

THE REPUBLIC OF UGANDA  
MINISTRY OF WORKS AND TRANSPORT

THE PREPARATORY SURVEY  
FOR THE PROJECT  
FOR IMPROVEMENT  
OF GULU MUNICIPAL COUNCIL ROADS  
IN  
NORTHERN UGANDA

FINAL REPORT

MARCH 2016

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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EIGHT-JAPAN ENGINEERING CONSULTANTS INC.  
NIPPON KOEI CO., LTD.  
NTC INTERNATIONAL CO., LTD.

EI
CR(1)
16-008



## PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to Eight-Japan Engineering Consultants Inc. consist of Nippon Koei co., ltd. and NTC International co., ltd.

The survey team held a series of discussion with the officials concerned of the Government of Uganda, 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 the enhancement of friendly relations between our two counties.

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

March, 2016

Akira Nakamura  
Director General  
Infrastructure and Peacebuilding Department  
Japan International Cooperation Agency





## SUMMARY

### **1. Outline of the country**

Since becoming independent in 1962, Uganda's economy was confused up to the latter half of the 1980's due to a continuous civil war. However, since 1987, Uganda has become a country with one of the highest economic growth rates in sub-Saharan Africa. This was achieved through support from the World Bank and IMF promoting the positive structural adjustment program. From 2008, there was inflation due to the price escalation of the international food market and crude oil, but the inflation rate came down after 2011 with the implementing of finance austerity policy. Although the austerity policy and shrinking external demand caused a temporary reduction of the economy growth rate, Uganda recovered to the 5% level in 2014.

Major export products are from agriculture and fishery industries such as coffee, tea and fish. And although it makes up only 28.1 % of the GDP, it accounts for 87% of the population. This explains the low profitability of these industries which is the reason for the low income of the farmers /fisherman, and is also one of the reasons for poverty in this country.

Furthermore, in the Northern Region of Uganda, 61% of the residents live under the poverty line, which is double the average rate of the country. Such a high poverty rate comes from the continuous 20 years of civil war in this region, and basic social infrastructures such as roads, bridges, water, sewage and power were lost in the conflict. 90% of the refugees, which are called IDP (Internally Displaced Persons), were brought about by the conflict concentrated around the Northern Region that includes the Gulu Municipality.

Since the peace agreement between the Uganda Government and the anti-government organization, the recovery process of the Government was conducted and since Gulu was positioned as the core municipality of the region, the population has increased dramatically from 119 thousand in 2002 to 152 thousand in 2014. From this, demand to repair the infrastructures of the Municipality has risen, but due to the many years of civil war, most of the roads were not maintained properly, and peeling of pavement, erosion on the shoulders and deterioration of drainage facilities can be seen.

### **2. Background, Circumstances and Outline of the Grant Aid Project**

Gulu, located in the northern part of Uganda, has a population of 152 thousand people (2011), and is becoming more and more engaged in economic activities as a base for reconstruction assistance after the civil war. Therefore, the Uganda Government is promoting a reconstruction plan for Northern Uganda, and Gulu has been positioned as a focus point for the activities.

However, during the 20 years of civil war, since the roads were not been sufficiently maintained, pavement peeling and road shoulder erosion have occurred in many places throughout the municipality. Since vehicles have to avoid the deteriorated areas, as flooding occurs in many areas especially during the rainy seasons, the road surface and shoulders have become further damaged leading to a situation in which most paved sections allowing smooth and safe travel have been lost. Also, the dust during the dry season and the soil erosion when it rains lead to further worsening of the road conditions, interfering with not only civil life but also with the function as a base for reconstruction. Amid this situation, with the city's tight budget circumstances, even if it finds road maintenance funds for emergency repairs, the municipality would not be able to make any drastic improvements to the extensive and severe deterioration.

Under such circumstances, the Ministry of Works and Transport (MoWT) made a request to the Japanese Government for grant aid relating to road improvement in Gulu. In response to the request, under the pre-condition of applying the Grant Aid for General Projects, the Japanese Government decided to implement the Outline Survey.

### **3. Outline of the Results of the Study and Summary of the Project**

JICA dispatched a study team to Uganda between 28th Feb. 2015 and 12th March to confirm the contents of the Ugandan side's request through discussion with the relevant organizations and agencies. As a result of the discussion, the necessity and importance of improving the Gulu Municipal roads, including river crossing structures, focusing on pavement of carriageways & pedestrians and drainage was confirmed. As a background of subsequent rapid changes of the currency exchange rate and recent price escalation of the construction materials, it was difficult to decide on improving all of the target roads that were requested. Therefore, further discussion was made between the JICA Team and the Ugandan side, and both sides agreed to implement the survey under the condition of placing priority on the targeted roads.

Then, after sharing information on the Agreement to concerned persons/sections in Japan, the Study Team was dispatched between 30th March and 13th May, 2015 as a second survey. In this survey, engineering studies such as natural condition survey (topographic, soil), existing deterioration survey, traffic survey, collection of hydrological data, material cost and procurement, social environment considerations, removal of utilities and progress confirmation of the related projects were carried out.

As a result of this survey, typical cross section, pavement structure, drainage and outline cost estimation were examined and compiled as a DOD (Draft Outline Design) report in Japan, and the Survey Team was dispatched between 16th and 24th September, 2015 for explanation and discussion

of the contents of the DOD report to the Ugandan side. As a result of the discussion, both sides agreed to evaluate and select the target roads to be improved as shown in Table-1.

**Table 1 Evaluation of the targeted roads**

Number	Road name	Evaluation		Distance
1	Kampala Rd.	✓	Is part of the national highway and is a core road in Gulu. Is in extreme need of maintenance.	240 m
2	Acholi Rd.	✓	Is connected with USMID-maintained roads, and is a core road in Gulu. Is in extreme need of maintenance.	1,209 m
3	Lagara Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	220 m
4	Coronation Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	215 m
5	Andrea Olal Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	224 m
6	Nehru Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	219 m
7	Gulu Ave.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	643 m
8	Awich Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	221 m
9	Queens Ave.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	218 m
10	Keyo Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	214 m
11	Aliker Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	219 m
12	Labwor Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	217 m
13	Awere Rd.	✓	Is a route that constitutes the urban center, and also is one of two routes for crossing the Peche River in addition. Is in extreme need of maintenance.	518 m
14	Oliya Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	215 m
15	Labolo Rd.	X	Function as a road is lost due to a government facility extending onto the land for the road. The MOWT has determined that removal and relocation would be difficult and therefore have judged it as appropriate for exclusion as an object for maintenance.	- m
16	Lumumba Ave.	X	Because it is away from the urban center, it is judged as low priority compared to other routes.	- m
17	Jomo Kenyatta Rd.	✓ /X	The section of Route 17 within the urban center is evaluated as very high priority. However, the section east of the intersection with Route 12, as there are no commercial facilities, is evaluated as low priority.	472 m
18	Bank Lane	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	399 m
19	Market St.	✓	Although this is an urban center route, for the road network, since it has a dead end, its priority in comparison with other routes is judged to be relatively low.	163 m
20	Harley Rd.	✓	It is an access route to the central medical hospital in Gulu, and its priority is extremely high.	78 m

21	Prince Rd.	✓	Is part of the national highway and is a central road in Gulu. Is of extremely high priority for maintenance.	160 m
22	Taxi Park	X	In the future, there is also an initiative to move the traffic terminal facility outside of the city, so it is determined appropriate to exclude this from this project.	-
23	Dr. Mathew Lukwiya Rd.	X	As periodic maintenance was carried out in 2014, it is in relatively sound condition. Therefore, compared to other routes, the priority is evaluated as low.	- m
24	Sir Samyuel Rd.	X	Although this has been a passage route for commodities from Sudan, the large-volume traffic has been decreasing in recent years because a bypass has been built. Therefore, compared to other routes, the priority is evaluated as low.	- m
	Total			6,064 m

Pre-mix asphalt concrete will be applied as pavement of the carriageways, and polymer-modified asphalt concrete where severe damage by heavy vehicles can be predicted such as intersections in particular. Considering Gulu is positioned as a central core municipal of Northern Uganda, interlocking pavement was applied to define the turnout and its scenery. Drainage with covers will be placed on both sides of the carriageway-pedestrian strip blocks, and the water will be lead to PECE River at the end of flow. For sections that have to cross PECE River, the vertical alimnt of the road shall be raised higher to avoid overflow of the river, and a box culvert shall be placed that passes under the road to bring water downstream. Furthermore, safety facilities such as humps and sign boards will be installed. Table 2 gives the outline of the proposed contents.

**Table 2 Summary of the Outline Survey**

Item	Description	Quantity	Remarks
Pavement (Carriageway)	Pre-mix asphalt concrete	48,945 m <sup>2</sup>	
	Polymer-modified premix asphalt concrete	2,372 m <sup>2</sup>	At Intersections
Pavement (Pedestrian)	Interlocking block	33,602 m <sup>2</sup>	
Drainage	U (L)-shape concrete drainage	19,403 m	
	Pipe culvert	1,163 m	φ300, 600, 900
	Box culvert	30 m	H1.0m×W2.0m, 2 sections
Safety Facilities	Hump	618 m	
	Sign boards	348 No.	

#### 4. Implementations Programme and Preliminary Cost Estimation

The planned implementation period necessary for the Project is 7.5 months for the detailed design and 22.5 months for the construction works. The Project will be implemented in accordance with Japan's Grant Aid scheme and the costs will be determined before concluding the Exchange Note for the Project.

## 5. Project Evaluation

### 5.1 Appropriateness

Table 3 shows the appropriateness of implementation of this Project.

**Table 3 Appropriateness of project implementation**

Evaluation item	Appropriateness
1) Profiting population	Those directly profiting from the repair of Gulu city roads are the 154,000 residents of Gulu city. If the surrounding Gulu District is included, the total is approximately 930,000 people. This is equivalent to 2.5% of the country's population. Furthermore, because the project area is stopping-over point of an international main road, all 37.58 million residents of Uganda, as well as the residents of Kenya and Somalia, will profit indirectly from the implementation of this project.
2) Promotion of economic growth / Contribution to peace building	Gulu city is the only base city in northern Uganda, and the economic effect from the servicing of the transportation facilities of Gulu city will be extremely large. Furthermore, because the area is an important transportation point connecting to an international corridor, this project can contribute to the smooth transportation of goods and benefit the users and residents through economic growth. Additionally, because of the civil war that has occurred over the last 20 years in the northern region, we expect that the implementation of this project will contribute to peace building in the northern area.
3) Coordination with Parliamentary development projects	In Uganda, Uganda Vision 2040 and NDP II aim for Uganda to become a middle-income nation through a reduction of the poverty rate and improvement in income, and road servicing is highly expected to spread the economic effect. Meanwhile, the Peace, Recovery and Development Plan 2 (PRDP2) indicates that appropriate maintenance of district, urban and community access roads (DUCAR) in the northern region promote economic recovery and mitigate potential conflict drivers. This project will contribute to these objectives.
4) Coordination with the support policies of Japan	This project was proposed as a maximum-priority project in the master plan targeting the Acholi region implemented by Japan in 2012. In addition, "Peace building in Northern Uganda" and "Infrastructure improvement to achieve economic growth" are important areas in Japan's Country Assistance Policy for the Republic of Uganda, and this project is in agreement with these policies.

### 5.2 Effectiveness

#### (1) Quantitative effects

Table 4 shows the quantitative effects expected from the implementation of this project.

**Table 4 Quantitative effects**

Index name	Standard value (Achievement value for 2015)	Target value (2021) [3 years after project completion]
Flatness (IRI) (m/mm)	6.23	3 or less
No. of traffic accidents (incidents)	26	13 or less
Road closures (days per year)	7	0

**(2) Qualitative effects**

- Considerable improvement of the flatness of road pavement and servicing of sidewalk pavement will result in a district with activity appropriate for a base city in the northern region.
- Traffic blockage due to road flooding in the rainy season will be eliminated, and access to public services and markets by road users and citizens will be secured year-round.
- Improvement of main intersections will increase traffic safety considerably for pedestrians and other vulnerable road users in particular.
- Repair of city roads will contribute to the strengthening and stabilization of physical distribution facilities connecting the northern region and the consumption area of Kampala, as well as with surrounding countries.

Due to the content above, implementation of this project is highly appropriate and anticipated to be effective as well.

# CONTENTS

**Preface**

**Summary**

**Contents**

**Location Map/Perspective**

**List of Figures and Tables/Abbreviations**

<b>Chapter 1 Background of the Project</b> .....	1
1-1 Background and overview of the Project.....	1
1-2 Natural Condition .....	4
1-2-1 General Situation.....	4
1-2-2 Rainfall and air temperature.....	5
1-3 Environment and social considerations .....	5
1-3-1 Environment impact assessment .....	5
1-3-1-1 Condition of the base environment and society .....	6
1-3-1-2 Countermeasures of the environment impacts of the Project.....	12
1-3-2 Land acquisition and resettlement.....	35
<b>Chapter 2 Contents of the Project</b> .....	40
2-1 Basic concept of the Project .....	40
2-2 Outline design of the Japanese Assistance.....	41
2-2-1 Design policy.....	41
2-2-2 Basic Design (Construction Plan) .....	46
2-2-2-1 Hydrological and Hydraulic Surveys .....	46
2-2-2-1-1 Calculation of the rainfall intensity formula.....	46
2-2-2-1-2 Considering river crossing for the Pece River .....	47
2-2-2-2 Topographical Surveys and Geological Surveys.....	52
2-2-2-2-1 Topographical Surveys .....	52
2-2-2-2-2 Geological Surveys.....	53
2-2-2-3 Design standards .....	54
2-2-2-4 Road classification .....	55
2-2-2-5 Pavement Design.....	62
2-2-2-6 Drainage Facility Design .....	72
2-2-2-6-1 Rainwater drainage System .....	72
2-2-2-6-2 Discharge of Storm water .....	72

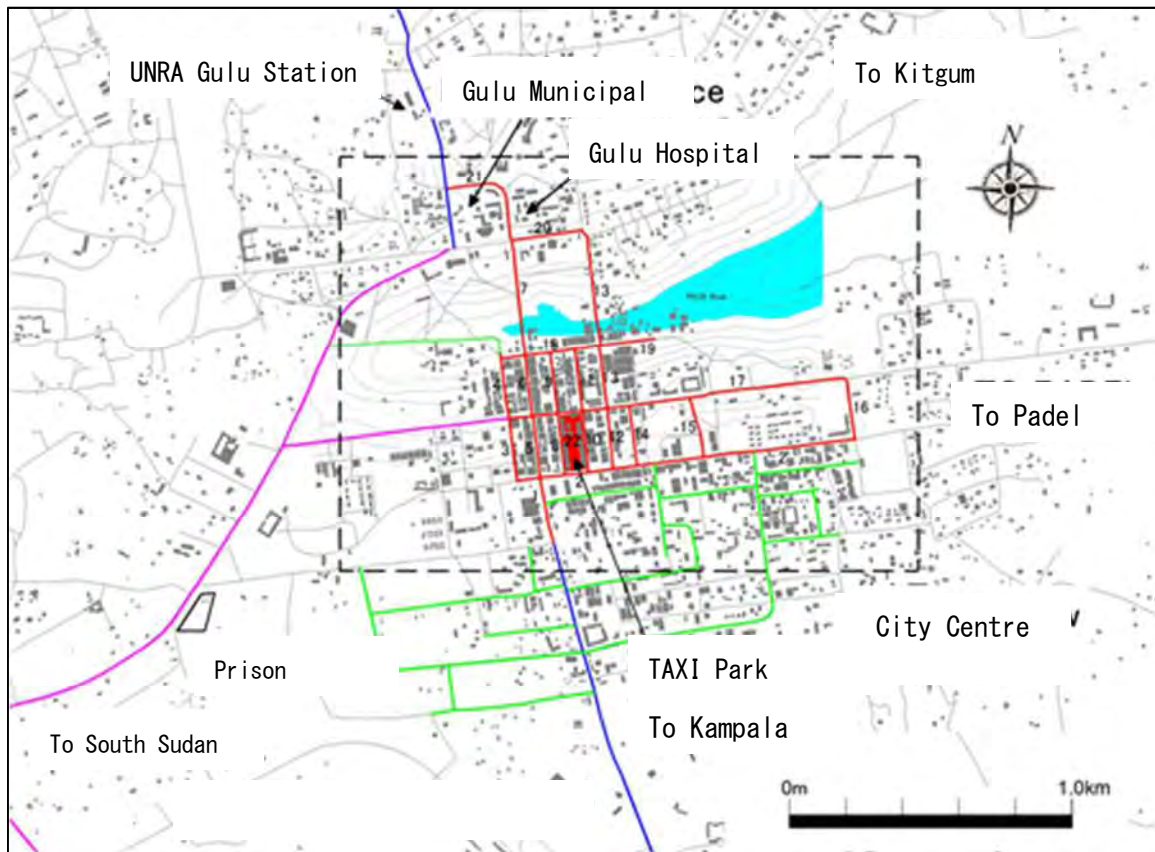
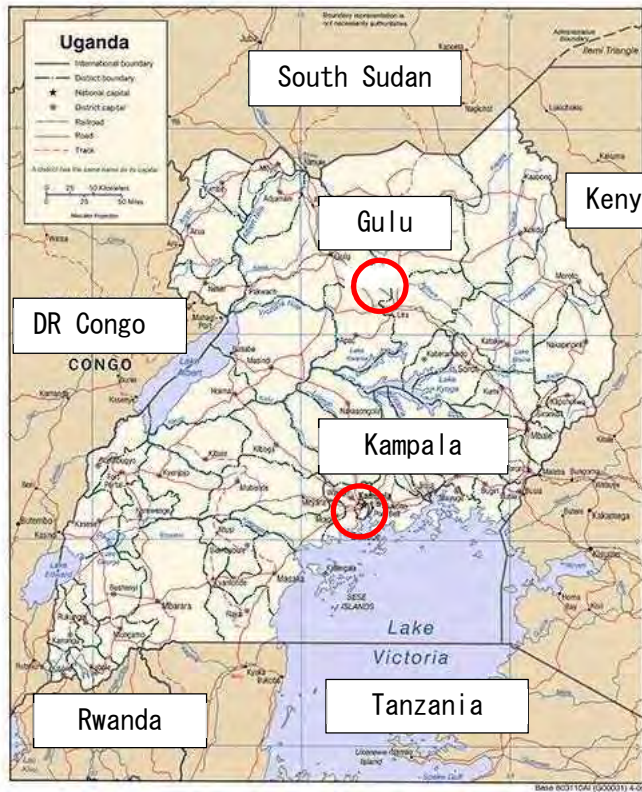
2-2-2-6-3 Drainage Facility Plan .....	75
2-2-2-7 Intersection Design .....	77
2-2-2-8 Ancillary Facility Design .....	80
2-2-2-9 Replacing Soft Ground.....	85
2-2-2-10 Retaining Walls .....	85
2-2-3 Outline Design Drawing.....	85
2-2-4 Implementation Plan .....	85
2-2-4-1 Implementation Policy .....	85
2-2-4-2 Implementation Conditions.....	88
2-2-4-3 Scope of Works .....	91
2-2-4-4 Consultant Supervisions.....	91
2-2-4-5 Quality Control Plan .....	94
2-2-4-6 Procurement Plan .....	95
2-2-4-7 Soft Component (Technical Assistance) Plan .....	98
2-2-4-8 Implementation Schedule.....	101
2-3 Obligation of Recipient Country .....	101
2-4 Project Operation Plan.....	102
2-5 Project Cost Estimation .....	102
2-5-1 Initial Cost Estimation.....	102
2-5-2 Cost borne by the Uganda side.....	103
2-5-3 Operation and Maintenance Cost .....	104
<b>Chapter 3 Project Evaluation .....</b>	<b>105</b>
3-1 Precondition.....	105
3-2 Necessary Inputs by Recipient Country .....	107
3-3 Important Assumptions.....	107
3-4 Project Evaluation.....	108
3-4-1 Relevance .....	108
3-4-2 Effectiveness .....	108



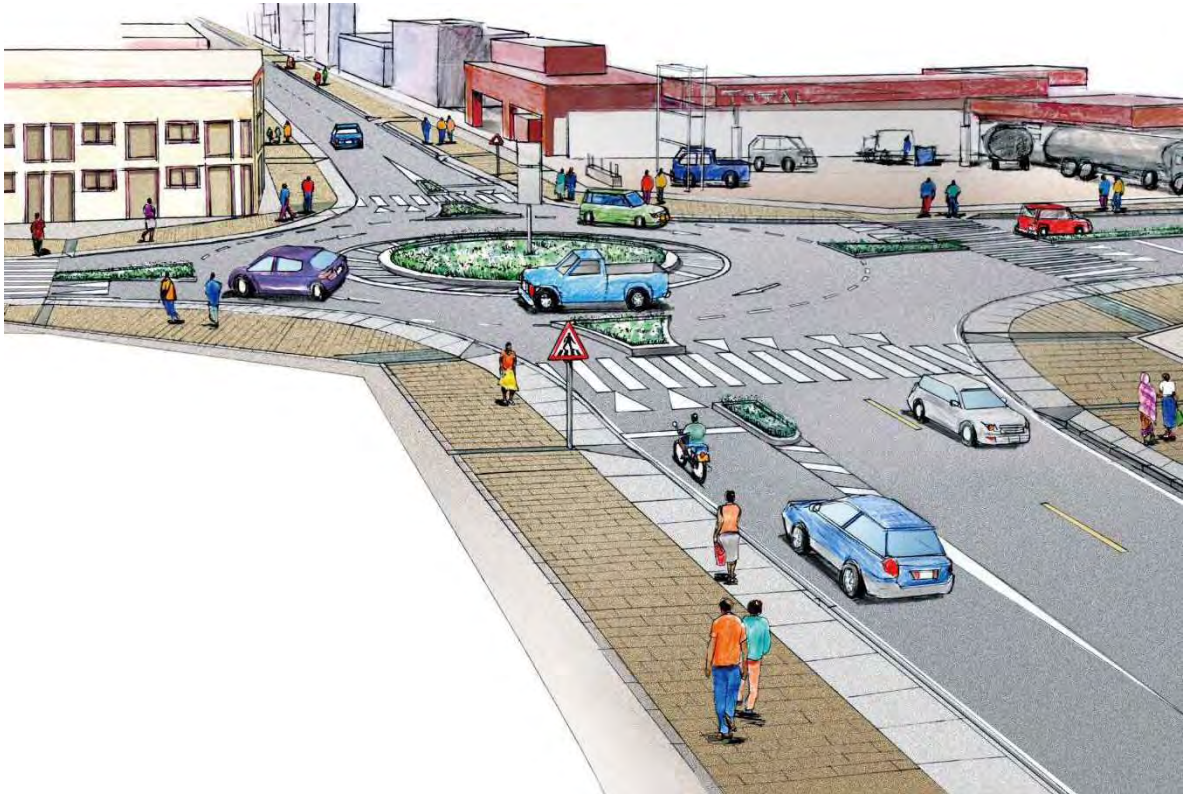
**【Appendix】**

1. Member list of the Study Team.....	Appendix-3
2. Study Schedule .....	Appendix-7
3. List of Parties Concerned in the Recipient Country.....	Appendix-13
4. Minutes of Discussions .....	Appendix-17
5. Outline Design Drawing .....	Appendix-131
6. Reference .....	Appendix-199

# LOCATION MAP





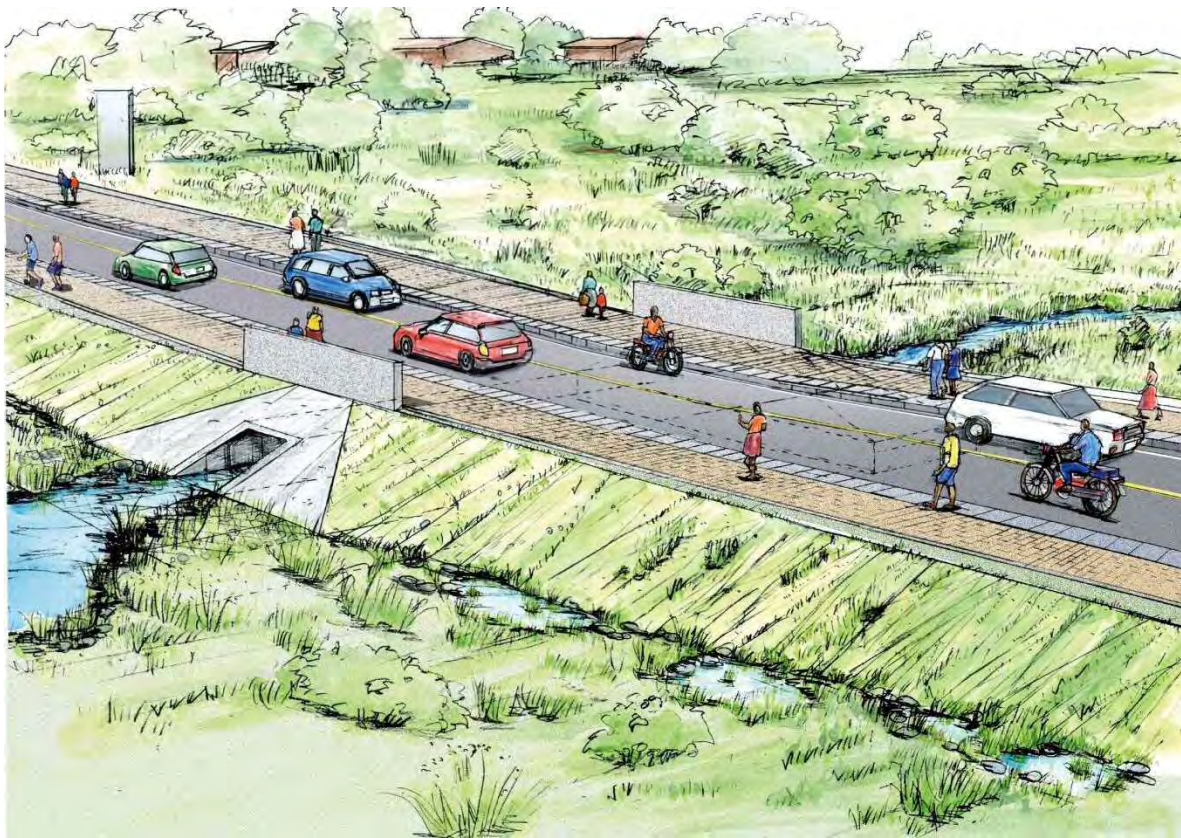


**PERSPECTIVE 1 (Intersection of Acholi Road and Kampala Road(Roundabout))**



**PERSPECTIVE 2 (Acholi Road near entrance/exit of TAXI park)**





**PERSPECTIVE 3 (Gulu Avenue crossing Pece river)**

## LIST OF FIGURES AND TABLES

### (Figure)

Figure 1-1-1 Route and location of the targeted road of the Project	4
Figure 1-3-1 Nature preserves in Uganda	6
Figure 1-3-2 Representative ecosystem and vegetation at the project site and Pece River	7
Figure 1-3-3 Geological conditions in project areas	8
Figure 1-3-4 EIA workflow in the Ugandan National road sector (Category IV case)	15
Figure 1-3-5 EMMP implementation system (draft)	34
Figure 1-3-6 Image of stakeholder conference	35
Figure 1-3-7 Road site and range of construction	36
Figure 1-3-8 Location of facilities along Acholi Road (#2) subject to relocation	37
Figure 2-2-1 Rainfall intensity curve	47
Figure 2-2-2 Catchment basin partition image	48
Figure-2-2-3 Flood control diagram (Gulu Avenue box culvert)	50
Figure 2-2-4 Flood control diagram (Awere Avenue box culvert)	51
Figure 2-2-5 Geological survey position diagram	54
Figure 2-2-6 Typical cross section (1/2)	59
Figure 2-2-7 Typical cross section (2/2)	60
Figure 2-2-8 Standard section allotment	61
Figure 2-2-9 Hourly traffic volume and average daily traffic at peak times in the morning and evening	65
Figure 2-2-10 Pavement structure for sidewalks and its application	71
Figure 2-2-11 Pavement structure at vehicle entrance/exits on sidewalks	71
Figure 2-2-12 Drainage network	73
Figure 2-2-13 Roundabout intersection structures	78
Figure 2-2-14 Raised crosswalks at intersections (example of their applications)	79
Figure 2-2-15 Controlling traffic on Acholi road using central median strip	84

### (Table)

Table 1-1-1 Recipient Government request contents	1
Table 1-1-2 Evaluation of targeted roads	2
Table 1-2-1 Collected meteorological data	5
Table 1-2-2 Monthly meteorological data for Gulu	5
Table 1-3-1 Results of basic water-quality examinations	8
Table 1-3-2 Population and growth rate of Gulu municipal	9
Table 1-3-3 Number of households and population by sex in Gulu Municipal in 2014	10
Table 1-3-4 Average monthly income by regions (UGX)	10
Table 1-3-5 Comparison of health care indices in Uganda and the Gulu Districts	10

Table 1-3-6 Literacy rates for population aged 10 years and above .....	11
Table 1-3-7 Schools on the routes of the Project .....	11
Table 1-3-8 Experience of Gulu Municipal with land actuations and comparisons .....	13
Table 1-3-9 Scoping results .....	16
Table 1-3-10 IEE-level EIA results .....	19
Table 1-3-11 Proposed mitigation measures .....	24
Table 1-3-12 Environment Mitigations & Monitoring Plan (EMMP) .....	28
Table 1-3-13 Summary of stakeholder conference .....	34
Table 1-3-14 Facilities along Acholi Road (#2) subject to relocation .....	36
Table 2-2-1 Probable daily rainfall in Gulu .....	46
Table 2-2-3 Flood control basin capacity .....	49
Table 2-2-4 The TRRL east African flood model (25 years recurrence interval) .....	49
Table 2-2-5 Outflow from the flood control basin .....	50
Table 2-2-6 Flood control volume and planned flood discharge .....	51
Table 2-2-7 Surveying items and quantiles .....	52
Table 2-2-8 Routes targeted for surveying .....	52
Table 2-2-9 Geological survey details .....	53
Table 2-2-10 Design standard documents applied and referred to for this survey .....	55
Table 2-2-11 Road classification for the targeted routes .....	55
Table 2-2-12 Road classes for design .....	56
Table 2-2-13 Classification consideration for the targeted roads .....	56
Table 2-2-14 Geometric structure parameters .....	57
Table 2-2-15 Dimensions of the design vehicle .....	57
Table 2-2-16 Selection table for the pavement design period .....	62
Table 2-2-17 Existing data on traffic condition and current (2015) traffic volume .....	64
Table 2-2-18 Setting the current traffic volume for each route .....	66
Table 2-2-19 Uganda's GDP growth rate .....	67
Table 2-2-20 Traffic volume growth rate set for this project .....	67
Table 2-2-21 ESAL conversion factor per vehicle by type of vehicle (VDP) .....	67
Table 2-2-22 Design ESAL for each route classification and pavement design traffic classification .....	67
Table 2-2-23 Calculation of the design CBR .....	69
Table 2-2-24 Traffic class via design ESAL .....	70
Table 2-2-25 Roadbed load bearing capacity class via design CBR .....	70
Table 2-2-26 Pavement structure for each route .....	70
Table 2-2-27 Runoff coefficient for the ground surface .....	74
Table 2-2-28 Design flow volume .....	75
Table 2-2-29 Drainage facility types and applications .....	76
Table 2-2-30 General descriptions of roundabout intersections .....	77

Table 2-2-31 Intersections where raised crosswalks will be installed .....	80
Table 2-2-32 Installation approach for road design .....	81
Table 2-2-33 Sections where traffic signs will be installed .....	81
Table 2-2-34 Roadside parking lanes .....	82
Table 2-2-35 Trees that pose an obstacles .....	83
Table 2-2-36 Retaining wall work .....	85
Table 2-2-37 Analysis and test methods regarding quality control .....	94
Table 2-2-38 Sources of main construction materials .....	96
Table 2-2-39 Construction machinery sources .....	97
Table 2-2-40 Soft component activities plan (draft) .....	99
Table 2-2-41 Project implementation progress schedule (draft).....	101
Table 2-5-1 Breakdown of the appropriate project costs .....	103
Table 2-5-2 Cost borne by the Ugandan side .....	103
Table 2-5-3 Required maintenance cost after handover .....	104
Table 3-4-1 Appropriateness of project implantation .....	107
Table 3-4-2 Quantitative effects .....	108

## **ABBREVIATION**

AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
CBD	Central Business District
CBR	California Bearing Ratio
DBST	Double Bitumen Surface Treatment
DD	Data Deficient
D/EMC	Environmental Monitoring and Compliance Department
DOD	Draft Outline Design
DUR	District and Urban Roads
EIA	Environment Impact Assessment
ELU	Environment Liaison Unit
EMMP	Environment Mitigation and Management Plan
EMP	Environment Management Plan
E/N	Exchange of Notes
ESAL	Equivalent Single Axle Load
G/A	Grant Agreement
GDP	Gross Domestic Product
GMC	Gulu Municipal Council
IDP	Internally Displaced Persons
IEE	Initial Environment Evaluation
JICA	Japan International Cooperation Agency
MLIT	Ministry of Land, Infrastructure and Transport
MOWHC	Ministry of Works, Housing and Communications
MoWT	Ministry of Works and Transport
NEMA	National Environment Management Authority
PRDP	The Peace, Recovery and Development Plan for Northern Uganda
RAP	Resettlement Action Plan
TOR	Terms of Reference
UBOS	Uganda Bureau of Statistics
UNHS	Uganda National Household Survey
UNRA	Uganda National Road Authority
USMID	Uganda Support to Municipal Infrastructure Development Program Project
VDF	Vehicle Damage Factor
VIMS	Vehicle Intelligent Monitoring System





## CHAPTER 1 BACKGROUND OF THE PROJECT

### 1-1 Background and Overview of the Project

#### (1) Request history and content

Gulu located in the northern part of Uganda has a population of 152 thousand people (2011) and is becoming more and more engaged in economic activities as a base for reconstruction assistance after the civil war. In addition, the city has become the pass-through center for the northern region, and, in recent years, the economic and transportation hub for peace-building in South Sudan. Particularly from December 2013, in response to the sudden changes in the situation in South Sudan, refugees from a location on the South Sudan border about 105 km to the north flooded into the city area, making the stability of the city's local and economic infrastructures vital for supporting Uganda's entire influx of refugees (estimated 130,000).

The Uganda government has been promoting a reconstruction plan for the northern Uganda region based on PRDP2, and Gulu has been positioned as a focal point for these activities. However, during the 20 years of civil war, because the roads had not been sufficiently maintained, pavement peeling and road shoulder erosion have occurred in many places throughout the city. Besides the vehicles having to avoid the deteriorated areas, as flooding occurs in many areas especially during rainy season, the road surface and shoulders become further damaged leading to a situation in which most paved sections allowing smooth and safe travel have been lost. Also, the dust during the dry season and the soil erosion when it rains lead to further worsening of the road conditions, interfering with not only civil life but also the function as a base for reconstruction. Amid this situation, with the city's tight budget circumstances, even if it finds the road maintenance funds for emergency repairs, the city is unable to make any drastic improvements to the extensive and severe deterioration.

Under such circumstances, the Ministry of Works and Transport (MoWT) has made a request to Japan for grant aid relating to road improvement in Gulu. Through this project, by the improvements to the traffic function and contributions to the local infrastructure of Gulu as the only base city in Uganda's northern area, the promotion of peace building in the entire region can be anticipated. In addition, with this strategic point of traffic connecting to the international corridor, by contributing to the smooth transportation of goods and benefiting the users and citizens through economic growth, we can anticipate retaining peace among the people.

The contents of the request are shown in **Table 1-1-1**.

**Table 1-1-1 Recipient government request contents**

Item	Request content
Facilities and equipment	- Renovation of Gulu roads, about 8.5 km - Drainage facilities - 2 box culverts
Consulting services	- Detailed design, construction supervision

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

	- Technology transfer related to road maintenance methods (hereinafter, “Soft-Components”)
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**(2) Routes targeted in this project**

Requests for the project were made by the Uganda government in 2013, but the objects of improvement will need to be narrowed down in line with the subsequent rapid changes in the currency exchange environment. The results of the evaluation are shown in **Table 1-1-2**. Note that detailed design, construction supervision, soft-components are implemented as requested.

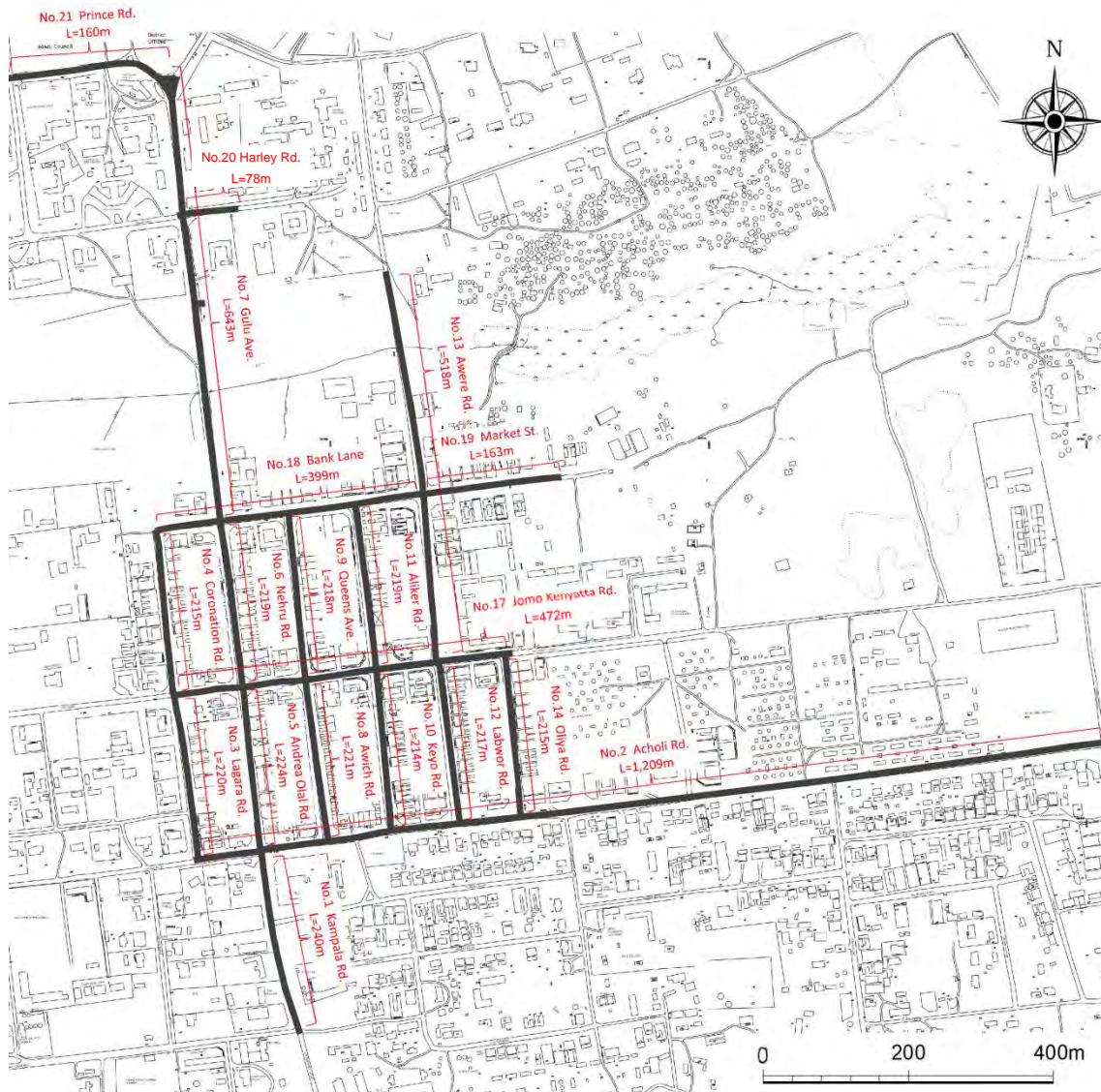
**Table 1-1-2 Evaluation of the targeted roads**

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5	Andrea Olal Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	224 m
6	Nehru Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	219 m
7	Gulu Ave.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	643 m
8	Awich Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	221 m
9	Queens Ave.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	218 m
10	Keyo Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	214 m
11	Aliker Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	219 m
12	Labwor Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	217 m
13	Awere Rd.	✓	Is a route that constitutes the urban center, and also is one of two routes for crossing the Peche River in addition. Is in extreme need of maintenance.	518 m
14	Oliya Rd.	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	215 m
15	Labolo Rd.	✓	Function as a road is lost due to a government facility extending onto the land for the road. The MOWT has determined that removal and relocation would be difficult and therefore have judged it as appropriate for exclusion as an object for maintenance.	- m
16	Lumumba Ave.	X	Because it is away from the urban center, it is judged as low priority compared to other routes.	- m
17	Jomo Kenyatta Rd.	✓ /X	The section of Route 17 within the urban center is evaluated as very high priority. However, the section east of the intersection with Route 12, as there are no commercial facilities, is evaluated as low priority.	472 m
18	Bank Lane	✓	Is a route that constitutes the urban center, and is in extreme need of maintenance	399 m

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

19	Market St.	✓	Although this is an urban center route, for the road network, since it has a dead end, its priority in comparison with other routes is judged to be relatively low.	163 m
20	Harley Rd.	✓	It is an access route to the central medical hospital in Gulu, and its priority is extremely high.	78 m
21	Prince Rd.	✓	Is part of the national highway and is a central road in Gulu. Is of extremely high priority for maintenance.	160 m
22	Taxi Park	X	In the future, there is also an initiative to move the traffic terminal facility outside of the city, so it is determined appropriate to exclude this from this project.	-
23	Dr. Mathew Lukwiya Rd.	X	As periodic maintenance was carried out in 2014, it is in relatively sound condition. Therefore, compared to other routes, the priority is evaluated as low.	- m
24	Sir Samyuel Rd.	X	Although this has been a passage route for commodities from Sudan, the large-volume traffic has been decreasing in recent years because a bypass has been built. Therefore, compared to other routes, the priority is evaluated as low.	- m
	Total			6,064 m

The route and location indicated in the **Table 1-1-2** are shown in **Figure 1-1-1** given bellow.



**Figure 1-1-1 Route and location of the targeted road of the Project**

## 1-2 Natural conditions

### 1-2-1 General situation

Uganda is located in the East African Plateau. As a country on the plateau, it has an average elevation of 1,100 m. The Southern region is slightly higher, and the elevation slopes gently downwards to the Sudan border to the north. The national land area is about 241,000 km<sup>2</sup>. The regional inland water area, including Lake Victoria, is approximately 44,000 km<sup>2</sup>, and the land area is about 197,000 km<sup>2</sup>. Because the country is located below the equator, the climate changes little by location, and the southern part has a lot of rain year-round. The rainy seasons of city of Entebbe on the northern shore of Lake Victoria are from March to June and November to December. Gulu is located in northern Uganda. Gulu's rainy season is from May to October, and it is extremely dry from November to February.

### 1-2-2 Rainfall and air temperature

Meteorological data in Uganda is managed by the Department of Meteorology and the Uganda Bureau of Statistics, and there is an observation station in Gulu. For this project, an analysis was carried out using the daily rainfall, air temperature, relative humidity, and other data obtained from the Gulu observation station. **Table 1-2-1** lists the collected data.

**Table 1-2-1 Collected meteorological data**

Item	Collection term (in years)
Daily rainfall	1991 - 2014 (24)
Monthly air temperature	1990 - 2014 (25)
Monthly relative humidity	2009 - 2013 (5)

**Table 1-2-2** shows the average monthly maximum temperatures, minimum temperatures, and rainfall from 1990 to 2014. The average yearly maximum temperature and minimum temperature were 30.2°C and 18.7°C, respectively. The average yearly rainfall was 1,485.2 mm.

**Table 1-2-2 Monthly meteorological data for Gulu**

Month	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Oct	Nov	Dec	Total	Average
Rainfall (mm)	18.3	18.9	66.5	152.9	168.3	142.3	222.5	171.5	203.9	119.1	40.0	1,485.2	
T-Max (°C)	32.3	33.3	32.6	30.3	29.4	28.2	28.4	29.4	29.5	29.8	31.0		30.2
T-Min (°C)	18.4	19.3	19.7	19.3	19.0	18.7	18.2	18.0	18.1	18.4	18.3		18.7

Note: Rainfall data is missing for March 2002 and December 2007.

Source: Created by JICA Study Team based on data from the Department of Meteorology of the Ministry of Water and Environment (MoWE).

### 1-3 Environmental and societal consideration

#### 1-3-1 Environmental impact assessment

Since it was determined this project does not fall under "Sensitive sectors/characteristics and sensitive regions" listed in the "Guidelines for environmental and societal concerns (April 2010)" (hereinafter referred to as the Environmental guidelines) and the undesirable impacts on the environment are not serious, this project was classified as Category B, which requires an EIA through an Initial Environment Evaluation (IEE).

On the other hand, because this project involves construction in an urban area, it corresponds to Category IV, which requires an EIA, according to the EIA guidelines prescribed by National Environment Management Agency (NEMA), the organization responsible for environmental impact assessments (EIA) in Uganda. Although implementation of an EIA is the responsibility of the local government, following support for the MoWT was provided to ensure smooth implementation of this

project.

- Creation of project briefing
- Creation of Environment Management Plan (EMP)
- Provided support for the creation of Terms of Reference (TOR) (draft) necessary for the procurement of consultants to implement the EIA.

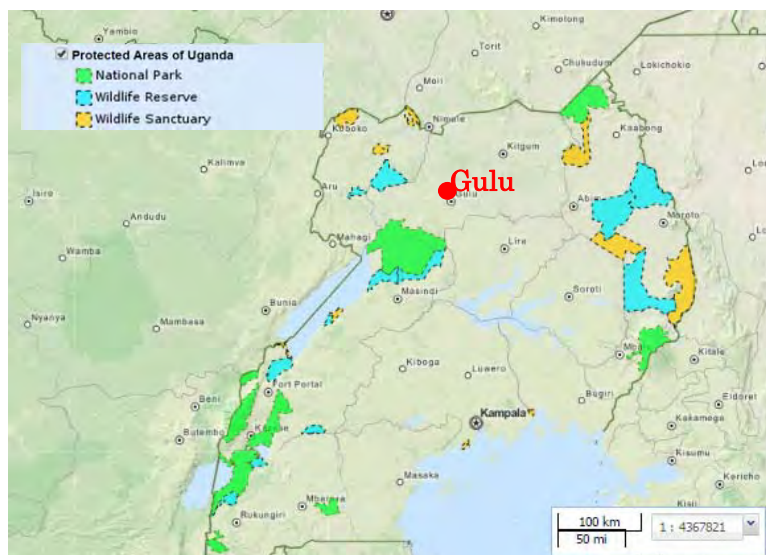
Furthermore, the following items were heeded and investigated shall make consultation to MoWT and Gulu Municipal when construction.

- Carry out a plan that considers traffic safety, including during the construction term, because the project involves road repair in a provincial city with a population over 150,000
- Make efforts to minimize the number of residents adversely impacted by road repair

### 1-3-1-1 Conditions of the base environment and society

#### (1) Protected regions

No national parks or nature conservation areas were found in or around Gulu Municipal, the target area of the project. **Figure 1-3-1** shows the location of national parks and nature conservation areas in Uganda.



**Figure 1-3-1 Nature preserves in Uganda**

Source: Environmental Information Network in Uganda (EIN: UG), 2014

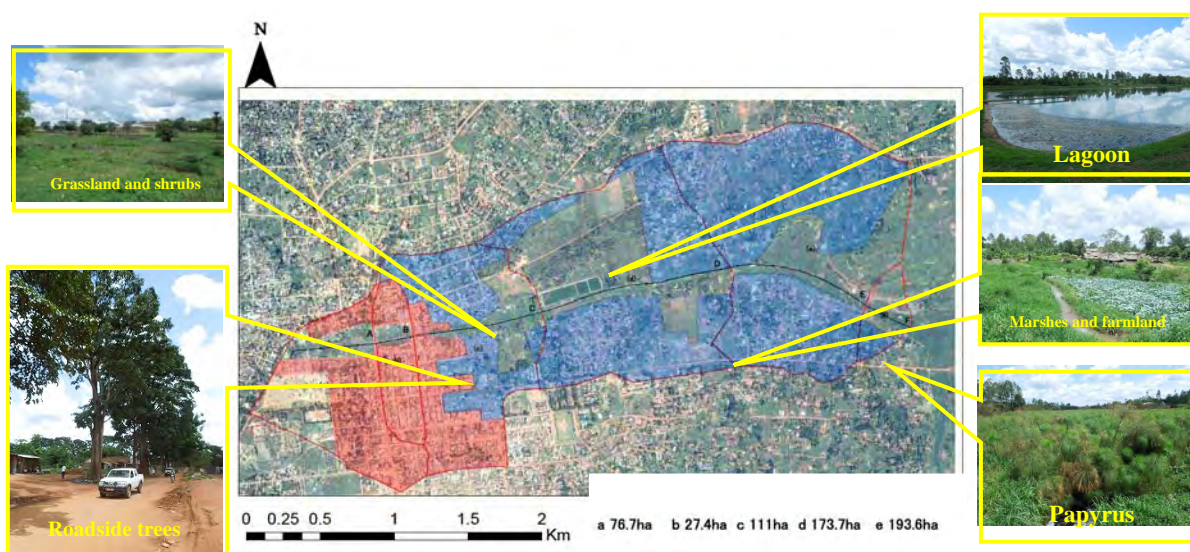
#### (2) Ecosystem and vegetation

According to the vegetation classification of Langlands (1974), the Gulu District belongs to the



intermediate savanna grassland. The main shrubs in this district include *Acacia* (LC<sup>1</sup>), *Ficus natalensis* (LC), *Combretum boanasus* (not applicable), *Aethiopum* (fan palm) (not applicable), and representative herbs include *Imperatus cylindrica* (not applicable), *Hypenaria fufa*, and *Digitaria scalarum* (LC or DD)<sup>2</sup>.

Because the project area is in the urban region of Gulu Municipal, vegetation is mostly limited to the Pece River and its watershed catchment areas and the roadside trees artificially planted in urban areas. There are three sewage disposal facilities called lagoons along the Pece River. After treatment, the clear layer of the water flows to the downstream sector where papyrus grows thickly. Furthermore, cultivation of vegetables, taro, and other items by residents along the Pece River was identified. No plants or animals considered endangered species were identified in these regions.



**Figure 1-3-2 Representative ecosystems and vegetation at the project site and Pece River**

Source: JICA Study Team

### (3) Roadside trees

Trees and shrubs that may be impacted by construction among the roadside trees of Gulu Municipal include 107 adult trees, 6 young trees, and 50 m<sup>2</sup> of liana. For the trees to be lost, trees will be planted on other routes that have room at their road sites, and young trees will be transplanted to locations not impacted by construction.

### (4) Meteorology

Indicated in Chapter 2-2-2-1.

### (5) Geology

According to the Geological Map of Uganda, the bedrock around the project site is comprised of gneissic granitoids, gneiss, and amphibolites. **Figure 1-3-3** shows the geological conditions of the

<sup>1</sup> IUCN red list: Least Concern (LC), Data Deficient (DD)

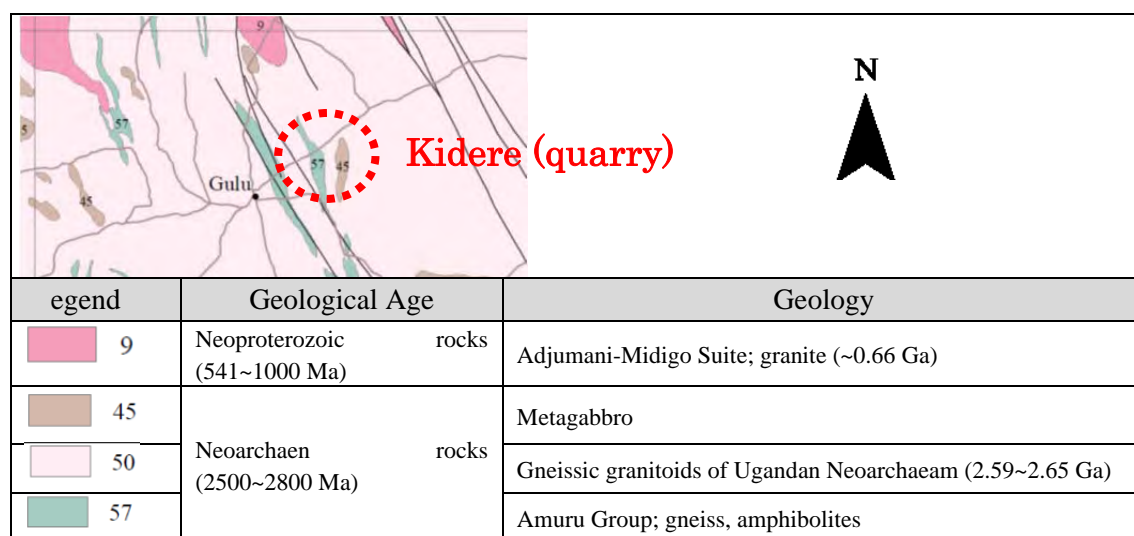
<sup>2</sup> Gulu District Environment Report 2004



project area.

### (6) Water quality

A basic water quality examination was carried out for the three wells used by the residents and the Pece River. The examination confirmed that almost all items met the water-quality standards of Uganda. However, the concentration of nitrate nitrogen and ammonium nitrogen of the Pece River showed a slightly high trend for drinking water.



Source : Geological Map of Uganda, Scale: 1:1,000,000

**Figure 1-3-3 Geological conditions in project subject area**

**Table 1-3-1 Results of basic water-quality examination**

Item/Site	Borehole in Taxi Park	Groundwater in Lamdogi	Borehole in Oliangolong (#24 Rd.)	Ugandan Standard*	Pece River
Time	14:30	15:10	15:30	---	16:00
Coordination	N 02°46'15.0'' E 032°17'57.2''	N 02°46'27.6'' E 032°17'54.6''	N 02°45'59.8'' E 032°17'27.9''	---	N 02°46'32.3'' E 032°18'00.0''
Elevation	1,107 m	1,102 m	1,116 m	---	1,104 m
Temp.	27 °C	27 °C	27 °C	---	33 °C
Taste**	Acceptable	Acceptable	Acceptable	Acceptable to consumers and no abnormal changes	N/A
Color**	Acceptable	Acceptable	Acceptable	15 true color units (TCU)	Slightly yellow ocher
Odor**	Acceptable	Acceptable	Acceptable	Acceptable to consumers and no abnormal changes	Smelly
EC	0.20 mS/cm	0.30 mS/cm	0.30 mS/cm	2.5 mS/cm	0.50 mS/cm
pH	7.1	7.1	7.7	6.5-8.5	7.4
Fe	< 0.05 mg/L	< 0.05 mg/L	0.05 – 1.0 mg/L	1.0 mg/L	N/A
NH <sub>4</sub> <sup>+</sup> -N	< 0.2 mg/L	< 0.2 mg/L	0.2 mg/L	1.0 mg/L	1.0 - 2.0 mg/L
NO <sub>2</sub> <sup>-</sup> -N	< 0.005 mg/L	< 0.005 mg/L	< 0.005 mg/L	0.2 mg/L***	0.2 - 0.5 mg/L
PO <sub>4</sub> <sup>3-</sup> -P	< 0.02 mg/L	< 0.02 mg/L	0.20 mg/L	N/A	< 0.02 mg/L

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

COD	< 5 mg/L	< 5 mg/L	< 5 mg/L	N/A	> 8 mg/L
TH (CaCO <sub>3</sub> )	20 – 50 mg/L	10 – 20 mg/L	50 – 100 mg/L	N/A	N/A

Note: Water quality was tested on Apr. 14, 2015 (Sunny day), more than 25 hours after the last rainfall.

\* : Uganda Standard Drinking (potable) water – Specification. 2008. Class II (untreated water like borehole and springs).

\*\* : Taste, color, and odor are evaluated by visual observation, smelling and tasting by surveyors and users.

\*\*\* : Uganda Standard Drinking (portable) water- Specification 2008. Requirements for chemicals from industrial source.

Source: JICA Study Team

### (7) Land use

The results of measuring the land-use classification of the approximately 600-hectare catchment area of this project based on satellite imagery showed that the commercial area was about 17%, the residential area was about 52%, and the greenery area was about 30%. Because this project involves repair of the existing roads, this pattern of land use will not change.

### (8) Land ownership configuration

According to land laws, the land ownership system of Uganda is classified into the following categories: *mailo*, freehold, customary tenure, and leasehold. According to the United Nations Human Settlements Programme (2010), the land ownership configuration of Gulu Municipal is 75.8% freehold, 6.1% *mailo*, and 18.2% unknown.

### (9) Population and ratio of population increase

The population of Gulu Municipal was 119,000 in 2002. This increased at a yearly average population growth rate of 1.9% (the national average population growth rate was 3.0%) and reached 152,000 in 2014. Table 2-2-4 shows the number of households and the population in the four sub-counties that make up Gulu Municipal as of 2014. Furthermore, **Table 1-3-2** shows the number of households and the population by sex in Gulu Municipal. According to this data, the total number of households in Gulu Municipal is approximately 29,000. The average household size is 4.9 people, and the sex ratio<sup>3</sup> is 0.95.

**Table 1-3-2 Population and growth rate of Gulu Municipal**

District	Urban Centre	Census population			Growth Rate (2002-2014)
		1991	2002	2014	
Gulu	Gulu Municipality	38,297	119,430	152,276	1.9%
Uganda Total	-	16,671,705	24,227,297	34,856,813	3.0%
		M 8,185,747	M 11,824,273	M 16,935,456	
		F 8,485,958	F 12,403,024	F 17,921,357	

**Table 1-3-3 Number of households and population by sex in Gulu Municipal in 2014**

County	Sub-county	Households		Population		Total
		Number	Average Size	Males	Females	

<sup>3</sup> Sex Ratio: defined as the number of males per 100 females in the population. National Population and Housing Census 2014 Provisional Result

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Gulu MC	Bar Dege Division	6,890	4.6	17,397	17,619	35,016
Gulu MC	Laroo Division	6,127	5.1	16,079	16,331	32,410
Gulu MC	Layibi Division	7,788	4.5	17,977	18,468	36,445
Gulu MC	Pece Division	9,102	5.3	22,579	25,826	48,405
Gulu MC Total		29,907	Average 4.9	74,032	78,244	152,276

Note 1: MC: Municipality

Source: JICA Study Team based on the National Population and Housing Census 2014 Provisional Result

### (10) Economy

Uganda has achieved stable economic development in recent years. The average GDP growth rate from 2004 through 2013 was 6.6%. <sup>4</sup>As the following table shows, monthly income also increased nationally from FY 2005/06 through FY 2009/10. At the same time, an increase in disparity was seen between regions and between urban and rural areas. The northern region in which the project target site of Gulu Municipal is located has the lowest average monthly income amount nationally.

**Table 1-3-4 Average monthly income by region (UGX)**

Region	2005/06			2009/10		
	Urban	Rural	Total	Urban	Rural	Total
Kampala	347,900	---	347,900	959,400	---	959,400
Central	320,200	192,600	209,300	603,800	336,800	389,600
Eastern	261,700	144,100	155,500	361,000	151,400	171,500
Northern	209,000	76,200	93,400	361,200	117,200	141,400
Western	313,100	144,200	159,100	479,000	282,300	303,200
<b>Uganda</b>	<b>306,200</b>	<b>142,700</b>	<b>170,800</b>	<b>660,000</b>	<b>222,600</b>	<b>303,700</b>

Source: UNHS, UBOS, 2011

### (11) Health care

The following table shows trends for health care indices in Uganda and the Gulu District. An improvement in health care was seen nationally from FY 2010/11 through FY 2012/13. Excluding “Latrine Coverage in households”, the Gulu District surpassed the national average for all items in FY 2012/13.

**Table 1-3-5 Comparison of health care indices in Uganda and the Gulu District**

	Uganda National Average			Gulu		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
Latrine Coverage in households (%)	71	68	68	50	62	62
Out Patient Department Utilisation in Government and PNFP health facilities (%)	1.1	1.2	1.1	1.8	2.3	1.8
Deliveries in Government and PNFP health facilities (%)	39	38	39	70	80	80

<sup>4</sup> Statistical Year Book (2014) UBOS

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

HIV testing in children born to HIV positive women	30	28	45	69	86	119
Pregnant women receiving 2nd dose of Fansidar for intermittent malaria prevention treatments (IPT)	43	46	48	63	77	74
Pregnant who receive 4 antenatal care visits	32	34	30	30	46	41

Source: Created based on Table 2.5.C through Table 2.5.F in the UBOS Statistical Abstract 2014

## (12) Education and gender

The UNHS defines literacy as the ability to read with understanding and write a meaningful sentence in any language. According to the UNHS investigation results, the northern region where the project subject area is located has the lowest literacy rate. Furthermore, the difference in literacy rates of men and women is remarkable in the northern region.

**Table 1-3-6 Literacy rates for population aged 10 years and above**

	2005/06			2009/10			2012/13		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<b>Uganda</b>	76	63	69	79	66	73	77	65	71
<b>Residence</b>									
Urban	89	83	86	90	86	88	88	81	85
Rural	74	58	66	77	62	69	74	59	66
<b>Region</b>									
Central Excluding Kampala	82	78	80	84	81	83	82	78	80
Eastern	71	56	64	75	60	68	70	59	64
Northern	74	45	59	77	52	64	73	48	60
Western	74	60	67	77	65	71	81	70	75
Kampala City	92	90	91	95	90	92	95	92	93

Source: UNHS 2005/06, UNHS 2009/10 and UNHS 2012/13, Uganda Bureau of Statistics

The following table is a list of schools on the routes of the project. It is particularly important to consider the school-commuting time zones of children when establishing the construction program of the project.

**Table 1-3-7 Schools on the routes of the project**

Facility name	Number of students			Time zones of school commuting
	Total	Male	Female	
No.17 Jomo Kenyatta Rd.				
SOS Children Village	166	100	66	Walking school-commute only Monday to Friday: 7 AM to 7:30 AM; Saturday: 9 AM to 10 AM, 12 PM to 12:30 PM
SOS Herman Gmeiner Primary School	280	138	142	Monday to Friday: 6:30 AM to 7:30 AM, 5 PM to 5:30 PM
Police Barracks Nursery School	200	105	95	Most students do not travel the roads because they use adjoining accommodation. Monday to Friday: 7:30 AM to 8 AM, 4 PM to 5 PM

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Holly Rosary Primary School	925	404	521	Morning/afternoon shift system Monday to Friday: 7 AM to 8 AM, 1 PM to 2 PM, 3 PM to 3:30 PM, 5 PM to 6:30 PM
Holly Rosary Nursery Kindergarten	250	100	150	Monday to Friday: 7:30 AM to 8 AM, 12:45 PM to 1:30 PM, 4 PM to 5 PM
No.2 Acholi Rd.				
Police Primary School	2,164	1,021	1,143	Largest school in subject area Monday to Friday: 6:30 AM to 8:30 AM, 1 PM to 2 PM, 5 PM to 6 PM
Seek and Find Nursery School	90	46	44	Monday to Friday: 7 AM to 8 AM, 12:30 PM to 1 PM
No.4 Coronation Road				
Gulu Senior Secondary School	1,583	982	601	Monday to Friday: 7:30 AM to 8 AM, 4:30 PM to 5:30 PM

Source: JICA Study Team

### 1-3-1-2 Countermeasures for the environmental impacts of the project

#### (1) Organizations and systems of environmental and social concerns

##### • Ministry of Works and Transport (MoWT)

In Uganda, the National Environment Act in 1995 obligated the establishment of an Environmental Liaison Unit (ELU) in each ministry and the formulation of EIA guidelines of each ministry by its ELU. After enactment of this law, the MoWT established an ELU within the ministry in 2001. With the objective of including multidisciplinary societal and environmental problems in road sector work, it established EIA guidelines (Environmental Impact Assessment Guidelines for Road Sectors) for road sectors. Because this project involves road sectors, various procedures are carried out in accordance with these guidelines.

The above-mentioned ELU is the organization responsible for the EIA and the abbreviated resettlement action plan of this project. Its main areas of responsibility are supervision of the EI Study report to be created by field consultants, submission to the NEMA, and supervision and approval of the abbreviated resettlement action plan report. However, because the MoWT is physically separated from Gulu Municipal, the Gulu Municipal Council Engineering Department mentioned below will handle daily monitoring before construction and during use and the confirmation of progress for compensation and relocation based on the abbreviated resettlement action plan.

##### • Gulu Municipal Council Engineering Department

The section of the Gulu Municipal Council Engineering Department responsible for the EIA and abbreviated resettlement action plan are the Senior Physical Planner and Senior Environment Officer working under the Principal Engineer. Land acquisition arising from this project is predicted to be one household only. Therefore, bearing in mind the current experience level of the Gulu Municipal Council Engineering Department (see **Table 1-3-8**), we believe that this issue can be handled sufficiently.

**Table 1-3-8 Experience of Gulu Municipal with land acquisitions and compensation**

Project Name	RAP preparation year	Number of Project Affected Persons (PAPs)	Acquired Land (ha/Acres)	Compensation Cost (UGX)	Budget source
Odonga Terence	2014	43	1.7 ha	48,889,181	Local Revenue
Agnach Close	2012	28	0.0228 ha	16,220,448	Local Revenue
Corti Pierro Rd.	2013	26	1.0 ha	6,670,543	Local Revenue
Lawiye Adul	2010	33	0.09 ha	14,302,270	Local Revenue
Ring Road (Pece) <sup>*1</sup>	2002	45	0.075 ha	26,277,000	Local Revenue
Ring Road (Layibi) <sup>*1</sup>	2009	68	0.075 ha	36,263,068	Local Revenue
Odur Min Odyek <sup>*1</sup>	1995	17	0.04 ha	4,470,280	Local Revenue
Acholi Lane <sup>*1</sup>	2002	7	0.057 ha	2,049,708	Local Revenue
Alokolum Rd. <sup>*1</sup>	2002	10	0.062 ha	2,788,000	Local Revenue
Laliya Rd.	2013	68	1.7 ha	21,033,009	Local Revenue
Sub Total (USMID)	-	147 (30HH) <sup>*2</sup>	0.3 ha (100 m <sup>2</sup> /HH) <sup>*2</sup>	71,848,056	-
Grand Total	-	345	4.8 ha	178,963,507	-

Note: <sup>\*1</sup>: Land acquisition and compensation done for the USMID project.

<sup>\*2</sup>: Census 2014 says average household size is 4.9 persons/HH, hence the number of PAHs estimated is 30HH with 100 m<sup>2</sup>/HH of land acquisition as average.

Source: JICA Study Team. 2015

#### ● National Environment Management Authority (NEMA)

The NEMA is the organization responsible for EIAs in Uganda. The National Environment Act (NEA) Cap. 153 stipulates the mandate of NEMA as the principal agency in Uganda responsible for the management of the environment by coordinating, monitoring, regulating, and supervising all activities in the field of environment.

The Environmental Monitoring and Compliance Department (D/EMC) in the NEMA is the section responsible for EIAs. The presence of implementation of an EIA is determined by the Third Schedule of National Environment Act (1995), which prescribes projects that must implement an EI Study/EIA by field. Because this project falls under "3. Transportation including- (a) all major roads", it is subject to implementation of an EI Study/EIA. Furthermore, development of a quarry falls under "6. Mining, including quarrying and open-cast extraction of- (g) stones and slate;". Accordingly, a total of 2 EI Study/EIA are required for the road repair and quarrying in this project. The following section indicates this procedure.

#### 1) Submission of Project Brief

The EIA procedure starts from submission of a Project Brief to the NEMA by the Project Developer (the MoWT in this project).

#### 2) Screening

The NEMA assigns screening to the Lead Agency (the Gulu Municipal Council in this project). Along with approving the screening results, the NEMA determines the environmental category classification. Because this project involves "repairs of arterial roads in urban areas", it is equivalent to Category IV, which requires a full-scale EIA implementation.

#### 3) Implementation of EI Study

There are two types of EI Study: the simplified version and the full-scale version. Projects

classified as Category III or IV by the screening results require implementation of a Partial EI Study (EI Review) or a Full EI Study (EIA), respectively. To ensure the quality of the EIA, it is customary in Uganda for the EIA to be subcontracted to a field consultant registered with the NEMA. In this project as well, a budget has been guaranteed through plans for the MoWT to procure a field consultant.

#### **4) Decision-making and costs**

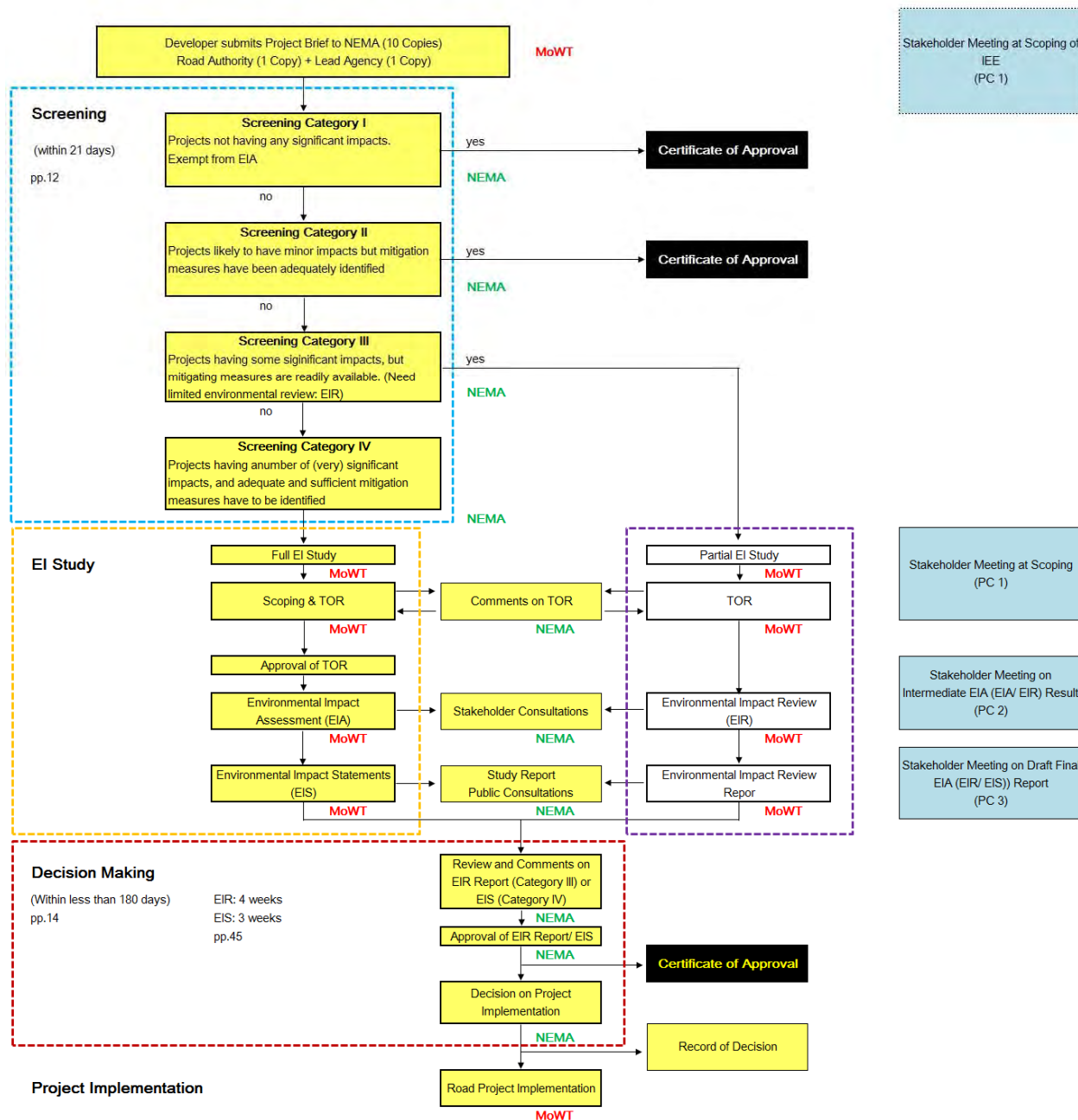
The NEMA, along with the Lead Agency, confirms the content of this created EI Statement or EI Review Report, and then determines the advisability of issuing an Environmental Certificate. At this stage, the operator pays the NEMA the handling fee and environmental approval fee. The charge for environmental approval depends on the project scale. When construction costs are UGX 5 billion or greater, the charge is 0.1%<sup>5</sup> of the construction costs, which is the case with this project. **Figure 1-3-4** shows a schematic of the above-mentioned procedures.

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<sup>5</sup> Third Schedule, EIA Regulation (1998)

[EIA Guidelines for Road Projects, 2008 MoWT]

[JICA ESC Guideline 2010]



Note: The National Environment Act has three levels of EIA, namely a) Environmental Impact Review, b) Environmental Impact Evaluation, and c) Environmental Impact Study. These Guidelines for Road Projects have two levels only, namely i) Environmental Impact Review (EIR) and Environmental Impact Assessment (EIA), where the latter has the meaning of full detailed EI Study. (pp.27)

- Flows and activities this project supposed to be required, based on the discussion with MoWT on May, 2015
- Though SHM is not mandatorily required on the project categorized as B by JICA ESC Guidelines, 1st SHM was held on IEE leveled scoping, on April, 2015

Source: JICA Study Team, based on the EIA Guidelines for Road Projects, MoWT, 2008, and JICA Guidelines for Environmental and Social Considerations, JICA, 2010

Figure 1-3-4 EIA workflow in the Ugandan national road sector (Category IV case)

(2) Comparative review of alternative plans (including zero option)

Because targets roads are coordinated between both the Ugandan and Japanese governments, it is



difficult to change the target for servicing in the case of routes in Gulu Municipal and its suburbs, and alternative plans are also limited. A comparative review was carried out for the following three plans under these conditions. The review did not recommend Plan B or Plan C because of forced resettlement and large adverse impacts, and recommended Plan A first.

**Plan A:** Select routes for servicing through field studies and coordination with local governments.

**Plan B:** Base on the initial requests of the local government

**Plan C:** Do not implement project

### (3) Scoping

Based on the environmental checklist in the Environmental guidelines, scoping for items that may receive environmental impacts in the project implementation was separated into three stages for investigation: before construction, during construction, and during use. **Table 1-3-9** shows the results.

**Table 1-3-9 Scoping results**

Classification	Impact item	Impact assessment			Evaluation pretext	
		Before construction	During construction	During use		
Pollution countermeasures	1	Atmospheric pollution	D	B-	B+	<p><u>During construction:</u> Dust and other particles accompanying the demolition of existing structures and construction-vehicle traffic is expected, but they will have a temporary impact during construction.</p> <p><u>During use:</u> The paving of roads and sidewalks will limit the quantity of dust clouds created by strong winds during the dry season.</p>
	2	Water pollution	D	B-	D	<p><u>During construction:</u> Turbid water, oil, and other pollutants from the box culvert and surrounding-area construction may enter the Pece River.</p> <p>Furthermore, the shallow wells currently used for drinking water may be contaminated by construction.</p>
	3	Waste	B-	B-	D	<p><u>Before construction:</u> The generation of waste from the demolition of existing structures is expected.</p> <p><u>During construction:</u> Waste, such as existing subbase course material, from changes in paving configuration and industrial waste from other general construction is assumed.</p>
	4	Soil pollution	D	B-	D	<p><u>During construction:</u> Soil pollution from inappropriate handling of construction vehicles and machinery in construction locations, borrow areas, stone pits, and construction yards is expected.</p>
	5	Noise and vibration	B-	B-	D	<p><u>Before construction:</u> Although limited by region, the generation of noise and vibration from the demolition of existing structures is expected.</p> <p><u>During construction:</u> Noise and vibration during construction may affect shops and pedestrians along the road.</p>

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Impact assessment			Evaluation pretext	
		Before construction	During construction	During use		
	6	Land subsidence	D	D	D	<u>During construction</u> : Work that draws a large volume of underground water to cause land subsidence is not assumed.
	7	Offensive odors	D	D	D	Work that causes offensive odors is not assumed.
	8	Bed material	D	C	D	<u>During construction</u> : Bottom material may be affected when the Pece River is widened as a part of a flooding countermeasure.
Natural conditions	9	Sanctuaries	D	C	D	<u>During construction</u> : We believe that there are no national parks or other sanctuaries around the project subject area, but this will be investigated through a field study.
	10	Ecosystem	D	C	D	<u>During construction</u> : Construction near the river, including the cutting of roadside trees and box-culvert construction that accompany road construction may have a minute impact on the ecosystem.
	11	Hydrometeor	D	D	C	<u>During use</u> : There is concern about the impacts downstream accompanying box-culvert construction and servicing of gutters of the cross-section of the Pece River. Hydrological analyses based on the results of a field study are required for an assessment of impact.
	12	Geographical and geological features	D	D	D	Work that affects geographical and geological features is not assumed.
Social environment	13	Land acquisition and resettlement	B-	D	D	No households that may be subject to resettlement have been identified, but shops that have built eaves called verandas on the road sites have been seen in the area. A field study is necessary to confirm whether such shops are subject to relocation. In the unlikely event a large-scale relocation (PAPs exceeding 200 people) is necessary, it may be necessary to change to a Category A case.
	14	Minority peoples and indigenous peoples	D	C	D	Although we do not anticipate impacts on minority peoples and indigenous peoples, this is being confirmed through a field study.
	15	Regional economy of employment and means of livelihood	D	B+	B+	<u>During construction</u> : Employment opportunities for basic laborers at construction sites are anticipated. <u>During use</u> : Stimulation of the regional economy due to the road repairs and public infrastructure servicing is expected.
	16	Use of land and regional resources	D	C-	D	<u>During construction</u> : Because activities to change land-use are not planned, impacts are not assumed. However, the use of crushed stone, laterite, and other regional resources is assumed.
	17	Water use	D	C-	D	<u>During construction</u> : Although we do not anticipate impacts on water use, this is being confirmed through a field study.

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Impact assessment			Evaluation pretext
		Before construction	During construction	During use	
18	Existing social infrastructure and social services	D	B-	A+	<p><u>During construction:</u> Traffic control due to construction is expected to cause traffic congestion. Furthermore, construction may affect the lives of residents due to temporary disconnection of existing utilities.</p> <p><u>During use:</u> Setting interlocking pavement as the paving for sidewalks will simplify maintenance work for utilities. Furthermore, improvements in transportation through road servicing will lead to the supply of stable social services to residents.</p>
19	Social infrastructure, regional decision-making organizations, and other social organizations	D	D	D	Because this project focuses mainly on the repair of existing facilities, impacts on social infrastructure, regional decision-making organizations, and other social organizations are not assumed.
20	Uneven distribution of advantages and disadvantages	D	D	D	This project involves the repair of existing roads and is not expected to bring about unfair advantages and disadvantages to the surrounding regions.
21	Conflict of interests within the region	D	D	D	This project involves the repair of existing roads, and it is not expected to cause a conflict of interests within the region.
22	Cultural heritage	D	D	D	No cultural heritage was identified in the project target site.
23	Landscape	D	B-	D	<u>During construction:</u> Construction will temporarily affect the landscape within the city. Furthermore, the deterioration of the landscape due to the deforestation of roadside trees is expected.
24	Gender	D	C	C	<u>During construction:</u> Because the impacts of the project on gender and children's rights are unknown, they will be confirmed through a field study.
25	Children's rights	D	C	C	
26	Infectious diseases such as HIV and AIDS	D	B-	D	<u>During construction:</u> Because many laborers will be hired locally, the spread of infectious diseases is believed to be limited. However, the risk of infectious diseases is expected to be higher than before construction.
27	Work environment (including work safety)	D	B-	D	<u>During construction:</u> Work environment and work safety countermeasures may be ignored.
28	Sanitation	D	B-	D	<u>During construction:</u> Inappropriate oversight of the excrement of laborers working in the camp yards and construction sites may cause sanitation problems.

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Impact assessment			Evaluation pretext	
		Before construction	During construction	During use		
Others	29	Accidents	B-	B-	B+	<p><u>Before and during construction:</u> The risk of accidents around the facilities at which people gather (schools, churches, mosques, orphanages, etc.) is particularly high.</p> <p><u>During use:</u> Reflectors installed at crosswalks can be expected to reduce the number of traffic accidents at night. Furthermore, the pedestrian-vehicle separation design is expected to reduce accidents involving pedestrians.</p>
	30	Maintenance	D	D	C	<p><u>During use:</u> Because the impacts related to maintenance are unknown at this point, they will be confirmed by a field study.</p>

A+/- : Serious impact (positive or negative), B+/- : Slight impact (positive or negative), C+/- : Extent of impact (positive or negative) unknown (Investigating study necessary, impact to become clear through investigation process), D: Almost no impact

Source: JICA Study Team

#### (4) Environmental impacts and mitigation measures in this project

Table 1-3-10 shows the results of the EIA accompanying the implementation of this project, and Table 1-3-11 shows the mitigation measures that should be implemented.

**Table 1-3-10 IEE-level EIA results**

Classification	Impact item	Evaluation at time of scoping			Evaluation based on investigation results			Evaluation pretext	
		Before construction	During construction	During use	Before construction	During construction	During use		
Pollution countermeasures	1	Atmospheric pollution	D	B-	B+	B-	B-	B+ /B-	<p><u>Before/during construction:</u> Dust and other particles accompanying the demolition of existing structures and construction-vehicle traffic is expected.</p> <p><u>During use:</u> The paving of roads and sidewalks will limit the quantity of dust clouds created by strong winds. However, the increase in traffic volume following economic development is expected to increase the burden.</p>
	2	Water pollution	D	B-	D	D	B-	D	<p><u>Before construction:</u> Work that contaminates water quality is not assumed.</p> <p><u>During construction:</u> Turbid water, oil, and other pollutants from the box culvert and surrounding-area construction may enter the Pece River. Furthermore, the shallow wells used for drinking water may be contaminated by construction.</p> <p><u>During use:</u> Water pollution due to the existence of roads is not assumed.</p>

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Evaluation at time of scoping			Evaluation based on investigation results			Evaluation pretext	
		Before construction	During construction	During use	Before construction	During construction	During use		
	3	Waste	B-	B-	D	B-	B-	D	<p><u>Before construction:</u> The generation of waste from the relocation of underground items is expected.</p> <p><u>During construction:</u> The generation of waste due to road construction is expected, but backfill and other materials will be reused as much as possible. Waste that cannot be recycled will be processed at a treatment plant with an environmental license.</p> <p><u>During use:</u> The generation of waste during use is not assumed.</p>
	4	Soil pollution	D	B-	D	D	B-	D	<p><u>Before construction:</u> Work that pollutes the soil is not assumed.</p> <p><u>During construction:</u> There is concern regarding soil pollution from the inappropriate handling of construction vehicles and machinery.</p> <p><u>During use:</u> Soil pollution due to the existence of roads is not assumed.</p>
	5	Noise and vibration	B-	B-	D	B-	B-	B+	<p><u>Before construction:</u> Although limited by region, the generation of noise and vibration from the demolition of existing structures is expected.</p> <p><u>During construction:</u> Because the generation of a noise level exceeding standards due to road construction is expected, countermeasures such as temporary enclosures and soundproof sheets are necessary.</p> <p><u>During use:</u> Improvements in road surface flatness can be expected to reduce the vibration level.</p>
	6	Land subsidence	D	C	D	D	D	D	Work that draws a large volume of underground water to cause land subsidence is not assumed.
	7	Offensive odors	D	D	D	D	D	D	Work that causes offensive odors is not assumed.
	8	Bed material	D	C	D	D	D	D	Work that affects bottom material is not assumed.
	9	Sanctuaries	D	C	D	D	D	D	There are no national parks or other sanctuaries around the project subject area.
	10	Ecosystem	D	C	D	D	C	D	<p><u>Before construction:</u> Work that impacts the ecosystem is not assumed.</p> <p><u>During construction:</u> Construction near the river, including the cutting of roadside trees and box-culvert construction that accompany road construction, may have a minute impact on the ecosystem.</p> <p><u>During use:</u> Impacts on the ecosystem due to the existence of roads are not assumed.</p>
Natural conditions	11	Hydromete or	D	D	C	D	D	D	The results of a hydrology analysis determined that there will be no large changes in water level before and after construction.

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Evaluation at time of scoping			Evaluation based on investigation results			Evaluation pretext	
		Before construction	During construction	During use	Before construction	During construction	During use		
	12	Geographical and geological features	D	D	D	D	D	D	Work that affects geographical and geological features is not assumed.
Social environment	13	Resettlement	B-	D	D	B-	D	D	<u>Before construction</u> : One household may be subject to resettlement. The household is located near the Drainage Outlet No. 4 candidate site on the northeast part of Jomo Kenyatta Rd. <u>During construction / during use</u> : No relocation is assumed during construction or use.
	14	Minority peoples and indigenous peoples	D	C	D	D	D	D	No impacts on minority peoples and indigenous peoples are assumed.
	15	Regional economy of employment and means of livelihood	D	B+	B+	B-	B+	B+	<u>Before construction</u> : The means of livelihood of the community that currently produces crushed rock by hand may be lost due to the establishment of a crushing plant. <u>During construction</u> : Employment opportunities for basic laborers at construction sites are anticipated. <u>During use</u> : Stimulation of the regional economy due to the road repairs and public infrastructure servicing is expected.
	16	Use of land and regional resources	D	C-	D	D	C-	D	<u>During construction</u> : Impacts on land-use are not assumed, but use of crushed stone, laterite, and other regional resources is planned. Particularly regarding crushed rock, dialog and coordination with the local community is required. <u>Before construction / during use</u> : activities that impact land use and regional-resource use are not assumed.
	17	Water use	D	C-	D	D	B-	D	<u>During construction</u> : Temporary water suspension due to construction is expected.

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Evaluation at time of scoping			Evaluation based on investigation results			Evaluation pretext
		Before construction	During construction	During use	Before construction	During construction	During use	
18	Existing social infrastructure and social services	D	B-	A+	B-	B-	A+	<p><b>Before construction:</b> Temporary disconnection during relocation/reconnection work for existing utilities (water pipes, Internet cables, electric wires, telephone poles, etc.) before construction is expected.</p> <p><b>During construction:</b> Traffic control due to construction vehicles and heavy machinery operation is expected to cause traffic congestion. Furthermore, construction may affect the lives of residents due to temporary disconnection of existing utilities.</p> <p><b>During use:</b> Separation of roads and sidewalks can be expected to reduce the number of pedestrian/vehicle contact accidents.</p> <p>Setting interlocking pavement as the paving for sidewalks will simplify maintenance work for utilities and lead to the stable supply of public services to residents.</p> <p>Improvements in drainage performance at Road #7 Gulu Avenue and Road #13 Awere Ave. due to box-culvert construction and gutter servicing at the cross-section of the Pece River is expected, and current traffic failures due to flooding will be resolved.</p>
19	Social infrastructure, regional decision-making organizations, and other social organizations	D	D	D	D	D	D	Because this project focuses mainly on the repair of existing facilities, impacts on social infrastructure, regional decision-making organizations, and other social organizations are not assumed.
20	Uneven distribution of advantages and disadvantages	D	D	D	D	D	D	This project involves the repair of existing roads and is not expected to bring about unfair damages and benefits to the surrounding regions or cause a conflict of interests within the region.
21	Conflict of interests within the region	D	D	D	D	D	D	
22	Cultural heritage	D	C	D	D	D	D	No cultural heritage was identified in the project target site.

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Evaluation at time of scoping			Evaluation based on investigation results			Evaluation pretext
		Before construction	During construction	During use	Before construction	During construction	During use	
23	Landscape	D	B-	D	D	B-	B+	<p><u>Before/during construction:</u> Relocation of underground pipes and other items and permanent works are expected to temporarily affect the landscape within the city. Furthermore, partial deforestation of roadside trees due to construction is planned, but the transfer of young trees and planting of new seedlings for adult trees can mitigate the adverse impacts.</p> <p><u>During use:</u> Relocation of telephone poles located along the centerline of roads to the sidewalk, burying of power lines and Internet cables that were suspended in the air, and culvert and drainage ditch construction to improve drainage performance are assumed to have a positive impact on the city landscape.</p>
24	Gender	D	C	C	D	C-	D	No problems related to gender were identified even in similar cases. However, concern is necessary regarding not only women, but children as well. This point is listed in the next section.
25	Children's rights	D	C	C	D	C-	C+	<p><u>During construction:</u> There is concern about child labor at the construction sites and obstacles to school commutes due to road construction.</p> <p><u>During use:</u> Changing open water channels to street gutters with lids will make it easier for children to walk.</p>
26	Infectious diseases such as HIV and AIDS	D	B-	D	D	B-	C+	<p><u>During construction:</u> Because many laborers will be hired locally, the spread of infectious diseases is believed to be limited. However, the risk of infectious diseases is anticipated to be higher than before construction.</p> <p><u>During use:</u> Stagnant water in depressions in damaged road surfaces and blocked sewer pipes has been recognized as an in-town spawning ground for malaria mosquitoes. Because these will be removed by this construction, the occurrence of malaria mosquitoes in town may be reduced slightly.</p>
27	Work environment (including work safety)	D	B-	D	D	B-	D	<p><u>Before construction / during use:</u> Activities that impact work environments are not assumed.</p> <p><u>During construction:</u> Work environment and work safety countermeasures may be ignored.</p>
28	Sanitation	D	B-	D	D	B-	D	<p><u>Before construction / during use:</u> activities that impact sanitation are not assumed.</p> <p><u>During construction:</u> Inappropriate oversight of the excrement of laborers working in the camp yards and construction sites may cause sanitation problems.</p>



The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Classification	Impact item	Evaluation at time of scoping			Evaluation based on investigation results			Evaluation pretext	
		Before construction	During construction	During use	Before construction	During construction	During use		
Others	29	Accidents	B-	B-	B+	B-/ B+	B-/ B+	B+ /C-	<p><u>Before and during construction:</u> B- There is concern about the occurrence of accidents at the construction site. B+ Because vehicles will be forced to decelerate, one-way alternating traffic during construction will limit fatal accidents due to excessive speed.</p> <p><u>During use:</u> B+ Reflectors installed at crosswalks will limit traffic accidents at night. Furthermore, the pedestrian-vehicle separation design will reduce accidents involving pedestrians. C- Improved flatness leads to an increase in vehicle speed, so the number of traffic accidents may not necessarily be reduced.</p>
	30	Maintenance	D	D	C	D	D	B+	<p><u>Before/during construction:</u> Work that impacts maintenance is not assumed.</p> <p><u>During use:</u> The lack of understanding of the underground location, depth, and functionality of underground pipes and cables makes the maintenance of existing utilities and sewer pipes difficult. Understanding the location of underground pipes and cables through the implementation of this project and completing the interlocking paving is expected to reduce the necessary maintenance workload in the city during use.</p>

A+/- : Serious impact (positive or negative), B+/- : Slight impact (positive or negative), C+/- : Extent of impact (positive or negative) unknown (Investigating study necessary, impact to become clear through investigation process),  
D: Almost no impact

Source: JICA Study Team

**Table 1-3-11 Proposed mitigation measures**

Impact item	Proposed mitigation measures	Executing agency	Responsible organization	Budget
<b>&lt;Before construction&gt;</b>				
3	Waste	Gulu Municipal	Ministry of Works and Transport (MoWT)	Administration costs (Gulu Municipal)
5	Noise and vibration	Gulu Municipal	Ministry of Works and Transport (MoWT)	Administration costs (Gulu Municipal)

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Impact item		Proposed mitigation measures	Executing agency	Responsible organization	Budget
13	Land acquisition and resettlement	<ul style="list-style-type: none"> <li>A grievance committee will be established in the early stages to create an environment that enables a dialog with residents targeted for land acquisition and relocation.</li> <li>After consultation with affected residents, the ideas of affected residents will be reflected in the abbreviated resettlement action plan (ARAP) as much as possible.</li> </ul>	Gulu Municipal	Ministry of Works and Transport (MoWT)	Administration costs (RAP consultant procurement: MoWT, RAP implementation supervision: Gulu MC)
15	Regional economy of employment and means of livelihood	<ul style="list-style-type: none"> <li>When the crushing plant is installed, the owner of the land, along with representatives of local government and crushed-rock producers, will be invited to a sensitization workshop to plan for an agreement regarding the payment methods for compensation.</li> <li>The content agreed to above (amounts, payment time, etc.) will be reflected in the tendering book, and the necessary budget be guaranteed.</li> <li>The above-mentioned conference records will be documented, and efforts will be made to prevent future conflict.</li> </ul>	Conference: Gulu District, Gulu Municipal, sub-county  Payment: Contractor	Ministry of Works and Transport (MoWT)	Construction costs
18	Existing social infrastructure and social services	<ul style="list-style-type: none"> <li>A location for conferences with the following stakeholders will be established, and a relocation plan for existing cables and pipes will be created. <ul style="list-style-type: none"> <li>Telephone poles, electric wires: UMEME</li> <li>Internet cables: UTL/MTN</li> <li>Water pipes : NWSC</li> <li>Drain pipes : NWSC</li> </ul> </li> <li>Residents will be notified of planned shutdowns / power outages.</li> </ul>	Gulu Municipal, with cooperation from the relevant organizations and bodies on the left	Ministry of Works and Transport (MoWT)	Administration costs (Gulu Municipal )
29	Accidents	<ul style="list-style-type: none"> <li>The community will be notified in advance about sections subject to construction.</li> <li>Barricades and guidance staff will be placed in the construction sections.</li> </ul>	Gulu Municipal	Ministry of Works and Transport (MoWT)	Administration costs (Gulu Municipal )
<b>&lt;During construction&gt;</b>					
1	Atmospheric pollution	<ul style="list-style-type: none"> <li>The road surface will be sprinkled with water (at least twice a day).</li> <li>Construction-vehicle drivers and workers will be instructed to not leave vehicles and machinery idling.</li> <li>When construction materials are transported, running speed, overloading prevention, and the installation of anti-scattering covers will be heeded.</li> <li>Dust-control devices will be installed at the crushing plant to limit the amount of dust.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Impact item		Proposed mitigation measures	Executing agency	Responsible organization	Budget
2	Water pollution	<ul style="list-style-type: none"> <li>Drip trays will be used when carrying out work that may result in oil discharge.</li> <li>At box-culvert construction sites, stanks will be installed, and the top water after natural sedimentation will be discharged downstream.</li> <li>Basic toilets and basic septic tanks will be installed in camp yards.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
3	Waste	<ul style="list-style-type: none"> <li>Excavated soil will be reused as backfill when possible.</li> <li>A waste treatment plant certified by the NEMA will be used.</li> <li>Workers will be instructed to not leave litter and waste inappropriately.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
4	Soil pollution	<ul style="list-style-type: none"> <li>Drip trays will be used when carrying out work that may result in oil discharge.</li> <li>Heavy machinery and equipment will be inspected and maintained regularly to prevent oil leaks.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
5	Noise and vibration	<ul style="list-style-type: none"> <li>Working hours will be limited to daytime for construction sites near shops and residences.</li> <li>When noise that exceeds standards is expected, temporary enclosures, sound proof sheets, and other countermeasures will be used.</li> <li>Machinery will be maintained regularly to prevent abnormal sounds and vibration.</li> <li>Workers who work near machinery that makes noise will be supplied with ear-protection supplies.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
10	Ecosystem	<ul style="list-style-type: none"> <li>Stanks and drip trays will be used to prevent the discharge of oil and turbid water into rivers.</li> <li>The Pece River will be patrolled regularly. A system that can detect problems in the early stages and provide real-time warnings to operators near culvert construction will be arranged.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
16	Use of land and regional resources	<ul style="list-style-type: none"> <li>A sensitization workshop will be held before establishment of the crushing plant. An agreement will be reached regarding construction content (including the necessary rubble amount, excavation range, and compensation method).</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
17	Water use	<ul style="list-style-type: none"> <li>Residents will be informed in advance of schedules for construction that may result in water outages or limit existing water use via the LC1 chairman and others.</li> <li>Close communication with NWSC will be planned to prevent a lack of communication regarding construction content.</li> </ul>	Contractor, with the cooperation of the LC1 chairman and NWSC	Ministry of Works and Transport (MoWT)	Construction costs

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Impact item		Proposed mitigation measures	Executing agency	Responsible organization	Budget
18	Existing social infrastructure and social services	<ul style="list-style-type: none"> <li>When roads are repaired, the impact on existing road traffic will be minimized by considering how to enable one-way alternating traffic.</li> <li>When necessary, the progress of the relocation of underground pipes and overhead wires will be confirmed after contacting the following organizations and bodies through Gulu Municipal. <ul style="list-style-type: none"> <li>Telephone poles, electric wires: UMEME</li> <li>Internet cables: UTL/MTN</li> <li>Water pipes : NWSC</li> <li>Drain pipes : NWSC</li> </ul> </li> <li>Based on the confirmed content, residents will be informed about planned temporary water suspension, power outages, traffic control, and other impacts.</li> </ul>	Contractor, with the cooperation of Gulu Municipal, UMEME, UTL, MTN, etc.	Ministry of Works and Transport (MoWT)	Construction costs
23	Landscape	<ul style="list-style-type: none"> <li>Trees will be planted to compensate for the roadside trees removed due to road construction.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
24	Gender	<ul style="list-style-type: none"> <li>Walking space for schoolchildren will be established so that school commutes will not be disturbed, particularly around schools.</li> </ul>	Contractor, with the cooperation of Gulu Municipal and the grievance committee	Ministry of Works and Transport (MoWT)	Construction costs
25	Children's rights	<ul style="list-style-type: none"> <li>When construction must be carried out during the school-commute time zones of schoolchildren, guidance staff will be deployed.</li> <li>The prohibition on child labor will be thoroughly enforced at construction sites.</li> <li>Problems related to gender and children's rights will be monitored through a grievance handling system.</li> </ul>			
26	Infectious diseases such as HIV and AIDS	<ul style="list-style-type: none"> <li>A Gulu Municipal HIV/AIDS case officer will be asked to hold a sensitization workshop for workers to inform them of the risks of infection.</li> <li>Condoms will be distributed to workers.</li> </ul>	Contractor, with the cooperation of Gulu Municipal	Ministry of Works and Transport (MoWT)	Construction costs
27	Work environment (including work safety)	<ul style="list-style-type: none"> <li>Workers will receive safety education.</li> <li>The necessary safety and sanitation work supplies (helmets, ear protection, gloves, goggles, etc.) will be supplied to workers according to their duties.</li> <li>Heavy machinery and equipment will be maintained regularly.</li> <li>A sufficient number of first-aid kits will be arranged for job sites.</li> <li>An accident and emergency response manual that includes safety measures will be created.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
28	Sanitation	<ul style="list-style-type: none"> <li>A sufficient number of temporary toilets will be arranged for camp yards and construction sites.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Impact item		Proposed mitigation measures	Executing agency	Responsible organization	Budget
29	Accidents	<ul style="list-style-type: none"> <li>The community will be notified in advance about sections subject to construction.</li> <li>Signs and guidance staff will be deployed to locations such as the following: around construction sites, and recognized areas of frequent accidents, congested sections, and sections with poor visibility.</li> <li>Reflectors and speed bumps will be established at crosswalks.</li> <li>Roundabouts will be constructed at intersections in which sufficient space can be guaranteed (#1 Kampala Rd. and #2 Acholi Rd. intersection).</li> <li>At stone pits, anti-scattering facilities for stones from blasting will be established, and a siren will be used to inform nearby residents and workers of blasting.</li> </ul>	Contractor	Ministry of Works and Transport (MoWT)	Construction costs
<b>&lt;During use&gt;</b>					
1	Atmospheric pollution	<ul style="list-style-type: none"> <li>Unnecessary idling of parked vehicles will be controlled.</li> </ul>	Gulu Municipal, with the cooperation of traffic police	Ministry of Works and Transport (MoWT)	Administration costs
29	Accidents	<ul style="list-style-type: none"> <li>Traffic-accident incident reports will be checked, and the results will be reflected in the traffic safety plans of following years.</li> <li>Traffic police patrols will be requested for areas with a high number of accidents.</li> </ul>	Gulu Municipal, with the cooperation of traffic police	Ministry of Works and Transport (MoWT)	Administration costs
30	Maintenance	<ul style="list-style-type: none"> <li>Regular maintenance will be carried for roads and incidental structures based on a maintenance manual.</li> <li>Regular repairs of traffic safety facilities (reflectors, speed restriction zones, signs, etc.) will be carried out to prevent accidents.</li> </ul>	Gulu Municipal	Ministry of Works and Transport (MoWT)	Administration costs

Source: JICA Study Team

### (5) Environment Mitigation & Monitoring Plan

The implementation conditions of the mitigation measures will be monitored before and during construction and during use. **Table 1-3-12** shows the Environment Mitigation & Monitoring Plan (EMMP). After monitoring the impacts of the project, items that can be expected to have positive impact during use will also be added to the monitoring items. The executing agency during construction is the contractor. The executing agency before construction and during use is the local government.

**Table 1-3-12 Environment Mitigation & Monitoring Plan (EMMP)**

Environmental item	Monitoring item	Method and frequency	Standard/index	Location
<b>&lt;Before construction&gt;</b>				
3. Waste	Waste records	With disposal, implemented once a month: Confirmation of records of waste sent to licensed treatment plant	Presence of suitable disposal	Project site

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for Improvement of Gulu Municipal Council Roads in Northern Uganda

Environmental item	Monitoring item	Method and frequency	Standard/index	Location
5. Noise and vibration	Noise and vibration level	With demolition, implemented once a month: Measurement using noise/vibration meter	See Annex-4, Table A4-3, Table A4-4	Existing-structure demolition/relocation locations
	Implementation date	With demolition, implemented once a month: Confirmation of implementation records	Presence of nighttime construction	Existing-structure demolition/relocation locations
13. Land acquisition and resettlement	Land acquisition and compensation payment conditions based on abbreviated resettlement action plan	Once a month: Confirmation of progress and receipts for land acquisition and compensation	Divergence from abbreviated resettlement action plan; presence of receipts	Targeted households
15. Regional economy of employment and means of livelihood	Sensitization workshop implementation records	Once at implementation: Confirmation of implementation records, minutes, etc.	Presence of agreement	Targeted households
	Presence of compensation payment	Once a month: Presence of payments, confirmation of receipts	Payment amount and time	Targeted households
	Grievance-handling records	Once a month: Confirmation of implementation records, minutes, etc.; implementation of hearing for residents as necessary	Presence of grievance handling	Grievance committee
18. Existing social infrastructure and social services	Relocation plan, relocation implementation conditions	Once a month: Confirmation of records of relocation conditions through photos, etc.	Presence of relocation	Project site
	Advance notice of relocation plan	Once a month: Confirmation of advance notice of relocation plan through radio and notification signs	Presence of notice	Project site
	Grievance-handling records	Once a month: Confirmation of records of the occurrence of grievances from unplanned power outages and water suspension	Presence of grievances	Grievance committee
29. Accidents	Deployment conditions of barricades and guidance staff around construction locations	Once a month: Confirmation of records of deployment conditions through photos, etc.	Presence of deployment	Existing-structure demolition/relocation locations
<b>&lt;During construction&gt;</b>				
1. Atmospheric pollution	Implementation conditions of water sprinkling in construction areas	Once a month: Confirmation of implementation records, including photos, etc.	Presence of implementation Dry season: At least twice a day	Project site
	Implementation conditions for the prevention of heavy machinery and equipment idling	Once a month: Confirmation of implementation conditions, confirmation of the presence of advance education for workers	Presence of implementation	Project site
	Dust conditions	Once a month: Visual confirmation	Presence of scattering	Project site

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Environmental item	Monitoring item	Method and frequency	Standard/index	Location
	NOx, SOx, CO, and TSP in areas along the road	Quarterly: Simple measurement through atmospheric measuring instrument	See Annex-4, Table A4-1	Project site
	Grievance-handling records	Once a month: Confirmation of grievance-handling records	Presence of grievance-handling records	Grievance committee
	Running-speed restriction conditions for construction vehicles in urban areas	Once a month: Confirmation and records of running speed	Use 30 km/h as a reference value.	Project site
	Installation conditions of anti-scattering covers on truck pallets	Once a month: Confirmation of deployment of anti-scattering covers through photos, etc.	Presence of deployment	Project site
	Installation conditions of dust control equipment	Once a month during operation: Installation records, including photos, etc.	Presence of deployment	Crushing plant
2. Water pollution	Usage conditions of drip trays	Once a month: Usage records, including photos, etc.	Presence of use	Project site
	Turbidity of water after turbid water treatment	Once a month: Measurement of transparency using a transparency meter	The upstream value shall be the standard value	Pece River (Two locations: upstream and downstream from the box-culvert construction location)
	Water quality (pH, EC, BOD, COD, hexane extracts, iron, ammonia) of wells near the construction site and the Pece River	Once a month: Simple measurement using a water examination kit	See Annex-4, Table A4-2	The Pece River and three wells near the construction site
	Hearing for water users of wells and Pece River	Once a month: Confirmation through inquiring survey	Presence of grievances	Users of the Pece River and well water
3. Waste	Reuse conditions of excavated soil	Once a month: Records of reuse	Presence of reuse	Project site
	Disposal conditions of concrete debris, molds, waste oil, etc.	Once a month: Records of disposal at an approved waste treatment plant	Presence of suitable disposal	Pabwo treatment plant
	Education for workers	Once a month: Implementation records of education for workers regarding the disposal of litter and waste	Presence of records	Project site
4. Soil pollution	Usage conditions of drip trays	Once a month: Usage records, including photos, etc.	Presence of use	Project site
	Regular inspection and maintenance conditions for heavy machinery and equipment	Once a month: Records of regular inspection and maintenance of heavy machinery and equipment	Presence of records	Project site
5. Noise and vibration	Noise and vibration level	Once a month: Measurement using noise/vibration meter	See Annex-4, Table A4-3 to Table A4-5	Areas along the road and the plant

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for Improvement of Gulu Municipal Council Roads in Northern Uganda

Environmental item	Monitoring item	Method and frequency	Standard/index	Location
	Work hours	Once a month: Records of nighttime construction	Presence of nighttime construction	Project site
	Use of temporary enclosures and soundproof sheets	Once a month: Usage records of temporary enclosures and soundproof sheets through photos, etc.	Presence of use	Project site
	Regular maintenance	Once a month: Confirmation through records of regular maintenance of heavy machinery and equipment	Presence of implementation records	Project site
	Soundproofing measures for workers	Once a month: Supply records of ear protection, etc. for workers working near machinery that makes noise	Presence of supply	Project site
10. Ecosystem	Remarkable changes in ecosystem	Once a month: Inquiring survey of residents	Presence of anomalies	Residents along Pece River Random sampling of about three households
16. Use of land and regional resources	Presence of agreement (implementation schedule, term, etc.)	During implementation: Minutes of sensitization workshop before installation of crushing plant	Presence of minutes	Stone pits
	Excavation amount, production amount, etc. of crushed rock, river sand, laterite, etc.	Once a month: Records of excavation, hauling, etc. of crushed rock, river sand, laterite, etc.	Presence of regional-resource use that greatly exceeds planned amounts	Borrow areas, sand pits, stone pits
17. Water use	Advance notice of the schedule for construction that will limit water use	During implementation: Implementation records of advance notice	Presence of advance notice	Around the Pece River, wells, and other existing water-use facilities
	Grievance-handling records	Once month: Confirmation of grievance-handling records that indicate water suspension and other obstacles to water use	Presence of grievance-handling records	Grievance committee
	Cooperation with stakeholders	As required during consultation: Consultation records with stakeholders (NWSC) related to water use	Presence of consultation records	Project site
18. Existing social infrastructure and social services	Grievance-handling records	Once a month: Confirmation of grievances-handling records related to unplanned water suspension and power outages	Presence of handling records	Project site
23. Landscape	Number of roadside trees	With deforestation, stumping, or transplantation, once a month: Records of deforestation, stumping, or transplantation due to construction	The number of roadside trees before construction shall be the standard value.	Areas along the roads
24. Gender 25. Children's rights	Conditions guaranteeing commuting space around schools	Records of conditions guaranteeing walking space for children around schools and orphanages through photos, etc.	Presence of walking space	Around schools and orphanages



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for Improvement of Gulu Municipal Council Roads in Northern Uganda

Environmental item	Monitoring item	Method and frequency	Standard/index	Location
	Employment of minors	Once a month: Confirmation of minors in the register of age-certified workers	Presence of employment of persons under 18 years of age <sup>6</sup>	Project site
	Grievance-handling records	Once month: Confirmation of grievance-handling records related to gender and children's rights	Presence of handling records	Project site
26. Infectious diseases such as HIV and AIDS	Implementation conditions of sensitization workshops	Implementation month: Implementation records of a sensitization workshop by a Gulu Municipal HIV/AIDS case officer	Presence of implementation	Camp yard
	Distribution conditions for condoms	Once a month: Records of distribution of condoms to workers	Presence of distribution	Camp yard
27. Work environment (including work safety)	Implementation conditions of safety education for workers	Once a month: Implementation records of safety education	Presence of implementation	Project site
	Distribution conditions for safety belts, protective goggles, and other supplies to workers	Once a month: Confirmation of distribution records and usage conditions of work safety tools	Presence of distribution and use	Project site
	Implementation conditions for regular maintenance of heavy machinery and equipment	Once a month: Confirmation of implementation records for regular maintenance of heavy machinery and equipment	Presence of implementation	Project site
	Deployment conditions of first-aid kits	Once a month: Deployment conditions of first-aid kits (FAK)	Presence of deployment	Project site
	Creation and distribution conditions for accident and emergency response manuals	With distribution; once a month: Conditions of creation of accident and emergency response manuals and distribution to workers	Presence of creation and distribution	Project site
28. Sanitation	Installation conditions of temporary toilets	Once a month: Records and arrangement of installation conditions through photos, etc.	Presence of deployment	Project sites and camp yards
29. Accidents	Conditions of advance notice of construction sections	Once a month: Confirmation of implementation records	Presence of implementation	Project site
	Deployment conditions of signs and guidance staff around construction locations and in areas with frequent accidents	Once a month: Confirmation of records of deployment conditions through photos, etc.	Presence of deployment	Project site

<sup>6</sup> Uganda National Constitution

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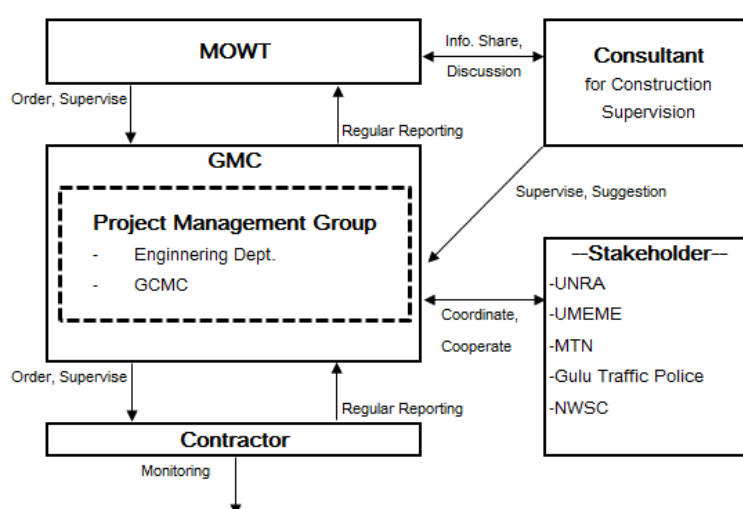
Environmental item	Monitoring item	Method and frequency	Standard/index	Location
	Installation of reflectors and speed restriction zones	During construction: Records of construction conditions through photos, etc.	Presence of deployment	Crosswalks near schools, churches, orphanages, etc.
	Construction of roundabouts	During construction: Records of construction conditions through photos, etc.	Presence of deployment	Kampala Rd. / Acholi Rd. intersection
	Implementation conditions of safety guidance for construction-vehicle drivers by local police	During employment: Confirmation of implementation records	Presence of implementation	Gulu Municipal traffic police
	Number of accidents	Once a month: Confirmation of records listing the extent, number, causes, future countermeasures, etc. of accidents that occurred	Presence of records	Project site
	Compliance conditions for the appropriate loading of trucks	Once a month: Records and confirmation of loading amounts	Presence of excessive loading	Project site
	Installation conditions of anti-scattering facilities for crushed rock	During operation, once a month: confirmation of installation conditions through photos, etc.	Presence of installation	Stone pits
	Conditions of blast warnings through sirens, etc.	During blasting, once a month: implementation records of warnings through sirens	Presence of implementation	Stone pits
<b>&lt;During use&gt;</b>				
1. Atmospheric pollution	Dust conditions	Once every six months (for three years of use): Results of hearings related to the frequency of dust clouds, particularly in the dry season	Increase/decrease of dust cloud frequency	Residents in urban areas
	Control conditions for unnecessary idling	Once every six months (for three years of use): Control records for unnecessary idling of parked vehicles	Presence of control records	Traffic police
29. Accidents	Accident records	Once every six months (for three years of use): Confirmation of accident records, including future accident-prevention measures	Presence of accident records	Traffic police; hearings for residents is necessary
	Variation in traffic volume after construction	Once every six months (for three years of use): Confirmation of traffic-volume survey records	Presence of traffic-volume survey records	Major intersections and roundabouts with large traffic volumes
30. Maintenance	Implementation conditions of maintenance work	Once every six months (for three years of use): Confirmation of records of regular maintenance work for roads and incidental structures	Presence of implementation	Project site

Notes

\*1: With regard to the relocation of aerial and underground items, the EMMP will be carried out in coordination with UMEME, MTN, UTL, etc. as required

Source: JICA Study Team

Since the MoWT, the executing agency of this project, is physically separated from the project site, the MoWT must commission supervision of the site to Gulu Municipal and establish a Project supervision group with its main members from the Gulu Municipal Council Engineering Department. This arrangement can be expected to quickly deal with problems that occur at the site, as well as offer friendly cooperation with stakeholders. The MoWT will confirm the monitoring results from Gulu Municipal, and then report to the Japan International Cooperation Agency (JICA) Uganda office. Japanese construction supervision consultants will supervise the Project supervision group in Gulu Municipal, and provide suggestions and guidance as necessary. The implementation core of the EMMP during construction is the contractor. The implementation core before construction and during use is the Project management group in Gulu Municipal.



**Figure 1-3-5 EMMP implementation system (draft)**

Source: JICA Study Team

### (6) Cooperation with stakeholders

With the backing of the JICA Study Team, an advance stakeholder conference was held to form a consensus among the MoWT, GMC, and JICA Study Team, and then another stakeholder conference including the NWSC, UNEME, MTN, etc. was held later. The following table provides a summary of the stakeholder conferences.

**Table 1-3-13 Summary of stakeholder conferences**

Executing agency	MoWT, Gulu Municipal Council	
Objective	By involving the stakeholders in the early stages of project implementation and having the project implementers understand impacts of concern in advance, conflict can be prevented through the study of appropriate avoidance measures. Furthermore, the project is expected to achieve better results with the cooperation of stakeholders.	
Location	Town Clerk's Office, Gulu Municipal Council	
Date and time	April 19, 2015 9 AM to 10:20 AM	April 30, 2015 9 AM to 11 AM

Main participants	JICA Gulu field office, MoWT, Gulu Municipal Council, JICA Study Team (total of 15 participants)	Uganda National Water and Sewerage Corporation (NWSC), UMEME, MTN, JICA Gulu field office, MoWT, Gulu Municipal Council, JICA Study Team (total of 18 participants)
Agenda	<ol style="list-style-type: none"> <li>1) Design policy</li> <li>2) Drainage system</li> <li>3) Standard road-crossing diagram</li> <li>4) Roundabouts/ intersections</li> <li>5) Traffic safety facilities</li> <li>6) Construction materials</li> <li>7) Topographical and geological surveys</li> <li>8) Environmental and societal concerns</li> <li>9) Q&amp;A</li> </ol>	<ol style="list-style-type: none"> <li>1) Project summary (targeted roads, drainage systems, standard road-crossing diagrams)</li> <li>2) Main adverse impacts due to project (including structures that are obstacles)</li> <li>3) Proposed avoidance measures</li> <li>4) Proposed Environment Monitoring Plan</li> <li>5) Q&amp;A</li> </ol>

Source: JICA Study Team

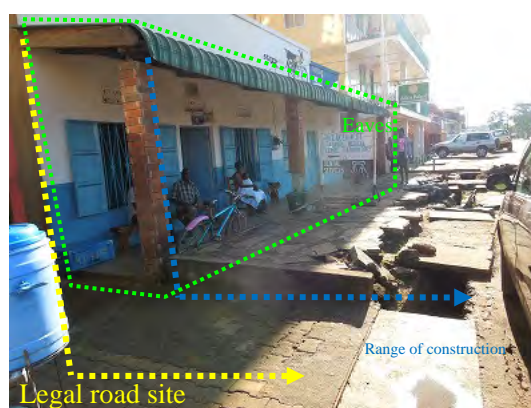


**Figure 1-3-6 Image of stakeholder conference**

## **1-3-2 Land acquisition and resettlement**

### **(1) Road-site boundaries**

Along the roads to be repaired by this project, many eaves have been built within road sites in violation of Uganda National Law. (See the green dotted line section in **Figure 1-3-6**) Although demolishing these illegal structures to ensure sufficient road and sidewalk width is desirable from a traffic safety perspective, it is clear that a large payment of compensation will accompany this demolition. Furthermore, it cannot be denied that legal issues concerning compensation may develop. In consideration of the present conditions, as well as the result of conferences with the persons concerned, the MoWT and Gulu Municipal Council held the view that it would be difficult realistically to request demolition of these buildings for this project because these buildings were built before the independence of Uganda, and the government tolerated their existence for many years. Accordingly, the construction range of this project is not the legal road site (yellow line in the figure below), but to the surface of the eaves (blue line in **Figure 1-3-7**), and a policy was formed to not impact residents through cutoffs and slices.



**Figure 1-3-7 Road site and range of construction**

However, there are two cases of unavoidable land acquisition and resettlement and one case that may disturb livelihoods. These cases are subject to the compensation as described below. Furthermore, even the road reserve is shortened from the above-mentioned reason, still more than 15m as road width remains. From this, it can be said that minimum width for the traffic safety on pedestrian and carriageway shall be secured.

**(2) Muslim cemetery along Acholi Rd. (#2)**

Acholi Rd. (#2) is between the new market built by the African Development Bank and the four-lane road under construction by US-MID. There is concern that traffic demand will increase in the future, and this will cause traffic congestion and traffic accidents on Acholi Rd. (#2). To resolve these issues, it is important to improve traffic by widening the urban sections of Acholi Rd. from two lanes to four lanes and install a right-turn only lane or center lane.

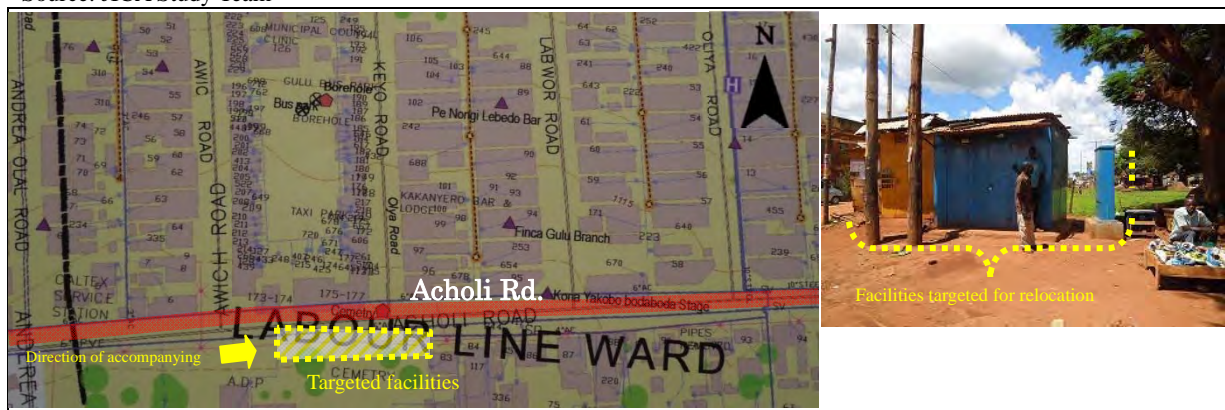
The following table lists the facilities that obstruct the widening of the urban section of Acholi Rd. (#2). Because the Gulu Municipal Council and the Muslim community agreed in March 2011 on the land acquisition and compensation for the cemetery of the Muslim community, once the payment of the compensation is completed, there will be no problems regarding demolition. At a stakeholders' meeting, it was agreed that the Gulu Municipal Council will notify Uganda Telecom and MTN of the road construction schedule and relocation for the kiosks and containers they have installed.

**Table 1-3-14 Facilities along Acholi Rd.(#2) subject to relocation**

Facility name	Facility owner	Land owner	Resident	Demolition area (m <sup>2</sup> )	Notes
Muslim cemetery	Muslim Community	Gulu Municipal	None	606 m <sup>2</sup> (12 m x 50.5 m)	Facility demolition and the compensation amount have already been settled.
Temporary container	Uganda Telecom	Gulu Municipal	None	1 unit	It has been agreed to carry out relocation without compensation.
Kiosk	MTN	Gulu Municipal	None	1 unit (1.2 m x 1.2 m)	It has been agreed to carry out relocation without compensation.
Temporary container	Gulu Municipal	Gulu Municipal	None	1 unit	Currently not in use.

Facility name	Facility owner	Land owner	Resident	Demolition area (m <sup>2</sup> )	Notes
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Source: JICA Study Team



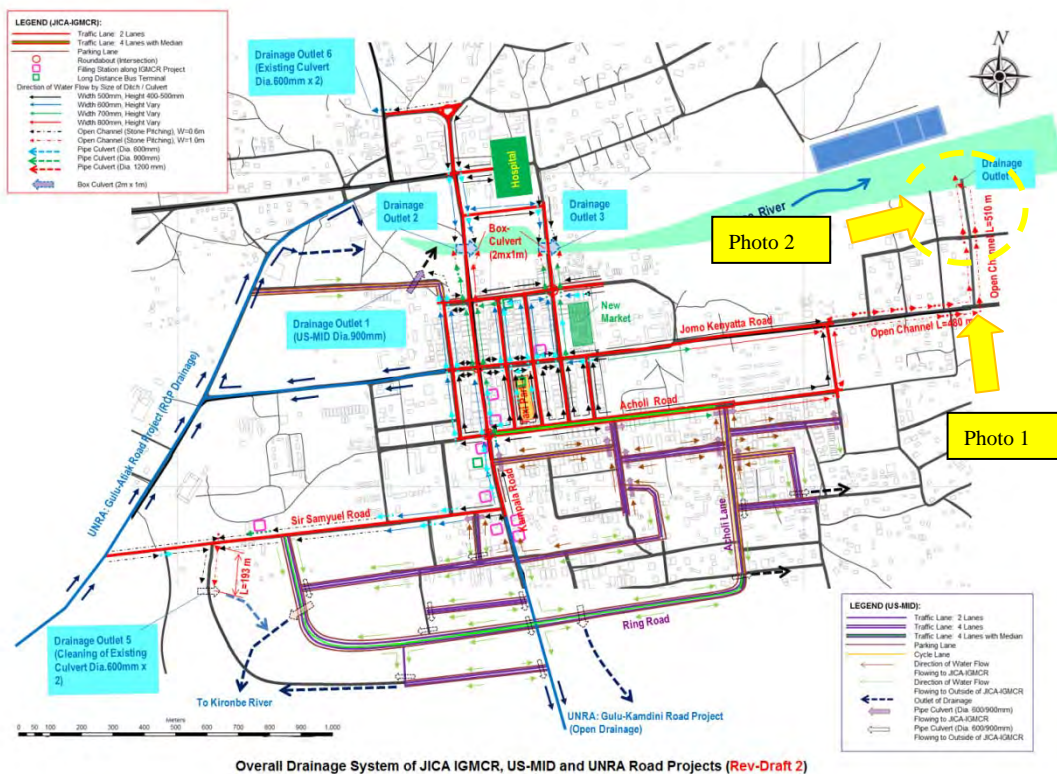
**Figure 1-3-8 Locations of facilities along Acholi Rd.(#2) subject to relocation**

Source: Created by the JICA Study Team based on the Map of Integrated Program to Improve the Living Conditions in Gulu. KFW (2014)

### (3) Household targeted for relocation at the Drainage Outlet No. 4 candidate site

The vicinity of Jomo Kenyatta Rd.(#17) past Oliya Rd. (#14) is an east/west watershed because the vicinity has a vertical alignment and the highest elevation. Therefore, it is necessary for the section of #17 from #14 and higher (East end) to be discharged to the Pece River by an open channel. Furthermore, the drainage from Acholi Rd. (#2) and the World Bank case (US-MID) must also be discharged to the Pece River via an open channel prepared at the East end of Lumumba Ave. (No. 16). Results of a field study identified one household that will be affected by the construction of Drainage Outlet No. 4, and so it is subject to payment of compensation.





Overall Drainage System of JICA IGMCR, US-MID and UNRA Road Projects (Rev-Draft 2)

Drainage-system plan



Photo 1 (Pece River at interior of photo)



Photo 2 (Two huts subject to demolition)

(4) Residents near Kidere Quarry

The entrance route for crushed rock is to be decided ultimately by the contractor. However, if Kidere is selected, no land acquisition or the location will occur, but compensation for the loss of means of livelihood will be necessary. The identification of persons to rightfully receive payments will be carried out during the EIA to be implemented by the MoWT.



View of Kidere Quarry



Conditions for manual production of crushed rock



Truck for loading crushed rock



## **CHAPTER 2 CONTENTS OF THE PROJECT**

### **2-1 Basic concept of the Project**

#### **(1) Overall Target and Project Targets**

The municipal of Gulu not only continues to revitalize its economic activity as a hub for supporting the reconstruction of the country following the end of its civil war, but it is also a key junction for transportation in a socioeconomic sense in that heavy vehicles pass through it via the Northern Corridor to carry out peace building in South Sudan.

Therefore, properly performing maintenance on district, urban, and community access roads (DUCAR), including those in regional urban areas, through the Peace, Recovery and Development Plan for Northern Uganda Phase-2 (PDRP2), which is a development plan for the northern region of Uganda, is thought to play a part in restoring the economy and alleviating the seeds of conflict. Moreover, Japan's Country Assistance Policy for the Republic of Uganda listed "Peace building in Northern Uganda" and "Infrastructure improvement to achieve economic growth" as priority areas. Conversely, adequate road maintenance has not been carried out in Gulu on account of the country's 20-year civil war, thus impairing its functions as a center not only for civil life, but for restoration, as evidenced by problems such as the peeling off of pavement and the collapse of road shoulders.

Therefore, this project will be carried out with the targets of promoting peace building in Northern Uganda by improving the transportation functions of Gulu, which serves as the regions only core urban area, while also contributing to facilitating the movement of goods and people in its capacity as a key junction for transportation that is connected to an international corridor.

#### **(2) Outline of the Project**

In order to achieve the targets mentioned above, this project will have Japanese construction companies perform construction, while also instituting soft components related to the planning and design of facilities, construction supervision, and road maintenance. The expectation is that doing so will enable the roads in Gulu to stably maintain their transportation and drainage functions. As part of this, projects eligible for cooperation shall include repairing the roads within Gulu and constructing drainage structures at crossings along the Pece River. An outline of the projects eligible for cooperation will be indicated below.

#### **[Road rehabilitation]**

- Roadway repairs via mixed asphalt and concrete paving (19 routes, 6.373 km total)
- Sidewalk repairs via interlocking pavement (30,600 m<sup>2</sup> in area)

- Installation of drainage ditches and drainage outlets (total length of Approx. 19,400 m)
- Installation of box culverts (two) at crossings along the Pece River
- Installation of safety facilities, such as speed bumps, signs, and road markings
- Installation of roundabout intersections (four locations)
- Installation of a four-way intersection

**[Consulting services]**

- Detailed design for the roads
- Creating tender documents and estimating construction costs
- Support for bidding procedures
- Construction supervision

**[Soft components]**

- Creating road inventory maps
- Engineering training in the classroom and in the field (three sessions)
- Holding of a workshop (one session)

## **2-2 Outline design of the Japanese Assistance**

### **2-2-1 Design Policy**

#### **(1) Basic Policy**

Gulu is a municipal located along the Northern Corridor that starts in Mombasa, Kenya and travels past Nairobi, Kampala to reach Juba, South Sudan. It is a key junction for transportation not only in the northern region of Uganda, but also from the perspective of international logistics. But as a result of the country's 20-year civil war, the roads within Gulu have deteriorated, and problems like the peeling off of pavement and the collapse of road shoulders occur frequently. During the rainy season lots of water-logged spots appear, and paved sections that people can drive on smoothly and safely are considerably limited. The municipal is raising the funds for road maintenance and working to make emergency repairs, but given its budgetary constraints is still a long way off from improving the wide-ranging and severe deterioration. In light of such circumstances, the basic policy for design is as follows.

- In light of the fact that Gulu is a core urban area in Northern Uganda, cross sections will be employed with an emphasis on ensuring sidewalk width and the safety of pedestrians so as to contribute to the creation of bustling streets.
- Owing to the prediction that vehicles' traveling speeds will increase as a result of road improvements, the safety of pedestrians will be ensured through measures like separating vehicles from pedestrians and installing facilities for reducing speed.

- Paving sections will be used that are suited to the road traffic volume, usage status for areas along roads, the laying of utility facilities, and the renovation status.
- A policy of maximizing the use of current roads will be adopted, and as a general rule horizontal and vertical alignment modifications are not to be carried out, except for two road sections where improvements to river-crossing structure are needed.
- With respect to the built-up area along Acholi Road, which connects to major roads, the current two-lane road will be modified to a four-lane road out of consideration for the future traffic dispersion in the urban center. Moreover, newly installed central median strips will be used to systematically restrict right and left turns at intersections in an effort to improve traffic safety.
- No new land acquisition will be carried out in order to minimize the negative environmental and social impact from the road improvements. As a general rule, overhanging sections (verandas) from buildings along roads will not be removed, and the road width will be planned with the veranda frontage serving as the property line.
- In addition to the existing three such locations, the intersection at Kampala Road and Acholi Road that serves as the main gate to the streets of Gulu will be turned into a roundabout, out of consideration for both the symbolic value of this and for the speed reduction effects conducive to traffic safety that this will have.
- Regarding road drainage, U-shaped gutters or trapezoidal gutters will be set up along both sides of roads to reliably lead water into the Pece River and other drainage outlets. U-shaped gutters will be fitted with lids so that pedestrians can use them.
- The river-crossing structures (pipe culverts) for the Pece River, which are currently showing signs of being water-logged, will be remade as box culverts for which a proper water cross section has been secured. In order to put these in place, the road sections around them will be raised by about 0.8m.
- With respect to the water supply facilities that the National Water and Sewage Corporation (NWSC) will begin maintenance construction work on in early 2016, an agreement has been reached to make use of the utility side strips for standard cross sections proposed in this survey. Adjustments will be made to things like the manhole height during the construction work.
- There are plans to have MTN lay communications cables at a position that is about 1.2m deep within the sidewalk along Kampala Road in the future, and adjustments will be made to things like the manhole height during the construction work.
- With forethought to the installation of street lights in the future, PVC pipes that are about 300mm in diameter will be installed at major intersections to serve as ducts for power and communication cables.

- Efforts will be made to devise a design that uses construction materials that can be procured locally to the utmost extent possible, with this including embankment materials, crushed rock, sand, and so on, out of consideration for economic efficiency.
- Compliance to “Basic Research for Implement the Road Development Projects by Japan’s ODA in Africa Countries –Ethiopia, Ghana, Tanzania-“

**(2) Policy regarding natural environmental conditions**

Plane figures will be created by surveying the current topographic features in the field, and these will be reflected in the design. For the surveying, surveys will be conducted not only on the topographical features, but also on the arrangement of tenements and the position of entrances and exits, gutters, buried objects, the position of manholes, cross sections, and more. Regarding the geology, samples will be collected in the field and the prescribed tests will be performed by a laboratory to confirm their physical properties. For the hydrological surveys, data from the Gulu weather station owned by the Uganda National Meteorological Authority will be collected and used.

**(3) Policy regarding socioeconomic conditions**

This project is located in the central part of Gulu’s urban areas, where numerous shops are arrayed along the side of the road. In order to minimize the impact on these shops, the plan calls for facilities to be designed within the existing site. There are two tenements that are subject to relocation as a result of the installation of facilities, and it was confirmed with the Ugandan side that the plan is to finish relocating said properties and resettling the residents prior to the start of the road improvement work. In addition, there are plans to develop a new quarry in Kirele, which is located roughly 10km away from Gulu, for the aggregate to be used for the installation of facilities. MoWT and Gulu have carried out advance negotiations with the landowner, and a basic agreement has been reached. The necessary procedures for the environmental licenses pertaining to the development will be carried out by the Ugandan side, and it was confirmed that they will be obtained prior to the public announcement.

**(4) Policy regarding construction conditions / procurement conditions**

**1) Design criteria**

Ugandan national standards (MoWT standards) will serve as the basis for this project, and in light of the unique characteristic of the project in that road improvement work will be carried out in an urban area, the Japanese Road Design Standards and the standards of other donors such as ASHOTTO will be referred to and applied appropriately for any items that are missing.

**2) Procurement of materials and equipment**

Materials will be procured locally to the extent possible, and consideration will be given to

procuring those materials that are difficult to procure locally from Japan or a third-party country. Since rental service providers are not found in the area around Gulu, nor are sound service providers to be found in Kampala, equipment will essentially be procured from Japan.

**3) Labor**

Common laborers will be hired from the area surrounding Gulu.

**(5) Policy regarding using local contractors**

In general, Ugandan construction companies are extremely lax in their quality consciousness, and sound locally-funded contractors are essentially non-existent. However, there are multiple foreign construction contractors from countries like India and China that have laborers with a certain level of technical proficiency and heavy machinery. Therefore, for this project the plan is to have foreign construction contractors supply laborers who will perform the work onsite under the guidance of Japanese technicians, while making temporary use of equipment.

**(6) Response guidelines regarding operation and maintenance**

The maintenance of the routes targeted for improvements will be under the jurisdiction of the Gulu engineering department. To date, Gulu has only been performing basic bituminous surface such as DBST for its asphalt road repairs, so it does not have any experience with the pre-mixed asphalt pavement that will be used in this project. Therefore, this project will incorporate a soft component related to the maintenance of pre-mixed asphalt pavement. Through this, technical knowledge will be transferred to Gulu's engineering department in the aim of improving its capabilities to enable it to perform appropriate maintenance after the hand-over.

**(7) Guidelines regarding establishing the facilities grade**

This project will perform road improvement work in order to improve the inner-city roadways that had been battered by the country's long-running civil war in Gulu, which is growing increasingly important in a socioeconomic sense.

Whereas the road pavement currently consists of basic bituminous surface (DBST), these road repairs will make the roads stronger by employing a mixed asphalt pavement. In addition, modified materials will be procured from Japan, and modified asphalt will be used for sections where the impact from heavy vehicles is judged to be particularly striking. For the sidewalk pavement, since lifelines lead into many of the houses along the side of the road, it was assumed that re-excavation and refilling would have to be carried out frequently on the sidewalk pavement in the future, so this will be accommodated by using interlocking pavement. The expectation is that going with interlocking pavement will contribute to the bustle and glamor that Gulu exhibits as a core municipal

in the northern region.

Drainage has long posed a problem in Gulu, and each time it rains water overflows onto the roadway due to the gutters' insufficient discharge capacity, which has furthered the deterioration of the roadways' pavement. This project will accommodate this by performing a hydrological analysis based on measured values obtained from the National Meteorological Authority, and installing drainage gutters of a suitable size to handle the amount of rainfall. In addition, a system of water channels will be soundly installed that leads to the Pece River, which serves as a drainage outlet, in order to ensure a sound drainage outlet and make sure water does not collect in the municipal.

By way of transportation safety measures, speed bumps, road markings, and signs will be installed, and central median strips and traffic islands will be adopted in order to control the flow of traffic. In addition, when it comes to intersection improvements, the intersection at Acholi Road and Kampala Road will be turned into a roundabout intersection to add to the three such locations that already exist. Since the entrance to the hospital (Road No. 20) is a section where accidents frequently occur, and in light of its public nature, intersection improvements such as installing a traffic island and right-turn lane will be made. Besides, considering the current traffic volume and condition of the electric supply, traffic signal and street light system will not be installed.

#### **(8) Policy on construction methods/procurement methods and the construction period**

The existing pavement will be removed using motor graders and bulldozers, after which drainage gutters and sidewalk border blocks will be installed at the sidewalk border. Thereafter, improvements such as replacing these will be carried out as needed, following which the roadbed will be shaped and the surface will be compacted. The base course will be wound off using motor graders, and the surface will be compacted using macadam rollers. After confirming that the prescribed density has been achieved, the asphalt binder course and surface course will be laid. Macadam rollers and vibrating rollers will be used for the surface compaction. The aggregate needed for concrete, asphalt, and sub-base course materials will be procured from an aggregate plant in Japan and manufactured. The asphalt will be procured from an asphalt plant in Japan and manufactured. Since interlocking pavement will be used for the sidewalk pavement, after the base course is laid the surface will be compacted via plates and the like, then interlocking plates will be laid by human power.

Generally speaking, May to October is the rainy season in the Gulu region, with particularly concentrated rainfall in the three months from July to September. During the rainy period, it will be difficult to carry out roadbed construction, for which moisture content surveys are important, as well as asphalt paving work, for which temperature management is important. Therefore, for this project

the plan is to avoid quality risks by avoiding carrying out construction work during the rainy period. Therefore, the overall construction period will last for 22.5 months.

## 2-2-2 Basic Plan (Construction Plan)

### 2-2-2-1 Hydrological and Hydraulic Surveys

#### 2-2-2-1-1 Calculation of the Rainfall Intensity Formula

##### (1) Probable daily rainfall

The maximum daily precipitation was extracted from daily rainfall data collected from the Uganda National Meteorological Authority and Bureau of Statistics, and the probable daily rainfall was calculated from this. A Gumbel distribution was used for the calculation. The results of the calculation are shown in **Table 2-2-1**.

**Table 2-2-1 Probable daily rainfall in Gulu**

Recurrence interval	2 years	5 years	10 years	25 years	50 years
Probable daily rainfall (mm/d)	70	85	95	110	120

##### (2) Rainfall intensity formula

The rainfall intensity formula for recurrence intervals of two years, five years, and ten years found in the Road Design Manual of the Ministry of Works and Transport (MoWT) (Republic of Uganda, MoWT, Road Design Manual, Volume 2: Drainage Design, January 2010) is shown below.

$$i = a / (0.33 + t_d)^c$$

In this formula, i: Rainfall intensity (mm/hr)

t<sub>d</sub>: Rainfall duration (hr)

a, c: Coefficients (see Table 3-2-2)

For Coefficients a and c, which are needed for the calculations, those provided in the Road Design Manual were used. However, it was decided that the rainfall intensity formula for recurrence intervals of 25 years and 50 years would be calculated separately based on the following formula. Here, Coefficients a and c were found using the following formula.

$$R^{25} = (T/24) \cdot (24.33 / (0.33 + T))^{1.01} \cdot 110$$

$$R^{50} = (T/24) \cdot (24.33 / (0.33 + T))^{1.01} \cdot 120$$

In this formula, R<sup>25</sup>, R<sup>50</sup>: Rainfall in T time (mm/T(hr)) for recurrence intervals of 25 years and 50 years

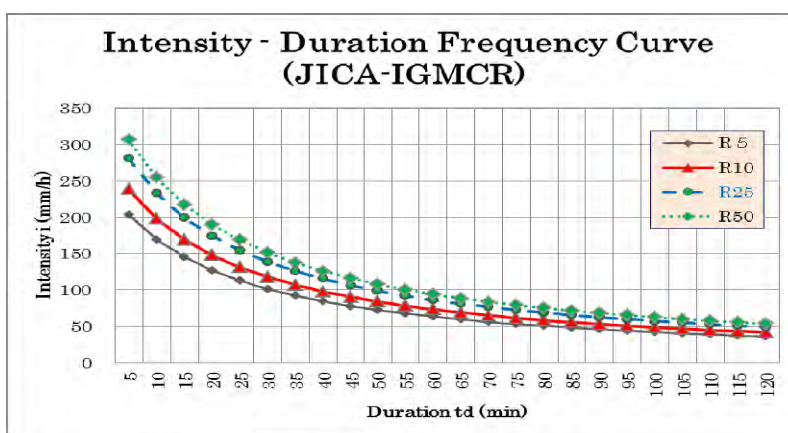
T: Rainfall duration (hr)

The rainfall intensity formula coefficients (a and c) for each recurrence interval are shown in **Table 2-2-2**.

**Table 2-2-2 Rainfall intensity formula coefficients for Gulu**

Recurrence interval	2 years		5 years		10 years		25 years		50 years	
Coefficients	a	c	a	c	a	c	a	c	a	c
Values	60.84	0.97	84.12	1.00	97.75	1.01	115.13	1.01	125.60	1.01

Using a and c as shown above, rainfall intensity formulas were found for each recurrence interval. These are expressed in Fig. 2-2-1.



**Fig. 2-2-1 Rainfall intensity curve**

### 2-2-2-1-2 Considering River Crossings for the Pece River

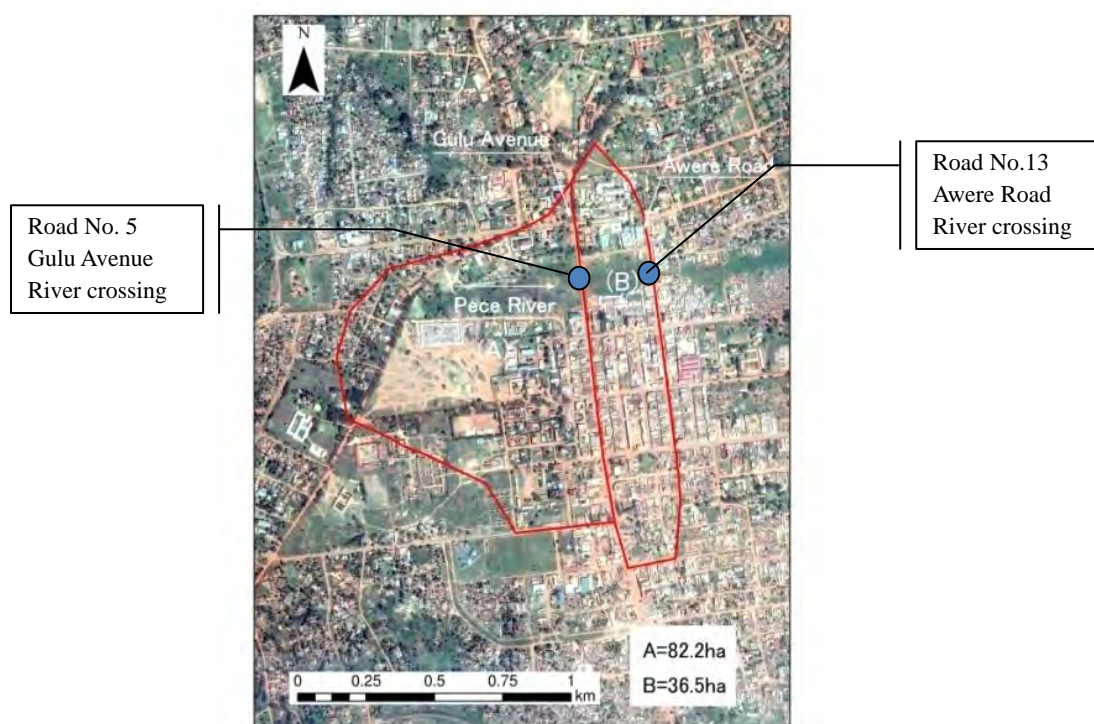
#### (1) Setting the planned flood discharge

The applied basic conditions for the setting of the planned flood discharge are shown below.

#### Regarding the catchment basin

- The catchment basin has been partitioned off from the current topographic features as shown in **Fig. 2-2-2**.





**Fig. 2-2-2 Catchment basin partition image  
(aerially photographed image taken in December 2013)**

### **Regarding the facilities**

- Owing to the assumption that there will be a considerable amount of sediment deposit that builds up, it has been deemed necessary to give forethought to ease of maintenance. As such, the design calls for box culverts to serve as drainage structures.
- In the Road Design Manual, the rainfall recurrence interval is prescribed by the box culvert interior width, with this set at a 25 year recurrence interval when the interior width is 2m or less and a 50 year recurrence interval when the interior width is between 2m and 6m. Therefore, in order to make the facilities economical, a box culvert interior width of 2m will be used, as will a rainfall recurrence interval of 25 years.
- The Pece River does not just wash surface water from rainfall and the like downstream, it also has flood adjustment functions as a natural flood control basin. One method for preventing the inundation flooding of roads when the water rises is to perform river improvements to hasten the downward flow of water. But with this project no particular river improvements will be carried out, so facility designs that harness existing flood adjustment functions will be considered. Therefore, this will be handled by reflecting the existing flood adjustment functions into the design and installing structures with adequate

drainability based on a hydrological analysis using data from meteorological observations.

**Regarding the plan**

- As described above, the rainfall recurrence interval was set at 25 years.
- The upstream area of Gulu Avenue and the low-lying area along the Pece River in the catchment basin between Gulu Avenue and Awere Road act as natural flood control basins. As such, their flood adjustment functions will be taken into consideration for the design of the box culverts. The capacities of both of these flood control basins are shown in **Table 2-2-3**.

**Table 2-2-3 Flood control basin capacity**

Flood control basin water depth (m)	Gulu A. upstream (m3)	Between Gulu A. - Awere R. (m3)
0.0	0	0
1.0	42,600	18,300
2.0	105,600	41,900

**(3) Setting the planned flood discharge**

The planned flood discharge of the box culvert will be found. For the planned precipitation, the difference between the amount of inflow from the catchment basin to the flood control basin from rainfall and the amount of outflow from the flood control basin must be evaluated. For the inflow, the TRRL East African Flood Model indicated in the Road Design Manual will be used. The results of calculations performed via the TRRL are shown in **Table 2-2-4**.

**Table 2-2-4 The TRRL East African Flood Model (25 year recurrence interval)**

Catchment basin	Gulu A. upstream area	Catchment basin between Gulu A. - Awere R.
Catchment basin area: A (km <sup>2</sup> )	0.822	0.365
Catchment basin gradient: Land Slope	0.0385	0.0425
Stream gradient: Channel Slope	0.0065	0.0091
River length: L (km)	0.47	0.26
Catchment basin lag time: K (hr)	0.5	0.5
CS (Value Relating to Field Capacity)	0.38	0.45
CW (Catchment Wetness Factor)	1.0	1.0
CL (Land Use Factor)	1.0	1.1
Basin factor: CA=CS·CW·CL	0.38	0.495
Loss of rainfall: Y (mm)	0.0	0.0
Planned rainfall: P (mm)	110	110
Hydrograph base time: Tb (hr)	2.0	2.0
Peak discharge: Qp (m <sup>3</sup> /s)	12.3	7.3

This indicates that the respective inflows from each catchment basin at peak times are 12.3m<sup>3</sup>/s for the Gulu A. upstream area and 7.3m<sup>3</sup>/s for the catchment basin between Gulu A. and Awere A.

The outflow from the flood control basin corresponds to the water depth in said basin. The results of the calculations are shown in **Table 2-2-5**.

**Table 2-2-5 Outflow from the flood control basin**

Flood control basin water depth (m)	Outflow (m <sup>3</sup> /s)
0.0	0.00
0.5	1.00
1.0	2.83
1.5	5.19

The planned flood discharge that takes the flood control functions of the flood control basins into consideration was calculated. The following formula indicated in the Road Design Manual was used to calculate this.

$$I - O = \Delta S / \Delta t$$

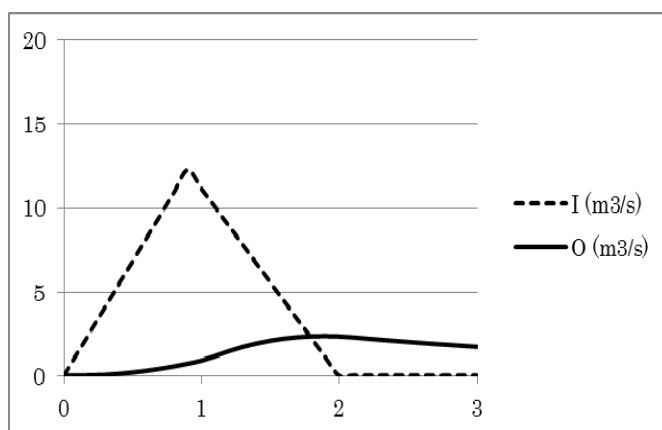
In this formula, I: Inflow into the flood control basins (= the planned basin yield mentioned above; but for the flood control basin between Gulu Avenue and Awere Road this also includes the outflow from Gulu Avenue as part of this inflow)

O: Outflow from the flood control basin (see Table XXX)

$\Delta t$ : Calculation time (360 seconds = 0.1hr)

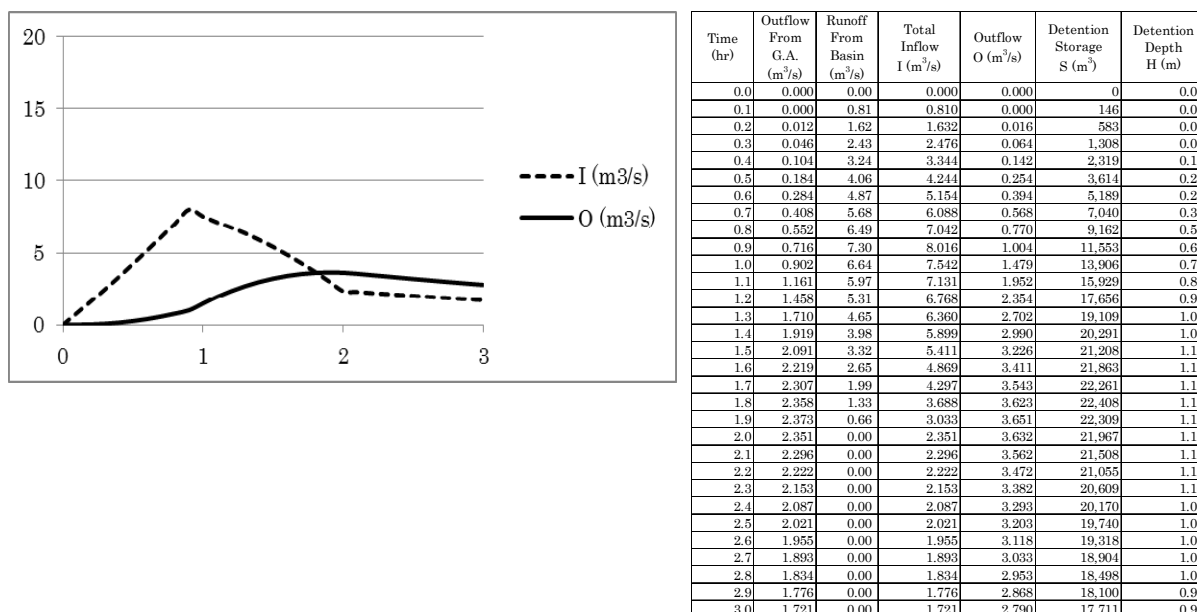
$\Delta S$ : Variation in the flood control basin capacity over  $\Delta t$

The planned flood discharges that take flood control functions into consideration are shown in **Fig. 2-2-3 (Gulu Avenue)** and **Fig. 2-2-4 (Awere Avenue)**.



Time (hr)	Inflow I (m <sup>3</sup> /s)	Outflow O (m <sup>3</sup> /s)	Detention Storage S (m <sup>3</sup> )	Detention Depth H (m)
0.0	0.00	0.000	0	0.00
0.1	1.37	0.000	247	0.01
0.2	2.73	0.012	983	0.02
0.3	4.10	0.046	2,202	0.05
0.4	5.47	0.104	3,898	0.09
0.5	6.83	0.184	6,060	0.14
0.6	8.20	0.284	8,681	0.20
0.7	9.57	0.408	11,755	0.28
0.8	10.93	0.552	15,272	0.36
0.9	12.30	0.716	19,225	0.45
1.0	11.18	0.902	23,160	0.54
1.1	10.06	1.161	26,612	0.63
1.2	8.95	1.458	29,563	0.69
1.3	7.83	1.710	32,013	0.75
1.4	6.71	1.919	33,977	0.80
1.5	5.59	2.091	35,469	0.83
1.6	4.47	2.219	36,504	0.86
1.7	3.35	2.307	37,097	0.87
1.8	2.24	2.358	37,263	0.88
1.9	1.12	2.373	37,016	0.87
2.0	0.00	2.351	36,368	0.85
2.1	0.00	2.296	35,532	0.83
2.2	0.00	2.222	34,719	0.82
2.3	0.00	2.153	33,931	0.80
2.4	0.00	2.087	33,168	0.78
2.5	0.00	2.021	32,429	0.76
2.6	0.00	1.955	31,713	0.74
2.7	0.00	1.893	31,020	0.73
2.8	0.00	1.834	30,349	0.71
2.9	0.00	1.776	29,699	0.70
3.0	0.00	1.721	29,070	0.68

**Fig. 2-2-3 Flood control diagram (Gulu Avenue box culvert)**



**Fig. 2-2-4 Flood control diagram (Awere Road box culvert)**

Based on the calculated results for the flood control functions, data on the flood control volume, planned flood discharge, and so forth for the two points were organized into **Table 2-2-6**.

**Table 2-2-6 Flood control volume and planned flood discharge**

Calculation points	Gulu A. Box culvert	Awere R. Box culvert	Notes
Rainfall recurrence interval	25 year recurrence	25 year recurrence	
Box culvert interior width	2m	2m	
Peak discharge before the adjustments (m³/s)	12.30	8.02	(A)
Peak discharge after the adjustments (m³/s)	2.37	3.65	(B)
Flood control volume (m³/s)	9.93	4.37	(A)-(B)
Planned flood discharge (m³/s)	2.37	3.65	
Maximum flow velocity (m/s)	2.30	2.65	
Highest flood control basin water depth (m)	0.88	1.17	

Regarding the current discharge capacity, two  $\phi 900$  pipe culverts have been installed at both Gulu Avenue and Awere Avenue. But trash, soil, and sand are backing up the culverts at Gulu Avenue so they have lost most of their discharge capacity, while those at Awere Avenue are thought to only have a discharge capacity of about  $2.1\text{m}^3/\text{s}$ . Therefore, the current discharge capacities at both sites have fallen below the planned flood discharge, and the need to repair the facilities has been affirmed.

**(4) Setting the interior height of the box culverts**

The interior width of the box culverts has been fixed at 2m, and the water depth at the box culvert's spigot was found using the maximum water depth of the flood control basin shown in **Table 2-2-6**. The results showed this was 0.52m at Gulu Avenue and 0.69m at Awere Avenue. The 0.3m management allowance was added to this to round up to 1.0m, with this figure taken to be the interior height of the box culverts.

**2-2-2-2. Topographical Surveys and Geological Surveys**

**2-2-2-2-1 Topographical Surveying**

Topographical surveys were performed as shown in **Table 2-2-7** and **Table 2-2-8** For the surveying, information was included on not just the topographic features, as information needed for the installation, such as the position of the entrances and exits to tenements, lifelines, sidewalk boundaries, and so forth was also included.

**Table 2-2-7 Surveying items and quantities**

No.	Item	Unit	Specification	Quantity
1	Mobilization and Demobilization	LS		1
2	Traffic Control Coordination	LS		1
3	Establish and Measure Traverse Control Points along alignment	No.	Place with concrete	19
4	Make the Topographic Map	m2	3-D Total Station	212,580
5	Data Compilation, Drawing & Report	LS	Plan 1/500 Profile V:1/100, H:1/500 Cross Sections each 20m	1

**Table 2-2-8 Routes targeted for surveying**

S/N	Road Name	Quantity		
		Length	Width	Area
1	Kampala Road	240	30	7,200
2	Acholi Rd.	1,209	30	36,270
3	Lagara Rd.	220	20	4,400
4	Coronation Rd.	215	20	4,300
5	Andrea Olal Rd.	224	20	4,480
6	Nehru Rd.	219	20	4,380
7	Gulu Ave.	643	30	19,290
8	Awich Rd.	221	20	4,420
9	Queens Ave.	218	20	4,360
10	Keyo Rd.	214	20	4,280
11	Aliker Rd.	219	20	4,380

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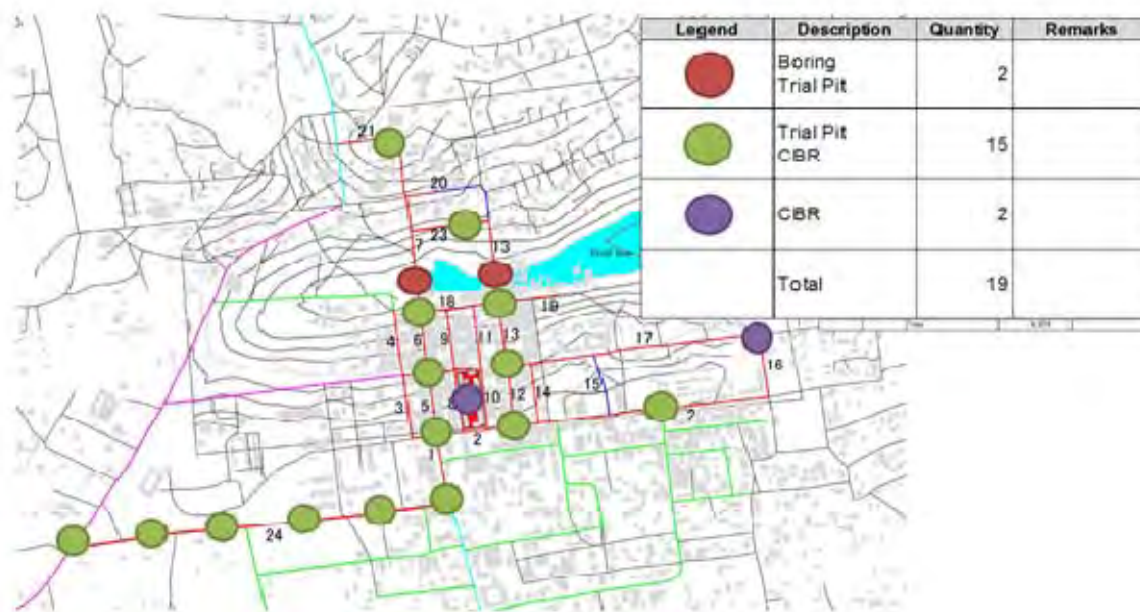
12	Labwor Rd.	217	20	4,340
13	Awere Rd.	518	30	15,540
14	Oliya Rd.	215	20	4,300
15	Labolo Rd.	0	20	0
16	Lumumba Ave.	211	20	4,220
17	Jomo Kenyatta Rd	1,209	20	24,180
18	Bank Lane	399	20	7,980
19	Market St.	163	20	3,260
20	Harley Rd.	100	20	2,000
21	Prince Rd.	160	20	3,200
22	Taxi Park			1,500
23	Dr. Mathew Lukwiya Road	265	20	5,300
24	Sir Samuel Road	1,300	30	39,000
	<b>TOTAL</b>	<b>8,599</b>		<b>212,580</b>

#### 2-2-2-2-2 Geological Surveys

Geological surveys were performed as shown in **Table 2-2-9** and **Fig 2-2-5**.

**Table 2-2-9 Geological survey details**

	No.	Work Item	Unit	Quantity
Field Survey	1	Mobilization & Demobilization of Personnel, Material and Equipment	LS	1
	2	Auger Boring	m	12
	3	Trial Test Pit & Disturbed Sampling (for CBR) & DCP Test	No	17
	4	Disturbed Sampling (for Fill Material)	No	2
	5	Quarry Sampling (for Aggregates )	No	2
Labo Test	6	Laboratory Testing		
	6-1	Soil Classification Tests	No	17
	6-2	Compaction & CBR for Base	No	17
	6-3	Compaction & CBR for Sub-base	No	17
	6-4	Compaction & CBR for Sub Grade	No	17
	6-5	Compaction & CBR for Embankment	No	2
	6-6	Aggregates Tests (TFV, Los Abrasion)	No	1
Reporting	7	Reporting	LS	1



**Fig. 2-2-5 Geological survey position diagram**

From the results of the surveys it was determined that the roadbeds of the targeted routes had a CBR of 3% or greater for almost every section, and they are in relatively good shape. Therefore, no particular improvements will be carried out, and it was decided that there will not be any particular problems from using the current foundation as the roadbed. But for those places where the CBR values are considerably lower relative to the surrounding sections, the decision was made to achieve average CBR values for the section as a whole through such means as replacing materials with improved materials. Moreover, for those locations where box culverts are planned to be installed, boring and consolidation tests were performed to check on the foundation. These led to concerns of settlement due to consolidation occurring, so it was decided that improvements would be made by replacing the bottom slabs of the boxes with improved materials with a depth of 1.0 m - 1.5 m.

**2-2-2-3 Design Standards**

As a general rule, the road design will be performed in accordance with the Road Design Manual (Volume 1 - 4) issued by the Ugandan MoWT. This manual was compiled with a focus on inter-city roads, and so there are cases where it is thought that applying this manual will be inappropriate for designing inner-city roads, which differ considerably from inter-city roads in their traffic characteristics and physical constraints. In such cases, reference will be made to AASHTO from the United States, DMRB from the United Kingdom, the Government Order on Road Design Standards from Japan, and other manuals published by road associations. **Table 2-2-10** shows the design standard documents applied and referred to for this survey.

**Table 2-2-10 Design standard documents applied and referred to for this survey**

No.	Category	Name of the standards
1	Geometric structures	Road Design Manual Volume 1: Geometric Design, MoWT, 2010
2		A Policy on Geometric Design of Highways and Streets, AASHTO, 6 <sup>th</sup> Edition, 2011
3		Geometric Design of Roundabouts: TD16/07
4		Materials from the Roundabout Review Committee, Ministry of Land, Infrastructure and Transport (MLIT), 2014
5		Explanation and Application of the Government Order on Road Design Standards, Japan Road Association, 2004
6	Drainage	Road Design Manual Volume 2: Drainage Design, MoWT, 2010
7		Manual for Road Engineering, Japan Road Association, 2009
8	Pavement	Road Design Manual Volume 3: Pavement Design, Part I: Flexible Pavements, MoWT, 2010
9		AASHTO Guide for Design of Pavement Structures 1993
10		Guidelines for Pavement Design and Construction, Japan Road Association, 2006

Source: JICA survey team

## 2-2-2-4 Road Classifications

### (1) Road classifications by administrators

The roads targeted by this survey include municipal roads in Gulu, excluding the national roads of Kampala Road and Jomo Kenyatta Road which are under the jurisdiction of UNRA. The built-up sections targeted by the survey along Jomo Kenyatta Road are managed by Gulu.

**Table 2-2-11 Road classifications for the targeted routes**

No.	Route name	Road classification	Administrator	Length (m)
1	Kampala Rd.	National Road	UNRA	240
2	Acholi Rd.	Municipal Road	Gulu Municipal Council	1,209
3	Lagara Rd.	Municipal Road	Gulu Municipal Council	220
4	Coronation Rd.	Municipal Road	Gulu Municipal Council	215
5	Andrea Olal Rd.	Municipal Road	Gulu Municipal Council	224
6	Nehru Rd.	Municipal Road	Gulu Municipal Council	219
7	Gulu Ave.	Municipal Road	Gulu Municipal Council	643
8	Awich Rd.	Municipal Road	Gulu Municipal Council	221
9	Queens Ave.	Municipal Road	Gulu Municipal Council	218
10	Keyo Rd.	Municipal Road	Gulu Municipal Council	214
11	Aliker Rd.	Municipal Road	Gulu Municipal Council	219
12	Labwor Rd.	Municipal Road	Gulu Municipal Council	217
13	Awere Rd.	Municipal Road	Gulu Municipal Council	518
14	Oliya Rd.	Municipal Road	Gulu Municipal Council	215
17	Jomo Kenyatta Rd. (CBD)	National Road	Gulu Municipal Council	472
18	Bank Lane	Municipal Road	Gulu Municipal Council	399
19	Market St.	Municipal Road	Gulu Municipal Council	163
20	Harley Rd.	Municipal Road	Gulu Municipal Council	78
21	Prince Rd.	Municipal Road	Gulu Municipal Council	160
	Total			6,064

Source: JICA survey team



**(2) Road classes for the design**

The Ugandan Road Design Manual specifies the classifications shown in **Table 2-2-12** as road classes for the design. The classifications are largely divided up into those for paved roads and those for gravel roads, and have been subdivided into Class Ia through Class C depending on the road's traffic volume, road width, design speed, and functional classification.

**Table 2-2-12 Road classes for design**

Design Class	Capacity [pcu x 1,000/day]	Roadway Width [m]	Maximum Design Speed [km/h]			Functional Classification				
			Level	Rolling	Mountainous	A	B	C	D	E
Ia Paved	12 - 20	20.80 - 24.60	120	100	80	✓				
Ib Paved	6 - 10	11.0	110	100	80	✓	✓			
II Paved	4 - 8	10.0	90	70	60	✓	✓	✓		
III Paved	2 - 6	8.6	80	70	50	✓	✓	✓		
A Gravel	4 - 8	10.0	90	80	70		✓	✓	✓	
B Gravel	2 - 6	8.6	80	60	50				✓	✓
C Gravel		6.4	60	50	40					✓

Source: Road Design Manual Volume 1: Geometric Design, MoWT, 2010

The functional classifications in the Ugandan Road Design Manual are divided up into Class A (international major roads), Class B (domestic major roads), Class C (primary roads), Class D (secondary roads), and Class E (minor roads). For the roads targeted by this survey, the items for considering the road class were organized as shown in **Table 2-3-13**. It was determined that it was appropriate to consider the road class equivalent to II Paved.

**Table 2-2-13 Classification considerations for the targeted roads**

Item	Consideration results
Traffic volume	This was estimated to be roughly 15,000 vehicles/day on major roads running north-south (Kampala Road, Andrea Olal Road), roughly half of this number at 5,000 - 7,000 vehicles/day on major roads running east-west (Acholi Road, Jomo Kenyatta Road), and about 2,000 vehicles/day in suburban areas.
Road width	The existing roads are two-lane roads heading out and back that are not isolated, with their road site widths being about 15 - 24m.
Design speed	The Uganda Road Design Manual established a design speed for roads in urban areas of 50km/h, and the design speed for a project to improve the roads running adjacent to these in the same city (USMID) is also 50km/h, so this figure was used for the design speed.
Functional classification	Since these are ordinary roads in urban areas, there are shops, tenements, schools, hospitals, banks, and public facilities lined up in the areas along the roads, and they are expected to carry out both traffic functions and access functions.

Source: JICA survey team

### (3) Geometric structure parameters

The geometric structure parameters stipulated by the Ugandan Road Design Manual are shown in **Table 2-2-14**. This survey referred to the prescribed values for Urban/Peri-Urban elements in this table.

**Table 2-2-14 Geometric structure parameters**

Design Element	Unit	Flat	Rolling	Mountainous	Urban/Peri-Urban
Design Speed	Km/h	90	70	60	50
Min. Stopping Sight Distance	m	135	95	75	58
Min. Passing Sight Distance	m	605	485	410	345
Min. Horizontal Curve Radius	m	320	185	130	100
Max. Gradient (desirable)	%	3.5	5.5	6	6
Max. Gradient (absolute)	%	5.5	7.5	8	8
Minimum Gradient in cut	%	0.5	0.5	0.5	0.5
Maximum Superelevation	%	7	7	7	4
Crest Vertical Curve stopping	K <sub>min</sub>	43	22	14	9
Crest Vertical Curve passing	K <sub>min</sub>	307	246	176	126
Sag Vertical Curve stopping	K <sub>min</sub>	30	20	15	11
Normal Cross fall	%	2.5	2.5	2.5	2.5
Shoulder Cross fall	%	4	4	4	4
Right of Way	m	50	50	50	50

Source: Road Design Manual Volume 1: Geometric Design, MoWT, 2010

### (4) Design vehicle

Given the traffic conditions in the local region, the single unit bus (DV-3) shown in **Table 2-2-15** was used as the design vehicle.

**Table 2-2-15 Dimensions of the design vehicle**

Design Vehicle Type	Symbol	Overall (m)			Overhang (m)		Wheel Base (m)	Minimum Design Turning Radius (m)	Minimum Inside Radius (m)
		Height	Width	Length	Front	Rear			
4 x 4 passenger car	DV-1	1.3	2.1	5.8	0.9	1.5	3.4	7.3	4.2
Single unit truck	DV-2	4.1	2.6	9.1	1.2	1.8	6.1	12.8	8.5
Single unit bus	DV-3	4.1	2.6	12.1	2.1	2.4	7.6	12.8	7.4
Semitrailer combination large	DV-4	4.1	2.6	16.7	0.9	0.6	6.1 & 9.1	13.7	5.8

Interstate Semitrailer	DV-5	4.1	2.6	21.0	1.2	0.9	6.1 & 12.8	13.7	2.9
------------------------	------	-----	-----	------	-----	-----	------------	------	-----

Source: Road Design Manual Volume 1: Geometric Design, MoWT, 2010

## **(5) Cross sections**

No new land acquisition will be carried out in order to minimize the negative environmental and social impact from the road improvements. As a general rule, overhanging sections (verandas) from buildings along roads will not be removed, and the roads will be planned with the veranda frontage serving as the property line.

The major cross section elements were set as shown below.

### **1) Lanes**

Since these are urban roads with lots of slow-moving vehicles, the lane width was left at its current 3.0m width from out of the available road site width. The number of lanes was set at four lanes for the built-up areas along Acholi Road, which connects to major roads, and kept at the current two lanes for all other roads.

### **2) Road shoulders**

Since these are urban roads with lots of slow-moving vehicles, the road shoulder width was set at 0.5m from out of the available road site width. In addition, L-shaped gutters will be installed at road shoulders to collect rain water from paved surfaces and drain it to street gutters.

### **3) Drainage facility installation zones**

As a general rule, lidded U-shaped gutters that are easy to maintain will be installed in the spaces adjoining sidewalks (1.0m wide), and will be arranged so that pedestrians can use them for passage.

### **4) Parking lanes**

There is enormous demand for road parking. So for those routes with extra room in their available road site width, parking lanes that are 2.0m wide will be installed on one or both sides of the road.

### **5) Sidewalks**

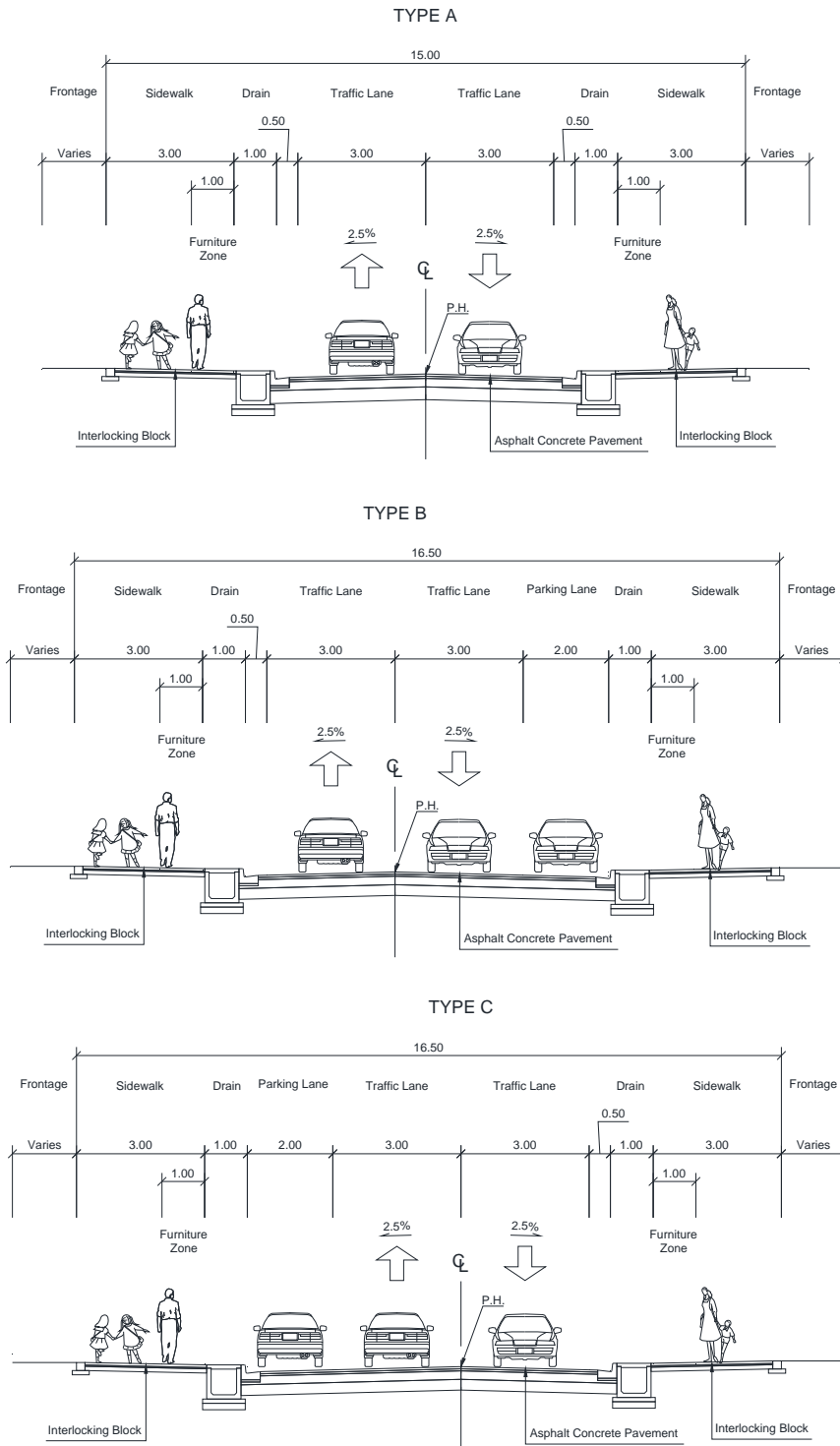
In the interest of contributing to the creation of bustling roads and ensuring the safety of pedestrians, mount-up sidewalks that are 3.0m wide will be installed on both sides of roads as a general rule. What is more, 1.0m of sidewalks on the sides of roadways will be used as utility side strips.

### **6) Median zones**

In the built-up areas along Acholi Road, which will be converted to a four-lane road, median zones consisting of median strips that are 1.5m wide and marginal strips that are 0.25m wide

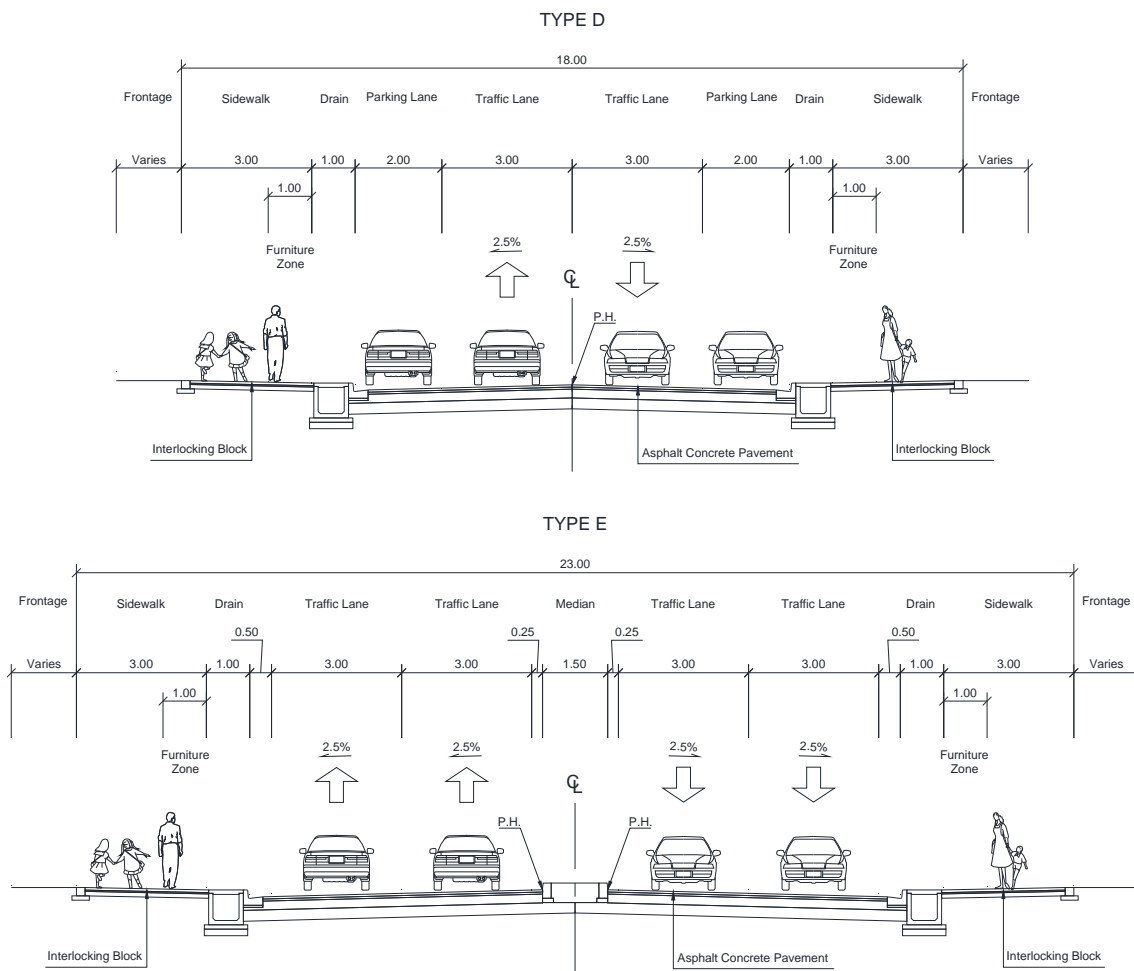
will be installed in an effort to regulate the flow of traffic and improve traffic safety.

The typical cross sections employed in this survey are shown in **Fig. 2-2-6** and **Fig. 2-2-7**.



Source: Survey team

**Fig. 2-2-6 Typical cross section (1/2)**



Source: Survey team

**Fig. 2-2-7 Typical cross section (2/2)**

The typical cross sections have been allotted to each route for the targeted roads as shown in **Fig. 2-2-8** based on the conditions along the roads and the traffic conditions observed in the field.



Source: Survey team

**Fig. 2-2-8. Standard Section Allotment**

### 2-2-2-5 Pavement Design

#### (1) Selecting the type of pavement

The pavement on the roadways currently consists of basic bituminous surface (DBST). Because of the routine traffic volume of the targeted roads and the frequency with which people enter and exit from the areas along the road, mixed asphalt pavement which offers superior durability and mobility will be adopted for this design. Interlocking block pavement will be used for the sidewalk pavement out of consideration for the laying and relocation of utility facilities.

#### (2) Roadway pavement

When it comes to the roadway pavement structure, a comparative review of designs based on Uganda's Road Design Manual and Japan's Guidelines for Pavement Design and Construction (Japan Road Association) was performed. As a result, it was confirmed that there is not a considerable difference between the two, and so a design based on the former was adopted.

#### (3) Design training volume

##### 1) Design period

The design period was established as shown in **Table 2-2-16**, and this was chosen based on the importance of roads and the reliability of the basic data used in the design.

**Table 2-2-16 Selection table for the pavement design period**

Design Data Reliability	Importance/Level of Service	
	Low	High
Low	10-15 years	15 years
High	10-20 years	15-20 years

Source: Road Design Manual Volume 3: Pavement Design, Part I: Flexible Pavements, MoWT, 2010

The basic data used in the design consists of the traffic volume and the load bearing capacity of the roadbed. With regard to the load bearing capacity of the roadbed, this data is highly reliable because geological surveys were carried out. But since the traffic volume could potentially fluctuate depending on Gulu's development status in the future, the thinking is that it would be safer to consider this data as not being very reliable. Based on the above, the design period for the pavement was set at 15 years.

##### 2) Design traffic volume

The two types of existing data shown in **Table 2-2-17** serve as data on the traffic conditions in the subject area.

**Table 2-2-17 Usable existing data regarding traffic conditions**

No.	Document name	Route	Year the traffic survey was implemented
1	Survey report from JICA's Project for Rural Road Network Development in Acholi Sub-Region in Northern Uganda	Kampala Road Andrea Olal Road	2011
2	Results of a traffic survey for a World Bank road renovation project (USMID)	Acholi Lane School Road	2012

Source: Survey team

The current (2015) traffic volume approximated based on the two types of existing data mentioned above is shown in **Table 2-2-18**.

Conversely, a survey team performed traffic volume surveys at three major intersections in the built-up areas of Gulu for each direction and by type of vehicle during peak times in the morning and evening. The average daily traffic (ADT) estimated from the results and the traffic volume at peak times is shown in **Fig. 2-2-9**.



**Table 2-2-17 Existing data on traffic conditions and current (2015) traffic volume**

Name and Road / Study	Saloon Car/ Taxi	Light Good Vehicle*	Buses			Light Single Unit Truck	Medium / Large Single Unit Truck	Truck Trailer / Semi-trailer	Motor Cycles, Scooters	Total	Estimated 2015 Traffic <sup>#</sup>	Pedal Cycles	Total
			Small Bus**	Medium Bus	Large Bus								
<b>Conversion Factor from "ADT" to "pcu"</b>													
Flat	1.0	1.0	1.0	1.5	2.0	1.0	2.5	5.0	1.0			0.5	
Rolling	1.0	1.5	1.5	3.0	4.0	1.5	5.0	10.0	1.0			0.5	
<b>Traffic Volume by Study</b>													
<b>2012 JICA Study (2011 traffic)<sup>a</sup></b>													
Kampala Rd (No.1)													
ADT	982	1,764	105	6	13	147	154	33	9,132	12,336	16,170	2,299	14,635
pcu (flat)	982	1,764	105	9	26	147	385	165	9,132	12,715		1,150	13,865
pcu (rolling)	982	2,646	158	18	52	221	770	330	9,132	14,308		1,150	15,458
Andrea Olal Rd (No.5)													
ADT	1,065	1,714	227	13	60	635	48	32	8,006	11,800	15,467	3,601	15,401
pcu (flat)	1,065	1,714	227	20	120	635	120	160	8,006	12,067		1,150	13,216
pcu (rolling)	1,065	2,571	341	39	240	953	240	320	8,006	13,774		1,801	15,575
<b>2013 US-MID Design (2012 traffic)<sup>b</sup></b>													
Acholi Lane													
ADT	161	160	121	23	0	36	123	0	911	1,535	1,880	525	2,060
pcu (flat)	161	160	121	34.5	0	36	307.5	0	911	1,731		263	1,994
pcu (rolling)	161	240	181.5	69	0	54	615	0	911	2,232		263	2,494
School Road													
ADT	170	173	124	23	0	45	122	0	620	1,277	1,564	484	1,761
pcu (flat)	170	173	124	34.5	0	45	305	0	620	1,472		242	1,714
pcu (rolling)	170	259.5	186	69	0	67.5	610	0	620	1,982		242	2,224

Notes: \* vans, pickups &amp; 4WD

\*\* minibuses and matatu

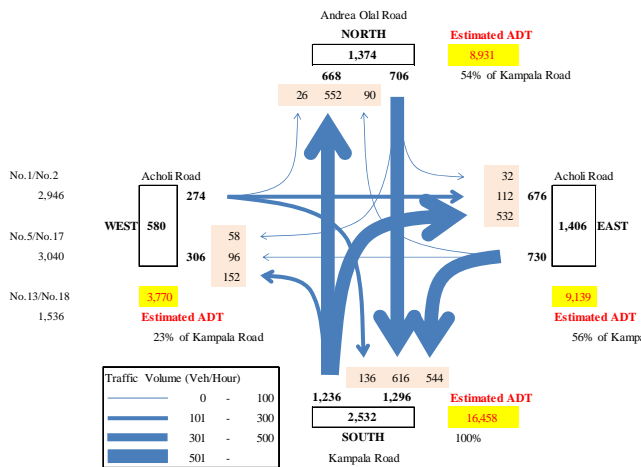
<sup>#</sup> Estimated Traffic by the Survey Team = the traffic volume in survey year x growth rate in Table 3-12

Sources: a. The Project for Rural Road Network Development Project in Acholi Sub-Region in Northern Uganda, JICA, April 2012

b. Final Detailed Engineering Design Report for the Priority Infrastructure Subprojects in Gulu Municipality, USMID, July 2013

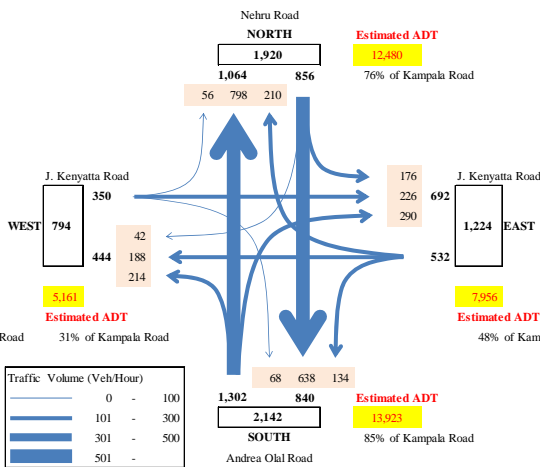
**(1) Kampala Road / Acholi Road Intersection**

**AM Peak (08:30-09:30)**



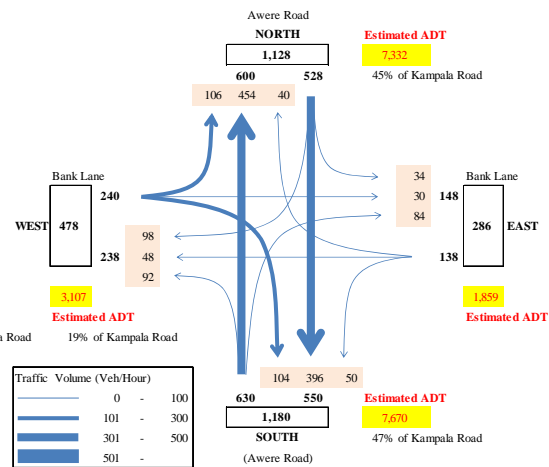
**(2) Andrea Olal Road / Jomo Kenyatta Road Intersection**

**AM Peak (08:30-09:30)**



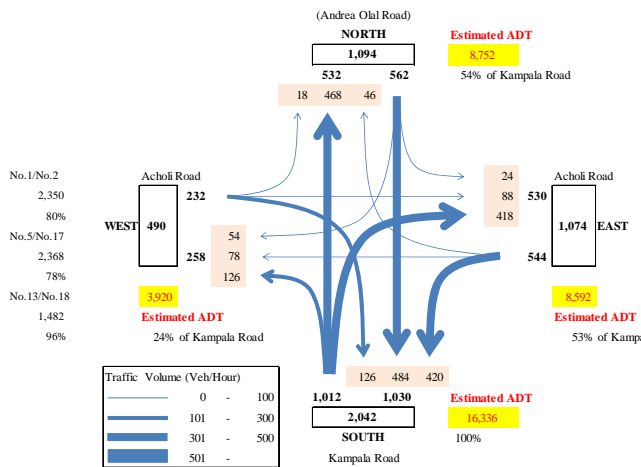
**(3) Awere Road / Bank Lane Intersection**

**AM Peak (08:30-09:30)**

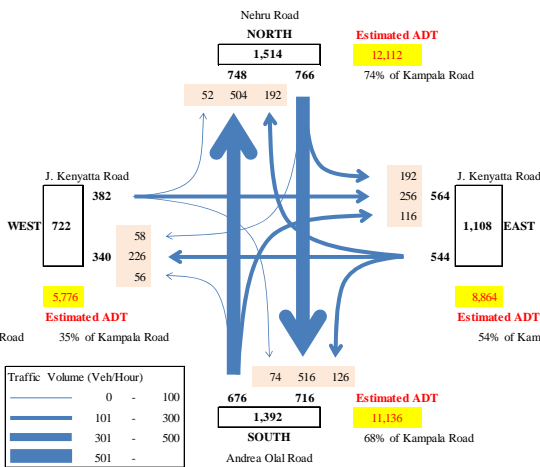


Note: Estimated ADT = AM Peak Hour Traffic Volume x 6.5

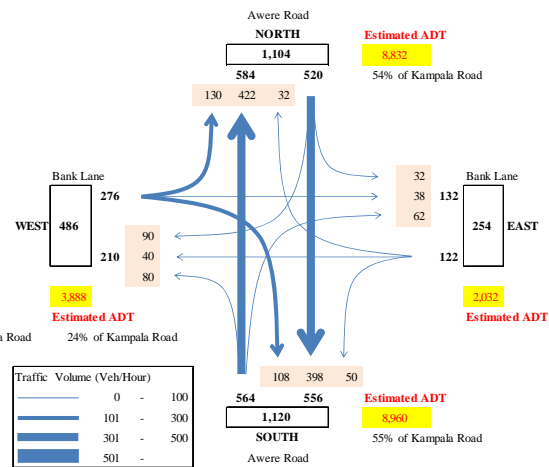
**PM Peak (16:30-17:30)**



**PM Peak (16:30-17:30)**



**PM Peak (16:30-17:30)**



**Fig. 2-2-9 Hourly traffic volume and estimated average daily traffic at peak times in the morning and evening**

The decision was made to set the traffic volume for the routes targeted for the design based on three sources: the existing data, the recent traffic volume surveys, and the traffic information observed in the field. The current traffic volume for the roads heading in both directions were set as shown in **Table 2-2-18** by taking the traffic volume of Kampala Road, which has the greatest traffic volume and serves as the core of Gulu, as the baseline.

**Table 2-2-18 Setting the current traffic volume for each route**

Division	Function	Route name	Estimated average daily traffic (ADT)	Percentage when the traffic volume on Kampala Road is taken to be 100%
1	North-south principal axis	Kampala Road	16,000	100%
	Same as above	Andrea Olal Road / Nehru Road / Gulu Avenue	9,000 – 13,000	60% - 80%
2	North-south secondary axes	Awich Road / Queens Avenue, Keyo Road / Alikor Road, Labwor Road / Awere Road	8,000 – 9,000	50% - 60%
3	Other north-south routes	Lagara Road / Coronation Road, Oliya Road	3,000 – 5,000	20% - 30%
4	East-west principal axis	Acholi Road (CBD)	9,000 – 13,000	60% - 80% (including diverted traffic from the opening of ring roads via USMID)
5	East-west secondary axes	J. Kenyatta Road (CBD), Bank Lane, Acholi Road (CBD)	6,000 – 9,000	40% - 60%
6	Other east-west routes	Market Street, Harley Road, Prince Road	3,000 – 5,000	20% - 30%

Source: Survey team

For this project, this survey was performed in 2015, the detailed design and competitive bidding will be carried out in 2016, the construction work will take place from 2016 - 2018, and the operation start is anticipated for 2018, so the design target was set for up to 15 years down the road in 2032. The growth rate in the traffic volume over this time was set as shown in **Table 2-2-20** by referring to the GDP growth rate from data from the Uganda Bureau of Statistics, which is shown in **Table 2-2-19**.

**Table 2-2-19 Uganda's GDP growth rate**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Av.
GDP	7.1	6.2	5.8	10.0	7.1	8.1	10.4	4.1	6.2	5.9	7.1
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Av.
GDP	5.8	10.0	7.1	8.1	10.4	4.1	6.2	6.4	3.6	4.7	6.6

Sources: Statistical Year Book (2012; top), Statistical Year Book (2014; bottom), Uganda Bureau of Statistics

**Table 2-2-20 Traffic volume growth rate set for this project**

Period	Growth rate
2011 - 2027	7.0%
2028 - 2032	5.0%

Source: Survey team

For the ESAL conversion factor per vehicle by type of vehicle (Vehicle Damage Factor: VDF), the numerical values used for a project to improve adjoining roads (USMID) shown in **Table 2-2-21** were used.

**Table 2-2-21 ESAL conversion factor per vehicle by type of vehicle (VDF)**

Vehicle Type	VDF
Small Bus	0.35
Medium Bus	0.60
Large Bus	0.75
Light Single Unit Truck	0.35
Medium / Large Single Unit Truck	3.30
Truck Trailer / Semi Trailer	8.00

Source : Final Detailed Engineering Design Report for the Priority Infrastructure Subprojects in Gulu Municipality, USMID, July 2013

The lane share for two-lane roads is 80%, and for the four-lane Acholi Road a directional factor of 60% and lane share of 90% were applied. The design ESAL for each route classification and pavement design class were set as shown in **Table 2-2-22**.

**Table 2-2-22 Design ESAL for each route classification and pavement design traffic classifications**

No.	Route classifications	Route name	Design cumulative ESAL (2018 - 2032)	Estimated percentage versus Kampala Road	MoWT pavement design traffic class
1	North-south principal axis	Kampala Road	10 million	100%	T6
	Same as above	Andrea Olal Road / Nehru Road / Gulu Avenue	6 - 8 million	60% - 80%	T6
2	North-south secondary	Awich Road / Queens Avenue, Keyo Road / Alier	5 - 6 million	50% - 60%	T5

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	axes	Road, Labwor Road / Awere Road,			
3	Other north-south routes	Lagara Road / Coronation Road, Oliya Road	2 - 3 million	20% - 30%	T4
4	East-west principal axis	Acholi Road (CBD)	6 - 8 million	60% - 80%	T6
5	East-west secondary axes	J. Kenyatta Road (CBD), Bank Lane, Acholi Road (Others)	4 - 6 million	40% - 60%	T5
6	Other east-west routes	Market Street, Harley Road, Prince Road	2 - 3 million	20% - 30%	T4

Source: Survey team

### 3) Sub-grade load bearing capacity

The sub-grade load bearing capacity (design CBR) was calculated based on test pitting surveys on existing roads as shown in **Table 2-2-23**.

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**Table 2-2-23 Calculations of the design CBR**

Unit: %

No.	Name of Road	No.	CBR	CBR Average	CBR Min.	CBR Max.	Design Subgrade Class				
1	Kampala Rd.	TP6	14.0	11.0	5.0	5-7	S3				
		TP7*	5.0								
			14.0								
2	Acholi Rd. (CBD)	TP7*	5.0	8.0	5.0	5-7	S3				
			14.0								
		TP16	5.0								
			8.0								
	Acholi Rd. (Others)	TP17	5.0	8.0	5.0	5-7	S3				
		TP7*	5.0								
			14.0								
3	Lagara Rd.	TP7*	5.0	9.3	5.0	5-7	S3				
			14.0								
		TP8	9.0								
4	Coronation Rd.	TP8	9.0	8.0	9.0	8-14	S4				
		TP9	7.0								
5	Andrea Olal Rd.	TP7*	5.0	9.3	5.0	5-7	S3				
			14.0								
		TP8	9.0								
6	Nehru Rd.	TP8	9.0	8.0	7.0	5-7	S3				
		TP9	7.0								
7	Gulu Ave.	TP9	7.0	5.5	4.0	3-4	S2				
		TP10	4.0								
8	Awich Rd.	TP7	5.0	9.3	5.0	5-7	S3				
			14.0								
		TP8	9.0								
9	Queens Ave.	TP8	9.0	8.0	7.0	5-7	S3				
		TP9	7.0								
10	Keyo Rd.	TP16	5.0	5.3	3.0	3-4	S2				
			8.0								
		TP15	3.0								
11	Alikor Rd.	TP15	3.0	5.3	3.0	3-4	S2				
		TP14	6.0								
			7.0								
12	Labwor Rd.	TP16	5.0	5.3	3.0	3-4	S2				
			8.0								
		TP15	3.0								
13	Awere Rd. (CBD)	TP15	3.0	3.0	3.0	3-4	S2				
	Awere Rd. (Others)	TP14	6.0					7.0	6.0	5-7	S3
			7.0								
		TP13	8.0								
14	Oliya Rd.	TP16	5.0	5.3	3.0	3-4	S2				
			8.0								
		TP15	3.0								
17	Jomo Kenyatta Rd. (CBD)	TP8	9.0	6.0	3.0	3-4	S2				
		TP15	3.0								
18	Bank Lane	TP9	7.0	6.7	7.0	5-7	S3				
		TP14	6.0								
			7.0								
19	Market St.	TP14	6.0	6.5	6.0	5-7	S3				
			7.0								
20	Harley Rd.	TP11	3.0	3.0	3.0	3-4	S2				
21	Prince Rd.	TP11	3.0	3.0	3.0	3-4	S2				

Note: \* Lowest CBR at TP7 in the laboratory report was corrected from 2% to 5% based on PI and LL data.

#### 4) Weather classifications in the subject area

The degree of damage suffered by pavement is significantly impacted by the amount of precipitation in the region where the road is situated, so the weather of the subject area will be taken into consideration when selecting the pavement structure. The subject area receives an annual

amount of precipitation of 1,000 - 2,000mm and has been deemed to be a very rainy (wet) region. As such, Chart W1 Wet Regions from the MoWT's Road Design Manual shall apply.

### 5) Selecting the pavement structure

For the traffic volume and roadbed load bearing capacity, their design classes were specified as shown in **Table 2-2-24** and **Table 2-2-25** via their respective design ESALs and roadbed design CBR values.

**Table 2-2-24 Traffic class via design ESAL**

Traffic Design Designation								
Traffic Ranges (Million ESAs)	T1	T2	T3	T4	T5	T6	T7	T8
	< 0.3	0.3-0.7	0.7-1.5	1.5-3	3-6	6-10	10-17	17-30

Source: Road Design Manual Volume 3: Pavement Design, Part I: Flexible Pavements, MoWT, 2010

**Table 2-2-25 Roadbed load bearing capacity class via design CBR**

Subgrade Class Designation						
Subgrade CBR Ranges (%)	S1	S2	S3	S4	S5	S6
	2	3-4	5-7	8-14	15-29	30+

Source: Road Design Manual Volume 3: Pavement Design, Part I: Flexible Pavements, MoWT, 2010

Based on the above, the plans for the pavement structure for each route are shown in **Table 2-2-26**. When the roadbed load bearing capacity is of the S2 class, then the uppermost part of the roadbed will be replaced with select materials (murrum materials that can be gathered from the vicinity around Gulu).

**Table 2-2-26 Pavement structure for each route**

Road Number	Road Name	design Condition		Pavement Structure*					
		Traffic Class	Subgrade Class	Surface Course	Binder Course	Base Course (Mechanically Crushed Stone)	Sub-base Course (Crusher Run)	Selected Materials (Marram)	Remarks
1	Kampala Rd.	T6	S3	50mm	50mm	200mm	250mm		
2	Acholi Rd. (CBD)	T6	S3	50mm	50mm	200mm	250mm		
	- do - (Others)	T5	S3	50mm		200mm	300mm		
3	Lagara Rd.	T4	S3	50mm		175mm	275mm		
4	Coronation Rd.	T4	S4	50mm		175mm	175mm		
5	Andrea Olal Rd.	T6	S3	50mm	50mm	200mm	250mm		
6	Nehru Rd.	T6	S3	50mm	50mm	200mm	250mm		
7	Gulu Ave.	T6	S2	50mm	50mm	200mm	225mm	200mm	Selected Layer
8	Awich Rd.	T5	S3	50mm		200mm	300mm		
9	Queens Ave.	T5	S3	50mm		200mm	300mm		
10	Keyo Rd.	T5	S2	50mm		200mm	250mm	200mm	Selected Layer
11	Aliker Rd.	T5	S2	50mm		200mm	250mm	200mm	Selected Layer
12	Labwor Rd.	T5	S2	50mm		200mm	250mm	200mm	Selected Layer
13	Awere Rd. (CBD)	T5	S2	50mm		200mm	250mm	200mm	Selected Layer
	- do - (Others)	T5	S3	50mm		200mm	300mm		
14	Oliya Rd.	T4	S2	50mm		175mm	225mm	200mm	Selected Layer
17	Jomo Kenyatta Rd.(CBD)	T5	S2	50mm		200mm	250mm	200mm	Selected Layer
18	Bank Lane	T5	S3	50mm		200mm	300mm		
19	Market St.	T4	S3	50mm		175mm	275mm		
20	Harley Rd.	T4	S2	50mm		175mm	225mm	200mm	Selected Layer
21	Prince Rd.	T4	S2	60mm					Overlay

Notes: 1. \* Based on Chart D1 of Volume 3: Pavement Design of Road Design Manual of MoWT (2010)

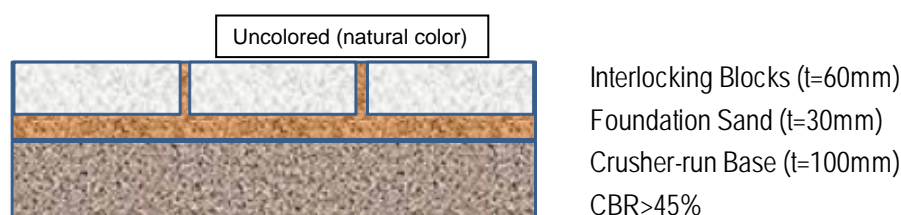
2. \*\* CBR of the selected layer, Murrum from Borrow Pit, shall be more than 15%.

Source: Survey team

## 6) Sidewalk pavement

### Ordinary sections

Interlocking pavement will be adopted out of consideration for the fact that there are lots of pedestrians on the sidewalk pavement, it is ideal to have a clear division between roadways and sidewalks, and because it can be partially dug up when laying utilities in the future. Since Uganda does not have any standards pertaining to interlocking pavement, Japanese design standards will be adhered to and the structure shown in **Fig. 2-2-10** shall be applied.

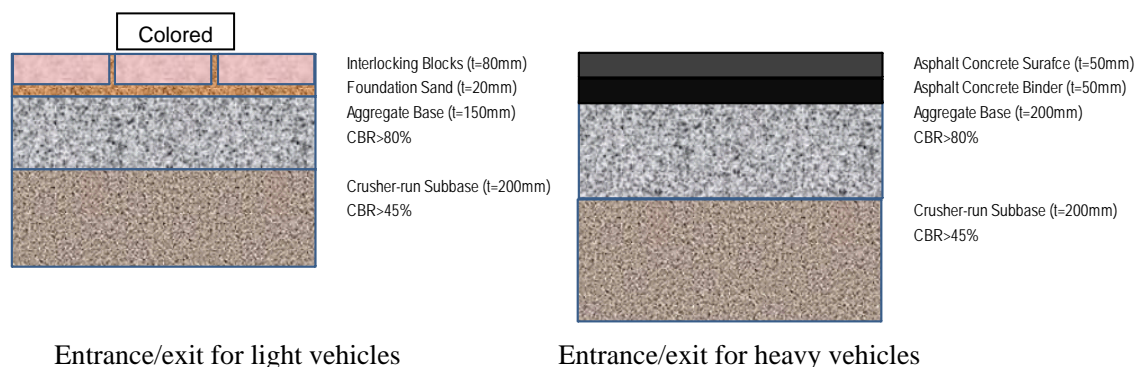


Source: Survey team

**Fig. 2-2-10 Pavement structure for sidewalks and its application**

### Vehicle entrances/exits

The interlocking pavement of sidewalks where people drive light vehicles onto them is shown in **Fig. 2-2-11**<sup>1</sup>. In order to clearly specify the difference between ordinary sidewalks and the sections people drive vehicles on for traffic safety reasons, colored interlocking blocks will be used for the latter. What is more, bus parking places, gas stations, and other entrances and exits for heavy vehicles will have an asphalt mixture surface layer and a two-layer binder course structure.



Source: Survey team

**Fig. 2-2-11 Pavement structure at vehicle entrances/exits on sidewalks**

<sup>1</sup> Guidelines for Interlocking Block Pavement Design and Construction, Japan Interlocking Block Pavement Engineering Association, July 2000



### **2-2-2-6 Drainage Facility Design**

#### **2-2-2-6-1 Rainwater Drainage System**

Surface drainage (rain water) in the project area collects in L-shaped gutters at the ends of roads. It is then discharged into safe existing rivers or water channels outside the project area via U-shaped gutters, transversal bedded culverts across roads, flumes, and other facilities set up together with sidewalks. **Fig. 2-2-12** shows a drainage network that includes cross section divisions for street gutters and transversal bedded culverts, as well as outlet heads (drainage outlets).

#### **2-2-2-6-2 Discharge of Storm Sewage**

##### **(1) Calculating the discharge of storm sewage**

The rational runoff formula was used to calculate the discharge of storm sewage.

$$Q=1/3.6 * C \times I \times A \quad \text{or} \quad Q=1/3.6 * C * I * a$$

Q: Outflow (m<sup>3</sup>/sec)

C: Runoff coefficient - Table 3-3

I: Rainfall intensity (mm/h)

A: Catchment area (km<sup>2</sup>), a: Catchment area (m<sup>2</sup>)

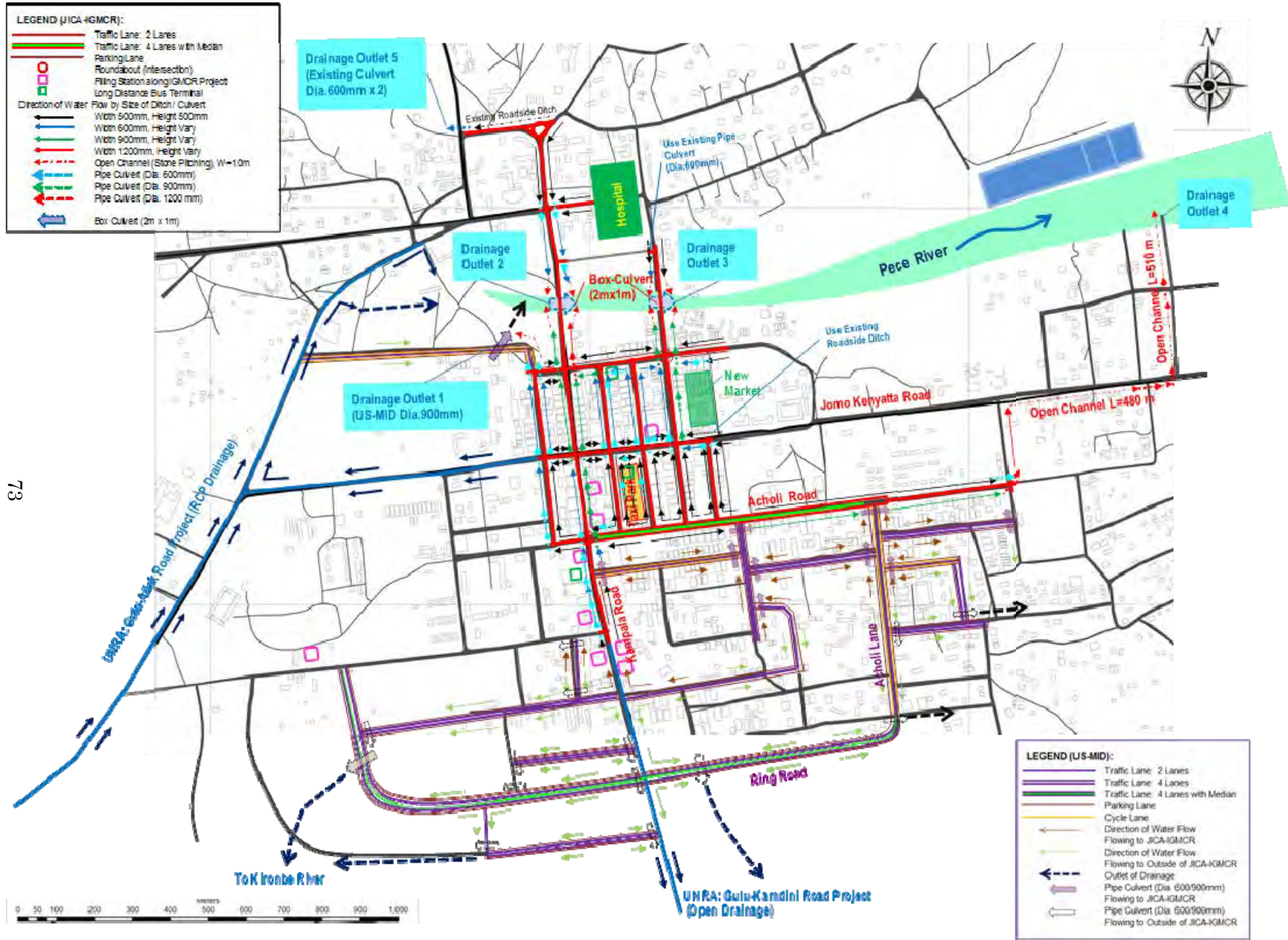


Fig. 2-2-12 Drainage network

**(2) Establishing the rainfall intensity and concentration time**

The rainfall recurrence interval was set at ten years by the MoWT’s Drainage Design Manual. Through the curve in the rainfall intensity and duration (concentration time) set in a hydrology survey, the time it takes water to reach the drainage facility from the furthest point in each route catchment area region (inlet time: t1) and the time it takes to pass through side gutters, transversal bedded culverts, flumes, and so on to reach the planned runoff point (flow time: t2) were approximated, and the rainfall intensity was established in response to this.

$$t = t1 + t2$$

t: Concentration time

t1: Inlet time

t2: Flow time - Setting the drainage basin and calculating the catchment area

This was calculated for each route based on satellite imagery and topographical surveys. Owing to the mixed land use, an approximate structural area ratio was used to reflect this in the catchment areas.

**(3) Run-off coefficient**

The runoff coefficient was calculated for each route based on satellite imagery and the results of topographical surveys of the subject area. The runoff coefficient that was adopted is shown in **Table 2-2-27**.

**Table 2-2-27 Runoff coefficient for the ground surface**

Ground surface type		Run-off coefficient	Values used
Road surface	Pavement	0.70 – 0.95	0.90
Commercial area	Downtown	0.70 – 0.95	0.70
	Regions neighboring the downtown	0.50 – 0.70	
Residential area	Residential area with little intervening land	0.65 – 0.80	0.70
	Residential area with lots of intervening land / gardens	0.30 – 0.50	0.40
Greenery	Athletic field	0.20 – 0.35	0.30
	Fields and farms	0.10 – 0.30	0.20

Source: The runoff coefficient was excerpted from the Road Engineering Guidelines, Japan Road Association. The values used are from a survey team

**(4) Outflow**

The design outflow into each drainage outlet calculated based on the above conditions is shown in **Table 2-2-28**.

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for Improvement of Gulu Municipal Council Roads in Northern Uganda

**Table 2-2-28 Design flow volume**

Drainage outlet number*	Catchment area (m <sup>2</sup> )	Water flow course (Road No.)	Concentration time (min)	Rainfall intensity (mm/h)	Design outflow (m <sup>3</sup> /sec)	Notes (Runoff destination)
1(L)	18,800	No.2->No.3->No.4	10	198	0.36	To USMID U-Ditch
1(R)	17,900	No.2->No.3->No.4	10	198	0.73	To USMID RCP
2(L)-South	44,700	No.1->No.5->No.6 ->No.7	10	198	1.65	To Box-Culvert No.1 (Up-stream)
2(R)-South	97,960	No.1/No.2->No.5->No.6 ->No.7 and  No.8->No.9 / No.10/ No.11-> No.18->No.7	11	192	3.56	To Box-Culvert No.1 (Down-stream)
2(L)-North	7,200	No.7	10	198	0.26	To Box-Culvert No.1 (Up-stream)
2(R)-North	27,100	No.20->No.7	13	180	0.80	To Box-Culvert No.1 (Down-stream)
3(L)-South	41,100	No.10->No.11->No.18-> / No.12->No.13	10	198	1.50	To Box-Culvert No.2 (Up-stream)
3(R)-South	70,900	No.14->No.17->No.13  No.12->No.13	15	169	2.53	To Box-Culvert No.2 (Down-stream)
3(L)-North	32,200	No.13	15	169	0.65	To Box-Culvert No.2 (Up-stream)
3(R)-North	11,200	No.20/No.23->No.7	13	180	0.27	To Box-Culvert No.2 (Down-stream)
4(R)	132,920	From USMID->No.2 ->No.16	24	134	2.99	To Pece River through Open Channel
5						No drainage work

Note: \* South means the southern side of Pece River and North means the northern side of Pece River.

Source: Survey team

### 2-2-2-6-3 Drainage Facility Plan

#### (1) Drainage structure specifications

Table 2-2-29 shows the types of drainage structures and the reasons for their selection.

**Table 2-2-29 Drainage facility types and application**

Type	Drainage structure specifications	Purpose	Notes
Street gutter	L-shaped street gutter Width: 300mm	Collect water from road surfaces	Uganda's standard sections will be applied
	U-shaped gutters (lidded) Base widths: 500mm, 600mm, 900mm, 1,200mm	Collect water from L-shaped gutters and sidewalks	Cast-in-place concrete (pipe culverts that are difficult to maintain will not be used)
Transversal bedded culverts across roads	Reinforced concrete pipes Diameters: 600mm, 900mm, 1,200mm	Horizontal/vertical cross sections for main roads and heavy vehicle access roads	Due to the fact that there is minimal earth covering and enormous variance in the cement quality, full concrete types will be used
Rain water containers	Square shaped	Locations connected to U-shaped gutters and transversal bedded culverts	A square-shape will be adopted instead of a round one out of consideration for local construction abilities
Drop structures (impermeable walls)	Reinforced concrete walls	These will be installed on the steep parts of longitudinal slopes where the flow velocity exceeds 3m/sec in an effort to reduce the flow velocity	
Rain water guides leading to drainage outlets	Trapezoidal flumes (wet stone pitching) Base width: 1,000mm	Leading from the end points of main roads to wastewater drainage outlets	Reinforced concrete covers will be used on the access roads leading to villages, etc.
River-crossing drainage structure	Box culvert 2,000mm x 1,000mm (Wide) (Height)	Pece River crossings	Gulu Avenue and Awere Road

Source: Survey team

## (2) Setting the drainage flow area

The flow rate that can pass through the drainage facilities was calculated using the following formula.

$$\text{Passable flow rate: } Q = A * V$$

A : Flow area (m<sup>2</sup>)

V : Mean velocity (m/sec)

$$\text{Manning formula: } V = 1/n * R^{2/3} * I^{1/2}$$

n: Coarse soil coefficient (sec/m<sup>1/3</sup>)

R (hydraulic radius) : A/P (m)

I: Channel gradient

The goal for the mean velocity of the gutters was set within the range of 0.6 - 3.0 m/sec for concrete structures and within the range of 0.6 - 1.8 m/sec for wet stone pitching structures. Drop structures (impermeable walls) were installed at sections with steep longitudinal slopes where the

flow velocity significantly exceeds these in order to control the flow velocity.

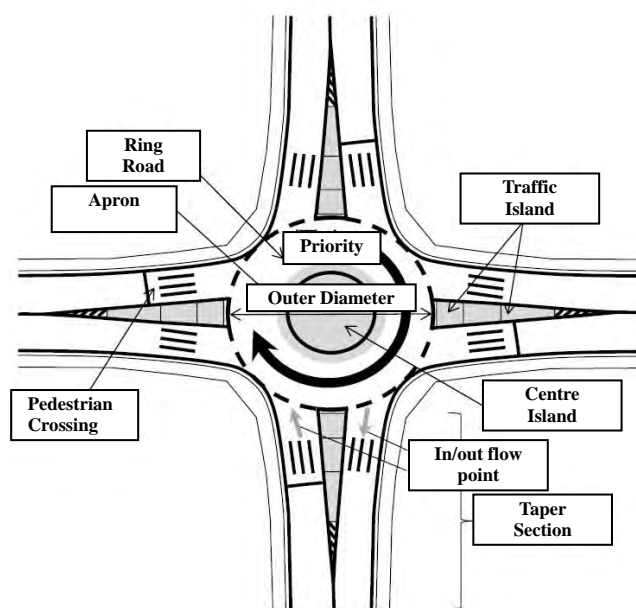
### 2-2-2-7 Intersection Design

#### (1) Intersection format

Roundabout and level intersection (without signals) formats were adopted for the intersections. Due to the unstable supply of electricity in the local region and the difficulty of performing maintenance on them, the installation of intersections controlled by signals was put off as a future issue. Regarding the design of the roundabouts, since the MoWT does not have any clear standards for this, these were designed based on consultation and review materials from Japan's Roundabout Review Committee (2013-2014), MLIT. General descriptions of the roundabout intersections are shown in **Table 2-2-30**.

**Table 2-2-30 General descriptions of roundabout intersections**

Number	Intersection name	Current configuration	Improvement plan
1	Kampala Road / Acholi Road intersection	Level intersection without signals	Changed to a roundabout Median island diameter: 12m Outer diameter : 27m Ring road width: 5m An apron (2m) will be installed at the median island to allow large buses to pass
2	Andrea Olal Road / J. Kenyatta Road intersection	Roundabout Median island diameter: 11m Outer diameter : 27 - 28m Ring road width: 7 - 8m	The following improvements will be carried out. Median island diameter: 12m Outer diameter : 27m Ring road width: 5m An apron (2m) will be installed at the median island to allow large buses to pass
3	Awere Road / Bank Lane intersection	Roundabout Median island diameter: 11m Outer diameter : 27 - 28m Ring road width: 7 - 8m	The following improvements will be carried out. Median island diameter: 12m Outer diameter : 27m Ring road width: 5m An apron (2m) will be installed at the median island to allow large buses to pass
4	Gulu Avenue / Prince Road intersection	Roundabout Median island diameter: 18m Outer diameter : 36m Ring road width: 8.5m	This roundabout was installed from 2013-2014. Structural improvements will not be performed on it, but an asphalt mixture will be overlaid on the existing DBST pavement.



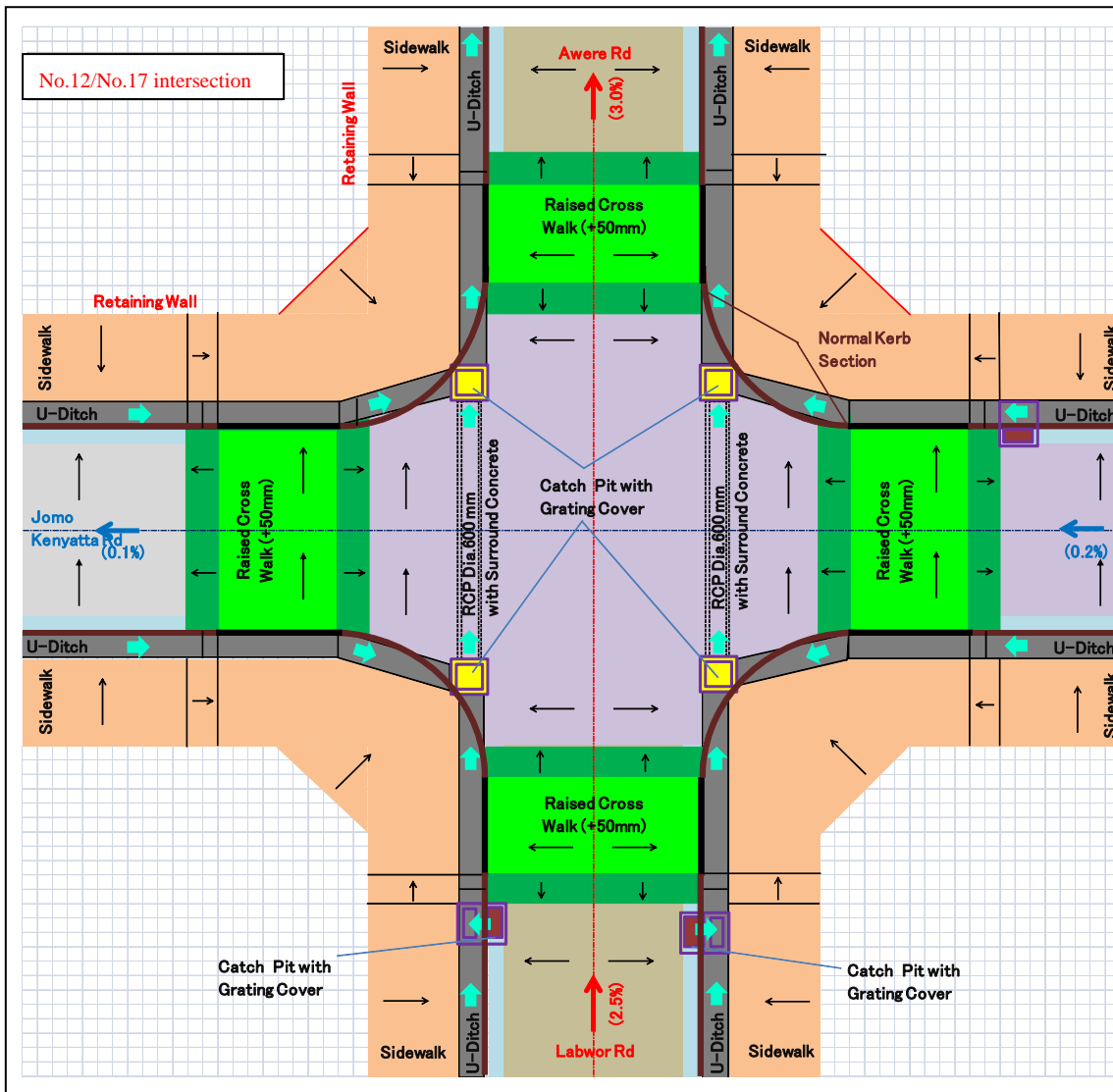
Source: Roundabout Review Committee, MLIT, (2013-2014)

**Fig. 2-2-12 Roundabout intersection structures**

## (2) Installation of crosswalks and safety measures

Field observations of locations where traffic accidents frequently occur were carried out with Gulu Municipal traffic police. According to these observations, there are dozen-some locations where traffic accidents frequently occur on the roads targeted by this survey. The majority of these involve accidents between vehicles and pedestrians at intersections, or accidents caused by motorcycle taxi (boda-boda) collisions or encounters.

Therefore, crosswalks will be installed at major intersections out of consideration for securing a smooth traffic flow and for the safety of pedestrians, who are at the mercy of motorized traffic. In addition, speed bumps will be installed in an effort to forcibly control the speed of vehicles, particularly in urban areas (**Fig. 2-2-13**). The speed bump height in the MoWT Design Manual is 10cm, but out of consideration for the fact that much of the traffic volume is from motorcycle taxis, and that the vast majority of female passengers sit with their legs out to the side, a height of 5cm was adopted instead.



Source: Survey team

**Fig. 2-2-13 Raised crosswalks at intersections (example of their application)**

Table 2-2-31 shows intersections where raised crosswalks will be adopted.



**Table 2-2-31 Intersections where raised crosswalks will be installed**

No.	Intersection name	Notes
1	No.1 (Kampala Road) / No.2 (Acholi Road)Intersection	Roundabout Intersection with frequent accidents
2	No.2 (Acholi Road) / No.8 (Awich Road)Intersection	
3	No.2 (Acholi Road) / No.10 (Keyo Road)Intersection	
4	No.2 (Acholi Road) / No.12 (Labwor Road)Intersection	Intersection with frequent accidents
5	No.2 (Acholi Road) / No.14 (Oliya Road)Intersection	
6	No.5 (Andrea Oral Rod) / No.17(J. Kenyatta Road)Intersection	Roundabout
7	No.6 (Nehru Road) / No.18 (Bank Lane)Intersection	
8	No.7 (Gulu Avenue)/ No.20 (Harley Road)Intersection	Intersection with frequent accidents
9	No.8 (Awich Road) / No.17 (J. Kenyatta Road)Intersection	
10	No.9 (Queen's Avenue) / No.18 (Bank Lane)Intersection	
11	No.10 (Keyo Road) / No.17 (J. Kenyatta Road)Intersection	
12	No.11 (Alikar Road) / No.18 (Bank Lane)Intersection	
13	No.12 (Labwor Road) / No.17 (J. Kenyatta Road)Intersection	Intersection with frequent accidents
14	No.13 (Awere Road) / No.18 (Bank Lane)Intersection	Roundabout Intersection with frequent accidents

Source: Survey team

### 2-2-2-8 Ancillary Facility Design

#### (1) Road signs and road markings

Road signs and road markings will be set in place in striving for safe and smooth road traffic. The standard pattern (Traffic Signs Manual, 2004, MOWHC) used within Uganda will be applied for the road signs and road markings. **Table 2-2-32** and **Table 2-2-33** show sections where both of these have been applied.

**Table 2-2-32 Installation approach for road signs**

Type of sign		Installation essentials
Informational signs	Information on direction, route name, major facilities, etc.	Information that indicates the major public facilities in Gulu
	Roadside parking lanes	Locations where roadside parking lanes have been installed
Warning signs	Presence of crossroads	Four-way crossings and T-shaped intersections
	Narrowed road width	Places where the roadway width narrows
	Intersections where speed bump-style facilities for reducing running speed will be installed	Intersections where speed bump-style facilities for reducing running speed will be introduced
	Roundabout	Roundabout intersection
	Frequent child crossings	Around the entrances/exits to kindergartens and elementary schools
	Crosswalks	Locations where crosswalks will be installed
Regulatory signs	Passing prohibited	Straight sections and central city roads with large longitudinal slopes
	Parking prohibited	Places where traffic flows into intersections and the environs around commercial streets
	Driving prohibited other than in the designated direction	Places where it is necessary to prohibit vehicles from driving in particular directions in the vicinity around intersections
	Yield	Exits from intersections to subsidiary roads
	Roundabout rotation direction	Roundabout intersection
	Speed reduction	Roads where people's running speed tends to exceed the speed limit (50km/h)

**Table 2-2-33 Sections where traffic signs will be installed**

Type		Installation location
Traffic signs (Instructional signs)	Median lines	Full length (except sections where passing is prohibited or where central median strips will be installed)
	Lane boundary lines	Places with multiple lanes
	Buffer zones	Places where traffic flows into and out of intersections
	Stop lines	Places where traffic flows out of intersections and where yield signs will be installed
	Crosswalks	Locations where crosswalks will be installed
Traffic signs (Regulatory signs)	Passing prohibited	<ul style="list-style-type: none"> <li>– Locations with steep slopes with a longitudinal slope of 5% or greater</li> <li>– Central urban roads</li> </ul>
	Passing sections for each traveling direction	Places with multiple lanes at intersections
Demarcation line	Lane edge line	All lines (except locations where road parking lanes will be installed)
	Changes to the roadway width	Places where the roadway width changes
	On-street parking places	Places where on-street parking lanes will be installed

Source: Survey team

## (2) Roadside parking lanes

When there is extra room in the existing road site width, then the plan is to install roadside parking

lanes that are 2m wide. The roads targeted for this are shown in **Table 2-2-34**.

**Table 2-2-34 Roadside parking lanes**

Road number	Road name	Direction	Parking lane width*	Notes
1	Kampala Road	R (east side)	2.0m	
8	Awich Road	R (east side)	2.0m	Taxi Park entrance
10	Keyo Road	L (west side)	2.0m	Taxi Park exit
18	Bank Lane	L (north side)	2.0m	
19	Market Street	L/R (both sides)	2.0m	North entrance/exit for a new market

Note: \* includes the width of road shoulders and L-shaped gutters

Source: Survey team

### (3) Access roads

There are 127 alleys (which are mainly used as parking spaces) and entrances and exits to private land along the central urban parts of the targeted roads. Efforts will be made to improve access to these and to prevent illegal parking on side strips. For the access to these, structures that can withstand being driven on by light vehicles will be used. In addition, since vehicles compete with pedestrians here, interlocking blocks with a different color from those of ordinary sidewalks will be used for the sake of traffic safety.

### (4) Facilities to control the speed of vehicles

After the road improvements have been made through this project, it is conceivable that the running speeds of vehicles will increase considerably on long straight sections. As such, MoWT standard speed bumps will be installed on the eastern sections of Acholi Road and Jomo Kenyatta Road, as well as on Sir Samyuel Road, in an effort to curb speeding.

### (5) Controlling traffic using central median strips

There are three intersections where accidents frequently occur on Acholi Road. As shown in **Fig. 2-2-14**, the design calls for using central median strips on four-lane roads to control the traffic flow to prevent traffic accidents from occurring.

### (6) Installation of lighting and communication cable ducts

Street lights will not be set in place as part of this project, but PVC pipes (JWWA K129 or a similar item) that are 300mm in diameter will be installed at major intersections to serve as power cable ducts out of consideration for the installation of such lights in the future. These will be buried at a depth where they will not interfere with the construction of street gutters and transversal bedded culverts. Two of these ducts will be jointly set in place to make it possible to lay communication cables and so that one can be used for the wiring to install traffic signals in the future. If a specific

plan for the manholes takes shape, then the concerned persons shall perform the installation.

**(7) Cutting down and planting of trees**

There are a total of 51 trees that are 20cm in diameter or larger on the road sites that must be cut down because they will hinder the road improvements. Most of these are pine trees. To replace the trees that are cut down, there are plans to plant trees along the river bed of the Pece River between Gulu Avenue and Awere Road. A list of said trees is shown in **Table 2-2-35**.

**Table 2-2-35 Trees that pose an obstacle**

No.	Route name	Diameter: 20 - 50cm	Diameter: 50cm or larger	Notes
1	Kampala Rd.			
2	Acholi Rd.	7		
3	Lagara Rd.	6		
4	Coronation Rd.	3		
5	Andrea Olal Rd.			
6	Nehru Rd.	5	1	
7	Gulu Ave.		1	The position of the sidewalk at the Harley Rd. intersection will be altered without cutting down the large evergreen oak tree there.
8	Awich Rd.	2		
9	Queens Ave.			
10	Keyo Rd.	1		
11	Aliker Rd.	3		
12	Labwor Rd.			
13	Awere Rd.	3	1	
14	Oliya Rd.			
17	Jomo Kenyatta Rd. (CBD)	6		
18	Bank Lane	11	1	
19	Market St.			
20	Harley Rd.			
21	Prince Rd.			
	Total	47	4	



Future traffic flow (diversion) and traffic flow management for preventing traffic accidents through the use of central median strips on Acholi Rd. for when the traffic capacity has reached the saturation point at the Kampala Rd./Acholi Rd. intersection

Fig. 2-2-14 Controlling traffic on Acholi Road using central median strips

### 2-2-2-9 Replacing soft ground

The results of the boring survey revealed that a soft ground that is roughly 1.0-1.5m thick exists in the embankment section (100m long) at the Pece River crossings at Gulu Avenue and Awere Road. The plan is to perform work to replace this weak foundation layer to prevent the subsidence of the road embankments and box culverts. The materials generated from removing the existing surface layer of pavement and base course materials will be used for the replacement materials.

### 2-2-2-10 Retaining Walls

Wet masonry retaining walls will be built in the following three locations in order to ensure the prescribed road width. Guard rails will be installed on the tops of the retaining walls to prevent falling.

**Table 2-2-36 Retaining wall work**

Route name	Position	Length	Height	Notes
Bank Lane	Left Hand Side between Coronation Road and Gulu Avenue	60m	1.0m	
J. Kenyatta Road	Left Hand Side between Alikor Road and Awere Road	20m	1.0m	Near J. Kenyatta Road/ Awere Road Intersection
Awere Road	Left Hand Side between J. Kenyatta Road and Bank Lane	20m	1.0m	Near J. Kenyatta Road/ Awere Road Intersection

Source: Survey team

### 2-2-3 Outline Design Drawing

The general drawings for each route based on the basic plans and design conditions indicated above will be shown at the appendix of this report.

### 2-2-4 Implementation Plan

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

##### (1) Temporary works

Cross box culverts will be installed at Gulu Avenue (Road No. 7) and Awere Road (Road No. 13) so as to ensure streamflow for crossing the Pece River. Since main lines will have to be excavated for the box culvert construction work, roads that allow for spot pipe removal will be installed owing to the determination that it will be difficult to interrupt the flow of traffic. These roads allowing for spot pipe removal will be built up using materials generated from the construction, and their pavement will consist of blacktop pavement such as DBST. The streamflow will be ensured via corrugated pipes and the like. In addition, since the construction will take place in the river channel area, sandbags will be used to protect the temporary roads. The risk of sudden flooding will be minimized by carrying out the construction work in the dry

season, when there is little river water.

**(2) Earthwork**

Since the main works will consist of road improvement work in an urbanized area, in essence it will not entail any large-scale changes to topographic features, such as filling or cutting. The earthwork needed for the main work will consist entirely of small-scale earthwork for the installation of the gutters, as well as the removal of the existing pavement and roadbed formation. Therefore, as a general rule the construction work will be carried out using machinery. The excavation of gutters will be carried out using excavators, while the surface compaction will similarly be performed through a combination of excavators and small rollers or tamping machines. Bulldozers, excavators, vibrating rollers, and other machinery suited to the width of the roads under construction will be used for the removal of the existing pavement and roadbed formation. The reclaimed materials are good quality materials known locally as “murram” and were used in the base course for the existing pavement. They will be used as temporary materials and refilling materials and the like, thereby giving forethought to curbing the amount of surplus soil for disposal.

**(3) Concrete work**

Since there are no facilities that can supply ready-mixed concrete in the subject area or the surrounding regions, concrete will be produced using large-scale 0.5m<sup>3</sup> mixers. A great deal of concrete will be needed so consideration will be given to procuring a concrete plant. But since the target structures are comparatively small-scale relative to gutters, and since it is envisioned that the construction work will be done using cast-in-place concrete as shown in “(4) Drainage structures,” it has been deemed appropriate to produce cement using mixer vehicles that can be counted on to have mobile power. The decision has been made to use domestically produced cement, and the aggregate will be produced in Kidere, which is located approximately 10km west of the local region, then hauled in.

**(4) Drainage gutter work**

Drainage gutters will be installed off to the sides of sidewalks at the border blocks between the sidewalk and the roadway. They will be lidded, U-shaped gutters between 500 - 900mm wide. The width applied will be determined based on the relationship between the runoff volume and conveyance force. As a unique feature of construction work in urban areas, there are numerous sections that will be driven over and there may be cases where it is necessary to avoid obstacles such as telephone poles. As such, it will be difficult to perform work on a certain cross section in succession, so the construction work will essentially be done by cast-in-place concrete.

**(5) Box culvert work**

For the box culverts, excavation will be carried out after first diverting roadway traffic onto temporary roads, then they will be constructed using cast-in-place reinforced concrete. It was acknowledged from the results of a geological survey that there is a clay layer in the support foundation, and so there are concerns over settlement due to consolidation. Therefore, the load bearing capacity will be ensured by replacing the box culverts with a depth of 1.0m with higher quality materials. The river will be separated off from the work sections using sandbags and the like, thereby ensuring the safety and efficiency of the work. The concrete will be produced at the work site using 0.5m<sup>3</sup> concrete mixers before being cast.

**(6) Asphalt pavement work**

Grading-adjusted crushed rock will be used for the subbase course material. Out of consideration for the impact on buried objects, one conceivable approach for this would be to thin the base course thickness by improving the cement or the like. But in Gulu there are some tenements that use water from shallow wells for their drinking water, so this will be used without any particular improvements in order to avoid affecting the water quality. The scattering and distribution of the subbase material will be performed using a 10t dump truck and motor graders (2.4 - 6.0m). For the surface compaction, 20t vibrating rollers will be used. For the subbase course material, the prime coat will be disseminated via a distributor, then asphalt finishers (2.4 - 6.0m) will be used to evenly spread out the mixed bituminous mixture. Adequate consideration will be given to managing the temperature of the bituminous mixture. The surface compaction will be carried out using vibrating rollers and pneumatic rollers. Moreover, if a surface course is planned then a tack coat will be dispersed over the binder course, then a bituminous mixture will similarly be evenly spread out and the surface will be compacted.

**(7) Interlocking pavement work**

In Uganda, interlocking pavement is a construction method that is commonly used in urban areas, and the same is true of Gulu. Therefore, the interlocking blocks will be procured locally. The thickness of the interlocking blocks will be 60mm in ordinary sections, and 80mm in sections that are driven over. This will consist of a structure in which 100 - 200mm of grade-adjusted materials has been laid for the base course, followed by the laying of 30mm of sand on top of this and then the arrangement of the interlocking blocks. The work will be carried out via human power.



#### **2-2-4-2 Implement Conditions**

##### **(1) Procurement of laborers**

The residents in the area around Gulu expect to earn a cash income from being hired to work on the main works for the project. Therefore, the decision has been made to hire Gulu residents to the utmost extent possible in the interest of promoting employment. The decision was also made to strive to adequately coordinate with local influential persons to ensure that the hiring is done equitably.

According to Uganda's Employment Act of 2006, the regulations and conditions for hiring laborers are as follows. Adequate consideration must be given to Uganda's labor regulations and related laws for the hiring of laborers.

- Working times: 8 hours per day, 48 hours per week
- Overtime allowance: 1.5-times the normal hourly rate for weekday overtime,  
2.0-times the normal hourly rate for work on holidays
- Retirement allowance: One to three months of salary
- Termination notification period:
  - For an employment period of 6 months up to 12 months: 2 weeks
  - For an employment period of 12 months up to 5 years: 1 month
  - For an employment period of 5 years up to 10 years: 2 months
  - For an employment period of 10 years or longer: 3 months

##### **(2) Construction work structure for construction contractors**

The main works will be performed under the management of Japanese construction contractors through the use of construction contractors with a certain ability level and laborers residing in the area around the site. As for the construction contractors, the following personnel will be assigned to ensure appropriate construction management.

- Project manager: Overall project management
- Person in charge of accounting and administrative work: Accounting and labor management
- Civil engineers (roads)
- Civil engineers (concrete)

What is more, two quality control personnel will be assigned to adequately ensure quality control. As to other construction contractors, Japanese engineers skilled in pavement, concrete form, and reinforcement bar work will be assigned, as will engineers skilled in machinery maintenance work,

for the following reasons.

- Pavement / concrete form / reinforcement bars: Currently, in Uganda there is extremely scant awareness when it comes to finish quality. As such, it is necessary to maintain the quality required of a grant aid project through proper assembly and installation under the meticulous guidance of Japanese skilled workers.
- Machinery: For the main works an aggregate production plant and asphalt plant will be introduced, and these will need to be assembled, installed, and dismantled. Since massive construction machinery will have to be operated under rigorous conditions, they will have to be properly inspected, repaired, and maintained to ensure they maintain their proper functionality in an ongoing manner. As such, machinery maintenance technicians must also be assigned.

### **(3) Installation of an aggregate plant and asphalt plant**

For the main works, an aggregate production plant and asphalt plant will be introduced, and these materials will be produced locally. The plants will be assembled and installed, and for the former crushed rock sieves will be adjusted and grain size analysis will be performed, while for the latter density tests, dynamic stability tests, and so forth will be carried out. Adequate coordination will be carried out to ensure that the plants themselves are operating properly.

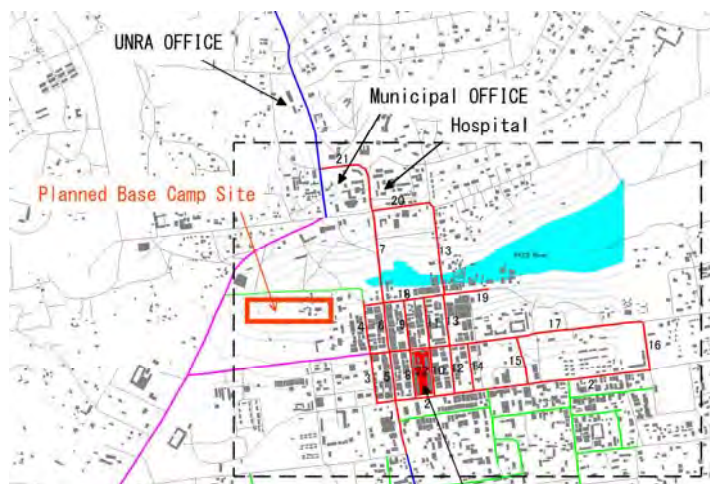
### **(4) Schedule**

The six month period from May to October is generally considered to be the rainy period in the Gulu region. The peak of the rainy period is from July to August, during which the maximum rainfall is expected to be around 200mm/month. During the rainy period it is difficult to perform types of construction work for which special consideration must be given to moisture content adjustments and temperature management, such as roadbed construction and asphalt paving. Therefore, an efficient and reasonable schedule that takes the rainy period into consideration will be set up wherein these types of work will be carried out during the dry season as much as possible, and tasks like the production of precast members will be carried out in the rainy period.

### **(5) Installation of a base camp**

The provision of a base camp is one of the items that the partner government is responsible for. As Gulu Municipal is the implementing agency for the main works, the plan calls for land owned by the municipal to be provided as a base camp as shown in **Fig. 2-2-15**. Consultations must be held with business operators over hooking up electricity and water supply to the base camp. But since the supply of electricity is extremely unstable in the Northern Region, which encompasses Gulu, the decision has been made to install generators (20KV × 2 units) to supply power to the field

office. As for telecommunications, since multiple telecommunications carriers are based in Gulu, this will be secured by concluding contracts with these companies over cell phone service and internet service.



**Fig. 2-2-15 Location of the base camp**

#### **(6) Safety measures during the construction work**

Since the main works consist of road improvement work in an urbanized area, adequate safety measures must be taken to guard against accidents involving people, damage to tenement buildings, and so forth. Such measures will include permanently stationing supervisors, properly guiding pedestrians and automobiles, as well as clearly indicating the construction work sections by taping off the work zones. In addition, measures will be taken to avoid problems, such as publicizing upcoming work zones and details in advance and excluding traffic that is not particularly necessary.

#### **(7) Environmental and societal concerns**

The following points must be kept in mind in light of the impact on the environment that performing the main works will have.

- The wastewater and waste generated by the construction work will undergo proper treatment and disposal in order to avoid affecting the environment, as well as to reduce and mitigate this as much as possible.
- Measures will be taken to reduce the dust and noise generated as a result of large vehicles passing by during the construction work, and in addition monitoring will be performed once a month to keep abreast of the situation in an ongoing manner.

#### **(8) Procurement of materials and equipment**

The primary construction materials needed for the main works include cement, aggregate, and asphalt. The cement will be procured through an agent in Kampala. Since there are no facilities in

the vicinity around Gulu capable of supplying aggregate in the quantities needed, the decision has been made to establish a new quarry in Kidere that will produce the aggregate. As for the asphalt, there are several agents in Kampala for this, and so it will be procured through them. However, since it will be difficult to procure modified materials for mixing the asphalt from Uganda and nearby countries, this will be procured from Japan. Construction machinery and the like will essentially be procured from Japan.

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

The scope of the construction work allotted to the Japanese and Ugandan sides is shown below.

##### **(1) Scope of the construction work allotted to the Japanese side**

- Road improvement work (roadway paving, sidewalk paving, drainage facilities)
- Sea and ground transportation of the equipment and materials procured from Japan to Uganda
- Consultant work (handling the detailed design, preparation of the tender documents, and assistance with the tender work, as well as construction supervision)
- Soft component work (road maintenance)

##### **(2) Scope of the construction work allotted to the Ugandan side**

- Securing the base camp site and hooking up its power, water supply, and sewage
- Expedited customs clearance procedures and tax exemption measures for equipment and materials
- Dispatch of project managers and their costs

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

##### **(1) Consultant work**

It is envisioned that the main works will be carried out via a 30-month loan. The consultants will assist with the detailed design, preparation of the tender documents, and the tender work through a consultant contract after it has been signed by the E/N and G/A. They will also carry out construction supervision after concluding contracts with the construction contractors. In addition, for the main works soft components are also planned on the theme of road maintenance to ensure that appropriate management can be carried out after the construction ends.

##### **1) Preparation of the detailed design and tender documents**

Based on the survey drawings and boring surveys from the preliminary design, the consultants will perform more detailed field surveys and prepare detailed design documents. In addition, they will prepare the documents needed for the tender work, and hold

consultations with Uganda over their content to gain their approval.

**2) Assistance with the tender documents**

The consultants will help Uganda with announcing the tender, prequalifications, distributing the tender documents, receiving the bids, and analyzing and evaluating them. They will also offer advice regarding the contract negotiations between Uganda and the business operator awarded the contract. They will also be present for the conclusion of the construction contract between the two parties.

**3) Construction supervision**

In Japan, the consultants will undertake the approval procedures for the approval documents submitted by the construction contractors. Locally, the consultants will provide assistance to Uganda with holding meetings prior to the start of the work, and will offer instructions to and supervision of the construction contractors related to the transportation of equipment and materials. In addition, they will also undertake process control, quality control (including quality inspections performed by the construction contractors), and material management in regards to the construction of facilities. Quality control workshops are scheduled to be held twice for the main works.

What is more, the construction supervisors will report on the monthly construction progress and so forth to the persons concerned on the Ugandan side and to the JICA Uganda Office, and will undertake the necessary coordination and consultations.

**4) Soft components**

The consultants will transfer technical knowledge via soft components for road maintenance in order to ensure the facilities are maintained in good shape after the hand-over. The details of this are shown in “**2-2-4-7 Soft Component (Technical Assistance) Plan.**”

**(2) Survey and design structure**

A survey and design structure comprised of personnel who are familiar with grant aid programs will be established, centered mainly around those personnel who took part in the cooperation preparation survey, in order to carry out the survey and design smoothly. The personnel for handling the surveys and design, preparing the tender documents, and assisting with the tender work, and the sharing of roles between them, are shown below.

**[Survey / design]**

- 1) Work manager / road plan: Supervision of the detailed design
- 2) Engineer 1: Detailed design regarding roads and pavement

- 3) Engineer 2: Detailed design regarding gutters and box culverts
- 4) Construction procurement plan / cost estimation: Cost estimation of the planned price for the construction order and confirmation of the procurement information

**[Tender-related 1]**

- 1) Work manager / road plan: Receive approval for the content of the detailed design and provide support for everything related to the tender
- 2) Engineer 1: Explanation of the details of the detailed design related to roads and drainage structures to the partner government
- 3) Tender documents: Preparation, announcement, and expression of interest for the construction contract documents, etc.

**[Tender-related 2]**

- 1) Work manager / road plan: Support related to the tender
- 2) Preparation of tender documents: Receive and respond to questions, support related to the tender
- 3) Tender document assessment: PQ examination
- 4) Handling additional work for the tender: Handling client reports, refusals, etc.

**(3) Construction supervision structure**

Construction supervision will be carried out by resident personnel by taking the construction details and scale of the main works into consideration. Civil engineers who have experience with grant aid projects will be dispatched for the construction supervisors. Moreover, the work managers will be dispatched at critical points in the construction stage to coordinate the work and supervise the construction. In addition, the people in charge of the construction materials, drainage gutters, structures, and pavement will be dispatched at the start of their construction work and at critical points, and spot supervision will be carried out to ensure that technical problems do not arise during the construction.

For the main works, the plan is to hold quality control workshops in order to ensure stable quality. The work managers will be dispatched for the quality control workshops, and will hold exchanges with the persons concerned from the Ugandan government, construction companies, consultants, and so forth. The necessary information will be shared and necessary corrective actions will be taken. The personnel related to construction supervision and their roles are shown below.

- 1) Work manager: Coordination and technical management related to every aspect of the work, quality control workshops

- 2) Resident supervisor: Routine management pertaining to the schedule and quality, monthly reports, design changes (as needed)
- 3) Spot supervision 1: Technical management support related to the construction materials and plant operation
- 4) Spot supervision 2: Technical management support related to concrete gutters
- 5) Spot supervision 3: Technical management support related to box culverts (structures)
- 6) Spot supervision 4: Technical management support related to asphalt paving
- 7) Completion inspection: Final inspection work prior to the hand-over of routes targeted for improvements that have been completed

In addition to the Japanese engineers mentioned above, construction supervision engineers comprised of local employees who will assist the resident managers, as well as office boys who will perform various tasks at the management office, will also be assigned.

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

The consultants will give instructions on performing analyses, tests, and so forth on the following items to the construction contractors regarding the construction of the facilities, and will reflect the results in quality control.

**Table 2-2-37 Analysis and test methods regarding quality control**

Type	Test item	Test frequency	Test method	UNRA
<b>1. Soil properties</b>				
	Physical test		Unit weight, specific gravity, grain size distribution, optimum moisture content, PI, etc.	✓
<b>2. Concrete</b>				
(1) Test mixing	Fine aggregate grain size analysis	Each mix proportion	Sieve method	✓
	Coarse aggregate grain size analysis	Same as above	Sieve method	✓
	Chlorine ion concentration test	Same as above	Quantab method	
	Compressive strength test	Same as above	7-day and 28-day strength	✓
(2) Cast-in-place	Slump test	Once a day		✓
	Chlorine ion concentration test	Once every two weeks	Quantab method	
	Compressive strength test	Once a day	7-day and 28-day strength	✓
<b>3. Base course</b>				
	Physical test		Unit weight, specific gravity, grain size	✓

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

			distribution, optimum moisture content PI, etc.	
	Density test	One spot every 20m	Sand replacement or RI	✓
	Proof rolling	As needed		
<b>4. Asphalt</b>				
	Repair CBR	As needed	Pavement handbook	✓
	Aggregate abrasion test	As needed	Los Angeles	✓
	Aggregate shape test	As needed	Pavement handbook	✓
	Softening point test	As needed	JIS K2207	
	Penetration test	As needed	JIS K2207	
	Density test	One spot every 20m	Sand replacement or RI	✓
	Dynamic stability test	One spot every 20m		
<b>5. Reinforcement bars</b>				
		Each purchase	Mill sheet check	

Regarding the testing machines, since UNRA's Gulu branch has a laboratory, this will be used for general tests such as physical tests. No other testing machines are to be found in the construction region aside from these, so other machines will be brought by the construction contractors.

#### 2-2-4-6 Procurement Plan

##### (1) Procurement plans for construction materials

The local procurement plan and procurement plan from Japan and third-party countries to be used for the main works are shown below.

##### 1) Cement

There are two cement companies in Uganda: Tororo Cement Ltd. and Hima Cement Ltd. Their domestically produced cement is generally used for small-scale structures. For the main works, only the drainage structures use concrete, so domestically produced cement will be procured. Conversely, in general the box culverts are of a higher relative importance than the gutters. Therefore, the plan is to use cement made in Kenya for the box culverts. The Kenyan cement will be procured from an agent in Kampala.

##### 2) Aggregate/crushed rock

There are not any rocky mountains capable of supplying this quantity nearby required for the main works, so it would have to be hauled in from Kampala. If this were to be done, it would have to be hauled roughly 350km, which would considerably run up the costs. Therefore, the decision was made to develop a new crushed rock factory in Kidere, which is roughly 10km away. A development permit from the National Environment Management Authority (NEMA) will be needed to develop this, and as the implementing body MoWT



is currently going through the procedures for this with NEMA. The expectation is that this will be issued prior to the announcement next year. Through the advance quality checks, it has been confirmed that this is extremely hard rock with a score of roughly 20% on the Los Angeles abrasion test.

**3) Reinforcement bars**

The reinforcement bars that will be used in the field are imported goods, and since there are several suppliers in Kampala that can provide the quantities needed, these will be procured locally.

**4) Lumber**

The lumber used for things like the concrete form will be procured from a vendor in Gulu.

**5) Embankment materials**

The embankment materials will be collected from Laroo, which is roughly 3.8km to the northeast of Gulu.

**6) Sand**

Sand will be collected from Pago (Siri River), which is approximately 74km north of Gulu. Pago is an existing sand pit for which a development permit has already been received, and it has been recognized as having a sufficient quantity.

**7) Asphalt and modified materials**

The asphalt that will be used for the main works will be straight asphalt and modified asphalt. There are several suppliers of straight asphalt in Kampala, so this will be procured locally. As for the modified materials, since it will be difficult to procure modified materials from Uganda and nearby countries, this will be procured from Japan.

**8)  $\phi$ 300 PVC pipe**

PVC pipes ( $\phi$ 300) will be installed at road cross sections for the laying of lifelines in the future. The PVC pipes will be procured from a supplier in Kampala.

**9) RC concrete pipes ( $\phi$ 600,  $\phi$ 900,  $\phi$ 1,200)**

The wastewater from the gutters will be sent across streets via RC concrete pipes at road cross sections and led to drainage outlets. RC concrete pipes are commonly made in Uganda, so for the main works they will be procured via a supplier in Kampala.

Based on the above, the sources of construction materials have been compiled below.

**Table 2-2-38 Sources of main construction materials**

Construction materials	Uganda	Japan	Third-party country	Summary
Cement	✓			
Aggregate/crushed rock	✓			

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Reinforcement bars	✓			
Lumber	✓			
Embankment materials	✓			
Sand	✓			
Asphalt	✓			
Modified materials		✓		
PCV pipe (φ300)	✓			
RC concrete pipes	✓			

**(2) Procurement of construction machinery**

The construction machinery that will be used in the main works will essentially be procured from Japan. The reason for this is because there are not any sound construction machinery rental operators in Kampala or the surrounding areas around the construction site. However, the decision has been made to use rental equipment for any temporary shortages resulting from machinery maintenance or the like, but the structure for this will consist of the bare minimum without including any spare machinery. The sources for construction machinery are shown in the list below.

**Table 2-2-39 Construction machinery sources**

Construction machinery, etc.	Uganda	Japan	Third-party country	Summary
Excavators		✓		0.8m <sup>3</sup> , 0.45m <sup>3</sup>
Bulldozers		✓		15t, 20t, 32t
Motor graders		✓		3.1t
Vibrating rollers		✓		20t
Pneumatic roller		✓		
Dump trucks		✓		10t
Sprinkler trucks		✓		
Asphalt finishers		✓		2.4 - 6.0m
Distributors		✓		2,000L
Aggregate production plant		✓		200t/h
Asphalt plant		✓		100t/h
Compressors		✓		
Generators		✓		
Tampers		✓		60 - 80t
Plates		✓		
Line markers		✓		2.0L/m

### **(3) Transportation plan for construction materials**

#### **1) Construction materials procured from Japan**

The only materials that it is envisioned will be procured from Japan are the modified materials for the asphalt. These will be shipped by sea from Japan to the Port of Mombasa in Kenya. The materials will be packaged by being packed into containers. It is estimated that for their transport route, it will take approximately 5 weeks to travel from major ports in Japan to the Port of Mombasa. After being unloaded in the Port of Mombasa, the materials will be shipped overland through Kenya to Gulu in Uganda. The route from the Port of Mombasa to Gulu consists of paved roads and is in good condition, so there should not be any particular problems with transportation.

#### **2) Materials from third-party countries**

For the main works, it is not envisioned that any materials will be procured from third-party countries.

### **(4) Transportation plan for construction machinery**

Excavators, bulldozers, trucks, vibrating rollers, finishing machines, and other heavy construction machinery that cannot be loaded into containers will be transported by being loaded and shipped individually. As for construction machinery that cannot move on its own, such as the aggregate production plant, asphalt plant, generators, and compressors, these will be packaged by being packed into containers and transported by sea. After that, they will be unloaded and hauled to Gulu in semi-trailers. It is estimated that it will take about 1.5 months from the time they are shipped from major ports in Japan until they reach Gulu.

### **2-2-4-7 Soft Component Plans**

#### **(1) Need to introduce soft components**

The Gulu Municipal Government will be in charge of maintaining the roads improved through this project. The Gulu Municipal Government has mainly dealt with DBST for asphalt paving, and it does not have sufficient experience with maintaining the mixed asphalt pavement planned with this project. Therefore, there is a strong need to incorporate soft components aimed at Gulu's Engineering Department to ensure that the roads are properly maintained after the project is completed.

#### **(2) Objective of the Soft component**

Technical knowledge was transferred to the MoWT on the Vehicle Intelligent Monitoring System (VIMS), which is a system for determining road conditions using IT, through the District and Urban Roads (DUR) Mapping and Roads Database Project that was implemented

through support from Japan. Conversely, the actual repair work in Gulu will be carried out either through direct management or by being outsourced to the private sector. Therefore, when it comes to soft components, the processes for everything from preparing road inventory maps to performing the repair work will be enhanced. This will be done because the project must be carried out with the target of “Enabling the counterpart to prepare systematic road maintenance plans and select appropriate repair work.”

### (3) Soft component results

The following results are anticipated.

- To enable the counterpart to prepare and update road inventory maps using the technical knowledge transferred, such as VIMS.
- To enable the personnel of the Gulu Engineering Department to prepare systematic road maintenance plans.
- To enable the counterpart to select appropriate repair methods for asphalt paving.

### (4) Soft component activities plan

The activities plan (draft) is shown in **Table 2-2-40**.

**Table 2-2-40 Soft component activities plan (draft)**

Results		Contents of activities				Implementation resources	Tangible outcomes, etc.	
		Required skills/line of work	Current technical level and required technical level		Target group			Implementation method
			Current technical level	Required technical level				
1. Preparing inventory maps of Gulu roads	Japanese side	Road engineering	—	—	—	Experts 1.5MM	—	
	Ugandan side	Road engineering	Unclear on how to prepare and use inventory maps	They must learn how to prepare and update inventory maps using the technical knowledge provided by technical experts in past years, and understand their connection with road maintenance plans	Gulu Engineering Department personnel (Personnel overseeing USMID)	Lectures and practical training MoWT personnel 2 people × 1.0MM	Inventory map of Gulu roads	

The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

2. Preparing systematic road maintenance plans	Japanese side	Road engineering	—	—	—		Experts 1.5MM	—
	Ugandan side	Road engineering	Since the counterpart handles repairs after the deterioration actually appears, it is not making efficient use of its budget.	The counterpart must become capable of using road inventory maps to prepare medium-term road maintenance plans.	Gulu Engineering Department personnel (Personnel overseeing USMID)	Lectures	(Direct management)	Gulu road maintenance plan
3. Selecting appropriate repair methods	Japanese side	Road engineering	—	—	—		Experts (lectures) 1.0MM Experts (practical training) 1.0MM	—
	Ugandan side	Road engineering	Experience on bituminous paving except DBST is missing	The counterpart must understand multiple repair methods and be able to select the appropriate method.	Gulu Engineering Department personnel (Personnel overseeing USMID)	Lectures and practical training	(Direct management)	Gulu road maintenance plan
4. Preparing Gulu maintenance guidelines	Japanese side	Road engineering	—	—	—		Experts 1.0MM	—
	Ugandan side	Road engineering	A consistent process from preparing road inventory maps to performing repair work has not been established.	The counterpart must understand the consistent process up through road repairs that encompass the above skills and organize them into guidelines.	Gulu Engineering Department personnel (Personnel overseeing USMID)	Workshops	(Direct management)	Gulu road maintenance guidelines

**(5) Implementation schedule (draft)**

The implementation schedule of the above mentioned activities are shown in “2-2-4-6. Implementation Schedule”.

### 2-2-4-8 Implementation Schedule

It has been determined that this project will take roughly 30 months on the whole. The progress implementation schedule is shown in **Table 2-2-41**.

**Table 2-2-41 Project implementation progress schedule (draft)**

	2016												2017												2018					
	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	28	29	30
E/N, G/A	▼																													
Consultant Agreement	▼																													
Detail Design./Tendering Documents																														
Tendering preparation duration																														
Tendering & Contract																														
Construction																														
Soft-Components																														

### 2-3 Obligation of the Recipient Country

Uganda is responsible to handle the following items for the implementation of this project.

#### (1) General items related to Japanese grant aid projects

- Securing sites to serve as material and machinery storage sites and work sites
- Securing sites for the construction of worker's lodging houses and other facilities
- Undertaking expedited customs clearance procedures for materials and machinery transported from Japan
- Exempting or bearing customs duties, national taxes, and all other charges imposed in Uganda in relation to the procurement of materials and machinery and the supply of labor by Japanese citizens
- Facilitating the entry to and departure from Uganda and necessary matters during the stay of the Japanese citizens providing their labor for this project in order for them to carry out their work
- Properly and efficiently maintaining and operating the facilities improved through this project
- Bearing the costs for people in charge of this project on the Ugandan side
- Bearing the advance costs related to exemptions of customs duties, consumption tax, etc.

#### (2) Items unique to this project

The Ugandan side should carry out the following items prior to the start of construction or before the day it is publicly announced.

- Removing facilities and tenements that will be affected by the construction
- Removing lifelines (telephone poles, road lighting, water supply and sewage systems, and telecommunications) that will interfere with the construction
- Providing and leveling construction yards

- Coordinating with Gulu municipal police (because the construction will take place in urbanized areas)
- Obtaining environmental licenses related to the permanent works and quarry prior to the date of the public announcement

#### **2-4 Project Operation Plan**

While the contracting government agency for this project is the MoWT, the field site for implementation and maintenance is Gulu Municipal. The maintenance for after the project has been completed has been divided up into routine maintenance to be carried out every year and periodic maintenance to be carried out once every several years.

##### **(1) Inspection and maintenance needed every year (routine maintenance)**

- Cleaning and weeding within the road sites
- Removing the sand, soil, and garbage that accumulate in the gutters and culverts
- Repainting road markings
- Repairing ancillary road facilities, such as road signs, curbs, etc.

##### **(2) Inspections and maintenance that need to be carried out once every several years (periodic maintenance)**

- Patching to be carried out at places where the pavement sloughs off (roughly once every five years)
- Overlays in response to decreased pavement durability (roughly once every ten years)

#### **2-5 Project Cost Estimation**

##### **2-5-1 Initial Cost Estimation**

The total project costs that will be needed to implement this project will come to 2,127 million yen including preliminary cost. The breakdown of costs for both sides based on the sharing of the cost burden between Japan and Uganda indicated above was estimated as follows by using the cost estimation conditions shown below. However, these amounts do not indicate the Grant Aid Limit in the Exchange Notes. The breakdown of the approximate project costs is shown in **Table 2-5-1**.

##### **[Cost estimation conditions]**

- 1) Time of the cost estimation: May 2015
- 2) US dollar exchange rate: 1USD = 120.55 yen  
(average for the past three months starting from the end of April 2015)
- 3) Ugandan shilling exchange rate: 1UGX = 0.0404 yen  
(average for the past three months starting from

the end of April 2015)

- 1) Period for the execution of works: 22.5 months
- 2) Other: This project will be implemented in accordance with the Grant Aid Guidelines of the Government of Japan. The approximate project costs shown in **Table 2-5-1** do not show the maximum amounts that will be provided via the exchange note (E/N), and will be re-examined by the Government of Japan prior to the E/N.

**Table 2-5-1 Breakdown of the approximate project costs**

Project cost divisions		Approximate project costs (million yen)
(1) Construction costs	Direct construction costs	1,190
	Shared temporary construction costs	259
	Site management costs	286
(2) Administrative costs		148
(3) Detailed design / construction supervision costs		133
Soft component costs		17
Preliminary costs (5%)		94
Total		2,127

Source: Survey team

### 2-5-2 Costs Borne by the Ugandan Side

The costs to be borne by the Ugandan side are shown in **Table 2-5-2**.

**Table 2-5-2 Costs borne by the Ugandan side**

Division	Quantity	Burden Charges (UGX)	Yen Conversion Cost (Thousand)
Social Environment Considerations (Permanent Works)	LM	49,504,950	2,000
Social Environment Considerations (Quarry)	LM	2,000,000	81
Social Environment Considerations (House relocation)	2 Houses	1,299,960	52
Relocation of utilities (Power)	5, 511m	633,765,000	25,604
Relocation of utilities (Street light)	11 No.	2,200,000	89
Relocation of utilities (manhole cover adjustments)	98 No.	294,000,000	11,878
Removal of billboards	100 No.	20,000,000	810
Compensation to the Islamic cemetery	LM	28,525,900	1,152
Opening A/P, Commitment of remittance	LM	49,756,950	2,010
Clearance of the temporary Yard	LM	25,000,000	1,010
EIA implementation cost	LM	200,000,000	8,080



The Republic of Uganda  
The Preparatory Survey for the Project  
for Improvement of Gulu Municipal Council Roads in Northern Uganda

Allotment of TAX by the Udandan side	LM	1,015,446,000	46,640
Cost to relocate the existing water pipe (incase of the NWSC Project delays)	LM	(2,500,000,000)	(101,000)
Total		2,321,498,760 (4,821,498,760)	99,406 (200,406)

Source: Survey team

### 2-5-3 Operation and Maintenance Costs

**Table 2-5-3** shows the item and its cost for road maintenance after the completion and of the construction and handover.

**Table 2-5-3 Required maintenance cost after handover**

Division	Contents	Alotted cost (UGX)	Yen converted cost (Thoussand Yen)	Remarks
Road maintenance required annyaly (Routine Maintenance)	De-silting, Cleaing drainage,etc	7,600,000	307	Twice in a year
	Re-painting road marking	15,750,000	636	Once in a year
	Repairing the road fucilities	53,154,475	2,147	Once in a year
Road maintenance required by each 5 years (Periodic Maintenance)	Repairing pot-holes	17,960,950	726	
Road maintenance required by each 10 years (Road Rehabilitation)	Overlay	359,219,000	14,512	
Annualized cost		116,018,565	4,686	

Source: Survey team

Gulu municipal is the authority which has the responsibility to maintain the municipal roads. Since the municipal is disbursed approx. 40,000 to 60,000 thousand yen annually from the road fund, it could be determined that adequate maintenance can be carried out.

## **CHAPTER 3 PROJECT EVALUATION**

### **3-1 Pre-conditions**

Preconditions for implementation of this project are shown below.

#### **(1) Environmental and societal considerations**

Procedures related to the environment in Uganda are under the jurisdiction of the National Environment Management Authority (NEMA), which categorizes projects and issues permits. From the results of the screening by NEMA, this project falls under Category IV, and environmental impact assessment (EIA) is judged to be necessary. Therefore, it has been decided that the operator of this project, the Ministry of Works and Transport (MoWT), will carry out the procedures for EIA implementation. Advance confirmation with MoWT and NEMA confirmed that EIA implementation takes about 3 months, and issuance of an environmental permit takes about 4 months after the EIA is submitted. If this is applied to the project schedule, the EIA will be completed in December 2015, EIA submission to NEMA will occur in January 2016, and issuance of the environmental permit by NEMA will occur in April 2016. Because the construction of this project is planned for September 2016, it appears possible to obtain an environmental permit before the public announcement.

#### **(2) Tax exemption**

A conference was held during the preparation investigation regarding the tax involved in the implementation of this project. The Ministry of Works and Transport (MoWT) confirmed that tax would be borne by the local authority (a budgetary provision). It was decided that concrete procedures would be advanced in consultation with the MoWT after the start of the project.

Furthermore, with regard to this matter, specific items of taxation were listed in the Minutes of Discussion regarding the tax exemption clause of items borne by the local authority based on a new grant agreement in the preliminary design investigation of September 2015. After an explanation to the Uganda Ministry of Finance, doubt was raised regarding income tax, corporate tax, and fuel tax. The Ministry of Finance explained that there is an inconsistency in the interpretation of Ugandan national law regarding income tax and corporate tax that taxation is unavoidable because profits have been acquired in Uganda and could not sign the meeting minutes. Furthermore, there was also concern regarding the diversion of purchased fuels to other projects with regard to the fuel tax. Accordingly, after consultation with the local Japanese Embassy, an agreement was reached using listed content that is the same as an Exchange of Notes / Grant Agreement (content with specific listings deleted), and the agreement of the Ministry of Finance was obtained.

After the preliminary design investigation, negotiations continued regarding specific tax

exemption measures within the Uganda Ministry of Finance. As a result of a conference with the Ministry of Finance Undersecretary/Finance Bureau director on Friday, October 16, the Ministry of Finance indicated the following policy: in accordance with national law, contractors implementing the Japanese Grant Aid are obligated to pay corporate tax and income tax because profit is being earned in Uganda. On the other hand, to avoid suspension of the Grant Aid, this matter will be deliberated in the national assembly with the goal of national acknowledgment. This policy can be considered a decision that comes after wrestling greatly with risk of the Ministry of Finance alone determining a response that opposes national law.

Later, at a cabinet meeting in Uganda on Wednesday, December 9, the decision for tax exemption measures was acknowledged, and it was determined that implementation would be borne by the local authority through the MoWT. However, in the future, it is important to pay attention to the inconsistencies of national law made clear by this series of discussions, including cases in other countries.

The Minutes of Discussion are appended to the end of this document for reference.

**(3) Relocation of facilities**

There are electricity, water and sewer services, and communication facilities within Gulu city that will be relocated. Of these facilities, the water and sewer services will be relocated with the support of the Germany Reconstruction Finance Corporation (KfW). The communication facilities will be relocated by the operator themselves. The electricity facilities must be relocated using the Ugandan government budget. One billion Ugandan shillings have been secured for the financial year 2015/2016, and it has been determined that the relocation work is possible.

**(4) Free provision of construction yard**

After an explanation to a Gulu city administrative representative at the stakeholders meeting, it was agreed that land held by Gulu city will be provided free of charge for the construction yard. Currently, storekeepers who started business at the new marketplace (mall) established by the African Development Bank have moved temporarily to the planned land and opened shops for the construction term only, but the city is gradually suggesting migration to the new mall because the marketplace is complete. Relocation should be complete by September 2016, the date planned for the start of construction, and it has been determined that the construction yard will be provided for free without issue.

To ensure safety during construction, the construction company must expressly regulate safety during construction in the construction plan. At the same time, full scale cooperation of Gulu city and the police is necessary.

### **3-2 Investments (responsibilities) of other parties necessary for achievement of the project master plan**

Investments by other parties are necessary for the manifestation and continuation of the effects of this project.

- 1) To implement this project smoothly, it is necessary to secure the budget listed in **table 2-5-2** of this report before the start of construction.
- 2) For smooth and appropriate implementation in the construction phases, interaction with the public is particularly important. Therefore, a Gulu Municipal Council Engineering Department staff member has been arranged as permanent manager.
- 3) To implement maintenance appropriately after completion of this project, it is necessary to secure the maintenance work listed in "2-5-3 Operation and Maintenance Plan" of this report and the staff necessary for this, as well as the necessary yearly maintenance costs.

### **3-3 External conditions**

The following external conditions must be satisfied for the manifestation and continuation of the effects of this project.

- 1) Control of overloaded vehicles, targeting large vehicles, is taking place.
- 2) After completion of the project, measures for illegal parking, running aground on sidewalks, and illegal stallholders are being implemented.
- 3) Understanding and cooperation regarding this project has been secured from the Gulu Municipal Council, police, and Gulu city residents.
- 4) After completion of the project, pavement and drainage facilities are maintained appropriately.

### 3-4 Project evaluation

#### 3-4-1 Appropriateness

This section indicates the appropriateness of implementation of this project.

**Table 3-4-1 Appropriateness of project implementation**

Evaluation item	Appropriateness
1) Profiting population	Those directly profiting from the repair of Gulu city roads are the 154,000 residents of Gulu city. If the surrounding Gulu District is included, the total is approximately 930,000 people. This is equivalent to 2.5% of the country's population. Furthermore, because the project area is stopping-over point of an international main road, all 37.58 million residents of Uganda, as well as the residents of Kenya and Somalia, will profit indirectly from the implementation of this project.
2) Promotion of economic growth / Contribution to peace building	Gulu city is the only base city in northern Uganda, and the economic effect from the servicing of the transportation facilities of Gulu city will be extremely large. Furthermore, because the area is an important transportation point connecting to an international corridor, this project can contribute to the smooth transportation of goods and benefit the users and residents through economic growth. Additionally, because of the civil war that has occurred over the last 20 years in the northern region, we expect that the implementation of this project will contribute to peace building in the northern area.
3) Coordination with Parliamentary development projects	In Uganda, Uganda Vision 2040 and NDP II aim for Uganda to become a middle-income nation through a reduction of the poverty rate and improvement in income, and road servicing is highly expected to spread the economic effect. Meanwhile, the Peace, Recovery and Development Plan 2 (PRDP2) indicates that appropriate maintenance of district, urban and community access roads (DUCAR) in the northern region promote economic recovery and mitigate potential conflict drivers. This project will contribute to these objectives.
4) Coordination with the support policies of Japan	This project was proposed as a maximum-priority project in the master plan targeting the Acholi region implemented by Japan in 2012. In addition, "Peace building in Northern Uganda" and "Infrastructure improvement to achieve economic growth" are important areas in Japan's Country Assistance Policy for the Republic of Uganda, and this project is in agreement with these policies.

#### 3-4-2 Effectiveness

##### (1) Quantitative effects

Table 3-4-2 shows the quantitative effects expected from the implementation of this project.

**Table 3-4-2 Quantitative effects**

Index name	Standard value (Achievement value for 2015)	Target value (2021) [3 years after project completion]
Flatness (IRI) (m/mm)	6.23	3 or less
No. of traffic accidents (incidents)	26	13 or less
Road closures (days per year)	7	0

**(2) Qualitative effects**

- Considerable improvement of the flatness of road pavement and servicing of sidewalk pavement will result in a district with activity appropriate for a base city in the northern region.
- Traffic blockage due to road flooding in the rainy season will be eliminated, and access to public services and markets by road users and citizens will be secured year-round.
- Improvement of main intersections will increase traffic safety considerably for pedestrians and other vulnerable road users in particular.
- Repair of city roads will contribute to the strengthening and stabilization of physical distribution facilities connecting the northern region and the consumption area of Kampala, as well as with surrounding countries.

Due to the content above, implementation of this project is highly appropriate and anticipated to be effective as well.

## Appendix

1. Member list of the Study Team
  2. Study Schedule
  3. List of Parties Concerned in the Recipient Country
  4. Minutes of Discussion
  5. Outline Design Drawings
  6. Reference
- 6-1 Outline of the results of Geological Survey





1. Member List of the Study Team



1. The First Survey (Explanation of the Inception Report)

Name	In charge of	Company
Tomoki Kanenawa	Team Leader	Japan International Cooperation Agency Infrastructure and Peacebuilding Department
Kiyohito Shimada	Team coordinator	Japan International Cooperation Agency Infrastructure and Peacebuilding Department
Motoki Ogawa	Chief Consultant/Road Planner	Eight-Japan Engineering Consultants Inc.

2. The Second Survey (Field Investigation)

Name	In charge of	Company
Motoki Ogawa	Chief Consultant/Road Planner	Eight-Japan Engineering Consultants Inc.
Shigeru Konda	Discharge Facilities & Structure Desing	Nippon Koei co., Ltd
Ippei Iwamoto	Road & Pavement Design	Nippon Koei co., Ltd
Kenichiro Kondo	National Condition Survey (Hydrological Survey)	NTC International co., Ltd.
Kenji Nakamura	Social Environment Consideration	NTC International co., Ltd.
Hiroyuki Ikeda	National Condition Survey (Topographic Survey)	Eight-Japan Engineering Consultants Inc.
Tatsuo Tomidokoro	Procurement P'lanner/Cost Estimation	Eight-Japan Engineering Consultants Inc.

3. The Third Survey (Investigation of existing water facilities in rainy season)

Name	In charge of	Company
Kenichiro Kondo	National Condition Survey (Hydrological Survey)	NTC International co., Ltd.

4. The Fourth Survey (Explanation of the Draft Final Report)

Name	In charge of	Company
Tomoki Kanenawa	Team Leader	Japan International Cooperation Agency Infrastructure and Peacebuilding Department
Motoki Ogawa	Chief Consultant/Road Planner	Eight-Japan Engineering Consultants Inc.
Shigeru Konda	Discharge Facilities & Structure Design	Nippon Koei co., Ltd



## 2. Study Schedule



### The First Survey

		Kanenawa	Shimada	Ogawa
28-Feb.	S	—	—	Move from
1-Mar.	S	Move from Tokyo to Entebbe		Kathmandu to Entebbe
2-Mar.	M	Discussion with JICA Uganda Office Courtesy call & discussion with MoWT 表敬		
3-Mar.	T	Discussion with NWSC Discussion with MoWT		
4-Mar.	W	Discussion with USMID Project Discussion with NWSC Project (Kaga & Partners)		
5-Mar.	T	Move from Kampala to Gulu Discussion with JICA Gulu field office		
6-Mar.	F	Courtesy Call to Gulu Municipal Discussion with NWSC Gulu Station Field Survey		
7-Mar.	S	Move from Gulu to Kampala		
8-Mar.	S	Internal Meeting		
9-Mar.	M	Discussion with MoWT Discussion with UNRA Discussion with Gulu Municipal		
10-Mar.	T	Signing to M/D		
11-Mar.	W	Report to EOJ and JICA Uganda Office		
12-Mar.	T	Move from Entebbe to Tokyo	—	Move from Entebbe to Kathmandu
13-Mar.	F	—	Move from	—
14-Mar.	S	—	Entebbe to Tokyo	—

### The Second Survey

		Ogawa	Konda	Iwamoto	Nakamura	Kondo	Ikeda	Tomidokoro		
29-Mar.	S	Move from Tokyo to Entebbe	Move from Tokyo to Entebbe	/	/	Move from Tokyo to Entebbe	Move from Tokyo to Entebbe			
30-Mar.	M		Data collection			Data Collection				
31-Mar.	T		Discussion with MoWT Discussion with JICA Uganda Office			Discussion with MoWT Discussion with JICA Uganda Office				
1-Apr.	W	Move from Kampala to Gulu				Move from Kampala to Gulu		Site Survey	Topographic Survey	Local Contractor, Market price of materials, Construction Plan
2-Apr.	T	Topographic Survey & Soil Investigation				Analysis of the Hydrological data,	Topographic Survey, Existing Utility			
3-Apr.	F									
4-Apr.	S									
5-Apr.	S									
6-Apr.	M									
7-Apr.	T									
8-Apr.	W									
9-Apr.	T									
10-Apr.	F	Background of the Project	Site Survey	Move from Tokyo to Entebbe		Quality Control Plan, Procurement Plan, Tax				
11-Apr.	S			Move from Kampala to Gulu						
12-Apr.	S			Site Survey	Confirmation					
13-Apr.	M									

14-Apr.	T	Activities of other development partners			of procedure and regal requirements regarding to social environmental consideration , Meeting with Gulu Municipality	metrological data and calculation of water discharge	Survey	exemption, construction plan					
15-Apr.	W												
16-Apr.	T												
17-Apr.	F	Soft Component											
18-Apr.	S												
19-Apr.	S												
20-Apr.	M												
21-Apr.	T												
22-Apr.	W	Indicators of the Project Evaluation			Collection of basic information and its analysis		Move from Gulu to Kampala	Cost Estimation					
23-Apr.	T												
24-Apr.	F												
25-Apr.	S	Reporting					Move from Entebbe to Tokyo	Comparison					
26-Apr.	S												
27-Apr.	M												
28-Apr.	T												
29-Apr.	W			Comparison		Reporting ,			Comparison				
30-Apr.	T												
1-May	F	Internal Meeting						Internal Meeting					
2-May	S												
3-May	S												
4-May	M	Preparation of Technical Note	Cost Estimation, Public Consultation				Cost estimation, Public Consultation						
5-May	T												
6-May	W												
7-May	T	Move from Gulu to Kampala						Move from Gulu to Kampala					
8-May	F	Meeting with MoWT, JICA, NWSC						Meeting with MoWT & JICA					
9-May	S	Internal meeting						Internal Meeting					
10-May	S												
11-May	M	Meeting with MoWT (Signing to the Technical Note) Report to JICA						Meeting with MoWT & JICA					
12-May	T	Meeting with MoWT, JICA	Move from Entebbe to Tokyo				Moto from Entebbe to Tokyo						
13-May	W												
14-May	T	Move from Entebbe to Tokyo											
15-May	F												

### The Third Survey

		Kondo
3-Aug.	M	Move from Tokyo to Entebbe
4-Aug.	T	
5-Aug.	W	Move from Kamala to Gulu Courtesy call to JICA Gulu Field Officer
6-Aug.	T	Meeting with Gulu Municipality Site Survey



7-Aug.	F	Site Survey
8-Aug.	S	Site Survey
9-Aug.	S	Move from Gulu to Kampala
10-Aug.	M	Report to IICA Uganda Office
11-Aug.	T	Move from Entebbe to Tokyo

#### The Fourth Survey

		Kanenawa	Ogawa	Konda
16-Sep.	W	Move from Tokyo to Entebbe		
17-Sep.	T	Courtesy call and Meeting with MoWT		
18-Sep.	F	Meeting with MoWT		
19-Sep.	S	Preparation of Minutes of Discussion (Draft)		
20-Sep.	S	Internal meeting		
21-Sep.	M	Meeting with MoWT & Finance, Collection of MD		
22-Sep.	T	Signing on MD, Report to EOJ		
23-Sep.	W	Mover from Entebbe to Tokyo		
24-Sep.	T			



### 3. List of Parties Concerned in the Recipient Country



## List of Parties

### (1) MOWT : Ministry of Works and Transport

Eng. Alex. Okelo	Permanent Secretary
Eng. Alex Onen	Principal Engineer (National Roads)
Eng. Godfrey Magala	Engineer (Japan Desk)
Eng. Busulwa Lambert	Engineer
Eng. Drake Baggende	Engineer
Eng. Charles Mutemo	Environmental Officer

### (2) MOF : Ministry of Finance

Ms. Maris Wanyena	Commissioner, Development Assistance and Regional Cooperation Department
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### (3) Gulu Municipality

Mr. Francis Barabanewe	Town Clerk
Eng. Terence Odonga	Municipal Engineer
Eng. Christopher Otok	Engineer (Building)
Eng. Christopher Lukwiya	Engineer (Electric)
Eng. James Ocaka	Environmental Officer

### (4) Gulu District

Ms. Dorothy M. Ajwang	Chief Administrative Officer (CAO)
Dr. Paul Onek	Chief Administrative Officer
Eng. Patrick Obwoya	District Engineer

### (5) UNRA: Uganda National Road Authority

Eng. Ongon Justine	Director of Operations
Eng. Joseph Otim	Regional Manager
Eng. Jimmy Adwek Makmot	Gulu Station Manager

### (6) NWSC : National Water & Sewerage Cooperation

Dr. Adolf Spitzer	Senior Infrastructure Planner
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### (7) USMID: Uganda Support Municipal Infrastructure development

Eng. Ojuka Emmanuel Tom	Municipal Infrastructure Development Specialist
Dr. Isaac Mutenyoo	Program Coordinator



## 4. Munities of Discussion





MINUTES OF DISCUSSIONS  
ON  
THE PREPARATORY SURVEY  
ON  
THE PROJECT FOR IMPROVEMENT  
OF GULU MUNICIPAL COUNCIL ROADS  
IN  
THE REPUBLIC OF UGANDA

In response to the official request of the Republic of Uganda (hereinafter referred to as “Uganda”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) in consultation with the Government of Japan had decided to conduct a Preparatory Survey for Outline Design on the Project for Improvement of Gulu Municipal Council Roads (hereinafter referred to as “the Project”), and dispatch a Preparatory Survey Team (hereinafter referred to as “the Team”) to Uganda.

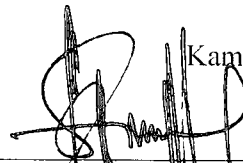
The Team is headed by Mr. Tomoki KANENAWA, Advisor, Infrastructure and Peacebuilding Department, JICA, and is scheduled to stay in Uganda from March 1st to March 11th, 2015.

The Team held a series of discussions with officials concerned in Uganda and conducted field surveys in the Project area. In the course of discussions and field surveys, both sides have confirmed the main items described in the attached sheets. The team will proceed to further studies and prepare a Preparatory Survey Report.

金 羅 知 樹

Tomoki KANENAWA  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

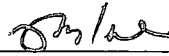
Kampala, March 10<sup>th</sup>, 2015



Alex B. Okello  
Permanent Secretary  
Ministry of Works and Transport  
Uganda

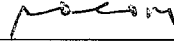
Witness

Maris Wanyera  
Commissioner, Development Assistance and  
Regional Cooperation Department  
Ministry of Finance, Planning and Economic  
Development  
Uganda



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Barabanawe Francis  
Town Clerk  
Gulu Municipality  
Uganda



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Ongom Justine  
Director of Operations  
Uganda National Road Authority  
Uganda

## ATTACHMENTS

### 1. Title of the Project

Both sides confirmed that the title of the Project shall be “The Project for Improvement of Gulu Municipal Council Roads”.

### 2. Objective of the Project

Both sides confirmed that the objective of the Project is to improve and rehabilitate the roads and drainage facilities in Gulu Municipality.

### 3. Project Site

The Project site is located in Gulu Municipality, Uganda, which is shown in **Annex 1**.

### 4. Objective of the Preparatory Survey

Both sides confirmed the objective of the Survey as follows:

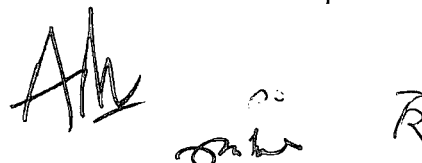
- 4-1. To understand the background and objective of the Project and examine its impacts and appropriateness;
- 4-2. To identify the components, and conduct outline design and cost estimation of the Project, based on the data and information collected from and the results of discussions with the Ugandan side; and
- 4-3. To study the issues of environmental and social considerations through the Survey.

### 5. Responsible and Implementing Organization

The Responsible Organization of the Project is Ministry of Works and Transport (hereinafter referred to as “MoWT”). The organization chart is shown in **Annex 2**.

### 6. Items requested by the Government of Uganda

- 6-1. It is written on the application form that the Ugandan side requests for improvement and rehabilitation of the road and drainage facilities in Gulu Municipality. JICA will assess the appropriateness of the request that would be examined in accordance with further studies and analysis in Japan and the final components of the Project would be decided by the Japanese side mainly from the viewpoints of necessity, technical and financial viability, sustainability and cost-effectiveness.
- 6-2. Both sides confirmed that there was no duplication for the Project to be conducted by other development partners or private enterprises.
- 6-3. Both sides confirmed the tentative priority of the target roads as described in **Annex 1**. The priority would be finally decided on the explanation of the Draft Final Report

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which is scheduled around September, 2015.

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

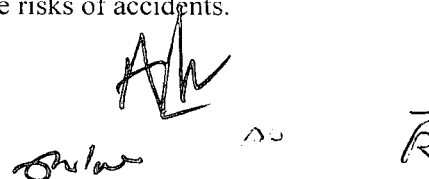
- 7-1. The Ugandan side understands the Japan's Grant Aid scheme explained by the Team, as described in **Annex 3** and **Annex 4**.
- 7-2. The Ugandan side will take the necessary measures, as described in **Annex 5**, to facilitate the smooth implementation of the Project, as a condition for the Japan Grant Aid to be implemented.

## **8. Environmental and Social Considerations**

- 8-1. The Team explained that environmental and social considerations for the Project is categorized as "Category B" according to the JICA Environmental and Social Consideration Guidelines, since the construction work will be conducted in right of way (ROW) and land acquisition will not be involved, which mean that the impact on the environment from the Project may be limited.
- 8-2. Both sides confirmed that the Ugandan side shall conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Initial Environmental Examination (IEE) etc.) and make IEE report of the Project. The IEE approval shall be received from the responsible authorities and submitted to JICA Uganda office before the commencement of the construction.
- 8-3. The Ugandan side agreed to arrange the budget allocation for IEE study, land acquisition, resettlement and compensation for the Project Affected Persons (PAPs) or Indigenous People's Plan (IPP) and secure the land before the detailed design of the Project.

## **9. Operation and Maintenance**

- 9-1. The Ugandan side explained that the maintenance works on the target roads would be conducted by Gulu Municipality. The organization structure of Gulu Municipality is described in **Annex 2**.
- 9-2. The Ugandan side will take every necessary action including securing enough budget and personnel for the operation and maintenance of the facilities implemented by the Project. The Ugandan side also understands that the continuous and emergency measures, maintenance and cleaning of drainage for securing the durability are especially important.
- 9-3. The Team explained to the Ugandan side that it would be necessary to let the road users respect traffic regulations regarding the following three issues in order to effectively maintain the facilities and also to ensure road safety.
  - 9-3-1. Although the project includes some facilities to ensure traffic safety such as humps and signage, increased traffic will inevitably raise the risks of accidents.

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9-3-2. Overloaded trucks which exceed designed axle loads would cause early failure and shorter life.

9-3-3. Proper asset management will impact greatly on maintenance cost and lifespan.

The Ugandan side explained that they shall conduct the road safety sensitization for the residents to reduce traffic accidents. The Ugandan side also explained that the overloaded trucks would not pass through central business district (CBD) Gulu since the axle load control is conducted at the border posts. Besides, the Ugandan side understood that preventive maintenance is important.

## **10. Safety Measures**

10-1. To avoid accidents on site during the implementation of the Project, the Ugandan side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel, based on “The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects” which has been published on JICA’s URL below.

[http://www.jica.go.jp/activities/schemes/oda\\_safety/ku57pq00001nz4eu-att/guidance\\_en.pdf](http://www.jica.go.jp/activities/schemes/oda_safety/ku57pq00001nz4eu-att/guidance_en.pdf)

10-2. The Team recommended to the Ugandan side to explain to the residents about the Project (necessity and significance, construction period, sites, impact etc.), so that consensus support can be obtained from them for the smooth operation of the Project.

## **11. Misconduct**

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, MoWT and relevant organizations shall provide JICA with additional such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations in Uganda.

MoWT and relevant organizations shall not, unfairly or unfavourably treat the person(s) and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

## **12. Schedule of the Survey**

Both sides confirmed the schedule of the Survey are as below, the schedule may be subject to change during the preparation and the course of the Survey:

12-1. The Team will conduct further studies in Uganda from March 31st to May 11th, 2015:

12-2. JICA will dispatch a mission team to check the situation in rainy season around August 2015:

12-3. JICA will prepare the Draft Final Report and dispatch a mission team to explain the

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details of the Project including the final components and cost estimation to the Ugandan side around September 2015; and

12-4. JICA will finalize the Final Report and send it to the Ugandan side around January 2016.

### **13. Other Relevant Issues**

#### **13-1. Provision of Conveniences to the Team by the Ugandan Side**

The Ugandan side shall, at its own expenses, provide the Team with the following items in collaboration with MoWT and other organizations concerned:

- (1) Security-related information as well as measures to ensure the safety of the Team members;
- (2) Information as well as support in obtaining medical service;
- (3) Data and information related to the Preparatory Survey;
- (4) Counterpart personnel;
- (5) Suitable office space with necessary equipment and services in both Kampala and Gulu;
- (6) Credentials or identification cards;
- (7) Entry permits necessary for the survey team members to conduct field surveys; and
- (8) Support in obtaining other privileges and benefits where necessary.

#### **13-2. Provision of Conveniences to the Project by the Ugandan Side**

The Ugandan side confirmed that undertakings described in **Annex 6** should be taken by the Ugandan side at its own expense if implementation of the Project is approved by the Government of Japan.

#### **13-3. Relocation of Existing Utilities**

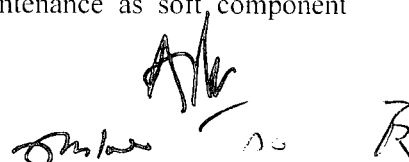
Both sides agreed that the existing utilities in the project site will be relocated by the Ugandan side. The Ugandan side agreed to secure the budget allocation for relocation in next fiscal year and relocation itself would be conducted by the Ugandan side before the commencement of the construction.

#### **13-4. Diverging Point between JICA's and UNRA's Project**

Both sides agreed that the diverging point is on the T-junction where Sir Samuel Baker Road diverges from Kampala Road. The improvement of T-junction itself will be conducted by JICA.

#### **13-5. Soft Component**

Japanese side explained that the operation and maintenance as soft component



would be implemented during the construction stage. The detail will be determined through the Preparatory Survey.

Annex 1: Project Site

Annex 2: Organization Charts of MoWT and Gulu Municipality

Annex 3: Japan's Grant Aid

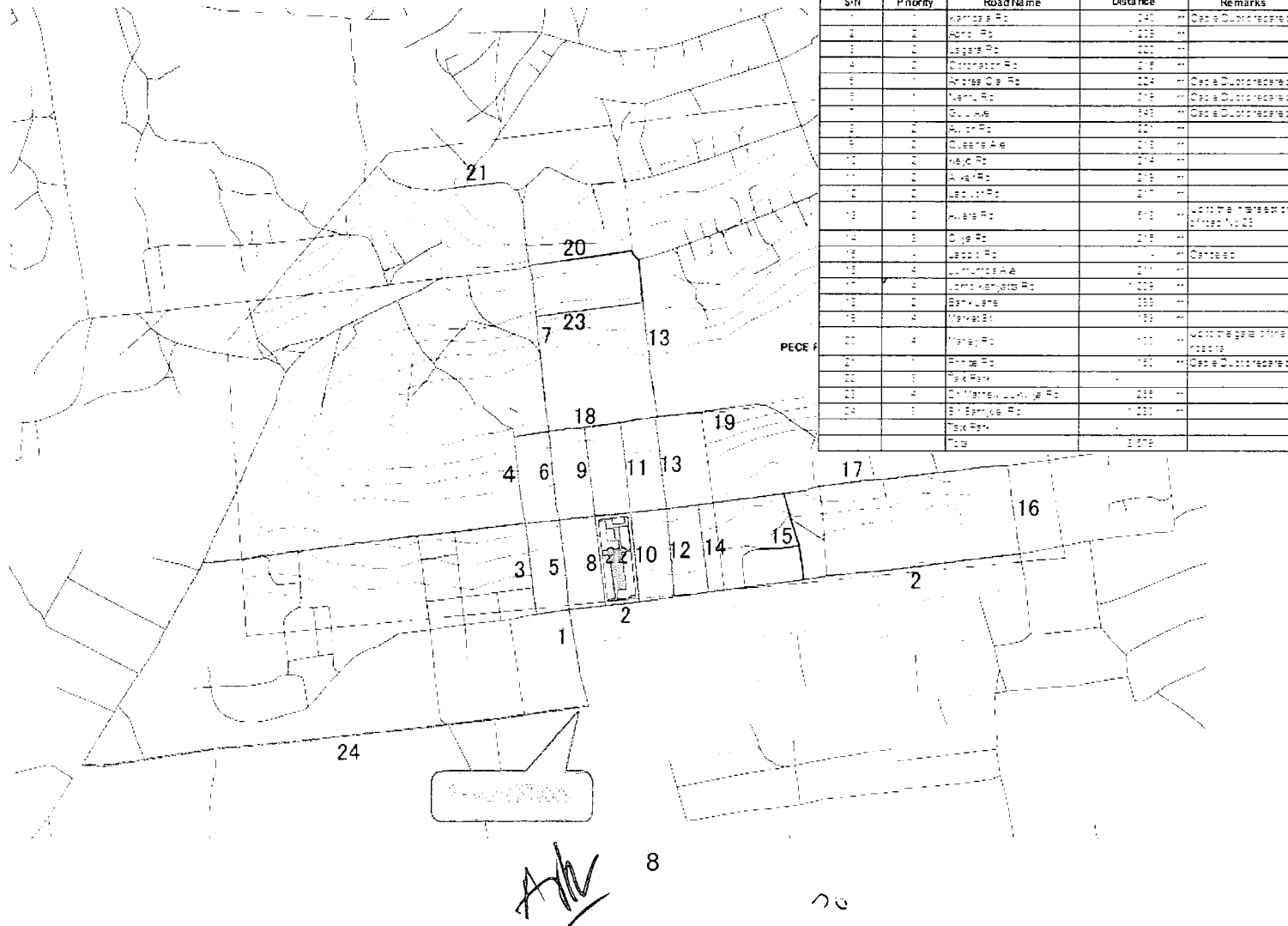
Annex 4: Flow Chart of Japan's Grant Aid Procedures

Annex 5: Major Undertakings to be taken by Each Government as a condition for the Japan Grant Aid to be implemented

Annex 6: Major Undertakings to be taken by Each Government after an approval of Project implementation

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Project Site



Appendix-26

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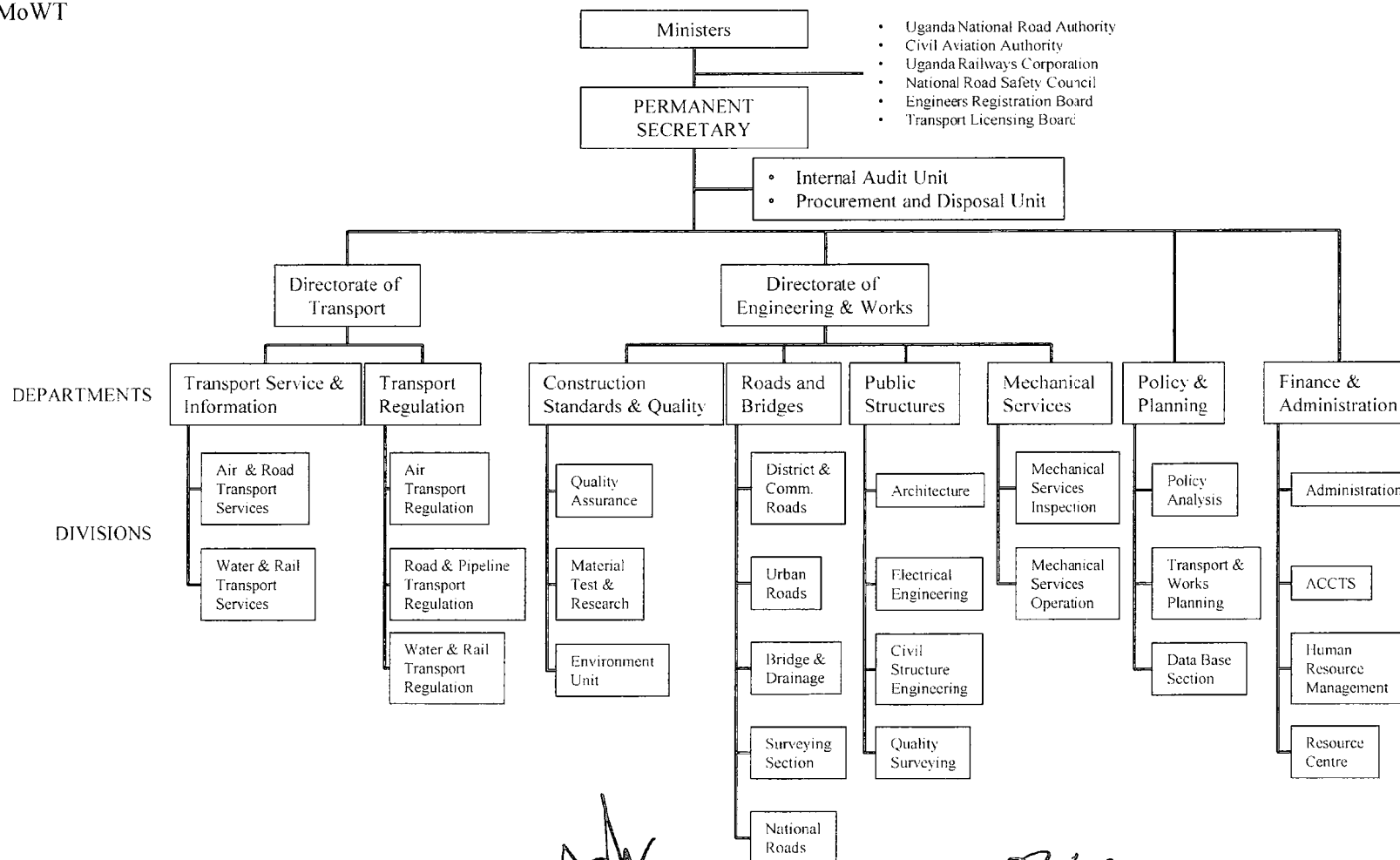
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1. MoWT

Organization Charts



Appendix x-27

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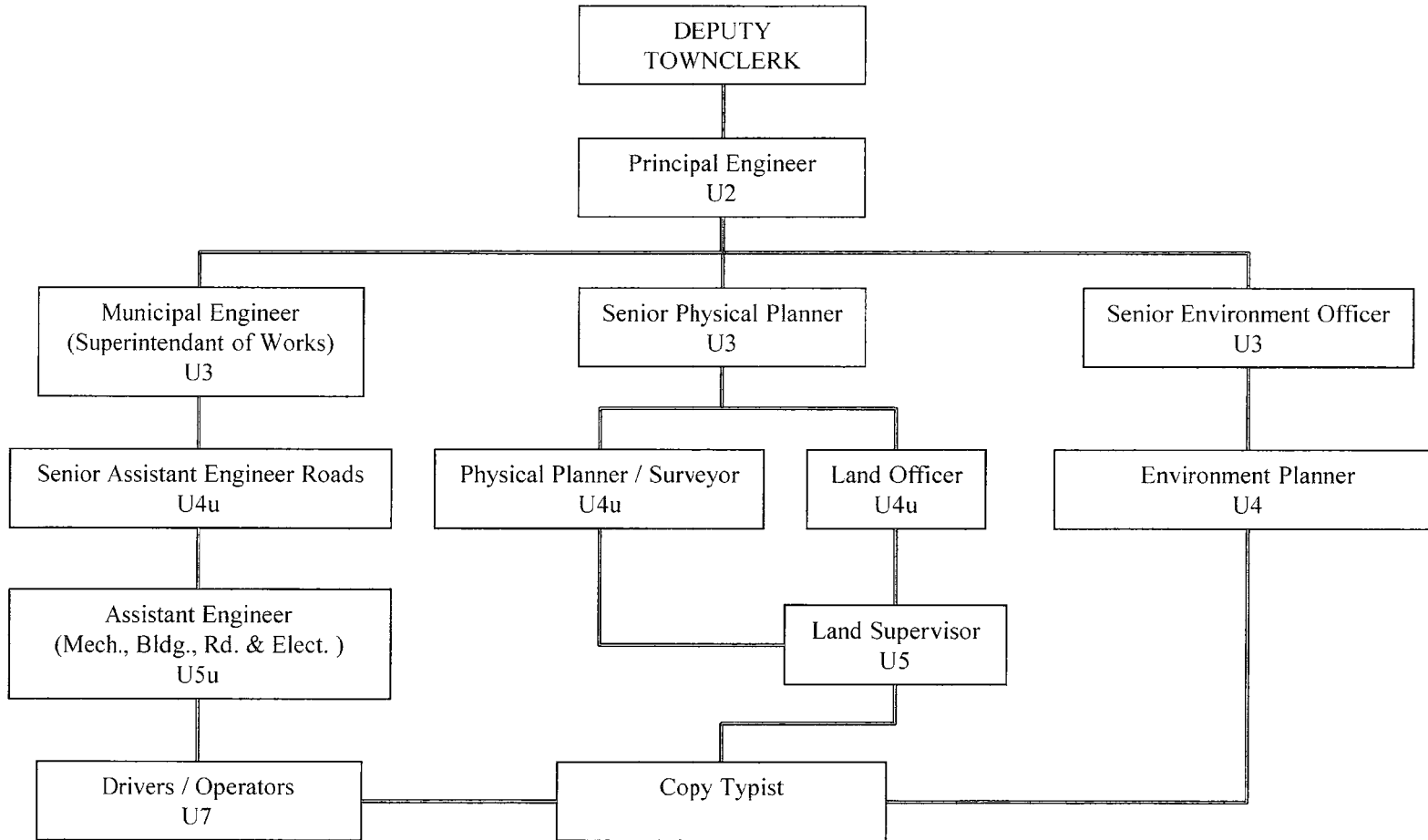
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2. Gulu Municipality (Only Engineering Department)



Appendix-28

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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:

- a) Preparatory Survey
  - The Survey conducted by JICA
- b) Appraisal and Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- c) Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- d) Grant Agreement (hereinafter referred to as “the G/A”)
  - Agreement concluded between JICA and a recipient country
- e) 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.

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- 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

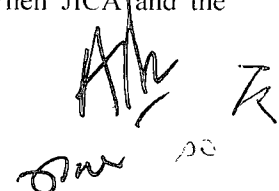
After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government 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 6.

(6) "Proper Use"

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

(7) "Export and Re-export"

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

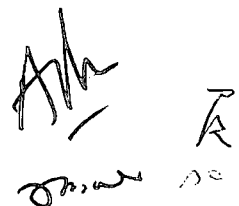
(8) Banking Arrangements (B/A)

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

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

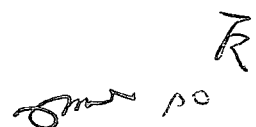
(9) Authorization to Pay (A/P)

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

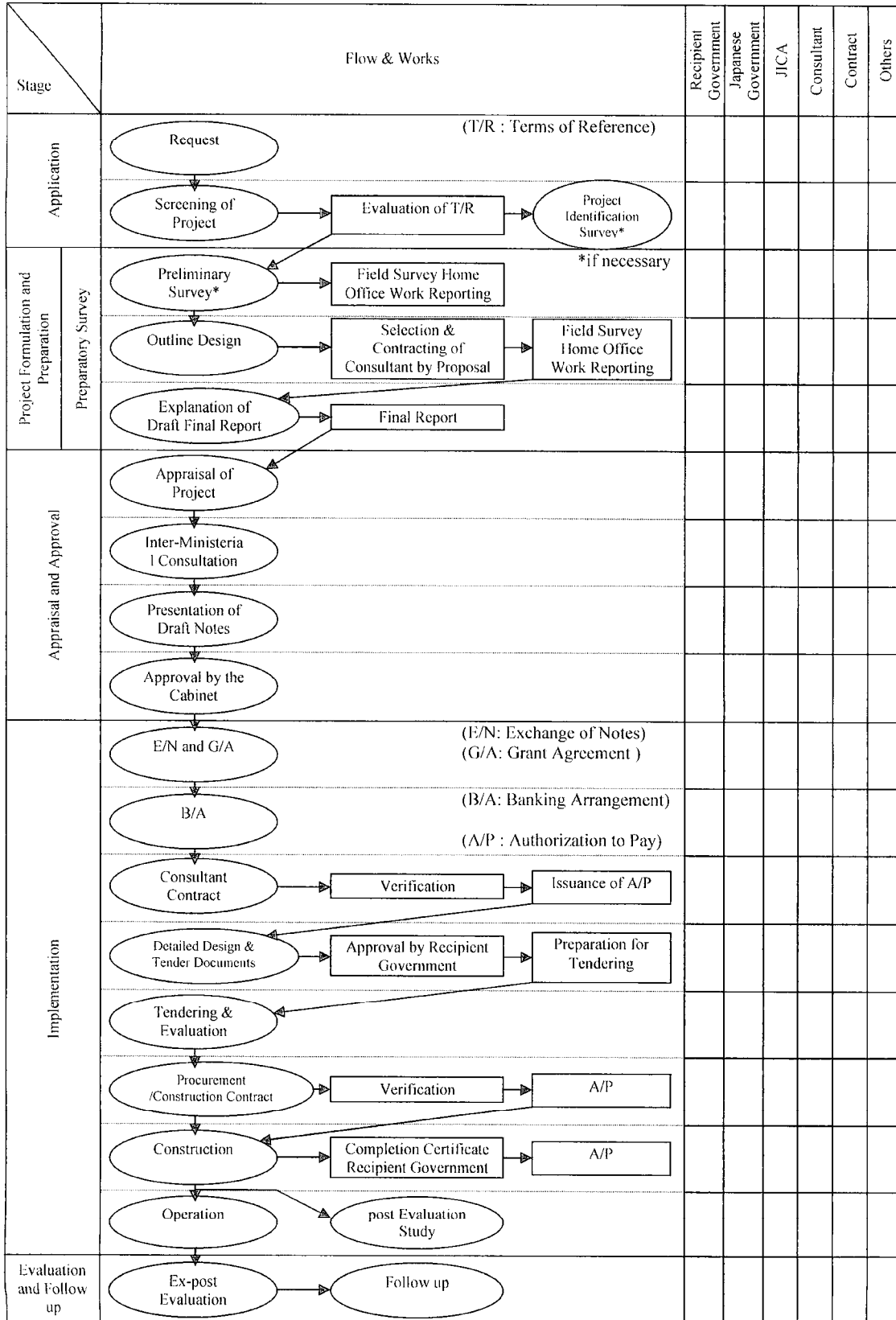


(10) Social and Environmental Considerations

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



Flow Chart of Japan's Grant Aid Procedures



*Sm/w* *AM* *R*

**Major Undertakings to be taken by Each Government  
as a condition for the Japan Grant Aid to be implemented**

No.	Items	To be covered by		Remarks
		Grant Aid	Recipient Side	
1	To secure land registration and its property, and permission for the implementation of the Project and to clear the site		⊙	
2	To bear the following commissions paid to the Japanese bank for banking services based upon the Banking Arrangement (B/A)		⊙	
	1) Advising commission of Authorization to pay (A/P)		⊙	
	2) Payment commission		⊙	
3	To ensure prompt customs clearance of the products and to assist internal transportation of the products in the recipient country			
	1) Marine or Air transportation of the products from Japan and/or third countries to the recipient country	⊙		
	2) Tax exemption and customs clearance of the products in the recipient country		⊙	
	3) Internal transportation of the equipment and components from the port(s) of disembarkation to the project site in the recipient country	⊙		
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be borne by the Authority without using the Grant		⊙	
5	To accord Japanese physical persons and / or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		⊙	
6	To maintain and use properly and effectively the facilities constructed and the equipment provided under the Grant Aid		⊙	
7	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		⊙	
8	To give due environmental and social consideration in the implementation of the Project		⊙	

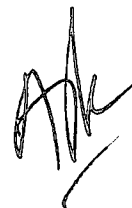
⊙: denote the side responsible for the work



**Major Undertakings to be taken by Each Government  
after an approval of Project implementation**

No.	Items	To be covered by		Remarks
		Grant Aid	Recipient Side	
1	To secure lots of land necessary for the implementation of the Project and to clear the sites		●	
2	To secure sites for material storing yard, temporary construction yard and waste disposal		●	
3	To relocate existing utilities within the Project site to designated area or Project affected area		●	
4	To arrange issuance of license, permission and other necessary procedures for the Project		●	
5	To secure enough budget and personnel necessary for the operation and maintenance of the facilities implemented under the Grant Aid, including the periodical maintenance work after the completion of the Project		●	

●: denote the side responsible for the work



*Ther...* *no* *R*



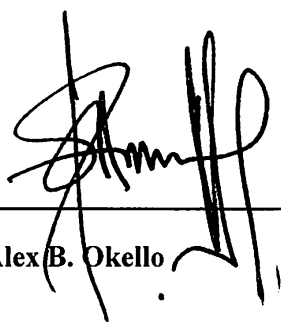
**TECHNICAL DISCUSSIONS**  
**ON**  
**THE PREPATORY SURVEY**  
**ON**  
**THE PROJECT FOR IMPROVEMENT OF GULU MUNICIPAL ROADS**  
**IN REPUBLIC OF UGANDA**

The Japan International Cooperation Agency (hereinafter referred to as “JICA”) decided to conduct a Preparatory Survey (hereinafter referred to as “the Survey”) on the Project for improvement of Gulu municipal roads in Republic of Uganda (hereinafter referred to as "the Project") in consultation with the Government of Japan.

JICA sent to Uganda the Preparatory Survey Team (hereinafter referred to as "the Team”), headed by Mr. Tomoki KANENAWA from March 2<sup>nd</sup> to March 11<sup>th</sup>, 2015 and held discussion with officials concerned of the Government of Uganda, and confirmed the main items as described in the Minutes of Discussion signed in 10<sup>th</sup> March, 2015.

Continuously, JICA sent the Preparatory Survey Team consisted of experts of the Chief Consultant from March 30<sup>th</sup> to 12<sup>th</sup> May, 2015. The Team conducted further surveys in Kampala and Gulu, and in the study area, and held various discussions with officials concerned of Uganda. In the course of the discussion, both parties have confirmed the necessity of the items shown in the Attached Document. The Team shall convey these items to the Japanese side for the preparation of the Preparatory Survey Report.

Kampala, 8th May, 2015



Alex B. Okello


Permanent Secretary  
Ministry of Works and Transport  
Kampala, Uganda



Motoki OGAWA

Chief Consultant  
Eight-Japan Engineering Consultant Inc.  
Tokyo, Japan

(Witness)



08/05/2015

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**Terence ODONGA**

Municipal Engineer  
Gulu Municipal Council  
Gulu, Uganda



## Attachment

### 1. Hydrological Analysis

#### 1.1. Rainfall Analysis

##### (1) Probable Rainfall

Probable rainfalls are estimated based on the daily rainfall data collected from Gulu Station (1991-2014). In this estimation, Gumbel's Distribution is applied. And results are, as follows:

**Table-1.1 Return Period and Probable Rainfall**

Return Period (year)	2	5	10	25	50
Probable Rainfall (mm/d)	70	85	95	110	120

##### (2) Rainfall Intensity

Rainfall intensities at Gulu are studied referring to the "Road Design Manual Volume 2, MoWT (The Manual)."

Results of this study are, as follows:

(i) For 2, 5 and 10 year return period

$$i = a/(0.33+t_d)^c: i \text{ (mm/h), } t_d \text{ (h)}$$

**Table-1.2 Return Period and Parameters**

Return Period (year)	2		5		10	
Parameters	a	c	a	c	a	c
Values	60.84	0.97	84.12	1.00	97.75	1.01

(ii) For 25 and 50 year return period

$$R^{25} = (T/24) \cdot (24.33/(0.33+T)^{1.01}) \cdot 110$$

$$R^{50} = (T/24) \cdot (24.33/(0.33+T)^{1.01}) \cdot 120$$

$$: R^{25}, R^{50} \text{ (mm/h), } T \text{ (h)}$$

#### 1.2. Flow Capacity and Flood Damages

##### (1) Gulu Avenue

Flow capacity of the existing pipe culverts is almost zero, because they are almost full of sediments. Overflow depths on the road during floods have been 0.3-0.8m.

##### (2) Awere Road

Flow capacity of the existing pipe culverts is estimated to be 2.4 m<sup>3</sup>/s. Overflow depth on the road during floods was less than 0.8m.

#### 1.3. Estimation of Design Flow

##### (1) General

- In-situ box-culverts are to be constructed at the crossings of PECE River and Gule Avenue and Awere Road.



- Considering the utilization of natural detention ponds and the discharge of sediment, river improvement of PECE River is not to be considered.
- Design flows for the box-culverts are to be 25 year as much as possible.

### (2) Flood Hydrograph

Flood hydrograph is estimated based on “TRRL East African Flood Model” mentioned in the Manual. The salient features of the estimation under 25 year conditions are, as follows:

**Table-1.3 Parameters to Calculate Water Discharged Volume**

Items	Upper Gulu A. Basin	Basin between Gulu A. and Awere R.
Catchment Area (km <sup>2</sup> )	0.89	0.27
Catchment Lag Time (h)	0.5	0.5
Base Time (h)	2.0	2.0
Peak Flow (m <sup>3</sup> /s)	13.4	4.8

### (3) Design Flow

Reduction of peak flow is estimated based on the following storage equation:

$$I-O = \Delta S/\Delta t: I=\text{input}, O=\text{output}, \Delta S=\text{storage change}, \Delta t=\text{routing time interval}$$

The results of computation and the estimation of design flow are, as follows:

**Table-1.4 Results of the Analysis**

Items	Gulu A.	Awere R.
Input Peak (m <sup>3</sup> /s)	13.40	5.59
Output Peak = Design Flow (m <sup>3</sup> /s)	2.65	2.76
Peak Reduction (m <sup>3</sup> /s)	10.75	2.83
Maximum Depth of Detention Pond (m)	0.95	0.98

### (4) Size of Box-culverts

Referring to the Manual, 25cm freeboard (Fb) is adopted in this design. And this Fb is applied to the maximum depth of the detention pond. This is because of considering the change of detention capacity in the future and the discharge of debris, etc during floods. As a result, sizes of the box-culverts are estimated, as follows:

- Gulu Avenue: W2000 x H1200 (mm)
- Awere Road: W2000 x H1230 (mm)

### 1.4 Conclusion

The Survey Team conducted hydrological analysis of PECE River using the actual rainfall data that was observed at Gulu Meteorological Station. The Survey Team explained the outline of the result as follows.

- According to the analysis, the existing 2 pipe culverts have a slightly less than enough capacity (diameter) to discharge water.
- However, due to inadequate maintenance, most of the area of the pipe is clogged by soil and this giving

significant damage to the capacity (especially, Gulu Avenue).

- Therefore, it would be recommended to place a Box Culvert instead of pipe culvert to support the municipal council to operate maintenance tasks.
- The size of the box culvert is also recommended to be less than 2 m (max 2m) width since the return period would shift to 50 years from 25 years when exceeds 2m width according to the design standard. From economic reasons less than 2m shall be recommended.
- Under the interview, it was found the water level frequently would rise higher than the existing surface between 0.3m to 0.8m (Gulu Avenue) and less than 0.8m (Awere Road), and this approx. match with the calculation.
- It was observed that the upper of Gulu Avenue and the section between two roads of PECE River also have a function to reduce water velocity and pond water. It is recommended to keep the river as it is to limit the influence might occur by constructing new culverts.
- The size of the box culverts would be recommended W2000 x H1200 for Gulu Avenue and W2000 x H1230 for Awere Road.

## 2. Soil & Topo Investigation

The Survey Team conducted soil and topographic survey at location shown bellow. The result of the survey is under analysis and expected to be report by end of May, 2015.

**Table-2.1 Area of the Topo-Graphic Survey**

		Length	Width	Area
1	Kampala Road	240	30	7,200
2	Acholi Rd.	1,209	30	36,270
3	Lagara Rd.	220	20	4,400
4	Coronation Rd.	215	20	4,300
5	Andrea Olal Rd.	224	20	4,480
6	Nehru Rd.	219	20	4,380
7	Gulu Ave.	643	30	19,290
8	Awich Rd.	221	20	4,420
9	Queens Ave.	218	20	4,360
10	Keyo Rd.	214	20	4,280
11	Aliker Rd.	219	20	4,380
12	Labwor Rd.	217	20	4,340
13	Awere Rd.	518	30	15,540
14	Oliya Rd.	215	20	4,300
15	Labolo Rd.	0	20	0
16	Lumumba Ave.	211	20	4,220
17	Jomo Kenyatta Rd	1,209	20	24,180
18	Bank Lane	399	20	7,980

19	Market St.	163	20	3,260
20	Marley Rd.	100	20	2,000
21	Prince Rd.	160	20	3,200
22	Taxi Park			1,500
23	Dr. Mathew Lukwiya Road	265	20	5,300
24	Sir Samuel Road	1,300	30	39,000
	<b>TOTAL</b>	<b>8,599</b>		<b>212,580</b>

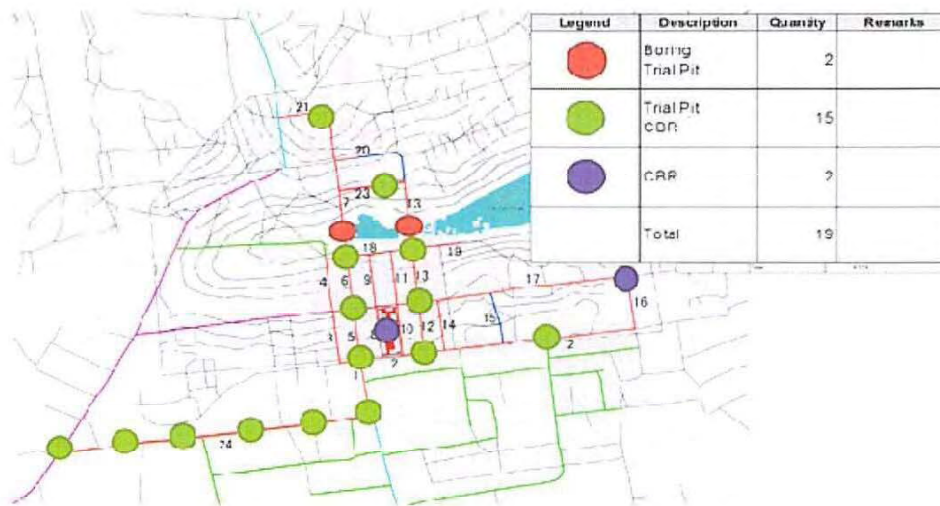


Fig-2.1 Location of the Soil Investigation

### 3. Road Design

#### 3.1. Targeted Roads and its Priority

Both parties confirmed that there is no reduction on the targeted roads and its priority as indicated in Chapter 6-3 of the Minutes of Discussion signed on 10<sup>th</sup> March, 2015 between MOWT and JICA.

#### 3.2. Design Standard

For design standards, the Road Design Manual series (Volumes 1-4, 2010) of MoWT (hereinafter, the Manual) shall be applied in principle. However, these manuals are not targeting the design for inter-urban roads, traffic characteristics and physical constraints, necessary adjustments will be done. Therefore, flexible application of the above-mentioned standards or application of alternative standards shall be considered as necessary. As alternative standards, AASHTO, DMRB (UK), Road Association (JRA) or any other appropriate standards shown in Table 3.1 shall be considered.

Table 3.1 List of Alternative Standards

No.	Category	Name of Standard
1	Geometry	Road Design Manual Volume I: Geometric Design, MoWT, 2010
2		A Policy on Geometric Design of Highways and Streets, AASHTO, 6th Edition, 2011
3		Geometric Design of Roundabouts: TD16/07

*AM*

*J.*



4		Japan Road Structure Ordinance, JRA, 2004
5	Drainage	Road Design Manual Volume 2: Drainage Design, MoWI, 2010
6	Pavement	Road Design Manual Volume 3: Pavement Design, Part I: Flexible Pavements, MoWT, 2010
7		AASHTO Guide for Design of Pavement Structures 1993
8		Guideline for Design and Construction of Pavement, JRA, 2006

### 3.3. Design Classification

Since most of the design items such as road width or alignment rely on the design classification, determination of the design class is the most sufficient and essence on road design. Considering traffic movement after construction and the existing width of ROW, “II Paved” in the Manual as shown in table below shall be applied to the targeted roads.

**Table 3.2 Road Design Classes in Road Design Manual**

Design class	Right of Way width [m]	Road way width [m]	Carriage way			Shoulder width [m]	Median width [m]
			Width [m]	Lane width [m]	No. of lane		
Ia Paved	60	20.80-24.60	14.6	3.65	4	2 x 2.5	1.2 – 5.0
Ib Paved	60	11.0	7.0	3.5	2	2 x 2.0	-
II Paved	50	10.0	6.0	3.0	2	2 x 2.0	-
III Paved	50	8.6	5.6	2.8	2	2 x 1.5	-
A Gravel	40	10.0	6.0	3.0	2	2 x 2.0	-
B Gravel	30	8.6	5.6	2.8	2	2 x 1.5	-
C Gravel	30	6.4	4.0	4.0	1	2 x 1.2	-

Source: Road Design Manual Volume 1: Geometric Design

### 3.4. Design Speed and Geometric Design Parameters

The design parameters for the design class “II Paved” are shown in the Table below. Since the target roads are categorized as “the Urban Road”, 50km/h shall be applied as the design speed.

**Table 3.3 Design Speed and Geometric Design Parameters for “II Paved”**

Design Element	Unit	Flat	Rolling	Mountainous	Urban/Peri-Urban
Design Speed	km/h	90	70	60	50
Min. Stopping Sight Distance	m	135	95	75	58
Min. Passing Sight Distance	m	605	485	410	345
Min. Horizontal Curve Radius	m	320	185	130	100
Max. Gradient (desirable)	%	3.5	5.5	6	6
Max. Gradient (absolute)	%	5.5	7.5	8	8
Minimum Gradient in cut	%	0.5	0.5	0.5	0.5
Maximum Superelevation	%	7	7	7	4
Crest Vertical Curve stopping	K <sub>min</sub>	43	22	14	9
Crest Vertical Curve passing	K <sub>min</sub>	307	246	176	126
Sag Vertical Curve stopping	K <sub>min</sub>	30	20	15	11
Normal Cross fall	%	2.5	2.5	2.5	2.5
Shoulder Cross fall	%	4	4	4	4
Right of Way	m	50	50	50	30

Source: Road Design Manual Volume 1: Geometric Design

### 3.5. Design Vehicles

From observation of actual traffic movement and the existing ROW, “Single unit bus (DV-3)” shall be adopted as the Design Vehicle defined in the Manuals as shown in the following table.

**Table 3.4 Dimensions of Design Vehicle**

Design Vehicle type	Symbol	Overall (m)			Overhang (m)		Wheel base (m)	Minimum design turning radius (m)	Minimum inside radius (m)
		Height	width	Length	Front	Rear			
4 x 4 passenger car	DV-1	1.3	2.1	5.8	0.9	1.5	3.4	7.3	4.2
Single unit truck	DV-2	4.1	2.6	9.1	1.2	1.8	6.1	12.8	8.5
Single unit bus	DV-3	4.1	2.6	12.1	2.1	2.4	7.6	12.8	7.4
Semitrailer combination large	DV-4	4.1	2.6	16.7	0.9	0.6	6.1 & 9.1	13.7	5.8
Interstate Semitrailer	DV-5	4.1	2.6	21.0	1.2	0.9	6.1 & 12.8	13.7	2.9

Source: Road Design Manual Volume I: Geometric Design

### 3.6. Typical Cross Section

The elements of the Cross Section shall be determined by considering the function of the road as well as the required design standard. Existing site condition shall be included in the consideration also. Examined cross section elements of the targeted roads are summarized in Table 3.5.

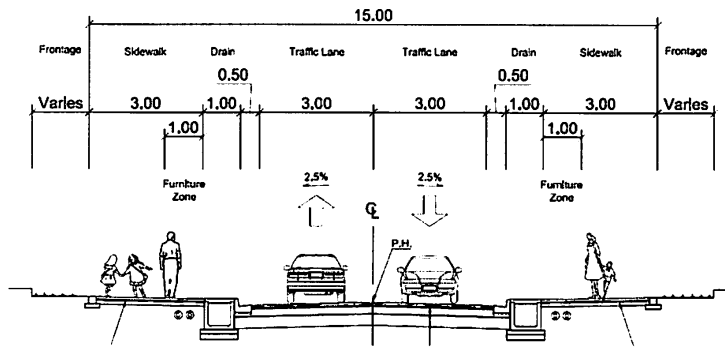
Typical cross sections of the targeted roads are classified into four (4) types as shown in Figure 3.1. Each type is further categorized based on the pavement type and the side of parking lane (L/R). Typical cross sections are tentatively allocated to each route as shown in Figure 3.2 depending on the standard roadway width. The allocation plan shall be reviewed after obtaining topographic survey results.

**Table 3.5 Cross Section Elements of the Targeted Roads**

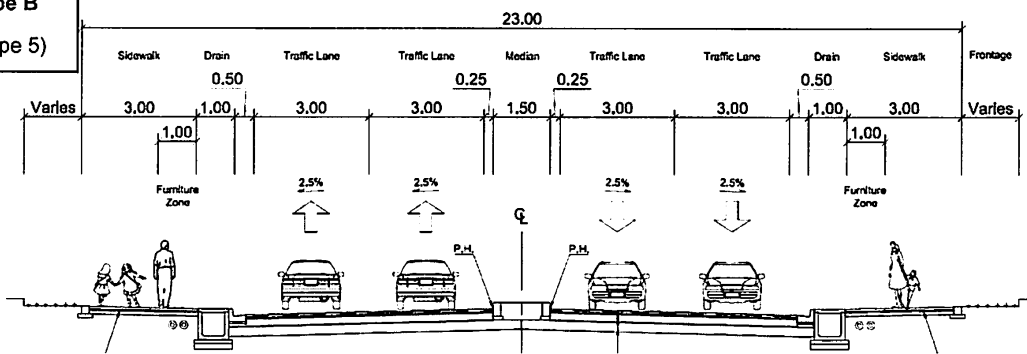
Sr.No.	Road Name	Length (m)	Existing ROW Width (m)		Remarks	Cross Section Plan					
			General	Narrowest		Roadway Width (m)	Traffic Lane Width (m) & No.	Parking Lane (m)	Shoulder/Road Side Drain	Walkway*	Remarks
			a	b							
1	Kampala Rd.	240	19.5	19.5	(National Road)	18.0	3.0 x 2	2.0 x 2	1.0 x 2	3.0 x 2	
2	Achofi Rd.	1,209	17.0-21.0	17.0	Awach Rd	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	Median 2.0m
			21.5-24.0	21.5	Andrea Olal Rd to Acholi Lane	23.0	3.0 x 4	-	1.5 x 2	3.0 x 2	
				13.0	Along Cemetery (L=55m)						
			19.0	19.0	Acholi Lane to Lumumba Ave.	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
3	Lagara Rd.	220	18.0	15.5	At Uganda Breweries Depot	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
4	Coronation Rd.	215	15.5-17.0	15.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
5	Andrea Olal Rd.	224	14.5-15.0	14.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
6	Nehru Rd.	219	14.5-18.5	14.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
7	Gulu Ave.	643	20.0	20.0		16.5	3.0 x 2	2.0 x 1 (L)	1.0 x 1 (L) 1.5 x 1 (R)	3.0 x 2	
8	Awich Rd.	221	17.5-19.0	17.5	Along Taxi Park	16.5	3.0 x 2	2.0 x 1 (R)	1.0 x 1 (R) 1.5 x 1 (L)	3.0 x 2	
9	Queens Ave.	218	14.5-15.0	14.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
10	Keyo Rd.	214	17.0	17.0	Along Taxi Park	16.5	3.0 x 2	2.0 x 1 (L)	1.0 x 1 (L) 1.5 x 1 (R)	3.0 x 2	
11	Aliker Rd.	219	16.5-17.5	16.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
12	Labwor Rd.	217	16.0-18.5	16.0		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
13	Awere Rd.	518	15.5-21.0	15.5	Along New Market	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
14	Obya Rd.	215	15.0	15.0		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
15	Cancelled	-									
16	Lumumba Ave.	211	16.0	16.0		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
17	Jomo Kenyatta Rd.	1,209	18.5	18.5	Atwal Rd.	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
			14.0-15.5	14.0	New Town Center	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
18	Bank Lane	399	24.0 18.5-23	24.0 18.5	Near Gulu Ave.	16.5	3.0 x 2	2.0 x 1 (R)	1.0 x 1 (R) 1.5 x 1 (L)	3.0 x 2	
19	Market St.	163	23.0	23.0		18.0	3.0 x 2	2.0 x 2	1.0 x 2	3.0 x 2	
20	Marley Rd.	100	18.0	18.0	(Hospital Access)	15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
21	Prince Rd.	160	21.0-22.0	21.0	Municipal Council Access	Overlay					
22	Taxi Park	-									
23	Dr. Mathew L. Rd.	265	17.5	17.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
24	Sir Samyuel Rd.	1,280	17.5-21.0	17.5		15.0	3.0 x 2	-	1.5 x 2	3.0 x 2	
			13.5	13.5	Near A-105 at Rice Mill						
Total		8,579									

Note \*: Including furniture zone with width of 1.0m

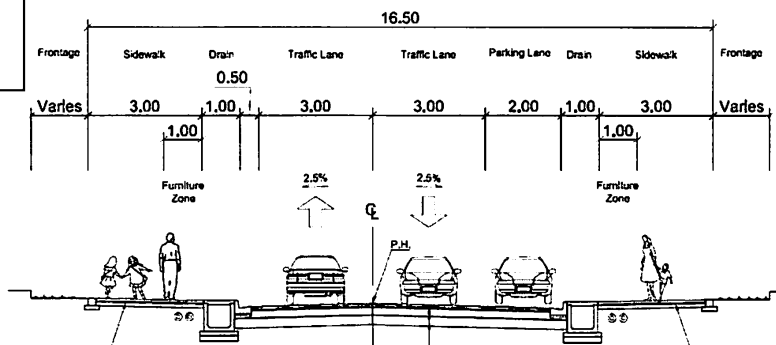
**Type A**  
(Type 1-Type4)



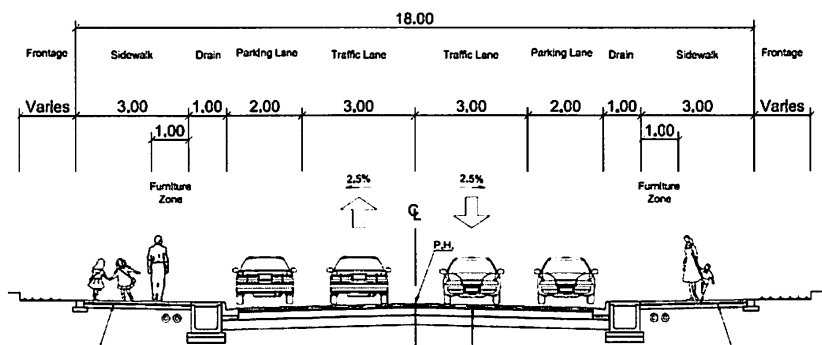
**Type B**  
(Type 5)



**Type C**  
(Type 6-Type7)



**Type D**  
(Type 8)



**Fig-3.1 Proposed Typical Cross Section**

ML



Figure 3.2 Typical Sections of Target Roads

PL



Both parties agreed on the typical cross section which the Survey Team has proposed as shown in the figures above under discussion made as follows.

- The existing veranda along the road shall remain as it is and would not be demolished for the Project due to long connivance from before independence. Hence, front veranda's location and height shall be the control point of the road design.
- Drainage shall be placed at both sides, on the side walk of the road.
- Parking lane shall be provided only at the sections where can secure roadway width of 16.5m and 18.0m. In particular, near the New Market and the Taxi Park has high demand to provide parking lane.
- It was discussed that sections where width to place parking lane are not enough, the proposed cross section shall be adopted to the design. According to the law, parking for the shops along the road shall be established in their land by the owner's expense in principal. Since customer who comes with their vehicles for shopping at these shops is expected very few, it is considered that the Municipal Council could enforce the parking restriction along the road.
- Both parties agreed not introducing bus parking lane since it requires 3 meter width and it would make the sidewalk only 1m remain.
- The Study Team confirmed that the Municipal Council would manage and enforce the Bodaboda running over and parking on sidewalk after opening to the traffic.

### 3.7. Road design

#### (1) Alignment

Both parties agreed to follow the existing alignments basically on both horizontal and vertical. In particular, the control point of the vertical alignment shall be the height of existing veranda.

#### (2) Pavement

Pavement structures shall be determined based on the cumulative traffic volume (Equivalent Standard Axle Load, ESAL) and stiffness of subgrade (California Bearing Ratio, CBR). Although pavement structures are to be examined after obtaining geotechnical investigation results, the following three (3) types shown in the following Figure shall be expected as standard.

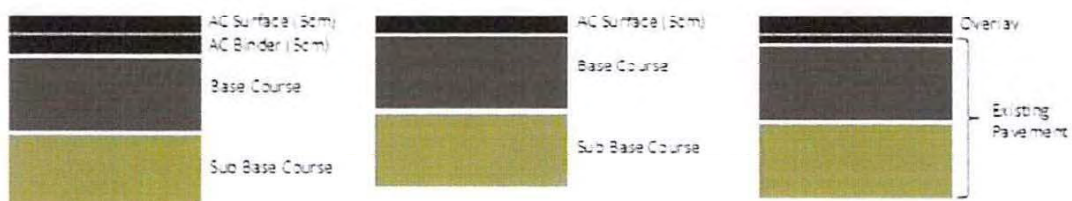


Figure 3.3 Standard Types of Pavement Structures (Tentative)

Both parties agreed to apply the MOWT standard for the pavement design, with confirmation by both USA and Japanese Standards. The pavement for the carriageway shall be hot mixed asphalt concrete. Interlocking pavement for the pedestrian walkway shall be adopted for easy maintenance of underground cables. Sections where heavy

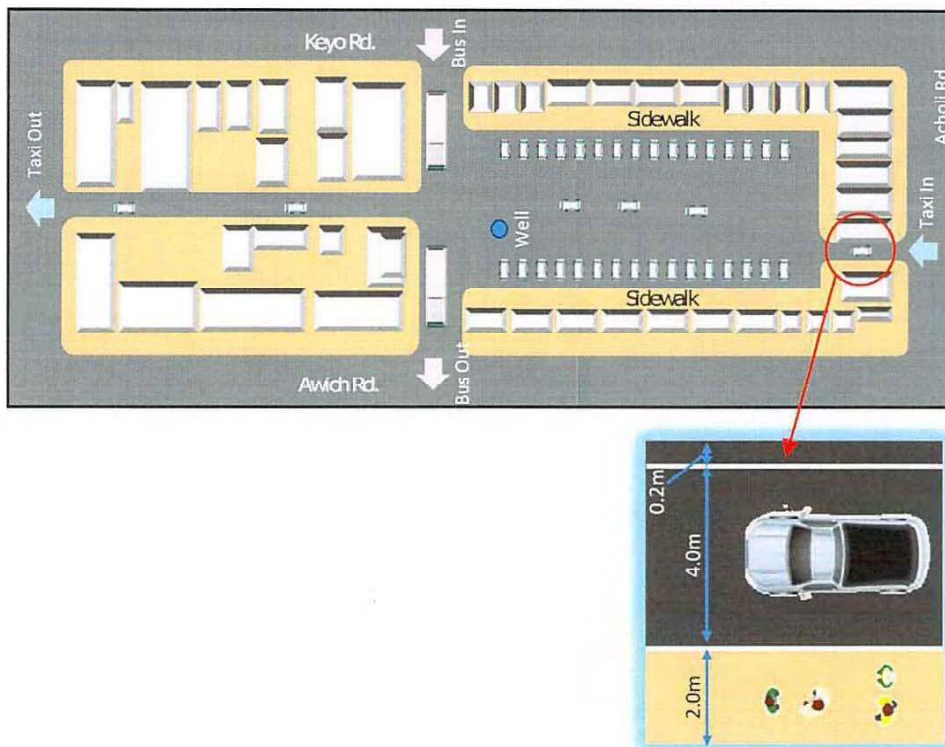
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load vehicles are expected, reinforced pavement such as Polymer Modified Asphalt (PMA) or Concrete Pavement shall be considered to prevent from the early deterioration. Type of layers and thickness depends on the traffic volume forecast and existing subgrade CBR.

**(3) Taxi Park**

The Municipal Council committed to demolish the northern part of the taxi park to open a new exit. Details are noted in the Social Environment Consideration of this Technical Note. The Survey Team held a discussion with the Municipal Council of Traffic Management of the Taxi Park and both parties agreed as shown in the Figure below.



**Figure 3.4 Proposed Traffic Management of the Taxi Park**

**(4) Utility Duct**

Both parties agreed to place PVC Pipe (D300) under the road crossing section of the utility to prevent re-excavation after the construction. Ducts by PVC pipe and handholds along the sidewalks shall also be considered subject to budget within the ceiling price.

**3.8. Roundabout and Intersections**

Both parties agreed to introduce roundabout at intersections indicated below.

- a. Kampala Rd. – Acholi Rd. Junction (New Construction)

- b. Andrea Olal Rd. – Jomo Kenyatta Rd. Junction (Partial Reconstruction)
- c. Bank Lane – Awere Rd. Junction (Full Reconstruction)
- d. Gulu Avenue (Overlay)

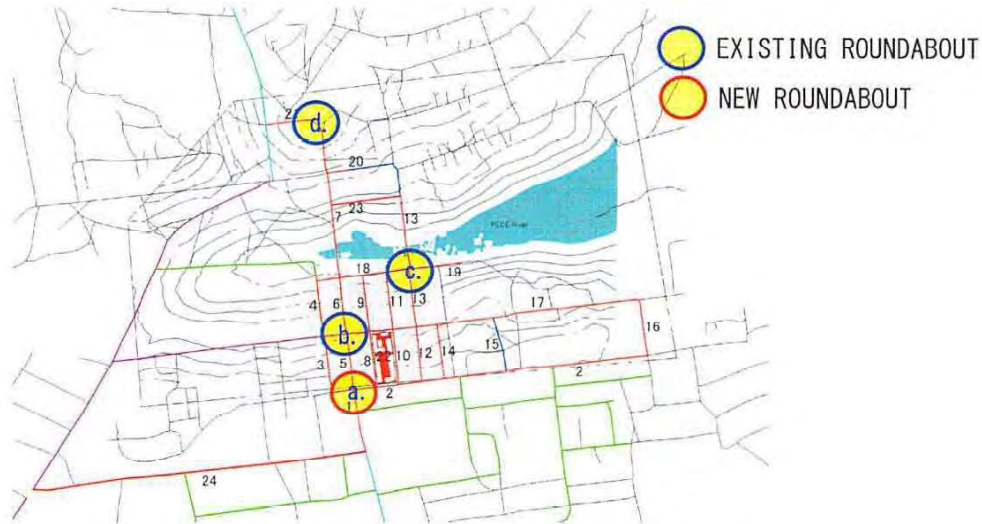


Figure-3.5 Intersections where to Introduce Roundabout

Both parties also confirmed as follows.

- The Study Team proposed to acquire land part of Stanbic Bank at intersection of Kampala Road and Acholi Road to establish roundabout. However, since the Municipal Council found the difficulty to acquire the land, both parties agreed to design roundabout within the existing road reserve.
- The Study Team proposed to make the traffic management at Acholi Road on both traffic management and safety aspects as shown in the next Figure and MOWT agreed.

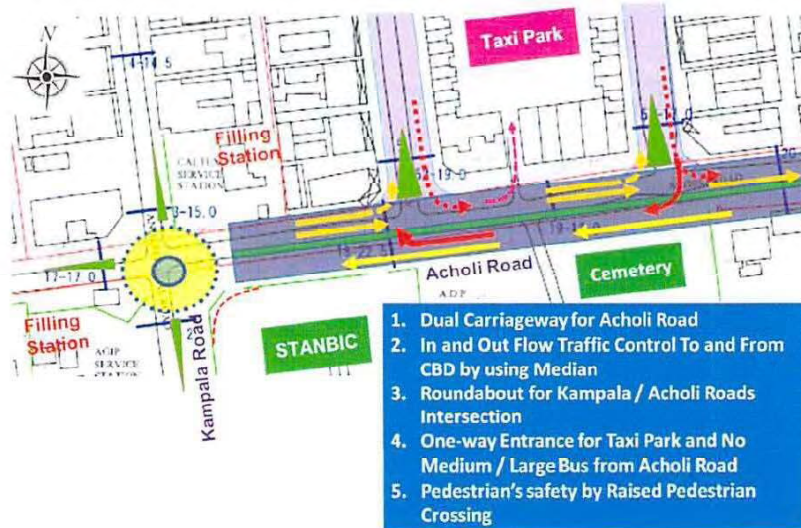


Figure-3.6 Proposed Traffic Management at Acholi Road

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### 3.9. Drainage

Overall drainage system for the project area including neighboring USMID project is proposed as shown in the next page. There are six (6) drainage outlets and these locations shall be confirmed and reviewed as necessary in August 2015 when the highest precipitation is expected. MOWT basically agreed of the location of the end of flow as shown in the Figure next page.

Both parties agreed to place U-shape drainage with cover on both sides of the road to secure width where pedestrians could walk over. The U-shape drainage shall be made by concrete and have enough width to do maintenance works such as de-silting.

### 3.10. Structures

Both parties agreed to place box culvert where crosses the PECE River. The road shall be considered to raise the vertical alignment maximum 0.8 meter from the existing surface in accordance with the interview of the overflow. The design of the box culvert shall be considered, to avoid affecting the downstream land use, not to change the existing condition of the water flow. The MOWT standard shall be applied as the design standard.

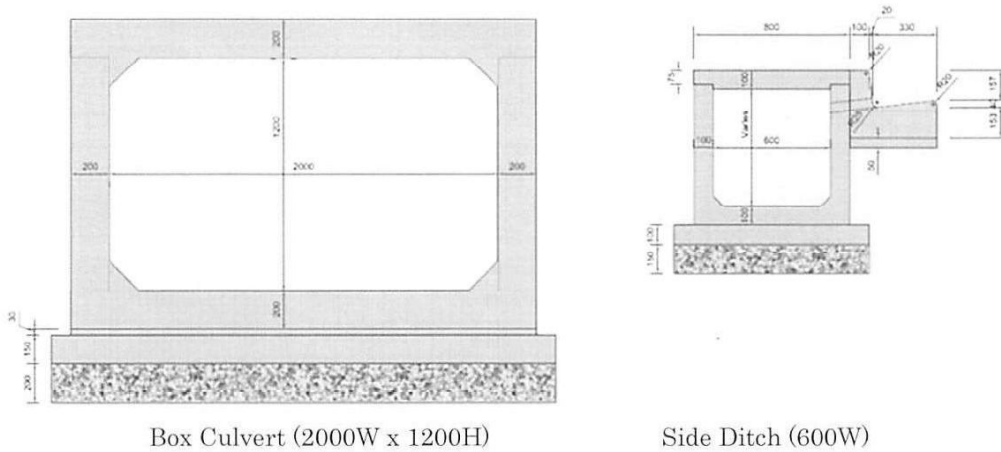


Figure 3.8 Proposed Figures of the Structures

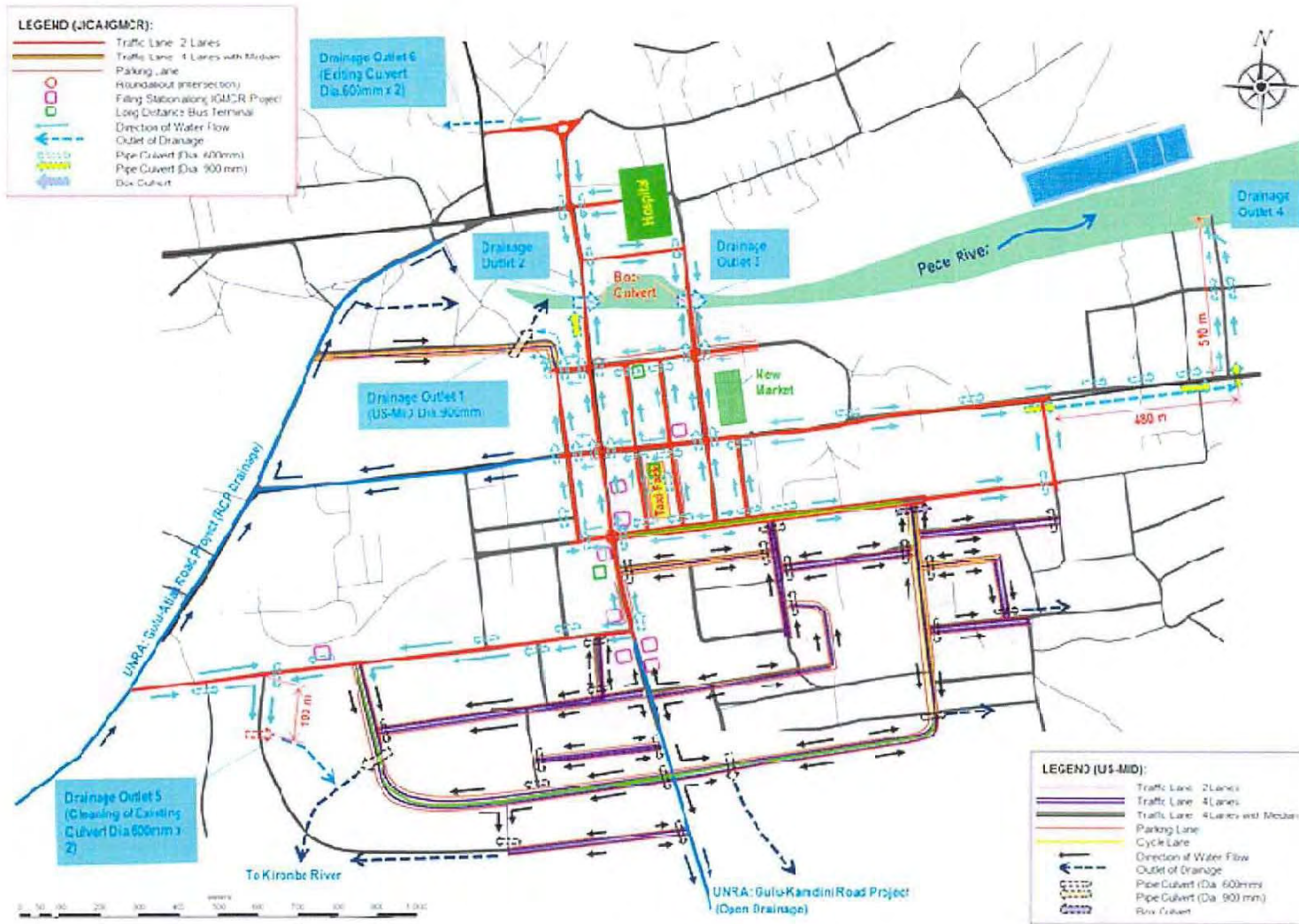


Figure-3.8 Water Discharge Channel and Location of the End of Flow

3.11. Miscellaneous

(1) Traffic Safety

Both parties agreed to place traffic safety facilities as shown in the figure below. "Raised Crosswalk" shown in the figure shall be placed at where pedestrians cross the road such as roundabout. Photo is given as a sample how this facility shall be provided. "Hump and Rumble strips" is also a facility to reduce speed. The detail of the location where to provide this facility is shown in Figure 3.2 of this Note.

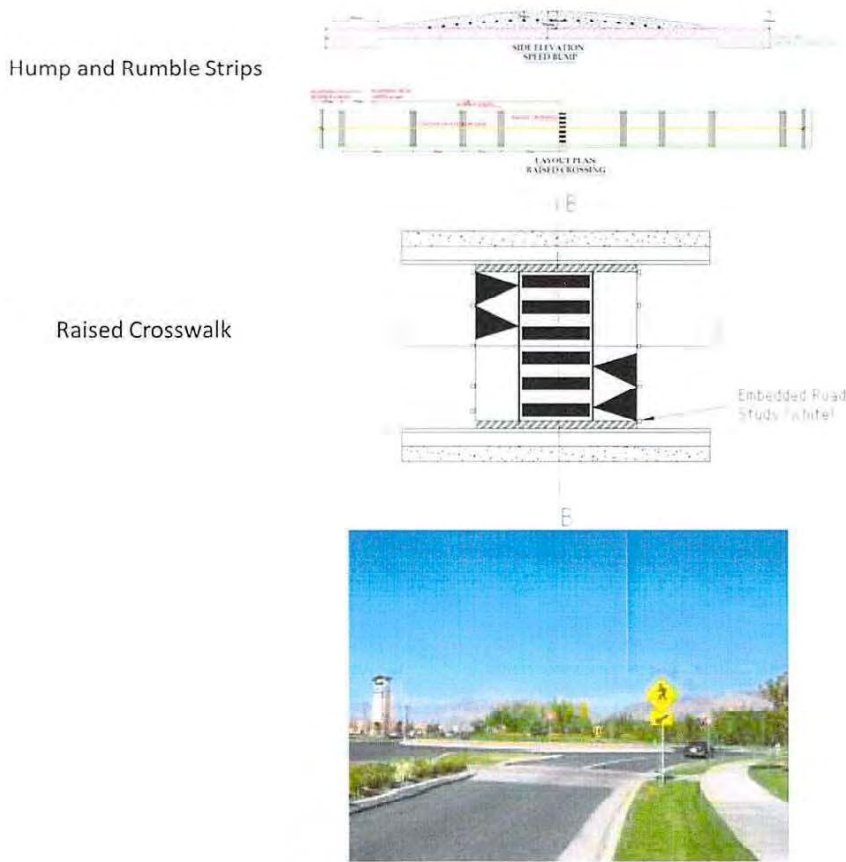


Figure-3.9 Proposed Type of Traffic Safety Facilities.

4. Construction Plan /Procurement

(1) Construction Yard

The Gulu Municipality proposed the following location as the construction camp yard for buildings, stock yard and asphalt plant. The survey team agreed to apply the land subject to all existing vender shifts to the New Market constructed by the ADB finance. The facilities should be demolished before commencement of the construction as

well as structures.



Figure-4.1 Location of Construction Yard

## (2) Construction Materials

Both parties agreed to apply following materials in the construction. Necessary public consultation shall be made by MOWT and Gulu Municipal Council according to NEMA's regulation.

- Borrow Pit: Laroo (Approx. 5 km from city center)
- Aggregate: Kidere (Approx. 10 km from city center)
- Sand: Pogo (Approx. 74km from city center)

Also, both parties agreed to use Pabwo Disposal Site.

- Disposal Site Pabwo (Approx. 11km from city center)

## (3) Tax Exemption Procedure

The MOWT explained that all taxes arising from the Project shall be met by the Government of Uganda.

## 5. Soft Components

The Study Team proposed the contents of the Soft Component as follows and MOWT agreed.

- Stage-1 : Develop road inventory map by using VIMS
- Stage-2 : Implement lecture of basic of asphalt pavement
- Stage-3 : Site Visit (Asphalt Plant and pavement construction)
- Stage-4 : Implement lecture of deterioration/evaluation of asphalt pavement and counter measures
- Stage-5 : Development of Municipality Maintenance Guideline

## 6. Social Environment Consideration

### 6.1 Stakeholder meeting

Series of meetings with Gulu Municipal Council and stakeholders were carried out on April 29, and 30, 2015 respectively at Town Clerk's office in Gulu Municipal Council. The summary of the meetings is shown in the following table.

**Table-6.1 Summary of Stakeholder Meetings**

Implementation Organization	MOWT Gulu Municipal Council	
Objectives	By involving local stakeholders from early stage of the Project, the Project proponent can receive their inputs and plan appropriate measures to address their concerns, avoid conflicts, and achieve higher results with their support.	
Venue	Town Clerk's Office, Gulu Municipal Council	
Date and Time	April 29, 2015 09:00AM to 10:20AM	April 30, 2015 09:00 to 11:00AM
Major Participants	JICA Gulu Field Office, MOWT, Gulu Municipal Council, and the Study Team (15 persons)	Uganda National Water and Sewerage Corporation (NWSC), UMEME, MTN, JICA Gulu Field Office, MOWT, Gulu Municipal Council, and the Study Team (18 persons)
Agenda	<ol style="list-style-type: none"> <li>1) Design policy</li> <li>2) Water discharge system</li> <li>3) Typical cross section</li> <li>4) Roundabout/intersections</li> <li>5) Traffic safety facilities</li> <li>6) Construction materials</li> <li>7) Topographic/soil investigation</li> <li>8) Environmental and social considerations</li> <li>9) Discussions</li> </ol>	<ol style="list-style-type: none"> <li>1) Project overview (target road, drainage system, typical cross section)</li> <li>2) Major adverse impacts by the project expected includes obstructions</li> <li>3) Mitigations proposed</li> <li>4) Environmental monitoring plan proposed</li> <li>5) Discussions</li> </ol>

The meeting was led Town clerk of GMC as a chair person delegated by MOWT, and 15 and 18 persons attend each meeting. The attendants understood the importance of the Project and agreed to implement. Following table shows summary of discussion in the stakeholder meeting.

**Table-6.2 Summary of Discussion in Pre-Stakeholder Meeting on April 29, 2015**

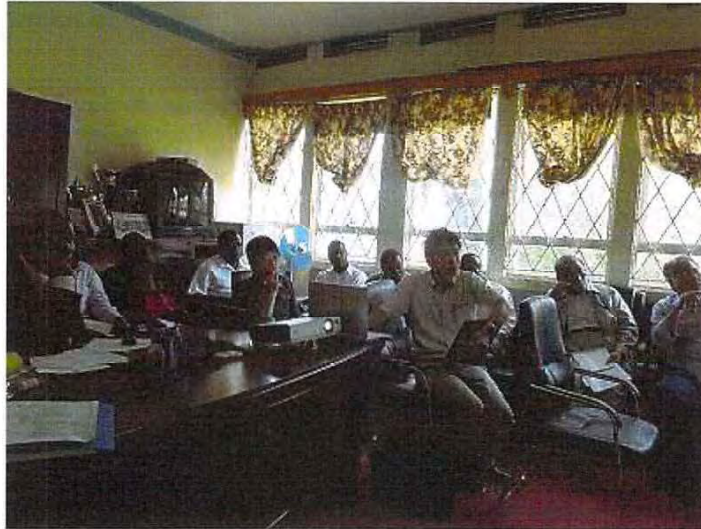
Category	Comments/Questions from Participants	Comments/Reply from JST	Remarks
Project in General	Question: Is IGMCR going to cover unpaved 70m roads? (GMC) Answer: UNRA is most likely to take up that section of the road and work on it. (GMC)		
Road	Comment: Due to limitation of spaces, car and motorcycle parking shall be restricted to only specific points of the roads. (GMC and Town clerk) Comment: Gulu is soon becoming a city, roadside parking should be limited in abid to decongest the city. (MOWT) Answer: No, it will be difficult. Small roundabout be maintained. (GMC)	Question: Is land acquisition from Stanbic Bank to accommodate bigger roundabout feasible? (JST)	
Drainage	Comment: Jomo Keyatta road is very long and needs to be drained to Pece River. (GMC)	Comment: The urban road project is strictly for roads and shall not comprehensively cover	(After the open discussion,



		drainage issues. It shall mainly cover drainage at road crossings and simply opening and straightening drainage lines. Drainage problem needs to be fixed by a big drainage project of its own. (JST)	participants visited two candidate sites for drainage outlet, and confirmed that one proposed by JST doesn't require demolition and resettlement of dwellers, while the other proposed by Eng. Terrence requires.)
Hydrology	Question: What kind of structural design for the Pece River is planned? (GMC)	Answer: The project shall only handle the culverts at road river crossing. I.e. widening of the river is not necessary (JST)	
Environmental and Social Considerations	Comment: Compensation payment to Muslim community for the demolition of cemetery needs to be done sooner. (GMC) Answer: Will engage the Ministry about the issue in about two weeks. (Town Clerk) Answer: Pe Yero Rice millers situation on Sir Samuel Baker Rd will also be handled soon. Structure which is blocking drainage in the Taxi Park is illegal and shall be removed without financial compensations. For the toilets and restaurant, they belongs to the Municipal Council and therefore GMC can handle. (GMC)	Question: How are you going to handle the obstructions for road development? (JST)	
	Answer: No problem with cutting the trees on roadside as they shall easily be replanted. (GMC)	Question: Isn't cutting trees on the roadsides problem?	

**Table-6.3 Summary of Discussion in Stakeholder Meeting on April 30, 2015**

Category	Comments/Questions from Participants	Comments/Reply from MOWT/GMC/JST	Remarks
Project in General	Question: When the construction starts? (Town Clerk)	Answer: Around Sep., 2016 (JST)	
Relocation of utilities	Question: Who meets relocation cost?	Answer: Government of Uganda (MOWT)	
	Question: How deep the road excavations for the project shall be? (MTN)	Answer: Generally about 1.2 meters in which case utility facilities may not be affected, but some may be deeper than that. (JST)	
	Question: Will the utility relocation take place before or after the contractor signed? Because, ample time is necessary for relocation. (MTN)	Answer: Final technical design is still being made. But utility relocation situation should be completed before the contractor comes on the ground. (JST)	
	Question: When project design be complete and to be given a copy? (MTN)	Answer: Technical design to be completed by end of this year and shall provide it to all stakeholders. However it is depend on the approval from the Government of Japan. Also, the tentative technical designs will be provided to stakeholders (JST)	
Environmental and Social Considerations	Comment: For the traffic safety, all drivers will have to be given safety instructions by traffic police before dismissed. (Traffic police)		
	Request: Engineer of GMC should find a solution for harmonization of stone crushing machine and local economy which is indispensable component for this project (Town Clerk)	Answer: The best way to handle this is through the office of the Local Council 5 (LC5) chairman by mobilizations, advocacy, and sensitization. (GMC)	
		Request: JICA to also observe the interface between the contractor and the local workers because some contractors tend to cheats and violates the rights of the local workers and community there by tarnishing the entire image of the project. (GMC)	
Others	Comment: Maximum support and cooperation for the implementation of this opportune project is required so that it becomes a role model project locally and regionally. (JICA Gulu office)		



**Photo-1 Stakeholder Meeting**

## **6.2 Implementation Framework of the Environmental Activities**

### **(1) Project Brief**

The first step to acquire an environmental certificate for project implementation is to submit a Project Brief to Uganda National Environmental Management Authority (NEMA) from Developer (MOWT). Project Brief (Draft) was prepared by the Study Team and both soft and hard copy of the brief were shared with MOWT on April 30, 2015. MOWT will revise the document in order to fulfill qualification of related guidelines with supports of GMC. Finally, both MOWT and the Study Team certainly agreed that MOWT submit the Project Brief to NEMA by end of the May 2015, and share result of screening with the Study Team as soon as MOWT receive the information from NEMA. It is also agreed by both parties that MOWT will surely secure the necessary budget for implementation of EI Study/EI Review and abbreviated RAP if those are requested by either NEMA or JICA.

### **(2) Successive Meetings with Local Community**

MOWT and GMC will carry out following activities and share the result and progress with the Study Team on time.

- ✓ Kidere Quarry: Meeting with local community and local government about harmonization of stone crushing machine with their local economy.
- ✓ Drainage Outlet: Meeting with residents about resettlement of hats (1: using, 1: not using), and agree with way of compensation.
- ✓ Taxi Park: Meeting with owner of restaurant illegally extends her verandah on the corridor.
- ✓ Rice Mill: Meeting with owner of Rice Mill Company illegally extends her storage from the wall.
- ✓ Muslim Cemetery: Compensation payment to the community.

### **(3) Time Schedule**

Following figure gives the time schedule and demarcation of works to obtain the environment license until bid tendering. MOWT certainly understood that the project will not be started on time without securing necessary budget for implementation of EIA if the project is categorized as Category III or IV. The Study Team shall assist MOWT in various stages mentioned in the figure.





Time frame of Overall Project Activity, Environmental Certificate, and RAP

As of May 7, 2015 (Thu) Ver.3

Activity	Responsibility	2015																																2016												2017												2018					
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6																							
											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	28	29	30	31	32																					
Reporting to JICA after 2nd field survey	JST																																																														
Finalize and Submit Project Brief to NEMA	MOWT																																																														
Cost Estimation for EIA & RAP	MOWT																																																														
Request for urgent budget for EIA & RAP	MOWT																																																														
Screening by NEMA	NEMA																																																														
Forward screening result to JST	MOWT																																																														
Budget Allocation (30% on July 1, 2015)	MOWT																																																														
Procurement of Consultant (2months)	MOWT																																																														
3rd Field Survey (hydrology)	JST																																																														
4th Field Survey and submit Draft Final Report	JST																																																														
Submit Final Report	JST																																																														
Implementation of EIA & RAP (3months)	MOWT																																																														
Cabinet Meeting	GOJ																																																														
E/N→G/A	GOJ-GOU																																																														
Contract agreement with Consultant	JICA																																																														
Preparation of Tender document	JST																																																														
Approval of Tender document	JICA																																																														
Approval of EIA & RAP by NEMA and Ministry of Land (4months after submission of EIA/RAP)	NEMA & Ministry of Land																																																														
Land acquisition and Compensation	MOWT/GMC																																																														
Grievance Management	GMC																																																														
RAP monitoring	GMC/MOWT																																																														
Bid tender & Contract agreement with Constructor	JICA																																																														
Construction	Contractor																																																														
Completion and Delivery	Contractor																																																														
Environmental Monitoring (By Contractor)	Contractor																																																														
Environmental Monitoring (By GOU)	GMC/MOWT																																																														

Note: Additional EIA shall be required separately for Quarry from the EIA for the Project if the Project is going to do blasting or buying rock.

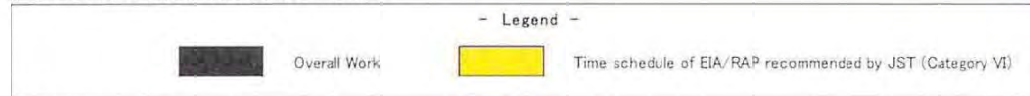


Figure-6.3 Implementation Frameworks for Environmental Activities

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## 7. Other Issues

### (1) Relocation of Utilities

The MOWT explained the Ministry of Finance has secured 1 Billion UGX for relocation of Utilities in FY2015/2016. Continuously, MOWT would request the utility companies to prepare for tendering (BQ, TOR and others), and if it was found the budget prepared was not enough, MOWT would take necessary measures

### (2) Further Schedule

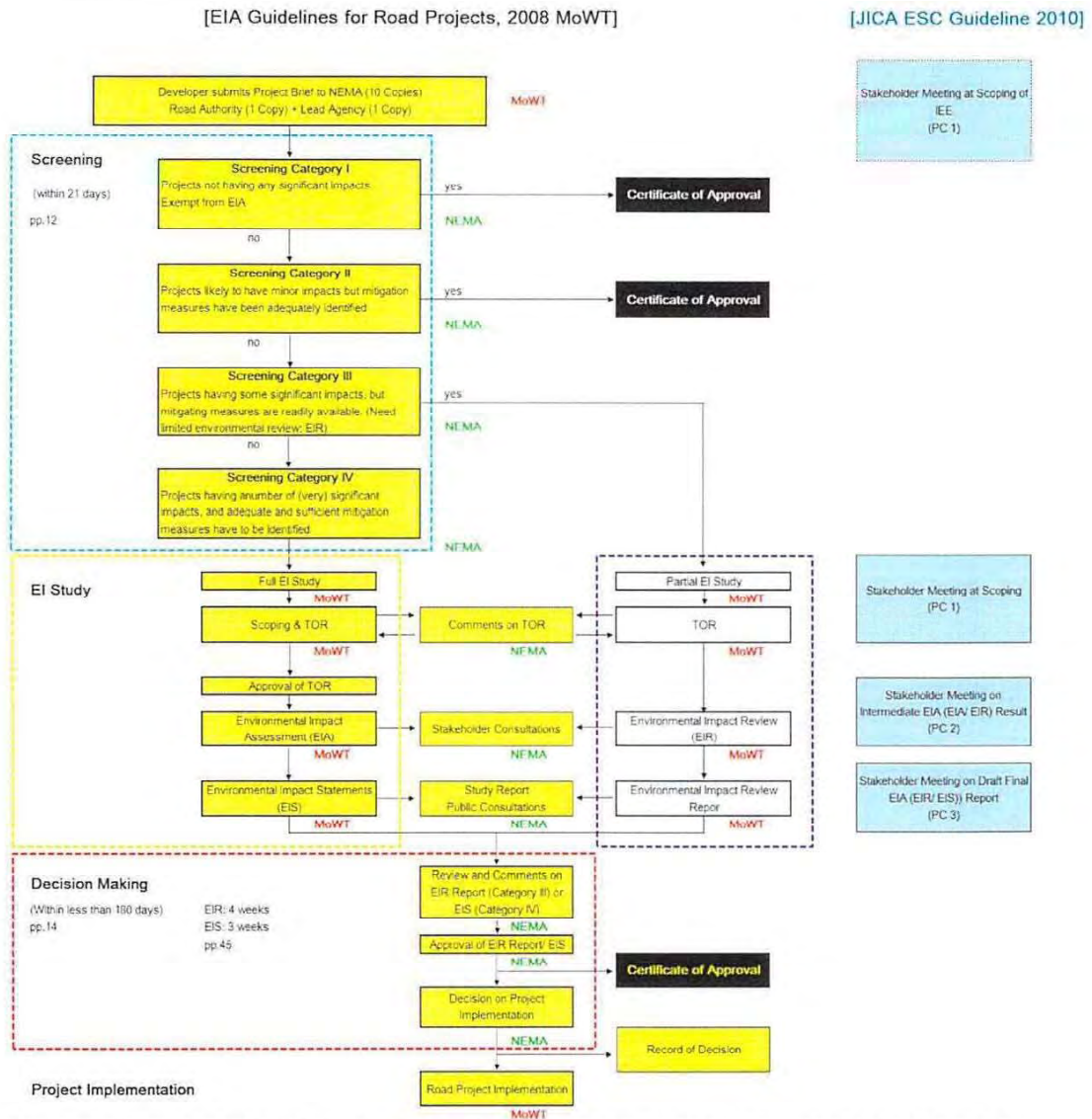
The Study Team, just for confirmation, re-explained the policy, objective and procedure of the Japanese Grant Aid as it was discussed in the first dispatch assignment on March, 2015. Also, the Study Team explained the general schedule of the Project as follows.

Early August/2015	: The third assignment to confirm the situation and condition during the heaviest raining season.
Med September/2015	: Explanation and discussion of the Draft Final Report
November/2015	: Approval of disbursement by the Cabinet of Japanese Government
January/2016	: Agreement with the Japanese Consultant, and Development of Detail Design and Tendering Documents
May/2016	: Approval of the Detail Design and Tendering Documents.
September/2016	: Tendering and Contract with the Japanese Contractor
September/2016	: Commencement of the Construction



**Appendix -A EIA process (Category IV Project)**

The category shall officially be informed to MOWT from NEMA after submission of the project brief. The JICA Study Team interviewed MOWT environment specialist and confirmed that the project is likely categorized as “3. Transportation including (a) all major roads” in the National Environment Statute, 1995, Schedule 3 which an EIA (full scaled EIA) shall be considered.



Note: The National Environment Act has three levels of EIA, namely a) Environmental Impact Review, b) Environmental Impact Evaluation, and c) Environmental Impact Study. These Guidelines for Road Projects have two levels only, namely i) Environmental Impact Review (EIR) and Environmental Impact Assessment (EIA), where the latter has the meaning of full detailed EI Study. (pp.27)

- Flows and activities this project supposed to be required, based on the discussion with MoWT on May, 2015
- Though SHM is not mandatorily required on the project categorized as B by JICA ESC Guidelines, 1st SHM was held on IEE leveled scoping, on April, 2015

Source: JICA Study Team, based on the EIA Guidelines for Road Projects, MoWT, 2008, and JICA Guidelines for Environmental and Social Considerations, JICA, 2010

**Figure-1 EIA process for Category IV Project**

**Appendix-B Minutes of Stakeholder Consultation**

See next pages.

A handwritten signature in black ink, consisting of several stylized, overlapping loops and lines.Handwritten initials in black ink, appearing to be 'A.' with a period.

## Minutes of Meeting

1. **Meeting Title:** Pre- Stakeholder Meeting for the IGMCRC project
2. **Date:** Apr. 29, 2015 (Wed)
3. **Time:** 9:00-11:00AM
4. **Venue:** Town Clerk's Office in GMC
5. **Attendance:** Ministry of Works and Transport (MOWT), Gulu Municipal Council (GMC),  
JICA Study Team (JST), and JICA Gulu Office (See attached attendance list).
6. **Structure of meeting:**
  - (1) Introductions and Prayers
  - (2) Opening remarks and welcome address by the Chairman
  - (3) Presentations from JICA Study Team
    - 1) Design policy
    - 2) Water discharge system
    - 3) Typical cross section
    - 4) Roundabout/intersections
    - 5) Traffic safety facilities
    - 6) Construction materials
    - 7) Topographic/soil investigation
    - 8) Environmental and social considerations
  - (4) Open Discussion

### 7. Meeting Minutes

The meeting was chaired by the Town Clerk (municipal administrative leader) of Gulu Municipal Council and began with a brief opening prayer and introduction of members present.

The Town Clerk warmly welcomed participants to the meeting. He lamented the state of the roads in Gulu Municipal Council and said, during the President's visit in the District, the minister for local governments voiced concerns about the poor state of the roads. The Town Clerk was however glad that JICA was going to do something about the municipal road and requested JICA to begin the road improvement project as early as possible. He then invited the JICA study Team.

The JICA Study Team made a comprehensive presentation based on the above mentioned eight agenda. The team pointed out the projects challenges/conflict to be discussed and resolved. They are:

- Due to heavy traffic expected to be occurred in Acholi Rd. in near future, the proposed four-lanes on Acholi Rd. lacks land to accommodate
- There is a need to engage Stanbic Bank to surrender a small strip of land to accommodate a roundabout



- What relocation and compensation strategies are in place for the Muslim cemetery and the kiosks on Acholi Rd.?
- There are some few obstructions (private properties) on the proposed water carriage way from upland to the main water channel (Pece River) on Jomo Kenyatta rd. down wards.
- Traffic polices identified black spots in the municipality. Improved of traffic safety should be considered in the final I technical designs of the road.
- Pe Yero Rice millers on Sir Samuel Baker road needs to be engaged to allow right of way of the road, because a part of their buildings extend toward the road.
- Toilet facilities in the Taxi Park will have to be relocated to accommodate the land for construction of northern exit.
- There is a verandah illegally constructed private structure behind the Taxi Park which is obstructing the proposed improvement plan.

## 8. Open Discussion

### (1) Hydrology and Drainage

Eng. Terrence Odonga asked about the structural design for the Pece River channel and the JST informed him that, this project shall only handle the culverts at road river crossing.

Eng. Terrence Odonga also said, Jomo Keyatta road is very long and needs to be drained to Pece River. (After the open discussion, participants visited both candidate sites for drainage outlet, and confirmed that one proposed by JST doesn't require demolition and resettlement of dwellers, while the other proposed by Eng. Terrence Odonga requires.)

JST explained that, the urban road project is strictly for roads and shall not comprehensively cover drainage issues. It shall mainly cover drainage at road crossings and simply opening and straightening drainage lines. Drainage problem needs to be fixed by a big drainage project of its own.

JST inquired whether the Jomo Kenyatta road drainage should be made to fit a four lane road status. GMC answered that, given the limited space for expansion; JST should adopt a two lane especially for Acholi road. I.e. maintaining the current carriage way with minimal expansions at few specific relevant points.

### (2) Road design

It was discussed and agreed that, due to limitation of space, car and motorcycle parking shall be restricted to only specific points because in the Gulu town plans, private businesses are expected to plan for their own private parking.

MOWT also agreed that, since Gulu is soon becoming a city, roadside parking should be limited in abid to decongest the city.




**(3) Land Acquisition and Compensation**

Eng. Terrence Odonga said the compensation payment to Muslim community for the demolition of cemetery needs to be done sooner and the Town Clerk said he will engage the Ministry about the issue in about two weeks time. He also promised to handle Pe Yero Rice millers situation on Sir Samuel Baker Rd.

According to Eng Terrence, Request for land from stanbic Bank to accommodate a roundabout may be difficult and suggested that, the small roundabout be maintained.

The engineer also said the structure (bar) which is blocking drainage in the Taxi Park is illegal and shall be removed without financial compensations.

For the toilets and the restaurant, the Engineer said they belongs to the Municipal Council and therefore GMC can handle.

GMC also said the lock up shops in the bus park are private, making acquisition of rooms for expansion difficult, the park should therefore be renovated without any room for expansions.

GMC also said there is no problem with cutting the trees on Jomo Kenyatta road as they shall easily be replanted.

**(4) Prioritization**

The meeting agreed to town clerks position that the meeting had no powers to adjust the project initiatives but could identify priorities in case of budget shortfalls.

The JST reiterated the need to move quickly on project decisions as to conform to budgeting and planning schedule of Government of Japan (GOJ).

There was also concern the WB has not considered about seventy meters of the road joining the end point of coronation road. Eng. Terrence Odonga said that UNRA is most likely to take up that section of the road and work on it.

**(5) Quarry**

The field trip to Kidere stone quarry site exposed some opposition by the local community to the mechanization of stone crushing by any private contractor. The project is expecting to source a private contractor to mechanize stone crushing that will match the project speed.

(See next meetings minutes on local community's concern about mechanized stone crushing.)



Annex-1 Time Table of Pre-Stakeholder Meeting & Stakeholder Meeting

Date	Time	Activity
28 <sup>th</sup> (Tue)	15:00 to 21:00	MOWT : Move to Gulu
29 <sup>th</sup> (Wed)	8:30 to 9:00	MOWT: Courtesy call to Town Clerk
	9:00 to 11:00	Meeting with MOWT, GMC & JST <ol style="list-style-type: none"> <li>(1) Design Policy</li> <li>(2) Water discharge system</li> <li>(3) Typical cross section</li> <li>(4) Roundabout /Intersection</li> <li>(5) Traffic Safety Facilities</li> <li>(6) Topo /Soil Investigation</li> <li>(7) Construction Materials</li> <li>(8) Environmental &amp; Social Considerations</li> </ol>
	11:00 to 13:00	Field Observation (regarding design) Obstacles/ PECE River /Taxi Park /
	13:00 to 14:00	Lunch Break
	14:00 to 15:00	Meeting with NWSC
	15:00 to 17:00	Field Observation (regarding construction) Asphalt Plant /Construction Camp Borrow Pit /Aggregates /Sand
30 <sup>th</sup> (Thu)	8:30 to 10:00	Stakeholders Meeting at Town Clerk's office <Expected Participants> <ul style="list-style-type: none"> <li>• UMEME</li> <li>• MTN &amp; Other telecommunication companies</li> <li>• NWSC</li> <li>• Gulu MC (Land, Eng., Environment, Health)</li> <li>• Gulu DC (Eng.)</li> <li>• Traffic Police</li> <li>• JICA Gulu Field Office</li> </ul>
	10:00 to 12:00	Meeting with MOWT, GMC & JST <ol style="list-style-type: none"> <li>(1) Soft Component</li> <li>(2) Confirmation of Client's Responsibility (Utility Relocation, Tax Exemption, etc.)</li> <li>(3) Confirmation of further schedule</li> </ol>
		Lunch Break, and Dismiss



Annex-2 List of Participants



Republic of Uganda  
The Preparatory Survey  
on



The Project for Improvement of Gulu Municipal Council Roads in Northern Uganda

List of Participants

Date : Apr 24 2015  
 Venue : Town Clerk's Office G.M.C  
 Agenda : Meeting ~~with~~ Members G.M.C and TST  
 Participants :

S/N	Name	Designation & Organization	Cell and/or Email	Signature
1	Omung John Oola	USCID coordinator - G.M.C	0782-142400 jomung87@gmail.com	
	Tatsuo Tomidokoro	JICA Study Team	0756-524-502 tomidokoro@jica.go.jp	
2	KENTI YAHARA	---	078-23-400 kentyahara@jica.go.jp	
4	MOTOEI OSHITA	---	075-6542997 oshita-motoei@jica.go.jp	
5	BAMBA BANDA FAN	Town Clerk	0772642436 fandabamba@gmail.com	
6	KUKWIGA CHRISTOPHER AIC	Eng (Electrical)	0772347633 christopherkukwiga@gmail.com	
7	Ocaaka James	Environment Officer	0774151502 ocaka.james@yahoo.com	
8	Oluma Lenny	Surveyor	0777805071 lennyoluma@gmail.com	
7	Odonga Jerome	Engineer	odonga.jerome@gmail.com	
10	Akera Denis	Architect	akera.denis@gmail.com	
11	BUSUBWA LAMBERT	Senior Engineer (Road)	Lambert13@gmail.com	
12	G. MAGALA	SENIOR ENGINEER (URBAN ROAD) MOWT	0752-642839 magalag@gmail.com	
13	Opic Christopher	Engineer G.M.C	Christopheropic@yahoo.com	
14	Emmanuel Kaito	JICA - F.C.	077924690 emman36@gmail.com	

Thank you very much for your cooperation!



## Minutes of Meeting

1. **Meeting Title:** 1<sup>st</sup> Stakeholders Meeting of IGMCR project
2. **Date:** Apr. 30, 2015 (Thu)
3. **Time:** 8:30-11:00AM
4. **Venue:** Town Clerk's Office in GMC
5. **Attendance:** UMEME (Power Distribution Company), Mobile Telecommunication Network Company (MTN), National Water and Sewerage Corporations (NWSC), Uganda Police Force, JICA Gulu Office, Ministry of Works and Transport (MOWT), Gulu Municipal Council(GMC), and JICA Study Team (JST) (See attached attendance list).
6. **Structure of meeting:**
  - (5) Introductions and Prayers
  - (6) Opening remarks and Welcome address by Chairman
  - (7) Presentation from JICA Study Team
  - (8) Open Discussions.
7. **Minutes of Meeting:**

### 7.1. Opening to Presentation by JST

After prayer and self-introduction, the Town Clerk as a chairman warmly welcomed every stakeholders and officially opened stakeholders meeting. The JICA Study team (JST) explained that overview of the project including project target road, overall drainage system, typical cross section designs, and traffic safety facilities. Then, in the presentation of the environmental and social considerations (ESC), the JST emphasized that implementation of this project shall have impact on the facilities of Utility Companies through reallocations and protection of those facilities before/during the road construction. Most if not all the roads has provision for sidewalks for pedestrians and this is where the facilities of the utility companies exists. The JST explained that the mitigation of social and environmental impact of the project shall be handled in three stages as follow:

- Pre-Construction Stage: by Gulu Municipal Council (GMC) and Ministry of Works and Transport (MOWT),
- Construction Stage: by the Contractor with supports of GMC, MOWT, and Stakeholders as necessary, and



- Post Construction (Operation) Stage: by GMC and MOWT

In addition, the JST highlighted some challenges as bellow:

Road	Facility	Requirement
Jomo Kenyatta Road	Muslim cemetery	Land acquisition, Partial demolition
	Kiosks	Relocation
Taxi Park (Northern side)	Verandah of private restaurant	Demolition
	Kiosks	Relocation
	Toilets	Partial or Total Demolition and Relocation, Rebuild, or Construct Temp. Toilet
	Bench	Relocation
	Restaurant (Govt.)	Partial/Total Demolition and Renovation
Sir Samuel Road	Pe Yoro Rice Miller's Storage	Partial demolition
Drainage outlet from Jomo Kenyatta Road	Huts	Demolition, and Resettlement
Kidera Quarry	Quarry	Discussion with Community in advance
All	Trees	Logging and replanting

At the end of the presentation, the JST reminded Town clerk, GMC, and MOWT importance of conducting more meetings with other stakeholders, grass root people in order to share project information, and receive feedbacks from them.

## 7.2. Open Discussion

The Town clerk wanted to be sure of when the project starts; JICA Study team said the project is aiming to start around September 2016.

### (1) Water Pipes

JICA Study team requested to be briefed about water pipes under pedestrian path in the project. NWSC said it needs more time to establish that. It's important to first have a detailed technical design for the urban road projects before so that they can pinpoint areas which needs interventions. NWSC also urged JST to consider mitigating the environmental impacts of blasting at the quarry site should they opt for mechanized means of stone production.

### (2) Traffic Safety

The traffic police officer said there was need to coordinate and administer the driver who will be working in the project. He lamented the system of simply dismissing the offending driver and rendering a police case dead as done by the Chinese firms doing construction. So, all drivers will have to be given safety instructions by traffic police before dismissed.

### (3) Quarry

The expected quarry source for the project is faced with some challenges. Although the quarry deposit in an individual persons land, it's communally used on payments of some little tokens to the individual owner. The community depends on it as their source of income. Thus making the community to have some kind of ownership to the point that, they have established a user committee to safeguard their interests and manage their peaceful operations. This community resists the use of contracted machines in stone crushing as stipulated by the project on three grounds viz:

- Machines could deplete the stone deposit thereby destroying their income source which could support them for many years,
- The use of machines shall displace them from their workstations because of its dangerous nature, and
- If contractor is to pay for the boulders then the benefits only goes to individuals or few people but not the community. They proposed that the contractor should instead buy their Hand crushed stones and refine it. But their speed does not match the project needs.

The meeting also got to know that some Chinese company was also denied the use of the quarry because of wrong approach. The Town clerk urged Eng. Terrence Odonga to work out some solutions for this but taking into consideration that the community should also benefit. Eng. Terrence Odonga said the best way to handle this is through the office of the Local Council 5 (LC5) chairman by mobilizations, advocacy, and sensitization. The Engineer also said the rock reserves is very vast (covers about half a kilometer landscape) and therefore can accommodate both the contractor and the local community. The GMC engineer also said that the Environment and Natural resources act allows the Government to own of some strategic facilities like rocks, wetlands, forests etc. Meaning Government could simply displace the local community and use the rocks for National development programs. Town clerk reiterated that, *inspite* of all the above, the community still has a say. There is need for harmonious solution. GMC also requested JST to also observe the interface between the contractor and the local workers (community) some contractors are cheats and violates the rights of the local workers and community there by tarnishing the entire image of the project.

#### **(4) Relocation of Utilities**

MTN asked how deep the road excavations for the project shall be. The JST said about 1.2 meters in which case utility facilities may not be affected. But should the need arise, then in some specific places for specific reasons, there may be excavations deeper than 1.2 meters.

NWSC asked about who meets the relocation cost. The JST informed that is Government of Uganda (GOU), and MOWT shall do it.

MTN wanted clarifications as to whether utility relocation takes place before or after the contracts for the projects has been signed. Because, there is need for ample time to plan for the relocations. The JST said the final technical design is still being made. But utility relocation situation should be completed before the contractor comes on the ground.



MTN asked when project design be complete and to be given a copy. The JST expects the technical design to be completed by end of this year and shall provide it to all stakeholders. However every depend on the approval from the Government of Japan (GOJ). It's therefore important to streamline schedules down here with that of the GOJ.

The JICA team also promised to provide to stakeholders the tentative technical designs.

NWSC said, the implication of the situation is that, the relocation of the utility shall only be done subject to the availability of the projects preliminary technical design and the availability of funds from GOU to meet compensations and other relocation costs.

#### **(5) Closing**

The JST reminded importance of continuous and regular stakeholders meeting even in the absence of consultants. JICA Gulu office called for maximum support and cooperation for the implementation of this opportune project so that it becomes a role model project locally and regionally. Finally, the Town clerk officially closed stakeholders meeting.



Annex-1 List of Participants



Republic of Uganda  
The Preparatory Survey  
on



The Project for Improvement of Gulu Municipal Council Roads in Northern Uganda

List of Participants

Date : Apr. 30, 2015 (Thu)  
Venue : GMC Town Clerk's Office  
Agenda : First Stakeholder Meeting of IGMCR Project  
Participants :

1/2

S/N	Name	Designation & Organization	Cell and/or Email	Signature
01	Emmanuel Pacoto	JICA - Field Coord.	emmpacoto@gmail.com 0772923696	
02	CHRISTO LAUTERBACH	Project Manager Plessey Mt. - Project	chris.lauterbach@plessey.co.za 0752312240	
03	Richard Turinawe	MTN UG	0772121213	
04	MADIBA ANTHONY	TRAFIC	0772652281 0700121612	
05	BASHARAH E	Town Clerk	0772692456	
06	Lukwago Christopher	Gmc/Electrical	0772547635	
07	OGAKA JAMES	Gmc/Environment	0774151502	
08	Oluna Conny	Gmc (Surveyor)	0772605473	
09	Odongo Terence	M/Electrical	0772590845	
10	G. MARGALA	RELIE (MOWT)	0752-642839	
11	BUSUNGA Lameera	SALSA (MOWT)	0752-71246	
12	ANWUZI BR TOM	Manager Umele	0776180168	
13	K. KONDO	JST/Hydrologist		
14	M. OGAWA	JST/Team Leader	075-6147997	

Thank you very much for your cooperation!



Republic of Uganda  
The Preparatory Survey  
on



The Project for Improvement of Gulu Municipal Council Roads in Northern Uganda

List of Participants

Date : Apr. 30, 2015  
 Venue : Town Clerk's Office, GMC  
 Agenda : First Stakeholder Meeting of IGMR Project  
 Participants :

2/2

S/N	Name	Designation & Organization	Cell and/or Email	Signature
15	Paul Kachkara	Area Manager, NWSC	0717315343 paul.kachkara@nwsc.org	
16	Komakech Francis Boguma	Operations Engineer Uweme	0776360176 francis.boguma@uweme.co.ug	
17	Yur Sato	JICA Gulu	0783 784 058 Sato.Yur@jica.go.jp	
18	KENJI NAKAMURA	JST / ESC	0781 296 406 k.nakamura@ntc-uwj	

Thank you very much for your cooperation!



**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Improvement of Gulu Municipal Council Roads in Northern Uganda**  
**(Explanation on Draft Preparatory Survey Report)**

On the basis of the discussions and field survey in the Republic of Uganda (hereinafter referred to as "Uganda") in September 2015, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report on the Project for Improvement of Gulu Municipal Council Roads in Northern Uganda (hereinafter referred to as "the Draft Report").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Uganda on its contents, JICA sent to Uganda the Preparatory Survey Team (hereinafter referred to as "the Team") to provide some explanation on the Draft Report, headed by Tomoki Kanenawa, Advisor, Infrastructure and Peacebuilding Department, JICA. The Team was scheduled to stay in the country from September 16th to September 23rd, 2015.

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

Kampala, September 22nd, 2015

金縄知樹

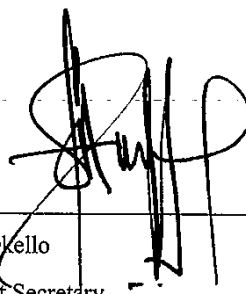
Tomoki Kanenawa

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Japan



Alex B. Okello

Permanent Secretary

Ministry of Works and Transport

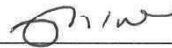
Uganda

Witness



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Maris Wanyera  
Commissioner, Development Assistance and  
Regional Cooperation Department  
Ministry of Finance, Planning and Economic  
Development  
Uganda



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Barabanawe Francis  
Town Clerk  
Gulu Municipality  
Uganda



## ATTACHEMENT

### 1. Objective of the Project

The objective of the Project is to secure smooth and safe traffic flow and improve the living environment for the residents through the improvement and rehabilitation of the main roads, drainage and traffic safety facilities in Gulu Municipality, Northern Uganda, thereby contributing to the stimulation of economic activity, peace and stability in Northern Uganda.

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Improvement of Gulu Municipal Council Roads in Northern Uganda”.

### 3. Project Site

Both sides confirmed that the site of the Project is in Gulu Municipality, Northern Uganda. Its location and names of the roads which will be improved in the project are shown in Annex 1.

Both sides confirmed that the southern edge of the project site is the T-junction where Sir Samuel Baker Road meets Kampala Road and the improvement of T-junction itself will be conducted by JICA.

### 4. Executing Agency

Both sides confirmed that the executing agency is Ministry of Works and Transport (hereinafter referred to as “MoWT”). The executing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are carried out by relevant agencies properly and on time.

### 5. Contents of the Draft Report

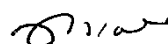
After the explanation of the contents of the Draft Report by the Team, the Ugandan side agreed in principle to its contents.

### 6. Cost Estimation

Both sides confirmed that the Project cost estimation described in the Draft Report



3



and Annex 2 were provisional and would be examined further by the Government of Japan for its final approval.

7. Confidentiality of the Cost Estimation and Specifications

Both sides confirmed that the Project cost estimation and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.

8. Japanese Grant Scheme

The Ugandan side understands the Japanese Grant Scheme and its procedures as described in Annex 3, Annex 4 and Annex 5, and necessary measures to be taken by the Government of Uganda.

9. Project Implementation Schedule

The Team explained to the Ugandan side that the expected implementation schedule is as attached in Annex 6.

10. Expected Outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as described below. The Ugandan side has the responsibility to monitor the progress of the indicators and achieve the target in year 2021.

[Quantitative Effect]

Index	Baseline Value (2015 Actual Data)	Target Value (2021) 【3 years after completion】
International Roughness Index (IRI) (mm/m)	6.23	Below 3
Traffic Accidents (No./Year)	26	Below 13
Impassible days (Day/Year)	7	0

[Qualitative Effect]

- The expected transformation of Gulu municipality to city status and economic center of the northern region of Uganda by the implementation of this project;
- The smoothness of the carriageway will be improved and pedestrian pavement will be introduced on the sidewalk;
- Since closure of the road in the rainy season will be solved, road users and

4

citizens will be able to access to the social infrastructures and markets throughout the year;

- Traffic safety of the pedestrian would be enhanced through the improvement of the intersection and traffic safety facilities for pedestrians; and
- The improvement of Gulu municipality roads shall contribute to strengthening and improvement of the connection between Northern Uganda and Kampala Capital City, the major consumption area in the country, as well as the connection between Uganda and neighboring countries.

#### 11. Technical Assistance (“Soft Component” of the Project)

Considering the sustainable operation and maintenance of the provided facility, some technical assistance is planned to be provided under the Project. The Ugandan side confirmed that it will assign necessary number of competent and appropriate counterparts as described in the Draft Report as follows:

- Implement technical training for the development and update of road inventory map in Gulu Municipality;
- Implement technical training for the development of appropriate road maintenance plan; and
- Implement technical training for appropriate asphalt pavement repair works.


#### 12. Undertakings Made by Each Government

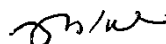
Both sides confirmed to undertakings described in Annex 7. The Ugandan side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. as at Outline Design level. More accurate costs will be calculated at the Detailed Design stage. Contents of Annex 7 will be updated as the Detailed Design progresses, and will finally be the Attachment to the Grant Agreement.

The Ugandan side shall take the following necessary measures:

- 1) relocate affected utilities including buildings, utility poles, street lights, water pipes, sewerage pipes and communication lines before tendering procedure scheduled from June 2016 starts;
- 2) submit Environmental Impact Assessment report (referred in 17-2-1) to National Environment Management Authority (hereinafter referred to as “NEMA”) by December 2015 and to obtain NEMA’s approval of it by April



5 



2016 and to obtain the environment license for both the road construction and the quarry development in Kidere by April 2016;

- 3) submit Resettlement Action Plan (hereinafter referred to as RAP) report (referred in 17-2-1) to NEMA by December 2015 and obtain NEMA's approval of it by April 2016;
- 4) complete necessary land acquisition, resettlement and compensation for them before tendering procedure scheduled from June 2016 starts (referred in 17-3-1); and
- 5) ensure that customs duties, internal taxes and other fiscal levies which may be imposed in Uganda with respect to the purchase of the Products and Services be borne by MoWT without using the Grant.

#### 13. Monitoring during the Implementation

The Project will be monitored four times (once before commencement of construction, twice during the construction and at completion of the construction) during the project period by the executing agency using the Project Monitoring Report (PMR) described in Annex 8.

#### 14. Ex-Post Evaluation

JICA will conduct ex-post evaluation three (3) years after the project completion with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability) of the Project. Result of the evaluation will be publicized. The Ugandan side is required to provide necessary support for them.

#### 15. Issues to be Considered for the Smooth Implementation of the Project

Both sides confirmed the issues considered and will take necessary measures for the smooth implementation of the Project described in Annex 6.

Both sides confirmed that MoWT should be responsible for coordinating co-operation with Gulu Municipal Council, Gulu police and local resident, for the smooth implementation of project in the center of Gulu municipality.

#### 16. Schedule of the Study

JICA will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Ugandan side around January, 2016.

## 17. Environmental and Social Considerations

### 17-1 General Issues

#### 17-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as 'the Guidelines') is applicable for the Project. The Project is categorized as B because the Project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

#### 17-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Check List attached as Annex 9. Both sides confirmed that in case of major modification of the content of the Environmental Check List, The Ugandan side shall submit the modified version to JICA in a timely manner.

### 17-2 Environmental Issues

#### 17-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed that EIA report will be approved by NEMA by April 2016.

#### 17-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed that Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project are as in Annex 10, respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

### 17-3 Social Environment

#### 17-3-1 Land Acquisition and Resettlement

Both sides confirmed that the 631 m<sup>2</sup> of land would be acquired and two houses (1 household), Muslim cemetery, two temporary containers (one is owned by Gulu city and the other is owned by Uganda telecom) and kiosk would be relocated/affected due to the implementation of the Project as indicated in the Draft Report.

Such land acquisition and resettlement shall be implemented based on the (Abbreviated) Resettlement Action Plan (RAP) prepared in line with JICA Guidelines and authorized by the Ugandan side in April, 2016.

#### 17-4 Environmental and Social Monitoring

##### 17-4-1 Environmental Monitoring

Both sides agreed that the Ugandan side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex 11.

##### 17-4-2 Social Monitoring

Both sides confirmed that the Ugandan side will implement social monitoring about land acquisition and resettlement plan proposed in the RAP. Both sides agreed that MoWT will submit results of social monitoring to JICA using the monitoring form attached as Annex 11.

##### 17-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that the Ugandan side will disclose results of environmental and social monitoring to local stakeholders through their website.

The Ugandan side agreed that JICA will disclose results of environmental and social monitoring submitted by the Ugandan side as the monitoring forms attached as Annex 11 on its website.

#### 18. Other Relevant Issues

##### 18-1. Operation and Maintenance of the Facilities

The Team explained the importance of operation and maintenance of the facilities constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. The Team also explained the necessary cost for proper maintenance of the facilities as shown in the Draft Report. The Ugandan side confirmed that the cost will be secured in the annual budget and shall provide sufficient staff necessary for appropriate operation and maintenance of the facilities. The annual operation and maintenance costs are estimated as described in Annex 2.

##### 18-2. Safety Measures

To avoid accidents on site during the implementation of the Project, the Uganda side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security



control to the public and deploying adequate security personnel, based on “The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects” which has been published on JICA’s URL below.

[http://www.jica.go.jp/activities/schemes/oda\\_safety/ku57pq00001nz4eu-att/guidance\\_en.pdf](http://www.jica.go.jp/activities/schemes/oda_safety/ku57pq00001nz4eu-att/guidance_en.pdf)

Likewise, the Team recommended to the Uganda side to explain to the residents about the Project (necessity and significance, construction period, sites, impact etc.), so that consensus support can be obtained from them for the smooth implementation of the Project.

#### 18-3. Misconduct

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, MoWT and relevant organizations shall provide JICA with additional such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations in Uganda.

MoWT and relevant organizations shall not, unfairly or unfavourably treat the person(s) and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

#### 18-4. Disclosure of Information

Both sides confirmed that the study results excluding the project cost will be disclosed to the public after completion of the Preparatory Survey. All the study results including the project cost will be disclosed to the public after all the contracts for the Project are concluded.

#### 18-5. Water Project in Project Area

Both sides confirmed that there is a possibility of delay in a water project which is implemented by National Water and Sewerage Corporation (hereafter referred to as NWSC) in the project area. It should be noted that the delay would cause damage to constructed road in the project if the water project by NWSC would be carried out after the project has started. Both sides confirmed that the Ugandan side will conduct the relocation of the existing pipelines and placement of ducts for future utilization by NWSC in case of late start of the water project by NWSC.

9

18-6. Quality Management Meeting

Both sides confirmed that JICA, MoWT, consultant and contractor shall have quality management meetings approximately once in a half year during the implementation stage. The meetings should be convened by MoWT before the commencement of construction works and during the construction to solve serious problems such as delay of utility relocation, resettlement exercise, construction works, etc.

Annex 1 Project Site

Annex 2 Project Cost Estimation

Annex 3 Japanese Grant

Annex 4 Flow Chart of Japanese Grant Procedures

Annex 5 Financial Flow of Japanese Grant

Annex 6 Project Implementation Schedule

Annex 7 Major Undertakings to be Made by Each Government

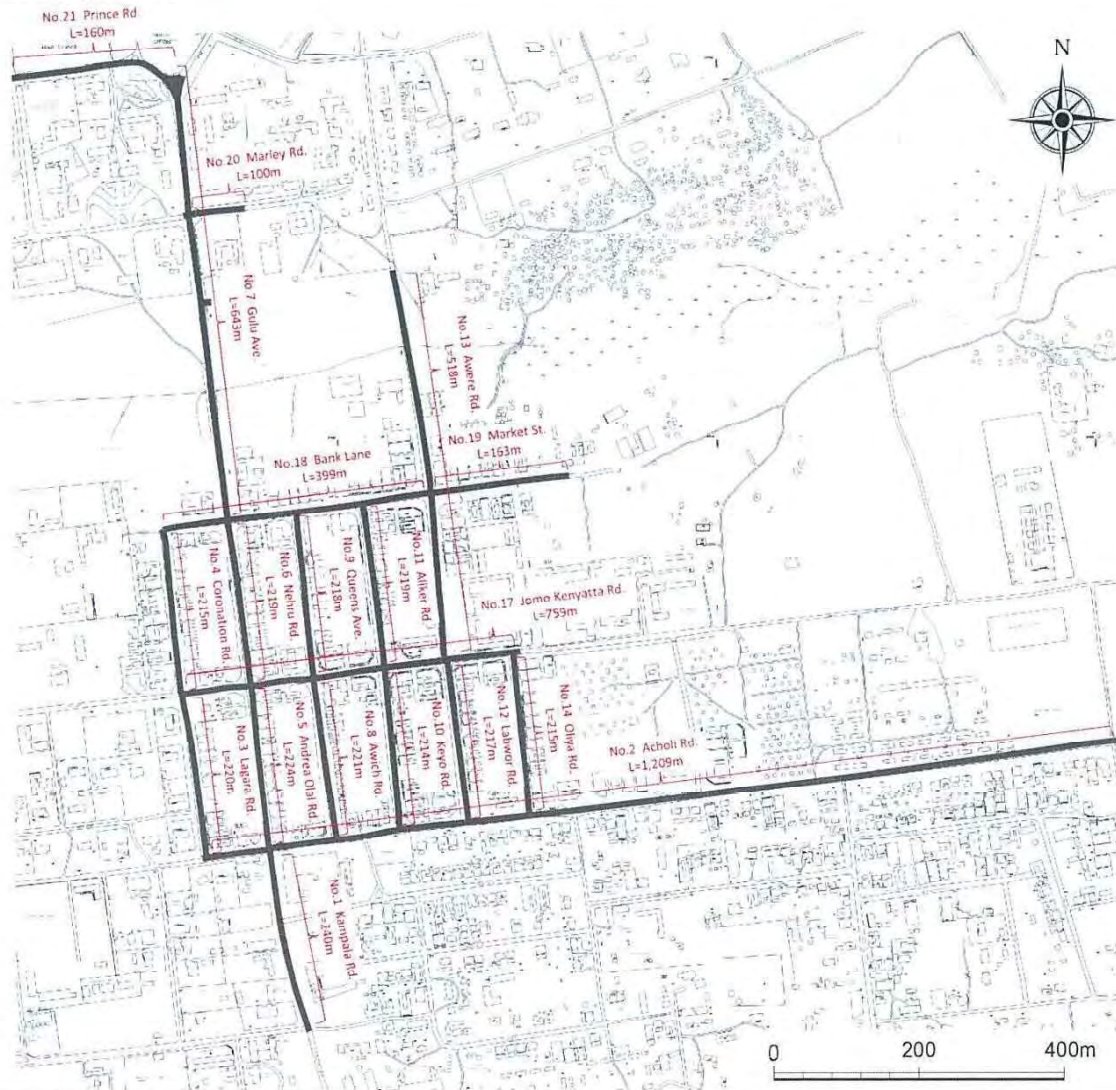
Annex 8 Project Monitoring Report (PMR)

Annex 9 Environmental Check List

Annex 10 Environmental Management Plan/Environmental Monitoring Plan

Annex 11 Environmental and Social Monitoring Form

Annex 1 Project Site



No.	Road Name	Improvement length	No.	Road Name	Improvement length
1	Kampala Road	240 m	11	Alier Road	219 m
2	Acholi Road	1,209 m	12	Labwor Road	217 m
3	Lagara Road	220 m	13	Awere Road / Dr. Corti Lucile Road	518 m
4	Coronation Road	215 m	14	Oliya Road	215 m
5	Andrea Olal Road	224 m	17	Jomo Kenyatta Road	759 m
6	Nchru Road	219 m	18	Bank lane	399 m
7	Gulu Avenue	643 m	19	Market Street	163 m
8	Awich Road	221 m	20	Harley Road	100 m
9	Queens Avenue	218 m	21	Prince Road	160 m
10	Keyo Road	214 m		Total	6,373m

It should be noted that the southern edge of the project site is the T-junction where Sir Samuel Baker Road meets Kampala Road and the improvement of T-junction itself will be conducted by JICA.

## Annex 2 Project Cost Estimation

### (1) Conditions of Cost Estimation

Estimated timing	May 2015
Exchange rates	USD1.00 = 120.55 JPY , UGX1.00=0.0404 JPY
Others	The project is implemented in accordance with the system of Japan's Grant Aid. The above cost estimation is not final, and GOJ is responsible for finalizing the ceiling amount of the Grant Aid assistance of the Project.

### (2) Cost to be borne by the GoJ

Items	Cost (million JPY)
1) Construction cost	1,883
2) Design cost and supervising cost	133
3) Soft component cost	17
4) Contingency (5%)	94
Reserve fund Total	2,127

### (3) Cost to be borne by the GoU during the Project

Items	Quantity	Estimated Cost (UGX)	Equivalent JPY(Thousand)
Cost to obtain environment license for the permanent works	Lm	49,504,950	2,000
Cost to obtain environment license for opening of the new quarry.	Lm	2,000,000	81
Cost of compensation for re-settlement of 2 houses	2 Houses	1,299,960	52
Relocation of overhead electric wires	5,511m	633,765,000	25,604
Removal of existing street light poles	11 poles	2,200,000	89
Removal of board	100 numbers	20,000,000	810
Adjustment of existing manhole heights	98 numbers	294,000,000	11,878
Compensation for muslim cemetery	Lm	28,525,900	1,152
Banking arrangement, advising/payment commission for A/P	Lm	49,756,950	2,010
Temporary construction yard	Lm	25,000,000	1,010
Consultant fee for EIA	Lm	200,000,000	8,080
Custom duties, internal taxes and other fiscal levies which may be imposed in Uganda with respect to the purchase of the products and services	Lm	1,015,446,000	46,640
(in case of late start of the NWSC project) Relocation of existing pipelines and placement of ducts	Lm	(2,500,000,000)	(101,000)
Total		2,321,498,760 (4,821,498,760)	99,406 (200,406)

### (4) Cost to be borne by the GoU after the project

Items	Contents	Costs (UGX)	Equivalent JPY (Thousand)	Remarks
Road maintenance needed every year (Routine Maintenance)	Cleaning & Desilting the drainage	7,600,000	307	Twice in a year
	Re-painting road the marking	15,750,000	636	Once in a year
	Repairing the road facilities	53,154,475	2,147	Once in a year
Road maintenance in roughly each 5 years (Periodic Maintenance)	Repairing potholes	17,960,950	726	Once in 5 years
Road maintenance in roughly each 10 years (Road Rehabilitation)	Overlay	359,219,000	14,512	Once in 10 years
Total		116,018,565	4,686	Converted annualized cost

## JAPANESE GRANT

The Japanese Grant (hereinafter referred to as the “Grant”) 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 is not supplied through the donation of materials as such.

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

### 1. Grant Procedures

The Grant is supplied through following procedures:

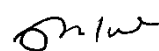
- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal & Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as “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 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 project. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant 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

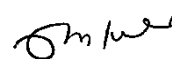
For smooth implementation of the Survey, JICA employs (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

### (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.



14



### 3. Japanese Grant 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, in accordance with the E/N, 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 Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

#### (4) Necessity of "Verification"

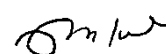
The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

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

In the implementation of the Grant Project, the recipient country is required to undertake such necessary measures as Annex 7. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant fund comes from the Japanese taxpayers.

#### (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, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

(7) "Export and Re-export"

The products purchased under the Grant 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"), in principle. JICA will execute the Grant 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) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010) .

(11) Monitoring

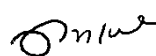
The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.



16



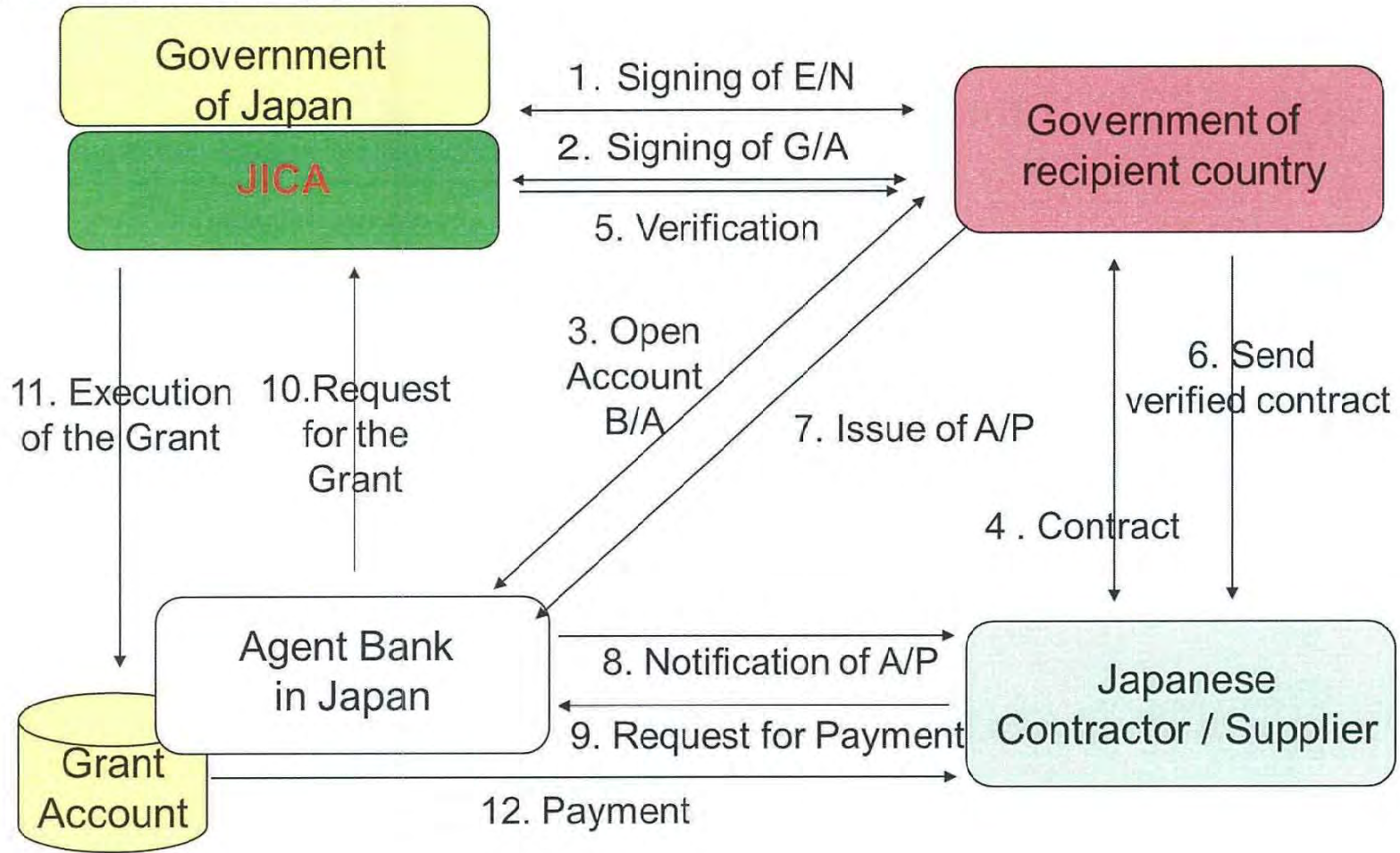


Annex 4 Flow Chart of Japanese Grant Procedures

stage	Flow & Works	Recipient Government	Japanese Government	JICA	Consultant	Contract	Others
Application							
Project Formulation & Preparation							
Appraisal & Approval							
Implementation	<p>(E/N: Exchange of Notes) (G/A: Grant Agreement) (A/P: Authorization to Pay)</p>						
Evaluation & Follow up							

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Annex 5 Financial Flow of Japanese Grant



Appendix-x-92

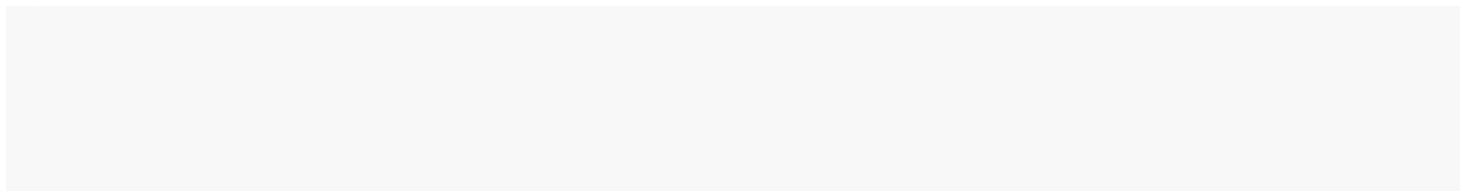
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Annex 6 Project Implementation Schedule

	2016												2017										2018							
	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	28	29	30
E/N, G/A	▼																													
Consultant Agreement	▼																													
Detailed Desing/Tendering Documents																														
Tendering Procedure																														
Contractor Contract																														
Construction																														
Soft Component																														



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## Annex 7 Major Undertakings to be Made by Each Government

### Major Undertakings to be Made by Recipient Government

#### 1. Before the Tender

NO	Items	Deadline	In charge	Cost (million UGX)	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	MoFPED	0.01	
2	To approve IEE/EIA and RAP	April 2016	NEMA	51.5	
3	To implement EIA and RAP	December 2015	MoWT	200.2	
4	To secure the following lands 1) A household located near the Drainage Outlet No. 4 candidate site on the northeast part of Jomo Kenyatta Rd. 2) Muslim Cemetery 3) temporary construction yard and stock yard near the Project area	before notice of the tender document	MoWT	29.7	
5	To clear, level, relocate and reclaim the following sites 1) overhead electric wires (5,511m) 2) existing manhole heights (98 numbers) 3) existing board (100 numbers) 4) existing street light poles (11 poles) 5) internet cables 6) telephone poles	before notice of the tender document	MoWT	950.0	
6	(in case of late start of the NWSC project) Relocation of existing pipelines and placement of ducts	before notice of the tender document	MoWT	2,500	

20

## 2. During the Project Implementation

NO	Items	Deadline	In charge	Cost (million UGX)	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract	MoWT	0.01	
	2) Payment commission for A/P	every payment	MoFPED	49.5	0.1% of payment amount
2	To ensure prompt unloading and customs clearance in recipient country			-	
	1) Tax exemption and customs clearance of the products	during the Project	MoWT	-	
	2) Internal transportation to the project	during the Project	MoWT	-	
	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 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	during the Project	MoWT	-	
4	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 borne by its designated authority without using the Grant.	during the Project	MoWT	1,015.5	
5	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	during the Project	MoWT	-	
6	To demolish and clear the existing facility on the temporary construction yard	3 months before commencement of the construction	MoWT	25.0	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities				
	1) Electricity The distributing line to the temporary construction yard	before start of the construction	MoWT	-	
	2) Water Supply The city water distribution main to the temporary construction yard	before start of the construction	MoWT	-	
	3) Drainage The city drainage main ( for storm, sewer and others ) to the temporary construction yard	before start of the construction	MoWT	-	

8	To implement EMP and EMoP	during the construction	MoWT	-	
9	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	MoWT	-	
10	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	MoWT	-	
11	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 MoWT 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)	MoWT	-	

*On/ue*

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### 3. After the Project

NO	Items	Deadline	In charge	Cost (million UGX)	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	Gulu Municipality	116.0	
2	To implement EMP and EMoP	for a period based on EMP and EMoP	Gulu Municipality	-	
	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 MoWT and JICA.	for three years after the Project	Gulu Municipality	-	

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

### Major Undertakings to be Covered by the Japanese Grant

NO	Items	Deadline	Cost Estimated (Million Japanese Yen)*	
1	To construct roads, drainage and traffic safety facilities .	Before end of the contract	1,883	
	1) To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country			
	a) Marine(Air) transportation of the products from Japan to the recipient country	during the construction		
	b) Internal transportation from the port of disembarkation to the project site			
2) To construct the temporary site office with electricity, water supply, drainage, furniture and equipment				
2	To implement detailed design, tender support and construction supervision (Consultant)	Before end of contract	133	
3	Soft components		17	
4	Contingencies	During the project	94	
	Total		2,127	

\*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

Annex 8 Project Monitoring Report (PMR)

<p><b><u>Project Monitoring Report</u></b></p> <p style="margin-left: 100px;"><i>on</i></p> <p style="margin-left: 100px;"><b><u>Project Name</u></b></p> <p>Grant Agreement No. <u>XXXXXXXX</u></p> <p style="margin-left: 100px;">20XX, Month</p>
---

**Organization Information**

<p>Authority (Signer of the G/A)</p>	<p>Person in Charge _____</p> <p>_____ (Division) _____</p> <p>Contacts _____ Address: _____</p> <p>_____ Phone/FAX: _____</p> <p>_____ Email: _____</p>
<p><b>Executing Agency</b></p>	<p>Person in Charge _____</p> <p>_____ (Division) _____</p> <p>Contacts _____ Address: _____</p> <p>_____ Phone/FAX: _____</p> <p>_____ Email: _____</p>
<p><b>Line Agency</b></p>	<p>Person in Charge _____</p> <p>_____ (Division) _____</p> <p>Contacts _____ Address: _____</p> <p>_____ Phone/FAX: _____</p> <p>_____ Email: _____</p>



**Outline of Grant Agreement:**

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



Once



**1: Project Description**

**1-1 Project Objective**

**1-2 Necessity and Priority of the Project**

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

**1-3 Effectiveness and the indicators**

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr )	Target (Yr )
<b>Qualitative Effect</b>		

## 2: Project Implementation

### 2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

<b>Location</b>	<b>Original:</b> (M/D)	<b>Actual:</b> (PMR)
	<b>Attachment(s):Map</b>	<b>Attachment(s):Map</b>

Table 2-1-1b: Comparison of Original and Actual Scope

<b>Items</b>	<b>Original</b>	<b>Actual</b>
(M/D)  'Soft component' shall be included in 'Items'.	(M/D)	(PMR)  Please state not only the most updated schedule but also other past revisions chronologically.  All change of design shall be recorded regardless of its degree.

(Sample)Table 2-1-1b: Comparison of Original and Actual Scope

<b>Items</b>	<b>Original</b>	<b>Actual</b>
1. Upgrading of the Kukum Highway	length 20km, single lane (3.47m*2), path(1.25m*2) Concrete Pavement 200mm (motor lane only)	length 20km, single lane (3.47m*2), path(1.00m*2) Concrete Pavement 200mm (motor lane only)
2. Replacement of Old Mataniko Bridge	Bridge length 40m, Width 9.5m, path(1.00m*2), compound steel box-girder bridge, Inverted T type-abutment spread foundation	Ditto

#### 2-1-2 Reason(s) for the modification if there have been any.

(PMR)

07/10

**2-2 Implementation Schedule**

**2-2-1 Implementation Schedule**

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
<i>[M/D]</i>	<i>(M/D)</i>		<i>(PMR)</i> As of (Date of Revision)
‘Soft component’ shall be stated in the column of ‘Items’.			Please state not only the most updated schedule but also other past revisions chronologically.
Project Completion Date*			

\*Project Completion was defined as \_\_\_\_\_ at the time of G/A.

(Sample)Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval	11/2015	-	-
E/N	12/2015	1/2016	24/1/2016
G/A	12/2015	1/2016	24/1/2016
Detailed Design	12/2015-4/2016	1/2016-5/2016	Amended 13/3/2017 1/2016-5/2016
Tender Notice	5/2016	5/2016	1/6/2016
Tender	6/2016	6/2016	15/7/2016
(Lot1) Construction Period	7/2016-11/2018	7/2016-11/2018	8/8/2016-30/11/2018
(Lot2) Installarion of Equipment	7/2016-6/2018	7/2016-6/2018	6/8/2016-30/60/2017
Project Completion Date	11/2018	11/2018	30/11/2018
Defect Liability Period	11/2019	11/2019	30/11/2019

\*Project Completion was defined as Check-out of Construction work at the time of G/A.

**2-2-2 Reasons for any changes of the schedule, and their effects on the project.**

*Om/w*

**2-3 Undertakings by each Government**

**2-3-1 Major Undertakings**  
See Attachment 2.

**2-3-2 Activities**  
See Attachment 3.

**2-3-3 Report on RD**  
See Attachment 4.

**2-4 Project Cost**

**2-4-1 Project Cost**

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan  
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction Facilities (or Equipment)	'Soft component' shall be included in 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Consulting Services	- Detailed design - Procurement Management - Construction Supervision			
Total				

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

Table 2-4-1b Comparison of Original and Actual Cost by the Government of XX

Items			Cost (Million USD)	
	Original	Actual	Original	Actual
				Please state not only the most updated schedule but also other past revisions chronologically.
Total				

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

29

(Sample)Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan  
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original <sup>1),2)</sup>	Actual
Construction Facilities	1. Outpatient Department 2. Operation Theatre, Casualty Unit, Maternity Ward	Ditto Ditto	1,169.5	1,035.0
Equipment	1) Primary and Secondary Surveillance Radars at Chittagong Int'l Airport 2) Access Control System for Dhaka Int'l Airport 3) Doppler VOR/DME at Saidpur Airport 4) Aerodrome Simulator for Civil Aviation Training Center 5) Baggage Inspection System for Dhaka Int'l Airport 6) Airport Fire Fighting Vehicles for Dhaka Int'l Airport	Ditto	2,374.6	2,110.0
Consulting Services	- Detailed design - Procurement Management - Construction Supervision - Soft Component	Ditto	0.87	0.87
Total			3544.97	3145.87

Note: 1) Date of estimation: October, 2014  
2) Exchange rate: 1 US Dollar = 99.93 Yen

(Sample)Table 2-4-1b Comparison of Original and Actual Cost by the Government of Bangladesh

Items			Cost (1,000 Taka)	
			Original <sup>1),2)</sup>	Actual
Dhaka International Airport	Modification of software of existing Rader Data Processing System	Ditto	8,000	9,240
	Provision of a partition, lighting, air conditioning and electric power supply at transfer hold baggage check point	Ditto	5,000	2,453
	Replacement of five doors in the international passenger terminal building	Ditto	4,000	5,340
Chittagong Int'l Airport	Preparation of the radar site including felling of trees, clearing and grabbing	Ditto	5,000	3,400
Total			22,000	20,433

Note: 1) Date of estimation: October, 2014  
 2) Exchange rate: 1 US Dollar = 0.887 Bangladesh Taka (local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR)

2-5 Organizations for Implementation

2-5-1 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: (M/D)

Actual, if changed: (PMR)

Done

**2-6 Environmental and Social Impacts**

- The results of environmental monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- The results of social monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- Information on the disclosed results of environmental and social monitoring to local stakeholders, whenever applicable.

**3: Operation and Maintenance (O&M)**

**3-1 O&M and Management**

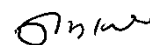
- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc.)

<b>Original:</b> (M/D)
<b>Actual:</b> (PMR)

**3-2 O&M Cost and Budget**

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

<b>Original:</b> (M/D)
------------------------





#### 4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

<b>Original Issues and Countermeasure(s): (M/D)</b>	
Potential Project Risks	Assessment
1.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
<b>Actual issues and Countermeasure(s)</b>	
(PMR)	

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**5: Evaluation at Project Completion and Monitoring Plan**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

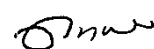
Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan for 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. Undertakings to be taken by each Government
3. Monthly Report
4. Report on RD
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)  
(Final Report Only)



Annex 9 Environmental Check List

Environment Items	Main Check Items	YES:Y NO:N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
<b>1. Permits and explanations</b>			
(1) EIA and Environmental Permits	a. Have EIA reports been already prepared in official process? b. Have EIA reports been approved by authorities of the host countries? c. Have EIA reports been unconditionally approved? If conditions are imposed on the approvals, have the conditions satisfied? d. In addition to the above approvals, have other required environmental permits been obtained from the appropriate regularity authorities of the hos country's government?	a. No b. No c. N/A d. No	a. Currently, EIA procedure is ongoing. The EIA report is scheduled to be submitted by December, 2015 to NEMA, however, since it took more time for screening, it is warried to be delayed. b. It was expected to be approved by April, 2016, however, for the reason mentioned-above, it might be delayed. c. Since the approval of the EIA report has not yet finished, the imposed conditions are not clear. However, conditions imposed at the screening and TOR at the survey stage is satisfied. d. Approval regarding opening a new quarry is necessary. Procedure to obtain the EIA is now on going as the permanent construction; however, it is concerned to be delayed as well.
(2) Explanation to the local stakeholders	a. Have contents of the project and the potential impacts been adequately explained to the local stakeholders based on appropriate procedures, including information disclosure? b. Have the comment from the stakeholders (such as local residents) been reflected to the project design?	a. Yes b. Yes	a. Under sponsorship by MoWT, the stakeholder meeting was implemented, and understanding among the stakeholders is obtained. b. Comments from the local residents are reflected also. Major points are traffic control during the construction, dust prevention by watering, and speed regulation.
(3) Examination of Alternatives	a. Have alternative plans of the project been exanimated with social and environmental considerations?	a. Yes	a. Alternative plans were considered including environmental and social considerations. The chosen plan was the one which the number of resettlements was smallest.
<b>2. Pollution Control</b>			
(1) Air Quality	a. Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality air quality comply with country's air quality standard? Are mitigation measures taken? b. Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse.	a. Yes b. Yes	a. Although environment standard relates to air pollution does not exists in Uganda, and it is anticipated that there will be stress to air quality due to increase traffic demand, dust raise from the road will be reduced by the construction. b. Same as above.
(2) Water Quality	a. Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? b. Is there a possibility that surface runoff from roads will contaminate water resources, such as groundwater? c. Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards?	a. No b. N/A c. No	a. Since this project is targeted to improve the existing roads, surface explosion by land runoff is not assumed. b. Contamination of the groundwater is not assumed since rain water shall be discharged at the existing end of flow and PECE River by installing drainage. Contamination of PECE River is also not assumed, however, monitoring shall be conducted during the construction stage. c. There is no plan to construct either parking or service areas.
(3) Wastes	a. Are wastes generated from the project facilities, such as parking areas/service	a. N/A	a. There is no plan to construct either parking or service areas.

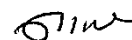
	areas properly treated and disposed of in accordance with the country's regulations?		
(4) Noise and Vibration	a. Do noise and vibrations from the vehicle and train traffic comply with country's standards?	a. Yes	a. It is expected the loudness and vibration is less than both Uganda and Japanese regulation standards.
<b>3. Natural Environment</b>			
(1) Protected Areas	a. Is the project site located in protected areas designated by the country's laws or international treaties and congestions? Is there a possibility that the project will affect the protected areas?	a. No	a. There is no protected area at and around the site.
(2) Ecosystem	a. Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g. coral reefs, mangroves, or tidal flats)? b. Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? c. If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impact on the ecosystem? d. Are adequate protection measures taken to prevent impacts on the ecosystem? e. Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystem due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? f. In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	a. No b. No c. N/A d. N/A e. N/A f. N/A	a. It was confirmed with the environment officer of Gulu Municipality that the project site does not include the area mentioned in the questionnaire. b. Same as above. c. Since the target of the project is the existing road, blocking the movement of wild animals and cattle, accident by animals and significant influence to ecosystem is not concerned. d. Same as above e. Same as above f. Same as above
(3) Hydrology	a. Is there a possibility that alternation of topographic features and installation of structures such as tunnels will adversely affect surface water and groundwater flows?	a. No	a. The was discharge capacity of Road No.13 (Awere Road) and Road No.7 (Gulu Avenue) will be improved due to improvement of the existing flooded area by introduction of box culvert and drainage. And under the hydrological analysis, it was understood that there will be no such difference in before and after the construction.
(4) Topography and Geology	a. Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? b. Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? c. Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to	a. Yes b. N/A c. Yes	a. Partially soft ground was found at the PECE River crossing point; however, the weak part will be replaced with good material. b. There is no civil works which might cause land slide and land failure in this project. c. For the borrow pit, regaining the vegetation by returning the topsoil shall be conducted. For the disposal area, soil runoff shall be prevented by slope protection such as stone pitching or vegetation.

		prevent soil runoff?		
<b>4. Social Environment</b>				
(1) Resettlement	<ul style="list-style-type: none"> <li>a. Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</li> <li>b. Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</li> <li>c. Is the resettlement plan, including compensation with full replacement costs, restoration of living standards developed based on socioeconomic studies on resettlement?</li> <li>d. Are the compensations going to be paid to the resettlement?</li> <li>e. Are the compensation policies prepared in documents?</li> <li>f. Does the resettlement plan play particular attention to vulnerable groups or people, including women, children the elderly, and people below the poverty line, ethnic minorities, and indigenous peoples?</li> <li>g. Are agreements with the affected people obtained prior to resettlement?</li> <li>h. Is the organizational framework established to properly implement the plan?</li> <li>i. Are any plans developed to monitor the impacts or resettlement?</li> <li>j. Is the grievance redress mechanism established?</li> </ul>	<ul style="list-style-type: none"> <li>a. Yes</li> <li>b. Yes</li> <li>c. Yes</li> </ul>	<ul style="list-style-type: none"> <li>a. Several alternative plans were considered, and plan with smallest number of resettlement was chosen.</li> <li>b. Explanation of compensation and resettlement assistance is expected to be made by the Gulu municipality.</li> <li>c. Livelihood survey shall be conducted for the resettlement, and compensation with full replacement, restoration of living standards is planned to be made.</li> <li>d. Compensation is planned to be paid in advance, before the resettlement.</li> <li>e. Compensation policies are planned to be prepared in documents.</li> <li>f. Considering the social vulnerable, notice shall be made 6 month in prior to commencement.</li> <li>g. Agreements are made before the resettlement.</li> <li>h. From the experience of the proponent on resettlement and land acquisition in the past, it is understood that the proponent has adequate capacity to implement small scale resettlement as this project.</li> <li>i. Impact of the resettlement shall be monitored by the Gulu Municipality.</li> <li>j. Grievance redress mechanism is established by referring to the similar case in the past.</li> </ul>	
(2) Living and Livelihood	<ul style="list-style-type: none"> <li>a. Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alternation of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?</li> <li>b. Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary?</li> <li>c. Is there any possibility that diseases, including infection, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</li> <li>d. Is there any possibility that roads will give negative influence in road traffic to surrounded areas? (such as</li> </ul>	<ul style="list-style-type: none"> <li>a. No</li> <li>b. No</li> <li>c. No</li> <li>d. No</li> <li>e. No</li> <li>f. No</li> </ul>	<ul style="list-style-type: none"> <li>a. Since this project is targeting to improve the existing road, existing traffic means and the people's life who is working on it shall not be affected.</li> <li>b. Same as above</li> <li>c. Same as above</li> <li>d. Widening of Acholi Road at section where are 市街化, and that connects with the road improved by the World Bank, will contribute to reduce the traffic congestion and improve the traffic safety.</li> <li>e. There is no structure planned to impede the movement of the inhabitants. Rather, it is considered that introduction of pedestrian crossway and speed limitation will contribute to improve the movement.</li> <li>f. There are no structure causes sun shading and road influences such as Flyover Bridge in this Project.</li> </ul>	

	<p>increase of traffic congestion and accidents)</p> <p>e. Is there any possibility that roads will impede the movement of inhabitants?</p> <p>f. Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and road influence?</p>		
(3) Heritage	<p>a. Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?</p>	a. No	a. No local archeological, historical, cultural, and religious heritage was confirmed around the site.
(4) Landscape	<p>a. Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p>	a. Yes	a. Although no special area to prevent landscape was confirmed around the site, the Project would re-plant the trees which were cut off by the Project to try keeping the city landscape.
(5) Ethnic Minorities and Indigenous Peoples	<p>a. Are consideration given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?</p> <p>b. Are all of the rights of ethnic minorities and indigenous people in relation to land and resources to be replaced?</p>	<p>a. N/A</p> <p>b. N/A</p>	<p>a. No ethnic minorities were confirmed around the site.</p> <p>b. Same as above</p>
(6) Working Environment	<p>a. Is the project proponent not violating and laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?</p> <p>b. Are tangible safety considerations in place for individuals involved in the project, such as the installation of safely equipment which prevents industrial accidents, and management of hazardous materials?</p> <p>c. Are intangible measures being planned and implemented for individuals involved in the project, such as the estimation of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>d. Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	<p>a. Yes</p> <p>b. Yes</p> <p>c. Yes</p> <p>d. Yes</p>	<p>a. The Project Plan was made by cost estimation following the Uganda's labour law.</p> <p>b. Safety measures are taken by placing barricades, watchman and frequent maintenance of the equipment</p> <p>c. Traffic Safety briefing by the Gulu police to the drives of the construction, and infection briefing by the person in charge of HIV/AIDS of Gulu Municipality and others measures are planned.</p> <p>d. Since most of the workers including guards would be employed from the inhabitants, it is difficult to consider the project would violate the safety of the inhabitants of the area. However, system to cope with claim arise from the people shall be prepared.</p>
<b>5. Others</b>			
(1) Impacts during constructions	<p>a. Are adequate measures considered to reduce impacts during constructions (e.g. noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>b. If construction activities adversely affected the natural environment (ecosystem) are adequate measures considered to reduce impacts?</p> <p>c. If construction activities adversely affect the social environment, are adequate measured considered to reduce impacts?</p>	<p>a. Yes</p> <p>b. Yes</p> <p>c. Yes</p>	<p>a. Mitigation measures shall be made by giving notice of the construction such as location and contents to the people and carrying out site monitoring. And also, placing barricade and noise shutting down sheet, prevent dusting by watering shall be considered as hard measures.</p> <p>b. Since this project is targeted at the central area of the municipality, it is considered there would be no affection to the natural environment. However, monitoring during the construction shall be made to grasp the influence to the natural environment.</p> <p>c. Although several impacts are considered such as infection, sanitation and accidents, countermeasures</p>

(2) Monitoring	<p>a. Does the proponent develop and implement monitoring program for the environment items that are considered to have potential impacts?</p> <p>b. What are the items, methods and frequencies of the monitoring program?</p> <p>c. Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>d. Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p>	<p>a. Yes</p> <p>b. Yes</p> <p>c. Yes</p> <p>d. Yes</p>	<p>are established against each of them.</p> <p>a. Since MoWT, the organization in charge, is located in Kampala far from the site, Gulu Municipality will do the monitoring for MoWT.</p> <p>b. Items which were evaluated as A-, B- or C- were selected to be monitored. Items which were evaluated A+, B+, C+ were selected also to monitor the positive impact.</p> <p>c. Through the stake holders meeting, it was confirmed that Gulu Municipality will do the monitoring after the handover.</p> <p>d. The method and frequency reporting the results of the monitoring are fixed. Details are shown in the Monitoring Plan.</p>
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Annex 10 Environmental Management Plan/Environmental Monitoring Plan

**<Environment Management Plan (EMP)>**

Adverse Impacts		Proposed Mitigation Measures	Implementing Organizations	Responsible Organizations	Budget
<b>&lt;Pre-Construction Phase&gt;</b>					
3	Solid Wastes	<ul style="list-style-type: none"> <li>To dispose solid wastes at licensed disposal site in Pabwo.</li> </ul>	Gulu MC	MoWT	Administrative expenditure (Gulu MC)
5	Noise and Vibrations	<ul style="list-style-type: none"> <li>To demolish the buildings at off-peak time when the number of pedestrians, customers of restaurants is not so much.</li> </ul>	Gulu MC	MoWT	Administrative expenditure (Gulu MC)
13	Involuntary Resettlement	<ul style="list-style-type: none"> <li>To establish a complain and grievance management committee of the project during the designing stage.</li> <li>To held meetings with affected persons and reflect their opinion as much as possible to the RAP (Resettlement Action Plan).</li> </ul>	Gulu MC	MoWT	MoWT: (Procurement of consultant) Gulu MC: Implementation of RAP
15	Local economy, employment	<ul style="list-style-type: none"> <li>To conduct a sensitization meeting with local community, and make a consensus.</li> <li>To reflect the information into the document which will be referred by the Contractor, so that conflicts between the Contractor and local community will be prevented.</li> </ul>	Gulu MC, Sub-county, District	MoWT	Administrative expenditure
18	Public infrastructures and services	<ul style="list-style-type: none"> <li>To held meeting with following organizations and draw up relocation plan of utility lines, cables, pipes:                             <ul style="list-style-type: none"> <li>- Electric pole and overhead wires: UMEME</li> <li>- Power line: UMEME</li> <li>- Fiber cable: UTL/MTN</li> <li>- Water supply: MWSC</li> <li>- Sewerage: MWSC</li> </ul> </li> <li>To give inhabitants advance notice of temporary cutoff schedule of the utility lines.</li> </ul>	Gulu MC with support of respective companies	MoWT	Administrative expenditure (Gulu MC)
28	Sanitation	<ul style="list-style-type: none"> <li>To reconstruct alternative toilets or establish temporarily toilets if the toilet on the northern exit of taxi park were totally demolished due to road construction.</li> </ul>	Gulu MC	MoWT	Administrative expenditure (Gulu MC)
<b>&lt;Construction Phase&gt;</b>					
1	Air Pollution	<ul style="list-style-type: none"> <li>To pay attention to the dust control during the construction nearby housing area for example:                             <ul style="list-style-type: none"> <li>- Sprinkling the working surfaces with water at least twice a day until the roads is paved.</li> <li>- Instructing drivers and workers not leave their vehicle or equipment idling.</li> </ul> </li> </ul>	Contractor	Contractor	Construction cost

40



Adverse Impacts		Proposed Mitigation Measures	Implementing Organizations	Responsible Organizations	Budget
2	Water Pollution	<ul style="list-style-type: none"> <li>To prepare a series of materials safety use procedures for oil, lubricants and chemicals should be obtained from the suppliers and storage and handling requirements stipulated in the Material Safety Data Sheet (MSDS).</li> <li>To use drip trays when draining oil from plant and equipment.</li> <li>To dispose wastewater and sewerage from the contractor's camp properly.</li> </ul>	Contractor	Contractor	Construction cost
3	Solid Wastes and Soil Contamination	<ul style="list-style-type: none"> <li>To reuse excavated materials as fillings in the earth fillings and back-fillings.</li> <li>To dispose solid wastes and industrial waste at the licensed disposal site.</li> </ul>	Contractor	Contractor	Construction cost
5	Noise and Vibrations	<ul style="list-style-type: none"> <li>To limit construction hours only day time if construction site is close to the residential area.</li> <li>To select low noise machinery if available.</li> <li>To do regular maintenance of the machinery and prevent an abnormal blating noise and vibration.</li> <li>To provide noise protectors such as ear muffs and plugs to the workers and employers who closely work with noisy machines.</li> </ul>	Contractor	Contractor	Construction cost
10	Ecosystem	<ul style="list-style-type: none"> <li>To replant trees on the roadside if logged out / cut down for the road construction.</li> <li>To monitor change of ecosystem which may caused due to road construction near Pece River.</li> </ul>	Contractor	Contractor	Construction cost
17	Water Use	<ul style="list-style-type: none"> <li>To give inhabitants advance notice of construction schedule of water pipeline, through the LC1 chairperson.</li> <li>To closely communicate with Uganda National Water and Sewerage Corporation (NWSC), and avoid miscommunication of water supply and construction schedule.</li> </ul>	Contractor with support of LC1 chairperson and NWSC	Contractor	Construction cost
18	Public infrastructures and services	<ul style="list-style-type: none"> <li>To confirm progress of the relocation plan of utility lines, cables, pipes which supposed to be done by the GOU before commencement of the construction. As necessary, following organizations shall be contacted through the Gulu-MC: <ul style="list-style-type: none"> <li>- Electric pole and overhead wires: UMEME</li> <li>- Power line: UMEME</li> <li>- Fiber cable: UTL/MTN</li> <li>- Water supply: MWSC</li> <li>- Sewerage: MWSC</li> </ul> </li> <li>To give inhabitants advance notice of temporary cutoff schedule of the utility lines.</li> </ul>	Contractor with support of Gulu MC, UMEME, UTL, and MTN	Contractor	Construction cost
24	Gender	<ul style="list-style-type: none"> <li>To take necessary curative measures if any gender/ children's right issues handled by Complain and Grievance Management Committee (CGMC) are confirmed.</li> </ul>	Contractor with support of Gulu MC, and CGMC	Contractor	Construction cost
25	Children's Right	<ul style="list-style-type: none"> <li>To make sure not obstructing children's walkway to and from their schools.</li> <li>To prohibit child labors from working at construction site.</li> </ul>			

Adverse Impacts		Proposed Mitigation Measures	Implementing Organizations	Responsible Organizations	Budget
26	Hazards(Risk) Infectious diseases such as HIV/AIDS and Malaria	<ul style="list-style-type: none"> <li>To request HIV/AIDS focal person of Gulu MC to give workers a sensitization workshop regarding risk of infectious diseases such as HIV/AIDS.</li> <li>To provide condoms to the workers directly or indirectly i.e. putting it in the washroom night clubs, hotels, or bars.</li> </ul>	Contractor with support of Gulu MC	Contractor	Construction cost
27	Working conditions, Occupational safety	<ul style="list-style-type: none"> <li>To provide adequate safety training and education to the employees.</li> <li>To equip workers with necessary accessories such as helmets, earmuffs, gloves, goggle, etc.</li> <li>To maintain heavy equipment properly.</li> <li>To make sure enough number of first-aid kits (FAK) are available on site.</li> <li>To prepare an Emergency Response Plan (ERP) that can be included in the Safety Manual.</li> </ul>	Contractor	Contractor	Construction cost
28	Sanitation	<ul style="list-style-type: none"> <li>To establish enough number of temporary toilets in the camp yards and construction sites.</li> </ul>	Contractor	Contractor	Construction cost
29	Accident	<ul style="list-style-type: none"> <li>To announce construction schedule of specific roads to the community well in advance.</li> <li>To set traffic signposts and flagmen/women in particular recognized black spots, well-trafficked site, and blind curve, etc.</li> <li>To set cat's eye and/or ramble strips on the pedestrian crossing especially on the Road #2 Acholi Rd., #17 Jomo Kenyatta Rd., and #24 Sir Samuel Rd. where close to the school, church, mosque, orphan's house, etc.</li> <li>To construct roundabouts if enough area of land is available.</li> </ul>	Contractor	Contractor	Construction cost
<b>&lt;Post-Construction (Operation) Phase&gt;</b>					
2	Water Pollution	<ul style="list-style-type: none"> <li>To stop usage of boreholes if water quality tested by the periodical environmental monitoring exceed the environmental limit of the country.</li> <li>To provide alternative water source to the affected persons.</li> </ul>	Gulu MC	MoWT	Administrative expenditure
10	Ecosystem	<ul style="list-style-type: none"> <li>To regularly monitor change on ecosystem, and take necessary action if significant changes are found.</li> </ul>	Gulu MC	MoWT	Administrative expenditure
11	Hydrological Situation	<ul style="list-style-type: none"> <li>To conduct flood countermeasures if a risk of flood due to change of hydrological situation of Pece River is confirmed.</li> </ul>	Gulu MC	MoWT	Administrative expenditure
23	Landscape	<ul style="list-style-type: none"> <li>To transplant trees along the streets as necessary.</li> </ul>	Gulu MC	MoWT	Administrative expenditure
28	Sanitation	<ul style="list-style-type: none"> <li>To reconstruct alternative toilets or establish temporarily toilets if the toilet on the northern exit of taxi park were totally demolished due to road construction.</li> </ul>	Gulu MC	MoWT	Administrative expenditure

Adverse Impacts		Proposed Mitigation Measures	Implementing Organizations	Responsible Organizations	Budget
29	Accident	<ul style="list-style-type: none"> <li>To do periodical maintenance work of speed brake facilities such as cat's eye, ramble stripes, etc.</li> <li>To review a record of annual traffic accidents registered by traffic police, and reflect the findings to the safety transportation plan of following years.</li> </ul>	Gulu MC	MoWT	Administrative expenditure
Total Budget (USD)					To be Estimated

**<Environment Monitoring Plan (EMoP)>**

Environmental Items	Monitoring Items	Monitoring Methodology and Frequency	Monitoring Place	Implementing Organization	Responsible Organization
<b>&lt;Pre Construction Phase&gt;</b>					
Solid Wastes	Record of dumping	➤ 1/demolition time: Daily records of disposal at licensed site	➤ Each demolition site	Gulu MC	MoWT
Noise and Vibration	Noise and Vibration level	➤ 1/demolition time: Noise and Vibration meter	➤ Each demolition site	Gulu MC	MoWT
Local economy and employment	Records of meetings held, Records of CGMC meeting	➤ 1/meeting time: Records of meeting with local community ➤ 1/month; Records of CGMC meeting	➤ Quarry site	Gulu MC	MoWT
Involuntary Resettlement	RAP	➤ 1/month: Progress of resettlement and demolition supposed to be done based on the RAP	➤ All PAPs and PAHs	Gulu MC	MoWT
Public infrastructures and services	Relocation Plan of Utilities	➤ 1/month: Progress of relocation of utilities	➤ Road construction sites	Contractor with supports of UMEME, UTL/MTN, MWSC	MoWT
Sanitation	Existence of toilet or not	➤ 1/installation time: Record of installation of alternative/new toilets (Photo, condition, and location should be registered)	➤ Taxi Park	Gulu MC	MoWT
<b>&lt;Construction Phase&gt;</b>					
Air pollution	Dust	➤ 1/month: Visual observation ➤ 1/month: Interviews to roadside inhabitants and LC1 ➤ 1/month: Review a record of CGMC	➤ The most exposed inhabited sites like local market or shops, along the roads	Contractor	Contractor
Water pollution	Suspended Solids, Oil, BOD	➤ 1/month: Water quality test ➤ 1/month: Interview to the users of Pece River water	➤ Pece River concerned by construction yard or box culvert construction	Contractor	Contractor
Solid wastes and soil contamination	Volume of surplus soil and solid wastes dumped	➤ 1/month: Daily records of disposal at licensed site	➤ Construction yard ➤ Road and drainage construction site	Contractor	Contractor
Noise and Vibration	Noise and vibration level	➤ 1/month: Noise and Vibration test ➤ 1/month: Interview to roadside inhabitants ➤ 1/month: Daily records of use of noise protectors by workers	➤ The most exposed inhabited sites like local market, shops, or residents near the camp or construction sites ➤ Construction site	Contractor	Contractor
Ecosystem	-Number of trees cut down/ replanted -Changes on ecosystem	➤ 1/months: Daily records of tree logged out/ replanted ➤ 1/month: Interview to Environmental officer of Gulu MC and inhabitants living near the riverside.	➤ Roadside ➤ Pece Riverside	Contractor	Contractor

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Environmental Items	Monitoring Items	Monitoring Methodology and Frequency	Monitoring Place	Implementing Organization	Responsible Organization
Water Use	Record of complain and grievance management	<ul style="list-style-type: none"> <li>➤ 1/month: Interview to users</li> <li>➤ 1/month: Visual observation</li> <li>➤ 1/month: Records of monthly meeting of CGMC</li> </ul>	<ul style="list-style-type: none"> <li>➤ Construction sites near the boreholes, Pece River, and tap water.</li> </ul>	Contractor	Contractor
Local economy and employment	Records of CGMC meeting	<ul style="list-style-type: none"> <li>➤ 1/month; Records of CGMC meeting</li> </ul>	<ul style="list-style-type: none"> <li>➤ Quarry site</li> <li>➤ Construction site</li> </ul>	Contractor	Contractor
Public infrastructures and services	-Daily records of cutoff -Record of CGMC	<ul style="list-style-type: none"> <li>➤ 1/month: Daily records of both scheduled and unscheduled cut off of utility lines</li> <li>➤ 1/month: Records of CGMC meeting</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project sites</li> </ul>	Contractor with supports of UMEME, UTL/MTN, MWSC	Contractor
	-Number of traffic accident -Record of training to workers	<ul style="list-style-type: none"> <li>➤ 1/month: Records of car accidents including presence or absence of traffic controller, car signs, barricade, etc.</li> <li>➤ 1/month: Records of safety instruction to workers such as risk of overloading, high speed drive, etc.</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project sites</li> </ul>	Contractor with support of traffic police as necessary	Contractor
Gender and Children's Right	Record of CGMC meeting	<ul style="list-style-type: none"> <li>➤ 1/month: Minutes of CGMC's monthly meeting</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project sites</li> </ul>	Contractor	Contractor
Hazards(Risk) Infectious diseases such as HIV/AIDS and Malaria	Record of a sensitization workshop to workers  Distribution record of condom	<ul style="list-style-type: none"> <li>➤ 1/month: Records of sensitization workshop to the employees by HIV/AIDS focal person of Gulu MC</li> <li>➤ 1/month: Records of distribution of condom and use or not</li> </ul>	<ul style="list-style-type: none"> <li>➤ Camp yard</li> </ul>	Contractor	Contractor
Working Conditions, Occupation Safety, and Accident	Number and degree of accident	<ul style="list-style-type: none"> <li>➤ 1/month: Record of accidents at working sites</li> <li>➤ 1/month: Presence of safety tools on workers' hands</li> <li>➤ 1/month: Presence of FAK</li> <li>➤ 1/month: Presence of ERP and Safety manual</li> <li>➤ 1/month: Log of safety instruction to the workers</li> <li>➤ 1/month: Records of maintenance of heavy equipment.</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project sites</li> </ul>	Contractor	Contractor
Sanitation	Number of temp. toilets	<ul style="list-style-type: none"> <li>➤ 1/month: Record of establishing enough number of temporarily toilets in the camp yards and construction sites.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Camp yard and Construction sites</li> </ul>	Contractor	Contractor
Accident	Record of announcement, traffic operator, signposts	<ul style="list-style-type: none"> <li>➤ 1/month: Interview to inhabitants whether construction schedule was announced in advance or not</li> <li>➤ 1/month: Record of safety instruction to the employees</li> <li>➤ 1/month: Record of traffic operators, signposts, and barricades</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project sites</li> </ul>	Contractor	Contractor
<b>&lt;Post-Construction (Operation) Phase&gt;</b>					
Air pollution	Dust	<ul style="list-style-type: none"> <li>➤ 1/3months: Interview to inhabitants (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ At random from project targeted roads</li> </ul>	Gulu MC	MoWT

Environmental Items	Monitoring Items	Monitoring Methodology and Frequency	Monitoring Place	Implementing Organization	Responsible Organization
Water pollution	EC, pH, Fe, BOD, NH <sub>4</sub> <sup>+</sup> , COD, Oil	<ul style="list-style-type: none"> <li>➤ 1/3 months: Simplified water quality test (3 years)</li> <li>➤ 1/3months: Interview to water users (3 years)</li> <li>➤ 1/3months: Record of CGMC's monthly meeting (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Boreholes and Pece River where people using water</li> </ul>	Gulu MC	MoWT
Ecosystem	Visual change of ecosystem	<ul style="list-style-type: none"> <li>➤ 1/3months: Visual observation (3 years)</li> <li>➤ 1/3months: Interview to inhabitants (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Pece River and its basin</li> </ul>	Gulu MC (Environment)	MoWT
Hydrological situation	Number of days roads sunk in the flood water	<ul style="list-style-type: none"> <li>➤ 1/3months: Interview to inhabitants (3years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Box Culvert in Gulu Ave. (#7) and Awere Rd. (#13)</li> <li>➤ Residents near the Pece River</li> </ul>	Gulu MC (Engineering)	MoWT
Public infrastructures and services	Accessibility, Comfortability	<ul style="list-style-type: none"> <li>➤ 1/year: Interview to inhabitants (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ At random from project targeted roads</li> </ul>	Gulu MC (Engineering)	MoWT
Landscape	Number of replanted tree seedlings growing	<ul style="list-style-type: none"> <li>➤ 1/year: Survey number and growth condition of replanted tree seedlings (3 years)</li> <li>➤ 1/year: Interview to inhabitants (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Jomo Kenyatta Rd. (#17)</li> <li>➤ At random from project targeted roads</li> </ul>	Gulu MC (Environment)	MoWT
Sanitation	Condition of toilets	<ul style="list-style-type: none"> <li>➤ 1/year: Cleaning and maintenance condition of the toilet (3 years)</li> <li>➤ 1/year: Interview to users (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Taxi Park (#22)</li> </ul>	Gulu MC (Health)	MoWT
Accident	Number of accidents New traffic safety system	<ul style="list-style-type: none"> <li>➤ 1/year: Traffic accident data from traffic police (3 years)</li> <li>➤ 1/year: Photos and records of newly established traffic safety system such as cat's eye, ramble strips, roundabout, etc.</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project roads</li> </ul>	Gulu MC (Engineering)	MoWT
Maintenance	Maintenance records	<ul style="list-style-type: none"> <li>➤ 1/year: Records of maintenance work (3 years)</li> </ul>	<ul style="list-style-type: none"> <li>➤ All project roads</li> </ul>	Gulu MC (Engineering)	MoWT

Annex 11 Environmental and Social Monitoring Form  
**Draft Monitoring Form (Pre-Construction Phase)**

Reporting Period (Year and Month): \_\_\_\_\_

Reporter (MOWT and GMC): \_\_\_\_\_

Frequency of Reporting: Monthly

**I. Pollution**

3. Waste

Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
Solid waste management at environmentally licensed site			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B
Reuse of the excavated soils as filling materials			Monthly	<input type="checkbox"/> C
Training to the employee regarding the waste management			Monthly	

5. Noise and Vibrations

Item	Unit	Measured value (Mean)	Measured value (Max.)	Standards in Uganda	Referred intl./3 <sup>rd</sup> country standards (Japan)	Location	Frequency	Evaluation
Noise Level	dB			70dB(A)	65dB(A)	Construction sites where relocating pipes and utility lines	Monthly	<input type="checkbox"/> A <input type="checkbox"/> B
Vibration Level	dB			N/A	70dB(A)			<input type="checkbox"/> C

**II. Social Environment (except for the Involuntary Resettlement)**

Item	Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
18. Social infrastructure and services	Establishment of the relocation plan of the utility line and pipe			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	Advance notice to the inhabitants about the relocation schedule			Monthly	
	Record of the complain and grievance management			Monthly	
29. Accident	Establishment of the barricade, flagmen around the construction sites			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	Record of the accident and countermeasures			Monthly	

Evaluation: "A" = Confirmed as no problem; "B" = To be re-examined; "C" = To be solved



### III. Social Environment (Involuntary Resettlement)

#### 1. Public Consultations

No	Date	Place	Comments of the consultation/ main comments and answers
1			
2			

#### 2. Resettlement Activities

Resettlement Activities	Planned Total	Unit	Progress in Quantity		Progress in %		Expected date of completion	Responsible organization
			Till the last month	Up to the this month	Till the last month	Up to the this month		
1.Preparation of ARAP								MOWT
1-1.Employment of Consultant	3	M/M						MOWT
1-2 Establishment of Complain and Grievance Management Committee								GMC
1-3.Implementation of Census Survey including socio-economic survey								Consultant employed by MOWT
1-4.Approval of ARAP			Date of Approval:					Ministry of Land
2.Finalization of PAPs List								Consultant employed by MOWT
3.Progress of completion of payment								
3-1. Muslim cemetery	1	Set						GMC
3-2. Drainage outlet No.4	1	PAH						GMC
3-3. Kidere quarry (if selected)	TBD	PAP						Contractor
4.Progress of land acquisition								

4-1. Muslim cemetery	606	m <sup>2</sup>						GMC
4-2. Drainage outlet No.4	50	m <sup>2</sup>						GMC
5. Progress of Relocation of PAPs								
5-1. Drainage outlet No.4	1	PAH						GMC

3. Record of Complain and Grievance Management

No	Date	Complain and Grievance from PAPs	Result of management
1			
2			
3			
4			

50

## Draft Monitoring Form (Construction Phase)

**Reporting Period (Year and Month):** \_\_\_\_\_

**Reporter (Contractor):** \_\_\_\_\_

**Frequency of Reporting:** Monthly

### I. Pollution

#### 1. Air Pollution

##### (1) Measurement

Item	Unit	Measured value (Mean)	Measured value (Max.)	Standards in Uganda	Referred intl./3 <sup>rd</sup> country standards (Kenya)* <sup>1</sup>	Location	Frequency	Evaluation
SO <sub>2</sub>	µg/m <sup>3</sup> (24h)			N/A	SOx: 125 µg/m <sup>3</sup> (24h)	3 locations on the roadside	Quarterly	<input type="checkbox"/> A
CO	mg/m <sup>3</sup> (24h)			N/A	CO: 5.0 mg/m <sup>3</sup> (8h)			<input type="checkbox"/> B
NO <sub>2</sub>	µg/m <sup>3</sup> (24h)			N/A	NOx: 150 µg/m <sup>3</sup> (24h)			<input type="checkbox"/> C
TSP	µg/m <sup>3</sup> (24h)			N/A	SPM: 500 µg/m <sup>3</sup> (24h)			
Pb	µg/m <sup>3</sup> (24h)			N/A	1.5 µg/m <sup>3</sup> (24h)			

\*1: The Environmental Management and Co-operation Act (1999)

##### (2) Observation & Hearing

Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
Sprinkling of water on the road in the construction site			Monthly	<input type="checkbox"/> A
No idling of equipment and machinery in the construction site			Monthly	<input type="checkbox"/> B
Physical observation of the dust around the construction sites			Monthly	<input type="checkbox"/> C

51

Driving speed of the construction machinery and vehicle in the construction sites			Monthly
Usage of dust cover sheet on the trucks			Monthly
Usage of dust control equipment at quarry plant			Monthly

## 2. Water Pollution

Item	Unit	Measured value (Mean)	Measured value (Max.)	Standards in Uganda	Referred intl. standards (WHO) *3	Location	Frequency	Evaluation
pH	---			6.0-8.0*1 6.5-8.5*2	N/A	Pece River and 3 boreholes near the construction sites	Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
EC	µS/cm			2500µS/cm*2	N/A			
BOD	mg/l			50mg/l *1	N/A			
COD	mg/l			100mg/l *1	N/A			
Oil	mg/l			10mg/l *1	N/A			
Iron	mg/l			10mg/l *1 1mg/l *2	N/A			
Ammonia	mg/l			10mg/l *1 1mg/l *2	N/A			
Temp	°C			20-35°C *1 25°C for *2	N/A			
Turbidity	mg/l			Compare the data between upstream and downstream MoFPE D the construction point	N/A	Up/down stream MoFPE D the construction sites in the Pece River		

\*1: The National Environmental (Standards for Discharge of effluent into water or on land regulations (1999), \*2: Ugandan Standard for drinking water (2008), \*3: Guidelines for drinking water quality, 4<sup>th</sup> Edition (WHO, 2011)

52

3. Waste

Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
Solid waste management at environmentally licensed site			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B
Reuse of the excavated soils as filling materials			Monthly	<input type="checkbox"/> C
Training to the employee regarding the waste management			Monthly	

4. Soil contamination

Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
Usage of oil tray at the construction site			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C

5. Noise and Vibrations

Item	Unit	Measured value (Mean)	Measured value (Max.)	Standards in Uganda	Referred intl./3 <sup>rd</sup> country standards (Japan)	Location	Frequency	Evaluation
Noise Level	dB			70dB(A): Road const., 114dB(C):Blasting	65dB(A):Road Const. 85dB: Const. *1	Road construction site, asphalt plant, and quarry plant	Quarterly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Vibration Level	dB			N/A	70dB(A)			

\*1: less than 65dB of noise limitation is applied for the daytime noise by traffic in the area categorized as "C" where having commercial, industrial, and living facilities in Japan. Specific standards for the blasting noise are not established, but general construction noise limit is not more than 85dB, while limitation value recommended by the Japan Explosives Industry Association is not more than 100dB.

**II. Natural Environment**

10. Ecosystem

Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
Interview to the inhabitants living along the Pece River about significant changes on the ecosystem identified by them.			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C

**III. Social Environment**

Item	Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
16. Land use and local resource	Minutes of the sensitization workshop with community regarding the condition of the payment, duration of the operation of the aggregate plant etc.			Month when conducted the sensitization workshop	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
17. Water use	Advance notice to the inhabitants and citizens about temporary cutoff of the water pipe			Month when conducted announcement	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
23. Landscape	Number of trees cut and replanted on the roadsides			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
24. Gender & 25. Children's right	Accessible pass way for the students around the schools			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B
	No child labor who are under 18 years old			Monthly	<input type="checkbox"/> C
26. Infectious disease like HIV/AIDS	Record of the Sensitization workshop to the workers by HIV/AIDS focal persons of GMC			Month when conducted the sensitization workshop	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	Distribution of condom to the workers			Monthly	
27. Working conditions, and occupation	Record of the safety training to the workers and distribution of the emergency			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B

safety	action plan				<input type="checkbox"/> C
	Distribution of the safety tools to the employees such as goggle, groves, etc.			Monthly	
	Periodical maintenance records of the equipment and machinery			Monthly	
	Allocation of the First Aid Kit (FAK) at construction sites and camp yard			Monthly	
28.Sanitation	Condition of the temporary toilets established in the construction sites and camp yard			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
29.Accident	Records of the accident and countermeasures			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B
	Establishment of the barricade, flagmen around the construction sites			Monthly	<input type="checkbox"/> C
	Construction of the traffic safety facilities such as roundabout, cat's eye, rumble strips, bump, etc.			Monthly	
	Safety driving instruction to the drivers by traffic police			Month taken the instruction	
	Overloading of construction materials on the trucks			Monthly	
	Safety measures at quarry sites such as advance notice of blasting by siren, use of blasting mat or sheet.			Monthly when operating crushing plant	
Common	Records of complains and grievance management if any			Monthly	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C

Evaluation: "A" = Confirmed as no problem; "B" = To be re-examined; "C" = To be solved

55

## Draft Monitoring Form (Operation Phase)

Reporting Period (Year and Month): \_\_\_\_\_

Reporter (Gulu Municipal Council): \_\_\_\_\_

Frequency of Reporting: Biannual

### I. Pollution

#### 1. Air Pollution

##### (1) Observation & Hearing

Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
Hearing to the inhabitants and citizens about their impression on degree of dust storm used to occur before road improvement			Biannual	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Policing records on unnecessary idling of the car parked/stopped on the roadside			Biannual	

### II. Social Environment

Item	Monitoring Item	Monitoring Result	Measures to be taken	Frequency	Evaluation
29. Accident	Record of traffic accident			Biannual	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	Number of traffics after construction			Biannual	<input type="checkbox"/> C
30. Maintenance	Records of the road maintenance including road safety facilities			Biannual	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C

Evaluation: "A" = Confirmed as no problem; "B" = To be re-examined; "C" = To be solved

56