diffusion of mud/ sand particles to surrounding waters, silt protectors shall be installed

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			anticipated. 2. However, the frontal waters from the tip of the berth to the left shore water area (land side, known as "Kigodeko") were recognized as biodiversity index 4 by scale (the highest level). Incidentally, the area is known to be the sole habitat of juveniles of a perch called Lates Mariae (endemic, IUCN category – Vulnerable) within the Lake; and other species such as endemic IUCN Vulnerable cichlid called Tropheus Duboisi Marlier, and gastropods such as L. Littorina (Hirthia Spp.) (endemic, IUCN category – Endangered) and L. Coronata (Lavigeria Spp.) (endemic, IUCN category – Near Threatened) were also observed. 3. At the Kigodeko shore area, grass banks (of algae) that are habitat to many benthic species were observed, along with underwater plant beds till around 5m in depth, were sighted, more densely in number nearer to the shore. 4. Logging or pruning of trees may be required to secure land for the temporary yard for construction material.		around the dredging works planned area, **during construction phase**. 3. Since Tanzania is one of the ratified countries of the Convention of Biological Diversity, there is obligation to comply with its requirements. If any endangered gastropods were found at either the planned land reclamation or dredging water area, proper measures will be taken, **during construction phase**. 4. Monitoring and assessment will be conducted in terms of the benthic species and their habitats during planning, construction and operation phase, and proper measures will be taken in place in accordance with the result of the surveys. 5. Logging or pruning of indigenous tress will be avoided when securing land for the temporary yard for construction material, **from the planning phase**.
11		Hydrological Situation	1. The hydrological situation of Lake Tanganyika is influenced by south winds especially in the dry season from May to September, the vertical and horizontal temperature distribution effects and by internal waves, creating a clockwise current and mixing between epilimnion and the deeper water layers once a year (Raud C. M. Crul, 1997). 2. However, due to influence by global warming, the lake water temperature has risen, and the once in a year phenomenon of mixing between epilimnion and the deeper water layers are	D-/D-	1. Based upon confirmation mentioned in left item 3, specific measure for mitigation was not found to be required.

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			decreasing in its tendency within recent years, effecting decline in value of dissolved oxygen (DO) and nutrients (such as planktons) , thus causing fall in population of benthic species also. 3. On the other hand, within scope of the natural environmental study, a study was conducted to check on the situation of currents at surrounding waters of the berth subjected for rehabilitation. However, the underwater plant beds were observed in an upright position, and there was no indication of such currents existing at the surveyed point.		
12		Topography and geology	1. The subjected project's purpose is to rehabilitate the existing berth and also to merely pave the existing access road. Therefore, the project does not basically alter the shoreline of the Lake. However, it should be solely notified that the east half of the berth shall be subjected for land reclamation, an area of 4,410 m^2 (140 m × 7-70 m /2), in the course of rehabilitation of the berth.	D/D	1. The scale of planned land reclamation area is limited, and hydrological situation of water area around the berth seem stable (without any currents confirmed), thus mitigation measure in terms of this item was considered unnecessary.
13	Social Environment	Involuntary Resettlement	1. It was confirmed that no involuntary resettlement would occur.	D/D	1. The selection of land to be used for construction office and temporary yard for placing the construction materials will avoid any involuntary resettlement to occur, **from the planning phase**.
14		Living and Livelihood	1. The Project will bring positive impact in creating jobs **after operation**, in light of exporting of agricultural and fishery goods as to which many low income people are contributing in (agriculture and fishery sector), that are major industrial sectors in the Kigoma Region. 2. Consideration shall be required to the west shore (namely, Kigodeko) area, sighting from the frontal	B-/B ±	1. To confirm whether fishermen at Kigodeko area possesses any legitimate fishing rights (if they already have established a fisheries association, it proves they earn legitimate rights), and conduct mitigation measures stated in item 10. Ecosystem, Fauna and Flora during **the construction phase**, to avoid violation to such rights. 2. **During the official public**

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			waters of berth subjected for rehabilitation, whereby fishermen have encroached to reside (within the port premises), due to anticipation of impact toward their fishing area and livelihood. 3. However, positive impact (to the above fishermen) may also be expected **during the construction phase**, since there is a possibility that benthic species, etc. may migrate to the Kigodeko frontal water area from the planned dredging area. 4. The access road is only subjected for pavement. Therefore, it wouldn't cause any negative impact such as involuntary resettlement, but more or less create positive impact by improved convenience of utilization of the subjected road by port authorities, passengers of the cargo-passenger ship, and surrounding residents **after operation**.		**hearing**, to be held at the draft scoping stage, the outline of the project, including the project brief and assumed environmental and social impact items shall be explained to the stakeholders, to achieve understanding from especially the fishermen in need of consideration. 3. With regard to selection of land for the construction office and temporary yard for placing the construction materials, adverse impact to the "living and livelihood" of the people shall be avoided **during the planning phase**, by avoiding private land acquisition and impact toward farm land, residential structures (avoiding any involuntary resettlement) and recreational facilities/ land. 4. Conduct monitoring survey on social impact, **during planning, construction and operation phase**, and place proper measures if found necessary.
15		Cultural Heritage	The Project will not cause any impact toward any cultural heritages.	D/D	In terms of selection of land for the construction office and temporary yard for placing the construction materials, adverse impact toward cultural heritages shall be avoided **during the planning phase**.
16		Landscape	This Project involves mainly rehabilitation works under the rehabilitation plan, and since the port facilities subjected for construction remain within the subjected berth area, their construction should not cause any impact to the surrounding landscape. Also, access road as the other project component, is only subjected for pavement, thus should not cause any such impact.	D/D	To check whether any opinions/ claims related to impact on the landscape may rise during the public hearing to be held as one of the official procedure of EIA, and if so, take necessary measures in consultation with TPA **during the planning phase**.
17		Indigenous People, Minorities, and Vulnerable People	1. There are no indigenous people nor minorities residing together within the project site area. Therefore, no such	D/D+	No specific counter measure is found necessary, due to left described reasons.

No.	Cat.	Environmental & Social Impact Items	Environmental Prediction (including assumed degree of impact)	IA* (C/O)	Possible Mitigation Measures (Avoidance, Mitigation & Compensation Measures)
			impacts are anticipated. 2. Positive impact towards vulnerable people is expected **after operation**, by enhancing especially the trading business opportunities of vulnerable people including low income people and women.		
18		Vocational environment, measures to avoid accidents	1. TPA complies with ILO regulations and has established the TPA-OSHE 2010, to improve also the vocational environment of port workers. 2. TPA has also started its process to acquire the EMS and ISO14001 certificate by 2015.	D-/D-	1. Provide proper safety and sanitary education to the construction workers, with sanitary facilities such as temporary toilets equipped, and safety instruments and equipments installed to prevent accidents from happening, **during the planning and construction phase**. 2. With regard to the Rehabilitation and Construction Plan, procurement of proper construction material based on proper construction and construction methodology plan shall be drafted, taking caution of safety (including earthquake resiliency) during construction and operation (**at the planning phase**).

(7) Outline of Focal Items

1) Benthic Species

The benthic species survey was conducted by utilizing remote video cameras, to take video images of the condition, mainly at the bottom of the Lake. As of this occasion, the surveyed water area was categorized by biodiversity indices (levels 1 = lowest to 4 = highest by scale), introduced below. And scientific names of each of the benthic species sighted were indicated, and analyzed if they were endemic kinds or not, in reference to IUCN's (International Union for Convention of Nature) Red Data Book category to check if they had any rare characteristics, along with surveyed points, bottom sediment condition of their habitats, including the vegetation situation of the area. Incidentally, such detailed survey including counting of each sighted species population within the subjected surveying area by sampling analysis was not conducted (without any diving surveys, due to consideration of diver's safety and avoiding the risk of ascariasis, etc.), and concentrated in grasping the approximate overall situation through rapid assessment.

The biodiversity indices, was set forth taking note of below indices/ criteria:

[Biodiversity indices/ criteria]

(a) Total aquatic species richness (approximate total number of species observed in the area)
(b) Abundance of stands (underwater plants) set for each area (low, medium, high)
(c) Turbidity (low, medium, high): the higher the temperature and conditions for the development of the fauna and flora are limited,
(d) The nature of the funds (rock or sediment) that supports or not the setting of settlements.

[Biodiversity/ sensitivity indices]

(a) Degree of high biodiversity (4): mono-specific grass banks in low-density
(b) Biodiversity index average (3): the intermediate zones in shallow grass, mid-density
(c) Index of low biodiversity (2): deep in the patch of grass, mono-specific
(d) Very low biodiversity index (1): deep sedimentary areas

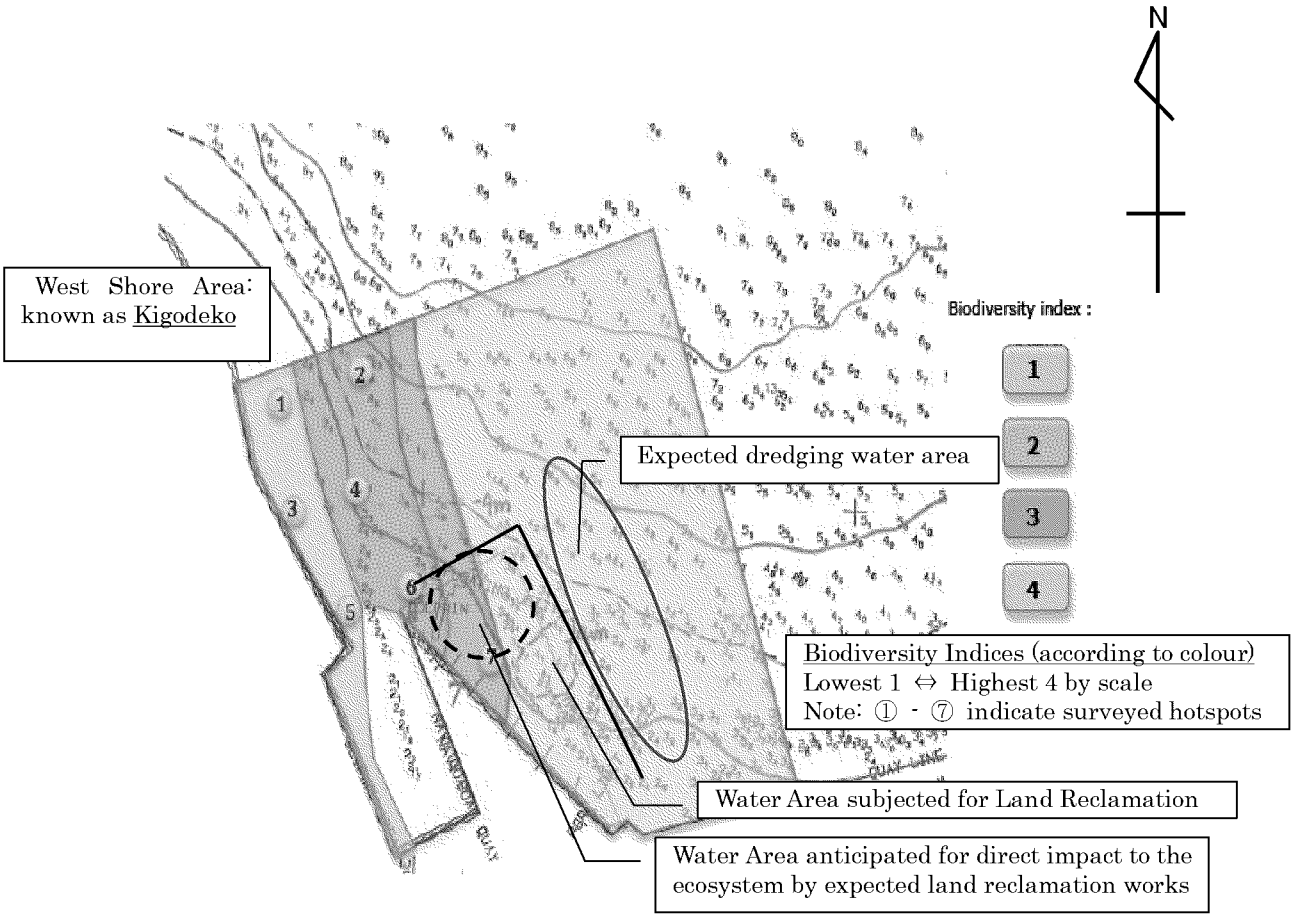


Figure 1.3.1-2 Biodiversity Level of Surrounding Waters of the Berth Area

[Description of Surrounding Waters of the Berth Area]

A part of the benthic species habitat cannot be avoided to be destroyed by especially the land reclamation works of the subjected berth for rehabilitation, however, the area subjected for land reclamation works is limited, and its area can be stated as slightly remote from the water area confirmed to possess habitats of highest level of biodiversity. The dredging area on the other hand, is confirmed as water area with lowest level of biodiversity. It is thus assumed, that by installing slit protectors around the land reclamation and dredging works area, and by relocating the gastropods found in these areas (to nearby waters, suitable for their habitat), impact towards the surrounding ecosystem can be mitigated.

(a) The frontal west side shore approx. 50m further from tip of the berth subjected for rehabilitation is known as Kigodeko, whereby (algae) grass banks, and underwater plant beds can be observed, normally habitat to many benthic species. Numerous endemic cichlids are therefore observed; with its water area assessed by the highest level of biodiversity indices. Incidentally, the juveniles of an endemic perch, named Lates Mariae (IUCN Vulnerable (VU) species) were found to solely exist in these grass banks within whole of Lake Tanganyika,

with its full grown ones known to migrate around the Lake and come back to nest in these waters (according to interview to the Tanzania Fisheries Research Institute - TAFIRI).

(b) Among other benthic species observed, also a IUCN Vulnerable (VU) cichlid species called Tropheus Doboisi Marlier, and gastropods such as IUCN Endangered (EN) species, namely L.Littorina (Hirthia Spp.) and IUCN Near Threatened (NT) species – L. Coronata (Lavigeria Spp.), were observed. However, in terms of gastropods, they were all confirmed by sampling at hotspot 1 point (see above Figure 1.2.1-2 map). In consistency with the biodiversity indices, it is assumed that habitat environment at land reclamation and dredging area must be severe for introduced gastropods' to survive (therefore considered none or very few in number even if found).

(c) Though not directly observed, the partial broken status of the endemic gastropods sampled, showed evidence of existence of nocturnal crabs (according to interview to TAFIRI).

(d) The frontal water area near Kigodeko is also sited to have dense underwater plant beds, with number of benthic species observed for its quite abundant biodiversity level. A part of such water area is within the planned land reclamation works area.

(e) At the water area further away from Kigodeko (water area which is also a part of the planned land reclamation area), some underwater plant beds were observed, but with almost none aquatic species such as nektons.

(f) Further on water area from Kigodeko, there are almost none underwater plant beds nor aquatic fauna observed, assessed as the most lowest level of biodiversity (the planned dredging area is consistent with this biodiversity level).

(g) All in all, it is vital to (a) avoid dredging works at the Kigodeko frontal water area, initially planned to be dredged, (b) to install silt protectors around the planned dredging area just east side of the planned berth, in order to minimize the spread of mud/ sand particles to surrounding water areas, (c) to take proper measures in terms of any endangered gastropods found in either the planned land reclamation or dredging water area, and (d) to consider on other measures for possible environmental remediation, as one of such mitigation measures.

Lake Tanganyika, being the second oldest lake in the world, is unique for its isolated environment, nurturing variety of benthic species (among approximately existing 1,500 species, approx. 600 are known to be endemic).

With regard to the Benthic Survey conducted as of this occasion, within its surveying zone, 15 kinds of cichlid species, 3 kinds of gastropods, all endemic kinds were observed, and existence of nocturnal crabs were assumed to exist also (by the state of partially broken gastropods, based on interview to Tanzania Fisheries Research Institute – TAFIRI staff).

Observed aquatic fauna species are shown in the following Table 1.3.1- 6.

Table 1.3.1-6 Sited Aquatic Species at Surveying Water Areas

Latin name	Author	Common name	IUCN Status	Distribution
Fishes				
Altolamprologus sp.			LC	Endemic to lake Tanganyika
Ctenochromis horei	(Günther, 1894)	Mbaramatete	LC	Lake Tanganyika. Common in tributaries rivers (Lukuga River, Ruzizi River, Nua River).
Lamprichthys tanganicanus	(Boulenger, 1898)	Msiha / Tanganyika killifish	LC	Endemic to the shore regions of Lake Tanganyika.
Lates mariae	Steindachner, 1909		VU	Endemic to lake Tanganyika
Limnotilapia dardennii	(Boulenger, 1899)		LC	Endemic to lake Tanganyika
Neolamprologus furcifer	(Boulenger, 1899)		LC	Endemic to lake Tanganyika
Ophthalmotilapia heterodonta	(Poll & Matthes, 1962)		LC	North end of Lake Tanganyika.
Ophthalmotilapia nasuta	(Poll & Matthes, 1962)		LC	Lake Tanganyika.
Oreochromis tanganicae	(Günther, 1894)	Ngege	LC	Lake Tanganyika, in the coastal area and river mouths
Petrochromis orthognathus	Matthes, 1959		LC	Endemic to lake Tanganyika
Simochromis diagramma	(Günther, 1894)		LC	Endemic to lake Tanganyika
Synodontis multipunctata	(Boulenger, 1898)	Kajikijiki	LC	Lake Tanganyika.
Tanganicodus Irsacae	Poll, 1950	Spotfin goby cichlid	LC	Endemic to the northern part of Lake Tanganyika.
Tropheus brichardi	Nelissen & Thys van den Audenaerde, 1975		LC	Endemic to Lake Tanganyika but does not occur in both ends of the lake.
Tropheus Duboisi	Marlier, 1959		VU	Endemic to Lake Tanganyika. Occurs in the northern part of the lake
Mollusks				
Hirthia spp			LC / EN	Endemic to lake Tanganyika
Lavigeria spp.			LC / NT	Endemic to lake Tanganyika
Spekia spp.			LC	Endemic to lake Tanganyika
Crustaceans				
Platythelphusa armata	A. Milne-Edwards, 1887		LC	Endemic to lake Tanganyika
Platythelphusa conculcata	Cunnington, 1907		LC	Endemic to lake Tanganyika
Platythelphusa denticulata	Capart, 1952		LC	Endemic to lake Tanganyika
Platythelphusa echinata	Capart, 1952		LC	Endemic to lake Tanganyika
Platythelphusa immaculata	Marijnissen, Michel, Cumberlidge & Schram, 2004		LC	Endemic to lake Tanganyika
Platythelphusa maculata	Cunnington, 1902		LC	Endemic to lake Tanganyika
Potamonautes platynotus	(Cunnington, 1907)		LC	Endemic to lake Tanganyika

Limnotilapia Dardenni
(Sample Picture, by JICA Study Team)

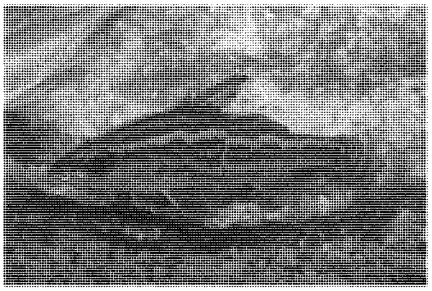
A Cichlid Species

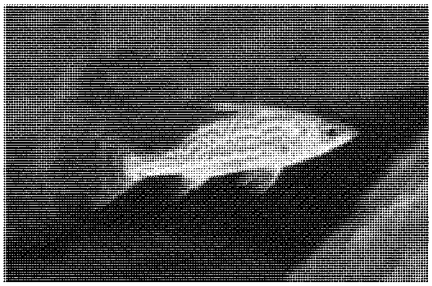
Species in need of caution categorized by IUCN as Vulnerable species (VN) are as follows:

IUCN Cichlids – Vulnerable (VN): below 2 species

Lates mariae Steindachner, 1909

Actinopterygii (Ray-finned fishes)/ Perciforme (Perch-like) /Latidae





Distribution: Tanganyika and tributaries rivers

Status: *Vulnerable*

Ecology

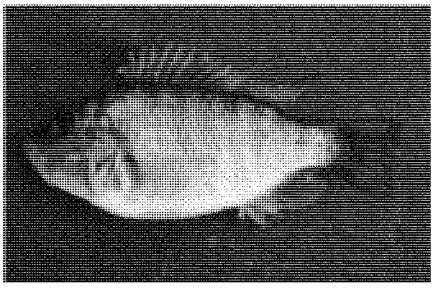
Juveniles live in a specific inshore habitat until they reach 18 cm. Adults live in the superficial pelagic zone.

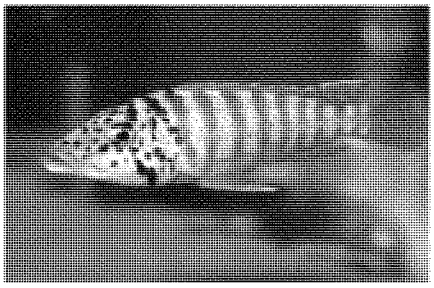
Fisheries catches have declined by more than 50% in the last 20 years due to heavy fishing. Sedimentation inshore is a threat to habitat for juveniles. With an estimated generation time of 1.4–4.4 years, the time period for decline is around 10 years. It is estimated that a decline of 30% of 10 years is probable.

Sources: Fishbase and IUCN Redlist

Ctenochromis horei (Günther,1894)

Actinopterygii (Ray-finned fishes)/ Perciforme (Perch-like) /Cichlidae / Pseudocrenilabrinae





Distribution: Endemic

Status: *Least Concerned*

Ecology

Ubiquitous species found over both rock and sand substrates, but is most frequently observed over soft bottoms habitats covered with aquatic grass. It is a shallow water species found along the lakeshore and in the lower reaches of the inflowing rivers.

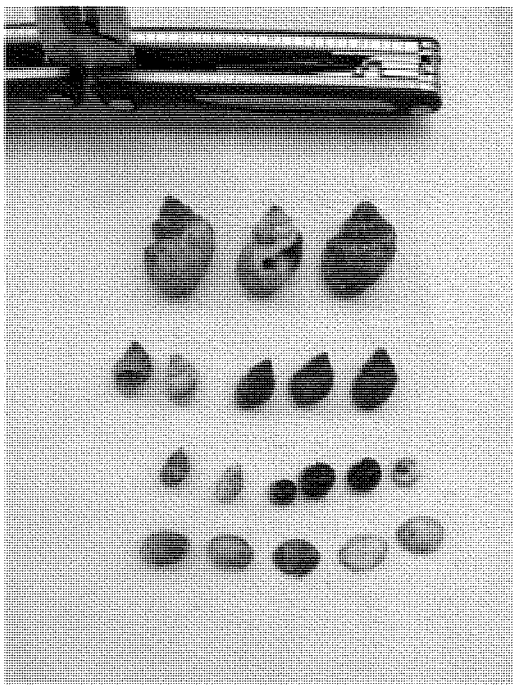
Omnivourous, but adults feed predominantly on fish.

Females brood their young in the mouth.

Sources:Fishbase and IUCN Redlist

B Gastropods

IUCN category – Endangered Species(EN) and Near Threatened Species(NT) were observed.

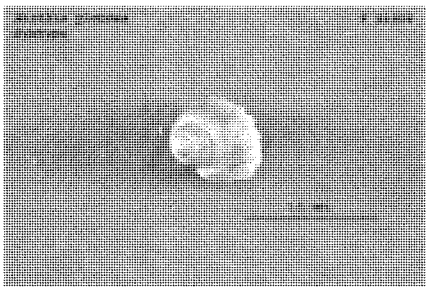


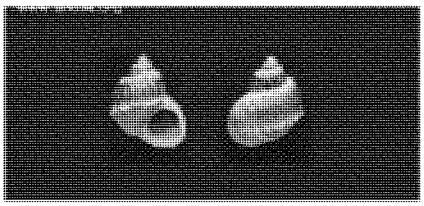
Picture: Sampled for photograph and placed back to original location - endemic gastropods
Note: According to each row from above: (a) Hirthia Spp., (b) Lavigeria Spp., (c) Spekia, (d) Bivalves

IUCN Category – Endangered Species (EN): The below row in the Ecology list is the EN kind.

Hirthia spp

Mollusca/ Gastropoda /Sorbeoconcha / Pachychilidae





Distribution: Endemic

Status: *Least Concerned / Endangered*

Ecology

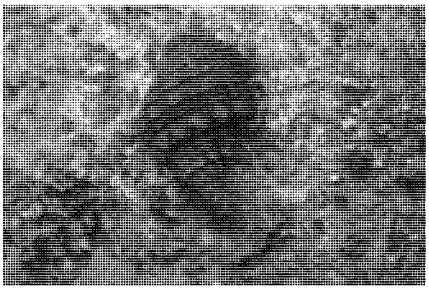
Species	Ecology
H.globosa	Found in rocky substrate at moderate depths 5-20 m.
L.littorina	**Endangered**. Confined to rocky substrates at moderate depths, 5-20 m.

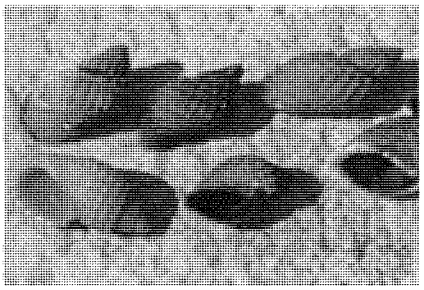
Sources: IUCN Redlist

IUCN Category – Near Threatened Species (NT): The first row in the Ecology list is the NT kind.

Lavigena spp

Mollusca/ Gastropoda / Sorbeoconcha / Paludomidae





Distribution: Endemic

Status: *Least Concerned / Near threatened*

Ecology

Species	Ecology
L.coronata	Found on boulders and rocks in clear water 2-30 m deep. **Near Threatened,** this species is known from two disjunct populations (15 sites) in Kigoma.
L.grandis	Found among rocks and boulders in wave swept zone, especially 0-5 m, but found as deep as 20 m.
L.rassa	Abundant in the littoral zone of the lake, where it browses on algae on wave-beaten rocks.
L.paucicostata	Found on muddy, sandy and sometimes rocky substrate attached to shells in shell lag deposit of macrophytes. 1-20 m depth.

C Crabs

According to TAFIRI, the partially broken status of sampled gastropods, proved the existence of nocturnal crabs, since the biodiversity situation drastically changes during night time. It is said, that in whole of Lake Tanganyika, 10 kinds of endemic crabs exist, and that among them 9 kinds are family of Platythelphusidae and the other one kind is a family of Potamonautidae (Saskia Marijnissen, 2007).

2) Water Quality

The water quality samples taken at 6 surveying points identified by below Table 1.2.1-7 (by latitude and longitude) and Figure 1.2.1-3 map, during November 14 and 15, 2011, were analyzed with the result shown in below Table 2.2.3.1-8.

Table 1.2.1-7 Water Quality Surveying Point (by latitude and longitude)

	WTZ 1/A	WTZ 2/B	WTZ 3/C	WTZ 4	WTZ 5	WTZ 6/D
Latitude	4°52'36.61"S	4°52'29.16"S	4°52'26.63"S	4°52'11.08"S	4°53'7.71"S	4°52'21.42"S
Longitude	29°37'25.40"E	29°37'23.20"E	29°37'29.42"E	29°37'12.53"E	29°37'12.46"E	29°37'43.69"E

Table 1.2.1-8 Result of Water Quality Sampling Analysis

Parameter	Unit	WTZ 01	WTZ 02	WTZ 03	WTZ 04	WTZ 05	WTZ 06
Temperature	°C	25.2	24.4	25.5	25.5	25.2	25.1
Salinity	mg/l	332	331	332	330	330	329
pH	-	9.2	9.3	9.2	9.2	9.3	9.2
Suspended Soild (SS)	mg/l	<1	<1	<1	<1	<1	<1
Chemical Oxygen Demand (COD)	mg/l	5	5	5	5	5	10
Biochemical Oxygen Demand (BOD)	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Disolved Oxygen (DO)	mg/l	6.13	6.27	6.49	6.50	6.32	6.35
Coliform Bacilli	ufc/100 ml	#9	$9.3\ 10^{1}$	#9	#9	$9.3\ 10^{1}$	$9.3\ 10^{1}$
Total Nitrogen (T-N)	mg/l	4.2	8.4	9.8	5.6	7.0	7.0
Total Phosphorus (T-P)	mg/l	0.000	0.000	0.000	0.000	0.000	0.010

Incidentally, for calibration of the lake water temperature, pH and dissolved oxygen (DO), water quality calibration kits were utilized at the site. As for November 14, 2011, when lake water samples were taken at surveying points WTZ1/A and WTZ2/B, the weather turned out to be very windy, and in the following November 15, when samples were taken at the other surveying points WTZ3/C to WTZ6/D, the weather was cloudy.

In Tanzania, there are below water discharge standards and water environmental standards as for water quality regulations, and also water standard including potable water established in 2005 (Tanzanian Water Standard: TZS 789:2008).

Table 1.2.1-9 Discharge Standard and Environmental Standard of Water Quality in Tanzania

Item	Unit	Discharge Standard		Environmental Standard				EHS Guideline
		TL	MPC	TL	MPC-1	MPC-2	MPC-3	
pH	–	–	6.5–8.5	–	6.5–8.5	6.5–8.5	6.5–9.0	6–9
TDS	mg/l	2500	3000	1700	2000	2000	2000	
TSS	US/cm^3	60	100	–	–	–	–	
Conductivity	mg/l	400	–	–	–	–	–	
$BOD_{20°C}$	mg/l	25	30	3.5	5	5	10	30
COD	mg/l	45	60	–	–	–	–	125
Chloride-Cl	mg/l	650	800	170	200	200	400	
Sulphate-SO_4	mg/l	600	600	500	200	200	200	
Ammonia-N	mg/l	7.5	7.5	0.35	0.5	0.5	0.5	
Nitrate-N	mg/l	50	50	35	50	50	100	
Phosphate-PO_4	mg/l	6.0	0.5	–	–	–	–	
Cyanide-Total	mg/l	0.1	0.01	0.035	0.5	0.5	0.1	
Oil & Grease	mg/l	1.0	5	0.35	0.5	0.5	5	10
Phenols	mg/l	0.2	0.1	0.0015	0.002	0.002	0.1	
Total Hydrocarbons (disolved & emulsified)	mg/l	–	–	–	–	–	–	
As	mg/l	0.10	0.1	0.04	0.5	0.05	0.1	
Cd	mg/l	0.10	0.1	0.04	0.5	0.05	0.2	
Cd (Total)	mg/l	0.10	0.1	–	–	–	–	
Cr^{+6}	mg/l	0.10	2.0	0.04	0.05	0.05	0.1	
Cu	mg/l	1.0	1	2.5	3	3	4	
Fe (Total)	mg/l	3	5.0	0.75	1	1	1.5	
Pb	mg/l	0.02	0.2	0.75	1	1	1.5	
Hg	mg/l	0.005	0.005	0.00075	0.001	0.001	0.002	
Ni	mg/l	0.2	0.5	0.4	0.05	0.05	0.1	
Zn	mg/l	1.0	0	0.15	0.2	0.2	0.5	

Notes: TL (Trigger Level) = If this level is exceeded, preparation for source investigation and counter measure will be required.
MPC (Maximum Permissible Concentration) = Permissible standard of domestic wastewater and industrial discharge, stipulated by Water Utilization (Control and Regulation) Amendment Act, 1981.
MPC -1, 2, 3 = permissible standard of below categories 1, 2 and 3.
Category 1: for potable use, swimming pool, soft drinks for food industry, usage by drug industry
Category 2: for livestock breeding, cultivation, recreation usage
Category 3: other usage apart from Category 1, 2; usage for irrigation and general industries, etc.

Table 1.2.1-10 Tanzanian Potable Water Standard (extracted)

Parameter	Unit	Limits
Coliform	cfu/100 ml	Suspicious: 4–10 ,Unsatisfactory: >10
Nitrate	mg/l	10–75
pH	–	6.5–9.2
BOD	mg/l	6.0
Permanganate value (oxygen abs. KmnO4)[8]	mg/l	20
Ammonium	mg/l	2.0
Total Nitrogen exclusive Nitrate	mg/l	1.0

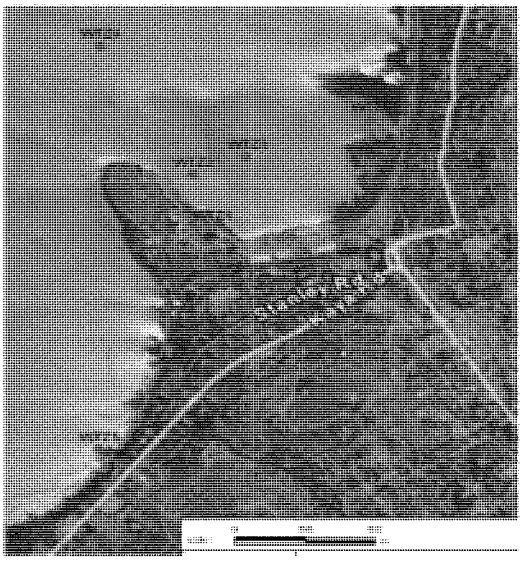


Figure 1.2.1-3 Map of Water Quality Surveying Points

Water quality survey was conducted in consideration of assumed water contamination by domestic wastewater (including analysis of water quality of sample taken at the river mouth at Kigoma Bay), and surrounding waters of the berth subjected for rehabilitation, offshore point, and doubtful water area with possible water contamination by industrial wastewater (ex. coastal point of waste oil leakage from the Tanesko Power Plant) as sampling surveying points. The analysis was conducted not just by comparison with the discharge standard, but also with the potable water standard. This is because intake of water for Kigoma/ Ujiji municipal area's water supply is conducted, very near to Lake Tanganyika Beach Hotel, neighboring just west to the port premise, and since according to Kigoma Profile Report of the Municipality office, the tap water was known to be suitable for potable water.

As a result, below kind of outcome were observed, with conclusion of possible water contamination by domestic wastewater impact.

(a) The pH values were all high in the 9th scale, therefore strong alkalinity was detected. However, Lake Tanganyika subjected for the survey, has a background (based on past studies) of having a characteristic for its water quality being at approx. pH 9.5 scale from ancient times by nature. Therefore, it cannot be estimated that the confirmed pH values are influenced from especially domestic wastewater discharges. On the other hand, dissolved oxygen (DO) levels (~6.5 mg/l) showed high values almost near saturation, a characteristic also as had been shown in past studies.

(b) There were notable number of coliform bacilli confirmed (90~93 bacilli per 100ml). On the other hand, the T-P (Total Phosphorus) value was higher within the bay, compared to the offshore point (the T-N also had such tendency, but since the analyzed concentration value were unusually high, it represented that there must have been a contamination in the field or the laboratory, therefore the result of analysis was considered invalid). These results most likely indicate that the lake water is contaminated due to domestic wastewater, especially by discharge of sewage water (in the case of Kigoma, sewage is only treated by septic tanks and are directly discharged into Lake Tanganyika

through the drainages). Incidentally, a past study (Chitamwebwa, 1994) of which for its water quality survey, samples were taken from 5 surveying points at Kigoma Bay, also proved that number of coliform was very high (1,000 per 100 ml).

(c) The detected concentration of salinity (~0.33 g/l) showed similar characteristics found from past studies in terms of Lake Tanganyika itself (conductivity: ~615 μS/cm) and Kigoma Bay (conductivity: 630 μS/cm), indicating possible content of mineral substances.

3) Bottom Sediment

As for the bottom sediment condition, the possibility of its pollution by discharge of industrial wastewater (with confirmed discharge of waste oil by TANESCO Power Plant at TAFIRI Bay and possible influence from the oil terminal near Kibirizi) was taken into consideration.

For this cause, bottom sediment sample for analysis was taken (i) from the planned dredging area just right to the planned berth subjected for rehabilitation, and (ii) from near the shore of the point where the TANESCO Power Plant had been leaking waste oil to the shore of the Lake. The result of the analysis is shown in below Table 1.2.1-12.

Incidentally, as for analysis on the degree of possible pollution from the substances detected at the laboratory, the French environmental standard (stipulated by Decree of 14 June, 2000) was utilized for their advanced standard on bottom sediment quality. As for Japan, on the other hand, stipulates a standard on concentration of dioxin as bottom sediment medium, of below 150 pg-TEQ/g by the "Law on Special Measure to counter Dioxin Type of Substances". Whereas as the "Provisional Standard on Removal of Bottom Sediment" stipulated that if mercury concentration of more than 22 ppm (at rivers, lakes and ponds), or polychlorinated biphenyl (PCB) concentration of more than 10 ppm (per dried weight of the bottom sediment) were detected, then they must be subjected for removal.

Table 1.2.1-11 Reference Level of Heavy Metal, PCB Concentration in the Bottom Sediment

	N1 (mg/kg)	N2 (mg/kg)
Arsenic	25	50
Cadmium	1.2	2.4
Chromium	90	180
Copper	45	90
Lead	0.4	0.8
Mercury	37	74
Nickel	100	200
Zinc	276	552
PCB Tot.	0.5	1
PCB 28	0.025	0.05
PCB 52	0.025	0.05
PCB 101	0.05	0.1
PCB 118	0.025	0.05
PCB 138	0.05	0.1
PCB 153	0.05	0.1
PCB 180	0.025	0.05

Note: Stipulated under French Decree June 14, 2000

Table 1.2.1-12 Result of Bottom Sediment Analysis

Type	Parameter	Sample 1 - within bay, planned dredging area	Sample 2 - water area near shore of TANESCO Power Plant	Limits
General	Specific Gravity	1.93	–	–
	Moisture content	78.30%	78.30%	0.01% m/m
	Particle size distribution	83% < 2 mm	–	–
Mineral Richness	Total Sulphide (T-S)	< 0.10%	–	10 mg/kg
	Total Nitrogen (T-N)	< 0.05% m/m	–	0.05% m/m
	Total Phosphorus (T-P)	248 mg/kg	–	100 mg/kg
Oil	Total Hydrocarbure (HAP)			µg/kg/sec
Heavy Metal	H metal – Arsenic (As)	1.2 mg/kg	0.6 mg/kg	0.1 mg/kg
	H metal – Cadmium (Cd)	< 0.1 mg/kg	< 0.1 mg/kg	0.1 mg/kg
	H metal – Chromium (Cr)	13 mg/kg	23 mg/kg	2 mg/kg
	H metal – Copper (Cu)	43 mg/kg	3 mg/kg	3 mg/kg
	H metal – Lead (Pb)	21 mg/kg	9 mg/kg	1 mg/kg
	H metal – Mercury (Hg)	0.06 mg/kg	< 0.02 mg/kg	2 mg/kg
	H metal – Nickel (Ni)	< 2 mg/kg	< 2 mg/kg	2 mg/kg
	H metal – Zinc (Zn)	44 mg/kg	12 mg/kg	2 mg/kg
PCB	DDT op'	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	DDT pp'	47.6 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 28	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 52	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 101	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 118	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 153	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 138	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
	PCB 180	< 1.0 µg/kg/sec	–	1.0 µg/kg/sec
Tin	Monobutyltin (MBT)	14.1 µg Sn/kg/sec	–	1.0 µg/kg/sec
	Dibutyltin (DBT)	78.7 µg Sn/kg/sec	–	1.0 µg/kg/sec
	Tributyltin (TBT)	85.8 µg Sn/kg/sec	–	1.0 µg/kg/sec

The sand particles of the bottom sediment at the dredging area are comprised of 81% of fine sand and medium size particles (particles > 2 mm), and 21% of silts (< 63 um). Part of these silts often has the characteristics in capturing pollutants of the bottom sediment.

From the bottom sediment of the same area, a certain amount of phosphate (248 mg/kg) was detected. The tendency of certain level of eutrophication shown from this result, were assumed to come from main sources such as, wastewater and detergent discharges from Kigoma City, from ship maintenance activity at the port or docking areas.

The rate of heavy metal detected from the sediments, were all within the limit set forth by the French environmental standard, and were found at relatively low levels (of both sampled surveying points. With result at the shore near the power plant showing slightly more low levels). Therefore, possible significant state of pollution was not identified.

On the other hand, as for the PCBs, the result also showed lower levels in comparison with the French environmental standard. From both of these results, it was concluded that anticipation of spread of pollution (caused by PCBs), by dredging works at the dredging area, were unnecessary.

Incidentally, due to condition of the bottom sediment, the Environmental Officer at Kigoma/Ujiji Municipal Office was suggesting to “transport the dredged soil, to a landfill remote (nearly 10 km away) from Kigoma city”, and likewise, the Environmental Officer (= Environmental Dept., Vice President’s Office, Kigoma) also known as the National Coordinator

of the Lake Tanganyika Project Coordinating Unit was also expressing concern for the "necessity to construct a new landfill, by assistance from aid agencies such as Nordic Fund, etc." (However, due to above reasons, these anticipations were now found unnecessary)

(8) Land Acquisition and Involuntary Resettlement1

1) Necessity of Land Acquisition or Involuntary Resettlement Related to Project Components

In terms of facilities subjected for rehabilitation or construction related to the subjected project components such as the berth, passenger waiting room and warehouse within the berth area and access road, are all within the port premises based on the cadastral map acquired from Kigoma/ Ujiji Municipality Office. Since there are no encroached residents affected in this aspect, no obligation for involuntary resettlement nor land acquisition were found necessary.

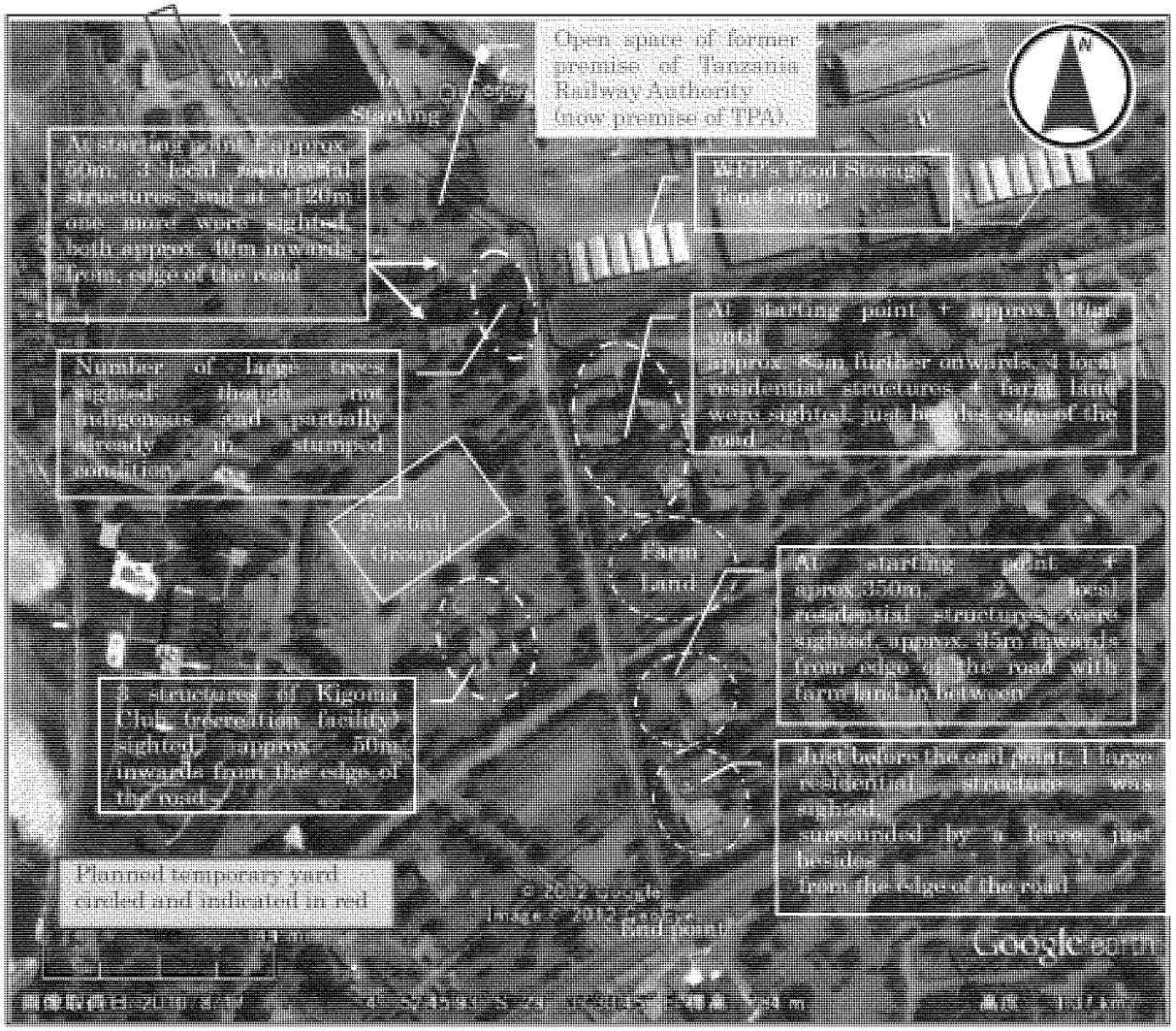


Figure 1.2.1-4 Temporary Yard for Construction Office & Construction Material within Port Premise & Access Road Subjected for Pavement

[1] Source: Quoted or taken into reference from JICA, *Environmental and Social Consideration Profile, Tanzania*, Sept., 2011. Other parts added according to survey by the JICA Study Team.

2) Necessity of Land Acquisition or Involuntary Resettlement related to Temporary Yard for Construction Office/ Material

With regard to this item also, during the basic design phase, utilization of open space is being considered. Therefore, there is no necessity of involuntary resettlement nor land acquisition identified.

As for final selection of above purpose land, (i) fishermen illegally residing at the far north west end of the port premises, facing to Lake Tanganyika (the part of port premises just besides the border to the Lake Tanganyika Beach Hotel premises), corresponding to the west shore area from the frontal waters of the berth subjected for rehabilitation, known as "Kigodeko", and (ii) especially illegally settled residents and farm land all along the left side (east side) of the access road subjected for pavement, facing the way from the Port Master Office to the main line road, must be taken into consideration, (iii) likely, although land acquisition will be unnecessary (since they are all within the port premises), including possible impact on the football field, residents and recreation facilities partially observed, at slightly further back areas at the right hand side (west side) of the mentioned access road, all measure shall be placed to avoid impact by involuntary resettlement which will lead to requirement for compensation to the PAPs (project affected persons), to mitigate impact on recreation facilities that provides community services, and full or partial demolishment of residential structures and sub-structures, with regard to all (i) to (iii) items.

Incidentally, in order to utilize open space at the side of the access road in question, some trees will be subjected for logging (or pruning). There were about 10 large scale trees observed at the right hand side close to the starting point of the access road subjected for pavement, but they were not confirmed as indigenous trees (by interview to port related personnel), therefore, there should not be any significant impact to the surrounding ecosystem in this regard.

3) Concrete Measures for Compensation and Assistance

With regard to the subjected Project, as already mentioned so far, we have confirmed that there are no indication for necessity for involuntary resettlement nor land acquisition that may require compensation and assistance. Therefore, no particular measure is considered necessary.

Nonetheless, according to Tanzania Port Authority (TPA) staff in charge (Principal Management Systems Officer), even if by any case, particular PAPs in need of compensation turned out to be identified, TPA is ready to make sufficient compensations for their resettlement, with prior payment conditions, including toward illegal settlers within the Port premises.

(9) Result of actual Stakeholder Meeting (public hearing) conducted

As for the subjected Project, stakeholder meeting (public hearing) shall be held at the Kigoma /Ujiji Municipality Hall where all related stakeholders are expected to gather. The public hearing is required to be held within either the screening, scoping/ EIA TOR preparation period, reviewing period of EIS by NEMC and other stakeholders, or until approval of EIA (however, according to the EIA Expert in charge, public hearing is normally held once during the scoping/ EIA TOR preparation stage).

1-3-2 Others

(1) Environmental Management Plan and Monitoring Plan (including implementing system, methodology and required cost, etc.)

The Environmental Management Plan (EMP) and Monitoring Plan will be included as a part of EIS. Required costs for conducting the mitigation measures, shall be indicated in the EMP.

As of July 24, 2012, it has been confirmed that TPA, after receiving the Draft Final Report from JICA, is currently still in tendering process for making contract with the EIA Expert, to conduct the remaining EIA procedure after screening.

According to the EIA Expert who was assigned during the screening procedure, the remaining EIA procedure after screening should take approximately another 3 months after the contract. Therefore, it can be said that the Final EIS incorporating the EMP and Monitoring Plan will be issued at the final period of this remaining procedure (see below (3)).

(2) Environmental Checklist

For reference, the completed environmental checklist is attached herewith, as Appendix - .

(3) Others

The result of official screening, conducted and presented by NEMC in mid-January 2012, revealed that the subjected project requires "Full EIA" procedure. Based on this result, time table for the remaining EIA procedure was drafted by the EIA Expert commissioned for the duty by TPA (pls. see below table). The tentative table suggests that the remaining procedure in essence should take approximately another 3 months, after TPA commissions the remaining task after screening to an EIA Expert, until approval of the EIA certificate (Note: pls. confirm footnote also).

Table 1.2.3.2-1 Tentative EIA Schedule after Screening

S.N	Activity	Duration	Month 1				Month 2				Month 3			
		Weeks	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
1.	**Project registration and screening**	**45 Days**	DONE.											
2.	**Scoping Study**	**26 days**												
3.	Stakeholders Consultation	8 days												
4.	Baseline Data Collection	10 days												
5.	Scoping Report Writing	4 days												
6.	Client Approval of Scoping Report	2 days												
7.	Printing and Binding of Scoping Report (3 copies)	1 days												
8.	Submission of Scoping Report to NEMC	1 day												
9.	**NEMC Review of Scoping Report and ToR**	**14 days**												
10.	**Preparation of Draft EIA**	**14 days**												
11.	Final Field work for Draft EIA preparation	2 days												
12.	Draft EIA writing	7 days												
13.	Client Approval of Draft EIA	2 days												
14.	Printing and Binding of Draft EIA (21 copies)	2 days												
15.	Submission of Draft EIA to NEMC	1 day												
16.	**NEMC site visit and TAC meeting**	**21 days**												
17.	**Review of Draft EIA and submission of final report**	**14 days**												
18.	**Minister Approval of the EIA and Certificate**	**45 days**					Depends on Minister Availability							

NB: from the table above it is seen that the whole exercise will take a total of 134 days but in essence it is only three months because other activities overlap.

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2-1 Project Summary

2-1-1 Basic Concept of Project

(1) Aim of the Project

United Republic of Tanzania is a member of International Maritime Organization (IMO) and is required to cope with International Convention for Safety of Life at Sea (SOLAS) under IMO for keeping international standard and marine human life safety as an international port applied to Kigoma Port where is international port in Lake Tanganyika. The improvement plan of Kigoma Passenger Terminal aims to promote safety and efficiency of passenger being subjected to SOLAS convention. And, the target passenger ship carries cargoes from other areas of Lake Tanganyika as well as passengers therefore, the plan shall include cargo handling. This plan is made considering the following concepts,

- Safety Port
- Efficient Port
- Clean Port
- Comfortable and Attractive Port for Passengers

(2) Basic Concept of the Plan

Four requested components from Application for Japan's Grant Aid in April, 2009 are described below.

- Construction of Passenger Wharf
- Construction of Passenger Terminal Building
- Construction of Cargo Shed
- Construction of Access Road

And there were additional requests for the necessary facilities in view of required items for international port and SOLAS Convention.

- Navigation Aid: Beacon
- Lighting Facility

As the basic concept of the plan, the following points are concerned considering utilizing situation of existing facilities and natural condition related with Lake Tanganyika.

- Improvement plan so as to solve problems in respect of existing function
- Improvement plan so as to be able to make existing function reproduced safely and efficiently

- Planned wharf facilities so as to be able to cope with natural conditions of Lake Tanganyika especially, the future lowering of lake water level as well.

2-1-2 Study on Requested Component

Concerning requested and additionally requested facilities, the following implementation policy is explained showing the necessity and the urgency of the facilities in order to study the relevancy.

(1) Civil Facilities

1) Passenger Wharf

【Necessity and Urgency】

- The existing passenger wharf is consisted of poor facilities and there is a problem to secure safety of passenger.
- Urgent rehabilitation of wharf facilities is necessary due to the aging and significant deterioration.
- Flow lines of passenger and cargo are concentrated in the same spot and it is necessary to improve it for the security of safety and efficiency.
- Acquisition of land is required since the efficiency of cargo handling can not be done as well as the land for wharf is narrow and congested by passengers and cargoes.

【Implementation Policy】

Passenger wharf is possible to be implemented by Japanese side with the following points.

- Recipient country has some difficulty in disbursing the high estimated project cost.
- Capabilities of planning, designing and construction by the recipient country are not sufficient.
- Main member of structure (steel products) shall be procured from Japan.

2) Access Road

【Necessity and Urgency】

- The access road is unpaved in spite of important infrastructure passing vehicles like taxies for passengers and port relevant staff and ship repair people in addition to large and small size cargo trucks for cargo transportation.
- As road is unpaved although ditch for trench is installed and compaction of road surface is made, periodical maintenance and repair are required.
- The road surface has tracks, pot holes and scouring parts by rain water here and there puddles in raining and the traveling performance becomes bad.
- The gradient of road is 6% that is steeply sloping and as rainwater flows when it is heavy rain, the vehicle's driving on the unpaved road becomes dangerous.
- Space in front of wharf is unpaved in spite of utilizing as passenger's movement, waiting space or car parking and there are many puddles in raining and therefore, the usage is in

trouble.

- The increase of large size vehicles is anticipated by the improvement of passenger wharf and the frequency of maintenance and repair shall be higher. There is a gate to container wharf nearby and the utilization by container vehicles is assumed.

【Implementation Policy】

Pavement of the access road is expected to be executed by Japanese side.

- The access road is only one road to connect between main road and passenger wharf and it is required to maintain in good condition through a year including rainy season and supply to port users. Therefore, it shall be included in this project component.
- As to the space at the entrance of passenger wharf, it is important facility being utilized as waiting space for passenger and car parking facility and therefore, the pavement shall be made as part of the access road.

(2) Building Facilities

1) Passenger Terminal Building

【Necessity and Urgency】

- The existing waiting facility is passenger waiting shed and it is used multi-purposely as well as waiting space for passenger.
- Ticket office and CIQ facility consisted of Customs, Immigration and Quarantine are aged and deteriorated and lack of the convenience.
- Service facilities for passenger such as stall and toilet are poor and do not meet with the passenger's need.
- It shall be necessary to remove these facilities in view of access portion for construction and layout plan of the project at the time of construction works.

【Implementation Policy】

Passenger Terminal Building is expected to be implemented by Japanese side with the following points.

Passenger waiting facility shall be the plan to add existing waiting shed and CIQ facility on the requested facility contents.

- Removal of the existing passenger waiting shed is necessary for the execution of construction works.
- Removal of Customs, Immigration and Quarantine facilities is necessary due to the deterioration in addition to the above.
- Scale of facility is assumed to be larger.
- Recipient country has some difficulty in disbursing the high estimated project cost.

2) Cargo Shed

【Necessity and Urgency】

- There is no such facility although passenger waiting shed shares a part of the function, in which the security condition is not good.
- Loading cargoes onto passenger ship are brought in wharf from Kigoma surroundings. Judging from the situation of handling cargoes, a part of cargoes are confirmed to be brought in advance and storage facility to store them is regarded as necessary.
- Unloading cargoes from passenger ship are taken out of port area immediately after unloading by consignees. As there is no facility to store temporary in raining, it is treated to be covered by water proof sheets.
- There is no cargo storage facility in the wharf in spite of necessity to store temporarily to be bonded articles in customs inspection or lost articles for the operation of passenger wharf.

【Implementation Policy】

It is assumed that the necessity of large scale cargo shed written in the grant application letter is low and it is possible to exclude from the project component. However, as a part of cargoes are temporary stored in advance and lost articles and bonded cargoes may be borne, this project copes to have cargo storage place in conjunction with Passenger Terminal Building.

(3) Requested and Planned Component

Based on the study results of necessity and urgency of the above requested components and the coping policy, the following components shown in Table 2.1.2-1 shall be executed as the project by the cooperation. And each component is set up at the project outline.

Table 2.1.2-1 Requested and Planned Component

Facility	Requested component		Content at Planning
	Size	Area	
Passenger Wharf	140m × 63m (except 7.0 m of existing jetty portion)	8,820m^2	Implementing as the project
Passenger Terminal Building	25 × 20m	500m^2	Implementing as the project
Cargo Storage	50 × 20m	1,000m^2	Implementing as a part of Passenger Terminal Building
Access Road	Length 800 × Width 12m		Implementing as the project, including pavement of open space in front of Passenger Wharf
Navigation Aid	Additionally requested		Beacon is installed as safety measure of passenger wharf
Lighting Facility	Additionally requested		Implementing as requesting item of SOLAS convention in passenger wharf

2-2 Outline of the Project

2-2-1 Basic Policy

(1) Basic Policy on Layout Plan of Passenger Wharf

1) Function of Passenger Wharf Facility

Layout plan of passenger wharf is made based on the flow lines of passenger and cargoes at the existing facilities and effective and safe facilities shall be placed. Necessary function and improvement method to each facility are as shown in Table 2.2.1-1.

Table 2.2.1-1 Function and Implementation Policy of Each Facility in Passenger Wharf

Requested Facility	Functions	Existing Facility	Improvement by Project
Passenger Wharf	- Embarkation & Disembarkation of Passenger - Loading & Unloading of Cargoes - Cargo Handling - Operation of Cargo Handling Vehicles and Equipment - Berthing of Small Boats	- Existing Passenger Wharf - Pontoon of North Side	- Improvement of Passenger Wharf - Improvement of Berth Facility - Expansion of Wharf Area
Passenger Terminal Building	- Ticket Sales - Customs, Immigration and Quarantine Services - Waiting for Ship Departure by Passenger - Weighing Accompanied Baggage & Collection of Excess Charge - Weighing & Charge of Cargoes - Temporary Storage of Cargoes - Internal Meeting of Port Staff - Simple Works - Sheltering from Rainfall	- Passenger Waiting Shed - CIQ Facility (Customs, Immigration & Quarantine) - Ticket Booth	Construction of Passenger Terminal Building - Administration Offices - Booth for Customs, Immigration & Quarantine - Booth of Ticketing and Security - Ticket Sales Booth - Service Facilities such as Kiosk and Toilet - Passenger Waiting Space - Weighing and Charge Collection Facility - Temporary Storage of Cargoes - Meeting and Simple Works and etc.
Cargo Shed	- Storage of Cargoes	- Passenger Shed is used for temporary storage of cargos - Repair tools and equipment for maintenance of passenger ship is stored in store house.	- Allocated in Passenger Terminal Building - No facility to store cargoes found in the existing facilities.
Access Road	- Passage of Cargo Handling and Port User's Vehicles - Passenger Move	- Unpaved road with two lanes (481 m in length) - Ditches for Drain at both Ends	Pavement on Road

2) Layout Plan of Passenger Wharf Facility

Each facility plan is set considering the functions required to the berth facility, on-land facility and passenger waiting building at the passenger wharf, the situation of flow lines of passenger and cargoes and the problems of existing facilities. The layout of each facility at the wharf is planned according to the layout plan shown in Figure 2.2.1-1. The figure shows the inclusion of storage house for tools and equipment now existing at the passenger wharf and at the same time, small boats that cannot be berthed in conjunction with the relocation of existing pontoon shall be moored at the north berth.

Now, the water area in front of north berth is going to be refrained from dredging in view of environmental consideration.

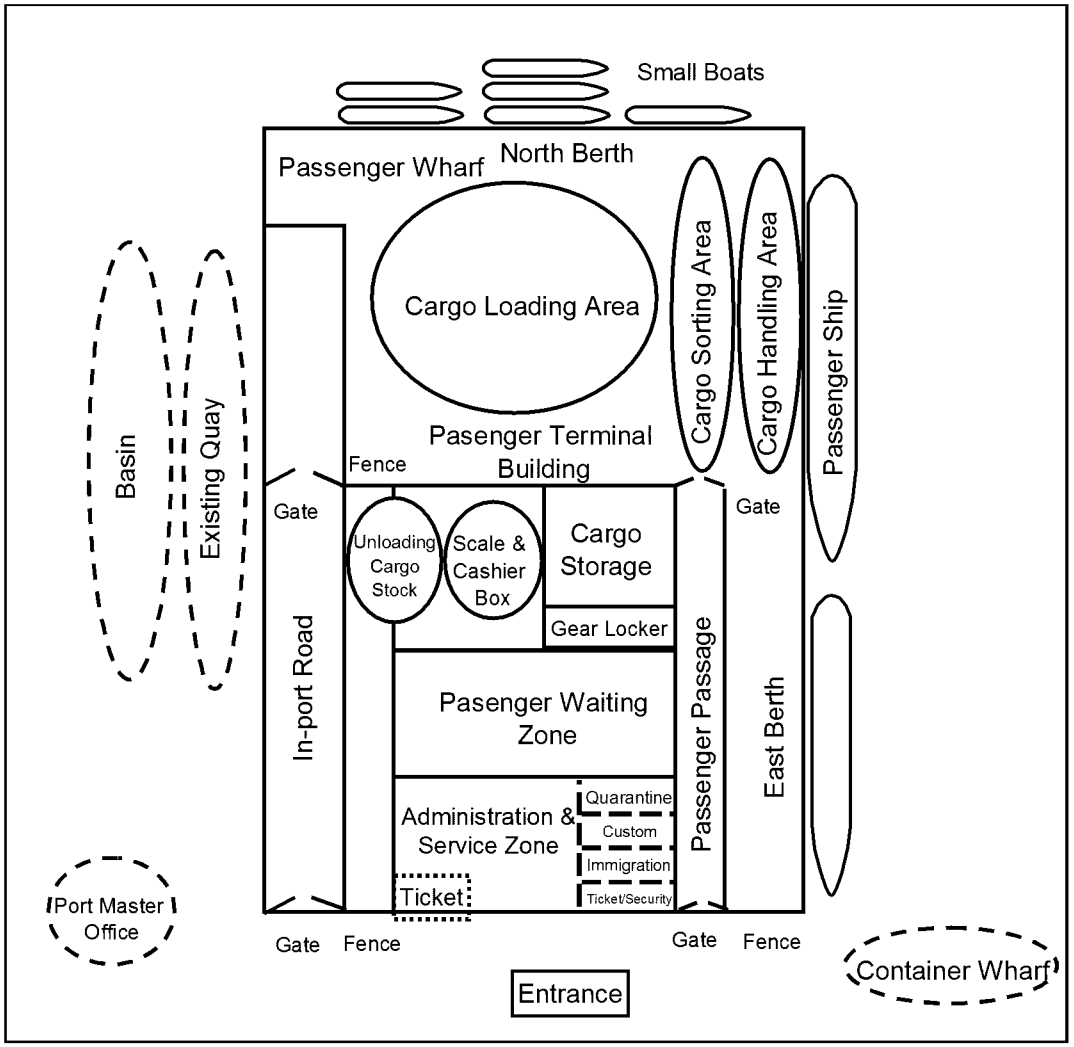


Figure 2.2.1-1 Layout Plan of Passenger Wharf Facilities

(3) Flow Line of Passenger Wharf

The flow lines of passenger and cargoes using passenger wharf shall be as per Figure 2.2.1-2, 3 when the planned facilities of passenger wharf are implemented according to the above layout plan.

1) Flow Line of Passenger

a) Flow Line of Passenger at Disembarkation

Passenger disembarked from passenger ship move along with passenger lane and move to outside after checking by Quarantine, Customs and Immigration.

b) Flow Line of Passenger at Embarkation

Boarding passenger wait for the departure time at the passenger waiting zone or in front of the wharf after purchasing ticket first. Passenger with excess baggage pays the excess charge at weighing and storage zone. Passenger gather in front of gate at the departure time and move along with passenger passage and move to passenger berth after checking by Immigration, Customs and Quarantine and embark to passenger ship on foot.

2) Flow Line of Cargoes

a) Flow Line at Cargo Unloading

The cargoes are unloaded and stored at cargo sorting area after unloading by cargo handling machineries that are installed at cargo handling area along the berth, ship's crane and workers. After that, the cargoes are carried out by vehicles waiting at cargo loading area.

b) Flow Line at Cargo Loading

The cargoes bringing-in by cargo trucks are unloaded at temporary cargo stock after paying freight measuring the weight. These cargoes and the cargoes stored temporarily at cargo storage are conveyed to cargo handling area by cargo handling workers or cargo handling equipment as needed when the ship is ready to receive them. The cargoes are loaded onto passenger ship by cargo handling equipment, ship geared crane or cargo handling workers.

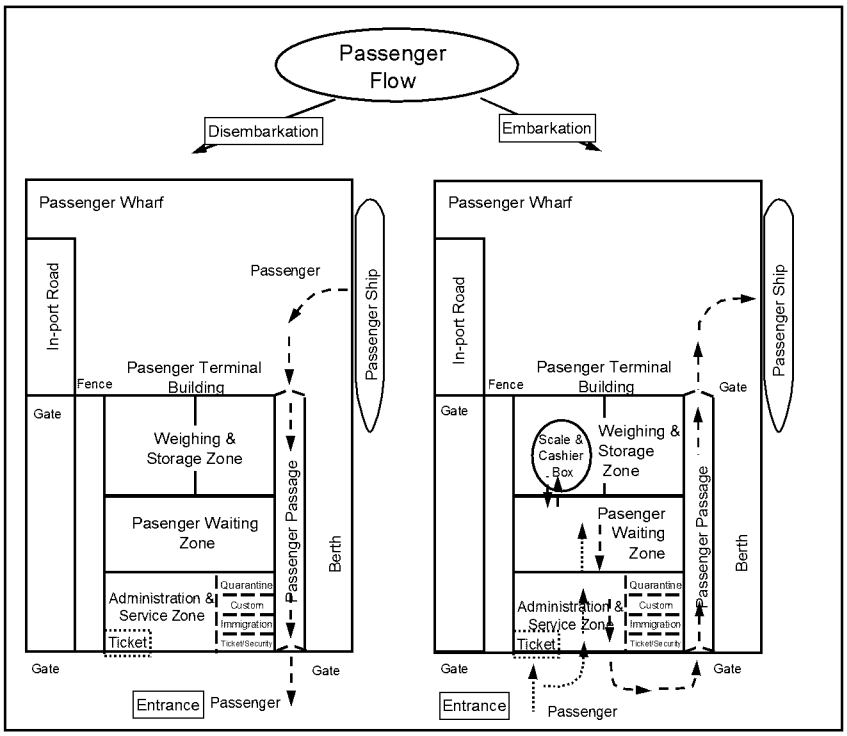


Figure 2.2.1-2 Flow Line of Passenger in Passenger Wharf

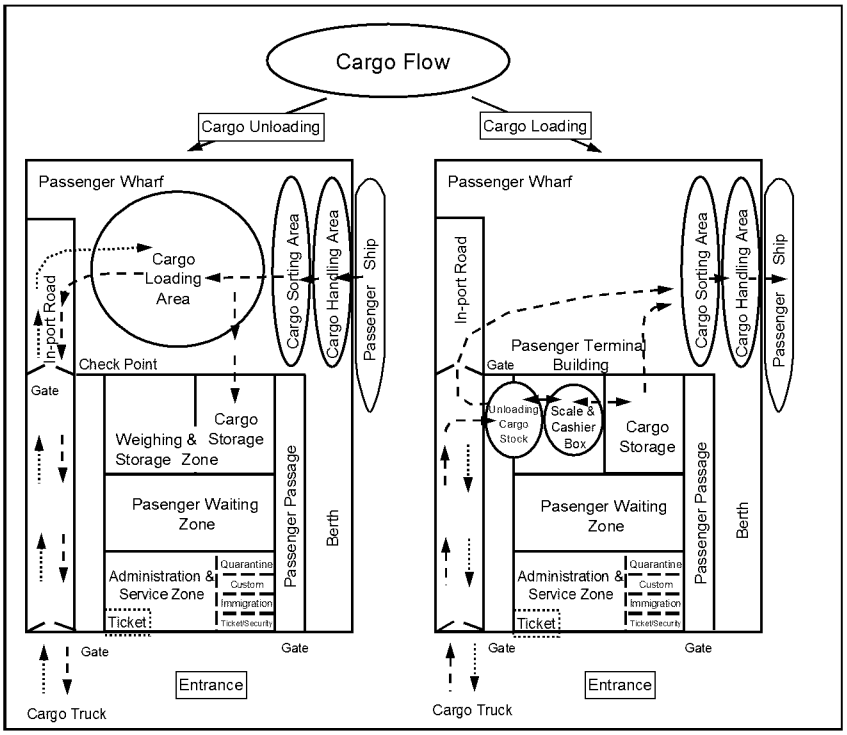


Figure 2.2.1-3 Flow Line of Cargo in Passenger Wharf

(4) Removal and Relocation of Existing Facility

Facilities to be removed and relocated by the implementation of this project are as per Table 2.2.1-2. And, as existing passenger wharf can not be used during construction of this project, temporary passenger facilities and relocation of pontoon that is now located at the wharf head shall be necessary and the candidate and the relocation locations are shown in Figure 2.2.1-4.

Each facility removal is the obligation of the Government of Tanzania and it shall be executed before the commencement of construction works of the project.

Table 2.2.1-2 Demolition Facilities Required by the Project

Facility	Functions	Reasons of Removal	Improvement by Project
CIQ and Ticket Sales Facility	- Ticket Sales - Customs - Immigration - Quarantine	- Aging & Deteriorating - Located at Entrance Part of Site and Access for Construction Works	- New Facility by Project of Passenger Terminal Building
Passenger Waiting Shed	- Waiting for Ship Departure by Passengers - Weighing of Accompanied Baggage and Charge Collection - Weighing Cargoes and Charge Collection - Temporary Storage of Cargoes - Internal Meeting - Simple Works - Sheltering from Rainfall	- Some Aging - Located at Access for Construction Works and Required Land Area for Project	- New Facility by Project of Passenger Terminal Building
Pontoon (Relocation)	- Landing & Boarding to / from Small Boats - Mooring of Small Boats (Boats of Customs, Immigration, National Park)	Plan by TPA	- Catered by New Berth Facility of North Side with Approach Steps
Storehouse for Ship Repairing Tolls	- Storehouse for maintenance materials and tools of passenger ship	- Empty Container House of Easy Relocation - Located at Required Land Area for Project	- New Facility by Project of Passenger Terminal Building

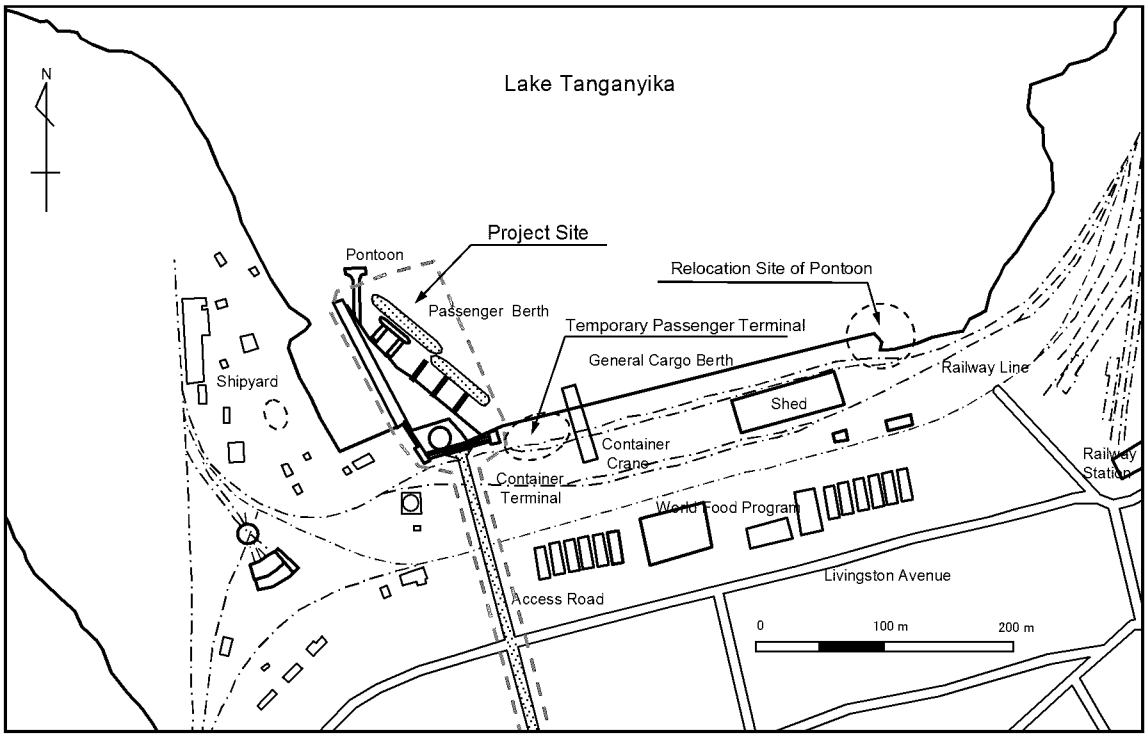


Figure 2.2.1-4 Location Map for Temporary Facilities for Implementation of the Project

2-2-2 Basic Plan

2-2-2-1 Basic Plan for Passenger Wharf

Following policies shall be executed in establishing basic plan for passenger wharf.

(1) Design Ships

In this project, ships owned by Marine Services Company Ltd. (MSCL) and used Kigoma Port as home port shall be the design ships. MSCL has a plan to allocate a new passenger ship in Kigoma Port according to public promises of government given party and she shall be included in the design ships. And, as other cargo ships are considered to call temporary, the design ships are set up referring to sizes of ships servicing in Lake Tanganyika.

With the above design conditions, ships shown in Table 2.2.2.1-1 are listed as the design ships for berthing facility plan in passenger wharf.

Table 2.2.2.1-1 Ship Particulars for Planning

Name of Ship	Flag	Built Year	Type	Gross Tonnage	L_{OA}(m)	Draft(m)
MV Teza	Burundi	1984	Cargo	1,880	60.0	3.6
MV Liemba	Tanzania	1913	Passenger	755	71.4	3.0
MV Mwongozo	Tanzania	1982	Passenger	800	59.5	2.5
MT Sangara	Tanzania	1981	Tanker	385	38.8	2.0
New Ship	Tanzania	2017(scheduled)	Passenger	——	60.0	3.6

(2) Basic Plan for Design Water Depth

The water depth of the berth in case of existing passenger ship is for MV Liemba with 3.0m draft that has the deepest draft. However, it is assumed that the ship draft shall be 3.6m when the new ship is allocated in 2017 as scheduled. And, as this berth neighbors upon cargo berth, it is considered that cargo ship is temporary berthed. MV Teza that has the deepest draft of 3.6m out of cargo ships servicing in Lake Tanganyika is equivalent to the new allocated ship. Therefore, the berth in passenger wharf is set up the draft of 3.6m for design ship and is studied further considering allowance for shoaling depth and future drawdown of lake water level.

According to "Technical Standards and Commentaries for Port and Harbor Facilities in Japan" (The Ports & Harbors Association of Japan), necessary water depth of berth is set up as standard considering keel clearance (more than 10% of full draft) like ship's up & down on the full draft of design ship. In the project, it is considered that ship's movement is small due to the calm wave condition at the project site and the keel clearance shall be regarded as 10%.

Necessary Berth Water Depth = Max. Draft of Design Ship + Margin (10% or more)

= 3.6m + 3.6 x 0.1 = 4.0m

Although in case of Lake Tanganyika, there is no fluctuation of water level being different

from ports and harbors facing to ocean, there is seasonal fluctuation due to the different water level between rainy and dry seasons. Drawdown of water level with about 4 cm annually was predicted, although the correlation is poor, from the records of water level fluctuation during 1995 to 2009 in Kigoma. Therefore, in order to cope with future drawdown of lake water level, for the time being, drawdown portion for future approx. 10 years shall be included in water depth for the berth.

Drawdown of Lake Water Level
= Annual Drawdown of Lake Water Level x approx. 10 years
= 0.04m/year x 10 years≒0.5m

And, as sand sedimentation becomes obvious in adjacent cargo wharf and container wharf in Kigoma Port, dredging is currently executed at water area in front of berth by cutter suction dredger. As sand sedimentation at passenger wharf cannot be neglected after construction of facilities, 0.5 m allowance as shoaling depth does include in order to cope with future sand sedimentation. In addition, if the sand sedimentation is generated more than the above, maintenance dredging shall be made by the existing cutter suction dredger owned by TPA and the restoration of berth water depth shall be made.

Therefore, design berth water depth as shown in Figure 2.2.2.1-1, each 0.5 m shall be included as the allowance by drawdown of lake water level and the shoaling by sand sedimentation in the future and set up as follows,

Design Berth Water Depth
= Water Depth of Berth + Drawdown of Lake Water Level + Shoaling Water Depth
= 4.0m+0.5m+0.5m=5.0m

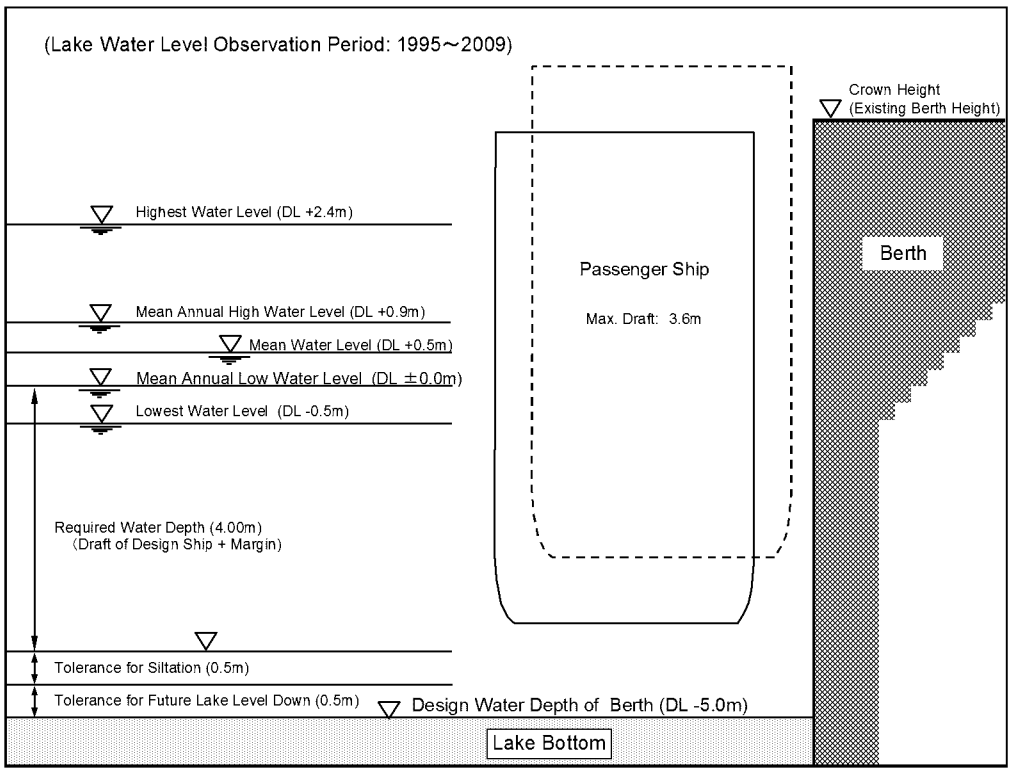


Figure 2.2.2.1-1 Design Water Depth of Berth

Water depth of this berth is equivalent to the water depth in the ports like Kasanga Port where liner passenger ships are calling (4 m), Lagosa Port, Kalya Port, Karema Port and Kipili Port where are rehabilitating at present by Community Service Project (5 m). And it is regarded as relevant as the berth water depth of main ports of neighboring countries is from 3.0 to 4.0 m.

It is also understood that the design ship shall be berthed without any problem since 4.4 m water depth is secured in case of 5 m design water depth even under situation in October, 2006 which was the minimum water depth, DL-0.5 m (772.9m) during observation period of lake water level from 1995 to 2009.

(3) Basic Plan for Water Basin

Center line of berth in passenger wharf is set up in the request application so as to secure 70 m width being parallel to the berth for small boats in the ship repair facility from the base point of cargo wharf side in the existing wharf. Figure 2.2.2.1-2 shows water area for turning basin when new allocated ship of MSCL which has the deepest draft out of design ships and MV Liemba is in the portside berthing. Judging from sizes of water area facilities in front of passenger wharf, it is understood to be able to secure enough water area since there is no influence to cargo ships berthing to container wharf and cargo wharf.

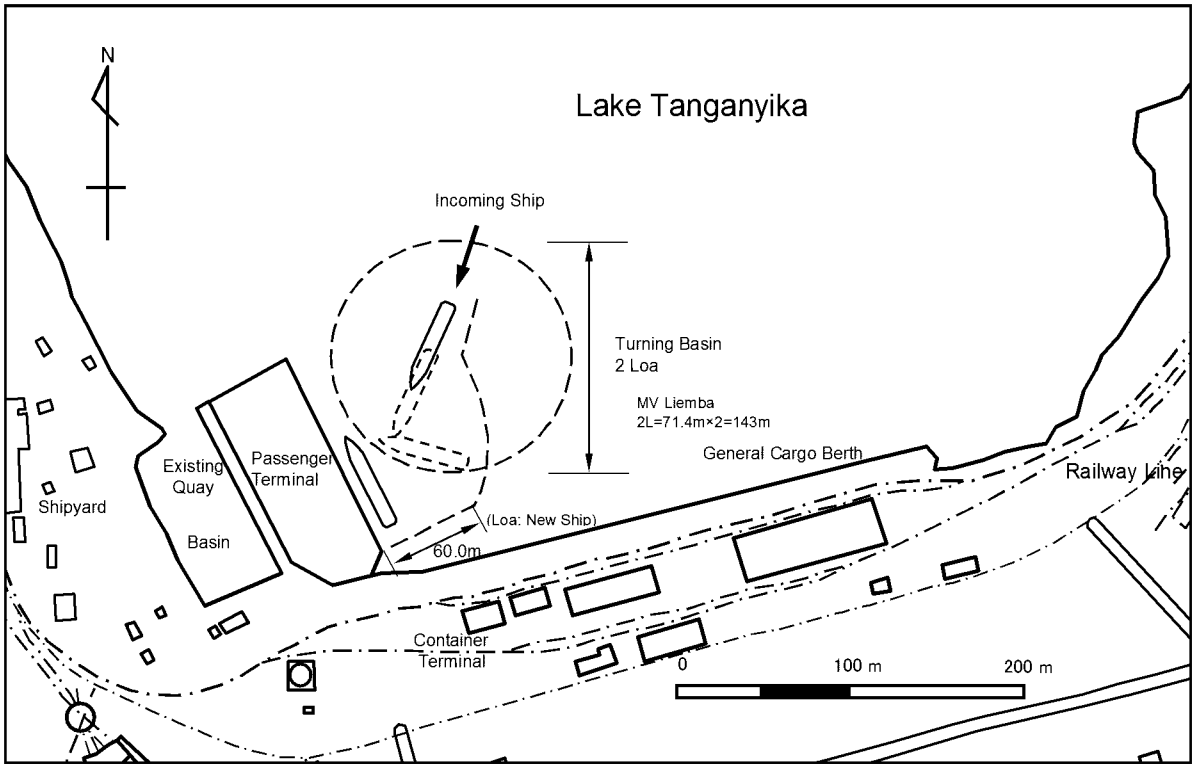


Figure 2.2.2.1-2 Turning Basin in front of Berth

(4) Basic Plan for Berth Length

Figure 2.2.2.1-3 shows location of mooring lines for alongside ship at the berth, the occupied length at the berth is set up including necessary length (Loa x 0.15) of mooring lines in bow and stern. In this project, the berth length is set up for MV Liemba and MT Sangara occupying and anchoring passenger wharf at Kigoma Port as mother port. In addition, MV Liemba is the ship that has the longest Loa out of vessels servicing in Lake Tanganyika.

Berth occupation length of MV Liemba is calculated as follows,

Berth Occupation Length of MV Liemba
= Loa of Calling Ship x 1.15
= 71.4m × 1.15＝82m

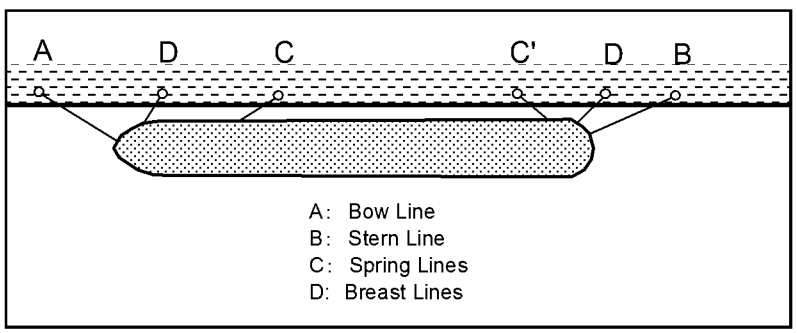


Figure 2.2.2.1-3 Location of Mooring Lines

Berth occupation length of MT Sangara is calculated being the same as MV Liemba.

Berth Occupation Length of MT Sangara
= Loa of Calling Ship x 1.15
= 38.8m × 1.15=47m

Therefore, the length of berth shall be set up as 130 m so that MV Liemba and MT Sangara can berth at the same time (2 berths).

Berth length = 82m+47m =129m→130m

And, the passenger wharf is used by MV Liemba, MV Mwangozo and MT Sangara owned by MSCL as their mother port and it is also regarded to be used by a new passenger ship. As the berth is considered to be occupied by these ships for their maintenance and resting, these ships shall be moved to offshore anchoring area or cargo wharf at the time of going in and out of other passenger ships.

(5) Basic Plan for Wharf Width

Wharf width is set up assuming loading and unloading cargoes from passenger ships. Wharf land area shall be planned with the allocation of cargo loading, handling and sorting works, parking space , turning space of cargo handling vehicles and in-port road.

Necessary function for wharf is as follows,

- Cargo Handling Area
- Cargo Sorting Area
- Cargo Loading Area
- In-port Road

Figure 2.2.2.1-4 shows the setting up of wharf width based on each necessary width.

Cargo handling area is set up referring to apron width of berth. It is stipulated as 10 m width in case of small vessel with "Technical Standards and Commentaries for Port and Harbor Facilities in Japan" (The Ports & Harbors Association of Japan). And, cargo sorting area is set up as 10 m width judging from the present working situation of sorting works at the site. Cargo loading area is set up by adding parking space for large size truck (maximum length: 12.0 m, maximum width: 2.5 m, maximum height: 3.8 m) and the drive way width. In addition, the width of in-port road, 7.0m with road shoulder, 3.0m for adjusting ground level at the site boundary shall be secured. As the result, project wharf width is set up as follows, and as a part of drive way width can be possibly combined with in-port road, the loading area shall be 20.0 m in width.

Design Wharf Width

= Cargo Handling Area + Cargo Sorting Area + Cargo Loading Area + In-port Road + Road Shoulder

＝10.0m＋10.0m＋20.0m＋7.0m＋3.0m

＝50.0m

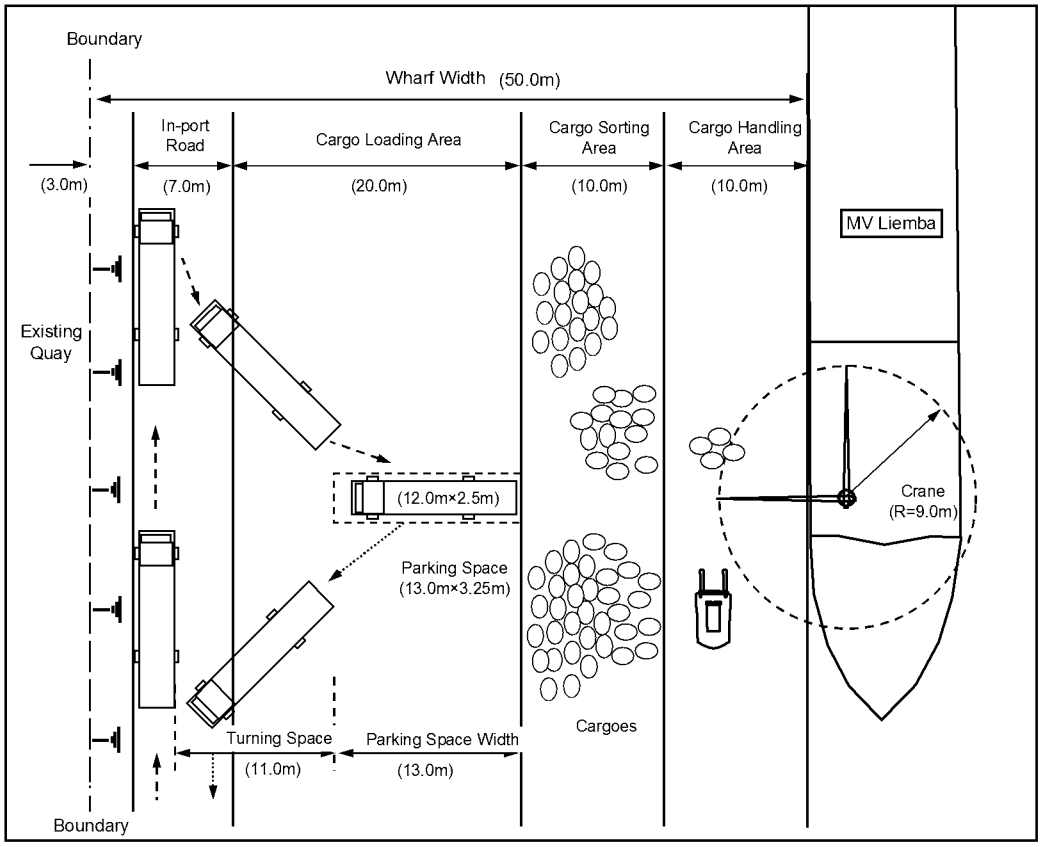


Figure 2.2.2.1-4 Functional Allocation and Necessary Width of Passenger Wharf

(6) Structural Plan for Wharf

In case of ports in Japan, proper structural type is selected out of various types of structures such as gravity-type quay-wall, steel sheet pile quay-wall and pile type jetty considering berth water depth, ground condition and construction condition. In this project, comparative design was made for the following three representative types of structures and steel sheet pile type berth has been selected to be able to easily cope with depth increase by future drawdown of lake water level.

- Gravity type berth: Concrete block type
- Sheet pile type berth: Steel sheet pile type
- Open type jetty: Steel pipe pile type

Figure 2.2.2.1-5 to 7 shows the cross-sections of each structure type. For preliminary comparative design, design water depth of berth is set up as 5.0 m and the ground condition is set up with N value of 10 from the result of existing boring result obtained by preliminary study team.

From the comparison table of structure types shown in Table 2.2.2.1-2, it is understood that steel sheet pile type structure is appropriate in its aspects of construction method, economic efficiency, construction period. And in the aspect of environmental consideration, it is considered that environmental load of any construction method is minor since water area of planned wharf corresponding to the area of current ships berthing and turning is already disturbed. Also, jetty type open structure that is considered to be favorable in the aspect of environment shall require some sort of reclamation and there is environmental load of shadow area under the jetty, therefore this has no special favor comparing with other structures.

Therefore, steel sheet pile type structure is considered to be appropriate as comprehensive evaluation in comparison with other structural ideas. And, it is considered that steel sheet pile type is used in the revetment for small boat basin of ship repairing facility adjoining to passenger wharf and this structure is already common in Tanzania as well as it was proposed to use steel sheet pile type as structure of berth by application letter.

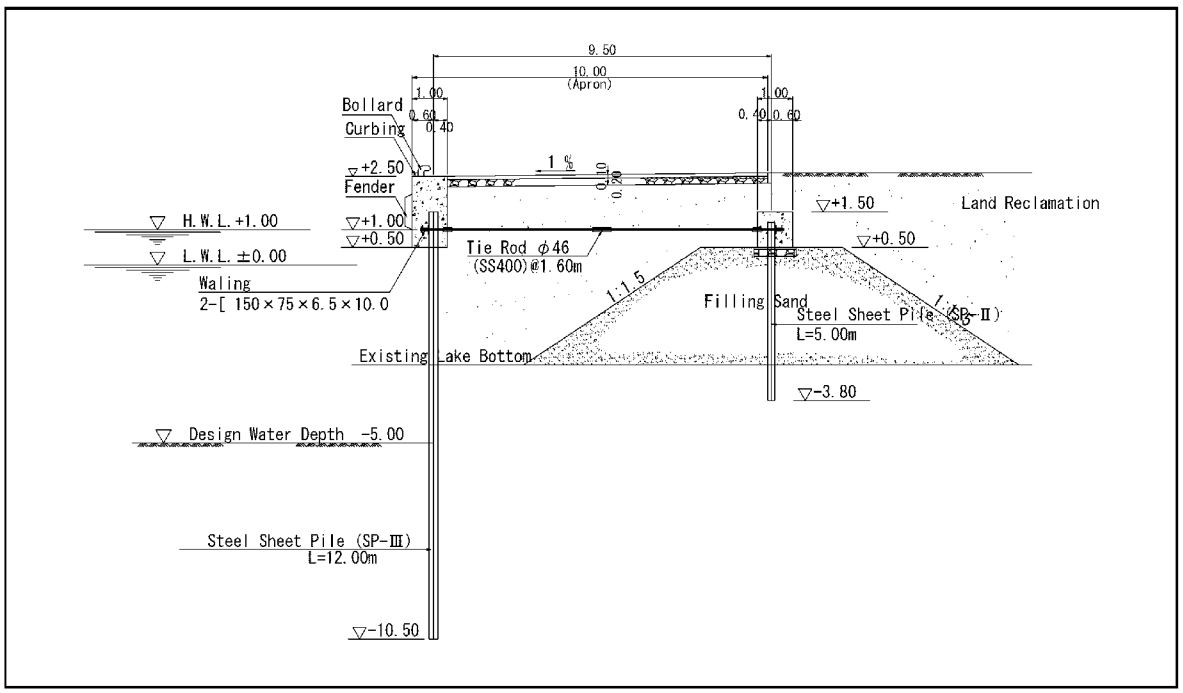


Figure 2.2.2.1-5 Comparative Cross Section of Steel Sheet Pile Type Berth Structure

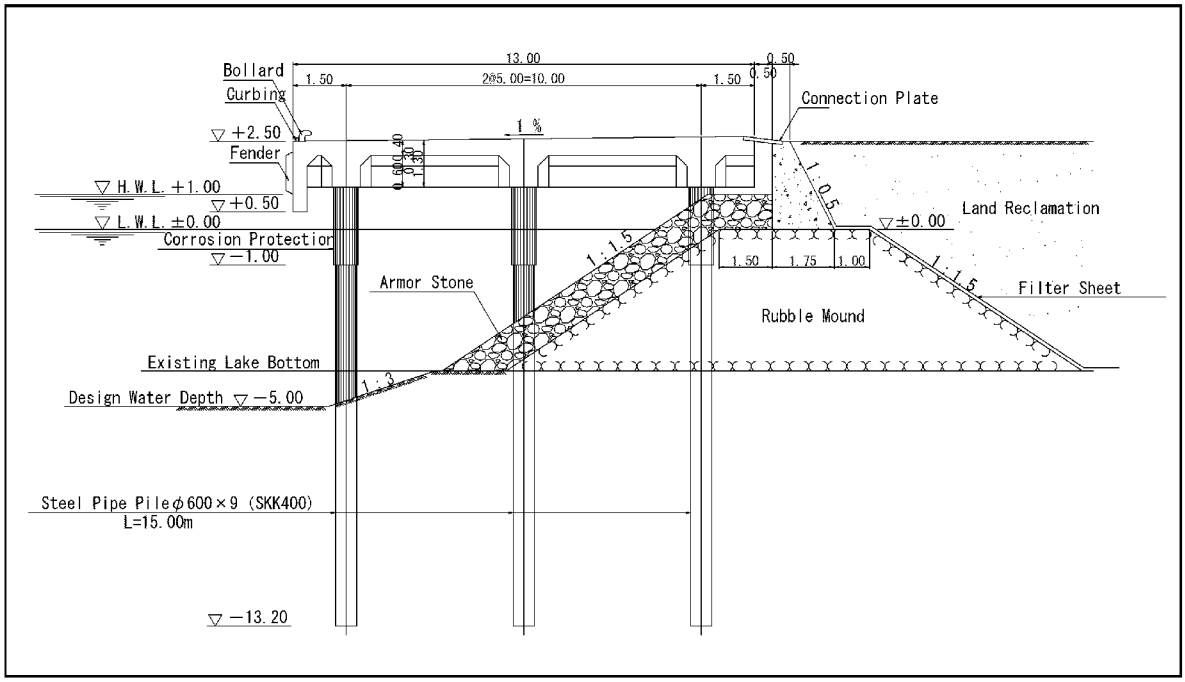


Figure 2.2.2.1-6 Comparative Cross Section of Pipe Pile Type Open Structure

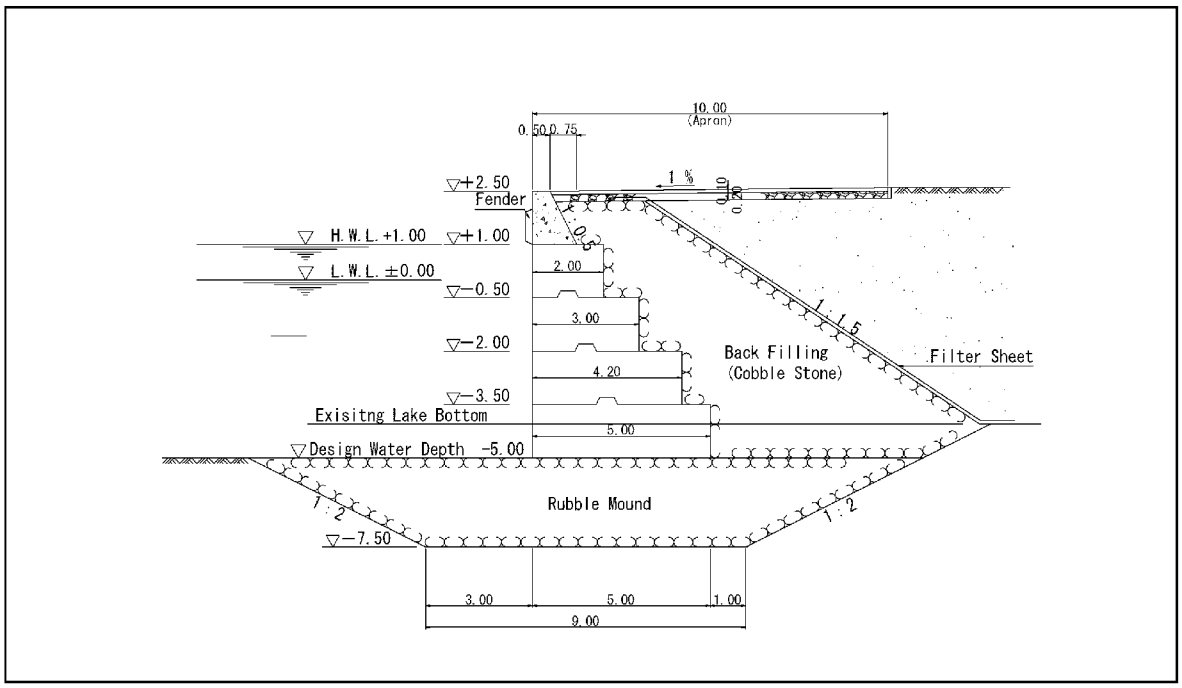
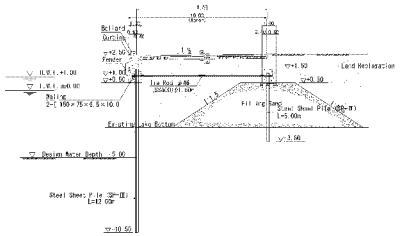
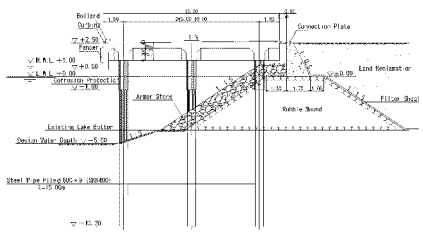
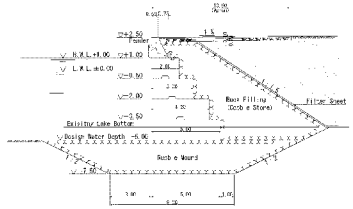


Figure 2.2.2.1-7 Comparative Cross Section of Concrete Block Gravity Type Structure

Table 2.2.2.1-2 Comparison of Alternate Berth Structure

Berth Structure	Steel Sheet Pile Type	Steel Pipe Pile Open Type	Concrete Block Gravity Type
Standard Cross Section (Preliminary Image)			
Construction Material	*Steel Sheet Piles for Berth *Anchoring Piles *Coping Concrete on Top *Reclamation	*Steel Pipe Piles *Deck Concrete *Gravel Mound *Armor Quarry Layer of Mound *Reclamation	*Concrete Blocks for Berth *Quarry Material for Back filling *Rubble Stones for Foundation *Sub water Excavation for Mound *Back Filling and Reclamation
Construction Period	○	△	○
Construction Cost	○	×	△
Construction Methodology	*Sheet Pile Driven from Landside *Dredging Material Utilized for Reclamation *Small Temporary Construction Yard	*Pile Driven from Waterside by Piling Berge *Placement of Gravel Mound and *Armor Quarry Layer from Seaside *Complicated Deck Concrete Casting *Some Difficulty in Dredged Material Utilization *Wide Temporary Construction Yard	*Most of Berth Construction Works from Waterside *Bigger Construction Berge Required *Some Difficulty in Dredged Material Utilization *Extensive Temporary Construction Yard
Procurement	*Steel Products Procured from Japan *Concrete Procured Locally	*Steel Pile Procured from Japan *Concrete Procured Locally *Quarry and Gravel Procured Locally *Berge and Construction Vessels Procured from Third Country or Japan	*Rein-forced Bar Procured from Third Country *Concrete Procured Locally *Big Berge and Construction Vessels Procured from Third Country or Japan (Difficulty in Land Transportation)
Quality Control	Easy Control Relatively Small Subwater Works	Relatively Difficult Control Concrete Casting of Complicated Deck Structure	Difficult control Sub Water Works by Well Skilled Divers from Third County
Construction Safety	Safest Most of Works Carried Out from Land	Safe Offshore Construction Works and Many Crane Works	Less Safe Difficulty in Sub Water Works of Berth Structure
Future Deepening due to Lake Water Level Down	Possible	Impossible	Impossible
Maintenance	○	△	○
Environemntal Aspect	New environmental impact by the project is less due to water area already disturbed by ships.	New environmental impact by the project is less due to water area already disturbed by ships. There is no significant differences on reclaimed area.	New environmental impact by the project is less due to water area already disturbed by ships.
Evaluation	◎	△	×

For the drawdown of future lake water level in the case that depth increase at the berth to attain required water depth is assumed, it is necessary to construct a big structure in advance implementation with the depth increase except the steel sheet pile type method. But, the steel sheet pile method requires dredging when depth increase is necessary in setting up the steel sheet pile structure that assume the future increase beforehand.

Concerning future drawdown of lake water level, as the result of assumption based on the observation results during 1995 to 2009, it has been assumed as approx. 4 cm per year although the correlativity is not so big. In case that the service life of port related facilities is 50 years, the drawdown of water level is projected as approx. 2.0m. The berth water depth of current plan is included 0.5 m drawdown of lake water level and further 1.5m depth increase is assumed to be necessary.

With the above, cross-section of steel sheet pile is set up assuming the design condition that the lake water level will drawdown 2.0 m in the future as shown in Figure 2.2.2.1-8.

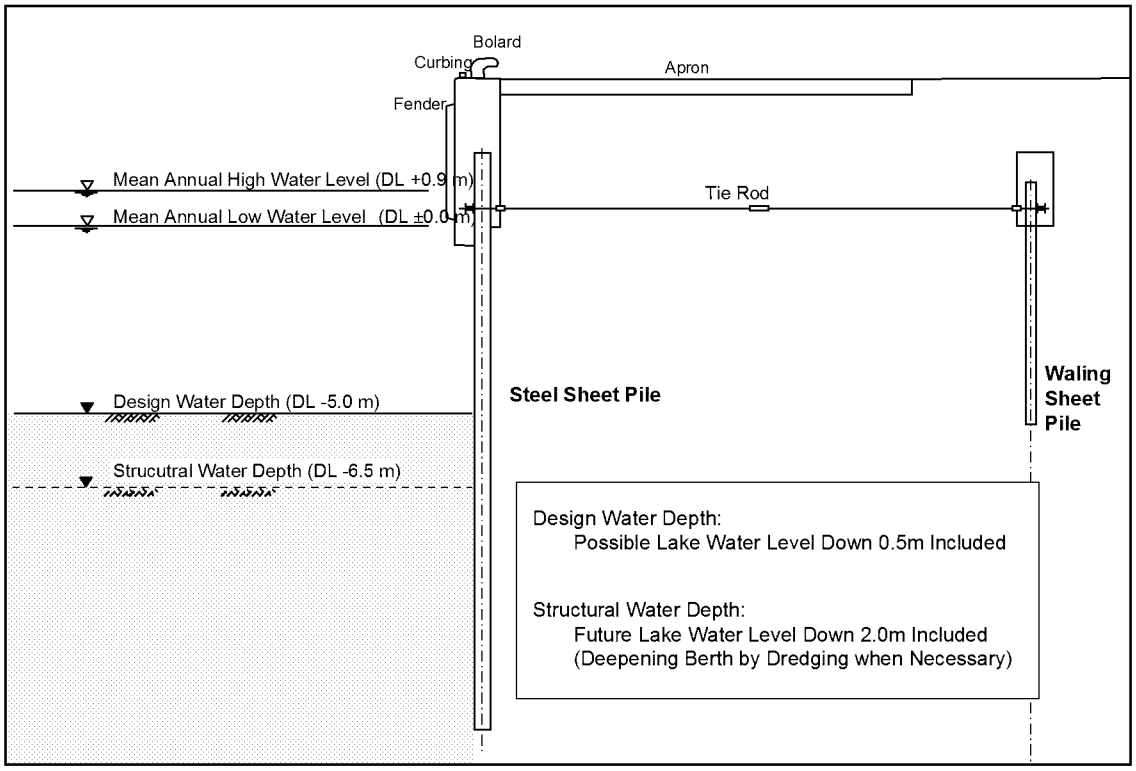


Figure 2.2.2.1-8 Structural Plan of Steel Sheet Pile Type Berth

In case that the lake water level drawdown 2.0m, as large scale of dredging works is necessary due to the lacking of water depth in wider range of area including water area in front of cargo wharf, dredging shall be required including surrounding water area when the depth increase becomes necessary. Therefore, in view of structural aspect, the berth water depth is planned as -5.0m as it was planned being possible to cope with future lake water level.

(7) Structural Plan of North Berth

North berth shall be planned as mooring facility for small boats that are currently moored at the pontoon.

The water area in front of north berth shall not be dredged in view of environmental consideration. As the draft of design small boats is less than 1.0m, the water depth there is enough and it is possible to be moored without dredging.

Structural type of berth is planned as steel sheet pile structure with the same as east berth. As the freeboard height of small boats is smaller in comparison with other passenger ships, footstep is going to be installed at the berth for the access to small boats from wharf.

(8) Dredging Plan at Offshore of East Berth

Figure 2.2.2.1-9 shows necessary water area to be dredged in case that berth water depth shall be DL-5.0m. Dredging volume is estimated as 5,000m^3.

These water areas are the areas where sand sedimentation is easily presumed to be generated therefore, monitoring of water level and the maintenance dredging becomes necessary upon need.

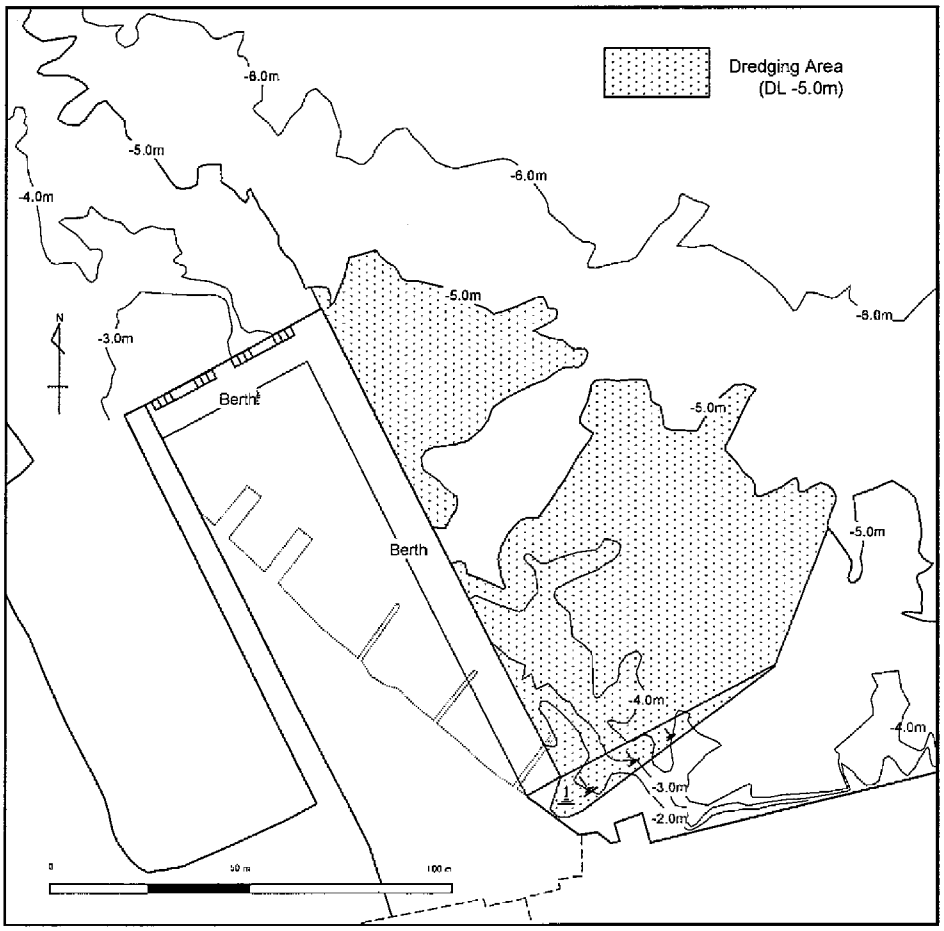


Figure 2.2.2.1-9 Necessary Dredging Area in front of Passenger Wharf

(9) Plan for Beacon

There is no beacon facility installed that shows the location of port at the time of low visibility, such as during night, in raining or in bad weather like heavy fog in Kigoma Port. Although, it is prohibited to enter into passenger berth at night, as it is necessary to prepare an emergency case, one beacon shall be installed to clearly specify the location of passenger wharf.

Size of beacon shall be as per below.

- Type : Beacon
- Quantity : 1
- Color of light : Yellow
- Emitting Part : LED Lantern
- Lighting Range : 5 n. mile

(10) Plan for Lighting Facility

Following facilities are obliged to install at international port facility in accordance with SOLAS Convention for safe human life on marine structures under IMO.

- Security measure (Access control to & from port facility, cargo control management, monitoring of within and without port facility and etc.)
- Installation of security facility like fence, lighting and etc

Therefore, lighting facility shall be installed to be necessary for security as a part of security facilities. Five sets of lighting towers are installed with respect to the illumination of the floor of 10 luxes. And, as the installation of fence and gate belongs to the obligation of the recipient country according to the Guideline of Grant Project, these shall be executed by the Government of Tanzania.

(11) Plan for Fuel and Water Supply Facilities

As fuel to passenger ship is supplied with fuel tank truck, it shall not be included in this project. And, lake water is now used for the water supply to passenger ship and water tank truck shall be used when it will be needed in the future therefore, this shall not be included in this project.

2-2-2-2 Plan for Access Road

Plan for the access road shall be executed with the following policies.

(1) Basic Plan of Access Road

The access road to passenger wharf is now provided with 481m having 8.0 m width from the wharf to main road as shown in Figure 2.2.2.2-1 and the road surface is unpaved. Since the road

width is two lanes and water drains are installed at both ends of the road, therefore the trench water on road surface will have no problem, only pavement on road surface shall be executed on the existing access road in this project.

And, the open space in front of passenger wharf that is starting point of the access road is also unpaved therefore, this pavement shall be treated as a part of the access road.

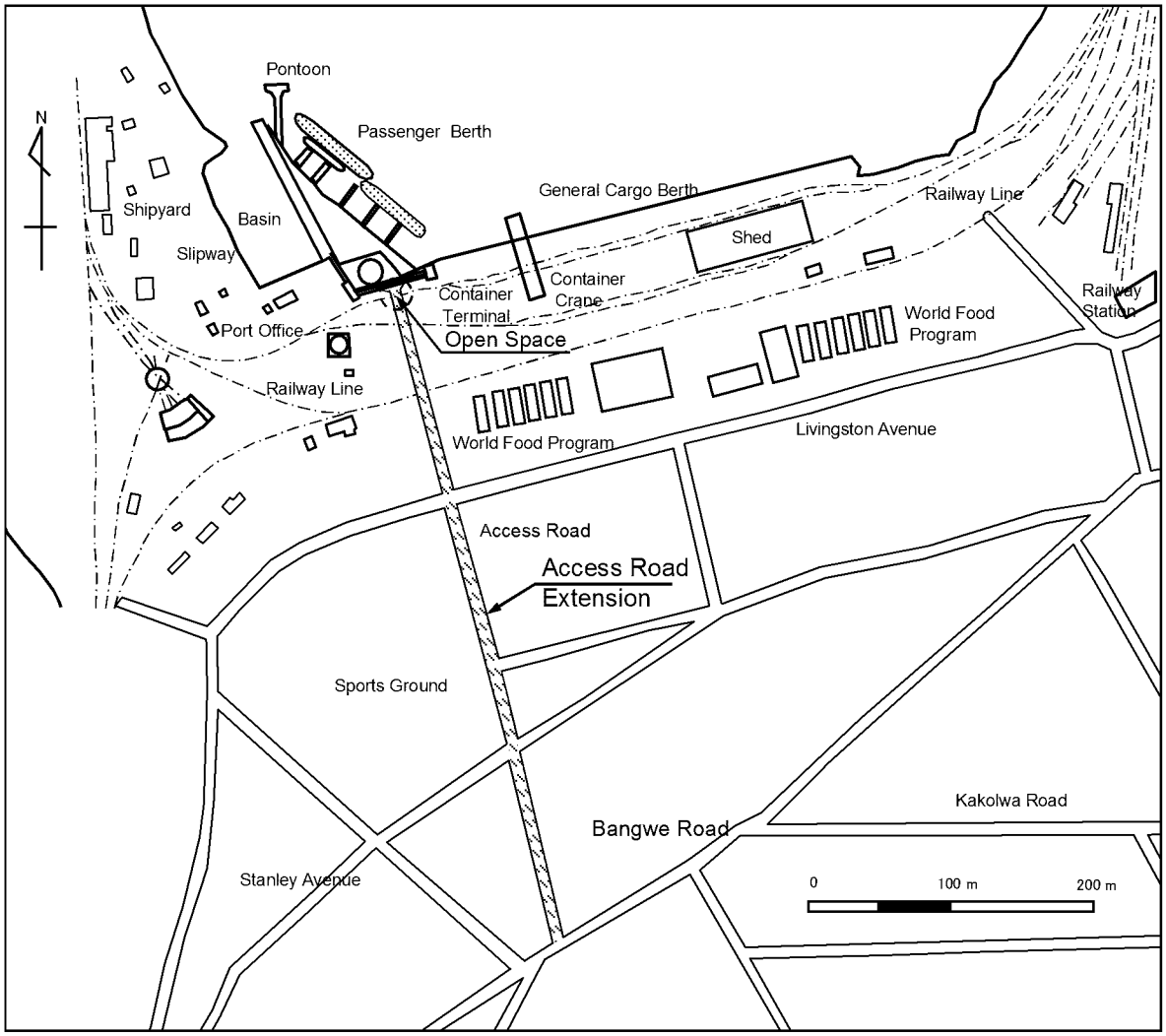


Figure 2.2.2.2-1 Paving Area of Access Road

(2) Basic Policy of Pavement Method

The pavement of the access road shall be concrete pavement with the reasons of no availability of asphalt plant nearby Kigoma Port, the small scale pavement work and other reasons as shown in Table 2.2.2.2-1.

Table 2.2.2.2-1 Comparison of Paving Methods of Access Road

Type	Concrete Pavement	Asphalt Pavement
Feature of Method	- Sufficient pavement structure can be obtainable regardless of bearing capacity of sub-grade and unevenness. Thickness of base course can be possibly thinner. - It is good for truck or cargo handling vehicle due to the strength against heavy contact pressure and intensive load.	- Although it is somewhat adjustable for some small uneven subsidence deeper than sub-grade, crack or uneven bump are occurred. - It is basically low strength and weak for intensive load.
	○	△
Productivity	- Easy site workability and the concrete plant can be used together with other facilities of the project. - It is producible at normal temperature with the materials of aggregate, cement and water. Production method is easy.	- Plant structure and operation are complicated due to the built in heating burner and dram in the plant. - Production method is complicated since it is produced by adding heat more than 150 degree with the materials of aggregate, asphalt and filler.
	○	△
Workability	- Working process is easy by the same routine work as concrete pavements on apron and wharf area in project. - It is comparatively less problem in construction control.	- It is easy to work step by step. As the curing period after installation is short, the service can be commenced immediately. - Construction control is complicated as temperature control and Marshall stability test are associated.
	○	○
Maintenance Work	- Durability of pavement is long and economic life is long. - Surface abrasion resistance is big and strong scratch resistant against heavy cargo handling equipment and etc.	- In spite of easy repairing and maintenance works, pavement life is comparatively short as the durability of surface layer is low. Frequent maintenance works are required. - It is weak for heavy static load and cyclic load, generating bumpy and rutting surface easily.
	○	△
Economic Efficiency	- Construction cost becomes cheaper as concrete plant can be used together with other concrete works.	- There is no asphalt plant nearby the project site. Since, asphalt plant is necessary to newly build, the possibility is poor due to the pavement scale.
	○	△
Overall Evaluation	○	△

(3) Basic Plan for Access Road

The pavement width of the access road shall be two lanes of 2.75m traffic lane width and allocated road shoulders with 0.75m each therefore, the pavement width becomes 7.0m as shown in Figure 2.2.2.2-2. There partly exist road areas in the existing access road where the road width becomes a little bit less than 7.0m. There, the pavement shall be made on the cross-section where is possible to be paved up to the trench.

Pavement cross-section is consisted of concrete pavement and base course and the road surface shall have 1.0% trench slope.

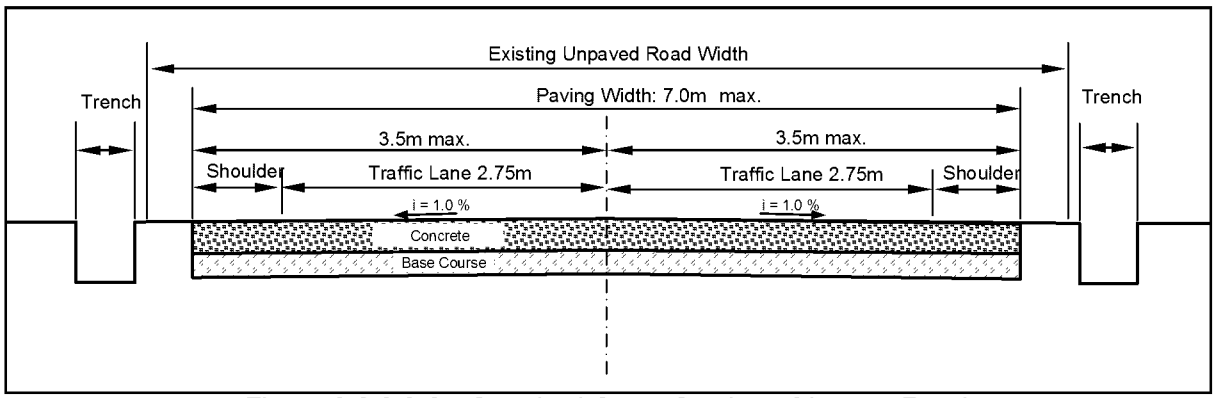


Figure 2.2.2.2-2 Standard Cross Section of Access Road

(4) Basic Plan of Open Space in front of Wharf

Open space is the area shown in Figure 2.2.2.2-3 and the same pavement shall be made with the access road. Although there are some big trees in the open space, it is the policy not to cut down as much as possible.

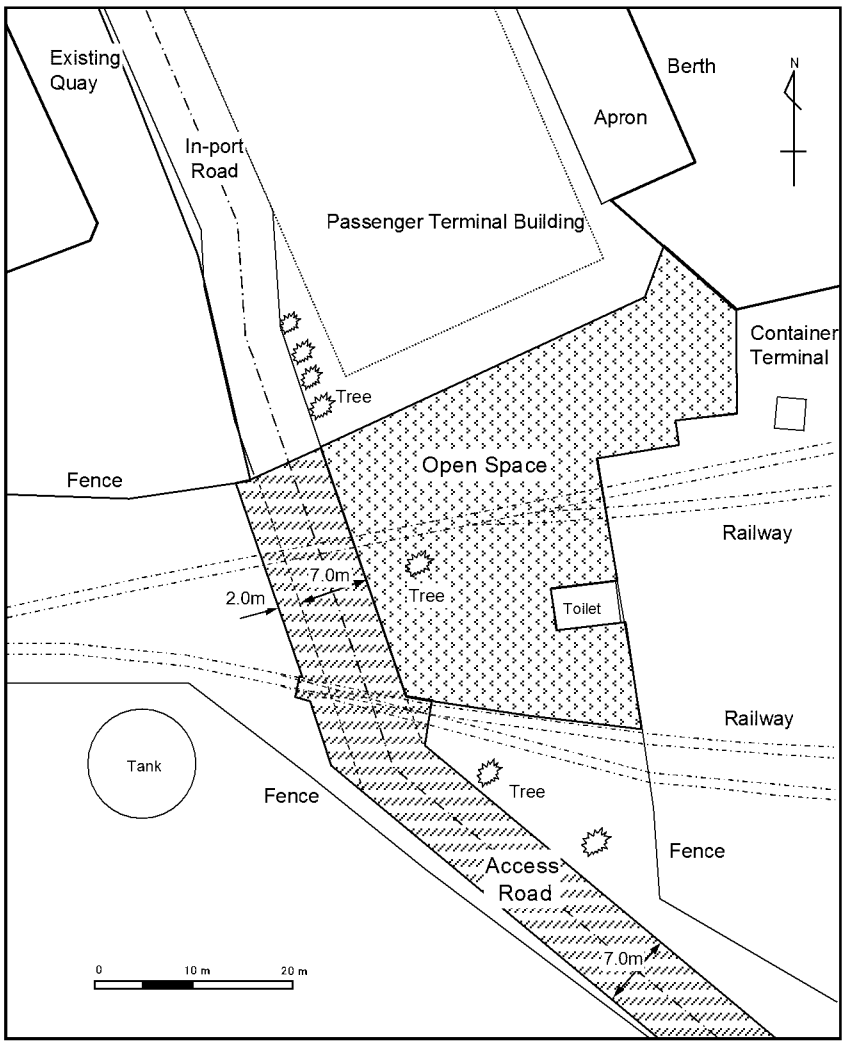


Figure 2.2.2.2-3 Paving Area of Open Space in front of Wharf

2-2-2-3 Basic Plan for Passenger Terminal Building

(1) Basic Policy of Passenger Terminal Building

Passenger Terminal Building as shown in layout plan of passenger wharf facilities of Figure 2.2.1-1, shall be allocated at the entrance of passenger wharf. Each functional facility shall be allocated at Administration & Service Zone, Passenger Waiting Zone and Cargo Storage & Weighting Zone.

Table 2.2.2.3-1 shows number of passengers and volume of handling cargoes for the facility planning. The number of embarkation and disembarkation of passengers is set up as about 500 judging from the monthly number of embarkation and disembarkation of passengers and 600 authorized passenger capacity of MV Liemba. And, the cargo handling is set up as 200 ton from the 200 ton of maximum cargo volume of MV Liemba and the hearing survey result that unloading volume is met with just about the maximum loadable volume. Loading cargo volume is resulted with about 50 ton that is smaller than the unloading volume.

In addition, a new ship is expected with 572 authorized passenger capacity and 400 ton maximum cargo volume. The authorized number is smaller than that of MV Liemba though the maximum cargo loading volume becomes twice. Handling cargo volume is to use the actual record of MV Liemba in the plan, considering that actual records cannot be estimated and planned quantity concerning the scale setting up of cargo storage area is limited.

Table 2.2.2.3-1 Design Number of Passenger and Cargo Volume

Category		Design Quantity
Passenger	Embarkation	500
	Disembarkation	500
Cargo	Loading	50 t
	Unloading	200 t

(2) Plan for Passenger Terminal Building

Following functions shall be allocated at each zone in passenger terminal building.

【Administration and Service Zone】

- CIQ Facility: Immigration, Customs, Quarantine
- Ticket Gate and Security Room
- Ticket Booth
- Administration Office: TPA
- Service Facility: Kiosk, Toilet, Entrance Lobby
- Storage
- Passenger Passage

【Passenger Waiting Zone】

- Passenger Waiting Room
- VIP Lounge

【Cargo Storage and Weighing Zone】

- Weighing Space
- Fare Collection
- Cargo Storage
- Cargo Stock
- Gear Lockers

(3) Administration and Service Zone

Following facilities scales shall be set up for the facilities to be allocated in this zone.

1) CIQ Facility and Ticket Gate & Security Office

CIQ facility comprising immigration, customs and quarantine shall be under the monitoring system with the same as present passenger's flow line and they are arranged in series along with passenger's flow line. Two officers shall be allocated in each room. Passengers shall move to booth in front of the administration room at the time of passage for their monitoring and the questioning to passenger and the related paper works shall be made by moving in room upon need.

The existing booth is with 3.7m in width and 2.2m in depth. The booth width shall be 4.0m and monitoring booth with 1.0m in depth facing to passage shall be secured in this project. Although 2 officers are stationed in administration space, they are not always stationed therefore, the room with 4m x 3m =12.0m^2 shall be secured for a desk and two chairs including questioning space.

And, a booth for two ticket collectors and a room for security officers shall be allocated at the entrance of passenger passage. Ticket collectors shall stay at front booth at the time of passage from this room.

CIQ facility and Ticket Gate & Security Office
= Monitoring Booth + Administration Office
= 4m×1m+4m×3m = 16.0m^2

Ticket gate located at the entrance of passenger passage is the place where passengers are most congested and cue of boarding passenger shall be sorted out equipping with hand rails.

2) Administration Office

The administration offices for TPA that manages the passenger terminal facilities shall be allocated. Two persons shall be always stationed in this spaces.

The scale of room is defined 7.0 to 15.0m^2 as room space per person concerning administration room in "Architectural Design Data Corpus ", therefore, it sets up as 12.0m^2 . As 2 persons are always works in each room, it sets up as 24.0 m^2 .

Space for Manager = 12.0m^2/person x 2 persons = 24.0m^2

3) Toilet

Concerning toilet, as it is utilization situation so as that the project number of passenger, 500 gets together to passenger waiting room gradually in accordance with the departure time, the number of passenger to use toilet is set up as 400. And, the usage of toilet by passenger is limited at the date that passenger ship is arrived and departed unlike the toilet outside and it is considered as the restrictive use, following numbers shall be set up based on the proper number of equipment of theater. Toilets for handicapped passenger are prepared at women's and men's rooms.

- For male : 4 closet bowls, 4 urinary and 4 wash basin
- For female : 7 closet bowls, 4 wash basin

As the result to allocate closet bowls and wash basin for male and female, the scale of toilet shall be as follows,

Toilet Space = Toilet for Male + Toilet for Female
= 30.0m^2 + 30.0m^2 = 60.0m^2

4) Ticket Booth

2 ticket sales persons are planned referring to the existing ticket sales area (2.0m x 7.6m = 15.2m^2).

Since the ticket booth is the most congesting facility before passenger's departure, it shall be allocated at the place separated from ticket gate so that it segregates from passengers to be boarded. The sales windows shall be allocated both inside of the building and outside. In addition, the hand rails shall be allocated to sort out cue of purchasers in front of the ticket sales booth.

Ticket Sales Booth Space=10.0m^2/person x 2 persons = 20.0 m^2

5) Kiosk

Kiosk shall be allocated as the service facility for passengers. Kiosk shall sell drinks and snacks, as well as fast food. Small sized kitchen and sink for simple cooking and dish washing are equipped inside of the space.

6) Entrance Lobby

Entrance lobby shall be allocated for the passengers to use toilet, kiosk and other service facilities in the center of passenger waiting zone. The passenger waiting lobby is allocated to accommodate about 40 passengers considering the space to be securable in the zone.

7) Passenger Passage

Passenger shall pass through the outside of passenger waiting room considering existing monitoring system in CIQ facility.

Passenger passage shall be allocated along the eaves outside of Passenger Terminal Building. Low wall shall be allocated for orderly disposition of passengers at the passage part from ticket gate to quarantine booth.

8) Storage

Storage space of $8.0m^2$ is secured in Passenger Waiting Zone to store relevant equipment, fixtures and miscellaneous consumables.

(4) Passenger Waiting Zone

1) Passenger Waiting Room

Target number of passengers is set as 500. It was found that there existed more than 100 passengers to arrive right before the departure time from the result by trend observation of embarkation passengers, therefore, the number of passenger to be allocated in the passenger waiting room shall be set up as 400 that is equivalent to about 80%.

The area of existing passenger waiting shed is $307m^2$ and 22 benches of 8 seats have been allocated and there are 172 number of seats available. It is considered that occupancy load is about 250 passengers since there are considerable numbers of passengers who do not sit. Therefore, that considerable number of passengers shall wait standing up around waiting shed or open space in front of the wharf.

As boarding is commenced at 16:00 and completed by the departure time at 18:00, passengers shall board within 2 hours from ticketing gate passing Customs, Immigration and Quarantine booths moving to passenger ship.

The scale of passenger waiting zone is considered to be relevant as $1.0m^2$/person including passage part. As about 40 passengers can be accommodated at entrance lobby of Administration and Service Zone in Passenger Terminal Building, the facility scale for remaining 360 passengers shall be set up. 60 units of benches for six persons are installed.

Passenger Waiting Space = $1.0m^2$/person x 360 persons = $360m^2$ → $363.2m^2$

2) VIP Lounge

At a request of TPA, VIP Lounge of 20 passenger capacity is allocated in Passenger Waiting Zone. The scale of VIP Lounge is considered to be relevant as $1.5m^2$/person including a small toilet as follows.

VIP Lounge Space = $1.5m^2$/person x 20 persons = $30m^2$ → $32m^2$

(5) Weighing and Storage Zone

Cargo storing and tool & equipment storing locker in addition to weighting equipment space, fare collection booth, cargo stock area shall be allocated in Weighing and Storage Zone, referring to the existing facilities contents.

1) Casher Box and Weighting Scale Space

Casher box of fare collection and space for weighting scale is the facility to collect the excess fee of carrying baggage of passengers and freight for the cargo transportation. 2 persons are worked in the fare collection booth and the administrative works are done as well as the works to collect fares and the existing facility scale is $2.1m \times 4.3m = 9.0m^2$. In this project, the scale is considered to be $10m^2$ /person and it is set up as below.

Casher Box =$10.0m^2$ /person x 2 persons = $20.0m^2$

2 weighting scale being the same as existing one shall be allocated in front of fare collection casher box. Space of $10.0m^2$ / equipment shall be secured since cargo sender waiting for his order in addition to cargo sender, person in charge for weighing and cargo handling worker stands around measuring equipment.

Weighing Space = $10.0m^2$/equipment x 2 equipment = $20.0m^2$

2) Cargo Storage

At present, cargo storage facility is not allocated in passenger wharf and loading cargoes are basically carried in at the morning of departure of passenger ship. However, as the cargoes that carried in a day before the departure were found at during field survey, it is assumed that the demand for cargo storage area shall be bigger in association with the installation of storage facility.

The setting up of scale for cargo storage area shall be made with the following prior conditions.

- Type of cargo: Carried in cargoes before departure, cargoes stored temporarily like bonded cargo or lost cargo
- Cargo volume to be carried in before departure date: approx. 20% of 50 ton that is average loading cargo volume
- Carried in cargo volume before departure date=50t x 0.2 = 10t
- Volume of temporary storing cargoes
- Lost cargo, bonded cargo, etc.= 10t

Unit weight of cargo shall be set as $0.3t/m^3$ since it is included big volume like general merchandise, furniture, food articles judging from the observation of loading cargoes.

Cargo Area

= (Cargoes Carried in before Departure + Temporary Storing Cargoes) /
Void Ratio / Stacking Height

= (10 + 10) t / 0.3 t/m^3 / 1.0 m = 67 m^2

Scale of cargo storage area shall be calculated as follows adding equivalent spaces with cargo occupation area for cargo handling and passage space.

Area of Cargo Storage Area

= Occupation Area of Cargoes x 2.0

=67 m^2 × 2.0=134m^2 → 124m^2

3) Temporary Cargo Stock Area

Cargoes to be loaded onto passenger ship are temporary stocked after unloaded by cargo handling vehicle at the side of temporary cargo stock area, measuring at measuring equipment space, payment of freight at fare collection casher box. Cargoes temporary stored is sequentially loaded onto passenger ship by port workers. This space is very congested by cargoes, consignees and cargo handling vehicles observing site working situation. Therefore, as well as studying cargo flow line, wider space shall be secured and the congestion shall be mitigated.

The setting up of scale for temporally cargo stock facility shall be made with the following prior conditions.

- Accommodating Cargo: Carry-in cargo for the loading onto passenger ship
- Volume to be temporary stocked: Carry-in cargoes for the loading are averagely about 50 ton and its 80% shall be the design volume excluding about its 20% that is the cargoes carried in before the departure of ship. Although carry-in cargoes are loaded in series onto passenger ship by port workers, it is considered that maximum 30% of them is stored since considerable cargoes have been dwelled at the temporary space from the work observation result.
- Dwelling cargoes volume at temporary stock space=50t×0.8×0.3=12t

Cargo weight per unit volume shall be set up as 0.2t/m^3 since fruits like bananas, empty fish boxes and etc. that have bigger void volume are included in addition to general merchandize, furniture, food products and etc. just like the warehouse. And although stacking of cargoes will be more bulky than the accommodation in cargo storage, it sets up as 1.0 m same as cargo warehouse.

Cargo Occupation Area

= Maximum Temporary Stocking Volume / Void Ratio / Stacking Height

= 12t / 0.2 t/m^3 / 1.0 m = 60 m^2

Size of temporary stocking area is calculated as below adding equivalent space like passage to the cargo occupation area.

Temporary Stocking Area
= Occupation Area of Temporary Storing Area x 2.0
= 60 m^2 x 2.0 = 120m^2

4) Gear Locker

Storage house for tools and equipment to maintain and repair passenger ship is now allocated in wharf. Currently, this is the facility made by laying three 20ft containers side by side with roof on them and the size is 2.4m x 6.0m x 3= 43.2m^2. In this project, racks to accommodate equipment and others shall be allocated at the both ends of the locker space and unnecessary equipment and others shall be separately stored and the following space shall be secured.

Space Area for Tools and Equipment
= 2.4m x 6.0m x 3units
= 43.2m^2 → 3.0m x 8.0m=24.0m^2

(6) Layout Plan of Passenger Terminal Building

Administration and service zone, passenger waiting zone and cargo storage and weighing zone shall be allocated in Passenger Terminal Building. Figure 2.2.2.3-1 shows floor arrangement of facilities included in each zone.

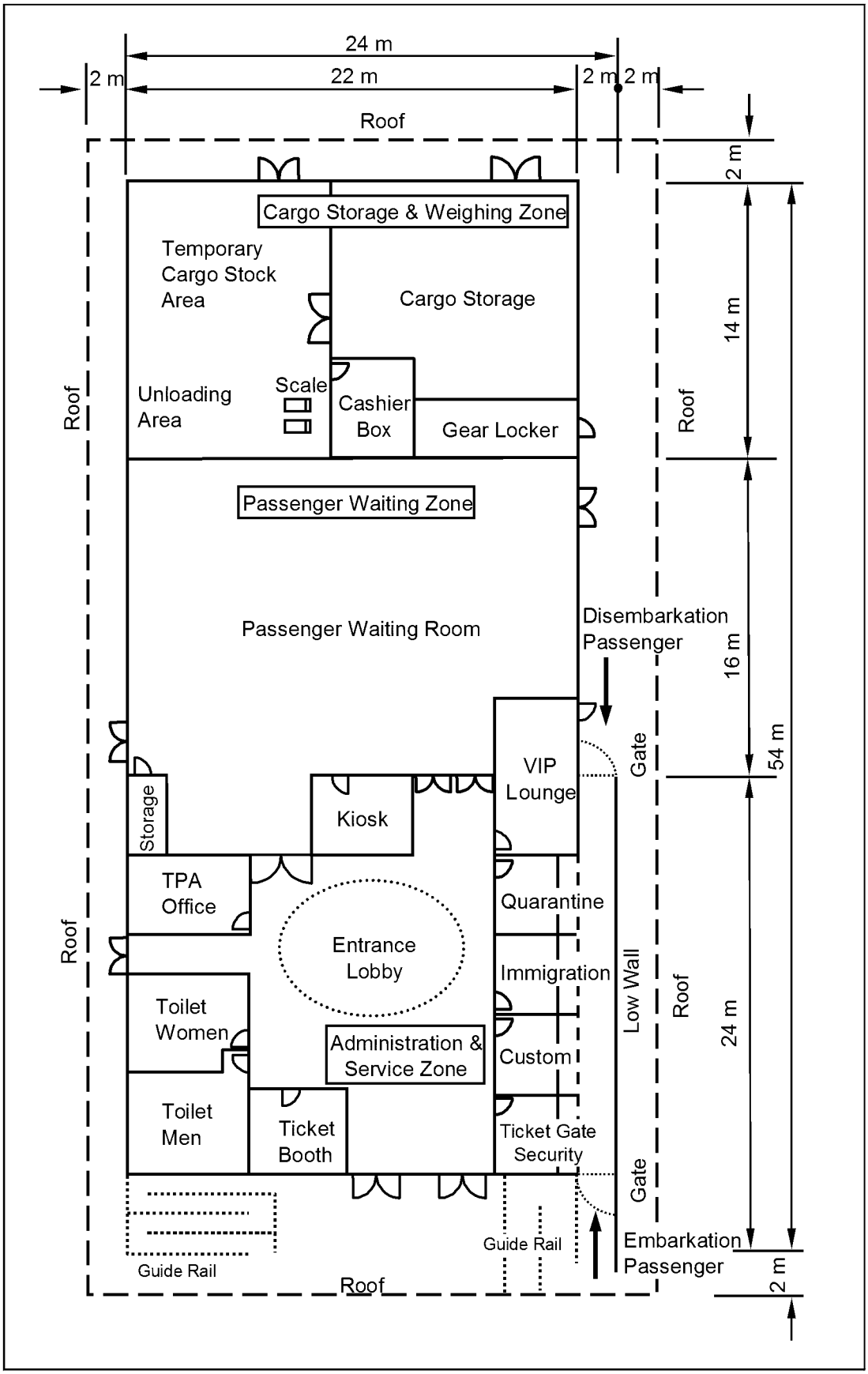


Figure 2.2.2.3-1 Layout Plan of Passenger Terminal Building

(7) Cross-Sectional Plan of Passenger Terminal Building

Construction works of Passenger Terminal Building shall be commenced at the time of completion of reclamation. Plate loading test is executed at the bottom face location (GL-900) and the bearing capacity of soil shall be confirmed. The height of footing beam is 900 mm. Slab-on-earth shall be applied to floor slab and the slab height shall be GL + 150 mm.

About more than 500 people tentatively use this building twice or so per month. At that time, officers for immigration use this building as the international port. As many people use, openings shall be installed at the both side walls of Passenger Terminal Building. The height of ceiling shall be set as 4,000 mm considering the heat load.

The roof shall be gable roof with folded plate and the method not to transfer roof heat to the space underneath by means of heat insulator attached to metal plates shall be applied as much as possible. Louvers shall be installed at gable side of the space under the roof where heat is discharged. The slope of roof can be lower as possible due to the metal roof (2.3/10).

(8) Structural Design Conditions

The structural design shall be accorded to Japanese Standards.

1) Seismic Force

Shearing force coefficient of seismic layer, Ci in Japanese Building Standards Act is defined as follows,

$$Ci = Z \cdot Rt \cdot Ai \cdot Co$$

- Z: Zonal coefficient according to the past record in the local area set up by Minister of Land, Infrastructure and Transport. (0.7 to 1.0)
- Rt: Numerical value calculated with the method setting up by Ministry of Land, Infrastructure and Transport depending on own natural period of building and soil features and it indicates vibration property of building. (1.0)
- Ai: Numerical value calculated with the method setting up by Ministry of Land, Infrastructure and Transport to indicate distribution direction of building height of seismic layer shearing force coefficient (1.0)
- Co: Standard Shearing Coefficient (more than 0.2)

With the above,

$Ci = 0.8 \times 1.0 \times 1.0 \times 0.2 = 0.16$

As the earthquake with the maximum Magnitude 6.8 were measured near the project site therefore, Z is set as 0.8 and the horizontal force against earthquake becomes $Ci \times W = 0.16\ W$.

2) Wind Force

Design wind force derived from Japanese Standards, in case of buildings with gable roof using the maximum height, 7.8 m of the existing buildings, the velocity pressure q shall be calculated as follows. Wind force (W) using 0.9 that is derived from the Table of Building Standards Acts is calculated as Structural plan of each facility is shown in Table 2.2.2.3-2.

$q = 60 \sqrt{7.8} = 167.60 \ (kgf/m^2)$

$W = 0.9 \times q = 150.84 \ (kgf/m^2) = 1,478.23 \ Pa \ (N/m^2)$

Table 2.2.2.3-2 Structural Plan of Each Facility

Facility	Foundation	Floor Slab	Column	Beam	Wall	Roof
Passenger Terminal Building	RC	RC	RC	S	CB	S
Septic Tank	RC	RC	RC	- - -	RC	- - -

Remarks: RC: Reinforced Concrete, CB: Concrete Block, S: Steel Structure

(9) Finishing Plan of Building Facility

Finishing plans of building facility are shown as follows.

1) Building Frame

Table 2.2.2.3-3 Finishing Plan of Building Frame

Location	Method
Foundation	Direct Foundation (Independent Footing Foundation)
Frame	Footing Beam, Columns: Reinforced Concrete
Wall Finish	Exterior: Concrete Block with t=200mm, Cement Mortar and AEP Paint
Roof	Steel Structures

2) Exterior Finish

Table 2.2.2.3-4 Finishing Plan of Exterior Works

Location	Finish
Roof	Folded Plate (Galvanized Steel Plate) H=150mm
Soffit	Cement Board and VE Paint Finish
Fascia Board	Wood, SOP Paint Finish
Exterior Wall	Concrete Block, Cement Mortar, AEP Paint
Opening Parts	Aluminum Window, Aluminum Door, Steel Door, Steel Shutter

3) Interior Finish

Table 2.2.2.3-5 Finishing Plan of Interior Works

Room	Finish		
	Ceiling	Wall	Floor
Ticket Gate and Security Booth	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
Immigration, Customs, Quarantine Booths	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
KPA and MSCL Offices	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
Passenger Waiting Lobby	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
VIP Lounge	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
Ticket Booth	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
Casher Box	Decorative Gypsum Board	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
KIOSK	Calcium Silicate Board and VE Finish	Cement Mortar with Emulsion Paint	Cement Mortar with Steel Trowel
Gear Locker	Calcium Silicate Board and VE Finish	Cement Mortar with Emulsion Paint	Cement Mortar with Hardener
Cargo Storage	No Ceiling	Cement Mortar with Emulsion Paint	Cement Mortar with Hardener
Toilet	Calcium Silicate Board and VE Finish	Blest Wall: Porcelain Tile Upper Wall: Cement Mortar with AEP Paint	Non-Slip Porcelain Tile

4) Finishing Plan of Sewage Treatment Tank

Table 2.2.2.3-6 Finishing Plan of Sewage Treatment Tank

Location	Method
Foundation	Direct Foundation
Frame	Reinforced Concrete
Wall	Reinforced Concrete
Upper Slab	Reinforced Concrete

(9) Electricity, Water Supply and Sewage

1) Electricity Facility

- Heavy Electrical Facility

3 phases power is installed to panel board for electric receiving & transforming in storeroom by ground burial from the south west side of project site and distributes to each facility after transformation. And, 3 phases shall be distributed to the panel board in berth for supplying to passenger ships. Lighting equipment shall be common shaped one and concerning outlet, single phase 230V that is rated voltage in Tanzania shall be installed.

Table 2.2.2.3-7 Necessary Electric Power Distribution

Facility	Electric Power
General Light and Outlets	9.0 KVA
Air Conditioners and Ventilations	12.0 KVA
Septic Tank	5.0 KVA
Water Supply and Drainage Pump	4.0 KVA
Total	30.0 KVA

- Light Electrical Facility

At present, cell-phone becomes widely used but fixed-line phone is also necessary to liaise with outside. And, from the necessity to exchange data among staff and secure communications through internet with outside, connection of telephone wire and LAN cable shall be considered to be installed in offices of stationing administration staff. The installation of telephone terminal, hard wiring of telephone and LAN are the obligation by the recipient country however the conduit piping work for these hard wirings shall be included in the project. And, automatic fire alarm shall be installed due to the purpose as passenger terminal building where general people is assembled.

2) Water Supply Facility

As tap water is supplied the water pressure from reservoir tank installed on the top of nearby mountain, the water pressure to be used in the project site is not deemed high enough. Considering that many people concentrated at the passenger terminal on a temporary base, water receiving tank shall be installed at the upper part of ticket booth nearby toilets of Passenger Terminal Building. Capacity of the receiving tank is set as10m^3 with the figure 7.7 / 0.8 = 9.625t.

Table 2.2.2.3-8 City Water Distribution and Quantity

Distribution to	Necessary Quantity
Passenger Ship	4.0 t/day
Toilet in Passenger Terminal	3.4 t/day
KIOSK	0.3 t/day
Total	7.7 t/day

3) Drainage Facility

There are 3 different discharging waters. Firstly, rainwater on roof goes to lake by ground burial pipes from berth through eaves gutter to down pipe. Secondary, sewage water shall be discharged to septic tank from toilet and it is effluent to lake after treatment. Thirdly, miscellaneous discharging waters from water closet of toilets and Kiosk shall be lead to septic tank together with sewage water.

"Operational Guideline on Design and Installation of Septic Tank" edited by Japan Conference of Building Administration gives the following calculation formula.

BOD and sewage quantity may be calculated by the following formula with following conditions,

In case of that public toilet, where number of users and utilization time are easily assumed and the sewage quantity is not met with the actual condition, such as boat racing course, horse race course, amusement park, bathing beach and other similar facilities, BOD and sewage quantity are allowed to be calculated with the following formula. And, calculated number of users shall not basically be reduced.

$nf = 0.0412 \times t \times p \times f$ ·····(a)

$n\mu = (0.216 + 0.325 / t) \times t \times p$ ·····(b)

where, t :Utilization time and sojourn time (hours/day) 3 hours
p :Number of users, number of visitors (person) 400 persons
f :Use factor of closet bowl (f = 0.5)
nf :Number of use of closet bowl (times/day)
nμ :Number of use of urinary (times/day)

- Quantity of Discharging Water to Septic Tank

I) Number of Use of Closet Bowl

$nf = 0.0412 \times t \times p \times f$

$= 0.0412 \times 3\ hr \times 400\ persons \times 0.5$

$= 24.72 \fallingdotseq 25\ times$

Ii) Number of Use of Urinary

$n\mu = (0.216 + (0.325 / t) \times t \times p$

$= (0.216 + (0.325 / 3\ hr)) \times 3\ hrs \times 400\ persons$

$= 389.2 \fallingdotseq 390\ times$

iii) Quantity of Water Used in Toilet

Water consumption of toilet is calculated on the basis of 13 litters/time for closet bowl and 6 litters/time for urinary.

Closet Bowl :25 times x 13 L =325 L
Urinary :390 times x 6 L = 2,340 L

Design water volume is set as the water volume of closet and urinary, with considering the safety factor 20%.

(325 + 2,340) x 1.2 = 3,198 L/day

And miscellaneous water consumption from washing basin at KIOSK is included as
20 times x 5 L = 100 L and add to the above,

Total Quantity of Water = 3,198 + 100 $\fallingdotseq$ 3,298 L /day $\fallingdotseq$ 3.3m^3 / day

Water quantity using in Passenger Terminal Building can be considered to be 3.298m^3/day and the treatment capacity of septic tank shall be 3.30m^3/day since this quantity goes to the septic tank.

- Density of BOD

The density of BOD of discharged water being effluent to the septic tank shall use 260 mg/L that is the figure used for public toilet. And as BOD value is defined as 25 mg/L as the discharging water standard in Tanzania. With the above and the following specifications, the design of septic tank shall be made.

Table 2.2.2.3-9 Treatment Capacity of Septic Tank

Quantity of Sewage Water into Septic Tank	3.30 m^3
BOD Inflow Density	260 mg/L
BOD Outflow Density	25 mg/L

2) Installation of Utility

Installation of utilities and equipment to each room at the Passenger Terminal Building is as shown in Table 2.2.2.3-10.

Table 2.2.2.3-10 Equipment List of for Passenger Terminal Building

Room Name	Outlet	3-ph. Power	Phone	LAN	Water	Ventila Tion	Air Con.	Lumi nance
Ticket Gate & Security	○		○	○		○	○	400
Immigration, Customs & Quarantine Booths	○		○	○		○	○	400
TPA Offices	○		○	○		○	○	400
Passenger Waiting Room	○					○		300
VIP Lounge	○		○	○		○	○	300
Ticket Booth	○		○	○		○	○	400
Casher Box	○		○	○		○	○	400
Kiosk	○		○		○	○	○	300
Gear Locker	○							200
Cargo Storage	○							200
Toilet	○				○	○		200
Berth		○			○			

Remark: Only installing work of piping for Telephone and LAN by Japan side

(10) Construction Machinery and Equipment Plan of Passenger Terminal Building

Construction machineries and Equipment to be used for Passenger terminal building are as follows.

- Backhoe to be used for loading excavated soil onto truck and the backfilling ($0.8m^3$)
- Dump truck to be used for transportation of excavated soil (10t)
- Truck crane to be used for lifting up of metal roof materials (20t), erection of steel structures (25t)
- Tamper to be used at the time of backfilling (60 to 100kg)
- Water pump to be used for discharging rain water from the pit until the backfilling is completed (4inch)
- Concrete bucket to be used at the time of concreting ($1.0m^3$)

2-2-2-4 Project Outline

The summary of facilities to be improved by this project is as shown in Table 2.2.2.4-1 to 3. And, the summary of plane layout for berth facility and land facility on passenger wharf is shown in Figure 2.2.2.4-1.

(1) Passenger Wharf

Table 2.2.2.4-1 Outline of Passenger Wharf

Facility	Particulars	Project Plan
East Berth	Target Ship Extension Water Depth	Passenger Ship 130m DL -5.0m
North Berth	Target Ship Extension Water Depth Ancillary Facility	Small Boats and Ships 50m Existing Water Depth Stairway for Small Boats
Wharf Area	Extension Wharf Area Additional Facility Ancillary of Wharf	130m × 50m 6,500m^2 Beacon, Security Light Fender and Bollard

(2) Access Road

Table 2.2.2.4-2 Outline of Access Road

Facility	Particulars	Project Plan
Access Road	Extension Width	481m Paving Width 7.0m Traffic Lane 5.5m (2 Lanes), Shoulder 0.75m (Both Sides)
Open Space	Area	949m^2

(3) Passenger Terminal Building

Table 2.2.2.4-3 Outline of Passenger Terminal Building

Facility	Particulars	Project Plan
Administration & Service Zone	CIQ Booths Ticketing & Security Ticket Booth Administration Office KIOSK Toilets Entrance Lobby Storage Floor Area	4m x 4m= 16m^2, 3 Booths 4m x 4m= 16m^2, 1 Booth 4m x 5m= 20m^2, 1 Booth 6m x 4m= 24m^2, 1 Rooms 5m x 4m= 20m^2, 1 Room 5m x 6m= 30m^2, 2 Rooms(Male & Female) 40 person w/ Bench 4m x 2m= 8m^2, 1 Room 24m x 22m= 484.8m^2
Passenger Waiting Zone	Passenger Waiting Room VIP Lounge Floor Area	363.2m^2 (360 Person Capacity) 4m x 8m= 32m^2 (20 Person Capacity) 395.2m^2
Weighing & Storage Zone	Cashier Box Scale Space Temp. Cargo Stock Space Cargo Storage Gear Locker Floor Area	5m x 4m= 20m^2 5m x 4m= 20m^2 9m x 10m + 5m x 6m= 120m^2 11m x 8m + 9m x 4m= 124m^2 3m x 8m= 24m^2 14m x 22m= 308m^2
Total Floor Area		54m x 24m= 1,296m^2

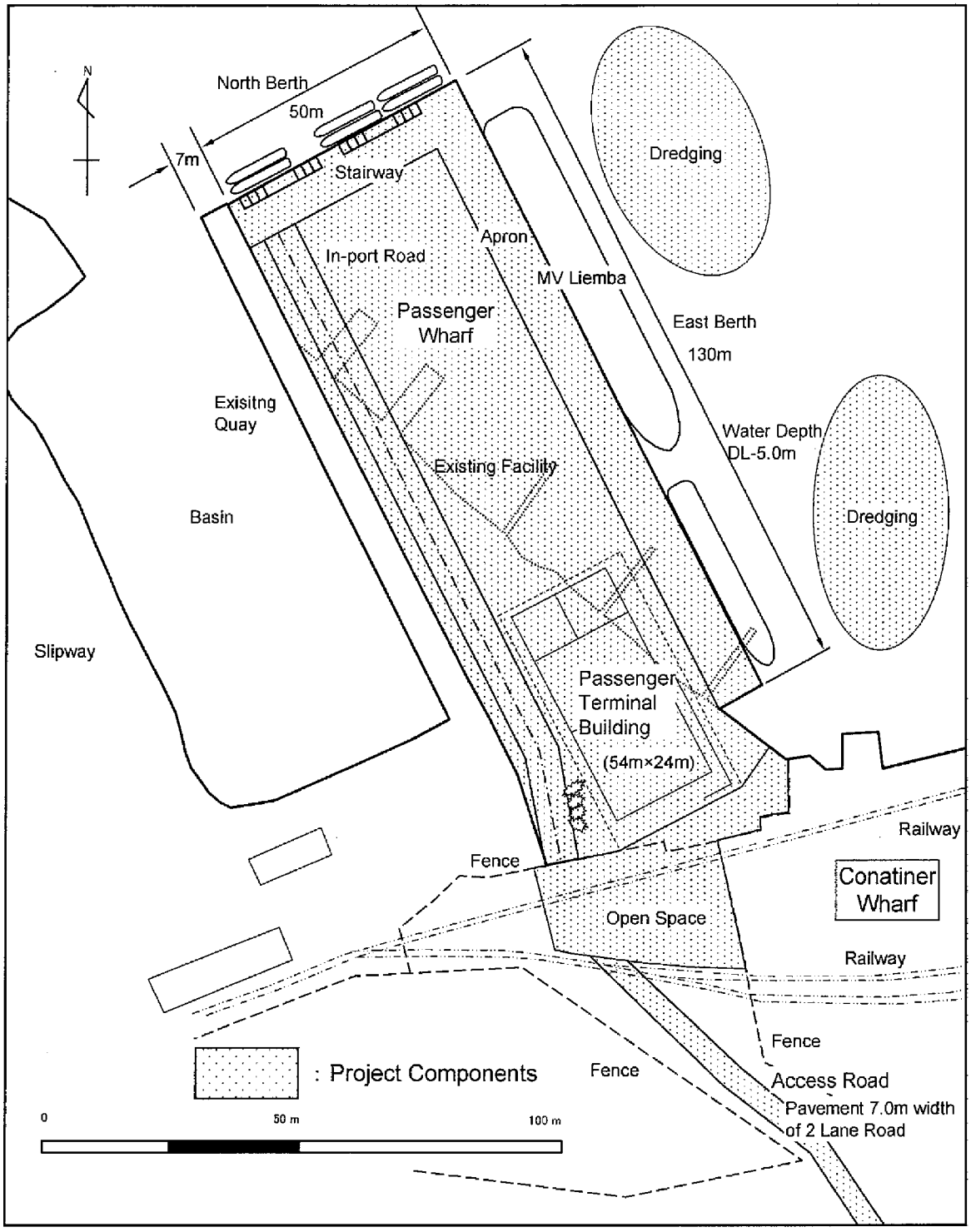


Figure 2.2.2.4-1 Layout Plan of Passenger Wharf

2-2-3 Outline Design Drawing

Drawings of facilities included in the project are shown as follows.

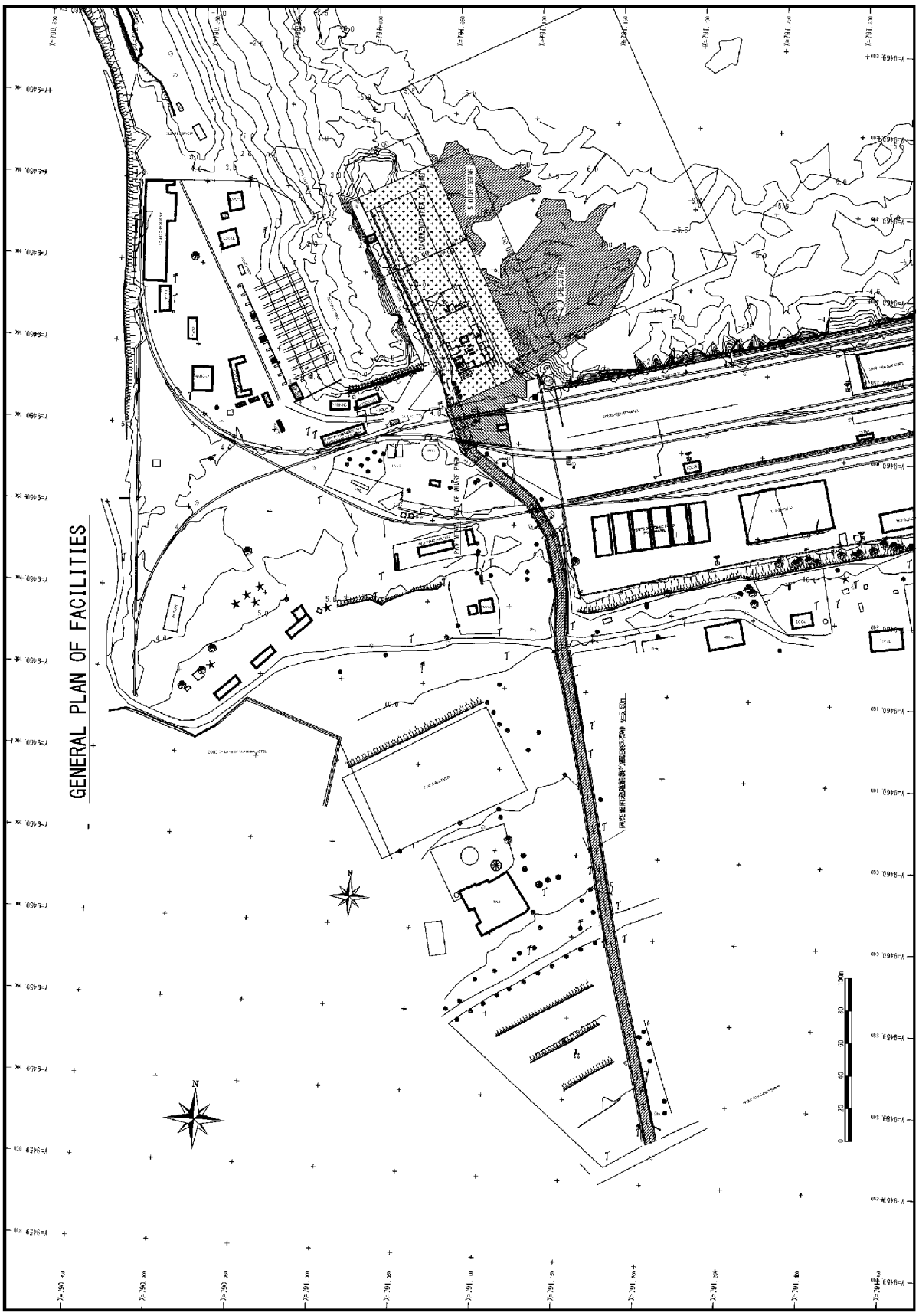


Figure 2.2.3-1 General Layout Plan

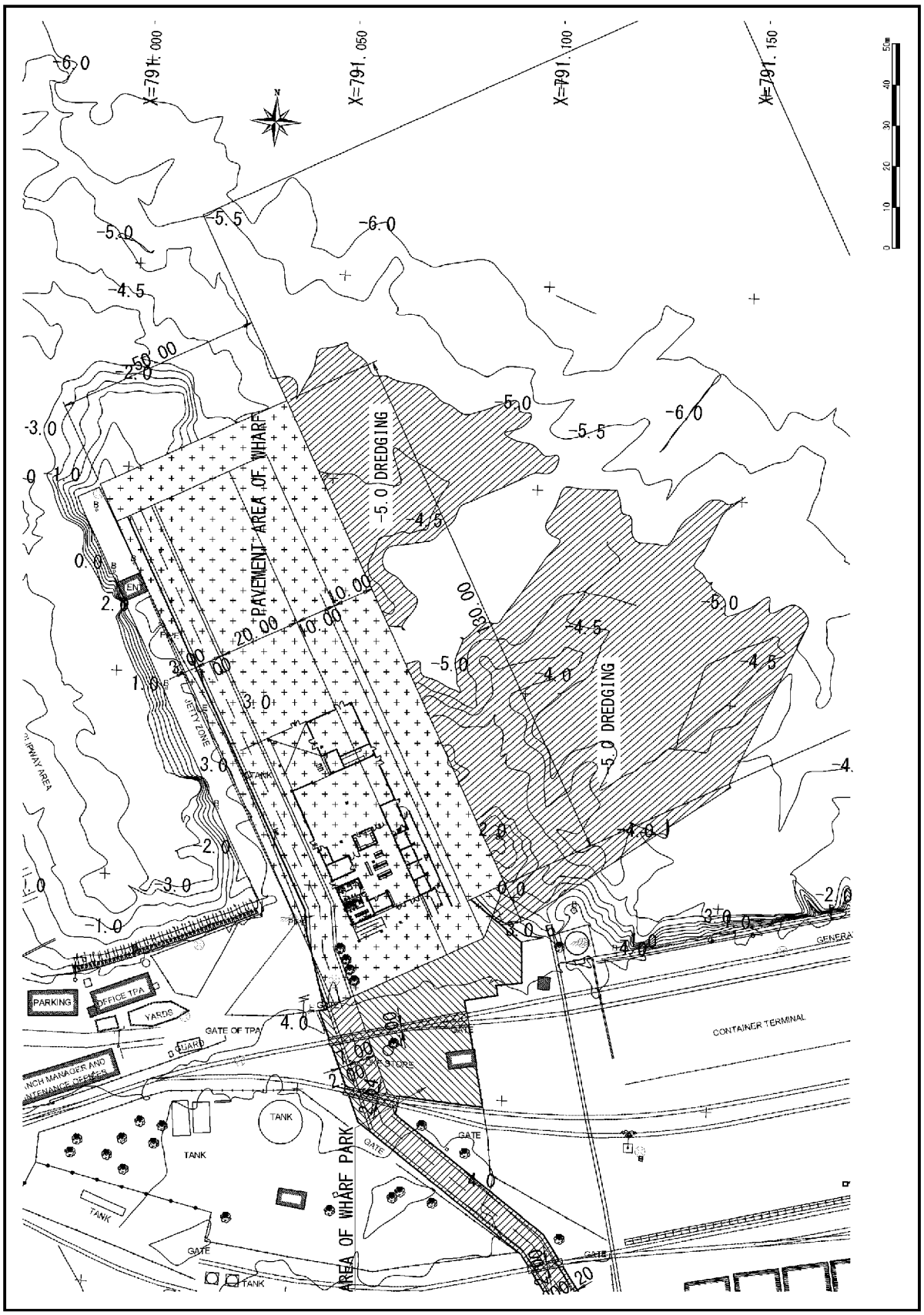


Figure 2.2.3-2 Detail Layout Plan of Passenger Wharf

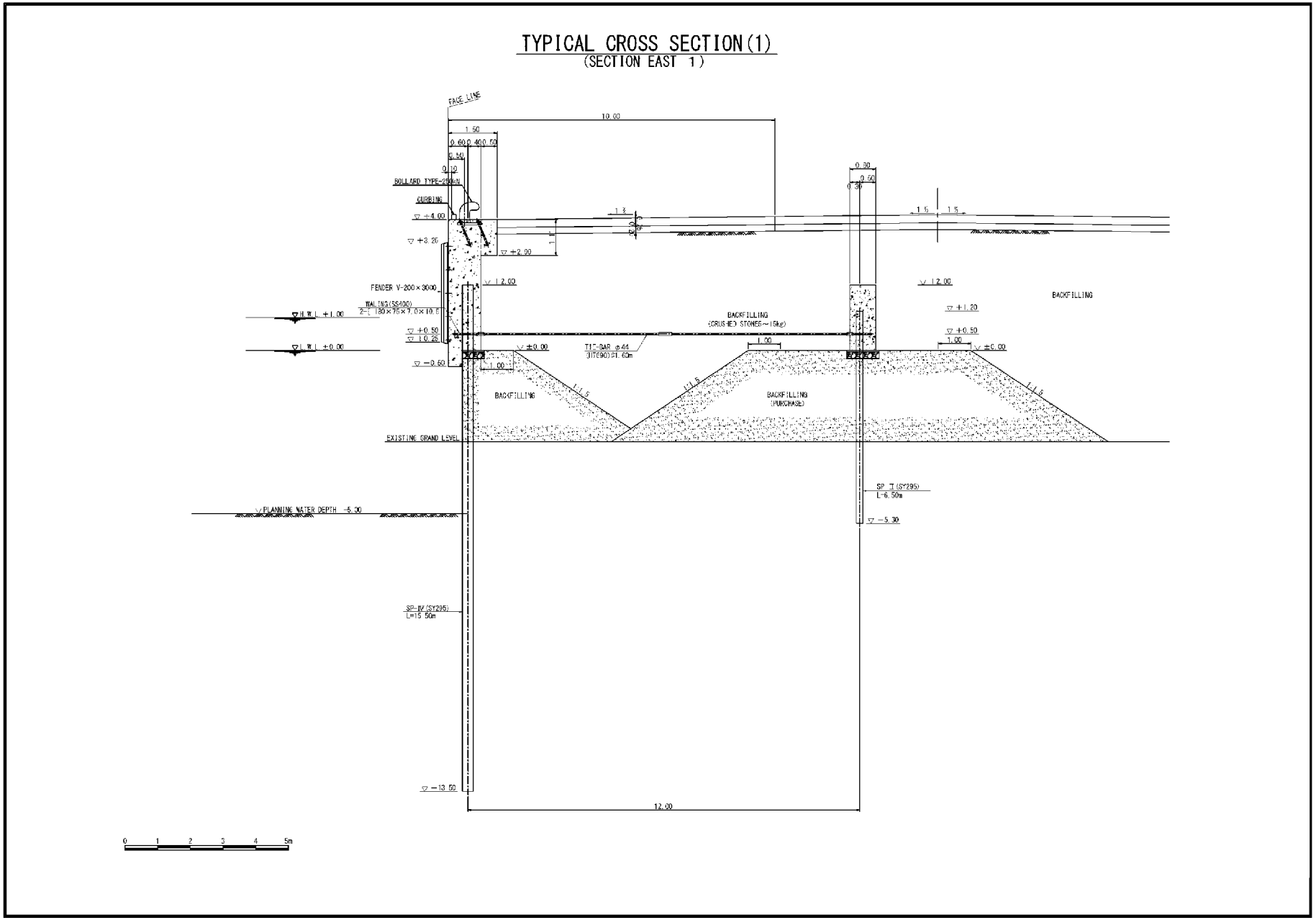


Figure 2.2.3-3 Cross Section of East Berth

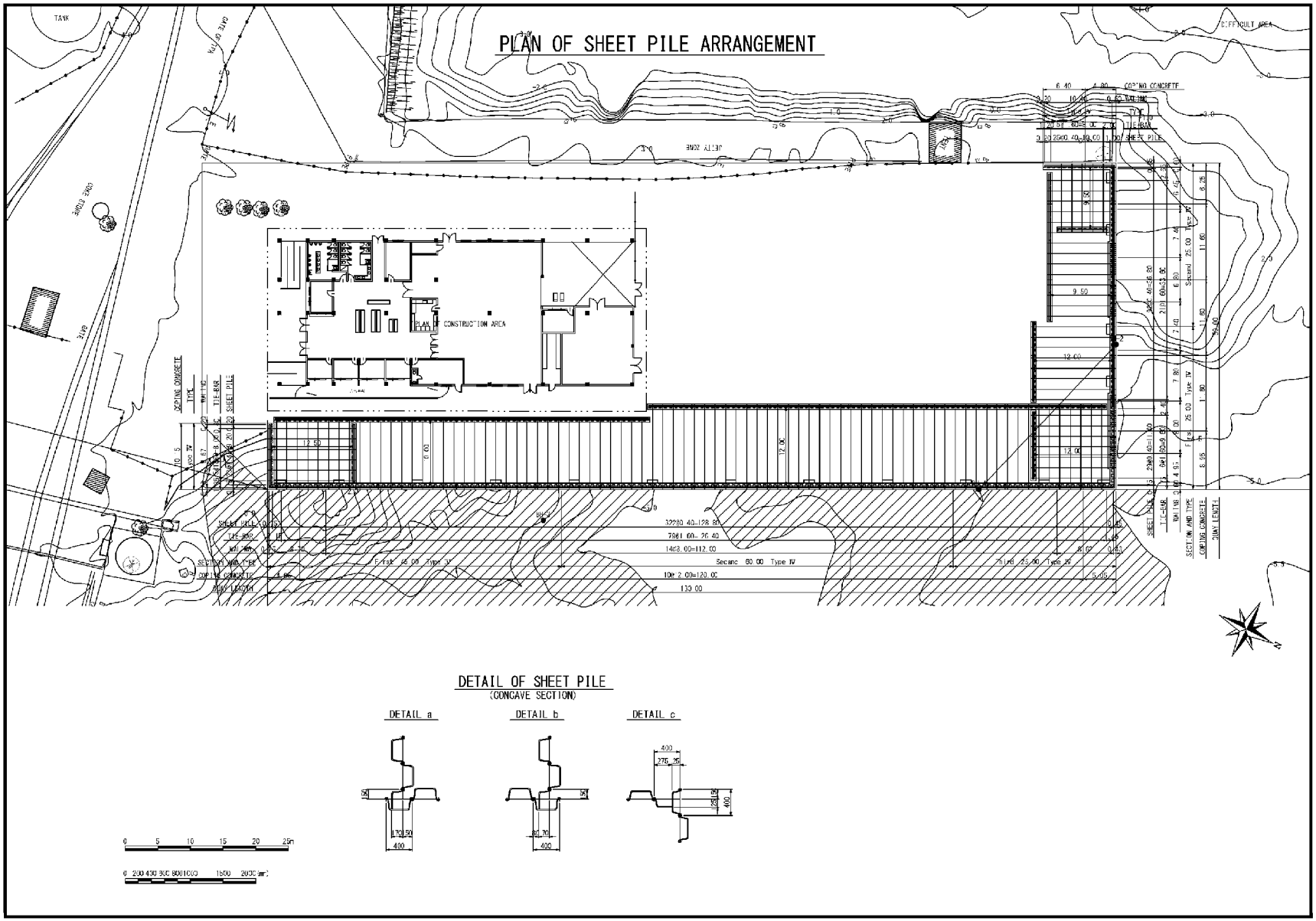


Figure 2.2.3-4 Plan of Sheet Pile Arrangement

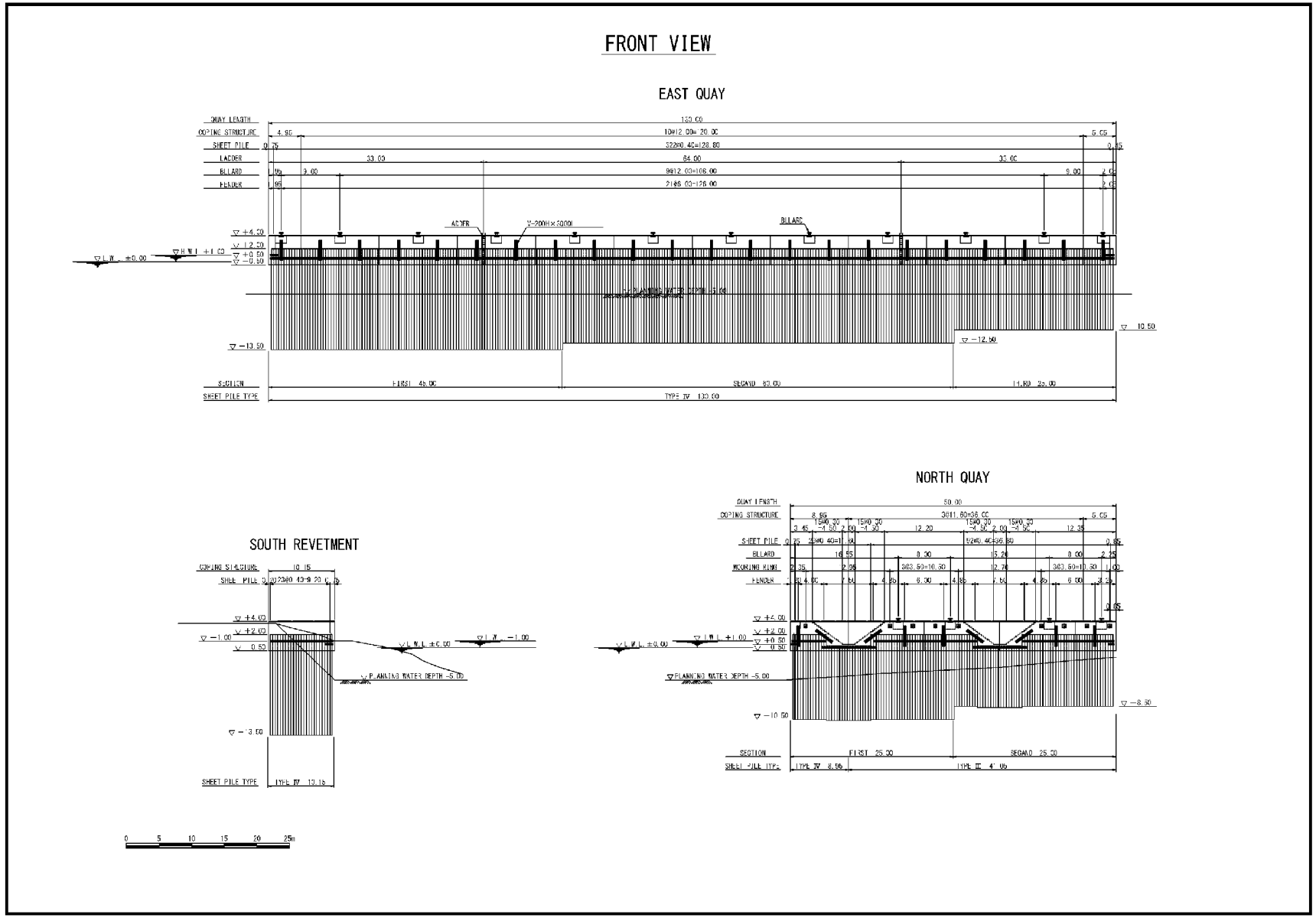


Figure 2.2.3-5 Front View of East Berth

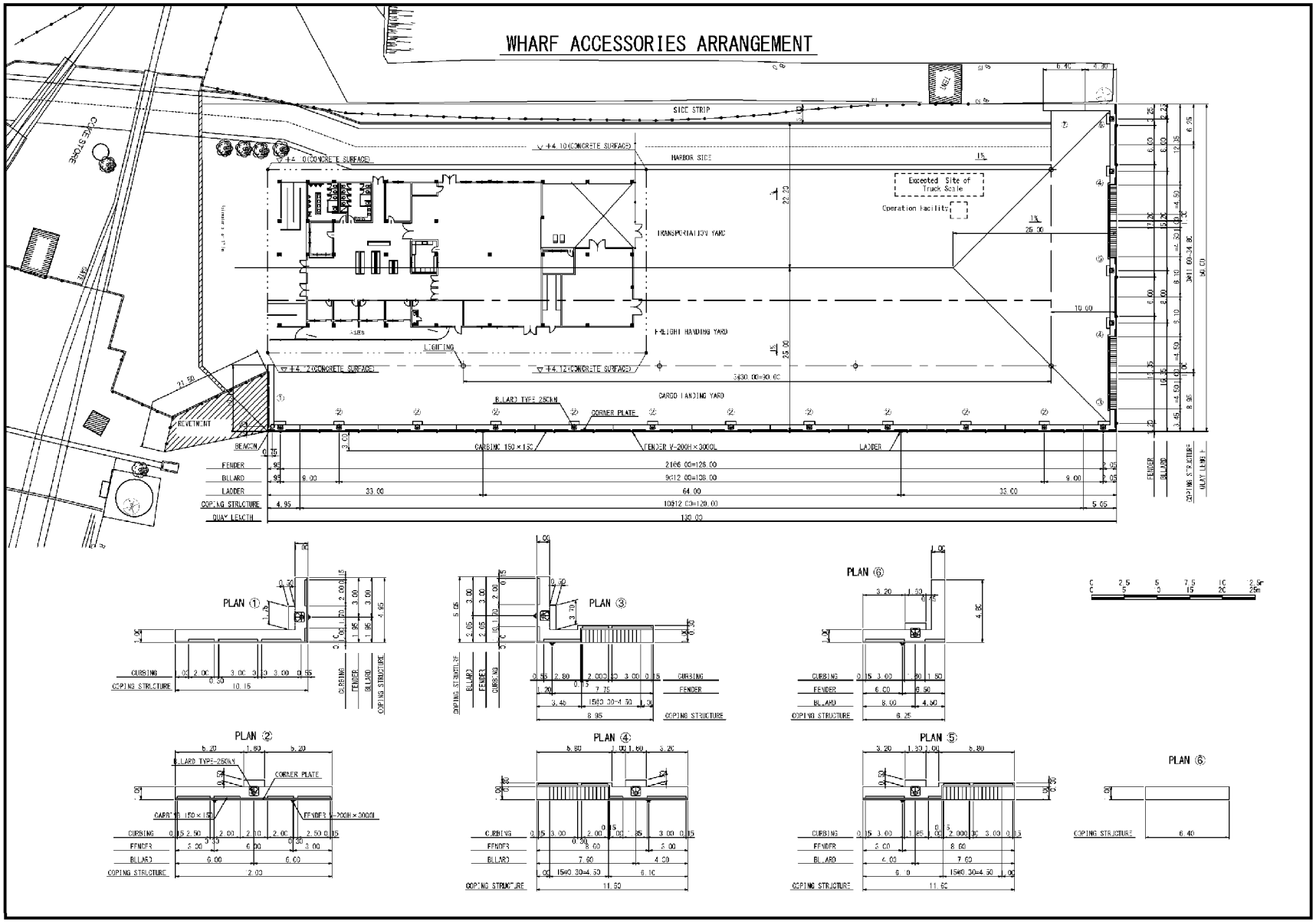


Figure 2.2.3-6 Wharf Accessories Arrangement

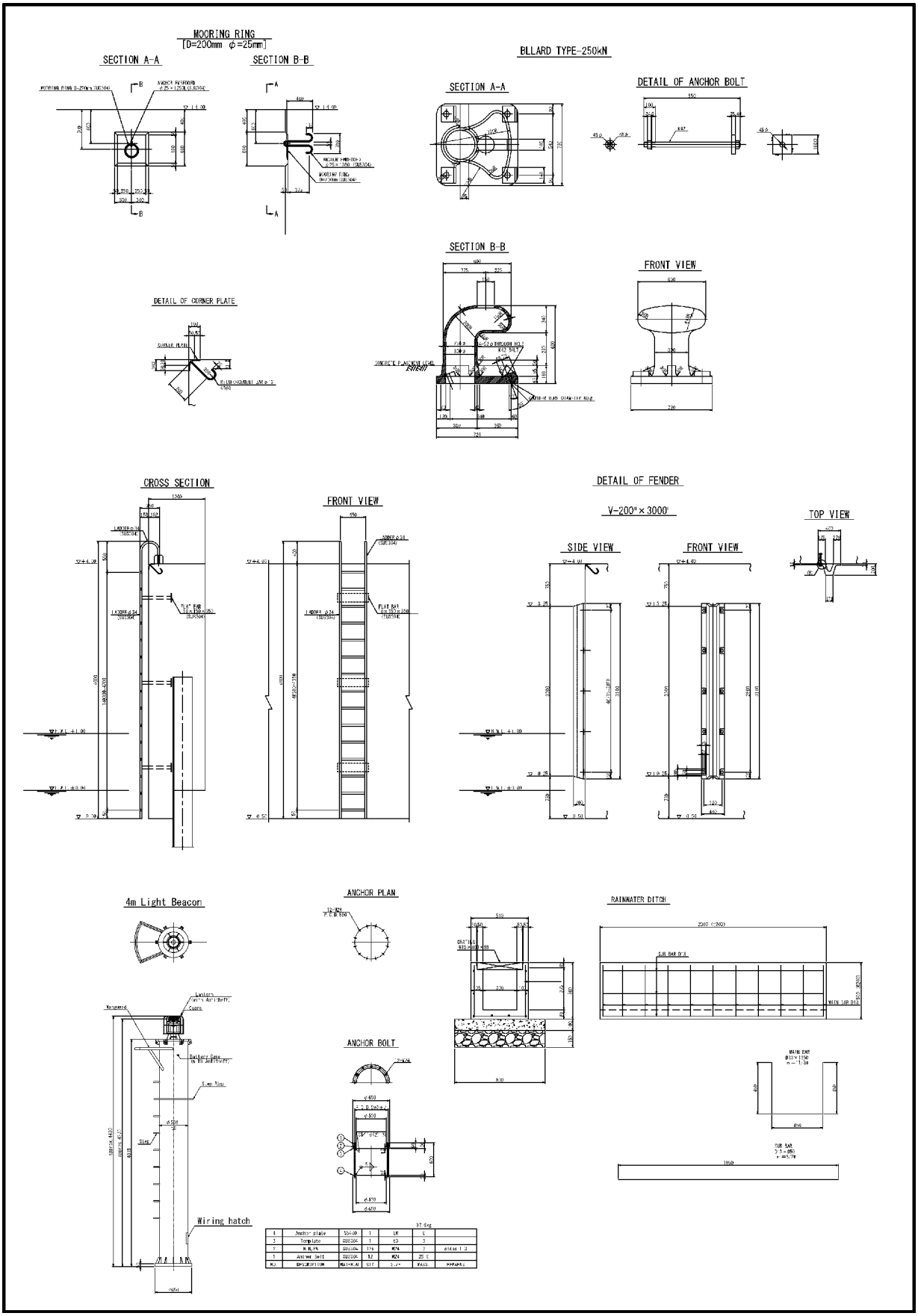


Figure 2.2.3-7 Details of Wharf Accessories

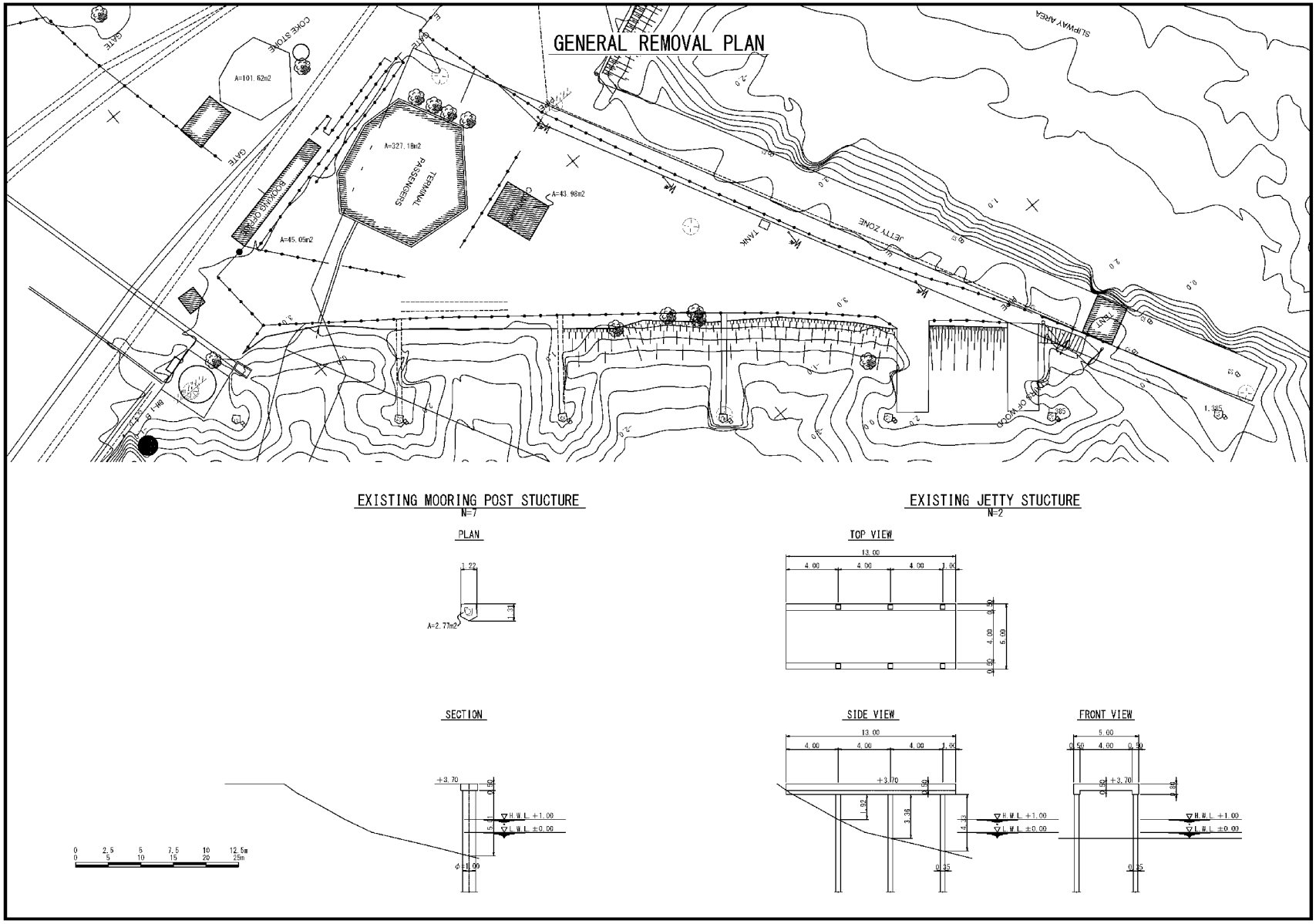


Figure 2.2.3-8 General Removal Plan of Existing Facilities

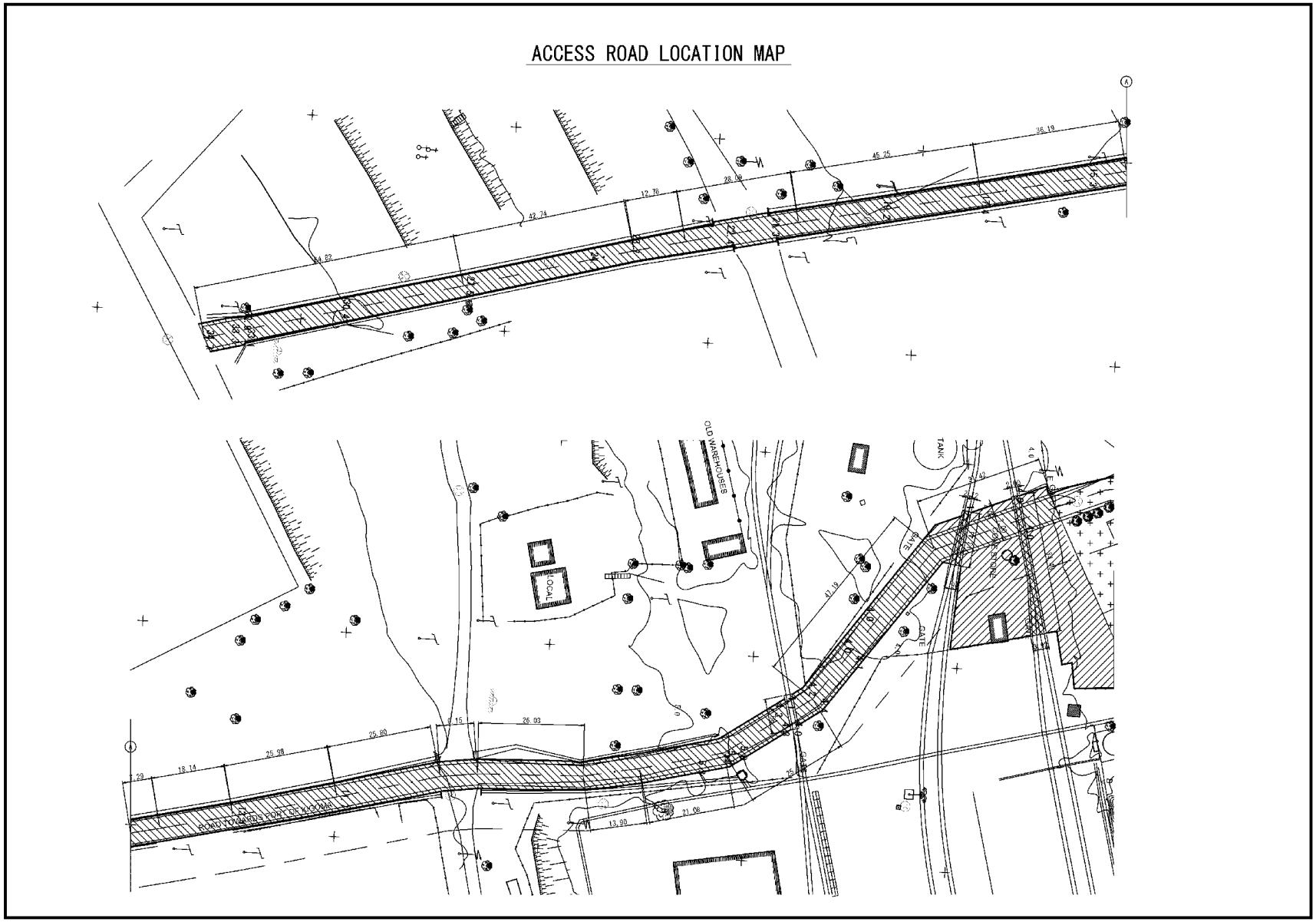


Figure 2.2.3-9　Access Road Location Map

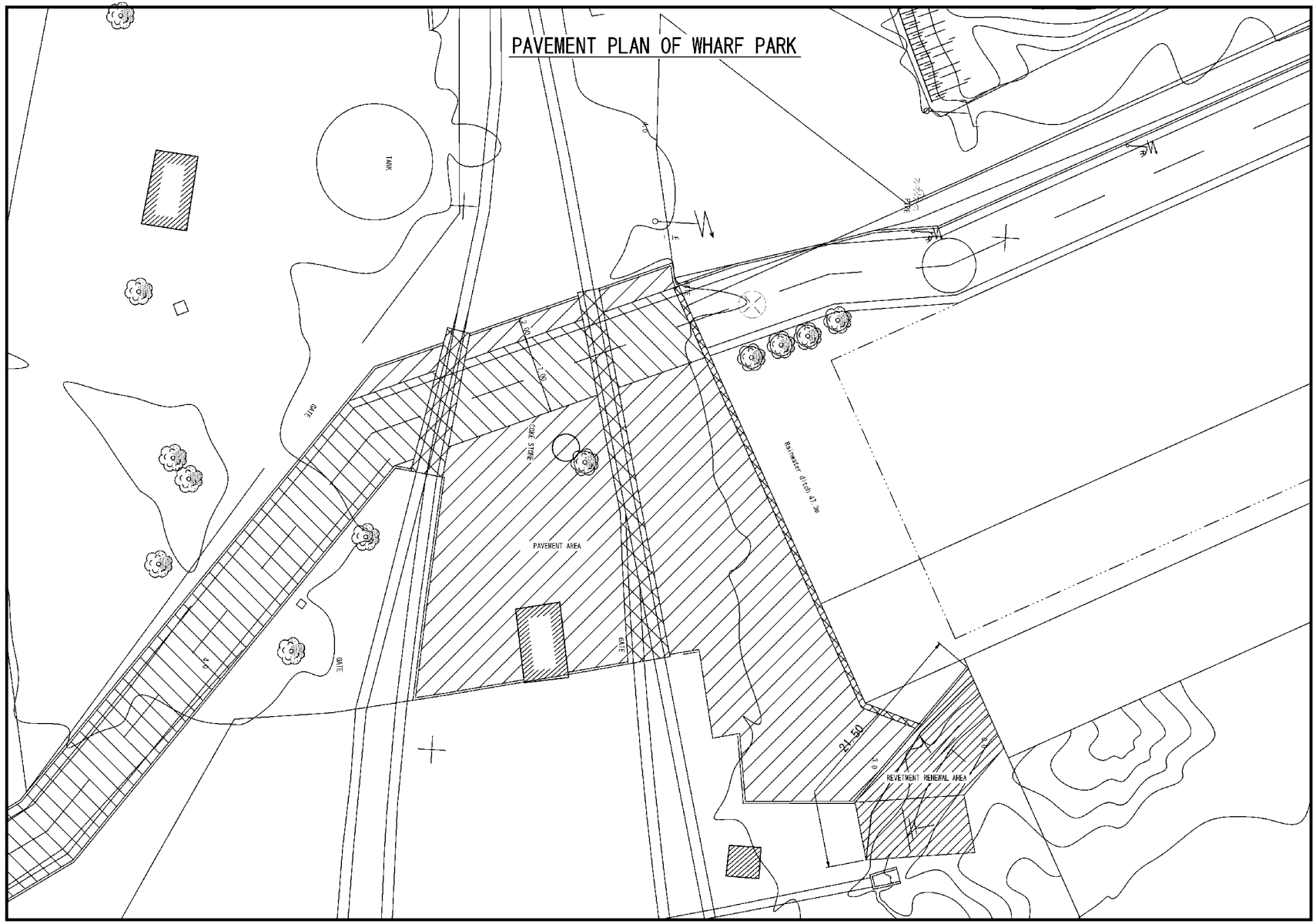


Figure 2.2.3-10 Pavement Plan of Wharf Park

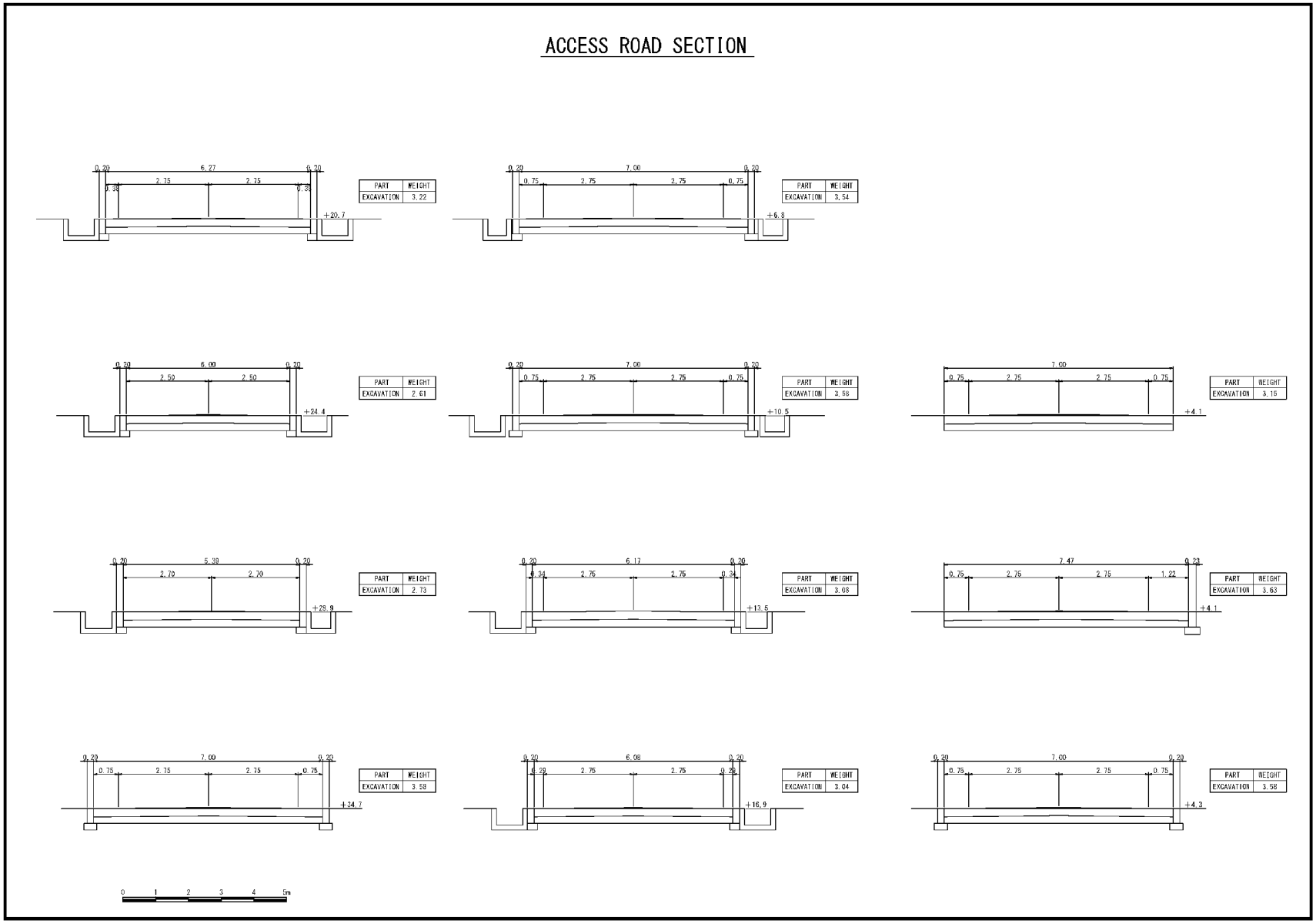


Figure 2.2.3-11 Access Road Section

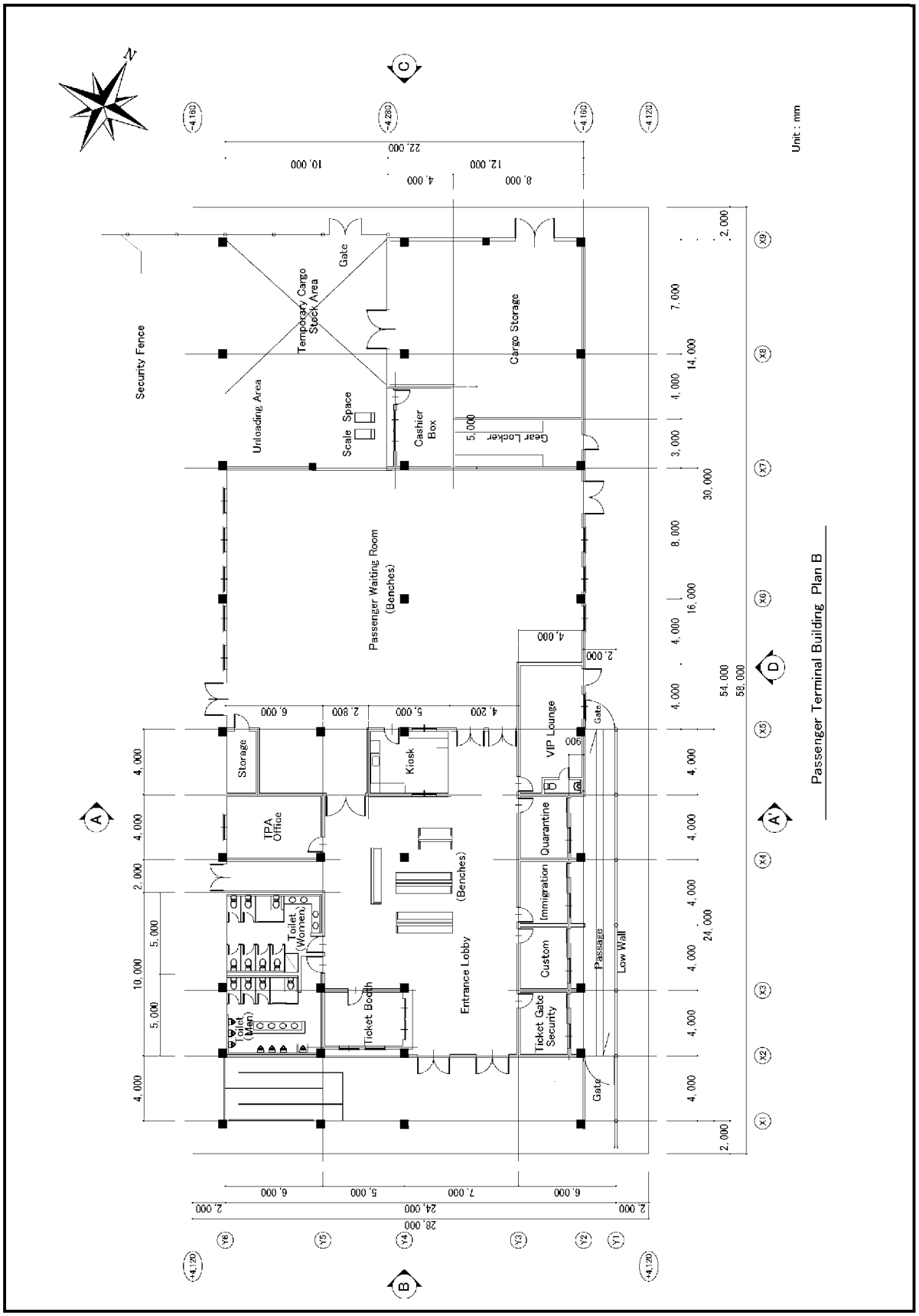


Figure 2.2.3-12 Layout Plan of Passenger Terminal Building

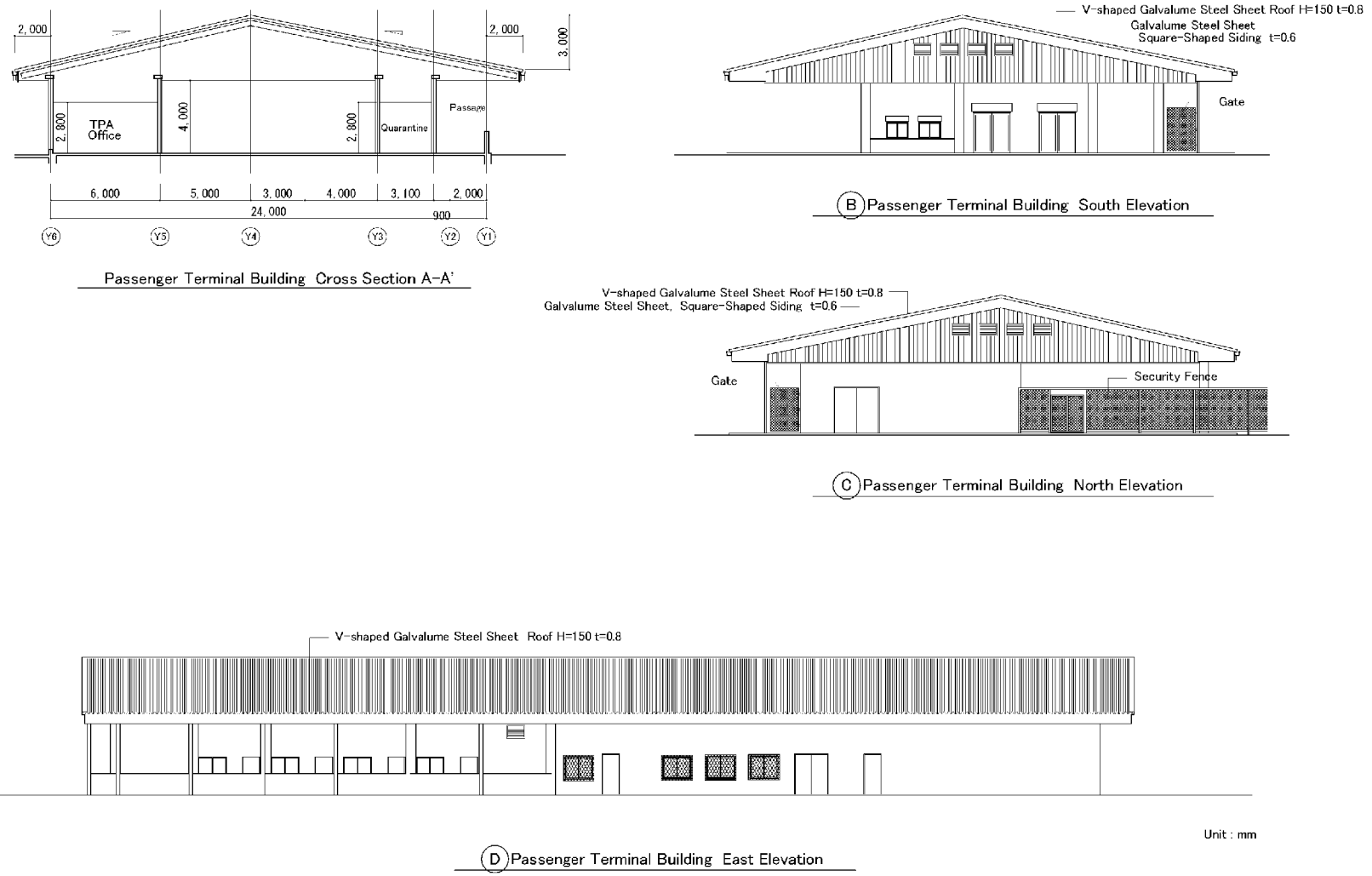


Figure 2.2.3-13 Elevation Plan of Passenger Terminal Building

2-2-4 Construction Plan and Procurement Plan

2-2-4-1 Construction Policy and Procurement Policy

(1) Basic Understandings Concerning Construction and Procurement

1) Basic Information for Construction

a) Domestic Construction Condition of Tanzania

i) Both local contractor and overseas base contractor are required to register for the Business License and CRB (Contractors Registration Board) Registration when construction is done in Tanzania. Registered contractor to CRB is sectioned with architectural one and civil one and divided into Class-1 to 7 depending on the business scale. Contractor ranked as Class-1 is large scale contractor that has no limitation of contract amount. Contractor of Class-7 can not construct a building more than 2 stories.

ii) Local contractors (main offices) ranked as Class-1 to 3 of CRB registration get centered on Dar es Salaam city. There exist contractors to have experiences of projects that are mainly for road and bridge implemented by TANROAD under the Japanese Grant Aid Cooperation.

iii) Local contractors in Tanzania have no experiences for marine and coast constructions such as port and harbor as a prime contractor.

Table 2.2.4.1-1 Rank of Domestic Contractor

Class	Class Limit for Any Single Contract (in Million Tsh.)		
	Civil	Building	Mechanical
1	Unlimited	Unlimited	Unlimited
2	5,000	3,000	2,000
3	3,000	2,200	1,200
4	1,500	1,200	600
5	750	600	300
6	300	200	150
7	150	120*	75

Source: Contractors Registration Board

b) Construction Condition around Kigoma

i) There are 7 registered contractors in Kigoma but their business scales are small ranked as Class-5 to 7 and mainly work for clay pavement, aggregate pavement and brick masonry of flat house in Kigoma. Especially, contractors who belong to Class-7 can not work for other than flat building.

ii) The number of registered engineer to ERB of local contractors registered in Kigoma is about one to two or alike and employ experts and labors for each project.

iii) In case of large scale construction, local contractors or overseas based contractors (contractors from China or Korea) registered in major city like Dar es Salaam are executing construction works for roads and bridges.

iv) Road pavement construction works from Kigoma to Tabora, comprising the funds of Tanzania for 30 km from Kigoma to Kidahwe, Saudi Arabia for 65 km from Kidahwe to Uvinza, U.A.E for 65 km from Uvinza to Malagarasi bridge and Korea for 48 km from Malagarasi bridge to Nguruka.

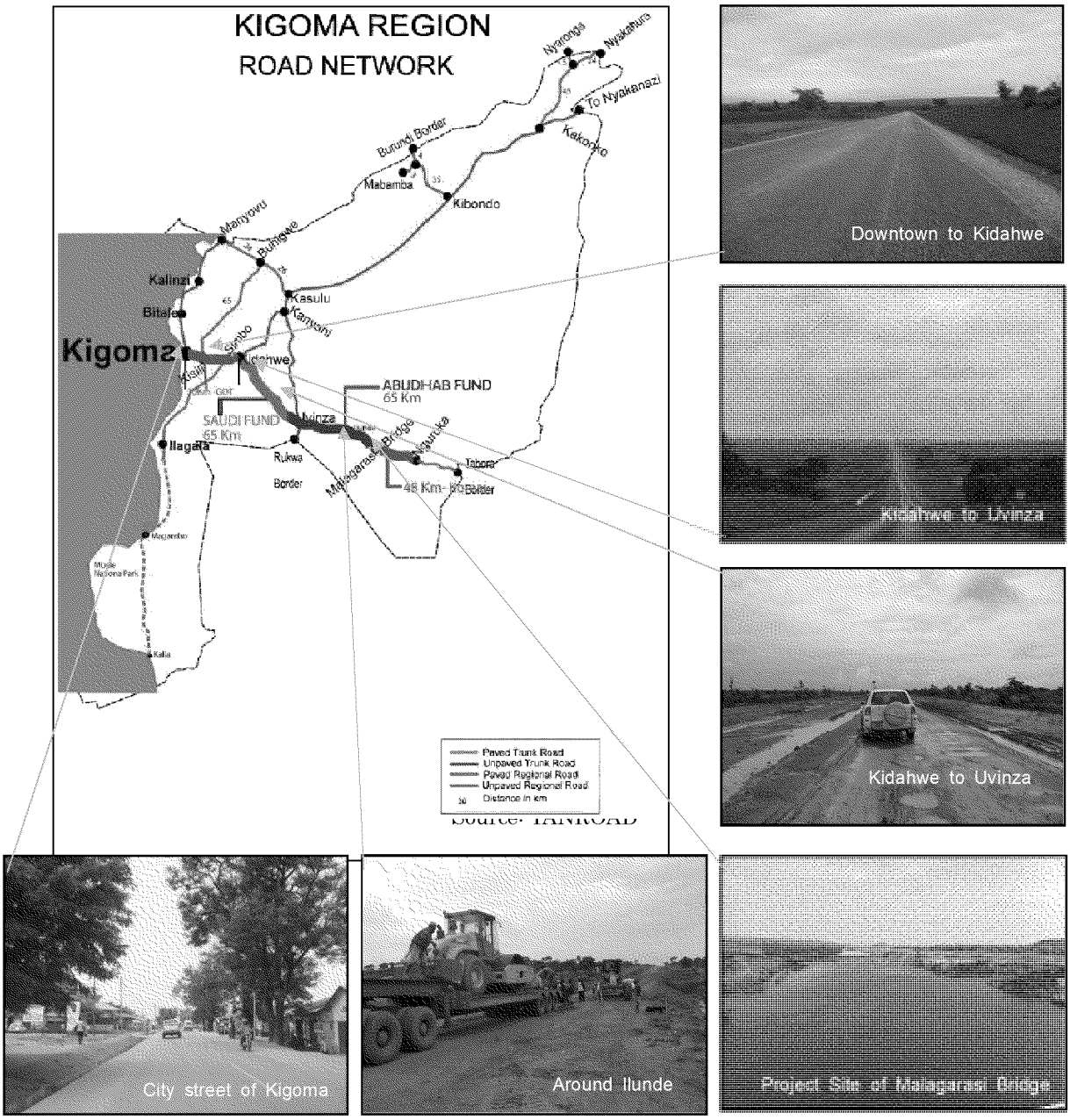


Figure 2.2.4.1-1 Road Projects Implemented in Kigoma

2) Information Concerning Procurement

a) Local Procurement Condition in Tanzania

i) Contractors and construction material suppliers get centered along Light Industrial Area in Dar es Salaam and Nyerere Road near Julius Nyerere Airport.

ii) General machinery to be used for road construction and building construction is comparatively easy to procure in Dar es Salaam. However, it is difficult to find crawler crane more than the hoisting capacity of 40 ton or pile driving machine that are large size construction machines.

iii) General construction material like cement, aggregate, reinforcing steel bar, forming material, interior and exterior materials for building construction and etc. is possible to procure in Dar

es Salaam, but volume retailer is a few.

iv) Cement company or aggregate (quarry) are in Arusha or Tanga near Kilimanjaro and supply to Dar es Salaam as well. There are three cement companies named SIMBA Cement, TWIGA Cement and TEMBO Cement. Especially, as SIMBA Cement Company exports to Rwanda and Burundi near Kigoma, it is possible to be procured for Kigoma.

v) Dar es Salaam Port has a problem of offshore waiting of calling container ships due to congestion caused by shallow water depth and small number of exclusive berths for container ships as shown on Photo 3.2.4.1-1. The efficiency to some extent was made by newly installation of cargo handling machineries and now it has been resolved to the situation of about two weeks waiting.

vi) There are means of railway transport and inland truck transport in case that construction machineries and construction materials transport from Dar es Salaam to Kigoma. As the railway transportation is heavily influenced by flood in rainy season as shown on Photo 3.2.4.1-2, 3, the operation organization, Tanzania Railways Limited (TRL) has no fixed cargo transport schedule. Road is also influenced by flood in rainy season however, local transportation companies and contractors now stand to use land roads where bypassing is available.

vii) Transportation distance from Dar es Salaam to Kigoma is approx. 1,600km as shown on Figure 2.2.4.1-2, taking 3 days in case of transportation by common vehicles. However, the cargo transportation period needs 10 days for container transportation and 14 days for the transportation of construction machineries. The reasons that cargo transportation needs more time comparing with common vehicles are as follows.

a. Application to Ministry of Construction or TRANROAD by the rules of road transportation (Section 114 (1) of The Road Traffic Act) to protect damages of existing road.

b. There exists restriction of speed and prohibition of night traffic.

c. Vehicles have to pass 7 weigh bridges to Kigoma. Further more, escort policeman or armed security guard is compulsory when passing forest zone from Isaka in Shingaya to Kigoma near the border of Burundi. (hearing from local transportation company)

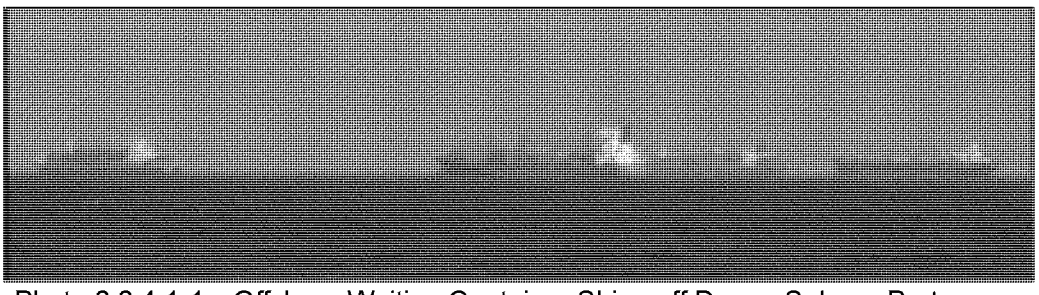


Photo 2.2.4.1-1 Offshore Waiting Container Ships off Dar es Salaam Port

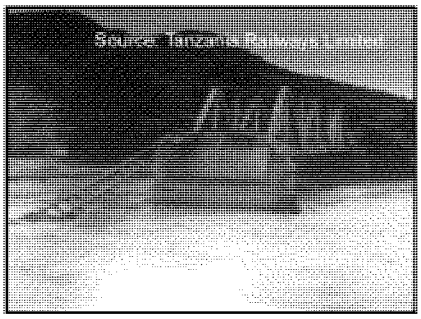


Photo 2.2.4.1-2 Destruction of Railway Bridge near Tabora

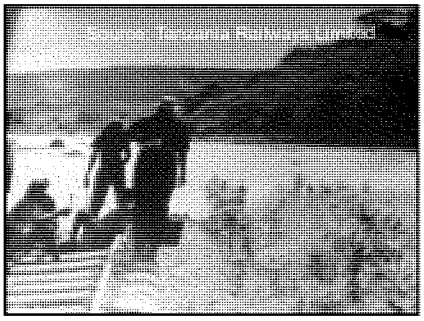


Photo 2.2.4.1-3 Flood near Dodoma

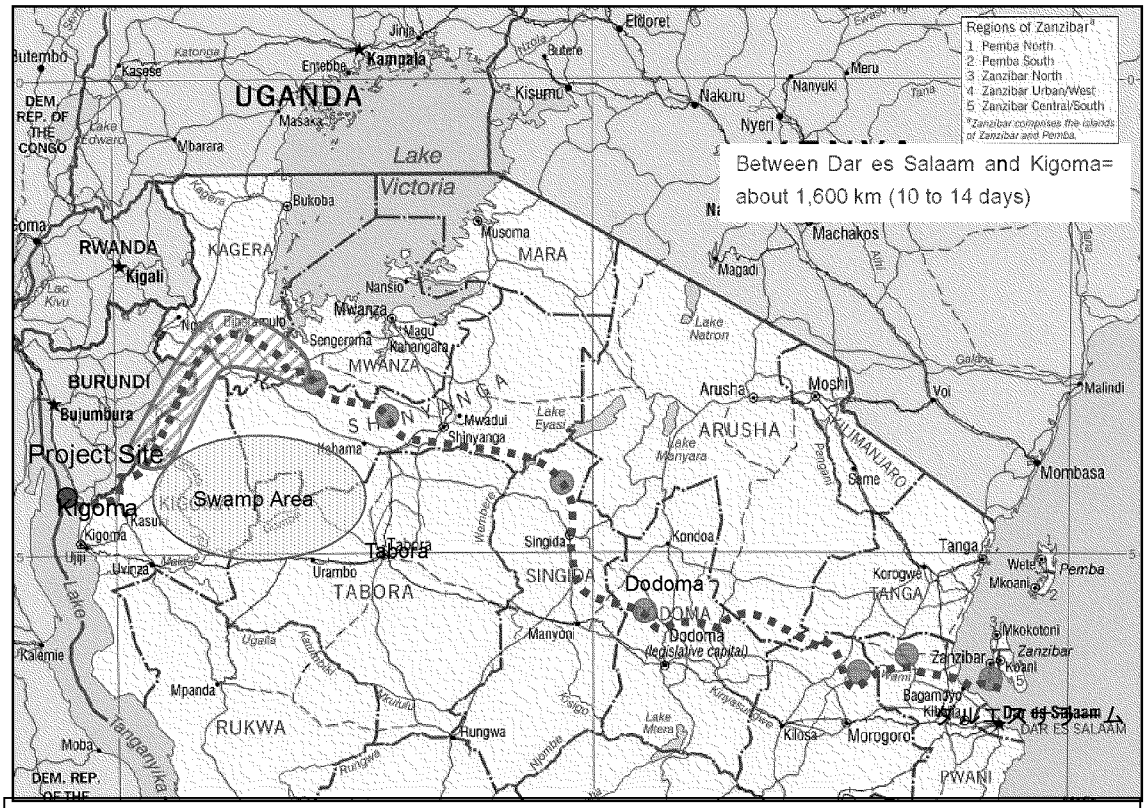


Figure 2.2.4.1-2 Road Transport Route between Dar es Salaam and Kigoma

b) Procurement Condition around Kigoma

i) There is only one company which is executing construction work at this moment. Although several companies own construction machineries, they are almost scrap machineries by out of order or aging. And, no concrete plant nor asphalt plant exist around project site. It is also difficult to procure barge being necessary for marine works.

ii) Although building material supply shops where piping material, electric wires, bricks, blocks and etc. are available but they are all small shops. Construction materials for this project considering supply capacity shall be procured from Dar es Salaam.

iii) Aggregate can be procured from 2 quarries along Malagarasi river. One is in Ilagala district at river mouth of Malagarasi river where is 60 km off from the project site and another one is around Ilunde district located at upper steam of Malagarasi river where is 150 km off from the project site. The quarry at Ilagala district is owned by local construction company and the one at Ilunde district is owned by Chinese construction company which works for road and bridge construction works. Access roads to the project site for both quarries are unpaved and especially, Ilunde one is far way from the project site and the transportation needs about 5 hours.

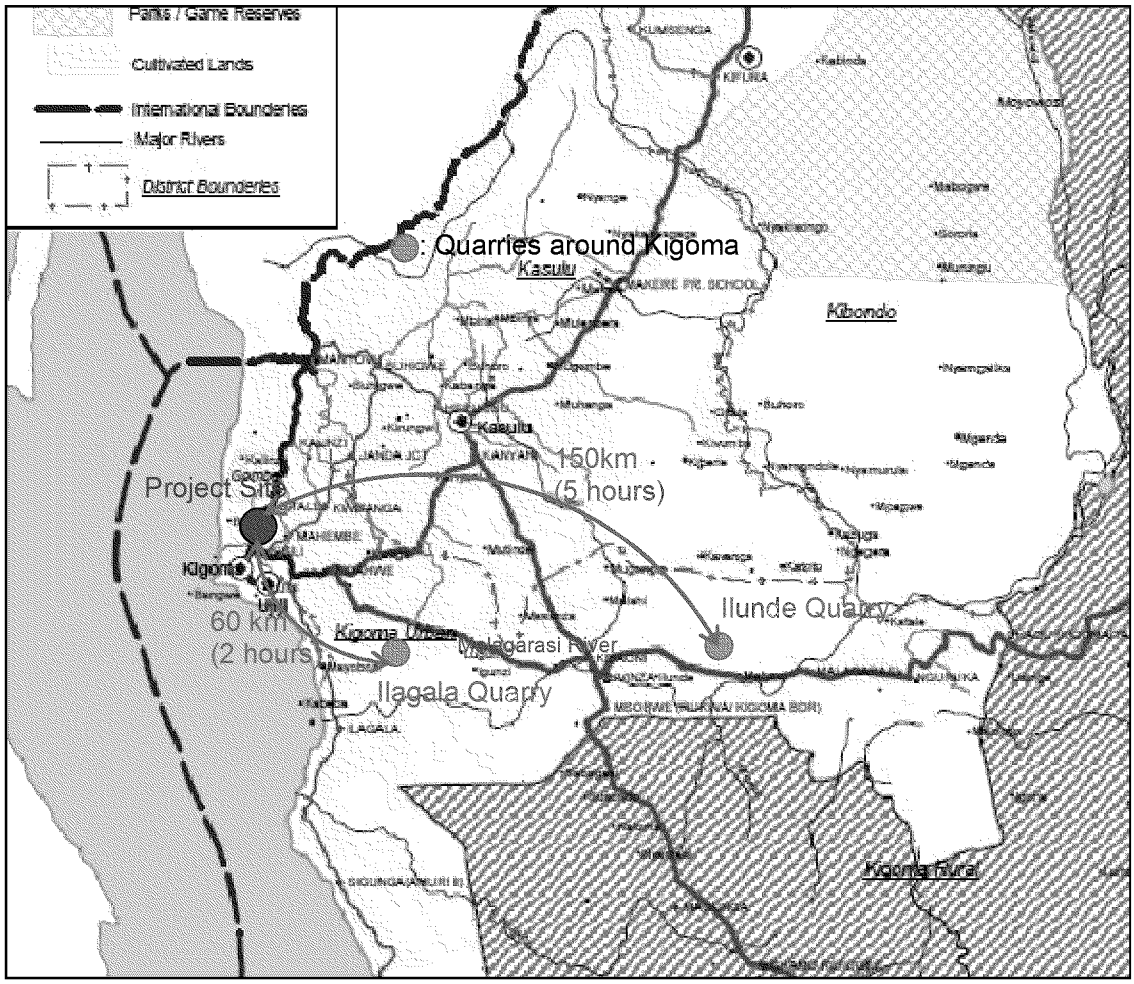


Figure 2.2.4.1-3 Road Conditions in Kigoma and Location of Quarries

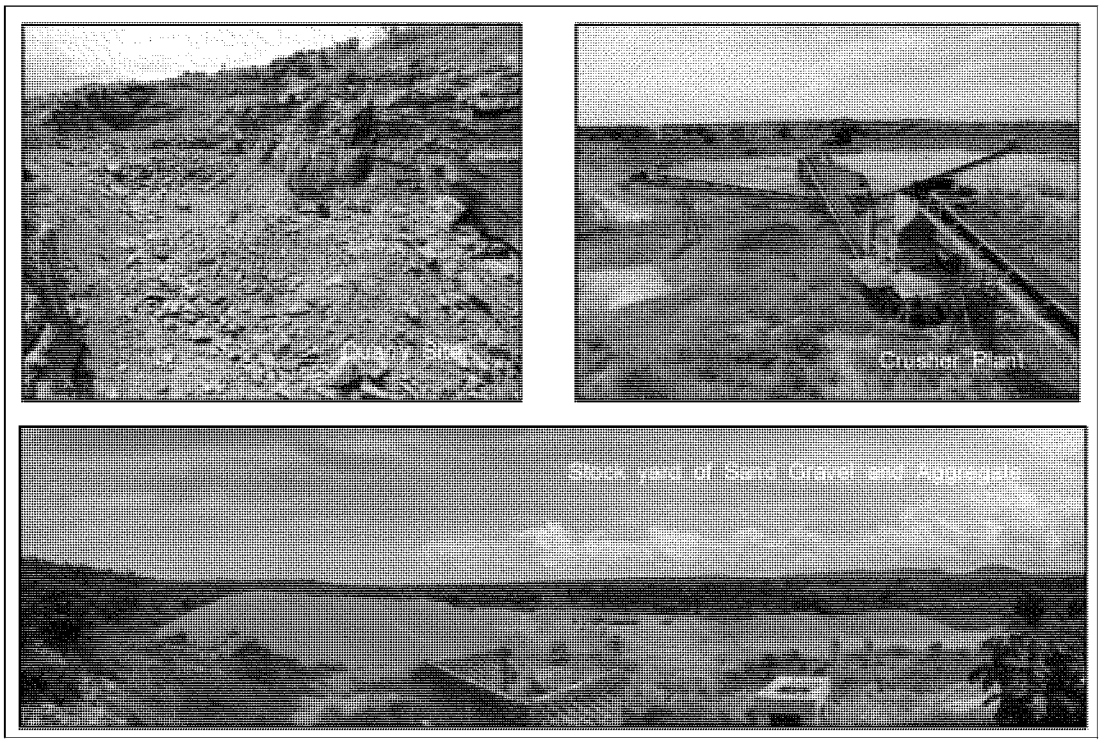


Photo 2.2.4.1-4 Quarry Site at Ilagala

(2) Basic Information around Project Site

1) Temporary Construction Yard

Temporary yard to be required for construction office, storage for construction material, construction machineries, aggregate and etc. has been approved to allocate following land except community open space in port area by Kigoma Office of Tanzania Port Authority.

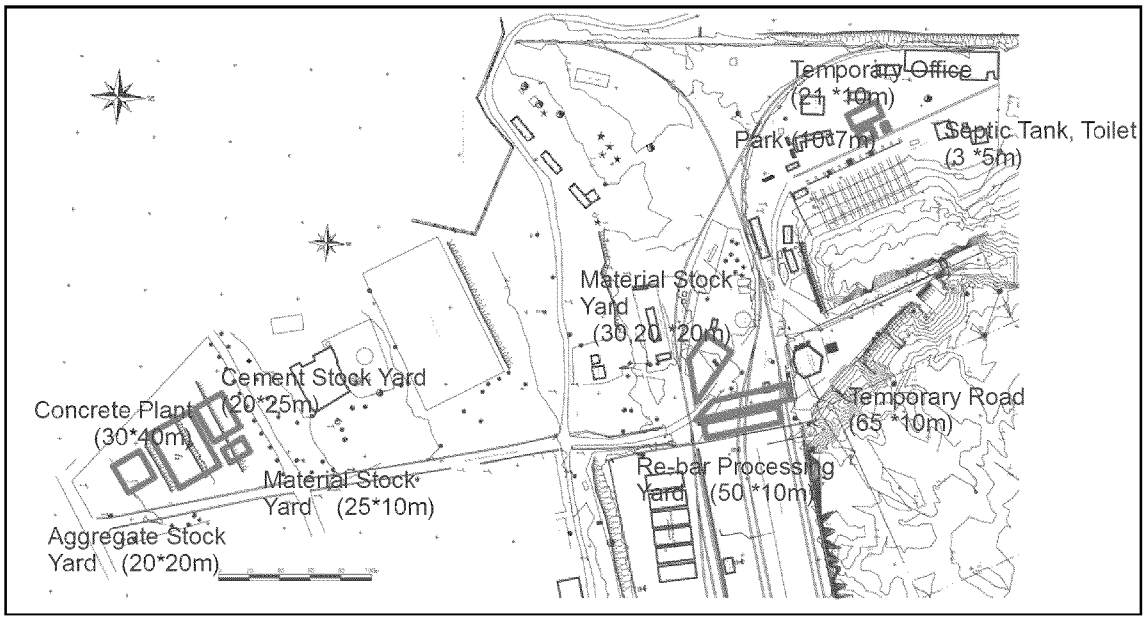


Figure 2.2.4.1-5 Location Map of Temporary Construction Yard and Road

2) Dumping Site

Dredging works are currently executing at the water area in front of cargo wharf in Kigoma Port during the field survey. Dredged sand is dumped off at lake water area through sand discharging pipe. Access channel of ship repairing boat basin of Dock Yard was carried out by pump dredger, of which dredged sand was dumped to open space of low ground level at landside behind the port.

From the results of bottom sediment survey by this study and judging from the dredging works and the result of dredged sand feature, as the impact on environment is considered to be minor, the sand disposal derived from dredging works by this project shall be planned to recycle as filling material to the project site.

Photo 2.2.4.1-5 Pump Dredger of TPA

Photo 2.2.4.1-6 Inland Dumping Site

3) Pump Dredger

Pump dredger currently working in Kigoma Port was procured by TPA from Darmen, Netherlands in 2008 and dredging works at Kigoma Bay area from 2009 with technical support by dredging company of South Africa and it has been continued at the time of the field study.

The total crew of pump dredger is 15 comprising chief (1), captain (1), chief boat crew(2), boat crew(11) and daily working 9 hours (including 1 hour rest) with one watch system. And the capacity of dredger is the maximum dredging depth up to 12 m from lake surface and 350m^3/day has been dredged under the bottom conditions around present Kigoma Port and its pump capacity.

The dredging schedule after dredging Kigoma Port according to the dredger engineer is going to be shifted to Mwanza Port of Lake Victoria and Kyela Port of Lake Nyasa (Lake Malawi). And, the schedule to shift from Kigoma Port to Mwanza port is unknown now.

【Specification of Pump Dredger】

- Horsepower : 605 ps, 448 KW
- Ladder length : 19.0 m
- Max dredging : -12.0m
- Dredging Capability : 350m^3/9h (1 day),1 watch

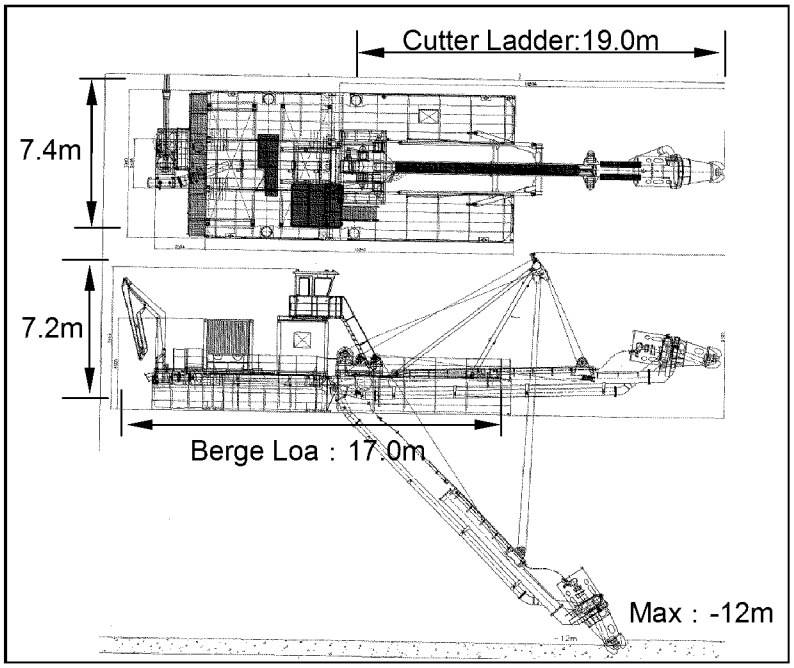
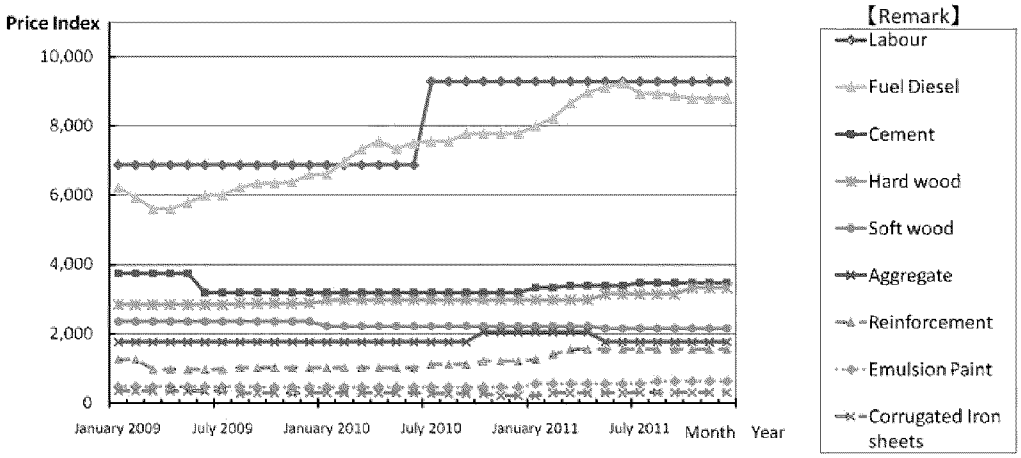


Figure 2.2.4.1-6 Pump Dredger Working in Kigoma Port

4) Coefficient of Fluctuation of Construction Price

Construction price index in Tanzania is publicly released by (NCC : National Construction Council). Appraisal items of price index are only labor cost and other representing materials and Table 2.2.4.1-7 shows two years contents from January, 2009 to December, 2011. According to this figure, the coefficient of fluctuation for the year of 2010 was 1.07 and 1.09 in 2011. The causes of price increase are by the increase of labor cost in 2010 and steel price in 2011. As steel materials shall be procured by Japan considering its quality and price, the coefficient of fluctuation of construction price in 2011 excluding steel material factors from the data becomes 1.03 that has almost not fluctuated.

With the result above, the estimated cost for this project is calculated setting up the coefficient of fluctuation of construction price as 1.00.



Source: NCC : National Construction Council

Figure 2.2.4.1-7 Construction Price Index in Tanzania

(3) Basic Matters Concerning Schedule

1) Cabinet Meeting and Exchange of Notes

Implementing this project by Grant Aid Cooperation, Japan formally commits the grant if E/N and G/A are concluded between the Government of Tanzania and the Government of Japan through the decision of Cabinet Meeting of the Government of Japan.

2) Detailed Design

After concluding E/N and G/A, service agreement for the design and construction supervision is concluded between a Consultant who has Japanese nationality and the Government of Tanzania and detailed design works is immediately commenced. Necessary period for the detailed design (from the date of Consultant Agreement to Contractor's Contract) is about 6 months.

3) Procedure of Environmental Certification

It is definitely necessary to complete the procedure of environmental impact study before the commencement of construction works and it is assumed that approximate 8 months is necessary as the schedule of environmental certification considering the necessary standardized period of environmental impact study and its reporting.

4) Tender

The Consultant shall make necessary drawings, specifications and cost estimation for the works and documents being necessary for contractor's tender and contract and select a Japanese Contractor through P/Q and evaluation of tendered documents upon approval of the Government of Tanzania.

5) Application Procedure for Obtaining "Work Permit" and "Tax Exemption"

The procedure concerning the work permit and tax exemption is that necessary documents made by the Contractor and the Consultant shall basically submit them to TPA by the Consultant together, TPA, implementation organization of this project, shall submit them to each related organization upon attaching introduction letter by TPA and Ministry of Transport.

The method of application procedure and the necessary period from the submission of each document to the approval are as follows.

a) Procedure of Obtaining "Work Permit "

The procedure and examination period after submission of documents concerning obtaining work permit is as follows and 4 months is necessary only for the examination period. And, depending upon the documents, other application documents need to be submitted together with other documents like TIN (Tax Payer Identification Number) and Tax Exemption Certificate. Therefore, it is ideal for doing the procedures simultaneously and in parallel.

With the above, the period needed from the Business License to the application for Work

Permit is about 4 months if the preparation period to make application documents is considered to be included.

Table 2.2.4.1-2 Acquisition Procedure of Work Permit

Application Procedure	Applicable		Content of Procedures	Exam. Period
	Cons	Cont		
(1) Business License Application	●	●	Submit application documents to **BRELA** (Business Registration Licensing Agency) that is on behalf of Ministry of Industry and Trade and get examinations concerning the Corporation Registration. **TIN** (Tax Payer Identification Number) shall be obtained in case of grant cooperation project.	1 month
(2) Engineer's Registration (ERB Registration) *Renewal needs every two years	●	●	Engineer's registration shall be made to ERB (Engineers Registration Board). In case of cooperation project, the application shall be made to TPE (Temporary Professional Engineer) or TCE (Temporary Consulting Engineer) as foreign engineer. Application documents shall be as follows, 1. Necessary application documents and application fee to TEP and TCE (US$1,500/person) 2. Contract or Letter of employment signed by employee specifying duration and specific works for which employee will be engaged in while in Tanzania 3. Copy of passport and two photographs 4. Detailed curriculum vitae 5. Copy of residence permit or temporary visitor's permit 6. Original or certified copies of degree certificates 7. Proof of registration in the country of origin or membership with engineering institute Board Meeting is held in general 6 times annually and needs 2 months as maximum for the examination of engineer's registration. In case of overseas cooperation project, about 1 month is required.	1 month
(3) Contractor's Registration (CRB Registration) *Renewal needs every two years	—	●	Contractor's registration shall be made to CRB (Contractors Registration Board). Contractor shall be required to submit following documents in addition to the general application documents. 1. Necessary application forms to CRB 2. Current business license by **BRELA** described in the above 1. 3. Introductory letter by project owner (TPA) 4. Certificate of incorporation or registration 5. Proof of ownership of office 6. CV's of shareholders with certified copy of share certificate 7. CV's of key personnel & certified copy of academic or professional certificate 8. Recent photograph of the technical director endorsed at the back by advocate 10. Certified current bank statement 11. Proof of fixed asset ownership 12. Duly filed & signed anti-bribery pledge 13. Company memorandum & articles of association 14. Translation of each application documents and examination certificate	2 weeks

(4) Application for Work Permit	●	●	Application of work permit shall submit to Immigration and Labor Departments and Immigration Service certifies by stamping on original passport as work permit through the examination of Ministry of Labor. The following documents shall be required to submit when the work permit is necessary. 1. Three covering letters to Principal Commissioner of Immigration Service, Labor Commission and Tanzania Investment Centre. 2. Certificate of incentives (summary of project and etc.) 3. Certificate of Incorporation 4. Memorandum and Articles of Association 5. Organization Chart (Project organization and etc.) 6. Business License issued by **BRELA** 7. Tax Clearance Certificate 8. **TIN Certificate** 9. Employment contract 10. TIF 1 forms (3 copies) obtainable at TIC or any Immigration Office 11. Photo copy of passport and Visa 12. Curriculum Vitae 13. Academic/Professional Certificates 14. Seven Photographs 15. Translations of documents/certificates (English or Swahili) 16. Residence Permit: US$ 1,550/person Remarks: The Consultant must submit Tax Clearance Certificate when he needs.	1.5 months

Remark: Bold letter shows common documents

b) Procedure for "Tax Exemption"

The procedures of tax is consisted of 1. VAT (Value Added Tax) and 2. Fuel Tax and both are required to apply to TRA (Tanzania Revenue Authority).

i) VAT is exempted subject to the submission of item list of equipment to be procured in Tanzania before the commencement of construction works of the project to TRA. Description of project name and TIN on the check makes tax exempted from the time of procurement.

ii) Fuel tax is treated as tax return subject to the use only for the Grant Aid Cooperation. Therefore, paid taxes shall be refunded by submitting delivery slip of fuel for the project after concluding the contract with Gas Station.

iii) Addition, as taxes born before the procedures of above (1. and 2.) are difficult to be refunded, it is considered that all the procedures to be completed before the commencement of construction works is important.

Table 2.2.4.1-3 Application for VAT Relief Procedure

Necessary Documents	Content of Documents
(1) VAT Application Form (VAT 220)	List per supplier for quantity, price and VAT price for each TIN, project name and equipment name to be procured shall be described on application document obtained from TRA and submit to TPA with the name of representative, signature and corporation stamp.
(2) Submitting representative name eligible to procure with specimen signature and photography	As the representative who has signing authority on application documents for relief procedure or checks is required therefore, the registration for such more than 2 persons is desirable.
(3) Invoice	This invoice becomes the attachment together with the documents of above (1) and the list by supplier shall be submitted describing items to be procured, quantity, price and VAT price.
(4) TIN	This is the TIN No. obtained at the time business license.
(5) Agreement between the Tanzania Government and the Development Partner Country	Copies of E/N and G/A

6) Transportation Period

As the procurement of material and equipment is difficult in the project site in Kigoma, it shall be procured from Dar es Salaam or Japan. The transportation period from Dar es Salaam or Japan is as follows,

- Japan to Dar es Salaam: Marine transportation 1.5 months, offshore waiting time of container ship 0.5 months
- Dar es Salaam to Kigoma: 2 weeks

(4) Construction and Procurement Policy

i) As the existing pump dredger owned by TPA can not be used for marine works for this project. Kigoma Port is located at inland of Tanzania, the procurement of dredging barge and etc. are in a difficult situation. Therefore, the procurement plan of working barge for dredging and etc. shall be secured by barge transportable segment to be assembled at the site.

ii) Sand generated by dredging and excavation works shall be used as filling materials at the project site and the construction method shall be the one to be able to execute filling works and piling works at the same time, which lead to the contribution of the cost reduction.

iii) Construction companies in Kigoma are small in scale and number of owned engineers, experts and construction machineries is extremely limited. Therefore, it shall be the base that common labors and etc. are procured locally in Kigoma but engineers, experts and main construction machineries shall be procured from Dar es Salaam.

iv) The procurement of materials and equipment from Dar es Salaam to Kigoma has been in trouble by frequent flood in case of railroad transportation and therefore, as the transportation method for this project, inland road transportation shall be considered as the

basic, since it took 2 months for the restoration from the damage and the cargo transportation schedule by TRL (Tanzania Railways Limited) is irregular or the situation being equivalent to no schedule.

v) Local construction companies in Tanzania have no experience of piling works of steel sheet piles or steel pipes nor marine works and do not own large scale construction machineries like piling machine or large crane with the lifting capacity more than 35 ton. Therefore, piling works or marine construction works shall be considered to procure engineers and construction machineries from the third country or Japan.

vi) There are concrete plant or asphalt plant in Ilunde where is away 150 km from the urban area of Kigoma and it takes more than 5 hours for transportation that is unrealistic. Therefore, the pavement conforming apron, yard and access road in passenger wharf shall be only studied to get supply from concrete plant to be built near project site for the project in view of cost reduction.

vii) Security of safety control shall be reflected to construction works considering the existing port activities, traffic, pedestrians and community environment.

viii) In order to proceed the construction works smoothly, close contacts shall be made among the Government of Tanzania, TPA, the Consultant and the Contractor.

2-2-4-2 Points of Concern on Construction Works and Procurement Works

i) Annual precipitation is about 900 mm that is not much but it is affected that the transportation of materials and equipment shall be influenced by flood of heavy rain in rainy season from November to April due to the low ground level of Kigoma. Therefore, it is ideal to procure and transport from Dar es Salaam during dry season from May to October as much as possible.

ii) It is reported that there were used to be robbers at the land roads in forest zone near boarders with Burundi. Although there is a report that the situation was improved now but even now policemen or armed guard by security company are still necessary for the transportation from Dar es Salaam to Kigoma according to each local transportation company.

iii) Tax borne before the procedure of tax relief is very difficult to request the refund on the country's system. Therefore, the tax relief procedure should complete before the commencement of the project.

vi) It is considered to take about 4 months for the application of work permit and tax relief procedures. And procurement of materials and equipment concerning VAT shall be made mainly in Dar es Salaam and necessary documents must be periodically submitted to TRA (Tanzania Revenue Authority) in Dar es Salaam for requesting tax refund in regard to the fuel tax. Therefore, not only Kigoma but also Dar es Salaam office is recommended to set up when local offices are considered.

v) As this construction works shall be rehabilitation works in the existing port, the safety to existing port activities like cargo handling works and passengers shall be considered. The access road to be the base for outside main road from Kigoma Port is used as passage road

for local resident in addition to the common traffic. Therefore, traffic control safe guard shall be allocated in the road during construction period and the safety measure like installation of fences is necessary upon need.

vi) Communication language at the project site, Kigoma is mainly by Swahili except the government and TPA officials of Tanzanian side and hotels. For this, local interpreter shall be considered to employ for the activities in Kigoma.

vii) Quarry is located at Ilagara where 60 km off from the project site is but judging from the condition of local construction companies, the transportation of stone material like aggregate is in difficult situation. Therefore, the transportation itself from Ilagala quarry to the project site shall be included in the project.

2-2-4-3 Demarcation of Construction and Procurement

(1) Items Covered by Japanese Side

i) Consultant services like detailed design, support to tender works and work supervision

ii) Provision of all construction materials and labors being necessary for Japanese construction works in this project

iii) Marine and inland transportation and its transportation insurance for imported materials and equipment to be necessary for Japanese construction works and the procurement of equipment.

iv) Necessary quality inspection to be necessary for Japanese construction works and procurement of equipment in this project.

v) Basic coverage shall be all the works after leading-in works from nearest electric pole of the project site as the responsible boarder point for electricity and all the works after water supply piping inside of boarder line of the project site and all the discharging water works for water supply.

vi) Removal of existing jetties

vii) Main works: Filling works, Passenger wharf, Passenger Terminal Building including cargo storage, in-port pavement and access road.

(2) Items Covered By Tanzania Side

i) Acquisition of land for this project construction site

ii) Relocation of existing pontoon and small barge in front of jetty

iii) Removal of existing passenger facility and relocation of passenger function during construction period

iv) Relocation of trees at the project site

v) Securing temporary yard and sand dumping area

vi) Application fees for work permit, ERB & CRB registration and tax relief procedure concerning Japanese and the third country persons related with the project.

vii) Execution of EIA

viii) Obtaining environmental certificate and construction permit

ix) Equipment to be necessary in Passenger Terminal Building (Desks, chairs, telephone and others)

2-2-4-4 Supervision Plan

In accordance with the policy of Grant Aid Cooperation by the Government of Japan, consistent and smooth detailed design and supervision works of the project shall be executed by the Consultant who well understands the intent of preparatory study of the cooperation. The Consultant shall dispatch a resident engineer who has enough experiences on work site and makes him to do supervision and liaison works and in addition, expert shall be sent to support inspections and work direction upon needs.

(1) Supervision Policy and Points of Concern

1) Close Liaison among Related Persons

Close liaison and reporting among the related organizations and persons in charge of Tanzania and Japan and the completion of facilities without delay based on the work schedule shall be aimed.

2) Positive Direction to Contractor

Aiming facilities construction to meet with design drawings, speedy and proper directions and advices shall be made.

3) Consideration of Technical Transfer

The effect as the project of Grant Aid Cooperation shall be made approaching to do technical transfer concerning work method and technique.

4) Realistic Advice on Maintenance

Proper advice and direction on the maintenance after handing over the facilities shall be made and smooth operation shall be encouraged.

(2) Construction Work System

1) Cooperation on Contractor's Contract

Selection of the Contractor, decision of the method of Contractor's Contract, making up Contractor's Contract (draft), study of content on work breakdown and witness to Contractor's Contract and etc. shall be made.

2) Checking and Confirmation of Shop Drawings

Inspection and etc. shall be made on shop drawings, materials, finish samples and facilities materials that will be submitted by the Contractor.

3) Direction to Construction Works

Study for work implementation plan and work schedule and etc. direction to contractor and progress report to the Client shall be made. Securing expert workers and stable supply of construction materials and equipment shall be the base conditions to commit the construction schedule. Enough study on securing needed personnel, transportation of materials and equipment, procurement plan and order of construction works and keep construction schedule shall be obliged to the Contractor.

4) Safety Control

Safety control system shall be made considering that this project is the rehabilitation works while operating by a resident engineer of the Consultant and all the staff of the Contractor. For that purpose, construction management plan shall be made considering work structure of the project site where large scale heavy vehicles are run and personnel assignment and getting across the safety control including the third parties.

And, as securing experts are not easy in Kigoma, accident prevention before happening shall be ensured by daily safety training and direction centered by skilled labors from Dar es Salaam or Japan.

5) Support for Payment Approval Procedure

Content check of invoices and the procedure concerning construction price to be paid during construction and after completion of construction shall be supported.

6) Witness to Inspections

Inspections and directions shall be made on each progress during construction period upon needs. The Consultant shall complete the works upon confirming the completion of construction and the pursuance of contract content and witness to the handing over the contract target and obtain the receipt confirmation by the Client. Periodical report shall be made to TPA and the Government of Japan on the necessary items of work progress during construction period, payment procedures and handing over after completion shall be made.

2-2-4-5 Quality Control Plan

Materials to be used in this construction works shall be controlled being equivalent to "Common Specification of Port and Harbor Construction" edited by Ministry of Land, Infrastructure, Transport and Tourism (MLIT), "Standard Specification and Commentaries of Architectural Construction Work JASS 5" edited by Architectural Institute of Japan, "Common Specification of Architectural Construction Work" edited by MLIT and "Japanese Industrial Standard " (JIS).

And concrete to be used in this construction works shall execute a design of mixture and the concrete work shall be commenced after quality confirmation like concrete compressive strength, temperature, air content and etc. executing trial mix. And, test report, control table of concrete

strength, control chart (X-R control) shall be made up and the maintenance and control of quality shall be done after commencement of construction works.

2-2-4-6 Procurement Plan of Materials and Equipment

Procurement of materials and equipment to be necessary in this project shall be as follows and the materials and equipment to be able to supply locally shall be taken a priority as much as possible through studying the quality and the supply capability.

Table 2.2.4.6-1 Procurement Source of Construction Materials (Draft)

Work	Material	Local	Japan
Civil Facility	Filling materials	○	
	Sand and Aggregate	○	
	Stones	○	
	Steel Materials (Re-bar, sheet pile, etc.)		○
	Cement	○	
	Form and Wood	○	
	Ancillary Facility (Beacon Light, Fenders, Bollards)		○
Building Facility	Steel materials (Re-bar, Fabricated Steel)		○
	Cement	○	
	Form and wood	○	
	Fitting	○	
	Roof Materials		○
	Paint	○	
Electricity	Cables	○	
	Wires	○	
	Lighting Equipment	○	
Water	Piping Materials	○	
	Septic Tank (Equipment from Japan)	○	○
	Sanitary Equipment	○	
Air Conditioner	Air Conditioner	○	

(Remark) Final result may be corrected upon the result of cost estimation

Table 2.2.4.6-2 Procurement Source of Construction Machinery (Draft)

Main Construction Machinery		Local	Japan
Bulldozer	21 t	○	
Backhoe	0.6 m^3	○	
Wheel Loader	2.1 m^3	○	
Dump Truck	10 t loading	○	
Truck with Crane	4 t / 2.9t	○	
Truck	11 t Loading Capacity	○	
Trailer	20 t	○	
Truck Crane	25 t Lifting Capacity	○	
Motor Grader	2.8 m	○	
Macadam Roller	8 to 20 t	○	

Tire Roller	8 to 10 t	○	
Agitator Truck	4.5 m^3	○	
Large Size Breaker	600 to 800 kg	○	
Generator	150KVA	○	
Welder	300A	○	
Tugboat	D500Ps	○	
Transport Boat	D50Ps	○	
Line Marker	15 to 20 cm	○	
Crawler Crane	50 t Lifting Capacity		○
Vibration Hammer	60 KVA		○
Water Jet	100 KVA		○
Small Barge			○
Backhoe (Long Arm)	1.0 m^3		○
Batcher Plant	0.5 m^3		○

2.2.4.7 Plan for Initial Operation and Training

Initial operation and training shall not be conducted since the procurement of equipment is not included in this project.

2-2-4-8 Soft Component (Technical Transfer) Plan

Soft component is not done in this project since this is the rehabilitation project of the existing port.

2-2-4-9 Execution Schedule

When this project is executed by the Grant Aid Cooperation of the Government of Japan Grant Agreement shall be concluded between JICA and the Government of Tanzania after concluding "Exchange of Notes" by both countries. After that, the selection of the Consultant who has Japanese nationality shall be made by the Government of Tanzania and the consultant service agreement shall be concluded between the Government of Tanzania and the Consultant. And, the project will be completed through detailed design, making up tender documents and tender is held for the construction contract and construction works based on the contractor's contract.

(1) Detailed Design Service

The Consultant shall commence the detailed design through the verification of agreement after concluding the consultant service agreement between the Government of Tanzania and the Consultant. Detailed design drawings, specifications and full set of tender documents like instruction to tenderer are made up. While, the meeting with the implementation agency of the Government of Tanzania shall be held to discuss the project facilities and final approval for full set of tender documents shall be obtained from the Government of Tanzania. Necessary duration of detailed design is about 3 months.

(2) Service for Tender

A contractor (a construction company that has Japanese nationality) who works for this facility construction shall be selected by tender. Tender shall be made from tender announcement, receipt of expression of interest, preliminary qualification, distribution of tender documents, tender, evaluation of tender result, designation of contractor and contractor's contract in order and takes about 3 months.

(3) Construction Works

1) Work Procedure

Work procedure is as shown below in this project.

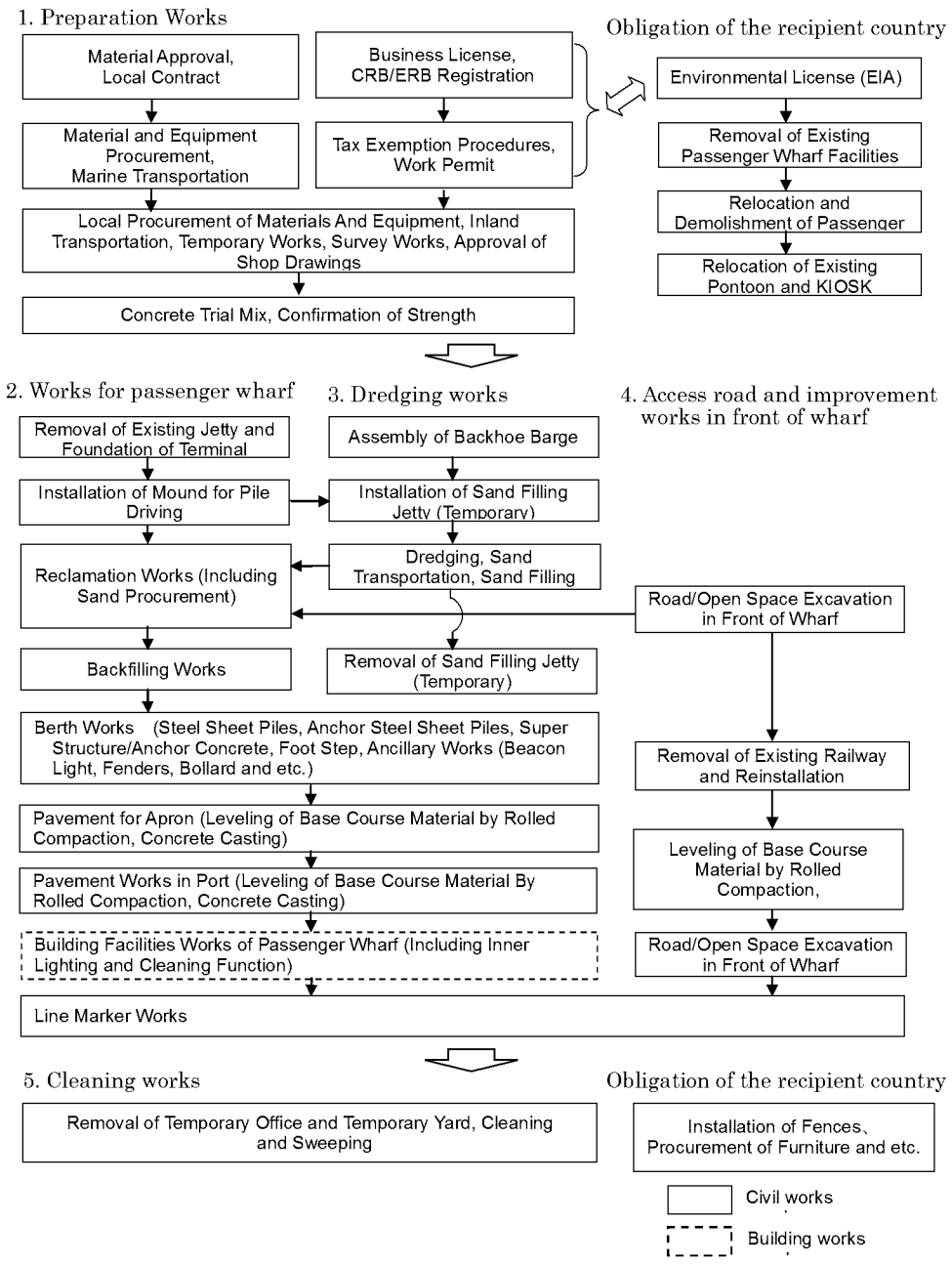


Figure 2.2.4.9-1 Work Procedure

2) Preparation Works

After conclusion of contractor's contract, the construction works shall be commenced through the verification on the contract note by JICA. When the construction is commenced materials approval and procurement and transportation, tax relief procedure, obtaining business license and work permit and in addition, construction of temporary yard and temporary construction and quality confirmation by concrete trial mixture shall be executed as the preparation works.

Necessary period for the preparation works is shown below and takes about 7 months after conclusion of contractor's contract. Out of these months, 3.5 months are necessary for the procedures in Dar es Salaam.

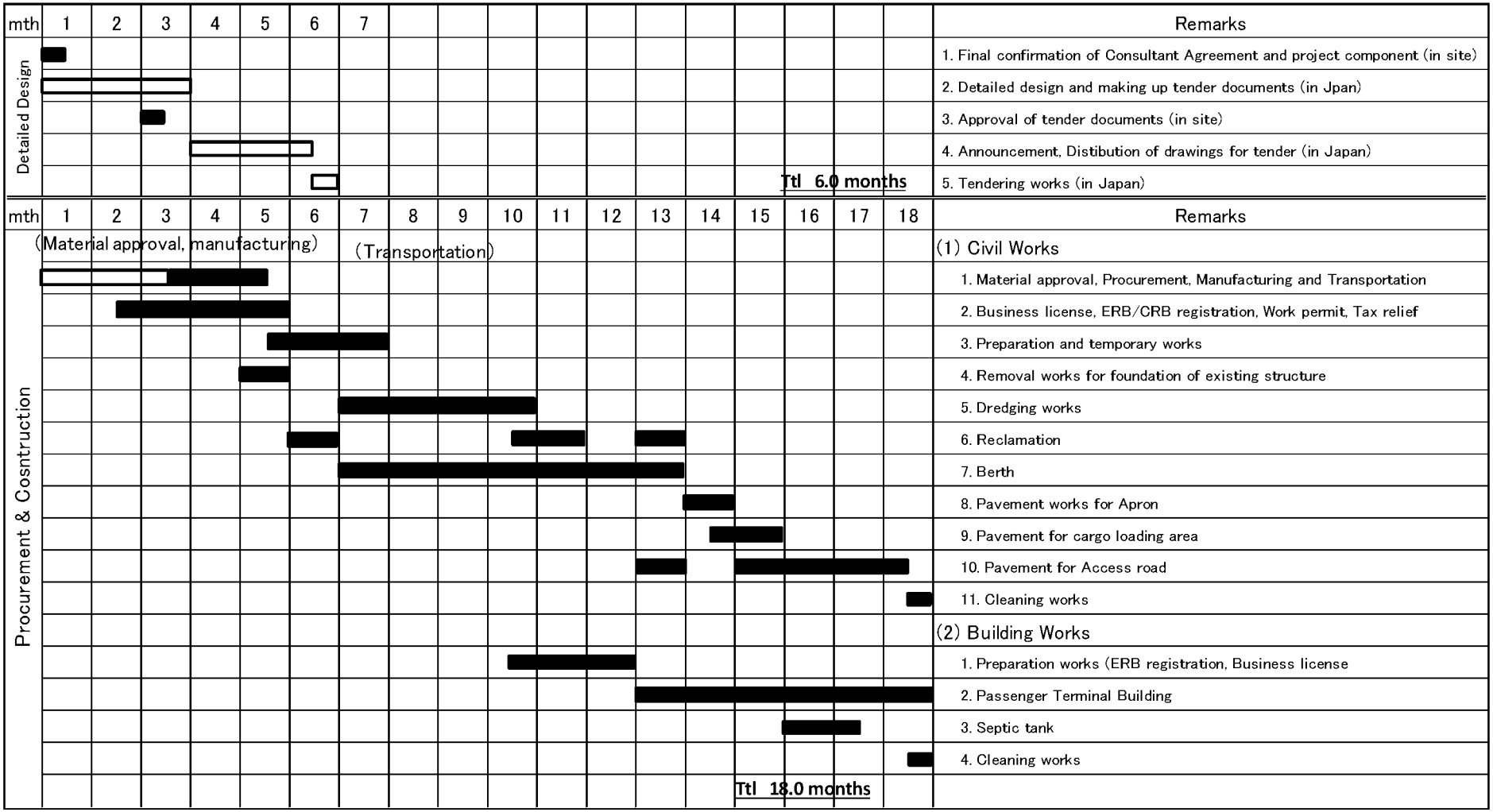
Table 2.2.4.9-1 Detailed Schedule of Preparation Works

	Work items of preparation works (month)	Period	1	2	3	4	5	6	7	8
0	Tender, Contractor's contract	0.0	☆							
1	Preparation works in Japan (verification of contract, material approval, preparation for procurement in Japan)	1.0								
2	Manufacturing (2 months), Marine Transportation (2 months including offshore waiting)	4.0								
3	Transshipment from marine to inland transportation	0.2								
4	Application for domestic transportation to Ministry of Construction and TRANROAD	0.3								
5	Domestic transport	0.5								
6	Dispatch of Japanese engineers	-								
7	Documentation for application (8 to 13) and submission to Consultant and TPA	1.0								
8	Business license (obtaining TIN for Grant Aid Cooperation)	1.0								
9	ERB Registration (Engineer's registration)	1.0								
10	CRB Registration (Contractor's registration)	0.5								
11	Application for work permit	1.5								
12	VAT(tax relief application) <TIN is necessary>	0.5								
13	Application for fuel tax refund and import tax	0.5								
14	Temporary offices in Kigoma and Dar Es Salaam/ Yard preparation	1.0								
15	Assembly of construction equipment (Dredging barge, Batcher plant, Crane)	0.5								
16	Survey works, Approval of shop drawings	0.5								
17	Concrete mixture, Confirmation of strength	1.0								
18	Commencement of main works	0.0								★

3) Project Implementation Schedule

Project implementation schedule is as per shown in Table 2.2.4.9-2 and it is assumed that about 6 months for detailed design and 18 months for construction works are required.

Table 2.2.4.9-2 Project Implementation Schedule



2-3 Major Undertakings to be Taken by Recipient Country

The obligations of the recipient country that was confirmed by Minutes of Meeting or others during the period of this study are as follows,

i) To secure the project Site
ii) To conduct the EIA, obtain other environmental approval and construction permit
iii) To secure land (Project site, temporary yard)
iv) To remove and relocate existing facilities in the project site.
   a) Relocation of pontoon and existing barge in front of the jetty
   b) Removal and relocation of existing passenger terminal (Passenger waiting shed, warehouse, ticket sales booth, customs, immigration, quarantine facility and etc.)
   c) Removal of existing fence and gate
   d) Cutting trees at the project site
v) To construct gates and fences to be necessary for passenger terminal under SOLAS Convention.
vi) To provide necessary equipment, furniture and etc. for administration office, ticket booth, Kiosk and others after completion of facilities.
vii) To collect trash in the passenger terminal after completion of facilities and periodical maintenance management of septic tank
viii) To assign full-time staff for operation and maintenance of the facilities and to allocated budget for it.
ix) To exempt taxes assessed on materials and equipment to be imported from overseas, the one procured in Tanzania and other levies for the project.
x) To exempt taxes and other levies assessed on Japanese nationals whose services under the verified contract and for the performance of their works in Tanzania.
xi) To bear commission for banking arrangement and advising commission of A/P
xii) To use facilities constructed under the scheme of Grant Aid Cooperation of Japan properly and effectively.
xiii) To bear all the expenses other than those to be borne by the Grant Aid.

2-4 Operation and Maintenance Plan

(1) Operation and Maintenance Structure

Concerning the structure of operation and maintenance of Kigoam Port, the operation department is allocated that manages local port including Kigoma Port under Director General as shown in organization chart of Tanzania Port Authority. The operation department is responsible for the operation management of 5 local ports except Dar es Salaam Port, such as Tanga Port, Mtwara Port facing to Indian Ocean and Kigoma Port in Lake Tanganyka, Mwanza Port in Lake Victoria and Keyla Port in Nyasa Lake. Local office of Kigoma Port is located in the area of Kigoma Port and the organization is consisted of Operation Section, Engineering Section, Finance Section, Human Resource Development & Administration Section and Procurement & Supplies Section under the Port Master. The Operation Section is responsible to operate Kasanga port in Rukwa State as well other than passenger wharf, container wharf, cargo wharf and oil jetty of Kigoma Port.

This project is to rehabilitate the existing passenger wharf and the same operation and maintenance system is considered to be maintained even after the rehabilitation of wharf is completed. Therefore, it is no need to establish a new operation and maintenance management system for this project nor new personnel is required.

(2) Method of Maintenance and Management

This plan is consisted of the rehabilitation of passenger wharf, pavement of access road and construction of passenger terminal building and the maintenance management is done by Engineering Section of Kigoma Port office. In case that Kigoma Port office can not work, the support from Civil Section, Hydrography Section, Electrical/Mechanical Section and others of Tanzania Port Authority can be expected. And, when special cost like future repair of facility and etc. shall be necessary it is executed by the support of Tanzania Port Authority as is conventionally done.

The methods of maintenance and management of planned facilities are as shown below.

1) Passenger Wharf Facility

Life time of berth facility of wharf is planned and designed as 50 years and basically, the particular maintenance is not considered to be required. In order to maintain and use the wharf facilities into the future, it is inevitable to promptly discover damages of on land facilities like apron, in-port road and wharf area in addition to the berth facilities and to repair them properly. After completion of this project, it is required to Tanzania Port Authority to execute maintenance management like a periodical inspection, repair necessary parts and etc.

Water area in front of the east berth is kept planned water depth by initial dredging and it is deeper than that of nearby container wharf or cargo wharf. These nearby berths have the issues how to secure berth water depth affected by long-term sedimentation and now dredging works by pump dredger is executed. In this project, the planned water depth is set including 0.5 m that is allowance of water depth by future sand sedimentation. However, the siltation is considered to

be unavoidable and maintenance dredging shall be executed promptly in case that the water depth is not enough as well as measuring water depths of berth and surrounding water area periodically.

Periodical inspection items are as follows,

- Water depth of berth and the water area in front: Confirmation of water depth DL -5.0m
- Substructure of berth (Steel sheet pile): Checking damages, deformation and rust
- Super structure of berth: Checking cracks and damages of Concrete and damages on fenders and bollards
- Apron, in-port road and etc.: Checking cracks, damages, subsidence and etc.
- Lighting facility: Confirmation of lighting condition and checking damages

2) Access Road

The maintenance management of the access road in this project is to be responsible by Tanzania Port Authority. The type of pavement is concrete pavement and it has enough pavement thickness and strength for the drive of vehicles to passenger wharf like cargo trucks.

Concerning the maintenance of the access road, the periodical inspection for the generation of surface subsidence or rutting and in addition, following repair works shall be necessary.

- Patching on the surface of pavement
- Forming and reinforcing of unpaved part between side ditches and road shoulders
- Cleaning side ditches or drainage facility

3) Passenger Terminal Building

As building structures are always suffered rain and wind damages, the maintenance works for the following parts of the passenger terminal building is considered to be necessary.

- Painting on external wall and eaves
- Painting on internal wall and ceilings
- Deterioration and aging of lighting tools

And the periodical maintenance is necessary for the septic tank to be used for the sewage treatment as building facility. The contents are two points as below.

- Periodical addition of chlorine to be used for the final treatment
- Solid material to be pumped up one or two times per year by vacuum vehicle

It is possible to make pump to be used in septic tank replaced due to the deterioration.

2-5 Estimated Project Cost

2-5-1 Estimated Project Cost under the Scheme of Grant Aid

The project cost defrayed by the Government of Tanzania shall be estimated as follows according to the estimation conditions shown in below (2). However, this amount does not necessarily mean to show grant amount limit on the Exchange of Notes.

(1) Cost to be Borne by the Government of Tanzania

Descriptions	Amount (Tsh)	Yen equivalent (million yen)
i) Conduction of EIA	21,000,000	Approx. 1.0
ii) Relocation of Pontoon and Barge	8,500,000	Approx. 0.4
iii) Removal and Relocation of Existing Passenger Terminal Facilities	60,000,000	Approx. 2.8
iv) Installation of Fence and Gate	19,000,000	Approx. 0.9
v) Business License, ERB Registration and CRB Registration	42,500,000	Approx. 2.0
vi) Commissions to Banking Arrangement	33,000,000	Approx. 1.6
Total	184,000,000	Approx. 8.7

(2) Cost estimation condition

i) Estimation time : December, 2011

ii) Exchange rate : 1US$=79.09 yen
1Tsh =0.04706 yen

iii) Construction period : Implementation schedule of detailed design and construction period are shown in the Work Schedule

iv) Others : The cost estimation was conducted in conjunction with the scheme of Grant Aid Cooperation of the Government of Japan

2-5-2 Cost of Operation and Maintenance

(1) Income from Port Operation

The following items are the main port incomes related with passenger terminal. These items except storage fee have been already collected but these port incomes shall be depended on the future number of passengers and handling cargoes volume.

- Port Due
- Wharfage
- Dockage
- Storage Charge
- Passenger Handling Fee
- Entrance Fee

As the storage facility is the new facility that is not existed in the existing passenger wharf, new port income can be expected. Cargo storage charge of Tanzania Port Authority has been set as follows.

- Import and Domestic Incoming Cargoes

Within 24 hours	: No Charge
2 to 7 days	: US$ 4.00/day/ton
8 to 23 days	: US$ 1.00/day/ton
More than 24 days	: US$ 1.50/day/ton

- Export and Domestic Outgoing Cargoes

Within 7 days	: No Charge
More than 7 days	: US$ 1.00/day/ton

(2) Maintenance Cost

1) Electricity

Lighting facilities in passenger wharf :

92 Base Cost +50.0 kwh x 157 Tsh/kwh = 7,942Tsh/month

7,942 Tsh x 12 months = 95,304 Tsh/year

Lighting facilities, air conditioner and etc. in passenger terminal building :

2,646 Base Cost + 1,450.0 kwh x 157 Tsh/kwh = 230,296Tsh/month

230,296 Tsh x 12 months = 2,763,552Tsh/month

2) Water

Toilet facility in passenger terminal building :

600 m^3 x 175 Tsh/ m^3 = 105,000 Tsh /month

105,000 Tsh x 12 months = 1,260,000 Tsh /year

3) Other Maintenance Costs

- Berth Facility : Maintenance cost shall not be counted for the time being for the berth facility. Annual periodical inspections for the berth water depth, berth structures and auxiliary facilities are necessary.
- Access Road : Maintenance cost shall not be counted for the time being for the access road. Daily inspection is necessary.
- Passenger Terminal Building
  : Maintenance cost for the septic tank in the amount of Tsh 500,000 is required 2 times /year.

4) Maintenance Dredging Cost for Berth and Water Basin

The maintenance dredging is not required for the time being since the allowance related with sand sedimentation is included on the berth water depth. Maintenance dredging is going to be made upon needs through executing annual survey of sand siltation conditions around berth and water area in front of berth. The maintenance dredging is considered to be made using pump dredger owned by Tanzania Port Authority.

With the above, the annual cost of operation and maintenance for this plan is estimated as shown in Table 2.5.2-1. This cost is equivalent to 1.1 % of the annual income of Kigoma Port Office which amount is 420.6 million Tsh however, it is small comparing with the annual budget of Tanzania Port Authority.

Table 2.5.2-1 Estimated Annual Operation and Maintenance Cost of Project

Item	Estimated Cost (Tsh/Year)
Electricity	2,860,000
Water	1,260,000
Other Maintenance	500,000
Total	4,620,000

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

The items to be preconditions for the project implementation are as follows,

(1) Securing project site for this project and utilization control of the water basin.

(2) Execution of EIA related with the rehabilitation works by this project and obtaining construction permit

(3) Site clearance of the project site
- On land wharf facilities: passenger shed, CIQ booths, ticket sales booth, water tank, container warehouse, cutting unnecessary trees, fences, gates and etc.
- Berthing facilities: jetty, finger dolphin including relocation of pontoon, barge and etc.
- Facilities of front open space of wharf: vending post, cutting unnecessary trees

(4) Construction of temporary passenger facility and safety measures for the passengers during construction period.
- On land facilities: Passenger waiting facility, CIQ booths, ticket sales booth, access road to the facility and etc.
- Berthing facilities: berthing facilities for passenger ships and etc.

(5) Securing temporary construction yard and soil dumping site to be necessary for the implementation of the project.

(6) Banking arrangement (B/A), opening the Authority to Pay (A/P) and the smooth payment in accordance with the A/P and the Project Contract.

(7) Granting conveniences and defrayal of application cost for work permit, registration to ERB and CRB for the Japanese and the third countries' company and persons related with the project.

(8) Tax exemption concerning procurement and import for the construction materials and equipment and the tax refund at the time of procurement of fuels.

(9) Leading-in of electricity, public water and other necessary ancillary facilities to the project site.

(10) Arrangement with related organizations
- Arrangement with TRL on railway track at the open space in front of the wharf
- Arrangement with the local government of Kigoma Ujiji City that controls the access road
- Arrangement with Kigoma Ujiji Police Stations that concerns with road regulations during construction period of the access road
- Permit of Energy & Water Utilities Regulatory Authority of Tanzania (ewura) concerning sewage water discharge from septic tank installed in the passenger terminal

(11) Installation of Fence and Gate in accordance with SOLAS Convention under IMO

(12) Procurement and installation of necessary equipment such as desk, chair, telephone to be necessary after completion of the Passenger Terminal Building

3-2 Necessary Inputs by Recipient Country

The items that the recipient country should undertake in order to accomplish and maintain

the project effects are as shown in Table 3.2-1.

Table 3.2-1 Necessary Inputs by Recipient Country

Timing	Items
(1) Before Construction	1) EIA, environmental license, construction permit and the approval for the project facilities 2) Work permit, Engineer's Registration and Business License of Corporation and tax exemption for the Japanese and the third countries company and persons related with this project 3) Arrangement of temporary passenger terminal facility and relevant on-land facilities during construction period 4) Tax exemption for the construction materials and equipment and the tax refund at the time of procurement of fuels with this project 5) Securing necessary land for this project, land for temporary passenger wharf and land for temporary yard 6) Site clearance of the project site 7) Utilization and control of the existing passenger wharf and the front water basin 8) Banking arrangement (B/A) and issue of Authorization to Pay (A/P)
(2) During Construction	1) Leading-in of electricity, public water and other necessary ancillary facilities to the project site 2) Arrangement of construction works nearby railway track at the open space in front of the wharf with TRL 3) Adjustment with city government that controls road and police station that performs road regulations 4) Permit of Energy & Water Utilities Regulatory Authority of Tanzania (ewura) concerning sewage water from septic tank 5) Passenger's security to the temporary passenger terminal facilities during construction period 6) Utilization and control of front water area of the project site 7) Verification of payment in accordance with A/P and the Contract
(3) After Completion	1) Proper and effective utilization of project facilities constructed by the Grant Aid Cooperation 2) Periodical checkup and maintenance of Passenger Terminal Facilities 3) Allocation of personnel to operate and maintain the Passenger Terminal Facilities 4) Installation of fence and gate in accordance with SOLAS Convention 5) Procurement and installation of necessary equipment such as desk, chair, telephone to be necessary after completion of the facilities 6) Introduction of cargo handling equipment for the effective cargo handling operation

3-3 Important Assumptions

The external conditions to develop and maintain the effect of the project after completion of facilities are as shown below.

(1) Proper utilization as exclusive wharf for passenger ships.

(2) Maintenance of MV Liemba who is old passenger ship is properly done and she is operated as main ship in the future as well.

(3) Number of passenger ships shall be increased by scheduled introduction plan of new passenger ship by MSCL.

(4) Voyage route shall be re-opened to Congo Republic by means of her stable political situation

(5) Ship accident affecting the utilization of berthing facility and its front water basin shall not be occurred.

(6) Effective cargo handling operation shall be made by introducing cargo handling equipment.

(7) Maintenance dredging shall be made to secure necessary water depth considering sand deposition at water basin in front of the berthing facility and possible lake water level down in future.

(8) No large scale natural disaster shall be occurred.

(9) No unexpected political uncertainty shall be occurred

3-4 Project Evaluation

3-4-1 Relevance

(1) Present Situation and Issues of the Sector

Kigoma Port is the international port located at east coast of Lake Tanganyika and connected with Dar es Salaam as a part of Central Corridor and is functioned as the hub port of Congo Republic on the other side of the lake and Burundi on the north side. The port facility is consisted of passenger wharf, cargo and container wharf, ship repairing facility and oil jetty at Kibirizi District, of which management and operation are done by Kigoma Port Office of Tanzania Port Authority. The passenger wharf is located at the west side of the general cargo wharf and is used as mother port of ships owned by Marine Services Company Ltd. (MSCL).

Passenger wharf where is the project site was built by filling the east side of sheet pile type jetty for ship repairing shop in a triangular shape and the simple concrete pile type jetties in front of the slope-type revetment and finger dolphin type mooring facilities. The wharf facilities are consisted of very poor structures and there are problems such as shallow water depth of berthing facilities, possible collapse due to the deterioration of concrete piles of jetty facilities. And, there are other problems for on land facilities that are poor capacity of passenger shed against the number of passenger and narrow wharf area to handle cargoes from passenger ship. Due to poor and vulnerable condition of the passenger wharf, passengers have been forced to disembark and embark through the jetty with danger of possible collapse and unstable barge. For cargo handling operation, cargoes are transported through the dangerous portion as same as the passenger path and the work area behind the wharf is too narrow for cargo loading and unloading of truck, which causes cargo handling operation very inefficient. Additionally, the access road to connect the passenger wharf and main public roads and open space in front of the wharf are unpaved in which troubles are occurred at the time of raining.

Resolving the problems of existing wharf facilities comprising on land passenger facilities and berthing facilities described above, the relevancy and the urgency to rehabilitate passenger terminal facilities in view of proper function shall be developed for securing the safety and efficiency of passenger terminal.

(2) Consistency with the Development Plan of Kigoma Port

"TSIP : Transport Sector Investment Program" drawn up in 2007 as upper plan of transport sector of Tanzania shows the development policy in the transport sector that supports the promotion of life level of nationals and industrial development in order to attain "Tanzania Development Vision 2025" that is national development strategy and "NSGRP : National Strategy for Growth and Reduction of Poverty" and "United Nations Millennium Development Goal". As the upper goal of maritime sector, it is drawn up that "Provision of alternative transport method at rivers, lakes and marine areas as well as cheaper marine transportation method to contribute to economic activities", and "Promotion of human resources for the operation management of facilities and services as well as the development, repair and maintenance of marine infrastructure" as the goal.

There is "Tanzania Ports Master Plan" drawn up in February, 2009 as the development plan of Tanzania Ports Authority. The target is the new port development plan in addition to the rehabilitation of the existing ports facing to the Indian Ocean such as Dar es Salaam Port that is the largest in Tanzania. And it includes the rehabilitation plan of main ports in Lake Victoria, Lake Tanganyika and Lake Nyasa (Lake Malaui). Expansion Plans of Kigoma Port and Kasanga Port in Lake Tanganyika were drawn up. The increase of future port demand is assumed in Kigoma Port with the development of agriculture and fishing activities in surrounding area, the cargo increase of cuppers and woods from Congo Republic, shortening of transportation distance by the improvement of railway services and road to Dar es Salaam and others. With the results, the expansion of cargo wharf has been proposed.

In addition, Tanzania Ports Authority issues a booklet as "Lake Tanganyika Port Development Program, October, 2011" that introduces two ports of Kigoma and Kasanga and local ports that are located along the lake side of Tanganyika. The improvement of passenger terminal facility has been focused as well as the development of cargo handling area of cargo wharf as the short-term development plan of Kigoma Port.

With the above related upper plans, the improvement of passenger wharf making consistent with the port expansion plan of Kigoma Port has been discussed and the consistency with the execution of this project is conspired.

(3) Beneficial Effect

Operational area of passenger ships based on Kigoma Port are Region of Kigoma and Rukwa along Lake Tanganyika coast, where the poverty ratio of each region becomes closer to 40% and the employment expansion with the further promotion of agriculture and fishing industries including hinterland in the future is expected. While, development level of transportation infrastructures is still low and road networks is poor and vulnerable and therefore, the lake transportation that regular and low cost has been the life line of local people for movement of people and distribution of commodities. And, Kigoma is functioned as the strategic spot of transportation in Lake Tanganyika of Tanzania Central Corridor and connected with Dar es Salaam with Tanzania Central Railway and main road networks. In addition to the

international connection to Mpulungu Port of Zambia, it is scheduled to re-open sailing route to Kalemie Port and Moba Port of Congo Republic which is not now on service, when the introduction plan a new passenger ship is realized.

With the rehabilitation of Kigoma passenger terminal, stable transportation of people and commodities in coastal area of Lake Tanganyika shall be possible and the service of passenger and cargo transportation shall be upgraded with the better operation of passenger ship leading to improvement of ship's allocation frequency. With the result, the improvement of transportation of people and cargo shall be made in coastal area of Lake Tanganyika and its hinterland and it contributes to the vitalization of economic activities and industrial promotion and furthermore, it is expected to contribute to area stability and peace. Therefore, the direct beneficiaries are considered to be 1.68 million people in Kigoma Region and 1.14 million people in Rukwa Region totaling a 2.82 million people. As this is located along the Central Corridor to connect with Dar es Salaam, the benefits is considered to be for the people living along with the corridor, people in Dar es Salaam and hinterlands of Kigoma Region and Rukwa Region shall be beneficial in its peoples and cargo transportation, most of population of Tanzania that is 44.84 million people is considered to enjoy its benefit indirectly. Furthermore, when the sailing route is re-opened to main ports of Congo Republic in the course of her political stability, the same benefit is considered to be given to the coastal area of Lake Tanganyika in Congo Republic.

(4) Constituency with Policies and Principals of Japanese Cooperation

The Japanese cooperation policy to Tanzania aims that the benefit of growth leads to poverty reduction as well as sustainable strong economic growth. The strategic field is the agriculture, infrastructure, governance and accountability. Promotion of agricultural and fishery industries by the improvement of logistics is expected as the beneficial effect of this project and as the result, the increase of employment that leads to poverty reduction is attained and the consistency with the politics and principals of Japanese cooperation is accomplished.

With the above, as this project widely contributes to the improvement of basic human needs (BHN) and the poverty reduction, the relevance to implement the Japanese Grant Aid Cooperation for the part of this project is confirmed.

3-4-2 Effectiveness

(1) Quantitative Effects

The outcome of quantitative effects by this project is as shown in Table 3.4.2-1.

1) Safety Improvement of Passengers at Embarkation and Disembarkation

As passenger ship can be directly berth along the wharf by this rehabilitation, the passenger can be possible to land directly without passing through unstable barge and dangerous jetty portion between passenger ship to the wharf where was seriously unsafe before.

Criterion Number of Passenger

= 500 passengers/ship x (embarkation +disembarkation) x approx. 26 trips/year

= 500 x 2 x 26 = 26,000 passengers/year

2) Improvement of Cargo Handling Efficiency

As passenger ship can berth just along the wharf by the rehabilitation, direct loading and unloading of cargoes to/from passenger ship can be possible. Therefore, the cargo transportation through the unstable barge and dangerous jetty portion between passenger ship to the wharf where were used to be unsafe for the cargo handling operation is eliminated and the safety of cargo handling workers as well as improvement of cargo handling efficiency are secured. Furthermore, the improvement of operability of cargo trucks and congestion mitigation can be attained by the expansion of wharf area, in which shortens cargo handling time can be expected. At present, it has taken 4 days including calling day of passenger ship, but it is assumed to be less than 3 days after completion of the project.

Table 3.4.2-1 Quantitative Effects

Target	Criterion Number (Year 2014)	Target Number (Year 2017)
1) Improvement of safety at embarkation and disembarkation (Number of passengers directly accessible to wharf and passenger ship)	0 passenger/year	26,000 passengers/year
2) Improvement of cargo handling efficiency (Shortening cargo handling time)	4 days	Less than 3 days

(2) Qualitative Effects

The outcome of qualitative effects by this project is as shown below.

1) Improvement of People Trip and Commodity Distribution

The cargo handling effect is improved by the rehabilitation of passenger wharf and berthing days of passenger ship is shortened. As the result, the number of sailing operation of passenger ships is improved and the frequency of ship trips shall be increased. And, people's flow and commodity's distribution at the coastal area of Lake Tanganyika and the hinterlands shall be accelerated by the increase of frequency of voyage. Furthermore, the people's flow and commodity distribution to the coastal area of Lake Tanganyika and this hinterland will be more accelerated, when shipping route to Republic of Congo, the opposite side, will be re-opened.

2) Improvement of Service Level of Passenger Terminal

Congestion of existing terminal is mitigated significantly as well as setting flow line of passenger in order by the rehabilitation of passenger terminal. And, the service level as passenger facility is improved distinctly and the comfortable feeling is provided by rehabilitating toilet facility, passenger waiting facility, Kiosk and etc.

3) Reduction of Distribution Cost

The safety and efficiency of cargo handling operation are improved with the possible introduction of cargo handling equipment as well as mitigating the congestion at the wharf area by the rehabilitation of passenger terminal facilities. Furthermore, the traffic performance of cargo handling vehicles is improved by the pavement of access road, which leads to the reduction of operation cost of the vehicles. As the result, ensuring smooth transportation of commodities, it is possible that the distribution cost becomes cheaper.

4) Contribution to Peace and Stability of Surrounding Areas

This rehabilitation project shall contribute to the peace and stability of surrounding areas including Congo Republic and Burundi with the vitalization of trade and economic activities, as well as the timely and stable transportation of humanitarian aid commodities around Lake Tanganyika.

With the above contents, the relevancy of this project is sufficient and the efficiency is considered to be significant.

APPENDICES

APPENDICES

Appendix 1 Member List of the Survey Team

(1) Site Survey

Assignment	Name and Position
Team Leader	Mr. Satoshi WAKASUGI Deputy Director, Economic Infrastructure Department, Transportation and ICT Division 1, Transportation and ICT Group Japan International Cooperation Agency (JICA)
Planning Coordinator	Mr. Eita NARITA Deputy Director, Grant Aid Project Management Division 1, Financing Facilitation and Procurement Supervision Department Japan International Cooperation Agency (JICA)
Chief Consultant / Port Planning	Mr. Yutaka OCHI ECOH CORPORATION
Port Facility Design	Mr. Masanori IKEDA ECOH CORPORATION
Natural Condition Survey	Mr. Takahisa AOYAMA ECOH CORPORATION
Environmental and Social Considerations	Mr. Yoshinori MIYAKE PADECO Co., Ltd.
Construction Planning / Cost Estimate	Mr. Kenji KUROKI ECOH CORPORATION

(2) Outline Design Explanation

Assignment	Name and Position
Team Leader	Mr. Makoto ASHINO Senior Advisor to the Director General, Economic Infrastructure Department, Japan International Cooperation Agency (JICA)
Chief Consultant / Port Planning	Mr. Yutaka OCHI ECOH CORPORATION
Port Facility Design	Mr. Masanori IKEDA ECOH CORPORATION
Architectural Design	Mr. Takeyoshi HANADA D.I.C

Appendix 2 Study Schedule

(1) Site Survey

No.	Date	Day	JICA Members		Consultant Members				
			Mr. Wakasugi	Mr. Narita	Mr. Ochi	Mr. Ikeda	Mr. Aoyama	Mr.Miyake	Mr. Kuroki
			Leader	Planning Management	Chief Consultant/ Port Planning	Port Facility Design	Natural Condition Survey	Environmental and Social Considerations	Construction Planning / Cost Estimate
1	05-Nov-11	Sat	Narita(21:20)→		Haneda(21:20) →Osaka(22:30) Osaka(23:20)→				
2	06-Nov-11	Sun	→Doha(05:30), Doha(07:25)→DAR(13:20)		→Dubai(05:45), Dubai (10:50) → DAR(15:20)				
3	07-Nov-11	Mon	Courtesy call and Meeting to EOJ, JICA and MOF/MOT/TPA						
4	08-Nov-11	Tue	Discussion on the project and Minutes with TPA					Hearing to NEMC and Univ.	
5	09-Nov-11	Wed	DAR→Mwanza(JICA), DAR→Tabora(Consultant)						
6	10-Nov-11	Thu	→Kigoma, Site Survey, Courtesy call to Kigoma Port, Site Survey Discussing with TPA, Kigoma Port						
7	11-Nov-11	Fri	Site Survey (Kigoma Port, Kigoma City, Rail Station),				Data Collection Meeting with Reconsignment Surveyors		
8	12-Nov-11	Sat	Team Meeting						
9	13-Nov-11	Sun	Kigoma(12:05)→DAR(15:20) JICA Kigoma(10:50) →DAR(13:50) Consultant				Data Collection		
10	14-Nov-11	Mon	Discussion on the project and Minutes with MOT/TPA, Explanation to MOF, Team Meeting				Data Collection	Discussing with Port	
11	15-Nov-11	Tue	Signing of Minutes with MOF/MOT/TPA, Report to EOJ and JICA				Site Survey	Survey for Water and benthos	Narita(21:20) →
12	16-Nov-11	Wed	DAR(18:15) →Doha(23:50) Doha(01:30)→Narita(19:30)		Data Collection				→Dubai(04:15) Dubai (10:50)→ DAR(15:20)
13	17-Nov-11	Thu						Social Impact Study	Courtesy call to TPA
14	18-Nov-11	Fri			Survey of Dar es Salaam Port				Survey of DAR Port
15	19-Nov-11	Sat			Team Meeting		Data Collection	Water and benthos	Team Meeting
16	20-Nov-11	Sun			Data Collection		Data Collection		Data Collection
17	21-Nov-11	Mon			Data Collection, Analysis Study Data Collection		Site Survey	Meeting with TPA	Data Collection local contractor, supplier, shipping company Public Works
18	22-Nov-11	Tue						Environmental Study	
19	23-Nov-11	Wed							
20	24-Nov-11	Thu							
21	25-Nov-11	Fri						Kigoma(12:05) →DAR(15:20)	
22	26-Nov-11	Sat			Team Meeting		Data Collection	Team Meeting	
23	27-Nov-11	Sun			DAR(6:15)→Kigoma(11:45) Site Survey			Data Collection	DAR(6:15)→ Kigoma(11:45)
24	28-Nov-11	Mon			Meeting with TPA, Site Survey		Site Survey	Hearing to NEMC	Meeting with TPA,
25	29-Nov-11	Tue			Site Survey			Hearing to Local Univ., Data Collection	Site Survey, Data Collec tion of contractor, supplier, shipping company
26	30-Nov-11	Wed			Survey of Kigoma Port facility and Infrastructure			Site Survey	

27	01-Dec-11	Thu			Survey of Kigoma Port facility and Infrastructure	Site Survey	Data Collection	Data Collec on of Temprorary Yard
28	02-Dec-11	Fri					Meeting with TPA	
29	03-Dec-11	Sat			Boarding Investigation		DAR(16:50) →Dubai(23:20)	Site Survey
30	04-Dec-11	Sun			Team Meeting		Dubai(02:55) → NRT(17:20)	Team Meeting
31	05-Dec-11	Mon			Survey of Kigoma Port facility	Site Survey		Materiel survey
32	06-Dec-11	Tue						Meeting with TPA
33	07-Dec-11	Wed			Kigoma(12:05)→Mwanza(13:15) Survey of Mwanza Port			Shipping company
34	08-Dec-11	Thu			Survey of Mwanza Port Mwanza(14:00)→DAR(15:20)			Data Collection of Unit price for Construction
35	09-Dec-11	Fri			Data Collection			
36	10-Dec-11	Sat			Team Meeting	Team Meeting		Team Meeting
37	11-Dec-11	Sun			Data Collection	Data Collection		Kigoma→ DAR
38	12-Dec-11	Mon			Report to Ministry of Transport and TPA	Site Survey		Public Works Data Collection
39	13-Dec-11	Tue			Report to JICA			
					DAR(16:50) →Dubai(23:20)			
40	14-Dec-11	Wed			Dubai(02:30) → NRT(16:55)			DAR Port
41	15-Dec-11	Thu				Meeting with Reconsignment		Data Collection of Unit price for Construction
42	16-Dec-11	Fri				Analysis Study		
43	17-Dec-11	Sat						Data Collection
44	18-Dec-11	Sun				Kigoma(12:05) →DAR(15:20)		
45	19-Dec-11	Mon				Data Collection		Data Collection of Unit price for Construction
46	20-Dec-11	Tue						
47	21-Dec-11	Wed						
48	22-Dec-11	Thu						
49	23-Dec-11	Fri				DAR(16:50) →Dubail(23:20)		DAR(16:50) →Dubai (23:20)
50	24-Dec-11	Sat				Dubai(02:55) → Narita(17:20)		Dubai(02:55) → Narita(17:20)

(2) Explanation of Draft Final Report

No.	Date	Day	JICA Members	Consultant Members		
			Mr. Ashino	Mr. Ochi	Mr. Ikeda	Mr. Hanada
			Leader	Chief Consultant/ Port Planning	Port Facility Design	Architectural Design
1	9-Jun-12	Sat	Narita(22:00)→	Narita(22:00)→		
2	10-Jun-12	Sun	→Doha(5:20) Doha(7:35) → DAR(13:20)	→Dubai(3:50) →DAR Dubai(10:50) →DAR(15:15)		
3	11-Jun-12	Mon	Courtesy Call to JICA and EOJ Courtesy Call to MOT,TPA Brief Explanation of DBD			
4	12-Jun-12	Tue	Discussion on DBD and Minutes			
5	13-Jun-12	Wed	Discussion on DBD and Minutes			
6	14-Jun-12	Thu	Signing of Minutes of Discussions Report to JICA and EOJ			
7	15-Jun-12	Fri	DAR(18:20)→ Doha(23:59)	Explanation to TPA and Site Survey and		
8	16-Jun-12	Sat	Doha(1:25)→ Narita(19:50)	DAR(6:15)→Mwanza(7:45) Mwanza(10:00)→Kigoma(11:10)		
9	17-Jun-12	Sun		Site Survey		
10	18-Jun-12	Mon		Discussion with TPA Kigoma DAR(11:40)→Mwanza(12:50),Mwanza(13:30)→Kigoma(15:00)		
11	19-Jun-12	Tue		Report to EOJ and JICA DAR(16:45)→Dubai(23:30)		
12	20-Jun-12	Wed		Dubai(2:50) → Narita(17:35)		

Remarks

EOJ : Embassy of Japan
MOF : Ministry of Finance
MOT : Ministry of Transport
TPA : Tanzania Ports Authority
DBD : Draft Basic Design
DAR : Dar es Salaam

: Survey at Kigoma

Appendix 3 List of Parties Concerned in the Recipient Country

(1) Government Offices

1) Ministry of Finance

Mr. Ngosha S. Magonya	Commissioner for External Finance
Ms. Marisa	Acting Commissioner for External Finance
Mr. M. K. Mutagwabe	Assistant Commissioner
Mr. Moses W. Dulle	Finance Management Officer
Mr. Abalallah Lyangu	Finance Management Officer

2) Ministry of Transport

Eng. Omar A. Chambo	Permanent Secretary
Mr. John T. J. Mmgodo	Deputy Permanent Secretary
Mr. William M. E. Nshama, Dr.	Director of Transport Services
Mr. Kirenga R. Ndemino	Assistant Director Airport and Meteorology
Mr. E. Mojwahozi	Acting Director for Transport Infrastructure
Ms. T. Mwaijande	Acting Director for Safety and Environment Management
Mr. Eng. H. A Mohamed	Assistant Director for Railway
Mr. Saad S. Y. Fungafunga, Eng.	Assistant Director for Maritime Transport
Ms. Tumpe S. G. Mwaijande	Principal Transport Officer

3) Tanzania Ports Authority (TPA, Head Office)

Mr. Ephraim Ngoza Mgawe	Director General
Mr. Julius S. Mfuko	Deputy Director General
Mr. Florence P. Nkya	Director of Planning& Investment
Mr. Rajah R. Mdoe	Director of Finance
Mr. Bakari Killo	Director of Engineering
Mr. M. A. H. Murisha, Dr.	Director of Management Systems - Environment
Mr. M. M. Ngabo	Representing Director of Finance
Mr. R. Swai, Eng.	Civil Engineering Manager
Mr. Stephen Mlabwa	Business Development Manager
Mr. Hebel Mhanga	Lake Port Manager
Mr. Alex Ndibalema	Estate Manager
Mr. S. I. Msemo	Acting Procurement Manager
Mr. Sleiman Hassan	Research and Information Manager
Mr. Michael Sinba	Acting Procurement Management Unit Manager
Mr. S. Mchomba, Dr.	Principal Management Systems Officer (EMS)
Mr. Damas T. Ndawi	Principal Statistical Officer
Mr. Mnaga Gassaya	Principal Planning Officer
Ms. Kokutulage S. Kazaura	Principal Legal Officer
Mr. Aggrey Joseph	Senior Hydrographer
Mr. Yoeze Senzighe Eng.	Senior Civil Engineer
Mr. Paul Humbi	Senior Statistician
Mr. R. Zander	

4) Tanzania Ports Authority (TPA, Kigoma Office)

Mr. S. G. Nandi	Port Master
Mr. D. Katembo, Eng.	Acting Port Master, Port Engineer
Mr. Medi Mbugi	Deputy Port Master
Mr. Suleiman Kalgendo	Port Officer
Mr. Juma Ladslaus Wanbura	Engineer
Mr. Emmanuel A Ntkanigwa	Engineer

5) Ministry of Lands, Housing Urban Development

Mr. Selassie D. Mayunga, Dr.	Director, Survey & Mapping Division

6) Ministry of Works, Tanzania Building Agency Kigoma (TBA)

Mr. Chaler Babrel Dyatua	Manager

7) Tanzania Ports Authority (TPA, Mwanza Office)

Mr. J. Mutalemwa, Eng.	Port Master
Mr. A.Katempo	Acting Port Master

8) Tanzania National Roads Agency (Tanroads)

Mr. Rayab Mager, Eng.	Project Engineer
Mr. Christina Kayoza, Eng.	Acting Director of Planning
Mr. Eng. N. Mirumbe	Head of Planning (Kigoma)

9) Rail Assets Holding Company (RAHCO)

Mr. Benhadard M. Tito, Eng.	Managing Director

10) University of Dar es Salaam

Mr. Fedrand, Dr.	Head, Dept. of Geology

11) Prime Minister's Office (Regional Administration and Local Government)

Mr. Valentino Francis Bangi, Dr.	Regional Medical Officer, Kigoma Regional Secretariat, Regional Health Management Team

12) Vice President's Office, Kigoma (Environmental Dept.)

Dr. Hudson H. Nkotagu, Dr.	National Coordinator, National Coordination Unit Lake Tanganyika Project
Mr. Steve Ngopa	Social Economist, National Coordination Unit Lake Tanganyika Project
Mr. Godlove Mwamsojo	Environmental Officer, National Coordination Unit Lake Tanganyika Project

13) Region Commissioners' Office

Mr. Petter H. Killewo, Eng.	Assistant Region Ambisious Prive Secretary
Mr. Jailos K. Pilla	Town & Rural Planner, Regional Secretariat

14) Kigoma Ujiji Municipal Council

Mr. John Nchilla, Eng.	Acting Municipal Director
Mr. Leonald Y. Nqicaylunde	Municipal Environmental Officer
Mr, George A. Kusiluka	Municipal Economist

15) Kigoma Police Office

Mr. Fraser Kashay	Regional Police Officer
Mr. Kiheya M. Kihenya	Staff Officer
Mr. Joseph Konyo	Regional Crime Officer

16) Kigoma Station

Mr. Fanuel J. Luwonubwa	Station Master
Mr. C.F. Ndenge	Chief of Rail Transportation
Mr. Ally M. Gunguti	Traffic Agent
Mr. Kiango Siagano	Acting Station Master

17) Kigoma Immigration Office

Mr. Salum Mtulia	Immigration Officer
Mr. Alinauswe Jackson	Immigration Officer

(2) International Agency

1) United Nations High Commissioner for Refugees (UNHCR)

Mr. Nabil Makki	Senior Supply Officer (Dar es Salaam)
Mr. Bernadette Castel	Head of Field Office (Kigoma)

2) World Food Programme (WFP)

Mr. Richard Ragan	Representative and Country Director (Dar es Salaam)
Mr. Mahamud Mabuyu	National Logistics Officer (Dar es Salaam)
Mr, Abebe Hankore	HSO & PRRO Coordinator (Kigoma)

3) Embassy of Denmark

Mr. Torben Traustedt Larsen	Counselor (Development) International Development Cooperation

(3) Private Company

1) Marine Service Company LTD. (MSCL)

Mr. Alex F. Mchauru	General Manager (Head Quater)
Mr. Projest Samson Kaija	Acting Branch Manager (Kigoma)
Mr. Xavier Kapinga	Maintenance Manager (Kigoma)
Mr. Giliad Abel	Commercial Officer (Kigoma)
Mr. Titus Benjamin, Capt.	Senior Captain of Liemba

2) Tanzania Railways Limited (TRL)

Mr. Hassan A Shaban	Principal Commercial Manager
Mr. Fanuel	Lugonzibra Statistics Officer (Kigoma)

3) Cricil Infrastructure Advidory (Consultant Company of India)

Mr. Saurabh Suneja	Team Reader

4) Thorndahl Consult (Consultant Company of Denmark)

Mr. Kaj Thorndahl	Chief Consultant

5) Environmental Association of Tanzania (ENATA LTD.)

Mr. Beatus Mboya	Environmental Consultant

6) Computer Repair Co. (Owner of Mv. Malagarasi)

Mr. Mubarak Hawud

7) Raviji Construction LTD. (Construction Company)

Mr. Raviji Vasan	Director
Mr. Chandres	Project Manager
Mr. Hiren	Financial Officer
Mr. Pasco	Operation Manager

8) CSI.Company (Construction Company)

Mr. Chris Glasson	Manager
Mr. Tom Laverick	Construction Director
Mr. Sreejith S. Nair	Director

9) MAC CONTRACTORS CO. LTD (Construction Company)

Mr. Lawrence G Mwakyambiki	Director

10) Estim Construction Co. LTD (Construction Company)

Mr. Jagdish K. Bhudia	Director

11) FRANKI (Piling Company of South Africa, Branch at Dar es Salaam)

Mr. Michael Scott	Contracts Manager

12) Vigu Trading Co. Ltd (Transportation Company)

Mr. Virani J. Mkomba	Director

13) JAMBO FREIGHT LDT (Transportation Company)

Mr. Hassan A Shaban	Principal Commercal Manager

14) Simba Cement (Cement Company)

Mr. Samwel L. Kitumbo	Regional Sales Manager

15) Nabaki Africa LTD (Construction Material Company)

Mr. Jeff Kayton	Sales Manager

16) DIY (Construction Material Company)

Mr. T. SaravanaKkumar Gopafa	Head Project

17) CTM (Construction Material Company)

Mr. Shiraz Satchu	CTM Operation of Imports & Distribution

18) Kigoma Urban Water Supply (KUWASA)

Mr. Mbike Jones	Account Manager

19) Tanzania Electric Supply Company Limited (TANESCO KIGOMA)

Mr.Asanawi I. Ngusi	Station Engineer

20) MOSACO ROADWORKS LTD (Construction Company)

Mr. Mohamed Ally	Director

21) CHICO (Chinese Construction Company)

Mr. Zhang Jum Ling	Project Manager

22) CARITAS BUILDING UTIT Co. LTD (Construction Company)

Mr. Mamilo Eliazar	Managing Director

23) C.J. ENGINEERING. LTD (Construction Company)

Mr. Samwel Isaya	Managing Director
Mr. Mkenga Mburi	Assistant Manager

24) Nyakirangani Construction Limited (Construction Company)

Mr. Mouza	Director
Mr. Mkenga Mburi	Assistant Director

(4) Japanese Parties

1) Embassy of Japan in Tanzania

Mr. Masaki OKADA, H.E.	Ambassador of Japan
Mr. Yukinori SEKI	Commercial Attache

2) JICA Tanzania Office

Mr. Yukihide KATSUTA	Chief Representative
Mr. Hajime IWAMA	Senior Representative
Mr. Shin Maruo	Representative
Mr. Eisuke TACHIBANA	Project Formulation Advisor

Appendix 4 Minute of Discussion (M/D)

4.1 Minutes of Discussion (Field Survey, November 2011)

MINUTES OF MEETINGS

ON

THE PREPARATORY SURVEY

ON

THE PROJECT FOR THE REHABILITATION OF KIGOMA PORT

IN

THE UNITED REPUBLIC OF TANZANIA

Based on the discussions held between the Government of the United Republic of Tanzania and the Japan International Cooperation Agency (hereinafter referred to as "JICA") during the Data Collection Survey on Transport and Trade around Kigoma Port in February, 2011, JICA dispatched a Preparatory Survey Team (hereinafter referred to as "the Team") on the Project for the Rehabilitation of Kigoma Port (hereinafter referred to as "the Project") to the United Republic of Tanzania.

JICA sent the Team, which is headed by Satoshi Wakasugi, Deputy Director, Transportation and ICT Division 1, Transportation and ICT Group, Economic Infrastructure Department, JICA, and is scheduled to stay in the country from November 6, 2011 to December 23, 2011.

The Team held a series of discussions with the officials of the Tanzanian side and conducted a field survey at the Project area. In the course of discussions and survey, both sides confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare a Draft Report of the Preparatory Survey.

Dar es Salaam, November 14, 2011

Mr. Satoshi Wakasugi
Leader
Preparatory Survey Team
Japan International Cooperation Agency

Mr. Ephraim Ngowa Mgawe
Director General
Tanzania Ports Authority

Witnessed by

Eng. Omar A. Chambo
Permanent Secretary
Ministry of Transport

Mr. Ngosha S. Magonya
Commissioner for External Finance
Ministry of Finance

ATTACHMENT

1. Objective of the Project

The objective of the Project is to contribute to the rehabilitation of Kigoma Port.

2. Project Site

The site of the Project is located at Kigoma Port which is shown in Annex-1.

3. Responsible and Implementing Organizations

3-1. The responsible organization of the Project is the Ministry of Transport (hereinafter referred to as "MoT").

3-2. The implementing organization of the Project is Tanzania Ports Authority (hereinafter referred to as "TPA").

3-3. The organization chart of MoT and that of TPA are shown in Annex-2.

4. Components of the Project

4-1. Both sides confirmed that the prioritization of the component of the Project are as follows ;

- Top Priority : Rehabilitation of Passenger Berth
- 2nd Priority : Construction of Passenger Terminal Building
- 3rd Priority : Construction of Cargo Shed
- 4th Priority : Construction of Access Road

4-2. Both sides confirmed that the prioritization as mentioned in the above would be considered when JICA prepare the draft report through analysis on the Preparatory Survey and discussion with concerned parties including the Ministry of Foreign Affairs in Japan.

5. Japan's Grant Aid Scheme

5-1. The Tanzanian side has shown a full understanding to the Japan's Grant Aid Scheme explained by the Team, as described in Annex-3 and Annex-4.

5-2. The Tanzania side will take the necessary measures, as described in Annex-5 and Annex-6 noted below, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Environmental and Social Considerations

6-1. The Tanzanian side confirmed that the Tanzanian side will submit "Project Brief" and "Preliminary Environmental Assessment Registration Form" to the National Environment Management Committee (NEMC) by December 15, 2011, and will inform the result of the NEMC screening to JICA Tanzania Office by the end of January 2012.

6-2. The Tanzanian side confirmed that if EIA or Preliminary Environmental Assessment (PEA) is necessary, the Tanzanian side will present schedule of the procedure to JICA Tanzania Office by February 10, 2012, and implement EIA and/or PEA study.

6-3. The Tanzanian side agreed to allocate budget for EIA study, land acquisition, resettlement and compensation for Project Affected Persons (PAPs) and secure the land before the implementation of the Project.

6-4. Regarding a part of the access road owned by Kigoma municipality, The Tanzanian side confirmed that TPA on behalf of the Tanzanian side will take required procedures as mentioned in the above.

7. Schedule of the Study

7-1. The consultants will proceed to further studies in both Kigoma and Dar es Salaam until December 23, 2011.

7-2. JICA will prepare the draft report and dispatch a mission in order to explain its contents around May, 2012.

8. "Construction of Jetty at Kibirizi Point in Lake Tanganyika" Project

8-1. The Tanzanian side clarified in the official letter (Ref.No. KG/EN/6/3/01) dated November 11, 2011 sent from Director General of TPA to the Team, that "Construction of Jetty at Kibirizi Point in Lake Tanganyika" Project does not include passenger berth and passenger related facilities.

8-2. The Tanzanian side confirmed that Kigoma Port will be the only passenger berth and terminal in Kigoma Bay, and its function as passenger berth remains in accordance with the Tanzania Port Master Plan.

8-3. Regarding the ongoing tendering process for "Construction of Jetty at Kibirizi Point in Lake Tanganyika" Project, TPA will amend the tender document deleting "passenger berth and passenger related facilities" component. TPA will send addendum of amendment to the Team by November 24 2011.

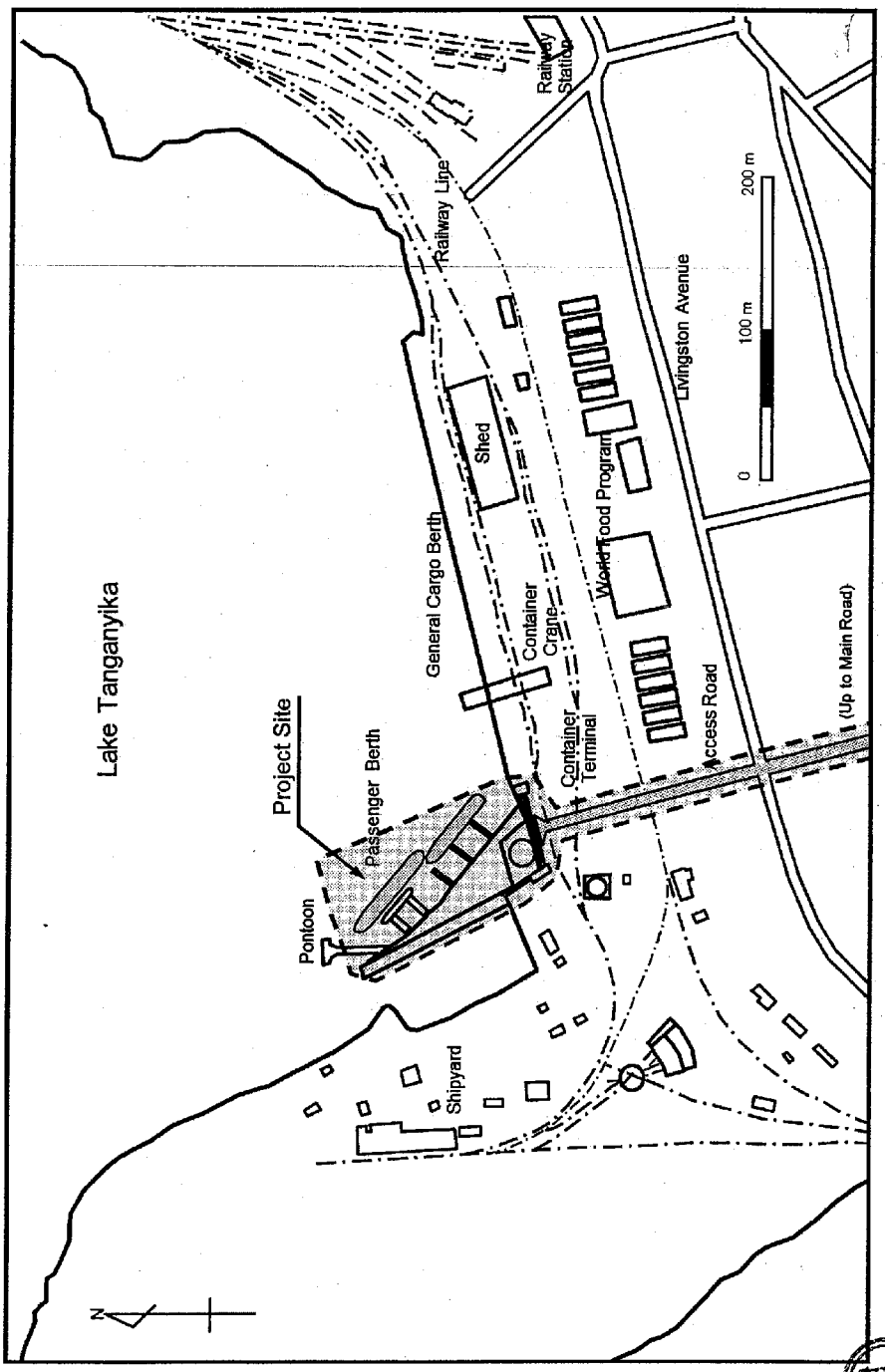
9. Other Relevant Issues

9-1. Both sides confirmed that components of the Project shall comply with SOLAS convention under IMO.

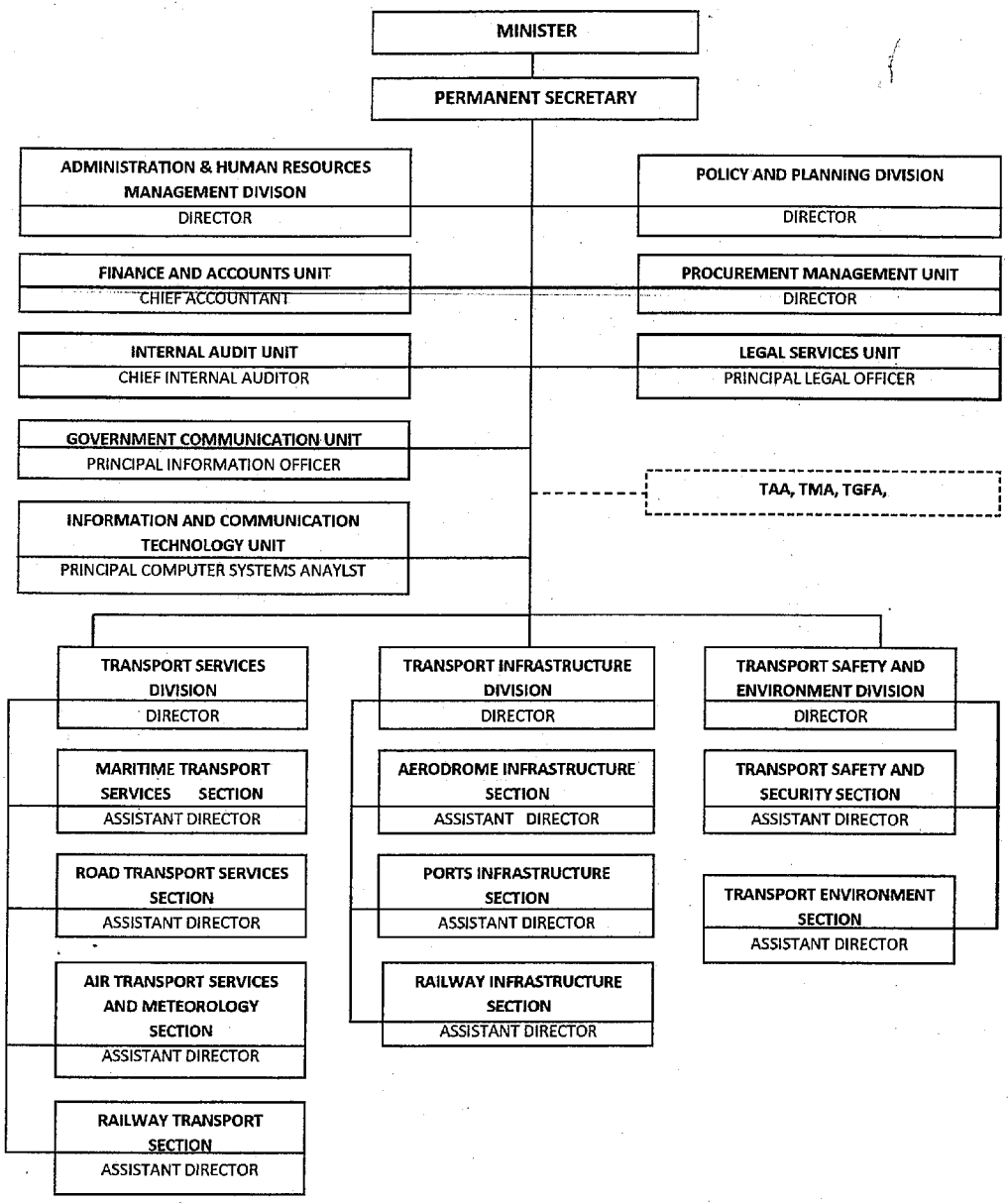
9-2. The Tanzanian side confirmed that the undertakings during the Preparatory Survey shown in Annex-6 should be taken by the Tanzanian side at the Tanzanian expenses under the Project.

Annex-1 Project Site
Annex-2 Organization Structure
Annex-3 Japanese Grant Aid
Annex-4 Japanese Grant Aid Flow Chart
Annex-5 Major Undertakings to be taken by Each Government
Annex-6 Undertakings to be taken by the Tanzanian side during the Preparatory Survey

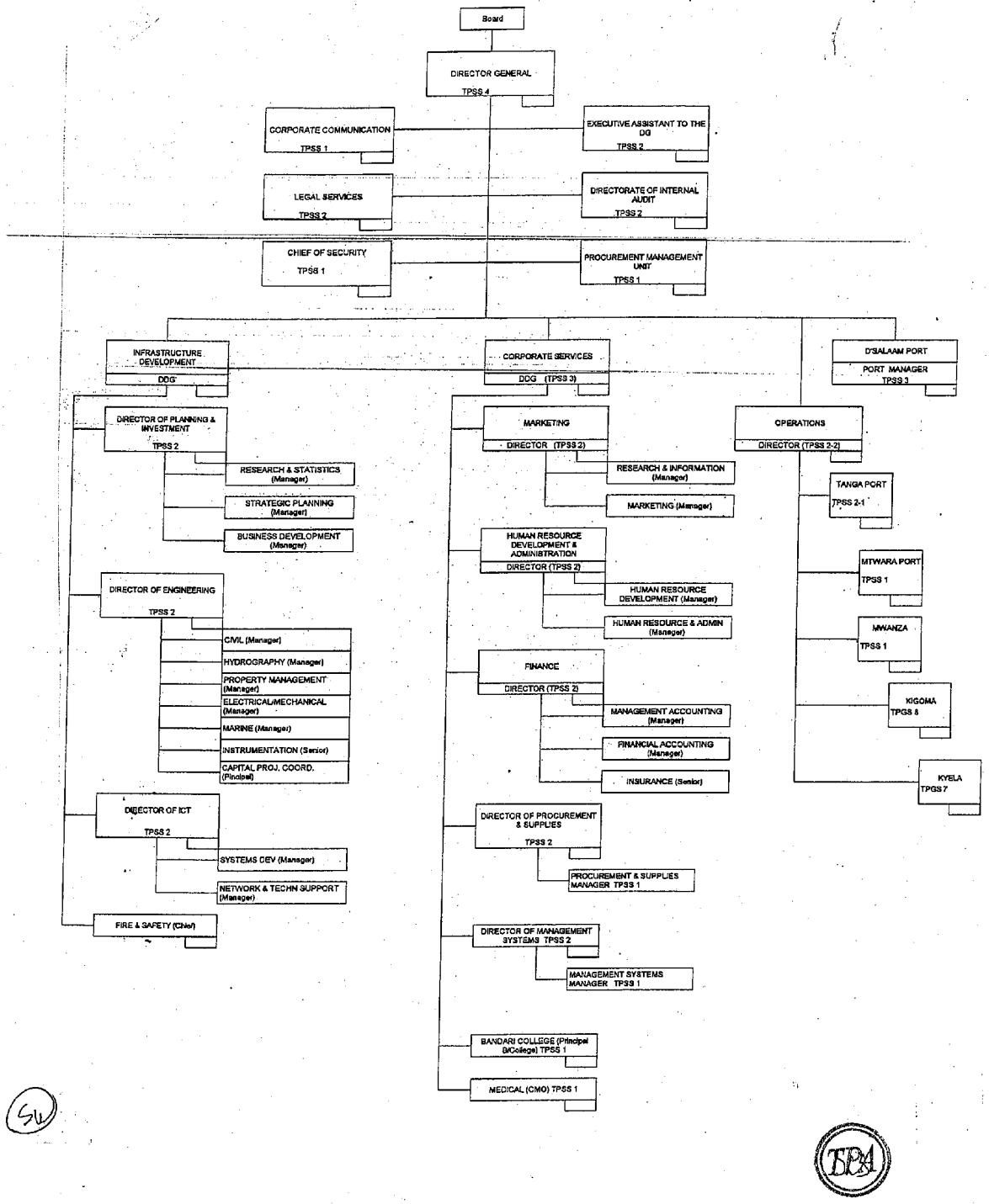
Annex-1 Project Site



Annex-2 Organization Structure (Ministry of Transport)



Annex-2 Organization Structure (Tanzania Ports Autority)



JAPAN'S GRANT AID

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

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

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

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

2. Preparatory Survey

(1) Contents of the Survey

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

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

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

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

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

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

3. Japan's Grant Aid Scheme

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

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

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

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

(5) Major undertakings to be taken by the Government of the Recipient Country
In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

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

(7) "Export and Re-export"
The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

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

(9) Authorization to Pay (A/P)

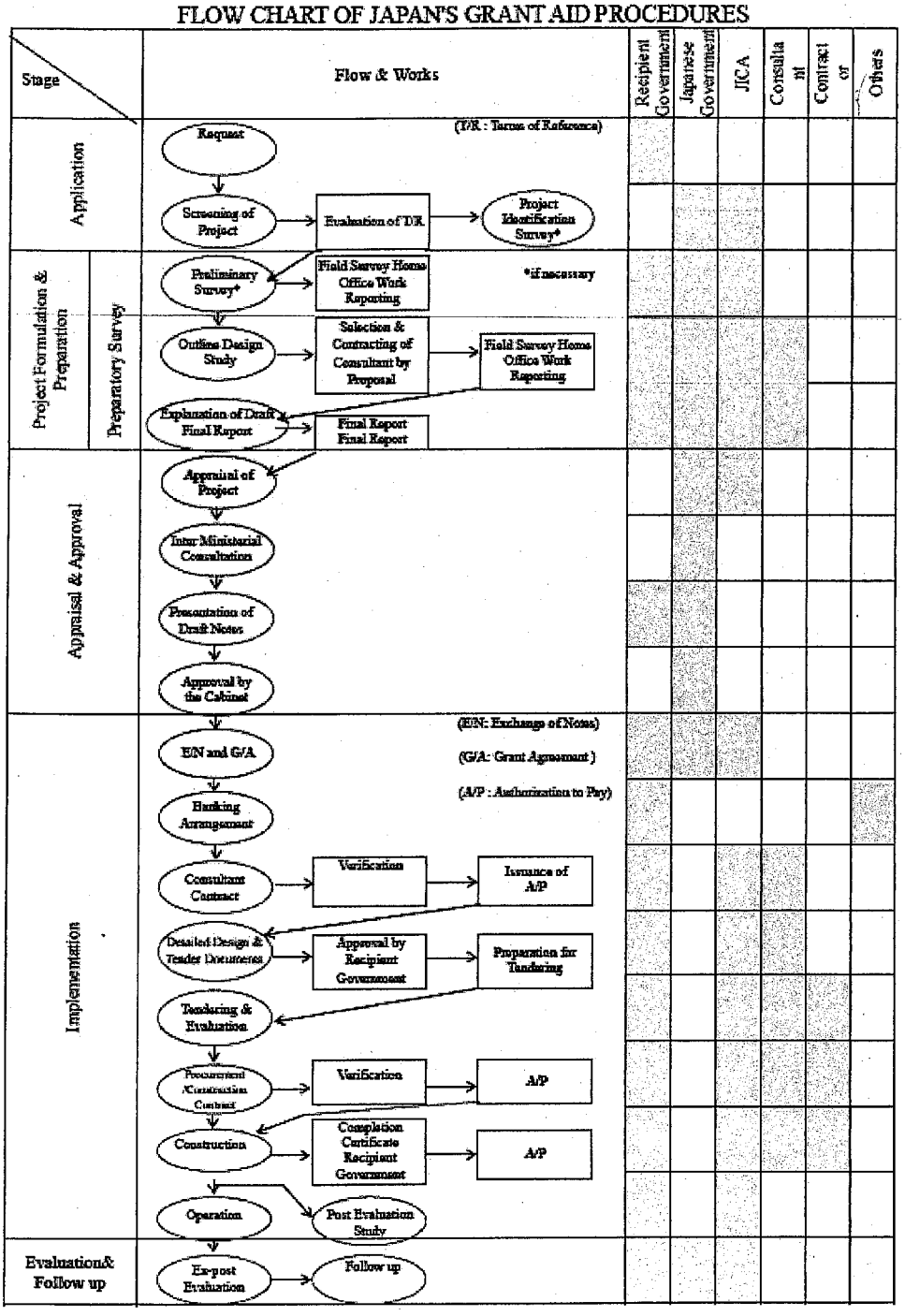
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

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

Annex-4 Japanese Grant Aid Flow Chart

FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



Annex-5 Major Undertakings to be taken by Each Government

No.	Items	To be covered by the Japanese Grant	To be covered by the Tanzania Government
1	To secure land (Project site , Temporary yard and etc.)		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences at and around the site		●
4	To construct a parking lot		●
5	To construct roads (the execution is studied based on the study result on the priority of components, necessity and urgency)		
	1) Within the site (within port area and the neighboring area)	●	
	2) Outside the site (the areas other than the above)		●
6	To secure disposal area for dredged soil and construction waste		●
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity (a. Distributing line to the site)		●
	2) Water Supply a. City water distribution to the site		●
	3) Drainage (when existed)		
	a. City drainage main (for storm, sewer and others) to the site		●
	b. Drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Fuel and Fire Hydrant		
	a. City gas distribution to the site(when existed) b. Fire Hydrant		●
	5) Telephone System		
	a. Telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To obtain construction permit for the works executed by Grant Aid Cooperation (when necessary)		●
9	To conduct the EIA (Environmental Impact Assessment)		●
10	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
11	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country for the equipment procured under the scheme of Grant Aid Cooperation. (including re-consignment to local companies)		
	1) Marine(Air) transportation of products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
12	To accord Japanese nationals whose services may be required in connection with the supply of products and the services under verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
13	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
14	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
15	To bear all the expenses including allocation of necessary staff and their cost, for the facilities operation and maintenance and management, other than those to be borne by the Grant Aid.		●
16	To take necessary countermeasures when sand accretion and contamination are generated in front of revetment after completion of this project.		●

(B/A: Banking Arrangement, A/P: Authorization to pay)

Annex-6 Undertakings to be taken by the Tanzanian side during the Preparatory Survey

(1) To provide the Team with available relevant data, information and materials necessary for the execution of the Survey.
(2) To prepare all answers for the Questionnaire presented by the Team until December 23, 2011.
(3) To assign full-time counterparts to the Team during their stay in Tanzania, to play the following roles as the coordinator to the Team.

a) To make the appointments, set up the meetings with authorities, departments and all other related organization whatever the Team intends to visit.
b) To attend the site survey and any other visiting place with the Team and to make any convenience on accommodation, working room, adequate transportation, getting the permissions if required, etc.
c) To assist and to advise the Team for their collection of data and information as much as possible.

(4) To secure the permission to photograph and enter into private properties and restricted areas for the Team for proper execution of the Survey, if necessary.
(5) To take any measures deemed necessary to secure the safety of the members of the team.
(6) To make arrangements to allow the team to bring back to Japan or other third countries any necessary data, maps and materials related to the Survey, subject to approval by the Government of Tanzania, in order to analyze the project and prepare the reports.
(7) To assist the Consultant and relevant survey Companies for field survey under the contract with ECOH Corporation in customs clearance of equipment such as boring machines, sounding equipment, topographic survey equipment and survey instruments, etc.

(2) Minutes of Discussion (Explanation of Draft Final Report, June 2012)

MINUTES OF MEETINGS

ON

THE PREPARATORY SURVEY

ON

THE PROJECT FOR THE REHABILITATION OF KIGOMA PORT

IN

THE UNITED REPUBLIC OF TANZANIA

In November 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Preparatory Survey on the Project for the Project for the Rehabilitation of Kigoma Port (hereinafter referred to as "the Project") to the United Republic of Tanzania, and through discussions, field survey and technical examination of the results in Japan, JICA prepared a draft report of the survey.

In order to explain and to consult with the concerned officials of the Tanzania Ports Authority and other relevant organizations (hereinafter referred to as "Tanzanian side") on the contents of the draft report, JICA sent to Tanzania, the Explanation Team of Draft Report of the Preparatory Survey (hereinafter referred to as "the Team"), which is headed by Mr. Makoto Ashino, Senior Advisor to the Director General, Economic Infrastructure Department, JICA, from June 10th to June 19th, 2012.

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

Dar es Salaam, June 14th, 2012

Mr. Makoto Ashino
Leader
Preparatory Survey Explanation Team
Japan International Cooperation Agency

Mr. Ephraim Ngoza Mgawe
Director General
Tanzania Ports Authority

Witnessed by

Eng. Omar A. Chambo
Permanent Secretary
Ministry of Transport

Mr. Ngosha S. Magonya
Commissioner for External Finance
Ministry of Finance

ATTACHMENT

1. Project Components and Draft Report

The Tanzanian side agreed and accepted in principle the Project Outline shown as in Annex-1. The Tanzanian side also accepted in principle the contents of the draft report of the Preparatory Survey explained by the Team.

2. Japan's Grant Aid Scheme

Both sides reconfirmed the Japan's Grant Aid scheme and the necessary measures to be taken by the Tanzanian side as explained by the Preparatory Survey Team as described in the Annex-5 of the Minutes of Meeting signed by both sides on November 14, 2011. The Tanzanian side understands that the Team is not in the position to guarantee implementation of the Grant Aid Project, this position is the responsibility of the Government of Japan.

3. Schedule of the Study

JICA will complete the Final Report in English, by incorporating comments given to the Team during explaination of the Draft Report to the Tanzanian side, and send it to the Tanzanian side through JICA Tanzania Office by end of July, 2012.

4. Cost Estimation

Both sides agreed that, in order to secure a fair and equitable procurement, the Project Cost Estimation as attached in Annex-2 should never be duplicated or released to any third parties before the signing of all the Contract(s) for the Project.

5. Environmental and Social Considerations

5-1. The Tanzanian side agreed to carry out and complete the EIA (Environmental Impact Assessment) including its certification process.

5-2. Both sides agreed to the contents of the Environment Check List as shown in Annex-3.

5-3. The Tanzanian side agreed that monitoring for Environmental and Social Considerations should be conducted by Tanzania Port Authority (TPA) in accordance with the Monitoring Plan for the Project as described in the Preparatory Survey and EIA reports. The results of monitoring will be provided to JICA by filling in the Monitoring Form attached as Annex-4, during pre-construction phase, construction phase, and after completion of the Project.

5-4. The Tanzanian side agreed that JICA will disclose monitoring results for Environmental and Social Considerations conducted by TPA on JICA's website and report them to the Advisory Committee for Environmental and Social Considerations that is in accordance with JICA's regulations.

6. Other Relevant Issues

6-1. The Tanzanian side agreed to secure necessary budget and personnel for operation and maintenance of the Kigoma Port rehabilitated through the Project.

6-2. Both sides confirmed that the following undertakings to be taken by the Tanzanian side with the Tanzanian side's expenses.

a. Temporary Passenger Terminal During Construction Period

During the construction period of the Project, the existing passenger terminal with relevant facilities will be allocated at an appropriate area along the cargo berth or the container berth in Kigoma Port.

b. Pontoon Relocation

Pontoon on the tip of the current passenger berth will be relocated from the existing location and will be utilized in other area in Kigoma Port.

c. Temporary Construction Yard and Dumping Area

Temporary construction yards and dumping area required for the construction works of the Project will be allocated in the vicinity area of the construction site.

d. Application of ERB and CRB

Applications of Engineer Registration Board (ERB) and Contractor Registration Board (CRB) at the project implementation stage will be undertaken by TPA. Necessary certificates of profession or recognition for submission to ERB and CRB will be prepared and submitted to TPA by the construction company and the consulting company be procured in Japan who will be engaged to undertake the Project.

e. Site Secure and Clearance

Project site will be secured and cleared and utilization control of the water basin will be secured.

f. Banking Arrangement (B/A), and Opening of Authorization to Pay (A/P)

g. Tax exemption

Necessary assistance for tax exemption and custom clearance for the Project related equipment, materials and facilities including timely issuance of Government Notice,

6-3. The schedule of the commencement of construction and implementation the Project will be informed by the Government of Japan to the Government of Tanzania in case of the Project is accepted as a Grant Aid. The Tanzanian side expressed their expectation for the early commencement and implementation of the Project.

6-4. The Tanzanian side requested designing review, and the Team will reconsider as follows;

a. VIP Lounge

VIP Lounge with a toilet accommodating up to 20 passengers should be designed instead of MSCL Office and storage.

b. Toilet for Handicapped Passenger

Design for handicapped passenger should be considered in men and women toilet.

c. Weigh Bridge

The expected location of weigh bridge to be procured by TPA in future should be figured in the Layout Plan for future increase of cargo volume.

Annex-1 Project Outline

Annex-2 Project Cost Estimation

Annex-3 Environmental Check List

Annex-4 Monitoring Form

Annex-1

Project Outline

(1) Passenger Wharf

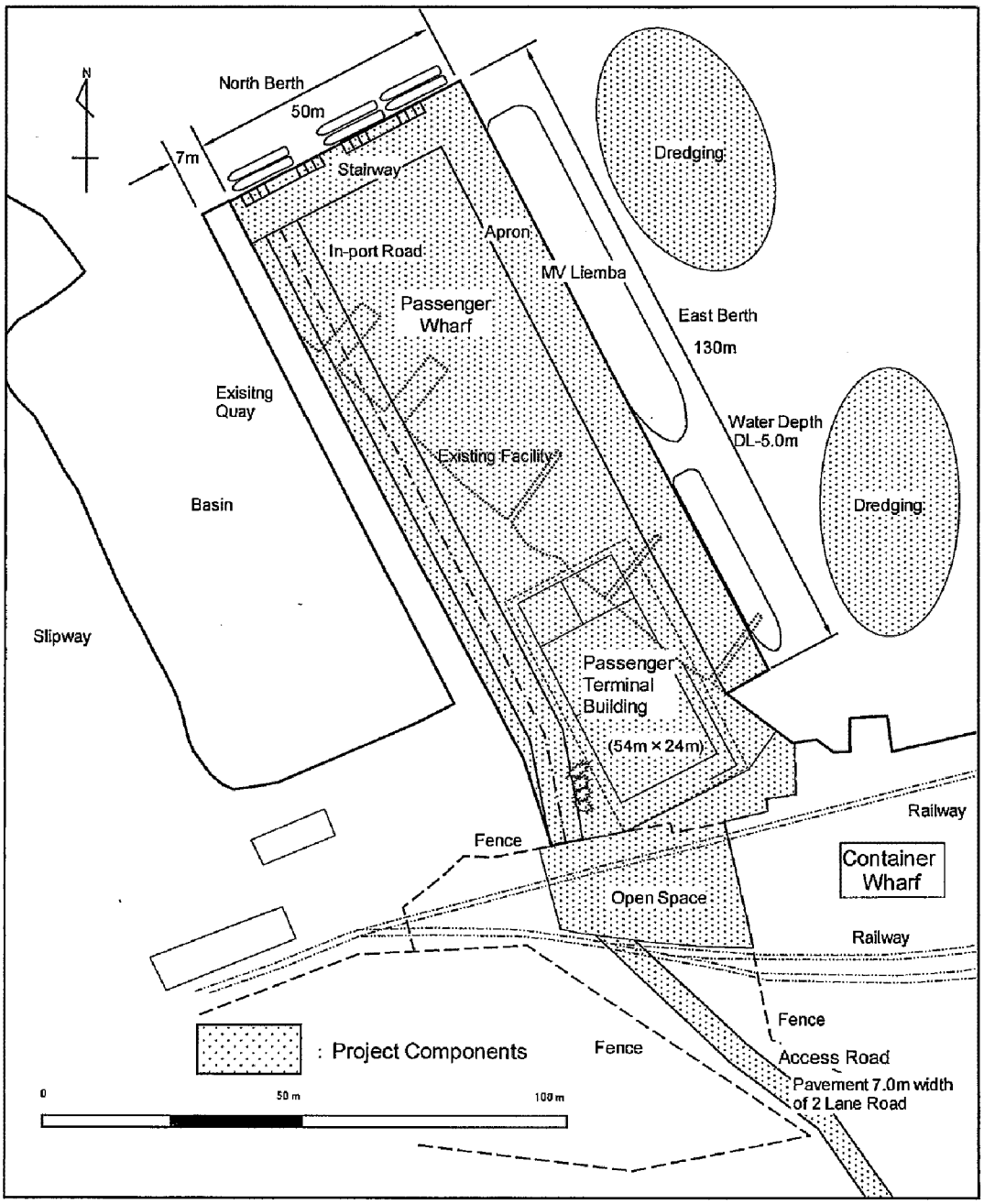
Facility	Particulars	Current Project Plan
East Berth	Target Vessel Extension Water Depth	Passenger Ships 130 m DL -5.0 m
North Berth	Target Vessel Extension Water Depth Ancillary Facility	Small Boats and Ships 50 m Existing Water Depth Stairway for Small Boats
Passenger Wharf	Wharf Area Additional Facility	Passenger Terminal Building, In-port Road, Cargo Sorting Area, Cargo Handling Area, Cargo Loading Area Beacon, Security Light

(2) Access Road

Facility	Particulars	Current Project Plan
Access Road	Width Extension	Pavement 7.0 m of 2 Lane Road 471m, Passenger Terminal to Bangwe Road
Front Open Space of Passenger Terminal	Paving Area	949m^2

(3) Passenger Terminal Building

Facility	Particulars	Current Project Plan
Administration & Service Zone	CIQ Booths	4m x 4m = 16m^2 3 Booths (48m^2)
	Ticket Gate & Security Booth	4m x 4m = 16m^2 1 Booth
	Ticket Booth	4m x 5m = 20m^2 1 Booth
	Administration Offices	4m x 6m = 24m^2 2 Offices (48m^2)
	Kiosk	5m x 4m = 20m^2 1 Booth
	Toilet	5m x 6m = 30m^2 2 Rooms (60m^2)
	Passenger Waiting Lobby	40 Passengers with Benches
	Storage	4m x 4m = 16m^2 1 Room
	Floor Area of Zone	24m x 24m = 576m^2
Passenger Waiting Zone	Capacity	360 passengers with Benches
	Floor Area of Zone	16m x 22m = 352m^2
Weighing & Storage Zone	Cashier Box	5m x 4m = 20m^2
	Scale Space	5m x 4m = 20m^2
	Temp. Cargo Stock Space	9m x 10m + 5m x 6m =120m^2
	Cargo Storage	11m x 8m + 9m x 4m = 124m^2
	Ship Gear Locker	3m x 8m = 24m^2
	Floor Area of Zone	14m x 22m = 308m^2
Total Floor Area of Building		54m x 24m = 1,296m^2



Layout Plan of Project Components

CONFIDENTIAL

Annex-2

Confidential

Project Cost to be Borne by Japan's Grant Aid

Environmental Check List

Category	Environmental Item	Main Check Items	Yes: Y No: N	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 host 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 host country's government?	(a) N (b) N (c) N (d) N	(a) No. However, the Tanzania Port Authority (TPA) will submit the Project Brief and Preliminary Environmental Assessment Registration Form to the National Environmental Management Committee (NEMC) before mid December, 2011, to be subjected for screening. (b) No. However, TPA have already began the EIA procedure, by assigning a registered EIA expert to submit the EIA application documents (Project Brief and Application Form) to NEMC. The tentative schedule in accordance with the result of screening (requiring 45 days after EIA application) shall be informed from TPA later. (c) The EIA report hasn't been approved yet, therefore, we do not know whether EIA approval shall go along with specific conditions or not at this stage. However, once imposed, TPA shall comply with the conditions set forth by the Authority. (d) The sole EIA regulatory body, NEMC, will instruct whether a Preliminary Environmental Assessment is required or not, for identifying whether to proceed on with the EIA process or not.
	(2) Explanation to the 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? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) (Y) (b) (Y)	(a) If EIA or the Preliminary Impact Assessment were found required in accordance with the result of screening, then the project will be subjected for public hearing (at the draft EIA TOR stage, in case of EIA). A brief outline of the subjected project, the draft EIA TOR and the benefits and assumed adverse impacts shall be explained to the stakeholders. (b) The stakeholders comments will be reflected to the EIA TOR.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) The focal point in terms of alternative plans regarding the subjected project shall be on the discussion whether to select the land reclamation alternative or the pier construction alternative. In consideration to the probable impact toward hydrological situation and on habitats of endemic benthos species around the subjected berth for rehabilitation, the consideration of the pier alternative may be an appropriate method in the perspective of preserving the ecosystem. However, the steel sheet pile type of structure with land reclamation method was considered as the most appropriate one, due to following reasons: (1) Even by the pier type of structure, land reclamation shall also be required up to a wide range of area, thus preservation of the habitat shall be very limited, (2) also the pier will make a shade to the existing habitat, thus existing underwater plant beds shall not be able to survive, (3) the steel sheet pile by land reclamation is the only method that is capable for renovation, when the lake surface may level down in the future, due to its tendancy, (4) and likewise with other proposed structures, it is endurable to earthquakes at highest level of international standard, (4) and also is the safest construction method for the construction workers, (5) as well as the most cost effective one.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2 Pollution Control	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted from ships, vehicles and project equipments comply with the country's emission standards? Are any mitigating measures taken?	(a) (N)	(a) The Environmental Management Plan (EMP) to be included in the EIA Report (or EIS), shall describe whether the ambient air quality around the project site might comply with the Tanzanian emission standards or not. The Tanzanian ambient air quality standard is shown in the National Environmental Standards Compendium 2005, whereby the Standard is based upon the WHO Guideline. However, at present, there are no official data on the ambient air quality of Kigoma city nor there are any monitoring activities. During planning stage, less polluting construction vehicles & machineries will be selected, with regulartory maintenance during construction. Ref.: MV Liemba = still operational passenger and cargo ferry, since the once sunk German Naviad ship was renovated for passenger and cargo use in 1924 by the British Royal Navy; triple expansion steam engine until 1971, replaced by 2 screw diesel engine, with installed power of 500ihp [370 kW] capable of 9 knots [17km/h] speed. Mitigation measure to mitigate air pollutants from this ship is out of scope of the project.
	(2) Water Quality	(a) Do effluents from the project facilities comply with the country's effluent and environmental standards? (b) Do effluents from the ships and other project equipments comply with the country's effluent and environmental standards? (c) Does the project prepare any measures to prevent leakages of oils and toxicants? (d) Does the project cause any alterations in coastal lines and disappearance/appearance of surface water to change water temperature or quality by decrease of water exchange or changes in flow regimes? (e) Does the project prepare any measures to prevent polluting surface, sea or underground water by the penetration from reclaimed lands?	(a) Y (b) - (c) - (d) N (e) Y	(a) The Japanese side is ready to provide port facilities that will comply with Tanzanian laws and regulations. The Maximum Permissible Concentration (MPC) of domestic wastewater and industrial wastewater discharge is stipulated in the Water Utilization (Control and Regulation) (Amendment) Act, 1981. Trigger Level (TL) are regulated whereby, if the water quality exceeds the TL level, a study for investigation and mitigation measure shall be advised to be executed and set forth. (b) The Japanese side is ready to provide other project equipments that will comply with the Tanzanian effluents and environmental standards. As for evaluation of the ship, it is out of scope from the subjected project, thus not applicable. (c) Not in particular. The measure is out of scope from the subjected project. (d) The change in alterations of coastal line and disappearance of surface water to change the flow regimes shall depend on consideration of alternatives by land reclamation or pier construction alternative for the rehabilitation of the berth. (e) A sheet protecter shall be installed around the land reclamation and dredging area, in order to minimize impact from dredged soil, in spreading around to the surrounding waters (with possibility of contaminating the waters or impact towards habitat to bentic species and underwater plant beds, etc.). Also, in case the bottom sediment of dredging soil were found contaminated by heavy metal, for instance, an alternative to dispose or treat the dredged soil to a landfill, etc. at a remote area from Kigoma City shall be put into consideration (rather than utilizing the dredged soil for land reclamation of the berth in accordance with the initial plan).

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(3) Wastes	(a) Are wastes generated from the ships and other project facilities properly treated and disposed of in accordance with the country's regulations? (b) Is offshore dumping of dredged soil properly disposed in accordance with the country's regulations? (c) Does the project prepare any measures to avoid dumping or discharge toxicants?	(a) N (b) - (c) Y	(a) Ships and boats at Lake Tanganyika do not have waste recepticals, nor do Kigoma port facilities have any septic tanks. For ref., waste related regulations are stipulated in EMA 2004 (Artiles: 110 (1), 114 to 139) (b) Dredged soil shall not be dumped offshore of the lake, therefore the question is not applicable. (c) In case the bottom sediment of dredging soil were found contaminated by heavy metal, for instance, an alternative to dispose or treat them at a landfill, etc. at a remote area from Kigoma City shall be put into consideration (rather than utilizing the dredged soil for land reclamation of the berth in accordance with the initial planning) (however, the project shall not deal with planning of any appropriate measures for disposal or treatment of discharged toxicants from the passenger/cargo ship, MV Liemba, since it is out of scope of the project)
2 Pollution Control	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) N	There are no Tanzanian national level law and regulations or standards on noise and vibration. However, TPA's Occupational Safety and Environmental Regulations (TPA - OSHE) 2010 (noise premissible level, depending on type of area) are recommended to be applied at ports in Tanzania. Its maximum permissible level is 85 dB. Low noise and vibration type of construction vehicles and machineries that will comply with such standard, shall be selected during the planning phase. In terms of trains, a US standard is applied (for trains operating twice a week at Kigoma).
	(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) Not applicable
	(6) Odor	(a) Are there any odor sources? Are adequate odor control measures taken?	(a) N	(a) Possible sources include direct discharge of domestic wastewater into the Lake through storm water drainage system and industrial wastewater (ex. waste oil discharge by Tanesko power plant, possible influence by oil terminal close to Kibirizi).
	(7) Sediment	(a) Are adequate measures taken to prevent contamination of sediments by discharges or dumping of hazardous materials from the ships and related facilities?	(a) N	(a) Adequate measures in terms of ships is not be applicable, since it is out of spec from the Project.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) Convention on Sustainable Management of Lake Tanganyika was ratified by the four related countries (Tanzania, DRC, Burundi and Rwanda) in 2008, however the Convention does not designate any protected area, though has a mission to conserve its nature sustainably (and does not prohibit any development projects). Just for reference, the Malagalasi - Moyowosi Wetland in Kigoma Region which is registered in scope of the Ramsar Convention is quite remote from the project site area. Ref. Convention on Biological Diversity is also applicable to the existing endemic benthic species at Kigoma Bay/ Port area (especially in nearby waters in front of the so called "Kigodeko" shore, just left from the subjected berth)
	(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 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 project will adversely affect aquatic organisms? Are adequate measures taken to reduce negative impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation or wildlife of coastal zones? If any negative impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) Y (c) Y (d) Y (e) Y	(a) The project site does not encompass such kind of environments. (b) The natural habitats of Lake Tanganyika are subjected for sustainable management under the Convention for Sustainable Management of Lake Tanganyika (however, the Convention does not prohibit development projects in the surrounding areas, though subjected to the Lake Tanganyika Integrated Regional Development Program [PRODAP]). However, the endemic benthos species are subjected for protection under the Convention on Biological Diversity of which the Tanzanian government already ratified, and thus in need of caution not to violate it. (c) A sheet protector shall be installed around the land reclamation and dredging area, in order to minimize impact from dredged soil, spreading around the surrounding waters (with possibility of impact towards habitat to bentic species and underwater plant beds, etc.). In addition, dredging at waters in front of Kigodeko area (waters in front of the pontoon, and to its left shore area) shall be avoided, in order to preserve the habitats of endemic benthos species (due through investigation of benthic habitats, subjected waters were observed as consisting relatively highest level of biodiversity). (d) Same as above (c).
	(3) Hydrology	(a) Do the project facilities affect adversely flow regimes, waves, tides, currents of rivers and etc if the project facilities are constructed on/by the seas?	(a) N	(a) Impact toward currents are not taken into consideration (or considered negligiable), since currents should not occur in freshwater lakes, as compared to oceanic seas.
	(4) Topography and Geology	(a) Does the project require any large scale changes of topographic/geographic features or cause disappearance of the natural seashore?	(a) N	(a) No. The right hand side of the current berth will be slightly widened, but impact on topographic/geolographic features will not be significant.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, 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) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indiganous 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? (j) Is the grievance redress mechanism established?	(a) N (b) Y (c) Y (d) Y (e) Y (f) N (g) Y (h) Y (i) N (j) Y	(a) Involuntary resettlement should not occur, by avoiding such impacts from occuring when sellecting the temporary yard for construction workers office, storage yard for construction materials, etc. (b) Explanation on the project and assumed positive and negative impacts shall be provided to the public during the public hearing at the draft scoping stage. (c) Even if involunatary resettlement may occur, in terms of TPA related projects, project affected persons (PAPs) including illegal settlers, shall be all compensated based on TPA's policy to enable them to resettle. (d) Compensations are usually paid prior to resettlements. (e) Yes they are. (f) No, but they are treated fairly. No vulnerable nor indigenous people are enticipated to be affected from the Project. (g) Yes, agreements are obtained prior to the resettlements. (h) TPA has the capability to implement resettlement including required budget for compensation, in case it may occur. (i) TPA does not normally monitor impacts occured by resettlements. (j) Normally, the grievance redress mechanism is established when involuntary resettlment, land acquisition and other compensation requirements occur. However, no such impact are assumed to occur with regard to the subjected JICA project.
	(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 changes in water uses (including fisheries and recreational uses) in the surrounding areas due to project will adversely affect the livelihoods of inhabitants? (c) Is there a possibility that port and harbor facilities will adversely affect the existing water traffic and road traffic in the surrounding areas? (d) Is there a possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are considerations given to public health, if necessary?	(a) N/Y (b) N/Y (c) Y (d) Y	(a) The project should not adversely affect the living conditions of inhabitants. However, possible impact on fishermen illegally settled at Kigodeko shore needs to be reconfirmed (especially if they have organized an association, whereby possessing legitimate right for fishing activities in the surrounding area). A sheet protector to mitigate impact on benthic species especially at Kigodeko water front area (with high level of biodiversity) shall be installed during the dredging works period. (b) Same as above (a). (c) During construction, a temporary docking area for MV Llemba must be prepared, however, once prepared the influence on the water traffic should be limited. (d) Though such possibility may not be neglected, appropriate healthcare and sanitation measures shall be provided to the workers, to mitigate any impact to the public (under above mentioned TPA-OSHE, etc.).
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) Commencement of the subjected project (including the access road project component and tentative yard for construction facilities and stock yard for construction materials, etc.) should not cause any damage to local heritages of importance.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The subjected project is a rehabilitation project, and therefore should not affect the local landscape. As such, mitigation measures for this item would not be required.
	(5) Ethnic Minorities and 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 (b) -	(a) The subjected project shall not cause any damage on assets of any of the surrounding residents. Therefore, the project is assumed that it will not cause any impacts on the culture and lifestyle of ethnic minorities and indigenous people. (b) Not applicable.
4 Social Environment	(6) Working Conditions	(a) Is the project proponent not violating any laws and 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?	(a) N (b) Y (c) Y (d) Y	(a) TPA is ILO compliant and abides by Tanzanian laws and regulations. TPA also stipulates the TPA Occupational Safety Health & Environment Regulations (TPA-OSHE) 2010, and its guidelines. (b) Tangible safety considerations for construction workers and other individuals involved shall be in place, including installation of safety equipments to prevent accidents, and management of hazardous materials by providing proper education to the workers. TPA, in addition to TPA-OSHE 2010, is also on the verge of implementing and acquiring the Environmental Management System (EMS) and ISO 14001 standards by 2015. (c) TPA abides by the Tanzaninan laws and regulations associated with the working conditions of workers. Safety and health programs and safety training shall be addressed to the workers, based upon the TPA Occupational Safety Health & Environment Regulations (TPA-OSHE) 2010 and its guidelines. (d) Same as above.
5 Others	(1) Impacts 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 environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a) Less polluting construction vehicles and machineries shall be selected during the planning phase, with regulartory maintenace during construction phase. Wastes generated by construction shall be disposed or treated properly. (b) A sheet protector shall be installed around the dredging area, in order to mitigate impact towards surrounding habitat and ecosystem. (c) Social impact are unlikely to occur (more or less, should prompt positive impact by improvement of port convenience), agreement with the stakeholders shall be met at the official public hearing. A concern should be addressed, however, to especially the fishermen residing in the Kigodeko area near the subjected berth for rehabilitation. Their legitimate fishing rights status should be confirmed by checking on their establishment of a fisheries association. Adequate mitigation measure can be stated as same as above (b).

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(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) - (c) Y (d) Y	(a) A monitoring plan shall be formed within the EMP, for monitoring the environmental items considered to have potential impacts. (b) The monitoring Plan, to be included in the EIS will describe the methods and frequencies. (c) The monitoring plan, to be included in the EIS will describe the monitoring framework, to be adequately applied. (d) A regulartory format and frequency of its reporting of the monitoring plan are stipulated by the law and regulations.
6 Note	Note on Using Environmental Checklist	(a) Where necessary, impacts on groundwater hydrology (groundwater level drawdown and salinization) that may be caused by alteration of topography, such as land reclamation and canal excavation should be considered, and impacts, such as land subsidence that may be caused by groundwater uses should be considered. If significant impacts are anticipated, adequate mitigation measures should be taken place. (b) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) - (b)	(a) Not applicable. (b) Not much of concern. However, concern towards prevention of violation to the Basel Convention, International Convention for the control and management of Ships' Ballast Water and Sediments, etc. should be addressed, though both are not within scope of the subjected project.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

MONITORING FORM (Sample)

-If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews. JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

-When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
ex.) Responses/Actions to Comments and Guidance from Government Authorities	

2. Mitigation Measures

- Air Quality (Emission Gas / Ambient Air Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
SO_2						
NO_2						
CO						
O_3						
Soot and dust						
SPM						
Dust						

- Water Quality (Effluent/ Wastewater/Ambient Water Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH	-					
TDS	mg/l					
TSS	US/com^3					
BOD	mg/l					
COD	mg/l					
DO	mg/l					
Total Nitrogen	mg/l					
Total Phosphorus	mg/l					
Heavy Metals	mg/l					
Hydrocarbons / Mineral Oils						
Phenols						
Cyanide						

Temperature						
Coliform Bacilli						

- Waste

Monitoring Item	Monitoring Results during Report Period
1. Industrial waste generated during construction period 2.	

- Noise / Vibration

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level	dB(A)	1.70 or less (NightTime) 2. 45 or less (NightTime) 3. 75 Compactors (rollers), front loaders, concrete mixers, cranes (movable)	1. 70 or less (Day Time) 2. 55 or less (Day Time) 3. 75 Dozers, graders, trucks, jack hammers	1. Standard noise values for different types of land use categories (at berth area) 2. Noise standards for areas facing roads 3. Noise emission standards for construction equipment and small and large vehicles	-	1. Type F (Industrial Areas) standard should be applied 2. Areas Type B/C (Type B: facing roads with two or more lanes, Type C: facing a road with one or more lanes) 3. Compactors (rollers), front loaders, concrete mixers, cranes (movable)/ Dozers, graders, trucks, jack hammers (i) Measurement Point (berth area, access road starting and end area) (ii) Frequency: Once a week (day time and night time each), during construction period (iii) Method: dB (A) caliberation
Vibration level						

- Odor

Monitoring Item	Monitoring Results during Report Period

3. Natural Environment

- Ecosystem

Monitoring Item	Monitoring Results during Report Period/ Construction Period (once every 2 months)/ Operation Period (twice after operation period, just after operation and half year later)
Negative effects/Actions to Valuable benthic species	1. Check and take record on biodiversity abundance (of benthic species) in comparison with monitoring results during report period, (i) at surrounding waters of the subjected berth for rehabilitation, (ii) including frontal water area of so called "Kigodeko" shore area recognized at North-West direction from the berth, and (iii) especially, the relocated habitat area of Endangered gastropod L. Littorina (Hirthia Spp.) near "Kigodeko", from the land reclamation area and dredging area of the berth subjected for rehabilitation, if any. 2. Check and take pictorial record, if possible and if found, especially of the valuable perch, Lates Mariae (IUCN Vulnerable (VU) species), as evidence of its existence. 3. Take few sample with pictorial and written record (regarding approximate number of existing and living species found in the survey area, and of samples taken and placed back) of existing gastropods enlisted as IUCN Endangered (EN) species, namely L.Littorina (Hirthia Spp.) and IUCN Near Threatened (NT) species – L. Coronata (Lavigeria Spp.), at water areas near Kigodeko, including relocated habitat area from the land reclamation and dredging area of the berth subjected for rehabilitation. 4. Seek to re-plan for appropriate mitigation measures if serious impact were identified during the course of monitoring survey.

4. Social Environment

- Resettlement

Monitoring Item	Monitoring Results during Report Period

- Living / Livelihood

Monitoring Item	Monitoring Results during Report Period (if any, extracted from opinions raised at public hearing session)/ during Construction Period (once every 4 months), during Operation Period (once after half year from operation)
1. Negative and positive impact to fishermen & their families residing at "Kigodeko" area, located at North-West direction from the berth subjected for rehabilitation 2. Negative and positive impact to residents surrounding the access road subjected for pavement works.	Monitoring interview to representing resident of the subjected area, regarding, 1. Annoyance by possible noise & vibration caused by construction vehicles and machinery (only during construction period). 2. Possible negative or positive impacts to their fishing areas (only subjected for monitoring group 1 of left column). 3. Possible negative or positive impact to their livelihood (ex. including possibilities of enhanced trading business activities by more convenient utilization of the berth)

Appendix 5 Reference Data

5.1 Letter of TPA (Kibirizi Project)

Tanzania Ports Authority

Kigoma Port,
P.O. Box 911,
KIGOMA

Telephone +255 0282802275
Fax +255 0282802275
e-mail pmkigoma@tanzaniaports.com

KG/EN/6/3/01

Date: 11th November, 2011

Team Leader
JICA Team to Kigoma Port Project
KIGOMA

Attn: Mr. Wakasugi,

RE: REHABILIATION OF KIGOMA PORT PROJECT

Please refer the above subject matter.
You may recall that on 10th November, 2011 your team held a meeting with TPA at the Kigoma Port Master office from 2.00pm to 4.25 pm to discuss the scope of work at the site.

One of the issue come across during meeting was that TPA had a plan to develop another project at Kibirizi area which will also consist of the passenger berth and its related facilities.

Your team requested TPA to provide clarity on this project at Kibirizi so that the project does not conflict with proposed project of the rehabilitation of Kigoma Port including the passenger berth and its related facilities.

TPA would like to make the clarification as follows:-

1. The aim of Kibirizi project is to legitimize TPA to collect wharfage on the cargo business at Kibirizi area and not otherwise.

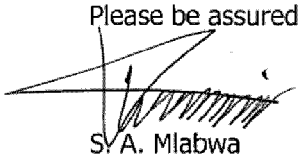
2. The component of passenger lounge that its related facilities that appear on the tender document were wrongly captured and same will be corrected. We highly regret for the error.

3. The TPA plan as identified in the Tanzania Ports Master plan to rehabilitate the existing Kigoma Port including developing the modern passenger berth and its related facilities to the main port remain unchanged.

Website: www.tanzaniaports.com

Should you seek further clarity, please let us know.

Please be assured that your endless support is highly appreciated by TPA.



S. A. Mlabwa
For: DIRECTOR GENERAL

Technical Notes
on the Preparatory Survey
on the Project for the Rehabilitation of Kigoma Port
in the United Republic of Tanzania

Based on the discussions held between the Government of the United Republic of Tanzania and the Japan International Cooperation Agency (hereinafter referred to as "JICA") during the Data Collection Survey on Transport and Trade around Kigoma Port in February, 2011, JICA dispatched a Preparatory Survey Team (hereinafter referred to as "the Team") on the Project for the Rehabilitation of Kigoma Port (hereinafter referred to as "the Project") to the United Republic of Tanzania.

JICA sent the Team, which is headed by Satoshi Wakasugi, Deputy Director, Transportation and ICT Division 1, Transportation and ICT Group, Economic Infrastructure Department, JICA, and is scheduled to stay in the country from November 6, 2011 to December 23, 2011. The basic principles such as objective, project site, and priority of the project components has been confirmed and Minutes of Meetings was signed on November 14, 2011 between the Team leader and Tanzanian side.

The Consultant members of the Team continued field survey in the study area and carried out a preliminary analysis of collected data and information. In the course of the discussions and field survey, both sides have confirmed the main items described in the attached sheets.

Dar es Salaam, December 12, 2011

Mr. Yutaka Ochi
Chief Consultant
Preparatory Survey Team
Japan International Cooperation Agency

Mrs. Florence P. Nkya
Director of Planning & Investment
Tanzania Ports Authority

ATTACHMENT

1. Request of Project Facilities

Beacon and lighting facilities are necessary at the new passenger berth in order to comply with the SOLAS convention and for emergency port call during night time.

2. Berth Arrangement of the Project

Northern part of the new passenger berth needs to accommodate existing small boats.

3. Structural Type of Berthing Facility

Regarding the berthing facility, a steel sheet pile type structure of the berthing facility is concluded to be preferable through discussion with the JICA study team, comparing other alternate structural type such as a steel pipe pile open type and a concrete block gravity type.

4. Temporary Passenger Terminal during Construction Period

During the construction period of the Project, the existing passenger terminal with relevant facilities will be allocated at an appropriate area along the cargo berth or the container berth in Kigoma Port.

5. Pontoon Relocation

Pontoon on the tip of the current passenger berth will be relocated from the existing location and will be utilized in other area in Kigoma Port.

6. Temporary Construction Yard

Temporary construction yards required for the construction works of the Project will be allocated in the vicinity area of the construction site.

7. Application of ERB and CRB

Applications of Engineer Registration Board (ERB) and Contractor Registration Board (CRB) at the project implementation stage will be undertaken by TPA. Necessary certificates of profession or recognition for submission to ERB and CRB will be prepared and submitted to TPA by engineers and contractors who will be engaged in the Project.

Over

Appendix-6 Other Relevant Data and Information

6.1 Results of Boring Survey (Grain size Distribution Curve)

BH1

BH1 0.0m-1.0m

Initial Dry Mass(g) 2298

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	20.9	0.9%	99.1%
2mm	179.6	7.8%	91.3%
1.180mm	232.8	10.1%	81.1%
0.600mm	449.8	19.6%	61.6%
0.425mm	298.8	13.0%	48.6%
0.300mm	101.7	4.4%	44.1%
0.212mm	144.2	6.3%	37.9%
0.150mm	162.7	7.1%	30.8%
0.075mm	77.6	3.4%	27.4%
Passing 0.075mm	629.9		

Grading modulus	GM	1.33	
Grading coeficient	GC	50.96	
D60, D30, D10	0.60	0.16	
Uniformity coeficient Uc	#DIV/0!		
Coeficient of cuevature Uc'	0.00		

BH1 1.5m-2.5m

Initial Dry Mass(g) 1540

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	1.4	0.1%	99.9%
4mm	6.6	0.4%	99.5%
2mm	168.8	11.0%	88.5%
1.180mm	338.3	22.0%	66.6%
0.600mm	511.4	33.2%	33.3%
0.425mm	233.2	15.1%	18.2%
0.300mm	69.3	4.5%	13.7%
0.212mm	81.8	5.3%	8.4%
0.150mm	61.4	4.0%	4.4%
0.075mm	17.9	1.2%	3.2%
Passing 0.075mm	49.9		

Grading modulus	GM	1.90	
Grading coeficient	GC	81.37	
D60, D30, D10	1.01	0.55	0.250
Uniformity coeficient Uc	4.04		
Coeficient of cuevature Uc'	0.11		

BH1 3.0m-4.0m

Initial Dry Mass(g) 1618

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0.6	0.0%	100.0%
1.180mm	4.4	0.3%	99.7%
0.600mm	247.3	15.3%	84.4%
0.425mm	325	20.1%	64.3%
0.300mm	121	7.5%	56.8%
0.212mm	469.1	29.0%	27.8%
0.150mm	113.9	7.0%	20.8%
0.075mm	174.2	10.8%	10.0%
Passing 0.075mm	162.5		

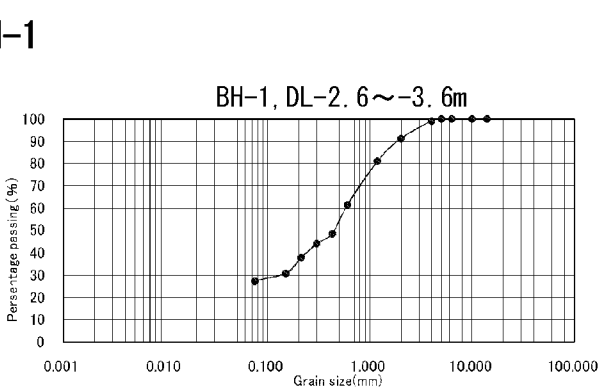
Grading modulus	GM	1.26	
Grading coeficient	GC	35.68	
D60, D30, D10	0.35	0.21	0.075
Uniformity coeficient Uc	4.67		
Coeficient of cuevature Uc'	0.08		

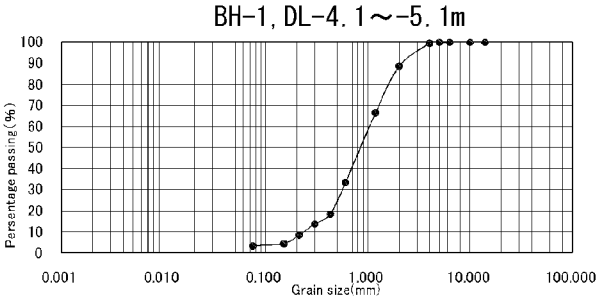
BH1 4.5m-5.5m

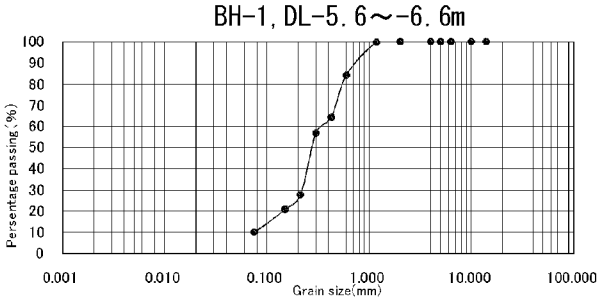
Initial Dry Mass(g) 1243.7

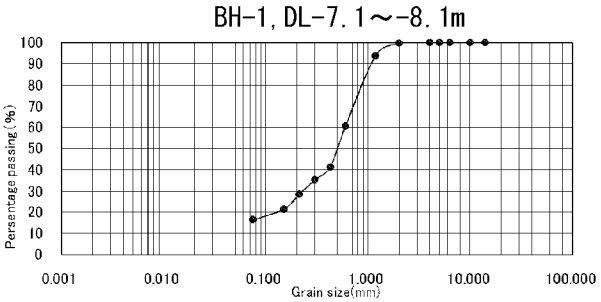
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	3.2	0.3%	99.7%
1.180mm	73.4	5.9%	93.8%
0.600mm	413.1	33.2%	60.6%
0.425mm	239.4	19.2%	41.4%
0.300mm	75	6.0%	35.3%
0.212mm	83.2	6.7%	28.7%
0.150mm	88.1	7.1%	21.6%
0.075mm	62.7	5.0%	16.5%
Passing 0.075mm	205.6		

Grading modulus	GM	1.42	
Grading coeficient	GC	58.62	
D60, D30, D10	0.60	0.23	
Uniformity coeficient Uc	#DIV/0!		
Coeficient of cuevature Uc'	0.00		





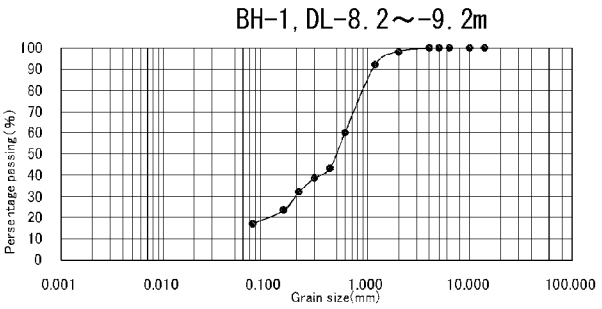




BH1 5.6m-6.6m
Initial Dry Mass(g) 1324

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0.5	0.0%	100.0%
2mm	22.4	1.7%	98.3%
1.180mm	80.2	6.1%	92.2%
0.600mm	424.2	32.0%	60.2%
0.425mm	224.1	16.9%	43.2%
0.300mm	60.4	4.6%	38.7%
0.212mm	88.4	6.7%	32.0%
0.150mm	112	8.5%	23.5%
0.075mm	85	6.4%	17.1%
Passing 0.075mm	226.8		

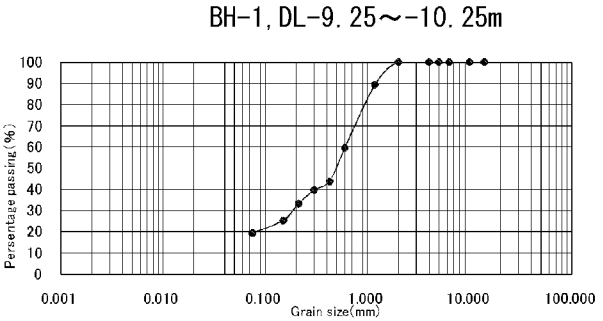
Grading modulus	GM	1.41
Grading coeficient	GC	56.73
D60, D30, D10	0.60	0.20
Uniformity coeficient Uc	#DIV/0!	
Coeficient of cuevature Uc'	0.00	



BH1 6.65m-7.65m
Initial Dry Mass(g) 1298

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0	0.0%	100.0%
1.180mm	137.2	10.6%	89.4%
0.600mm	387.5	29.9%	59.6%
0.425mm	204.1	15.7%	43.9%
0.300mm	54.8	4.2%	39.6%
0.212mm	82.1	6.3%	33.3%
0.150mm	103.2	8.0%	25.4%
0.075mm	77.8	6.0%	19.4%
Passing 0.075mm	251.3		

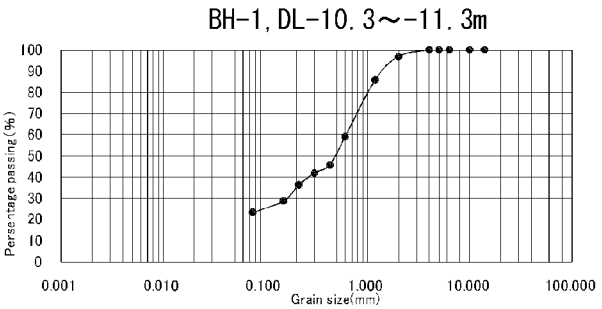
Grading modulus	GM	1.37
Grading coeficient	GC	56.15
D60, D30, D10	0.60	0.19
Uniformity coeficient Uc	#DIV/0!	
Coeficient of cuevature Uc'	0.00	



BH1 7.7m-8.7m
Initial Dry Mass(g) 1010.4

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	32.3	3.2%	96.8%
1.180mm	111.2	11.0%	85.8%
0.600mm	271.7	26.9%	58.9%
0.425mm	133.2	13.2%	45.7%
0.300mm	37.9	3.8%	42.0%
0.212mm	57.2	5.7%	36.3%
0.150mm	76.8	7.6%	28.7%
0.075mm	54.8	5.4%	23.3%
Passing 0.075mm	235.3		

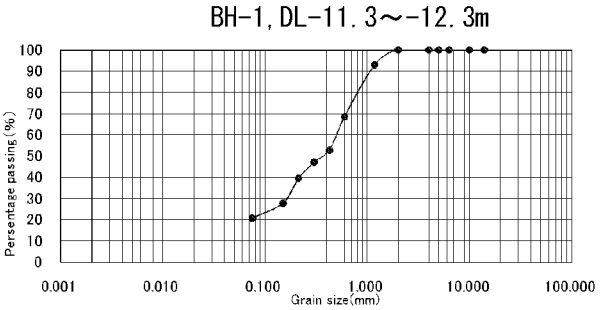
Grading modulus	GM	1.34
Grading coeficient	GC	54.28
D60, D30, D10	0.61	0.17
Uniformity coeficient Uc	#DIV/0!	
Coeficient of cuevature Uc'	0.00	



BH1 8.7m-9.7m
Initial Dry Mass(g) 1269.4

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0	0.0%	100.0%
1.180mm	88.6	7.0%	93.0%
0.600mm	309.4	24.4%	68.6%
0.425mm	200.5	15.8%	52.9%
0.300mm	74.8	5.9%	47.0%
0.212mm	96	7.6%	39.4%
0.150mm	146.7	11.6%	27.8%
0.075mm	90.6	7.1%	20.7%
Passing 0.075mm	262.8		

Grading modulus	GM	1.26
Grading coeficient	GC	47.15
D60, D30, D10	0.50	0.17
Uniformity coeficient Uc	#DIV/0!	
Coeficient of cuevature Uc'	0.00	



BH2a

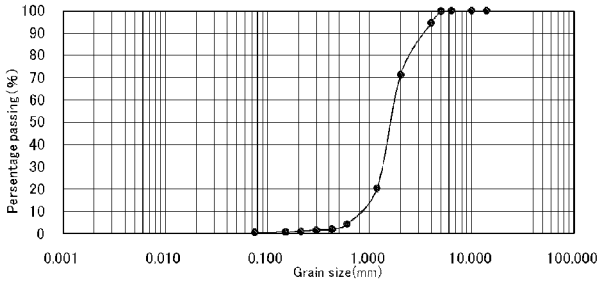
BH-2a

BH2a 0.0m-1.0m
Initial Dry Mass(g) 1476.6

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	1.6	0.1%	99.9%
4mm	77.7	5.3%	94.6%
2mm	343.2	23.2%	71.4%
1.180mm	751.4	50.9%	20.5%
0.600mm	238.8	16.2%	4.3%
0.425mm	34.2	2.3%	2.0%
0.300mm	6.6	0.4%	1.6%
0.212mm	6.6	0.4%	1.1%
0.150mm	4.5	0.3%	0.8%
0.075mm	2.9	0.2%	0.6%
Passing 0.075mm	9.1		

Grading modulus	GM	2.26	
Grading coeficient	GC	92.73	
D60, D30, D10	1.80	1.40	0.850
Uniformity coeficient Uc	2.12		
Coeficient of cuevature Uc'	0.29		

BH-2a, DL-1.55～-2.55m

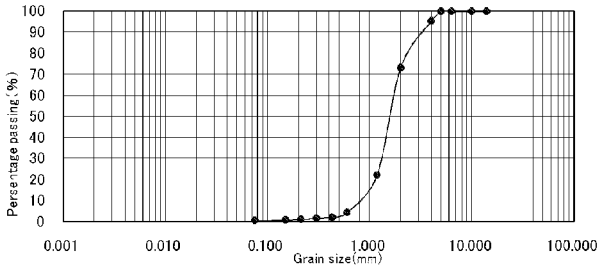


BH2a 1.5m-2.5m
Initial Dry Mass(g) 1622.6

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	1.3	0.1%	99.9%
4mm	75.1	4.6%	95.3%
2mm	361.2	22.3%	73.0%
1.180mm	825.2	50.9%	22.2%
0.600mm	290.7	17.9%	4.3%
0.425mm	36.8	2.3%	2.0%
0.300mm	7.3	0.4%	1.5%
0.212mm	7.7	0.5%	1.1%
0.150mm	6.7	0.4%	0.7%
0.075mm	4.2	0.3%	0.4%
Passing 0.075mm	6.4		

Grading modulus	GM	2.25	
Grading coeficient	GC	93.39	
D60, D30, D10	1.80	1.40	0.800
Uniformity coeficient Uc	2.25		
Coeficient of cuevature Uc'	0.25		

BH-2a, DL-3.05～-4.05m

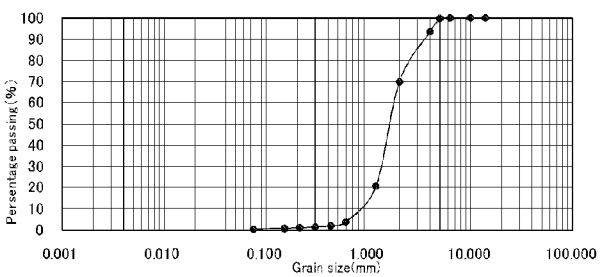


BH2a 3.0m-4.0m
Initial Dry Mass(g) 1702.3

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	3.1	0.2%	99.8%
4mm	107.7	6.3%	93.5%
2mm	400.5	23.5%	70.0%
1.180mm	840.1	49.4%	20.6%
0.600mm	286.4	16.8%	3.8%
0.425mm	33.6	2.0%	1.8%
0.300mm	6.5	0.4%	1.4%
0.212mm	6.7	0.4%	1.0%
0.150mm	6.1	0.4%	0.7%
0.075mm	5.2	0.3%	0.4%
Passing 0.075mm	6.4		

Grading modulus	GM	2.28	
Grading coeficient	GC	91.79	
D60, D30, D10	1.80	1.40	0.850
Uniformity coeficient Uc	2.12		
Coeficient of cuevature Uc'	0.29		

BH-2a, DL-4.55～-5.55m

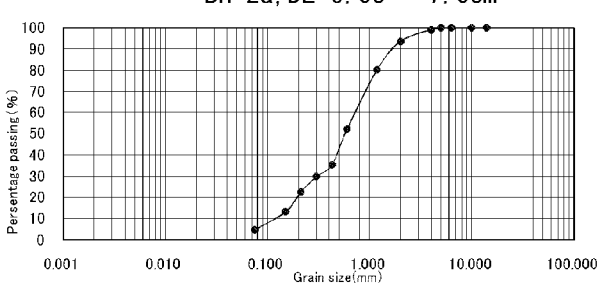


BH2a 4.5m-5.5m
Initial Dry Mass(g) 1892.1

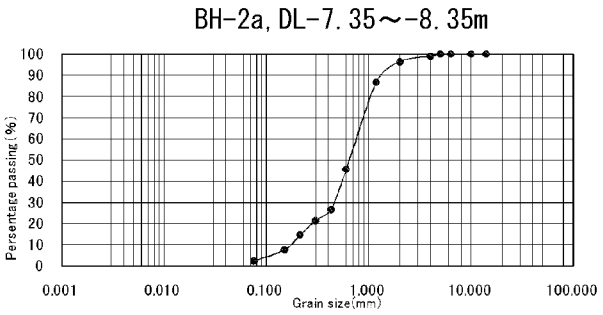
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	1	0.1%	99.9%
4mm	18.5	1.0%	99.0%
2mm	103.1	5.4%	93.5%
1.180mm	250.9	13.3%	80.3%
0.600mm	532.3	28.1%	52.1%
0.425mm	318.4	16.8%	35.3%
0.300mm	101	5.3%	30.0%
0.212mm	138.3	7.3%	22.7%
0.150mm	177.4	9.4%	13.3%
0.075mm	161	8.5%	4.8%
Passing 0.075mm	90.2		

Grading modulus	GM	1.66	
Grading coeficient	GC	64.03	
D60, D30, D10	0.70	0.20	0.130
Uniformity coeficient Uc	5.38		
Coeficient of cuevature Uc'	0.12		

BH-2a, DL-6.05～-7.05m



BH2a	5.8m-6.8m		
Initial Dry Mass(g)	1773.2		
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0.6	0.0%	100.0%
4mm	17	1.0%	99.0%
2mm	46.7	2.6%	96.4%
1.180mm	171.6	9.7%	86.7%
0.600mm	727.1	41.0%	45.7%
0.425mm	335.9	18.9%	26.7%
0.300mm	91.4	5.2%	21.6%
0.212mm	122.9	6.9%	14.7%
0.150mm	125.5	7.1%	7.6%
0.075mm	93.4	5.3%	2.3%
Passing 0.075mm	41.1		
Grading modulus	GM	1.75	
Grading coeficient	GC	72.52	
D60, D30, D10	0.75	0.46	0.170
Uniformity coeficient Uc	4.41		
Coefficient of curvature Uc'	0.08		



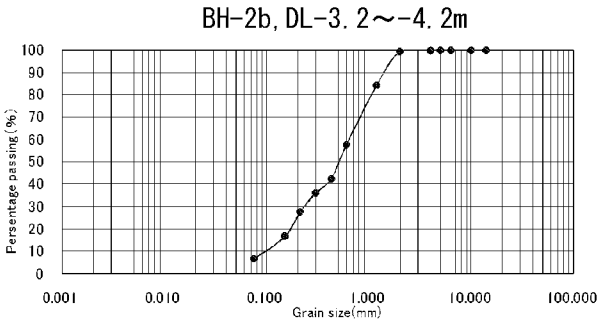
BH-2b

BH2b

BH2b 0.0m-1.0m

Initial Dry Mass(g) 1796.7

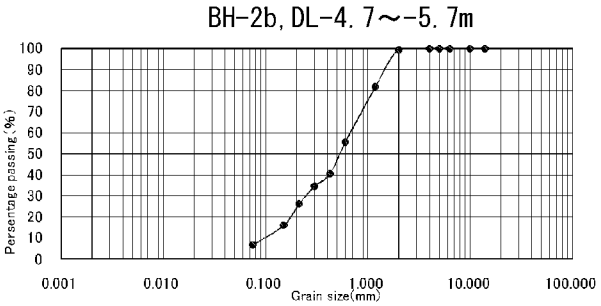
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	2	0.1%	99.9%
2mm	8.8	0.5%	99.4%
1.180mm	272	15.1%	84.3%
0.600mm	477.8	26.6%	57.7%
0.425mm	273.4	15.2%	42.5%
0.300mm	112.6	6.3%	36.2%
0.212mm	152.4	8.5%	27.7%
0.150mm	197.6	11.0%	16.7%
0.075mm	181.4	10.1%	6.6%
Passing 0.075mm	118.7		
Grading modulus	GM	1.52	
Grading coeficient	GC	57.49	
D60, D30, D10	0.64	0.23	0.095
Uniformity cosficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		



BH2b 1.5m-2.5m

Initial Dry Mass(g) 1322.4

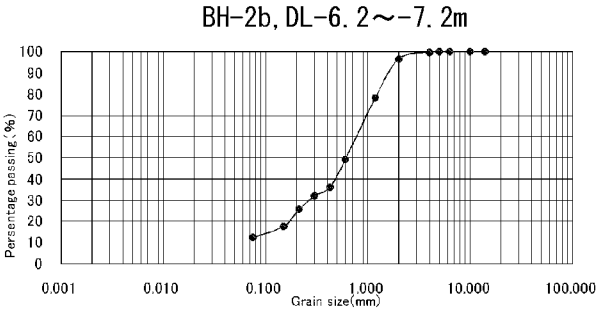
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	1.7	0.1%	99.9%
2mm	5.5	0.4%	99.5%
1.180mm	233.2	17.6%	81.8%
0.600mm	349.1	26.4%	55.4%
0.425mm	196.5	14.9%	40.6%
0.300mm	79.1	6.0%	34.6%
0.212mm	110.9	8.4%	26.2%
0.150mm	133.9	10.1%	16.1%
0.075mm	123.8	9.4%	6.7%
Passing 0.075mm	88.7		
Grading modulus	GM	1.53	
Grading coeficient	GC	59.36	
D60, D30, D10	0.69	0.25	0.095
Uniformity cosficient Uc	7.26		
Coeficient of cuevature Uc'	0.05		



BH2b 3.0m-4.0m

Initial Dry Mass(g) 2177

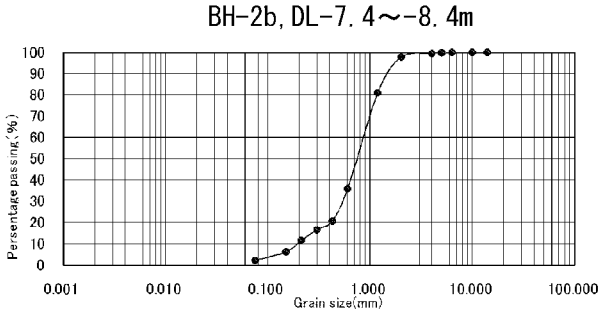
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	7.4	0.3%	99.7%
2mm	69.1	3.2%	96.5%
1.180mm	394.6	18.1%	78.4%
0.600mm	635.3	29.2%	49.2%
0.425mm	281.2	12.9%	36.3%
0.300mm	91.6	4.2%	32.1%
0.212mm	135.2	6.2%	25.8%
0.150mm	175.2	8.0%	17.8%
0.075mm	115.7	5.3%	12.5%
Passing 0.075mm	271.7		
Grading modulus	GM	1.55	
Grading coeficient	GC	63.52	
D60, D30, D10	0.76	0.28	
Uniformity cosficient Uc	#DIV/0!		
Coeficient of cuevature Uc'	0.00		



BH2b 4.2m-5.2m

Initial Dry Mass(g) 1893.5

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	1.3	0.1%	99.9%
4mm	6.4	0.3%	99.6%
2mm	33.1	1.7%	97.8%
1.180mm	320.6	16.9%	80.9%
0.600mm	854.4	45.1%	35.8%
0.425mm	286	15.1%	20.7%
0.300mm	77.5	4.1%	16.6%
0.212mm	94	5.0%	11.6%
0.150mm	102.9	5.4%	6.2%
0.075mm	74	3.9%	2.3%
Passing 0.075mm	43.3		
Grading modulus	GM	1.79	



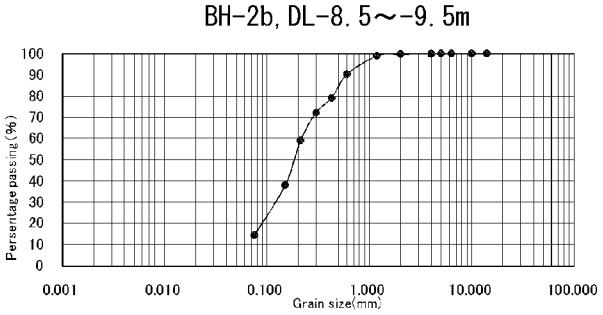
Grading coeficient	GC	78.99	
D60, D30, D10	0.89	0.53	0.200
Uniformity coeficient Uc	4.45		
Coeficient of curvature Uc'	0.08		

BH2b 5.3m-6.3m

Initial Dry Mass(g) 1460.7

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0.9	0.1%	99.9%
2mm	1.3	0.1%	99.8%
1.180mm	12.2	0.8%	99.0%
0.600mm	127.1	8.7%	90.3%
0.425mm	161.8	11.1%	79.2%
0.300mm	102.7	7.0%	72.2%
0.212mm	191.6	13.1%	59.1%
0.150mm	307.6	21.1%	38.0%
0.075mm	344.5	23.6%	14.4%
Passing 0.075mm	211		

Grading modulus	GM	1.06
Grading coeficient	GC	20.75
D60, D30, D10	0.22	0.13
Uniformity coeficient Uc	#DIV/0!	
Coeficient of curvature Uc'	0.00	



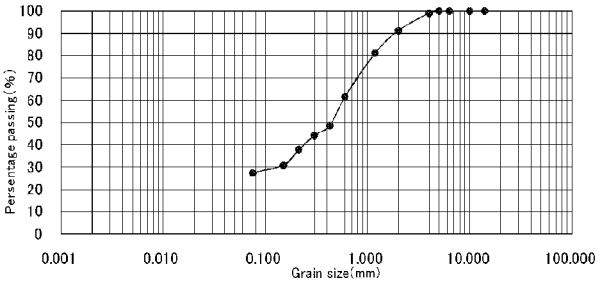
BH-3

BH3
BH3 0.0m–1.0m
Initial Dry Mass(g) 2298

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	20.9	0.9%	99.1%
2mm	179.6	7.8%	91.3%
1.180mm	232.8	10.1%	81.1%
0.600mm	449.8	19.6%	61.6%
0.425mm	298.8	13.0%	48.6%
0.300mm	101.7	4.4%	44.1%
0.212mm	144.2	6.3%	37.9%
0.150mm	162.7	7.1%	30.8%
0.075mm	77.6	3.4%	27.4%
Passing 0.075mm	629.9		

Grading modulus	GM	1.33	
Grading coeficient	GC	50.96	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		

BH-3, DL-2.8～-3.8m

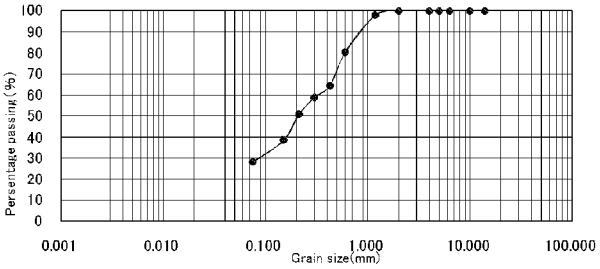


BH3 1.5m–2.5m
Initial Dry Mass(g) 1235

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0	0.0%	100.0%
1.180mm	26	2.1%	97.9%
0.600mm	217.1	17.6%	80.3%
0.425mm	196.2	15.9%	64.4%
0.300mm	68.3	5.5%	58.9%
0.212mm	98.3	8.0%	50.9%
0.150mm	152.2	12.3%	38.6%
0.075mm	130.3	10.6%	28.1%
Passing 0.075mm	346.6		

Grading modulus	GM	1.08	
Grading coeficient	GC	35.57	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		

BH-3, DL-4.3～-5.3m

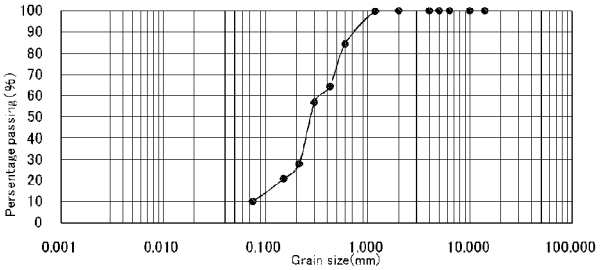


BH3 3.0m–4.0m
Initial Dry Mass(g) 1618

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0.6	0.0%	100.0%
1.180mm	4.4	0.3%	99.7%
0.600mm	247.3	15.3%	84.4%
0.425mm	325	20.1%	64.3%
0.300mm	121	7.5%	56.8%
0.212mm	469.1	29.0%	27.8%
0.150mm	113.9	7.0%	20.8%
0.075mm	174.2	10.8%	10.0%
Passing 0.075mm	162.5		

Grading modulus	GM	1.26	
Grading coeficient	GC	35.68	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		

BH-3, DL-5.8～-6.8m

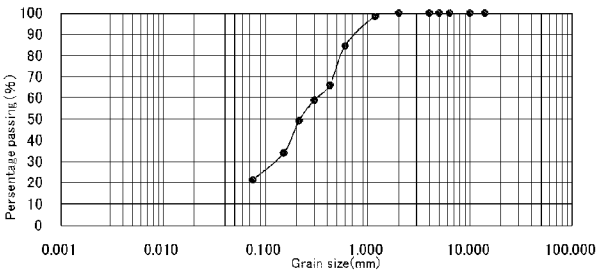


BH3 4.5m–5.5m
Initial Dry Mass(g) 1284.39

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	0	0.0%	100.0%
2mm	0	0.0%	100.0%
1.180mm	20.9	1.6%	98.4%
0.600mm	176.5	13.7%	84.6%
0.425mm	237.3	18.5%	66.2%
0.300mm	90.8	7.1%	59.1%
0.212mm	125.6	9.8%	49.3%
0.150mm	194.9	15.2%	34.1%
0.075mm	163.4	12.7%	21.4%
Passing 0.075mm	274.99		

Grading modulus	GM	1.12	
Grading coeficient	GC	33.84	
D60, D30, D10	0.64	0.23	0.095
Uniformity coeficient Uc	6.74		
Coeficient of cuevature Uc'	0.06		

BH-3, DL-7.3～-8.3m



BH-4a

BH4a

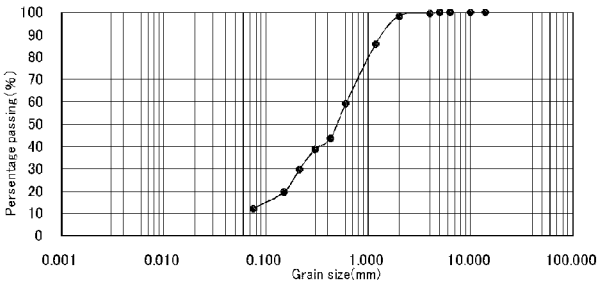
BH4a 0.0m-1.0m

Initial Dry Mass(g) 1831

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	9.9	0.5%	99.5%
2mm	21.4	1.2%	98.3%
1.180mm	226.8	12.4%	85.9%
0.600mm	491.3	26.8%	59.1%
0.425mm	282.3	15.4%	43.7%
0.300mm	91.7	5.0%	38.6%
0.212mm	161.4	8.8%	29.8%
0.150mm	185.7	10.1%	19.7%
0.075mm	136.9	7.5%	12.2%
Passing 0.075mm	223.6		

Grading modulus	GM	1.46
Grading coeficient	GC	56.04
D60, D30, D10	0.60	0.21
Uniformity coeficient Uc	#DIV/0!	
Coeficient of cuevature Uc'	0.00	

BH-3, DL-1.9～-2.9m



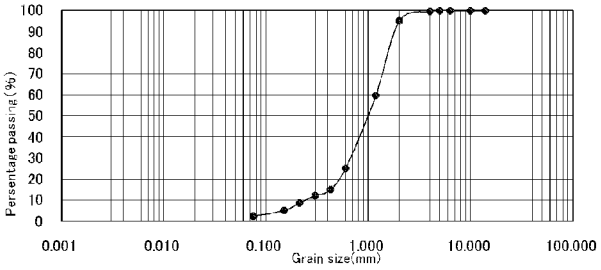
BH4a 1.5m-2.5m

Initial Dry Mass(g) 1827

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	7.4	0.4%	99.6%
2mm	82.1	4.5%	95.1%
1.180mm	647.3	35.4%	59.7%
0.600mm	629.1	34.4%	25.2%
0.425mm	189.2	10.4%	14.9%
0.300mm	50.7	2.8%	12.1%
0.212mm	62.4	3.4%	8.7%
0.150mm	66.2	3.6%	5.1%
0.075mm	46.8	2.6%	2.5%
Passing 0.075mm	45.8		

Grading modulus	GM	1.88	
Grading coeficient	GC	84.77	
D60, D30, D10	1.20	0.68	0.230
Uniformity coeficient Uc	5.22		
Coeficient of cuevature Uc'	0.06		

BH-3, DL-3.4～-4.4m



BH-4b

BH4b

BH4b 0.0m-1.0m

Initial Dry Mass(g) 1831

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	9.9	0.5%	99.5%
2mm	21.4	1.2%	98.3%
1.180mm	226.8	12.4%	85.9%
0.600mm	491.3	26.8%	59.1%
0.425mm	282.3	15.4%	43.7%
0.300mm	91.7	5.0%	38.6%
0.212mm	161.4	8.8%	29.8%
0.150mm	185.7	10.1%	19.7%
0.075mm	136.9	7.5%	12.2%
Passing 0.075mm	223.6		

Grading modulus	GM	1.46	
Grading coeficient	GC	56.04	
D60, D30, D10	0.60	0.22	
Uniformity coeficient Uc	#DIV/0!		
Coeficient of cuevature Uc'	0.00		

BH4b 1.5m-2.5m

Initial Dry Mass(g) 1411

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0.5	0.0%	100.0%
4mm	7	0.5%	99.5%
2mm	72.9	5.2%	94.3%
1.180mm	380	26.9%	67.4%
0.600mm	463.3	32.8%	34.5%
0.425mm	166.4	11.8%	22.7%
0.300mm	48.8	3.5%	19.3%
0.212mm	62.3	4.4%	14.9%
0.150mm	73	5.2%	9.7%
0.075mm	62.8	4.5%	5.2%
Passing 0.075mm	74		

Grading modulus	GM	1.78	
Grading coeficient	GC	76.85	
D60, D30, D10	1.10	0.54	0.170
Uniformity coeficient Uc	6.47		
Coeficient of cuevature Uc'	0.05		

BH4b 3.0m-4.0m

Initial Dry Mass(g) 2629

	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	1.1	0.0%	100.0%
4mm	10.1	0.4%	99.6%
2mm	67.4	2.6%	97.0%
1.180mm	874.9	33.3%	63.7%
0.600mm	982	37.4%	26.4%
0.425mm	295.2	11.2%	15.2%
0.300mm	74.7	2.8%	12.3%
0.212mm	91	3.5%	8.8%
0.150mm	92.9	3.5%	5.3%
0.075mm	71.3	2.7%	2.6%
Passing 0.075mm	68.4		

Grading modulus	GM	1.85	
Grading coeficient	GC	84.49	
D60, D30, D10	1.20	0.55	0.240
Uniformity coeficient Uc	5.00		
Coeficient of cuevature Uc'	0.09		

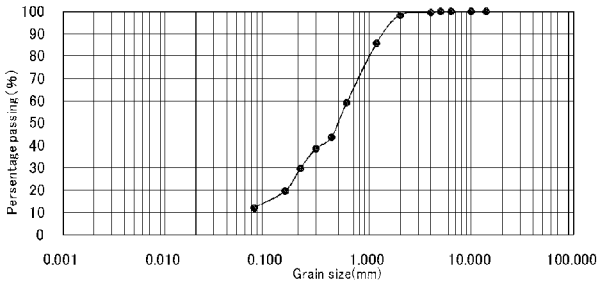
BH4b 4.5m-5.5m

Initial Dry Mass(g) 1422

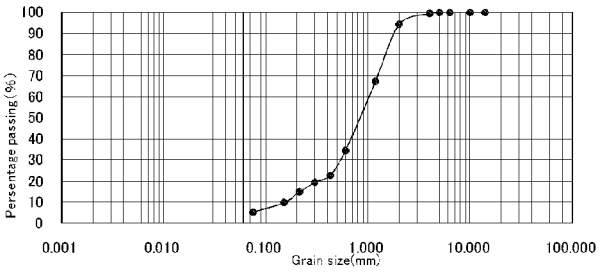
	Mass retained	Retained (%)	Cumulative Passing (%)
14mm	0	0.0%	100.0%
10mm	0	0.0%	100.0%
6.3mm	0	0.0%	100.0%
5mm	0	0.0%	100.0%
4mm	4.2	0.3%	99.7%
2mm	20.4	1.4%	98.3%
1.180mm	119.4	8.4%	89.9%
0.600mm	344.2	24.2%	65.7%
0.425mm	257.8	18.1%	47.5%
0.300mm	114.7	8.1%	39.5%
0.212mm	150.6	10.6%	28.9%
0.150mm	146.5	10.3%	18.6%
0.075mm	110.1	7.7%	10.8%
Passing 0.075mm	154.1		

Grading modulus	GM	1.43	
Grading coeficient	GC	52.31	
D60, D30, D10	0.53	0.23	0.070
Uniformity coeficient Uc	7.57		
Coeficient of cuevature Uc'	0.04		

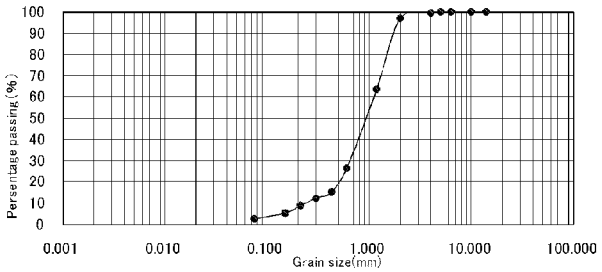
BH-3, DL-2.3～-3.3m



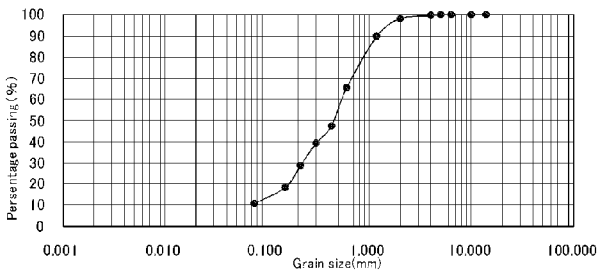
BH-3, DL-3.8～-4.8m



BH-3, DL-5.3～-6.3m



BH-3, DL-6.5～-7.5m



6.2 Environmental Check List

Environmental Checklist: . 10.Ports and Harbors (1)

Category	Environmental Item	Main Check Items	Yes: Y No: N	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 host 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 host country's government?	(a) N (b) N (c) N/Y (d) N	(a) No. However, the Tanzania Port Authority (TPA) have had submitted the Project Brief and Preliminary Environmental Assessment Registration Form to the National Environmental Management Committee (NEMC) before mid December, 2011, and Full EIA procedure has become a requirement based on result of screening, revealed in mid-January, 2012. As of July, 2012, TPA is in tendering process towards contract with the EIA Expert for commencement of the remaining EIA procedure until acquisition of the EIA License. It is estimated that the remaining process will take approximately 3 months, after the contract is signed. (b) No. Pls. refer to above (a) for details. (c) The EIA report hasn't been approved yet, therefore, we do not know whether EIA approval shall be accompanied with specific conditions or not at this stage. However, once imposed, TPA shall comply with the conditions set forth by the EIA Authority. (d) The sole EIA regulartory body, NEMC, has already indicated the result of screening, that the JICA Project in question will be subjected for full EIA procedure and not the Preliminary Environmental Assessment procedure. No other type of environmental permits are required.
	(2) Explanation to the 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? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) N (b) N	(a) Not yet. Since full EIA procedure is required for the project in question, in accordance with the result of screening, it is subjected for public hearing (at the draft EIA TOR stage). A brief outline of the subjected project, the draft EIA TOR and the benefits and assumed adverse impacts shall be explained to the stakeholders. (b) Not yet. The stakeholders comments will be reflected to the EIA TOR.

Environmental Checklist: . 10.Ports and Harbors (2)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) The focal point in terms of alternative plans regarding the subjected project shall be on the discussion whether to select the land reclamation alternative or the pier construction alternative. In consideration to the probable impact toward hydrological situation and on habitats of endemic benthic species around the subjected berth for rehabilitation, the pier type of alternative may have been considerd as one of the appropriate method in the perspective of preserving the ecosystem. However, the steel sheet pile type of structure with land reclamation method was finally considered as the most appropriate one, due to following reasons: (1) Even by the pier type of structure, land reclamation shall also be required up to a wide range of area, thus preservation of the habitat shall be very limited, (2) also the pier will create a shade at the bottom of the lake, thus existing underwater plant beds shall not be able to survive, (3) the steel sheet pile by land reclamation is the only method that is capable for renovation, when the lake surface may level down in the future, due to its tendancy, (4) and likewise with other proposed structures, it is durable to earthquakes at the highest level of international standard, (4) and also is the safest construction method for the construction workers, (5) as well as the most cost effective one. In addition, a quantitative analysis with correction by weighting method was taken place, including not just on the environmental and social aspect, but also on the economic efficency aspect as well, with the same preferable result of the steel sheet pile option counting the lowest score (meaning, it has the least risk of causing adverse impacts) among other alternatives.
2 Pollution Control	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted from ships, vehicles and project equipments comply with the country's emission standards? Are any mitigating measures taken?	(a) NA/Y	(a) The Environmental Management Plan (EMP) to be included in the EIA Report (or EIS), shall describe whether the ambient air quality around the project site might comply with the Tanzanian emission standards or not. The Tanzanian ambient air quality standard is shown in the National Environmental Standards Compendium 2005, whereby the Standard is based upon the WHO Guideline. However, at present, there are no official data on the ambient air quality of Kigoma city nor any monitoring activities, though impacts are estimated to be very limited due to its remote district location, with very few traffic at the subjected access road. During planning stage, less polluting construction vehicles & machineries will be selected, with regulartory maintenance during construction. Ref.: MV Liemba = still operational passenger and cargo ferry, since the once sunk German Navial ship was renovated for passenger and cargo use in 1924 by the British Royal Navy; triple expansion steam engine until 1971, replaced by 2 screw diesel engine, with installed power of 500ihp [370 kW] capable of 9 knots [17km/h] speed. Mitigation measure to mitigate air pollutants from this ship is out of scope of the project.

Environmental Checklist: . 10.Ports and Harbors (3)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2 Pollution Control	(2) Water Quality	(a) Do effluents from the project facilities comply with the country's effluent and environmental standards? (b) Do effluents from the ships and other project equipments comply with the country's effluent and environmental standards? (c) Does the project prepare any measures to prevent leakages of oils and toxicants? (d) Does the project cause any alterations in coastal lines and disappearance/appearance of surface water to change water temperature or quality by decrease of water exchange or changes in flow regimes? (e) Does the project prepare any measures to prevent polluting surface, sea or underground water by the penetration from reclaimed lands?	(a) Y (b) - (c) Y (d) N (e) Y	(a) The Japanese side is ready to provide port facilities that will comply with the Tanzanian laws and regulations. The Maximum Permissible Concentration (MPC) of domestic wastewater and industrial wastewater discharge is stipulated in the Water Utilization (Control and Regulation) (Amendment) Act, 1981. Trigger Level (TL) are regulated whereby, if the water quality exceeds the TL level, a study for investigation and mitigation measure shall be advised to be executed and set forth. Along with the stated water discharge standard, the National Water Policy 2002 and the Water Supply and Sanitation Act 2009 should be taken into consideration in terms of the sewage treatment facility with must comply with this standard and regulations. (b) The Japanese side is ready to provide other project equipments that will comply with the Tanzanian effluents and environmental standards. As for evaluation of the ship, it is out of scope from the subjected project, thus it is not applicable. (c) Construction vehicles and machineries will be subjected for regular maintenances. (d) The change in alterations of coastal line and disappearance of surface water to change the flow regimes shall depend on consideration of alternatives by land reclamation for the rehabilitation of the berth. (e) A silt protecter shall be installed around the dredging area, in order to minimize impact from dredged soil, in spreading around to the surrounding waters (with possibility of contaminating the waters or impact towards habitat to bentic species and underwater plant beds, etc.). On the other hand, since according to the bottom sediment analysis, no polluted state by heavy metal nor by PCB was confirmed, reconsideration of the initial plan to utilize of the dredged soil for land reclamation of the berth was regarded unnecessary.

Environmental Checklist: . 10.Ports and Harbors (4)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2 Pollution Control	(3) Wastes	(a) Are wastes generated from the ships and other project facilities properly treated and disposed of in accordance with the country's regulations? (b) Is offshore dumping of dredged soil properly disposed in accordance with the country's regulations? (c) Does the project prepare any measures to avoid dumping or discharge toxicants?	(a) (N)Y (b) - (c) Y	(a) Ships and boats at Lake Tanganyika do not have waste recepticals, nor does the Kigoma port facilities at present, accomodate any septic tanks. Wastes generated from port facilites after implementation of the project shall be properly treated based on waste related regulations stipulated in EMA 2004 (Artiles: 110 (1), 114 to 139) (b) Dredged soil shall not be dumped offshore of the lake according to domestic regulation, therefore the question is not applicable. The dredged soil is expected to be re-utilized for land reclamation for the rehabilitation of the berth (by applying the steel sheet pile alternative for its design and construction methodology). (c) Since according to the bottom sediment analysis, no polluted state by heavy metal nor by PCB was confirmed, reconsideration of the initial plan to utilize of the dredged soil for land reclamation of the berth was found unnecessary. (On the other hand, the project shall not deal with planning of any appropriate measures for disposal or treatment of discharged toxicants from the passenger/cargo ship, MV Liemba, since it is out of scope of the project)
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) NA	The Environmental Management Plan (EMP) to be included in the EIA Report (or EIS), shall describe whether the noise level will comply with the TPA Regulations, introduced herewith. There are no Tanzanian national level law and regulations or standards on noise and vibration. However, TPA's Occupational Safety and Environmental Regulations (TPA - OSHE) 2010 (noise premissible level, depending on type of area) are recommended to be applied at ports in Tanzania. Its maximum permissible level is 85 dB. Low noise and vibration type of construction vehicles and machineries that complies with the regulation, shall be selected during the planning phase. In terms of trains, a US standard is usually applied (for trains operating twice a week at Kigoma), however, mitigation measures regarding trains are out of scope of the Project.
	(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) -	(a) Not applicable
	(6) Odor	(a) Are there any odor sources? Are adequate odor control measures taken?	(a) N	(a) Possible sources include direct discharge of domestic wastewater into the Lake through storm water drainage system and industrial wastewater (ex. waste oil discharge by Tanesko power plant, possible influence by oil terminal close to Kibirizi).
	(7) Sediment	(a) Are adequate measures taken to prevent contamination of sediments by discharges or dumping of hazardous materials from the ships and related facilities?	(a) -	(a) Adequate measures in terms of ships is not be applicable, since it is out of specification of the Project.

Environmental Checklist: . 10.Ports and Harbors (5)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) Convention on Sustainable Management of Lake Tanganyika was ratified by the four related countries (Tanzania, DRC, Burundi and Zambia) in 2008, however the Convention does not designate any protected area, though it has a purpose to conserve its nature's sustainablly (and does not prohibit any development projects). Just for reference, the Malagalasi - Moyowosi Wetland in Kigoma Region which is registered in scope of the Ramsar Convention is quite remote from the project site area. Ref. Convention on Biological Diversity is also applicable to the existing endemic benthic species at Kigoma Bay/ Port area (especially in nearby waters in front of the so called "Kigodeko" shore, just north-west from the subjected berth for rehabilitation)
	(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 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 project will adversely affect aquatic organisms? Are adequate measures taken to reduce negative impacts on aquatic organisms? (e) Is there a possibility that the project will adversely affect vegetation or wildlife of coastal zones? If any negative impacts are anticipated, are adequate measures taken to reduce the impacts on vegetation and wildlife?	(a) N (b) Y (c) Y (d) Y (e) Y	(a) The project site does not encompass nor is neighboring to such kind of domestically designated protected area, nor by international treaties and conventions. (b) The natural habitats of Lake Tanganyika are subjected for sustainable management under the Convention for Sustainable Management of Lake Tanganyika (however, the Convention does not prohibit development projects in the surrounding areas, though subjected to the Lake Tanganyika Integrated Regional Development Program [PRODAP]). However, the endemic benthic species are subjected for protection under the Convention on Biological Diversity of which Tanzania have had already ratified, and thus in need of caution not to violate it. (c) Silt protector shall be installed around the dredging area, in order to minimize impact from dredged soil, spreading around the surrounding waters (with possibility of impact towards habitat to benthic species and underwater plant beds, etc.). Dredging at Kigodeko frontal water area (water area in front of the pontoon, and to its west shore water area) shall be avoided, in order to preserve the habitats of endemic benthic species (due through investigation of benthic habitats, subjected waters were observed as consisting relatively highest level of biodiversity). Also, if any IUCN Endangered (EN) category gastropod, L.Littorina are to be found at either the planned land reclamation or the dredging area, they will be relocated to a suitable habitat area for its conservation. (d) Same as above (c). (e) Yes. Algaes, underwater plant beds and endemic benthic species (including a perch called "Lates Mariae", of which its juveniles are only inhabiting in this Kigoma bay area throughout the Tanganyika Lake and gastropod called L.Littorina a IUCN Endangered (EN) category species; together with various kinds of endemic cichlids, gastropods and crabs, etc.) were sighted within the surrounding waters of the subjected berth. Its mitigation measures are the same as above (c).

Environmental Checklist: . 10.Ports and Harbors (6)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(3) Hydrology	(a) Do the project facilities affect adversely flow regimes, waves, tides, currents of rivers and etc if the project facilities are constructed on/by the seas?	(a) N	(a) Impact toward currents are not taken into consideration (or considered negligiable), since within scope of the natural environmental study, the situation of currents at surrounding waters of the berth subjected for rehabilitation had been checked. Underwater plant beds were observed in an upright position, and there were no indications of such currents existing at the surveyed point.
	(4) Topography and Geology	(a) Does the project require any large scale changes of topographic/geographic features or cause disappearance of the natural seashore?	(a) N	(a) No. The east side of the current berth will be slightly widened, but due to its very limited scale of difference, impact on topographic/geolographic features will be almost negligible.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, 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) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, 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? (j) Is the grievance redress mechanism established?	(a) N (b) (Y) (c) (Y) (d) (Y) (e) (Y) (f) N (g) (Y) (h) (Y) (i) N (j) (Y)	(a) Involuntary resettlement should not occur, by avoiding such impacts from occuring when selecting the temporary yard for construction workers office, storage yard for construction materials, etc. (b) Explanation on the project and assumed positive and negative impacts shall be provided to the public during the public hearing at the draft scoping stage. (c) No involuntary resettlement case will occur. Even if so, as for TPA related projects, project affected persons (PAPs) including illegal settlers, shall be all compensated based on TPA's policy to enable them to resettle. (d) Compensations are usually paid prior to resettlements. (e) Yes they are. (f) No, but they are treated fairly. No vulnerable nor indigenous people are anticipated to be affected from the Project. (g) Yes, agreements are obtained prior to the resettlements. (h) TPA has the capability to implement resettlement including required budget for compensation, in case it may occur. (i) TPA does not normally monitor impacts occured by resettlements. (j) Normally, the grievance redress mechanism is established when involuntary resettlment, land acquisition and other compensation requirements occur. However, no such impact are assumed to occur with regard to the subjected JICA project.

Environmental Checklist: . 10.Ports and Harbors (7)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
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 changes in water uses (including fisheries and recreational uses) in the surrounding areas due to project will adversely affect the livelihoods of inhabitants? (c) Is there a possibility that port and harbor facilities will adversely affect the existing water traffic and road traffic in the surrounding areas? (d) Is there a possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are considerations given to public health, if necessary?	(a) (N)/Y (b) (N)/Y (c) Y (d) Y	(a) The project should not adversely affect the living conditions of inhabitants. However, possible impact on fishermen illegally settled at Kigodeko shore needs to be reconfirmed (especially if they have organized a fisheries association, whereby possessing legitimate right for fishing activities in the surrounding area). A silt protector to mitigate impact on benthic species especially at Kigodeko frontal water area (with high level of biodiversity) shall be installed during the dredging works period. (b) Same as above (a). (c) During construction, a temporary docking area for MV Liemba must be prepared, however, once prepared the influence on the water traffic should be limited. (d) Such possibility cannot be denied, and thus appropriate healthcare and sanitation measures shall be provided to the workers, to mitigate any impact to the public (in accordance with the TPA-OSHE, etc.).
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N/N	(a) Commencement of the subjected project (including the access road project component and tentative yard for construction facilities and stock yard for construction materials, etc.) should not cause any damage to local heritages of importance. Therefore no specific mitigation measure is considered.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N/N	(a) The subjected project is a rehabilitation project, and therefore should not affect the local landscape. As such, mitigation measures for this item would not be required.
	(5) Ethnic Minorities and 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 (b) -	(a) The subjected project shall not cause any damage on assets of any of the surrounding residents. Therefore, the project is assumed that it will not cause any impacts on the culture and lifestyle of ethnic minorities and indigenous people. Specific mitigation measures are not required. (b) Not applicable.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and 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?	(a) N (b) Y (c) Y (d) Y	(a) TPA is ILO compliant and abides by Tanzanian laws and regulations. TPA also stipulates the TPA Occupational Safety Health & Environment Regulations (TPA-OSHE) 2010, and its guidelines. (b) Tangible safety considerations for construction workers and other individuals involved shall be in place, including installation of safety equipments to prevent accidents, and management of hazardous materials by providing proper education to the workers. TPA, in addition to TPA-OSHE 2010, is also on the verge of implementing and acquiring the Environmental Management System (EMS) and ISO 14001 standards by 2015. (c) TPA abides by the Tanzaninan laws and regulations associated with the working conditions of workers. Safety and health programs and safety training shall be addressed to the workers, based upon the TPA-OSHE 2010 and its guidelines. (d) Same as above.

Environmental Checklist: . 10.Ports and Harbors (8)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(1) Impacts 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 environment, are adequate measures considered to reduce impacts?	(a) Y (b) Y (c) Y	(a) Less polluting construction vehicles and machineries shall be selected during the planning phase, with regulartory maintenace during construction phase. Wastes generated by construction shall be disposed or treated properly. (b) A silt protector shall be installed around the dredging area, in order to mitigate impact towards surrounding habitat and ecosystem. (c) Social impact are unlikely to occur (more or less, should prompt positive impact by improvement of port convenience), agreement with the stakeholders shall be met at the official public hearing. A concern should be addressed, however, to especially the fishermen residing in the Kigodeko area near the subjected berth for rehabilitation. Their legitimate fishing rights status should be confirmed by checking on their establishment of a fisheries association. Adequate mitigation measure can be stated as same as above (b).

Environmental Checklist: . 10.Ports and Harbors (9)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(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) - (c) Y (d) Y	(a) A monitoring plan shall be formed within the EMP, for monitoring the environmental items considered to have potential impacts. (b) The monitoring Plan, to be included in the EIS will describe the methods and frequencies. (c) The monitoring plan, to be included in the EIS will describe the monitoring framework, to be adequately applied. (d) A regulartory format and frequency of its reporting of the monitoring plan are stipulated by the law and regulations.
6 Note	Note on Using Environmental Checklist	(a) Where necessary, impacts on groundwater hydrology (groundwater level drawdown and salinization) that may be caused by alteration of topography, such as land reclamation and canal excavation should be considered, and impacts, such as land subsidence that may be caused by groundwater uses should be considered. If significant impacts are anticipated, adequate mitigation measures should be taken place. (b) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) - (b) N.A.	(a) Not applicable. (b) Not much of concern. However, concern towards prevention of violation to the Basel Convention, International Convention for the control and management of Ships' Ballast Water and Sediments, etc. should be addressed, though both are not within scope of the subjected project. On the other hand, the rehabilitation of the berth should contribute positively in stablizing the security between other lake shore countries of Lake Tanganyika.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

Environmental Checklist: 7. Roads (1)

Category	Environmental Item	Main Check Items	Yes: Y No: N	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 host 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 host country's government?	(a) N (b) N (c) N/Y (d) N	(a) All the same with environmental checklist 10. "Ports and harbors" (b) (c) (d)
	(2) Explanation to the 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? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) N (b) N	(a) All the same with environmental checklist 10. "Ports and harbors" (b)
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) N	(a) Alternative plans regarding the access road have not been taken, but the subjected route is based upon the request by TPA to JICA.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	(a) Y/NA (b) N	(a) The Environmental Management Plan (EMP) to be included in the EIA Report (or EIS), shall describe whether the ambient air quality around the project site might comply with the Tanzanian emission standards or not. The Tanzanian ambient air quality standard is shown in the National Environmental Standards Compendium 2005, whereby the Standard is based upon the WHO Guideline. However, at present, there are no official data on the ambient air quality of Kigoma city nor there are any monitoring activities (although in actual terms, the result is apparant that polluted state of ambient air at the project site shall be very limited due to its remote local location with very few traffic, and that such condition will be stated in the EMP). During planning stage, less polluting construction vehicles & machineries will be selected, with regulartory maintenance during construction. (b) No. There are no industrial areas of concern nearby (except for a TANESCO power plant at TAFIRI bay, and oil terminal facility near Kibiriji, both remote from the project site), and the access road is only subjected for pavement works. Thus the project should not cause any significantly worse state of air pollution (though traffic amount may rise slightly, due to enhanced road convenience).

Environmental Checklist: 7. Roads (2)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2 Pollution Control	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	(a) Y (b) N (c) N/Y	(a) Civil works will be required by filling and excation works, therefore there remains possibility for soil runoff. Along both sides of the existing access road, storm water drainage are already been installed which will not be changed. However, most of its system runs down headed for the lake; for the effluent through the system to be directly discharged into the lake (which may lead to slight impact on turbidablity of lake waters). (b) The storm drainage system have had already been installed before the subjected project's planning, therefore, adverse impact to groundwater water sources are unlikely to occur. (c) There are no such parking or service area along neither side of the very short distance access road. Yes, but quite unlikely that storm water by rainfall could become a source of water contamination, except if oil or grease leakages from construction vehicles or machineries may occur (preventable by regular maintenace).
	(3) Wastes	(a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a) N	(a) No. There are no parking/ service areas along the subjected access road, which is less than 500m. Therefore, such anticipation is quite unnecessary.
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) N.A	(a) The EMP to be incorporated within the EIS may indicate the current state of noise and vibration pollution. However, at present there are no such available data, although such concerns are assumed unnecessary, due to the observed state of the very small amount of traffic and remote district location. There are no Tanzanian national level law and regulations or standards on noise and vibration. However, TPA's Occupational Safety and Environmental Regulations (TPA - OSHE) 2010 (noise premissible level, depending on type of area) are recommended to be applied at ports in Tanzania (ref. the subjected access road is within the port premise). Its maximum permissible level is 85 dB. Low noise and vibration type of construction vehicles and machineries that will comply with such standard, shall be selected during the planning phase.

Environmental Checklist: 7. Roads (3)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) Same with environmental checklist 10. "Ports and harbors"
	(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 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) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? (f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	(a) N (b) N (c) N (d) N (e) N/N (f) N	(a) There are no indigenous trees along the subjected access road. (b) The access road is not within , nor is neighboring to any protected area domestically designated nor by international treaties or conventions. However, 50 - 1000 m from the shore of Lake Tanganyika, is designated as a critical habitat area by the Fisheries Regulations, 2009 (where regulation is set forth prohibiting "fishing" activities during closed periods). (c) No. No significant ecological impacts are anticipated in terms of pavement works of the access road. Some trees (all of which are not indigenous ones) may need to be logged due to land use for temporary yard for construction material, however, at a well below significant level. Therefore, no particular protection measures are considered necessary. (d) No. The access road is not interrupting any species' or livestocks' migration route. Therefore, no such concerns are required. (e) No. All stated concerns are inapplicable with the state of the subjected access road and temporary yard for construction material. Therefore no preventing measures are to be required. (f) No. The access road only requires pavement works, therefore it is inapplicable.
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	(a) N	(a) No. There will be no alteration of topographic features nor installation of any structures. Therefore the concern is inapplicable.
	(4) Topography and Geology	(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(a) N/N (b) Y/Y (c) Y/Y	(a) No such soft ground that may cause slope failures were observed along the subjected access road. No particular measures are to be taken, except precausions normally taken during civil works in general. (b) By observation of the situation of the subjected access road, there are uneven inclinations according to sections of the route. Cutting and filling works may be required, and therefore causions to avoid any slope failures or landslides from happening, should be placed. Supervision for proper cutting and filling works shall be made, in this accord. (c) Yes, such possibility cannot be denied. Likewise with above (b), supervision to avoid such accidents from happening, shall be placed, in this accord.

Environmental Checklist: 7. Roads (4)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, 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) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, 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? (j) Is the grievance redress mechanism established?	(a) N (b) (Y) (c) (Y) (d) (Y) (e) (Y) (f) (N) (g) (Y) (h) (Y) (i) N (j) (Y)	(a) Involuntary resettlement should not occur, by avoiding such impacts from occuring when sellecting the temporary yard for construction workers office, storage yard for construction materials, etc. (b) Explanation on the project and assumed positive and negative impacts is expected to be provided to the public during the public hearing at the draft scoping stage. (c) Even if involunatary resettlement may occur, in terms of TPA related projects, project affected persons (PAPs) including illegal settlers, shall be all compensated based on TPA's policy to enable them to resettle. (d) Compensations are usually paid prior to resettlements. (e) Yes they are. (f) No, but they are treated fairly. No vulnerable nor indigenous people are anticipated to be affected from the Project. (g) Yes, agreements are obtained prior to the resettlements. (h) TPA has the capability to implement resettlement including required budget for compensation, in case it may occur. (i) TPA does not normally monitor impacts occured by resettlements. (j) Normally, the grievance redress mechanism is established when involuntary resettlment, land acquisition and other compensation requirements occur. However, no such impact are assumed to occur with regard to the subjected JICA project.
	(2) Living and Livelihood	(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts? (b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary? (c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)? (e) Is there any possibility that roads will impede the movement of inhabitants? (f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?	(a) N/Y (b) N (c) Y/Y (d) N (e) N (f) N	(a) The subjected road is an existing road only requiring pavement. No significant impacts are anticipated in terms of such indicated impacts. Yes, impacts toward residential structures or farm lands or recreational facilities shall all be avoided. (b) Same as above. (c) There maybe such possibility. Proper sanitary and healthcare education shall be provided to the construction workers. (d) No. The subjected access road is far from congested state, and although the project may invite in slightly more road users in the future, no congestions are to be anticipated. (e) No. On the contrary, the project will enhance convenience for smoother movements of inhabitants. (f) No. There are no such structures to be newly constructed, that may cause such issues.

Environmental Checklist: 7. Roads (5)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) The project will not damage any of such heritages. Therefore, no particular measure is considered necessary.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Same with environmental checklist 10. "Ports and harbors"
	(5) Ethnic Minorities and 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 to be respected?	(a) N (b) -	(a) No particular ethnic minorities nor indigenous people will be affected by implementation of the project. (b) Not applicable for above reason.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and 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 being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) N (b) Y (c) Y (d) Y	(a) (b) (c) (d) } Same with environmental checklist 10. "Ports and harbors".
5 Others	(1) Impacts 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 environment, are adequate measures considered to reduce impacts?	(a) Y (b) N (c) Y	(a) Low polluting construction vehicles/ machineries shall be sellected, during the planning phase. Regular sprinkling of water shall be conducted during the construction phase, to avoid dusts from rising to surrounding atmosphere. (b) No. The subjected access road is only subjected for paving, and therefore, no significant impact on the surrounding ecosystem are anticipated. No particular adequate measures are to be placed due to this accord. (c) Involuntary resettlement and land acquisition shall be avoided as the best adequate measure, thus no significant adverse affect on the social environment is anticipated.

Environmental Checklist: 7. Roads (6)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(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) - (c) Y (d) Y	(a) (b) (c) (d) Same with environmental checklist 10. "Ports and harbors".
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation). (b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).	(a) N (b) N	(a) Although in order to secure land for temporary yard for construction material, logging of trees may be required, the area and amount will be very limited (without any indigenous trees to be affected). Therefore, such anticipation is unnecessary. (b) The access road in question is only subjected for pavement without any necessity of widening it. Therefore, no anticipation is required in terms of affecting the power lines.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) Not of any concern. The road requiring pavement is an existing road. Thus along with the rehabilitation of the berth (including construction of the passenger waiting room and cargo warehouse within the berth area), the overall project will have very little adverse impact towards any global issue.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.