

The United Republic of Tanzania
Ministry of Works, Transport and Communication (MoWTC)

**THE PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR WIDENING OF
NEW BAGAMOYO ROAD (PHASE 2)
IN
THE UNITED REPUBLIC OF
TANZANIA**

DECEMBER 2017

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on New Bagamoyo road Widening Project (phase2) in Dar es Salaam in the United Republic of Tanzania, and dispatched a survey team from April 6 to May 12, 2014, and from July 24 to July 30, 2016.

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

December, 2017

Itsu ADACHI
Director General
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SUMMARY

1. Overview of the Country

The United Republic of Tanzania (hereinafter referred to as "Tanzania") is situated half way up the African continent's east coast, facing the Indian Ocean. It has a total land area of approximately 945,000 km² and a population of some 49.25 million (2013, World Bank). Highlands with an elevation of 1,000 ~ 2,000 m dominate the inland and Mt. Kilimanjaro (EL. 5,895 m) rises high in the north. Tanzania is bordered by Kenya to the north and Mozambique to the south, as well as Uganda, Rwanda, Zambia and Malawi, etc. to the west (inland side), and it represents an important transportation route for these inland neighbors. In particular, Dar es Salaam Port in Tanzania is becoming more and more important in recent years. The prevailing climate is characterized by high temperature and high humidity as is typical of coastal regions in Tanzania. There are two rainy seasons: a major rainy season from late March to late May and a minor rainy season from November to December. The period from June to September is relatively cool with temperatures at around 22°C, but hot weather continues from December to February with temperatures exceeding 30°C. Rainfall is observed all year round although half of the annual rainfall is recorded during the three months of the major rainy season.

After independence in 1961, Tanzania actively implemented socialist economic policies but its economy reached a crisis point in the 1980's due to oil shocks and severe drought. To improve the situation, the Government of Tanzania commenced economic reform in 1986 with the assistance of the World Bank and IMF. The economic growth rate in recent years has been improving and has fluctuated between 6~7% in recent years (6.93% in fiscal 2012 and 6.96% in 2013). Moreover, the GNP per capita has been steadily increasing from US\$ 210 in 1997 to US\$ 509 in 2009. The main industries are agriculture (46% of GDP), manufacturing based primarily on food processing (7%) and mining (2%). Primary industry accounts for 43%, secondary industry for 18%, and tertiary industry for 39% (2006, World Bank).

2. Background of the Requested Project

In the National Strategic Poverty Reduction Plan (NSGRP), the Government of Tanzania is striving to promote economic growth and mitigate poverty under the banner of 'Growth and reduction of income poverty.' It has placed emphasis on infrastructure development, especially development of the road sector, which is indispensable for economic growth, and is striving to connect the country's major cities and improve access to markets under the National Transport Policy (NTC) that has been compiled as the policy for the road sector. In 2007, the Government of Tanzania formulated the Transport Sector Investment Program (TSIP Phase II: 2007~2016), and based on this is advancing comprehensive development plans covering trunk roads, local roads, airways and marine transport, etc.

Dar es Salaam, where the Project road is situated, plays a central role in the economy and physical distribution of Tanzania. As the city is the starting point for all transport systems, including the road, rail, air and maritime transport systems, it is truly a strategic point for transport in Tanzania.

Concerning road traffic in Dar es Salaam, in the last 10 years, the number of registered vehicles in the city has grown at an annual rate of 7% which is higher than the population growth rate. As a result, the traffic congestion along trunk roads has been worsening every year, thereby hampering economic activities. Furthermore, since population in Dar es Salaam has displayed a high growth rate of 4% in recent years, it is forecast that traffic congestion in the urban area will continue to deteriorate from now on.

Under the TSIP, improvement of trunk roads through widening to four-lane roads is being advanced, while the Bus Rapid Transit (hereafter referred to as the BRT) Program has been formulated with a view to encouraging people to use public transport rather than private vehicles. Works have been completed on the Phase1 sections of the BRT Program with a view to relieving traffic congestion in the Dar es Salaam urban area. New Bagamoyo Road is regarded as a priority section within this urban trunk road development program.

Against such a background, the Government of Tanzania issued a request to the Government of Japan for implementation of the Urban Transport Policy and System Development Master Plan Study for the City of Dar es Salaam aimed at improving the transport network in the city.

In response, the Government of Japan consigned the Japan International Cooperation Agency (hereafter referred to as JICA) to implement study from April 2007 to June 2008, and it formulated the Transport Master Plan (M/P) having 2030 as the target year. In the M/P, among priority projects that have been selected for implementation between 2008 and 2015, the widening of New Bagamoyo Road (Phase2) (hereinafter referred to as Phase2), targeted under the Project for Improvement of Transport capacity in Dar es Salaam, will connect to the end point of the New Bagamoyo Road Widening Project (hereinafter referred to as Phase1), which aims to widen the said road to a four-lane highway under Japan's grant aid. Since the existing two-lane (some section were 3 lanes and in 2015, additional 2 lane were constructed by TANROADS on the left side of these 3 lanes) New Bagamoyo Road is a major hindrance to smooth traffic between the city center and suburbs, it is regarded as a high priority project.

Taking the findings of the above development survey into consideration, the Government of Tanzania made a request for further survey implementation to the Government of Japan in July 2008. Responding to this, the Government of Japan consigned JICA to implement the first part of the preparatory survey (Phase1) in November 2009 with the aims of defining the road's significance, confirming the target components, implementing an initial environmental impact assessment, etc. based on the JICA environmental and social consideration guidelines, and so on. Through these efforts, the validity and urgency of the Project were confirmed.

Table 1 Past Studies

Study	Year Implemented	Implementing Agency	Study Section	Outline of Study Results
New Bagamoyo Road Widening Project	November 2009	JICA	Morocco Intersection to Tegeta	Target section approximately 17 km
New Bagamoyo Road Widening Project (phase1) Detailed Design	August 2010	Government of Tanzania (JICA)	Mwenge to Tegeta	Target section approximately 12 km

Source: Survey Team

3.Outline of Study Findings and Project Contents

JICA dispatched the Preparatory Survey Team to Tanzania to conduct the field survey from April 6 to May 12, 2014. The Team engaged in discussions with various government officials in Tanzania, conducted field surveys in the Project area, examined the present state of the target section, the state of development progress around the end point of the road and progress of the BRT project and other related plans, and confirmed the level of necessity and urgency of upgrading on the requested section. Based on the site investigation and analysis, it was decided to upgrade the road according to the contents shown Table 2.

Table 2 Outline of the Project

Planned item	Description/Specifications	
Target Section	Approximately 4.3 km (from Morocco Intersection to Mwenge Intersection)	
Design Speed	60 km/hr	
Number of Lane	4 lane	
ROW	0 - 1.6 km = 45.0 m, 1.6-2.7 km = 60.0 m, 2.7-4.3 km = 70.0 m	
Width	Carriageway 7.0 m x 2, Shoulder 1.5m x 2, Central reservation 9.0m, footpaths 1.5m x 2, Service road 4.0m x 2	
Intersection	Roundabout : 1 location at round 3.8km	
	Inter section controlled by signal : 7 locations at, Morocco intersection, Victoria intersection, Makumbusho-1 and 2, Kijitonyama intersection, Shekilango intersection, Mwenge intersection	
Drainage work	Concrete U-shaped side drains : install along the entire route Road crossing culvert : Box culvert, pipe culvert	
Ancillary road structures	Curbstone work, Concrete retaining walls, Safety barriers, Traffic signals, Streetlights, Road signs, Road markings, Bus bays, Slope protection (Turving)	
Design life of pavement	15 years (Based on Pavement and Material Design Manual)	
Road Paving Work	Carriageway	Wearing course : Asphalt concrete (Modified asphalt) (5cm)
		Binder course : Asphalt concrete (5cm)
		Base course : Asphalt stabilized (DBM) (20cm)
		Sub-base course : Cement stabilized (30cm)
	Intersections, Bus bays	Wearing course : Semi-flexible (Open graded AC + Cement milk) (5cm)
		Binder course : Asphalt concrete (5cm)
		Base course : Asphalt stabilized (DBM) (20cm)
		Sub-base course : Cement stabilized (30cm)

	Service road	Wearing course : Asphalt concrete (5cm)
		Base course : Crushed stone (CRR) (20cm)
		Subgrade : (G10) (20cm)
	Footpath	Surface course : Interlocking block
		Base course : Sand (10cm)
		Subgrade : (G15) (15cm)

4. Project Schedule and Estimated Project Cost

As a result of the above surveys, the length of time required to implement the Project is estimated to be 6 months for implementation detailed design, 5.5 months for tender work and 27 months for the construction work, and the Tanzanian portion of the cost is estimated as approximately 20 million yen.

5. Project Assessment

(1) Relevance of the Project

Project implementation will contribute to improving convenience for impoverished inhabitants of the northern part of Dar es Salaam, as well as improving the trunk road network linking the north of Tanzania with the economic center. Accordingly, there is great significance in implementing the Project under the Government of Japan's Grant Aid scheme. Moreover, in order to ensure the long-term sustainability of such achievements, TANROADS is judged to have sufficient manpower and funding to conduct maintenance of the road after the implementation of the Project.

(2) Validity of project implementation

Implementation of the Project will improve the road conditions of the target section and also secure smooth and safe traffic flow, thereby benefiting the residents of Dar es Salaam and Northern Tanzania. The expected positive effects of the Project are briefly described next.

Quantitative effects

- ① Through widening the section between Morocco Intersection and Mwenge Intersection, average travel speed during the morning-noon and evening peaks (a total of seven hours: from 06:00 to 10:00 in the morning and from 16:00 to 19:00 in the evening) will be increased from 3 km/h (due to congestion) to around 40 km/h, thereby greatly shortening travel times.
- ② Traffic capacity will increase from the current some 830 vehicles/hr/lane to 1,740 vehicles/hr/lane.
- ③ Days of inundation will improve from the current some 30 days/year to 0 days/year.

Qualitative effects

- ① The shortening of travel times will reduce transportation costs.
- ② Increasing transport capacity on the road will improve the level of convenience of transport in Dar es Salaam.
- ③ Through securing regularity of passenger and goods distribution, access to the center of Dar es Salaam and port facilities will be improved, thereby contributing to the social and economic vitalization of Tanzania.
- ④ Construction of the Project road will make it possible to separate vehicles traveling at the standard speed from slower vehicles, thereby ensuring safe and smooth traffic flow.
- ⑤ Through stabilizing access from surrounding farm areas to markets, the stable transportation of goods will be secured, thereby leading to lower transportation costs and contributing to stable prices.
- ⑥ Through constructing a road linking Dar es Salaam to northern parts of Tanzania, the Project will contribute to economic development of the north and help rectify poverty differentials in that region.

Preparatory Survey Report on New Bagamoyo Road Widening Project (Phase 2)
in the United Republic of Tanzania

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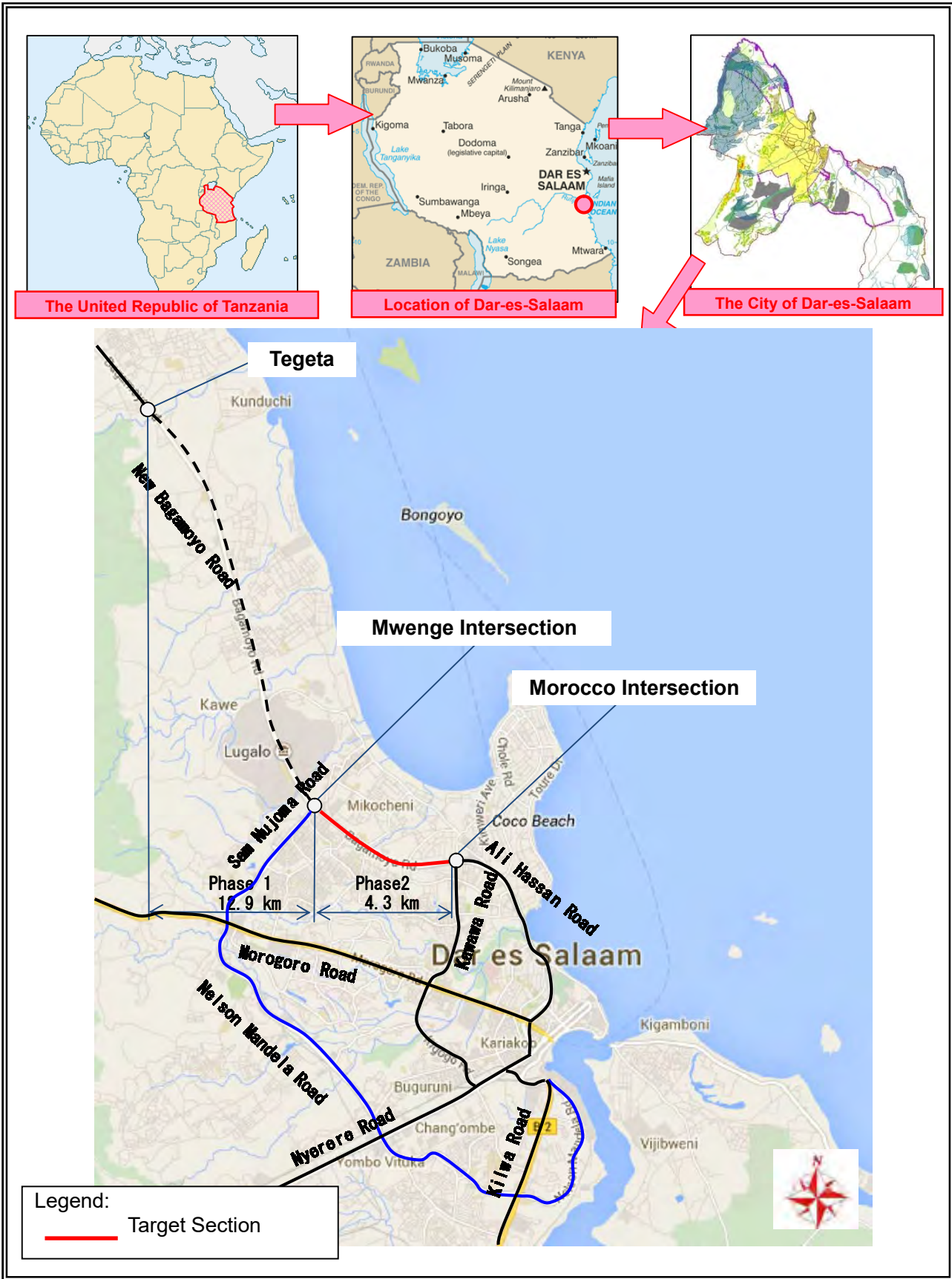
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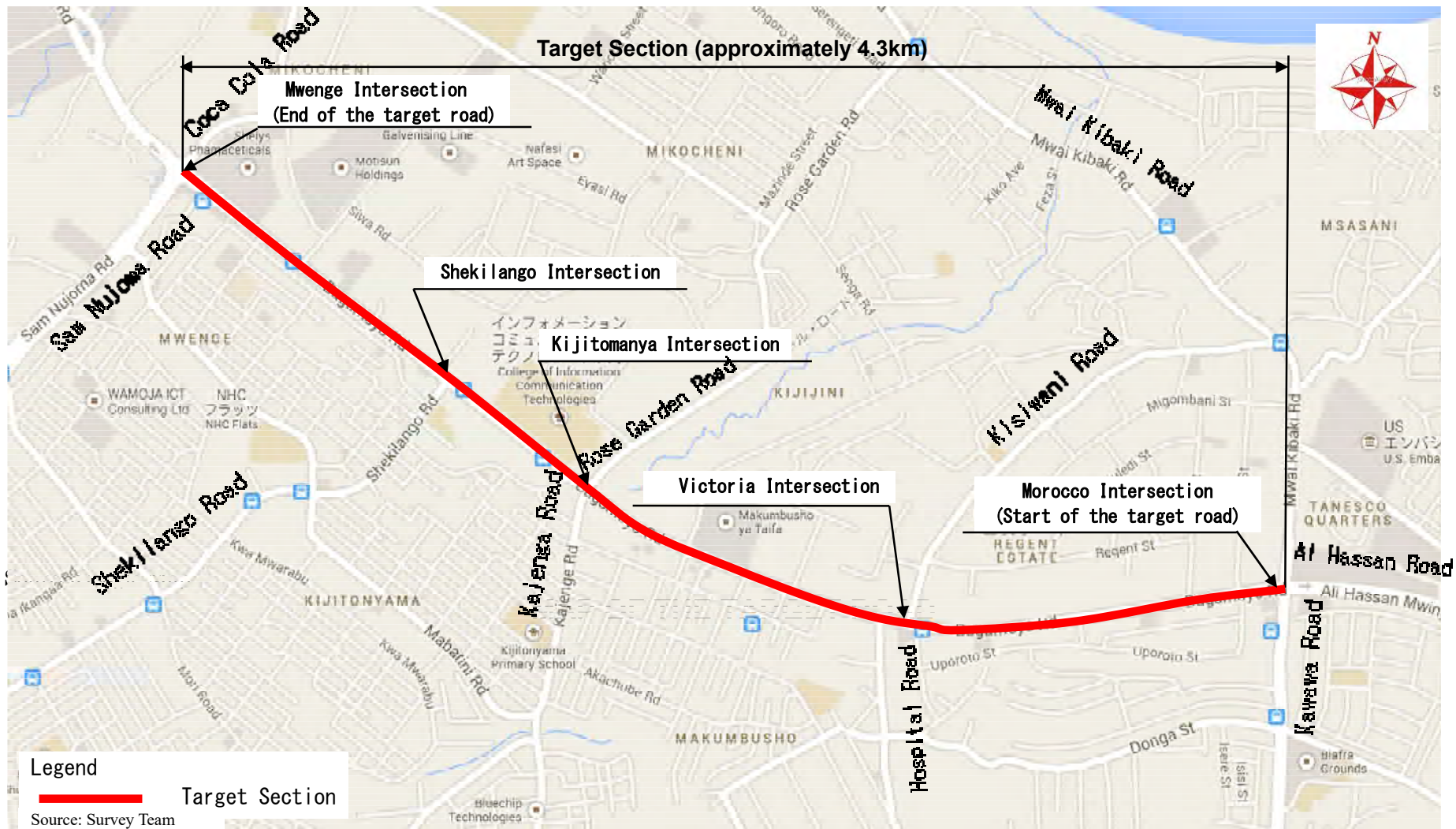
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Source: Survey Team

Location Map



MAP OF THE TARGET ROAD



PERSPECTIVE

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ABBREVIATIONS

AASHTO	American Standard of State Highway and Transportation Officials
AfDB	African Development Bank
BS	British Standard
CBR	California Bearing Ration
CRB	Contractor Registration Board
DANIDA	Danish International Development Assistance
DBST	Double Bituminous Surface Treatment
DCP	Dynamic Cone Penetration
EIA	Environmental Impact Assessment
EU	European Union
GNI	Gross National Income
GDP	Gross Domestic Product
GNP	Gross National Product
GOT	Government of Tanzania
JICA	Japan International Cooperation Agency
M/D	Minutes of Discussion
MoWTC	Ministry of Works, Transport and Communication
NEMC	National Environmental Management Council
NSGRP	National Strategy for Growth and Reduction of Poverty
PC	Prestressed Concrete
RAP	Resettlement Action Plan
RC	Reinforced Concrete
ROW	Right of Way
SADC	Southern African Development Community
SATCC	Southern African Transport and Communications Commission
SBST	Single Bituminous Surface Treatment
TANROADS	Tanzania National Roads Agency
TLC	Traffic Load Class
Tshs	Tanzania Shillings

CHAPTER 1

BACKGROUND OF THE PROJECT

CHAPTER1

BACKGROUND OF THE PROJECT

1-1 Background and Outline of the Request for Grant Aid

The road network of Dar es Salaam, which is the economic center of Tanzania, comprises four main radial highways connected by two circular roads. The road section targeted in the Project is the inner city section of a main radial highway situated at an important location in the city's transport network. In line with urban expansion accompanying the country's recent economic growth, road traffic in Dar es Salaam is growing rapidly, and this trend is especially pronounced in the inner city areas. Furthermore, the target road experiences chronic congestion that paralyzes city traffic during rush hour times, and improvement of this situation has become an issue of urgent importance. In order to improve the said situation, it is urgently necessary to conduct widening of the Project target section of road.

In response to these conditions, the Government of Tanzania in July 2007 requested the Government of Japan to provide grant aid for the widening of New Bagamoyo Road to six lanes over a 35 km section from Morocco Intersection to Mpiji on the border of Dar es Salaam Region. The Government consigned JICA to dispatch the road development project formation survey team to Tanzania from April to June 2008. As a result of the survey, it was decided to adopt the plan to secure BRT over four lanes over the section from Morocco Intersection to Tegeta and not to implement the project between Tegeta and Mpiji as the optimum plan.

Following this, JICA implemented the preparatory survey on the section of 17.2 km from Morocco Intersection to Tegeta in the outskirts in 2009. In this survey, since it was not possible to confirm the position and depth of underground structures such as large diameter water mains underneath the road over a section of approximately 4.3 km between Morocco Intersection and Mwenge Intersection, and it was deemed that relocation of these structures by the Government of Tanzania was not feasible, it was decided to exclude this section. Consequently, the Project for Widening of New Bagamoyo Road (Phase1), entailing widening to four lanes over the section of 12.9 km from Mwenge Intersection to Tegeta District, was completed July 2014. Meanwhile, the local implementing agency has been striving to secure right of way over the abovementioned 4.3 km section and it has more or less finished removing existing structures. It was against such background that the Government of Tanzania requested the Government of Japan to provide grant aid for the Project for Widening of New Bagamoyo Road between Morocco Intersection and Mwenge Intersection (Phase2).

1-2 Natural Conditions

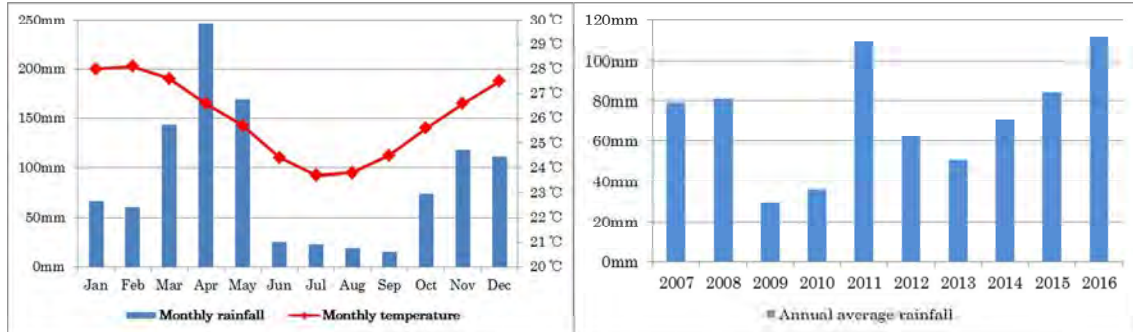
(1) Natural conditions around the target area

1) Topography and geology

New Bagamoyo Road in Dar es Salaam, one section of which is targeted in the Project, runs along the coastal terrace running parallel to the coastline at a distance of some 2 km from the Indian Ocean coast and has an elevation ranging from 20 m to 60 m. The ground supporting the target section of the road generally consists of sandy soil mixed with silt throughout, and there are some points where sandy soil is mixed with clay and is too soft to support the planned road.

2) Meteorological conditions

The prevailing climate is a high temperature and high humidity which is typical of coastal regions in Tanzania. There are two rainy seasons: a major rainy season from late March to late May and a minor rainy season from the end of November to early December. The period from June to September is relatively cool but extremely hot weather continues from December to February. Rainfall is observed all year round although half of the annual rainfall is recorded during the three months of the major rainy season.



Source: Survey Team

Figure 1-1 Temperature and Rainfall

(2) Implementation of Natural Conditions Survey

1) Topographical surveying

The surveying work items for the target route are as shown in the following table.

Table 1-1 Work Item for Topographical Survey

Work item	Quantity	Remark
(1) Bench mark installation	7 place	1 place/km
(2) Control survey	7 place	Bench mark for traverse survey in target section
(3) Center line survey	4.3 km	Existing road center line confirmation
(4) Survey cross section of road	108 section	25 m interval

(5) Topographical survey	34 ha	4.3km
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Source: Survey Team

2) Soil and materials survey

Material testing was implemented on fill material and stones from potential borrow pit and stone quarry in order to determine the feasibility of procuring materials for road construction and confirm the distances to be carried. Moreover, to determine the properties of foundation soil on the planned road section, samples were taken in the pit exploratory excavation and subjected to indoor testing.

Table 1-2 Outline of Soil and Materials Survey

Work item	Quantity	Remark
(1) In-situ material sampling	5 place	Stone Quarry 1place, Sand 2 places, Borrow pit 2 places
(2) Laboratory test	Stone Quarry: 1 sample Sand: 2 samples Borrow pit: 2samples	<u>Stone Quarry sample</u> : particle size, specific gravity, water absorption rate, abrasion, stability, flatness, alkali-silica reaction <u>Sand sample</u> : gradation, specific gravity, water absorption rate, organic content, sand equivalence, stability, alkali-silica reaction <u>Borrow pit sample</u> : particle size, specific gravity, water absorption rate, liquid limit, plastic limit, liner shrinkage, atterberg, CBR, organic content
(3) Existing pavement survey <u>Trial pit survey:</u> <u>Laboratory test:</u>	56 place 60 samples	Each 200 m particle size, specific gravity, liquid limit, plastic limit, atterberg, CBR, organic content

Source: Survey Team

3) Current ground survey

In this survey, in order to grasp the detailed scope and volume of unsuitable soil, as well as the conventional soil survey methods (exploratory pit excavation, indoor testing, etc.), the dynamic cone penetration (DCP) test and nondestructive investigation were implemented with a view to examining more appropriate countermeasures for unsuitable soil. Exploratory pit excavation and sampling were conducted at 200 m intervals midway between the

Table 1-3 Outline of Soil Survey

Work item	Quantity
Portable DCP test on site (each 100m)	252 places
DCP test (each 200 m)	84 places
Mechanical boring (Both side at 0.3 km, Both side at 0.5 km, Both side at 1.1km, RHS at 3.3km, RHS at 3.5 km)	8 places 28 samples

Source: Survey Team

existing road and public-private boundary, and DCP testing was implemented on both sides of the exploratory pit excavation positions and next to the public-private boundary. As a result, strata transition positions in the lateral direction and groundwater level were confirmed as follows. Moreover, in order to complement these findings, bearing capacity was confirmed using a simple bearing capacity meter at midway points every 200 m, thereby

enabling ground conditions in the target area to be gauged. Moreover, because soft layers were confirmed at depths of 2 m and more on the right side around the 0~1 km and 3.5 km points, it was decided to implement additional boring survey to gauge the impact of banking on subsidence, stability and nearby houses and reflect the findings in the design. The boring positions and test items and quantities are indicated below.

4) Traffic Volume Survey

Traffic volume survey

In the survey, a survey of traffic volume according to vehicle type was implemented for 24 hours in both directions around five major intersections on April 29 (Tuesday) and 30 (Wednesday), 2010. The survey dates were selected upon confirming no events that may impact the investigation result.

Axle load survey

In a 24-hour axle load survey conducted in both directions 2.8 km from Kijitonyama Intersection between April 30 and May 1, 2010.

5) Existing underground pipes

Existing underground pipes were investigated in prior interviews with related agencies, and the actual confirmation survey was implemented.

Table 1-4 Survey for Existing underground utilities

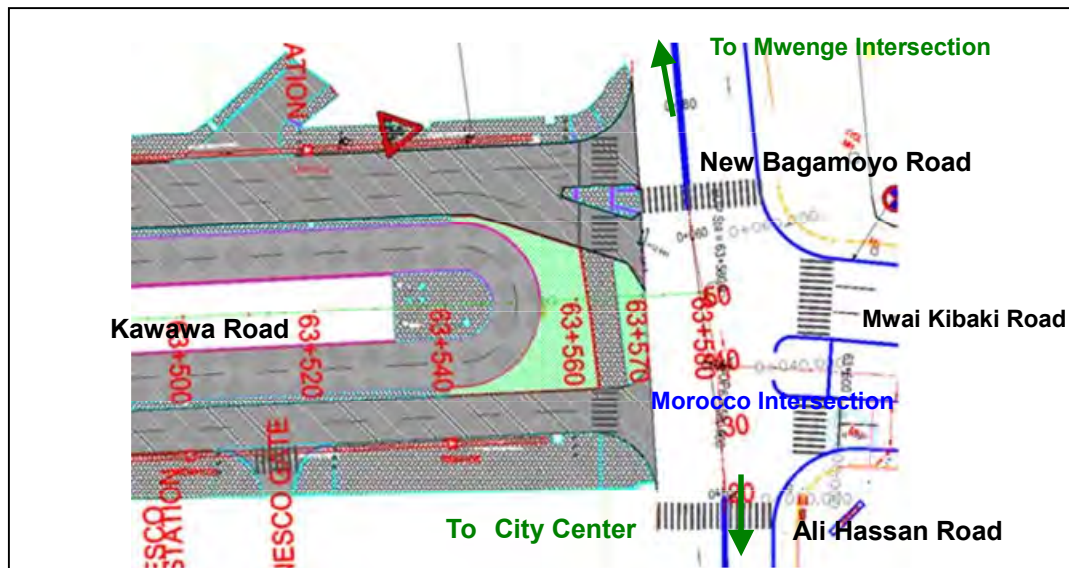
Survey items	Quantity
① Underground survey (Every 100 m)	84 locations
② Test pit	9 locations
③ Data collection	4.3 km

Source: Survey Team

1-3 Plans related to Project Implementation

1) Impact of the BRT Project

The BRT Phase1 works was completed in 2015 and operation started in 2016. The following figure shows the as-built drawing for Morocco Intersection in the BRT project. The existing road was two-lane (some section were 3 lanes) and additional 2 lanes were constructed in 2015 by TANROADS on the left side of the existing road. An additional survey was conducted by JICA survey team in July, 2016 and the present condition was studied and considered in the outline design of the preparatory survey. Moreover, since the Project road is expected to undergo development in phase4 of the BRT project, it has been decided to establish a central median for future BRT space as was also done in the phase1 section of New Bagamoyo Road. Incidentally, the contractor and consultant for the BRT phase1 works are STRABAG (Germany) and SMEC (Australia) respectively.



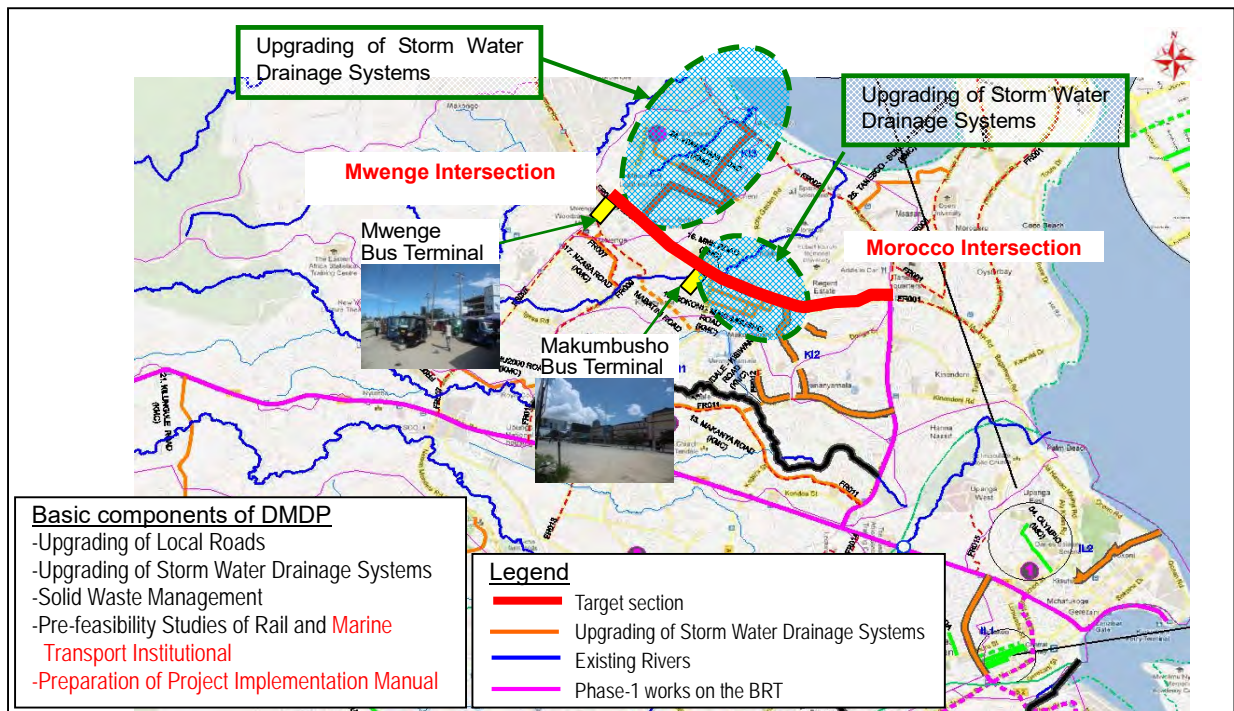
Source: Survey Team

Figure 1-2 Morocco Intersection As-built Drawing of Phase I works on the BRT

2) Dar es Salaam Metropolitan Development Project (DMDP)

Dar es Salaam Metropolitan Development Project (DMDP), which was started in 2014, is a World Bank undertaking aimed at improving infrastructure in the Dar es Salaam region. This project mainly targets the following five components, and the consultants and local governments concerned conduct surveys and design work, etc.

Regarding this project, the concerned local government is Kinondoni Municipal Council, while the consultants are Crown Tech with respect to wastewater and COWI with respect to roads. In terms of impact on the Project, it is possible that the Tanzanian side may ask for existing branch roads to be upgraded to service roads in line with the new bus terminal (Makumbusho Bus Terminal) constructed by TANROADS at 1.9 km on the left side and the planned new bus terminal next to Mwenge Intersection that is currently being examined by Kinondoni Municipal Council. Also, it will be necessary to ensure consistency of drainage facilities with the World Bank project. These points have been taken into consideration in planning the Project works.



Source: Survey Team

Figure 1-3 Dar es Salaam Metropolitan Development Project (DMDP)

1-4 Environmental and Social Considerations

1-4-1 Outline of Project Components Concerning Environmental and Social Impact

The following is the road length and standard cross section, etc. to be considered.

Target Road Length: 4.3km

Road composition: Separately indicate the W=45m section and W=60m section.

Improvement of intersections: 8 intersections

1-4-2 Environmental and Social Consideration Systems and Organizations in Tanzania

(1) Current Environmental Legislation

The major policies concerning environmental management and sustainable development in Tanzania are: the National Environment Action Plan 1994 (NEAP), the National Conservation Strategy for Sustainable Development 1994 (NCSSD), and the National Environment Policy 1997 (NEP). NEAP, which lays the basis for environmental policy in Tanzania, was enacted by the Ministry of Tourism, Natural Resources, and Environment in 1994 as the first step in incorporating environmental problems into national development plans, and it covers the following six areas as the items requiring urgent attention in the mainland of Tanzania.

- Land degradation
- Access to good quality water
- Pollution
- Loss of wildlife habitats and biodiversity
- Deterioration of marine and freshwater systems
- Deforestation

NEP, which was enforced in 1997, establishes the framework for implementing drastic reform, i.e. primarily incorporating environmental consideration, into policy decisions, and it indicates the required guidance and strategy planning for policies. It also provides guidelines for conducting sector-separate or cross-sector policy analysis and ensuring that consistency and synergy are obtained between sectors.

In addition to the above, environment-related policies are enacted for each of the following sectors.

Table 1-5 Sectors for Environmental Protection

Transport	Agriculture
Industry	Livestock
Water	Land
Construction	Mining
Tourism	Fisheries
Wildlife	National Parks
Forest	Energy
Gender	Health

Source: Survey Team

The Environmental Management Act (2004 / Gazette Number No.20 of 2004), which was enforced in November 2004, provides the basis upon which various environmental legislation is established. Chapter 10 of this law prescribes the procedure and responsible agencies for setting environmental standards, while the National Bureau of Standards establishes standards concerning potable water quality, wastewater, air quality, atmospheric emissions, noise and vibration, solid wastes, hazardous substances, soil quality, toxic gases, and light pollution¹.

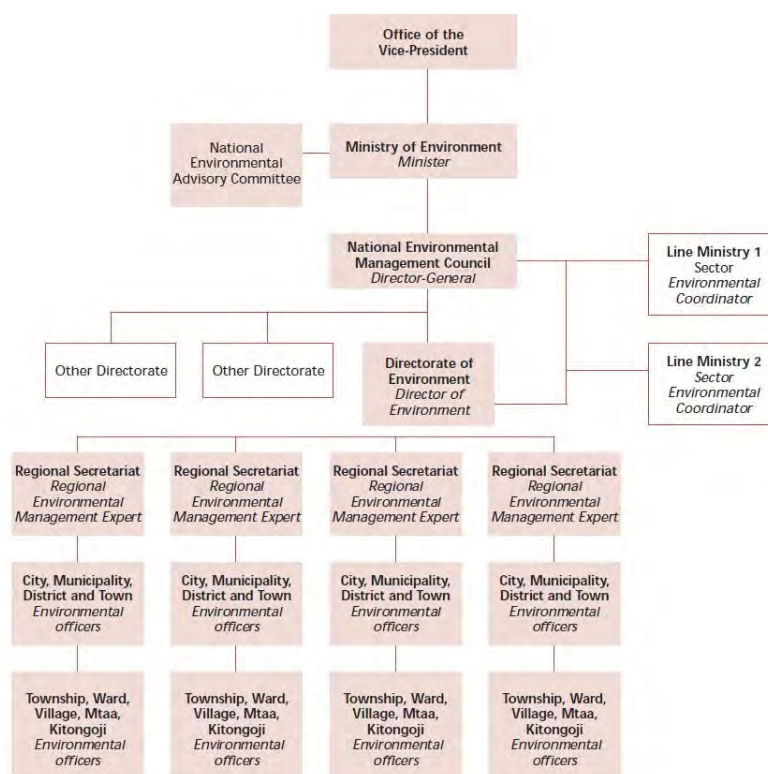
Environmental planning and management regulations concerning the road sector are stipulated in the Road Act 2007, which provides the following regulations and guidelines as a supplement to the Environmental Management Act.

- The Road Sector Environmental Protection Regulations 2009
- Road Sector Environmental Assessment and Management Guidelines 2011

¹ June, 2011

- Environmental Code of Practice for Road Works 2009
- Compensation and Resettlement Guidelines 2009
- A Guide to Road Safety Auditing 2009

Organizational functions concerning environment range from central government to villages, and the general structure is as follows.



Source: SADC Environmental Legislation Handbook 2012

Figure 1-4 Organizational Structure for Environmental Management in Tanzania

- National Environmental Advisory Committee
 - Minister Responsible for Environment
 - Director of Environment
 - National Environment Management Council (NEMC)
 - Sector Ministries
 - Regional Secretariat
 - Local Government Authorities (city, municipal, district, town council)

Belonging to the Vice-President's Office, the NEMC has legal authority over environmental conservation and environmental management and makes recommendations to the Vice-President's Office concerning all environmental issues. Moreover, the NEMC undertakes the implementation, compliance with, review, and monitoring of Environmental

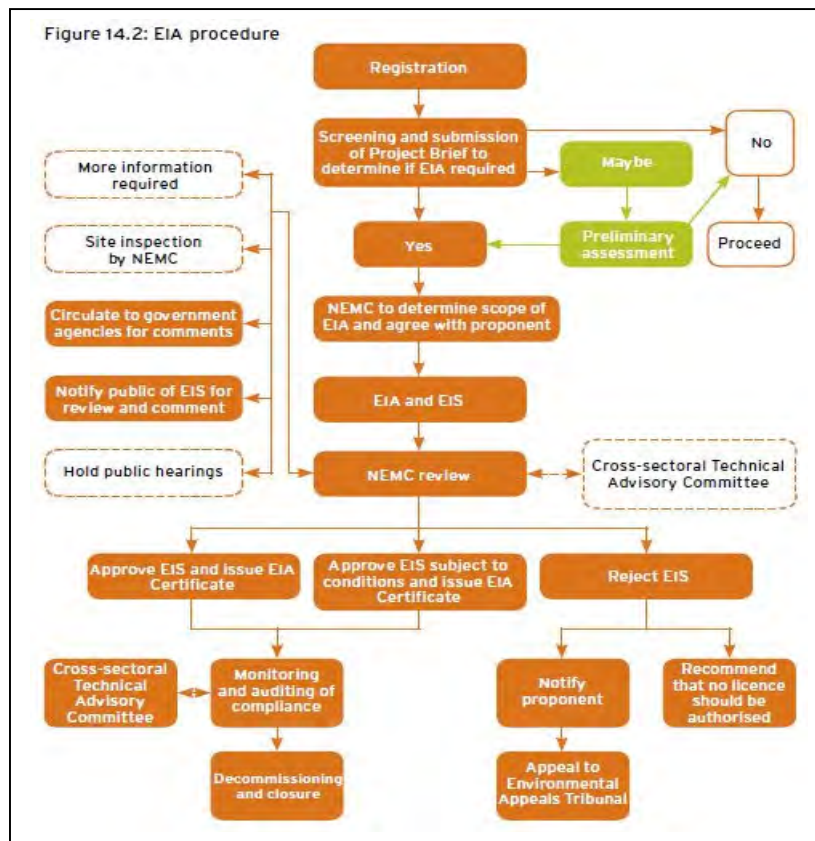
Impact Assessment (EIA) and also coordinates public participation in environmental policy decision making.

The main mandates of the NEMC are as follows.

- Enforce and ensure compliance with the national environmental quality standards.
- Review Environmental Impact Statements (EISs) and conduct environmental monitoring and auditing of projects and facilities.
- Undertake and coordinate research, investigation and surveys related to the environment, and collect and disseminate information.
- Carry out research and surveys for the proper management and conservation of the environment
- Render advice and technical support to entities engaged in natural resources and environmental management.
- Initiate and evolve procedures and safeguards for the prevention of accidents that may cause environmental degradation.
- Enhance environmental education and public awareness, and establish and operate national environmental information systems for sound environmental management.
- Publish and disseminate manuals, codes and guidelines relating to environmental management and the prevention or abatement of environmental degradation.
- Issue restoration and easement orders and prohibition notices.
- Undertake any other functions, such as integrated coastal zone management.

(2) Environmental Procedures and Important Points to Consider

Legal regulations concerning EIA in Tanzania are prescribed in Chapter 6 of the Environmental Management Act. EIA authorization is stipulated as compulsory in a total of 22 sectors including transportation infrastructure, agriculture, energy and so on, and it is also required for construction, widening, improvement, etc. of roads. The procedure for EIA authorization is as follows.



Source :SADC Environmental Legislation Handbook 2012

Figure 1-5 Procedure for EIA authorization

EIA for the Project

Regarding the environmental procedure for the Project, the Ministry of Infrastructure Development (MOID), which is the government office with primary responsibility, made the application in 2008, and the NEMC gave notification of completion of registration of the target road project in October that year.

The target section of the Project initially stretched for approximately 17 km between Morocco Intersection and Tegeta Intersection, and the environmental and social impact assessment (ESIA) prepared by TANROADS for this section was submitted to NEMC and environmental approval was granted on January 15, 2010. Accordingly, Phase 2 of the Project (Morocco Intersection to Mwenge Intersection), which was part of the original section, has already received environmental approval as is indicated on the NEMC homepage. Incidentally, according to the environmental guidelines of Tanzania, it is necessary to implement the Project within three years of environmental approval, however, work on Phase 1 has already been finished and the environmental approval for the Project including Phase 2 is still effective.

Table 1-6 Data of the Target Section of the Project in EIA approved List

REG.NO	PRINT DATE	SIGN DATE	NAME (M/S)	ADDRESS	PROJECT TITLE	AREA	DISTRICT	REGION
210	30.12.2009	15.1.2010	TANZANIA NATIONAL ROADS AGENCY (TANROADS)	P.O.BOX 11364 DAR ES SALAAM	NEW BAGAMOYO ROAD (17 KM) WIDENING PROJECT, DAR ES SALAAM REGION	MOROCCO TO TEGETA	KINONDONI	DAR ES SALAAM

Source: Extracts from NEMC home page²

(3) Related Legislation in relation to Social Matters

In Tanzania, starting with the Land Act, 1999 and the Village Land Act, 1999, there are various laws and regulations concerning the ownership, acquisition and transfer of land. According to the Constitution of Tanzania and the Land Act, all the land of Tanzania belongs to the nation and is managed by the people's representative, i.e. the President. There is no private ownership of land, however, rights of occupancy and land use are recognized under law.

Land is divided into the following three types:

- Reserved land: National parks, land for public buildings, land where development is restricted for protection of wild habitats and nature, etc.
- Village land: Land that is deemed to belong to villages based on the Village Land Act, and land that has been occupied by villages for 12 years or more based on the Customs Act
- General land: Other land apart from the above

The following types of land occupancy are recognized.

- Customary right of occupancy: Villagers can use village land under the jurisdiction of the Village Land Act. Villages can also demand that villages pay rent in such cases.
- Granted right of occupancy: This is occupancy of reserved land or general land where the legally recognized limit of use is 99 years. Based on the Land Registration Ordinance, it is compulsory for occupants to conduct surveying and registration of the land.
- Leasehold: Persons who hold legally recognized right of occupancy are allowed to lease land for a period within the length of occupancy of 10 days or more.




²http://www.nemc.or.tz/index.php?option=com_content&view=article&id=106&Itemid=250

- Residential license: License is approved by the state or state-designated agency on reserved land or general land, and this is mainly applicable to land in cities or non-hazardous land. Persons who have lived on land for at least three years following enforcement of the Land Act and have made application within six years following enforcement of the Land Act have the right to acquire license.

(4) Important Points to Consider and Issues in Social Matters

Removal of buildings and trees and compensation procedures have been completed on the land required for road widening in the Project, and there are no more remaining problems in terms of legislation in Tanzania. However, some of the said land is used for building and shop parking areas and is occupied by tables for eating and stalls, and the area around Mwenge Intersection is like a shopping bazaar. Since there are no residents or permanent residents on the land, TANROADS believes that there should be no problem removing these objects by the time of handing over before the start of works. Moreover, since these stalls and so on are not authorized, they are not eligible for compensation under local environmental guidelines. The scope of compensation in line with resettlement and the method of assessing and calculating the amount of compensation and so on differ between the World Bank’s safeguard policy and the JICA guidelines, while the Tanzanian side intends to deal with compensation according to its own domestic law³. In the latest development, the bazaar at Mwenge bus terminal was removed in June.

Photo 1 Present Situation of Widening Section in Target Area

After removal market in bus terminal	Street vendor in area for widening	Restaurant table in area for widening
		
Area for widening after removal structure	Area to red line is for widening	Parking space in area for widening
		

³According to listening to TANROADS officer in charge

Kinondoni Municipal Council, which is in charge of the compensation procedure for the target land, reports that some of the residents who have been resettled and received compensation are complaining that the compensation amount is too low and have made an appeal to TANROADS, and it is possible that the matter will be brought before a court of law⁴.

1-4-3 TOR for Scoping and Environmental and Social Consideration Survey

The draft scoping plan below shows the environmental and social items that need to be considered in the Project.

⁴According to listening to Kidondoni Municipal Council, Development Natural Resource and Environment

Table 1-7 Draft Scoping Plan

Impact Item		Rating		Basis and Reasons for Impact	
		During works	When in services		
Pollution	1	Air pollution	B-	C	<p>During works: In line with the operation of construction machinery, deterioration of air quality, albeit temporary, is forecast.</p> <p>When in service: Depending on the level of increase in traffic volume, gas emissions from vehicles are expected to have a negative impact on air quality. On the other hand, with increase in the number of lanes from three to four and with the construction of service roads, the impact of Co2, NOx and particulate emissions, etc. from vehicles is expected to be mitigated.</p>
	2	Water pollution	B-	D	<p>During works: There is a possibility that water pollution will be caused by wastewater from works sites, heavy machinery, vehicles and worker living quarters.</p> <p>When in service: With the construction of drainage ditches, the level of flood occurrence at times of rainfall will be mitigated.</p>
	3	Solid waste	B-	D	<p>During works: It is expected that residual soil and waste materials will be generated in the works.</p> <p>When in service: It is not expected that waste materials that have an impact on the local environment will be generated.</p>
	4	Soil pollution	B-	D	<p>During works: There may be a possibility of soil pollution caused by leakage of construction oil, etc.</p> <p>When in service: There is not expected to be any soil contamination thanks to periodic road cleaning and construction of side ditches.</p>
	5	Noise and vibration	B-	C	<p>During works: It is expected that noise will be generated through the operation of construction equipment and vehicles, etc.</p> <p>When in service: There are no residences or medical facilities alongside the road between Morocco Intersection and Mwenge Intersection. There are religious facilities, a university, and education research facilities, however, these are set well back from the road, and there is not expected to be any noise impact from increased traffic volume and faster travel speeds thanks to paving of the road and provision of more lanes.</p>
	6	Ground subsidence	D	D	There is not expected to be any work that could trigger ground subsidence.
	7	Odor	D	D	There is not expected to be any work that could generate odor.
	8	Sediments	D	D	There is not expected to be any work that could impact the bottom sediment.
Natural environment	9	Protected districts	D	D	There are no national parks or protected districts, etc. around the Project target site and environs.
	10	Ecosystems	D	D	Because the Project entails upgrading of an existing

Impact Item		Rating		Basis and Reasons for Impact	
		During works	When in services		
				road and there are no rare flora and fauna in the target area, there will be hardly any impacts on ecosystems.	
	11	Water conditions	D	D	During works: There is not expected to be any work that could trigger changes in river water flow or riverbeds. When in service: Through appropriately treating water channels running across the existing road, it is forecast that less flooding will occur around the road.
	12	Terrain and geology	D	D	Because the Project entails upgrading of an existing road and no major cutting or banking works are planned, there will be hardly any impacts on the terrain and geology.
Social environment	13	Relocation of inhabitants	D	D	Before works: Acquisition of land for road widening has been completed and there will be no resettlement of residents. (Occupancy and retailing of ceramics and plants and trees can be seen in parts of the ROW).
	14	People in poverty	D	D	Before works: There are no unlawful occupants and so on inside the ROW. When in service:
	15	Indigenous population, minorities	D	D	There are no minorities or indigenous races in and around the Project target site.
	16	Local economy: employment and means of livelihood, etc.	D	D	Because the Project entails upgrading of an existing road, there will be hardly any impacts on the local economy.
	17	Land use and local resources use	D	D	Because the Project entails upgrading of an existing road, there will be hardly any impacts on land use and local resources.
	18	Water usage	D	D	During works: If water is used around rivers within the Project target area, impact could be caused by muddy water during the works. When in service: If water is used around rivers within the Project target area, impacts could be triggered by the outflow of weed killers from the road surface to rivers and runoff of particulate and oil at times of rainfall.
	19	Existing social infrastructure and social services	B-	D	During works: It is planned to relocate water pipes inside the ROW before the start of the works. However, it is expected that traffic congestion will arise during the works. When in service: Due to the composition of traffic lanes and improvement of intersections, etc., it is expected that unlawful running by three-wheel vehicles will be regulated and contribution will be made to safety of pedestrians.
	20	Social infrastructure and social organizations such as local decision making	D	D	Because the Project entails upgrading of an existing road, there will be hardly any impacts on infrastructure and local decision-making agencies, etc.

Impact Item		Rating		Basis and Reasons for Impact	
		During works	When in services		
		bodies, etc.			
	21	Deviations in damage and convenience	D	D	Because the Project entails upgrading of an existing road, it will impart hardly any inequitable damage or benefits on surrounding areas.
	22	Local conflicts of interest	D	D	Because the Project entails upgrading of an existing road, it will not cause any conflict of interests in the local area.
	23	Cultural assets	D	D	There is no cultural heritage, etc. in the Project target area and environs.
	24	Landscape	D	D	Because the Project entails upgrading of an existing road, there will be hardly any impacts on the landscape.
	25	Gender	D	D	There are not expected to be any particular negative impacts on gender as a result of the Project.
	26	Children's rights	D	D	There are not expected to be any particular negative impacts on children's rights as a result of the Project.
	27	Infections (HIV)	B-	D	During works: Risk of infections could increase due to the influx of construction workers.
	28	Working environment (including safety)	B-	D	During works: It will be necessary to pay attention to the working environment of construction workers. When in service: Work that could have a negative impact on workers after the road goes into service is not planned.
Other	29	Accidents	B-	B-	During works: It will be necessary to pay attention to accidents during the works. When in service: There is fear that increased traffic volume and faster speeds could lead to more road accidents.
	30	Effects of crossing border and climate change	D	D	Because the Project entails upgrading of an existing road and its scale is not great, there will be hardly any trans-border impacts or impacts on climate change, etc.

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

Source: Survey Team

B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)

D: No impact is expected.

Concerning the identified impacts, survey items and methods were reviewed and the TOR for environmental and social consideration was prepared as shown below.

Table 1-8 TOR for Environmental and Social Consideration

Environmental items	Survey items	Survey method
Consideration of alternative plan	①Review of alignment ②Review of work methods	Minimization of the number of households for resettlement and land acquisition, and maximization of the Project benefits Review of works methods for mitigating environmental impacts and traffic congestion, etc. during works
Air pollution	①Confirmation of environmental standards, etc. (environmental standards in Tanzania,	①Survey of existing materials ② Survey of existing materials and, where

Environmental items	Survey items	Survey method
	<p>environmental standards in Japan, WHO standards, etc.)</p> <p>② Grasping of current air quality</p> <p>③ Grasping the degree of increase in traffic volume based on the traffic demand forecast</p> <p>④ Confirmation of residences, schools, hospitals, etc. around the Project target site</p> <p>⑤ Impacts during works</p>	<p>necessary, actual measurements</p> <p>③ Forecasting of impacts based on the results of traffic demand forecast</p> <p>④ Site reconnaissance and hearings</p> <p>⑤ Confirmation of the works contents, work methods, period, position, scope, types of construction machinery, operating positions, operating periods, number of running works vehicles, running routes, etc.</p>
Water pollution	① River water quality	① Survey of existing materials, information collection at related agencies
Solid waste	① Construction waste materials treatment method	① Hearings at related agencies, survey of similar projects
Soil pollution	① Prevention of oil leaks, etc. during works	① Confirmation of the works contents, work methods, period, position, types of construction machinery and equipment, operating and storage positions, etc.
Noise and vibration	<p>① Confirmation of environmental standards, etc. (environmental standards in Tanzania, environmental standards in Japan, WHO standards, etc.)</p> <p>② Distance from generation sources to residential areas, hospitals and schools</p> <p>③ Impacts during works</p>	<p>① Survey of existing materials</p> <p>② Site reconnaissance and hearings</p> <p>③ Confirmation of the works contents, work methods, period, position, scope, types of construction machinery, operating positions, operating periods, number of running works vehicles, period, running routes, etc.</p>
Land acquisition and resettlement of residents	<p>① Confirmation of the scale of land acquisition and resettlement of residents</p> <p>② In the case where land acquisition or resettlement of residents does arise, preparation of a resettlement plan (summary)</p>	<p>① Related legal systems and case studies, etc.</p> <p>② Satellite photos of the target area</p> <p>③ Confirmation of types of buildings, if any, around the target road based on site reconnaissance (residences, schools, medical facilities, etc.)</p> <p>④ Confirmation of land use conditions around the target road based on land use maps and interviews during site reconnaissance</p> <p>⑤ Preparation of a resident resettlement plan (summary) based on the Tanzanian Lands Act, JICA environmental and social consideration guidelines, and World Bank's Operational Policy 4.12, etc.</p>
Existing social infrastructure and social services	① Existence of residences, schools and medical facilities around the Project target area	① Survey of existing materials, hearings at related agencies, site reconnaissance
Infections (HIV)	<p>① HIV/AIDS Prevalence around the Project target area</p> <p>② Agencies that conduct related activities</p>	<p>① Survey of existing materials, hearings at related agencies</p> <p>② Hearings at related agencies</p>
Working environment (including safety)	① Labor safety measures	① Survey of similar projects (contents of contracts with contractors in other similar projects, etc.)
Accidents	① Increase in road accidents when the road goes into use (distribution of residences and facilities, and distance and position of human movements in relation to the planned transport facilities)	① Survey of existing materials, site reconnaissance
Stake holder meeting	<p>Two-stage implementation</p> <p>① Draft scoping stage</p> <p>② Draft report stage</p>	<p>① Past stakeholder discussions</p> <p>Period: June 2008</p> <p>Target: Kinondoni municipal employees in charge, Road Agency, local residents, NGOs, etc.</p>

Environmental items	Survey items	Survey method
		<p>Discussion contents: Objectives of survey, schedule, explanation of the scoping plan, discussions on the scoping plan</p> <p>②Past discussions with residents (16 locations)</p> <p>Period: June - August 2009</p> <p>Targets: Representative and responsible employees of related facilities, Road Agency, local residents, NGOs, research agencies</p> <p>Implementation of stakeholder meetings and interviews in this survey (May 2014)</p>

Source: Survey Team

1-4-4 Results of Environmental and Social Consideration Survey (including forecast results)

The results of the environmental and social consideration survey based on the TOR are indicated below.

Table 1-9 Results of Environmental and Social Consideration Survey

Air pollution	<p>During works: In line with the operation of construction machinery, deterioration of air quality, albeit temporary, is forecast, however, the impacts will be mitigated by implementation of appropriate measures based on the environmental management plan, and they will be limited to the works period only.</p> <p>When in service: It is forecast that CO₂ generation from traffic congestion and particulates caused by non-pavement will be reduced. Impacts of NO_x will increase in line with the increase in traffic volume, however, in the long term the impacts will be reduced in line with the introduction of vehicles with controlled exhaust gas emissions, regulation of vehicle remodeling, and dissemination of measures.</p>
Water pollution	<p>During works: The effects of wastewater from works sites, heavy machinery, vehicles and worker living quarters, etc. can be minimized through taking appropriate countermeasures based on the works management plan.</p>
Solid waste	<p>During works: Impacts from wastes can be minimized through classifying and reducing the volume of wastes based on the works management plan, and selecting appropriate disposal sites and methods, etc.</p>
Soil pollution	<p>During works: Through adhering to methods for storing and handling oils based on the works management plan, the possibility of soil pollution caused by leakage of construction oil, etc. can be minimized.</p>
Noise and vibration	<p>During works: The impacts of noise and vibration can be kept within standard levels through introducing construction machinery with low noise and vibration specifications, thoroughly implementing maintenance and inspections based on the environmental management plan, and using soundproof sheeting as required.</p> <p>When in service: It is forecast that noise level alongside the road will increase by around 3dB(A) in line greater traffic volume and faster running speeds.</p>
Infections (HIV)	<p>During works: There is a possibility that risk of infections could increase due to the influx of construction workers, however, impacts can be prevented in advance through implementing a HIV/AIDS, etc. campaign program based on the environmental management plan as needed.</p>
Working environment (including safety)	<p>During works: It will be necessary to pay attention to the working environment of construction workers based on the contract documents and environmental management plan.</p>
Accidents	<p>During works: It will be necessary to implement safety management based on the contract documents and environmental management plan.</p> <p>When in service: It will be necessary to implement road safety measures based on an accident prevention campaign and tighter controls.</p>

Source: Survey Team

1-4-5 Impact Assessment

Based on the abovementioned survey findings, the environmental impacts arising from project implementation have been summarized as the draft scoping plan and survey results indicated below.

Table 1-10 Draft Scoping Plan and Survey Results

Impact items			Environmental impacts in scoping		Environmental impacts based on survey findings		Reason
			During works	When in services	During works	When in works	
Pollution	1	Air pollution	B-	C	C	C	The increase of exhaust gases in line with increase in traffic volume is expected to be minor.
	2	Water pollution	B-	D	D	D	
	3	Solid waste	B-	D	D	D	
	4	Soil pollution	B-	D	D	D	
	5	Noise and vibration	B-	C	B-	B-	Because there are no residences, schools, or medical facilities, etc. alongside the road between Morocco Intersection and Mwenge Intersection, it is deemed that impacts will be within the permissible limit.
	6	Ground subsidence	D	D	N/A	N/A	
	7	Odor	D	D	N/A	N/A	
	8	Sediments	D	D	N/A	N/A	
Natural environment	9	Protected districts	D	D	N/A	N/A	
	10	Ecosystems	D	D	N/A	N/A	
	11	Water conditions	D	D			
	12	Terrain and geology	D	D	N/A	N/A	
Social environment	13	Relocation of inhabitants	B-	D	B	D	Land for the ROW has been acquired; however, it is still used as parking space and a taxi waiting area and is occupied by restaurant tents, kiosks, ceramics and plant vendors, while the area around Mwenge Intersection is like a shopping bazaar. It will be necessary to remove these occupying people and objects by the time the land is handed over at the start of the works.
	14	People in poverty	D	D	D	D	
	15	Indigenous population, minorities	D	D	N/A	N/A	
	16	Local economy: employment and means of livelihood, etc.	D	D	N/A	N/A	
	17	Land use and local resources use	D	D	N/A	N/A	

Impact items			Environmental impacts in scoping		Environmental impacts based on survey findings		Reason
			During works	When in services	During works	When in works	
	18	Water usage	D	D	N/A	N/A	
	19	Existing social infrastructure and social services	B-	D	B-	D	It will be necessary to relocate water pipes and telegraph poles by the time the land is handed over.
	20	Social infrastructure and social organizations such as local decision making bodies, etc.	D	D	N/A	N/A	
	21	Deviations in damage and convenience	D	D	N/A	N/A	
	22	Local conflicts of interest	D	D	N/A	N/A	
	23	Cultural assets	D	D	N/A	N/A	
	24	Landscape	D	D	N/A	N/A	
	25	Gender	D	D	D	D	
	26	Children's rights	D	D	D	D	
	27	Infections (HIV)	B-	D	B-	D	It is forecast that the influx of workers into the workers' camp will cause impacts.
	28	Working environment (including safety)	B-	D	B-	D	Labor safety measures will need to be taken in order to secure safety during the works.
Other-	29	Accidents	B-	B-	B-	B-	As the number of lanes will increase and vehicles will travel at faster speeds, there will be greater risk for pedestrians trying to cross the road.
	30	Effects of crossing border and climate change	D	D	N/A	N/A	

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

Source: Survey Team

B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)

D: No impact is expected.

1-4-6 Mitigation Measures and Cost and Monitoring Plan for Implementing Mitigation Measures

The works supervision consultant and contractor need to comply with the environmental management plan stated in the ESIA report approved by the Tanzanian side, and the draft plan based on this is as follows.

Table 1-11 Draft Environmental and Social Monitoring Plan (Morocco~Mwenge)

Parameters		Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility for monitoring
Water Quality	Turbidity	Twice before the construction starts (Once during rainy season and once during dry season)	Interval of 300m for the whole construction site	NTU	<i>Turbid meter</i>	10NTU	Contractor/ Environment Supervisor
Air quality	Dust	Once before the construction starts and in subsequent stages (construction and Operational)	At crossroads	$\mu\text{g}/\text{m}^3$	<i>Micro Dust Pro</i>	0.01	Contractor/ Environment Supervisor
Noise Baseline	Noise level	Once before the construction starts and in subsequent stages (construction and Operational)	At crossroads	dBA	Measurements	110	Contractor/ Environment Supervisor
Compensation	Rate of compensation for land and properties	Once before the construction starts	All affected people	Once before construction begins	Resettlement Action Plan (RAP).	-	Municipal council/ TANROADS/ Consultant
Water Quality	Turbidity	Once Per month	Interval of 300m for the whole construction site	NTU	<i>Turbid meter</i>	10NTU	Contractor/ Environment Supervisor
Air pollution	Dust	Once Per month	At crossroads	$\mu\text{g}/\text{m}^3$	<i>Micro Dust Pro</i>	0.01	Contractor/ Environment Supervisor
Noise pollution	Noise level	Once Per month	At crossroads	dBA	Measurements	110	Contractor/ Environment Supervisor
Vibration	Vibration levels	Once per Month	Project road,	No per time	Records	-	Contractor/ Environment Supervisor
Frequency of illness of construction workers	Illness of construction workers	Once in a month for the construction period	Project site	Number of cases	Health records	-	Municipal Health officers/ Contractor
Employment opportunity	Percentage of local construction labor	Three times a year	Project site	Number of local people employed in the project	Records, inquiries and observation	-	Municipal council/ Contractor/ TANROADS
Safety and health risks	Number and type of safety equipment such as	Once in three month	Project site	Number of safety measures provided	Actual injuries and illness statistics	-	Contractor/ OSHA

	mask, helmet gloves and ear plugs. Health and sanitation facilities in camps.						
Water Quality	Turbidity	Once in three month	Interval of 300m for the whole construction site	NTU	<i>Turbid meter</i>	10NTU	Contractor/ Environment Supervisor
Air pollution	Dust	Once in three Months	At crossroads	$\mu\text{g}/\text{m}^3$	<i>Micro Dust Pro</i>	0.01	TANROADS
Noise pollution	Noise level	Once in three Months	At crossroads	dBa	Measurements	110	TANROADS
Safety of human beings in settlements and business areas	Road accidents and roads signs	Three times a year for the project life span	Project site	Road signs and number of accidents	Records, inquiries and illness statistics	Zero accident and sufficient no of road signs	Traffic police/ Municipal council

Source: Survey Team

Moreover, the works supervision consultant and contractor will be responsible for establishing the monitoring setup, monitoring and supervising the items stated in the environmental management plan during the works implementation period. Concerning the following monitoring items, it will be necessary to implement even if they are not stated in the ESIA report.

Table 1-12 Environment Monitoring Plan

Environment item	Measure	Execution time	Executer* organization	Monitoring item
Land acquisition, Resettlement	Execution appropriate building transfer and removal	In detail design In construction	- municipal office -Supervision Consultant	- Situation of traveling or removal - disposal method of removed house
	Execution appropriate compensation and resettlement plan	In detail design In construction	- TANROADS -Supervision Consultant	- situation of compensation - Situation of resettlement - Opinion from PAPs or contractor
Environmental pollution with construction	Execution construction not to cause environmental pollution	In construction	-Contractor	- Dust - Turbid water - Noise - Vibration - Maintenance of construction machine - Opinion from residents
Environmental destruction with construction	Execution construction not to cause environmental destruction	In construction	-Contractor	- Situation of borrow pit and quarry - Disposal method of construction waste
Accident, risk	Appropriate management of safety	In construction	-Contractor	- Occurrence situation of accident - Situation of street vendor - Opinion from residents, pedestrian
Deforestation	Prohibition to cut down trees unnecessary	In construction	-Contractor	- Situation of deforestation

Source: Survey Team

1-4-7 Land Acquisition and Resettlement of Residents

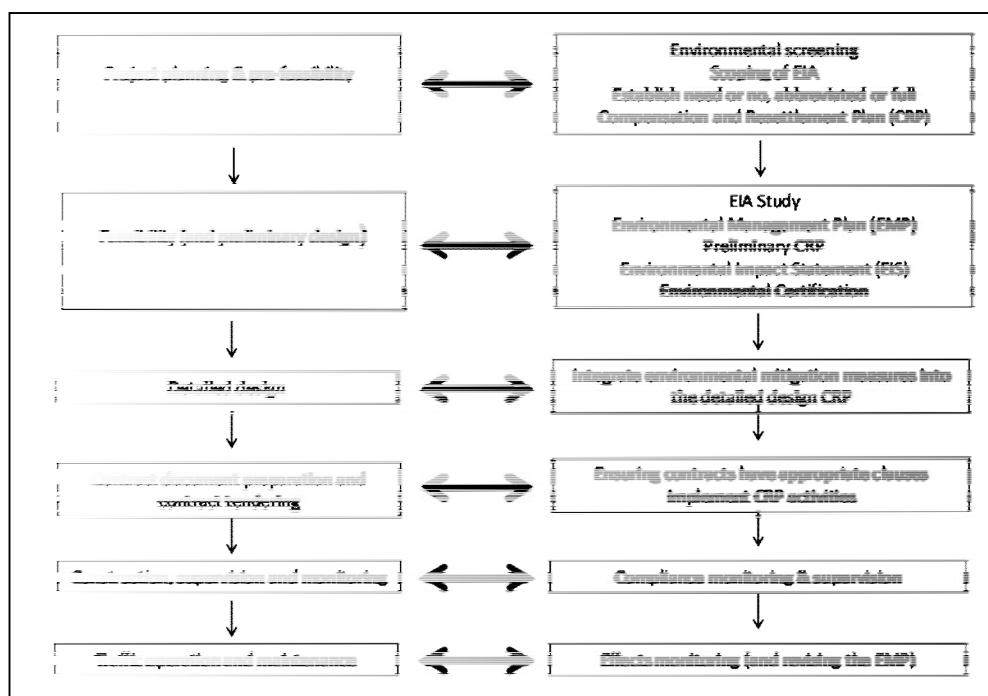
(1) Necessity of Land Acquisition and Resettlement of Residents

The preparatory survey was implemented in 2009 on the 17.2 km section between Morocco Intersection and Tegeta including the 4.3 km section between Morocco Intersection and Mwenge Intersection targeted in the Project, and compensation procedures for the target section were completed in 2012. The compensation mainly covered fences, living quarters for security staff, and trees, and the removal or relocation of these objects has generally been finished.

(2) Legal Framework concerning Land Acquisition and Resettlement of Residents

As was mentioned above, the basic legislation concerning land in Tanzania is the Land Act, 1999, and various laws and regulations are established concerning land ownership, acquisition and transfer.

Items concerning resettlement planning and compensation in line with road works are indicated in the Road Sector Compensation and Resettlement Guidelines 2009 compiled by the Ministry of Infrastructure. In cases where economic impacts or physical resettlement or relocation arise during the planning and implementation of road works, since the Compensation & Resettlement Plan (CRP) is an important component of the environmental and social impact assessment, the guidelines aim to have the compensation and resettlement process incorporated from the planning stage. Therefore, before a project is implemented, it is stipulated that the CRP be compiled and implemented by the compensation and resettlement agency at the same time as the EIA survey. The following figure shows the flow of project planning, CRP and EIA survey.



Source: Road Sector Compensation and Resettlement Guidelines

Figure 1-6 EIA Process, CRP and Project Cycle

The main contents of the CRP are as follows.

Table 1-13 Contents of Compensation and Resettlement Plan

Main contents
- Background: Purpose, method of CRP
- Outline of road plan: Description of compensation for area
- Applied law: Enactment of law for compensation
- Organization, system: Organization, system for compensation, resettlement
- Affected population: Investigation affected people, objects
- Social and economic characteristics of the subject: Household composition, income, estimates, livelihoods, health status, etc.
- Vulnerable people: specific population in the weak position of persons with elderly, sick, disabilities
- Option of resettlement: Expected social impact and subject's requests
- Community participation: Overview of residents description, subject's and stake holder's opinion
- History and cultural heritage, etc: Investigation for affected historical and cultural facilities
- Eligibility criteria: Standards of compensation and relocation target
- Evaluation of assets: Evaluation Calculation of affected assets
- Execution of CRP: Procedure, schedule, charged agency, complaints management
- Monitoring of CRP: Monitoring of the status and results
- Environmental protection and management: Prediction of possible environmental impact
- Expenses: Expenses with execution of CRP
- Annex

Source: Road Sector Compensation and Resettlement Guidelines 2009

(3) Comparison of JICA Guidelines with Legal Systems in Tanzania

The following table shows a comparison of the JICA Guidelines and laws in Tanzania.

Table 1-14 JICA Guidelines and laws in Tanzania

No	(A) JICA Guidelines	(B) Laws of the Tanzania	Gaps between (A) and (B)	Project Policy in this RAP
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	Tanzania policies also insist on looking for best alternatives when implementing Involuntary resettlement and loss of means of livelihood.	No gap between JICA and Tanzania policies.	
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	<p>The <i>Land Acquisition Act</i>, the <i>Land Act 1999</i> and the Village <i>Land Act 1999</i> have stated clearly that land owners, with or without formal legal rights, are entitled to full, fair, and prompt compensation. They also get disturbance allowance, transport allowance, accommodation allowance, and loss of profit if they were in actual occupation of the acquired property.</p> <p>Lost assets are limited to “unexhausted improvements”, that is the land and developments on the land. The law does not cover economic and social impacts of relocation and as such socio-economic surveys are not part of the land acquisition process.</p>	<p>There is no gap between Tanzania and JICA Guidelines as well as WB OP 4.12 as far as those with formal legal rights and those without formal legal rights are concerned</p> <p>However, the lost assets in Tanzania are restricted to land and developments on land, and where relevant, loss of profits. The lost assets under WB OP 4.12 are much wider than land and include loss of access to livelihoods and standard of living and seeks to improve them or at least to restore them to pre-displacement levels.</p>	The <i>Land Acquisition Act</i> , the <i>Land Act 1999</i> and the Village <i>Land Act 1999</i> .

3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Tanzania law on compulsory acquisition and compensations limited to those who can prove <i>de jure</i> or <i>de facto</i> land ownership. Users are not covered.	Tanzania law makes no differentiation between owners of permanent and non-permanent buildings.	The <i>Land Acquisition Act</i> , the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i> .
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Land acquisition and Compensation matters are regulated by the Land Acquisition Act No.47 of 1967 and assessment of Compensation is specifically provided under Land Regulations made under section 179 in Land Act No. 4 of 1999 which explains that Compensation should be paid in full air and prompt. Prompt means it should be paid within six months, failure to do which attracts an interest rate equivalent to the average rate offered by commercial bank fixed deposits.	The reference to Market value in Land Act No.4 as opposed to Replacement cost has tended to give impression that the two directives are at odds with one another, while WB OP 4.12 insist on Replacement cost as the ‘...amount of money needed to buy land or houses of equal make, dimension and location, Land Act No.4 provides Market Value as the best price the land owner would obtain in a free market operations but in addition provides for payment of allowances as rehabilitation to the affected persons.	The <i>Land Acquisition Act</i> , the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i> .
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	Under the law, the government can take possession of the acquired land at the end of the notice to acquire period, before paying compensation. However, current practice is such that possession is usually after the payment of compensation whereby the displaced persons are given time to vacate the land, which is usually as soon as possible. On other assistance, there are no	The <i>Land Acquisition Act</i> , 1967, allows the government to take possession of the acquired land before paying compensation. There are no transitional measures provided for under	<i>Land Assessment of The value of Land for Compensation) Regulations, 2001</i> , and the <i>Village Land Regulations, 2001</i> and WB OP 4.12

		<p>legal provisions requiring the government to restore livelihood or to provide assistance towards the restoration of such livelihoods.</p> <p>Indeed, compensation is not payable in the case of restrictions to access to areas of livelihood opportunities.</p> <p>Moreover, there are no provisions that require the government to pay special attention to vulnerable groups or indigenous peoples</p>	<p>Tanzanian law and practice; nor are there provisions for compensation as a result of restrictions to access to livelihood. The Tanzanian law does not make provisions requiring the government to pay special attention to vulnerable groups in the administration of compensation</p>	
6	<p>For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)</p>	<p>Tanzanian laws do not provide for Relocation and resettlement. However, there are a few cases where the government has provided both compensation and alternative land, but this has been done at its discretion. In general however, the government feels that it has discharged its duty once compensation is paid, and it is up to the displaced persons to resettle and re-establish themselves elsewhere</p>	<p>Tanzanian law provides for transport allowance for 12 tons of luggage for up to 12 km from the acquired land, provided the displaced person was living on that land.</p> <p>In lieu of housing accommodation allowance is made in the form of rent for 36 months.</p> <p>Occasionally in a discretion any manner alternative land is awarded.</p>	<p>The <i>Land Acquisition Act</i>, the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i>.</p>
7	<p>In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)</p>	<p>There scanty provisions related to consultation and disclosure in Tanzanian law.</p> <p>The notice, under the <i>Land Acquisition Act</i>, informs land owners about the President’s need to acquire their land, and their right to give objections. The Land Act allows displaced persons to fill in forms requiring that their land be valued, and giving their own opinion as to what their assets are worth.</p> <p>Currently, there is no specific policy as “Resettlement Policy” in</p>	<p>The provisions in WB OP 4.12 requiring consultation, options and disclosure have no equivalent in Tanzanian law and practice</p>	<p><i>Land Acquisition Act</i>,</p>

		Tanzania. However, the resettlement in the country is guided by the national policies and laws related to land issues, thus, there are no provisions about informing the displaced persons about their options and rights; nor are they offered choice among feasible resettlement alternatives. The government provides compensation in cash.		
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Under the <i>Land Acquisition Act</i> , informs land owners about the President's need to acquire their land, and their right to give objections. The Land Act allows displaced persons to fill informs (in Kiswahili) requiring that their land be valued, and giving the their own opinion as to what the their assets are worth.	The provisions in WB OP 4.12 requiring consultation and disclosure have no equivalent in Tanzanian law and practice. However, in identifying eligible PAPs forms No. 69 and 70 are used for identification and value of assets.	The <i>Land Acquisition Act</i> ,
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	Consultation with wide range of project stakeholders including individuals or groups affected by the project either positively or negatively also the host community is regularly held as a procedure towards resettlement exercise.	Tanzanian law does not make provisions requiring the government to pay special attention to vulnerable groups in the administration of compensation despite the consultations	<i>WB OP 4.12 and JICA Guidelines (These guidelines are used as instrument during consultations to include tenants and vulnerable groups. In this project tenants were not affected despite being involved in the consultations)</i>
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Under s. 13 of the <i>Land Acquisition Act</i> , where there is a dispute or disagreement relating to any of. the following matters (a) the amount of compensation; (a) (b) the right to acquire the land; (b) (c) the identity of persons entitled to compensation; (c) (d) the application of section 12 to the land; (d) (e) any right privilege or liability conferred or imposed by this Act; (e) (f) the apportionment of compensation between the persons entitled to the same and such dispute or disagreement is not settled by the parties concerned	The law in Tanzania does not provide for the establishment of grievance resolution mechanisms specific to particular resettlement cases.	The <i>Land Acquisition Act</i> ,

		<p>within six weeks from the date of the publication of notice that the land is required for a public purpose the Minister or any person holding or claiming any interest in the land may institute a suit in the High Court of Tanzania for the determination of the dispute.</p> <p>In practice the government tries to resolve grievances through public meetings of the affected persons.</p>		
11	<p>Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6)</p>	<p>Identification of affected people is done through census and surveys which assist to know the social structure of the population and their distribution to inform resettlement</p>	<p>There is no gap between Tanzania Resettlement Guideline and that of JICA</p>	<p>The <i>Land Acquisition Act</i>, the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i> and WB OP. 4.12/JICA Guidelines (WB OP. 4.12 and JICA Guidelines insist the inclusion of tenants which are not pronounced in Tanzania Laws)</p>
12	<p>Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)</p>	<p> Holders of formal right to land/assets. Holders of land under customary law</p>	<p>There is no gap between Tanzania and WB OP 4.12 as far as those with formal legal rights and those without formal legal rights are concerned</p> <p>However, the lost assets in Tanzania are restricted to land and developments on land, and where relevant, loss of profits. The lost assets under OP 4.12 are much wider than land and include loss of access to livelihoods and</p>	<p>The <i>Land Acquisition Act</i>, the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i>.</p>

			standard of living and seeks to improve them or at least to restore them to pre-displacement levels	
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Tanzania law on compulsory acquisition and compensation is limited to those who can prove <i>de jure</i> or <i>de facto</i> land ownership. Users are not covered	The gap between Tanzania and WB OP 4.12 is about eligibility, which is hinged upon formal or informal ownership. While, in Tanzania, compensation is based on market value, determined using the depreciated replacement cost approach for developments on	The <i>Land Acquisition Act</i> , the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i> .
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	Tanzanian law requires that compensation be full, fair and prompt. Prompt means it should be paid within six months, failure to do which attracts an interest rate equivalent to the average rate offered by commercial banks on fixed deposits. However PAPs are guaranteed 90 days to vacate after compensation.	In terms of timing, both Tanzanian laws and WB OP 4.12 require that compensation be paid promptly.	The <i>Land Acquisition Act</i> , the <i>Land Act 1999</i> and the <i>Village Land Act 1999</i> .
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	There are no legal provisions requiring the government to restore livelihood or to provide assistance towards the restoration of such livelihoods. Indeed, compensation is not payable in the case of restrictions to access to areas of livelihood opportunities. Moreover there are no provisions that require the government to pay special attention to vulnerable groups or indigenous peoples	There are no transitional measures provided under Tanzanian law and practice; nor are there provisions for compensation as a result of restrictions to access to livelihood. The Tanzanian law does not make provisions requiring the government to pay special attention to vulnerable groups in the administration of compensation	<i>WB OP. 4.12 and JICA Guidelines (Emphasize the borrower countries to restore the livelihood of the PAPs and pay attention to elderly people, terminally sick and other vulnerable groups directly or indirectly affected by the project)</i>

16	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	Tanzania laws and policies on resettlement do not demarcate nor specify between RAP and ARAP. When involuntary resettlement is due RAP and Compensation should be implemented despite the number of PAPs.	It is adopted from WB OP.4.12	The <i>Land Acquisition Act</i> , the <i>Land Act 1999</i> , <i>Guidelines for Resettlement Action Plan in Road Sector (Ministry of Works) and WB OP. 4.12/JICA Guidelines (To facilitate ARAP in Road projects where there are less than 200 households.)</i>
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Source: Survey Team

(4) Scale and Scope of Land Acquisition and Resettlement

The land acquisition survey and compensation procedures for the Project target section were implemented in 2010 and 2012 respectively. The structures that will be affected by the widening works are mainly walls, fences, trees, offices, and the living quarters for security staff of houses, but the removal of all these has been completed. The following table shows the objects that have been removed.

Table 1-15 Removal Quantity

Land	Walls, Fences	Barracks for Guard	Trees
16,494.92 m ²	59 places	26 barracks	1661 trees

Source: Survey Team

Because land occupied by commercial buildings and houses partially occupies the road widening area, 59 buildings have had walls or fences removed or moved back, while 29 living quarters for security staff have also been removed, as is shown in the following table. On the other hand, no residents have been forced to resettle as a result of the Project.

Table 1-16 PAU and AP

Type of loss	No. of PAUs			No. of APs		
	Legal	Illegal	Total	Legal	Illegal	Total
Required for Compensation				NOT APPLICABLE		
HH walls/fence (Structure owner on Gov. land)	12	-	12			
HH (Hall owner on Gov. land)	1	-	1			
HH (Structure-Quarter guards owner on Gov. land)	2	-	2			
HH walls/fence (Structure owner on Private land)	46	-	46			
HH (Structure-Quarter guards owner on Private land)	24	-	24			
HH Tenants	NA	NA	NA			

CBEs (Structure owner on Gov. land)	-	-	-			
CBEs (Structure owner on Private land)	-	-	-			
CBEs Tenants	NA	NA	NA			
Community owned structures including physical cultural resources	-	-	-			
Not required Compensation						
Land Owners	-	-	-			
Gardeners	DO NOT POSSESS NEITHER LAND NOR STRUCTURES					
Liquid waste trucks, tricycle bikes and taxi						
Motor spare parts vendors						
Other vendors						
Total	85	-	85	-	-	-

Source: Field survey data, 2014/ HH: House Hold, CBEs: Commercial and Business Enterprises

(5) Concrete Compensation and Support Measures

The Project works will entail reduction of occupied land and removal of fences and trees and so on, however, the concrete measures concerning compensation and support in this respect have already been planned and implemented according to the Tanzanian Land Act and the Road Sector Compensation and Resettlement Guidelines 2009 compiled by the Ministry of Infrastructure. Compensation for the owners and residents of commercial buildings inside the Project area was handled as follows.

- Compensation: Based on the assessed amounts by Kinondoni Municipality, talks were held between the affected persons on the municipal council until both side came to an agreement.
- Compensation method: At the request of the persons targeted for compensation, it was decided to offer support in the form of cash compensation. The Tanzanian government has paid a total of roughly 3.2 billion Tanzanian shillings⁵ (approximately 210 million yen) as compensation for the removal of structures, etc. along the project target section. All the affected persons have received their compensation money, however, 32 households are currently in discussions with a view to having the amount of compensation reassessed⁶.

Meanwhile, concerning the street vendors who have set up bazaar-like stalls in the target area but are not eligible for compensation, Kinondoni Municipality is

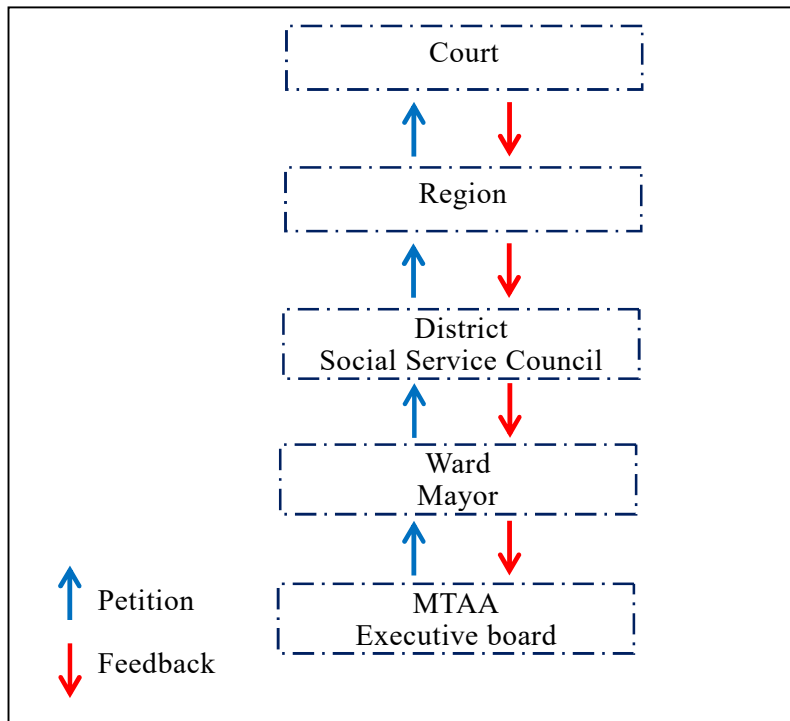
⁵ According to materials provided by TANROADS

⁶As of June 2014. According to an interview with the responsible staff member of Kinondoni Municipality, because the process from assessment to payment took longer than usual, some owners are demanding that inflation of market prices in the interim be taken into account. However, since the original assessed amounts were approved, the money was received and the necessary structures were removed, the situation is unlikely to change.

implementing consultation and providing support such as proposing alternative sites for the stalls. In the discussions with residents conducted during the survey, the said street vendors understood the need for the project and their own situation and did not voice any complaints in particular.

(6) Complaint Handling Mechanism

Public meetings are held in order to explain to the general public national policies and legal systems concerning resettlement and removal of structures, criteria for assessing compensation, and the mechanism for making complaints. The basic procedure is as shown in the following figure. Starting from lower level administrative organizations, the procedure moves through to upper level organizations if a resolution cannot be reached.



Source: Survey Team

Figure 1-7 Procedure of Making complaints

(7) Implementation Setup

The TANROADS Dar es Salaam area office implemented the assessment of compensation targets, and then the Kinondoni Municipality Evaluation Office (where the target area is located) reconfirmed the assessment contents and made the actual payments to the concerned parties. When making compensation payments, each compensated party is asked to sign and seal documents stating the detailed compensation contents and is then photographed with the documents. The documents

and four of the said photographs are then held by the TANROADS area office.

(8) Implementation Schedule

The environmental and social impact assessment (ESIA) for the target section was implemented in 2009, assessments were conducted in 2010, and the compensation payments were made in 2012.

(9) Cost and Source of Funds

As was mentioned earlier, compensation was paid for 58 walls and fences, 26 security staff living quarters, 1,661 trees and a total area of 16,495.92m². The total amount of compensation paid as a result of assessment based on market prices was 3,194,565,578 Tanzanian shillings.

(10) Public Discussions

In May 2014, the subcontractor staged a meeting to provide explanations to stakeholders and at this time gave an outline explanation of the project. Since procedures for the parties eligible for compensation have been finished, this meeting mainly targeted unofficial street vendors in the Project target area.

(11) Environmental Checklist

The environmental checklist in the Project is as follows.

Table 1-17 Environmental Checklists

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1. Permits and Explanation	(1)EIA and Environmental Permits	<ul style="list-style-type: none"> ① Have EIA reports been officially completed? ② Have EIA reports been approved by authorities of the host country's government? ③ Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? ④ In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government? 	<ul style="list-style-type: none"> ① The environmental and social impact assessment report (ESIA report) was compiled in September 2009. ② The ESIA report was submitted by TANROADS to the National Environmental Management Council in September 2009 and received approval in January 2010. ③ No problem ④ Not necessary

	(2)Explanation to the Public	<p>① Are contents of the project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public?</p> <p>② Are proper responses made to comments from the public and regulatory authorities?</p>	<p>①② A meeting to provide explanations was held for stakeholders (individuals working alongside the road who are not eligible for compensation) by Kinondoni Municipality in May 2014, and general understanding for the Project was obtained.</p>
2. Mitigation Measures	(1)Air Quality	<p>① Is there a possibility that air pollutants emitted from various sources, such as vehicle traffic will affect ambient air quality? Does ambient air quality comply with the country's ambient air quality standards?</p> <p>② Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?</p>	<p>① Currently, exhaust gas standards according to the Tanzanian environmental standards are followed. However, no environmental standards for monitoring the environment alongside the road have been introduced. Since the Project aims to resolve current traffic congestion, the pollution that arises from congestion will be improved.</p>
	(2)Water Quality	<p>① 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?</p> <p>② Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater?</p> <p>③ Do effluents from various facilities, such as stations and 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 that do not comply with the country's ambient water quality standards?</p>	<p>① Since the project entails upgrading of an existing road, there will be no major topographical transformation or earthworks. Muddy water will be generated by the works, however, there are no water intake facilities in the lower reaches.</p> <p>② Since wastewater from the road surface will basically be conveyed to the flow terminal alongside ditches and so on, there will be no impact on water sources.</p> <p>③ No parking or service areas are planned in the Project.</p>
	(3)Noise and Vibration	<p>① Do noise and vibrations from vehicle and train traffic comply with the country's standards?</p>	<p>① It is expected that widening of the existing road will lead to improvement of the current noise and vibration level.</p>
3. Natural Environment	(1)Protected Areas	<p>① 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?</p>	<p>① There are no important nature reserves or national parks around the Project route.</p>

	(2)Ecosystem	<p>① Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats) ?</p> <p>② Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?</p> <p>③ If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>④ Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?</p> <p>⑤ 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?</p> <p>⑥ In cases where the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?</p>	①~⑥ No habitats of valuable flora and fauna have been reported around the Project route.
	(3)Hydrology	① Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	① Since the project entails upgrading of an existing road, there will be no major topographical transformation.
	(4)Topography and Geology	<p>① Is there a soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed?</p> <p>② 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?</p> <p>③ 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?</p>	<p>①② No steep slopes at risk of slope failure or landslide have been confirmed around the Project route.</p> <p>③ If appropriate banking works are conducted, there will be no large-scale runoff of soil.</p>
Environment	4. Social (1)Resettlement	<p>① Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>② Is adequate explanation on relocation</p>	<p>① ~ ⑥ Resettlement and compensation procedures for residents in the Project target section have been completed according to Tanzanian law.</p> <p>⑦ The monitoring plan has been indicated within the environmental and</p>

	<p>and compensation given to affected persons prior to resettlement?</p> <p>③ Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p>	social management plan.
(2) Living and Livelihood	<p>④ Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>⑤ Are agreements with the affected persons obtained prior to resettlement?</p> <p>⑥ Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>⑦ Is a plan developed to monitor the impacts of resettlement?</p>	<p>①② Since the project entails upgrading of an existing road, there will be no serious impacts on the lives of local residents and road traffic.</p> <p>③ It will be necessary to educate workers about prevention of malaria and HIV.</p> <p>④ The Project is mainly intended to mitigate traffic congestion. It will be necessary to pay attention to congestion and traffic accidents during the works. Also, it will be necessary to plan safety facilities in appropriate places along the Project route.</p> <p>⑤⑥ There will be no impedance of resident movements, sunlight or radio waves.</p>
(3) Heritage	<p>① Where roads or railways 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?</p> <p>② Is there a possibility that the project will adversely affect the living conditions of inhabitants other than the affected inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>③ Is there a possibility that diseases, including communicable diseases, such as HIV will be introduced due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</p> <p>④ Is there a possibility that the project will adversely affect road traffic in the surrounding areas (e.g., by causing increases in traffic congestion and traffic accidents)?</p> <p>⑤ Is there a possibility that roads and railways will cause impede the movement of inhabitants?</p> <p>⑥ Is there a possibility that structures associated with roads (such as bridges) will cause a sun shading and radio</p>	<p>① There is no cultural heritage on or around the Project target route.</p>

		interference?	
	(4)Landscape	①Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?	①There is no scenery that requires special consideration on or around the Project target route.
	(5)Ethnic Minorities and Indigenous Peoples	①Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	①②There are no minority or indigenous races that have unique culture or lifestyles in the surrounding area.
5. Others	(1)Impacts during Construction	①Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? ② If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? ③ If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? ④ If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?	① Concerning noise and vibration during the works, unnecessary revving of engines and nighttime work will be avoided. Waste products will be transported to a site for disposal. Also, the works area will be periodically sprinkled with water in order to mitigate dust. ②Since the Project entails upgrading of an existing road, there will be no negative impacts on the ecosystem. ③The works in both directions will be totally separated, and safety facilities and traffic controllers will be assigned as required to minimize any impacts on current traffic flow. ④Education on traffic safety and public sanitation will be periodically conducted for the construction workers. Mitigation measures concerning the above items will be implemented by the contractor under the supervision of TANROADS.
	(2)Monitoring	① Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? ②Are the items, methods and frequencies included in the monitoring program judged to be appropriate? ③ Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? ④ 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?	①~④ The monitoring plan is stated in the ESIA report. Following the start of works, TANROADS and the contractor will continue to review the situation and implement monitoring.

6. Note	Reference to Checklist of Other Sectors	<p>① Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).</p> <p>② 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).</p>	Not applicable
	Note on Using Environmental Checklist	<p>① If necessary, the impacts to Tran boundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as Tran boundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	Not applicable

Source: Survey Team

- Note 1) In cases where “standards in the country concerned” differ greatly from internationally recognized standards, countermeasures will be examined according to necessity.
Concerning items for which there are currently no controls established in the country concerned, review will be conducted based on comparison with appropriate standards in other countries (including Japan’s experience).
- Note 2) The environmental checklist only shows standard environmental check items, and it may be necessary to delete or add items according to the characteristics of the project or area.

CHAPTER 2

CONTENTS OF THE PROJECT

CHAPTER2

CONTENTS OF THE PROJECT

2-1 Basic Concept of the Project

2-1-1 Superior Objectives and Project Targets

In the National Strategic Poverty Reduction Plan (NSGRP), the Government of Tanzania is striving to promote economic growth and mitigate poverty under the banner of ‘Growth and reduction of income poverty.’ It has placed emphasis on infrastructure development, especially development of the road sector, which is indispensable for economic growth, and is striving to connect the country’s major cities and improve access to markets through developing transport networks under the National Transport Policy (NTC) that it has compiled for the road sector. In 2007, the Government of Tanzania formulated the Transport Sector Investment Program (TSIP Phase II: 2007~2016), and based on this is advancing comprehensive development plans covering trunk roads, local roads, airways and marine transport, etc. Dar es Salaam, where the Project road is situated, plays a central role in the economy and physical distribution of Tanzania. As the city is the starting point for all transport systems, including the road, rail, air and maritime transport systems, it is the base for network formation and a strategic point for transport in Tanzania.

Concerning road traffic in Dar es Salaam, in the last 10 years, the number of registered vehicles in the city has grown at an annual rate of 7%, which is higher than the population growth rate. As a result, traffic congestion along trunk roads has been growing worse every year, hampering economic activities in the city. Furthermore, since population in Dar es Salaam is growing rapidly, it is forecast that traffic congestion in the urban area will continue to deteriorate from now on and urgent improvement is needed. In response to this, under the TSIP, improvement of trunk roads through widening to four-lane roads is being advanced, while the Bus Rapid Transit (hereafter referred to as the BRT) Program has been formulated with a view to inducing people away from private vehicles to public transport. Works have been completed on the Phase-I section of the BRT Program with a view to relieving traffic congestion in the Dar es Salaam urban area. New Bagamoyo Road is regarded as a priority section within the urban trunk road development program. Furthermore, JICA implemented a development survey, the Dar es Salaam General Urban Transport Network Survey (comprising formulation of a transport master plan (M/P) with 2030 as the target year, and selection of priority projects from 2008~2015), from 2007 to 2008. Within this, the widening of New Bagamoyo Road, targeted under the Project for Improvement of Transport Capacity in Dar es Salaam was proposed as an extremely important undertaking within improvement of the overall road network in Dar es Salaam, and the

Tanzanian side issued the request based on this proposal. Accordingly, the Project has the goal of implementing improvement on the target road section, thereby securing smooth and stable transport of people and goods. As a result, it aims to secure smooth traffic flow in Dar es Salaam, vitalize flows of people and goods in Tanzania as a whole, and promote vitalization of social and economic growth in the country.

2-1-2 Outline of the Project

In order to achieve the above objectives, the Project aims to widen the road to four lanes with 9 m width of central median for future BRT over a section of approximately 4.3 km from the boundary of the BRT at Morocco Intersection to Mwenge Intersection. The scope of work to be implemented under Japan's assistance will be as follows.

- The target road section will be approximately 4.3 km from the boundary with the BRT phase-1 works at Morocco Intersection to Mwenge Intersection.
- In order to mitigate congestion on the target road, it will be widened to four lanes with 9 m width of central median for future BRT.
- Intersections (intersections) will be improved in order to secure safe and smooth traffic flows.
- Service roads and sidewalks will be installed in order to secure the road service level and safety.
- Road drainage facilities for resolving road inundation; auxiliary facilities for securing the road functions; and traffic safety facilities for securing traffic safety will be installed.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Concept

Taking into account the request of the Government of Tanzania and the findings of the site survey and discussions, the basic concept of the design will be to secure the safe and smooth flow of traffic. The basic policies for achieving this are as indicated below.

1) Basic policies of road design

- ① The road will meet Tanzanian design criteria as a trunk road.
- ② The road will be planned to fit within the overall trunk road network including other sections.
- ③ The plan will be examined so that it fits inside the existing right of way (the existing

route will be traced, existing pavement and structures will be utilized as far as possible, and negative impacts on the social environment will be minimized).

- ④ Project cost will be reduced upon securing the necessary functions and durability.
- ⑤ Traffic volume and characteristics (large vehicles, small vehicles, bus traffic, pedestrians, etc.) and related plans (BRT program) will be examined and reflected in the design.
- ⑥ Based on the findings of the natural conditions survey, facilities will be planned and design to correspond to the natural conditions.
- ⑦ Plans will be examined with consideration to traffic safety including installation of safety facilities and so on.
- ⑧ The implementation schedule will be compiled in view of weather conditions, and diversions for minimizing the impact on traffic will be planned.
- ⑨ Materials will be selected with a view to utilizing local materials and products and in consideration of cost, ease of execution, quality, and procurement reliability.
- ⑩ The road will be planned so that it can be kept in good condition over the long term by conducting simple maintenance.

2-2-2 Basic Plan

2-2-2-1 Overall Plan

(1) Scope and Scale of the Project Facilities

The scope of the Project is the widening of the road from two lanes to four lanes, upgrading of intersections, and the installation of road drainage facilities and auxiliary facilities (service roads, sidewalks, bus bays, traffic signals, street lights, etc.) over the section from the boundary with the BRT at Morocco Intersection to Mwenge Intersection. Figure 3-1 on the following page indicates the envisaged road plan in the Project based on consideration of the points that were discovered in the field survey, the wishes of the Tanzanian side, and related plans.

(2) Outline of the Basic Plan

The following table shows the outline plan that has been set as a result of design review based on the basic concept.

Table 2-1 Outline Plan of the Project

Planned item		Description/Specifications
Target Section		Approximately 4.3 km (from Morocco Intersection to Mwenge Intersection)
Design Speed		60 km/hr
Number of Lane		4 lane
ROW		0 - 1.6 km = 45.0 m, 1.6 – 2.7 km = 60.0 m, 2.7-4.3 km = 70.0 m
Width of Carriageway		7.0 m (3.5 m x 2) / direction
Width of Shoulder		1.5 m
Width of Central Reservation		9.0 m
Typical Width of Service road		4.0 m
Width of Footpaths		1.5 m
Traversal Gradient		2.5 %
Maximum vertical slope		7 % (Max = 10 %)
Intersection		Roundabout : 1 location at round 3.8km
		Inter section controlled by signal : 7 locations at, Morocco intersection, Victoria intersection, Makumbusho-1 and 2, Kijitonyama intersection, Shekilango intersection, Mwenge intersection
Fill slope	General fill	1 : 1.5 ~ 4.0 (by soil type)
	Hard rock	1 : 0.5
Cut slope	Soft rock	1 : 0.75
	Except for rock	1 : 1.0~1.5 (by soil type)
Drainage work		Concrete U-shaped side drains : install along the entire route Road crossing culvert : Box culvert, pipe culvert
Ancillary road structures		Curbstone work, Concrete retaining walls, Safety barriers, Traffic signals, Streetlights, Road signs, Road markings, Bus bays, Slope protection (Turfing)
Design life of pavement		15 years (Based on Pavement and Material Design Manual)
Road Paving Work	Carriageway	Wearing course : Asphalt concrete (Modified asphalt) (5cm)
		Binder course : Asphalt concrete (5cm)
		Base course : Asphalt stabilized (DBM) (20cm)
		Sub-base course : Cement stabilized (30cm)
	Intersections, Bus bays	Wearing course : Semi-flexible (Open graded AC + Cement milk) (5cm)
		Binder course : Asphalt concrete (5cm)
		Base course : Asphalt stabilized (DBM) (20cm)
	Service road	Sub-base course : Cement stabilized (30cm)
		Wearing course : Asphalt concrete (5cm)
		Base course : Crushed stone (CRR) (20cm)
	Footpath	Subgrade : (G10) (20cm)
		Surface course : Interlocking block
Base course : Sand (10cm)		
Plan for existing water pipe	Subgrade : (G15) (15cm)	
	Existing water pipe will not be re-located, and the following will be dealt.	
	Under carriageway: By protective work (Apply concrete protection plate) At side of carriageway: By execution method (Using middle weight machine).	

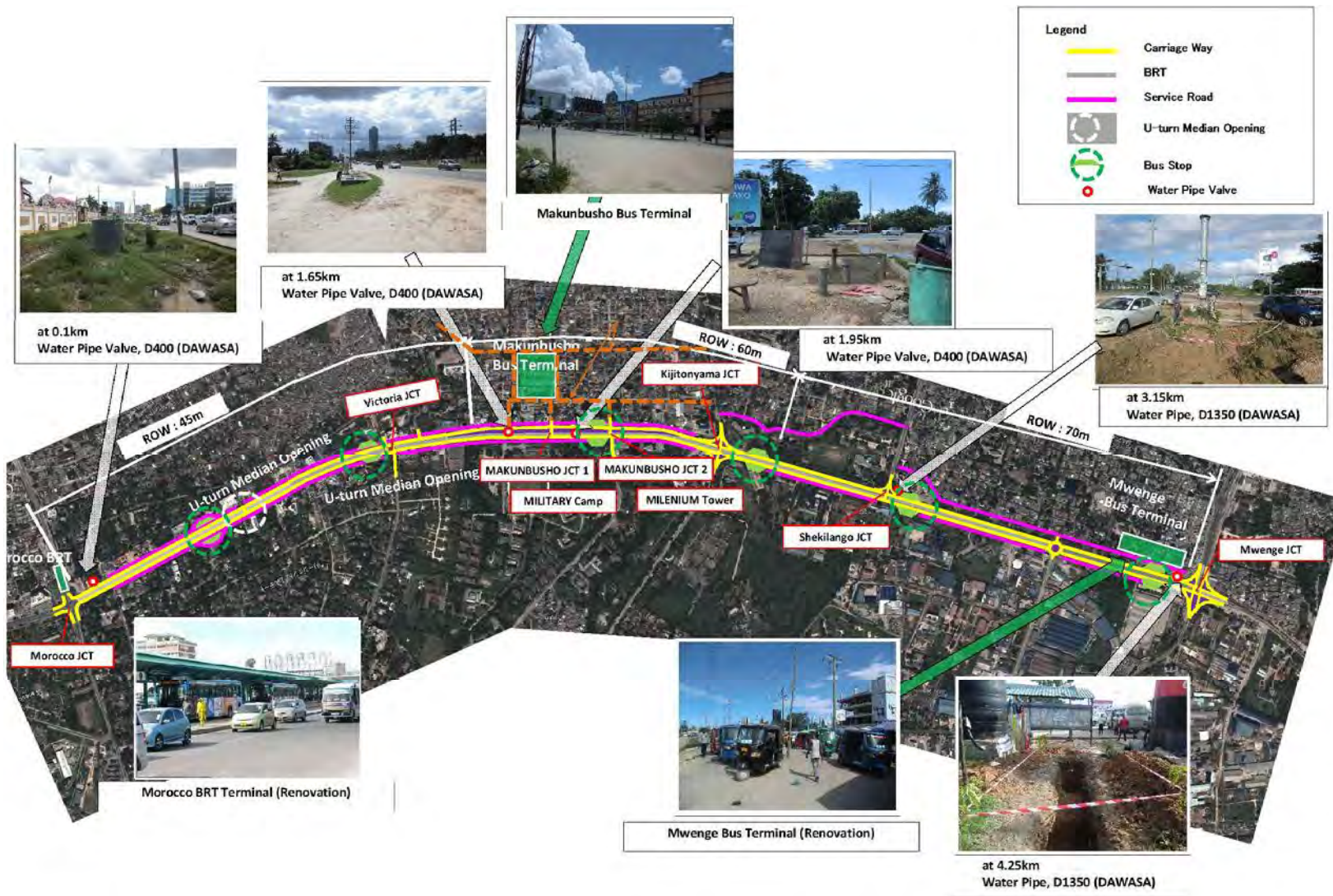


Figure 2-1 Outline figure of the Road Plan

2-2-2-2 Design Conditions

(1) Design Conditions

1) Design standards

The Standard Specifications for Road Works 2000, which were published by the former Ministry of Infrastructure Development and which are commonly used for road projects in Tanzania, will be applied to design of the Project road. Also, the “Road Design Standard in Japan – Commentary and Application” and international standards such as the British Standard (BS) will be referred to as needed.

2) Road geometric structure

The road standard in the Project was examined upon applying the standards for trunk roads in Tanzania. Design speed has been set at 60 km/h as it was in Phase 1 in consideration of the existing road. Also, since intersections are a major cause of the current congestion, it has been decided to add right-turn and left-turn lanes and install traffic signals in order to maximize traffic throughput at these points. The table 2-1 shows the basic outline of the Project road.

3) Road vertical alignment

The vertical alignment of the existing road comprises a downward slope from the start point at Morocco Intersection to the outskirts; it becomes an upward slope from the Oyster Bay Substation around 1.6 km from the start point; and it becomes flat with undulations over approximately 3 km up to Mwenge Intersection (the end point). The gradient reaches a maximum of 3.6% at Oyster Bay Substation around the 1.7 km point, but the overall gradient over the section is gentle at between 0.3% and 0.5%. Because the vertical alignment of the existing road satisfies the design speed of 60 km/h in the Project, the current road alignment has basically been traced.

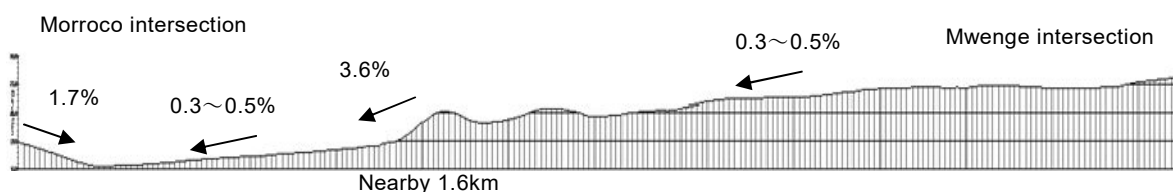


Figure 2-2 Vertical Alignment of the Existing Road

4) Road cross section

The road cross-section was examined to fit inside the target ROW (45 m, 60 m, 75 m) taking into account the required functions of a four-lane road, maximization of traffic

capacity at intersections, consideration of BRT land, minimization of impacts on roadside obstructions, traffic safety and so on. Since the target section is a key trunk road expected to be an integral part of the basic road framework in Dar es Salaam, the following cross-section has been planned in order to secure these functions: dual carriageway (4 lanes total) + 9 m central median (considering BRT land) + service roads on both sides of 4 m (one-way traffic) to 6 m (two-way) + sidewalks of 1.5~3 m on both sides. As for the gradient of cutting and banking slopes, 1:1.0~1.5 on cuttings and 1:1.5~4.0 on banking is planned in consideration of local conditions and soil quality, etc. The width of carriageways, shoulders and sidewalks was decided upon considering road cross-sections in similar projects and taking cost reduction into account. The following standard cross-section is envisaged.

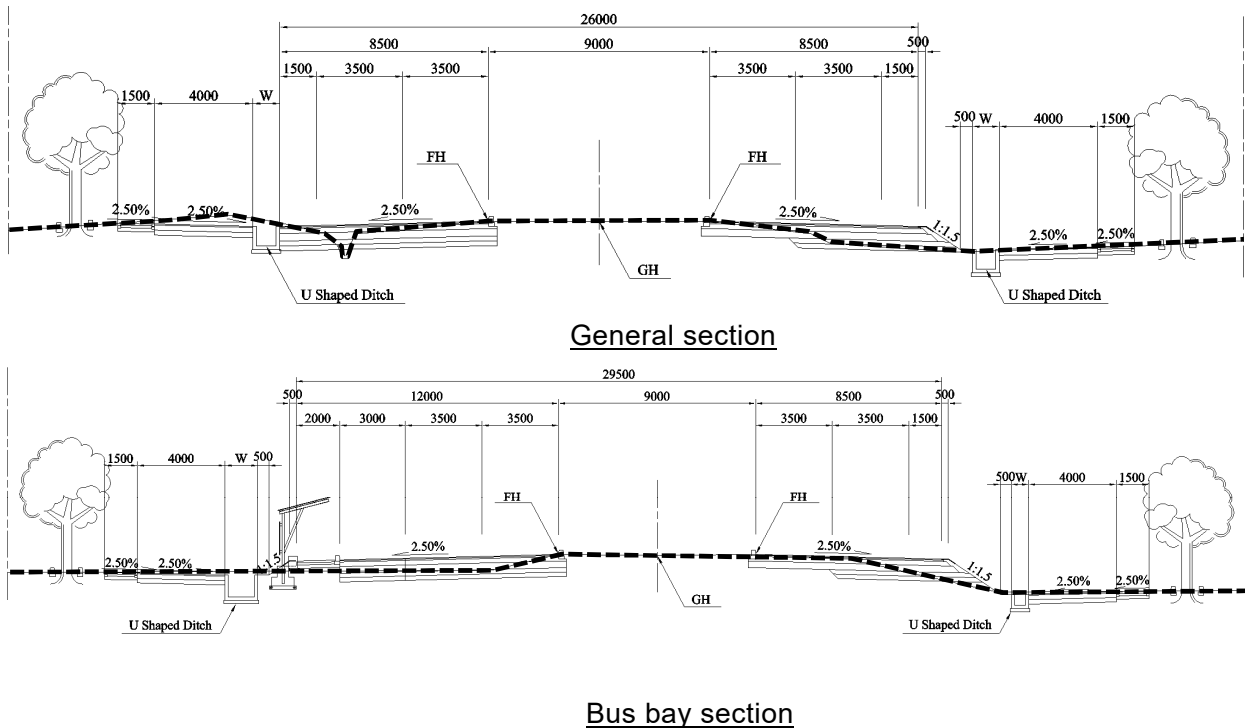


Figure 2-3 Standard Road Cross-section of the Plan

- 5) Consideration for existing large diameter water mains and water stop valves (valve boxes)

It is hoped to adopt a horizontal alignment whereby large diameter water mains are located under the service roads or sidewalks free from the impact of heavy vehicle loads, however, in the case where they have to be located under the carriageway, protective works will be designed around the pipes.

Water stop valves (valve boxes) are located in three locations as shown in Figure 2-1. Since valve boxes are necessary for performing maintenance of water supply facilities,

the road horizontal alignment has been designed to avoid them.

2-2-2-3 Paving Plan

(1) Outline of the Plan

The Pavement and Materials Design Manual 1999 (PMDM), which is published by the former Ministry of Infrastructure Development, was mainly used for planning paving in the Project. The PMDM, which adheres to the British Standard (BS), American standard AASHTO, and Japanese paving guidelines were also referred to for verification of the configuration of the planned paving work in the Project. Based on the traffic volume and axial load over the target section that were obtained in the field survey, the cumulative traffic load during the design period was calculated in terms of the standard axle load (converted to 8.2 ton axle load) over a design service life of 15 years considering growth of Tanzania's GDP and traffic growth rate in similar projects. Examination was conducted while considering applicable materials from the viewpoint of procurement conditions and cost reduction in the target area. The following paragraphs give an outline of the main planning items.

(2) Design traffic volume

As a result of conducting traffic volume survey in the field survey, traffic volume on the target road was found to be approximately 43,000 vehicles per day. The breakdown according to each type of vehicle was as follows.

Table 2-2 Summary of Result for Traffic Survey

Class	Traffic volume/day	Remark
1. Private cars	26,279	61.8 %
2. Public transportation	4,226	9.9 %
3. Bus	1,334	3.1 %
4. Truck/Trailer	2,471	5.8 %
5. Others	8,236	19.4 % (motor cycle, Bhajaj, etc)
Total	42,546	Ref: Commercial vehicle ratio 8.9 % in sum of 3. and 4.

Source: Survey Team

(3) Traffic growth rate

The rate of increase in future traffic volume was estimated as 7% upon taking into consideration the actual annual rate of growth (4%) over five years (2009~2014) in Phase 1 of the New Bagamoyo Road project, the annual growth rate (6.8%) of Tanzania's GDP over the past 10 years, and the growth in traffic volume in other road improvement projects.

(4) Axle load survey results

Over two days from April 30, 2014, axle load of 444 vehicles was measured continuously for 24 hours by the roadside at a location 2.5 km from the start point. The results were converted into the 8.2 ton vehicle equivalence factor (VEF) and used as basic data for the paving design.

Table 2-3 Vehicle Equivalent Factor (VEF) of Commercial Vehicle

Type of car	VEF
Bus	0.21
2 axle truck	0.58
3 axle truck	1.23
Trailer	5.77

Source: Survey Team

(5) Other Consideration Items

1) Consideration of impacts of congestion

Traffic in Dar es Salaam is increasing, and chronic congestion is witnessed every morning and evening around Selander Bridge. Since congestion has been relieved following the completion of the Phase-1 works adjoining the target section, and services will start on the BRT phase-1 works being advanced around Morocco Intersection, it is guessed that traffic congestion will be relieved for around 10 years following completion of the Project. Therefore, it has been decided not to adopt any special consideration regarding congestion in the paving plan in the Project.

2) Application of modifier and semi-flexible paving

The coastal area of Tanzania where the target road is located experiences daytime temperatures in excess of 30°C and the temperature does not fall much at night either. These are extremely harsh conditions for the surface course of asphalt paving, and when a higher volume of heavy vehicle traffic (in line with development of Bagamoyo Port) and traffic congestion (albeit temporary) are also considered, there will be an extremely high risk of deformation and fluxion in the asphalt surface layer. Therefore, it has been decided to apply modifier to the asphalt surface course of the road carriageway in the Project. Moreover, around intersections that will experience very heavy load conditions and bus bays where there will be frequent stopping and starting by vehicles and occurrence of fuel and oil leaks, semi-flexible paving (open graded AC + Cement milk), which displays greater compatibility with such conditions, has been planned.

3) Paving composition on similar roads

In the Project, the paving composition of similar roads in Dar es Salaam was confirmed and referred to in examining the paving plan. Particular attention was paid to Samun Joma Road and the Phase-1 section of New Bagamoyo Road, which connects to the target section and has similar traffic volume and vehicle types.

Table 2-4 Pavement Composition on Similar Roads

Item	Surface	Binder	Base course	Subbase course	Remark
Nelson Mandela Road	AC 5cm (60/70)	AC 5cm (60/70)	DBM40 20cm	C1 20cm	
Sum Nujoma Road	AC 5cm (60/70)	AC 5cm (60/70)	DBM40 20cm	C1 20cm	
Morogoro Road	AC4cm (PG10-64)	AC6cm (PG10-64)	CRR 15cm	C1 15cm	BRT plan completed
Nyerere Road	AC 5cm	AC 5cm	Base 15cm	C1 15cm	
New Bagamoyo Road(Ph1)	AC 5cm (60/70)	AC 5cm (60/70)	DBM40 10cm	C1 12-33cm	

Source: Survey Team

Remark: AC=Asphalt Concrete, DBM= Asphalt Stabilized Base, CRR=Crushed run stone, CRS=Natural crushed stone, C1=Cement Stabilized, CBR=Bearing capacity, Super Pave pavement design method is applied to Morogoro road in, Marshal method is applied to the other roads.

4) Design period traffic volume and traffic load

— Confirmation of design load classes in Tanzania

Concerning axle load according to each vehicle type, applying a standard axle (8.2 ton) converted value (VEF) of per vehicle obtained from the results of traffic volume measurement and actual measurements of axle load, as a result of calculating the load exerted on the road by passing vehicles during the design period of 15 years from 2019 to 2033 (18 kip (8.2 t) converted single axis load, ESAL), the design traffic load during the design period is computed as approximately 32.4 million-axes, which corresponds to TLC50 in the Tanzanian Traffic Load Classes. Paving structure was examined upon considering these findings and the following paving materials.

(5) Paving materials

In the Tanzanian pavement planning standards, the following options are given regarding the materials of each paving course. Also, materials are selected according to each project concerning other paving type options.

Table 2-5 Material Type for Each Pavement Layer in Tanzanian Standard

Item	Surface	Base course	Sub base course
Option of material type	AC 5 cm/1 layer	Crushed run stone(CRR)	Natural material (Granular material)
	AC 10 cm/2 layer	Natural crushed stone(CRS)	Cement stabilized(C1, CM)
	Asphalt surface treatment	Stabilized asphalt(DBM)	
		Cement stabilized(C1, C2)	

Remark: AC=Asphalt Concrete

Source: Survey Team

(7) Paving Design

The paving design was implemented based on the Tanzanian Paving Standard verified according to the PMDM1999. Also, for comparative verification, the paving design was verified while referring to the AASHTO Guide for Design of Pavement Structures 1993 and Japan’s paving guidelines (TA method). The following conditions were used when preparing the paving design.

- Design period : 15 years, 2019~2033
- Design traffic load (W18) : Number of passing equivalent single axle loads (ESAL) converted to 18 kip during the service life = 32.4 million axles
- Design traffic load class : TLC50 (Tanzanian traffic load class)
- Reliability (R) : Probability that traffic load and paving strength are within the assumed scope is assumed to be 95% judging from the target road rating (Standard deviation ZR = -1.645, standard deviation of load and paving strength S0 = 0.40)
- Serviceability index : Initial serviceability index P0 = 4.2 (AASHTO road test results)
Ultimate serviceability index Pt = 2.5 (AASHTO standard value for trunk road)
- Subgrade resilient modulus (MR) : 12,000
- Paving course coefficient: Asphalt-concrete surface course a = 0.44
Asphalt stabilized course a = 0.34
Cement stabilized subbase course (C1)a = 0.12
- Drainage coefficient : Base course m = 0.9 (considering water accumulation, etc. in the rainy season)
Subbase course m = 0.9 (considering water accumulation, etc. in the rainy season)

The paving structure was examined upon taking into general account the ground bearing force of the target road, local characteristics (water accumulation during rainfall), traffic volume over the target section, the ratio of large-size vehicles, the rate of growth in traffic, and the results of hearing surveys on the Tanzanian side concerning implementation conditions in similar projects. Also, the traffic load classes stipulated in the Tanzania Pavement and Materials Design Manual were taken into consideration. Based on consideration of the existing traffic conditions, paving structure comprising a two-layer asphalt-concrete surface course,

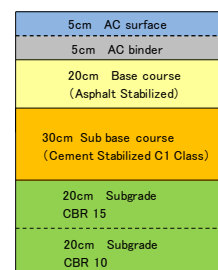


Figure 2-4 Pavement Composition on the Project

asphalt-stabilized (DBM) upper base course, and cement-stabilized (C1) lower base courses deemed to be appropriate (see the figure).

Table 2-6 Design of Pavement Composition

Source: Survey Team

Layer	Material	Thickness (cm)	AASHTO		TA method	
			Layer coefficient	Structure index (SN)	Equivalent coefficient	TA
Surface	Asphalt Concrete	5	0.44	0.866	1	5
Binder	Asphalt Concrete	5	0.44	0.866	1	5
Base Course	Asphalt stabilized	20	0.34	2.407	0.8	16
Sub Base Course	Cement stabilized	30	0.12	1.276	0.25	7.5
Total			a.Total SN	5.415	a.Total TA	33.5
			b.Necessary SN	5.158	b.Necessary TA	33.5
Judgment			$a \geq b$	OK	$a \geq b$	OK

Remark: Design CBR=10 (Subgrade upper=CBR15, 20cm, lower=CBR10, 20cm, other CBR7, 60cm)

2-2-2-4 Intersection Plan

The four main intersections on the target road were examined with a view to maximizing traffic volume through the intersections and securing safe and smooth traffic flow.

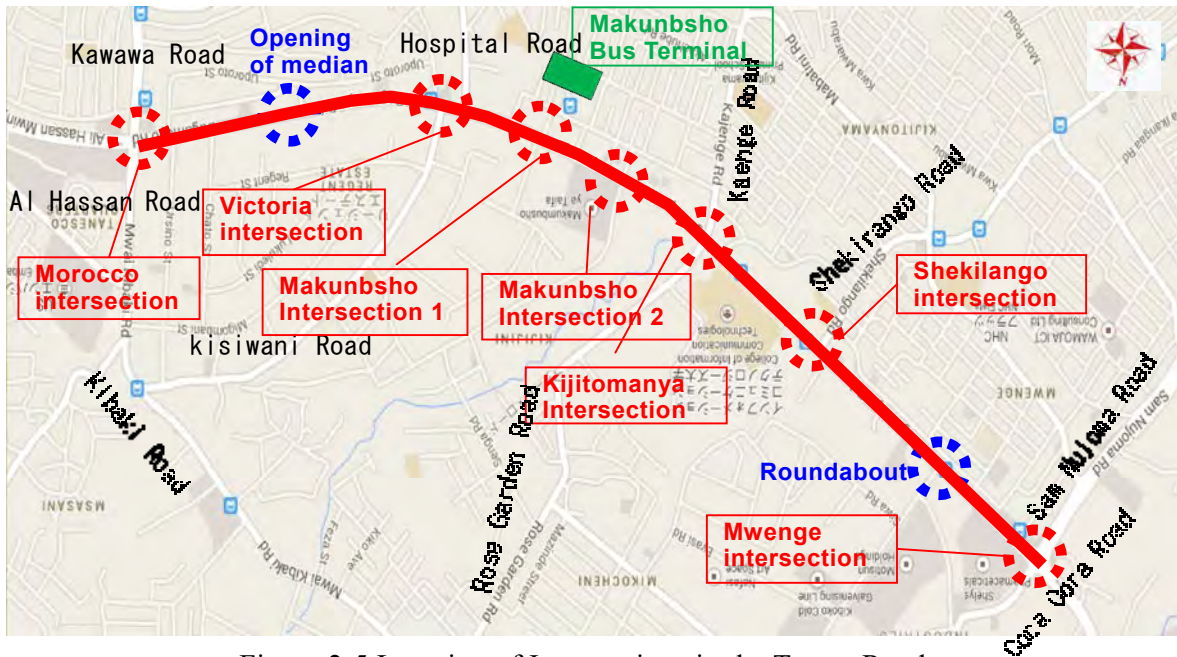


Figure 2-5 Location of Intersections in the Target Road

(1) Intersection plan

① Morocco Intersection (start point)

➤ As at present, a signal control type intersection has been adopted.

- A right-turning lane and left-turning lane leading from the target road to Kawawa Road and Kibaki Road respectively have been adopted.
 - Right-turning lanes leading from Kawawa Road and Kibaki Road to the target road have been adopted.
- ② Victoria Intersection (1.3 km)
- A signal control type intersection has been adopted.
- ③ Makunbsho Intersection 1 (1.9 km)
- A signal control type intersection has been adopted.
- ④ Makunbsho Intersection 2 (2.1 km)
- A signal control type intersection has been adopted.
- ⑤ Kijitonyama Intersection (2.5 km)
- As at present, a signal control type intersection has been adopted.
 - A right-turning lane and left-turning lane leading from the target road to Rose Garden Road and Kaenge Road respectively have been adopted.
 - Right-turning lanes leading from Rose Garden Road and Kaenge Road to the target road have been adopted.
- ⑥ Shekirango Intersection (3.1 km)
- As at present, a signal control type intersection has been adopted.
 - A right-turning lane leading from the target road to Shekirango Road has been adopted.
 - A right-turning lane leading from Shekirango Road to the target road has been adopted.
- ⑦ Mwenge Intersection (4.3 km, end point)
- As at present, a signal control type intersection has been adopted.
 - As at present, a left-turning lane and right-turning lane leading to Sam Mujoma and Coca Cora Road respectively have been adopted.
 - Right-turning lanes leading from Sam Mujoma Road and Coca Cora Road to the target road have been adopted.
- (2) Other Plans
- ⑧ Roundabout (3.8 km)
- A roundabout has been added in order to enable U-turns and facilitate right turning into Mwenge bus terminal.
- ⑨ Central median openings (0.7km)
- Openings and the necessary service lanes for enabling U-turns have been adopted.

2-2-2-5 Service Road and Sidewalk Plan

(1) Service roads

Because the target road has no service roads, poor access to roadside areas exasperates congestion on the main road, impedes safety, and generally lowers the service level of the road. Furthermore, because traffic is expected to increase further on the main road and it is predicted that access traffic will also increase as roadside residential areas are transformed into commercial and office building districts, the construction of service roads leading into the main road would be highly effective in securing smooth traffic flow. In the Project, for the reasons described above, it has been decided to adopt service roads of around 4~6 m. Since the target section includes Makunbusho Bus Terminal and Mwenge Bus Terminal, the service roads have been designed in consideration of the systems adopted at both bus terminals.

(2) Sidewalks

Sidewalks have been constructed alongside Ali Hassan Road on the city side of the target road, and the Phase-1 section of Bagamoyo Road on the outskirts side. Land alongside the target road is currently witnessing construction of large buildings and transformation from residential land to commercial land. Moreover, since the Tanzanian side is also developing a large bus terminal and so on in the area, leading to a major increase in pedestrians, it will be essential to construct sidewalks of around 1.5~3 m along the target section.

2-2-2-6 Drainage plan

(1) Target road and the Condition around the Road

1) Main Drainage and Flooded Area

The target road passes over gently undulating land from the interior to the coast. In the longitudinal profile, between the road start and the water divide at the 1.6 km point, water flows to lowland at the 0.3 km point; and between the said water divide and the road end, it flows to a river at the 2.4 km point. When rain falls, the water flows to the end of flow via the road side ditches and crossing pipes, etc. (see below).

Table 2-7 Existing Major Discharge Point and Drainage Area

Discharge Point No.	Location	Drainage facilities	Drainage Area
No.1	Nearby 0.3 km	Pipe culvert (dia. 0.9 m)	0 to 1.6km (start point to watershed)
No.2	Nearby 2.4 km	River (6 m x 3 m)	1.6 to 4.3km (watershed to nearby end point)
No.3	Nearby end point	Side ditch along Coca Cola road (V shaped 1.2 m)	4.3km (nearby end point)

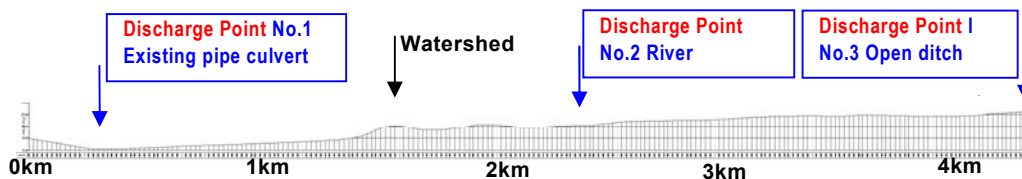


Figure 2-6 longitudinal section of Target section



Figure 2-7 Drainage System around Existing Road

Source: Survey Team

2) Condition of Road Drainage in Rainy Season, Problem and Countermeasure

During the field survey conducted in April 2014, 360 mm of torrential rain fell in Dar es Salaam over two days from April 11, and four major roads in the city were damaged by flooding. Data obtained from the Dar es Salaam weather station indicated that 138.1 mm of rain fell in a day. The following table describes the condition and problems of three drainage flow terminals on the target road in the event of torrential rain, as well as the countermeasures that are envisaged.

Table 2-8 Condition of Target Road in Torrential Rain, Problem and Countermeasures

Item	Condition of road drainage	Problem	Countermeasure
Start point	<ul style="list-style-type: none"> Rainwater from Kawawa Road, which intersects at the start point of the target road, flows down the road surface to the end of flow at the 0.3 km point. 	Rainwater flowing over the road surface adversely affects road traffic.	Drainage facilities plan that takes the rainwater from Kawawa Road into account
Nearby 0.3 km (Flow terminal No.1)	<ul style="list-style-type: none"> Rainwater from the existing side ditches of the target road flows into existing drainage pipes (diameter 0.9 m, envisaged flow = 1.6 m³/sec) adjacent to connecting roads that intersect the target road at right angles. Some of the rainwater from the inland area overflows from the existing side ditches of the target road and flows over the road surface (depth 3 cm, length around 60 m, flow rate = 0.4m³/sec). The overflowing rainwater flows into the existing drainage pipes adjacent to connecting roads and into the side ditches installed on one side of the road. On the upstream side, water is retained to a depth of 0.2 m over an area of 70 m x 50 m for around 1 hour. The flow rate into this part is thought to be around 0.2m³/sec. To sum up the above, total flow rate at this point =2.2m³/sec. 	The overflowing water adversely affects road traffic.	Drainage facilities plan that takes the rainwater on adjacent land and the road surface into account
Nearby 1.7 km	<ul style="list-style-type: none"> Rainwater from the inland area overflows the road (depth 10 cm, length around 60 m, flow rate = 0.6 m³/sec) and flows into the side ditch inside the military facility on the downstream side. The rainwater that flows inside the military facility towards the coast flows from the edge of the facility along the nearby existing road and eventually into a small river. 	The overflowing water adversely affects road traffic.	Drainage facilities plan that doesn't cause overflows or ponding on the road surface
Nearby 2.2 km	<ul style="list-style-type: none"> Rainwater from the inland area flows onto the road (flow rate = around 0.4m³/sec) and forms a pond of 20 cm in depth and length roughly 80 m on the carriageway. This rainwater flows into a small river via existing drainage pipe (0.6 m diameter but with a possibility of clogging due to sediment and wastes) installed along the carriageway. 	Adverse impacts of ponding on traffic and paving	Drainage facilities plan that doesn't cause ponding on the road surface

Nearby 2.4km (Flow terminal No.2)	<ul style="list-style-type: none"> • Rainwater from the inland area flows into a small river via the existing box culvert (width 3 m x height 2 m) and drainage pipe (diameter 1.2 m). Wet depth inside the box culvert is currently around 0.7 m (flow rate = 4.7m³/sec), and the drainage pipe is currently full (flow rate = 5.5m³/sec). • The combined flow rate of the above flows is 10.2m³/sec. • In the case where rainwater from the end point is carried to the river from the 1.7km, 2.2km and 2.4 km points, the total flow = 12.1m³/sec. 	Existing drainage facilities have been complicated due to residential development around inflow parts.	Drainage facilities installation plan that corresponds to the amount of runoff
2.5 to 4.0 km	<ul style="list-style-type: none"> • Rainwater from the inland area can be seen flowing in from the connecting roadsides. Temporary ponding can be seen in the local area, however, this is resolved in around 30 minutes to 1 hour (flow rate =0.9m³/sec). 	Temporary ponding on the roadside	Drainage facilities plan that corresponds to the amount of runoff
End point (Flow terminal No.3)	<ul style="list-style-type: none"> • There is no ponding of rainwater. 	None	
Others	<ul style="list-style-type: none"> • In the downstream area of the connecting road at the 0.3 km point, ponding over the road and residential land and overflows from side ditches can be seen. This is caused by the rainwater flowing down from the upstream and rainwater inside the local area. • The above conditions are worsening every year, and it is thought that the installation of small-diameter drainage pipes in the developed residential area at the furthest downstream point (near the ocean) has had an impact. • Currently, TANROADS and Kinondoni Municipal Council are conducting improvement works (2 drainage pipes of 1.8 m, 2 places) aimed at resolving the problems, and these are scheduled to finish in November 2014. 	Ponding occurs on the road and in residential land and water overflows from side ditches	Measures are needed to improve capacity of existing drainage facilities between the current improvement works and target road. When planning countermeasures, it will be necessary to adopt a drainage facilities plan that considers gradient changes in the section and takes the city planning viewpoint into account.

Source: Survey Team

3)Basic Condition of Drainage

The basic conditions for planning drainage facilities, i.e. rainfall, catchment basin, runoff amount, etc. in the project target area, as confirmed in the field survey and collected materials, are described.

3-1) Rainfall Analysis

a) Probable Rainfall Intensity

Concerning the probable rainfall intensity, rainfall intensity for each probable year was calculated through conducting rainfall analysis using annual peak daily rainfall data

between 1955-2014 obtained by Dar es Salaam Airport weather station and Tanzania Meteorological Agency(TMA). Incidentally, the torrential rainfall of 138.1 mm/day that occurred in April 2014 is considered to be equivalent to the 30-year probable rainfall intensity indicated in Table 4 below.

Table 2-8 Annual Max Rainfall Amount per day

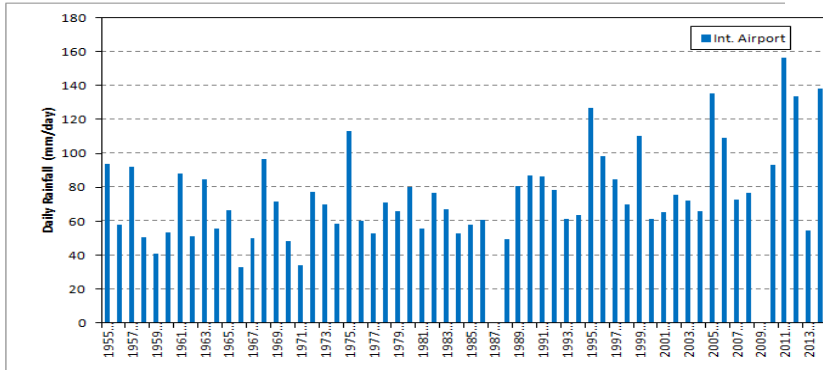


Table 2-9 Probable Rainfall Intensity

Probability year (year)	Probability rainfall intensity (mm/day)
2	71.5
3	82.5
5	94.8
10	110.3
20	125.1
25	129.8
30	133.6
50	144.3
80	154.1
100	158.7
150	167.1
200	173.0
400	187.3

Source: Airport station in Dar es Salaam=1955-1989, 2006-2008, TMA=1990-2005, 2010-2014. ※ Lack of observation data in 1987, 2009

3-2) Decision of Formula for Runoff Flow

a) Formula for Runoff Flow

The flow rate is thought to be 2.2 m³/sec at end of flow 1 at the 0.3 km point and 12.1 m³/sec at end of flow 2 near the 2.4 km point, as confirmed in the field survey (see Table 2). Incidentally, the torrential rainfall of 138.1 mm/day that was observed is considered to be equivalent to the 30-year probable rainfall intensity. Since applying a combination of rational runoff formula, rational formula, and Kerby equation to these confirmed phenomena (flow rate and rainfall intensity) demonstrates results similar to these phenomena, it has been decided to calculate runoff flow in the Project catchment basin using the same formula.

<p>Rational formula</p> $Q = 1/3.6 \times A \times C \times \gamma$	<p>Q: Runoff flow (m³/sec)</p> <p>A: Catchment area (km²)</p> <p>γ: Design rainfall intensity (mm/hr)</p> <p>C: Coefficient (C=Road surface and slope surface 0.80, Undulating area and forest 0.65, Resident area 0.60, Green area (school) 0.30)</p>
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3-3) Runoff Flow and Catchment Area

The target road is subject to rainwater flows from basins A~H as shown in Figure 3. Drainage from basins A~C flows to the existing drainage pipe and roadside ditch around the 0.3 km point, while drainage from basins D~F flows into the small river around the 2.4 km point. The flow rate from each basin has been calculated using the above formula (see Table 5). Moreover, as reference, flow rates at end of flows 1 and 2 as confirmed during the torrential rain of April 2014 indicated in Table 2 are also shown.

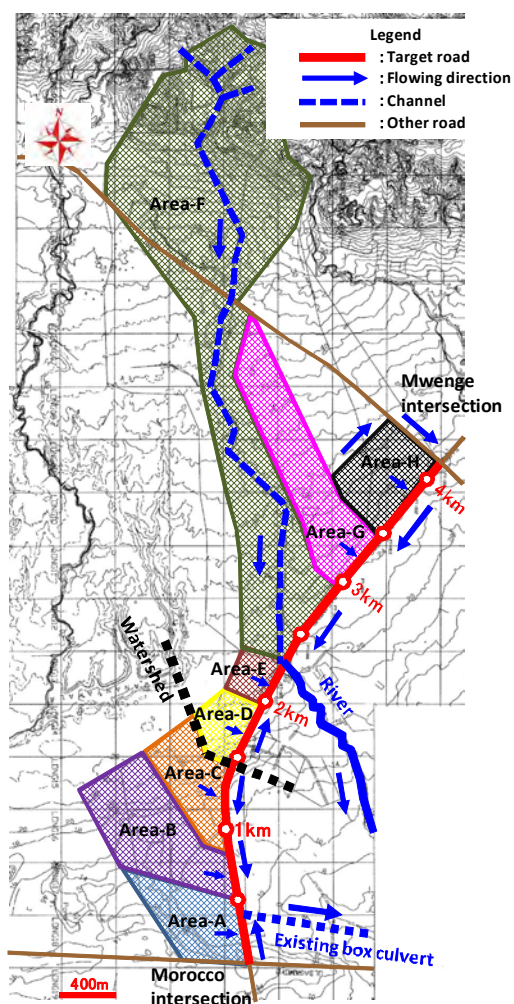


Figure 2-9 Catchment Area

Table 2-10 Catchment Area and Flow Terminal

Catchment area number	Catchment area (km ²)	Total catchment area (Flow terminal)	Runoff flow
Area-A	0.232	0.9 km ² (Existing drainage pipe)	①: 4 m ³ /sec (25 years probable rainfall intensity) ②: 2 m ³ /sec
Area-B	0.490		
Area -C	0.213		
Area -D	0.134	4.3 km ² (Existing river)	①: 16 m ³ /sec (25 years probable rainfall intensity) ②: 12 m ³ /sec
Area -E	0.086		
Area -F	2.841		
Area -G	1.055		
Area -H	0.206		

Source: Survey Team

(2) Drainage Facility Plan

1) Policy of Drainage Facility Plan

In the Project, in view of the current situation described above, review of the drainage plan was advanced based on the following basic policies.

- ① Based on the assumption that the catchment basins that drain into the three ends of flow are not changed, aim to strengthen and improve drainage facilities in line with widening of the target road.
- ② In addition to installing drainage facilities for averting road inundation that is seen on some sections of the target road, raise the road level in these parts to make a structure that can eliminate the effects of water on the ground.
- ③ Concerning the lack of functions of existing drainage facilities, confirm flow rate at each point and examine specifications of drainage facilities that give consideration to urbanization.

2) Plan of Drainage Facility

2-1) Applied Rainfall Probable Year to Drainage Facility

For the facilities-separate rainfall probability years in the drainage facilities plan, figures from the South African Road Design Manual, which are applied to the other trunk roads in Dar es Salaam, were applied (see Table 6).

Table 2-11 Probability Rainfall Intensity by Drainage Type

Drainage type	Probable rainfall year
Side ditch	2 years
Pipe culvert	10 years
Box culvert	25 years

Source: Survey Team

2-2) Calculation of the Discharge Capacity of Drainage Facility

The discharge capacity of side ditches and drainage pipes was calculated using the following Manning formula. Discharge capacity is usually calculated assuming a water depth of 80%, however, in consideration of the effects of accumulation of the local fine sand, this has been reduced by 10% to 70% here.

Formula of discharge capacity of flowing

Capacity of flowing : $Q_0 = A (70\% \text{ depth}) \times V$

Q_0 : Capacity of flowing (m³/sec), A: Sectional area of flowing (m²)

V: Average of flowing velocity (m/sec) = $1/n \times R^{2/3} \times I^{1/2}$ (Manning formula)

R: Hydraulic mean depth (m), I: slope (%)

2-3) Drainage Facilities in the Project

Rainwater over the section between the start point of the Project at Morocco Intersection and the water divide around the 1.6 km point is planned to be conveyed by side ditches and six box culverts to end of flow 1 (existing drainage pipe and side ditch) around the 0.3 km point. Although the drainage facilities over the scope of the

Project ROW are designed to permit the calculated flow rate from upstream, there is still a possibility that ponding will temporarily occur on the upstream side (250 x 140 m, depth 0.2 m, ponding time around 10 hours) at times of torrential rain due to the lack of permissible capacity of existing downstream facilities on the downstream side. Accordingly, it is necessary to replace and upgrade the existing drainage pipe (diameter 0.9 m) on the downstream side upon considering specifications of the drainage channel improvement works currently being implemented by the Tanzanian side approximately 1.2 km downstream and city planning in the surrounding area.

Rainwater between the water divide and Mwenge Intersection is planned to be conveyed by side ditches and five box culverts to the existing end of flow 2 (small river) around the 2.4 km point. Concerning the overflowing rainwater in the lowland part that flows into the side ditches inside the military facility beside the road, because it is difficult for TANROADS to conduct maintenance work inside the military facility, it is planned to handle the rainwater in this part via a bypass pipe (pipe culvert ϕ 1.8 m) connecting to the existing end of flow 2. Moreover, concerning the road inundation occurring around the 2.2 km point, it is planned to drain it away by connecting to the abovementioned bypass.

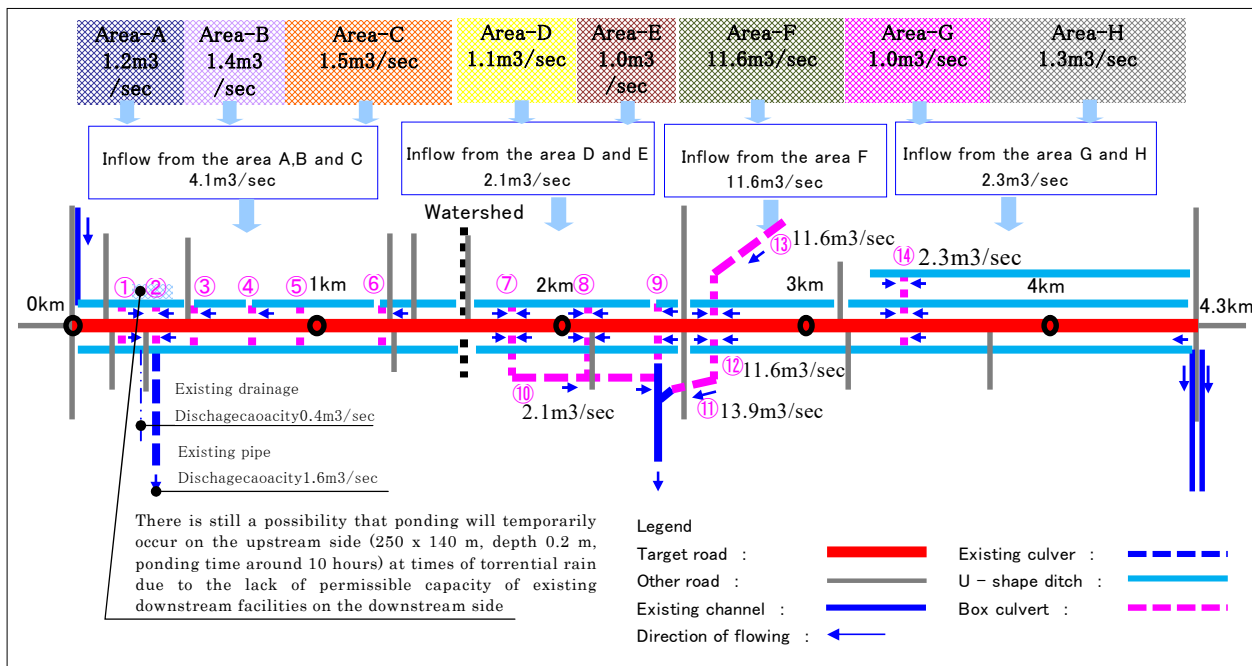


Figure 2-10 Plan View of Road Drainage Facility

Source: Survey Team

Table 2-12 Result of Culvert Design

No.	Specification	Length (m)	Inflow (m ³ /sec)	Flow Volume (m ³ /sec)	Remark	
1	Box W0.9m×H0.9m	35	0.6	0.93	※1 Allowance has been added in consideration of sedimentation risk at the lowest gradient point. Also, it is possible that that ponding will temporarily occur on the upstream side (250 x 140 m, depth 0.2 m, ponding time around 10 hours) at times of torrential rain due to the lack of permissible capacity of existing downstream facilities on the downstream side.	
2	Box W0.9m×H0.9m×2 ※1	35	0.6	1.86		
3	Box W0.9m×H0.9m	35	0.7	0.93		
4	Box W0.9m×H0.9m	35	0.7	0.93		
5	Box W0.9m×H0.9m	35	0.7	0.93		
6	Box W0.9m×H0.9m	35	0.8	0.93		
Total of No.1 to No.6			4.1	6.5	Flow volume/inflow: 1.6	
7	Box W1.0m×H1.0m	40	1.1	1.23	The flow rate of 16 m ³ /sec to the existing river in this section should not be a problem because the permissible discharge capacity of the river at 70% depth is approximately 32 m ³ /sec. ※2 Moreover, consideration has been given to the size of existing culverts (1.8 m x 1.0 m) on the upstream side. ※3 The long No. 10 culvert has been given extra allowance in consideration of maintenance.	
8	Box W1.0m×H1.0m	40	1.0	1.23		
9	Box W1.2m×H1.2m×2 ※2	80	3.2	4.00		
10	Pipe φ1800 ※3	630	2.1	4.93		
11	Box W2.0m×H2.0m×2	120	13.9	15.6		
12	Box W2.0m×H2.0m×2	40	11.6	15.6		
13	Box W2.0m×H2.0m×2	230	11.6	15.6		
14	Box W1.0m×H1.0m×2	80	2.3	2.46		
Total of No.7, No.8, No.12 and No.14			16.0	20.5		Flow volume/inflow: 1.3

Source: Survey Team

2-2-2-7 Road Auxiliary Facilities Plan

(1) Retaining Walls

Around box culverts that connect to the river, since there is a grade difference of approximately 7 m between the road edge and river, it has been decided to conduct sheathing by means of reverse-T retaining walls. In places where there is grade difference between the road edge and service roads, gravity type retaining walls have been planned.

- ① Reverse-T retaining walls of 8.5~3.0 m in height: Outlet side of box culverts connecting to rivers
- ② Gravity type retaining walls of 3.0~1.0 m in height: Road banking edges and tap and outlet side of box culverts

(2) Road Auxiliary Facilities

Since the target road is located in a city area, the following auxiliary facilities have been included in the plan in consideration of convenience and safety, etc. for road users commuting to work and school and on business, etc.

1) Bus bays

The 10 bus bays on the target section become choked by stopping small-size buses (dara-dara) during the morning and evening rush hours, and this further exasperates congestion on the main road. In order to remedy this situation, the improvement of bus bays has been reviewed in consideration of conditions of use at the existing bus bays, improvement plans on surrounding roads, and roadside development plans, etc. It is planned to establish 12 bus bays along the target section upon taking into account conditions of use of existing bays and future roadside plans. Concerning the size of bus bays, three types (width 3 m x length 60 m, 80 m, 100 m) have been examined in view of conditions of use at existing bus bays. Moreover, as it is expected that the currently used small-size buses will be converted to medium-size buses in future, the bus bay shape and dimensions were designed based on the assumption of medium-size buses.

2) Street lights

The area around the target road has been developed as residential land, however, in recent years, large buildings have been constructed and the residential land is being turned into commercial land with residences to the rear. As the road is improved, the volume of traffic increases, and more large buildings and office buildings will be constructed in future, the number of road users and pedestrians is expected to increase. Therefore, street light installation is planned along the whole section from Morocco intersection to Mwenge intersection in consideration of night traffic safety.

3) Central median

It is planned to install a central median 9 m wide that will also serve as the BRT zone in the future. Phase 1 (Morogoro Road and Kawawa Road) of the BRT program is currently being implemented, and the target road is planned for incorporation into the program in Phase 4. In the Project, because a central median will be situated where the existing road is, the existing pavement will not be removed. Moreover, in places where earthworks still remain, it has been decided to pave the central median with a single layer of asphalt in order to prevent erosion by rain.

(3) Protection of Large Diameter Water Mains

Large diameter water mains are buried to depths of 1.5~4.0 m in some parts within ROW. As a result of analyzing the road traffic load and load bearing capacity of water mains, it was found that the water mains might be damaged. In order to prevent this, protection has been planned using concrete slabs (3-4 m wide x 30-50 cm thick).

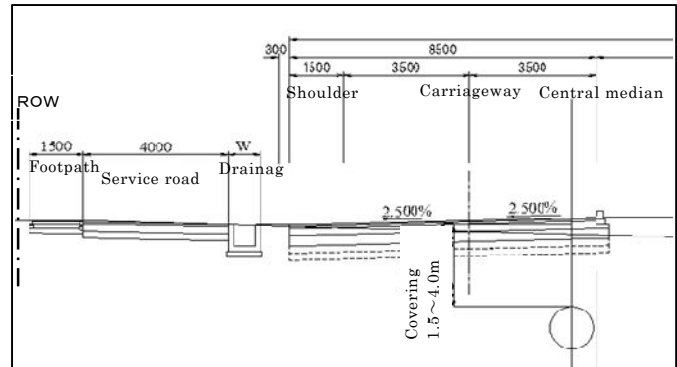


Figure 2-11 Covering for Large Diameter Water Main (nearly 2 km)

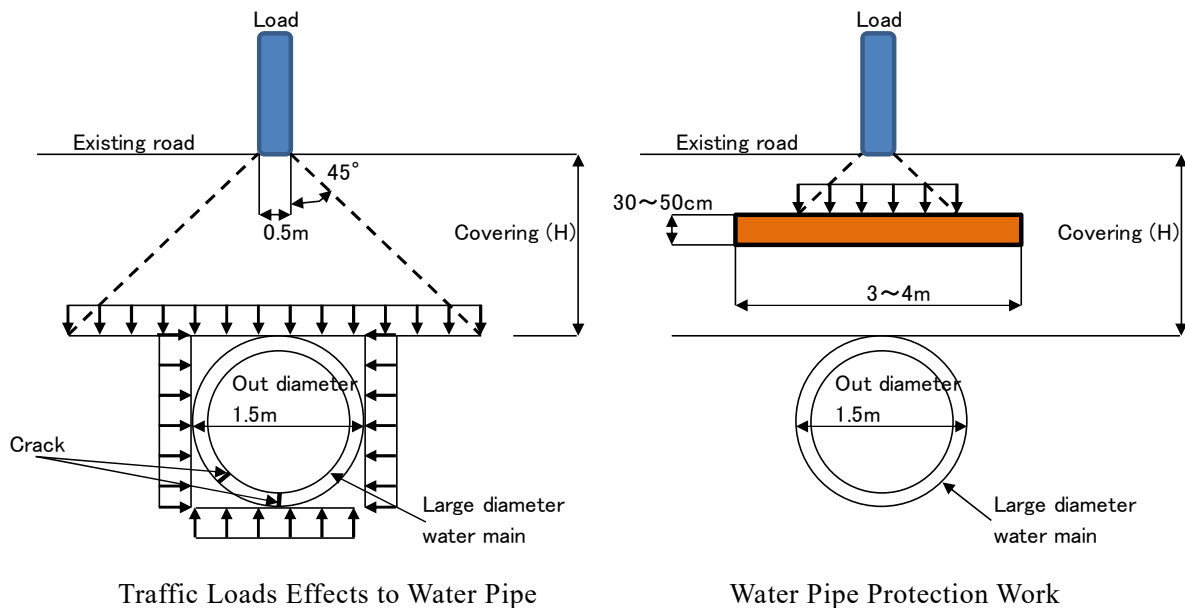


Figure 2-12 Large Diameter Water Main Protection Work

2-2-2-8 Unsuitable Soil Countermeasures

During work on the Phase-1 section adjoining the Project section, much more unsuitable soil (soft soil, expansive soil, waste-mixed soil, etc.) than expected was discovered inside the ROW. In the survey, in order to obtain more accurate findings in the limited time available, a combination of exploratory pit excavation, DCP survey, and boring survey was adopted in order to complement the survey intervals and depths. As a result, unsuitable soil was confirmed at depths of 1~3 m at intervals of 200 m. The findings were adjudicated based on the following judgment criteria and examination was conducted on the scope of unsuitable soil and necessary countermeasures.

(1) Adjudication of Unsuitable Soil

Unsuitable soil was adjudicated based on the following standards set according to the Tanzanian Pavement and Materials Design Manual (PMDM).

Table 2-13 Unsuitable Soil Adjudication Standard

Unsuitable Soil Type	Adjudication Standard
Soft soil	Soil with CBR of less than 3%, which is the adjudication standard for "6.1 Low-Strength Soils" according to the PMDM, is deemed to be soft soil.
Expansive soil	Soil with more than 20% of the PIw (plasticity index of materials based on samples passing through a 425 µm sieve) obtained from the results of liquid plasticity threshold and granularity test, which are the adjudication standard in "6.2 Expansive Soils" according to the PMDM, is deemed to be expansive soil.
Waste-mixed soil	Areas that are deemed to be former sites of waste disposal sites containing large quantities of waste, irrespective of the local ground CBR, will be removed as waste-mixed soil from the viewpoint of securing quality, and the substituted soil will be evaluated.

Source: Survey Team

(2) Scope of Unsuitable Soil

As a result of conducting adjudication based on the above standards, soft soil with CBR of less than 3% was confirmed to be distributed as shown below. As for expansive soil, as a result of conducting indoor testing, the PIw value was found to be in the range of 1~14% but never in excess of 20%, and there was found to be no expansive soil over the target section. Concerning waste-mixed soil, as a result of implementing pit exploratory pit excavation, DCP testing and boring tests, soil containing organic materials or wastes, etc. was not found.

Table 2-14 Results of Unsuitable Soil Survey

Section	Side	Average depth	Value of CBR	Value of PIw	Judge
0.1~1.1km	Left	2m(1~3m)	Less than 1~3	1.1%~13.0%	Soft soil
	Right	2m(1~3m)	Less than 1~3	4.3%~12.7%	Soft soil
1.6~1.8km	Left	0.8m(0.5~1m)	Less than 1~3	4.0%~7.8%	Soft soil
1.6~2.2km	Right	1m(0.5~1m)	Less than 1~3	5.2%~6.6%	Soft soil
2.6~3.0km	Right	1m(1~1.5m)	Less than 1~3	6.5%~14.0%	Soft soil
3.2~3.8km	Right	1m(0.5~1m)	Less than 1~3	3.7%~7.8%	Soft soil
4.0~4.2km	Right	0.5m	Less than 1~3	7.6%~9.3%	Soft soil

Source: Survey Team

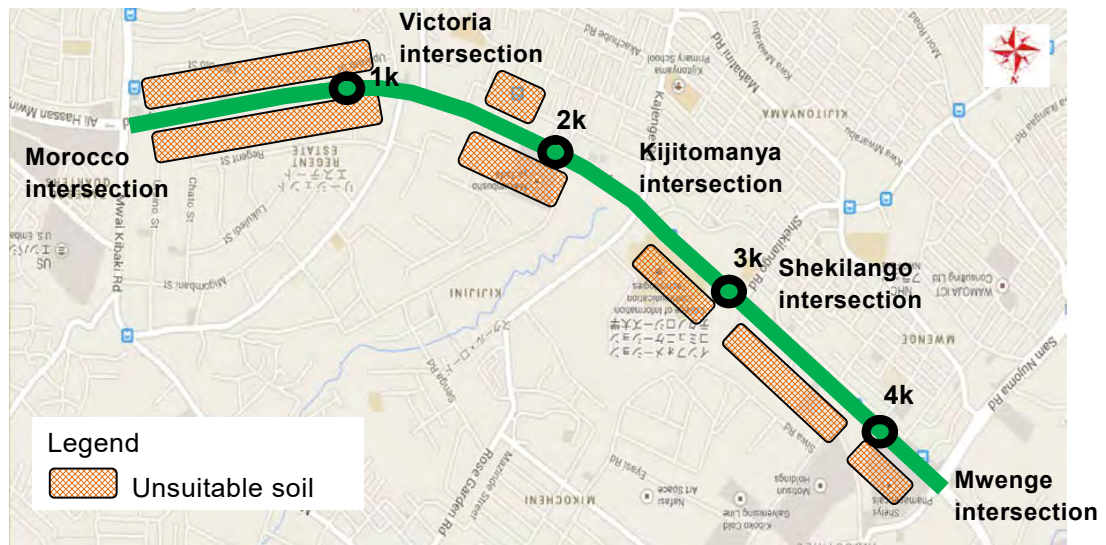


Figure 2-13 Section of Unsuitable Soil

(2) Unsuitable Soil Countermeasures

Unsuitable soil countermeasures suited to the local sites were selected upon considering site conditions, economy and ease of execution. Assuming “substitution” and “ground improvement,” which were conducted in Phase 1, to be suitable methods for the local area, “substitution” was selected as a result of comparing the two. Moreover, as a means of preventing groundwater impacts on the road, these areas will be replaced with cobble stones and underground drains to enable easier execution. The following table shows the groundwater countermeasures.

Table 2-15 Comparison of Unsuitable Soil Countermeasures

Comparison Item	Replacement of Grand	Ground Improvement
Outline of works	Remove the unsuitable soil, lay good quality soil, and perform compaction. Dispose of the unsuitable soil as residual soil.	Mix the local ground with cement-based or limestone-based hardener in order to improve the ground.
Site applicability	This was adopted in the Phase-1 works on New Bagamoyo Road. If groundwater is occurring, place a 60 cm layer of stones at the base and place the good quality soil over them. A flexible approach can be adopted with respect to the state of the unsuitable soil.	Groundwater has been confirmed over 0~1 km. This method isn't suitable when groundwater exists or during the rainy season. Waste-mixed soil was not found in this survey; however, it was confirmed in the Phase-1 works. This method isn't suitable when there is waste-mixed soil.
Ease of execution	Machinery and execution procedure are the same as in conventional earthworks. Concerning quality control, because the work is the same as in earthworks, conventional quality control measures are applicable.	Works are started after first setting the target strength, deciding the type of hardener, the test procedure, the quantity of hardener and so on. In order to secure stable quality, it is necessary to thoroughly mix in the hardener. Concerning quality control, it is necessary to conduct preliminary control and routine

		control, and it is also necessary to conduct testing and trial execution to determine the ratio of hardener every time the quality of materials changes.
Economy (direct works costs)	Compared to ground improvement, cost is approximately 20% cheaper.	This tends to be relatively expensive.
Results of comparison	○	×

(3) Groundwater Countermeasures

As a result of confirming the groundwater level by exploratory pit excavation conducted at the roadside during the rainy season in 2014, the top of the groundwater table was measured at a depth of 1.5 m in excavated pits on the left side of the road between the 0.1 km and 1.1 km points. Similarly, the top of the groundwater level was observed at a depth of 1.5 m on a building construction site located on the left side of the road at the 1.0 km point. In other sections, exploratory excavation revealed no groundwater even at depths of 2 m. Because the confirmed scope of groundwater is the same as the distribution of unsuitable soil on the left side of the road between the 0.1 km and 1.1 km points indicated above, it is planned to implement the following groundwater countermeasures under the unsuitable soil countermeasures. These works will be executed at right angle to the road at 50 m intervals and the drained water will be connected to the road crossing culvert installed at the 0.3 km point in the Project so that the water can be drained away.

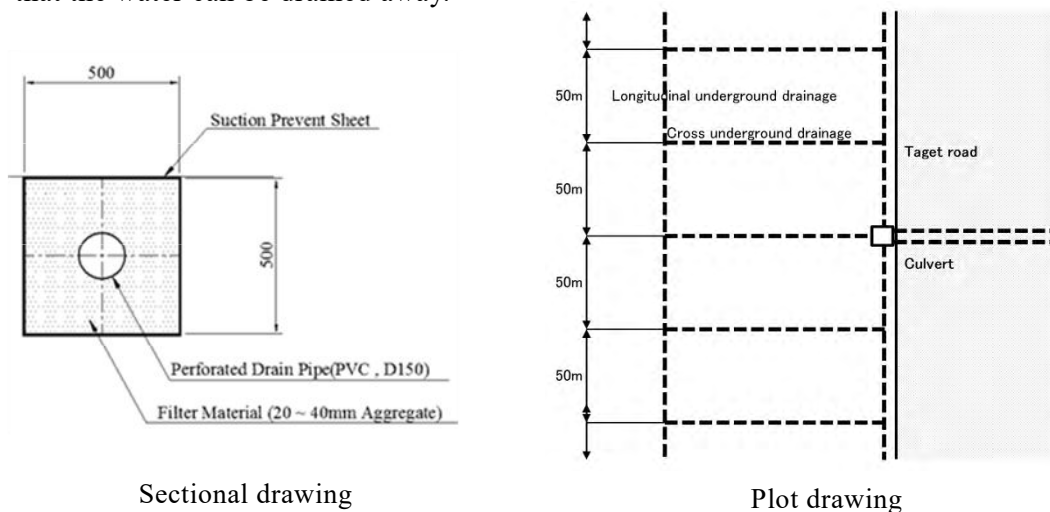


Figure 2-14 Underground Drainage

2-2-3 Outline Design Drawings

The outline design drawings prepared based on the basic plan are as indicated below. The actual drawings are attached to the appendices.

Table 2-16 List of Basic Design Drawing

Item	Contents of drawing	Number of drawing
1	Standard section drawing Plan view drawing Longitudinal section drawing	11
2	Drainage facilities structural drawing	5
3	Ancillary facilities structural drawing	6

Source: Survey Team

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Basic policy in implementation

Since the Project will be implemented under the grant aid scheme of the Government of Japan, the following points have to be taken into consideration as a guideline for execution.

- ① Formulate the implementation method and construction schedule in reflection of the local natural conditions such as weather, terrain and local features and current traffic conditions on the target road.
- ② In consideration of maintenance capacity on the Tanzanian side, adopt common execution methods that do not require special construction machinery or technology following construction.
- ③ In compiling the execution plan, give ample consideration to the social environment and traffic safety.
- ④ Utilize locally procurable materials as much as possible in order to contribute to vitalization of the local economy.

2-2-4-2 Implementation Conditions

(1) Adherence to Labor Standards

The contractor will comply with appropriate labor conditions and customs in line with employment based on the existing construction legislation in Tanzania, and it will strive to prevent disputes with workers and secure safety during the works period.

(2) Social and environmental consideration during the works period

- ① Select construction methods with a view to minimizing dust and particulate, etc.
- Establish plants, etc. that generate noise and particulate away from inhabited areas, etc.
- Transport waste materials that arise as a result of the works to an appropriate site for landfill disposal, etc.
- Appropriately treat wastewater discharged from plants according to Tanzanian standards.

(3) Securing of safety during works

- Since lane control will be required during the works, establish safety facilities (barricades, colour cones, revolving lights) and assign traffic controllers.
- Warn local residents about the increased works traffic through staging public hearings (chaired by TANROADS) and installing information/notice boards.

(4) Need for means of communication on site

Since mobile phones can be used on the Project section, it has been decided to let works personnel carry mobile phones. Moreover, traffic controllers will carry portable transceivers and a traffic safety control setup geared to ensuring the safety of general traffic and local residents will be established.

(5) Observance of local customs

A construction time schedule in accordance with the local religious customs and daily habits will be considered when formulating the execution scheme

(6) Securing of traffic safety

A plan will be formulated for ensuring the efficient and rational diversion of traffic within the ROW while paying attention to safety.

(7) HIV countermeasures

It will be necessary to consider measures for countering HIV among Project personnel when compiling the execution plan.

(8) Customs clearance

The execution plan will be formulated upon considering the number of days required for importing, unloading and clearing customs, etc.

(9) Land acquisition

Confirm that pre-agreement for land use and payment of guarantee money, etc. will properly be undertaken by the Tanzanian government.

(10) Coordination of construction time schedule with others

Progress of works on the Tanzanian side will sufficiently be verified for coordination.

2-2-4-3 Scope of Works

The works to be undertaken by the Japanese and Tanzanian sides during the Project are outlined below.

(1) Scope of work by Japan side

1) Construction work

Upgrading of existing road over the target section of approximately 4.3km

- Temporary installations and main structural works for road upgrading (earth works, roadbed works, binder course and surface course works, drainage structures, road auxiliary facilities, etc.) and bridge works
- Temporary installations (base camp (including plant yard), office, warehouse, etc.)

2) Procurement of labor, equipment and materials

Procurement of the labor, construction materials and equipment for construction of the road and bridge

3) Safety measures

Safety management and measures concerning execution of the construction works

4) Consulting service

Detailed design, drawing up of tender and contract documents, assistance for bidding, and works supervision

(2) Scope of work by Tanzania side

1) Securing of land

The Tanzanian side will secure the road right of way (ROW), land necessary for facilities such as base camp, etc. given in the "Work execution plan," and site for disposal of construction waste materials and surplus soil.

2) Customs clearance and procedure for tax exemptions

Provision of conveniences and prompt implementation to facilitate customs clearance and tax exemption based on the list of imported equipment and materials prior to

commencement of the construction works

3) Relocation of public facilities

- Relocation of obstructing facilities (water pipes, telephone cables, power line) (see 3-2 'Items Unique to the project')
- Assignment of Tanzanian supervisory staff and securing of expenses for the relocation work

4) Others

- Provision of conveniences to facilitate immigration and stay, etc. of Japanese engaged in implementation of the Project
- Appointment of counterpart and securing of personnel and expenses

2-2-4-4 Detailed design, Consultant supervision

(1) Detailed design

In the detailed design, the items that need to be considered in the initial plans that are compiled as a result of analysis and review in the preparatory survey will be investigated in detail; the detailed structure necessary for the works will be economically and rationally reviewed, and the drawings and reports necessary for ordering the works will be prepared.

1) The items that need to be considered in the detailed design

- ① Confirmation of clearance between the planned culverts and buried objects
- ② Confirmation of connections between planned drainage facilities and existing drainage facilities
- ③ Confirmation of positions of planned road boundaries and ROW boundaries
- ④ Reconfirmation of the scope and depth of unsuitable soil
- ⑤ Expediting of the removal of unauthorized kiosks and other facilities
- ⑥ Confirmation of materials procurement sources (fill materials, aggregate, sand)
- ⑦ Confirmation of candidate sites for camp yards and disposal areas

(2) Tender preparation and Tender

In the Project, in view of the anticipated characteristics of the works, it will be necessary to set the following items as requirements for prospective tender participants.

1) Pre-qualification (PQ)

In addition to the financial and management situation and works record of bidding

companies, the following items are needed concerning experience working in similar natural conditions and with the same methods used as in the Project, and the experience and qualifications, etc. possessed by employees.

- ① Experience in conducting road works and paving works on urban roads with four or more lanes
- ② Experience in conducting road works and paving works in projects with similar site conditions (high temperatures)
- ③ Qualifications or experience with similar works of paving management engineers and paving quality control engineers
- ④ Experience of conducting works on unsuitable soil and soft ground

2) Tender documents, Technical documents

The following technical materials should be appended to the tender documents with the objectives of ensuring fair provision of information to bidders and preventing discrepancies from arising in the tender contents:

- Detailed design reports, drawings, traffic survey, axle load survey, geological survey, materials survey, site-related data, etc.

(3) The items that need to be considered in the construction stage

After the successful bidder is decided, it will promptly submit the execution plan to the consultant for review. At the kickoff meeting conducted by the client, contractor, and consultant at the start of the works, major items such as the works schedule, execution methods, consultant supervision methods, specifications, scope of quality standards (permissible values and conformance levels), confirmation frequency, completion criteria, etc. will be confirmed based on the contractor's execution plan and consultant's supervision plan; also, the consultant's scope of responsibility (design, setting of specifications, and recommendation to the client of the execution items that require contractual judgment) and the contractor's scope of responsibility (quality, achievement of the works schedule), and all the essential items for works will be compiled into the execution management standard document, which will be agreed and signed by the client, contractor, and consultant. If the said standard document needs to be revised, the three parties will form consent in discussions. The main items in the execution plan and consultant supervision plan are indicated below.

Concerning the specifications to be applied to the Project works, the contractor will confirm whether or not there is a possibility of nonconformities, and if it is possible they exist, it will conduct prior examination and confirmation of countermeasures,

which will then be confirmed and decided by the three parties. Concerning the decided specifications, if the contractor has any doubts following the start of work, it will promptly seek rational evidence and report to the consultant. The consultant will convene a meeting of the three parties to confirm the contract articles and plan of countermeasures.

1) Work execution plan

Work schedule, Organization chart, Safety control, Construction machinery, Construction materials, Execution plan, Construction process, Construction plan, Measurement workmanship plan, Correction measures (Schedule control, Quality control, Measurement workmanship), Emergency response system, Safety control, Environmental measures

In the above documents, since statements and mentions concerning the following items are intrinsically related to work quality, it is necessary to state them in particular detail.

Confirmation of implementation system

- Engineer (Assignment of full-time pavement expert (Improved Asphalt, Semi-flexible (Open graded AC + Cement milk), Cement stabilized, Experience of thermal area of overseas, Experience of wheel tracking test, Implementation experience by standards of AASHTO) and Assignment of full-time Plant management. Confirmation of qualification, experience and career)
- Equipment (Asphalt plant (Presence or absence of removal device) , Concrete plant, Asphalt concrete equipment, Test equipment for Asphalt concrete)
- Quality control system (career of each of engineers, Specific method for accuracy verification of test data)
- Technical specifications (Reference value, Reference interval, Frequency)
- Safety control system
- safety measure of each of items

2) Consultant Supervision Plan

Consultant supervision system, each of items of execution for consultant supervision, Quality control, Control of workmanship, Schedule control, Control of progress of work, Change order, Maintaining low and order

(2) Consultant Supervision Work

1) Objectives of Consultant Supervision

Confirmation to ensure that the works conducted by the contractor comply with the contents of the tender documents will be conducted based on the methods prescribed in the tender documents, and by other rational methods suitable for the target works, for example, on-the-spot checks, confirmation based on consultant's instructions, checks of process and quality control records submitted by the contractor, and so on.

The consultant will conduct the checking and confirmation of works against design documents by means of on-the-spot inspections or confirmation of documents or a combination of the two.

1-1) On-the-spot confirmation

Detailed confirmation and sample checks will be implemented in each stage of execution to ensure that processes and quality are being implemented according to design documents and confirm safety management and so on.

1-2) Confirmation based on consultant's instructions

The consultant will set effective confirmation frequency according to the contents of works and design upon taking the execution conditions and situation regarding submission of documents and so on into account.

1-3) Confirmation of documents

The contents of quality control records submitted at each stage of execution will be confirmed in detail and by sampling.

2) Consultant's site supervision setup

After the construction contract is concluded with the contractor, the consultant will issue the written instruction to start works to the contractor and assign a permanent representative on the site to supervise the works. In the supervision work, it will report on the progress of works to the client and offer improvement measures and recommendations to the contractor concerning works progress, quality, safety, and payments. Also, it will provide periodic reports to foreign diplomatic missions and the local JICA office. In addition, it will observe the defect inspection that is conducted one year following completion of the consultant supervision.

2-2-4-5 Procurement Plan

(1) Policies regarding Procurement

1) Labor

With a view to creating employment opportunities, promoting technology transfer and vitalizing the local economy, local engineers and laborers will be utilized to the fullest extent; however, for jobs that are beyond the local technical level, skilled workers will be dispatched from Japan or third countries.

2) Construction materials

The field survey found that the general materials (cement, aggregate, timber, etc.) for use in the main construction works are produced in Tanzania. Imported bitumen and reinforcing bars are available on the local market and can be procured in Tanzania. Considering the above points, procurement sources have been planned as shown in the table below based on the following principles.

- ① Procure locally produced items as much as possible.
- ② Procure imported products in cases where they are constantly available on the local market.
- ③ Concerning materials that cannot be procured locally, procure from Japan or third countries. Concerning procurement sources, make final decisions upon considering price, quality, delivery time and other relevant issues.

Table 2-17 Procurement Class of Main Material

Source: Survey Team

Material Name	Procurement Class			Remark
	Tanzania	Japan	3 rd country	
[General material]				
Bitumen	•			
Special material for pavement (Semi-flexible pavement, Improved pavement)		•		Because local procurement is impossible
Cement	•			
Aggregate for pavement	•			
Reinforcing bars	•			
Aggregate for concrete	•			
Non-sieving crushed stone	•			
Wood (plywood, Square timber, Plate timber)	•			
Fuel	•			
Oil	•			
Paint	•			
Shape steel, Steel pipe	•			
[Traffic signal, Street light]				
Traffic signal	•			
Street light	•			

Remark: Concerning aggregate, sand, coral stone and fill material, as a result of conducting materials tests, these can be procured from the following local sources.

Table 2-18 Use of Material and Distance to Quarry, Borrow Pit

Sampling location	Material	Use	Distance to construction site
Lugoba area	Crushed stone	Coarse aggregate, Aggregate for pavement	150km
Bunju area (basin of Mpiji river)	Sand	Fine aggregate, Sand for pavement, paving sand	40km
Bunju area	Soil and sand	Sub base course, Subgrade, General fill	40km
Bunju area	Coral stone	Base course for by-pass road	40km

Source:Survey Team

3) Construction Machinery

Road construction machines not including special machinery can be rented from local construction companies in Tanzania. However, some of the machines that are leased by local construction companies are not maintained in suitable condition for use in the Project.

Considering the above information, the procurement sources of main works equipment have been planned as shown in the following table based on the following principles.

- ① Rent construction machinery that is owned by local construction companies.
- ② In cases where local procurement is unfeasible, procure from Japan or third countries. Decide procurement sources upon considering the ease of procurement, transportation cost and rental charge.

Table 2-19 Main Works Machinery Procurement Sources

Equipment	Specifications	Source		
		Tanzania	Japan	3rd Country
Large breaker	Hydraulic type, 1300kg		●	
Concrete plant	Forced mixing type, Capacity 30m ³ /hr		●	
Asphalt plant	60t/h		●	
Generator	Upper 300kVA Type		●	
Bulldozer	Normal	●		
Back hoe	Crawler type	●		
Wheel loader	Normal type, 2.1m ³ piling	●		
Dump truck	Normal type, diesel	●		
Truck	Normal type, diesel	●		
Truck with crane	Hanging 2.9t	●		
Semi-trailer	Loading 20t	●		
Truck crane	Hydraulic expansion jib(Hanging 4.9t, 16t, 25t)	●		
Rough terrain crane	Hydraulic expansion jib	●		
Large breaker	Hydraulic type, 600~800kg	●		
Motor grader	Blade width 3.1m	●		
Road roller	Macadam 10~12t	●		
Tire roller	8~20t	●		
Forklift	Engine drive, maximum load 1.5t	●		
Vibrating roller	Hand guide type, Mounted combined type	●		
Mixer truck	Mixing capacity 4.4m ³	●		
Asphalt Finisher	Wheel type, paving width 2.4~6.0m	●		
Asphalt kettle	Stationary type, tank capacity 6,000ℓ	●		

Asphalt distributor	Self-running type, tank capacity 2,000~3,000ℓ	●		
Asphalt engine sprayer	Handcart type, capacity 25ℓ/min	●		
Concrete cutter	self-propelled	●		
Tamper	60~80kg	●		
Vibrating Compacter	40~60kg	●		
Line marker	Molten, self-running type Line width 15, 20cm Hopper capacity 80~130kg	●		
Solution sink	200~350 kg x 2 sink	●		
Air Compressor	Screw type, Portable	●		
Submersible Pump	Portable type	●		
Generator	Under 220kVA Type	●		
Concrete Mixer (Handy type)	0.2m ³	●		
Water sprinkler (water supply) truck	Tank capacity 11,000ℓ	●		
Fuel supply truck	Tank capacity 11,000ℓ (Applied water sprinkler capacity)	●		
Chip Spreader	Hanger type	●		

(2) Important Points to consider in Procurement

The important points to consider in procurement are as follows.

- ① Compile a procurement schedule that doesn't put pressure on the overall construction schedule.
- ② Procure local products as far as possible in order to contribute to local economic vitalization.
- ③ Concerning materials that cannot be procured locally, procure from Japan or third countries upon considering quality reliability, ease of procurement, available quantities and economy.
- ④ Concerning products procured from Japan or third countries, land at Dar es Salaam Port (the main port of Tanzania). For inland transportation, use trailer trucks for construction machinery and trucks for general goods (materials).

2-2-4-6 Tax Exemptions and Customs Procedures

(1) Tax Exemptions

When works equipment and materials are procured for grant aid projects in Tanzania, the construction contractor pays for the initial procurement including tax, and this is refunded by the authorities at a later date. The refund procedure is implemented based on notification of Government Notice (GN), however, it takes a lot of time from application to refund and this is a major drawback in project implementation. Moreover, although the major targets of refund in line with works implementation are fuel tax and value added tax (VAT), it is necessary to conduct separate GN procedure for these. Based on the experience of past projects, it can take between three and six months from procurement to refund at the soonest, and in reality it takes longer than this, and the

burden of interest payments placed on contractors as a result of such delays is a major problem. Moreover, in addition to delays, tax refunds are sometimes refused on fuel purchased before the GN notification, while the amount of refund is sometimes reduced for no clear reason and so on.

Moreover, levying of new taxes (transaction tax and exercise duty) was started from the end of last year. Since these are levied on domestic money transfers in Tanzania, they are an additional consideration for when contractors make payments to subcontractors and so on.

(2) Customs Clearance

Imports of equipment and materials to Tanzania are mainly handled at Dar es Salaam Port, but this port is currently unable to cope with the volume of incoming imports. In particular, large numbers of ships need to wait offshore before they can unload containers. Accordingly, it is necessary to depend on imports by bulk vessels that allow faster unloading, however, bulk cargoes tend to be unloaded in disparate locations and take longer to pass through customs. Since there is little possibility that functions at Dar es Salaam Port will be improved in the near future, it will be necessary to devise a procurement plan that allows ample scope for maneuver.

2-2-4-7 Soft Component Plan

This is not applicable in the Project.

2-2-4-8 Execution Schedule

(1) Setting of the Works Period

In the event where the Project is implemented under the grant aid scheme of the Government of Japan, the following table shows the draft schedule for implementation design and construction supervision. The estimated entire schedule is approximately 27 months, comprising approximately 12 months for the implementation design and tender activities and 39 months for the construction works.

(2) Implementation Schedule

The draft implementation schedule is indicated below.

Table 2-20 Project Execution Schedule (Draft)

Number of months	1 2 3 4 5 6 7 8 9 10 11 12 13																										
	Implementation design	■ (Field survey, implementation design)							■ (Tender assistance)						▲ (Contractor agreement)												

Number of months	1 2 3 4 5 6 7 8 9 10 11 12 13													14 15 16 17 18 19 20 21 22 23 24 25 26 27													
	Main works and Execution supervision	■ (Domestic preparation)																									
■ (Preparatory works)																											
■ (Removal works for existing structure, clearing)																											
■ (Road earth work)																											
■ (Measure for problem soil)																											
■ (Paving works)																											
■ (Drainage works)																											
■ (Ancillary works, structural works)																											
■ (Street right, signal works)																											
■ (Clearing)																											

2-3 Obligations of Recipient Country

2-3-1 General Items in the Government of Japan's Grant Aid Scheme

The following lists the general scope of works of the Tanzanian side confirmed in the minutes of meeting agreed upon by both governments.

- Secure the land needed for the Project before the commencement of construction work.
- Exempt Japanese nationals from customs tax, domestic tax and other forms of public charges for service and materials that are supplied under approved contracts.
- Provide necessary convenience and assistance to the Japanese nationals who enter and reside in Tanzania for the Project implementation in order to facilitate supply of service and materials under approved contracts.
- Complete the environmental and social consideration procedures and necessary surveys required under Tanzanian environmental and social consideration procedures.

2-3-2 Specific Requirements for the Project

The items undertaken by the Tanzanian side that are specific to this Project and are not included in the general requirements for grant aid are as follows.

- (1) Securing of land for the road works and demolition/relocation of existing structures

The demolition/relocation of existing structures on the necessary ROW for the Project

has been completed. As is shown in the following table, the budget required for the Project is approximately 400 million Tshs, and since this is equivalent to roughly 0.05% of the total development works budget in 2012/13 of approximately 770,380 million Tshs, it is comfortably affordable for the Tanzanian side. Moreover, it has been confirmed with TANROADS that these budgets will be secured in fiscal 2015.

Table 2-21 Outline of the Scope of Works on the Tanzanian side

(Unit: million Tshs)

Item		Contents	Cost burden
1	Registration of engineers	Costs of engineer's registration of contractor (CRB), and consultant (ERB)	176
2	A/P costs	Authorization for payment (A/P) expenses	60
3	Relocation of existing utility	Relocation of existing water pipe of small diameter	164
Total			400

Remark: 1Tshs = 0.05 yen

Source: Survey Team

(2) Securing of temporary yard and disposal area

Because the target road passes through residential and commercial land, it will be difficult to secure a temporary yard and disposal area. Consequently, the following sites will be secured:

- Expected locations and scale of temporary yards
Base camp: 80 m x 150 m, 9 km from the project
Asphalt and concrete plant: 30 m x 200 m, 9 km from the project
Disposal area: 200 m x 150 m, 12 km from the project
- Required period: 3 years



Figure 2-15 Candidate Sites for Temporary Yard and Disposal Area

(3) Implementation of a project explanation meeting for roadside residents

Immediately following signing of the official exchanged notes (E/N), the implementing agency is requested to stage an explanation meeting geared to thoroughly conveying

safety measures, noise countermeasures and work methods, etc. to the roadside residents or their representatives.

(4) Traffic safety measures

It is requested that pedestrians and drivers will be thoroughly informed about temporary traffic arrangements so that they comply with instructions given by traffic controllers during the construction period.

(5) Thorough notification to road users

Since the construction work is expected to cause inconvenience to the passing traffic, it is requested that such inconveniences be thoroughly informed to road users via TV, radio, newspapers and other public media.

(6) Engineer's Registration costs (CRB, ERB)

In recent years, it is necessary to bear the following registration costs when construction firms and consultants in Tanzania register with the associated organizations in that country.

Table2-22 Engineer's Registration Costs

Item	Cost	Remarks
Registration fee	\$20,000	Assuming \$10,000 each for CRB and ERB
Annual membership fee	\$60,000	Assuming \$10,000 per year each for CRB and ERB, 3 years
Total	\$80,000 (176,000,000 Tshs)	

Source: Survey Team

2-4 Project Operation and Maintenance Plan

The following maintenance work will be required in order to keep the Project facilities in good condition following construction.

(1) Routine maintenance

Maintenance work, particularly the repair work required after the rainy season, is listed below.

- Patching up the damaged road surface (filling potholes)
- Repairing the sub-base as required
- Reshaping the road surface

Also, it is necessary to repair and clean side ditches, slopes and traversal drainage structures constantly.

(2) Periodic maintenance work

- Road surface repairs
- Sub-base repairs
- Repairs of structures

Currently, the TANROADS Dar es Salaam regional office conducts the above maintenance work by subcontracting to local construction companies (works contracts include direct works costs, personnel expenses and overheads), and there are no operational problems. Since it will be especially important to repair damaged parts immediately, the local side will be expected to conduct regular rounds of inspection at sufficient intervals for early detection.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Cost Burden on the Tanzanian side:	400 million Tshs (Approximately 20 million yen)
① Cost of registering construction company:	176,000,000 Tshs (Approximately 8.8 million yen)
② Cost for issuing AP:	60,000,000 Tshs (Approximately 3.0 million yen)
③ Cost relocation of existing water pipe :	164,000,000 Tshs (Approximately 8.2 million yen)

(2) Estimation Conditions

The conditions at the point of estimation in August 2016 were as follows.

1) Exchange rate

US\$1 = ¥107.12

2) Implementation period

The Project intends to use the government bond (A) scheme for funding with approximately 39 months being set aside for the detailed design, tender assistance and construction work as shown in the implementation schedule.

3) Other

The Project will be implemented in accordance with the grant aid scheme of the Government of Japan.

2-5-2 Operation and Maintenance Cost

As is shown in the following table, the average annual operation and maintenance cost for routine and periodic maintenance is estimated to be approximately 69.8 million Tshs (equivalent 3.5 million yen) during the Project life. Since this is equivalent to 0.03% of the annual maintenance budget (12 billion yen) of TANROADS in fiscal 2012/2013, this cost is considered to be easily affordable for the Tanzanian side.

Table 2-23 Main maintenance Items and Costs

(1 Tshs = 0.05 yen) Source: Survey Team

Type	Cycle	Maintenance contents	Specifications	Unit	Unit cost (Tshs)	Work quantity	Frequency	Cost (Tshs)
Routine	Every year	Patching	1 % of road area	m ²	35,000	730	12	306,600,000
		Roadbed repair	1 % of road area	m ²	26,400	730	12	231,300,000
		Shoulder repair	1 % of footpath area	m ²	26,000	130	12	40,600,000
		Clearing structure	5 % of the length of side ditches	m	2,860	430	12	14,800,000
		Subtotal-I				15-years aggregate=		
Periodic	Every 5 years	Roadbed repair	2 % of road area	m ²	26,400	1500	3	118,800,000
		Overlay	2 % of road area	m ²	35,000	1500	3	157,500,000
		Shoulder repair	2 % of footpath area	m ²	26,000	260	3	20,300,000
		Repair of structure	1 % of the length of side ditches	m	230,230	90	3	62,200,000
		Subtotal-II						358,800,000
			Total routine and periodic maintenance III (=I+II)					952,100,000
Operation and maintenance cost			10 % of III	Set	-	-		95,210,000
Total								1,047,310,000
Cost per year								69,820,000

2-6 Other Relevant Issues

In order to smoothly implement the Project works and realize and sustain an adequate Project effect, the Tanzanian side will need to pay particular attention to the following points.

(1) Speeding-up of tax exemption and customs clearance procedures

After the Exchange of Notes (E/N) marking the official decision of Project implementation, TANROADS will need to appeal to the necessary organizations and agencies to ensure speedy and sure exemption from tax and customs clearance.

(2) Implementation of Project explanation meetings for roadside residents

After the Exchange of Notes (E/N) marking the official decision of Project implementation, TANROADS will promptly need to stage meetings to explain the Project to roadside residents or their representatives.

(3) Traffic safety

It will be necessary to appeal to drivers to follow the guidance of traffic controllers during the works.

(4) Notification of inconvenience during the works

Since the works are expected to cause inconvenience to passing traffic, it will be necessary to thoroughly inform road users via radio and other public media.

CHAPTER 3

PROJECT EVALUATION

Chapter 3

Project Evaluation

3-1 Preconditions for Project Implementation

3-1-1 Preconditions for Project Implementation

The preconditions necessary for Project implementation will be as follows.

- In the road upgrading to be conducted in the Project, TANROADS has already secured the necessary right of way (ROW, 45 m in width), however, parts of this land are occupied by parking spaces for buildings and shops, restaurant tables, kiosks and so on. It will be necessary to remove these things by the start of the Project tender.
- It will be necessary to secure camp sites, plant sites and earth quarries for the Project and to obtain authorization for digging.
- It will be necessary to support customs clearance procedures and facilitate the prompt and definite implementation of tax exemption measures regarding the equipment and materials procured for the Project. Failing to do so could lead to works delays.
- It is expected that the road upgrading works will be conducted while securing daily traffic volume of at least 20,000 vehicles. Moreover, following completion, vehicles will travel faster than at present due to the improved road conditions. Accordingly, in order to prevent serious accidents during and after the works, it is desirable to implement public education on road safety for road users and local residents.
- In order to secure smooth traffic and extend the service life of the road and structures following completion of the works, it will be necessary for the Tanzanian side to immediately start maintenance work after issuing the works completion certificate. In addition to implementing everyday maintenance, removing obstacles and conducting cleaning work, etc., it will be important to definitely implement periodic inspections and conduct prompt repairs when damage is found on the road and structures. Accordingly, it will be necessary to secure the necessary budget and personnel so that maintenance can be implemented on an ongoing basis. Moreover, as was mentioned in the previous section on operation and maintenance, the Tanzanian side is amply capable of implementing the necessary work.

3-1-2 External Conditions for Attainment of the Overall Project Plan

The following external conditions will be needed in order to realize and sustain the Project effects.

- ① The first phase works of the Bus Rapid Transit (BRT) Programme have been completed and operation was started with a view to improving road traffic conditions in Dar es

Salaam. Since the Project road section corresponds to the fourth phase of the BRT programme, it is intended to secure a 9 m wide space in the center of the Project road. Accordingly, when it comes to implementing the BRT programme over the Project section, it may become necessary to make fine adjustments for BRT stations and intersection structures, etc.

- ② In order to improve the road traffic situation in Dar es Salaam, in addition to the said BRT programme, widening works and so on are being conducted on successive sections of trunk roads. Moreover, the Project road section is the final section on the trunk road that will be the sole link between the capital Dar es Salaam and the south of the country. Accordingly, not only is the Project road an important route in the metropolitan region, it will also play an important role in the arterial road network of Tanzania, and Project implementation is indispensable for promoting development in the south of the country.

3-2 Project Evaluation

3-2-1 Relevance

In view of the following items, Project implementation is deemed to have high relevance.

- ① The Project beneficiaries will be large numbers of residents (4.4 million) living in impoverished areas in the interior of Tanzania, the north of Dar es Salaam and the entire city area.
- ② The Project is urgently required in order to rectify income differentials, strengthen the trunk road transportation network, improve the living environment of residents and remove impediments to improvement of citizen lifestyles and economic activity caused by the serious congestion occurring on the target road section.
- ③ Thanks to mitigation of road inundation, congestion will be relieved, while the improvement of unsuitable soil will prevent subsidence of paved surfaces and enhance road safety.
- ④ The Project road can be operated and maintained utilizing the independent funds, human resources and technology of the Tanzanian side, and it will not require excessively sophisticated technology.
- ⑤ The Project will contribute to rectifying poverty differentials, which is a common goal in national development plans in Tanzania, and it will help improve and strengthen the trunk road network.
- ⑥ The Project entails hardly any negative environmental and social impacts.
- ⑦ As well as having necessity and superiority in using Japanese construction technology, the Project can be implemented without any great difficulty under Japan's Grant Aid scheme.

3-2-2 Effectiveness

(1) Quantitative Effects

Project implementation will impart direct effects in that the serious congestion currently arising on the target road will be mitigated, safety on the bridge section will be enhanced through raising load resistance and width, safety of pedestrians will be improved through installing sidewalks and auxiliary facilities, and safe and smooth traffic flow will be secured. Table 3-1 shows the quantitative effects that can be anticipated from Project implementation. This shows reference values from the reference year before Project implementation and target values for the intended Project completion year.

Table 3-1 Quantitative Effects

Indicator	Current Value (2017)	Design Value (2020)
Peak (*) average speed	3 km/h	40km/h
Days of road inundation	30 days/year	0 days/year
Traffic volume	830 vehicles/hour/lane (1660 vehicles/2 lanes)	1,740 vehicles/hour/lane (6,960 vehicles/4 lanes)

(*)Peak times (morning 06:00~12:00, evening 16:00~19:00, total 9 hours)

(2) Qualitative Effects

The Project will bring about the following qualitative effects.

- ① The shortening of the travelling time will reduce transportation costs.
- ② Increasing transport capacity on the road will improve the level of convenience of transport in Dar es Salaam.
- ③ Through securing regularity of passenger and goods distribution, access to the center of Dar es Salaam and port facilities will be improved, thereby contributing to the social and economic vitalization of Tanzania.
- ④ Construction of the Project road will make it possible to separate vehicles travelling at the standard speed from slower vehicles, thereby ensuring safe and smooth traffic flow.
- ⑤ Through stabilizing access from surrounding farm areas to markets, the stable transportation of goods will be secured, thereby leading to lower transportation costs and contributing to stable prices.
- ⑥ Through constructing a road linking Dar es Salaam to inland parts of Tanzania, the Project will contribute to economic development of the interior and help rectify poverty differentials in that region.

APPENDICES

- Appendix 1 Member List of the Survey Team
- Appendix 2 Survey Schedule
- Appendix 3 List of Parties Concerned in the Recipient Country
- Appendix 4 Minutes of Discussions (M/D)
- Appendix 5 Other Relevant Data (Technical Note signed with the Government of Tanzania)
- Appendix 6 References (Outline Design Drawings)

Appendix 1 Member List of the Survey Team

1st Survey (2014)

Position	Name	Affiliation
Team leader	Kenshiro TANAKA	Counsellor, JICA, Financing Facilitation and Procurement Supervision Department
Chief/Road Planning	Hisashi MUTOH	Ingérosec Corporation
Pavement Design	Hideaki MORITA	Ingérosec Corporation
Road design/Underground Survey	Sueo HIROSE	Ingérosec Corporation
Environmental and Social Consideration	Kunihiko HARADA	CHODAI CO., LTD.
Natural Condition Survey	Tetsu TANIAI	Ingérosec Corporation
Execution planning/Estimation	Takashi NAKAGAWA	Ingérosec Corporation

2nd Survey (2016)

Position	Name	Affiliation
Pavement Design	Hideaki MORITA	Ingérosec Corporation
Road design	Sueo HIROSE	Ingérosec Corporation

3rd Survey (2016)

Position	Name	Affiliation
Chief/Road Planning	Hisashi MUTOH	Ingérosec Corporation
Pavement Design	Hideaki MORITA	Ingérosec Corporation

Appendix 2 Survey Schedule

1st Survey (2014)

MM	DD	Project Leader	Chief Consultant/ Transportation Planner	Pavement Designer	Road Designer/Underground Utility Survey	Environmental & Social Consideration Specialist	Natural Condition Surveyer	Construction Planner & Cost Estimator			
		Kenshiro TANAKA	Hisashi MUTO	Hideaki MORITA	Sueo HIROSE	Kunihiko HARADA	Tetsu TANAI	Takashi NAKAGAWA			
4	1	T									
	2	W									
	3	T									
	4	F									
	5	S									
	6	S	Japan ~	Dili ~ Dar es salaam	Japan ~ Dar es salaam	Japan ~ Dar es salaam					
	7	M	~ Dar es salaam	Field Survey	Field Survey	Field Survey					
	8	T	Courtesy Call (EOJ, JICA, Tanroads)/Inception Report Submission and Discussion			Negotiation with Subcontractor					
	9	W	Minutes Submission and Discussion		Field Survey	Field Survey					
	10	T	Minutes ocope								
	11	F	Sign of Minutes Meeting/Report to EOJ, JICA								
	12	S	Dar es salaam ~	Field Survey							
	13	S	~ Japan	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion					
	14	M		Field Survey	Field Survey	Field Survey					
	15	T									
	16	W							Japan ~ Dar es salaam		
	17	T									
	18	F	Good Friday							Field Survey	
	19	S							Japan ~ Dar es salaam		Japan ~ Dar es salaam
	20	S		Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion		
	21	M	Easter Monday	Field Survey	Field Survey	Field Survey	Field Survey	Field Survey	Field Survey		
	22	T									
	23	W									
	24	T									
	25	F	Report to EOJ, JICA								
	26	S	Dar es salaam ~	Field Survey							
	27	S	~ Japan	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion	Survey Team International Discussion		
	28	M		Dar es salaam ~	Dar es salaam ~	Field Survey	Field Survey	Field Survey(Data for Cost Estimation)			
	29	T		~ Japan	~ Japan						
	30	W									
5	1	T	International Workers Day			Dar es salaam ~			Field Survey	Field Survey(Data for Cost Estimation)	
	2	F				~ Japan					
	3	S									
	4	S					Survey Team International Discussion	Survey Team International Discussion			
	5	M					Field Survey	Field Survey(Data for Cost Estimation)			
	6	T					Data Preparation				
	7	W					Data Preparation	Data Preparation			
	8	T					Data Preparation	Data Preparation			
	9	F					Report to JICA				
	10	S					Data Preparation	Data Preparation			
	11	S					Dar es salaam ~	Dar es salaam ~			
	12	M					~ Japan	~ Japan			
	13	T									
	14	W									
	15	T									

2nd Survey (2016)

No.	MM	DD		Pavement Design	Road design
				Hideaki MORITA	Sueo HIROSE
1	7	24	SUN	Transfer	Transfer
2		25	MON	Report to JICA, TRD	Report to JICA, TRD
3		26	TUE	Field Survey	Field Survey
4		27	WED	Field Survey	Data for Cost Estimation
5		28	THU	Discussion with TRD	Discussion with TRD
6		29	FRI	Report to JICA	Report to JICA
7		30	SAT	Transfer	Transfer

3rd Survey (2016)

No.	MM	DD		Chief/Road Planning	Pavement Design
				Hisashi MUTOH	Hideaki MORITA
1	12	11	SUN	Transfer	Transfer
2		12	MON	Discussion with JICA, Field Survey	Discussion with JICA, Field Survey
3		13	TUE	Discussion with TRD	Discussion with TRD
4		14	WED	Discussion with TRD	Discussion with TRD
5		15	THU	Discussion with TRD	Discussion with TRD
6		16	FRI	Discussion with TRD	Discussion with TRD
7		17	SAT	Field Survey	Field Survey
8		18	SUN	Data Preparation	Data Preparation
9		19	MON	Report to JICA	Report to JICA
10		20	TUE	Transfer	Transfer

Appendix 3 List of Parties Concerned in the Recipient Country

Ministry of Works, Transport and Communication (MoWTC)	
V. K. Ndyamukama	Acting Director of Roads
Joseph M. Nyamhanga	Deputy Permanent Secretary
Hussein Mativila	Project Engineer
Alex Mollel	Road Engineer
Tanzania National Roads Agency, TANROADS	
Patrick A.L. Mfugale	Chief Executive
Jason Rwiza	Director of Planning
Ndyamkama	Dar es Salaam Regional Director
Ebenezer R Mollel	Head of Design and Standards
BencoliasTinkaligaile	Head of Planning
Mataka	Head of Material
Lutengano E. Mwandambo	Project Engineer
Julius Ngusa	Project Engineer
MoftaKyando	Project Engineer
BarakaelMmari	Project Manager BRT
RottsonKabalika	Highway Engineer
Ambari S. Idabaga	Material Engineer
Sanjo M. Mgeta	Senior Environmentalist
Dar es Salaam Rapid Transit, DART	
Cosmas P. M. Takule	Chief Executive
Enoch J. Kitandu	System and operation Director
Kinondoni Municipal Council	
Ismail M. Mafita	Municipal Road Engineer
Embassy of Japan	
Takashi HIGUCHI	Second Secretary
JICA Tanzania Office	
Yasunori OHNISHI	Chief Representative
Hajime IWAMA	Senior Representative
Yoshiyuki KOBE	Representative

Appendix 4 Minutes of Discussions (M/D)
1st Minutes of Discussions (M/D)

MINUTES OF DISCUSSIONS
ON THE PREPARATORY SURVEY (OUTLINE DESIGN STUDY)
ON
THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD PHASE-2
IN THE UNITED REPUBLIC OF TANZANIA

In response to a request from the Government of the United Republic of Tanzania (hereinafter referred to as the "Government of Tanzania"), the Government of Japan decided to conduct a Preparatory Survey for Outline Design (hereinafter referred to as "the Survey") on the Project for Widening of New Bagamoyo Road Phase-2 (hereinafter referred to as "the Project"), and entrusted the Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent a Preparatory Survey Team for Outline Design (hereinafter referred to as "the Team") to Tanzania. The Team is headed by Mr. Kenshiro Tanaka, Advisor, Grant Aid Project Management Division 1, Loan and Grant Administration Department, JICA and is scheduled to stay in the country from 7 to 12 April 2014.

The Team held a series of discussions with the officials of the Government of Tanzania and conducted a field survey at the Project site. In the course of the discussions, both sides confirmed the main items described in the attached sheets. The Team will proceed to further work and prepare the Preparatory Survey Report.

Dar es Salaam, 11th April 2014



Kenshiro Tanaka
Leader
Preparatory Survey Team
Japan International Cooperation Agency

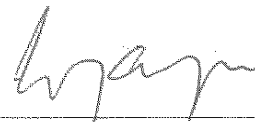


Eng. Patrick A.L. Mfugale
Chief Executive
Tanzania National Roads Agency
United Republic of Tanzania



Eng. Mussa I. Iyombe
Permanent Secretary
Ministry of Works
United Republic of Tanzania

(Witness)



For: Eng. Ngosha Said Magonya
Commissioner for External Finance
Ministry of Finance
United Republic of Tanzania

ATTACHMENT

1. Objective of the Project

The objective of the Project is to increase the traffic capacity of the New Bagamoyo Road through road widening, improving urban mobility and logistics in Dar es Salaam.

2. Project Site

The Project site is in Dar es Salaam as shown in Annex-1.

3. Responsible and Implementing Organizations

The responsible agency of the Project is the Ministry of Works (hereinafter referred to as "MoW"). The implementing agency of the Project is the Tanzania National Roads Agency, (hereinafter referred to as "TANROADS"). The organization charts are shown in Annex 2.

4. Items requested by the Government of Tanzania

4-1. Both sides confirmed that the items requested for the Phase-2 project is widening of New Bagamoyo Road to 4-lane dual carriageway for the road section between the Morocco junction and Mwenge junction (approximately 4.3 km).

4-2. As a result of discussions, it was confirmed that the outline design covers the following:

Improvement of the existing road from single carriageway with 2 lanes to dual carriageway with 4-lanes including BRT area at the median, sidewalks, service roads, drainage facilities and improvement of intersections.

JICA will assess the appropriateness of the project component(s) recommended by the Survey and will report the findings to the Government of Japan. Implementation of the Project will be decided by the Government of Japan.

5. Japan's Grant Aid Scheme

5-1. The Tanzanian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Tanzania as explained by the Team and described in Annex 3 and 4.

5-2. The Tanzanian side will take the necessary measures, as described in Annex-5, for smooth implementation of the Project.



6. Schedule of the Survey

- 6-1. The Team will proceed with further studies in Tanzania until mid May 2014.
- 6-2. JICA will prepare a draft final report in English and dispatch a mission to Tanzania in order to explain its contents around November 2014.
- 6-3. When the contents of the report are accepted in principle by the Government of Tanzania, JICA will complete the final report in English and send it to the Government of Tanzania around December 2014.

7. Environmental and Social Considerations

- 7-1. The Team explained that all JICA financed project shall comply with JICA Guidelines for Environmental and Social Considerations (April 2007) (the "JICA Guidelines"). The Project is tentatively categorized as Category B because the project is not considered as a large-scale road and bridge sector project, is not located in a sensitive area, and has none of the sensitive characteristics under the Guidelines, it is not likely to have significant adverse impact on the environment.
- 7-2. The Team explained that JICA conducts an environmental review in accordance with the project category and refers to the environmental checklist for the road sector as attached in the Guidelines.
- 7-3. The Tanzanian side explained that the certificate of the Environmental Social Impact Assessment (ESIA) obtained for the entire road section between Tegeta and Morocco junctions in Phase 1 remains valid for the Phase 2. JICA explained that if necessity arises due to alteration to the original project scope for example, a supplementary environmental and social considerations survey will be conducted in accordance with the JICA Guidelines as well as Tanzanian Guidelines for environmental and social consideration. Also the Team will confirm the Resettlement Action Plan (hereinafter referred to as "RAP") prepared for the Phase 2 road section, if necessary, a supplementary survey will be conducted in accordance with the JICA Guidelines and the Tanzanian laws.
- 7-4. The Tanzanian side shall bear the expenses of EIA procedures except supplementary EIA and/or RAP prepared by the consultant members of the Team.
- 7-5. The Tanzanian side shall secure the necessary land for the Project in accordance with the Tanzanian laws. The expenses of the procedures and compensation to the Project Affected Persons (PAPs) shall be borne by the Tanzanian side. The Tanzanian side shall hold meetings and/or negotiate with land owners and confirm the consensus on the expropriation and/or temporarily use of land necessary for the Project by the end of Survey. The Tanzanian side shall report the results to JICA Tanzania office.
- 7-6. The consultant members of the Team shall provide the Tanzanian side with



necessary information of outline design to smoothly carry out the above mentioned procedures.

8. Other Relevant Issues

8-1. The following undertakings should be taken by the Tanzanian side at their expenses before the commencement of the Project. The Tanzanian side agreed to secure necessary resources to conduct these undertakings in a timely manner including request the budget for next fiscal year.

(1) Acquisition of necessary land for the Project

(2) Relocation of existing utilities (power, telecommunication lines, water lines, etc.)

8-2. During mobilization of the Project, the Tanzania side will assist to secure land for temporary yard, borrow pits and disposal areas that will be proposed in the draft final report.

8-3. The Tanzanian side shall secure enough budget and personnel necessary for maintenance of the road sections rehabilitated/widened by the Project.

8-4. The Tanzanian side assured the Team that there is no overlap of similar support by other development partners for the Project.

8-5. The Tanzanian side shall provide necessary counterpart personnel to the Team during the period of Survey in Tanzania.

8-6. Both sides confirmed that levelling and reclaiming the site in item No.2 and constructing gates and fences in and around the site in item No.3 of Annex-5 will not be applicable to the Project.

8-7. The Tanzanian side requested the detailed design should be included in this survey to accelerate implementation of the Project. The Team answered the Tanzanian side that the request will be conveyed to JICA headquarters.

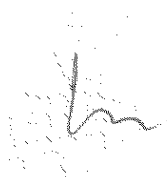
Annex-1 Project Site

Annex-2 Organization Chart

Annex-3 Japan's Grant Aid

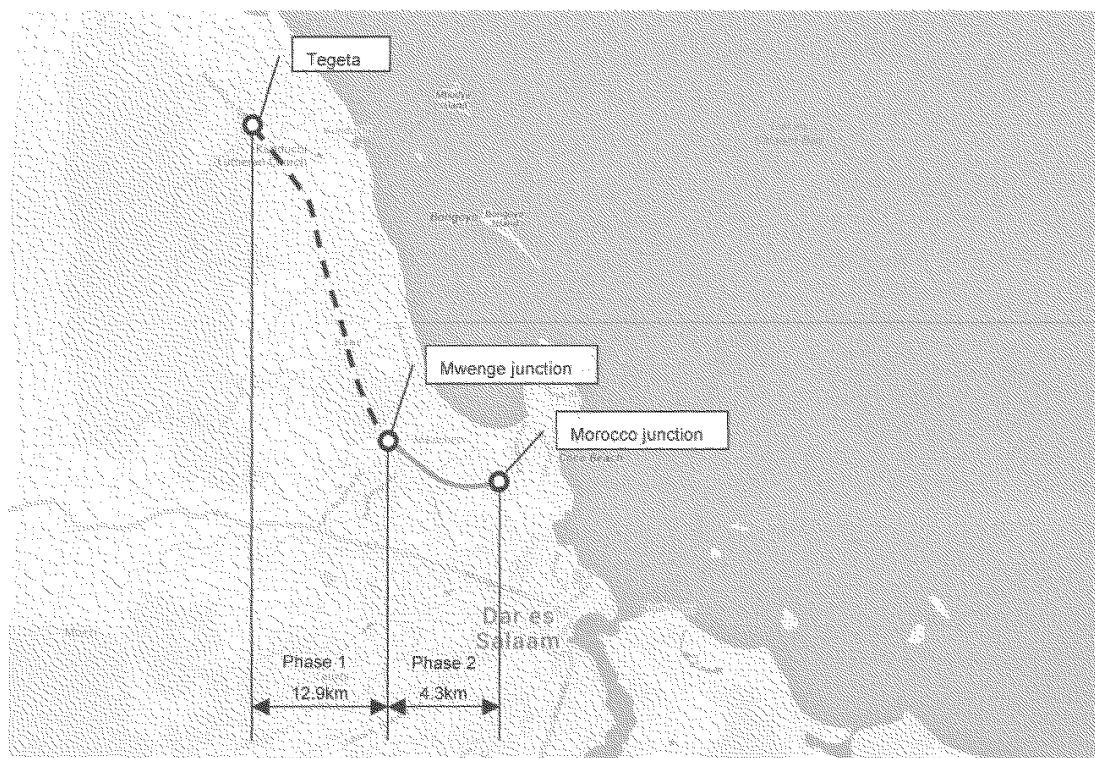
Annex-4 Flow Chart of Japan's Grant Aid Procedures

Annex-5 Major Undertakings to be taken by Each Government



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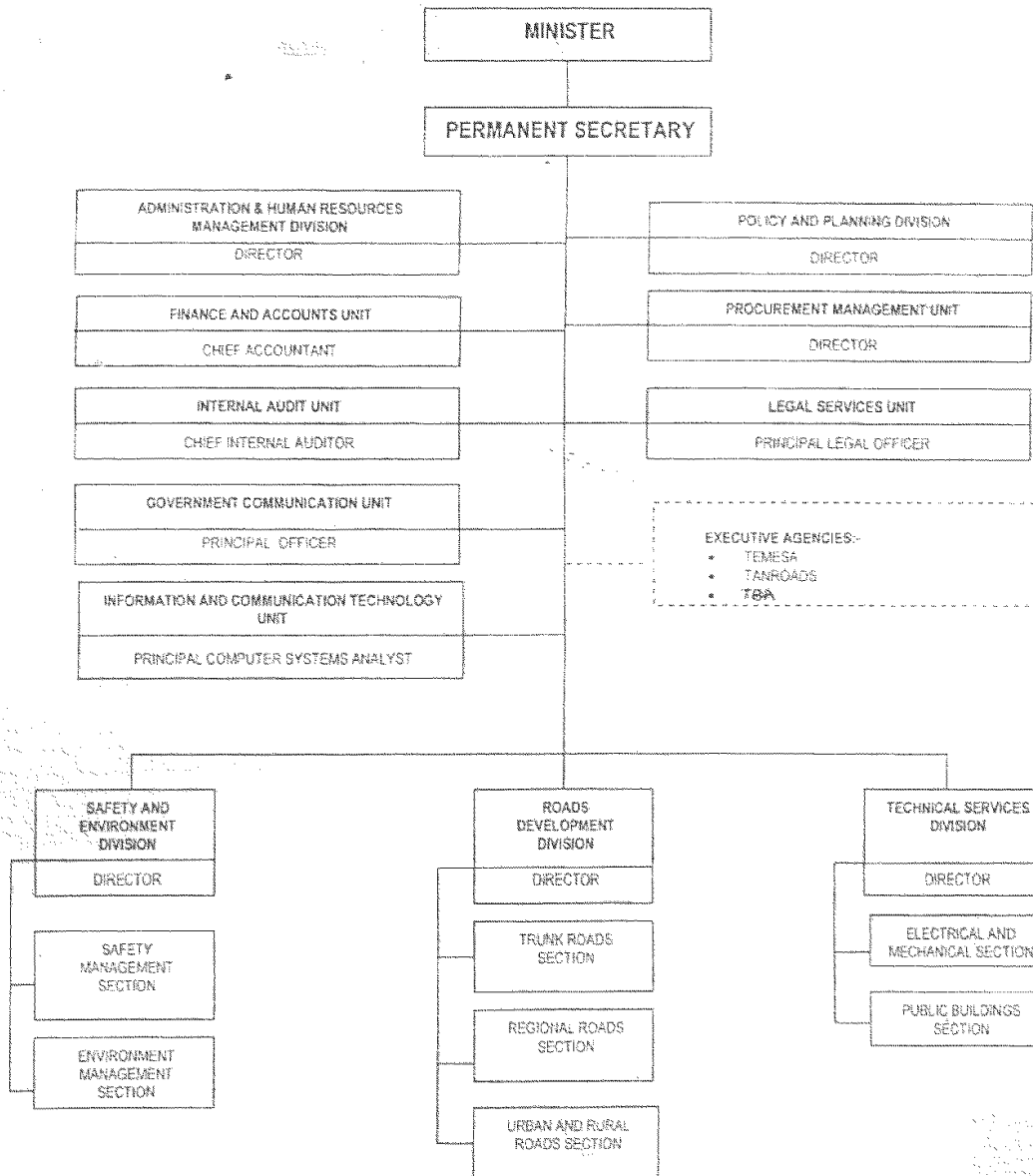
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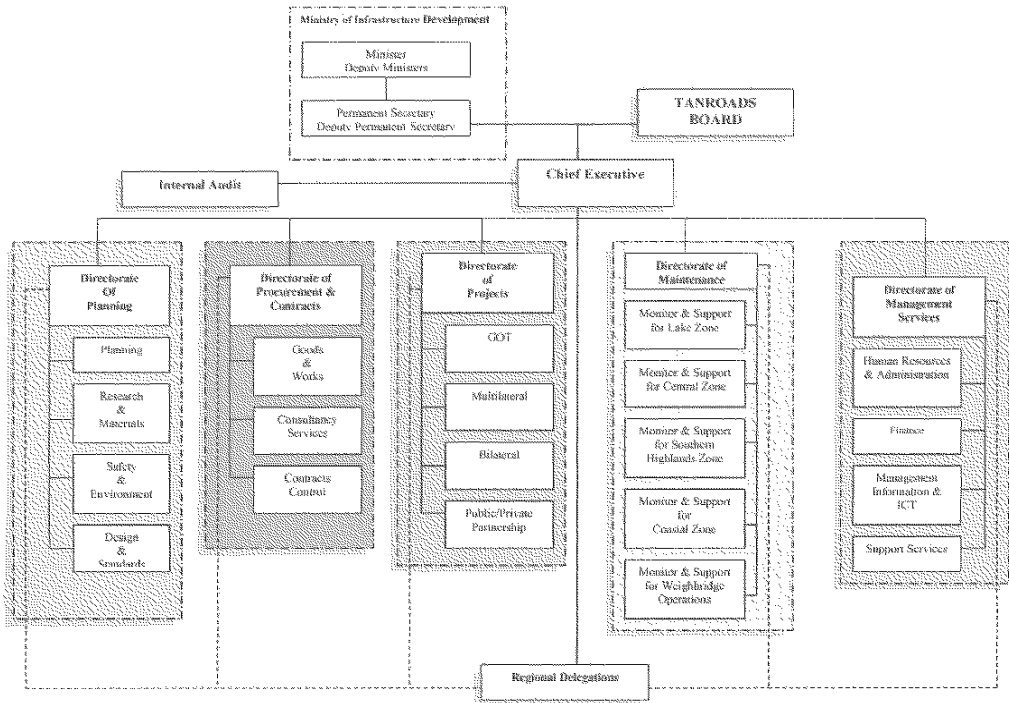
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THE ORGANISATION STRUCTURE OF THE MINISTRY OF WORKS
 (Approved by the President on 3rd June, 2011)



MoW Organization Chart



TANROADS – Organization Chart

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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 :

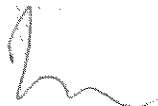
- Preparatory Survey
 - The Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the 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

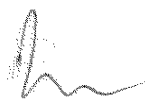
After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government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

(2) Selection of Consultants

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

(3) Eligible source country

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



(4) Necessity of "Verification"

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

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

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex-5.

(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)

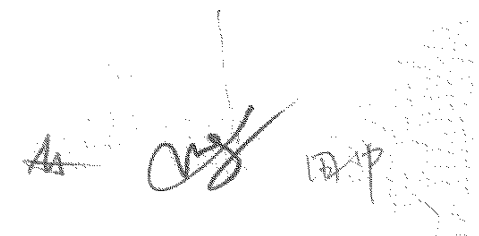
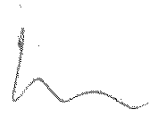
- a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations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



(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-5.

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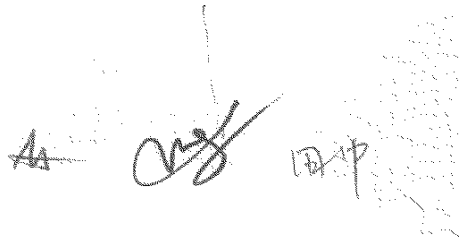
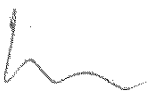
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(9) Authorization to Pay (A/P)

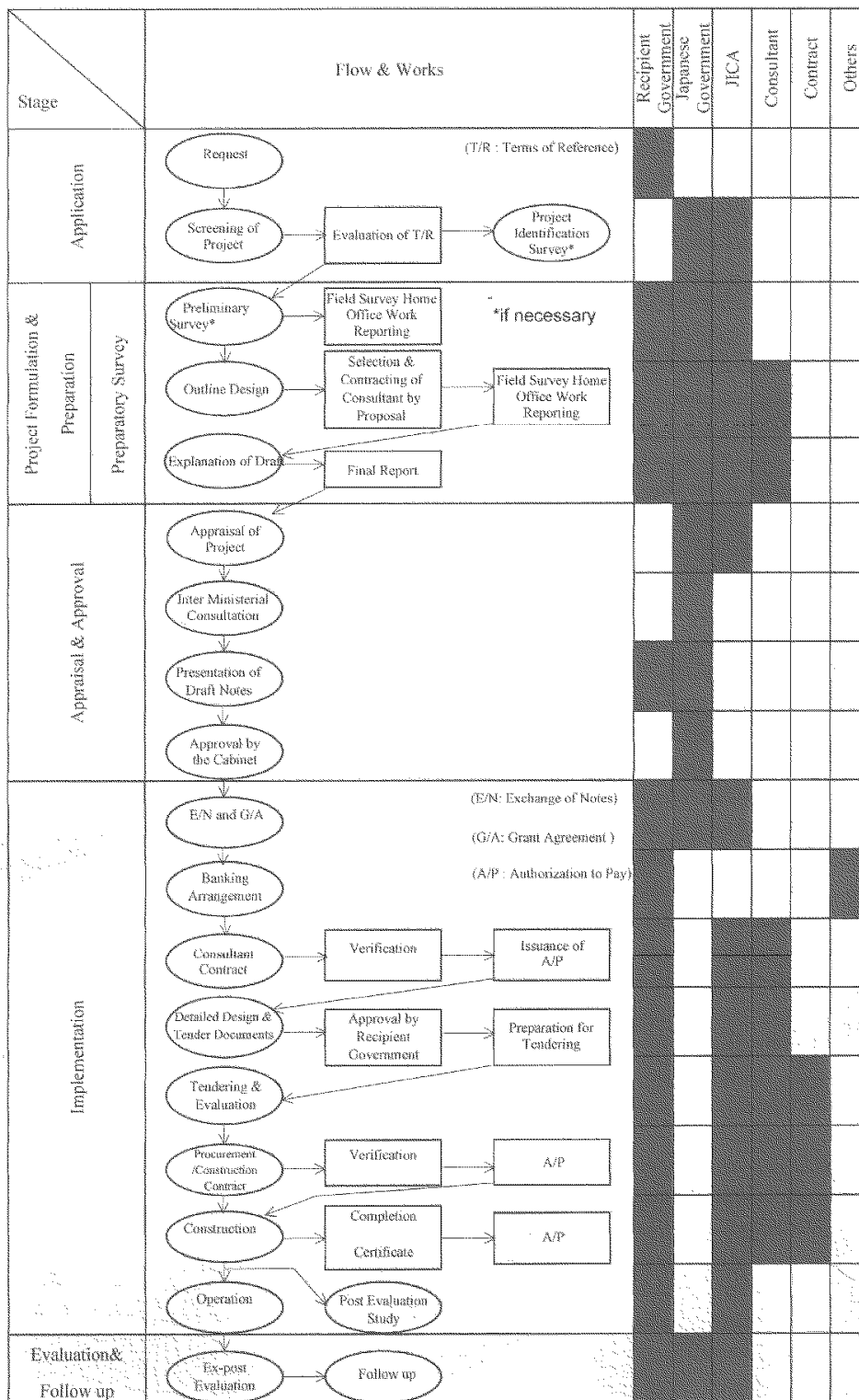
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(10) Social and Environmental Considerations

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 guidelines for environmental and social considerations.



FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



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Major Tasks to be Undertaken by Each Government

No	Items	To be covered by Grant Aid	To be covered by the Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
5	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine/Air/Land transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
6	To accord Japanese nationals, whose service may be required in connection with the supply of the products and the services under the Verified Contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts		●
8	To maintain and use properly and effectively the facilities contracted and equipment provided under the Grant Aid		●
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

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

AA OS 12/11


2nd Minutes of Discussions (M/D)

Minutes of Discussions
on
the Preparatory Survey for the Project
for
Widening of New Bagamoyo Road (Phase 2)
in the United Republic of Tanzania
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between the Tanzania National Roads Agency (hereinafter referred to as "TANROADS"), Ministry of Works, Transport and Communications, Ministry of Finance and Planning and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 11 April 2014 and in response to the request from the Government of the United Republic of Tanzania (hereinafter referred to as "Tanzania") dated 13 August 2007, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Widening of New Bagamoyo Road Phase 2 (hereinafter referred to as "the Project"), headed by Mr. Satoru Matsuyama, Senior Representative, JICA Tanzania Office from 13 -16 December 2016.

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


Dar es Salaam, 18th August 2017



Satoru Matsuyama
Leader
Preparatory Survey Team
Japan International Cooperation Agency

PP 

Eng. Patrick A.L. Mfugale
Chief Executive
Tanzania National Roads Agency
United Republic of Tanzania



Eng. Joseph Nyamhanga
Permanent Secretary(Works)
Ministry of Works, Transport and
Communication
United Republic of Tanzania

ATTACHMENT

1. Responsible authority for the Project
Both sides confirmed that TANROADS will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time.
The line ministry of the Executing Agency is the Ministry of Works, Transport and Communication responsible for supervising the Executing Agency on behalf of the Government of Tanzania.
2. Contents of the Draft Report
After the explanation of the contents of the Draft Report by the Team, the Tanzanian side agreed to its contents except for several issues (e.g. pavement design and construction period). Those issues will be discussed in the Detailed Design stage.
3. Cost estimate
Both sides confirmed that the cost estimate described in Annex 1 is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.
4. Confidentiality of the cost estimate and technical specifications
Both sides confirmed that the cost estimate and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts under the Project are concluded.
5. Timeline for the project implementation
The Team explained to the TANROADS's side that the expected timeline for the project implementation is as attached in Annex 2. TANROADS requested the team to shorten the project implementation period. This request is subject to discussion in the Detailed Design stage.
6. Expected outcomes and indicators
Both sides agreed that key indicators for expected outcomes will be updated. The Tanzanian side will be responsible for monitoring agreed key indicators targeted in year 2020 and shall monitor the progress based on those indicators.



1



[Quantitative Effect]

Indicators	Base year 2014	Target year 2023 (3 years after project completion)
Annual Average Daily Traffic Volume (pcu/day) Mwenge jct.–Morocco jct.	44,000	70,000
Average Travel Speed (km/h) Mwenge jct.–Morocco jct. AM Peak Time	3	40
Period of road inundation (days/year)	30	0

[Qualitative Effect]

- Improved safety for pedestrians and vehicles realized through dual carriageway
- Enhanced convenience of the road network

7. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 3. Regarding the tax exemption and fee reimbursement described in (2) 5 of Annex 3, both sides confirmed that such customs duties, internal taxes and other fiscal levies include corporate and personal income tax, VAT, and fee for Contractors Registration Board (CRB) and Engineers Registration Board (ERB), which shall be clarified in the bid documents by the Executing Agency during the implementation stage of the Project as agreed in the Grant Agreement (G/A). The Tanzanian side assured to take the necessary measures and coordination including allocation of the necessary budget which are requirements of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage. Both sides also confirmed that the Annex 3 will be used as an attachment to G/A.

8. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 4. The timing of submission of the PMR is described in Annex 3.

9. Project completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

2

10. Ex-Post Evaluation

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

11. Items and measures to be considered for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as follows:

- Regarding the tax exemption described in (2) 5 of Annex 3, an import master list submitted by the contractor is approved by TANROADS) before commencement of work and submitted to Ministry of Finance and Planning.
- Regarding the tax exemption described in (2) 5 of Annex 3, the application on exemption of corporate and personal income tax submitted by the contractor via TANROADS is approved and gazetted by the Government of Tanzania in timely manner.
- Necessary fee for Contractors Registration Board (CRB) and Engineers Registration Board (ERB) is reimbursed by TANROADS.
- Construction safety shall be secured with reference to the "Guidance for the Management of Safety for Construction Works in Japanese ODA Projects"

12. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Tanzanian side around September 2017.

13. Environmental and Social Considerations

13-1 General Issues

13-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2004)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as category B because the project is not considered as a large-scale road and bridge project, is not located in a sensitive area, and has none of the sensitive characteristics under the Guidelines, it is not likely to have significant adverse impact on the environment.

13-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 5. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Tanzanian side shall submit the modified version to JICA in a timely manner.



13-2 Environmental Issues

13-2-1 Environmental and Social Impact Assessment (ESIA)

Both sides confirmed that the ESIA report was approved by the National Environmental Management Council in January 2010 and remains valid for the Project.

13-2-2 Environmental Monitoring Plan

Both sides confirmed the Environmental Monitoring Plan (EMoP) of the Project is as Annex 6. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMoP, which may be updated during the detailed design stage.

13-3 Social Issues

13-3-1 Land Acquisition and Resettlement

Both sides confirmed that land acquisition of the area 16,500m² and relocation and compensation for 64 Project Affected Persons (PAPs) were completed. But 10 PAPs have disputed and there is an ongoing case in the court.

13-3-2 Indigenous People

Both sides confirmed that there are no indigenous people affected by the Project.

13-4 Environmental and Social Monitoring

13-4-1 Environmental Monitoring

Both sides agreed that the Tanzanian side will submit results of environmental monitoring to JICA with Project Monitoring Report (PMR) by using the monitoring form attached as Annex 7. The timing of submission of the monitoring form is described in Annex 5.

13-4-2 Social Monitoring

Both sides confirmed that the Tanzanian side will implement social monitoring about land acquisition and resettlement for disputed cases. The Tanzanian side and the Team agreed that TANROADS will submit results of social monitoring to JICA with PMR by using the monitoring form attached as Annex 7.

13-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that the Tanzanian side will disclose results of environmental and social monitoring to local stakeholders through their website / in their field offices.

The Tanzanian side agreed that JICA will disclose results of environmental and social monitoring submitted by the Tanzanian side as the monitoring forms attached as Annex 7 on its website.

14. Other Relevant Issues

14-1. Disclosure of Information



Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

- Annex 1 Project Cost Estimation
- Annex 2 Project Implementation Schedule
- Annex 3 Major Undertakings to be taken by the Government of Tanzania
- Annex 4 Project Monitoring Report (template)
- Annex 5 Environmental Checklist
- Annex 6 Environmental Monitoring Plan (EMoP)
- Annex 7 Environmental and Social Monitoring Form



Annex 1 Project Cost Estimation

CONFIDENTIAL

(1) Cost Borne by the Government of Japan

(2) Cost Borne by the Government of the United Republic of Tanzania

- Relocation of Utility and Environmental Monitoring, etc.: JPY19.8million

(3) Conditions of Cost Estimation

- Estimated timing: August 2016
- Exchange rates: USD 1.00 = JPY 107.12
- Others: The project is implemented in accordance with the system of Japan's Grant Aid. The above cost estimation does not assure the ceiling cost on the Exchange of Note (E/N) and shall be reviewed by the Government of Japan (GOJ) before signing of the E/N between the two Governments.

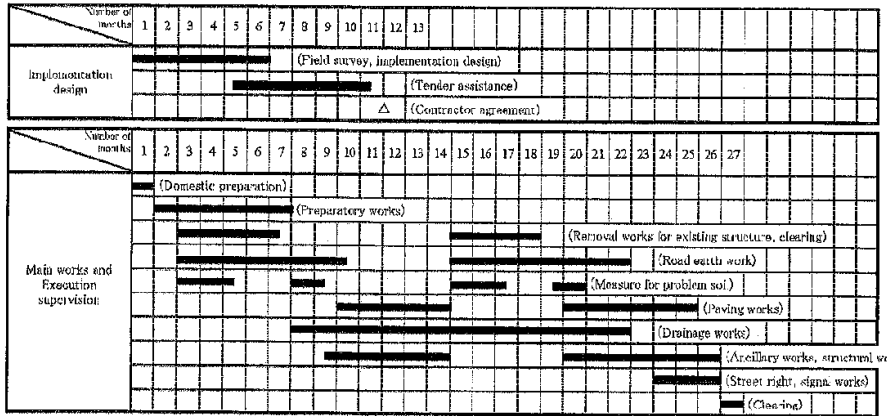
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Annex 2 Project Implementation Schedule



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Annex 3 Major Undertakings to be taken by the Government of Tanzania

Specific obligations of the Government of Tanzania which will not be funded with the Grant

(1) Before the tender

NO	Items	Deadline	in charge	estimated cost	ref.
1	To open bank account (B/A)	within 1 month of the signing of the G/A	TANROADS	Nil	
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month of the signing of the contract	TANROADS		
3	To approve ESIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation.	ESIA was approved in January 2010.	NEMC		
4	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before notice of the bidding document	TANROADS		
5	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement complete	TANROADS		
6	To secure and clear the following lands: 1) Right of Way: 45m-70m 2) Temporary construction yard and stock yard near the Project area 3) Borrow pit and disposal site near the Project area	before notice of the bidding document	TANROADS		
7	To obtain the planning, zoning, building permit	before notice of the bidding document	TANROADS		
8	To clear obstacles such as 1) Public utilities (water pipes with diameter not greater than 300mm, electricity line, gas line, telephone line, etc.) 2) Other obstacles (advertise board and others)	before notice of the bidding document	TANROADS		
9	To submit Project Monitoring Report (with the result of Detail Design)		TANROADS		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

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(2) During the Project Implementation

No.	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Consultant/Contractor	within 1 month of the signing of the contract(s)	TANROADS		
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A		Ministry of Finance and Planning (MOFP)		
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOFP		
	2) Payment commission for A/P	every payment	MOFP		
3	To assist prompt unloading and customs clearance at ports of disembarkation in recipient country and to assist the Consultant/Contractor with internal transportation therein	during the Project	TANROADS		
4	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	TANROADS		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be given exemption as follows. <ul style="list-style-type: none"> - Customs duties - Corporate income tax - Personal income tax - Value Added Tax (VAT) The modality of VAT will be discussed before signing E/N and G/A. Necessary fee for Contractors Registration Board (CRB) and Engineers Registration Board (ERB) is reimbursed by TANROADS	during the Project	Ministry of Finance and Planning TANROADS		
6	1) To submit Project Monitoring Report	every month	TANROADS		
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	TANROADS		
7	To submit a report concerning completion of the Project	within six months after completion of the Project	TANROADS		

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8	To provide facilities for distribution of electricity, water supply facilities necessary for the implementation of the Project		TANROADS		
	1) Electricity a) The distributing line to the temporary site yard b) Arrangement for permanent power supply for traffic signal and Street lighting	a) before start of the construction b) after completion of construction at the time of construction completion	TANROADS		
	2) Water Supply The city water distribution to the temporary site yard	before start of the construction	TANROADS		
9	To assist the Contractor to obtain the Traffic Police assistance during traffic control for safe construction. take necessary measure for traffic control coordinating with the Police for safety construction	during the construction	TANROADS		
10	To implement EMO P	during the construction	TANROADS		
11	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	TANROADS		
12	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	TANROADS		
13	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between TANROADS and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	TANROADS		

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(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMoP	for a period based on EMoP	TANROADS		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between TANROADS and JICA.	for three years after the Project	TANROADS		
3	To maintain and use properly and effectively the facilities constructed under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	TANROADS		

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Annex 4 Project Monitoring Report (template)

<p><u>Project Monitoring Report</u> on <u>Project Name</u> Grant Agreement No. <u>XXXXXXX</u> 20XX, Month</p>

Organizational Information

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

General Information:

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

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1: Project Description

1-1 Project Objective

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1-2 Project Rationale

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

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1-3 Indicators for measurement of "Effectiveness"

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

2: Details of the Project

2-1 Location

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

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2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

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

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations
 See Attachment 2.

2-4-2 Activities
 See Attachment 3.

2-4-3 Report on Record of Discussion (RD)
 See Attachment 11.

2-5 Project Cost

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

Components	Original		Actual	
	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>
1.				
Total				

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

2-5-2 Cost borne by the Recipient

Components	Original		Actual	
	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>
1.				

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

A4-3

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

(PMR)

2-6 Executing Agency

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

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

2-7 Environmental and Social Impacts

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

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

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

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

3-2 Budgetary Arrangement

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

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

A4-4

4: Potential Risks and Mitigation Measures

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

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

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

A4-5

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

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

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

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

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

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
 - Consultant Member List
 - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

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Monitoring sheet on price of specified materials

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1. Initial Conditions (Confirmed)

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

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

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

	Items of Specified Materials	1st	2nd	3rd	4th	5th	6th
		● month, 201X	● month, 201X	● month, 201X			
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

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

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NA

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

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

600

20

Annex 5 Environmental Checklist

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1. Permits and Explanation	(1) EIA and Environmental Permits	① Have EIA reports been officially completed? ② Have EIA reports been approved by authorities of the host country's government? ③ Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? ④ In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	① The environmental and social impact assessment report (ESIA report) was compiled in September 2009. ② The ESIA report was submitted by TANROADS to the National Environmental Management Council in September 2009 and received approval in January 2010. ③ No problem ④ Not necessary
	(2) Explanation to the Public	① Are contents of the project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public? ② Are proper responses made to comments from the public and regulatory authorities?	① ② A meeting to provide explanations was held for stakeholders (individuals working alongside the road who are not eligible for compensation) by Kiuondoni Municipality in May 2014, and general understanding for the Project was obtained.
2. Mitigation Measures	(1) Air Quality	① Is there a possibility that air pollutants emitted from various sources, such as vehicle traffic will affect ambient air quality? Does ambient air quality comply with the country's ambient air quality standards? ② Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	① Currently, exhaust gas standards according to the Tanzanian environmental standards are followed. However, no environmental standards for monitoring the environment alongside the road have been introduced. Since the Project aims to resolve current traffic congestion, the pollution that arises from congestion will be improved.
	(2) Water Quality	① 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? ② Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? ③ Do effluents from various facilities, such as stations and 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 that do not comply with the country's ambient water quality standards?	① Since the project entails upgrading of an existing road, there will be no major topographical transformation or earthworks. Muddy water will be generated by the works, however, there are no water intake facilities in the lower reaches. ② Since waste water from the road surface will basically be conveyed to the flow terminal alongside ditches and so on, there will be no impact on water sources. ③ No parking or service areas are planned in the Project.

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	(3) Noise and Vibration	① Do noise and vibrations from vehicle and train traffic comply with the country's standards?	① It is expected that widening of the existing road will lead to improvement of the current noise and vibration level.
3. Natural Environment	(1) Protected Areas	① 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?	① There are no important nature reserves or national parks around the Project route.
	(2) Ecosystem	① Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? ② Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? ③ If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? ④ Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? ⑤ 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? ⑥ In cases where the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	①~⑥ No habitats of valuable flora and fauna have been reported around the Project route.
	(3) Hydrology	① Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	① Since the project entails upgrading of an existing road, there will be no major topographical transformation.
	(4) Topography and Geology	① Is there a soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? ② 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? ③ Is there a possibility that soil runoff will	①~② No steep slopes at risk of slope failure or landslide have been confirmed around the Project route. ③ If appropriate banking works are conducted, there will be no large-scale runoff of soil.

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		result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	
4. Social Environment	(1) Resettlement	<p>① Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>② Is adequate explanation on relocation and compensation given to affected persons prior to resettlement?</p> <p>③ Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p>	<p>① ~ ⑥ Resettlement and compensation procedures for residents in the Project target section have been completed according to Tanzanian law.</p> <p>⑦ The monitoring plan has been indicated within the environmental and social management plan.</p>
	(2) Living and Livelihood	<p>④ Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>⑤ Are agreements with the affected persons obtained prior to resettlement?</p> <p>⑥ Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>⑦ Is a plan developed to monitor the impacts of resettlement?</p>	<p>① ② Since the project entails upgrading of an existing road, there will be no serious impacts on the lives of local residents and road traffic.</p> <p>③ It will be necessary to educate workers about prevention of malaria and HIV.</p> <p>④ The Project is mainly intended to mitigate traffic congestion. It will be necessary to pay attention to congestion and traffic accidents during the works. Also, it will be necessary to plan safety facilities in appropriate places along the Project route.</p> <p>⑤ ⑥ There will be no impedance of resident movements, sunlight or radio waves.</p>
	(3) Heritage	<p>① Where roads or railways 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?</p> <p>② Is there a possibility that the project will adversely affect the living conditions of inhabitants other than the affected inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>③ Is there a possibility that diseases, including communicable diseases, such</p>	<p>① There is no cultural heritage on or around the Project target route.</p>

A5-3

	<p>as HIV will be introduced due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</p> <p>④ Is there a possibility that the project will adversely affect road traffic in the surrounding areas (e.g., by causing increases in traffic congestion and traffic accidents)?</p> <p>⑤ Is there a possibility that roads and railways will cause impede the movement of inhabitants?</p> <p>⑥ Is there a possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?</p>		
(4) Landscape	<p>① Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?</p>	<p>① There is no scenery that requires special consideration on or around the Project target route.</p>	
(5) Ethnic Minorities and Indigenous Peoples	<p>① Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p>	<p>①② There are no minority or indigenous races that have unique culture or lifestyles in the surrounding area.</p>	
3. Others	(1) Impacts during Construction	<p>① Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>② If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p> <p>③ If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p> <p>④ If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?</p>	<p>① Concerning noise and vibration during the works, unnecessary revving of engines and nighttime work will be avoided. Waste products will be transported to a site for disposal. Also, the works area will be periodically sprinkled with water in order to mitigate dust.</p> <p>② Since the Project entails upgrading of an existing road, there will be no negative impacts on the ecosystem.</p> <p>③ The works in both directions will be totally separated, and safety facilities and traffic controllers will be assigned as required to minimize any impacts on current traffic flow.</p> <p>④ Education on traffic safety and public sanitation will be periodically conducted for the construction workers. Mitigation measures concerning the above items will be implemented by the contractor under the supervision of TANROADS.</p>
	(2) Monitoring	<p>① Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>② Are the items, methods and frequencies included in the monitoring program judged to be appropriate?</p> <p>③ Does the proponent establish an</p>	<p>①④ The monitoring plan is stated in the ESI report. Following the start of works, TANROADS and the contractor will continue to review the situation and implement monitoring.</p>

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A5-4

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		adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? ④ 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?	
6. Note	Reference to Checklist of Other Sectors	① Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation). ② 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).	Not applicable
	Note on Using Environmental Checklist	③ If necessary, the impacts to trans boundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as trans boundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	Not applicable

Note 1) In cases where "standards in the country concerned" differ greatly from internationally recognized standards, countermeasures will be examined according to necessity.
Concerning items for which there are currently no controls established in the country concerned, review will be conducted based on comparison with appropriate standards in other countries (including Japan's experience).

Note 2) The environmental checklist only shows standard environmental check items, and it may be necessary to delete or add items according to the characteristics of the project or area.

A5-5

Annex 6 Environmental Monitoring Plan

Environment Item	Measure	Execution time	Executer organization	Monitoring item
Land acquisition, Resettlement	Execution appropriate building transfer and removal	In detail design In construction	- municipal office -Supervision -Consultant	- Situation of traveling or removal - disposal method of removed house
	Execution appropriate compensation and resettlement plan	In detail design In construction	- TANROADS -Supervision -Consultant	- situation of compensation - Situation of resettlement - Opinion from PAPs or contractor
Environmental pollution with construction	Execution construction not to cause environmental pollution	In construction	-Supervision -Consultant -Contractor	- Dust - Turbid water - Noise - Vibration - Maintenance of construction machine - Opinion from residents
Environmental destruction with construction	Execution construction not to cause environmental destruction	In construction	-Supervision -Consultant -Contractor	- Situation of borrow pit and quarry - Disposal method of construction waste
Accident, risk	Appropriate management of safety	In construction	-Supervision -Consultant -Contractor	- Occurrence situation of accident - Situation of street vendor - Opinion from residents, pedestrian
Deforestation	Prohibition to cut down trees unnecessary	In construction	-Supervision -Consultant -Contractor	- Situation of deforestation

A6-1

Annex 7 Environmental Monitoring Format

Parameters		Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility for monitoring	Result of monitoring
Water Quality	Turbidity	Twice before the construction starts (Once during rainy season and once during dry season)	Interval of 300m for the whole construction site	NTU	Turbid meter	10NTU	Contractor/ Environment Supervisor	
Air quality	Dust	Once before the construction starts and in subsequent stages (construction and Operational)	At crossroads	µg/m ³	Micro Dust Pro	0.01	Contractor/ Environment Supervisor	
Noise Baseline	Noise level	Once before the construction starts and in subsequent stages (construction and Operational)	At crossroads	dBA	Measurements	110	Contractor/ Environment Supervisor	
Compensation	Rate of compensation for land and properties	Once before the construction starts	All affected people	Once before construction begins	Resettlement Action Plan (RAP).		Municipal council/ TANROADS/ Consultant	
Water Quality	Turbidity	Once Per month	Interval of 300m for the whole construction site	NTU	Turbid meter	10NTU	Contractor/ Environment Supervisor	
Air pollution	Dust	Once Per month	At crossroads	µg/m ³	Micro Dust Pro	0.01	Contractor/ Environment Supervisor	
Noise pollution	Noise level	Once Per month	At crossroads	dBA	Measurements	110	Contractor/ Environment Supervisor	

A7-1

Vibration	Vibration levels	Once per Month	Project road.	No per time	Records	-	Contractor/ Environment Supervisor
Frequency of illness of construction workers	Illness of construction workers	Once in a month for the construction period	Project site	Number of cases	Health records	-	Municipal Health officers/ Contractors
Employment opportunity	Percentage of local construction labor	Three times a year	Project site	Number of local people employed in the project	Records, inquiries and observation	-	Municipal Council/ Contractor/ TANROADS
Safety and health risks	Number and type of safety equipment such as mask, helmet, gloves and ear plugs. Health and sanitation facilities in camps.	Once in three months	Project site	Number of safety measures provided	Accidental injuries and illness statistics	-	Contractor/ OSHA
Water Quality	Turbidity	Once in three months	Interval of 300m for the whole construction site	NTU	Turbid meter	10NTU	Contractor/ Environment Supervisor
Air pollution	Dust	Once in three Months	At crossroads	$\mu\text{g}/\text{m}^3$	Micro Dust Pro	0.01	TANROADS
Noise pollution	Noise level	Once in three Months	At crossroads	dBA	Measurements	110	TANROADS
Safety of human beings in settlements and business areas	Road accidents and roads signs	Three times a year for the project life span	Project site	Road signs and number of accidents	Records, inquiries and illness statistics	Zero accident and sufficient no of road signs	Traffic police/ Municipal Council

A7-2

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Appendix 5 Other Relevant Data (Technical Note signed with the Government of Tanzania)



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Our Ref : NB2/OD/IGS/TAN/03/Apr/2014

Date: 23rd April, 2014

To: Chief Executive
Tanzania National Roads Agency (TANROADS)
P.O. Box 11364, Dar es Salaam, Tanzania

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)
SUB: Technical note of design value to be used for Preparatory Survey of the Project.

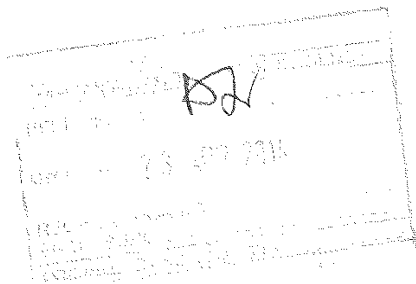
We are very pleased to submit a Technical Note for the key design value to be used for the captioned project. The values on the Technical Note is in accordance with the result of discussion carried out at the conference room of TANROADS head quarter on 23rd April, 2014 by the Survey Team dispatched by Japan International Cooperation Agency (JICA) and TANROADS technical representatives..

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Hisashi MUTO', written over a horizontal line.

Hisashi MUTO
The Chief Consultant of JICA Survey Team
INGEROSEC CORPORATION

Attachment: Memorandum of Technical Note



Memorandum

23/April/2014

Subject : Technical note of Design Value to be used for Preparatory Survey on The Project for Widening of New Bagamoyo Road (Phase-2)

The JICA Preparatory Survey Team will propose the following principal standard for the design of captioned project.

Table Proposed Road Design Parameter

Item	Description	
Target Road Section	Approx. 4.2km Start : Morocco Junction, End: Mwenge Junction	
Design Speed	60 Km/hr	
Number of Lane	4 Nos.	
Carriageway	3.5m x 2 / Direction	
Shoulder	1.5m	
Central Median	9.0m	
Service Road	3.0~4.0m (depend on location)	
Footpath	1.5~3.0m (depend on location)	
Max Cross fall	2.5%	
Mac Gradient	7% (Max = 10%)	
Min Curve Length	50m	
Embankment slope	Ordinary soil	1:1.5~4.0 (depend on soil type)
	Solid rock	1:0.5
Excavation slope	Decomposed rock	1:0.75
	Other than rock	1:1.0~1.5 (depend on soil type)
Pavement design life	15 years	
Pavement structure	Carriageway	Surface: Wearing=AC(Modified), Binder=AC Base: Crushed material (CRR) or DBM Sub Base: Cement or lime stabilized granular material
	Junction	Surface: Wearing=AC(Semi-flexible), Binder=AC Base: Crushed material (CRR) or DBM Sub Base: Cement or lime stabilized granular material
	Bus stop	Surface: Wearing=AC(Semi-flexible), Binder=AC Base: Crushed material (CRR) or DBM Sub Base: Cement or lime stabilized granular material
	Service road	Surface: Wearing=AC Base: Crushed material (CRS) Sub Base: Cement or lime stabilized granular material
	Footpath	Surface: Interlocking block Base: Sand Sub Base: Granular material

Drainage	Transversal	Concrete culvert (Box, pipe)
	Road side	Concrete ditch (U type, concrete block type, concrete surface type)
	Access/Entrance	Concrete ditch (U type, Slab type)

Note:

(1) Right of Way (RoW)

Morocco to Victoria (Approx. 1.1km from Morocco Junc.) = 45.0m, Victoria to Mwenge = 60.0m

(2) Major Junction

- 1) Morocco Junction: At grade, plan by BRT phase-1 project applied
- 2) Kijitonyama Junction: At grade, signal control type
- 3) Shekirango Junction: At grade, roundabout type or signal control (depend on traffic volume)
- 4) Mwenge Junction: At grade, signal control type

(3) Safety facilities

- Street light For major junction and Bus stop will be studied (connection to the existing power line will be excluded)
- Traffic signal For Kijitonyama and Mwenge Junction (Shekirango, refer above) will be considered

(4) Social and Environmental Consideration

1) Removal and Relocation

i) Water main pipe $\phi 1200 \sim \phi 400$ mm

- Within proposed carriageway : Existing water main pipe will not be relocated and protection by concrete slab or metal plate will be carried out
- Outside proposed carriageway: Service road, footpath, ditch by light weight construction equipment and method (eg; Interlocking block pavement) will be considered for the existing water main pipe location area.

ii) Other water pipe

- Dia. less than 300mm shall be stored within 1.5m from the RoW boundary

iii) Other public utilities

Other public utility (electric, telecom, etc.) shall be stored within 1.5m from the RoW boundary

iv) Private properties

Removal of existing private properties (kiosk, plants, etc.) required within the RoW

2) Environmental permission

Environmental permission obtained in Jan./2010, for Morocco to Tegeta section is still valid for Morocco to Mwenge section.

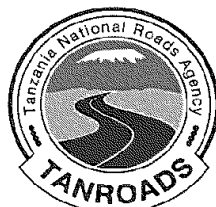
Note: AC=Asphaltic concrete, DBM=Dense bituminous macadam, Semi-flexible=AC+cement milk, R/A=round about



Hisashi MUTO

The Chief Consultant of JICA Survey Team
 INGEROSEC CORPORATION

TANZANIA NATIONAL ROADS AGENCY



P.O Box 11364
3rd Floor
Airtel House
Ali Hassan Mwinyi/Kawawa Roads jct
Dar es Salaam

Date: 27 December 2016

Our Ref: TRD/D/GEN/P.147/07/Vol XII/60

Good roads for national development

INGEROSEC Corporation CHODAI Co.,Ltd,
Tokyo, Japan

Dear Sir,

RE: WIDENING OF NEW BAGAMOYO ROAD PHASE 2 (MOROCCO-MWENGE SECTION)

Sub: Comments on the Preparatory Survey Report

Kindly refer to the letter with Reference No. JICA/1607/16 dated 13th December 2016 and discussion held in TANROADS-HQ on 21st December 2016 regarding the above captioned subject.

We have reviewed the submitted Preparatory Survey Report on the above mentioned project and the following are our comments;

1. The report has considered construction of two lanes to either side, leaving the existing 9m road as a median while the current road is having 5 lanes of more than 15m wide. This has to be updated as per the current site conditions.
2. The study has to consider under or overpasses to enhance safety to the pedestrians especially at Victoria, Makumbusho, ITV areas and any other location for safety enhancement.
3. Based on the current developments around the Morocco junction, the preparatory report has to consider inclusion of an interchange at the Morocco Junction within the assignment.
4. The study has to consider provision of street lights, for the entire road section and not only at the busbays and junctions as indicated on page 2-23.
5. For better performance of the road, the Morocco and Mwenge intersection should be considered for provision of grade separated junctions.

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TANROADS is an Executive Agency of the Ministry of Works, Transport, and Communication Tanzania, established under the Executive Agencies Act, 1997

6. There is inconsistency of project cost between the Preparatory Survey Report and the Minutes of Discussion. While the report mentioned that the cost to be borne by the Tanzanian Government is 12 million Japanese yen, the Minutes of Discussion shows 20 million yen.
7. Recast the name "Ministry of Works" to read "Ministry of Works, Transport and Communication".
8. The project schedule indicates five (5) months for design, eight (8) months for tender works and 27 Months of implementation. The duration is considered to be excessively long.
9. The design of the pavement layers have to conform to the requirements of the Pavement and Materials Design Manual (1999).
10. The traffic study should be revised to cope with the current situation due to change of the traffic and design year.
11. The name of the Team Leader differs between the Preparatory Survey Report and the Minutes of Discussions.
12. The design period for bituminous roads shall be 20 not 15 years as indicated in the report.
13. Wearing course for carriageway should be Superpave 12.5 (SP 12.5) of 5cm and binder should be SP 19 and minimum thickness of 6.5cm. Appropriate performance grade (PG) bitumen to be used.
14. Base course should be of DBM₄₀ and if binder is applied the thickness of DBM₄₀ can be reduced to 175mm. The sub-base should be CM of 25cm thick (not 30cm).
15. The subgrade should be brought to CBR of 15% by using improved subgrade, this can be done by identifying suitable borrow pits of min. CBR of 15%.
16. Please revisit the right of way provided in Page iii – Table 2.
17. Table 2: page iii: Service road should be uniform 3.5m and foot path uniform 2.0m
18. The type of materials for the wearing course for intersection and bus bays should be specific and not just indicating "semi flexible".

This is therefore brought forward to you for your further action.



Eng. Chrispianus B. Ako
For: **CHIEF EXECUTIVE**

Tel: Tel: +255 22 2926001/6

Fax: +255 22 2926011/4;

E-Mail: tanroadshq@tanroads.go.tz

TANROADS is an Executive Agency of the Ministry of Works, Transport, and Communication Tanzania, established under the Executive Agencies Act, 1997

Cc:

- (1) The Permanent Secretary (Works),
Ministry of Works, Transport, and Communication,
7 Samora Machel Avenue,
P.O.Box 9423,
11475 Dar es Salaam.
- (2) Japan Internationa Cooperation Agency,
Tokyo, Japan
- (3) Japan Internationa Cooperation Agency,(Tanzania Office)
3rd Floor, Barclays House,
1008/1, Ohio Street,
P.O.B 9450,
Dar es Salaam- Tanzania

1st Answer



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Our Ref : NB2/OD/IGS/TAN/17Jan/2017

Date: 17 Jan, 2017

To: Chief Executive
Tanzania National Roads Agency (TANROADS)
P.O. Box 11364, Dar es Salaam, Tanzania

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)

SUB: Comments on the Preparatory Survey Report

With reference to your letter date December 27th, 2016 (TRD/D/GEN/P.147/07/Vol XII/60), we would like to inform you of our replies as follows. We will submit the second version of the draft Preparatory Survey Report reflecting the following 18 items by courier as soon as possible.

- Q1: The report has considered construction of two lanes to either side, leaving the existing 9m road as a median while the current road is having 5m lanes of more than 15m wide. This has to be updated as per the current site conditions.
- A1: The descriptions of current site conditions will be updated in the second version of the draft Preparatory Survey Report.
- Q2: The study has to consider under or overpasses to enhance safety to the pedestrians especially at Victoria, Makumbusho, ITV areas and any other location for safety enhancement.
- A2: The intersections at Victoria, Makumbusho, ITV areas are controlled by signal for safe pedestrian crossing.
- Q3: Based on the current developments around the Morocco junction, the preparatory report has to consider inclusion of an interchange at the Morocco junction within the assignment.
- A3: At-grade improvement of the Morocco junction is included in the plan and the description of Table.2 Project Outline of the second version of the draft Preparatory Survey Report will be amended accordingly.

- Q4: The study has to consider provision of street lights, for the entire road section and not only at the bus bays and junction as indicated on page 2-23.
- A4: The street lights for the entire road section are included in the plan and this matter will be amended in page 2-23 of the second version of the draft Preparatory Survey Report.
- Q5: For better performance of the road, the Morocco and Mwenge intersection should be considered for provision of grade separated junction.
- A5: The Morocco and Mwenge intersection was designed at grade in accordance with the Technical Note confirmed by TANROADS on 23rd April, 2014. Leeway for future installation of graded separation at Morocco and Mwenge intersection will be considered by the cross section planning during the detailed design (D/D)
- Q6: There is inconsistency of project cost between the Preparatory Survey Report and the Minutes of Discussion. While the report mentioned that the cost to be borne by the Tanzanian Government is 12 million Japanese yen, the Minutes of Discussion shows 20 million yen.
- A6: The figure shown in the the Preparatory Survey Report is correct and this matter will be amended in the Minutes of Discussion.
- Q7: Recast the name “Ministry of Works” to read “Ministry of Works, Transport and Communication”.
- A7: The description of the report will be corrected.
- Q8: The project schedule indicates five (5) months for design, eight (8) months for tender works and 27 Months of implementation. The duration is considered to be excessively long.
- A8: The project schedule will be corrected as 6 months for design, 5.5 months for tender works and 27 months of implementation based on the following breakdown.
- i) Total 6 months for D/D including preparation of Tender Documents.
 - ii) Total 5.5 months for the Tender works (Minimum 2.5mth from PQ to tender, minimum 3mth from TANROADS Tender Documents approval to Japanese Government Cabinet meeting and E/N and G/A arrangement.
 - iii) Total 27 months for considering actual monthly progress rates of New Bagamoyo Phase-1 and particular construction items by Phase-2 (Service road, etc.)

- Q9: The design of the pavement layers have to conform to the requirements of the Pavement and Materials Design Manual (1999).
- A9: Pavement design was conformed to the PMDM1999 and the pavement structure will be reviewed during D/D.
- Q10: The traffic study should be revised to cope with the current situation due to change of the traffic and design year.
- A10: Review of traffic volume and pavement design will be conducted during D/D.
- Q11: The name of the Team Leader differs between the Preparatory Survey Report and the Minutes of Discussion.
- A11: A senior representative of JICA Tanzania Office assumes a duty as the team Leader this time appointed by JICA.
- Q12: The design period for bituminous road shall be 20 not 15 years as indicated in the report.
- A12: The design period described in the Technical Note was confirmed by TANROADS on 23rd April, 2014.
- Q13: Wearing course for carriageway should be Superpave 12.5 (SP 12.5) of 5cm and binder should be SP 19 and minimum thickness of 6.5cm. Appropriate performance grade (PG) bitumen to be used.
- A13: Superpave material, which imported from the USA, is not considered for this Japanese Grant Aid Project.
- Q14: Based course should be of DBM40 and if binder is applied the thickness of DBM40 can be reduces to 175mm. The sub-base should be CM of 25cm thick (not30cm).
- A14: The pavement structure will be reviewed during D/D.
- Q15: The subgrade should be brought to CBR of 15% by using improved subgrade, this can be done by identifying suitable borrow pits of min. CBR of 15%.
- A15: The pavement structure will be reviewed during D/D.
- Q16: Please revisit the right of way provided in Page iii – Table 2.
- A16: The right of way will be rechecked and will be amended in Table.2 of the second version of the draft Preparatory Survey Report.



Engineering Consultant

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Q17: Table – 2: page iii: Service road should be uniform 3.5m and foot path uniform 2.0m.

A17: The typical widths of service roads and foot paths are planned to be 4m and 1.5m respectively and your suggestion will be reviewed during D/D.

Q18: The type of materials for the wearing course for intersection and bus bays should be specific and not just indicating “semi flexible”.

A18: The description for “semi flexible” will be added as “(Open graded AC + Cement milk)” and has been updated.

※ Note: Q is your statement in your previous letter; A is our reply.

Yours faithfully,

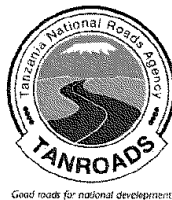
Attachment: The second version of the draft Preparatory Survey Report

Hisashi MUTO
The Team Leader,
INGEROSEC CORPORATION

cc; The Chief Executive, Dar Rapid Transit Agency (DART)
cc; The Regional Manager. TANROADS-DSM
cc; JICA Tanzania Office

2nd Question

TANZANIA NATIONAL ROADS AGENCY



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Ali Hassan Mwinyi/Kawawa
Roads Junction
Dar es Salaam

Date: 10th February 2017

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Our Ref: TRD/GEN/P.147/07/Vol XII/62

Director,
Ingerosec Engineering Consultant,
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6-5-1, Nishi-Shinjuku, Shinjuku-ku
Tokyo 163-1343
JAPAN

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE 2)

Sub: Comments on the Preparatory Survey Report

Reference is made to your letter with ref. no. NB2/OD/IGS/TAN/17Jan/2017 dated 17th January 2017 on the above subject.

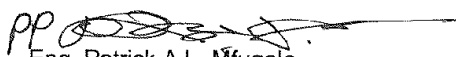
We have reviewed the submitted responses to our previous comments on the reports and found that most of the comments have been accepted to be incorporated in later reports save for the following:

1. The need for providing pedestrian bridges on areas with high pedestrian crossing is considered important and better than signalised control on this road.
2. The Construction duration of 27months for the road of 4 km is considered to be long.

In this regard you are required to revise the design with the noted comments.

Attached herewith please find our detailed comments.

Yours Sincerely,


Eng. Patrick A.L. Mfugale
CHIEF EXECUTIVE

TANROADS is an Executive Agency of the Ministry of Works, Transport and Communication, Tanzania, established under the Executive Agencies Act, 1997

THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE 2)

Comments on the Preparatory Survey Report

Q2: The intersections at Victoria, Makumbusho and ITV areas to be controlled by signals for safe pedestrian crossing;

Comment: Currently the road has 4 signalized junctions within the 4.4 km of road. Adding another three signalized junctions at Victoria, Makumbusho and ITV locations for safe pedestrian crossing will increase the signalized crossings from 4 to 7 within the improved vehicle speed due to the improvement of the road. Further, separating the pedestrian traffic from vehicular/motorized traffic is safer than the motorized and non- motorized traffic being at grade.

Q8: The total duration of the project has been revised from 40 month to 38.5 months. The reduction has only been considered during tendering. The reference measure of the construction duration is Bagamoyo- Tegeta road (12km).

Comments:

- It should be remembered that Tegeta- Bagamoyo road section had three bridge structures while in the case of Morocco- Mwenge there is no bridge.
- Further, the Mwenge – Tegeta road had single carriageway with 2 lanes before improvement to dual carriageway, different from the Morroco – Mwenge road section which has 5 lanes to be improved to dual carriageway, which is partly rehabilitation.

The construction duration should be revised.

Q13: The wearing course to be designed as Superpave. Superpave material from USA is not acceptable in Japanese Grant Aid Project.

Comments: Superpave material is not necessarily from USA. The Superpave design is just the method of design that is performance based not that the material is sourced from USA. Further, it's the method that is adopted for all

new roads with AC wearing courses in the country. So the Superpave is still recommended for the wearing course of this road section.

2nd Answer



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Our Ref : NB2/OD/IGS/TAN/20Feb/2017

Date: 20 Feb, 2017

To: Chief Executive
Tanzania National Roads Agency (TANROADS)
P.O. Box 11364, Dar es Salaam, Tanzania

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)

SUB: Comments on the Preparatory Survey Report

With reference to your letter date February 10th, 2017 (TRD/GEN/P.147/07/Vol XII/62), we would like to inform you of our replies as follows.

Q1: The need for providing pedestrian bridges on areas with high pedestrian crossing is considered important and better than signalized control on this road.

A1: Safety pedestrian crossing for this project at many pedestrian crossing points is going to design by signal crossing. This signal crossing method rater convenient and then safety both for pedestrian and vehicle traffic based on the experience of pedestrian bridge at Manzesse on Morogoro road and other Japanese donated road projects. And finally proposed pedestrian crossing bridges should be designed during coming BRT project and detailed location and type of bridges are not appropriately be determined by this project.

Q2: The construction duration of 27 months for the road of 4 km is considered to be long.

A2: A construction period of total 27 months had been considered based on the actual progress of Tegeta- Bagamoyo road section which was constructed new 2 lane road with 2 more lane of existing 2 lane road and new condition (service road, signs street lights. intersection improvement construction, large water pipe protection work etc.).



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Q3: The wearing course to be designed at Superpave. Superpave material from USA is not acceptable in Japanese Grant Aid Project.

A3: The project is Japanese Grant Aid Project, so it is necessary to select the method that Japanese construction companies can handle fairly.
Therefore, in consideration of the possibility of bidding by Japanese construction companies, the proven pavement design method in Japan will be considered, and Superpave design method will be taken as reference.

Yours faithfully,

Hisashi MUTO
The Team Leader,
INGEROSEC CORPORATION

cc; The Chief Executive, Dar Rapid Transit Agency (DART)
cc; The Regional Manager, TANROADS-DSM
cc; JICA Tanzania Office

3rd Question

TANZANIA NATIONAL ROADS AGENCY



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Date: 23rd February 2017

Our Ref: TRD/GEN/P.147/07/Vol XII/65

Director,
Ingerosec Engineering Consultant,
Shinjukuni-LAND Tower 43F,
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Tokyo 163-1343,
JAPAN

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE 2)

Sub: Comments on the Preparatory Survey Report

Reference is made to your letter with ref. no. NB2/OD/IGS/TAN/20Feb/2017 dated 20th February 2017 on the above subject.

We have reviewed your responses to our comments on the subject reports and found that two issues still need discussion for mutual understanding. The issues noted are:

1. The Construction duration of 27 months for the road of 4 km is considered to be on the higher side. The estimation of the duration basing on the referred project (Mwenge - Tegeta) is considered not to reflect the comparison of the scope of works that are involved between the two road sections. The referred project was being upgraded from single carriageway two lanes to dual carriageway four lanes while the Morocco – Mwenge section has five lanes which were improved recently. It wouldn't make value-for-money to demolish the existing road during implementation. Further, in the referred project there were 3 bridge structures while the Morocco – Mwenge does not have such structures. Therefore the basis of reference does not compare.
2. The asphalt concrete for wearing course need to be ensured of performance to avoid the premature failures that have been experienced in other roads. Therefore the referred as "proven pavement design method in Japan" has to be introduced, tested in our environment before adoption.

The Consultant should consider meeting with TANROADS on Monday 27th February 2017, 14:00 hrs for further discussion and conclusion of the matter.

Yours Sincerely,

Eng. Chrispianus B. Ako
Ag. CHIEF EXECUTIVE

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3er Answer



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Our Ref : NB2/OD/IGS/TAN/07Mar/2017

Date: 07 Mar, 2017

To: Chief Executive
Tanzania National Roads Agency (TANROADS)
P.O. Box 11364, Dar es Salaam, Tanzania

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)

SUB: Comments on the Preparatory Survey Report

With reference to your letter dated February 23rd, 2017 (TRD/GEN/P.147/07/Vol XII/65), we would like to inform you of our replies as follows.

Q1): The Construction duration of 27 months for the road of 4 km is considered to be on the higher side. The estimation of the duration based on the referred project (Mwenge – Tegeta) is considered not proper to compare the different scope of works that is involved between the two road sections. The referred project was being upgraded from single carriageway two lanes to dual carriageway four lanes while the Morocco – Mwenge section has five lanes which were improved recently. It wouldn't make value-for-money to demolish the existing road during implementation. Furthermore, in the referred project there were 3 bridge structures while the Morocco – Mwenge does not have such structures. Therefore the basis of reference cannot be compared.

A1): This plan calculated in consideration of actual progress of each type of the Mwenge – Tegeta section (NB-1) construction. The construction period (sum of critical paths) of the plan in consideration of these results is as follows (please also refer to the attached Project Execution Schedule (Draft)). Also, the policy is to make maximum use of existing five-lane road.

A. Preparation in Japan:

It takes one month for various procedures.

B. Procurement and shipping of Equipment

Procurement and Transportation requires 3 months. In addition, the start of earth work will be one month after procurement and transportation start.

C. Earth work:

The amount of earth work in the Morocco – Mwenge section (NB-2) is 81,200m³ in total on the left and right side of the existing road. This project plans to construct one side at



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a time to secure existing traffic. Construction period for approximately 40,000m³ of the earth work amount on one side requires 6.1 months from the actual results of NB-1 construction. Improvement work of approximately 19,000 m³ of unsuitable soil countermeasures will also be completed during earth work.

D. Subgrade work:

Construction period for approximately 17,000m³ of the subgrade work amount on one side will be carried out in parallel with the above earth work. The completion of the subgrade work will be 1.5 months after the completion of above earth work.

E. Pavement work:

Construction period for approximately 48,000m² of the subbase work amount on one side will start continuously after the above subgrade work. The completion of the subbase work will be 1.5 months after the completion of above subgrade work.

Construction period for approximately 48,000m² of the base course work amount on one side will start continuously after the above subbase work. The completion of the base course work will be 0.5 months after the completion of above subbase work.

Construction period for approximately 48,000m² of the asphalt binder and wearing course work amount on one side will start continuously after the above base course work. The completion of the asphalt wearing course work will be 2.5 months after the completion of above base course work.

F. Total for one side construction:

Total C + D + E = 12.1 months is required before the completion of the above series of constructions. The construction on the other side will be done in 12.1 months just like one side after completion of the other side. Therefore the total is 24.2 months.

G. Clearing and handover:

It is assumed that 1.0 month is required for clearing and handover.

H. Total construction period:

A+B+F+G=27.2≒27 months.


In the above process, we will thoroughly review the site conditions during the detail design and proceed maximum use of the 5 lanes structure based on the consideration of the value for money sufficiently.

Q2): The asphalt concrete for wearing course needs to be ensured of performance to avoid the premature failures that have been experienced in other roads. Therefore the referred to as “proven pavement design method in Japan” has to be introduced, tested in our environment before adoption.

A2): Pavement design in Japan has a good track record of applying the Marshall Stability Test and the Wheel Tracking Test for constructing highways covering more than 7,000 km. In 1995 when the Superpave method was introduced to Japan, comparisons between the Superpave method and the above testing methods were carried out by public and private sectors, and it was found that similar results were obtained for both methods. Therefore, we will adopt that the above testing methods for the pavement design and all trial will be tested in Tanzania environment in Dar es Salaam in order to finalize optimum mix before adoption with due consideration of your concerns.

Yours faithfully,

Attachment: Project Execution Schedule (Draft)



Hisashi MUTO
The Team Leader,
INGÉROSEC CORPORATION

cc; The Chief Executive, Dar Rapid Transit Agency (DART)
cc; The Regional Manager. TANROADS-DSM
cc; JICA Tanzania Office



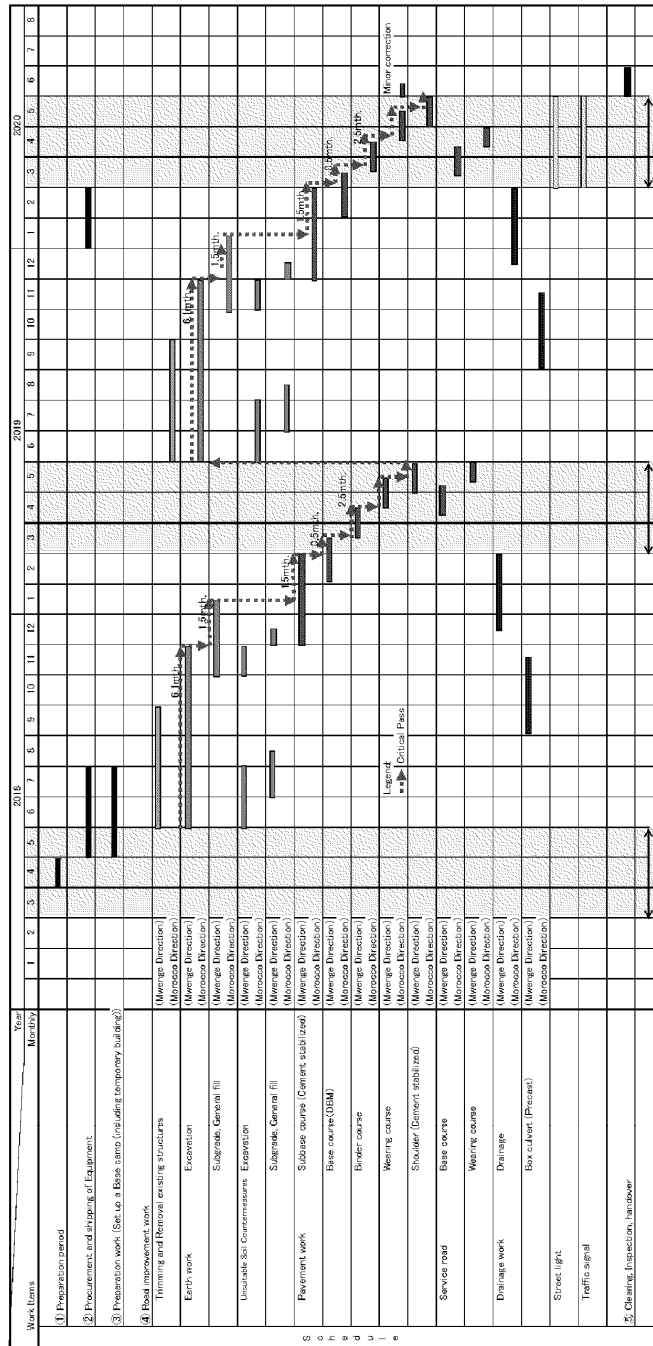
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Project Execution Schedule (Draft)

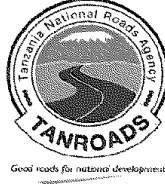


4th Question

TANZANIA NATIONAL ROADS AGENCY

Date: 28th April, 2017

Our Ref: TRD/D/GEN/P.287/01/46



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RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE 2)

Sub: Comments on the Preparatory Survey Report

Reference is made to your letter with Ref. No. NB2/OD/IGS/TAN/07/Mar/2017 and NB2/OD/IGS/TAN/01/Apr/2017 dated 07th March, 2017 and 18th April, 2017 respectively regarding the above captioned subject.

We have reviewed your response on the estimated scope of works and project timeline and found it to still be questionable. The construction period of 27 months for a 4.3 Km road is considered too long due to the following observations:

1. We are confident that your estimates of quantities for earthworks of 81,200m³ improvement works for 19,000m³ of unsuitable soil are on the higher side under present site conditions. This comes to our attention as the road section is now paved to five lanes and has not experienced substantial pavement failure due to subgrade conditions.
2. Furthermore, the estimated quantities of 48,000m² for subbase, base course and asphalt concrete layers for each side of the carriageway as informed in your analysis (Item E: Pavement works) has the implication that the recently completed pavement works have not been considered. To underscore our observations, we have found that the given estimated quantities may sufficiently cover reconstruction of a full carriageway width of about 12m.
3. We recommend that only some sections that will need intervention for improvements/strengthening pavement, improvements of vertical and horizontal geometry subject to comprehensive investigations should have to be quantified and considered accordingly for ascertaining the project timeline. In addition, road safety improvement including construction of raised median and other ancillary works have

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to be assessed on whether they are in the critical path or otherwise and be considered appropriately in your project execution schedule.

Furthermore, your response on the type of asphalt concrete for wearing course to use Marshall Stability Test is still questionable. Our experience in recently constructed roads in Dar es Salaam shows that even with the Marshall Stability Test as you propose, the roads develop premature failure as evidenced along the Mandela road, Kilwa road and Mwenge – Tegeta road. We therefore strongly recommend performance based pavement be adopted as opposed to Marshall Stability mix design.

It is worth to note that the value for money as per our earlier communication to you is not limited to utilisation of the physical lateral dimensions of the newly widened road (5 lanes) but also the vertical profile of the pavement layers. It is therefore prudent that the reconstruction of pavement layers be considered appropriately taking into consideration the already existing pavement on your assessment of value for money.

With the foregoing, you are requested to adjust the project execution schedule based on actual improvements that will be applied on the road section. It is our opinion that the project can be completed in not more than 12 months. This is supported by the fact that the current, dualing of Sakina – Tengeru (14.1 Km) was achieved in 23.5 months, despite of delays due to relocation of utilities which is not an issue for Morocco – Mwenge road.



Eng. Chrispianus B. Ako
ACTING CHIEF EXECUTIVE

- Copy:**
1. Chief Executive – Dar es Salaam Rapid Transit Agency (DART).
 2. JICA Office – Headquarter, Japan.
 3. JICA Office – Tanzania.
 4. Regional Manager, TANROADS - Dar es Salaam.



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4th Answer



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Our Ref : NB2/OD/IGS/TAN/26May/2017

Date: 26 May, 2017

To: Chief Executive
Tanzania National Roads Agency (TANROADS)
P.O. Box 11364, Dar es Salaam, Tanzania

Dear Sir,

RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)

SUB: Comments on the Preparatory Survey Report

With reference to your letter dated April 28th, 2017 (TRD/D/GEN/P.287/01/46), we would like to inform you of our replies as follows.

Q1): We are confident that your estimates of quantities for earthworks of 81,200 m³ improvement works for 19,000 m³ of unsuitable soil are on the higher side under present site conditions. This comes to our attention as the road section is now paved to five lanes and has not experienced substantial pavement failure due to subgrade conditions.

A1): In the section of approximately 2,500m from the Morocco intersection (0 km) to the Kijitonyama intersection (2.5km), unsuitable soil improvement seems completed at the time of construction from 3-lane to 5-lane widening by TANROADS. Therefore, improvement of unsuitable soil in that part might not be necessary and there is a possibility of shortening the construction period.

On the other hand, in the section of approximately 1,800 m between the Kijitonyama intersection (2.5km) and the Mwenge intersection (4.3km), which was widened 2-lane to the left side toward the end point, unsuitable material is deposited on the right side where the unsuitable soil improvement was not included at the time of widening from 3-lane to 5-lane. We believe it is difficult to shorten the construction period by not implementing unsuitable soil improvement work.

From the above, improvement work volume of unsuitable soil can be reduced by up to approximately 30%, in that case there is a possibility that the construction period can be shortened by approximately 4 months.

In addition, shortening of the actual construction period should be considered during the detailed design.



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Q2): Furthermore, the estimated quantities 48,000 m² for subbase, base course and asphalt concrete layers for each side of the carriageway as informed in your analysis (Item E: Pavement works) has the implication that the recently completed pavement works have not been considered. To underscore our observations, we have found that the given estimated quantities may sufficiently cover reconstruction of a full carriageway width of about 12m.

A2): In order to cope with flooding and ponding on the existing road surface and roadside, the following sections must be constructed as raising sections.

- ① The sag section around 300m north of Morocco intersection. (0.2km – 0.4km, approximately 200m)
- ② Around Makumbusho (in front of Military camp) and Millennium Tower. (1.6km – 2.5km, approximately 900m)
- ③ Left hand roadside between the Kijitonyama intersection and the Shekilango intersection. (2.5km – 3.1km, approximately 600m)

With regard to sections from 0 km to 0.2km (approximately 200 m), from 0.4km to 1.6km (approximately 1,200 m) and from 2.5km to 4.3km (approximately 1,800 m) excluding the raising sections (above ①～③), when utilizing the pavement (subbase, base course and asphalt concrete layers) of the existing 5-lane road, the construction amount can be reduced by up to approximately 30% and the construction period be shortened by up to approximately 4 months.

In addition, shortening of the actual construction period should be considered during detailed design. In that case, the part utilizing the existing pavement structure should be exempted from the defect liability.

Q3): We recommend that only some sections that will need intervention for improvements/strengthening pavement, improvements of vertical and horizontal geometry subject to comprehensive investigations should have to be quantified and considered accordingly for ascertaining the project timeline. In addition, road safety improvement including construction of raised median and other ancillary works have to be assessed on whether they are in the critical path or otherwise and be considered appropriately in your project execution schedule.

A3): From the above, the construction period, currently set as 27 months, could be shortened by 8 months thus it will be approximately 19 months.



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In addition, shortening of the actual construction period should be considered during detailed design. In that case, the part utilizing the existing pavement structure should be exempted from the defect liability.

- Q4): Furthermore, your response on the type of asphalt concrete for wearing course to use Marshall Stability Test is still questionable. Our experience in recently constructed roads in Der es Salaam shows that even with the Marshal Stability Test as you propose, the roads develop premature failure as evidenced along the Mandela road, kilwa road and Mwenge – Tegeta road. We therefore strongly recommend performance based pavement be adopted as opposed to Marshall Stability mix design.
- A4): This time we are not only implementing Marshall Stability Test but to combine Marshall Stability Test with Wheel Tracking Test , which is commonly used by Japanese construction companies and achieved many good results . Through this method, it is possible to achieve Performance based pavement type in a state where formulation success or failure is visible, not just of the mixing quantity result. In the basic design, the composition of pavement type / thickness is determined with respect to the assumed traffic load, the specification of the formulation design, as topic for this time, will be discussed together with other testing methods in detail during the detailed design stage and an agreement should be reached with the consideration of bidding conditions of the contractor as well.
- Q5): It is important to note that the value for money as per our earlier communication to you is not limited to utilization of the physical lateral dimensions of the newly widened road (5 lanes) but also the vertical profile of the pavement layers. It is therefore prudent that the reconstruction of pavement layers be considered appropriately taking into consideration the already existing pavement on your assessment of value for money.
- A5): The major purpose of this project is to improve flooding and ponding on the existing road surface and roadside occurring regularly. Therefore, it is designed for raising roads, service roads and footpaths in the section where flooding and ponding occur as shown in A2 ①～③. For that reason, we believe it is difficult to shorten the construction period without raising the section shown in A2 ①～③.
- Q6): With the foregoing, you are requested to adjust the project execution schedule based on actual improvements that will be applied on the road section. It is our opinion that the project can be completed in not more than 12 months. This is supported by the fact that



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the current, dealing of Sakina – tegeru (14.1 km) was achieved in 23.5 months, despite delays due to relocation of utilizes which is not an issue for Morocco – Mwenge road.

A6): From the above description, when utilizing the existing pavement structure as much as possible, there is a possibility to shorten the construction period to approximately 19 months (shortened by up to 8 months from the current 27 months) and this should be considered at the time of detailed design. In that case, the part utilizing the existing pavement structure should be exempted from the defect liability.

Yours faithfully,

Hisashi MUTO
The Team Leader,
INGEROSEC CORPORATION

cc; The Chief Executive, Dar Rapid Transit Agency (DART)
cc; The Regional Manager. TANROADS-DSM
cc; JICA Tanzania Office

5th Question

TANZANIA NATIONAL ROADS AGENCY

Date: 12th May, 2017

Our Ref: TRD/M/R.72/Vol. 3/132



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RE: THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE 2)

Sub: Comments on the Preparatory Survey Report

Reference is made to your letter with Ref. No. NB2/OD/IGS/TAN26May/2017 dated 26th May, 2017 regarding the above captioned subject.

We take note of your responses to the issues that we raised in the previous letter notably, the sections that require subgrade treatment, improvement of the vertical alignment to address the flooding and ponding sections in the existing road and the appropriate type of asphalt concrete mix design for the pavement.

Nevertheless, we still consider the construction duration of 19 months to be on a higher side. Accordingly, we are of the opinion that the actual construction period and proper pavement design should realistically be estimated during the Detailed Engineering Design.


To this end, you are therefore requested to expedite the detailed engineering design.

Yours sincerely,

Eng. Chrispianus B. Ako
ACTING CHIEF EXECUTIVE

Copy:

1. Chief Executive – Dar es Salaam Rapid Transit Agency (DART).
2. JICA Office – Headquarter, Japan.
3. JICA Office – Tanzania.
4. Regional Manager, TANROADS - Dar es Salaam.

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Appendix 7 References (Outline Design Drawings)

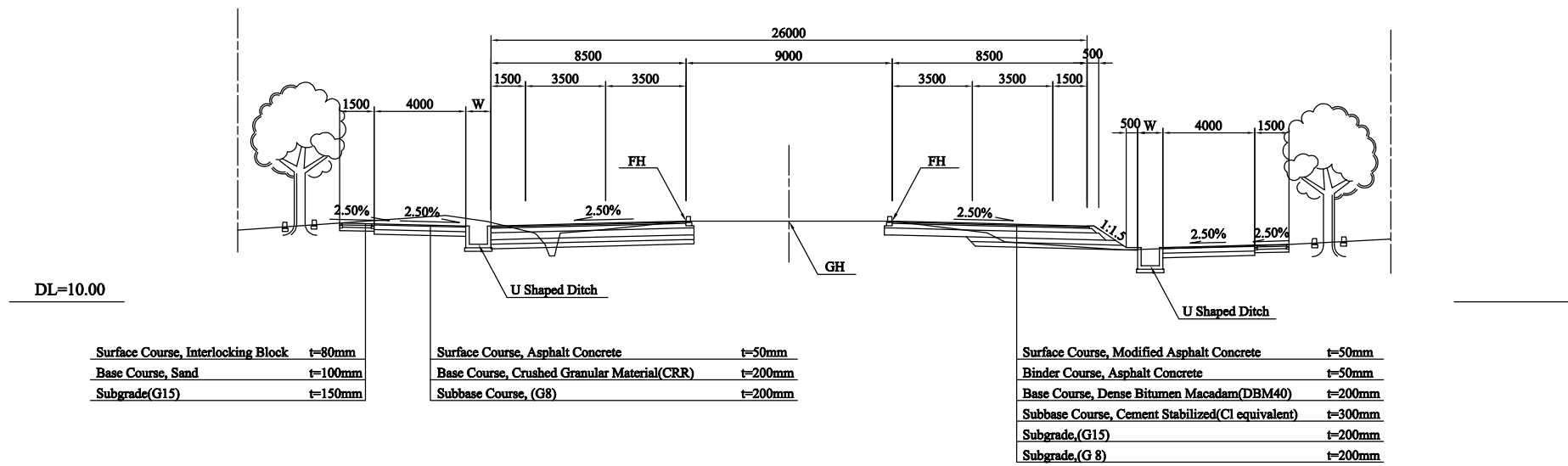
List of Outline Design Drawings

No.	Drawing Contents	Number of Drawings
1	Standard section drawing Plan view drawing Longitudinal section drawing	11
2	Drainage facilities structural drawing	5
3	Ancillary facilities structural drawing	6

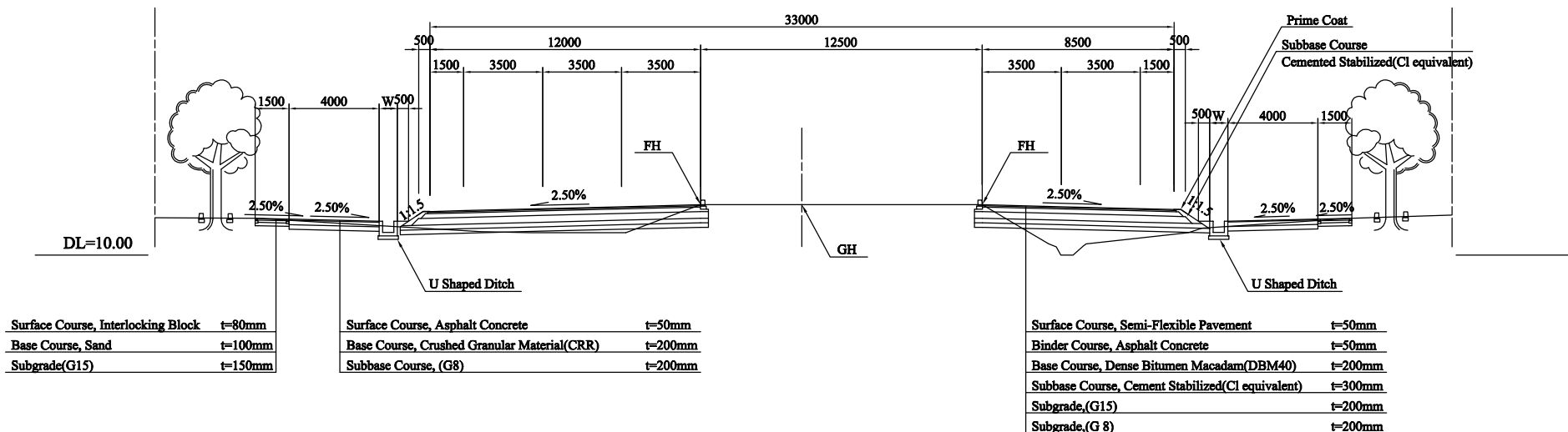
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STANDERD SECTION



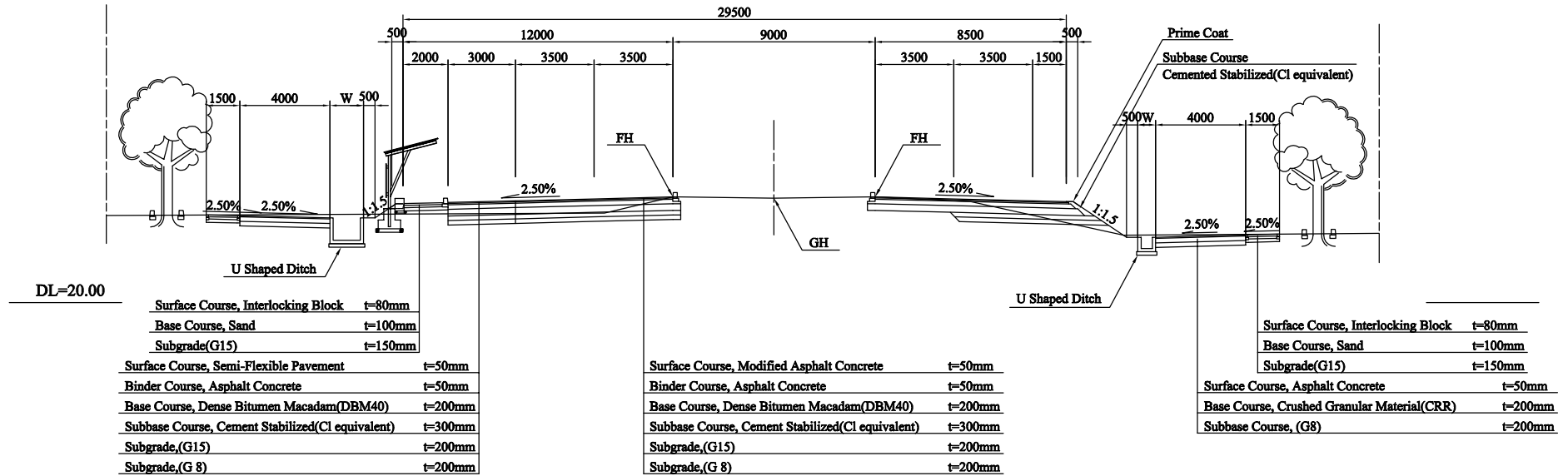
INTER SECTION



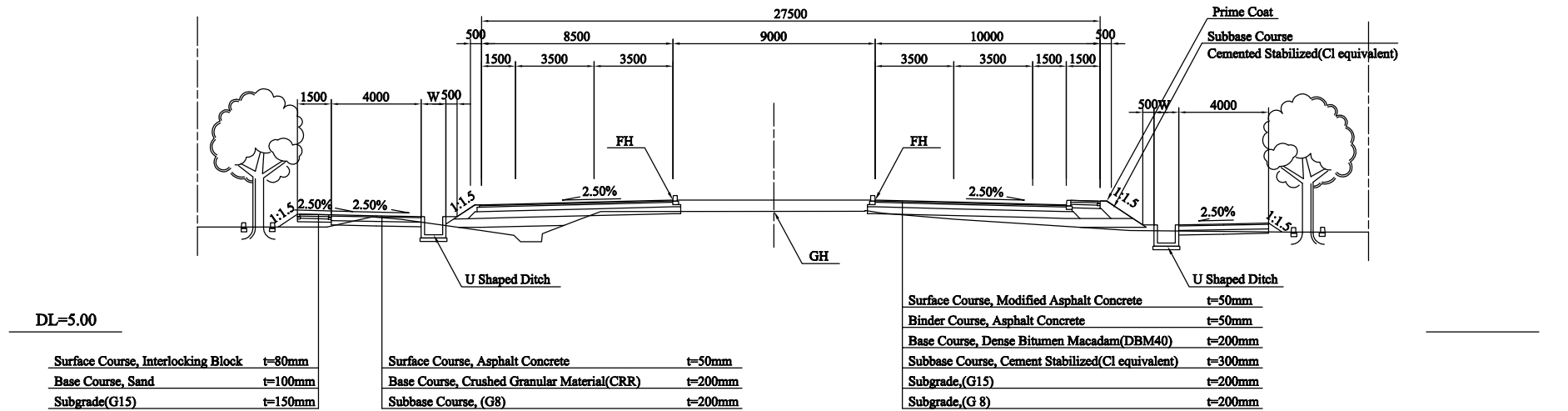
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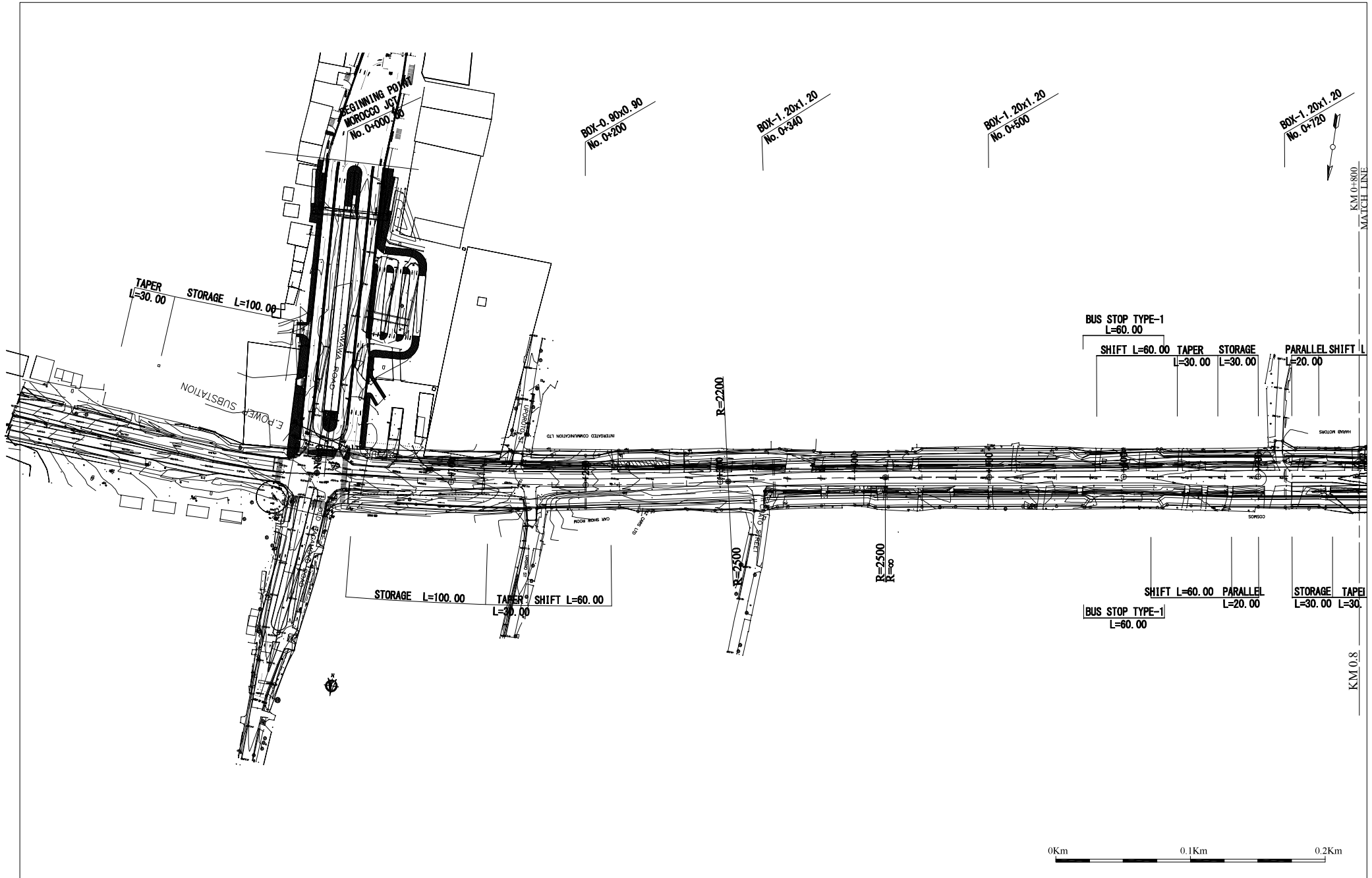
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LAY-BY SECTION

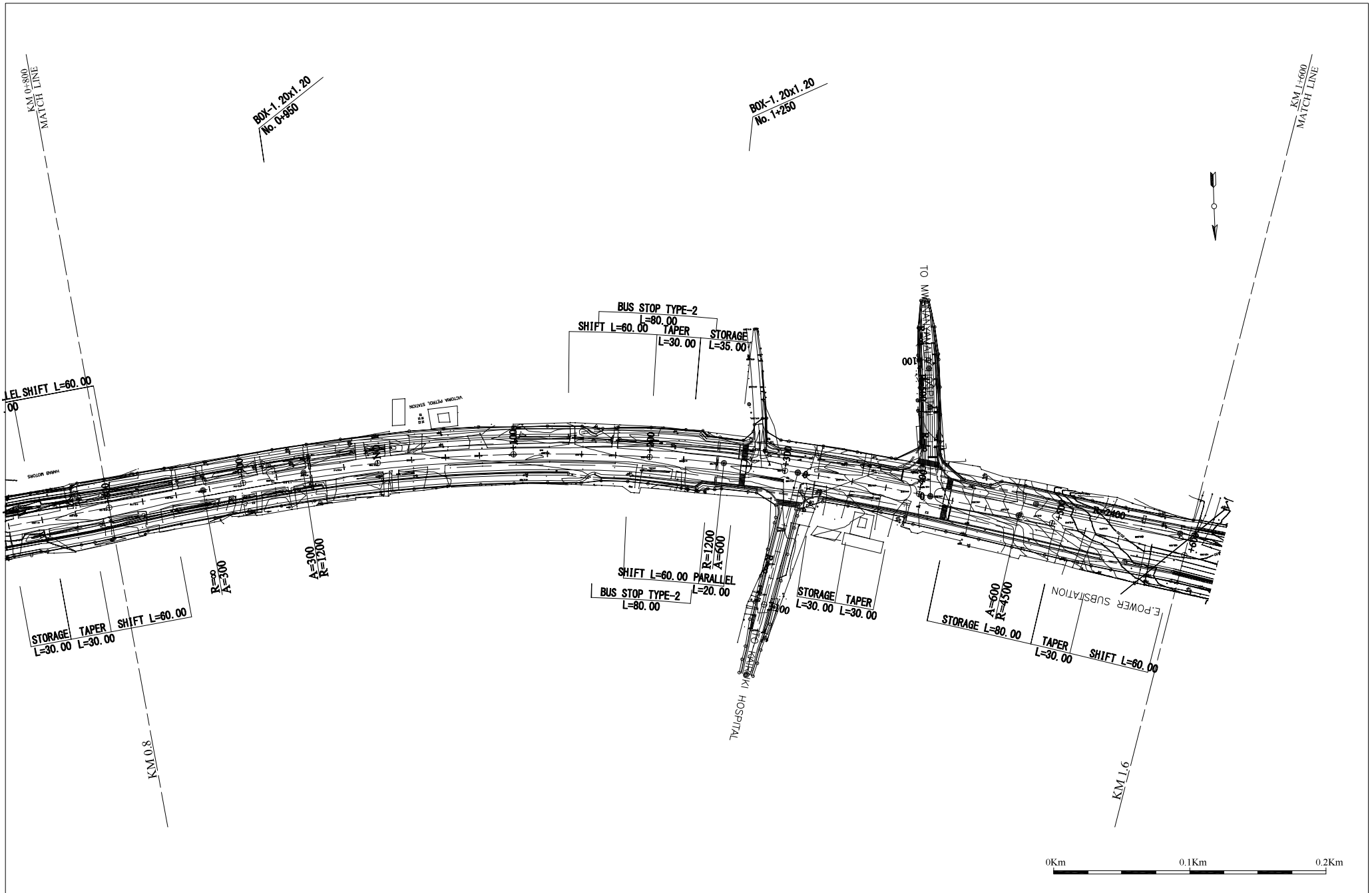


PUDDLE AREA SECTION

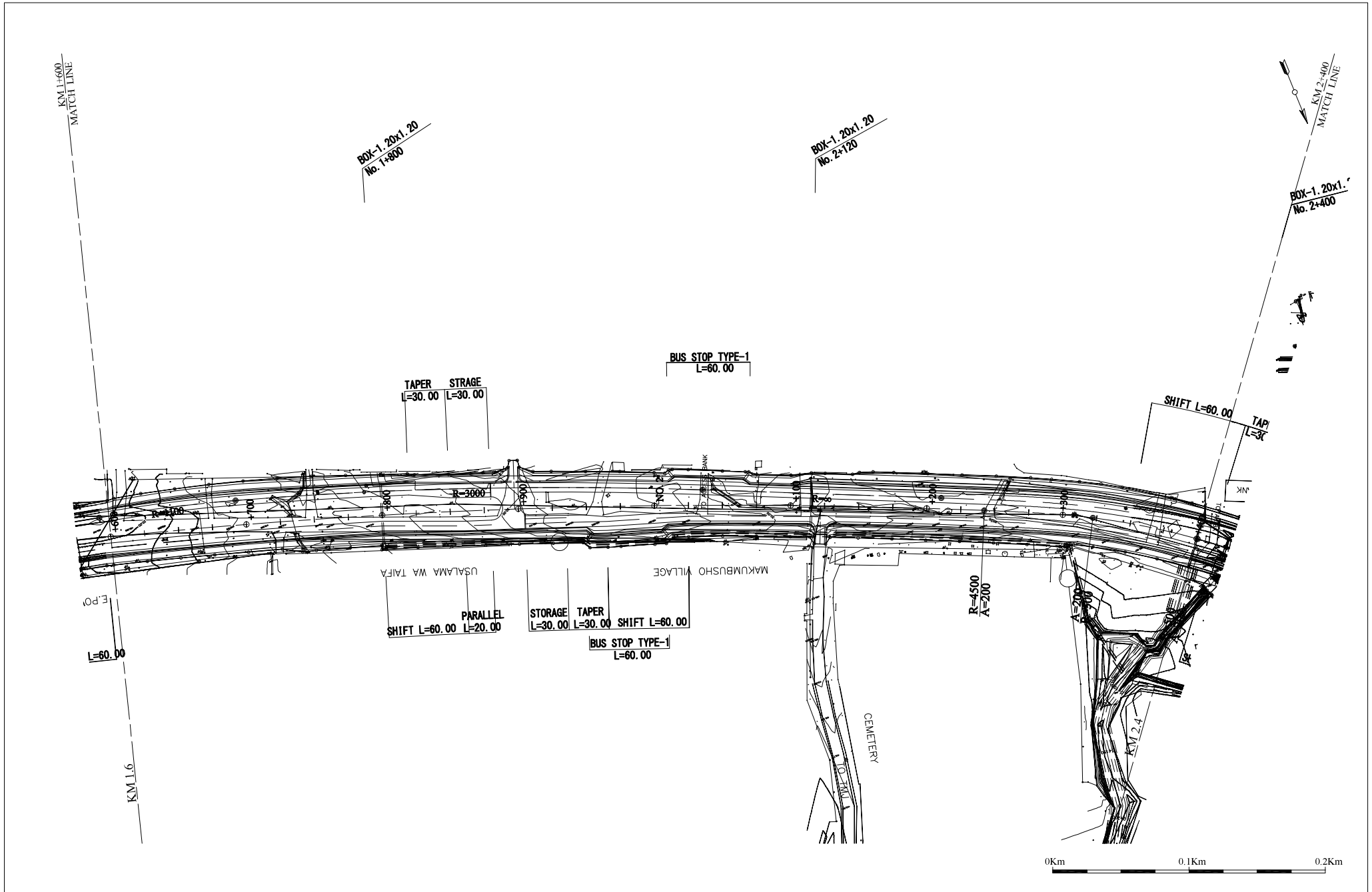




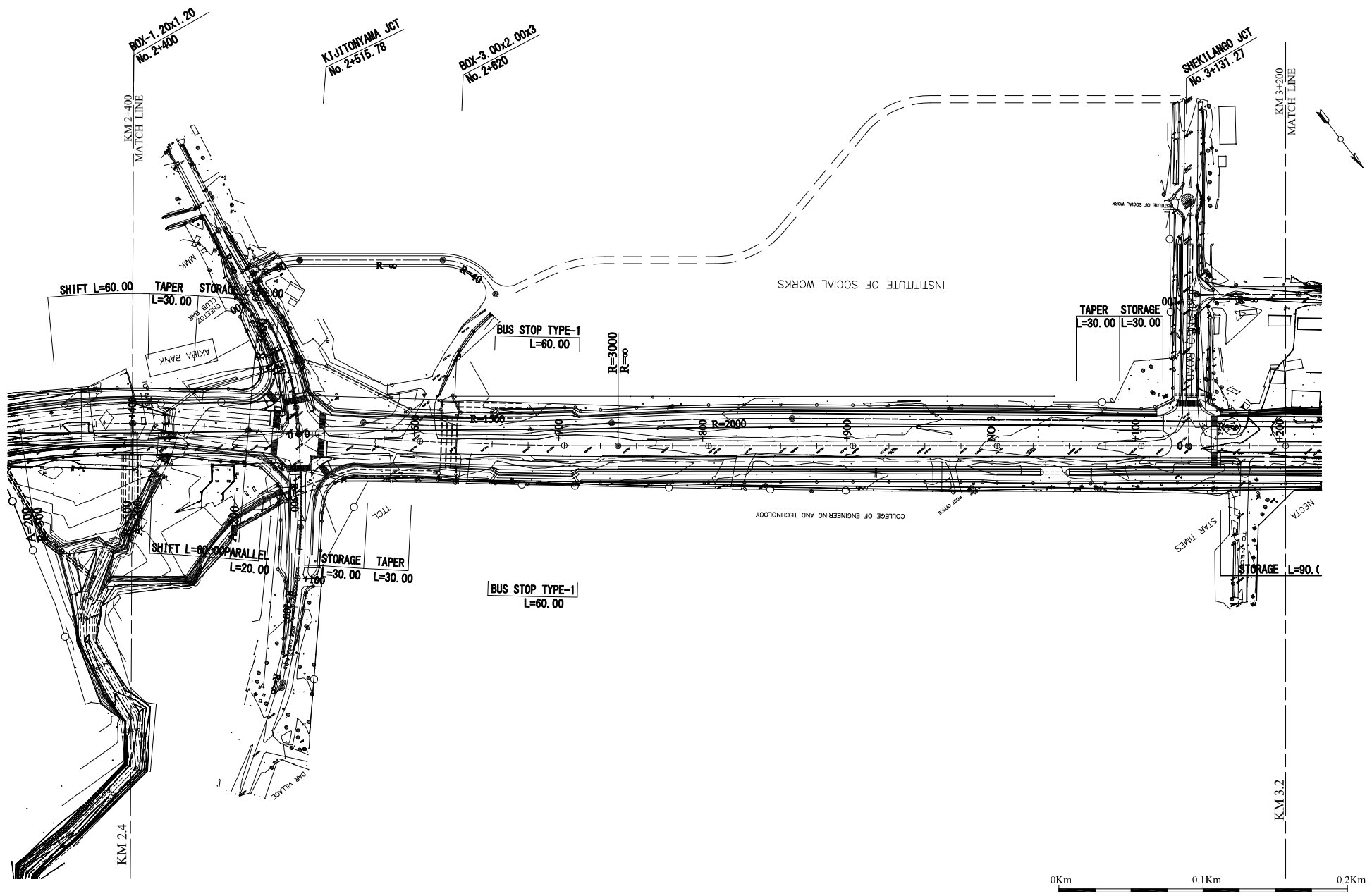
MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: INGEROSEC CORPORATION	PROJECT NAME: PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAWING TITLE: PLAN (1)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : DBD-001
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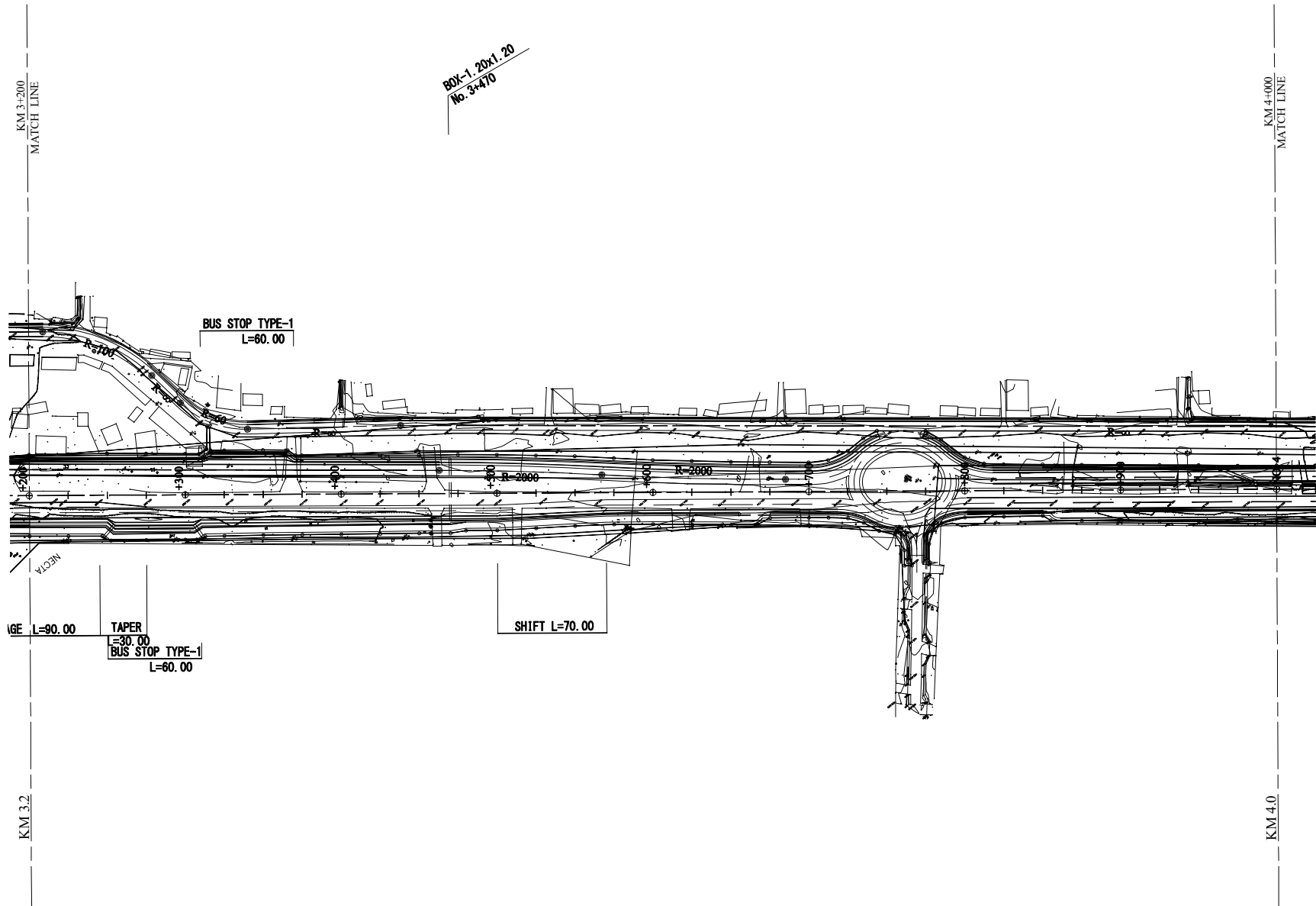
MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: INGEROSEC CORPORATION	PROJECT NAME: PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAWING TITLE: PLAN (2)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : DBD-002
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MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: INGEROSEC CORPORATION	PROJECT NAME: PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAWING TITLE: PLAN (3)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : DBD-003
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MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: INGEROSEC CORPORATION	PROJECT NAME: PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAWING TITLE: PLAN (4)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : DBD-004
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BOX-1 20x1.20
No. 3-470

KM 3+200
MATCH LINE

KM 4+000
MATCH LINE

BUS STOP TYPE-1
L=60.00

AGE L=90.00

TAPER
L=30.00
BUS STOP TYPE-1
L=60.00

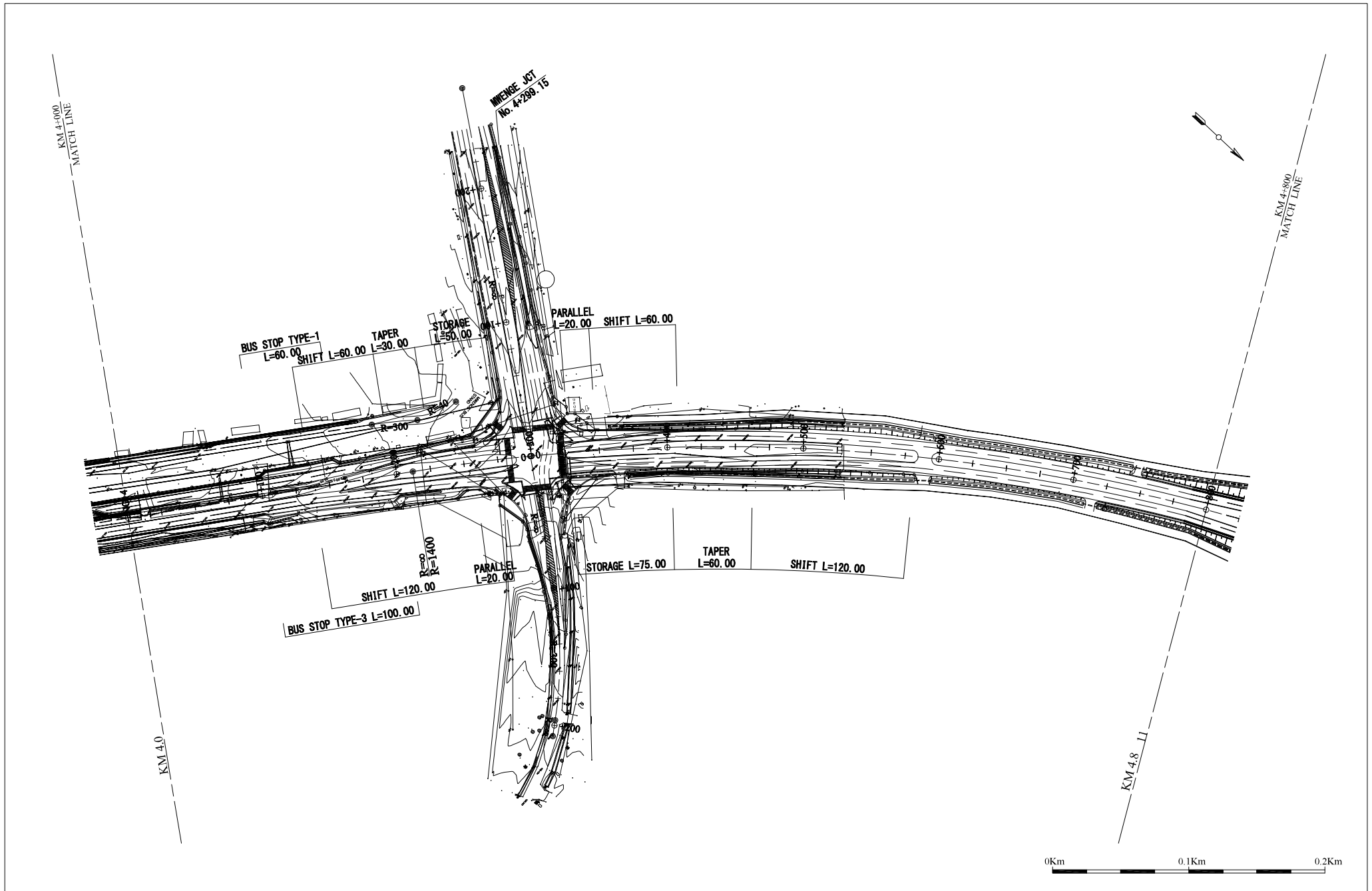
SHIFT L=70.00

KM 3.2

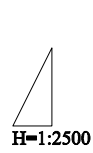
KM 4.0

0Km 0.1Km 0.2Km

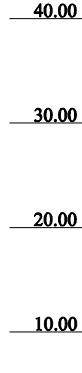
MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. : DBD-005
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	PLAN (5)	PREPARED BY: CHECKED BY:	



MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS: INGEROSEC CORPORATION	PROJECT NAME: PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAWING TITLE: PLAN (6)	DATE: PREPARED BY: CHECKED BY:	DRAWING No. : DBD-006
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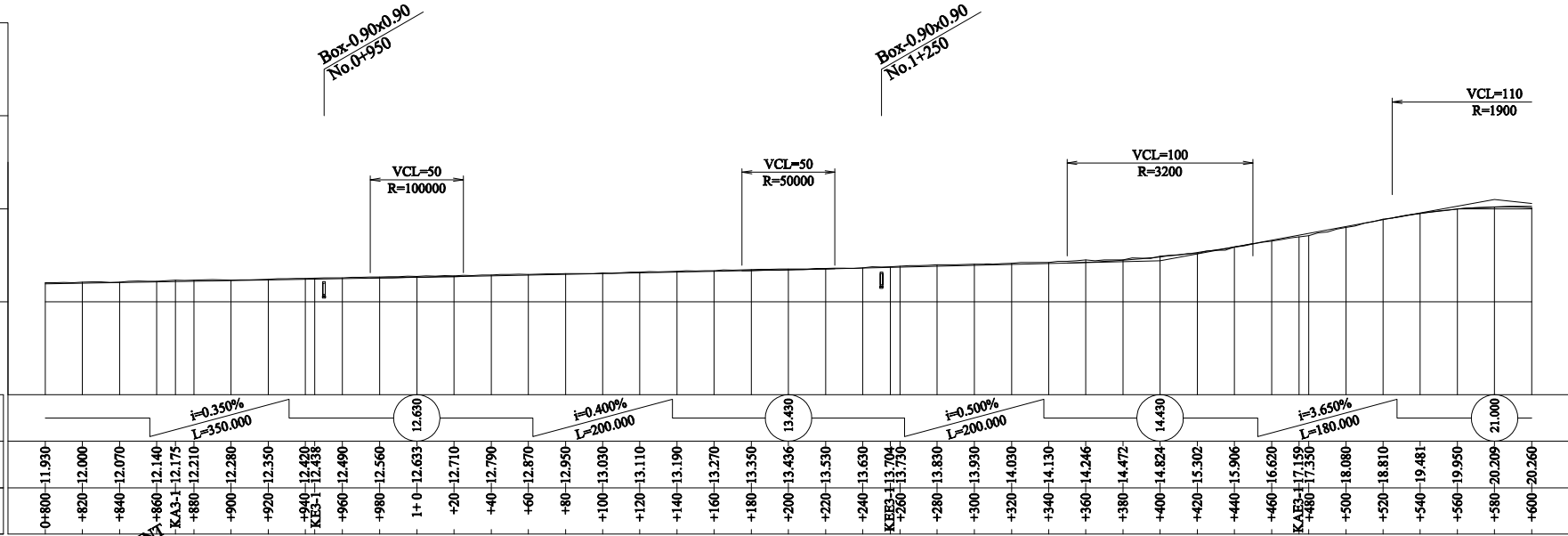


V=1:500

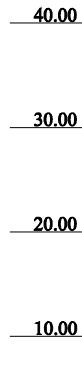


DL=0.00

VERTICAL ALIGNMENT
PLANNED LEVEL
STATION NUMBER

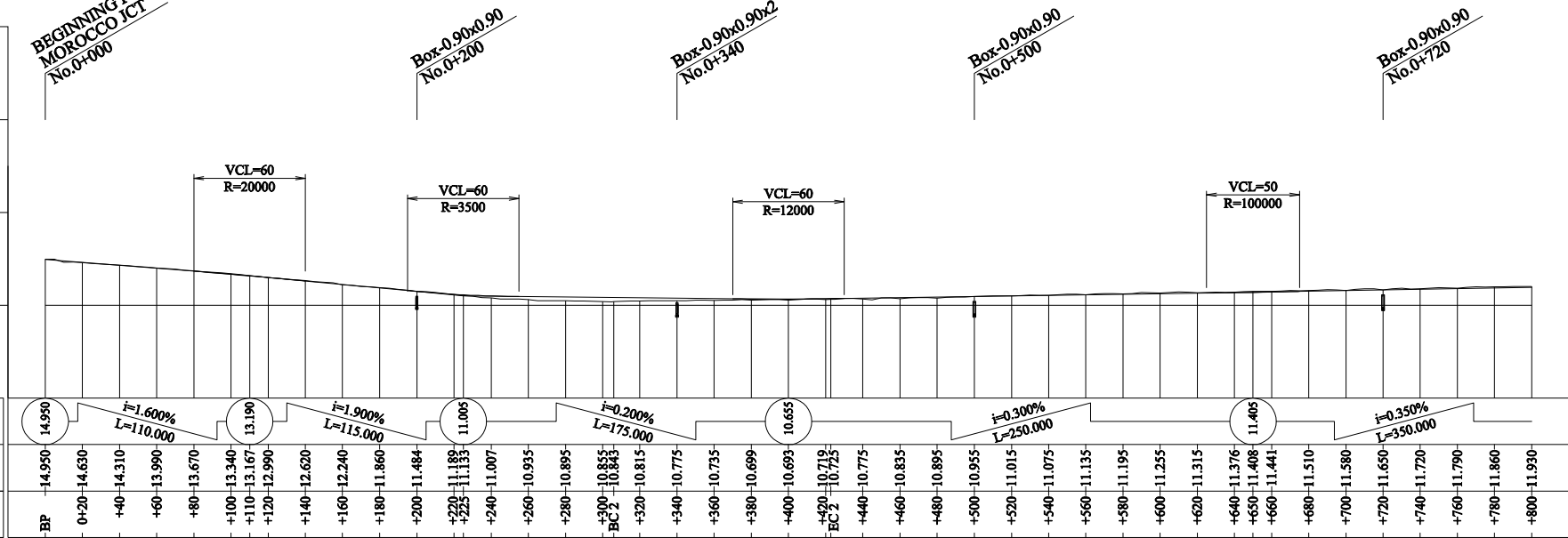


V=1:500



DL=0.00

VERTICAL ALIGNMENT
PLANNED LEVEL
STATION NUMBER



MINISTRY OF INFRASTRUCTURE DEVELOPMENT
THE UNITED REPUBLIC OF TANZANIA
JAPAN INTERNATIONAL COOPERATION AGENCY

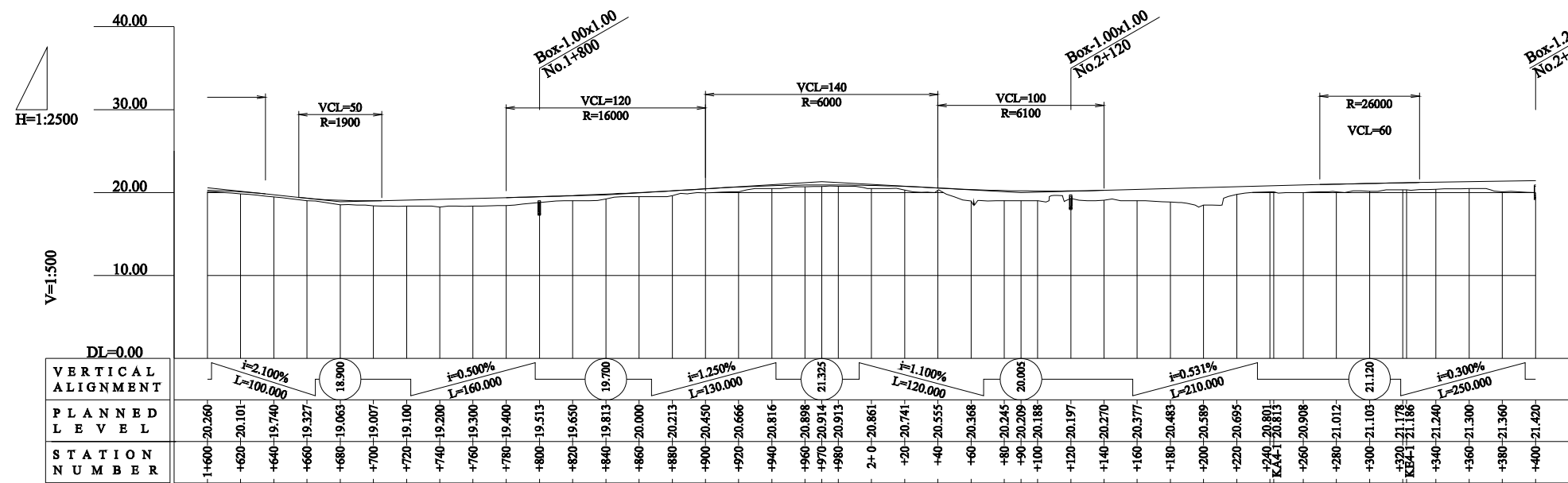
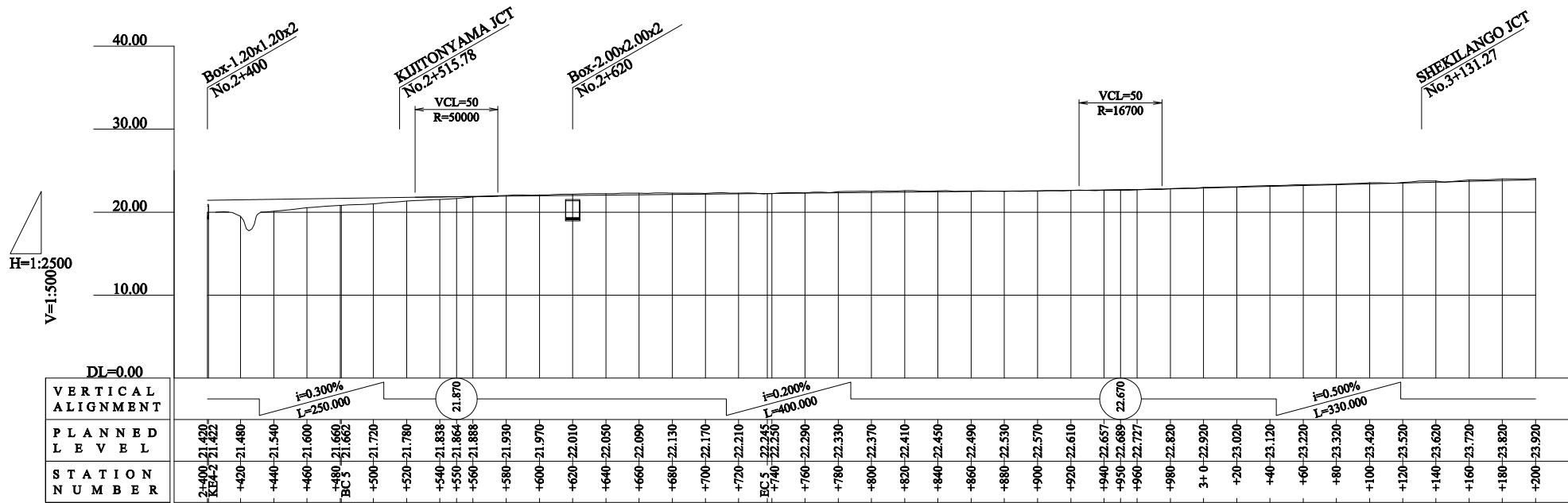
CONSULTANTS:
INGEROSEC CORPORATION

PROJECT NAME:
PREPARATORY SURVEY ON THE PROJECT FOR
WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)

DRAWING TITLE:
PROFILE (1)

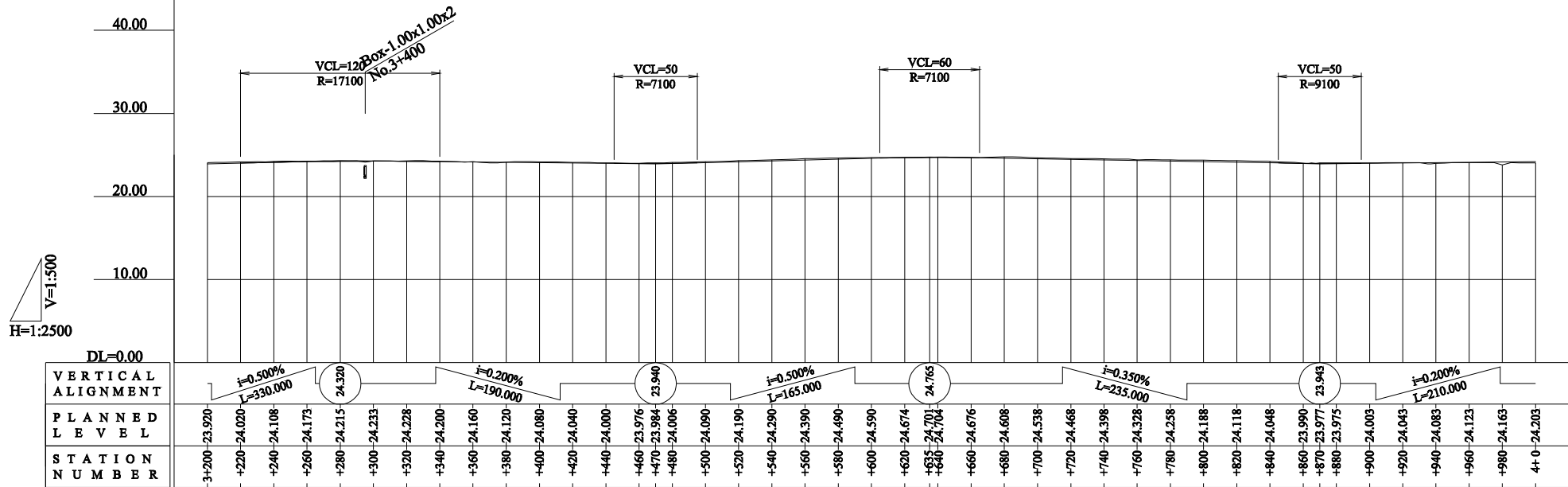
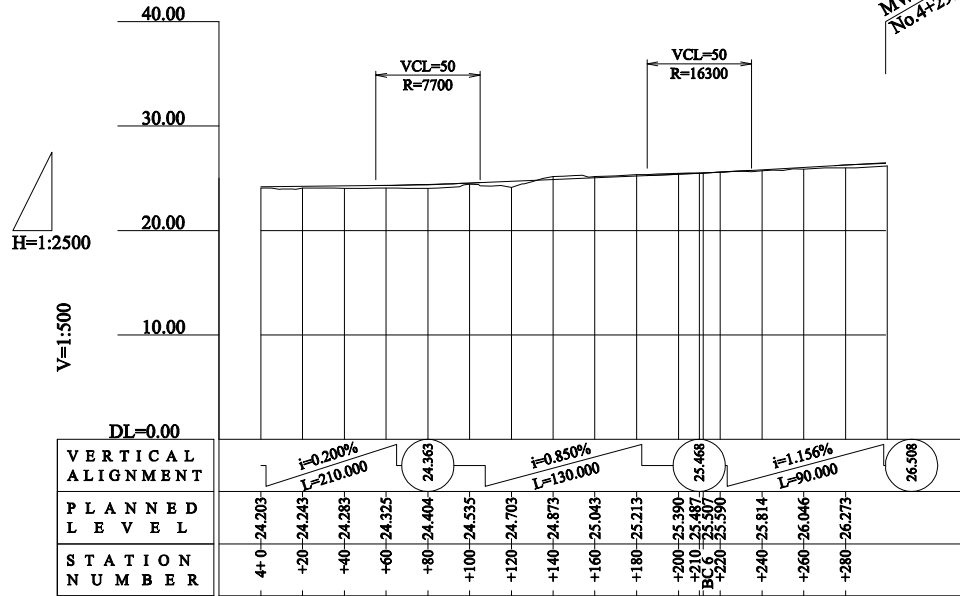
DATE:
PREPARED BY:
CHECKED BY:

DRAWING No. :
DBD-006



MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	PROFILE (3)	PREPARED BY:	DBD-007
				CHECKED BY:	

MTWENGE ICT
No 4-299.15



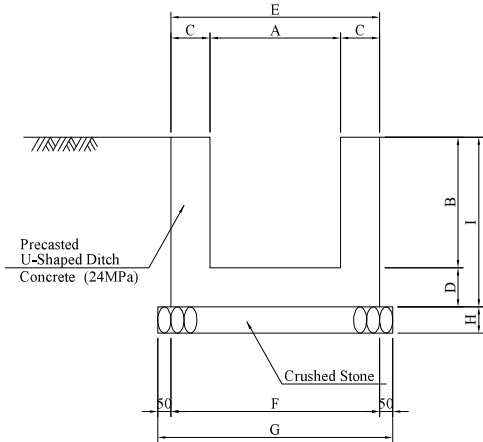
MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	PROFILE (5)	PREPARED BY:	DBD-008
				CHECKED BY:	

DRAINAGE STRUCTURE (1)

SCALE 1:20

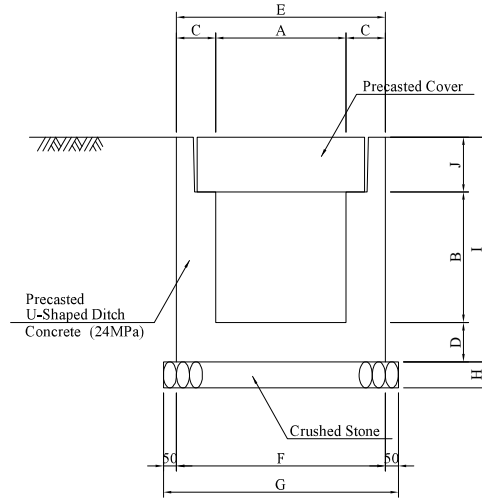
U Shaped Ditch

500 x 500
600 x 600
800 x 800

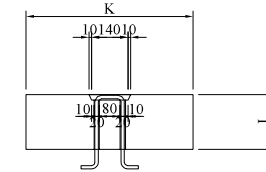


U Shaped Ditch with Cover

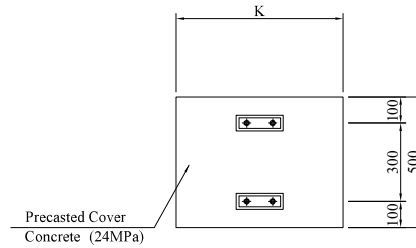
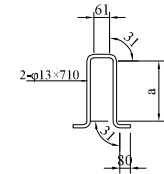
500 x 500
600 x 600
800 x 800



Cover



Handle



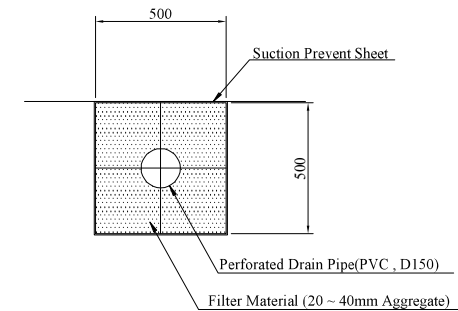
DIMENSION TABLE

TYPE	A	B	C	D	E	F	G	H	I	REMARK
500 x 500	500	500	150	150	800	800	900	100	650	
600 x 600	600	600	150	150	900	900	1000	100	750	
800 x 800	800	800	150	150	1100	1100	1200	150	950	

DIMENSION TABLE

TYPE	A	B	C	D	E	F	G	H	I	J	K	a	REMARK
500 x 500	500	500	150	150	800	800	900	100	860	210	640	230	
600 x 600	600	600	150	150	900	900	1000	100	980	230	740	250	
800 x 800	800	800	150	150	1100	1100	1200	150	1210	260	940	280	

Subsoil Drain



MINISTRY OF INFRASTRUCTURE DEVELOPMENT
THE UNITED REPUBLIC OF TANZANIA
JAPAN INTERNATIONAL COOPERATION AGENCY

CONSULTANTS:
INGEROSEC CORPORATION

PROJECT NAME:
PREPARATORY SURVEY ON THE PROJECT FOR
WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)

DRAWING TITLE:
DRAINAGE STRUCTURE (1)

DATE:
PREPARED BY:
CHECKED BY:

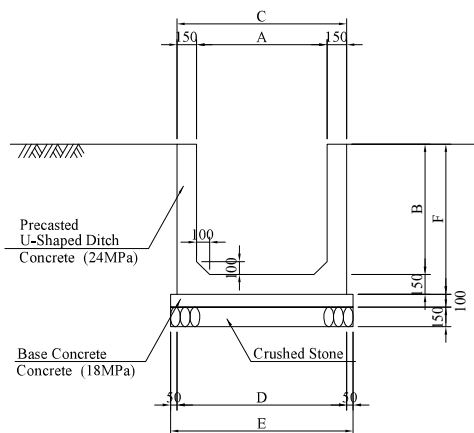
DRAWING No. :
DBD-009

DRAINAGE STRUCTURE (2)

SCALE 1:40

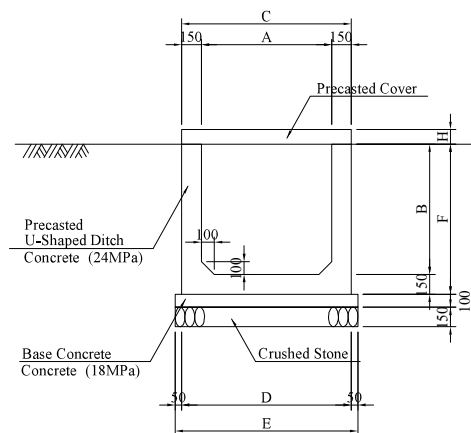
U Shaped Ditch

1000 x 1000
1200 x 1200
1400 x 1400

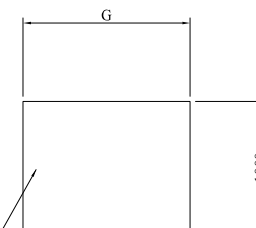
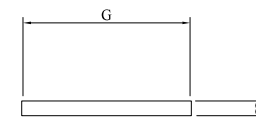


U Shaped Ditch with Cover

1000 x 1000
1200 x 1200
1400 x 1400



Cover



DIMENSION TABLE

TYPE	A	B	C	D	E	F	REMARK
1000 x 1000	1000	1000	1300	1300	1400	1150	
1200 x 1200	1200	1200	1500	1500	1600	1350	
1400 x 1400	1400	1400	1700	1700	1800	1550	

DIMENSION TABLE

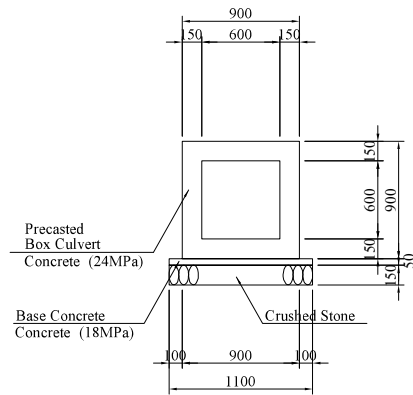
TYPE	A	B	C	D	E	F	G	H	REMARK
1000 x 1000	1000	1000	1300	1300	1400	1150	1300	110	
1200 x 1200	1200	1200	1500	1500	1600	1350	1500	120	
1400 x 1400	1400	1400	1700	1700	1800	1550	1700	130	

MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAINAGE STRUCTURE (2)	PREPARED BY:	DBD-010
				CHECKED BY:	

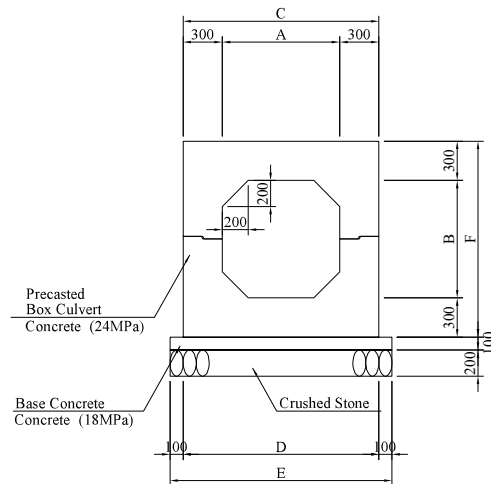
DRAINAGE STRUCTURE (3)

SCALE 1:40

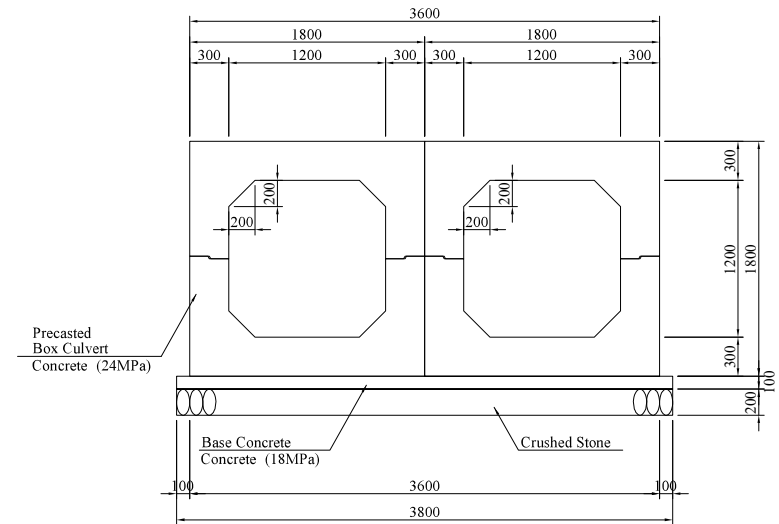
Box Culvert
600 x 600



Box Culvert
900 x 900
1000 x 1000
1200 x 1200
1400 x 1400



Box Culvert
1200 x 1200 x 2



DIMENSION TABLE

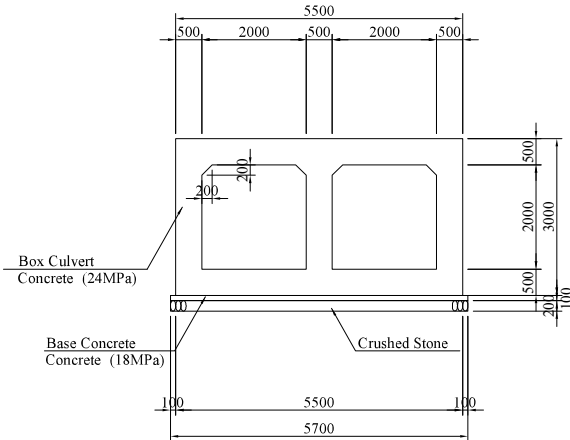
TYPE	A	B	C	D	E	F	REMARK
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1000 x 1000	1000	1000	1600	1600	1800	1600	
1200 x 1200	1200	1200	1800	1800	2000	1800	
1400 x 1400	1400	1400	2000	2000	2200	2000	

MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAINAGE STRUCTURE (3)	PREPARED BY:	DBD-011
				CHECKED BY:	

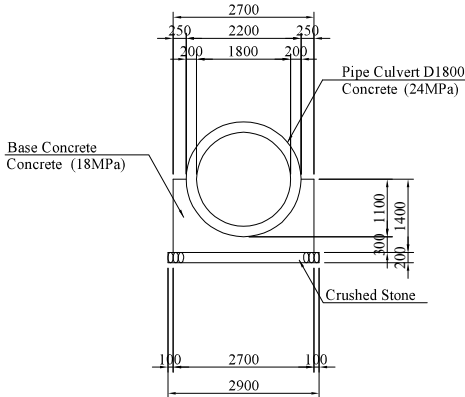
DRAINAGE STRUCTURE (4)

SCALE 1:100

Box Culvert
2000 x 2000 x 2



Pipe Culvert
D1800



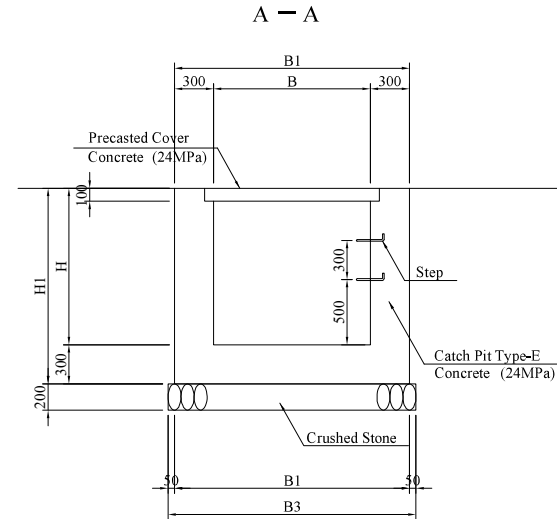
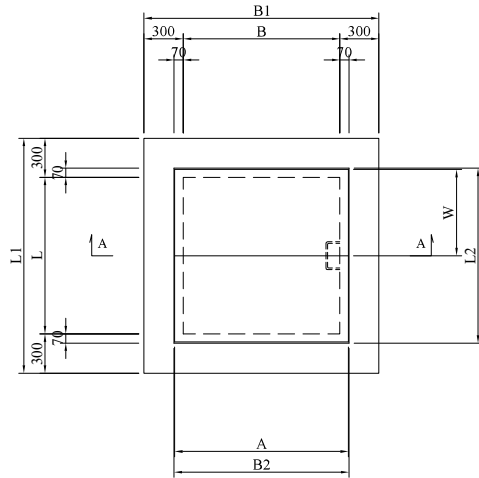
MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAINAGE STRUCTURE (4)	PREPARED BY: _____	DBD-012
				CHECKED BY: _____	

DRAINAGE STRUCTURE (5)

SCALE As shown

Catch Pit Type-E SCALE 1:40

- 1200 x 1200 x 1200
- 1500 x 1500 x 1500
- 1600 x 1600 x 1600
- 1800 x 1800 x 1800
- 1400 x 1400 x 4000

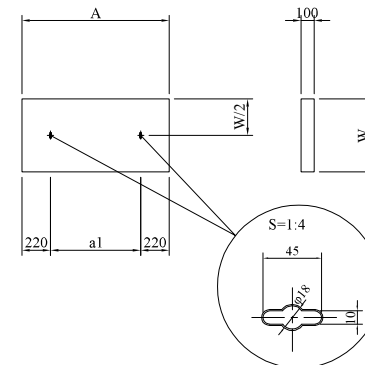


DIMENSION TABLE

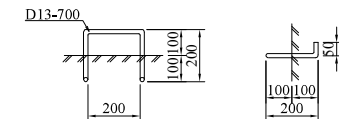
TYPE	B	L	H	B1	B2	B3	L1	L2	H1	A	W	a1	REMARK
1200 x 1200 x 1200	1200	1200	1200	1800	1340	1900	1800	1340	1500	1330	660	890	
1500 x 1500 x 1500	1500	1500	1500	2100	1640	2200	2100	1640	1800	1630	810	1190	
1600 x 1600 x 1600	1600	1600	1600	2200	1740	2300	2200	1740	1900	1730	860	1290	
1800 x 1800 x 1800	1800	1800	1800	2400	1940	2500	2400	1940	2100	1930	960	1490	
1400 x 1400 x 4000	1400	1400	4000	2000	1540	2100	2000	1540	4300	1530	760	1090	

Cover A x W

SCALE 1:40



Step SCALE 1:20

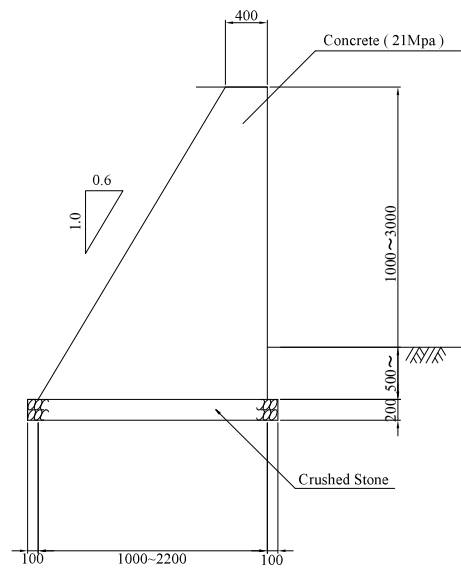


MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	DRAINAGE STRUCTURE (5)	PREPARED BY:	DBD-013
				CHECKED BY:	

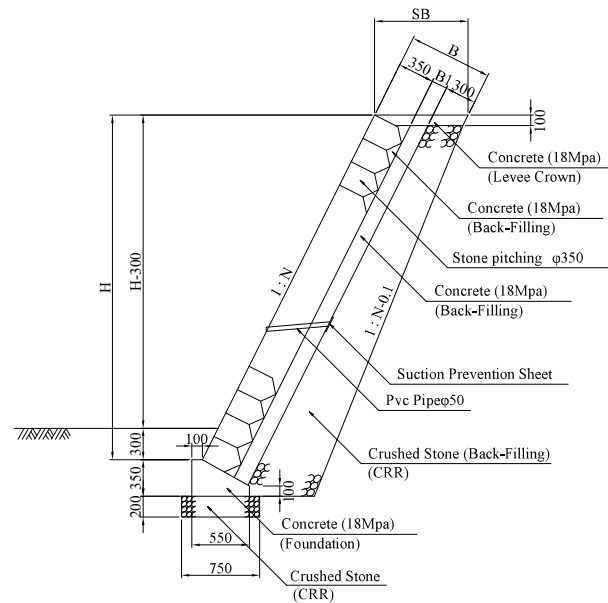
RETAINING WALL DETAILS (1)

SCALE A3 1:50

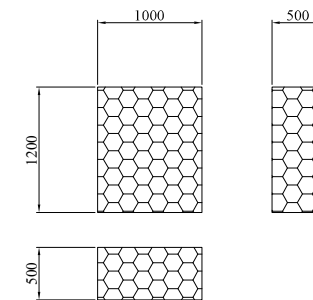
Gravity Type Retaining Wall



Concrete Block Retaining Wall



Mat Gabion



DIMENSION LIST mm

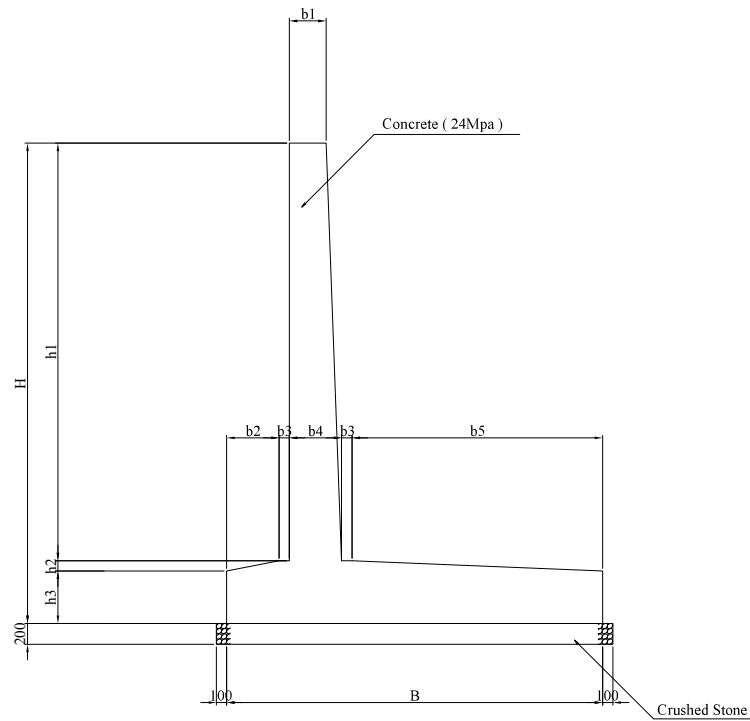
H	B1	B	SB	N
0~1.5	100	750	783	0.3
1.5~3.0	100	750	808	0.4
3.0~5.0	150	800	894	0.5

MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	RETAINING WALL DETAILS (1)	PREPARED BY: CHECKED BY:	DBD-015

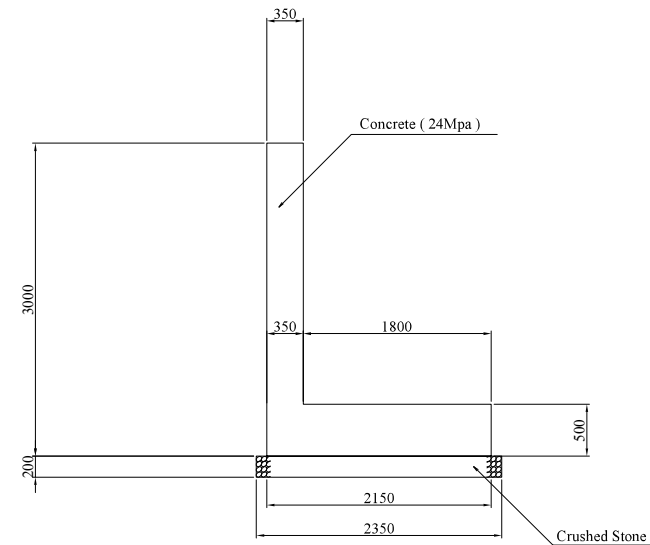
RETAINING WALL DETAILS (2)

SCALE A3 1:50

Inversed T-Type Retaining Wall



L- Type Retaining Wall



DIMENSION LIST

H	h1	h2	h3	B	b1	b2	b3	b4	b5
4500	4000	0	500	3600	350	600	0	500	2500
8500	7500	200	800	6800	400	1300	100	900	4400

mm

MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	RETAINING WALL DETAILS (2)	PREPARED BY:	DBD-016
				CHECKED BY:	

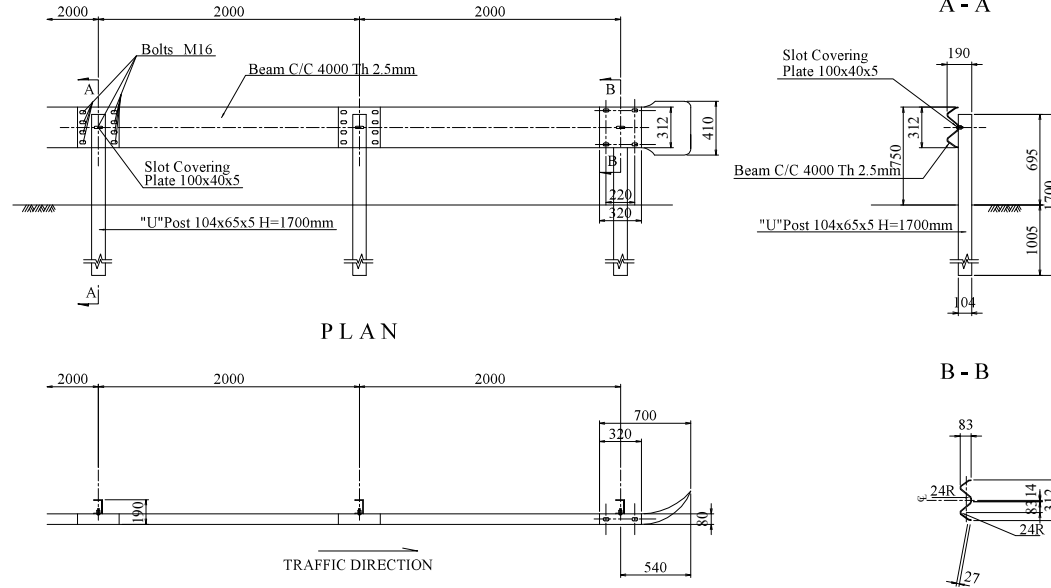
TRAFFIC SAFETY DETAILS (1)

SCALE As shown

GUARD RAIL

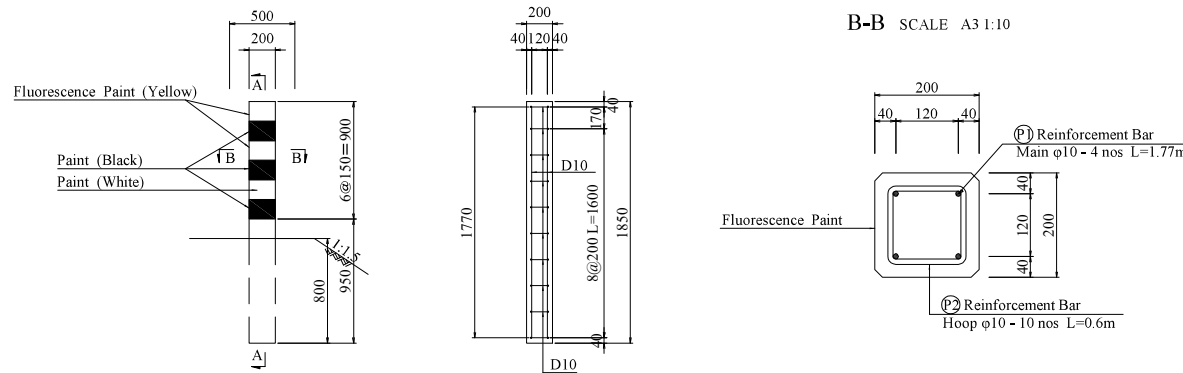
SCALE 1:40

VIEW



GUARD POST

GENERAL VIEW SCALE A3 1:40 A-A SCALE A3 1:40



Note :
 1) Concrete strength shall be measured by cylinder crushing strength (Cube crushing strength shall be used cylinder crushing strength $\times 1.25$ value)
 2) N/mm² = Mpa
 3) Rust free material shall be applied for guard rail and metal guard fence.

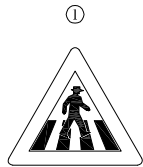
MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DATE:	DRAWING TITLE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)			DBD-017
				CHECKED BY:	

TRAFFIC SAFETY DETAILS (2)

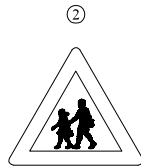
SCALE As shown

WARNING SIGNS

SIGN POST DETAILS SCALE A3 1:20



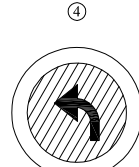
PEDESTRIAN CROSSING AHEAD



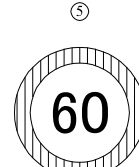
CHILDREN AHEAD



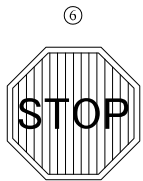
BUS STOP



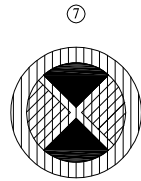
DIRECTION TO BE FOLLOWED



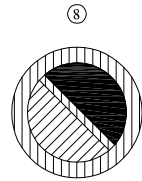
SPEED LIMIT 60 km/h



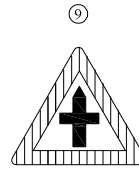
STOP



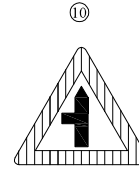
STANDING AND PARKING PROHIBITED (NO STOPPING)



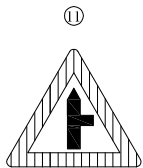
PARKING PROHIBITED (NO PARKING)



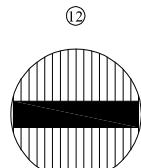
CAUTION CROSS READ AHEAD



SIDE ROAD ON THE LEFT



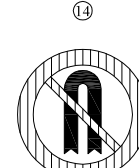
SIDE ROAD ON THE RIGHT



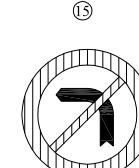
NO ENTRY



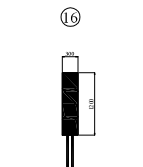
NO RIGHT TURN



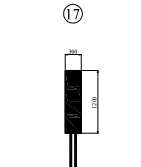
NO U TURN



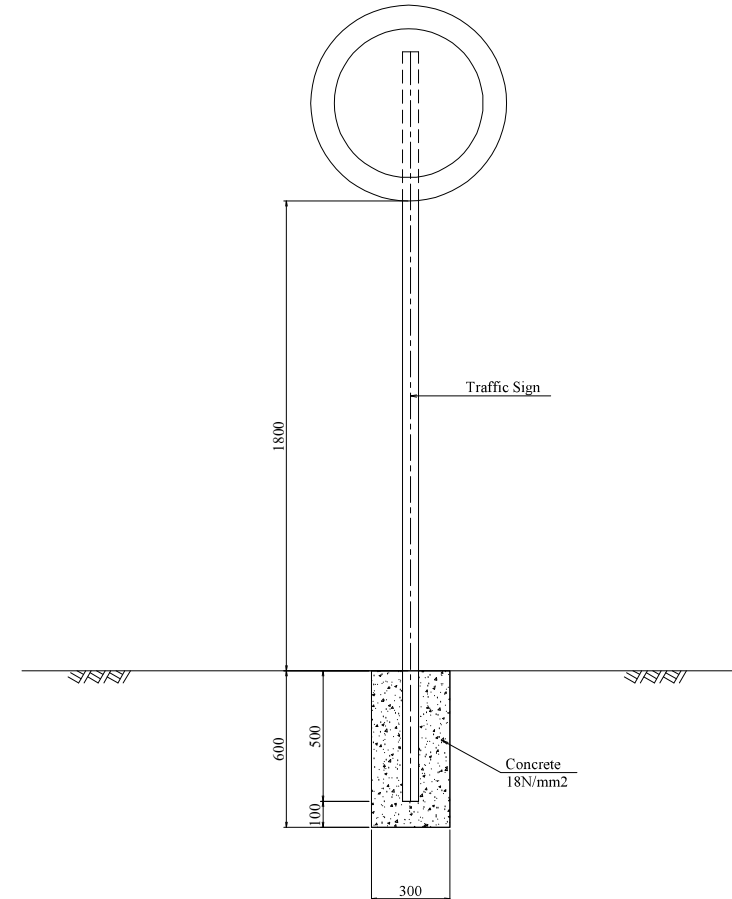
NO LEFT TURN



DANGER PLATE



DANGER PLATE



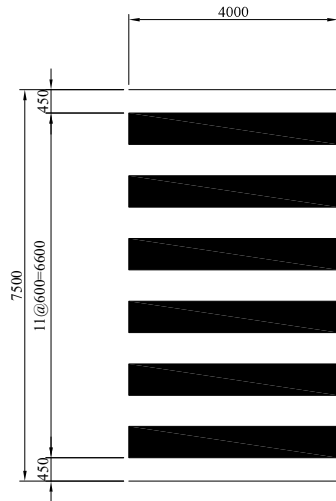
Note :
 1) Concrete strength shall be measured by cylinder crushing strength (Cube crushing strength shall be used cylinder crushing strength \times 1.25 value)
 2) N/mm² = Mpa

MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	TRAFFIC SAFETY DETAILS (2)	PREPARED BY:	DBD-018
				CHECKED BY:	

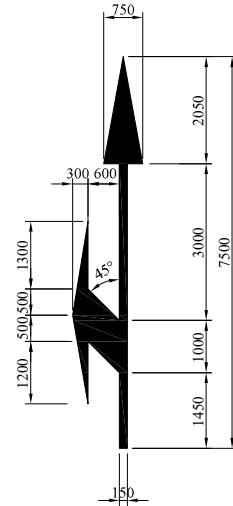
TRAFFIC MARKING DETAILS

SCALE 1:20

PEDESTRIAN-CROSSING

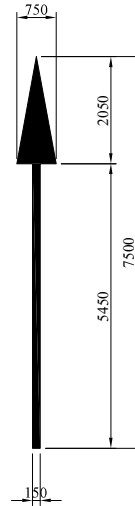


STRAIGHT-LEFT-TURN

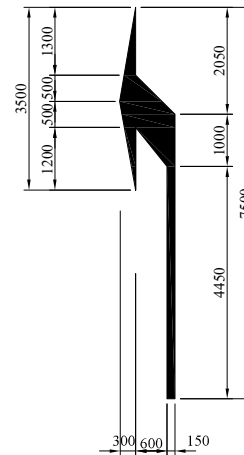


ARROW MARK

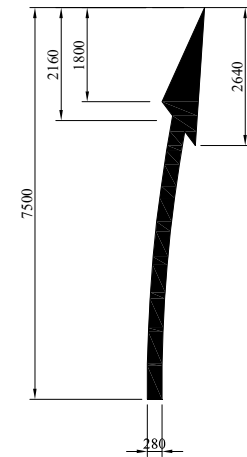
STRAIGHT



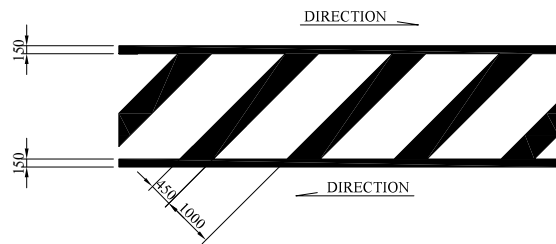
TURN



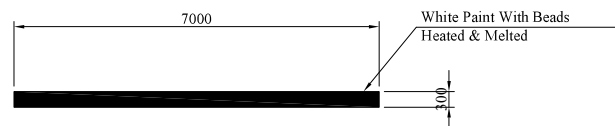
DEFLECTING-ARROWS



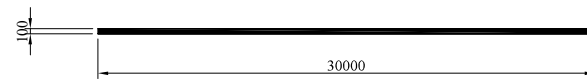
ZEBRA MARKING



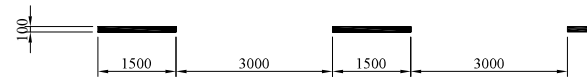
STOP LINE



CONTINUOUS LINE



LANE LINE



LAY BY

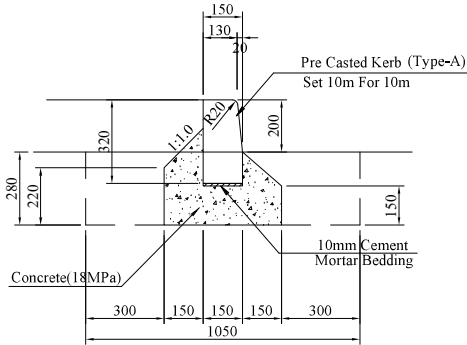


MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	TRAFFIC MARKING DETAILS	PREPARED BY: CHECKED BY:	DBD-019

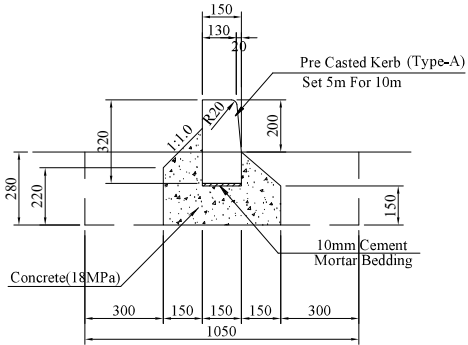
OTHER STRUCTURE DETAILS (1)

SCALE 1:20

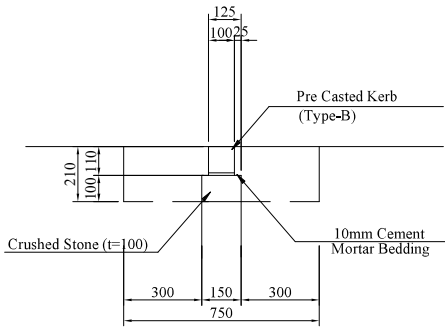
Kerb Stone Type1



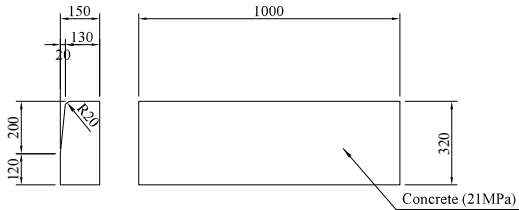
Kerb Stone Type2



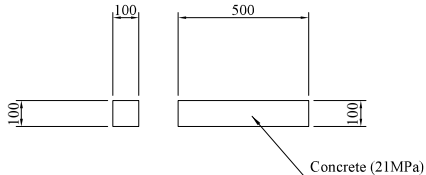
Kerb Stone Type3



Kerb Stone Type-A



Kerb Stone Type-B



MINISTRY OF INFRASTRUCTURE DEVELOPMENT THE UNITED REPUBLIC OF TANZANIA JAPAN INTERNATIONAL COOPERATION AGENCY	CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No. :
	INGEROSEC CORPORATION	PREPARATORY SURVEY ON THE PROJECT FOR WIDENING OF NEW BAGAMOYO ROAD (PHASE-2)	OTHER STRUCTURE DETAILS (1)	PREPARED BY:	DBD-020
				CHECKED BY:	