THE REPUBLIC OF UGANDA

District Road Works

VOLUME

1

Planning Manuals

Manual B:

Annual District Road Inventory and Condition Surveys (ADRICS)

Ministry of Works, Housing and Communications

JUNE 2002

ACKNOWLEDGEMENTS

These manuals have been prepared by the Ministry of Works, Housing and Communications, Uganda.

The aim of the manuals is to complement the Ministry's effort in providing guidance and building capacity of Local Governments to enable them handle their mandated roles in planning and management of the road sector development.

This manual is part of a set titled District Road Works. The set consists of 5 Volumes, each volume comprising a series of manuals covering varying aspects under the following headings:

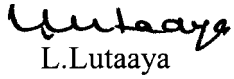
Volume 1	Planning Manuals
Volume 2	Contract Management Manuals
Volume 3	Implementation and Monitoring Manuals
Volume 4	Technical Manuals
Volume 5	District Administrative and Operational Guidelines

The Manuals describe in detail the organization and techniques for planning, implementation and administration of a district road network. The manuals support Government strategies on sustainable maintenance of district roads; they encourage community participation, promote use of labour based methods and gender balance, ensure protection of the environment, foster work place safety and health in implementation of road works by adopting appropriate contracting practices and support the local construction industry.

They are primarily aimed at Road Engineers, Planners and Managers involved in the planning and management of district road works.
In line with the topics covered in these manuals, related training modules have been designed and are incorporated in the curriculum of the Mount Elgon Labour Based Training Centre.

The manuals are the property of the Ministry of Works, Housing and Communications, but copying and local distribution is not restricted.

We wish to acknowledge the efforts of COWI Consulting Engineers and Planners AS who assisted in the compilation of the Drafts and the invaluable support of the Danish International Development Agency for the financial assistance extended to the Ministry in preparing the manuals.



L.Lutaaya
Engineer in Chief / DE

Volume 1 Manual B

Annual District Road Inventory & Condition Surveys (ADRICS)

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General Information

General Information

The purpose of undertaking Annual District Road Inventory and Condition Surveys (ADRICS) is to facilitate identification of the core district road network, and the subsequent selection and prioritisation of those road works that must be planned for and performed during the forthcoming financial year in order to conserve the network in a condition that ensures basic yet reliable all weather access to economic and social services for the maximum possible number of road users.

Conservation of the district road network involves three principle activities including -

- maintenance (both routine and periodic) of all maintainable roads within the network,
- spot repairs and/or rehabilitation of existing and/or potential bottle necks on those core network roads, and, where funds are remaining,
- spot repairs and/or rehabilitation of existing and/or potential bottle necks on those roads outside the core network.

ADRICS, therefore, is a procedure that enables the District Local Government Engineer (DLGE) to collect all data necessary for subsequent use in the selection and prioritisation of those district road works most urgently required and to plan and budget for them accordingly.

Procedures for selection and prioritisation of district road works using a computer software package called Rehabilitation and Maintenance Planning System (RAMPS) are provided in **Volume 1/Manual C**.

An overview of the RAMPS is provided in **Section 4** below.

Section B2
The ADRICS Procedures and Resources Required to Undertake ADRICS

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The ADRICS Procedure

The procedure for undertaking Annual District Road Inventory and Condition Surveys (ADRICS) involves the following activities -

a) A drive through of the entire district road network during the period November/December by the DLGE, together with the Road Inspectors. This timing coincides with the annual planning cycle including the Local Government Budget Framework Paper (LGBFP) process and allows sufficient time for the subsequent selection and prioritisation of district road works and preparation of Work Plans for the forthcoming financial year; refer **Volume 1 / Manual D**.

b) During this drive through, the DLGE's Road Inspectors (RIs) undertake a detailed survey of each and every one of the district roads within the network recording, on forms provided for the purpose (refer data collection **Forms A** and **Form B** below), such details as new road links and structures included in the network since the previous ADRICS, and the actual current condition of all existing roads and their drainage structures. During the drive through, information on major infrastructure (schools, clinics, markets, etc.) served by the roads is also recorded.

c) Immediately following these surveys, the Road Inspectors update the district road maps to include all new district road links and structures built since the last ADRICS, and the locations of all major infrastructure served by the roads.

d) Concurrently with undertaking surveys of the district roads, the DLGE and the Road Inspectors arrange meetings with all sub-counties in the district to determine sub-county preferences and/or priorities in terms of district roads and the most important Community Access Roads (CARs) connecting thereto. This data (refer data collection **Form C** below) will assist with the identification of the core district road network.

e) Following these sub-county meetings, the district road maps are further updated to reflect the sub-county preferences and other relevant information.

On completion of the ADRICS, there shall be a detailed record of all relevant data including -

a) District map of scale 1:250,000, detailing the **District Road Inventory** including the locations of all trunk and district roads, their road numbers and start and end points, locations and types of structures, locations of material sources and other relevant information including locations of important socio-economic facilities such as schools, health units and markets.

b) A second district map sheet of scale 1:250,000, detailing the actual Condition of each link in the network and identifying those links which are (i) in routinely maintainable condition, (ii) requiring periodic maintenance, (iii) needing rehabilitation, and (iv) locations of **Bottlenecks**. Included on this same map are the **Sub-County Preferences** for each and every link within the entire district road network, showing the priority of each district road link from the sub-counties view point, together with the locations of those CARs identified as being most important by the sub-counties. Other relevant data collected during sub-county meetings will also be recorded on this map sheet.

c) Sketch maps of each sub-county, showing the boundaries of the sub-county and the parishes, together with the locations of the sub-county headquarters, the district roads (including their gazetted numbers) within and in the vicinity of the sub-county, the main community access roads and their priority ranking as perceived by the sub-county, all essential socio-economic facilities and sub-county area and population figures.

d) Hard copies of all data collection formats filed by road number including details of the sub-county meetings. Note that many district roads serve more than one sub-county and, therefore, all data from all those sub-counties served by a specific district road should be filed under that road number.

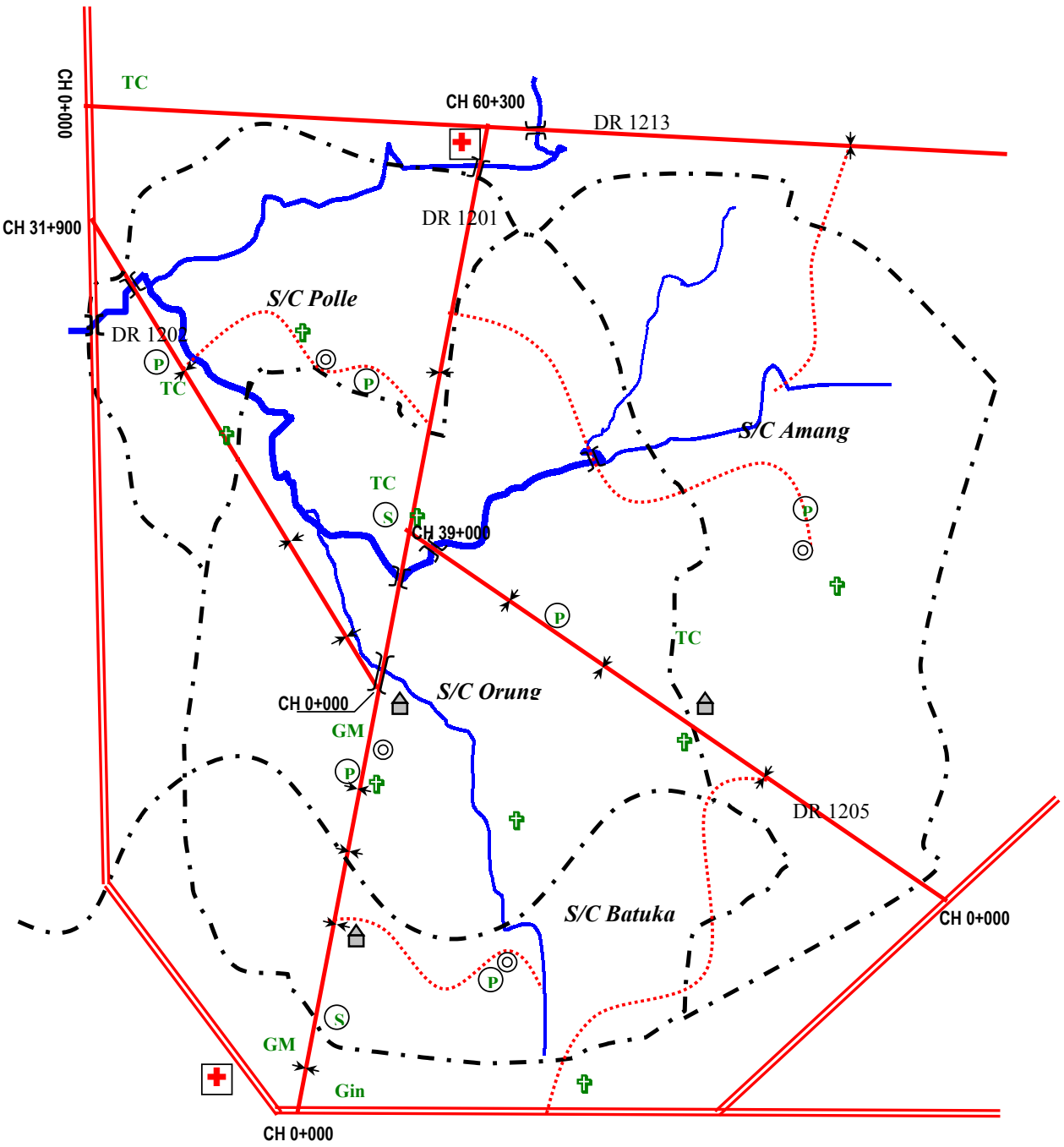
Following completion of the subsequent selection and prioritisation of district road works using the RAMPS (refer **Volume 1 / Manual C**), a third map sheet of scale 1:250,000 will be prepared showing the links included in the **Core District Road Network**, the actual **Condition** of all links and the **locations of Bottle Necks**.

The three maps will be displayed in all offices of the DLGEs staff and used for planning, programming and monitoring of all works to be performed during the financial year.

Please remember that the two map sheets described above detailing, firstly, the **District Road Inventory** and secondly, its **Condition** including the locations of **Bottlenecks** and **Sub-County Preferences** shall be included with and form an important part of the Annual District Road Work Plans (ADRWP); refer **Volume 1, Manual D**.

Typical examples of these two map sheets follow -

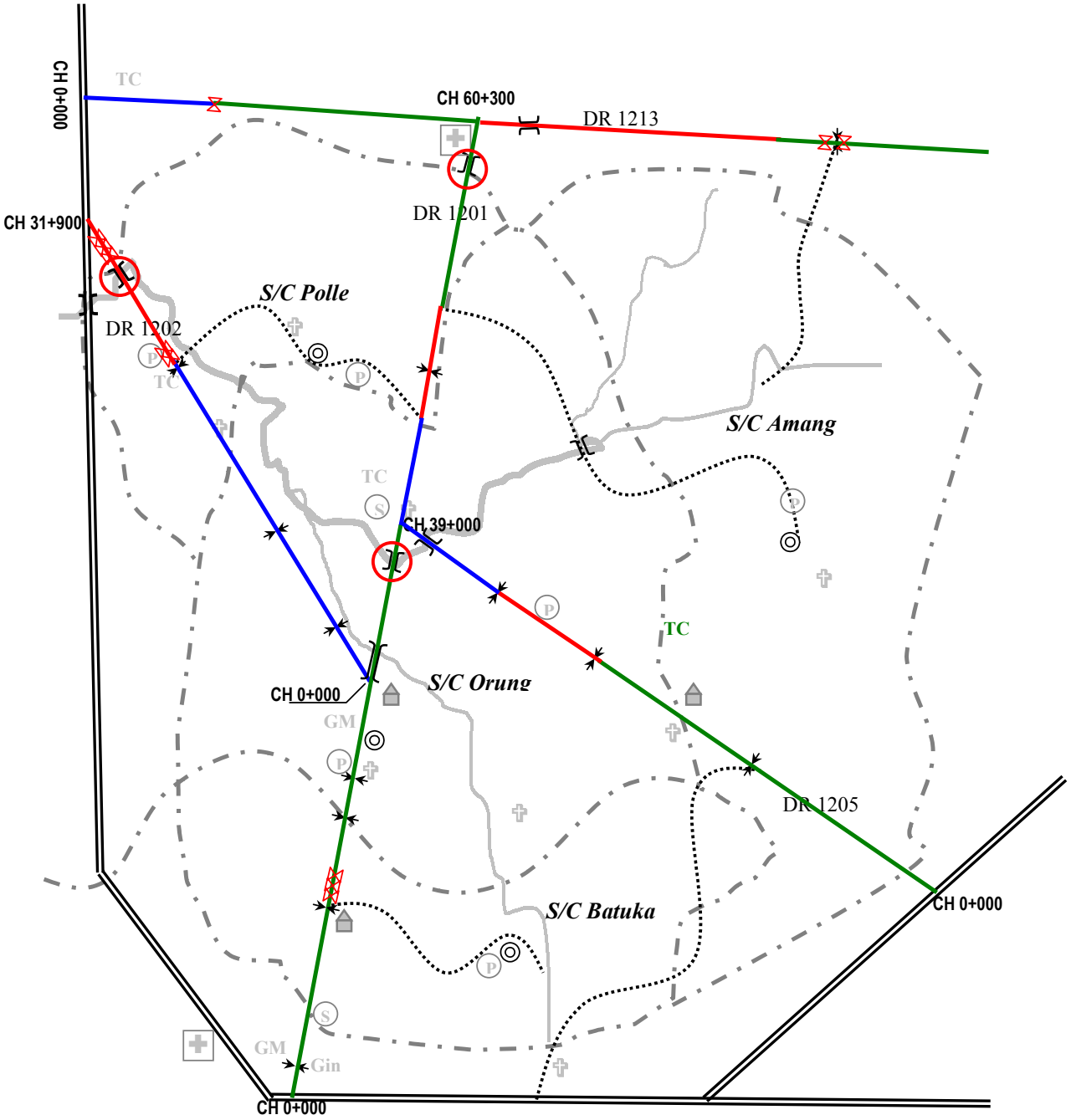
MAP 1: District Road Inventory



Legend

GM; Gin; TC:	Grinding mill; Ginnery; Trading Centre		Sub-County boundary
H	Health Unit; Hospital	◎	Sub-County HQ
P S	Primary, Secondary School		Community Access Road
	Church; Factory	DR 1205	District Road and No.
	Road Structures		Trunk Road

MAP 2: District Road Condition



Legend

- Sub-County boundary
- Community Access Road
- Trunk Road
- Road Structures; Major repair needed
- Routine Maintainable section
- Periodic Maintenance required
- Rehabilitation required
- Bottleneck / Major Repair required

Resources Required to Undertake ADRICS

Experience from Uganda and other neighbouring countries indicates that it is possible to undertake ADRICS at an average rate of about twenty (20) kilometres per day assuming the availability of a minimum of two trained staff within the DLGEs office and one reliable vehicle having a functioning trip metre (odometer) with a 100 metre calibration. This average rate includes the time necessary to undertake inventories of both the district roads and their structures, convene and attend sub-county meetings, and record and file all relevant data.

Data entry into the RAMPS is considered an additional time consuming activity and is included in the subsequent procedure for the Selection and Prioritisation of District Road Works.

A district with about 400 kilometres of district roads should, therefore, be able to complete their ADRICS in about 20 working days with the following resources -

- one vehicle with functioning odometer and driver,
- one trained DLGE staff member, preferably the Road Inspector responsible for the road links being surveyed, facilitated with the necessary stationary including the data collection formats, district maps sheets and basic measurement instruments.
- one assistant/labourer to clear vegetation at structures in order to fully assess condition.

> *It is essential that the DLGE include in the Annual District Road Work Plans, an adequate budget for undertaking ADRICS including the subsequent data management using RAMPS and ensure that these funds are used solely for this purpose.*

Section B3
Data Collection Formats & Procedures

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Data Collection Formats & Procedures

Data collection **Forms A**, **B** and **C** have been specifically prepared to facilitate the accurate collection and recording of all information necessary for regular updating of the district road **Inventory**, determination of the current **Condition** of each and every link within the network and the locations of **Bottle Necks**.

Each of these Forms is described in detail below together with instructions on how best to collect and record the required data.

DLGEs are encouraged to undertake training at the beginning of every ADRICS to ensure those responsible are familiarised with the survey procedure and the data collection and recording requirements.

FORM A - ROAD SECTION CONDITION ASSESSMENT FORM

Information!
A copy of Form A is provided below.

The purpose of **Form A** is twofold; firstly to record the data necessary for updating the district road **Inventory**, and secondly, to record information regarding the current **Condition** of the road link. This data will be used as the basic input to RAMPS for subsequent classification of the link as part of the core or non-core network, identification of its maintainability, and the prioritisation of any spot improvement and/or rehabilitation works required.

The details included in the heading regarding District Name, Road Number, etc., are self explanatory.

Only one district road link shall be recorded on one form and it may be necessary to have a number of pages of Form A to record all data on one road link. These multiple pages shall be clearly marked as being sheet 2 of 3, 3 of 5 and so on; provision is made for this on the bottom right-hand corner of **Form A**.

ROAD SECTIONS -

During implementation of the ADRICS, district roads are broken into **Sections** and a clear understanding of the need for having Sections and the rules for locations of **Section Breaks** is most important; refer Form A, columns (i) Road Section Number, (ii) Road Section, Chainage Start (km), (iii) Road Section, Chainage End (km), and (iv) Road Section Length (km).

To understand the need for Sections and Section Breaks, it is necessary to understand how the RAMPS computer software package works or 'thinks'. An overview of the RAMPS is provided in **Section B4** below. In summary, RAMPS looks at individual Sections of a district road link and makes decisions, based on the data recorded on Form A, regarding its maintainability, whether or not a 'Bottle Neck' exists and so on.

For simplicity, the fundamental rules regarding the location of **Section Breaks** follow -

- The ADRICS chainage **start point** of a district road constitutes a Section Break.
- The ADRICS chainage **end point** of a district road also constitutes a Section Break.
- The chainage point of a **junction** with any other road (trunk, district or community access) constitutes a Section Break.
- The chainage point at which the district road crosses a **sub-county border** constitutes a Section Break.
- The chainage point at which there is a significant **change in Condition** of the drainage, shoulder and/or surface characteristics of the road constitutes a Section Break.
- The chainage point at which occurs a significant **physical change** in pavement type, terrain type and/or road cross-section geometry constitutes a Section Break.
- A convenient chainage point at the market or other important public building (including a sub-county office) in any village or town constitutes a Section Break.

CAPTURE OF ROAD INVENTORY DATA -

In Form A, Columns (v) to (xv) are for recording specific types of information concerning the district road link with column (xvi) reserved for comments.

Columns (v) to (ix) are concerned with data related to the road surface type, when the road was last surfaced (for gravel surface roads only), the surfacing material type and its proximity to the district road, and the traffic volume carried by the road link. 0 and, if so, the likely costs thereof.

CAPTURE OF ROAD CONDITION DATA -

Columns (x) to (xiv) are concerned with the **actual condition of the district road link at the time of undertaking the ADRICS**.

Information is recorded during the drive through regarding the actual condition of the drainage system on both left and right sides of the road, columns (x) and (xi), actual condition of the left and right side shoulders, columns (xii) and (xiii), and the actual condition of the road surface, column (xiv).

Column (xv) is used to record the chainage of any **Bottle Neck** which inhibits access to motorised vehicles and column (xvi) provides the opportunity for those recording data to elaborate on matters concerning bottle necks, names of sub-counties through which the road passes, and so on.

There will often be occasions where column (xv) is used to indicate a bottle neck caused by a damaged or missing drainage structure; the specific details of which will be elaborated on **Form B** - Structures Inventory/ Condition Assessment Form.

LOOK-UP TABLES (FORM A1)

Data is recorded in Form A, using a **coding system** that provides information in a numbered or factor format that can be interpreted by RAMPS during subsequent data analysis for selection and prioritisation of district road maintenance operations, spot repairs and rehabilitation works; please refer to **Volume 1 / Manual C**.

A coding or factor in the form of a number between 1 and 4 is used to describe the observed condition assessment for each of those items included in columns (v) and (vii) to (xiv).

Column (vi) is used to record the actual year of the most recent resurfacing operation.

Column (xv) is used to identify a bottle-neck and should be filled with the word 'yes' or 'no'.

A clear understanding of the condition definitions included in the Look-Up Tables, and consistency in both the interpretation of these definitions, and the recording of condition data, particularly that related to Drainage Condition, Shoulder Condition and Surface Condition, is most important.

Where reliable and consistent data is provided as input, the RAMPS output reports concerning identification of core district road links, their level of maintainability and the priorities for spot repairs and/or rehabilitation will also prove reliable.

Information!
The coding system for recording data on Form A is detailed in the Look-Up Tables, a copy of which are provided below.

FORM A - WORKED EXAMPLE

A worked example of Form A is provided below, demonstrating the following -

- convention for identification of Section Breaks - columns (i) to (iv),
- method for use of factor numbers to describe the road section condition assessment - columns (v) and (vii) to (xiv),
- means for identification of Bottle Necks, column (xv), and use of column (xvi) for comments.

Information!
A worked example of Form A is provided below

RAMPS

ROAD SECTION CONDITION ASSESSMENT FORM

Form A

District Name: _____ **Road Number:** _____ **Road Name:** _____

Assessed by: _____ **Assessment Date:** _____ **Road Length:** _____ **km**

Section breaks required at:
Any change in road condition
Sub-County boundary
Intersection with other roads

Road Sect. No	Road Section Chainages (km)		Rd Sect. Length (km)	Road Surface Type	Year Last Surfaced	Surface Material Factor	Material Proximity Factor	Traffic Group Factor	Drainage Cond. Factor		Shoulder Cond. Factor		Surface Cond. Factor	Bottle Neck Yes/No	Comments (particularly concerning Bottle Necks)
	Start	End							left	right	left	right			
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	(xii)	(xiii)	(xiv)	(xv)	(xvi)

Notes: Refer to "Look-Up" Tables in **Form A1** for Factor Coding and Definitions.
Bottle Necks must be fully described in column **P** including their chainage and details thereof.

SHEET:___of ___

ROAD SECTION CONDITION ASSESSMENT - LOOK-UP TABLES

(v) ROAD SURFACE TYPE

1	Earth	Not gravelled in last 5 years
2	Gravel	Gravelled in last 5 years
3	Paved	

(vii) SURFACE MATERIAL FACTOR

1	Good	Surface wears steadily
2	Fair	Surface wears quickly
3	Poor	Surface damages quickly

(viii) MATERIAL PROXIMITY FACTOR

1	Near	Haul 0-5 km
2	Average	Haul 5-15 km
3	Far	Haul > 15 km

(ix) TRAFFIC GROUP FACTOR

1	Very Light	< 20	vehicles/day
2	Light	20 - 30	vehicles/day
3	Medium	30 - 40	vehicles/day
4	Heavy	> 40	vehicles/day

(x) & (xi) DRAINAGE CONDITION FACTOR

1	Good	No water on the road during rain; No erosion or silt deposits; good roadside drainage
2	Fair	Some water on the road during rain; some erosion/scouring in roadside drains, or drains half silted
3	Poor	Much water on the road during rain; severe erosion/scouring in roadside drains, or drains fully silted
4	Bad	Non existing/non functioning drainage system

(xii) & (xiii) SHOULDER CONDITION FACTOR

1	Good	Good shape, allowing easy runoff from the road surface into the roadside drains; shoulder not eroded
2	Fair	Uneven shape, but allowing most water to run off the road surface into the roadside drains; some erosion of shoulder
3	Poor	Poor shape and seriously restricts water to run off the road surface into the roadside drains; severe erosion of shoulder
4	Bad	Non functioning or non existing

(xiv) SURFACE CONDITION FACTOR

		Roughness:
1	Good	< 8 m/km ; good shape, smooth running surface
2	Fair	9-14 m/km ; reasonable shape, corrugations and potholes up to 10 cm deep
3	Poor	15-18 m/km ; Poor shape, frequent depressions, rutting and potholes >10 cm deep
4	Bad	>18 m/km ; bad shape, deep depressions and potholes, serious rutting, 4WD-dry weather only

INFORMATION TO BE PLOTTED ON THE DISTRICT MAP

H	Hospital	(M)	Main Market
✚	Other Health Unit	(l)	Local market
P	Primary School	▲	Factory, Ginnery
S	Secondary School	- - - -	Community Access Road
✞ ♉	Church, Mosque		

(xv) BOTTLENECK

- Any section of the road that needs emergency repair
- Broken or missing structures (bridge, culvert, etc.) that restricts access

Column OTHER PARAMETERS:

(ii) & (iii)	Chainage in meters
(iv)	Section length (km) = (iii) - (ii)
(vi)	Year of last surfacing operation
(xvi)	Comments

Additional Data relating to this Road
1. Attach *Strip Map o*f the road, showing all facilities on and near the road
2. Attach all Inventory sheets of structures on this road; **Form B**
3. Attach all Sub-County Inventory sheets relevant to this road; **Form C**
4. Attach Sub-County Sketch map

RAMPS

ROAD SECTION CONDITION ASSESSMENT FORM

Form A

District Name: Lira **Road Number:** 2002 **Road Name:** Lira Border to Mpigi Town

Assessed by: Paul Seguya **Assessment Date:** 15/08/2000 **Road Length:** 9.500 **km**

Section breaks required at:
Any change in road condition
Sub-County boundary
Intersection with other roads

Road Sect. No	Road Section Chainages (km) Start	End	Rd Sect. Length (km)	Road Surface Type	Year Last Surfaced	Surface Material Factor	Material Proximity Factor	Traffic Group Factor	Drainage Cond. Factor left	right	Shoulder Cond. Factor left	right	Surface Cond. Factor	Bottle Neck Yes/No	Comments (particularly concerning Bottle Necks)
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	(xii)	(xiii)	(xiv)	(xv)	(xvi)
1	0+000														Start point - Sub-county Okwang, Lira border
		1+100	1.100	2	1997	2	1	3	2	2	2	2	2	**no**	Condition change point
2	1+100														
		1+800	0.700	2	1997	2	1	3	3	3	3	3	3	**no**	Sub-county Office and Condition change point
3	1+800														
		2+500	0.700	2	1997	2	1	2	2	2	2	2	3	**no**	Change in Road Surface type
4	2+500														
		3+500	1.000	3	o	2	1	2	2	2	2	2	3	**no**	Junction with Community Access Road
5	3+500														
		4+600	1.100	3	o	2	2	2	2	2	3	2	3	**no**	Sub-county border Okwang / Lowero
6	4+600														
		6+200	1.600	3	o	2	2	2	2	2	2	2	3	**no**	Junction with District Road No 2004
7	6+200														
		6+800	0.600	3	o	2	2	1	2	2	2	2	3	**Yes**	Damaged Bridge - impassable during rain
8	6+800														
		7+700	0.900	3	o	2	2	1	2	2	2	2	3	**no**	Condition change point
9	7+700														
		8+400	0.700	3	o	2	2	1	3	3	3	3	3	**no**	Moroto Village Market
10	8+400														
		9+500	1.100	3	o	2	2	1	3	3	3	3	3	**no**	Mpigi Town, End point - dead end road

Notes: Refer to "Look-Up" Tables in **Form A1** for Factor Coding and Definitions.
Bottle Necks must be fully described in column **P** including their chainage and details thereof.

FORM B - STRUCTURES INVENTORY / CONDITION ASSESSMENT FORM

Information!
A copy of Form B is provided below

The purpose of **Form B** is twofold; firstly to record the data necessary for updating the district road structures **Inventory**, and secondly, to record information regarding the current **Condition** of the structures.

The details included in the heading are self explanatory.

It is important that, for each and every district road, there is an accurate Inventory of all structures. The details required are those recorded in Form B, and include -

- the structure type, column (ii) and Look-Up Table of **Structure Types** at the foot of Form B,
- location or chainage of the structure, column (iii),
- for bridges only, the number of spans included, column (iv),
- for bridges only, the width of the deck, column (v),
- in the case of a bridge, the total length of the deck including all spans, column (vi) or in the case of a culvert, the length of the structure across the roadway including headwalls (if any), and where skewed, the total skewed length, column (vi),
- for culverts only, the number of openings, column (vii),
- for culverts only, the size of the openings (width by height for box culverts and the diameter for pipe culverts), column (viii),
- for culverts only, the existence or otherwise of headwalls, column (ix),
- for all structures, their current condition, column (x) and Look-Up Table of **Condition** at the foot of **Form B**, and
- details of work to be done and relevant comments, column (xi).

FORM C - SUB-COUNTY INVENTORY

Information!
A copy of Form C is provided below

The purpose of the inventory at sub-county level is to capture the preferences and priorities of the sub-county in accessing the district roads and the most important community access road links, feeding into the district roads. The information from the sub-county will inform the selection and prioritisation methodology for district roads in terms of (i) the **population served** by the district road and (ii) the importance of the district roads in the network.

PREPARATION FOR THE SUB-COUNTY INVENTORY -

Form C is used to guide the inventory at the sub-county.

Before starting work in the sub-counties, it is necessary for the DLGE and RIs, in consultation with the Community Development Officer (CDO), to prepare a sub-county visitation programme.

The DLGE should write a formal letter to each of the sub-county Chiefs and copied to the LCIII Chairpersons, requesting the sub-county to organise a ***key-informants*** meeting. The letter should (i) explain the purpose of the inventory, (ii) propose the people to be invited to the meeting, (iii) propose a date and place for the interview and (iv) request the sub-county to collect all possible information in preparation for the meeting including population data, sub-county area and so on - refer **Form C**.

The Key-informant group should include; the sub-county Chief, the LCIII Chairperson, the Secretary of Works (General Purpose) Committee, the Community Development Assistant (CDA), representatives from the Development Planning Committee, and representatives from all Parishes and concerned Interest Groups in the sub-county.

Prior to commencing the programme of sub-county visitations, it will also be necessary for the DLGE and Road Inspectors assisted by the CDO and district planning department staff to prepare the following -

- collection of secondary information related to each of the sub-counties including population figures, area, and other relevant information, and
- preparation of sub-county maps for each of the sub-counties, which could be photocopied enlargements of the district maps (or, where existing, 1:50,000 scale topographic maps) with the sub-county boundaries and the district roads, crossing or passing nearby the sub-county, highlighted.

INVENTORY IN THE SUB-COUNTY -

Cost effectiveness, population data and area of influence

The ***cost effectiveness*** of a road is expressed as the number of people served by the road over the investment costs necessary to conserve the road in a condition providing basic yet reliable all-weather access. The greater the number of people served by the road per unit conservation cost, the higher the cost effectiveness.

To establish the cost effectiveness of a road, two parameters are therefore important: the ***population*** and the ***area of influence*** of the road. Where possible, the sub-county inventory should make clear were people live by plotting the population distribution on the sub-county map. The area of influence of a road is generally taken to include a four kilometre strip of land on both sides of the road for the entire length of the road.

RAMPS

STRUCTURES INVENTORY / CONDITION ASSESSMENT FORM

Form B

District Name: _____ **Road Number:** _____ **Road Name:** _____

Assessed by: _____ **Assessment Date:** _____ **Road Length:** _____ **km**

Struct. No	Structure Type (see below)	Location (chainage)	No of Spans (bridge only)	Width (m)	Length (m)	No of openings (culvert only)	Size of openings (culvert only)	Head walls (Y/N)	Structure Condition (see below)	Details of Work to be Done / Comments
(I)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)

STRUCTURE TYPES								
A	R/C bridge	**D**	Steel Truss bridge	**G**	Concrete pipe culvert	**J**	Vented ford
B	Composite bridge	**E**	Timber bridge	**H**	Steel pipe culvert	**K**	Drift
C	Bailey bridge	**F**	Other Bridge type	**I**	Concrete box culvert	**L**	Other structure type

CONDITION	
1	Good (no work required
2	Fair (minor work required)
3	Poor (major work required)
4	Bad (in danger of failure/failed)

SHEET: ___of ___

RAMPS

SUB COUNTY INVENTORY

Form C

Sub-County: *Adagimon* **District:** *Lira*

Collected by: *F. Ongia* **Date:** *11* / *5* / *2001*

1) **Sub County Population (no):** *27,632* **(source:** *LDDP, SC profile* **dated:** *1999* **)**

2) **Sub County Area (km²):** *72.6 km* **(source:** *Survey Department* **dated:** *1978* **)**

3) **List all District Roads that are used by the Sub-County *in their order of Priority*:**

District Road Name (from-to)	Road No	Reason for Priority	
Amach - Erate	*DR#*	*2*	*Access to school and market in Bar (Erate South)*
Agwata - Amach - Akals - Lira	*DR#*	*1*	*Most direct access to Lira, ginnery in Aits*

4) **List the *main* Community Access Roads of the sub county, feeding into the district road and/or trunk road network *in their order of Priority* and mark these on the map (See 6 below)**

Community Access Road Name (from-to)	Approximate length	Feeding into District Road (No)
Adweni - Amach (6.8 km)	*6.8 km*	*DR# and DR# intersection*
Agwata - Amach (15.3 km)	*15.3 km*	*-do-*
etc.		

5) **What is the number of labourers availabler for road works in the Sub-County and in what season/months?**

Season	Month(s) - from to	Number of Labourers
All year		*3000*

6) **Prepare a sketch map of the Sub-County showing:**
- **Administrative boundaries and names: Sub-County, Parish**
- **Residential Area**
- **District Roads (and No) and Community Access Roads**
- **Socio-Economic Services/Facilities including - (I) Primary & Secondary schools**
  (II) Health Facilities (Dispensaries, HC, Hospitals, etc)
  (III) Markets
  (IV) Ginneries, Factories, etc.

Area of the Sub-County

This information is needed to establish the average population density of the sub-county. The computer programme RAMPS, used to record the road inventory and determine the level of importance (prioritisation) of each of the district roads, uses the population density and area of influence to calculate the population served per road link. Knowing the sub-county area also allows for the calculation of road density per sub-county; an important indicator of access and/or isolation.

Information on sub-county areas and population is available at the district CDO and Planning offices, but should be obtained and thereby confirmed during the sub-county interviews.

Ranking of roads

During the sub-county interviews, two types of roads are to be assessed in terms of their priority for the sub-county; ***District*** Roads (DRs) and ***Community Access Roads*** (CARs).

District roads are those roads that fall under the responsibility of the District. The district road network provides links between district towns, sub-counties and to the higher-level trunk road network. CARs are the roads under responsibility of the sub-county and link the parishes to each other, the sub-county headquarters and to the higher level road networks including both the district and trunk roads.

To people living in the sub-counties, both road types are important; CARs provide internal access to administrative and socio-economic facilities, and to the district road network, while DRs provide access to major socio-economic facilities, to the main administrative centres, and the higher road network.

The Annual District Roads Inventory and Condition Survey (ADRICS), is designed to prioritise district roads, identify the ***Core Network*** and determine the resource requirements necessary for its conservation. The ADRICS makes an inventory of all district roads in terms of their condition and level of service, but these roads also need to be assessed against the priority given by the same people who make use of them.

It is therefore essential that the ADRICS includes an inventory that embraces the preferences of the sub-counties and the reasons for using both the DRs and the CARs that provide access to and/or connect with the DRs.

The sub-county Inventory is designed to do this. **Form C** provides tables to capture the necessary data and the sub-county maps provide visualisation from where and to where people move and for what reason.

Ranking of district roads (DRs)

Form C, **Part 3** presents a table that captures information on DRs –

3) **List all District Roads that are used by the sub-county in their order of priority:**

District Road Name (from-to)	Road No	Reason for priority

The DRs that are to be listed include; (i) all those that pass within the sub-county, and (ii) all those that pass outside the sub-county but are directly accessed via CARs from within the sub-county.

The "Road No" is the official number of the DR.

The third box, "reason for priority" is used to clarify why the road is important to the sub-county, e.g. main road to the district HQs, or: Access to health centre in ..... and market in ....., etc., and the order of the listing should present the ranking in priority or importance for the sub-county.

The priority ranking of the DRs should be established through discussion with the key-informant group and after establishing their order of priority, they should be added to the sub-county map.

> ***An important note***: *It could be that a DR is given a low priority, although is appears to provide the most direct access to, for example, the district HQs. It is important therefore, to find out why this DR is given a low priority. It could be, that it is in such a poor state and/or condition (access constraining bottlenecks), that people are inhibited from using it. However an important question that should be asked is, if the DR was accessible, what then would be its priority?*

The opposite could also possible; a DR is given a high priority but is in fact not accessible because of, for example, a collapsed bridge. The priority in this case reflects the importance of this road, if it would be accessible.

The above two examples show that it is crucial to understand the condition of the DR and whether or not it is accessible. The ADRICS will determine this and the sub-county map and Form C, Part 6 is used to note this type of information together with any additional information that may be relevant.

Ranking of community access roads (CARs)

Form C, Part 4 presents a table that captures information on CARs –

4) List the main Community Access Roads of the sub-county, feeding into the district road and/or trunk road network in their order of Priority and mark these on the map (see 6 below):

Community access road name (from-to)	Approx. length	Feeding into district road no:

The CARs that are to be considered are only those that directly feed into a DR, either within or outside the sub-county; in other words, those CARs that provide direct external access.

Similar to the ranking of DRs, the CARs should be listed in order of priority; starting with the most important CAR and their approximate length and location recorded on the sub-county maps.

The last box of the table contains the official/gazetted number of the DR to which the CAR provides access.

Although the CARs to be ranked are restricted to direct external access links, the number of CARs to be considered can still be great. This could make ranking of these roads somewhat cumbersome. A useful tool for prioritising CARs is called ***pair-wise ranking*** and is further discussed below.

Technique for ranking CARs

Where there are more than four CARs to prioritise, it is advised to use the pair-wise ranking technique.

In this technique, each road is compared against each of the other roads in turn, to assess whether it is of greater or lesser importance/priority.

In the sub-county Inventory, only those CARs that provide direct external access to the DRs shall be included in this prioritisation process.

Use of the pair-wise ranking **Diagram** for prioritisation, including example CAR data, is shown below.

Sub-County: *Ameko* District: *LIRA*

Ranking of: ***District Roads / Community Access Roads***

Omit A	B: S/C HQ - DR 103	C: Amako Parish - S/C HQ	D: S/C HQ - DR 101	E: Motiko Parish - DR 102	F: Awale Parish - Amako Parish	G:	H:	I:	J:	←SCORE
A: Junction DR102 - Erute P/S	B	A	D	A	A					3
B: S/C HQ - DR 103		B	B	B	B					5
C: Amako Parish - S/C HQ			D	C	C					2
D: S/C HQ - DR 101				D	D					4
E: Motiko Parish - DR 102					F					0
F: Awale Parish - Amako Parish										1
G:										
H:										
I:										
J:										

SUMMARY:

1st : S/C HQ - DR 103 (B)	6th: Motiko Parish - DR 102 (E)
2nd: S/C HQ - DR 101 (D)	7th: --
3rd: Junction DR102 - Erute P/S (A)	8th: --
4th: Amako Parish - S/C HQ (C)	9th: --
5th: Awale Parish - Amako Parish (F)	10th: --

On the vertical axis, all important CARs (including the DRs to which they connect together with their official/gazetted road numbers) are written in any order in the space behind the capital index letters (A to J).

On the horizontal axis, this listing is repeated in the same order but with omission of the CAR assigned to A.

Road A (vertical axis) is compared against road B (horizontal axis). If A is considered less important than B, then "B" should be written in the box as shown in the above diagram; if A is considered more important than C then "A" is written in the box, and so the procedure continues.

The Score column counts how many times "A", "B", etc., is noted in the whole diagram.

The summary table can then be completed, listing the roads in order of priority and this information is then copied to **Form C, Part 4**.

While discussing the comparative importance of each CAR, the interviewer should establish the reasons for the priority of each road and these reasons noted accordingly on **Form C**.

Labour availability

Form C, Part 5 presents a table that collects information on the number and seasonal availability of labour. This information is useful to programme district road works, using labour intensive techniques and determining the potential for community contracts in road maintenance.

Sub-County Mapping

For some districts of Uganda, sub-county maps are available from the Bureau of Statistics, Entebbe. Where such maps are not available, the RIs will need to improvise and, as already mentioned above, prepare sub-county maps from photocopied enlargements of the district maps.

These sub-county maps will be updated by the RIs, assisted by the CDAs, during the sub-county interviews and the following additional information recorded -

- administrative boundaries of the sub-county including all Parishes,
- location of the sub-county headquarters,
- locations of all DRs (and their gazetted numbers) running through or passing nearby the sub-county,
- boundaries of population areas and the approximate number of people,
- the CARs in the sub-county that have a direct link to a district road,
- the main socio-economic facilities within the sub-county,
- the priority for each DR (expressed in capital roman numbers (I, II, III, etc.),
- the priority of each CAR (expressed in normal numbers (1,2, etc.), and
- any other relevant data.

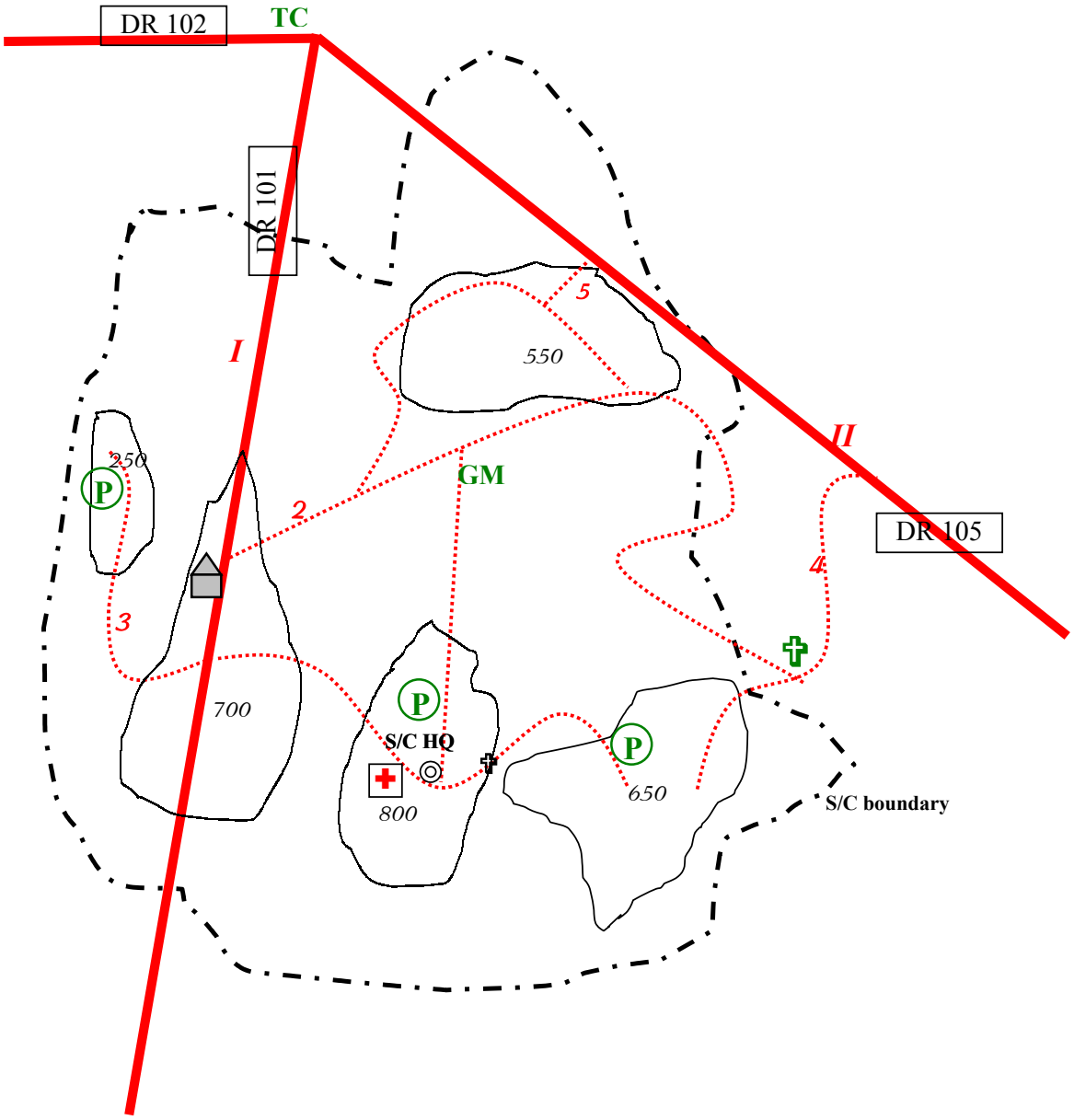
The recommended technique for preparing maps in the field is by the use of flip-chart sheets and colour markers. If the key-informant group is large, it may be useful to first compile a sketch map on the ground, using sticks and stones to symbolise features and then transfer this information to a flip-chart sheet for subsequent discussion.

Upon completion of the sketch map, the information is copied by the RIs to an A3 size sheet, which is then filed into the DLGE's hard copy ADRICS ring-binder file.

The flip-chart map should remain with the sub-county Works Committee for future use.

An example of a **typical sub-county sketch map**, with the appropriate symbol keys, is shown below together with a worked example of **Form C** and a blank copy of the **Diagram for Pair-Wise Ranking**.

Typical Sub-County sketch map



Legend

GM; Gin; TC:	Grinding mill; Ginnery; Trading Centre
H	Health Unit; Hospital; Factory
P S	Primary, Secondary School
	Church; Mosque
650	Residential area and population
	Sub-County boundary
	Sub-County HQ
3	Community Access Road; S/C priority
DR 105 I	District Road and No; and S/C priority.
	Trunk Road

Responsibilities and Procedures

The sub-county inventory is an essential component of the ADRICS procedure and must be undertaken in all sub-counties within the district.

The sub-county inventory informs the ADRICS on local preferences and priorities in accessing DRs and provides detailed information on the use and location of all important roads and facilities served.

The DLGE, Supervisor of Works (SoW) and RIs need to co-ordinate all activities in close co-operation with the CDO, who in turn is responsible for the co-ordination of inputs by the CDAs.

The DLGE is responsible for the inputs of the RIs. However, at the working level the RIs are responsible for the planning and execution of the ADRICS and Sub-County Inventories and arranging for the CDAs to be available for provision of assistance when conducting the sub-county interviews.

The programme of sub-county visits should be co-ordinated with the (ADRICS) road surveys and, where-ever possible, the visit to and road survey in a particular sub-county conducted simultaneously.

Data Base for District Road Networks

During the sub-county inventory/interviews, the following information will have been collected for all sub-counties in the district -

- completed inventory sheets (Form C),
- updated sub-county sketch maps, and
- completed pair-wise ranking diagram sheets for prioritisation of CARs.

The results of all the sub-county inventories in the district are first checked for accuracy by the DLGE and transferred to and assembled by the RIs into one ***Sub-County Inventory*** file. This file is kept in the DLGE's office with copies provided to the CDO for future reference.

The DLGE maintains one additional file for all that engineering data resulting from the ***ADRICS*** exercise.

These two files together form the database of the district road network.

Data Analysis

Undertaking the above ***ADRICS*** activities results in the accumulation of a significant amount of data both in the formats provided and on the district maps. To facilitate the management of this data and to assist with the subsequent selection and prioritisation of district road works, a computer software package called Rehabilitation And Maintenance Planning System (***RAMPS***) is provided to the DLGE and his/her staff. Using ***RAMPS***, the Road Inspectors enter all data collected into the System thereby confirming/updating the Inventory of all district roads and recording their actual Condition at the time of the current ***ADRICS***.

The sub-county inventory and ***ADRICS*** information is then further processed and analysed by the DLGE with the aid of ***RAMPS***, which enables identification of the core district road network, and listings of prioritised district road works together with separate budget estimates for routine and periodic maintenance operations, spot repairs and rehabilitation works.

Detailed information regarding the use of ***RAMPS*** for data analysis is provided in **Volume 1 / Manual C**, however an overview of the System is provided in **Section 4** below.

Section B1 : General Information

Section B2 : The ADRICS Procedures and Resources Required to Undertake ADRICS

Section B3 : Data Collection Formats & Procedures

Section B4

Overview - Rehabilitation & Maintenance Planning System (RAMPS)

Annex 1 : Procedures for District Road Traffic Surveys

Annex 2 : Forms

Section B4

Overview - Rehabilitation & Maintenance Planning System (RAMPS)

Rehabilitation & Maintenance Planning System - RAMPS

PURPOSE OF THE RAMPS

RAMPS has been developed to facilitate effective planning of rehabilitation and maintenance works on District Roads, and possibly at some later date for community access roads, throughout Uganda.

RAMPS is an updated and expanded data management system and planning tool based on the Routine Maintenance Planning System (ROMAPS) introduced in 27 districts by Roughton International during implementation of the African Development Bank supported district road component of the Ugandan Road Transport Project (URTP), which commenced in 1997.

RAMPS has been designed for use at the District level and takes into account current methods of data collection during the ADRICS. Standard formats for data collection, similar to those used for ROMAPS but with some modifications, have been adopted for use by the Local Government District Engineers (DLGEs), to record all necessary information with data entry requirements simplified to the extent possible; refer Section B 3 above.

Linkages between RAMPS and any future GIS based multi-sector district planning system, such as the Integrated Rural Accessibility Planning (IRAP) methodology, have been included to allow for electronic digitisation and production of detailed mapping information on district and sub-county basis.

PRINCIPAL ELEMENTS OF RAMPS

The four principal elements of RAMPS include -

a) **Planning**; determination of prioritised district road rehabilitation and maintenance needs including global costs of all interventions,

b) **Programming**; based on actual fund availability, determination of final priorities, selection and timing of operations/activities, etc.,

c) **Implementation**; based on choice of implementation technology, work scheduling and allocation of resources, and

d) **Monitoring**; assessing performance in terms of output, quality and costs of works enabling the updating of global costing and other data.

RAMPS AND THE PLANNING PROCESS

The first steps in the planning process include the collection of information describing in detail the extent and current condition of the district road network. The data collected is specifically concerned with -

a) An **Inventory** of district roads; information recording the location and geometry of the road together with data regarding drainage (including structures), soils, climate, traffic, population served, past pavement treatments (when last gravelled, etc.), proximity to suitable pavement materials, etc..

b) A **Condition** Survey of district roads; information regarding the current condition of the road pavement surface, its shoulders and drainage system including structures.

In other words, the ADRICS is the basic tool for the assessment of rehabilitation and maintenance needs and should be annually updated through physical inspections of each and every district road in the network.

ANNUAL DISTRICT ROAD INVENTORY AND CONDITION SURVEY - ADRICS

ADRICS information must be recorded on site. This exercise is facilitated by the use of pre-printed forms assembled on a road-by-road basis within a District; refer **Section B 3** above.

The forms record actual road 'condition' information available at the time of the ADRICS and constitute the hard copy or record from which data into RAMPS is subsequently entered.

MAINTAINABLE CONDITION ID

Using ADRICS data recorded in Forms A, B and C, RAMPS has been designed to automatically determine -

> *District Roads which are, and are not, in Routinely Maintainable Condition*
>
> *Prioritisation of all District Roads (maintainable and not maintainable) in terms of their Importance within the Core Network*
>
> *Prioritisation of District Road Works including Maintenance, Spot Repairs and/or Rehabilitation*

Based on government policy that limited funds, including PAF Grant I for routine maintenance and PAF Grant II for periodic maintenance, should only be spent for maintenance of those existing district roads which are in maintainable condition, a Maintainable Condition ID has been introduced to enable the DLGEs to make their first decision -

'. . . which roads should I maintain and which roads should I not.'

Using the ADRICS data regarding the current condition of the road pavement surface, its shoulders and drainage system, RAMPS automatically calculates the Maintainable Condition ID with a value ranging between 1 (good condition), and 4 (bad condition).

In addition, various 'weights' are attributed to each of these three condition assessments which when added together give a result corresponding to the following conditions –

a) 'Good' - providing all-weather access for 2WD motorised vehicles and can be routinely maintained using labour-based methods.

b) 'Fair' - providing all-weather access for 4WD motorised vehicles and can be routinely maintained using labour-based methods albeit at a higher level of intensity.

c) 'Poor' - providing access during dry weather only for all motorised vehicles but cannot be effectively routinely maintained using labour-based methods; the amount of work and types of activities being beyond the capacity of labour only inputs.

d) 'Bad' - not accessible to motorised vehicles for whatever reason and the amount of work and types of activities being way beyond the capacity of labour only inputs.

A cut-off value of 2.5 is suggested whereby any road with a value less than 2.5 is considered to be maintainable and in a condition that can be sustained using labour-based routine maintenance methods.

The DLGEs are, therefore, immediately directed to their first priority activity; the routine maintenance of all those district roads that have been identified as being in routinely maintainable condition.

Above a value of 2.5 the road is considered to be not routinely maintainable, the amount of work and types of activities being beyond the capacity of labour only routine maintenance inputs, and automatically reverts to the list of non-maintainable roads requiring interventions including spot repairs and/or rehabilitation.

During implementation of the ADRICS, Bottle Necks are specifically identified (**Form A**) and their locations plotted on district maps. Bottle Necks are locations which inhibit all-weather use by motorised traffic on what may otherwise be a routinely maintainable core network or non-core network road. Together with this, those district roads comprising the core network are identified based on information relating to traffic (motorised and non- motorised), sub-county preferences and mapping data related to network consistency and provision of access to major infrastructure and services.

This information specifically directs the attention of the DLGEs to what must be their second and third priority activities; spot repairs and/or rehabilitation including periodic maintenance of, respectively, the maintainable core network, and maintainable non-core network roads.

REHABILITATION

RAMPS identifies those district roads determined to be not maintainable (Maintainable Condition ID > 2.5) and creates a separate list of such roads.

Based on government policy that limited funds including PAF Grant III for rehabilitation should only be spent for the rehabilitation of existing district roads, RAMPS provides a method for prioritisation of those roads which are not in maintainable condition thereby enabling the DLGEs to make a further decision -

'. . . which roads should I rehabilitate and which roads should I not.'

RAMPS determines the priority of these roads taking into account traffic levels and composition, the population served and the costs of spot repairs and/or rehabilitation works. Priority is given to those roads demonstrating the best cost-effectiveness, i.e. those road links with the greater number of persons served (benefiting) per unit cost of rehabilitation works.

UNIT RATES - COSTS OF REHABILITATION & MAINTENANCE WORKS

For all relevant district road maintenance, spot repairs and rehabilitation work items, Global Unit Rates have been established which reflect current work practice and costs of inputs in Uganda.

RAMPS uses these Global Unit Rates as work item cost defaults. The Global Unit Rates are regularly updated together with the RAMPS cost defaults. Following the input of ADRICS data and the Global Unit Rate cost defaults, RAMPS automatically provides the following reports –

- Budget requirements for district road maintenance works dis-agregated to detail individual funding needs for routine, periodic and emergency maintenance, with budget time frames selected as required; annual, five year, ten year and so on.
- Budget requirements for district road spot repair / rehabilitation works also dis-aggregated to detail funding needs for individual roads and road sections, and with time frames selected as required; annual, five year, ten year and so on.

This reporting facility provided by the RAMPS allows DLGEs and their staff to prepare -

a) Annual district road maintenance programmes and work plans.

b) Annual district road rehabilitation programmes and work plans.

c) Three year rolling plans for all district road conservation and development works.

d) Longer term work plans including District Road Development Plans (DRDPs).

TRAFFIC SURVEY METHODS FOR DISTRICT ROADS

(From World Bank Technical Paper)

District Local Government Engineers and planners often face a lack of data concerning traffic on District Roads, and scarce resources for collecting new data. In addition, there may be weak institutional capacity for data collection and management at the local government or community level, which can be further compounded by poorly defined networks, ownership, and responsibilities. This Annex to **Volume 1 / Manual B** describes low cost methods for conducting traffic survey on district roads.

The purpose of the traffic counts is to classify roads in broad categories for maintenance planning purposes. For this purpose a high level of accuracy is not required. Information on traffic, however, is essential for effective design and appraisal of Rural Transport Infrastructure, particularly when upgrading to a higher than least-cost basic access standard or for investments motivated by economic objectives. If proposed improvements are to be appraised on a cost-effectiveness basis, traffic data samples should be collected and correlated with other indicators, such as populations served by the particular RTI. For socioeconomic impact studies, household-level mobility studies are required, including data on means of transport, trip purpose, origin and destination of trip and duration, in addition to other socioeconomic data.

Traffic survey data in the form of Average Daily Traffic (ADT) are used for:

- Determination of the economic importance or priority of a road (whether the road is an 'Economic' or 'Social' road) refer **Volume 1 / Manual C.**
- Verification of eligibility of the district road for upgrading to the MoWHC Tertiary Road System.
- Substantiation as to whether the road is justified for major rehabilitation.
- The re-grading /graveling frequency.
- The intensity of routine maintenance necessary to provide basic all-weather access.
- Evidence for the abandonment/downgrading of a district road to Community Access standard.
- For any other purpose.

The following two types of low-cost traffic surveys are described here:

1. Moving Observer Count (MOC)
2. Manual Traffic Survey (MTS)

The MOC is a rapid method of assessment suitable for categorizing roads into broad flow bands. The MTS is a more discerning and complete survey method, but requires considerable capacity and resources for appropriate execution.

The DLG Engineer is responsible for organising the above traffic surveys, including the training of staff and TEs, compiling and reporting the results of the surveys.

Traffic Survey Form and Calculation of Average Daily Traffic (ADT)

A sample of a typical survey form is attached to this appendix. It can be used for both MOC and MTS surveys. Different categories of motorized and non-motorized vehicles are listed. These can be adjusted to reflect the actual existing types of vehicles in use in a particular area. "Weights" for the different means of

transport are sometimes used for converting different vehicle types to Passenger Car Units (PCU)[1] Manual traffic counts normally should last 12 daylight hours. To get daily (24 hours) traffic, the 12-hours traffic would then normally have to be multiplied by a factor of 1.33. The Average Daily Traffic (ADT) would be calculated as the average of the seven days' count of the total daily "weighted" traffic.

Moving Observer Count (MOC)

MOC can be carried out by the DLG Engineer or by a Supervisor of Works from the district local government. The survey can be executed at any location of a particular road section but should last at least one hour. Utilizing the form proposed in this appendix, the different types of vehicles need to be put into three different categories: (a) vehicles traveling in the opposite direction (x); (b) vehicles overtaking observer (y); and (c) vehicles overtaken by the observer (z). Following will then be the hourly traffic in both directions (HT):

$$HT = (x + y - z) / t$$

(t = period of survey measured in hours). To convert the hourly flow into daily flows the following formula normally applies:

$$DT = 16 \times HT$$

Manual Traffic Survey (MTS)

Manual traffic counts, using an adaptation of the form introduced above, should be used on all district road network sections which are earmarked for upgrading to higher than basic access standard (including the upgrading from non-motorized basic access to motorized basic access). As mentioned above, a seven-day, 12-hour count is recommended. In particular circumstances, for example, in hotter climates where night travel is common, 24-hour counts might be warranted. It is important that both motorized and non-motorized traffic is counted and, in the case of non-motorized access only, obviously, human porterage must be counted as well.

Seasonal variations might be important, and, if possible, counts should be conducted during various seasons of high- and low-traffic flows. A count should be carried out during each main climatic and/or agricultural season so that the effects of seasonal rainfall and of variations in agricultural activity (especially during and just after harvest-time, when traffic flows usually show a marked increase) are taken into account. Counts should be done far enough away from urban or village areas, so results are not distorted by local traffic activities. The effects of local market days, which may account for a high proportion of annual traffic on low-volume roads, may be allowed for by making two counts, one on a market day and one on a non-market day.

DLG Engineers should carry out traffic surveys on all major sections of their network on a regular basis (at least annually). With experience, certain patterns will be established and time and efforts for individual surveys will be reduced. Such patterns include: typical seasonal variations, traffic composition, the share of night-time to day-time traffic, growth factors, and the correlation between traffic and villages size.

The equipment required for manual counting comprises a supply of pre-printed forms, pencils and clipboards. A shelter from sun or rain may be required. At low traffic volumes, the work is not demanding and the main problem is likely to be ensuring that the enumerators stay on the job. Unscheduled visits by the engineer or a senior supervisor may be necessary to secure discipline and attention to the work. If the proportion of heavy vehicles in the traffic flows is expected to be high, classified counts may be necessary.

[1] These "weights" are based on the standard measure of road capacity, Passenger Car Units (PCU), an approach applied on higher-category roads, which allows consistent comparison of traffic throughout the network. However, for RTI where traffic capacity is not usually an issue, the merit of this conversion is not clear.

Example

Counts were taken near a village, which has a market every seventh days. The wet season lasts for about four months and the dry season eight months. The counts have been multiplied by the factor 1.33 to get the daily (24 hours) traffic.

1. Two 12-hour counts were taken at the end of the dry season (low level of agricultural activity)

   Count on market day = 73 vehicles

   Count on non-market day = 21 vehicles

2. Two 12-hour counts were taken at the end of the wet season (harvest time)

   Count on market day = 94 vehicles

   Count on non-market day = 48 vehicles

For this example of a seven-day traffic cycle, the average daily traffic is calculated for each season as follows:

Average daily traffic (dry season)
Tdry = (1/7 x 73) + (6/7 x 21) = 28 vehicles

Average daily traffic (wet season)
Twet = (1/7 x 94) + (6/7 x 48) = 54 vehicles

The ADT is taken as the weighted mean of the seasonal flows, calculated thus:

ADT = (8/12 x 28) + (4/12 x 54) = 37 vehicles

COUNT MADE BY		CHECKED BY		SHEET		OF	
DISTRICT		ROAD NO.		SITE LOCATION		DAY	DATE

VEHICLE CLASS	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	Hrs:	COUNT	FACTOR	TOTAL	
BICYCLES 															X 0.2 =		a
CARTS: ANIMAL HAND DRAWN 															X 0.2 =		b
PASSENGER CARS 															X 0.5 =		c
LIGHT GOODS: PICKUPS SMALL BUS LANDROVERS OTHER 4WD 															X 1.0 =		d
TRACTORS 															X 1.0 =		e
MEDIUM + HEAVY TRUCKS 															X 2.0 =		f
BUSES 															X 1.5 =		g
TOTALS															Total = a….g		G

- Manual Traffic Count to last 12 daylight hours
- Average Daily Traffic (ADT) to be calculated from average of 7 consecutive days

REMARKS:

Daily Traffic = DT = G x 1.33 = _____ **ADT = Average DT over 7 Days =** _____ **Date:** _____

Annex 2
Forms

Annex 2
Forms

Form A Road Section Condition Assessment Form

Form A1 Road Section Condition Assessment - Look-Up Tables

Form B Structure Inventory / Condition Assessment Form

Form C Sub County Inventory

Diagram for Pair-Wise Ranking

RAMPS

ROAD SECTION CONDITION ASSESSMENT FORM

Form A

District Name: _____ **Road Number:** _____ **Road Name:** _____

Assessed by: _____ **Assessment Date:** _____ **Road Length:** _____ **km**

Section breaks required at:
Any change in road condition
Sub-County boundary
Intersection with other roads

Road Sect. No	Road Section Chainages (km)		Rd Sect. Length (km)	Road Surface Type	Year Last Surfaced	Surface Material Factor	Material Proximity Factor	Traffic Group Factor	Drainage Cond. Factor		Shoulder Cond. Factor		Surface Cond. Factor	Bottle Neck Yes/No	Comments (particularly concerning Bottle Necks)
	Start	End							left	right	left	right			
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	(xii)	(xiii)	(xiv)	(xv)	(xvi)

Notes: Refer to "Look-Up" Tables in **Form A1** for Factor Coding and Definitions.
Bottle Necks must be fully described in column **P** including their chainage and details thereof.

SHEET:___of ___

ROAD SECTION CONDITION ASSESSMENT - LOOK-UP TABLES

(v) ROAD SURFACE TYPE

1	Earth	Not gravelled in last 5 years
2	Gravel	Gravelled in last 5 years
3	Paved	

(vii) SURFACE MATERIAL FACTOR

1	Good	Surface wears steadily
2	Fair	Surface wears quickly
3	Poor	Surface damages quickly

(viii) MATERIAL PROXIMITY FACTOR

1	Near	Haul 0-5 km
2	Average	Haul 5-15 km
3	Far	Haul > 15 km

(ix) TRAFFIC GROUP FACTOR

1	Very Light	< 20	vehicles/day
2	Light	20 - 30	vehicles/day
3	Medium	30 - 40	vehicles/day
4	Heavy	> 40	vehicles/day

(x) & (xi) DRAINAGE CONDITION FACTOR

1	Good	No water on the road during rain; No erosion or silt deposits; good roadside drainage
2	Fair	Some water on the road during rain; some erosion/scouring in roadside drains, or drains half silted
3	Poor	Much water on the road during rain; severe erosion/scouring in roadside drains, or drains fully silted
4	Bad	Non existing/non functioning drainage system

(xii) & (xiii) SHOULDER CONDITION FACTOR

1	Good	Good shape, allowing easy runoff from the road surface into the roadside drains; shoulder not eroded
2	Fair	Uneven shape, but allowing most water to run off the road surface into the roadside drains; some erosion of shoulder
3	Poor	Poor shape and seriously restricts water to run off the road surface into the roadside drains; severe erosion of shoulder
4	Bad	Non functioning or non existing

(xiv) SURFACE CONDITION FACTOR

		Roughness:
1	Good	< 8 m/km ; good shape, smooth running surface
2	Fair	9-14 m/km ; reasonable shape, corrugations and potholes up to 10 cm deep
3	Poor	15-18 m/km ; Poor shape, frequent depressions, rutting and potholes >10 cm deep
4	Bad	>18 m/km ; bad shape, deep depressions and potholes, serious rutting, 4WD-dry weather only

INFORMATION TO BE PLOTTED ON THE DISTRICT MAP

H	Hospital	(M)	Main Market
✚	Other Health Unit	(l)	Local market
P	Primary School	▲	Factory, Ginnery
S	Secondary School	- - - -	Community Access Road
✞ ♉	Church, Mosque		

(xv) BOTTLENECK

- Any section of the road that needs emergency repair
- Broken or missing structures (bridge, culvert, etc.) that restricts access

Column OTHER PARAMETERS:

(ii) & (iii)	Chainage in meters
(iv)	Section length (km) = (iii) - (ii)
(vi)	Year of last surfacing operation
(xvi)	Comments

Additional Data relating to this Road
1. Attach *Strip Map o*f the road, showing all facilities on and near the road
2. Attach all Inventory sheets of structures on this road; **Form B**
3. Attach all Sub-County Inventory sheets relevant to this road; **Form C**
4. Attach Sub-County Sketch map

RAMPS

STRUCTURES INVENTORY / CONDITION ASSESSMENT FORM

Form B

District Name: _____ **Road Number:** _____ **Road Name:** _____

Assessed by: _____ **Assessment Date:** _____ **Road Length:** _____ **km**

Struct. No	Structure Type (see below)	Location (chainage)	No of Spans (bridge only)	Width (m)	Length (m)	No of openings (culvert only)	Size of openings (culvert only)	Head walls (Y/N)	Structure Condition (see below)	Details of Work to be Done / Comments
(I)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)

STRUCTURE TYPES								
A	R/C bridge	**D**	Steel Truss bridge	**G**	Concrete pipe culvert	**J**	Vented ford
B	Composite bridge	**E**	Timber bridge	**H**	Steel pipe culvert	**K**	Drift
C	Bailey bridge	**F**	Other Bridge type	**I**	Concrete box culvert	**L**	Other structure type

CONDITION	
1	Good (no work required
2	Fair (minor work required)
3	Poor (major work required)
4	Bad (in danger of failure/failed)

SHEET: ___of ___

RAMPS **Form C**

SUB COUNTY INVENTORY

Sub-County: _____ **District:** _____

Collected by: _____ **Date:** | | | 200 |

1) Sub County Population (no): _____ **(source:** _____ **dated:** _____ **)**

2) Sub County Area (km^2): _____ **(source:** _____ **dated:** _____ **)**

3) List all <u>District Roads</u> that are used by the Sub-County *in their order of Priority*:

District Road Name (from-to)	Road No	Reason for Priority

4) List the *main* <u>Community Access Roads</u> of the sub county, feeding into the district road and/or trunk road network *in their order of Priority* and mark these on the map (See 6 below)

Community Access Road Name (from-to)	Approximate length	Feeding into District Road (No)

5) What is the number of labourers availabler for road works in the Sub-County and in what season/months?

Season	Month(s) - from to	Number of Labourers

6) Prepare a sketch map of the Sub-County showing:

- **Administrative boundaries and names: Sub-County, Parish**
- **Residential Area**
- **District Roads (and No) and Community Access Roads**
- **Socio-Economic Services/Facilities including - (I) Primary & Secondary schools**
  (II) Health Facilities (Dispensaries, HC, Hospitals, etc)
  (III) Markets
  (IV) Ginneries, Factories, etc

Diagram for Pair-Wise Ranking

Sub-County:_____ District:_____

Ranking of: ***District Roads / Community Access Roads***

Omit A	B:	C:	D:	E:	F:	G:	H:	I:	J:	**←SCORE**
A:										
B:										
C:										
D:										
E:										
F:										
G:										
H:										
I:										
J:										

SUMMARY:

1st :	6th:
2nd:	7th:
3rd:	8th:
4th:	9th:
5th:	10th: