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|-----------------------|--|---|---|
| AID 1880-1X (8-70) | DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT | 1. Cooperating Country Southern AFRICA (OSARAC) REG'L, MALAWI | Page 1 of 13 Pages |
| | | 2. PIO/T No. 690-028-3-20010 XXXXXX | 3. <input checked="" type="checkbox"/> Original or Amendment No. _____ |
| PIO/T | PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES | 4. Project/Activity No. and Title MALAWI LOWER SHIRE ROADS 690-12-310-028 Bp | |

| | | | | | | |
|---------------------------------------|--|----------------|---|----------|---|-----|
| DISTRIBUTION: | 5. Appropriation Symbol 72-1121004 | | 6.A. Allotment Symbol and Charge 254-58-690-00-79-21 | | 6.B. Funds Allotted to: <input type="checkbox"/> A.I.D./W <input type="checkbox"/> Mission | |
| | 7. Obligation Status <input checked="" type="checkbox"/> Administrative Reservation <input type="checkbox"/> Subobligation | | | | 8. Funding Period (Mo., Day, Yr.) From 03/01/72 to 08/15/72 | |
| | 9.A. Service to Start (Mo., Day, Yr.) Between 03/01/72 and 04/15/72 | | | | 9.B. Completion date of Services (Mo., Day, Yr.) 08/15/72 | |
| | 10.A. Type of Action <input type="checkbox"/> A.I.D. Contract <input type="checkbox"/> Cooperating Country Contract <input type="checkbox"/> Participating Agency Service Agreement <input type="checkbox"/> Other: | | | | | |
| | 10.B. Authorized Agent AID/W | | | | | |
| | Estimated Financing | | (1) | (2) | (3) | (4) |
| \$1.00 = | | Previous Total | Increase | Decrease | Total to Date | |
| 11. Maximum A.I.D. Financing | A. Dollars | | \$20,000 | | \$20,000 | |
| | B. U.S.-Owned Local Currency | | | | | |
| 12. Cooperating Country Contributions | A. Counterpart | | | | | |
| | B. Other | | | | | |

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|------------------------|--|
| 13. Mission References | 14. Instructions to Authorized Agent The Contract Officer shall negotiate personal service contracts with two consultants to conduct this study and prepare the analysis required and submit reports as called for in the attached Scope of Work. |
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|---|---|
| 15. Clearances - Show Office Symbol, Signature and Date for all Necessary Clearances. | |
| A. The specifications in the scope of work are technically adequate RAP AFR/CDF, R.A. Delemarre | B. Funds for the services requested are available C/ACC/CFSB, D.F. Brown |
| C. The scope of work lies within the purview of the initiating office and approved Agency Programs AFR/SAF, A. Ellis | D. |
| E. | F. |

| | | |
|--|---|-------------------------------------|
| 16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to Signature and date: Title: | 17. For the Agency for International Development Signature: <i>S.R. Nevin</i> S.R. Nevin Title: Dep. Director, AFR/MGT/C | 18. Date of Issuance 3/16/72 |
|--|---|-------------------------------------|

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|-----------------------|--------------------------------|------------------------------|--------------------|
| AID 1350-1X (9-70) | Cooperating Country | PIO/T No. 690-028-3-20010 | Page 2 of 23 Pages |
| PIO/T | Project/Activity No. and Title | | |

SCOPE OF WORK

19. Scope of Technical Services

A. Objective for which the Technical Services are to be Used

See Attached Scope of Work

B. Description

C. Technicians

| (1) (a) <u>Number</u> | (b) <u>Specialized Field</u> | (c) <u>Grade and/or Salary</u> | (d) <u>Duration of Assignment (Man-Months)</u> |
|-----------------------|------------------------------|--------------------------------|--|
| 1 | Transport Economics | GS 13-15 | Two Months |
| 1 | Highway Engineers | GS 13-15 | Two Months |

(2) Duty Post and Duration of Technicians' Services Malawi (Blantyre)

(3) Language requirements English

(4) Access to Classified Information None

(5) Dependents Will Will Not Be Permitted to Accompany Technician At their own expense.

D. Financing of Technical Services

(1) By AID - \$ 20,000.

(2) By Cooperating Country -

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|------------------------------------|--------------------------------|------------------------------|--------------------|
| AID 1380-1X (9-70) PIO/T | Cooperating Country | PIO/T No. 690-028-3-20010 | Page 3 of 13 Pages |
| | Project/Activity No. and Title | | |

20. Equipment and Supplies (Related to the services described in Block 19 and to be procured outside the Cooperating Country by the supplier of these services)

| | | | |
|------------------------|------------------------|---------------------------|---------------------------------|
| A. (1) <u>Quantity</u> | (2) <u>Description</u> | (3) <u>Estimated Cost</u> | (4) <u>Special Instructions</u> |
|------------------------|------------------------|---------------------------|---------------------------------|

N. A.

B. Financing of Equipment and Supplies

(1) By AID - \$

(2) By Cooperating Country -

21. Special Provisions

- A. This PIO/T is subject to AID (contracting) (PASA implementation) regulations.
- B. Except as specifically authorized by AID, or when local hire is authorized under the terms of a contract with a U.S. Supplier, services authorized under this PIO/T must be obtained from U.S. sources.
- C. Except as specifically authorized by AID/W, the purchase of commodities authorized under this PIO/T will be limited to the U.S. under Geographic Code 000.
- D. Other (specify):

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| AID 1350-1X (9-70) | Cooperating Country | PIO/T No. 690-028-3-20010 | Page 4 of 43 Pages |
| PIO/T | Project/Activity No. and Title | | |

22. Reports by Contractor or Participating Agency (Indicate type, content and format of reports required, including language to be used if other than English, frequency or timing of reports, and any special requirements)

See Attached Scope of Work.

23. Background Information (Additional information useful to Authorized Agent and Prospective Contractors or Participating Agency; if necessary cross reference Block 19.C(4) above.)

Various data will be provided by AID/W.

24. Relationship of Contractor or Participating Agency to Cooperating Country and to AID

A. Relationships and Responsibilities The consultants will be responsible to the Contracting Officer, Bureau for Africa, Agency for International Development.

B. Cooperating Country Liaison Official To be appointed by the Government of Malawi

C. AID Liaison Officials Robert A. Delemarre, Office of Capital Development, Bureau for Africa.

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|-----------------------|--------------------------------|------------------------------|--------------------|
| AID 1350-1X (9-70) | Cooperating Country | PIO/T No. 690-028-3-20010 | Page 5 of 13 Pages |
| PIO/T | Project/Activity No. and Title | | |

LOGISTIC SUPPORT

| 25. Provisions for Logistic Support A. Specific Items (Insert "X" in applicable column at right. If entry needs qualification, insert asterisk and explain below in C. "Comments") | In Kind Supplied By | | From Local Currency Supplied By | |
|---|---------------------|---------------------|---------------------------------|---------------------|
| | AID | Cooperating Country | AID | Cooperating Country |
| (1) Office Space | | X | | |
| (2) Office Equipment | | X | | |
| (3) Housing and Utilities | | | | |
| (4) Furniture | | | | |
| (5) Household Equipment (Stoves, Refrig., etc.) | | | | |
| (6) Transportation in Cooperating Country | | X | | |
| (7) Interpreter Services | | | | |
| (Other: (Specify) (8) | | | | |
| (9) | | | | |
| (10) | | | | |
| (11) | | | | |
| (12) | | | | |
| (13) | | | | |
| (14) | | | | |
| (15) | | | | |

B. Additional Facilities Available From Other Sources

None

C. Comments

None

MALAWI
LOWER SHIRE DEVELOPMENT PROJECT PHASE II

The following general terms of reference are to serve as a guide to the consultants in making a determination of the technical and economic feasibility for proposed improvement of road transport facilities (roads and facilities for crossing the Shire River) in the Lower Shire valley of Malawi.

The Traffic Corridor

The general traffic corridor under study includes a low-type road which intercepts the main road from Blantyre to Chikwawa (M-8) about 5 miles east of Chikwawa, and passes near the base of the Cholo escarpment on the east bank of the Shire River enroute to a river crossing by ferry service in the Chiromo/Bangula area and thence via the main road on the west bank (M-8) enroute to Nsanje and Marka on the southern border of Malawi. The southern part of this traffic corridor, from Marka to a point east of the railway bridge at Chiromo also is served by Malawi Railways. The total length of the road traffic corridor is about 100 miles.

I - OBJECTIVES

The study shall be carried out with cognizance to the proposed study of the 57-mile West Bank road (M-8) between Chikwawa and Bangula and the proposed improvements to the main road (M-8) between Chikwawa and Blantyre.

The general purpose of this study of technical and economic feasibility is to investigate the adequacy of the existing facilities and to determine whether these facilities (road and ferry) should be upgraded or whether new facilities should be developed to serve more effectively and economically the needs of the traffic corridor in a 20-year period, e.g. 1975-1995. The service performed by the railway should be considered in the evaluation.

-2-

Depending upon the results of this study a second phase would be carried out if necessary. The purpose of the second phase would be to carry out such detailed or other engineering as is necessary for the proposed improvement of the road traffic corridor including detailed proposals for the execution of the works (and, if required, specifications for equipment) and any necessary bidding documents to enable the Government to call for bids for the proposed improvements arising out of the results of this study.

II - SCOPE OF CONSULTING SERVICES

A. General

The study shall consist of: A determination of the technical and economic feasibility, based upon such preliminary engineering information and standards as are necessary, of either improving the existing roads (and water crossing of Shire River) mentioned above or constructing new facilities to serve their areas of influence to all-weather standards (maximum of 24 hour delay).

The consultants will perform all preliminary engineering work, economic studies, organizational and financial analysis, field investigations and related work to the degree as required in accordance to their best professional judgment, to attain the objectives in Section I hereof, even though they have not been expressly set forth in these terms of reference.

In the conduct of their work, the consultants shall cooperate fully with the Government Ministries of Finance, Works, Transportation and Agriculture and Natural Resources; the Government will provide the consultants with the data and services outlined in Section IV hereof. The consultants shall be solely responsible, however, for the analysis and

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interpretation of all data received and for the conclusions and recommendations contained in their reports.

Part 1

B. Technical and Economic Feasibility Studies for the Improvement of the Existing Facilities or the Construction of New Facilities to Serve the Areas of Influence of the Roads Mentioned in Section I Above

1. Route Selection

The consultants shall determine the technical and economic feasibility of either improving the existing above-mentioned roads, and ferry crossing between Chiromo and Bangula, or constructing new roads and a river crossing to serve the areas of influence of the roads mentioned above. In carrying out such determination the consultants shall evaluate possible realignments to the basic route and methods of crossing the River Shire at Chiromo including possible modification of the existing railway bridge to carry vehicular traffic and select the most advantageous alignment and crossing to serve the proposed development of the Shire Valley on the basis of traffic forecasts, reconnaissance field surveys, order-of-magnitude construction and maintenance cost estimates and preliminary economic analysis.

Studies of alternative routes and river crossing shall commence with an evaluation of the existing roads mentioned above and include the possibilities of improving them by relocating short sections to improve drainage, widths, curvature, grades and surfacing. In comparing alternative methods of crossing the Shire River between Chiromo and Bangula, the consultants shall consider the alternatives of either improving the existing ferry or using the railway bridge.

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The order-of-magnitude cost estimates will be determined primarily per mile on the basis of cost indices/established for various terrain sections in Malawi. Determination of construction costs shall include all necessary bridges and culverts for the road. Cost of improving ferry service or decking the railway bridge for use by road traffic will also be determined. Design and construction standards appropriate to the anticipated traffic will also be recommended for each section of the road. The cost analysis will provide estimates of foreign exchange and local currency requirements.

To determine the type and volume of future traffic for each of the alternative alignments or river crossings under study, the consultants shall analyse all available data on traffic in the areas of the zones of influence of the alternative alignments and river crossings. In addition, the consultants shall identify, describe and quantify existing and potential traffic generating sources in the regions served by the road alignments and river crossing under investigation. Such identification shall take account of the existing development and the proposed Second Phase Lower Shire Valley Development Project and an estimate of future demands for highway transport resulting from:

(a) development of agricultural and other production in area of influence in the Lower Shire Valley based upon current plans for development and an analysis of the agricultural production potential based upon agronomic and population aspects.

(b) anticipated growth in local trades and population.

The consultants shall make preliminary economic analyses for each alternative alignment and river crossing under study, using the methods outlined in paragraph 2 of this section and the traffic forecasts and

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construction cost estimates described above. On this basis, the consultants shall make recommendations as to (i) location, alignments, design and standards and methods for the improvement or reconstruction of the roads mentioned above; and (ii) the best method of crossing the Shire River between Chiromo and Bangula. The consultants may conclude that improvements of some or all of the roads or sections of them may be so simple as to require only 'type' engineering in which case such 'type' engineering and the extent to which it should be carried out shall be described. A general construction plan and schedule for accomplishment of recommended improvements and/or new construction will also be programmed and include recommendations for staged construction, as applicable.

2. Economic Analysis

Such economic analysis of alternatives to options and/or alignments shall include for a 20 year period (e.g. 1975-1995):

(i) estimates of the volume and destination of traffic leaving or entering the East Bank area of the lower Shire Valley by road via Chikwawa (or Blantyre) and by road and rail via Bangula, allocating such traffic to the least cost transport mode and route and taking into account the prospective improvements to the Blantyre-Tete road; similar estimates are to be made for the Bangula-Marika corridor.

(ii) estimates of future transport costs with and without the proposed improvements using unit costs of owning and operating typical vehicles on the existing road and railway costs, and estimated future costs of vehicle operation on the existing and proposed improved roads and the railway;

(iii) estimates of other economic benefits, if any, including reductions in road maintenance costs and increase in the net value of

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agricultural or other outputs resulting from the proposed road improvements; and

(iv) a comparison of the expected costs of construction, maintenance and administration for the economic life of the proposed improvements (20 years) using computations of the internal rate of return on the investments and a benefit cost ratio discounted to present values.

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III - Reports

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1. At the end of field work (max. of ~~eight~~ ^{four} weeks) and before departing for the United States, the consultants will orally brief appropriate officials of the GOM on work accomplished and possible tentative findings and conclusions related to the transports links being evaluated.
2. Within thirty (30) days after completion of field work, the consultants will submit ten (10) copies of a draft final report to A.I.D. Said report will provide sufficient data and analysis to ascertain the economic and technical justification of the recommended improvements without recourse to any further documentation.
3. Within forty-five (45) days after receipt of the draft final report, A.I.D. will submit written comments on the report to the consultants who will then make any changes/clarification as deemed appropriate.
4. Within thirty (30) days after receipt of A.I.D. comments, the consultants will submit () copies of the final report to A.I.D.

IV - DATA, LOCAL SERVICES AND FACILITIES
TO BE PROVIDED BY THE GOVERNMENT

A. Data and Counterpart Personnel

The Government will provide the consultants with all available data on:

- to be completed by Government. In particular
- the Government will provide the following
- to be completed by Government

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In connection with work by the consultants which requires the co-operation of government agencies, the Government will provide liaison and will ensure that the consultants have access to all information required for the completion of the studies. The Government will assign on a full-time basis, the following counterparts to the key personnel of the consultants for the purpose of liaison and training.

..... to be completed by Government

B. Local Facilities and Supporting Staff

The Government will provide the following facilities for use by the consultants in performing the services:

- (i) A four-wheel drive vehicle; and
- (ii) A driver familiar with the survey area.

The Government will furnish the following technical personnel to assist the consultants in performing the services:

..... to be completed by Government

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| AID 1880-1X (8-70) PIO/T | DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES | 1. Cooperating Country So. Afr. (OSARAC) Reg'l, Malawi | Page 1 of 11 Pages |
| | | 2. PIO/T No. 690-028-3-30001 | 3. <input checked="" type="checkbox"/> Original or Amendment No. _____ 11 p. |
| | | 4. Project/Activity No. and Title Malawi - Lower Shire Roads 690-12-310-028 | |

| | | | | | | |
|---------------------------------------|--|----------------|---|----------|--|-----|
| DISTRIBUTION | 5. Appropriation Symbol 72-1131004 | | 6.A. Allotment Symbol and Charge 354-58-690-00-79-31 | | 6.B. Funds Allotted to: <input checked="" type="checkbox"/> A.I.D./W <input type="checkbox"/> Mission | |
| | 7. Obligation Status <input type="checkbox"/> Administrative Reservation <input type="checkbox"/> Subobligation | | | | 8. Funding Period (Mo., Day, Yr.) From 7/15/72 to 2/28/73 | |
| | 9.A. Service to Start (Mo., Day, Yr.) Between 7/15/72 and 8/15/72 | | | | 9.B. Completion date of Services (Mo., Day, Yr.) 2/28/73 | |
| | 10.A. Type of Action <input checked="" type="checkbox"/> A.I.D. Contract <input type="checkbox"/> Country Contract <input type="checkbox"/> Service Agreement <input type="checkbox"/> Participating Agency Other: | | | | | |
| | 10.B. Authorized Agent AID/Washington | | | | | |
| | Estimated Financing | | (1) | (2) | (3) | (4) |
| \$1.00 = | | Previous Total | Increase | Decrease | Total to Date | |
| 11. Maximum A.I.D. Financing | A. Dollars | | \$80,000 | | \$80,000 | |
| | B. U.S.-Owned Local Currency | | | | | |
| 12. Cooperating Country Contributions | A. Counterpart | | | | | |
| | B. Other | | | | | |

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| 13. Mission References | 14. Instructions to Authorized Agent AFR/MGT/C shall negotiate a contract with a U.S. consulting firm to conduct this study and prepare the analysis required and submit reports as called for in the attached Terms of Reference. |
|------------------------|---|

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|---|---|
| 15. Clearances - Show Office Symbol, Signature and Date for all Necessary Clearances. | |
| A. The specifications in the scope of work are technically adequate AFR/CDF, R.A. Delemarre AFR/CDF, R.G. Rose | B. Funds for the services requested are available S/ACC/CFSB, D.F. Brown |
| C. The scope of work lies within the purview of the initiating office and approved Agency Programs AFR/ESA, J. Knoll | D. AFR/ESA, E. Gales |
| E. | F. |

| | | |
|--|---|-------------------------------------|
| 16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to Signature and date: Title: | 17. For the Agency for International Development Signature: S. R. Nevin Title: Dep. Dir., AFR/MGT/C | 18. Date of Issuance 7/31/72 |
|--|---|-------------------------------------|

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| AID 1350-1X (9-70) PIO/T | Cooperating Country So. Afr. (OSARAC) Reg'l, Malawi Project/Activity No. and Title Malawi: Lower Shire Roads | PIO/T No. 690-028.3.30001 690-12-310-028 | Page 2 of 11 Pages |
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SCOPE OF WORK

19. Scope of Technical Services

A. Objective for which the Technical Services are to be Used

See attached Terms of Reference

B. Description

C. Technicians

| <u>(1) (a) Number</u> | <u>(b) Specialized Field</u> | <u>(c) Grade and/or Salary</u> | <u>(d) Duration of Assignment (Man-Months)</u> |
|-----------------------|------------------------------|--------------------------------|--|
| 1 | Transport Economist | GS 13-16 | Four months |
| 1 | Highway Engineer | or | Four months |
| 1 | Soils Engineer | equivalent | Four months |

(2) Duty Post and Duration of Technicians' Services - Blantyre, Malawi

(3) Language requirements - English

(4) Access to Classified Information - None

(5) Dependents Will Will Not Be Permitted to Accompany Technician

D. Financing of Technical Services

(1) By AID - \$ 80,000

(2) By Cooperating Country -

| | | | |
|-----------------------|--|-------------------------------------|-----------------------|
| AID 1380-1X (9-70) | Cooperating Country So. Afr (OSABAC) Reg'l Malawi | PIO/T No. 690-028=3-30001 | Page 4 of 11 Pages |
| PIO/T | Project/Activity No. and Title Malawi: Lower Shire Roads | | 690-12-310-028 |

22. Reports by Contractor or Participating Agency (Indicate type, content and format of reports required, including language to be used if other than English, frequency or timing of reports, and any special requirements)

See Attached Terms of Reference

23. Background Information (Additional information useful to Authorized Agent and Prospective Contractors or Participating Agency; if necessary cross reference Block 19.C(4) above.)

See attached Terms of Reference

24. Relationship of Contractor or Participating Agency to Cooperating Country and to AID

A. Relationships and Responsibilities - The Contractor will be responsible to the Contracting Office, Bureau for Africa, Agency for International Development.

B. Cooperating Country Liaison Official - To be appointed by the Government of Malawi

C. AID Liaison Officials - Robert A. Delemarre, Office of Capital Development and Finance,
Bureau for Africa
John A. Buche, Counselor, American Embassy, Blantyre, Malawi

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|-----------------------|---|-------------------------------------|--------------------|
| AID 1380-1X (9-70) | Cooperating Country SO. Afr. (OSARAC) Reg'l, Malawi | PIO/T No. 690-028-3-30001 | Page 5 of 11 Pages |
| PIO/T | Project/Activity No. and Title Malawi: Lower Shire Roads 690-12-310-028 | | |

LOGISTIC SUPPORT

| 25. Provisions for Logistic Support | In Kind Supplied By | | From Local Currency Supplied By | |
|--|---------------------|---------------------|---------------------------------|---------------------|
| | AID | Cooperating Country | AID | Cooperating Country |
| A. Specific Items (Insert "X" in applicable column at right. If entry needs qualification, insert asterisk and explain below in C. "Comments") | | | | |
| (1) Office Space | | | | |
| (2) Office Equipment | | | | |
| (3) Housing and Utilities | | | | |
| (4) Furniture | | | | |
| (5) Household Equipment (Stoves, Refrig., etc.) | | | | |
| (6) Transportation in Cooperating Country | | X | | |
| (7) Interpreter Services | | | | |
| Other: (Specify) (8) Soil Laboratory - Staff and | | | | |
| (9) Facilities | | X | | |
| (10) | | | | |
| (11) | | | | |
| (12) | | | | |
| (13) | | | | |
| (14) | | | | |
| (15) | | | | |

B. Additional Facilities Available From Other Sources

C. Comments

MALAWI
LOWER SHIRE DEVELOPMENT PROJECT PHASE II

The following general terms of reference are to serve as a guide to the consultants in making a determination of the technical and economic feasibility for proposed improvement of road transport facilities in the Lower Shire Valley of Malawi.

THE TRAFFIC CORRIDOR

The traffic corridor under study includes the 128 mile Trunk Road (M-8) between Elantyre and Marka (via Chikwawa and Pangula on the West Bank of the Shire River). The southern part of this traffic corridor, from Pangula to Nsanje and Marka is also served by Malawi Railways.

I - OBJECTIVES

The valley road on the East Bank (S38 between Thabwa - junc. M8 - and Makanya - junc. M9), the connecting road over the Shire River (M9 between Makanya and Pangula) and a section of the West Bank road (M8, Pangula and Nsanje to Marka) have been the subject of a recent feasibility study. The escarpment section from Elantyre to Chikwawa has also been the subject of preliminary engineering (existing and alternative route). The consultant shall review and consider these studies in formulating his recommendations for the 20 year period 1975 through 1995.

The general purpose of this study of technical and economic feasibility is to investigate the adequacy of the existing road from Elantyre to Pangula and to determine whether this road, or sections thereof, should be upgraded or whether a new road should be developed to serve more effectively and economically the needs of the traffic corridor. The services performed by the railway shall be considered in the evaluation.

Depending upon the results and recommendations of this study, a second phase may be carried out under a separate contract. The purpose of the second phase would be to provide the detailed engineering for the proposed improvement of the road traffic corridor including complete specifications and bidding documents to enable the Government to call for bids for the proposed improvements arising out of the results of this study.

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II. SCOPE OF CONSULTING SERVICES

A. General

The study shall consist of: a determination of the technical and economic feasibility, based upon such preliminary engineering information and standards as are necessary, of either improving the existing road mentioned above or constructing a new road to serve its areas of influence to all-weather standards.

In the conduct of their work, the consultants shall cooperate fully with the Government, Ministries, including the Ministries of Agriculture and Natural Resources, Works and Supplies, Finance, the Office of the President and Cabinet (Economic Planning and Development Divisions) and Transport and Communications. The Government will provide the consultants with the data and services outlined in Section IV. The consultants shall be solely responsible, however, for the analysis and interpretation of all data received and for the conclusions and recommendations contained in their report.

B. Technical and Feasibility Studies for the Improvement of the Existing Road or the Construction of a New Road to Serve the Area of Influence of the Road Mentioned in Section I Above

Route Selection

The consultants shall determine the technical and economic feasibility of either improving the existing road between Chikwawa and Bangula or constructing a new road to serve its areas of influence. In carrying out such determination the consultants shall first review any studies already carried out on the proposed road and evaluate feasible alternative routes and select the most advantageous location and alignment to serve the proposed development of the Shire Valley on the basis of traffic forecasts, reconnaissance field surveys, order of magnitude construction and maintenance cost estimates and preliminary economic analysis, including the feasibility of staged construction.

Studies of alternative routes shall commence with an evaluation of the existing road and include the possibilities of improving it by re-locating short sections to improving drainage, widths, curvature and grades.

The consultants shall determine, after reviewing all existing data and studies, the extent and composition of necessary sub-surface investigations, testing and analyses that are required and carry out such work. The purpose of the sub-surface work will be to determine the acceptability of existing underlying soils along the possible routes for use as roadway base and embankments materials and to determine the location, quality and quantity of necessary suitable borrow areas all for use in developing

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preliminary layout and designs, the comparison of alternates and the preparation of reasonably firm order-of-magnitude cost estimates. The cost estimates shall be based on the best estimated construction costs per mile of road (in Malawi) for the design and construction standards appropriate to the anticipated traffic on each section of the road in the twenty-year period 1975-1995.

(a) Without compromising the generality of the foregoing, the consultant will be required to:

- (1) Based on a general appraisal of the homogeneity of soil conditions along the possible alternate routes, develop and conduct a program (frequency, depth, sampling) of subsurface exploration and determine the depth of unusable soils and the acceptability of underlying soils for embankment and base material.
- (2) Classify the various soils encountered based on gradation, plasticity, shrinkage limits, and possibly mechanical analyses tests. In addition establish the maximum density-moisture relationship and the CBR value.
- (3) Using similar procedures locate and evaluate borrow pits for required base, sub-base and embankment materials.
- (4) Prepare a preliminary design and layout and estimate the order-of-magnitude cost.

Based on a review of available maps, aerial photographs and proposed development plans for the Shire Valley, the consultants shall determine the type and amount of any additional aerial photography required in the design phase. The consultant shall also make recommendations concerning additional soils exploration required during the design phase.

To determine the type and volume of future traffic for each of the alternative alignments under study, the consultants shall analyse all available data on traffic on the areas of the zones of influence of the alternative alignments under the study. If the consultants find that additional traffic counts and origin and destination studies are required for the purposes of their study, the necessary additional counts and field investigations shall be undertaken by the consultants. In addition, the consultants shall identify, describe and qualify existing and potential traffic generating sources in the region served by the road location under investigations. Such identification shall take account of the existing development and the proposed Second Phase Lower Shire Valley Development Project and as estimate of future demands for highway transport resulting from:

(a) development of agricultural and other production in the Lower Shire Valley including the execution of the Kasinthula irrigation and other planned projects. In addition, an analysis of the agricultural production potential of the area of influence based upon agronomic and population aspects will be projected.

(b) estimated future growth in local trade and population.

The consultants shall make preliminary economic analyses for each alternative route location and alignment under study, using the traffic forecasts and cost estimates described above. On this basis the consultants shall make recommendations as to the best design and construction standards for the improvement or reconstruction of the road, including the possibilities for staged construction.

Economic Analysis

The economic analysis of alternative alignments shall include:

(a) estimates of the volume and destination of traffic entering and leaving the Lower Shire Valley by road via Chikwawa (to or from Blantyre and Tete) and by road and rail via Bangula and by river via Chiromo, allocating such traffic to least cost transport mode and route taking into account the prospective improvements to the Blantyre-Tete road corridor:

(b) estimates of future transport costs with and without the proposed improvements using unit costs of owning and operating typical vehicles on the existing road, railway costs, and river transport costs, and estimated future costs of vehicle operation on the existing and proposed improved roads (including a new road in the Chikwawa/Blantyre corridor), the railway; and the Shire River;

(c) estimates of other economic benefits, if any, including reductions in road maintenance costs and increases in the net value of agricultural or other outputs resulting from the proposed road improvements; and

(d) a comparison of the expected costs of construction, maintenance and administration for the economic life of the proposed road improvements using computations of the internal rate of return on the investments as well as their net present values.

III REPORTS

At the end of the field work and before departing for the United States, the consultants will orally brief appropriate officials of the GOM on work accomplished and possible tentative findings and conclusions related to the transport links being evaluated.

Within thirty (30 days) after completion of field work, the consultants will submit twenty (20) copies of a draft final report to A.I.D., ten of which are for onward transmission to the Malawi Government. Said report will provide sufficient data and analysis to ascertain the economic and technical justification of the recommended improvements without recourse to any further documentation.

Within forty-five (45) days after receipt of the draft final report, A.I.D. will submit written comments on the report to the consultants who will then make any changes/clarification deemed appropriate.

Within thirty (30) days after receipt of A.I.D. comments, the consultants will submit fifty (50) copies of the final report to A.I.D., twenty-five of which are for onward transmission to the Malawi Government.

IV - DATA, LOCAL SERVICES AND FACILITIES TO BE PROVIDED BY THE GOVERNMENT

A. Data and Counterpart Personnel

The Government will provide the consultants with the following available data:

1. Economic Report 1972
2. Mid-Year Review 1971
3. Compendium of Statistics 1971 (if available in time)
4. annual Survey of Economic Activities 1969
5. National Sample Survey of Agriculture 1970
6. E.I.U. Report on Road Transport in Malawi
7. Latest Annual Report of Road Traffic Commissioner
8. Statement of Development Policies 1971 - 1980
9. Survey of Agricultural Small-holder - Chikwawa and Nsanje
10. Survey of Agricultural Small-holder - Southern Region
11. Lockwood Report on Kasinthula Irrigation Project
12. Lockwood Report on Lower Shire Valley Irrigation Development Plan.
13. C.D.C. Halcrow Pre-Appraisal Report on Lockwood Survey
14. The Lohnro Report on the Mlanju Alumina project.

In connection with work by the consultants which requires the co-operation of Government Agencies, the Government will provide liaison and will ensure that the consultants have access to all available information required for the completion of the studies.

B. Local Facilities and Supporting Staff

The Government will provide the following facilities for use by the consultants in performing the services:

- (i) A four-wheel drive vehicle; and
- (ii) A driver familiar with the survey area
- (iii) The use of the staff and facilities of the GOM laboratories as required to conduct the field and lab soils sampling and testing for the study.

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The GOM will assign on a full-time basis such counterparts to the key personnel of the contractor for the purpose of training as may be available.