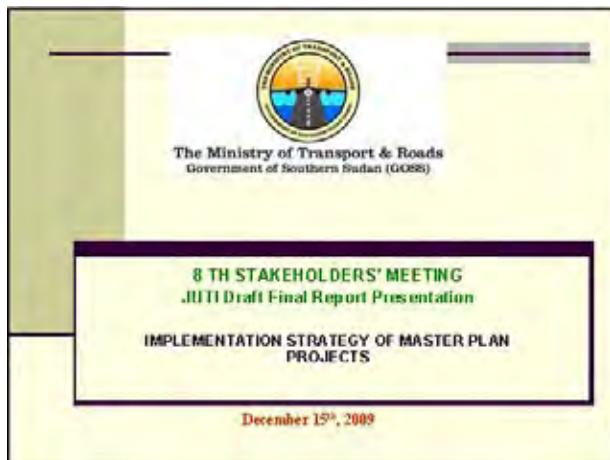


8.2 Presentation Materials

(a) Mr. Otim Bong



IMPLEMENTATION STRATEGY

The implementation plan of Juba Urban Transport Master plan will have to involve time framework, capacity and possible availability of funds

Implementation Time Framework

MTR transport policy development strategy proposed a two phase implementation strategy

- a) Recovery phase: 2007 - 2008
- b) Development phase: 2009 - 2011

However, JUTI proposes

- Short Term (2009-2015)
- Medium Term (2016-2020)
- Long Term (2021-2025)

IMPLEMENTATION STRATEGY cont.....

Institutional and Organization

In order to systematically and effectively implement projects proposed in the master plan, appropriate institution and organization shall be establish.

The Road Network Development Master Plan covers various transport sectors, such as road network, public transport, traffic management and transport institution.

IMPLEMENTATION STRATEGY cont.....

Project Implementation Capacity

The administrative and technical capacity for the implementation of the Master Plan Projects shall be developed with effective deployment of the government human resources.

Experienced engineers shall be employed for consulting services, including planning, design, tendering and construction supervision.

The construction of projects shall be executed by professional and reliable contractors.

PROBLEMS AND ISSUES IN URBAN TRANSPORT

- Land for Expansion
- Increment in the traffic volume
- Road encroachment
- Traffic control system
- Accidents
- Design issues
 - Roundabouts/Junctions
 - Parking lanes
 - Bus stops
 - Narrow bridges
 - Road markings, signs, speed control structures
 - Road alignment
 - Footways/Pedestrians path

MAINTENANCE STRATEGY

- The department of Maintenance and Equipment in the Ministry of Transport and Roads will be responsible for the routine and periodic maintenance of Highways and Interstate Roads
- City Roads will be maintained by Municipal Council
- State Roads will be maintained by Ministry of Physical Infrastructure and County Roads for County Roads Department

THANKS FOR YOU
ATTENTION

Questions and Comments

(b) Mr. Tsuneo Bekki


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)


GOVERNMENT OF SOUTHERN SUDAN
 Ministry of Transport & Roads
 Ministry of Physical Infrastructure, CES

Juba Urban Transport Infrastructure and Capacity Development Study

Summary of the Study

8th Stakeholder's Meeting
December 15, 2009

OBJECTIVES OF THE STUDY

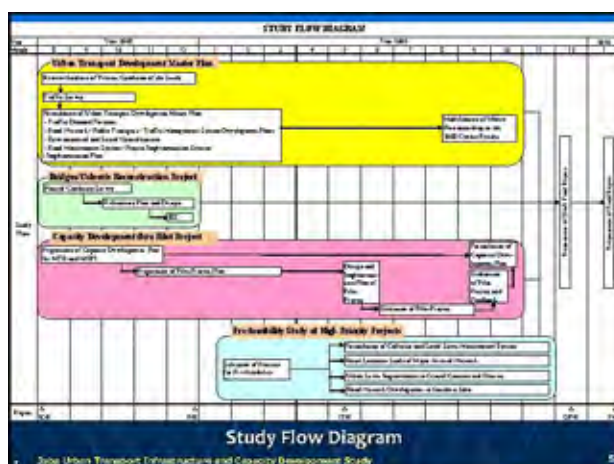
1. To formulate an urban transport development master plan with a target year of 2025.
2. To formulate a project for reconstruction of bridges/culverts.
3. To conduct pre-feasibility studies of high priority projects.
4. To prepare a capacity development plan for MTR and MOPI staff.
5. To support in planning and execution of a pilot project as a part of capacity development.

STUDY AREA



SCOPE OF THE STUDY

1. Formulation of urban transport development master plan
2. Formulation of bridges/culverts reconstruction project
3. Pre-feasibility studies of high priority projects
4. Capacity development thru pilot project execution



STAKEHOLDER MEETING

1 ST	Inception Report Presentation	Aug. 28, 2008
2 ND	Future Land Use and Road Network	Nov. 5, 2008
3 RD	Urban Transport Development Plan	Feb. 16, 2009
4 TH	JUTI Interim Report	June 2, 2009
5 TH	Route Location Alternatives for Arterials	July 1, 2009
6 TH	Environmental and Social Consideration	Aug. 18, 2009
7 TH	Pilot Project and Capacity Development	Oct. 30, 2009
8 TH	Draft Final Report Presentation	Dec. 15, 2009

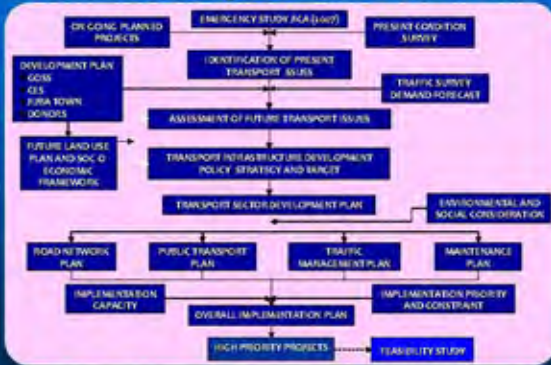
Study Component(1/2)

- **PART I GENERAL**
 - Introduction
 - Administration and Physical Profile
 - Present Urban Transport Infrastructure
- **PART II URBAN TRANSPORT DEVELOPMENT MASTER PLAN**
 - Transport Development Policy and Target
 - Traffic Demand Forecast
 - Road Network Development Plan
 - Public Transport Development Plan
 - Traffic Management System Development Plan
 - Environmental and Social Consideration
 - Proposed Project Implementation System
 - Proposed Road Maintenance System
 - Overall Implementation Plan

Study Component(2/2)

- **PART III PRE-FEASIBILITY STUDY**
 - Formulation of Urban Street Maintenance System
 - Urban Street Improvement in CCD
 - Route Location Study of Major Arterials
 - Urban Street Network Development in Southern Sudan
- **PART IV BRIDGES AND CULVERTS RECONSTRUCTION PROJECT**
 - Selection of Bridges and Culverts
 - Preliminary Plan and Design
- **PART V CAPACITY DEVELOPMENT THRU PILOT PROJECT**
 - Pilot Project Implementation
 - Capacity Development plan
- **CONCLUSION AND RECOMMENDATIONS**

Procedure of Transport Master Plan Formulation



Topographic Map



Socio Economic Framework

Item	2008	2015	2025	
Population	260,000	520,000	950,000	
Working Population	42,000	106,000	240,000	
GRDP(US\$ million)	140	540	2,540	
GRDP per Capita(US\$)	530	1,030	2,670	
Land Demand (ha)	Residential	1,800	3,600	6,660
	Commercial	40	160	300
	Business	30	150	340
	Industrial	10	50	110
	Institutional/ Religious	180	270	420
	Military	300	300	300
	Transport	380	720	1,290
Agri./Rec./ Green/ Open	1,330	2,450	4,580	
Total	4,070	7,700	14,000	

Present Road Network



Proposed Urban Road Network



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Proposed Standard Cross Section



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Traffic Efficiency (Year 2015)



Traffic Assignment
In Do-Nothing Case



Traffic Assignment
With Project Case

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Traffic Efficiency (Year 2025)



Traffic Assignment
In Do-Nothing Case



Traffic Assignment
With Project Case

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Public Transport Development Plan

- Existing Condition and Problem
- Planning Direction
- Bus Network and Terminal Improvement Plan
- Taxi System improvement Plan

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Proposed Bus Network and Bus Terminals



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Proposed Taxi System

1. Present Situation

Mode	Main User	Assignment	Remarks
Taxi	Middle income level	On demand use, middle or long trip (all weather)	Fare is not fixed; based on the nego. The fare for within city 40SDG.
Motorbike	low income level	On demand use, short or middle trip (under fine weather)	Fare is not fixed; based on the nego. The fare for within city is 3 SDG.

2. Proposed Taxi System

- Registration System in order to control the taxi service operation
- Strengthen of the taxi driver's education for traffic safety
- Introduction of a designated zone for motorbike-taxi as a feeder transport mode to minivan (future)

Proposed Taxi System

3. Introduction of a designated zone for motorbike-taxi (Concept)



Intersection Improvement Plan



Exclusive Left Turn Lane



4. Traffic Safety Education

- Introduction of a System for Traffic Accident Data and Analysis
- Implementation on Periodical Traffic Safety Campaign
- Traffic Safety Education for the Schoolchildren

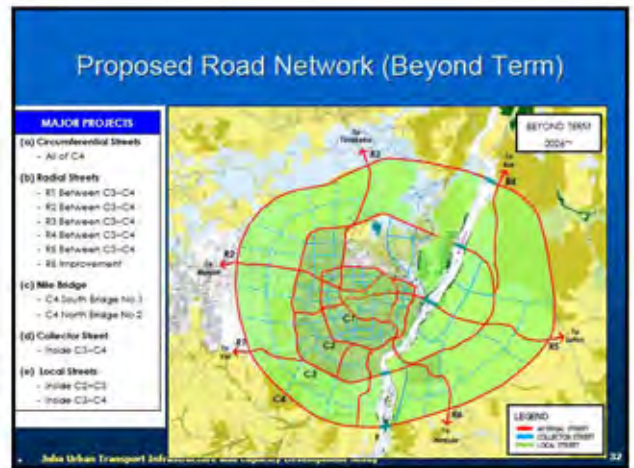
5. Traffic Enforcement

Strengthening the Traffic Enforcement by the Traffic Police

- Ignoring traffic rules
- Ignoring controls by traffic police at junctions
- Illegal on-street stopping/parking at/near junctions, especially minivans and bike taxi

Proposed Overall Organizational Structure





JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) GOVERNMENT OF SOUTHERN SUDAN Ministry of Transport & Roads Ministry of Physical Infrastructure, CES

Juba Urban Transport Infrastructure and Capacity Development Study

FORMULATION OF URBAN STREET MAINTENANCE SYSTEM

8th Stakeholder's Meeting
December 15, 2009

Objectives

- The objective of the study is to formulate the urban street maintenance system, including:
 1. estimation of road length to be maintained,
 2. required maintenance work volume,
 3. necessary equipment/materials/manpower,
 4. annual budgeting plan, and
 5. execution system/organization.

Assumed Scenario

- The study focuses the maintenance system of the MOPI, covering only collectors and local streets, with the following scenario:
 - Maintenance plan for 2012 : Completion of Circumferential Road 1 (C-1), and Radial Roads and Collector Streets within C-1 by 2011.
 - Maintenance plan for 2015 : Completion of C-2 and Radial Roads and Collector Streets within C-2, and Local Streets within C-1 by 2015.
 - Maintenance plan for 2025 : Completion of most parts of the master plan by 2025

Road Improvement Types

Re-surfacing
Gravel Pavement
Asphalt Pavement

Assumed Stage of Road Improvement

Four options of stepwise road improvement are proposed under the condition of limited resources, especially availability of funds.

Options	Resurfaced Road Conditions (RC)	Re-surfaced Road (RS)	Gravel Road (GR)	Asphalt Road (AR)
Options I	RC			AR
Options II	RC		GR	AR
Options III-1	RC	RS		AR
Options III-2	RC	RS	GR	AR

Options	Improvement	Land Use Condition	Traffic Condition
Options I	AC	Normal / Selected Areas	Heavy
Options II	SP - AC	Fast Developing Areas	Heavy
Options III-1	RS - AC	Fast Developing Areas	Light
Options III-2	RS - SP - AC	Normal Areas	Light

Typical Required Road Maintenance Work

Major Roadside Name	Road Type	Category	Services	
			Equipment and Tools	Materials
Local Street	Cleaning (C)	4 worker	Truck, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel
		2 worker	Truck, Sign, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel, gravel and sand
	Graveling (G)	2 worker	Truck, Sign, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel, gravel
		4 worker	Truck, Sign, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel, gravel and sand
Collector Street	Cleaning (C)	4 worker	Truck, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel
		2 worker	Truck, Sign, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel, gravel and sand
	Graveling (G)	2 worker	Truck, Sign, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel, gravel
		4 worker	Truck, Sign, Sweeper, Blower, Vacuum, Sign and Safety Equipment, etc.	Fuel, gravel and sand

Urban Street Maintenance System (1/3)

Proposed Organizational Set-up of MOPI



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Urban Street Maintenance System (2/3)

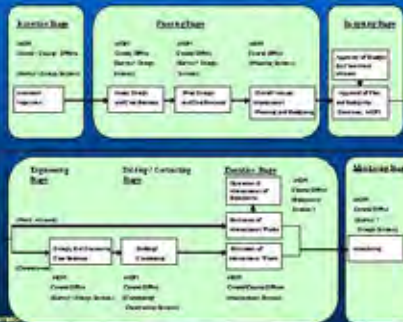
Proposed Management and Maintenance Responsibilities of MOPI

Existing Department	Proposed Department	Proposed Responsibility
Planning	Planning	Planning is to be undertaken to evaluate and prioritize the required works and to conduct budgeting for the succeeding year based on the results of road survey, required maintenance works and cost estimation.
Road Survey	Survey/Design	Survey works shall be conducted to identify the existing condition of roads and to maintain proper records in a database for efficient utilization in planning. Design works shall be undertaken based on adequate knowledge and analysis of existing conditions obtained from the road survey. Cost estimation also shall be conducted for the required works.
Road & Bridges	Construction	Improvement, rehabilitation and new construction works shall be executed by the force-account and/or contract-out basis.
Construction	Maintenance	Maintenance works shall be executed by the force-account and/or contract-out basis.
Maintenance	Mechanical	Equipment shall be allocated to conduct the maintenance work economically, to maintain the equipment in the workshop, and to procure spare parts timely.

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Urban Street Maintenance System (3/3)

Implementation Cycle and Proposed Function of MOPI



Joba Urban Transport

Annual Maintenance for 2012 and 2016 of MOPI (1/3)

The collector and local streets to be maintained by MOPI below include:

Beginning Year 2012: Local and Collector Streets Inside CCD
Beginning Year 2016: Local and Collector Streets Inside CCD plus additional streets inside C1.



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Annual Maintenance for 2012 and 2016 of MOPI (2/3)

Proposed MOPI Annual Maintenance Budget

Street	Total Length (km)	2012				2016			
		Improved		Not Improved		Improved		Not Improved	
		Length	Cost	Length	Cost	Length	Cost	Length	Cost
Collector	116.04	732	35	108.72		35.23	120	90.61	
Local	49.18	1397	40	454.21		70.52	2,400	427.56	
Total	165.22	2129	75	562.93	40	105.75	2,520	518.17	800

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Annual Maintenance for 2012 and 2016 of MOPI (3/3)

Major Equipment for Maintenance Work

The following equipment is recommended to be owned by MOPI for:

- Capacity development of the MOPI, and
- Emergency maintenance works for the collector and local streets

Major Equipment	2012	2016
1. Pick up truck	1	1
2. Tractor	3	10
3. Motor grader	1	2
4. Roller	1	3
5. Wheel loader	1	3
6. Water truck	1	2
7. Road roller	1	4
8. Asphalt paver	1	1

Joba Urban Transport Infrastructure and Capacity Development Study



(d) Mr. Ryuichi Ueno

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Juba Urban Transport Infrastructure and Capacity Development Study

URBAN STREET IMPROVEMENT IN CENTRAL COMMERCIAL DISTRICT (CCD)

8th Stakeholder's Meeting
December 15, 2009

Background

- The Central Commercial District (CCD) is a historical block spreading in the north and south of the eastern section of May Road with an area of about 1.4 km in north-south and about 1.0 km in east-west.
- This area has been developed as a center of Juba town in commercial, business and institutional activities, where Juba Town Market and many State Government offices and private business entities are situated.

Existing Land Use

Objectives

- The objective of the study are:**
 - to prepare a basic plan of the street improvement in CCD and
 - to conduct a pre-feasibility study thereof as a preparatory work for early implementation of the project.

The study includes road inventory, basic strategies and plan, preliminary design, construction plan and cost estimate, environmental impact assessment, economic evaluation and implementation plan at preliminary levels.

Streets Covered by On-going Project

Ongoing Project: Urban Street Rehabilitation Project in Juba

Road Class	Length (km)		
	Total	On-Going	Remaining
Arterial Rd.	0.00	0.00	0
Collector Rd.	2.94	0.78	2.16
Major Local Rd.	4.94	0.00	4.94
Minor Local Rd.	8.78	0.64	8.14
Total	16.76	1.42	15.34

Improvement Policy (1/3)

Role of CCD

CCD is expected to play the following roles:

- center of economic activities in Juba as commercial and business center.
- center of administrative function as the capital of Central Equatoria State while the capital function of the Southern Sudan is concentrated in the GOSS Compound at the west side of May Road.
- expected to be a model area for urban development.

Improvement Policy (2/3)

Development Policy

For CCD to fully play its role, the following are carefully considered:

- Accessibility.** Includes improvement of road network, development of public transport, and improvement of pedestrian facilities.
- Land Use.** Direction for densely developed land use.
- Environment and Amenity.** Provision of sidewalk with lighting, parking facilities, drainage facilities, proper garbage treatment, etc.
- Urban Aesthetics.** In harmony with culture, climate, economies, etc.

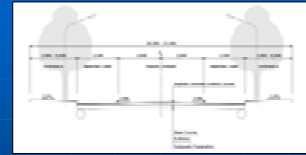
Improvement Level(3/3)

The level of improvement in CCD is set based on the proposed road sections in the master plan and depends on the road class.

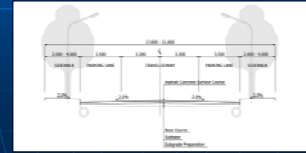
Road Class	Improvement Level							
	1	2	3	4	5	6	7	8
Arterial Street	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
Collector Street	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Major Local Street	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
Minor Local Street	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0

Standard Cross Section(1/2)

Arterial Street

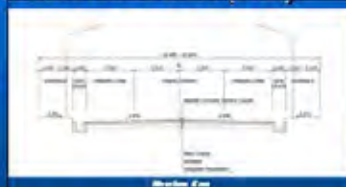


Collector Street

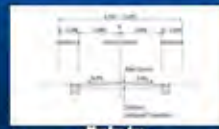


Standard Cross Section(2/2)

Major Local Street



Minor Local Street



Preliminary Design (1/6)

Pavement Type

Road Class	Pavement Type
Arterial Streets	Asphalt concrete pavement (AC)
Collector Streets	Asphalt concrete pavement (AC)
Major Local Streets	Asphalt concrete pavement (AC)
Minor Local Streets	Gravel surfaced (GR)

Preliminary Design (2/6)

Road Facilities

- Roadside Drainage
- Pavement Marking
- Street Lighting
- Greenbelt
- Traffic Sign
- Bus Terminal
- Bus Stop
- Traffic Signal



Preliminary Design (3/6)

Drainage Design

The road drainage layout planning policy shall be:
 to utilize pipe culverts of both sides of arterial and collector streets,
 to utilize open concrete ditches on both sides of local streets, and
 to minimize the length of drainage between the start point and the outlet.



Preliminary Design (4/6)

Traffic Management

The present condition does not require a traffic circulation plan such as one-way street and left turn prohibition. This will be considered in the future when traffic volume increases. Provision of parking lanes in arterial, collector and major local streets is considered in the plan but authorities should strictly control parking within the allocated space.

Preliminary Design (5/6)

Interchange Design

Intersect Loc.	Existing Type	Proposed Intersection Type
Intersect. Item-1	Roundabout	Signalized
Intersect. Item-2	Roundabout	Roundabout
Intersect. Item-3	Roundabout	Roundabout
Intersect. Item-4	Roundabout	Roundabout



Proposed Traffic Signal



For Traffic Signal



Proposed Signal

Preliminary Design (6/6)

Environment Amenity

Improvement of the environment is one of the major issues and considerations for CCD development. Some measures to enhance the environment include:

- provision of sidewalk and greenbelt area for pedestrians for safety and public convenience,
- provision of street lighting for pedestrians and road users,
- proper drainage facilities and waste disposal,
- facilities for handicapped and physically disadvantaged road users,
- facilities for vehicle parking,
- improvement of parks and public places,
- considerations for urban aesthetics thru proper design of buildings and structures, and
- proper arrangement and layout of utilities such as water pipes, electricity, sewerage, etc.

Construction Cost

Summary of Project Cost

Total Project cost is 48 million US\$.

Million US\$

Item Code	Quantity	Unit Price	Total Price	Construction	Other
Urban Street	80	7,014	561,120	561,120	0
Collector Street	814	27,869	22,685,366	22,685,366	0
Major Local Street	817	1,148	938,916	938,916	0
Minor Local Street	340	6,047	2,036,080	2,036,080	0
Total	1,751	46,711	27,641,482	27,641,482	0

Source: Rightline and Computer Simulation

Economic Evaluation

The result of economic analysis indicate the project is feasible.

Indicator	Arterial Streets	Collector Streets	Major Local Streets	Minor Local Streets	All Roads
Net Present Value (NPV) (million US\$)	17.40	-0.56	-0.25	2.31	18.84
Benefit Cost Ratio (B/C)	3.22	0.98	0.97	1.34	1.39
Economic Internal Rate of Return (ERR)	20.0 %	7.7 %	7.7 %	11.9 %	12.4 %

Discount Rate 8%

Thank You

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 Ministry of Transport & Roads Ministry of Physical Infrastructure, CES

Juba Urban Transport Infrastructure and Capacity Development Study

URBAN STREET IN SOUTHERN JUBA

8th Stakeholder's Meeting
 December 15, 2009

Objectives

- The objective of the study are:**
 - To prepare a preliminary alignment and basic plan of the road network in the southern section of Juba following the proposed Road Network Master Plan
 - To establish C3 south and southeast alignment to link R1 (Juba Yei Road) with R6 (Juba Nimule Road), and
 - to conduct a pre feasibility study as preparatory works for the implementation of the road project.

The study includes road inventory, basic strategies and plan, preliminary design, construction plan and cost estimate, initial environmental examination, economic evaluation and implementation plan at preliminary levels.

Study Roads

Road Name	Road Length	Road Length
C2	7.2km	Arterial
C3	11.1km	Arterial
CS A	3.3km	Collector
CS B	2.1km	Collector

Design Policy

- The design policy adopted for roads and structures are:**
 - The road corridor shall follow the ROW recommended in the master plan which is 50m for C2, 60m for C3 and 40m for CSA & CSB. **The full ROW shall be secured at the initial stage.**
 - Considering traffic demand and minimal initial investment, **stage construction shall be applied with 2-lane road at the initial stage.**
 - Road design shall provide proper amenities and ancillary facilities including proper drainage.
 - Intersection layout shall be carefully planned for efficient traffic mobility.**
 - Structures shall be planned consistent with road.
 - Road planning shall consider **minimal environmental impact.**

Standard Cross Section

Arterials C2 & C3

Ultimate Stage Cross Section

Initial Stage Cross Section

Standard Cross Section

Collectors CSA & CSB

Ultimate Stage Cross Section

Initial Stage Cross Section

Preliminary Design

Pavement Design

The preliminary pavement design is carried out based on "AASHTO Guide for Design of Pavement Structures 1993" (AASHTO Guide).

	C-2	C-3	Loligo Rakal Road	Naykaram Rakal Road	
Thickness	Surface Course (S ₁)	19 cm	19 cm	19 cm	19 cm
	Base Course (S ₂)	20 cm	15 cm	15 cm	20 cm
	Subbase Course (S ₃)	25 cm	30 cm	20 cm	25 cm
	Total	65 cm	65 cm	55 cm	65 cm
Structural Number (SN)	3.895	3.442	3.442	3.895	
Required Structural Number	3.775	3.581	3.351	3.738	

Juba Urban Transport Infrastructure and Capacity Development Study

Preliminary Design

Intersection Design

Considering the volume-capacity ratio of intersections for year 2015 and 2025 and the availability of area at the intersections, **the signalized intersection is recommended at all sites.**



Juba Urban Transport Infrastructure and Capacity Development Study

Preliminary Design

Structures Design

- Bridges and Culverts. Road structures for obstructions like streams and rivers are identified and preliminary schemes prepared.



Juba Urban Transport Infrastructure and Capacity Development Study

Preliminary Design

Drainage Design

- Road Surface Drainage.** Road surface drainage is facilitated by L-shaped gutter with catch basin and 900mm ϕ collector pipes.
- Road Side Drainage.** For embankment sections, earth ditches are provided at the toe of the embankment to protect the road from rainfall, floods, etc.



Juba Urban Transport Infrastructure and Capacity Development Study

Preliminary Design

Ancillary Facility Design

Road ancillary facilities and road furniture considered for the preliminary design include:

- Space for Public Utility Services
- Parking Lanes
- Sidewalk
- Greenbelt
- Pedestrian Crossing
- bus bay
- Road markings
- Street Lighting
- Traffic Signals
- Traffic Signs



Juba Urban Transport Infrastructure and Capacity Development Study

Nile River Bridge

Following the alignment recommended in the route location study for C3 Nile River Crossing a pre-feasibility level study of the Nile river bridge is undertaken by:

- Establishing the bridge site location,
- Examining the site condition, river condition, etc.
- Formulating applicable alternative bridge types and schemes based on engineering requirements,
- Examining construction methods, available technology and costs.

Juba Urban Transport Infrastructure and Capacity Development Study

Nile River Bridge



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Bridge Scheme

Alternative bridge schemes include:

- PC Box Girder,
- PC Extradosed Bridge,
- Steel Tied Arch Bridge,
- Steel Truss Bridge,
- Steel Cable Stayed Bridge

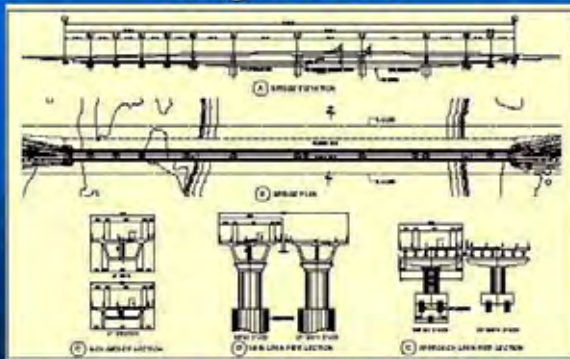
After evaluating the alternatives, possible bridge type for Nile River Bridge is **PC box girder type**.



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Bridge Scheme



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Construction Cost

Summary of Project Scope

Road Section	Road Length (km)	No. of Signalized Intersection	No. of Bridges	No. of Culverts
Circumferential Street C2	7.2	5	2 (L=20m & 35m)	7 (1-cell: 3x3 & 4x3; 2-Cells: 4x3)
Circumferential Street C3	15.1	4	6 (L=20m - 35m; 1-Nile Bridge, L=540m)	6 (1-cell: 4x3; 2-Cells: 3x3 & 4x3)
Collector Street CSA in Lologo	3.3	-	2 (L=20m & 50m)	3 (1-cell: 3x3 & 4x3; 2-Cells: 4x3)
Collector Street CSB in Nyakuron	2.1	-	1 (L=30m)	4 (1-cell: 3x3; 2-Cells: 3x3 & 4x3)

JICA Urban Transport Infrastructure and Capacity Development Study

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Construction Cost

Summary of Project Cost

Item	Amount (USD Million)
1. Construction Cost (Circumferential Street)	
C2 Road	19.54
C3 Road	31.49
Collector Street	
CSA (Lologo Street)	38.81
CSB (Nyakuron Street)	14.83
CSB (KUSA)	231.23
2. Engineering Cost (100% USD and 5%)	18.64
3. Contractor Overhead (1 to 1.6%)	34.74
4. Administative Cost (1 to 2%)	11.89
5. Contingency (1 to 2+ to 10%)	29.43
Grand Total	524.28

JICA Urban Transport Infrastructure and Capacity Development Study

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Economic Evaluation

The result of economic analysis indicate the project is feasible.

Economic Indicator	C2 Road	C3 Road	Lologo Road	Nyakuron Road
Net Present Value (NPV) Million, US\$	18.9	75.8	21.1	11.4
Benefit Cost Ratio (BCR)	1.30	1.49	1.71	1.63
Economic Internal Rate of Return (EIRR)	11.2%	11.7%	14.9%	13.7%

Discount Rate 8%

JICA Urban Transport Infrastructure and Capacity Development Study

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