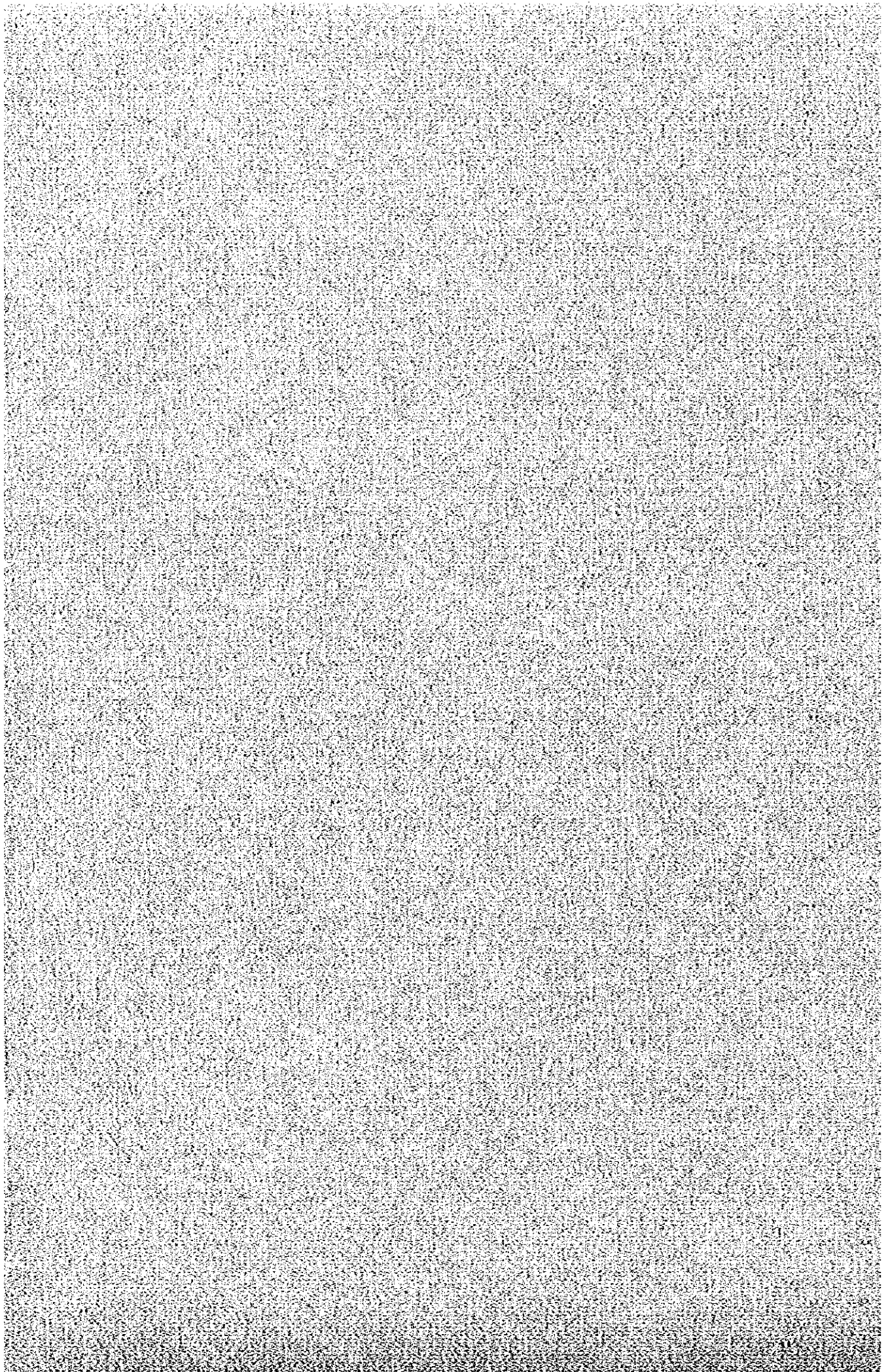


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FEASIBILITY STUDY FOR A NORTHERN BY-PASS TO KAMPALA CITY

TERMS OF REFERENCE

1. BACKGROUND

The Northern Corridor Road link between Malaba on the Kenya/Uganda border and Katuna and Kakitumba on the Rwanda/Uganda border has been rehabilitated with the assistance of funds from EEC, World Bank and KFW.

This road carries International and Local traffic between Kenya, Uganda, Rwanda, Burundi and Eastern Zaire. Major urban centres that the route traverses are Tororo, Jinja, Kampala, Masaka, Mbarara and Kabale. Of these, Tororo, Jinja and Masaka have by-passes. By-passes are planned for Mbarara town and Kampala city. The more urgently required is that for Kampala city.

A tentative route has already been identified for the Kampala City By-Pass, passing to the southern part of the city. This proposed route leaves Jinja road around Kireka, passes to the Eastern part of Mbuya and Bugolobi residential areas, and crosses the Nakivubo swamp to join the Masaka road between Kibuye and Busega roundabouts.

This route was, however, identified without consideration of other possible alternatives in the Northern part of the city. Environmental considerations especially the conservation of wetlands were also not fully covered and the high costs of compensation for industrial, commercial and residential establishments may make the cost of constructing the By-Pass along the proposed route prohibitively expensive.

In order to decide whether the By-Pass should pass through the southern part of the city or not, another feasibility study of a possible alternative in the northern part of the city is required. It is proposed that the By-Pass leaves Jinja road between Bwayogerere and Nakawa and Joins Masaka Road between Natele and Busega. The By-Pass may or may not utilise some of the existing roads along its route.

The By-Pass is expected to:

- encourage the movement of east-west through traffic not to pass through the city centre. This will benefit such traffic which does not intend to stop over in the city.
- by the provision of junctions at existing connecting roads with Kampala city, where the city centre of local traffic which at present is confined to very constricted roads.
- in general, minimise overloading of city roads and create a better environment for Kampala to function as a business centre.

The Government of Uganda with the assistance of EEC is to fund the feasibility study of the Northern By-Pass. The cost of carrying out the Feasibility study is not to exceed ECU 60,000.

2. OBJECTIVES

The purpose of the study is:

- To assess the economic viability of constructing a Northern By-Pass taking into account the design parameters adopted for the southern By-Pass to Kampala city;
- To determine the impact of the By-Pass to the North of the city and on the city roads network, with emphasis on the intersecting roads;
- To assess the impact of the proposed Northern and Southern by-passes on the environment and urban land use and a comparison of the two;
- To prepare a feasibility study report.

3. SCOPE OF WORK

To achieve the objectives described above, the Consultant shall include the following in the work programme:

- a description and analysis of the Kampala city road network together with relevant maps;
- an analysis of economic activity with the road influence area, including forecasts of internal freight/passenger movement;
- updating of available traffic counts and axle load survey, together with a projected model resulting from generated traffic movement due to the By-Pass;
- a description and quantification of benefits likely to derive from the construction of the Northern By-Pass including the determination of the Internal rate of return (IRR);
- carrying out a sensitivity analysis on the economic feasibility study in order to determine how changes in traffic forecasts, construction costs and discount rates would affect the project;
- study the 1994 to 2004 Master Plan for the development of Kampala city, now available with Kampala City Council, as regard to selection of an appropriate route;
- liaison with the Ministries of Works, Transport and Communications, Local Government, Finance and Economic Planning, Lands, Housing and Urban Development, Kampala City Council and other relevant authorities for some information on the likely alignment of the By-Pass, junction locations and layout;
- reconnaissance survey of the possible route(s)
- ✓ • hydrological survey of the study area;
- survey of utility services within the Alignment;
- examination of existing pavement where existing roads are to be incorporated within the alignment;
- adopt typical cross-section of the southern By-Pass and provide detailed construction cost estimates.

4 DATA, STAFF, SERVICES AND FACILITIES

4.1 The Government of Uganda shall provide the Consultant with:

- information on traffic counts, origin-destination surveys and axle load surveys made to date;
- reports and design documents of the already designed Southern By-Pass;
- costs of recent road construction/rehabilitation and estimated costs of KCC Phase II rehabilitation;
- information on possible locations of material and sources for construction;
- where available, topographical and meteorological maps of the area;
- details on land ownership;
- town planning proposals along the location of the By-Pass, particularly at populated areas;
- location of existing utility services and plans for future services;
- all standard documents currently in use by Government together with any projected modifications;
- custom and tax exemption as per Customer Conventions between ACP and EU countries;

4.2 The Consultant shall:

- employ only those key staff whose C.Vs have the approval of the administration;
- ensure the proper performance and behaviour of his staff;
- make his own arrangements for office and residential accommodation; supplies, furnishings and equipment; local transport; laboratory facilities/special equipment necessary to undertake site investigations; typing/printing and delivery of all draft and final documents;
- treat as confidential all reports and documents loaned to him by Administration and shall be responsible for returning them in good condition when submitting the final report;
- the Government may attach junior professional staff and technicians to the Consultant for appropriate training and instruction.

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5. REPORTS AND DOCUMENTS

5.1 The Consultant shall submit the following reports and documents in English in approved prescribed format:

- (a) Inception Report: summarising Consultant's state of mobilisation, proposed methodology, work programme and details of progress of the assignment.

The report should include Consultant's comments on the Terms of Reference and any other factors which may affect final presentation of this report.

- (b) Draft Feasibility Study report with the economic feasibility study (10 copies). To be presented in edited form in accordance with the standards adopted by Administration.

- (c) Final Feasibility Study report with the economic feasibility study (10 Copies). This report shall be submitted in bound form as approved by Administration.

5.2 Distribution of Report

All reports to be distributed as follows:

- four copies to the Delegation of the Commission of the European Communities;
- remainder to the Administration.

Time table for submission of reports (provisional):

- (a) Inception report within 2 weeks of agreed starting date;
- (b) Draft Feasibility Study report within 2 months of agreed starting date;
- (c) Final Feasibility Study report within 1 month of receipt of Administration's comments on Draft Feasibility Study report.

ANNEX B. - ORGANISATION AND METHODOLOGY

- B1. Traffic Survey and Data Collection**
- B2. Traffic Modelling and Traffic Forecasts**
- B3. Estimation of User Costs**
- B4. Economic analysis**
- B5. Selection of Routes**
- B6. Preliminary Engineering**
- B7. Environmental Impact Assessment**
- B8. Reports and Document**

B.1 TRAFFIC SURVEYS AND DATA COLLECTION

B.1.1 Traffic Surveys to be carried out during the Study

The following traffic and traffic related surveys will be carried out to estimate the future traffic on the existing network and the proposed Northern and Southern by-passes:

Origin/Destination Survey

- Origin/Destination surveys on all major Kampala radial roads, preferably inbound; these will be carried out for two days, with all sites surveyed on the same days. Interviews periods will be 12 hours. However, if it is felt that that night interviews are necessary and feasible these will be carried out. The details of the O/D survey will be finalised after mobilisation. The location of the O/D survey points will be designed to pick up data required to build the model described in Section 8.4.

In addition to the origin and destination of each vehicle, the survey will identify the following details:

- the vehicle type.
- make and model.
- load type.
- number of seats and the actual number of passengers.
- journey purpose and frequency of travel.

Traffic Counts

- Manual classified counts in each direction at all origin/destination sites, together with counts at any major junctions or other points considered essential within the study area. They will identify traffic volumes and vehicle mix, plus details of turning traffic at certain junctions.
- Flows and turning flows, on the approaches to and through the centre of Kampala, along the existing Jinja to Masaka road.
- A set of screen line counts will be carried out across Kampala centre; these will be used to validate the model.
- The counts taken for the 1992 Southern by-pass study will be repeated, enabling growth at these points to be determined.

Duration of Counts

- Major traffic counts at all the O/D sites will be carried out for 7 days over a 12 hour period from 7 am to 7 pm. 24 hour traffic count will be carried out for two days to obtain conversion factors for 24 hour flows. These will also be compared to existing data (with particular reference to the Southern by-pass study). Other count points will have 1 days counts for a 12 hour period 7 am to 7 pm. Additional 1 hour counts may be carried at locations deemed necessary to validate the traffic model.

Journey Time

- Journey time surveys on Kampala through route.

Axle Loads

- We are given to believe that suitable axle load information is available; if however it turns out that existing data on axle loads is not adequate, an axle load survey will be required. Should this situation arise the survey will be carried out over two days at the same time as the O/D survey using one of the O/D survey sites (assuming this is feasible). The cost implications be discussed with the Client prior to undertaking the axle load survey.

B.1.2 Description and Analysis of Traffic Survey Results

The results of the proposed traffic survey will be described and analysed in detail. This description and analysis will cover the following aspects:

- levels and structure - defined by vehicle classes - of traffic actually using the network at present;
- origin-destination matrices for each vehicle class - and for passenger and freight traffic separately;
- breakdown of traffic volumes into local and inter-national traffic;
- an analysis of all traffic identified as having the potential to divert on to either of the by-passes.

B.1.3 Compilation of Traffic Forecasts giving Scope and Details

Forecasts of volumes of future traffic on either by-pass and the existing spine roads will be compiled for:

- normal (existing network only),
- diverted and generated traffic (by-passes only),
- six classes of vehicle will be identified as set out in Section 8.5.
- three versions of forecasts (low, medium and high),

All surveys will be designed to forecast traffic details for individual sections of either of the by-passes.

The forecasts will be compiled for the following time periods:

- from 1995 to the opening of the road;
- detailed annual forecasts for a period of 20 years after opening of the project road.

Volumes of average annual daily traffic will be broken down by types of traffic and class of vehicle. In addition, the present and future traffic flows will also be evaluated in terms of axle loading, expressed in equivalent standard axles. Forecasts will be made for the "best estimate" case, the optimistic case (high flows) and for the pessimistic case (low flows).

The forecasted traffic on the northern bypass will be compared to that forecast for the southern bypass.

B.1.4 Traffic Growth Rates

Applicable traffic growth rates will be derived from data and other information presented and analysed within the scope of the following areas:

- Population growth predictions in both Kampala area and Uganda nationally,
- relevant past and present traffic growth,
- past, present and anticipated future economic and socio-economic development within Kampala District,
- predicted flows of international freight volumes.

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B.2 TRAFFIC MODELLING AND TRAFFIC FORECASTS

The time scale of the project does not permit the calibration of separate AM peak, PM peak and off-peak models, and it is proposed that the traffic model should represent average conditions during a 12-hour 7am to 7pm weekday. Traffic model assignments will be for an average hour during this time period.

The model will not represent the centre of Kampala in any great detail, since the purpose of the model is to determine the routing of through traffic and the usage of a bypass. Roads forming part of Kampala through routes will be represented. The favoured form of assignment is simple capacity restraint utilising speed/flow relationships. If local, national or regional speed/flow relationships have been established, they will be used. If not, standard United Kingdom speed/flow relationships, modified to fit the surveyed journey time and flow observations, will be used.

Use of the TRIPS suite of programs is proposed. It is an international standard, widely used and well supported, and is flexible and efficient for the type of model proposed. It allows the representation of junction capacity restraint should the need arise. It also has powerful matrix building and matrix manipulation features. On termination of the project, the Government of Uganda will be given the option of acquiring the TRIPS suite, training in its use and copies of the data files with accompanying documentation. This will be separately priced.

Forecast traffic flows will be determined from the following elements:

- Reassignment to new routes.
- General economic growth.
- Traffic generation due to time reductions on cross city journeys.
- Traffic generation due to local land use changes.

Using the traffic model, with either by-pass and without by-pass travel times for journeys through Kampala will be established, for the base year and for future years of interest. The time savings resulting from provision of the bypass will be reported on. If the data exists to translate these timings journeys into generated strategic traffic, this will be done.

Locally generated traffic will be estimated by reference to forecast land uses in the area of influence of the proposed by-passes. The City Council's Masterplan for Kampala will form the principal source of information on future land use. It may be necessary to undertake some traffic counts to estimate trip generation from different land use types for predicting the likely level of traffic induced by the provision of either bypass and the ensuing land use changes. The extent to which either by-pass will be the determining factor in bringing about these developments will also be assessed.

B.3 ESTIMATION OF ROAD USER COSTS

B.3.1 Method of Estimating Vehicle Operating Costs

In order to quantify benefits, up-to-date estimates of Highway User costs and more particularly unit vehicle operating costs (VOC's) will be produced.

The method to be adopted for estimation of Highway User Costs is the British Transport and Research Laboratory (TRL) model Road Transport Investment Model Version 2 (RTIM2). This method was first developed in East Africa and modified to produce Version 2 following further research in the Caribbean. The methodology proposed for the study is generally that followed by the TRL model RTIM2. However modifications developed by the consultants are incorporated; these give more realistic evaluations of vehicle depreciation.

In the consultants model the major portion of depreciation is deemed to be use - related, dependent upon the distance travelled and the quality of the road network with the balance being considered to be time related reflecting the effects of weather and the continuing increase in vehicle efficiency. This differs from the original TRL model which assumes that vehicle depreciation is totally time dependent and can be determined on the basis of the age spectrum of the vehicle and the new vehicle cost.

B.3.2 Collection of Data to Estimate Vehicle Operating Costs(VOC's)

Surveys of vehicle and tyre suppliers, repair and maintenance businesses, fuel and lubricant retailers, and transport operators will be undertaken to establish the required parameters for the model.

Classes of Vehicles to be used in the Study

Data will be collected for six main classes of vehicle; these six are:

- Cars, including 4WD's.
- Light Goods, including pickups, vans up to about 3 tonnes GVW and 4WD's i.e. Land Rovers, Toyota Land Cruisers, Nissan Patrol, etc.
- Medium Goods, including all 2 and 3 axle trucks with GVW's between 3 and 18 tonnes.
- Multi-axle trucks with 4 or more axles, these will include both truck and drawbar trailer combinations and articulated trucks. The latter consist of a "Horse"(the tractive unit) with 2 or 3 axles and an articulated trailer with 1 to 3 or very occasionally 4 axles.
- Small Buses, these are the buses designed to carry 12 to 33 passengers.
- Large Buses, any Bus designed to carry more than 33 passengers.

Vehicle Sales Statistics, Prices and Characteristics:

Basic prices collected will be the financial price (including all duty tax and VAT) of vehicles, tyres etc.; the duty free prices of vehicles and new tyres will also be collected, plus the tax or sales tax on retreads.

- Two lists, one for light and one for heavy vehicles, will be compiled containing all the major vehicle makes sold in Uganda. In view of the fact that a significant number of the vehicles likely to use the bypass will be International Transit Traffic, costs of heavy vehicle makes not sold in Uganda (where significant numbers are identified in the O/D surveys) will be obtained from Kenya.
- Visits will be made to the main dealers for each make of vehicle to obtain prices and vehicle specifications for their most popular models. For each of the main models the following details will be obtained:
 - approximate number sold each year (including historic sales if available),
 - Gross Vehicle weight (GVW) for trucks and buses,
 - Tyre size,
 - Number of passenger, (for buses only),
 - Engine (output) i.e. the Max Brake Horse Power.

Tyre Sales and Prices:

Tyre price lists will be obtained from the main agents of all the major makes of tyres sold in Uganda. Data on the costs and market share of retread tyres will also be collected.

Interest Rates:

Rate(s) of interest a person or company would have to pay on a loan to buy a vehicle will be identified.

Insurance costs:

The following details on the cost of insuring vehicles will be obtained:

- the cost of the minimum legal insurance required,
- the cost of third party, fire and theft insurance,
- the cost of fully comprehensive insurance,
- data on the proportions of vehicles holding each of the three above types of insurance for the six classes of vehicle.

The Cost of Garage Labour:

The hourly cost of labour required for the vehicle cost estimation model will be obtained for both light and heavy vehicles. Labour costs represent the cost charged for "labour" on vehicle repair bills and include all garage overheads to cover the costs of tools and equipment, premises, supervision, management etc.

Fuel and Oil prices:

Full details of fuel prices including in-bond cost, transport costs, duty and tax, and pump prices will be collected.

Wage Rates:

The total cost per month of a driver, and drivers assistant(s) in the case of trucks and buses will be obtained. The cost should be for a "standard month" and should include any normal allowances paid. An attempt will also be made to estimate the average number of hours per month that commercial vehicles are used, plus estimates of the percentage of non-commercial use commercial vehicles.

B.4 ECONOMIC ANALYSIS

B.4.1 General

The economic analysis of the Northern by-pass will be carried out as detailed below. However, for the purpose of comparison, the economic analysis previously undertaken for the Southern by-pass will be updated to a base year of 1995 and to the same 20 year appraisal period specified for the Northern by-pass.

B.4.2 Benefits

Benefits will accrue to users and non-users of the selected by-pass: it will be important to make accurate estimates of both as, in the context of a congested urban network, each is likely to be significant.

Users of the road may benefit from savings in vehicle operating costs and from time savings. Users may experience reduction in the distances of their journeys and may also be able to travel at speeds closer to the optimum thus yielding fuel savings. However, by far the most significant benefits are likely to come from savings in journey times.

As traffic diverts from existing heavily trafficked roads in the network to the new road those remaining on these roads will experience congestion relief. Time savings to these non-users will form a significant component of overall benefits. To a certain extent, non-users may also experience some savings in vehicle operating costs.

The volume of traffic likely to use the proposed bypass will be estimated using the TRIPS model described in Section B.4.

Estimates of the value of working and non-working time will be made in order to quantify the benefits of time savings. The results of a small sample survey will allow the determination of proportion of trips made in working and non-working time. The value of time savings for those involved in work trips will be estimated on the assumption that wage costs represent marginal productivity and that time saved travelling can be fruitfully diverted to other economic activity. The surveys will also be used as a means to determine the wages/salaries of drivers if no other sources of information are available. Wage costs will also include additional costs falling on employers (social overheads for instance) and these will be added to estimates of wages/salaries. Although savings in non-working time are clearly worth less than savings in working time they still have a value: at the margin people are not indifferent between an extra minute spent travelling and might be willing to pay for any reduction. Estimates of the value of non-working time will therefore also be made.

Environmental/amenity benefits will accrue to residents of Kampala who experience reductions in traffic and its detrimental effects, e.g. noise, pollution and accidents. It is unlikely that there will be scope within the resources of the study for undertaking the necessary willingness-to-pass surveys to quantify these benefits and they may be treated in qualitative terms only unless other means of quantification are possible (e.g. through examining changes in land prices).

B.4.3 Costs

Costs will include construction costs, and operating and maintenance costs for the new road over the 20 year appraisal period, as well as consideration of reduced maintenance costs on other parts of the network due to lower traffic levels caused by the project. As well as the financial costs of land acquisition, suitable estimates of the true economic cost of land used up in the project will be made where these differ.

It is possible that the new road by increasing speeds may lead to an increase in accident costs on the network. It is unlikely that it will be possible to quantify this effect accurately, in which case it will be treated in qualitative terms only.

B.4.4 Economic/financial analysis

The project will be analysed in both economic and financial terms. Financial prices will be the critical variables influencing driver behaviour and will determine the level of diversion to the project road as well as the response of drivers remaining on the existing network. Financial costs will therefore be used in any MODELLING work. Economic or resource costs will be used for assessing the value of the project to the nation as a whole and will take into account factors outside the scope of financial analysis. The economic appraisal will seek to identify and measure all the relevant costs and benefits of the project and value them in terms of their impact on the use of national resource costs.

If there is sufficiently well developed market in land (and adequate information on land prices) it may be possible to use changes in land prices as a proxy for some of the benefits and disbenefits of the project to the city and its economy. Improvements in amenity for areas experiencing less traffic will be reflected in rising land prices (values will move closer to those in areas which already have lower traffic volumes). More importantly, the value of the project to the local economy through which the bypass runs will be reflected in rising land prices which will move closer to those of areas which currently have better access. Any disbenefits should also be fully reflected in land price.

In economic analysis, it is important to draw a distinction between economic and financial costs. Financial costs are given at market prices and represent the actual costs paid by private sector operatives. Economic costs represent the real use of national resources and need not be the same as financial costs if there are distortions in the economy such as exchange rate controls, unemployed or under-employed labour, or excess monopoly profits. Subsidies, indirect taxes and import duties merely represent transfers of resources rather than their consumption and should be subtracted from market prices to yield economic prices.

The project will be appraised by comparison to the next best alternative and the resulting streams of costs and benefits will be generated. The economic appraisal of the project road will examine four measures of economic viability:

- Net present value;
- Economic internal rate of return;
- Benefit: cost ratio; and
- First year rate of return.

The first year rate of return will be calculated to give an indication of the optimal timing for the project.

Relevant costs for each option will comprise capital and maintenance costs and include design and supervision costs. The project's quantifiable benefits will be measured in terms of savings in vehicle operating costs and time to diverted and generated traffic over a twenty year project period following project completion.

All costs and benefits will be expressed in the constant prices of 1995. Costs and benefits will be discounted to 1995 to express them in terms of present values at the appropriate discount rate which reflects the opportunity cost of capital for Uganda. This discount rate will be determined through discussion with the personnel of the relevant authority.

B.4.5 Sensitivity tests

The robustness of the conclusions reached will be tested by applying variations in the key parameters used in the analysis as follows:

- Variation in construction costs +/- 20%;
- Variation in traffic forecasts;
- Combined variation in traffic forecasts and construction costs; and
- Variation in discount rate.

B.5 SELECTION OF ROUTE

B.5.1 Study of Masterplan

Copies of the 1995 to 2005 Master Plan for the development of Kampala City will be obtained and studied to determine a number on possible route corridors for the bypass.

Selection of the possible corridors will take into account the proposed future development and land use in the north of Kampala

B.5.2 Discussions with Relevant Bodies

The possible route corridors will be discussed at length with representatives of the Ministries of Works, Transport and Communications (MOWT & C), Local Government, Finance and Economic Planning, Lands, Housing and Urban Development, Kampala city Council and other relevant authorities to obtain further information and to discuss the difficulties likely to be encountered along each possible corridor.

Following these discussions, the corridors will be ranked in order of preference and the favoured two or three investigated further.

B.5.3 Reconnaissance Survey

A reconnaissance survey will be undertaken along the routes of the favoured corridors.

The survey will seek to identify areas of potential difficulty and particular attention will be paid to landtake problems, effect on services, use of existing roads, drainage problems, and environmental impact.

An interim report ranking the corridors in order of preference and recommending the preferred alignment to be investigated further will be prepared and submitted to the Ministry of Works, Transport and Communications for comments.

Following submission of the interim report, a meeting will be held with representatives of EU, NAO and MoWT&C to review the preliminary findings and agree upon a preferred route for the Northern by-pass.

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B.6 PRELIMINARY ENGINEERING

B.6.1 Survey and Mapping

Mapping at a scale of 1:2,500 for the area to be traversed by the proposed route will be purchased. This mapping will be digitised to produce a Digital Terrain Model of the area. Where necessary, the mapping will be supplemented by a topographical survey in order to locate any features of developments which are not covered by the mapping.

Where the proposed route is to make use of an existing road, centre-line spot levels will be taken at 50m intervals.

B.6.2 Drainage Studies

Detailed hydrological and hydraulic studies will be conducted to determine the requirements for drainage structures and assess the adequacy of any existing structure. This will comprise:

- collection and study of existing hydrological data to assess catchment characteristics and peak run-offs;
 - assessment of the capacity of any existing structures to be used; and
 - proposals for new drainage structures such as culverts, surface water drains and ditches.
-

B.6.3 Methodology for this study

Data Collection

We will obtain all available data including:

Mapping

- Topographical maps
- Soil maps
- Geological maps

Meteorological Data

- Patterns of rainfall (daily, monthly, annual variability both temporally and spatially)
- Rainfall storm data (intensity/frequency/duration data for storms up to 24 hours)

Catchment Characteristics

- Land usage (forest/plantation/other)
- Soil type (well drainage/poorly drained)
- Physical characteristics (1:2,500 and 1:50,000 maps)
- River Channel Characteristics
- Dimensions, slopes
- Roughness
- Capacity
- Historic flood levels

Existing Drainage Structures

- Type and dimensions
- Hydraulic Capacity
- Evidence of stress (overtopping)

Local Knowledge

- Design Criteria
- Locally used prediction methods
- Local publications

The data collection exercise will be carried out during a site visit followed by a desk study.

Analysis

Following the data collection exercise, we will:

- provide a comprehensive catchment description, covering climate, geology, drainage, land usage etc.
- Select the most appropriate method of flood determination.
- Derive locally applicable rainfall frequency intensity duration curves.
- Analyse available flood data using standard statistical techniques.
- Prepare flood predictions.

Sizing of Drainage Structures

Based on the above flood runoff calculations, the existing drainage structures will be assessed and where necessary new structures will be proposed and sized taking into account the road vertical alignment, the existing watercourse dimensions and foundation conditions. The adopted return period for which the structure will be sized will be dependent upon the type of structure and on the size of catchment, but in all cases the effects of extreme floods on the local environment will be examined in reaching decisions.

Hydrological Reports

The hydrological and hydraulic analysis will be submitted in the Feasibility Report. This section of the Report will comment on the appropriate design return periods to be adopted for each type of structure. To summarise, the hydrological/hydraulic report will contain:

- Detailed hydrological analysis
- Detailed data major water courses
- Survey data for major watercourses
- Design standards
- Capacity of existing structures.

B.6.4 Pavement Analysis

The Terms of Reference require the adoption of the pavement designed for the Southern by-pass for the purpose of comparison. However, we propose to check this pavement structure against TRL Road Note 31 or any other pavement design standards agreed with the Client.

Where it is intended to make use of existing roads, a programme of non-destructive testing will be carried out to determine the cause or causes of any failure and to establish the residual value of the existing road. In general, additional material tests will also be required to support the evidence from the non-destructive tests.

The non-destructive tests will comprise a series of Dynamic Cone Penetrometer (DCP) tests carried out at 500m centres along the outer wheel path of each lane. The tests will be staggered such that the road is effectively tested every 250m.

Where the existing road has an asphaltic concrete surface, cores will be taken prior to the DCP testing to establish the surfacing thickness and to provide samples for laboratory testing.

A series of test pits will then be dug to confirm or help identify the reasons for the observed behaviour of any particular pavement layer and to provide information for the subsequent pavement design over these sections.

The laboratory tests which will be carried on material sampled from the road pavement will be as follows:-

- Road base/sub-base: Grading and classification
In-situ density and moisture content
CBR value (after 4 days soak).
- Subgrade: Grading and classification
In-situ density and moisture content
CBR value (after 4 days soak).

B.6.5 Road Alignment

The design of the horizontal alignment for the selected route will commence as soon as mapping of the area to be traversed has been prepared.

The route selection will be based on the tenet that the line should be as short as possible whilst satisfying economic, social and environmental demands, geological problems (both drift and solid), topography (including choice of waterway crossings) and satisfying design standards.

When designing the alignment we will specifically consider:

Horizontal Alignment

- Compliance with agreed standards in Uganda
- Subsequent ease of phasing vertical and horizontal alignments
- Land Use and Environmental impact
- Minimum destruction of crops, buildings and other assets
- Link road and junction requirements
- Suitable crossing points of waterways

Vertical Alignment

- Compliance with agreed standards in Uganda
- Optimum earthworks with regard to required standards and overall project costs
- Necessary clearance for waterways.

General

- Environmental Impact
- Disruption to existing services and utilities.

In addition, great care will be taken to ensure that the road design standards match the respective types of terrain and/or urban environment and that necessary changes are introduced.

B.6.6 Engineering Plans

We will produce plan and longitudinal sections of the proposed alignment at a scale of 1:2,500 horizontally and 1:250 vertically. The plans will show the road centre-line, chainages of horizontal curves, location and description of all drainage and bridge works, the road reserve boundary together with land utilisation and other relevant natural and cadastral information as necessary.

Typical cross sections, as adopted for the southern by-pass will be produced.

General arrangement drawings for each major structure will be produced at a scale suitable for each location.

B.6.7 Cost Estimates

Northern by-pass

Estimated construction quantities will be taken off the prepared 1:2,500 road plans.

Estimated quantities for any bridges or major culverts that are required will be taken from the general arrangement drawings and will take into account the types of foundations to be used at each location.

The quantities will be valued using the information provided by the Government of Uganda on the cost of recent road construction/rehabilitation projects and estimated costs of Kampala City Roads Phase II Rehabilitation Project.

An estimate of the cost of land acquisition will also be made.

Southern by-pass

For the purpose of comparison with the Northern by-pass, construction costs and land acquisition costs previously estimated for the Southern by-pass will be updated using the rates derived for the Northern by-pass.

B7 ENVIRONMENTAL IMPACT ASSESSMENT

B.7.1 Basic Objectives

This component of the study will assess the impact of the proposed Northern and Southern by-passes on the environment and urban landuse and will make a comparison of the two. The study will cover indigenous people, and environmental effects in particular.

B.7.2 Overall Approach

The methodology proposed for the environmental study is based on experience and will take into account the guidelines given in the "Environmental Manual" published by the European Union in June 1993.

The methodology will be carried out in four main stages:

- (i) Identification, description and mapping of the Northern and Southern by-passes
 - (ii) Review of existing data
 - (iii) Field data collection
 - (iv) Assessment of environmental impacts of the two by-passes and recommendations of the preferred alignment.
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B.7.3 Identification of Areas of Impact

The areas of environmental impact for each by-pass will be identified using existing available 1:2,500 and 1:50,000 scale topographic maps and confirmed in the field.

B.7.4 Review of Existing Data

We will collect and assimilate all existing reports, data and information that is available in Uganda.

Using this information, a detailed baseline profile of the study area will be prepared. Field data collection will complete the profile and bring it up-to-date.

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B.7.5 Assessment of Environmental Impacts

The environmental impacts will be considered under three categories as follows:-

Physical Impacts

- Clearing of vegetation and felling of trees
- Removal of structures or sites of scenic, architectural archaeological or historical significance
- Mechanical disturbance e.g. through operation of vehicles and heavy machinery during construction
- Establishment of quarries
- Establishment of drainage lines, trenches, etc.
- Water shed modification

Social Impacts

- Effect on animal habits
- Habitat change
- Land degradation
- Loss of species - both flora and fauna
- Air and noise pollution
- Water pollution

Social-economic

- Creation of employment
- Loss of community land (farmland, pasture, built-up areas)
- Charcoal, fuel wood and building material
- Providing new or improved access to previously inaccessible or undeveloped land/area.

B.7.6 Impact of Women in Development

Impact of Women in Development is handled by the study as a discrete activity. Some field work coupled with the collection of existing information will be conducted in order to establish a basis for analysing the relationship between the construction of the road and human activity/well-being. Specific attention will be paid to the attitudes and behaviour of women. To this end, the following factors will be identified and analysed.

- Present economic activities, and likely changes in job opportunities.
- Perceptions on environment, health and economic aspects in relation to the improved road network will be evaluated. This will include an analysis of the expected improvements in social services, e.g. health, education, etc. with specific regard to women and children, assess the adequacy of any existing structure.
- Changes in work patterns with regard to the distance and time spent in the collection of water and wood, and utilisation patterns will be anticipated.
- The demographic profile will be reviewed and future trends e.g. immigration, will be assessed. Particular attention will be paid to the possible impact the road may have on immigration patterns especially as they relate to household structure and the work load of women.

B.8. REPORTS AND DOCUMENTS

As required by the Terms of Reference and agreed during contract negotiations, the following reports will be submitted at the times shown below.

- Inception Report: 6 copies within 4 weeks of the date of notification distributed as follows:
 - two copies to NAO;
 - two copies to MOWT&C;
 - two copies to EC Dlg.

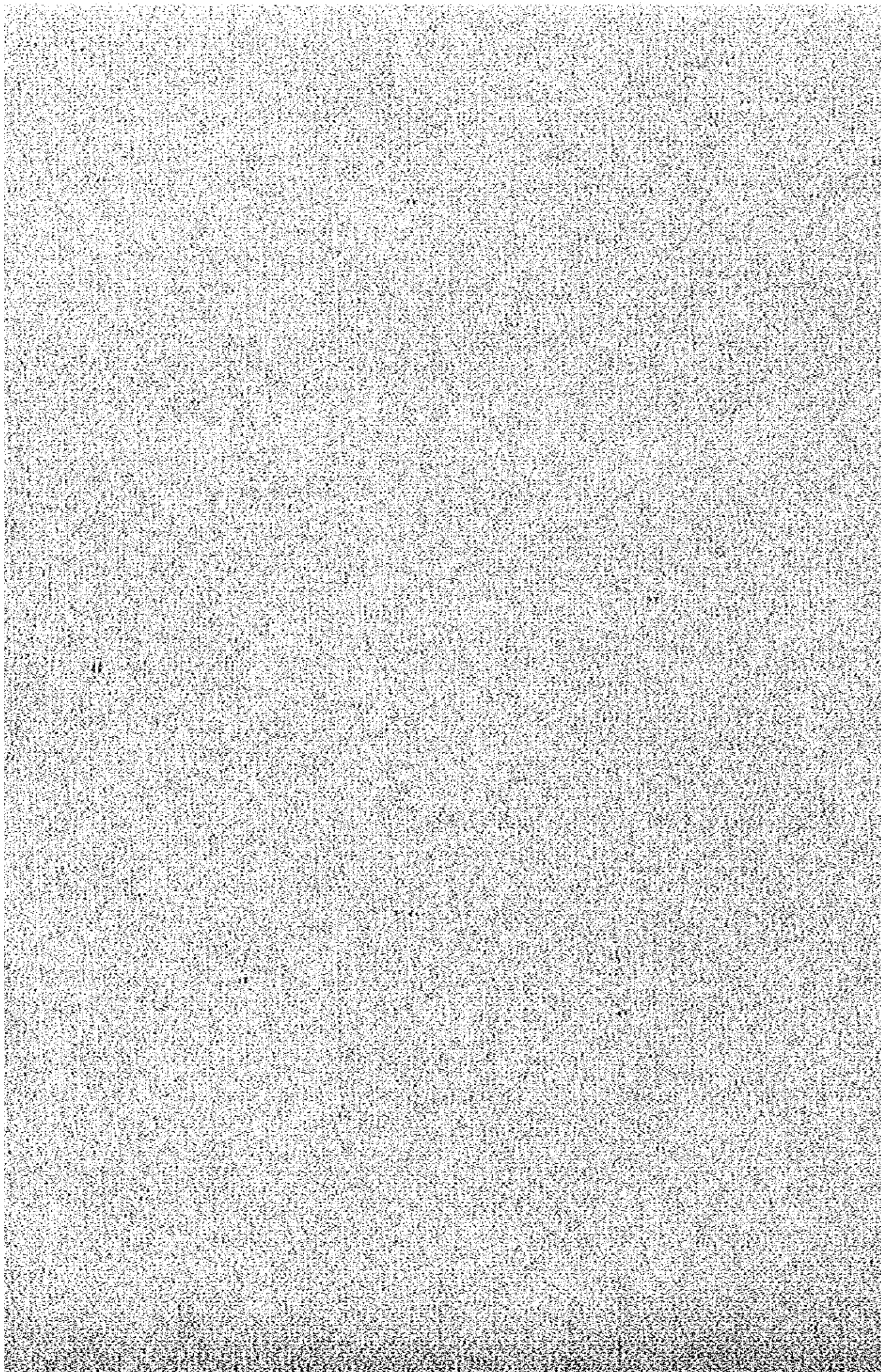
- Interim Report: 6 copies within 8 weeks of the date of notification distributed as follows:
 - two copies to NAO;
 - two copies to MOWT&C;
 - two copies to EC Dlg.

- Draft Final Report: 10 copies within 5 weeks of receipt of the Supervisor's comments on the Interim Report, distributed as follows:
 - two copies to NAO;
 - four copies to MOWT&C;
 - four copies to EC Dlg.

- Final Report: 12 copies within 2 weeks after receipt of the Supervisor's comments on the Draft Final Report, distributed as follows:
 - two copies to NAO;
 - four copies to MOWT&C;
 - six copies to EC Dlg.

As stated in minute (ii) of the minutes of meeting held on 14 March 1995 between NAO and the EC Delegation, the Draft Feasibility Report will include a comparison of the Southern and Northern Bypasses and make a recommendation on which is the most attractive.

14. MOWTCプロジェクトリスト



A. HIGHWAY PLANNING, DESIGN & DOCUMENTATION SECTION

ITEM	PROJECT	SCOPE OF WORK	PROGRESS	TIMING	FINANCING	REMARKS
1	10-YEAR ROAD SECTOR DEVELOPMENT PROGRAMME (RSPP)	Study and finalise MOWTC 10 Year road sector programme 1995/96-2004/5	90% completion Pre-Draft final Report submitted	Technical discussion with potential Donors held here end of April 1996. Donors' Conference expected to be held in September 1996, following completion of a 2-3 month Institution is presently on going	IDA/GOU	Study is behind schedule, making possibility of holding the September 1996 Donor's Conference doubtful
2	THE CLASSIFIED ROAD NETWORK 3 Packages (A, B, C)					
	A. Road Maintenance in Central Uganda	Development of a 3-year road maintenance programme for Central Uganda	Road Component virtually completed Systems component on going	Systems Component expected to be completed in June 1996	ADB/GOU	Study being done by Scott Wilson Kirkpatrick and is progressing on schedule
	B. Karuma-Pakwach-Arua Road	Feasibility study Stage 1 and detailed engineering Stage 2	Stage 1 Draft Final Report has been received MOWTC comments were sent to ADB beginning of April 1996	Schedule to end December 1996 EIA Report expected July 1996	ADB/GOU	Study being carried out by ACE/Iberinsa. Study progress on schedule
	C. Ntungamo-Rukungiri-Ishasha Road	- do -	Consultation has been instructed to start Stage 2 following ADB's No Objection	Schedule to be completed in December 1996	ADB/GOU	Study being carried out by Roughton International and is on schedule

3	PTA ROADS (3 Packages)					
3.1	Package I Kyotera-Mutukula 43km Ishasha-Nungano- Kakitumba 96km Kabale-Kisoro-Bunagana 90km	Feasibility study and detailed design including preparation of tender documents for the total length of 229km	Stage II Final Report and Tender Documents have been submitted as has the Environmental Impact Assessment (EIA) report.	Consultants's Assignment is virtually completed but the Bukora Bridge design is still awaited	ADB/COU	Study carried out by Roughton Int.
3.2	Package II Kauguru-Kasese-Fort Portal Road 108km Fort Portal-Bindibugyo Road 70km	- do - but for 178km	- do -	- do -	- do -	Study carried out by Sabbour/Mott MacDonald but Mubuku Bridge design yet to be submitted
3.3	Package III Busunju-Heima-Butaba 180km Sironko-Kapchorwa-Suam 126km	Detailed engineering (Stage (2) design has started and is in progress	Stage I Final Report was submitted in September 1995. Stage 2 Draft Final Report expected October 1996	- do -	- do -	Study being carried out by Waujobi Consulting Engineers/TDC

Project/Component	Description	Status/Key Dates	Responsible Party	Notes/Comments
4.1	TRANSPORT REHABILITATION PROJECT (TRP) Planet Hire Pool	Feasibility Study for establishment of a plant hirepool.	Final Report submitted in 1996	Study carried out by M/S Gannett Fleming. Study needs to be updated subject to availability of funds.
4.2	Main Roads Component i) Kampala-Entebbe Rd. ii) Mbarara-Ibanda Rd. iii) Kampala-Gayaza-Zirabwe-Bugema-Wobulenzi Rd. iv) Villa-Maria-Sembabule Rd.	Feasibility and design for upgrading/rehabilitation of the roads and then construction.	Construction of Kampala-Entebbe road in progress since April, 1996. IDA's No objection for the Mbarara-Ibanda Road expected shortly. Due to cost-overs the other two components are to be deferred.	Kampala-Entebbe Road is expected to be completed in 12 months and Mbarara-Ibanda Road is to take 24 months.
5	MALABA-JINJA ROAD	Feasibility Study and detailed design for the improvements and strengthening	Stage 1 Draft Final Report submitted TOR for stage 2 sent to KfW for approval.	At the Ministry's recommendation, H.P. Cauff has been approved by KfW as the consultant to undertake the assignment.
6	KAMPALA-JINJA ROAD SECTION I	Study for maintenance improvement of road including procurement of contracting and supervision services and then physical works.	Contract to be signed August 1996	Contract to be carried out by M/S Gleeson and works to start by September, 1996.
7	KAWEMPE-WOBULENZI AND BUSUNU-ROIKA ROADS	- do -	- do -	- do -

18	MITYANA-FORTPORTAL	Feasibility Study (FS) of Mubende-Kagororo section (121 km) for upgrading to Class II bitumen standard completed	Upgrading of Kagororo-Kyeajjo section 28 km in progress. Feasibility update Report by DANIDA consultant expected by end of June 1996	Stage 2 work will start immediately. Stage 1 findings and recommendations are accepted by DANIDA	DANIDA/GOU	Indications are that DANIDA will fund construction of the whole road from Mubende to Kagororo including Stage 2 consultancy services.
19	ROAD BRIDGES IN NORTHERN AND NORTH-EASTERN UGANDA	Draft Terms of Reference have been sent to KfW for comment and approval	KfW comments awaited	Study expected to commence after financing has been accepted by German Government and TOR approved by KfW.	KfW/GOU	Need to liaise closely with MOFEP and send reminder to KfW.
110	KAMPALA-BY-PASS	Comparative study of southern and Northern By-Passes	Consultant in final stages of the study. Interim Reports being reviewed by Ministry	Draft Final Report expected mid Aug. 1996.	EU/GOU	Sir Alexander Gibb is carrying out the study
111	TIRINYI-PALLISA-KUMI & INBALE-PALLISA ROADS	Feasibility Study (Stage 1) and detailed engineering design (Stage 2)	Stage 1 started mid May 1996.	Stage 1 and 2 will take 15 months	ADB/GOU	Lead consultant is компанtran of Ghana. Local associate is Kanamura Melvin. Progress is on schedule
112	INLAND WATER TRANSPORT STUDY	Study of all potential inland water transport points with a view of reactivating this type of transport.	Contract negotiations concluded with International Development Consultants.	Study will commence in September and take approx 16 months	ADB/GOU	International Development Consultant (IDC), Uganda in association with the Management Centre of Kenya shall carry out the study.

13	GAYAZA-KALAGI ROAD	Upgrading to Class II bitumen standard	Procurement of contractor on-going. Tender Evaluation Report submitted.	Construction period is 15 months.	BADEA/COU	Recommendation for contract award approved by BADEA and CTB but MOFEP has advised that a new financier must be found as BADEA's loan terms are not acceptable for Uganda. Close follow-up with MOFEP necessary.
14	KAKUMIRO-KIBAALE-KAGADI ROAD	Rehabilitation and upgrading to Class II gravel Road of 75 km earth surface.	Works to be carried out by force account under Project Management.	Construction period is 12 months.	Irish Aid/COU	The Project Management Consultants are being selected to start the works.
15	SWURMP	Periodic Road Maintenance of approx 2,000 km of Roads in South Western Uganda.	Procurement of Consultants to Manage the programme over a 3-year period is on-going.	Shortlisting is complete and Tenders are expected to be sealed by August, 1996.	EU/COU	EU approved of the TOR awaited.
16	ISRP	Rehabilitation of two project Packages. i) Kabale-Kisoro Road and Katuna Bridge. And ii) Kisoro-Kyanika and Kisoro-Bunagana Roads plus Kisoro Airstrip	Tenders are on-going and are due to be received by 7 August, 1996.	Construction period is 12 months max.	EU/COU	Works are estimated to start in October, 1996.

B. CONSTRUCTION SECTION

ITEM	PROJECT	SCOPE OF WORK	PROGRESS	TIMING	FINANCING AND COST ESTIMATE	REMARKS
1	KANGOROGORO-KYENOJO ROAD	Upgrading to bitumen standard 23 km of the Fort Portal-Mubende road.	Bush-clearing 2 km.	March 1996 to March 1997.	ICOU Contract Price Shs 5,948,496,000	Contractor: Energo(U) Ltd. Consultant: ACE Contract deferred to enable formalities to be finalised for utilising Danida's US\$3.5 million to be finalised. The balance of approx Shs 3.5 billion was not included in FY 1996/97 Budget. Contractor: Impresa Ing. Fortunato Federici spa Consultant: Carl Bro Int a/s
2	IGANAGA-MBALE ROAD	Upgrading of approx. 96km	<ul style="list-style-type: none"> ■ Earth works 66% ■ Sub-base 57% ■ Crushed stone base 53% ■ Bridge : sheet piling complete ■ surface dressing 30km ■ Overall progress 60% 	<ul style="list-style-type: none"> Commencement : 16.9.94 Completion : 15.11.96 6 months behind schedule. 	ADB/GOU	
3	NORTHERN RE-CONSTRUCTION PROGRAMME (HIGWAYS COMPONENT)					
i)	Kafu-Karuma	Rehabilitation/ Reconstruction 93 km of Kampala-Gulu Highway	17% of works completed	<ul style="list-style-type: none"> Commencement 15.10.94 Duration 540 Days Original completion : 9.4.96 Revised completion : 31.5.97 	IDA/GOU Original Contract price UShs 10,201,193,218 Revised contract price UShs 13,586,076,287	Main Contractor - C.G. Jensen Subcontractor - Sogea Consultant - Renardet Original Main Contractor - Wade Adams Invitation to receivership August 1995. Contract assigned to new owners C.G. Jensen February 1996 Road deteriorated with time requiring total reconstruction.
ii)	Atak-Moyo	Rehabilitation/Regraveling of 92 km	45% of permanent works completed by end of February 1996.	<ul style="list-style-type: none"> Original commencement : 24.6.94 Revised Commencement : 13.12.94 Duration 200 days Completion 1.7.95 Forecast completion : 	IDA/GOU Contract price : UShs 6,666,802,501	Contractor- Sietco Consultant - Gibbs Work suspended 24.2.96 due to insecurity. Works are resumed to-date.

iii) Gulu - Acholibur	Rehabilitation/Regraveling of 83 km	100% of permanent works completed	Original commencement: 24.6.96 Revised commencement: 13/12/94 Duration: 150+119 days Actual completion: 31.1.96	IDA/COU Original contract price UShs 4,031,610,332 Revised Contract price UShs 5,544,018,969	Contractor - Sietco Consultant - Gibb Insecurity in project area delayed works. Rise in cost mainly due to Contract price adjustment. Prolonged costs, Security costs
iv) Soroti-Lira	Rehabilitation/Regraveling of 112 km	100% permanent works completed	Commencement: 24.6.96 Duration: 250+58 days Actual completion: 31/1/96	IDA/COU Contract price UShs 6,857,965,303	Contractor - Sietco Consultant - Gibb Road handed over to MOWTC
v) Kumi-Severe-Soroti	Rehabilitation/Regraveling of 78 km	100% permanent works completed	Commencement: 24.6.96 Duration: 150 days Completion: 21.11.94 Actual completion: 30.4.96	IDA/COU Contract price UShs 5,364,574,250	Main Contractor: Mukabazi Technical service Subcontractor: Emergo Uganda Consultant: Gibb All delays attributed to main contractor. Liquidated damages were charged accordingly.
ROAD BRIDGES:					
Package A Bridges in Eastern Uganda	Construction of 15 No. of new drainage structures. 17 No. reinforced concrete bridges/culverts and rehabilitation of 10 No. of existing structures including associated works.	55% complete.	Commencement 22/2/95. Forecast completion date: June 1997	KW/COU Revise sum approx. UShs 3.5 billion.	Contractor - Stirling Civil Eng. Consultant - Gaufl Contractor delayed commencement 5 extra bridges added
Package B Bridges and culverts in Central and Western Uganda	Construction of 11 No. new structures with all associated works. realignment of approach roads then rehabilitation of 10 No. structures.	45%	As above	Revised tender sum UShs 2.4 billion	Contractor and consultant as above Excessive rainfall hampered progress of this package.

15a	Steel Truss Bridges in Central and Western Uganda	Fabrication	Rehabilitation of 6 No. trusses. Fabrication of steel girders finished and 75% of miscellaneous items done.	Start: 22/2/95 End: 21/11/95 Forecast Comp: Dec. 1996	Tender Sum UShs 292,120,752
	MASAKA MBARARA KABALE ROAD SECTIONS	Immediate repairs of potholes and base failures	98% of works substantially completed	Start: 11/10/95 Original Compl: 9/1/96 Actual Compl: 20/2/96	European Union UShs 1,204,811,663
15b	KAKINGA RIVER BRIDGE	Reconstruction	As above	As above	UShs 165,189,180 ditto