PD-AAP-472
ISN= 35328

UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Southern Perimeter Road	690-0076	USAID/Lesotho

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 690-83-7

☐ REGULAR EVALUATION ☒ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent FY 78	B. Final Obligation Expected FY 82	C. Final Input Delivery FY 85	A. Total $ 41,500,000 B. U.S. $ 34,000,000	From (month/yr.) 1978 To (month/yr.) October, 1983 Date of Evaluation Review

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Conduct a detailed review of current and anticipated Title III expenditures	USAID Project Officer	December 1983
2. Encourage development of a detailed training program to include statement of goals, description of methodology, implementation schedule, specification of reporting procedures and evaluation mechanisms.	USAID Project Officer	January 1984
3. Encourage coordination of training program with training section of Roads Branch, MOW	USAID Project Officer	January 1984
4. Encourage examination of training policies in relation to innovative approaches being used elsewhere.	USAID Project Officer	January 1984
5. Recommend to GOL use of the Mt. Moorosi camp site as a future training institution by GOL	USAID/Lesotho	Continuing
6. In regard to maintenance of completed roadwork, encourage liaison between the Road Training Officer and SPRPA Title III personnel in order to transfer expertise and facilitate integration of Title III achievements with MOW objectives.	USAID Project Officer	Continuing
7. Monitor development of the MOW road maintenance capability.	USAID	Continuing
8. Re-examine vehicle operating costs for Lesotho before next project evaluations.	USAID Project Officer	Continuing
9. Conduct a social-economic baseline study.	USAID/REDSO	Mid-1984

9. INVENTORY OF DOCUMENTS TO BE REVISED FOR ABOVE DECISIONS

- ☐ Project Paper
- ☐ Financial Plan
- ☐ Logical Framework
- ☐ Project Agreement
- ☐ Implementation Plan e.g., CPI Network
- ☐ PIO/T
- ☐ PIO/C
- ☐ PIO/P
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. ☒ Continue Project Without Change
- B. ☐ Change Project Design and/or ☐ Change Implementation Plan
- C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

John Zedalis/Transportation Consultant - Engineer
Al Ruiz/Consultant - Team Leader
Philip Moeller/Transportation Consultant - Economist
Gene Wilken/Consultant - Social Scientist
Jack Smith/REDSO/EA - Engineer

12. Mission/AID/W Office Director Approval

Signature: Edna A. Boorady
Typed Name: Edna A. Boorady
Date: Feb. 14, 1984

AID 1330-15 (3-78)

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR (Continued)

10.	Encourage continuing adherence to plan for protection of archeological and paleontological finds along the construction route as identified by pertinent consultant reports.	USAID Project Officer	Continuing
11.	AID legal advisor's review need for further follow-up investigation by RIG/A or other appropriate office regarding advisability of recovering costs resulting from any PRC Harris poor performance during Title I and II phases of the work. Conclusions of such a review would follow resolution of the Nello Teer Title II claims.	USAID/L; RLA/SA; GC/AID/W	Mid-1984
12.	The Force Account concept of construction with a technical Management Team in actual charge of the work, rather than in an advisory capacity, appears to have considerable merit for low-cost, low-volume road construction. Recognition in "Front Lines" is suggested so that the concept might be considered in developing and implementing future road projects.	USAID/L; AID/W	1984

EXECUTIVE SUMMARY

PREPARED BY: Fred Zobrist/Mulugeta Yohannes, USAID/Lesotho

DATE: October 1, 1983

PROJECT: Southern Perimeter Road

COUNTRY: Lesotho

COST: $41,000,000 (7 million GOL, 34 million U.S.)

I. What constraint did the project attempt to relieve?

The project is attempting to (a) relieve the geographic isolation of the southern region of the country from the rest of Lesotho; (b) increase the provisions of and access to agricultural inputs and services; (c) extend the social benefits associated with education, health, agriculture, and the miscellaneous benefits such as improved tax collection, reduced bus and truck fares, and increased identification with GOL goals and aspirations; (d) encourage tourism in the project's zone of of influence; (e) reduce the migration of labor to the RSA; (f) eliminate or at least reduce any economic repercussions emanating from border closures by Transkei, the SA homeland whose independence status is not recognized by Lesotho; and (g) reduce the dependence on the use of the South African transportation network to transport freight and people from one district to another within Lesotho..

II. What technology did the project promote to relieve this constraint?

To relieve this constraint the project is promoting the construction of a 200 km long all-weather road in the southern part of the country. A fifth of this stretch of road is being newly constructed by a U.S. contractor.

The remaining, essentially an upgrading of an existing road, is being constructed by a semi-autonomous force account team, established with the assistance of a six-man U.S. T.A. management team, operating capital and equipment. Additionally, another 50km section of road was designed by a U.S. consulting firm and turned over to the GOL for implementation. Currently, the GOL is soliciting construction funds for this section from other donors.

III. <u>What technology did the project attempt to replace?</u>

The project is attempting to replace:

(a) The use of beast of burden and draft animals to transport goods and people through a rugged and mountainous terrain.

(b) The use of an existing access road that even a slight rain can render impassable due to its slippery surface, poor drainage, rock falls and inadequate river and stream crossings.

IV. <u>Why did project planners believe that intended beneficiaries would adopt the proposed technology?</u>

With an estimated internal rate of return of 15% the project guarantees substantial economic incentives to intended beneficiaries. Cost savings would be realized by beneficiaries who will utilize both the upgraded and the new road for either private or public transportation. People who receive direct employment with the project will have upgraded skills which will enhance employment possibilities subsequently. Inhabitants of the project's zone of influence will be attracted by the improved general services, increased availability of consumer goods and services, improved marketing channels for produce, and many other social benefits that the project generates.

V. What characteristics did the intended beneficiaries exhibit that had relevance to their adopting the proposed technology?

In general the literacy level of the beneficiaries is high (50%) when compared to many other similar LDCs in Africa. This essentially enhances and facilitates the adoption of the proposed technology. Further, most beneficiaries have travelled on foot or vehicles, and have witnessed the ease with which people and goods are being moved over good roads that exist in the neighboring, developing country of RSA. As inhabitants of the project's zone of influence at the moment heavily use the existing poor access road when and wherever possible, the need and desire for the road already exists.

VI. What adoption rate has this project achieved in transferring the proposed technology?

Actual construction of the road project began about 2 years ago. Some two more years are required before all intended stretches of road construction are completed. Hence the adoption rate cannot now be assessed fully. However, judging by the existing enthusiasm, and participation of the people within the past year, a high adoption rate is expected to prevail at the completion of the project.

VII. Has the project set forces into motion that will induce further exploration of the constraint and improvements to the technical packages proposed to overcome it?

So far the design portion of work undertaken under the project has been utilized by the implementing agency, Ministry of Works (MOW), to solicit construction funds from other donors. At the completion of the project the MOW is expected to have a well-organized and equipped construction force to continue further road construction work within the country.

In general, the institutional capacity of the Roads Division of the MOW would be strengthened in all of its functional aspects.

VIII. Do private input suppliers have an incentive to exa[illegible]e the constraint addressed by the project and to come up with solutions?

Private input suppliers are small, generally inexperienced and lack the financial, managerial and human resources at this time to address and tackle the constraints being addressed by the project, although they do participate to the extent possible.

As of now, the constraint can and is being fully addressed effectively by the public sector (GOL) ONLY.

IX. What delivery system did the project employ to transfer technology to intended beneficiaries?

The project provided a management team experienced in road construction to supervise the road upgrading section of the project which is being performed by a force account team. Consultants were hired to design and to supervise the portion of the road project being constructed by an international construction contractor. The management team, consultants and construction contractor are required by the contract to develop a training program for the project and to train their local employees in all facets of road design, construction, maintenance, as well as the management and administration of road construction/maintenance activities.

X. What training techniques did the project use to develop the delivery system?

The project relies heavily on on-the-job training to impart the technology and to develop the delivery system. Further a semi-autonomous force account work force team has been established under the administrative supervision of the SPRPA, and this team is being supervised by a management team of expatriate advisors. This supports institutional building of the MOW and provides a framework for learning and acquiring valuable experience by all who are involved in the project. Individual counterparts are also assigned to key members of the expatriate work force team.

Although no formal participant training program has been built into the SPRPA, the project will benefit from the participant training that is undertaken under USAID's manpower development program, for the MOW. Under this program seven participants from the MOW are receiving training in the U.S. One has already returned with an engineering degree, and is currently working with the MOW.

XI. What effect has the transferred technology had upon those impacted by it?

The project is essentially in its second year of the implementation schedule. Hence it is too early to quantify or enumerate the effects of the transferred technology upon the intended beneficiaries. However, all indications are that after the completion of the project, the constraints detailed in I above would be relieved substantially. On a project level, skills of many local employees are being improved. Some have had position grades upgraded to a higher scale due to skills acquired in the project, and thus can avail themselves of the potential to improve their standard of living.

EXTERNAL EVALUATION:

SOUTHERN PERIMETER ROAD PROJECT
(690-0076)

Kingdom of Lesotho

June 3, 1983

8

FOREWORD

This report, prepared by a combined team of three outside consultants and one U.S.A.I.D. Direct Hire, presents the results of the first external evaluation of the Southern Perimeter Road Project, Kingdom of Lesotho, AID Project Number 690-0076, Grant Agreement No. 78-632-22 executed on June 30, 1978. The road is currently under construction. Two consultants, the Team Leader and the Transport Economist participated in this evaluation under the provisions of AID/L Contract No. 632-0076-S-00-3019-00 (PIO/T No. 690-0076-3-80663) dated May 10, 1983 and AID/L Contract No. 632-0076-S-00-3018-00 (PIO-T No. 632-0076-3-80681) dated May 9, 1983, respectively. The contract statements of work are attached as Appendix XXII. The Social Scientist participated under a centrally funded S&T/MD, AID/W contract. The A.I.D. team member was provided by REDSO/ESA on TDY for two weeks.

The evaluation was begun on May 9, 1983 and completed on June 3, 1983. During this period the team reviewed documentation, collected supplemental information for analysis, conducted interviews, made a field trip to the construction site and camps at Mount Moorosi, and prepared this report. The team would like to express its appreciation for the support of its activities provided by members of the USAID Mission, the Government of Lesotho, and representatives of the contractors under Titles II and III.

GLOSSARY OF ACRONYMS

A

AADT	Annual Average Daily Traffic
AID	Agency for International Development
AID/W	Agency for International Development/Washington, D.C.

B

BOQ	Bill of Quantities

C

CM	Cubic Meters

D

DBST	Double Bituminous Surface Treatment

E

EA	Environmental Assessment
EEC	European Economic Community

F

FY	Fiscal Year

G

GA	Grant Agreement
GNP	Gross National Product.
GOL	Government of Lesotho

H

HC.	Host Country

I

IBRD	International Bank for Reconstruction and Development
IFB	Invitation for Bid
IMF	International Monetary Fund
IRR	Internal Rate of Return

K

KM	Kilometers

L

LBI/LBII	Louis Berger International (Incorporated)
LDC	Desser Developed Countries

M

M	Maloti (Lesotho Currency, 1 US$ = M1.07)
MOA	Ministry of Agriculture
MOW	Ministry of Works

N

NT	Nello Teer

O

ODA	Overseas Development Administration
OSARAC	Office of Southern Africa Regional Activities Coordination

P

PID	Project Identification Document
PIO/T	Project Implementation Order/Technical Services
PP	Project Paper
ProAg	Project Agreement
PRCH	PRC Harris
PVPS	Plan Vehicle Pool Service

R

RE	Resident Engineer
REDSO	Regional Economic Development Services Office
RFP	Request for Proposal
RIG/A	Regional Inspector General/Audit
RIG/II	Regional Inspector General
ROCKEX	Rock Excavation
RSA	Republic of South Africa

S

SPR	Southern Perimeter Road
SPRP	Southern Perimeter Road Project
SPRPA	Southern Perimeter Road Project Authority

T

TDY	Temporary Duty

U

UN	United Nations
USAID	United States Agency for International Development

V

VOC	Vehicle Operating Costs

W

W	With
W/O	Without

TABLE OF CONTENTS

FOREWARD

GLOSSARY OF ACRONYMS

TABLE OF CONTENTS

LIST OF TABLES

I. EXECUTIVE SUMMARY

II. INTRODUCTION

A. Evaluation Team Members
B. Evaluation Plan

1. General
2. Data Acquisition

a. Discussions, Interviews, and Meetings
b. Reference Documents

3. Analysis
4. Preparation of Preliminary Draft Evaluation Report
5. Review and Refinement of Evaluation Report

C. Genesis of Project
D. Description of the Project
E. Preliminary Findings

III. CHRONOLOGICAL HISTORY

A. Feasibility Study
B. Project Identification Document
C. Project Paper
D. Project Authorization Amendment
E. Project Agreement
F. Contracts and Amendments

IV. USAID PROJECT FILE REVIEW

V. PROJECT RESPONSIBILITIES

A. Project Agreement

1. GOL Responsibilities

a. Administration
b. Contracting

2. AID Responsibilities

a. AID Direct Hire Engineer
b. Project Engineer, Ministry of Works, GOL

3. Recommendations

B. Title III - Camp Construction and Management

1. Construction
2. Management
3. Recommendations

C. Implementation Schedule
D. Local Purchasing Procedures
E. Out of Country Purchasing
F. Inspection and Testing
G. Recommendations

1. Project Agreement
2. Title III

VI. ARCHITECT-ENGINEER SERVICES AND RESPONSIBILITIES

A. Feasibility Study
B. Project Paper
C. Project Grant Agreement
D. Title I
E. Title II
F. Title III

VII. CONSTRUCTION SERVICES AND RESPONSIBILITIES

VIII. PROJECT COSTS

A. Title II N.T Construction Contract
B. Title III

IX. TRAINING

A. Introduction
B. The Louis Berger International Feasibility Study
C. The Project Identification Document (PID)
D. The Project Paper (PP) and Amended PP
E. The Current Situation

1. USAID Participant Training
2. Training Under Title II
3. Training Under Title III

F. Recommendations

X. ANALYSIS OF PROJECT EXECUTION

XI. MAINTENANCE

A. An Overview of Project Documen
B. The Current Situation
C. Recommendations

XII. ECONOMIC ANALYSIS

A. Introduction

1. Analytical Approach
2. Cost/Benefit Analysis
3. Other Benefits

B. The Louis Berger International Feasibility Study

1. Traffic Analysis and Projections
2. Savings in Vehicle Operating Costs
3. The Internal Rate of Return (IRR): Construction Standards and Strategies

C. The Project Identification Document (PID)
D. The Project Paper (PP)

1. An Overview of Data Sets
2. The Internal Rate of Return (IRR)

E. The Amended Project Paper
F. The 1982 Evaluation
G. The Current Perspective: The Potential for Erosion of Project Feasibility

1. Total Project Costs
2. Road Length and Alignment
3. Project Time Table
4. Vehicle Operating Costs
5. Traffic Projections
6. Maintenance Cost Savings

H. Recommendations

XIII. SOCIAL ANALYSIS

A. Introduction
B. Objectives of Social Analysis
C. Procedures
D. Analyses

1. Social Goals and Objectives

a. Berger Feasibility Study
b. Project Identification Document
c. Project Paper
d. Project Agreement

2. Mechanisms for Achieving Goals

a. Berger Feasibility Study
b. Project Identification Document
c. Project Paper
d. Project Agreement

3. Monitoring Change

a. Berger Feasibility Study
b. Project Identification Document
c. Project Paper
d. Project Agreement

4. Sources of Data

a. Senqu River Agricultural Extension Project (FAO-UN)
b. Basic Agricultural Services Project (BASP)
c. Other Sources

5. Related Projects

E. Summary
F. Recommendations

XIV. ENVIRONMENTAL ASSESSMENT

A. Introduction
B. Review of Documents and Concepts
C. Current Status of Environmental Protection
D. Summary
E. Recommendations

XV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions
B. Recommendations

XVI. APPENDICES

Appendix I	Engineering Assessment
Appendix II	Provisional Table of Contents/Guidelines for Evaluation
Appendix III	USAID Mission Director's Memorandum: Engineering Assessment
Appendix IV	Map
Appendix V	Major Documents Reviewed
Appendix VI	Persons Interviewed
Appendix VII	Implementation Plan (ProAg)
Appendix VIII	Gazette: Supplement No. 4
Appendix IX	Southern Perimeter Road Project Authority (SPRPA)
Appendix X	PIO/T Position Description
Appendix XI	Geometric Standards
Appendix XII	Purchasing Procedures, SPRPA
Appendix XIII	Summary of Claims
Appendix XIV	Participant Training: Civil Engineering
Appendix XV:	Contractors Personnel: Title II (N.T.)
Appendix XVI	Training Program Memo, Title II
Appendix XVII	Status of Trainees, Title II
Appendix XVIII	SPRPA Monthly Progress Report Format, Title III
Appendix XIX	Monthly Personnel Report, Title III (N.T.)
Appendix XX	Baseline Study: General Terms of Reference
Appendix XXI	Initial Social/Economic Impact, SPRP
Appendix XXII	Sample Contract Scope of Work for Evaluation
Appendix XXIII	PRC Harris, Letter No. COLS 167
APPENDIX XXIV	SPR, Letter No. W/R/1049-A Supplemental Engineering Evaluation by J.P.Zedalis.

LIST OF TABLES
(by Section)

III-1	Cost Estimate Summary
VIII-1	Southern Perimeter Road - Cost Summary
VIII-2	Proposed N.T. Budget, Title III
XII-1	Lesotho: Actual and Proposed Daily Total Traffic (AADT)
XII-2	Lesotho: Induced Traffic by Segment and Vehicle Type (AADT)
XII-3	Lesotho: Construction Strategies, Constraints, and Internal Rate of Return
XII-4	Lesotho: Vehicle Operating Costs
XII-5	Lesotho: Trial AADT Rates, Quthing
XII-6	Lesotho: Trial AADT Rates, Mount Moorosi

I. EXECUTIVE SUMMARY

After initial review of the project files and interviews, it became evident to the Evaluation Team that the magnitude of the project and its past and present problems required an in-depth and thorough evaluation which was impossible to carry out within the available time. This was particularly true as it pertained to the engineer team member, who was available for only two weeks. Consequently, in order to maximize the the total team participation in the evaluation, it was recommended to the Mission management to carry on the evaluation in two phases. The Mission concurred with this approach. The time limitation of the engineer precluded his full participation in the preparation of the report. The Engineering Assessment was prepared as a separate document and annexed to the report as Appendix I.

The Southern Perimeter Road Project stems from Lesotho's refusal to recognize the independence of the South African homeland Transkei. In 1977 the Republic of South Africa (RSA) established the area adjacent to Lesotho's eastern border as an independent homeland. Lesotho, along with most of the World's nations, refused to recognize Transkei as an independent nation. The newly created Transkei Government controls key border gates leading to outside markets and could cut off access at any time. In response to a United Nations report recommending upgrading the Southern Perimeter Road as a means of protecting Lesotho residents against economic repercussions, the Government of Lesotho requested the United States to provide assistance in upgrading the road.

The project agreement signed in June 1978 called for an A.I.D. contribution of $26 million grant and a GOL contribution of $5.5 million. It was expected that the road would be fully constructed by May 1982. Design and construction work was to be accomplished under host country methodology.

The first design portion of the project, referred to as Title I, showed a cost of $121 million which necessitated a re-design of the road to a new alignment and to lower design standards. Although this re-design showed a lower cost that the original design, it still required additional funds to finance the project. Amendment No. 1 to the PROAG increased U.S. contribution to $34 million and GOL contribution to $7.5 million.

The new design called for construction of 38 km through virgin territory by a contractor, (referred to as Title II). The remaining 151 km was to be upgraded from an existing track to all weather gravel road (G-3 standard) by a GOL force account team supervised by a construction management assistance team (referred to as Title III).

After an extensive review, the Evaluation Team focused in four main areas of concern: engineering; management; erosion of project standards; and general considerations of project concepts, effectiveness and benefits.

Engineering discrepancies are those that stem from a faulty road design (Title I), discrepancies between design and actual construction, and the application of unsound engineering standards, in particular those associated with drainage structures and road construction. Some of these are specific and require immediate action. Others are of a more general nature and have resulted in recommendations for analysis in the Phase II Evaluation. Engineering exceptions form the basis for substantial claims by the Title II Contractor (Section VIII, Appendix XIII) and are of such magnitude as to possibly affect the execution of the project, projected internal rates of return, and thus economic justification of the project. The overall problem of faulty design in relation to economically feasible construction will likely plague the project for some time to come.

Many of the difficulties encountered in this project concerned engineering management. Although some are residual from earlier stages, others are of more recent origin. Other problems stem from inadequate communication and coordination between the contractors and SPRPA, MOW, and USAID and could be solved by more frequent scheduled contacts, site visits and improved lines of responsibility and communication. It should be noted that the Evaluation Team does feel that coordination between SPRPA, MOW, USAID, and the Contractors has improved considerably and that site visits are more frequent. Given the history of this project, it is certainly in the best interests of all concerned to avoid any suggestion that managerial weaknesses will continue.

The proposed road has changed drastically from the original concept to the implementation stage, generally in the direction of lower standards, and this erosional process is still going on. It appears that original goals initially were abandoned because of cost considerations and later because of poor management (Title I), construction and supervision (Titles II and III).

The original fault for erosion of project standards seems to lie in the rapidity with which this project was implemented. Although a sense of urgency undoubtedly accompanied the problems along the Transkei border with the RSA, it should have been apparent even under those circumstances that remedial action, in the form of major road construction, would take years to implement, and that careful, deliberate planning would in the long run prove to be the most expedient approach.

A number of recommendations deal with the concerns for overall project concepts, realizing benefits, and avoiding undue environmental degradation. Many of these issues should have been explored in greater depth in the planning stages of this project. But again, the urgency with which this

project was implemented precluded the sorts of exhaustive studies and analyses that normally would accompany an activity of this size. Areas that merit consideration are training, maintenance, economic and social analyses, and environmental considerations.

Training is a key element to both Title II and Title III. The Evaluation Team notes that one of the reasons the previous project management was defaulted was for failure to comply with the training requirements. The Evaluation Team was most concerned about deficiencies relevant to training under Title III. The contractor for Title III has yet to prepare a detailed training program, and the GOL has not provided counterparts for training under Title III as proposed. Training under Title III needs to be carefully integrated with MOW objectives. Mechanisms will also be necessary to transfer institutional capacity developed under Title III to the MOW on a permanent basis.

The capacity of the MOW to provide adequate maintenance of the SPR after termination of the project has been a concern at all stages of project development. Technical assistance from several donors, including USAID, are intended to increase the maintenance component of the MOW. The current budget crisis faced by the GOL, however, requires continued monitoring of this issue.

On the basis of extensive discussions the Evaluation Team feels that the entire project could be finished within the costs currently allocated for the SPR, provided that there are low settlements of claims, no further over-runs, and proper management practices. The economic feasibility of the project were re-examined on the basis of past and current assumptions and associated cost/benefit analyses. Assuming completion of the entire route from Quthing to Qacha's Nek and minimal cost over-runs the feasibility of the project would not be eroded. Adjustments of the data necessary for the calculation of the IRR for the project are suggested, but conservative calculations in previous analyses would counterbalance projected adjustments.

Social goals of the SPR include (a) integration of southeastern Lesotho into the national economy and society, (b) development of the region, and (c) strengthening Lesotho's ability to resist recognition of an "independent" Transkei. The mechanisms for achieving these goals are not specified despite cautionary comments from several sources that Lesotho's economy and society do not automatically respond even to major infrastructural changes. Furthermore, since pre-Project socio-economic baseline conditions have not been established, it will be difficult if not impossible to accurately monitor and measure impacts of the SPR.

Environmental considerations of the SPR have gradually eroded from the comprehensive assessment of the Berger Feasibility Study to the low level of present Project activities. Specific concern for archaeological and paleontological sites is covered in several consultants' reports, but general defense of the environment along the road alignment is now limited, mostly to drainage ways. Since Project funds would prohibit an extensive environmental protection program, recommendations are restricted to (a) reassessment of environmentally vulnerable areas along the SPR alignment, (b) use of other programs (e.g., Food-for-Work) to augment defensive measures, especially slope and bank stabilization, and (c) protection of a few valuable archaeological and paleontological sites.

The results of the evaluation are expressed in the detailed findings and recommendations that accompany each section of this report. A review of the recommendations reveals a clustering that suggests several major areas of concern on the part of the Evaluation Team and that are fully reviewed in the Conclusions and Recommendations section of this report.

Despite the essentially engineering nature of this project, most of the recommendations pertain to management issues: establishing responsibilities, lines of control, supervision, communication, coordination, and so on. Probably this reflects the earlier problems of this project, and

the disruption of management functions associated with contractor replacement. Another group of recommendations deals with technical issues. These require specific engineering action, training, and generation of data for measuring and monitoring project progress and impacts. Finally, a smaller group of recommendations call for the reappraisal of project goals, effectiveness, costs and benefits.

The Project, in essence, was envisioned as institutional building and to certain extent this approach is still being carried on under Title III. But, the project history clearly demonstrates that U.S. personnel insensitive to developmental issues in Lesotho were assigned to the project.

As previously noted, the Engineering Assessment was prepared prior to the preparation of this report due to the early departure of the engineer member. The Mission management reviewed and commented on that portion of the report. As such, in the interest of presenting a well-balanced evaluation and at the request of the Mission management, the comments are attached as Appendix III.

It is the opinion of the Evaluation Team that the GOL was not properly equipped to manage and oversee a project of this magnitude, even with assistance being provided by the Project Coordinator partially funded by A.I.D. As such, the "Host Country Contracting" approach, which the team finds to be a commendable policy, needs to be re-evaluated on an individual basis. This in the light of not overtaxing the absorptive capacity of the LDCs.

It should be noted from RIG/A Report of March 18, 1983, "Perhaps the most significant results of the audit/investigation is the realization that due to the nature and wording of this host country contract, AID does not have an identifiable legal recourse criminally or civilly against Harris for violations committed by their employees on this project."

Finally, the Evaluation Team feels that the Agency should consider the preparation of a case study on the history of the project. The review of the project disclosed numerous technical and managerial problems which have interacted upon one another in an unfolding series of complications. Complete documentation of the experiences related to the project should be made for subsequent in-house use by the Agency.

Despite many difficulties, progress is being made on the SPR. The Mount Moorosi - Mphaki cut-off is more than half complete. The Seaka Bridge has been repaired and the new Quthing Bridge is well along. On Title III some 20 km of rough grading has been completed, the camp site is fully usable, and equipment is in place and operating. In addition, MOW and its personnel have accumulated considerable experience in major road construction operations. Thus despite remoteness, difficult terrain and project disruptions the SPR Project is being implemented.

II. INTRODUCTION

A. Evaluation Team Members

Aldelmo Ruiz, P.E., Team Leader, Consultant

J.F. Smith, P.E., REDSO/ESA, Chief Engineer

Philip W. Moeller, Ph.D., Senior Transport Advisor, Consultant

Gene C. Wilken, Ph.D., Social Scientist, Professor of Geography, Department of Economics, Colorado State University, Consultant

B. Evaluation Plan

1. General

Requirements, purposes and objectives for evaluation of the Lesotho Southern Perimeter Road Project were subjects of telephone conversations and cables between USAID/Lesotho and the Team Members (terms of reference outlined in the contractors' "Scope of Work").

The Senior Transport Advisor arrived in Maseru, Lesotho on Sunday, May 8. The Team Leader and Engineer arrived on Tuesday, May 10 and the Social Scientist arrived on Friday, May 13.

2. Data Acquisition

a. Discussions, Interviews and Meetings

Lesotho requirements for the highway project history and background feasibility study, design, construction, and problems encountered were subjects of discussions, interviews and meetings conducted during the days May 9-16. A list of personnel contacted is presented in Appendix VI.

b. Reference Documents

During the period of May 9-16, 1983, the team identified, acquired, reviewed, and analyzed documents pertaining to Lesotho, the project requirements, background history, feasibility studies, contracts, design documents, Agency documentation, CPP, PID, ProAgs and amendments, and related project documents and correspondence.

3. Analysis

Data acquired were analyzed continuously to:

clarify the detailed nature of the project

determine the past performance of consultants and contractors

determine the past, current and anticipated roles of the designers, contractors, and Ministry of Works

define current and anticipated problems

determine capabilities or organizations responsible to carry on the project

develop recommendations which pertain to the overall project implementation, i.e., policy, planning, responsibility, organization, development.

4. Preparation of Preliminary Draft Evaluation Report

This report, presenting the results of the project evaluation efforts, was prepared in Lesotho in accordance with the terms of the contract for the evaluation.

5. Review and Refinement of Evaluation Report

The preliminary draft of this evaluation report was reviewed with appropriate members of USAID/L.

C. Genesis of Project

The genesis of the Southern Perimeter Road Project stems from Lesotho's refusal to recognize the independence of the South African homeland, Transkei. In 1977, the Republic of South Africa (RSA) established the area adjacent to Lesotho's eastern border as an independent homeland. Lesotho, along with most of the world's nations, refused to recognize Transkei as an independent nation

This refusal created a political climate which could lead to economic repercussions against Lesotho. The economic viability of southeastern and southern Lesotho is highly dependent upon access to markets in South

Africa. The newly created Transkei Government controls three border gates leading to these markets and could cut off access to them at any time.

A special United Nations mission to Southern Africa studied the economic impact of Transkei independence on Lesotho and recommended upgrading the Southern Perimeter Road as a means of protecting residents against economic repercussions. An improved road would decrease dependence on Transkei border posts and the South African network. Additionally, an upgraded road would have development impact by integrating southern and southeastern Lesotho more fully into the national economy.

In response to the UN report and a GOL request, the United States agreed to provide assistance in upgrading the road.

D. Description of the Project

The project agreement signed in June 1978 called for (a) the design and construction of 155.2 kilometers of both paved and gravel road from Quthing to Qacha's Nek; (b) the design only of the road from Mohale's Hoek to Quthing, and (c) the rehabilitation of the Seaka Bridge. The United States was to contribute a $26 million grant and the GOL's contribution was to be $5.5 million. It was expected that the road would be fully constructed by May 1982. Design and construction work was to be accomplished under host country contracting methodology.

Problems related to the design portion of the project (Title I), discussed in succeeding sections of the report, necessitated an amendment to the project agreement in an attempt to bring escalating project costs under control. This amendment called for (a) a new alignment of 38 km to be constructed in virgin territory by a contractor between Mount Moorosi and Mphaki (Title II), and (b) the remaining 151 km of the road was to be upgraded from existing track to G-3 standard by a force account team

(GOL construction team) supervised by a construction management technical assistance team (Title III). This amendment increased the U.S. contribution to $34 million and the GOL contribution to $7.5 million. The amendment established an implementation plan which called for Title II construction to be completed by February 1983, and Title III upgrading to be finished by February 1985.

E. Preliminary Findings

During the first two days on site, the team reviewed project documentation and interviewed Mission and GOL personnel (Host Country National and expatriates). It became evident to the team that the magnitude of the project and its past and present problems required an in-depth evaluation which was impossible for the team to carry out within the time available. In particular, this was true of the engineering assessment. The original time requirement for the engineer team member to carry out his responsibility on the evaluation was one month, but subsequently was reduced to two weeks as an accommodation to his available time. Consequently, in order to maximize the team participation in the evaluation and come up with a highly professional product, it was decided to recommend to the Mission management to carry on the evaluation in two phases. This approach was discussed with, and approved by Mission management. With this concept in mind, the team developed a table of contents annexed as Appendix II. Then the field trip was accomplished and several additional interviews were carried out with personnel on site. Subsequent to the field trip the engineer representative opined that in order to maximize his input to the evaluation he felt that his engineering assessment should be prepared as a separate document and annexed to the report. The team concurred with this approach.

The Engineering Assessment, including findings, conclusions and recommendations is annexed as Appendix I.

III. CHRONOLOGICAL HISTORY

A. Feasibility Study

The study was prepared by Louis Berger International Inc., 100 Halsted Street, East Orange, N.J., 07019 and submitted to REDSO/EA on 15 April 1978. The consultants began work on this project on 9 January 1978, and the final report was submitted on 15 April 1978. Louis Berger presented detailed construction costs for various construction strategies as shown:

TABLE III-1

COST ESTIMATE SUMMARY
(1000's of 1978 Constant U.S. Dollars)

	US Contr W/O Waiver	US Contr W/Waiver	Int. Contr.	Force Account	
Total with DBST on 10%	28128	22838	22422	23848 =	Gravel Total
Total with DBST	37851	31990	31368	32901 =	Paved Total

As noted, the highest total cost of the project as estimated amounted to $37,851 million for a paved road and $28,128 million for a gravel road.

B. Project Implementation Document (P.I.D.)

Lesotho Roads Assessment Project 690-0076 was approved by the Acting Regional Development Officer, OSARAC on March 24, 1977. The amount shown in the Project Review Paper Facesheet is for $20,140,000 Grant. The project purpose is stated as "To develop within the Government of Lesotho's Ministry of Works the institutional capacity to be involved effectively in Lesotho's road construction and maintenance as part of overall national development." The PID clearly states that the project is to be institutional building. It states: "To assure that road maintenance does not become a future problem the next state of project documentation will examime road

maintenance in detail and develop a course of action which addresses any identified problems." The document further identifies the need for a full time direct hire engineer to serve as project officer and monitor implementation during the life of the project. The workshop at Mohale's Hoek was planned to support (repair and maintain) equipment operating on the segment of the road from Mohale's Hoek to Quthing area. This workshop will eventually support road maintenance operations for the general area.

The PID states "the greatest and most important long range effect of this project will come from the trained Basotho it finances and guides on-the-job training and supervision. It is exceptionally important that this part of the project be designed carefully and realistically so as to produce the most effective possible results for the government and the people of Lesotho."

C. Project Paper

The Project Authorization which is part of the Project Paper, was signed by the Deputy Administrator, A.I.D., on June 29, 1978. The document states: "The project will consist of the design and construction of the Southern Perimeter Road from Qacha's Nek in southeastern Lesotho to Quthing in the western lowlands (approximately 155.1 kilometers), and the design only of that portion of the road north from Quthing to Mohale's Hoek (approximately 50.3 kilometers). Approximately 101 kilometers of the road to be constructed under this project will be built to two-lane gravel standards and approximately 54 kilometers will be built to paved standards."

The cost of the total project was estimated at $31,450,300 of which AID provided $26 million and the GOL $5.5 million of which approximately $500,000 was in-kind.

The Environmental Assessment (EA) as called for in the document addresses in detail the environmental effects of the proposed road construction. The paper recommends measures to insure that the environmental factors and values are safeguarded. The recommended construction standards to mitigate negative environmental impact are:

aprons of concrete or rock to be placed on the downstream of culverts;

the ditches with steep slopes will be lined with rubble, masonry, or concrete;

where soil is exposed along cuts, hydro-seeding will be used after adding top soil as necessary;

borrow areas will be selected carefully to minimize erosion;

existing erosion gullies along the road will be treated to protect the ecology and the road;

various forms of stabilizing structures such as slope walls and retaining walls will be constructed predominantly from locally available rubble stones; and,

paving of the road in urban areas.

D. Project Authorization Amendment

The Project Authorization Amendment was signed by the Acting Administrator of A.I.D. on September 25, 1980. The amendment authorized an increase of funds amounting to $8.0M for the project. A detailed engineering design was completed on December 1979. On the basis of the design work, the total completion cost of the project was estimated at $121 million, an increase of $90 million which A.I.D. could not seriously consider. Design standards for the road were revised downward in order to permit the successful accomplishment of project objectives at substantially lower costs to both the GOL and AID. The $8 million grant increase by A.I.D. to the project was to achieve original project objectives of providing an all-weather road in southern Lesotho, allowing southern and southeastern Lesotho to be opened to accelerated development programs and integrating those regions more fully with the national economy of Lesotho.

E. Project Agreement

Project Grant Agreement No. 78-632-22 was signed on June 30, 1978. Appropriation No. 72-1181000, Allotment No. 850-52-090-79-81. Amendment No. 1 dated November 10, 1980 contains a detailed implementation plan for the project. It is attached as Appendix VII.

F. Contracts and Amendments

The following contracts have been executed:

- Contract between USAID REDSO/EA and Louis Berger International, Inc., signed on 4 November 1978 (LBII) and 10 November 1978 (AID). Not available at USAID.

- Contract between the Government of Lesotho and Frederic R. Harris, Inc. for Consulting Services in Connection with: Design, Construction Supervision, and Inspection/Monitoring of the Southern Perimeter Road and the Seaka Bridge dated 5 April 1979.

- Contract Amendment No. 1 between the Government of Lesotho, Ministry of Works and PRC Harris for Consulting Services in Connection with: Construction Supervision (Title II) and Management of Construction by Force Account (Title III). Contract No. 690-0076-1HCC, January 1, 1981

- Agreement between Government of Lesotho, Ministry of Works and Nello L. Teer Company for the Construction of Lesotho Southern Perimeter Road - Mount Moorosi to Mphaki Cut-Off, Dated June 29, 1981. Contract 690-0076-03HCC.

Contract between the Government of Lesotho, Ministry of Works and Nello L. Teer Company for Management Consulting Services in Connection with the Construction by Project Authority Title III. Contract No. 690-0076-2HCC, dated 10 December 1982.

IV. USAID PROJECT FILE REVIEW

The evaluation included the review of documents provided by AID/W as well as review of the USAID Project Files. The comprehensive files maintained by the Mission represented a major source of documentation used by the team in its analysis. A list of major items reviewed is included in Appendix V, Major Documents Reviewed.

V. PROJECT RESPONSIBILITIES

A. Project Agreement

The Project responsibilities are delineated in the PROAG, its amendments, and the various documents outlined in Appendix X. However, the team felt that a synthesis of those responsibilities should be brought forth in this evaluation.

1. GOL Responsibilities

a. Administration

The PROAG, dated June 30, 1978, states, "The Ministry of Works and, in particular, the MOW's Road Branch, will be the principal implementing institution of the Grantee for this project. The Grantee will provide personnel and other resources to meet the administrative requirements of the project and monitor its progress. Such administrative requirements may include procurement and management of services for the engineering and construction contractors, and making available for the use of the contractors laboratory and other facilities of the Ministry."

The problems and difficulties experienced in the project implementation were recognized in Amendment No. 1, dated November 10, 1980, "The Chief Roads Engineer of the Ministry of Works is the official in operational charge of the Project. With the creation of the force account team and the Inter-Ministerial Board, as described below, he will have a large organization to manage and will have regular direct access to relevant policy makers. He will have the services of a U.S. engineering firm to prepare the invitations for bid, contract documents, construction drawings and specifications, to prequality bidders, to evaluate bids and to supervise construction on those portions of the work to be carried out by a construction contractor.

To overcome certain difficulties it has previously experienced in operating a force account team, the Grantee will create an autonomous entity to do the upgrading portion of the Project. This entity will have the right to employ and lay-off personnel and to pay wages comparable to those paid by construction contractors, but will operate under strict fiscal controls with grant funds. Professional personnel assigned to it from the Ministry will receive no additional compensation beyond their Ministry salaries. Key personnel to manage the force account and equipment will be provided under the Grant. While the daily field direction of the force account will be the responsibility of the key field personnel, the Chief Executive Officer of the team will be the Chief Roads Engineer of the Ministry of Works. He will periodically report to and receive policy guidance from an Inter-Ministerial Board, with representatives from Finance, Planning, Labor, Works and the Cabinet."

Supplement No. 4 to Gazette No. 10 of 13 March, 1981, Appendix VIII, published the Southern Perimeter Road Project Authority (SPRPA) responsibilities. The authority was established on February 16, 1981. The authority is responsible for:

- The management and execution of the Project;
- Allocation and use of the resources of the Project;
- Performing all such acts as are necessary for the achievement of the purposes specified in paragraphs (a) and (b)

The authority consists of:

- Permanent Secretary for Works, as Chairman
- Permanent Secretary for Finance, as Vice-Chairman
- Permanent Secretary for Central Planning
- Permanent Secretary for Cabinet (Personnel)
- Commissioner of Labour
- Chief Roads Engineer,
- Budget Controller

The Project Manager, SPRPA serves as Secretary.

Observers: USAID and MOW Senior Technical Advisors attend (usually about three). The authority shall meet once a month and four members constitute a quorum. The authority is authorized to:

Subject to the approval of the Minister, appoint a Project Manager;

Appoint, discipline or dismiss staff employed for the Project;

Establish salary scales, terms and conditions of service for staff employed by the Authority;

Designate officials competent for signing and counter-signing of cheques and similar instruments for the Project;

Establish salary scales, terms and conditions of service for staff employed by the Authority;

Designate officials competent for signing and counter-signing of cheques and similar instruments for the Project;

Maintain or cause to be maintained for three years after the last disbursement by AID all books and records relating to the Project.

During the period of March 1981 to May 1983 the Authority has met eleven times, three of which have been this year; February, April, May 1983. The failure of the Authority to meet as programmed and the lack of the designated members to take active participation and/or sending members of their staffs without decision-making authority to participate prompted to the Permanent Secretary of Works, Chairman of the Authority, to send a letter to the Senior Permanent Secretary of the Cabinet, Appendix IX. It was requested to impress upon the members of the Authority the imperative need to regularly attend the meetings and take a meaningful part in the project.

The Authority, which is to be maintained for three years after the last AID disbursement, was set up primarily to expedite the construction phase of the project and not as institutional building mechanism.

The concept of the authority is a good management tool. It was set up as a mechanism to expedite actions which will accelerate project implementation. However, the lack of the designated members to take active participation has at times caused delays in the decision-making process. Further, it has been reported that at meetings the representative of the MOW has been the forceful authority in taking actions and making decisions.

b. Contracting

Under amendment No. 1 to the PROAG dated November 10, 1980, the procurement services responsibilities are delineated:

1. Engineering and Technical Assistance

The engineering design and supervision services and construction services will be obtained under a host country contract, using the assistance of USAID/Lesotho as necessary in the advertising and contracting process. Contracting will be done in accordance with AID Handbook 11 (which covers host country contracting).

2. Construction Services

Construction services for the cut-off and Seaka Bridge will be obtained by host country contract. The assistance of the engineering firm will be used to prepare the bid documents and select the contract with the construction firm which will build the cut-off, following AID Handbook 11 procedures. The Seaka Bridge rehabilitation will be contracted for following the Grantee's normal contracting procedures with assistance from the engineering firm.

3. Equipment

Equipment will be purchased directly by the Grantee wi[illegible] assistance from USAID/Lesotho, following procedures outlined in AID Handbook 11.

4. Force Account

All other force account materials and equipment will be purchased by the force account team once it has been authorized.

As indicated above all the responsibility for project management and overall supervision was vested in the Host Country.

2. A.I.D. Responsibilities

a. A.I.D. Direct Hire Engineer

Under the PROAG Amendment USAID/Lesotho provided a senior General Engineer, experienced in road construction, who is serving as the AID Project Officer. The engineer is assisted by an associated Gener[illegible] Engineer. The A.I.D. engineer is included as an observer on the In[illegible] Ministerial Board. He monitors the project, ensures that A.I.D. assi[illegible]rce is provided as planned, and provides liaison services with AID/Washington and REDSO/EA.

It has been reported to the Team that the A.I.D. engineer is scheduled for Spanish training and then home leave and return to post. This will mean that the project will be without the required A.I.D. overall supervisor monitoring on a daily basis for a period between 9 months to a year and this at a critical stage.

b. Project Engineer, Ministry of Works, GOL

Under a PIO/T A.I.D. provided the funds to recruit an experienced engineer to serve as a project coordinator for the project and to be responsible to the Chief Roads Engineer, MOW. According to the records, the

PIO/T was executed on March 9, 1981 and the engineer arrived at post March 19, 1982. It took the contractor (TransCentury) one year to recruit the technician.

As indicated in Appendix X, "Duties and Obligations" the project coordinator is required to supervise and monitor the performance of the consultant as per the contract provisions and terms of reference. The on-site supervision by MOW representatives is crucial to the implementation of the project, and as such frequent and lengthy inspection trips are required. The Team wants to stress this concern which is a must for the success of the project.

B. Title III - Camp Construction and Management

The responsibility for construction and the management of the camp is the responsibility of Nello L. Teer as outlined under the Terms of Contract No. 690-0076-2-HCC.

1. Construction

There exists evidence that there may have been certain irregularities during the construction of the camp. On page 12, Nello L. Teer Report No. 4, dated April 1983 quote:

> The Mountain Building Team had been retained by the Interim Management Team to complete the camp. The Mountain Building Team had prepared an estimate of cost to complete the total camp using material that was supposedly on site.
>
> Their estimate was M20,336.00. On two occasions, the Mountain Building Team returned to the Interim Management and requested additional funds of M9,516.05. These funds were provided.
>
> The Mountain Building Team continued camp construction and in January 1983 the new Management Team arrived. In February the Mountain Building Team approached the New Management for additional funds to complete the camp. The New Management requested the Mountain Building Team to provide an accounting of money spent before they would provide additional revenue. The Mountain Building Team has not yet justified their expenses of M29,852.00 and in February they departed leaving the camp not completed.

At this point the current Management Team contacted another constructor to complete the camp. The constructor came to Mount Moorosi in March and looked at the work to be completed. At the end of March this constructor returned with an estimate of M119,000.00 to complete the work on Title III camp. Based on the new estimate the New Management Team has continued camp construction using a small construction crew formed from SPRPA employees.

2. Management

Since arriving at the project site the new team has faced many problems concerning the overall management and operations of the camp site. In essence the management has been through a learning process. The team has the right concept concerning the institutional building requirements within the Force Account project. Much of their efforts have been expended in familiarization of regulations establishing control and financial and personnel procedures. The project manager has spent most of his time in camp administration. At the time of the evaluation administrative procedures such as warehousing and personnel needed to be systemized. Consequently, although the team feels that it is too early to fully evaluate the productivity of the new team, the need for a business manager to handle camp operations is urgent.

At the time of the evaluation there was no radio communication between the site and the MOW. It was reported that a radio was installed, that it operated for some time, but it became inoperable.

C. Implementation Schedule

The PROAG states: "Details of the Implementation Plan and implementation schedule are shown in Appendix VII. The long lead time required to obtain heavy construction equipment from the United States was the critical factor deferring the complete mobilization of force account construction unit until August 1981."

As indicated in the implementation schedule, the cut-off construction (Title II) was scheduled for completion on February 15, 1983. The estimated completion date now is April 1984, approximately 14 months behind schedule.

According to the implementation schedule for Title III, Force Account G-3 (Appendix VII) upgrading (referred to as R-4 in the implementation) is scheduled for completion on February 1, 1985. Nello Teer management reported to the Team that the schedule for completion is now 22 months from June 1, 1983. This would mean that the project is now 2 months behind schedule. However, both Mission and MOW are now analyzing the reliability of Nello Teer's schedule, as it was opined by USAID and MOW engineers that a 6 month delay appears more realistic at present.

D. Local Purchasing Procedures

The SPRPA has established purchasing procedures, See Appendix XII. These procedures as approved outline the tendering process. M0 - M3,999.99 - telephone quotes for best prices. M3,000 - M10,000 - minimum of three quotes required; lowest quote can be accepted; if the desired source is not the lowest quote it must go to Tender Board for approval. Over 10,000 - must get Tender Board approval. Use existing GOL tenders. Although the purchasing procedures are well established, it was reported that at the present time there is not a competent purchasing agent in Maseru to carry on these functions in compliance with GOL and USAID regulations. It was reported that the position exists but that recruitment is slow.

The Project Manager for Nello L. Teer estimates show a total budget of $678,770 for parts to be purchased for the period of six months, i.e., April through September 1983.

As shown in Section XIII, the rent for equipment (including depreciation) for a period of six months is estimated to be approximately $430,000.

The GOL has an organization called Plan Vehicle Pool Service (PVPS). This organization, under the Ministry of Works, provides on a rental basis, equipment for the project. Upon receiving a request from Title III management PVPS will seek the equipment requested from other sources or their own, and provide it to the project. While the team is in full agreement with the concept to use available resources within the country to the maximum extent possible, it also realizes that for a project of the SPR magnitude, equipment with the specifications requested must be made readily available from PVPS or some other source to the project. Germane to this requirement is the fact that, as it was reported to the team, PVPS is not a full functioning body and consequently, its resources are over-taxed and it is in the process of re-organization with the assistance of an outside consultant. As such, in order for PVPS to provide the type of services required by Title III, it must know with adequate lead time the project requirements to determine the feasibility of providing the support required by Title III.

E. Out of Country Purchasing

1. Out-of-country procurement, it was determined, has been performed according to established A.I.D. Regulations. As such, no further comments are deemed necessary.

F. Inspection and Testing

During the construction stage the supervision of the inspection and testing is the responsibility of PRC Harris for Title II and Nello Teer for Title III. There are Basotho technicians performing inspection and analyzing samples at the job site. These Basotho are obtaining on-the-job training. However, there is no evidence of any systematic formalized approach to the on-the-job training. See Section IX.

G. Recommendations

1. Project Agreement

1. USAID consider the pros and cons in exploring the possibility with GOL of shifting the authority to MOW with a revised composition of interested parties in the Project.

2. The requirement for an A.I.D. engineer to be assigned full-time at the Mission during the absence of the Senior General Engineer be assessed among AID/W, USAID and REDSO/EA.

3. Formal bi-weekly meetings be held at the project site between MOW Chief Roads Engineer or his representatives, Title II Contractor and Resident Engineer. USAID should participate as appropriate. Similar meetings should be held during the same visit with the Title III project manager. In this case USAID should participate as appropriate as well as other key MOW personnel such as Chief Design Engineer. Minutes should be kept with copy to USAID.

2. Title III

1. It is recommended that: (a) a detailed audit be conducted by USAID of Title III on current and anticipated expenditures and (b) that systematic control measures be established.

2. A Business Manager be recruited to manage the camp. This will enable the Project Manager to concentrate his full efforts on expediting the execution of the construction and the training of personnel.

3. Communications be established and adequately manned at both the project site and the MOW.

4. In consultation with the MOW and other appropriate GOL authorities, NT Title III management make a concerted effort to recruit a competent procurement specialist. Guidelines need to be established as to the line of authority and responsibilities of the position.

5. NT Title III management prepare a long-range requirement of PVPS support for the project for PVPS determination if the organization will be capable of fulfilling such requirements.

6. The performance and adequacy of support of PVPS in providing the necessary service to Title III be evaluated periodically.

VI. ARCHITECT-ENGINEER SERVICES AND RESPONSIBILITIES

A. Feasibility Study

A review of the three-volume, Techno-economic Feasibility Study, submitted on 15 April 1978 by Louis Berger International, Inc., was made to assess the envisaged role of future A&E participants. Collaterally, this review afforded a comparative basis for subsequent considerations of conceptive thoughts vs as-designed and as-built results, and allowed ultimate, albeit in retrospect, means of determining the realism of those original concepts.

The LBI report identified an A&E consultant as a critical element from design phase, through contract document preparation and contract award, and extending on a construction-inspection basis during field operations. A&E presence during the post-construction maintenance period, as would be required of the constructor, was not specified. Training programs cited the inclusion of technical assistance and defined personnel, estimated costs, and general training parameters, but did not designate such TA sources, either by A&E, constructor, or a third contract.

Detailed services and responsibilities for A&E design/inspection participation were not found in the feasibility report and were reasonably presumed to not be a part of the LBI scope of work. It is to be noted that the feasibility study was executed in early 1978 and no copy of the LBI contract or scope of work was available. An overall assessment of LBI's Techno-economic Feasibility Study led to the conclusion that its execution was complete, informative, and provided a firm basis for entry into Project Paper concepts and an ultimate Title I contract.

B. Project Paper

By Action Memorandum double dated 28 and 29 June 1978, the Project Paper was submitted and subsequently approved. Technical portions of the Project Analysis, as contained in the PP, essentially endorsed the recommendations of the LBI feasibility study regarding alignment and design standards. This confirms original consultant-Agency concurrence.

Pursuant to normal practice, the PP does not cite specific services and responsibilities of an intended A&E firm but rather, leaves this to scope-of-work development as a prelude to RFPs. In general terms of service, however, the PP did state that:

• "A Consulting firm will be selected to prepare the final design, contract documents and to provide the construction supervision." (PP, p. 033)

• As an initial condition precedent, "Submission of a contract for design and engineering services satisfactory to A.I.D. with a firm satisfactory to A.I.D." (PP, p. 069)

C. Project Grant Agreement

1. The PROAG (or GA), dated 30 June 1978, contained no specifics regarding the exact services and responsibilities of an A&E. This is normal practice. The GA did, however, confirm in Article 2, page 1, the PP intent to provide design services, construction supervision and construction services. Additionally, the GA repeated the PP requirement for a satisfactory A&E contract, prior to first disbursement, as a condition precedent.

Finally, the GA's Amplified Project Description, page 3, specified that the GOL's contract for engineering services would cover " . . . the design and construction supervision and maintenance monitoring phases, including services connected with the award of a construction contract, such as, prequalification of contractors, issuance of invitations

for bid (IFB"), and analysis of and recommendations on the responses thereto." It is concluded that the GA followed normal patterns in a staged approach for A&E services and represented a final, and satisfactory step prior to detailed SOW development and A&E acquisition.

D. Title I

Severe time constraints prevented the evaluation team from thoroughly reviewing RFP processes and the subsequent selection of PRC Harris, Inc. as the A&E for design and construction supervision purposes. Since the team has determined that a strong, in-depth evaluation is only possible through a two-phase review it is recommended that the A&E process be assessed by the Phase II team.

No preliminary scope of work, or draft indicating appropriate review and approvals, was found in the project files. The team was unable, therefore, to determine if any changes occurred between the scope of work originally contemplated and that finally agreed upon in the PRCH contract dated 5 April 1979.

Appendix II, of the PRCH contract, contains a detailed description of services required from, and responsibilities of, PRCH. Modifications to required services were selected by Amendment No. 1 dated January 1981. Specifics regarding compliance with both original and amended service/responsibility requirements will be addressed in appropriate sections of this evaluation. For the purpose of this section, however, it is intended only to establish what those general services/responsibilities were.

Relationship between the A&E execution of Title I (design) Contract requirements and subsequent activities under Title II and III are discussed in various sections throughout the report. These relationships are defined in Appendix 11 of PRCH Contract and Contract Amendment No. 1 of 1 January 1981.

E. Title II

The PRCH Contract services/responsibilities are defined for both Title I and II in the original 5 April 1979 contract; those for Title II, however, were redefined in Amendment No. 1 dated 1 January 1981.

F. Title III

The A&E contract services/responsibilities are defined in Amendment No. 1 to the PRCH contract of 1 January 1981.

VII. CONSTRUCTION SERVICES AND RESPONSIBILITIES

The review of SPR construction and contractor and A/E services and responsibilities was one of the topics of consideration under this evaluation. The analysis relative to this concern was the responsibility of the engineer. For additional information the reader is referred to his comments included as Appendix I.

VIII. PROJECT COSTS

The Southern Perimeter Road Project cost was originally envisioned in the Project Paper of June 19, 1978 to be $31.5M of which the U.S. contribution was a $26 million grant and the Government of Lesotho was to contribute $5.5 million. Subsequent to completion of the design phase which estimated a cost of $121 million for construction, the road was redesigned by lowering the standards and changing the alignment. This action necessitated an amendment to the project authorization. This amendment was executed on September 19, 1980 and it authorized a U.S. total grant contribution of $34 million and a GOL contribution of $7.5 million or a total of $41.5 million to complete the project. The general project budget is shown in Table VIII-1. Subsequent discussion in this section is related to the Evaluation Team concern as to whether the original intent of the project will be accomplished within the funds now available.

A. Title II NT Construction Contract

The total construction price for this portion of road - Mount Moorosi to Mphaki (approximately 38 km) is $15.9 million. The total amount of claims submitted up to May 12, 1983 by NT (reasons for such claims are covered in Appendix I, Engineering Assessment) is $11.6 million. The validity of these claims were not analyzed at the time of this report.

USAID reported that funds available to cover over-runs amount to $4.0 million ($2.0 million from contingencies plus $2.0 million from foreign exchange savings). USAID also reported that the amount of documented billable over-runs to date amounts to $1.5 million.

TABLE VIII-1

SOUTHERN PERIMETER ROAD - COST SUMMARY

(000's)

	USAID	GOL	TOTAL
Title I	$ 2,447	$ 745	$ 3,192
Title II	960	176	1,136
Title III	2,616	-	2,616
Eqpt. Purch.	3,301	-	3,301[a]
Cut-Off Const.	17,850	-	17,850
Evaluation	115	-	115
Force Acct.	6,711	6,079	12,790
TOTAL	$34,000	$ 7,000	$41,000[b]

[a] $3,026 ordered + $275 for crusher plant and freight.

[b] An additional GOL in-kind contribution equivalent to U.S.$500,000 would bring the total cost to U.S.$41.5 million.

The total estimated budget for six months of operation will be $3,412,117.00. Funds available for the project as of the end of May are approximately $9,400,000. Article II of the contract between the Government of Lesotho, Ministry of Works, and Nello L. Teer Company states: "The Contract shall be effective from the date of signing of the contract and extend for the period of thirty-seven (37) months unless amended or terminated in accordance with the provisions thereof." The effective date of the contract was the tenth of December 1982. As such it will run until June 12, 1986. However, it was reported that the present plan is for the project construction phase to last 21 months from May 31, 1983. Both NT and USAID estimate that monthly expenditures will run at an average of approximately $450,000 per month until the completion of the project; that is $450 x 21 months = $9.45M. As such, it is concluded that if the operations run in an orderly and efficient manner, there are enough funds to complete the project. This is contingent, of course, on Title II requirements. If additional funds are required for claims and over-run for Title II, the funds must come from Title III. As such, it is of utmost importance to stress the recommendation, paragraph 19(d), page 15, Engineering Assessment: "The MOW/USAID maintain closer control over all operations through more frequent site visits, more on-site meetings to resolve issues, and enforcement of contract requirements."

IX. TRAINING

A. Introduction

Training represents an integral part of and key determinant of the success of the SPRP in achieving its goals. The concept of training associated with the project, however, has changed considerably over time. This section will provide an overview of modifications of the concept as revealed in major project documents, assess the current situation, and make recommendations for future action.

B. The Louis Berger International Feasibility Study

The Louis Berger International (LBI) Study devoted considerable attention to the issue of training. Setting aside the task of training by the contractor's staff, the LBI study proposed a comprehensive, unified program covering:

- Construction;
- Road Maintenance;
- Equipment maintenance and service

This program was geared to the manpower requirements of the MOW, which was reported to have a vacancy rate of almost 50 percent, as well as to maintenance requirements of the old road between Mount Moorosi and Mphaki. Coordination of the program with the nation-wide maintenance and training plan is being developed with assistance from ODA.

The training package was costed at somewhat over US$4 million. It was to include a residential training school at Mount Moorosi, equipment, teaching aids, and technical assistance as well as the cost of training engineers and technicians at the local polytechnic institute. Training time requirements for various types of skills were proposed, and an overall schedule for training was also provided.

C. The Project Identification Document (PID)

The PID facesheet describes the project purpose as developing the institutional capacity of the MOW so that it can be effectively involved in road construction and maintenance in relation to overall national development. The discussion of training states that the most important long-run effect of the SPRP is to come from the training it finances. In addition to on-the-job training the PID recommends training in the United States and at the Lerotholi Polytechnic in Maseru. It also suggests supporting construction and equipment requirements of the institute, and providing two engineering instructors. The total cost of these suggestions exceeded US$2 million but only expenditures for the instructor, included under technical assistance, are costed in the PID.

D. The Project Paper (PP) and Amended PP

Neither the PP nor the amended PP include a discussion of training as a component in the project. The Mission explained that this was the result of the decision to use alternate funding for participant training and the elimination of training at the Lerotholi Polytechnic for a variety of reasons including assistance by other donors and absorptive capacity of the MOW. The nature of the tasks at hand, however, implied that on-the-job training would be required under both Titles II and III.

E. The Current Situation

1. USAID Participant Training

Although not integrated into the SPRP as it stands, USAID is involved in participant training keyed to the manpower requirements of the MOW originally discussed in project documentation. A review of the USAID files indicated that seven participants from the MOW were receiving training in engineering in the United States and that one participant had already returned (See Appendix XIV).

2. Training Under Title II

Under Title II the contractor has engaged in on-the-job training in order to facilitate the road construction between Mount Moorosi and Mphaki. Initial reporting by the contractor on training was restricted to enumerations of personnel listed according to expatriates, Malawi nationals, and Lesotho nationals. Upon request Nello Teer produced a memorandum on their inhouse, i.e., on-the-job training program including reclassifications of personnel. On the basis of training as of August 30, 1982 almost 50 individuals had received training leading to job reclassification. The majority of training to be provided has already been undertaken. An update of training still underway indicates that during April 1983 several individuals were in training, and four had been reclassified (for copies of these reports see Appendices XV-XVII).

3. Training Under Title III

The training to be provided under Title III remains a key element in the fulfillment of the institution-building function originally associated with the project. For the purpose of this analysis training by PRC Harris under Title III will not be discussed. Comments on performance by Nello Teer under Title III are restricted by the short duration of time since start-up by Nello Teer.

Under the terms of the contract signed with Teer, the contractor was required to:

> "Develop and implement a detailed training program for operators, mechanics and technicians as appropriate, including the staff who may be assigned." (Article I, Statement of Work, Section C, 4, c, p. S-3)

Particular reference to the inclusion of training under each of the five sections in the Monthly Progress Report by the contractor was also specified in a memorandum from the Project Coordinator of SPRPA to the Project Manager (See Appendix XVIII, dated April 6, 1983).

Discussions at the site with the Project Manager and Project Engineer on May 17-18, 1983, covered training being undertaken by Nello Teer under Title III. The Project Manager stressed the importance of training and indicated that personnel records relative to training were still being evolved. The report for April 30, 1983 showed that 167 individuals were on the payroll but did not indicate status of training for these individuals (See Appendix XIX). Discussion relative to both a detailed training program and associated reporting, including requirements for the Monthly Progress Report, indicated confusion on the part of the contractor concerning his responsibilities. The Project Manager did comment on the special training requested by the MOW in surveying.

A particular problem was identified in terms of the training to be provided counterparts for the expatriates. Counterparts were to be provided as available by the MOW. To date only one counterpart has been provided and he finally had to be withdrawn from the Project as a result of his overstepping his authority. Concern was expressed on all sides as to whether counterparts were to be provided by the MOW in order to meaningfully implement counterpart training.

F. Recommendations

1. High priority should be given to the development of a detailed training program by Nello Teer for Title III. This program should include:

- a statement of goals
- a description of methodology
- an implementation schedule
- a specification of reporting procedures
- an evaluation mechanism

2. The coordination with assistance from the training section of the Roads Branch as proposed by the SPRPA for Title III under PRC Harris should also be used to facilitate training activities by Nello Teer.

3. Consideration of MOW training policies relative to construction should be examined and considered in light of such innovative approaches as training production units being used elsewhere; these factors should be included in the "training program" to be followed by Nello Teer.

4. Eventual institutional transference between Title III and the MOW needs to be given careful consideration. Mechanisms keyed to this process should be established. Responsibility for this task should not be left with the contractor.

5. The realism and likelihood of meaningful counterpart training under Title III needs to be fully considered. USAID needs to press the GOL on fulfilling its obligation to provide counterparts. If the expectations relative to this obligation are unrealistic they should be adjusted accordingly.

6. Training in equipment maintenance and servicing under Title III requires additional support; a specialist in equipment maintenance and servicing should be recruited.

7. Use of the camp site as a training site or other facility by the MOW should be considered, and necessary actions in this regard should be made well in advance of the shut-down of project activities.

X. ANALYSIS OF PROJECT EXECUTION

The analysis of project execution was identified by the team for inclusion in this evaluation. The engineer was to be responsible for this issue. For additional information the reader is referred to his comments included as Appendix I.

PRC Harris letter No. COLS 167, Cut-Off Construction - Title II, dated 23 May 1983 and SPRPA letter W/R/1049A are annexed as Appendix XXIII. to indicate reactions to concerns raised by the Evaluation Team as indicated in Appendix I.

XI. MAINTENANCE

The issue of maintenance is a key consideration of any road project. Reduced maintenance costs are a benefit usually used to justify investment in a project (See Section XII), but once such an investment has been made continued maintenance is required to protect that investment. This section provides an overview of approaches to maintenance indicated in the project documents and briefly reviews the current status of road maintenance operations in Lesotho.

A. An Overview of Project Documentation

The LBI feasibility study discusses both pre-contract and post-contract maintenance. Various problems affecting the capability of the MOW to provide road maintenance and remedial efforts including both technical assistance and equipment are included in the training proposal designed by the LBI study.

The PID flags the issue of maintenance as a potential problem and targets detailed analysis and the development of a course of action as a consideration for the PP. The discussion in the PP raises the issue of high rates paid for hired equipment and suggests that the GOL consult with USAID in regard to resolution of this problem. Other donor assistance, relative to such maintenance is reviewed, and USAID support for maintenance from separate funding from the SPRP is stated as an expectation. The amended PP does not focus additionally on maintenance but does include equipment which has a residual life beyond the SPR and could be used for maintenance activities by the MOW.

B. The Current Situation

The Roads Branch of the MOW is currently being strengthened under the Third Highway Project funded by the IBRD. The project covers both road construction and road maintenance, but primary focus is on the former. A

series of road maintenance reports has been funded under this project, and will provide the basis for institutional upgrading. Topics included in this series include:

- road maintenance management systems;
- road maintenance field organization;
- maintenance resources;
- road inventory forms;
- cost accounting;
- average daily traffic counting.

Initiatives undertaken under the Third Highway Project are to be supplemented by actions under the Fourth Highway Project already under preparation.

Although separate from the Third Highway Project, complementary assistance for road maintenance is also being provided by ODA which includes funding for a Roads Training Officer at the Roads Branch Headquarters in Maseru. Under this assistance a syllabus and instruction manuals have been developed, and a classroom with audio-visual equipment has been established. Training is largely confined to the headquarters but the officer is available for consultation as needed.

In May, 1977 the EEC provided a grant of M1.5 million for maintenance and upgrading of the SPR in order to keep the road open on an emergency basis. An additional M70,000 was also provided by the EEC for maintenance tools and two maintenance camps along the SPR, one at Mphaki and the other at Qacha's Nek. The GOL has continued these camps and proposes to use them and facilities at Mohale's Hoek and Quthing to maintain the SPR upon completion of the project.

The high vacancy rate in the Roads Branch referred to in the project document continues to be a problem, and a disproportionate number of these vacancies are in field maintenance. The works branch is, nonetheless,

generally credited with having done a good job of road maintenance. This is in part the result of the use of expatriate staff. An analysis of recurrent expenditures for road maintenance since the early 1970's indicates the progressive expansion of attention being devoted to road maintenance. The GOL is currently facing a budgetary crisis, however, which could lead to a reduction in the allocation for subsequent years.

C. Recommendations

1. The road maintenance training center funded by the ODA represents an in-house service and capabilities which can be related to the training task of the SPRPA. Liaison should be established between the Road Training Officer and Title III personnel in order to transfer expertise as well as facilitate the integration of achievements under Title III with overall MOW objectives.

2. The GOL is obligated under the PROAG to take all steps necessary to adequately maintain the SPR upon completion of the project. The seriousness of this issue, especially in view of the current budget crisis, requires continued monitoring of the capability of the GOL to meet this obligation. Responsibility for this monitoring remains a concern for the USAID engineer, but the issue should also be included for review at the time of the proposed mid-term USAID evaluation of the project.

XII. ECONOMIC ANALYSIS

A. Introduction

1. Analytical Approach

The economic analysis undertaken to date relative to the Southern Perimeter Road Project (SPRP) consistently distinguishes between standard cost/benefit analysis used to determine the feasibility of the project and more generalized, and less readily quantified, analysis concerning the expected social and economic impact of the project. Although for the purpose of this report the Evaluation Team also makes such a distinction, both kinds of analyses are essential to an appraisal or evaluation of the project no matter at what stage in project evaluation such takes place.

2. Cost/Benefit Analysis

The feasibility of the SPRP has been discussed at several junctures in project development and implementation in terms of the Internal Rate of Return (IRR). The IRR has been found by calculating the point at which discounted costs have equaled discounted benefits. The IRR has then been compared to the opportunity cost of capital and sensitivity tests have been run to determine the potential for erosion of project feasibility. The major elements examined in cost/benefit analysis for the project have been average daily traffic (AADT) rates, vehicle operating costs, and road maintenance costs.

Although the various feasibility studies undertaken have all shown a favorable IRR, there have been divergencies in the IRR each study has suggested. These have resulted mainly because of variations in:

- the composition or structure of the project;
- the expected costs of the project;
- the expected benefits of the project.

There have also been variations in the methodology used to calculate the IRR or to determine costs and benefits. In view of the evolutionary or, perhaps more accurately, disjunctured nature of project development such variation would be expected. The implications of these variations for ultimate project feasibility, however, would warrant further consideration.

The team has felt it useful in this evaluation to review the feasibility analysis to date, with particular concerns for variations in project assumptions, and to indicate the current potential for erosion of project feasibility. Each feasibility study is regarded as an integral unit for analysis, but recurrent issues are earmarked for discussion in the concluding overview. This analysis is followed by basic recommendations relative to economic analysis of the SPRP.

3. Other Benefits

As indicated above, the discussion of project feasibility offered in this section is limited to the standard calculation of IRR and associated cost/benefit analysis. Additional consideration of project benefits is offered in Section XIII.

B. The Louis Berger International Feasibility Study

The project assessed in the original feasibility study by Louis Berger International (LBI) covered road linkage between Mohale's Hoek and Qacha's Nek. This involved an alignment of 264.9 kms which under the proposal was to be shortened to 205.5 kms, including major realignment between Mount Moorosi and Mphaki and widened to two lanes throughout its length. The cost/benefit analysis included in the LBI study set project costs -- including costs for design, supervision, construction, and technical assistance -- against benefits resulting from savings in vehicle operating costs and from savings in maintenance costs. The discounted cost

and benefit streams were plotted for a range of discount rates to determine the IRR. Although the methodology used followed standard procedures, the process was complicated by two considerations:

> First, the data needed to calculate the benefits for the most part were either incomplete or dated;
>
> Secondly, the determination of the cost and benefit stream was affected by uncertainties regarding both the standard to which the road was to be improved and the construction strategy to be followed in implementing the project.[1]

Major assumptions relative to the resolution of these issues are briefly discussed in the following overview (for more detailed dicussion of the methodology see the LBI study itself).

1. Traffic Analysis and Projections

In order to calculate the savings in vehicle operating costs the LBI study needed figures for actual and projected average annual daily traffic (AADT) over the road from Mohale's Hoek to Qacha's Nek. Using the 1974 Lesotho Transportation Study (Roughton) and a MOW traffic count, the LBI study had data only for the years 1970, 1973 and 1977. In view of the light traffic on certain segments trend analysis based on only three years of counting was most uncertain, a problem openly discussed in the LBI study. AADT rates were calculated by using projected growth for associated sectors, primarily agriculture, fitted with other adjustments or inputs. Rates were calculated for both vehicle types and road segments. (See Table XII-1.)

Equally complicated was the issue of induced traffic attracted because of improvements to the road. The LBI study again had incomplete data which it attempted to adjust first as a composite set and then across the board by using only 50 percent of the projected induced traffic in subsequent economic analysis. (See Table XII-2.)

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[1] Assumptions concerning the length and alignment of road segments as proposed in the LBI study were held as fixed in the feasibility analysis provided by the study.

TABLE XII-1

LESOTHO: ACTUAL AND PROJECTED DAILY TOTAL TRAFFIC (AADT)[1]

Segment	Existing Length (kms)	Actual Traffic		Projected Traffic				Averag Annual Projec Growth Rates
		1973	1977	1985	1990	1995	1999	
1	4.4	118	229	838	1431	2399	3646	11.5
2	15.2	75	141	421	714	1193	1816	11.9
3	14.5	46	84	271	444	723	1085	11.4
4	115.0	10	26	115	166	248	385	11.4
5	35.0	13	50	178	277	440	650	11.4
6	10.7	28	98	309	514	848	1281	11.6

TABLE XII-2

LESOTHO: INDUCED TRAFFIC BY SEGMENT AND VEHICLE TYPE (AADT)[2]

Segment	Light Vehicles	Bus	Truck	Total
1	61	2	27	110
2	50	3	27	80
3	59	4	27	90
4	56	5	29	90
5	56	5	29	90
6	66	5	29	100

[1] TECHNO-ECONOMIC FEASIBILITY STUDY OF THE LESOTHO SOUTHERN PERIMETER ROAD, Prepared by Louis Berger International for USAID under contract (AID 632-002, Project No. 690-0104, 1978, Vol. 1, p. III-110.

[2] TECHNO-ECONOMIC FEASIBILITY STUDY OF THE LESOTHO SOUTHERN PERIMETER ROAD, Prepared by Louis Berger International for USAID under contract (AID 632-002, Project No. 690-0104, 1978, Vol. 1, p. III-111.

2. Savings in Vehicle Operating Costs

In order to first determine vehicle operating costs (VOC) the LBI study took data from the 1974 Lesotho Transportation Study and adjusted it for inflation and cost increases reflecting the jump in world prices for petroleum. This process was checked by spot comparisons with actual prices. Costs were indicated according to vehicle type.

Then to calculate the savings to result from the project, the VOC were keyed to road type on the basis of Delta-L Values, following standard procedures. Included in the calculation were differentials based not only on surface type but also on grade, side friction and curvature.

3. The Internal Rate of Return (IRR): Construction Standards and Strategies

Calculation of the IRR for the project was run for relative cost/benefit streams dependent on whether the road was improved to gravel or paved (DBST) standard and whether the road was constructed according to one of six construction strategies. The results are shown in Table XII-3 with a low IRR of 15.8 and a high IRR of 28.6. This compared favorably (that is exceeded) an opportunity cost of about 12 percent. The highest IRR was for a paved road because of the projected benefits for vehicle operating costs and maintenance.[1]

The LBI study also ran sensitivity tests for each of the twelve sets of data used to calculate the IRR. Testing provided for:

- an increase in costs by 20 percent with benefits held stable;
- cost held stable with a decrease in benefits by 25 percent;
- an increase in costs by 20 percent combined with a decrease in benefits by 25 percent.

[1] Note that the final costs used in the LBI study differ from those used to calculate the IRR for the project. This was the result of subsequent cost adjustment after the data run. The LBI study did not feel that the differential was sufficient to warrant rerunning the data.

TABLE XII-3

LESOTHO: CONSTRUCTION STRATEGIES, CONSTRAINTS AND INTERNAL RATES OF RETURN (LBII FEASIBILITY STUDY)

Construction Strategies	Economic Costs * (Millions 1978 U.S. $)	IRR
U.S. Contractor (Waiver)+		
Gravel	22.0	22.0
Paved	30.0	28.5
U.S. Contractor (No Waiver)		
Gravel	26.6	19.1
Paved	35.1	25.8
International Contractor		
Gravel	29.4	28.6
Paved	21.6	22.1
Force Account		
Gravel	29.9	15.8
Paved	37.8	22.4
First Section Force Account Second Section Contract (Waiver)		
Gravel	24.4	20.7
Paved	32.5	27.0
First Section Force Account Second Section Contract (No Waiver)		
Gravel	27.5	18.8
Paved	35.8	25.6

*Costs include those for construction, design and supervision and technical assistance.

+The Waiver permits a U.S. Contractor to employ as many third-country nationals as he wishes.

SOURCE: TECHNO-ECONOMIC FEASIBILITY STUDY OF THE LESOTHO SOUTHERN PERIMETER ROAD, Prepared by Louis Berger International for USAID under contract (AID 632-002, Project No. 690-0104, 1978, Vol. 1, p. III 135)

The 25 percent decrease in benefits appeared the greatest thr to the IRR as opposed to the 20 percent increase in costs, however it was only with adjustment of both costs and benefits and the use of a construction strategy of improvement to gravel with Force Account by the GOL that project feasibility was eroded. (IRR ≈ 10.4% and the benefit/cost ratio fell to .9).

C. The Project Identification Document (PID)

Discussion of the project in the PID did not include cost/benefit analysis, and no IRR was projected. The project as envisioned in the PID eliminated the section of the road from Mpiti to Qacha's Nek which would have required adjustment of the cost/benefit streams. Other variations were well within the parameters discussed in the LBI study and did not erode the feasibility of the project.

D. The Project Paper (PP)

The project discussed in the PP differed from both the LBI study and the PID. It provided for design of the entire route from Mohale's Hoek to Qacha's Nek with the same proposed realignment of 205.5 kms, however, financing for the cost of construction and construction supervision was to be limited to only the proposed 155.2 kms between Quthing (Moyeni) and Qacha's Nek; the costs of the design for the Mohale's Hoek/Quthing section of the road were not included in the feasibility analysis in the PP. Only 54 kms of the road was to be upgraded to DBST[1] and the remainder was to be upgraded to gravel. Certain other adjustments were made in the analysis:

- Costs

  -- Construction costs included special measures to protect the environment such as hydro-seeding. (Also, the paving/DBST/ through major towns already mentioned)

  -- The cost of reinforcing the Seaka Bridge was included

[1] Included were: 35.3 kms -- Quthing to Mount Moorosi
9.2 kms -- Mpiti to Qacha's Nek
4.2 kms -- Grades of 10 percent or more
5.3 kms -- Sections through urban areas

- Benefits

  -- Residual value for 100 percent of earth works was added as a benefit;

  -- Residual value for 50 percent of the cost of construction of structures was added as a benefit.

Otherwise the analysis basically followed the methodology used in the LBI study. Savings in VOC proved the major source of project benefits.

1. An Overview of Data Sets

The projections for the AADT, including traffic, adopted the data included in the LBI study. The same was true of the VOC and inputs relative to the application of the Delta-L values. A new benefit stream for maintenance cost savings was prepared on the basis of adjustment to the road standard being proposed.

2. The Internal Rate of Return (IRR)

The discounted cost and benefit stream indicated an IRR of 17.2 percent for the project, again compared to an opportunity cost of 12 percent. Sensitivity tests were run and indicated:

An IRR of 14.9 percent if costs were increased by 20 percent but benefits held stable;

An IRR of 14.5 percent if costs were held stable but benefits decreased by 20 percent.

Sensitivity was not run for a combination of these shifts in costs and benefits but if such were to happen there would be a major erosion of the IRR and a benefit/cost ratio of 1 would be approached.

E. The Amended Project Paper

The project as funded in the amended PP required a further modification of the cost/benefit streams:

- Costs

  -- Alignment was increased from 155 km to 189 km;

  -- The road standard was reduced from G-1 to G-3;

-- Only construction of the cut-off between Mount Moorosi and Mphaki, construction of the new 80 meter Quthing River Bridge, and rehabilitation of the Seaka Bridge were to be by contractor, the remainder being shifted to Force Account under the GOL;

-- No further structures were to be changed;

-- Construction was reprogrammed from 2.5 years to 3.5 years.

- Benefits

-- Road maintenance costs were assumed to be equal on the existing and proposed road and no benefits were projected from this source;

-- VOC were adjusted to reflect 1980 costs;

-- Adjustment of the kilometers having 10 percent or more gradients were made on the basis of the PRC Harris data;

-- No residual value was included for either earthworks or structures but a salvage value for equipment for Force Account work to be provided by the funding was included on the basis of a seven year useful life.

The result of these modifications of the cost/benefit stream indicated an IRR of 19 percent, again compared to an opportunity cost of 12 percent. Sensitivity tests were run and indicated:

- An IRR of 16.2 percent if costs were increased by 20 percent but benefits held stable;
- An IRR of 16.3 percent if costs were held stable but benefits decreased by 20 percent;
- An IRR of 17.3 percent if cost and benefits were held stable but the rate of induced traffic decreased by 50 percent.

No combinations of the above were run but if the worst case were made the IRR would remain above the opportunity cost of 12 percent.

The higher IRR is primarily the result of adjustments in the VOC. This is only partially offset by the lowered road standard -- which reduces the differential in VOC provided by the project over the existing work -- increased project costs, and a delay in the onset of the benefit stream.

F. 1982 Evaluation

The 1982 AID evaluation of the project raised several issues relative to the economic assumptions of the amended PP. Questions concerning the AADT, VOC, and induced traffic are treated in the discussion in the next sub-section. There are two major areas which the 1982 evaluation felt warranted further consideration:

- First, the PP failed to account for the fact that if the AADT rates reach projected levels there will either have to be upgrading of portions of the road or deterioration from the increased AADT will result in increased VOC and maintenance costs.
- Secondly, the methodology used in the PP did not:
  - -- Assume any multiplier effect to the income generated by the construction or the effect of investment by road workers of a portion of their earnings;
  - -- Add in the cost of GOL contributions to the project and inflate the GOL contribution to reflect budget shortages;
  - -- Deflate the cost of local labor to reflect unemployment;
  - -- Inflate the maintenance savings to reflect GOL budget shortages (none were included in the amended PP).

It should be noted that the adjustments falling in this second category clearly represent a methodological approach not taken in any of the previous feasibility assessments of the SPR. As a whole they represent a refinement of the State of the Art in feasibility analysis. Some economists have been slow to incorporate these adjustments into their analyses and others disagree as to the best method of making the adjustment. These adjustments are particularly important to planners in developing countries where resources are limited.

The economic analysis in the 1983 evaluation concludes by offering a preliminary estimate of an IRR for the project of 14.5 percent. This is based on adjustments of the analysis in the amended PP according to all the

factors raised in the discussion in attachment D. Details of the specific adjustments made, however, are not included, which restricts comments on transference between the IRR in the evaluation and that indicated in previous analysis.

G. Current Perspective: Potential for Erosion of Project Feasibility

Efforts to provide a current assessment of project feasibility are complicated by:

- uncertainties relative to fluctuations in the structure of the project;
- uncertainties relative to associated costs;
- incomplete data sets or divergent interpretations concerning such sets.

Calculation of yet another IRR for the project could be undertaken at this time only on the basis of subjective determinations. The utility of such an exercise is marginal. The approach taken for the purpose of the Phase I Evaluation, therefore, is to discuss these uncertainties and set forth the potential they represent for erosion of project feasibility.

In the amended PP project benefits were derived solely from savings in VOC as a result of improvement to the road. Although the conservative bias of such an assumption is to be questioned, impact on VOC savings is a major focus for discussion. Actions supportive of the Phase II Evaluation are suggested in the course of discussion and also are included under subsection H, Recommendations.

1. Total Project Costs

The cost stream used in the amended PP was based on capital costs equivalent to about US$33.8 million expended by AID over a seven year period (1979-1985). Sensitivity tests indicated that an increase of costs by 20% would result in a decrease in the IRR of about 2.8 percentage points (i.e., from 19 percent to 16.2 percent). Similar impact was shown in the

sensitivity tests run in the other feasibility analyses for the SPRP. If one used the adjusted IRR in the 1982 evaluation, which presumably adds in GOL costs for initial force account contributions as well as subsequent upgrading of the road because of increased traffic in the second half of the 20 year life cost/benefit stream, the IRR might well be eroded to a benefit/cost ratio of less than 1.0 or, alternately, to a percentage less than the discount rate of 12 percent.

Project costs could increase as a result of over-time, or, using the adjusted approach of the 1982 evaluation, if additional costs were incurred in conjunction with GOL force account actions.[1] Cost over-runs accepted to date represent small amounts. However, Nello Teer has made a claim of US$10-12 million. The impact of such claims on the economic feasibility of the project cannot be assessed until a settlement has been reached. Major increases in the GOL Force Account costs would not seem likely unless project funds run out before the completion of the work envisioned under Title III. (See Section VIII, Project Costs)

[1] At issue here is not only what will be final over-runs but also how such over-runs should be fitted to real or adjusted project costs.

2. Road Length and Alignment

Strictly speaking, both the final length and alignment of the road remain subject to final construction. Current options indicate that road length should be about the same as projected in the amended PP with the possibility of even a shorter distance. The major differentials in vertical and horizontal alignment against the PRC Harris design have already been encountered. There remains some uncertainty over the gradient sections over 10 percent as well as curve definitions. These variations have implications on the application of the Delta-L values in calculating the VOC savings. In general, however, there should be minimal differences between the benefits in general indicated in the amended PP and those to be found on the actual road resulting from road length and alignment. No potential for erosion of project feasibility is indicated.

3. Project Time Table

The actual and projected schedule for the SPRP diverge both in terms of sequential arrangement and absolute time consumption. At present, it is estimated that the project will take six to twelve months longer than proposed in the amended PP; the shift in internal time is more difficult to contrast. Both factors, however, result in a restructuring of the cost/benefit streams as compared to what was used in the amended PP. Interviews with the contractor and other engineers as well as a visit to the construction site would indicate that although there have been delays, certain benefits have come on stream anyway. The result may be a modification of the IRR but not a major erosion of feasibility.

4. Vehicle Operating Costs

The amended PP calculated the VOC savings on the basis of an adjustment of the calculation made in the LBI study. The VOC savings indicated in the amended PP are keyed to 1980 constant dollar costs.

Setting aside the need to adjust these costs, a major problem relates to the actual VOC and the VOC differentials for different road types. The costs and differentials used in the PP differ widely from those found in a study of the transport sector in Lesotho by Dorsch Consult GMBH. According to Dorsch, for example, the VOC rates for light vehicles are 34 percent lower and for trucks 34 percent higher than in the PP (See Table XII-4.)

TABLE XII-4

LESOTHO: VEHICLE OPERATING COSTS

Type of Vehicle	Amended PP	Dorsch	Differential	%
Light	21.95 c/km	14.56 c/km	10.39	-34%
Large Bus	53.03 c/km	52.01 c/km	1.02	-02%
Truck	35.08 c/km	47.05 c/km	11.97	+34%

Spot checks indicated greater validity for the adjusted LBI calculations but were an insufficient test.

The Dorsch report also estimates that a gravel surface increases VOC costs by only 35% over a paved surface. The Delta-L values used by Berger indicate an increase of 75 percent. The Dorsch estimate would seriously reduce VOC savings resulting from the project and erode project feasibility to a point below the opportunity cost of 12 percent. Other adjustments would only marginally counterbalance this erosion. The Delta-L values used by the LBI study is a relatively standard mechanism which has been used in feasibility studies for transport projects throughout Southern Africa. The divergence in the differentials suggested by the two sources would warrant further consideration of this issue, but the Delta-L values should be retained until an independent assessment can be made.

5. Traffic Projections

The accuracy of projected VOC savings resulting from the SPRP is restricted by the lack of data about the AADT, growth rates, and induced traffic, The LBI study went through a complicated but subjective process in order to provide projected AADT for the life of the project. These projections assumed growth rates of somewhat over 11 percent for each of the road segments (See Table XVIII-1). Projections included in Dorsch again disagree with the LBI data, but in this case the Dorsch projections exceed those of the LBI study except for the short segment between Mpiti and Qacha's Nek where the reverse is true. The 1985 projection for daily traffic on the Quthing to Mount Moorosi segment, for example, is 361 in Berger and 908 in Dorsch. This represents a differential of 547 or an increase of about 152 percent by Dorsch over the LBI projection. Adjusting the LBI data to compare it to the 2000 projections of Dorsch for the same segment of road provides a reduced differential of only about 14 percent with Dorsch still higher at 1,496 compared to 1,292 for LBI.

The MOW is currently engaged in a traffic count project which will help clarify this issue. This project is being funded under the Third Highway Project in conjunction with a series of reports by BCEOM Consulting Engineers of France. It will provide manual counting at selected points throughout the country on an annual basis as well as a few automatic counts on a more frequent basis. Unfortunately the counting only began on May 13 and the MOW will not have the results until early June, after the departure of the Evaluation Team. Two sample runs were available, however, for Quthing and for Ha Makoae which is on A4 just beyond Mount Moorosi. These counts show AADT rates of 258 and 102 respectively. (See Tables XII-5 and XII-6). This compares to the LBI AADT projections for the same segments of 222 and 100.

TABLE XII-5

LESOTHO: TRIAL AADT RATES, QUTHING

KINGDOM OF LESOTHO MINISTRY OF WORKS ROADS BRANCH //// MAINTENANCE MANAGEMENT SYSTEM

MANUAL TRAFFIC COUNTS

STATION QUTHING

5 TO 11 JANUARY 1983

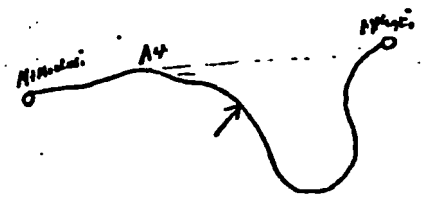
DAILY NUMBER OF VEHICLES

	LV	MV	HT2	HT3	TOT
DAY 1	123	50	34	12	227
DAY 2	147	56	41	19	243
DAY 3	213	84	24	16	337
DAY 4	169	51	35	23	278
DAY 5	90	41	15	9	163
DAY 6	147	72	36	15	290
DAY 7	165	51	21	14	251
TOTALS:	1002	413	206	108	1809
DAILY AVERAGES:	153	59	29	15	258

Light vehicles:&&&&&&, medium vehicles:))))))), two-axle heavy trucks:++++++, three-axle heavy trucks:<<<<<

TABLE XII-6

LESOTHO: TRIAL AADT RATES, MOUNT MOOROSI



KINGDOM OF LESOTHO MINISTRY OF WORKS ROADS BRANCH ///// MAINTENANCE MANAGEMENT SYSTEM

MANUAL TRAFFIC COUNTS

STATION HA MAKOAE

9 TO 15 DECEMBER 1982

		DAILY NUMBER OF VEHICLES				
		LV	MV	HT2	HT3	TOT
DAY 1	**********	49				
	>>>>

The total over-run will determine if the project is to be executed within the available funds. This, of course, will depend on the final settlement of claims submitted by NT. The Mission is at present working with and encouraging the Ministry of Works to settle the claims at the earliest possible date.

B. Title III

The total funds available for Title III operation as of May 1983 amount of $9.4 million. The Project Manager has prepared a budget which is based on complete construction start-up by the end of May 1983 as shown in Table VIII-2.

TABLE VIII-2: PROPOSED NT BUDGET, TITLE III

ITEM	1st Qtr (May-June)	2nd Qtr (July-Sept)
Rent (including depreciation	$ 196,655	$235,986
Fuel, Oil & Grease	261,687	314,025
Parts	308,577	370,293
Tires	51,270	61,524
Labor and Fringe Benefits	150,000	180,000
Sub-Contracts	45,000	40,000
Supplies	162,509	195,000
New Equipment	650,000	20,000
	$1,825,689	$1,416,828
Insurance for the Year	130,000	-
Others (Misc.)	20,000	20,000
	$1,975,689	$1,436,428

Although the LBI projections are close to the sample, they include an arithmetic adjustment for induced traffic. The work on the SPR to date may have already been sufficient to have created induced traffic; the portion of current rraffic which has been induced, however, cannot be determined. Nevertheless, it can be concluded that the AADT figures used by LBI were conservative. The MOW believes that the induced traffic figures used by the LBI study were also conservative; this is based on their experience with other roads. The IRR would not be eroded but in fact increased if the sample data reflects the final results of the count underway.

6. Maintenance Cost Savings

In the amended PP no benefits have been derived for maintenance cost savings resulting from the project. This was based on the conclusion that maintenance costs for either a modified G-3 or G-1 standard road would be the same. The differential between maintenance needed for the road as it stood, at slightly over G-4 standard and either G-3 or G-1 would be significant, especially in view of the drainage component of the project and the decision to use DBST on grades over 10 percent.[1]

7. Summary

The preceeding analysis assumes completion of the entire project from Quthing to Qacha's Nek and that cost over-runs will be limited to the lower range of claims already presented. Conservative calculations in the amended PP which excluded savings in maintenance costs and use potentially lower than actual AADT rates would counterbalance moderate adjustments in VOC rates if such proved necessary, if current Delta-L values are retained. Within these assumptions the feasibility of the project is not eroded whether one uses the IRR calculations in the amended PP or 1982 evaluation.

---

[1] Upon completion of adjustments underway of the costing system used by the Roads Branch more detailed information concerning this differential in 1983 prices will be available.

H. Recommendations

The recommendations included in this section are keyed to the collection or review of data not available for this evaluation but relevant to the mid-term evaluation proposed for the project. Timing for each type of data is also recommended.

1. General Transport Data

General transport data and marketing analysis should be included in the baseline study for the regions affected by the SPRP. This should be done as soon as possible. Included should be:

- quantity/distance of freight and passengers carried;
- structure of freight;
- origin and destination for freight/passenger service;
- rate structure and unit costs for transport;
- number of suppliers providing transport services;
- associated facilities;
- employment related to transport services;
- profit/earnings related to transport services;
- general marketing.

(NOTE: For suggested scope of work see Appendix XX)

2. Annual Average Daily Traffic

The information provided in the traffic counts underway should be revised and compared to the LBI projections. In order to have a 2nd year control this review should be delayed until June/July 1984 but otherwise information would be available June/July 1983. Additional consideration should be given to induced traffic in conjunction with this analysis.

3. Vehicle Operating Costs

Before the next evaluation additional consideration should be given to VOC for Lesotho. This should also be undertaken either now or in 1984.

4. Road Maintenance Costs

In view of the transition underway in the MOW leading to the adoption of a new costing system a review of road maintenance costs should be undertaken in early 1984.

XIII. SOCIAL ANALYSIS

A. Introduction

Unlike actual construction, expected social and economic benefits from roads are not subject to contractual arrangements. That is, the ultimate justification of roads, in the form of social and economic development and integration, cannot be assured by contract but instead depend upon responses of the general society and economy. Thus, social benefits, which are the primary raison d'etre of road construction, cannot be subjected to rigorous examination of performance in relation to contract. Instead, evaluations must focus upon original assumptions, provisions for goal realization, and procedures for measuring changes that occur in response to new or improved roads.

Although the SPRP was conceived and implemented in the atmosphere of urgency that surrounded Lesotho's refusal to recognize the newly created "independent" nation of Transkei, the desirability of an improved national road system, including the southern section, had long been recognized. The advantages of improved roads are largely social and economic and include:*

- enhanced movement of citizens within their country;
- reduced dependence upon foreign transportation and market facilities;
- lowered transportation costs for people and goods both into and out of the affected region;
- improved delivery of administrative and social services;
- increased attractiveness for, and responsiveness to, investment in the region;
- stimulus to further infrastructural growth and general improvement of the development environment.

*The Berger Feasibility Study discusses possible social benefits in terms of education, health, and changes in standards of living (pp. III-98-106).

Road projects benefit the region in which they are implemented in two distinct phases:

- During the construction when the road itself represents a substantial direct source of new income in the form of wages paid to workers, and purchase of goods and services from the region. Under the most desirable of circumstances these responses continue after the construction phase in the form of permanent market-oriented farming, retail establishments, and so on (Appendix XXI).

- After construction, when the long-range benefits of improved and less expensive transportation accrue to the region.

Finally, it is not only inadvisable but also impossible to consider the social benefits of the SPRP in isolation. Implicit in the goals is the concept of extensive and intensive interaction with other programs and projects that would benefit from an improved road, and that in turn will enhance its value. Other activities in the region will be briefly reviewed to ascertain how and under what circumstances they might relate to the SPRP, and whether modifications should be considered to obtain maximum benefits from the improved road.

B. Objectives of Social Analysis

The Project Agreement (pp. 4-5) notes that evaluation of socio-economic impacts may not take place until well into the life of the Project, and beyond the PACD. But Amendment No. 1 (pp. 6-7) calls for a final evaluation that will focus upon attainment of Project goals and purposes and specifically upon the contributions of the SPR to the economic and social integration of the southeastern region of Lesotho that traditionally has had its primary linkages outside the national boundaries. Evaluating

progress toward such a broad and multi-faceted goal requires careful, early preparation, including establishing a base against which immediate and long-term changes can be measured.

Unfortunately, the SPR was proposed and implemented in an atmosphere of extreme urgency. Thus, while construction goals were supported by procedures for their realization, social goals, which constitute the justification for the project, were less precisely defined, and the means for their achievement were not specified. Therefore, it will be the objective of this evaluation to:

- Identify and clarify the social goals of the SPRP as expressed in the Project documents;
- Examine procedures and mechanisms for achieving Project goals;
- Evaluate provisions for measuring and monitoring economic and social impacts of the Project;
- Identify existing data that might contribute to analyses of the social effects of the Project;
- Identify other past, and ongoing projects and programs that should be related to, coordinate with the SPRP.

C. Procedures

The social analysis will employ the following procedures for achieving its objectives:

- Review of Project Documents:

  Berger Feasibility Study

  P.I.D.

  PP plus amendments

  Project Agreement

  Other Documents

- Identification of Project goals and expected effects as presented in various project documents (social and economic goals and effects will be considered for the Project as a whole, and for the separate design and construction phases (Titles I, II and II) only when appropriate).

- Evaluation of mechanisms and procedures for achieving Project goals.

- Identification of procedures for monitoring progress toward achievement of Project goals

Data for the social evaluation were obtained primarily from the various Project documents and were augmented by interviews with Project participants. Documentary data from other sources and interviews with other individuals supplemented those directly related to the SPRP and will be included when appropriate.

D. Analysis

1. Social Goals and Objectives for the Project

a. Berger Feasibility Study

Specific social goals of the SPRP initially were reviewed in the Techno-Economic Feasibility Study conducted by Louis Berger International Inc. (1978).* These consisted of:

- Inclusion of the southeast region (districts of Mohale's Hoek, Quthing and Qacha's Nek) as an internal part of the national economy.

*A more extensive review of general socio-economic benefits (and costs) of roads is contained in Roughton & Partners, Lesotho Transportation Study, Final Report, March 1974, and to a lesser extent in Dorsch Consult GMBH, Lesotho Transportation Study, Final Report (3 vols.), 1980. See also Devres, Inc., Socio-Economic and Environmental Impacts of Low-Value Rural Roads (USAID, February 1980; and G. William Anderson, Rural Roads Evaluation Summary Report (USAID), March 1982.

- Reduction of dependence upon roads and markets in the Transkei region of the Republic of South Africa.
- Unhindered movement of people within the country.
- Facilitated movement of goods and delivery of administrative and social services into and out of the region.
- Lowered costs of transportation.
- Accelerated development
- Increased tourism because of easier accessibility to the region.

Although the Berger Feasibility Study discusses the possibility for labor-intensive construction, it discards it as an option because of schedule requirements, lack of skilled manpower, and sophistication of proposed road design. It does recommend maximum local participation in general project work, and specifically that masonry work associated with drainage structures be done on a labor-intensive basis. Inherent in the concept of labor-intensive construction are the benefits of direct, broadly distributed wage payments, and experience in modern construction methods.

b. Project Identification Document

The Project Identification Document (PID) repeast most of the socio-economic objectives of Berger Feasibility Study but in addition, identifies as a primary goal the development of institutional capacity for road construction and maintenance within the Ministry of Works (MOW). The PID also reiterates the decision to use equipment-intensive rather than labor-intensive construction methods because of technical requirements, schedules, and labor shortages. The PID does, however, allow for maximum use of labor wherever feasible, specifically in culvert fabrication and bridge construction.

c. Project Paper

Social goals previously identified in the Berger Feasibility Study and the PID are reviewed in the Project Paper (PP). They are then reduced in the Logical Framework to (a) facilitation of economic development, and (b) national economic integration. The Project Authorization Amendment (PAA) specifically states (pp. 4, 80) that Project goals remain as defined in the PP.

d. Project Agreement

The Project Agreement (PROAG) does not discuss overall social goals. However, these are implied by provisions in the PROAG and Amendment No. 1 for evaluations that focus upon achievement of social goals.

2. Mechanisms for Achieving Project Goals

In most cases there is a considerable gap in project documents between statements of goals and methods for achieving them. That is, although the SPR is expected to produce an array of social, political and economic benefits, the means by which these will be achieved are not identified. Of course, a major difficulty is that goal achievement depends largely upon responses on the part of the general population, farmers, merchants, investors, and the government itself, and these are outside the sphere of this project. Still, there are many that could be identified and encouraged, or perhaps even initiated, that would provide a measure of assurance that the road will produce desired results.

a. Berger Feasibility Study

The Berger Feasibility Study does not specifically discuss goal achievement, except to note than an all-weather road will facilitate movement of people within the country (p. V-8) and thus will contribute

to national integration. The assumptions (p. V-9) that the road will result in lower transportation costs and will accelerate development are not supported. (Although an improved road should result in lower vehicle operating costs, there are no assurances that these will be reflected in substantially lower costs to purchasers of transportation services.)

b. Project Identification Document

The PID restricts discussion of procedures for realizing Project goals to two areas: reduction of vulnerability, especially with respect to recognition of an "independent" Transkei; and development of construction and maintenance capabilities within the MOW.

There can be little question that a serviceable road between the eastern district headquarters of Qacha's Nek and Quthing, and Maseru will substantially reinforce Lesotho's ability to deny recognition to an "independent" Transkei even in the face of extreme pressure.

Development of a construction and maintenance capability within MOW will depend in large part upon institutional changes and a comprehensive training program, which is discussed elsewhere in this report.

c. Project Paper

The PP is equally vague about the processes by which Project goals will be realized. The assumptions, again, seem to be that an improved road will automatically produce desired results. The Logical Framework does not adequately describe solutions to the socio-economic problems addressed by the Project, nor does it identify verifiable indicators of progress or beneficiaries.

Yet the PP itself raises certain questions precisely about this assumption. For example, the important point is made (p. 106) that Lesotho's dependence upon the RSA is a basic economic dependence that will not be altered by the SPR. Real dependence can only be reduced by production of import substitutes.

In addition, the response of population is questioned (pp. 153-154):

> Normally an improved road pulls population towards its immediate vicinity. However experience in Lesotho does not suggest this phenomenon will occur . . . . /For example/ it would not appear that construction of the Mountain Road caused any significant movement of population towards the road itself. The Southern Perimeter Road is located in similar terrain. The major constraint to settlement appears to be the availability of cultivatable land which is not more available near the road than elsewhere.

This passage reveals a foundation upon which several questions can be raised. There seems no doubt that the SPR will result in altered social and economic activities on the part of the local population. But the nature and magnitude of these responses in a society still only partially monetized and in which land is not a market commodity are difficult to predict.

d. Project Agreement

The PROAG does not contribute significantly to an understanding of how an improved SPR will affect the economy of the southeastern region.

3. Monitoring Change

Unless adequate provisions are made for measuring and monitoring change, it will never be possible to accurately assess the impact of the SPR, or to calculate the overall value of this project. Project documents address the problem in several ways.

a. Berger Feasibility Study

In addition to estimating the economic feasibility of the road in terms of construction, maintenance and operating costs, and projected use, the Berger Feasibility Study proposes to analyze the effect of the road on the economic and social context of the road's course (p. III-107-108):

This involves the assembly of data by which the total effect of the road's presence in the country, over a period of time, can be estimated. Effects may be either beneficial or detrimental - both must be recognized. It is usually difficult to quantify these socio-economic benefits and, because the resources external to road construction costs that must be expended to achieve them may also be difficult to quantify, reduction of these benefit/cost relationships to a simple ratio has not yet become an accepted practice.

Other quantifiable benefits that should be mentioned, although not included in the stream utilized to calculate economic viability, are added employment and expenditures on wages and salaries for Basotho employees hired specifically to work on the road improvement. These will vary, depending upon the approach for construction.

In order to take into account all possible benefits from an improved road, it was tempting to assign a percentage of the benefits anticipated from increases in agricultural production directly to an improved road. it would have been equally useful to assign potential increases in tourism. However, quantification of these benefits would have required a joint investment approach not possible in the absence of discrete agricultural or tourism programs within the zone of influence of the road.

b. Project Identification Document

The PID proposes to use GOL documents from Central Planning Office and Ministry of Works to verify progress toward long-run rural development on the affected region, and on development of construction and maintenance capability within MOW. Since the exact nature of these documents is not indicated, it is not possible to comment upon their adequacy for such a task, or even to determine whether suitable documents are being kept.

c. Project Paper

The PP is more specific in its proposal for monitoring Project goal achievement. Specifically, the PP (p. 050) calls upon OSARAC to:

> . . . . request REDSO/EA or AFR research funding for a detailed baseline socio-economic study of the zone of influence. In 1988, five years after completion of road construction, a follow up study will attempt to measure socio-economic change in the zone and assess to what degree that change (positive or negative) can be attributed to the upgraded Southern Perimeter Road.

d. Project Agreement

The PROAG (pp. 4-5) notes that the evaluation of socio-economic impacts of the project may not take place until well after completion of construction. Nevertheless, Amendment No. 1 stipulates that a final external evaluation in 1985 will focus on an attainment of Project goals and purposes, and assessment of Force Account construction methodology (p. 7). Specifically it will examine:

- Whether an all-weather road will make a significant contribution towards the economic and social integration of a region which has traditionally traded in markets outside the national boundaries.

- Whether a low-speed, two-lane, gravelled road will serve the communications needs of a rural area, as well as a more expensive, higher speed road would in terms of carrying traffic and minimizing maintenance.

3. Sources of Data

At the time of the evaluation, the baseline study called for in the Project Paper (p. 050) had not been conducted. This is a serious deficiency since without adequate base data it will be difficult if not impossible to accurately determine what short- and long-term effects the road will have on the economy and society of the region. However, there are other sources of data that could be used to partially reconstruct the socio-economic situation prior to the road project, or to supplement a SPR study should one be made.

a. Senqu River Agricultural Extension Project (FAO-UN)

The Senqu River Project produced a substantial number of reports in the late 1970's that contain data on parts of Mohale's Hoek and Quthing Districts. Two general reports would be especially useful for baseline data:

> Tesfa Guma and William Mafoso, Farm Management Economics Terminal Report on Socio-Economic Survey, June 1976.
>
> John Gay, Rural Sociology Technical Report (Part 1, Text; Part 2, Appendices and Tables), April 1977.

In addition, a number of special reports (e.g., Some Production Costs and Returns from Dryland Cropping in the Senqu Project Area, 1975) would contribute to a data base upon which to measure short- and long-term effects of the SPR Project.

b. Basic Agricultural Services Project (BASP)

BASP data are somewhat more recent than Senqu figures and would provide a valuable addition to a data foundation for the region. But like the Senqu Project, the southernmost BASP "block" (VI) covers only part of the SPR project area in the Mohale's Hoek and Quthing Districts. Thus there remains a serious lack of data for Qacha's Nek District. Two BASP reports would be especially useful:

> W. Reichart and F.E. Winch, Phase I, Basic Agricultural Data for Blocks V/VI, Baseline Survey Research Report No. 3, April 1981.
>
> Fred E. Winch, The Agro-Economic Farm Situation in the Lowlands and Foothills of Lesotho, MOA, October, 1981.

As with the Senqu Project, a considerable number of special reports also should be examined for data appropriate to a baseline assessment of the SPR region.

c. Other Sources

A thorough search for possible baseline data sources was outside the scope of this evaluation. However, it is likely that considerable basic information could be retrieved from such sources as the Ministry of Agriculture and the Ministry of Cooperatives and Rural Development. For example, the latter ministry currently is compiling and mapping a wide range of data on a district basis.

5. Related Projects

The SPR should not be regarded as an isolated project but instead, as one component of an infrastructure that hopefully will integrate a remote region and link it more effectively to the national society and economy. Thus, the road should be considered not only in relation to existing social and economic institutions and activities, but also to other projects and programs that address the same issues. Almost any development program would qualify under this definition and should be considered in relation to the SPR project. More specifically, secondary and tertiary road programs should be carefully examined:

> The road will benefit all social and public services but the maximum impact will not be felt until a network of feeder roads has been built to connect the scattered population to the new arterial. It will serve the feeder roads which will allow the bulk of the population to become integrated into the modern society of which social and public services form a part. The road will improve existing social and public services by increasing their efficiency without additional expenditure, /and/ by decreasing travel times and costs. However, the road will generate demands for additional services and it is not at all clear whether the road will induce increased economic activity to raise sufficient revenue to sustain these services. (Berger Feasibility Study V-81)

An analysis of other programs and projects does not constitute a part of this evaluation. Nevertheless, it is apparent that close coordination with other projects (e.g., the Food Management Unit - Ministry of Cooperatives and Rural Development "Food for Work" program, and the Labor Management Unit (labor-intensive construction) is essential. As with other projects, there are considerable quantities of data available on these activities, e.g.:

> Food Management Unit Circular No. 1 of 1983 (see especially sections on roads and soil conservation).
>
> Socioeconomic Indicators of Progress on Programs and Projects - 1982, Planning and Monitoring Section, Ministry of Cooperatives and Rural Development, March 1983. (See especially sections on Rural Road Construction Program.)

In addition to existing projects and programs, an improved Southern Perimeter Road will create a favorable environment for additional efforts aimed at capitalizing on this major infrastructural investment. The GOL has indicated an appreciation of this opportunity and announced that special efforts will be made to accelerate development in the region:

> The construction of an all-weather road in this area will not only enhance the unhindered movement of people within the country but also facilitate the movement of goods and delivery of social services. The Government of Lesotho has announced that special efforts will be made to accelerate development activities in southeastern and southern Lesotho. The transport of materials for development projects will be made easier and cheaper by an improved, all weather road, and the farmers will be able to transport their produce more easily to Maseru and other centers for marketing. An upgraded Southern Perimeter Road is a sine qua non for efforts to protect residents from the economic repercussions of Transkei "independence" and to accelerate development activities in the region. (PP, p. 010)

At the time of this evaluation, it was not clear just what form or direction such special efforts would take. It would seem that the time is ripe for careful planning of a coordinated development effort in the region, using the improved SPR as a focus.

E. Summary

From the preceeding review and analysis the following points have emerged:

1. Except for the construction itself, Project goals are vaguely phrased.

2. Little or no attention was directed toward mechanisms for achieving the social and economic goals of the Project.

3. The specific provision for a baseline study has not been carried out.

4. There are no specific provisions for measuring or monitoring short- or long-term social and economic impacts of the Project.

5. Although future evaluations of Program achievements are scheduled, procedures for generating data to support such evaluations are not in place.

6. A coordinated development program for the southeastern region is suggested in Project documents. However, procedures for coordinating existing projects and programs and for developing new activities have not been specified.

F. Recommendations

The time for evaluating original project design and objectives is past: construction is well underway and at some point in the near future an improved road from Quthing to Mphaki and beyond to Qacha's Nek will be a reality. But roads are not ends in themselves, they are means to ends, and ultimately, the SPR Project will be judged on whether it brings about desirable social and economic changes in southeastern Lesotho. In this regard, it is still timely to clarify just what is expected from this considerable investment, and how these results will be achieved and measured. It is from this positive perspective that the following recommendations are made.

1. Restatement of Project Goals and Objectives

Without a set of realistic, achievable goals, it is impossible to measure project success or failure or to evaluate its role in the development of the region and nation. Therefore, although perhaps seemingly a questionable *ex post facto* procedure, it is recommended that a clear, detailed statement of specific social and economic goals and objectives be made. These should not exceed those contained in original project documents, but should clarify and specify just what is expected so that corresponding monitoring systems, and verifiable indicators can be developed.

2. Identify Conditions and Mechanisms for Achieving Project Goals

By itself, the improved SPR may or may not produce the types of activity that will result in goal achievement. The particular nature of the Lesotho society and economy does not assure that conventional market and societal responses will occur. Therefore, in conjunction with restatement of social and economic goals, it is recommended that the conditions and mechanisms needed to link an improved road with specific aspects of social and economic development be identified. This will also serve as a guide for evaluating existing and future projects and programs with respect to their potential for furthering Project goal achievement.

3. Conduct a Socio-Economic Baseline Study

The basic purposes of an improved SPR is to integrate and develop southeastern Lesotho. Unless pre-existing conditions are identified in some detail, there will be no way of measuring progress toward these general goals, nor of assessing the utility of the road. Lack of such a baseline study constitutes a serious deficiency that must be corrected as soon as possible, using all available means including data from other projects and programs, and field surveys to fill in essential missing data.

By their nature, roads trigger responses that differ from other types of development projects, if for no other reason than many responses are spontaneous and not subject to control or planning. Therefore, the baseline study must be constructed with considerable care if it is to include those factors that can be used to measure the distinct effects of improved access. In addition, changed spatial relationships, both as interregional integration and linkages with the national economy and with the RSA, can affect almost every facet of the local and national economy. Thus, in addition to covering distinct elements that directly flow from improved road access, the baseline study must be complete enough so that secondary, tertiary, and parallel effects are not overlooked. A suggested baseline outline is attached as Appendix XX.

4. Establish a System for Monitoring Short- and Long-Term Effects of the Project

Once clear and specific goals have been established and proper indicators identified, it is possible to set up a monitoring system that will provide data for periodic evaluation of progress. It is necessary here only to caution against indicators that are difficult to obtain, and to suggest use of data already being generated by GOL or by other projects.

5. Prepare for Future Evaluations

Achievement of social and economic goals are not as easily documented as physical construction goals. It is recommended that periodic evaluations be conducted, at least to 1988, as stipulated by project documents (e.g., PP, p. 050) and perhaps beyond. The impacts of a project of this magnitude are likely to continue for many years. It would be worthwhile to document these benefits (negative as well as positive) over a considerable length of time.

6. Develop Procedures for Coordinating Other Projects and Programs, and Development Activities

By improving access between major population centers within the region, and linking the region with the western lowlands and the capital, the SPR will have a powerful impact upon southeastern Lesotho. The effect will be reinforced by considering the SPR as a development project and coordinating it with other projects and activities. Most obvious are the programs for building secondary and tertiary roads that will link outlying villages with the SPR. But in addition, all other economic and social activities will be affected. Coordination with other programs nd projects will assure realization of maximum benefits from the road investment.

Two final recommendations stem less from a strict evaluation of project documents and activities and more from a general assessment of the SPR in relation to overall development efforts in Lesotho.

7. Make Maximum Use of Labor-Intensive Methods

Although labor-intensive methods are briefly considered in the Project documents, they are discarded because of construction schedules, available labor, and sophistication of design. However, it appears that there may be fresh opportunities for incorporating systematic, extensive use of labor-intensive methods in some of the Title III (Force Account) portions of the road and certainly in the post-construction phase of SPR maintenance and feeder road construction. It is recommended that labor-intensive methods, utilizing the now-substantial expertise and experience of the Labor Management Unit, Ministry of Cooperatives and Rural Development, Food-for-Work Programs, and MOW, be utilized as much as possible.

8. Use District-Level Planning for Development

The primary purpose of an improved SPR is to integrate and develop southeastern Lesotho, especially the districts of Qacha's Nek, Quthing and Mohale's Hoek. The improved road, offering year-round, all-weather access for the first time, can act as a powerful force for change. It also offers an unusual opportunity to simultaneously develop the capacity of the three districts to engage in the sorts of district planning and implementation of development activities inherent in the concept of decentralization (Wilken, 1981). Therefore, it is strongly recommended that the coordination of programs, projects and activities noted in recommendation No. 6 be delegated in large part to the districts.

XIV. ENVIRONMENTAL ASSESSMENT

A. Introduction and Present Status

Cost considerations have forced reduction or elimination of many aspects of the SPR Project. Not suprisingly, environmental considerations were one of the early casualties. From an original, extensive review and analysis in the Berger Feasibility Study, environmental responsibilities have eroded to a few specific areas and even these are imprecisely specified.

Contractual agreements with respect to environmental protection cannot be changed by this evaluation. Nevertheless, in addition to reviewing specific environmental defense measures, a few environmental conserns will be expressed, and a few suggestions will be made for measures that still could be implemented.

B. Review of Documents and Concepts

The Berger Feasibility Study (see especially Volume II, Environmental Assessment) reviews the general geography and ecology of the Project area and identifies both avoidable and unavoidable effects. The Project Identification Document similarly devotes an entire section (Annex E) to a review of potential environmental impacts. But by the time the Project Paper (PP) was drafted, environmental measures had been reduced to a narrower focus upon construction standards (PP, p. 029):

> The Environmental Assessment (EA) addresses in detail the environmental effects of the proposed road construction. The study recommends measures to insure that the environmental factors and values are safe-guarded. The study states that the proposed measures will not only reduce negative environmental impact but will provide a net positive benefit. The recommended construction standards to mitigate negative environmental impact which are integrated in the design are:
>
> - aprons of concrete or rock to be placed on the downstream of culverts;
> - the ditches with steep slopes will be lined with rubble masonary or concrete;
> - where soil is exposed along cuts, hydro-seeding will be used after adding top soil as necessary;

- borrow areas will be selected carefully to minimize erosion;
- existing erosion gullies along the road will be treated to protect the ecology and the roads;
- various forms of stabilizing structures such as slope walls retaining walls will be constructed predominately from locally available rubble stones; and
- paving of the road in urban areas.

The Project Authorization Amendment (PAA) denies that reduced engineering design standards will adversely effect environmental impact mitigation, and even suggests that the lower cost alternatives would further reduce negative impacts (PAA, p. 22):

> The proposed revisions to the project do not alter or materially affect the benefits of the environmental protection measures described in the Project Paper. The substantial reduction in engineering design specifications described in this amendment in no way reduced the environmental impact mitigation measures called for in the original PP. In fact, this new, lower cost alternative will further reduce negative impacts by following the existing road alignment more closely and avoiding disturbance of the ground.

But environmental considerations continued to evolve from suggestions to omissions. For example, by the time the Project Agreement was written, the overall environmental provisions had essentially been reduced to a statement of GOL responsibilities for protecting archaeological and paleontological sites:

> Section 5.3. Environmental Responsibilities. The Grantee covenants to provide the services of an archeologist and/or other appropriate personnel, to work with the design contractor to identify and preserve, to the maximum extent possible, paleontological and archeological sites along the route of the project road. The Grantee also covenants that to protect approximately nine noteworthy sites it will provide guardians and maintenance of fencing, and assume all other responsibilities for preservation of these and other sites not borne by AID.

Identification of archaeological and paleontological sites has proceeded in a thorough manner. Contractors from Roma (Lesotho) and Paris (France) have conducted surveys within a 100 meter strip of the SPR alignment and

examined special sites at even greater distance. Several reports provide detailed reviews of these reconnaissances and also contain recommendations for their protection and preservation:

L.G.A. Smits, Rock Art Survey Along the Southern Perimeter Road, Preliminary Report. NUL, Roma: ARAL Project, March 1983.

B. Battail, Report on Palaeontological Reconnaissance along the Southern Perimeter Road, Mount Moorosi to Qacha's Nek. Institute de Paleontologie, Museum National d'Histoire Naturelle, Paris, December 1982.

Lesotho: Rescue Archaeology 1982/83, Preliminary Report. UCT-SPR (n.d.).

C. Current Status of Environmental Protection

General provisions for defense of the physical environment have been less than rigorous. The status of the specific construction standards proposed in the Project Paper (p. 029) is as follows:

Proposed Measures	Current Actions
o aprons of concrete or rock to be placed downstream of culverts	placement of gabions where needed
o ditches with steep slopes to be lined with rubble, masonry or concrete	lined with loose rock
o replacement of topsoil and hydro-seeding where soil is exposed along cuts	no soil replacement or hydro-seeding
o borrow areas carefully selected to minimize erosion	not verified[1]
o treatment of existing gullies (dongas) along road to control erosion	no treatment
o paving road in urban areas	uncertain[2]

[1] A borrow pit has been opened on the slopes of Thaba Moorosi, one of the more important historical sites in Lesotho. Although it is possible that a carefully managed and treated borrow pit will not adversely affect the site, it is a decision that should have received careful review before the action was taken.

[2] Since none of the Project documents define "urban areas" it is not clear just how this provision will be enforced.

D. Summary

It was not possible to investigate all of the sensitive environmental areas during this evaluation. From the documents and brief field inspection only a few specific problem areas were identified:

1. The original Project documents contain general and special provisions for investigating and protecting the physical environment. However, no systematic survey of environmental conditions along the SPR alignment has been conducted during the actual construction phases.

2. Since cuts and embankments usually are steep and devoid of vegetation, they are especially susceptible to erosion. In addition, exposed subsoil lacks organic matter and is slow to revegetate by natural processes.

3. The engineering report attached to this evaluation (Appendix I, p. 13) reports embankments constructed with inadequate compaction. This represents an extreme hazard in the form of slope failure and erosion.

4. Borrow pits are highly visible, susceptible to erosion, and difficult to revegetate. They require careful treatment if long-lasting, unsightly scars on the landscape are to be avoided. A systematic examination of borrow pits along the SPR alignment was not conducted during this evaluation. Nevertheless, it appears that sites for borrow pits could be more carefully selected, with due attention to their general visibility and proximity to historical and scenic areas. After excavation, they must be treated to avoid ponding and continued erosion that would prevent recovery.

5. Archaeological surveys have identified a number of areas and specific sites, mostly of rock art, that will be endangered by road construction or subsequent increase in traffic through this area. The Bolahla Site is particularly important and has been singled out as the most endangered locality on the SPR (Rescue Archaeology 1982/1983, pp. 1-3).

6. The internationally famous reptillian imprints at Moyeni (Quthing) are in grave danger from road activities. In addition, the site is completely unprotected from unsupervised visitors and is vulnerable to vandalism.

7. Paleontological deposits are found all along the SPR alignment, mostly in the mudstones and sandstones of the Elliot Formation.

E. Recommendations

Cost considerations have resulted in general abandonment of environmental defense as a major component of the SPR (except in the form of acceptable engineering practices during construction). Thus, there now exist possibilities for major landscape degredation, either as a result of construction operations or subsequently, from erosion of disturbed slopes and unprotected surfaces. In addition, expected increased traffic along the road will create additional opportunities for despoilation of archaeological, historical, and paleontological sites. Although costs constitute a severe constraint, some protective measures still are possible:

1. Conduct a survey (much was done for archaeological and paleontological sites) of actual road alignment and construction activitives to determine those areas that are especially vulnerable to erosion and degradation.

2. Stabilize exposed cuts and embankments with vegetation. Although no provision for such work presently exist in the construction contracts, there are opportunities for accomplishing this with "Food-for-Work" programs using Ministry of Works supervision under Title III.[1]

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[1] Since the SPR passes through areas where animals are uncontrolled, it would be a mistake to construct fragile terraces, or seed exposed cuts or slopes with edible grasses which would only attract grazing animals. Instead, hardy, inedible (but not deleterious) plants are recommended for slope stabilization.

3. Test and reconstruct if necessary the inadequately compacted embankments identified in the engineering report (Appendix I, p. 16).

4. Select borrow pits carefully with due attention to general visibility and proximity to historical and scenic areas, and follow excavation with appropriate treatement to ensure recovery and revegetation.

5. Protect the archaeological site at Bolahla during construction operations. Subsequently it should be fenced and guarded for protection against vandalism.

6. Protect and preserve the internationally famous reptile print site at Moyeni (Quthing). Extreme care during construction is essential to protect the exposed site from heavy equipment, blasting, and other such hazards of heavy road work. It has been recommended that the site be covered with a protective layer of soil during construction. Subsequently, the site should be protected against vandalism by adequate fencing, guards, and possibly shielding structures to ensure that this paleontologically and touristically valuable site is not degraded.

7. Protect other paleontological finds along the construction route as outlined in Battail, Palaeontological Reconnaissance.

Roads are showcases: the road itself and its immediate environs are under close scrutiny by all who pass by. In a country where erosion has often been declared the number one problem it seems questionable policy to neglect the many hazards of environmental degredation inherent in road construction and subsequent increase in traffic. The measures proposed here fall short of a comprehensive protection program. But they would help avoid some of the more common, and more obvious problems that could occur along the SPR.

XV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The recommendations included in each section of this report, and restated in abbreviated form in this section, clearly indicate specific points identified by the Evaluation Team that require attention or corrective action. Taken as a whole, the recommendations suggest four main categories of concern: engineering, management, erosion of standards, and general consideration of project concepts, effectiveness and benefits.

Engineering. Engineering discrepancies are of three general types: those that stem from flawed road design in relation to actual construction, discrepancies between contract requirements and actual construction, and application of improper engineering practices. A few of these, especially those associated with drainage structures, are specific and require immediate corrective action. Others are of a more general nature and have resulted in calls for further reviews in the Engineering Assessment. Engineering exceptions form the basis for substantial claims by the contractor and are of such a magnitude as to seriously threaten projected internal rates of return and thus, economic justification for the project. It is hoped that these specific problems will be resolved soon. But the overall problem of faulty design in relation to economically feasible construction will likely plague this project for some time to come.

Management. Many of the early problems encountered by the project concerned engineering management. The Evaluation Team is of the opinion that management issues continue as a potential threat to progress. Although some of the problems are residual from earlier stages, others are of more recent origin.

Another group of problems stem from inadequate communication between the contractors and SPRPA, MOW, and USAID. These could be solved in large part by more frequent scheduled contacts, site visits, and improved lines of responsibility and communication.

It appears to the Evaluation Team that the logical framework was not incorporated as an integral part of Project planning and development but instead, was relegated to a pro forma role. Project goals as solutions to specific problems are poorly stated. Verifiable indicators and beneficiaries often are only suggested, rather than being specifically identified. The logical framework potentially is a valuable tool for project planning and management. In this case it appears that this potential was largely lost.

Project Standards. In general, the Evaluation Team found that the proposed SPR had changed drastically from original concept to contract stage, generally in the direction of lower standards, and that this erosional process is still going on. Details are contained in the individual sections. But generally, it appears that original goals and standards were abandoned in the face of cost considerations and later as a result of poor management of design (Title I), construction, and supervision (Titles II and III). The original fault seems to lie in the rapidity with which this project was implemented. Although a sense of urgency undoubtedly accompanied the problems along the Transkei border with the RSA, it should have been apparent even under those circumstances that remedial action in the form of major road construction would take years to implement, and that careful, deliberate planning in the long run would prove to be the most expedient approach.

General Considerations. Finally, a number of recommendations deal with concerns for overall project concepts, realizing benefits, and avoiding undue environmental degredation. Many of these issues should have been explored in greater depth during the planning stages of this project. But again, the urgency with which this project was implemented precluded the sorts of exhaustive studies and analyses that normally would accompany an activity of this size.

It is the opinion of the Evaluation Team that the GOL was not properly equipped to manage and oversee a project of this magnitude, even with the assistance being provided by the Project Coordinator partially funded by A.I.D. As such, the "Host Country Contracting" approach, which the team finds to be a commendable policy, needs to be re-evaluated on an individual basis. This in the light of not overtaxing the absorptive capacity of the LDCs.

It should be noted from RIG/A Audit Report of March 18, 1983, "Perhaps the most significant results of the audit/investigation is the realization that due to the nature and wording of this host country contract, AID does not have an identifiable legal recourse, criminally or civilly, against Harris for violations committed by their employees on this project."[1]

Finally, the Evaluation Team feels that the Agency should consider the preparation of a case study on the history of the project. The review of the project disclosed numerous technical and managerial problems which have interacted upon one another in an unfolding series of complications. Complete documentation of the experiences related to the project should be made for subsequent in-house use by the Agency in subsequent planning and implementation.

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[1]It is RIG/A's understanding that most, if not all host country contracts have similar terminology.

An evaluation necessarily focusses upon deficiencies and discrepancies. But it is also important to note progress. In point of fact, on the Title II, the 38 km cut-off is approximately 60 percent complete, with rough grading completed for approximately 36 km. Repair of the Seaka Bridge is finished, and the new Quthing Bridge is about half done. In addition, more than two hundred Basotho technicians, inspectors skilled craftsmen, and administrative personnel have received on-the-job training.

On Title III, approximately 20 km of rough grading has been completed, with several hundred meters of culvert in place. The campsite is fully usable, equipment is at the site and operating, and a rock crusher is in place and producing.

A considerable amount of institutional strengthening already has been accomplished. Since the beginning of the project MOW has gained considerable skill and confidence in contractor management negotiations. Junior engineers and technicians have gained on-the-job training on a major road and construction project. In addition, GOL has developed skills in operating and managing the Project Authority. Thus, despite the many difficulties associated with a remote area, difficult terrain, and Project disruptions, an improved Southern Perimeter Road is in the process of becoming a reality. The Evaluation Team sincerely hopes that the problems noted in this report will soon be resolved so that the project can continue to move forward in an atmosphere of confidence and respect.

B. Recommendations

Review and analysis of the project by the Evaluation Team resulted in a series of findings and recommendations in the following nine areas:

V. Project Responsibilities

VI. Architect-Engineering Services and Responsibilities

VII. Construction Services and Responsibilities

IX. Training

X. Project Execution

XI. Maintenance

XII. Economic Analysis

XIII. Social Analysis

XIV. Environmental Analysis

Three of these sections: Architect-Engineering and Construction Services and Responsibilities (VI and VII) and Project Execution (X) are addressed in the appended Engineering Assessment. The balance are found in the main body of the report.

A synopsis of recommendations is presented here to facilitate review of this evaluation. As with the findings, the full recommendations are to be found in the main body of the report with the exception of those that relate to sections VI, VII, and X, which appear in the Engineering Assessment (Appendix I). Many of the recommendations contained in the Engineering Assessment are directed to the proposed follow-on Phase II evaluation of the SPR project, rather than to the action parties: GOL, MOW, USAID, or the contractors. For consistency, these have been separated into their appropriate categories. But since it is not always certain whether a particular recommendation pertains to the Phase II evaluation team or to an action party, all of the recommendations in the Engineering Assessment should be reviewed by all affected parties.

In addition, the USAID Mission/Maseru has produced a preliminary response to the Engineering Assessment which discusses some of its recommentations. This has been attached (Appendix III) for convenience and completeness. (Subsequent Roman Numerals refer to sections in major body of report.)

V. PROJECT RESPONSIBILITIES

1. Consider shifting SPR Project Authority from GOL to MOW.

2. Reassess assignment of full-time engineer to USAID Mission during absence of the Senior General Engineer.

3. Hold bi-weekly meetings between MOW Chief Roads Engineer, Title II contractor, and the Resident Engineer at the project site.

4. USAID conduct a detailed audit of current and anticipated Title III expenditures, establish systematic control measures.

5. Recruit a business manager for the construction camp at Mount Moorosi.

6. Establish communications between the construction camp at Mount Moorosi and MOW/Maseru.

7. Recruit a competent procurement specialist for Title III and establish guidelines and responsibilities for the position.

8. Prepare the long-range requirements of PVPS support for the project, and determine whether the organization is capable of fulfilling the requirements.

9. Periodically evaluate the performance and adequacy of PVPS support to Title III.

IX. TRAINING

1. Contractor should develop a detailed training program to include statement of goals, description of methodology, implementation schedule, specification or reporting procedures and evaluation mechanisms.

2. Coordinate training program with training section of Roads Branch, MOW.

3. Examine training policies in relation to innovative approaches being used elsewhere.

4. Consider eventual institutional transference between Title III and MOW. Responsibility for this should not be left with the contractor.

5. Reconsider likelihood of counterpart training.

6. Provide additional support for training in equipment maintenance and servicing.

7. Consider use of camp site as a training institution by GOL.

XI. MAINTENANCE

1. Establish liaison between the Road Training Officer and SPRPA Title III personnel in order to transfer expertise and facilitate integration of Title III achievements with MOW objectives.

2. Monitor development of MOW maintenance capability.

XII. ECONOMIC ANALYSIS

1. Conduct a baseline study that includes collection of general transportation and marketing data.

2. Revise current daily traffic counts and compare them to feasibility study projections.

3. Re-examine vehicle operating costs for Lesotho before the next project evaluation.

4. Review road maintenance costs before adoption of the new MOW costing system.

XIII. SOCIAL ANALYSIS

1. Clarify project goals and objectives.

2. Identify conditions and mechanisms for achieving project goals.

3. Conduct a socio-economic baseline study.

4. Establish a system for monitoring short- and long-term effects of the project.

5. Prepare for future evaluations.

6. Develop procedures for coordinating other projects, programs, and development activities.

7. Make maximum use of labor-intensive methods.

8. Use district-level planning for development in the SPR region.

XIV. ENVIRONMENTAL ANALYSIS

1. Conduct a survey of environmentally vulnerable areas along the actual road alignment.

2. Stabilize exposed cuts and embankments with vegetation using Title III, "Food-for-Work" and other appropriate programs.

3. Test and reconstruct if necessary inadequately compacted embankments.

4. Protect and preserve the valuable paleontological site at Moyeni (Quthing).

5. Protect archaeological and paleontological finds along the construction route as specified in the pertinent consultant reports.

6. Protect and preserve the archaeological site at Bolahla.

ENGINEERING ASSESSMENT: DIRECT RECOMMENDATIONS (numbers in parentheses refer to pages in original report)

General:

1. (p. 3) RIG/A and RIG/II audit and investigate Title I, II, and III.

2. (p. 3) USAID/Lesotho review contract files prior to Phase II evaluation.

Title I:

3. (p. 3) MOW and USAID locate quantity/cost back-up data prior to Phase II evaluation.

4. (p. 5) Determine whether actual drainage calculations exist to validate structures/pipes as purchased and constructed.

Title II:

5. (p. 9) Program RIG/A and RIG/II into further project reviews.

6. (p. 9) Review non-conformance to adopted design criteria.

7. (p. 9) MOW require maintenance of "as-built" drawings.

8. (p. 9) MOW/USAID/Lesotho require scheduled staff meetings between PRCH and NT, and PRCH and MOW, with USAID participation when appropriate.

9. (p. 9) Review NT's equipment fleet repair vs Title II needs vs NT future use.

10. (p. 9) MOW/USAID review PRCH claim-rebuttal data prior to negotiations.

11. (p. 9) MOW exert greater control over Title II operations.

12. (p. 11) Review lack of cost comparisons of alternatives to bridge and approach changes.

13. (p. 11) Obtain a file copy of PRCH professional insurance policy, and question the payment further.

14. (p. 11) Obtain a file copy of PRCH analysis and report covering borings at the bridge site.

15. (p. 11) Review necessity of revising Title I design.

16. (p. 11) NT submit updated progress schedules.

17. (p. 11) MOW and USAID/Lesotho consider project completion alternatives in relation to projected shortfall of funds.

Title III:

18. (p. 15) Review materials control and testing procedures.

19. (p. 15) Enforce NT design requirements.

20. (p. 15) MOW/USAID maintain closer control over all operations through more frequent site visits, on-site meetings to resolve issues, and enforcement of contract requirements.

21. (p. 15) Stress camp completion.

22. (p. 16) Analyze "turnkey" approach for design/construction for possible future programs.

23. (p. 16) All parties review MOW, USAID, and NT records, files, and as-built plans for completeness and inclusions.

24. (p. 16) Identify uncompacted embankments for testing, and reconstruction if required.

25. (p. 16) MOW/USAID engineers review entire Title III drainage program. Check in-place culverts against design requirements; check stock-piled sizes and physical properties against designs; review design data; and inspect field operations for adherence to proven practices and procedures.

26. (p. 16) Relocate the single-barrel culvert at Six Penny Crossing (approximately 26+500) back to natural stream channel with full consideration and of the II.C14, 15, 16, 17 and 18 discussions in this Engineering Assessment.

ENGINEERING ASSESSMENT: RECOMMENDATIONS SPECIFICALLY TO PHASE II EVALUATION

General:

1. (p. 3) Assemble Phase II Evaluation Team after baseline socio-economic data is generated.

2. (p. 3) Phase II Team follow table of contents developed in Phase I.

3. (p. 3) Phase II Team to consist of a civil engineer, transportation economist, social scientist, and environmentalist.

4. (p. 3) Allot one month for engineering input to Phase II, with additional two weeks for team leader.

Title I:

5. (p. 4) Compare design standards of the feasibility study, PP, PRCH contract standards, and those produced by PRCH under Title I.

6. (p. 4) Establish that approved modifications took place and if initial PRCH design followed design requirements previously approved.

7. (p. 5) Review PRCH's "Lower-standard" design for compliance with requested, local GS-3 standards.

8. (p. 5) Review payment for PRCH's second design.

Title II:

9. (p. 8) Expand Phase I review of PRCH Title I design sequence and results, and implications of the Title I product upon subsequent implementation problems of Title II.

10. (p. 9) Assess this highly sensitive project in greater-than-normal depth.

11. (p. 11) Evaluate judgement in selection and adequacy of alignment of PRCH Title I bridge design.

Title III:

12. (p. 15) Review NT staff for adequacy, and field operations for progress and quality.

13. (p. 15) Analyze implications of NT's inherited problems.

14. (p. 16) Review procurement and training procedures.

APPENDIX I

ENGINEERING ASSESSMENT

MEMORANDUM

TO: A. Ruiz P.E., Evaluation Team Leader

FROM: J.F. Smith P.E., Chief Engineer, REDSO/ESA

SUBJ: Evaluation: Project 690-0076, Southern Perimeter Road

DATE: 23 May 1983

1. The attached engineering assessment is self-explanatory in content and purpose. Its inclusion in the subject evaluation should be as previously discussed; i.e., intact, unaltered and in lieu of table-of-content breakdown. The latter, because of incompleteness, spawned by time constraints, and its nature (and intention) as a lead-in tool for Phase II evaluation use.

2. It is strongly recommended that the previously-adopted table-of-contents be retained since its extensive inclusions were purposely designed for both Phase I and Phase II use to ensure the necessary evaluation completeness. Incomplete or blank T of C sections, resulting from our Phase I evaluation, are normal for a two-phase effort and should not be deleted. Rather, such sections should be designated for Phase II completion.

3. It is requested that the attached engineering assessment not be altered without my concurrence and that any other engineering inclusions be coordinated with me before finalization.

JFS:CAR

Attachment

SOUTHERN PERIMETER ROAD
(690-0076)

PHASE I EVALUATION
TITLES I, II & III
(ENGINEERING REVIEW)

J.F. Smith, P.E.

I. GENERAL:

A. Justification/Background:

1. This review is generated from the writer's seconded position as engineering representative on a team assembled for the SPR evaluation. Its purpose, which will be more specifically identified in Section I.A.2, has genesis in the extraordinary circumstances surrounding the Project and collateral evaluation criteria.

2. Original concepts envisaged a one-month evaluation effort for the engineer with subsequent reduction to two weeks as an accommodation to his available time. Although no engineering scope-of-work has been defined, it was initially considered that Title II would receive primary attention, with Titles Nos. I and III occupying secondary positions of priority. The former had been completed in the not-too-recent past and the latter had been the subject of intensive scrutiny in late 1982 and early 1983. Such consideration was negated, however, by the initial Maseru-review of project scope and related conditions which were both unique and germane.

3. Preliminary team meetings established a fundamental precept which prescribed an intensive, in-depth evaluation based, in great part, upon the following general dictates:

a. The evaluation was described by Mission officials as being the first combined external evaluation of Titles Nos. I, II and III.

b. A total project cost (current) of $41.5M, of which $34M is U.S. dollar funded, demanded maximum effort due to the large grant involvement.

c. Previous, and thoroughly-investigated project distress, which culminated in the cancellation of one participant's contract, suggested strongly that the evaluation would receive wide-spread attention, and therefore, merited an all-inclusive approach.

105

d. Extensive overlapping of Titles I, II and III prevented isolation of one as an entity for evaluation, thereby creating a review scenario embracing all three.

4. From I.A.3 above, it was justifiably concluded that a conflict, involving available time vs work requirements, existed. Following a maximum extension of individual time schedules and reaffirmation of evaluation needs, the solution most nearly satisfying all parameters was adopted; i.e., a two-phase evaluation with the current team representing Phase I. It was recognized that such an approach would enhance engineering efforts primarily with somewhat lesser, but significant, benefit to economic input and relatively low, but potentially higher, impact upon socio-environmental review.

5. Accordingly, a table of contents was compiled which, due to its extensive inclusions, was adopted not only as the table of contents for a combined Phase I and Phase II evaluation report, but also as a detailed guideline/checklist for evaluators of both phases. This T of C drew from personal experience, the Agency's manual on evaluation, excerpts from similar evaluation reports, and awareness of problems/conditions unique to this project. It is, therefore, extensive but compatible with conditions established by I.A.3 above and is attached.

6. With T of C adoption, it was intended that carefuly-orchestrated, sectionalized writing would lead into Phase 2 completion of appropriate, incomplete or omitted sections with minimum back-tracking. This is still envisaged for all but the more detailed engineering input where varying amounts of investigative overlap must necessarily occur.

7. Through interviews, contract file and document review, and field investigation, each engineering or construction implication escalated to proportions which were no longer compatible with the reporting intent as cited immediately above in I.A.6; i.e., expansion by "Pandora's Box" concept precluded follow-up and subsequent reporting within available time frames, fragmented report writing was viewed as diluting the import of subject matter, and Phase II evaluation was predicted as possibly suffering a detrimental impact by having to excessively backtrack for clarification or further data accumulation.

8. As a means of maximizing Phase I effect and minimizing Phase II overlap and confusion, it was a team consensus that an alternate form of engineering/construction submittal was more appropriate for this initial evaluation phase. The selected option took the form of this report.

9. Note that recommendations, appearing throughout this review, are intended as a partial list for guidance only and are not intended as either a complete list or as constraint upon the Phase II evaluation team.

B. Purpose

1. Although Phase I evaluation efforts permitted some engineering conclusions and recommendations, it is believed that Phase II will provide greater opportunity for pragmatic appraisal. This is most evident from awareness that the Phase II team will be assembled with an adequate time frame commensurate with the in-depth demands of previously-cited evaluation considerations.

106

2. Equally, it is believed that Phase II efforts will be most effective through maximum coordination with Phase I results. Such an obvious conclusion, however, belies the difficulty surrounding actual data transfer. Since time constraints prevented more than a minimum-depth engineering approach, information gathered evolved into a wide-ranging, but fragmented, pattern. It becomes the purpose of this report, therefore, to transmit the contents of such a pattern in a manner which will accomplish the following:

a. Allow the Phase II team to continue the evaluation with minimum delay in assessing specific Phase I accomplishments.

b. Permit the Phase II team to readily isolate previous efforts related to document review, persons interviewed and other sources of information which led to stated conclusions and recommendations.

c. Identify major problem areas, both contractual and physical, and delineate status of evaluation efforts to date.

d. Underscore the need for an in-depth project appraisal through detailed completion of the previously-adopted, extensive table of contents.

3. Recommendations (General):

a. That the Phase II team be assembled following the generation of base-line economic data which is being discussed elsewhere in the Phase I report. Such timing will allow combined disciplines to complete the evaluation process. Team assembly is estimated as occurring 90-120 days (minimum) after the start of base-line data accumulation.

b. That the Phase II team continue the use of the T of C as developed in Phase I.

c. That the Phase II team be composed of:

i. Team Leader - Civil Engineer - David Gephart
ii. Transportation Economist
iii. Socio-Anthropologist Specialist (as required)
iv. Environmentalist (as required)

d. That the engineering input be programmed for a minimum of one month and, for the team leader, an additional two weeks be allowed for finalizing the report and review with Mission personnel.

e. That Titles I, II and III be the subject of audit and investigation by RIG/A and RIG/II respectively. Although both offices participated in a similar Title I exercize, following the PRCH contract cancellation, a follow-up including all three Titles is recommended on a schedule to be coordinated with USAID/Lesotho.

f. That USAID/Lesotho review contract files, prior to Phase II evaluations, for chronological inclusion of, but not necessarily limited to, the following:

107

i. PID
ii. PP
iii. RFP's and IFB's
iv. Scope of Work (all)
v. Contracts (all)
vi. Amendments (all)
vii. Reports (all)
viii. Correspondence (all incoming/outgoing including copies between non-Agency participants)
ix. Invoices
x. Previous evaluation reports
xi. Inserts giving location and nature of related classified material
xii. Other (including back-up data)

II. EVALUATION

A. Title I (Design)

1. The common denominator between Titles I, II, and III is the highway/drainage design effort required of PRCH in their Title I contract. This included, in part: highway/drainage design, contract document preparation, specifications for construction, and quantity/cost estimates. Although SOW details cite contractual obligations, it must also be accepted that there are fundamental operations, inherent to a given engineering exercise; i.e., survey to highway design, hydraulic/watershed calculations to drainage design, field alignment review to computerized design practice, quality control (testing) to construction implementation, documentation/calculation/approvals to design changes, quantity/cost revisions to any changes, etc.

2. Since many of the problems in Titles II and III, disclosed during the Phase I evaluation, were directly related to Title I contract execution, the absolute need for further Phase I examination was apparent.

3. PRCH's Title I contract required, in part, full highway/drainage design including quantity/cost estimates for the entire length of the project's approximate 247 km. from Mohale's Hoek to Qacha's Nek. The design was reportedly finished (although unseen by the Phase I team) but quantity/cost estimates were preliminary only. Since the design indicated a highway standard higher than desired, and since rough cost estimates implied a construction price (approximately $120M) vastly more expensive than available funds allowed, PRCH was paid for the work and their efforts scrapped.

4. Recommendations

a. That a comparison be made in the Phase II evaluation between the design standards recommended by the feasibility study, those envisaged by the PP, PRCH contract standards, and those produced by PRCH which resulted in the wasted exercise.

b. That the comparison, cited immediately above, establish what approved modifications took place, if any, and if the initial PRCH design followed design requirements previously approved.

c. That actual drainage calculation existence be determined to validate structures/pipes as purchased and constructed.

d. That quantity/cost back-up data be located to determine the extent and accuracy of submitted estimates.

5. PRCH was then requested to prepare a lower-standard design, by contract modification, and this led to the following:

a. A lower-standard design, including quantities and costs for "the cut-off" from Mount Moorosi to Mphaki (approximately 38 km.)

b. Approved PP revision.

c. Revised PRCH contract which gave birth to Titles II and III.

6. Title II was established with Nello Teer Inc. (NT) as the construction contractor (after a bid procedure not reviewed by the Phase I team), PRCH as the A&E for construction management and a design represented by II.A.5.a. above.

7. Title III was established as a force account operation, with PRCH as the supervisory group and no specific roadway/drainage design. The latter was to be developed by the PRCH/Title III group on a turn-key basis, ahead of construction, and incorporate previously-designed (See II.A.3 above) drainage features.

8. Recommendations

a. That PRCH's "lower-standard" design be reviewed in Phase II for compliance with the requested, local GS-3 standards.

b. That payment for PRCH's second design also be reviewed in conjunction with recommendations made in II.A.4 above.

c. That quantity/cost back-up data be located (if existing) by MOW/USAID, for Phase II review, relative to conditions which will be discussed under Titles II and II of this report.

9. Generally, it was concluded that, due to the unavoidable relationship between the design of Title I and implementation of Titles II and III, there should be heavy emphasis placed upon further review of PRCH's Title I contract and its product. Equally concluded, was that such emphasis might require further audit/investigation by RIG/A and RIG/II respectively as a follow-up to their earlier efforts.

B. Title II (Implementation)

1. Per the request, noted in II.A.5 above, PRCH completed a low-standard design covering the 38 km. cut-off from Mount Moorosi to Mphaki. There have been, however, major implementation issues which make design validity highly suspect.

2. On 17 May 1983, NT reported that 37.5% of the first 15 km. out of Mount Moorosi had required design-alignment relocation. PRCH verbally confirmed the extent of this realignment. Reasons for the changes, offered by both PRCH and NT with general agreement by MOW, reflect an intended reduction in rock excavations and improved alignment geometrics.

3. Collaterally, although alignment changes were intended to reduce rock excavation and although all parties agree that rockex would indeed have been higher by following the PRCH design alignment, actual rockex quantities have virtually doubled. Original PRCH estimates, which NT bid against, called for 129,000 CM. Projected quantities reflect a minimum of approximately 270,000 CM.

4. It is to be noted that in June 1982, invoices were presented for approximately 80,000 CM of rockex, or about 62% of the BOQ amount. This was an obvious indicator of things to come. In September 1982, the invoiced quantity was approximately 140,000 CM, or about 109% of BOQ amounts. Although the over-run might have been foreseen, no correspondence can be found which would have notified any participants of impending quantity/cost increases. There was, therefore, no opportunity for decision-making re funds or alternatives. Thus, although all parties were aware of the situation, no one had apparently taken official action prior to NT's claim for additional time and money.

5. Directives for alignment changes were issued to NT by PRCH. Since PRCH is the authorized professional representatives of MOW, this practice, per se, does not warrant criticism. Collateral implications, however, make the procedure questionable. The PRCH Resident Engineer advised the evaluation team that his limit of authority to make changes, without MOW approval, was $10,000. Since each of the realignment directives was issued without accompanying cost revisions, there was no control exercised over authorization maximums. Additionally, as alignment changes accumulated, so did rockex over-runs and associated cost increases. The evaluation team is aware that over-runs in rockex were initiated by incorrect PRCH Title I estimates. This does not, however, negate the apparent and repeated practice by PRCH (Title II) of exceeding their limit-of-change authority. Equally, it is concluded that MOW did not exercise adequate control of the A&E in monitoring the changes or the resulting cost/quantity implications. A further conclusion is that no accumulation of rockex totals were developed for over-run considerations, except those presented as invoice amounts by NT.

6. Complicating the extensive realignment situation is the realization that such revisions were found necessary on the <u>second</u> PRCH (Title I) design. The necessity of having to compensate PRCH for two Title I designs has already been questioned and the Title II necessity for extensive changes to the second design makes the initial PRCH effort even more suspect. The situation implies strongly that GA funds paid for something that either wasn't delivered or was faulty to the point of being partially unusable. This scenario is further complicated by being the target of claims for additional time and money by NT. These claims have been submitted as follows:

110

a. Claim No. 4: Rock excavation and type of construction methods imposed. M309,271 plus 10 days.

b. Claim No. 5: Price increases for blasting. M93,204.99 (no time increase).

c. Claim No. 6: Delay due to over-run of rock excavation. M762,551 plus 4.5 months.

d. Claim No. 7: Delay due to roadway realignment. M5,805,025 plus 6.16 months.

Certainly, the NT claims will be settled for a lesser amount by negotiation but any increase further reinforces the apparent inadequacy of PRCH's original design or the alignment changes or both.

7. A review of the original (second) design and field implementation also disclosed:

a. Title I rockex quantities were estimated has having an average of 5M overburden. This was reported by PRCH as having been determined from interpretation of actual subsurface investigation in the field and from induced seismic probes. Subsequently, during Title II implementation, the average overburden was found to be only about one meter (1 M). Although this error accounts for a large portion of the rockex over-run, field measurements suggest that, even with an overburden adjustment for depth, a rockex over-run of approximately 35-40% would still occur.

b. Realignment locations evidenced extensive rockex, and other works, prior to the decision for realignment. This was most apparent through the designed SW approach to the Quthing River Bridge where NT reported verbally to the evaluation team that an estimated 38,000 CM of rock had been removed before being abandoned in favor of a new location. Although contract rates vary between the approximate unit costs of $9.00 - $11.00 per CM, due to interpretations to exchange rates, expanded funds for abandoned work still total $342,000 - $418,000. Discounting contractor inflation in estimating quantities, considerable loss was apparently incurred. It is noted that PRCH and NT both cite an overall savings of approximately $200,000 by realigning the approach section but such a savings in no way voids the previously expended funds on an abandoned alignment. The evaluation team has concluded that proper Title I design practice should have recognized the alternate alignment prior to Title II contracting.

c. On-site inspection presented an opportunity to review actual field locations of the PRCH design vs realignment sections. In each case, the realighment appeared justified either due to reduced rockex or factors related to horizontal or vertical geometrics. Since the necessity for such changes was apparent, the team concluded that the design had been computerized and that, although PRCH (Title I) had employed ground reconnaissance during preliminary design stages, no such ground effort was made later, with the computer printout in hand. It is stressed, however, that this is a conclusion based upon experience and judgement, but unprovable.

d. The first Title I (PRCH) design criteria included a maximum 10% gradient which could be increased to 14% but not in lengths exceeding 200 M. The lower-standard, revised design, adopted for Title II, reflected GOL G-3 criteria which allows grades up to 14% for 1000 M. This adopted criteria, however, appears to have been exceeded in the vicinity of Km 16 (±) with a grade and distance estimated at 15% and 2 km respectively. Although provisions are being considered for escape roads, projected bus and truck traffic suggest an undesirable configuration.

8. Additional evaluation considerations resulted in the following:

a. Currently there are no "as-built" drawings which reflect implementation changes. PRCH states that these will be prepared.

b. There are no scheduled staff meetings between PRCH and NT or PRCH and MOW. Such meetings are ad hoc and sporadic.

c. Alignment changes were apparently of arbitrary selection without cost analysis of alternatives.

d. The NT contract completion date of August 1983 is now projected to early-mid 1984, coinciding with time-extension claims. The team suggests that such an extensive time-increase request might be influenced by NT's lack of other contracts.

9. It was stated that NT's construction equipment had experienced past heavy usage and might be excessive for the project. Additionally, interviews indicated extensive repair efforts. In view of NT's lack of work elsewhere, it must be speculated that NT may be using Title II as an equipment rehabilitation exercise. The obvious response is that Title II's lump-sum characteristics suggest such NT action only reflects a lower profit and is, therefore, of no evaluation interest. Conversely, however, if NT's price includes equipment rehabilitation for future works, it represents a funding consideration for Title II that is inappropriate and one to be avoided in the future.

10. NT claims were reviewed and discussed with NT, PRCH and USAID/Lesotho. Significantly, of the seven claims, four are directly related to PRCH's design, directives, or alledged non-actions. This suggests that PRCH must not only respond as the MOW's representative but also in defense of their operational role. NT's claim data is impressive in volume, but its appropriateness and relevance was indeterminable.

11. <u>Recommendations</u>

a. That the Phase II evaluation team expand the Phase I team's review of PRCH's Title I design sequence and results, and the implications of Title I product upon the subsequent implementation problems of Title II. An

112

expanded, in-depth review should encompass, in part, payments vs contract requirements, over-payments or payments for inappropriate/unusable products, ramifications of design inaccuracies regarding subsequent necessary charges and associated costs, quantity/cost over-runs vs original estimates, field-change procedures, documentation, et al.

b. That RIG/A and RIG/II be programmed into further project review relative to evaluation findings and USAID/Lesotho's scheduling.

c. That non-conformance to adopted design criteria be reviewed.

d. That MOW require "as-built" drawings to be immediately emphasized by PRCH and that they be maintained.

e. That MOW/USAID/Lesotho require scheduled staff meetings between PRCH and NT, PRCH and MOW, with Mission participation when appropriate.

f. That Phase II evaluation further address the lack of alternative comparisons by cost prior to realignments, or other change, selection.

g. That the subject of NT's equipment fleet repair vs Title II need vs future NT use be reviewed further.

h. That MOW/USAID-Lesotho carefully review PRCH's claim-rebuttal data, prior to negotiations, and pragmatically assess both the most applicable approach and settlement-potential goal.

i. That because of the "Pandora's Box" nature of Phase I evaluation review efforts, the Phase II team be guided by the need to assess, in greater-than-normal depth, this highly-sensitive project.

j. That MOW exert greater control over Title II operations. This may be in the form of more frequent field trips, greater demands for documentation and procedural conformance, increased participation in meetings, closer and more timely scrutiny of invoices/quantities/costs, and other means as required.

12. It was concluded that an assessment of Quthing River Bridge conditions warranted an isolated review. After the initial PRCH design, which was paid for in Title I, NT proposed a redesign at their (NT) expense. This was admittedly for their convenience and appropriate authorization was given for the NT submittal.

13. PRCH was contracted to review the NT redesign with payment to be made by NT. PRCH's initial fee request was for $37,500 and was later negotiated downward to $31,750, of which $15,000 was for professional insurance. Since A&E firms normally carry such insurance, PRCH was querried as to why an additional payment was required for this service. Their response cited a $250,000 deductable clause in their current insurance and the need for a $15,000 payment for that range of coverage. No response was received to the follow-up querry, "If you normally operate with a deductable insurance clause, why do you treat this situation differently since, in all cases, you are doing similar engineering reviews?"

113

14. Prior to redesign by NT, the originally-designed PRCH structure was laid out in the field. Subsequently, NT was authorized by PRCH to engage Matrolab Ltd., from Johannesburg, RSA, for bridge site borings.

15. The structure was designed for pre-stressed concrete beams, with a 40 M center span between piers and two 20 M spans between piers and abutments. Although local geology strongly implied underlying strata of unweathered sandstone or basaltic bedrock, the nature of the structure suggested a design-need for extensive and conclusive exploration of subsurface conditions.

16. Matrolab Ltd. was commissioned for only four borings, one each at two pier and two abutment locations. Although possibly an unnecessary pre-caution, it is felt that a minimum of two borings at each of the four locations would have been appropriate insurance against changes in subsurface conditions.

17. PRCH reported that: (a) cores were taken from each location and delivered to their site office; (b) the cores were then shipped to PRCH/NYC; (c) PRCH/NYC did the core analysis and subsequent design; and (d) Matrolab Ltd. provided no post-drilling service either in the form of analysis or reporting. There was no drilling/analysis report submitted by PRCH, as far as can be determined from interviews or file review.

18. The NT redesign was endorsed by PRCH, approved by MOW and implemented. Its location differed from the PRCH design to accommodate roadway realignment discussed earlier in this report section. This relocation involved a 10° rotation around abutment "B" (NE end) which remained fixed. The rotation was in a downstream direction with abutment "A" being repositioned by approximately 20 M and each of the two piers correspondingly lesser distances. Borings were not taken at the new abutment and pier locations but rather, design proceeded on the apparent assumption that there was no change in subsurface formation. Since considerable savings were envisaged at the time, the cost of new bridge borings might have been considered as insurance money, well-spent.

19. In conjunction with the above discussion on bridge-approach alignment changes, the following issues were raised regarding the PRCH Title I bridge design effort:

a. Why did the Title I design not recognize the eventual bridge relocation which resulted in savings, estimated by NT, of approximately $300,000? (NOTE: Neither interviews nor file review answered this question.)

b. Before adopting the new bridge location and approach realignment, was any cost analysis made of alternative solutions which might have salvaged work already accomplished? (NOTE: PRCH acknowledged during interviews that no such comparative analysis had been made.)

20. Claims, generated by NT and reflecting bridge revisions, were submitted in their claim No. 3 for M838,073.84 plus five months time extension. During the evaluation's brief review of claims and back-up data, as discussed in II.B.10 above, the bridge claim was included with those pertaining to the roadway. Comments contained in that paragraph are, therefore, applicable to NT's bridge claim.

21. NT reported a projected shortfall of funds approaching $1.25M. PRCH could not confirm this amount.

22. Recommendations

a. That a further Phase II evaluation review be made regarding judgement in selection, and adequacy of alignment, of the PRCH Title I bridge design.

b. That the issue of having no cost comparison of alternatives prior to bridge and approach change adoption receive further review.

c. That a copy of PRCH's professional insurance policy be a part of the contract file, since payment of a premium was justified by its inclusion; additionally, that the payment itself be questioned further since services performed by PRCH were those normally performed under such coverage, including the deductable consideration.

d. That the PRCH analysis and report, covering borings at the bridge site, be obtained for the contract file.

e. That the necessity of revising the Title I design be reviewed. (Why did Title I design not recognize both the realignment potential and a lesser-cost structure as proposed by NT?)

f. That updated progress schedules be submitted by NT and that revised schedules be required as any change in rate-of-progress indicates.

g. That early consideration be given by MOW and USAID/Lesotho to project-completion alternatives considering the projected shortfall of funds.

C. Title III (Force Account)

1. By contract amendment, the original PRCH contract was expanded to include construction management/supervision over a force-account implementation program.

2. Following the cancellation of PRCH's Title III contract in mid-1982, an interim management team from MOW was on site until the arrival of NT personnel on 1 January 1983. NT, by contract, had, therefore, become the construction contractor on Title II and the management/supervisory authority on Title III. Phase I evaluation efforts attempted to focus upon appropriate facets with consideration given to the relatively-short NT presence and the dead issue of PRCH departure. The intricacies of overlapping responsibilities (PRCH and NT), inherited problems, and the unavoidable connection between Titles I and III made it impossible to isolate either Titles or the participants.

3. Under Title I, the first (high-standard) PRCH design began at Mohale's Hoek and covered approximately 247 Km to Qacha's Nek. When this design was considered both too high-standard and too expensive, the total project was fragmented into four sections with three different design/implementation concepts:

115

a. Mohale's Hoek - Quthing (58 Km). In order to reduce total costs, this section was deleted from the project but retained the first (high-standard) PRCH Title I design for construction, which was envisaged in conjunction with another donor).

b. Quthing - Mount Moorosi (44 Km). This section became one of the two Title III, force-account construction sections. PRCH and later NT, were contracted for management/supervision services and were to produce highway designs as part of a turnkey operation. Drainage design was to be taken from the first, high-standard design, produced by PRCH in Title I.

c. Mount Moorosi - Mphaki (38 Km). NT was contracted for construction of this section with PRCH assuming the role (by contract) of management/inspection). This was the only Title II portion of the project.

d. Mphaki - Qacha's Nek (107 Km). This was the second of two Title III sections and was included in the force-account/PRCH-NT management scheme discussed in II.C.3.b above.

4. No PRCH design for Title III could be found through file/plan review. Subsequently, MOW and USAID/Lesotho confirmed that PRCH had not completed any design for Title III and such failure was one factor considered in their contract termination.

5. During the PRCH period, Kms 22-37 (approximate) were rough-graded with no design. The MOW, while acting as interim managers, produced a design for this section which was inherited by NT who, in turn, are reportedly working on a design for the balance of Title III. The evaluation team did not, however, find any evidence of such NT effort.

6. Although NT has been in-country since 1 January 1983, no special effort was made to assess their operational performance to date. Start-up time and delays attributable to a change in management firms, combined to allow only a brief construction period prior to this Phase I evaluation. It is felt to be more appropriate that the Phase II team examine NT's Title III performance. Currently, the NT expatriate staff includes: Project Superintendent (Manager), Project Engineer, Project Financial Manager, Equipment Superintendent, Maintenance Superintendent, Quarry Superintendent.

7. Title III camp facilities, which were to have been completed under PRCH, are still incomplete although NT claims continuing efforts. During the evaluation, it was noted that Title III expatriates are, at least in part, being housed and messed at the Title II camp. This suggests a review of accounting procedures since both Titles, and their respective contracts, are intended as separate entities. Additionally, the incomplete status of plumbing and electric facilities in particular, and housing in general, suggests that the M400,000 (approximate), spent to date, might have been more carefully managed. This was reviewed with the NT financial manager but the complexities of having both GOL and AID accounts combined with two administrators (PRCH and NT), led to the conclusion that this issue would be better served if handled by others.

8. Title III design procedures, involving a turnkey approach have been accepted by all parties as providing a low-cost acceptable solution. It is questioned, however, why the apparently, more expensive contractor/A&E concept has been promoted for Title II. This rationale should be reviewed in light of the projected funding shortfall.

9. The engineering evaluation briefly touched upon the areas of procurement, maintenance and training. Time constraints and the expertise of other team members, suggested that procurement and training be reviewed by others. These will, therefore, be discussed elsewhere in the report. Maintenance (training, capability, operations) requires an in-depth review on a schedule which provides adequate time, and a field operation, sufficiently advanced to allow fair assessment. Although covered briefly elsewhere in the Phase I report, a thorough review is warranted by the Phase II team.

10. Records of site meetings were requested from NT and none were available. Subsequently, records of February and April meetings, held at MOW/Maseru were found in USAID files. The team concluded that operational/management problems might be relieved if MOW increased the frequency of site visits and established a schedule for formal (as opposed to ad hoc) meetings on site.

11. Title III construction deficiencies were given a low priority due to combined time constraints and the belief that NT should have adequate (more) time to become operationally effective and straighten out their inheritance. Additionally, past internal reviews by REDSO/ESA and Mission personnel during the PRCH contract-cancellation phase, and collateral audit/investigation by RIG/A and RIG/II respectively, were felt to be sufficient pending the arrival of a team for Phase II evaluations.

12. It was found, however, that extensive embankment construction had occurred without benefit of adequate compaction and testing. NT claimed to be aware of this condition and the areas involved, and cited their intention to take appropriate measures.

13. A review of project drainage was necessarily restricted to field operations since no design data was available. As discussed earlier in this report, drainage for Title III was intended to be as included in the original Title I, high-standard design. Spot checks were made during the time available, and no major deviations from planned pipe sizes were noted. Since the team received NT reports that cited procurement errors by the previous PRCH management team, however, Phase II evaluation procedures should include a detailed plan-in-hand review of drainage facilities in place and a review of stockpiled pipe.

14. Particular attention was focused upon NT construction practices as are currently being applied to drainage installations. There were found to be instances of creating artificial channels rather than using the original, combining two channels into one, and elevating entire culverts above and adjacent to the normal channel. Additionally, there were instances where pipes were laid upon fill sections which ranged from one to five meters in depth. It is recognized that there must occasionally be innovative measures taken to satisfy specific, and unusual, conditions but it appears that NT may

117

have violated good and proven drainage practices with their construction methods. It is also recognized that there may be extenuating circumstances, which were not revealed, related to PRCH design/procurement, which influenced NT's operation. The entire drainage program for Title III should be the subject of an in-depth review by the Phase II team.

15. Of particular interest was the placement of a single-barrel, structural-plate, CMP arch at Six Penny Crossing, station 26+500 (±). This pipe measures 4.46M along its greatest horizontal axis, 3.67M through its longest vertical axis, and has been placed on fill, approximately 5M above the existing stream channel and approximately 25-30 meters to the side of that channel! The current embankment section effectively serves as a dam with major up-stream ponding occuring. NT plans on filling behind the dam with approximately 10,000 CM of material and, in doing so, create an artificial channel between that embankment and in-situ formations. This methodology will also require filling the newly-created channel bottom with an estimated 2M (deep) of fill at the culvert invert and day-lighting in the existing channel, approximately 70-100M upstream. Extensive scouring must be anticipated at both inverts and in the artificial channel. The result can only result in serious and continual problems for culvert and embankment (roadway) maintenance. Original design placed the pipe in the original channel and, with its relocation, virtually all axioms of drainage design have been broken.

16. During the NT interviews, the Six Penny Culvert installation was questioned. It was explained by NT that PRCH had ordered incorrect quantities of pipe sections and relocation, as described immediately above, to a higher point in the embankment was necessary to make the reduced pipe length fit the narrower fill section. Interviews also established that additional structural plate sections could be delivered from RSA in 2-4 weeks. It was an apparent NT decision to relocate the pipe, as described, rather than order more sections and make the more desirable installation. For evaluation purposes, this must be regarded as an NT error of judgement which compounded the initial PRCH procurement error.

17. This evaluation is dwelling at great length upon the Six Penny Crossing problems because of their significance and wide-ranging implications. It will be an evaluation recommendation to reposition the culvert back to its intended, and correct, location in the natural stream channel. This will now involve extensive effort, some delay and a cost factor. Delays will be negligible for the project over-all, but may effect culvert completion by several weeks. There will certainly be cost implications to be resolved with NT and arguments can be generated by both sides regarding responsibility. Regardless, the relocation is considered vital for adequate drainage and minimizing future maintenance.

18. If MOW/USAID endorse the recommendation to relocate the Six Penny Culvert, other factors are recommended for consideration prior to making the move.

118

a. Pipe-arch configurations are usually selected where headroom is limited and where a hydraulic advantage at low-flow is desired. The Six Penny Crossing, however, is in an area where high-volume and high-rate-of-flow values are suggested. This does not negate the use of a pipe-arch under such conditions but does imply a need to review the appropriateness of its choice and inherent trade-offs.

b. Under the imposed load of such fill depths as may be encountered above the natural channel, any CMP must be capable of withstanding differential settlements and dynamic shocks without failure. Unless specific conditions dictate otherwise, a full-round section is preferable under high fills, rather than the pipe-arch configuration. This general axiom stems from special design problems for pipe-arches not found in round or vertically-elongated pipes; i.e., pipe-arches generate corner pressures greater than fill pressures and these become the practical limiting design-factors, rather than stress in the pipe wall.

c. It was noted that, in its present location, no camber was allowed for settlement. Since embankments exert greater loads at the center of the fill than at the toe-of-slope, such camber is vital under higher fills. Equally, proper "bedding" in stable, but relatively-yielding material, is recommended.

d. In the absence of design data, and considering size of conduit, depth of fill, pipe-arch configuration, etc., a competent review should be made of the physical properties of the pipe-arch currently on site. If structural plate and its corrugation size have not been carefully selected for prevailing conditions, none of the previously-cited practices will prevent ultimate failure.

19. Recommendations

a. That the Phase II evaluation team review the NT staff for adequacy, and field operations for progress and quality.

b. That an in-depth review be made of materials control and testing procedures/frequency.

c. That NT's design requirement be enforced.

d. That MOW/USAID maintain closer control over all operations through more frequent site visits, more on-site meetings to resolve issues, and enforcement of contract requirements.

e. That the Phase II evaluation team review the NT contract for adequacy and compliance.

f. That implications of NT's inherited problems be analyzed in the Phase II evaluation and, for future reference, "cause and effect" conclusions be documented.

g. That camp completion be stressed.

h. That the "turnkey" approach for design/construction, currently being used on Title III, be closely analyzed for possible future, similar programs.

i. That a thorough review of procurement and training procedures be made in Phase II.

j. That MOW, USAID, NT records, files and as-built plans be reviewed by all parties for completeness of inclusions. This should be followed by a Phase II evaluation review.

k. That uncompacted embankments be identified for testing and reconstruction if required.

l. That the entire Title III drainage program be reviewed by MOW/USAID engineers. In-place culverts should be checked against design requirements; stockpiled sizes and physical properties should be checked against designs; design data should be reviewed if available; and field operations should be closely inspected for adherence to proven practices and procedures.

m. That the single-barrel culvert at approximately 26+500 (Six Penny Crossing) be relocated back to the natural stream channel with full consideration being made of the II.C.14, 15, 16, 17 and 18 discussions.

III. EPILOGUE:

A. Comments:

1. It is recognized that the complexities of planning, designing and executing a project of such magnitude, under difficult conditions may unavoidably include errors along the way. Such realistic cognizance should reinforce the "lessons learned" and "future considerations" conclusions in no way, condone poor contract compliance or errors of judgement by those whose areas of expertise have been engaged at high cost.

2. Unquestionably, the attention, previously generated by this project, will be remembered since drastic, unfavorable actions are more often recalled than relatively smooth operations. For this reason, and in the professional spirit of objective evaluation, all facets of the three Titles should be given thorough consideration when measuring overall project impact upon future programs and their methods of execution.

3. Accordingly, this engineering assessment must be accepted in its intended, and unavoidable light, and not as a full messianic outlet from some technical wilderness; i.e., time constraints and the absolute belief that circumstances, surrounding the project and its evaluation, dictate a full-depth approach which can only be accomplished by continuing the evaluation through second phase efforts. In that light, this Phase I submittal (engineering assessment) represents the first of two investigative periods and is the lead-in, or preliminary, tool to be used in Phase II.

APPENDIX II

PROVISIONAL TABLE OF CONTENTS/GUIDELINES FOR EVALUATION

TABLE OF CONTENTS

FORWARD AND ACKNOWLEDGEMENTS

GLOSSARY OF ACRONYMS

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

A. Narrative
B. Conclusions
C. Recommendations

II. INTRODUCTION

A. Evaluation Team
B. Evaluation Plan
C. Genesis of Project
D. Goals
E. Interviews and Persons Contacted
F. Description of Project:

1. Title I
2. Title II
3. Title III

III. CHRONOLOGICAL HISTORY

A. Feasibility Study
B. PID
C. PP
D. AID Authorization
E. Pro-Ag
F. Contracts and Amendments

IV. USAID PROJECT FILE REVIEW AND MANAGEMENT RESPONSIBILITIES

A. Title I
B. Title II
C. Title III
D. Invoices
E. Recommendations

V. GOL RESPONSIBILITIES

A. Contracting
B. Administration
C. Invoices
D. Inspection and Testing
E. Force Account Operations and Personnel
F. Other
G. Recommendations

VI. ARCHITECT-ENGINEER SERVICE AND RESPONSIBILITIES

A. Feasibility Study
B. Title I
C. Title II
D. Title III
E. Recommendations

VII. CONSTRUCTION SERVICES AND RESPONSIBILITIES

A. Title II
B. Title III
C. Recommendations

VIII. PROJECT SUPPORT: (Titles I, II and III)

A. USAID/Lesotho
B. GOL
C. A&E
D. Construction Contractor
E. Recommendations

IX. PROJECT OBJECTIVES, RESOURCES AND IMPLEMENTATION

A. Project Objectives

1. Original and Time Frame
2. Revised and Time Frame

B. Project Inputs

1. Original Resource Proposals
2. Actual Contributions and Timing

C. Implementation Plan

1. Per PP
2. Per Grant Agreement
3. Actual
4. Chronology
5. Completion Date

D. Changes in Project Setting:

1. Host Country (or U.S.) Development Policies and Priorities
2. Nature and Size of Problems Addressed
3. Physical and Environmental Conditions
4. Economics Demand, Competitiveness, Cost (e.g., oil prices)
5. Attitudes and Other Social Variables
6. Institutional Capacity to Implement the Project
7. Other

E. Recommendations

123

X. PROJECT COSTS AND PROGRESS (For Each Title)

A. Anticipated Costs
B. Actual Costs
C. Programmed Progress
D. Actual Progress
E. Current Status
F. Claims

1. Actual
2. Settled

G. Projected Costs
H. Project Progress
I. Recommendations

XI. TECHNICAL ASSISTANCE AND TRAINING

A. Planned in PID
B. Planned in PP
C. Required in Grant Agreement
D. Actual
E. Recommendations

XII. REALISM OF ORIGINAL PROJECT PLAN

A. As Defined in PP
B. As Defined in Grant Agreement
C. As Contracted (Titles I, II and III)
D. Required Design (Title I)
E. Schedule
F. Funding
G. Quantity of Work (Titles I, II and III)
H. Equipment Mix and Projections (Title III)
I. Anticipated Work Quality
J. Recommendations

XIII. ANALYSIS OF PROJECT EXECUTION (Title I)

A. Procurement

1. Plans at Inception

a. Services
b. Commodities
c. Facilities
d. Target Dates for Delivery

2. Actual Procurement Performance

a. Sources of Supply (services)
b. Sources of Supply (commodities)
c. Methods
d. Delivery

(1) Actual
(2) Expected
(3) Normal

124

3. Materials Management

   a. Supplies
   b. Materials
   c. Storage
   d. Inventory
   e. Control

B. Technical Assistance and Training

   1. Planned
   2. Actual
   3. Results

C. Surveys and Design

   1. As Prescribed in PP
   2. As Indicated in Grant Agreement
   3. As Contained in A&E Contract
   4. Criteria/Parameters
   5. As Executed by A&E
   6. Constraints
   7. Adequacy as Executed by A&E
   8. Accuracy of A&E BOQ
   9. Accuracy of A&E Cost Estimates
   10. Cost and Quantity (A&E) Comparison to PP
   11. Schedule (Planned vs Actual)
   12. Monitoring

      a. GOL
      b. USAID
      c. In-House

D. Construction (Delete for Title I)

   1. Basis for Capital/Labor Mix
   2. Appropriateness of Equipment Mix to Field Conditions

      a. Earthwork
      b. Drainage
      c. Major Structures
      d. Other Structures

   3. Construction Supervision

      a. Quality
      b. Sufficient
      c. Timeliness
      d. Monitoring: GOL/USAID/In-House

   4. Production Rates

      a. Operational Progress
      b. Overall Progress
      c. Equipment Effectiveness

125

5. Quality

   a. Testing Requirements (by operation)
   b. Testing actual
   c. Overall

6. Conformance with Design

   a. Specific
   b. General

E. Maintenance

1. Planned in PP (Delete in Title I)
2. Specified in Grant Agreement
3. Actual Capability
4. Progress

F. Failures

1. Contractual (Type and Course)
2. Design Survey (Type and Course)
3. Construction (Type and Course)
4. Administration (Type and Course)
5. Supervisory (Type and Course)
6. Other (Type and Course)

G. Contract

1. Requirements
2. As Executed
3. General Compliance vs Non-Compliance

H. Personnel

1. As Required by Contract
2. Competency
3. Sufficient Numbers
4. Qualified
5. Timeliness of Arrival
6. Duration of Stay

I. Payments

1. Approvals (GOL A&E/USAID)
2. Reviews
3. Contract Requirements
4. Back-up Date
5. Accuracy
6. Timeliness of Submittal
7. Timeliness of Payment
8. Audit

126

J. A&E/Contractor Performance

1. Schedule
2. Furnishing Personnel
3. Furnishing Plant
4. Execution of Works
5. Quality of Personnel
6. Quality of Work
7. Design/Testing
8. Accuracy
9. Other

K. Support (Required/Planned vs Actual)

1. GOL
2. USAID
3. A&E
4. Contractor

L. Progress

1. As Planned in PP
2. As Scheduled in Contract
3. Actual
4. Causes for Delays
5. Justification of Delays
6. Cost/Other Delay Implications
7. Monitoring

   a. Gol
   b. USAID
   c. In-House

M. Issues and Problems

1. Procurement
2. Technical Assistance
3. Design and Surveys
4. Construction
5. Maintenance
6. Failures
7. Contract
8. Personnel
9. Payments
10. A&E/Contractor Performance
11. Support
12. Progress
13. Administration

N. Conclusions and Recommendations

1. Conclusions
2. Recommendations

127

XIV. ANALYSIS OF PROJECT EXECUTION: (TITLE II)

(Repeat XIII with following modification)

Delete -"Contract" and, in lieu of, add:

Contract (A&E)

1. Requirements
2. As Executed
3. General Compliance vs Non-Compliance

Contract (Construction Contractor)

1. Requirements
2. As Executed
3. General Compliance vs Non-Compliance

XV. ANALYSIS OF PROJECT EXECUTION: (TITLE III)

(Repeat of XIV with following modifications)

Add after "A&E/Contractor Performance",

GoI Participation

1. As Specified in PP
2. As Required in GA
3. Actual
4. Satisfactory

XVI. PROJECT ADMINISTRATION (Titles I, II & III)

A. Conditions Precedent

1. Citation of Conditions Precedent
2. Record of Fulfillment of Conditions Precedent and Effect Upon Project Execution
3. Assistance to Grantee in Meeting Conditions Precedent

B. Financial Management

1. Realism of Original Budget and Causes of Cost Overruns
2. Total of Cost Overruns
3. Adequacy of Controls
4. Method of Payment
5. Availability of Local Currency and Foreign Exchange as Needed

C. Operations Management

1. General; Lines of Authority for Management and Operational Decisions; Personnel Adequacy

   a. GOL (Original; Subsequent)
   b. A&E/Contractor
   c. USAID
   d. Logistic Support

2. Communication
3. Reporting System

   a. Progress
   b. Operational Reports
   c. Quality Control Reports
   d. Other

D. Project Monitoring and Evaluation

   1. Prescribed
   2. Actual

E. Environmental Assessment

XVII. REVIEW OF TITLES I, II & III ANALYSIS

A. Title I

   1. Findings (Field, Design, Contract, Adm, USAID, GOL, etc.)
   2. Constraints
   3. Realism of Requirements
   4. Major Problems
   5. Unexpected Effects
   6. Conclusions

B. Title II

   1. Findings (Field, Design, Contract, Adm, USAID, GOL, etc.)
   2. Constraints
   3. Realism of Requirements
   4. Major Problems
   5. Unexpected Effects
   6. Conclusions

C. Title III

   1. Findings (Field, Design, Contract, Adm, USAID, GOL, etc.)
   2. Constraints
   3. Realism of Requirements
   4. Major Problems
   5. Unexpected Effects
   6. Conclusions

XVIII. ECONOMIC ANALYSIS

(Table of Contents to be inserted when furnished by P. Moeller)

XIX. SOCIAL ANALYSIS

(Table of Contents to be inserted when furnished by G. Wilken)

XX. ENVIRONMENTAL ASSESSMENT

(Table of Contents to be inserted when furnished by Wilkens/Ruiz)

XXI. FUTURE CONSIDERATION & LESSONS LEARNED

A. Future Considerations

1. PP Inclusions
2. GA Requirements
3. H/C Contract Clauses
4. A&E Contract Inclusions
5. Contractor Contract Inclusions
6. GOL Participation
7. USAID Participation
8. Other Changes: Management

   a. Administration
   b. Financial
   c. Facilities
   d. Monitoring
   e. T/A
   f. Planning
   g. Maintenance
   h. Meetings/Liaison
   i. Reports/Records

B. Lessons Learned

1. PP Intensions
2. GA Omissions/Other
3. Contracts: H/C

   a. A&E
   b. Contractor

4. GOL Capability
5. GOL Participation
6. USAID Participation
7. Monitoring
8. Other

   a. Administration
   b. Financial
   c. Facilities
   d. Monitoring
   e. T/A
   f. Planning
   g. Maintenance
   h. Meetings/Liaison
   i. Reports/Records

XXII. CONCLUSIONS AND RECOMMENDATIONS (TITLE I)

A. Conclusions
B. Recommendations

XXIII. CONCLUSIONS AND RECOMMENDATIONS (TITLE II)

A. Conclusions
B. Recommendations

XXIV. CONCLUSIONS AND RECOMMENDATIONS (TITLE III)

A. Conclusions
B. Recommendations

XXV. ANNEXES

Maps
Figures
Tables
PP
GA
Tables of Organization (all participants)
Correspondence and Documentation
Progress Schedules (Planned and Actual)
Economic Data/Tables, etc.
Socio Data/Tables, etc.
Environmental Data/Tables, etc.
Cost Increase vs Time Charts
Quantity Increase Chargs

APPENDIX III

USAID MISSION DIRECTOR's MEMORANDUM: ENGINEERING ASSESSMENT

June 1, 1983

TO: Al Ruiz, Team Leader, SPR Evaluation

FROM: Edna A. Boorady, Director

SUBJ: J.F. Smith Evaluation Memo of 22 May 1983

1. Attached for inclusion as an appendix in the SPR evaluation report is a memo providing additional data and clarifying remarks to the subject memo.

2. Prior to inclusion of the subject memo in your report you are requested to delete the last two sentences of paragraph 10 on page 8 as inappropriate for an evaluation report and may be prejudicial to the interest of the GOL and the U.S.

133

TO: Al Ruiz, Team Leader, SPR Evaluation

THRU: E.A. Boorady, Director

FROM: FAZobrist, Chief Engineer

DATE: June 1, 1983

SUBJ: Mission Comments Regarding J.F. Smith Evaluation Memorandum of 23 May 1983

1. Background

Mission comments on the subject memorandum are provided to amplify and in some cases clarify the evaluators work while respecting his request of not altering his assessment.

This Mission regrets that more time could not be made available by REDSO/ESA for the participation of the REDSO/ESA engineer. Because of this he did not have the opportunity to review all files and records or even meet with many of the parties most knowledgeable on the project. The other team members however were able to continue their work for approximately 1½ weeks after his departure and prepared the final evaluation report.

2. The following specific comments are keyed to the related paragraph of the Smith Memorandum.

PARAGRAPH I-B-3

Subparagraphs a thru d are noted and will be considered as appropriate.

In regard to subparagraph e, in mid 1982 USAID asked that an audit and investigation be made by RIG/A and RIG/II respectively. Their results were presented in considerable detail in Audit Report No. 3-632-83-11 dated March 18, 1983, titled "Poor Contractor Performance Has Hindered the Construction of Lesotho's Southern Perimeter Road." This report encompassed all three project

titles however because of the nature of the problems being experienced at that time, their final recommendations focused on the Title III activities. However, the discussion and background analysis covered Title I and II.

The Mission would welcome further RIB/A and RIG/II review if that office felt such was warranted. A detailed accounting audit would be appropriate and if undertaken should include PRC Harris home office records. Improper billing procedures by Harris have been noted to be a continual problem by the MOW.

As a point of clarification of subparagraph f, it is noted that official contract files are maintained by the GOL as contracting officer on all PRC Harris and Nello Teer Contracts. Any future evaluation team should consider reviewing the official files in regard to the questions raised. However, USAID project management files are complete containing all documents listed except the original Berger contract for the feasibility study conducted in 1978. The contracting officer was the REDSO/ESA Contracts Service Office with the Contract No. USAID-632-002. This contract and supporting documentation were issued prior to the establishment of USAID/Lesotho. A list of pertinent Mission documents is attached.

B. II. Evaluation, A, Title I Design

Paragraph II-A - 1 to 3

The history of the Title I design is complicated and could provide an excellent case study. However such a study should involve the contractual and management process. For example the host country contracting approach versus direct contracting, Mission and Host Country management and technical capabilities, and the ability of American consultants to work effectively in developing countries are all general points of interest that may be worth reviewing from the overall AID perspective as these are issues common to any project of this nature.

135

Equally important is the issue of contract type; for example the Fixed Rate versus the Reimbursable plus Fixed Fee. Both contract types have been employed in this project and can be compared as to effectiveness and cost efficiency.

In regard to further evaluation and case studies a Memo dated 14 November 1980 written by Zobrist for USAID, subject: A Case for Poor Performance by PRC Harris in Completing the Design Contract for the Lesotho Southern Perimeter Road, spells out Harris design history and suggests possible contractual default. At that time, this memo was reviewed by the RLA and the GC with the verbal conclusion that AID had no legal recourse (and therefore no interest) in pursuing any recovery. Also if a case study approach were used, two other examples including the SPR by Zobrist could be helpful. These were published in 1980 in the Engineering Newsletter (AID/W) and titled Cost Plus Fixed Fee versus a Fixed Price Contract Approach and Cost Over-runs; A Review of Three Project Histories.

We also point out that considerable analyses of Title I in regard to engineering and contractual matters has already been done, with detailed documentation in the Mission files. A team of AID/W, REDSO/ESA and the RLA worked with the Mission at various times in 1980 to resolve what at that time was a major cost over-run. Included were the Director, Deputy Director and Chief Engineer of REDSO as well as the Chief Engineer of the Africa Bureau. Harris work for the most part was shelved, however, package B (Mohale's Hoek to Quthing) remains presumably useable. Pieces of Package A (Quthing to Qacha's Nek) were salvaged. The quality of this salvaged work however in some cases could be challenged.

PARAGRAPH II-A-4

Recommendation a, concerning a comparison of the design standards, was done in the Project Paper Amendment. Contractually and in the PP intensive design criteria were never provided but left to the discretion of the designer. (However, it is noted that current design criteria is less than that envisaged by the PP - Gravel 3 vs Gravel 1). As noted in Recommendation b, all modifications made by PRC Harris, were approved by the Contracting Officer, the MOW. Negotiation records closing out Title I detail this fact where some $48,000 was deleted from Harris billings as being outside of the contract provisions. Of course further evaluation or audit could uncover a missed point.

In regard to Recommendation c, actual drainage calculations do exist. However this work can only be used as a base or more appropriately as a reference for adjusting to current standards. The MOW issued Design Guidelines and Standard Specifications for the Title III work during the period when they were interim managers. Both of these documents fully address the drainage requirements and standards and are the current guidelines in effect and in use by the current Title III management. Some concern may exist over earlier purchased pipe based on the old standard which was generally higher. However because of the assortment of sizes and the need for additional purchases the current management has full flexibility to fit available pipe sizes to actual needs based on current criteria.

Recommendation d could prove an interesting exercise, if meaning comparing historical Harris submittals to actual results. The record is clear that in many cases great discrepancies occur.

PARAGRAPH II-A-7

The statement that no specific roadway/drainage design was established needs some clarification. The force account (project authority) concept was established to upgrade and rehabilitate existing roadway. Advance plans and

specifications are not a requirement except where specific realignment may be required to meet design criteria. However, design standards were provided as well as an engineering capability within the project authority team. The engineering function is primarily one of quality control assuring vertical and horizontal alignment criteria are met, material standards are met and that drainage is within the established criteria. Previous Title I drainage design or other features are not to be incorporated unless specifically meeting the criteria and concept of the project authority.

PARAGRAPH II-A-8

Points made earlier again generally provide additional background on these recommendations.

PARAGRAPH II-A-9

The evaluation over-emphasizes the relationship between Title I and Title III. Title III currently has little relationship to actual results accomplished in Title I. Usable Title I results would be limited to some drainage work, a very rought estimate of material quantities based on a computer analysis and the possible adaptation of some R-4 work in realignment areas. The existing Title III team or concept does not include incorporating the results of Title I. Previous discussion regarding RIG/A and RIG/II would also apply regarding this comment.

PARAGRAPH II-B-4

This paragraph seriously misrepresents the facts on the Rock Excavation. The resident engineer (RE) has reported the status of the rock excavation problem monthly starting in April 1982. This has been closely monitored by USAID and the MOW since that time with several meetings held concerning the subject.

Further at USAID insistence, a senior Harris representative (Green) was asked on November 19, 1982 to make a detailed study of the rock problem and other areas of potential claims. This study was conducted in February 1983 with results well documented. Nello Teer's claim was only made after continual pressure by USAID, the MOW and the RE in order that all potential problems be tabled in a timely manner rather than after all work had been completed as is often the case with construction projects. Unfortunately because of the natureof the Title I design work, rock quantity totals could not be adequately predicted until May 1983. However continued monthly monitoring always maintained a higher side prediction well within the contingency budget.

PARAGRAPH II-B-5

This paragraph is supplementary to the previous paragraph. In the spirit of reducing rock excavation which has been monitored by USAID, the MOW and the RE for over a year, the RE had undertaken a series of realignments. Such realignments were always made with the intention of reducing rock quantities and thus always assumed by the RE to be cost saving and fully within their authority to implement. USAID believes the RE to be sincere regarding this based on many discussions over the past year in which he always firmly stated that there were no delays being encountered. Teer has proposed otherwise and these differences will be subject to future negotiations.

However it should be noted in a Feburary 1983 meeting with senior Harris officials, with USAID present, the following were requested of Harris:

(a) The reasons for increase in rock excavation from 125,000 cm to 270,000 cm .

(b) An analysis of implications due to realignments (also requested by letter in January 1983).

(c) A complete report on the analysis of Title II services which covers work done during the visit (Green's February visit) and advises the client on the course of action.

By cable of 15 April 1983 the MOW again asked Harris for a response to these items with a followup letter on May 11, 1983 again asking for a reply.

Harris (Green) responded in part on May 12 ignoring the reasoning for item a, probably because of the implicating nature of the question.

In regard to item b, Harris reports savings of $940,074 for three specific realignments reviewed. It is also noted that Harris reported an additional cost savings of approximately M237,000 for realignment of the Quthing River Bridge approach in their June 1982 monthly report.

The conclusion reached that the "MOW did not exercise adequate control of the A&E in monitoring the changes or resulting cost/quantity implications" is not supported by the preceding discussion and is premature until the value, if any, of the Teer claims has been fully determined.

A further conclusion "that no accumulation of rockex totals were developed for over-run considerations, except those presented as invoice amounts by Teer" is obviously incorrect since the RE has monthly analyzed and commented on the situation over the past year.

PARAGRAPH II-B-6

The point that Harris was paid for two Title I designs and now the GOL is faced with major potential claims because of the inadequacy of this Harris work is valid (see later comment regarding the corresponding recommendation).

PARAGRAPH II-B-7.d

For the case noted, the comment regarding exceeding the 14% grade maximum limit for 1000M criteria was one of considerable debate and study between the MOW and the RE. The original realignment proposed by the RE was rejected by USAID and the MOW as being unsafe. This realignment was proposed by the RE

to further reduce rock excavation. As a result the RE re-proposed 6 alternatives from which a compromise solution was formally approved by the MOW on 8 March 1983.

PARAGRAPH II-B-9

In regard to the point made about equipment rehabilitation, such considerations would not enter into the contractor selectionprocess under competitive bidding or competitive negotiations processes. Teer was selected using the later process. However, interestingly, the concern being addressed could be a factor in dealing with claims especially where overhead is being adjusted. In Teer's case USAID observes that equipment conditions in many cases are poor and that the maintenance crews have been over-taxed just to meet operational requirements.

PARAGRAPH II-B-10

Unfortunately the evaluator did not have the opportunity to review the details of the claims or assess their validity. Any suggestion by USAID of a settlement level would be prejudicial and therefore should be removed from the report.

PARAGRAPH II-B-11

The suggestion that overpayments were made is considered to be inappropriate in the absence of specific evidence.

However, further evaluations should pursue this question. More importantly, however, such evaluations should review Harris performance under their Title I cost reimbursable contract. It is in this area that Harris had control over their expenditures rather than the MOW, which could have resulted in excessive costs (rather than over-payments) for work performed.

In regard to the RIG/A and RIG/II recommendation, comments made earlier (I-B-3) are still pertinent.

The comment regarding non-conformance to adopted design criteria is not clear. Detailed design criteria is established by MOW within the General Guidelines of the PP. Deviations such as the long grade mentioned by Smith were approved by the MOW and therefore the contractor is in conformance. However, the reason behind the need to make such a deviation certainly should be included in any evaluation.

The comment inferring that the MOW should exert greater control (j) over Title II operations, make more field trips, require scheduled meetings may have merit, however, should be reviewed within the context of both the MOW and USAID management approach on this project. This factor is further complicated by staff availability and capability. For example, any future evaluation team should determine if holding routine formal meetings on a bi-weekly basis would have resolved or have foreseen the problems any more readily than the daily contact now being made. All problems noted by the evaluator, especially in regard to the Teer claims, would not have been identified or resolved any faster by this suggested procedure. The existing control approach should be evaluated, as well as the correspondence and minutes of meetings files before making final judgments on the MOW management capability.

In addition, both USAID and MOW staff have, to a great extent been pre-occupied with resolving problems caused by the Title III failure. In addition to evaluations and audits, there have been the close-out of the Harris contract, interim management, and the selection, briefing and start-up of new management. All these factors have been extremely time consuming and all are activities in excess of normal anticipated project management requirements. Further, all demanded the first priority of attention. An evaluation of MOW/USAID management should include these factors and also to the extent appropriate analyze the effectiveness of the audits and evaluation made to date.

PARAGRAPH II-B-13

The question of insurance payments was the cause of some concern to the MOW, as well as a point of considerable discussion during the negotiation of the Bridge Review with Harris. Harris' concern was over their liability for any failure or later claims. As the original designer they were fully agreeable to abide by their standard policy of a $250,000 deductable. However, once the bridge was redesigned by Nello Teer, Harris was put in the position of being the reviewer, yet they claimed equally liability. Their non-negotiable demand was a complete waiver of liability by the GOL or payment of the insurance premium for coverage under $250,000. The MOW refused to accept liability on behalf of Harris and conceded the premium. Any future evaluation may want to review the Harris position further.

PARAGRAPH II-B-15 and 16

The local geology is clear and well understood. There is no underlying basaltic rock as suggested with all bridge footings to be on unweathered sandstone. These layers of sandstone are separated by layers of unsuitable foundation material. Based on the predictable nature of sandstone, Harris concluded that one boring at each foundation was fully adequate. USAID and MOW fully agree.

PARAGRAPH II-B-18

Regarding the need for additional borings, after the Bridge shift the preceding paragraph comments still remain valid. The abutment B footing remained in the same location while abutment A shifted approximately 8 meters. The center pier footings overlapped their original locations. Visual inspections after excavation would confirm the consistency of the geology.

PARAGRAPH II-B-19

In regard to (a) it is suggested that the liability factor be fully considered especially in light of Harris' insistance that additional premiums be paid.

In regard to (b), PRC Harris monthly report for June 1982 notes the following:

> "On 8 June 1982 the Consultant received a Ministry's request to make an in-depth study of its suggestion to reduce the grade of the South approach to the Quthing River Bridge with a view toward improved road operation and traffic saftey. A sketch showing a possible alignment modification was included which realigned the bridge by approximately 15°. An added advantage to line change would be a reduction of rock excavation.
>
> The Consultant made a cost study of a number of line and grade trials and submitted what was considered to be optimum modified design. The bridge was rotated 10° about working point number 4 at the north abutment which changed the centerline bearing from N22.694°E to N32.694°E.
>
> A plan and profile was submitted to the Ministry along with a statement that the redesign would affect a savings of approximately M237,000.
>
> Ministry approval was received on 26 June with the proviso that a length of adverse grade, that was included for reasons of economy, be removed.
>
> A new profile was developed and the Consultant immediately started to set the required stakes in the field so that the Contractor could implement the change as soon as possible.
>
> The design change extends from Station 3 + 038 to Station 3 + 497. No structured element of the Quthing River Bridge is changed."

The preceding documentation obviously does not correspond to the Evaluator's statement.

PARAGRAPH II-B-21

This statement regarding shortfall is not understandable. Possibly the author is referring to measured cost over-runs (i.e., actual quantities as opposed to Bill of Quantities). In this regard Harris has documented the following in a letter dated May 12, 1983.

(a) over-runs less under-run savings	$940,767
(b) POL escalation	178,583
(c) approved claims (approx.)	20,000
(d) foreign exchange savings to date	(1,451,957)
Net surplus of funds available	$312,607

Foreign exchange savings are expected to exceed $2,000,000 during the contract life. In addition, USAID has retained $2,000,000 in project funds as a contingency for use on the "cut-off" construction. These funds are in addition to the Teer contract amount.

PARAGRAPH II-B-22

The record does not show that subparagraph b has merit, however further review is welcomed.

The significance of subparagraph f is not understood as this is a routine matter with required documents on file.

Again subparagraph g is not understood in terms of a shortfall of funds. However USAID and the MOW continually monitor completion alternatives since this project must be completed within the funds available (neither USAID or the MOW plan to provide additional funds).

PARAGRAPH II-C-3

Several clarifications are again in order. In regard to subparagraph a, construction of the Mohale's Hoek - Quthing Section has never been in the authorized project. In b, the drainage position was addressed and clarified earlier.

145

PARAGRAPH II-C-4

Again a clarification, during the Harris Management of Title III a senior Harris design engineer worked on design drawings in Lesotho for approximately one month. His effort was to define the areas where realignment was required between Mt. Moorosi and Quthing. He completed this task and these plans are currently in custody of the new Title III management. In some cases further revision was done by the interim MOW management and in others the current managementhas made revisions or opted to use a new plan.

PARAGRAPH II-C-5

Again a clarification is needed. Harris management rough graded kms 22-37 as noted however their work was limited to rehabilitation of the existing roadway under the concept that detailed plans were not necessary. The general design criteria regarding vertical and horizontal control were to be followed as were general materials and compaction standards. During this period they proceeded with the design exercise noted in the preceding paragraph for areas that deviated from the existing alignment. Also, during the latter part of this period the project operated without an effective project manager (just prior to Harris termination up to the time of project shut-down). At that time the field supervision completed several realignments without plans even though available. The MOW interim management, more as an as-built exercise, then attempted to fit this work to to the established vertical and horizontal standards. This latter design work was also to serve as the plan for finish grading.

Nello Teer Title III management has continued with these design efforts, building on the previous work. They have adopted the concept that general rehabilitation along the existing alignment will not require pre-engineering and that only an as-built plan will be prepared. This approach was done at the insistence of USAID and with the approval of the MOW. This procedure is defined

146

in a document titled Proposed Design, Engineering Standards, SPRPA, Quthing - Mt. Moorosi. The requirement for pre-engineered drainage is also defined in this document. Further evaluation of this concept is welcomed.

PARAGRAPH II-C-8

The questions raised here, in part, are discussed in the Project Paper amendment. These Project Paper discussions still remain valid.

PARAGRAPH II-C-10

In this regard the MOW conducts formal meetings scheduled for the first Monday of the month and attended by USAID. In addition Project Authority Board meetings are held at least bi-monthly. These are supplemented by ad hoc meetings which probably average weekly. An evaluation of this management approach should fully consider the factors noted in II-B-11 before making final judgment or conclusions.

PARAGRAPH II-C-11

The inference that Nello Teer needs time to straighten out inherited problems on Title III should not be over-emphasized. Nello Teer should be evaluated on their own management abilities and accomplishments in regard to their contractual requirements. These parameters are all independent of historical problems which often are, or can easily be used as an excuse, valid or not.

PARAGRAPH II-C-13 and 14

The previously purchased pipe was addressed earlier (II-A-14). However again its improper use by Teer Title III management, if actually done, would be a violation of contract requirements and any future evaluation should consider such use in this light. In light of drainage concerns noted, an in-depth

evaluation is welcomed and should also include a review of MOW standard practices and procedures upon which standards are based.

PARAGRAPH II-C-15 to 18

The Six Penny Crossing is discussed at considerable length. The evaluator had the opportunity to review this at the beginning of its construction but apparently without benefit of the Teer engineer's plan.

The MOW engineer who accompanied the Evaluation Team noted that Teer had deviated from thier agreed approach and that he has formally asked for an immediate clarification in order that the MOW may decide on the acceptability of the construction.

PARAGRAPH II-C-19

The recommendation that Nello Teer's Design Requirement be enforced (d) infers that required design is not being done. Unfortunately, other than some unsubstantiated opinions, the evaluator has not identified where design requirements are not being met. It is certainly the intention of the MOW and USAID that agreed and required design requirements will be met.

In regard to Recommendation d, again the point is made that an evaluation team must look at the MOW/USAID management approach and capabilities, as well as the details of the historical record before making final conclusions.

This issue of management has been a point of many serious discussions between USAID, the MOW, auditors and evaluators. This is typified by a MOW response during a serious period when the MOW asked for internal management of Title III and USAID objected. Their reasoning was basically that they now spend a disproportionate share of time managing expensive American contractors who cannot seem to do their job. They suggested that it would be simpler and cheaper for them to do it themselves. This statement of course was an embarrassment to USAID but the point of this discussion is that for both Title II and

Title III the experience levels and staff numbers of the expatriate teams far exceeds the MOW's internal capabilities. They have been retained to be technical and management advisors to the MOW and not vice-versa.

This problem should be investigated in any future evaluation exercise.

The MOW position is that they cannot second guess, check, evaluate or perform the work of these highly skilled management teams. A detailed check of the record will show that in fact they have however been doing just that in many cases. USAID welcomes an evaluation of this concern including the effectiveness of both USAID and MOW.

In regard to subparagraph e, a detailed evaluation of the Nello Teer contract could be most useful. It is a major departure from the previous Harris contract and contains many "lessons learned" regarding contract terminology and clauses.

The "inherited" problems issue (f) was discussed under paragraph II-C-11 and certainly would be worthy of future evaluation.

Camp completion is being stressed (g).

The "turnkey" approach could provide the basis for a case study as it does have far reaching application in other AID programs (h).

The drainage item (1) has been fully discussed earlier. USAID and the MOW are satisfied that standards are adequate and will continue to monitor their implementation as appropriate. The Six Penny culvert recommendation will be considered after review of the engineer's design.

LIST OF KEY REPORTS AND/OR DATA AVAILABLE ON THE SOUTHERN PERIMETER ROAD

I. Historical Documents (1978 - 1980)

1. Southern Perimeter Road PID	March 1977
2. Berger's Feasibility Report, 3 volumes	March 1978
3. Worksheets and Backup (Berger) on Bridge, Culverts, and Bridge Assessment, Computer Print Out of the Stress Analysis of Seaka Bridge	1978
4. Soils Lab Tests, Mohale's Hoek - Quacha's Nek (Lesotho Government)	
5. Southern Perimeter Road Project Paper	June 1978
6. Proposals for Consultancy (SPR) (1) Michael Baker, Jr., Inc. (2) Wilbur Smith and Assoc. (3) Louis Berger, International (4) TAMS (5) Rongved, Erickson & O'Dwyer (6) Aman and Whitney (7) Iyons (8) KZF, Inc. (9) King and Gavarics (10) Frederic R. Harris	
7. Contract Agreement (Frederick R. Harris/GOL)	April 1979
8. Subcontract Files (1) C.A. Liburd & Assoc. (4 files) (2) Aerial Survey (Botswana) (2 files)	
9. Design Memorandum No. 1, Short span bridges and Seaka Bridge	August 1979
10. Southern Perimeter Road, Quthing-Qacha's Nek, Evaluation of Prequalification (2 Vol)	December 1979
11. Review of the Design of Southern Perimeter Road Project	August - September, 1977
12. Design Memorandum, Typical Sections	October 1979
13. Drainage Design Report	December 1979
14. Structural Design	December 1979
15. Interim Report, Sub-Surface Survey	December 1979
16. Contract Documents, Quthing-Quacha's Nek Vol 1 and Vol 2	January 1980
17. Interim Report, Sub-Surface Survey	Feburary 1980

150

18.	Mohale's Hoek - Quthing Preliminary Engineers Estimate, Price Analysis	February 1980
19.	Axial Load	April 1980
20.	Design Memorandum, Pavement Design, Package B	May 1980
21.	Design Memorandum, Pavement Design, Package A	May 1980
22.	Tabulation of Proposed Preliminary Drainage Structures on the Upgraded Existing Road R-4	May 1980
23.	Design Memorandum Evaluation and Recommendation for R-4	May 1980
24.	Contract Document Seaka Bridge (1 Vol)	June 1980
25.	Contract Documents, Mohale's Hoek - Quthing (2 Vol)	September 1980
26.	Soils and Materials Investigation (Package B) Volume 1 Report, Volume 2 Appendixes	September 1980
27.	Project Paper (PP) Amendment	September 1980
28.	Pavement Design, Package B, Southern Perimeter Road	September 1980
29.	Pavement Design, Package A, Southern Perimeter Road	October 1980
30.	Mount Moorosi/Mphaki Cut-Off, Soils and Materials Investigation, Southern Perimeter Road	October 1980
31.	Mount Moorosi/Mphaki Cut-Off, Pavement Design, Southern Perimeter Road	October 1980
32.	Soils and Materials Investigation, Southern Perimeter Road, Package A	October 1980
33.	Southern Perimeter Road, Soils and Materials Investigation, Appendix A - Land Terrain Maps, Quthing-Qacha's Nek	October 1980
34.	Monthly Progress Reports, No. 1 through No. 18	April 1979 to October 1980

II. <u>Miscellaneous Plans and Drawings (1979 - 1980)</u>

1.	Computer Plot Plans - Scale 1:250, Existing Road Edges, Quthing to Qacha's Nek	8 rolls
2.	Topo of Existing Roadway, Mohale's Hoek - Quacha's Nek Scale 1:1000	4 rolls
3.	R-4 Existing Road Topo Plans, Quthing - Quacha's Nek Scale 1:1000	3 rolls
4.	R-4 Existing Road Horizonal Alignment, Quthing - Qacha's Nek, Sclae 1:1000	3 rolls
5.	R-4 Preliminary Proposed Centerline Profile, Quthing - Qacha's Nek, Horizontal 1:1000, Verticle 1:200	3 rolls

6. Road Plan and Profile, Quthing - Qacha's Nek (old)
   14 m wide road

7. Plan and Profile, Mohale's Hoek - Quthing
   (issued Sept. 15, 1980) Sclae Horizontal 1:1000
   Verticle 1:100,

8. Bridges on Mohale's Hoek - Quthing Section

9. Bridges on Quthing - Mohale's Hoek

10. Seaka Bridge Rehabilitation Design

11. Land and Terrain Map, Cut-Off (Mount Moorosi - Mphaki) October 1980
    Scale 1:8000 (includes soils and materials description)

12. Cut-Off Plan and Profile with MOW/USIAD Comments
    Includes Drainage, Scale Horizontal 1:1000, Verticle 1:100

13. Preliminary Construction Cost Estimate R-4, For Each Km
    Quthing to Qacha's Nek, Unit Price (1979), Computer Print Out

14. Preliminary Detailed Contractor's Estimate Summaries
    R-4 Cut-Off Area, Mount Mooroisi to Mphaki, Computer Print
    Out

15. R-4 Existing Road Computerized Centerline Profile,
    Quthing - Qacha's Nek

16. R-4 Preliminary Proposed Upgraded Road, Computerized Centerline
    Profile, Quthing to Qacha's Nek

17. R-4 Existing Road, Computerized Centerline Alignment,
    Quthin - Qacha's Nek

18. R-4 Preliminary Proposed Upgraded Road, Computerized Centerline
    Alignment, Quthing - Qacha's Nek

19. Mohale's Hoek - Quthing, Soils Map (Land and Terrain) September 1980
    Scale 1:8000, (includes Soils and Materials Description)

20. Quthing - Qacha's Nek, Soils Map (Land and Terrain) October 1980
    Scale 1:8000, (includes Soils and Materials Description)

21. Final Contract Drawings (Plan and Profile) Cut-Off December 15, 1980
    (including Quthing River Bridge)

22. Final Drawings for Seaka Bridge (Repair) December 15, 1980

152

III. Title II Key Documents (1981 - 1983)

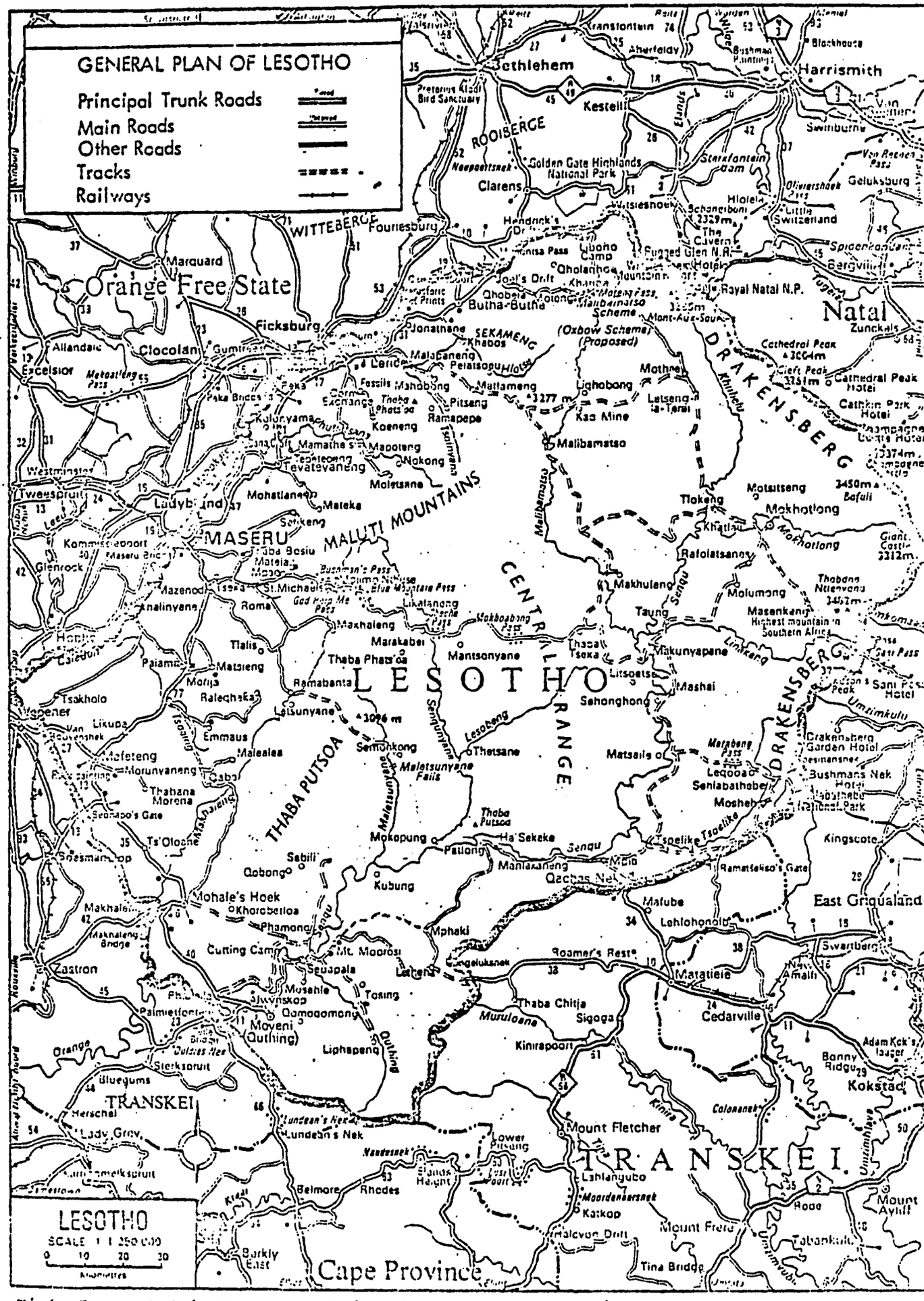
1. IFB and Amendment for Cut-Off Construction
2. Bids Submitted by 5 Potential Contractors
3. Contract with Teer
4. Contract with PRCH
5. Monthly Payment Certificates for Teer (1 to 21)
6. Invoices of PRCH fees for Title II
7. Resident Engineer Monthly Reports (1 through 19)
8. Claims Submitted by Teer

IV. Title III Key Documents (1981 - 1983)

1. IFB and Specifications of Equipment Purchased by USAID, Title III (IFB)
2. Contracts with Equipment Suppliers
3. Contract with PRCH for Management Services
4. Minutes of SPRPA Meetings (1 through 11)
5. Harris Billings for Title III Work
6. Design Memorandum for Title III Work as proposed by MOW/Roads
7. Miscellaneous Regulations for Title III approved by SPRPA
8. Termination Negotiations of PRCH on Title III, including Final Settlement
9. Negotiation with Teer for Title III Work (management supervision)
10. Contract between Teer and MOW for Title III Management Services
11. Monthly Reports as Prepared by Teer Team on Title III (1 through 4)

APPENDIX IV

MAP


GENERAL PLAN OF LESOTHO
Principal Trunk Roads
Main Roads
Other Roads
Tracks
Railways
LESOTHO
SCALE 1 : 250 000
0 10 20 30
Kilometres
Orange Free State
Natal
TRANSKEI
Cape Province
LESOTHO
MASERU
MALUTI MOUNTAINS
CENTRAL RANGE
THABA PUTSOA
DRAKENSBERG
ROOIBERGE
WITTEBERGE
SEKAMENG
Bethlehem
Harrismith
Kestell
Clarens
Fouriesburg
Ficksburg
Clocolan
Ladybrand
Tweespruit
Marquard
Excelsior
Westminster
Butha-Buthe
Leribe
Pitseng
Ramapepe
Koeneng
Mapoteng
Nokong
Moletsane
Mohatlanong
Mateka
Seitkeng
Mazenod
St.Michaels
Roma
Maxhaleng
Marakabei
Thaba Phatsoa
Mantsonyane
Ramabanta
Leitsunyane
Emmaus
Maleales
Semonkong
Thetsane
Maletsunyane Falls
Mokopung
Patlong
Ha Sekake
Mantlakaneng
Qacha's Nek
Qoqong
Sabili
Kubung
Mohale's Hoek
Khoabetloa
Phamong
Cutting Camp
Mt. Moorosi
Seujapala
Mosehle
Tosing
Qomoqomong
Moveni (Quthing)
Liphapeng
Quthing
Mphaki
Roomer's Rest
Lehlohonolo
Matatiele
Cedarville
Thaba Chitja
Sigoga
Kinirapoort
Mount Fletcher
Lower Pitseng
Lahlangubo
Katkop
Rhodes
Belmore
Barkly East
Lady Grey
Herschel
Zastron
Sterkspruit
Bluegums
Palmietfontein
Makhaleng Bridge
Makhaleng
Ts'Ologhe
Thabana Morena
Mofeteng
Morunyaneng
Qacha
Likupa
Tsakholo
Hopener
Caledon
Paiama
Matsieng
Motsia
Raleqhaka
Van Rooyenshek
Van Reenen
Van Reenen Pass
Swinburne
Geluksburg
Little Switzerland
Bergville
Spioenkop Dam
Royal Natal N.P.
Cathedral Peak
Cathedral Peak Hotel
Cathkin Park Hotel
Champagne Castle Hotel
Giant's Castle
Sani Pass
Sani Pass Hotel
Drakensberg Garden Hotel
Bushmans Nek Hotel
Bushmans Nek
Kingscote
East Griqualand
Swartberg
Amalfi
Adam Kok's Laager
Bonny Ridge
Kokstad
Mount Ayliff
Rode
Tabankulu
Mount Frere
Tina Bridge
Malcomess Drift
Mount Fletcher
Lower Pitseng
Lady Grey
Herschel
Lundean's Nek
Sterkspruit
Bluegums
Palmietfontein
Zastron

APPENDIX V

MAJOR DOCUMENTS REVIEWED

APPENDIX V

MAJOR DOCUMENTS REVIEWED

BASIC PROJECT DOCUMENTS

Techno-Economic Feasibility Study of the Southern Perimeter Road, Mohale's Hoek - Qacha's Nek, Vol. I-III. Project No. AID 690-0104, Contract No. AID 632002, Louis Berger International, East Orange, N.J., March 1978.

PID: Lesotho Roads Assessment, Project 690-0076, AID, March 24, 1979.

Project Paper: Southern Perimeter Road Project Authorization Amendment, (690-0076), AID, September 1980.

Project Evaluation Summary: Southern Perimeter Road (Project No. 690-0076), (Evaluation No. 632-82-6), AID, July 2, 1982.

Poor Contractor Performance Has Hindered the Construction of Lesotho's Southern Perimeter Road, Audit Report No. 3-632-83-11, AID, March 18, 1983.

Project Grant Agreement No. 78-632-22, Dated June 30, 1978. Appropriation No. 72-1181000. Allotment No. 850-52-090-00-79-81.

Project Grant Agreement Amendment No. 1 - Dated November 10, 1980.

Project Agreement Amendment No. 2 - Dated January 7, 1982.

Project Agreement Amendment No. 3 - Dated June 30, 1982.

USAID Memorandum - Dated December 2, 1982, Subject: Extension of PACD, Southern Perimeter Road Project Grant Agreement 78-632-72 and Amendments.

USAID Memorandum for the Record - Dated July 2, 1982, Subject: Internal Evaluation of Southern Perimeter Road Project (690-0076).

Contractor Performance Evaluation Report - Dated July 20, 1982: Contractor PRC Harris - Title III, Southern Perimeter Road.

USAID REPORTS AND MEMOS

Subject	Date
Status Report No. 1	April 28, 1981
Status Report No. 2	May 18, 1981
Status Report No. 3	June 3, 1981
Status Report No. 4	August 31, 1981
Status Report No. 5	November 2, 1981
Status Report No. 6	March 17, 1982
Quarterly Implementation Report	June 30, 1982
USAID Comments on the Internal Evaluation Report	July 2, 1982
Report on Transfer of Title III Work to Roads (MOW) Administration	July 19, 1982

Contractor Performance of .. Evaluation Report (Title III) Covering Jan. 1, 1982 to June 30, 1982)	July 20, 1982
Site Visit Reports	September 20, 1982
Quarterly Implementation Report	September 30, 1982
SPR Correspondence Log (Nov. '82)	November 30, 1982
SPR Correspondence Log (Dec. '82)	December 31, 1982
Quarterly Implementation Report	December 31, 1982

OTHER USAID REPORTS

Anderson, G. William, Rural Roads Evaluation Summary Report, AID Program Evaluation Report No. 5, March 1982.

Moeller, Philip W., Transportation and Telecommunications in the Southern Africa Region: A Report to the Congress on Development Needs and Opportunities for Cooperation in Southern Africa. AID Contract AFR-C-1424, Washington, D.C., March 1979.

Devres, Inc., Socio-Economic and Environmental Impacts of Low-Value Rural Roads, AID Program Evaluation Discussion Paper No. 7, February 1980.

CONTRACTS

Government of Lesotho and Frederick H. Harris Inc. Contract - For consulting services in connection with: Design, Construction, Supervision and Inspection/Monitoring of the Southern Perimeter Road and the Seaka Bridge, 5 April 1979.

Government of Lesotho, Ministry of Works and Nello L. Teer Co. Agreement - For the construction of the Lesotho Southern Perimeter Road - Mount Moorosi to Mphaki Cut-Off, 29 June 1981. Contract 690-0076-03-HCC.

Government of Lesotho, Ministry of Works and PRC Harris, Contract Amendment No. 1 - For consulting services in connection with: Construction Supervision (Title II) and Management of Construction by Force Account (Title III, Contract No. 690-0076-1HCC, 1 January 1981).

Government of Lesotho, Ministry of Works and Nello L. Teer Company Contract - For Management Consulting Services in connection with the construction by Authority Title III. Contract No. 690-0076-2HCC, 10 December 1982.

CONTRACTOR REPORTS (TITLE III)

Monthly Progress Report (No. 1)	January 1983
Monthly Progress Report (No. 2)	February 1983
Monthly Progress Report (No. 3)	March 1983
Monthly Progress Report No. 4)	April 1983

GOL DOCUMENTS

Auditor General, Special Audit of Southern Perimeter Road Project Authority Accounts, (A/DEV/19/2-10) Government of Lesotho, February 7, 1983.

Food Management Unit Circular No. 1 of 1983 (see especially sections on Roads and Soil Conservation). Maseru: (n.d.).

Gay, John, Rural Sociology Technical Report (Part 1, Text; Part 2, Appendices and Tables), (Senqu Project) Maseru: MOA, April 1977.

Guma, Tesfa and William Mafoso, Farm Management Economics Terminal Report on Socio-Economic Survey, (Senqu Project) Maseru: MOA, June 1976.

Kingdom of Lesotho: Lesotho Transportation Study Final Report, Vols. I-IV. Prepared for the Ministry of Transport and Communications by Dorsch Consult GMBH, Munich, March 26, 1980.

Lesotho Transportation Study: Final Report, March 1974, Roughton and Partners, London.

Reichard, W. and F.E. Winch, Phase I, Basic Agricultural Data for Blocks V/VI, Baseline Survey Research Report No. 3, Maseru: BASP-MOA, April 1981.

Socioeconomic Indicators of Progress on Programs and Projects - 1982, Planning and Monitoring Section, Ministry of Cooperatives and Rural Development. (See especially sections on Rural Road Construction Program), Maseru: March 1983.

Traffic Count System: Technical Services for Road Maintenance, prepared for the Ministry of Works, Roads Branch, Kingdom of Lesotho by BCEOM Consulting Engineers, France, January 1983.

Winch, Fred E., The Agro-Economic Farm Situation in the Lowlands and Foothills of Lesotho, Maseru: BASP-MOA, October 1981.

IBRD FUND DOCUMENTS

Economic Memorandum on Lesotho: Report No. 2251-LSO. Eastern Africa Office, International Bank for Reconstruction and Development, February 22, 1979.

Staff Report for the 1982 Article IV Consultation. SM/82/116, International Monetary Fund, May 28, 1982.

Lesotho: Recent Economic Developments. SM/82/116, International Monetary Fund, June 18, 1982.

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Smits, L.G.A., Rock Art Survey Along the Southern Perimeter Road, Preliminary Report. NUL, Roma: ARAL Project, March 1983.

Battail, B., Report on Palaeontological Reconnaissance Along the Southern Perimeter Road, Mount Moorosi to Qacha's Nek. Institute de Paleontologie, Museum National d'Histoire Naturelle, Paris, December 1982.

Lesotho: Rescue Archaeology 1982/83, Preliminary Report. UCT-SPR (n.d.).

Wilken, Gene C., "Geography's Role in Decentralization: The Example From Lesotho." IGU Commission on Rural Development, Fresno, CA: April 1981

APPENDIX VI

PERSONS INTERVIEWED

APPENDIX VI

PERSONS INTERVIEWED

AID, Washington, D.C.

1. D. D'Antonio, Desk Officer, AFR/SA
2. K. Nurick, Project Officer, AFR/PD

USAID/Lesotho

1. Edna Boorady, Mission Director
2. Fred Zobrist, Chief Engineer
3. Mulugeta Yohannes, Engineer

GOL

1. M. Marumo, Chief Roads Engineer, Roads Branch, MOW
2. L. Ross, Project Coordinator, SPRPA, MOW
3. E. King, Senior Design Engineer, MOW
4. E. Kim, Projects Coordinator, MOW
5. J.L. Kolobe, Deputy Permanent Secretary, MOW
6. J.P. Lehloenya, District Coordinator, Quthing District
7. C.P. Nkhabu, Senior Executive Officer, Quthing District
8. T. Barry, Assistant Chief Roads Engineer, MOW
9. P. Datta, Engineer, MOW
10. J.G. Gochenour, Planner, Ministry of Cooperatives and Rural Development
11. P. Ryden, Planner, Ministry of Cooperatives and Rural Development
12. L.L. Molapo, Director, Food Management Unit

Field

A. PRC Harris

1. Bob Weisphaut, Resident Engineer
2. Charles Clark, Assistant Resident Engineer

B. Teer Title II

1. Sam Koff, Project Manager
2. Ken Gutsman, Project Engineer
3. Bob Gordon, Contract Manager
4. Veronika Hutton, Soils and Materials Engineer

C. Teer Title III

1. Ralph Marks, Project Manager
2. Bill Curtis, Project Engineer
3. Charles Griffin, Foreman, Rock Crushing

D. Others

1. Manager, Mitchell Brothers, Mt. Moorosi
2. Manager, Mount Moorosi Supermarket

APPENDIX VII

IMPLEMENTATION PLAN (PROAG)

Implementation Plan - Southern Perimeter Road

1980

7/2	Design of Seaka Bridge rehabilitation completed
7/11	Finalize plan for force account upgrading of existing road
7/18	Project Paper amendment submitted to AID/Washington
8/1	Force account/project team implementation approved by GOL
8/15	Establish Inter-Ministerial Coordinating Committee to monitor force account implementation
8/15	Finalize bid package/IFB for procurement of force account construction equipment
8/21	Project Paper amendment approved
8/29	Grant Agreement amendment executed
9/1	Final design of package B delivered to MOW
9/15	Publish IFB for force account construction equipment
9/16 - 9/30	Complete negotiations for revised technical services requirements for Title II of contract
9/30	Publish IFB for Seaka Bridge rehabilitation
10/10	Final design and complete bid package for "cut-off" delivered to MOW
10/10	Pre-qualification completed for "cut-off" (including Code 941 firms) and data delivered to MOW
11/1	Publish IFB for "cut-off" construction
12/1	Pre-bid conference for "cut-off" construction
12/1	Receive bids for Seaka Bridge rehabilitation
12/15	Contracts awarded for force account construction equipment

1981

1/1	Project Manager, Deputy Project Manager and Chief Superintendent arrive
1/2	Cut-off bids received
2/15	Contract awarded for Seaka Bridge rehabilitation
2/15	Contract awarded for cut-off
3/1	Force account mobilization operations begin
3/1	Controller arrives
4/1	Deputy Superintendent, Chief of Materials, and Chief Surveyor arrive
7/1	Master Mechanic arrives
7/1	Force account equipment arrives
7/15	Seaka Bridge rehabilitation completed
8/1	Force account mobilization completed and R-4 upgrading begins

1982

1/15	First external evaluation

1983

2/15	Cut-off construction completed
3/1	Deputy Project Manager and Controller depart
4/1	Chief Surveyor departs

1983

7/1 Chief of Materials departs

1985

1/31 Final external evaluation
2/1 Force account R-4 upgrading completed
2/1 Project Manager, Chief Superintendent, Deputy Superintendent, and Master Mechanic depart

Article IV. Evaluation

A. General

Evaluation is a built-in and crucial component of this Project. It is designed to ensure that Project purposes and assumptions as stated in the logical framework are being attained. It also attempts to measure what changes have taken place and the impact of the Project over its life. There are evaluations planned during the life of this Project as discussed below.

B. External Evaluations

Two external evaluations are proposed for the Project. The first is planned for January 1982 and the final for January 1985. Each evaluation would require 3 persons for a period of five to six weeks each.

The first external evaluation in January 1982 will take place early to permit an assessment of the achievement of the Project goal and purpose or the cost and time effectiveness of the force account construction method. Therefore, the first evaluation will include examination of the following major aspects of the Project:

- Status of Project implementation including reasons for any differences between status and implementation plan, as well as relevant recommendations.

- Examination and recommendations regarding performance and future capabilities of the consultant, contractors, Ministry of Works, and USAID/Lesotho to effectively implement and monitor the Project.

- Review and update original implementation schedule, if necessary, and identify critical implementation issues or activities that may warrant specific discussion or actions by appropriate parties.

The final external evaluation in January 1985 will focus on an

APPENDIX VIII

GAZETTE: SUPPLEMENT NO. 4

WORKS
Registry Maseru
30 MAR 1981
Lesotho
ADS DIVISION

Supplement No. 4
to Gazette No. 10 of 13th March, 1981

Southern Perimeter Road Project Authority Regulations 1981

Legal Notice No. 16 of 1981

Published by the Authority of the Prime Minister
Price: 10 Lisente

LEGAL NOTICE NO. 16 OF 1981

Southern Perimeter Road Project Authority Regulations 1981

In exercise of the powers conferred by sections 2 and 7 of the Development Projects Order 1973, I,

Evaristus Retšelisitsoe Sekhonyana

Minister of Finance, make the following regulations —

Citation

1. These regulations may be cited as the Southern Perimeter Road Project Authority Regulations, 1981.

Interpretation

2. In these regulations —

"AID" means the Agency for International Development of the United States of America;

"Project" means the Southern Perimeter Road Project for the upgrading and construction of an all weather road from Quthing to Qacha's Nek pursuant to the Project Grant Agreement entered into with the Government of the Kingdom of Lesotho and the Government of the United States of America dated June 30, 1978.

Establishment of the Authority

3. There is established the Southern Perimeter Road Project Authority (hereinafter referred to as "the Authority") which shall be responsible for —

(a) the management and execution of the Project;

(b) allocation and use of the resources of the Project;and

(c) performing all such acts as are necessary for the achievement of the purposes specified in paragraphs (a) and (b).

Composition of the Authority

4. The Authority consits of —

(a) Permanent Secretary for Works, as Chairman

(b) Permanent Secretary for Finance, as Vice-Chairman;

(c) Permanent Secretary for Central Planning;

(d) Permanent Secretary for Cabinet (Personnel);

(e) Commissioner of Labour;

(f) Chief Roads Engineer; and

(g) Budget Controller

Meetings of the Authority

5. (1) The Authority shall meet once every two months.

(2) At the meetings of the Authority four members are a quorum.

(3) The Project Manager shall be a Secretary of the Authority.

(4) The Government of the United States of America may be represented at any meeting of the Authority as an observer.

167

(5) The Chairman may at any time, and shall at the request in writing of two members of the Authority, convene a meeting of the Authority stating the purpose for which the meeting is called.

Functions of the Authority

6. In addition to the powers conferred on the Authority by section 4 of the Order the Authority shall —

(a) subject to the approval of the Minister, appoint a Project Manager;

(b) appoint, discipline or dismiss staff employed for the Project;

(c) establish salary scales, terms and conditions of service for staff employed by the Authority;

(d) designate officials competent for signing and countersigning of cheques and similar instruments for the Projects;

(e) maintain or cause to be maintained for three years after the last disbursement by AID all books and records relating to the Project.

E. R. Sekhonyana,
Minister of Finance.

16th FEBRUARY, 1981

Printed by the Government Printer, P.O. Box 268, Maseru 100, Lesotho

168

APPENDIX IX

SOUTHERN PERIMETER ROAD PROJECT AUTHORITY (SPRPA)

CABINET (SPS)

WKS/24/04/4A

P.L. NTHOLI

7th April, 1983

Southern Perimeter Road Project Authority (SPRPA)

The Southern Perimeter Road Project Authority (SPRPA) was established under the Legal Notice No.16 of 1981. The Authority has been made responsible for:

(a) the management and execution of the Project;

(b) allocation and use of resources of the project; and

(c) performing all such acts as are necessary for the achievement of the purposes specified in paragraph (a) and (b).

2. The Authority consists of:-

(a) Permanent Secretary for Works, as Chairman;

(b) Permanent Secretary for Finance, as Vice Chairman;

(c) Permanent Secretary for Central Planning;

(d) Permanent Secretary for Cabinet (Personnel);

(e) Commissioner of Labour

(f) Chief Roads Engineer; and

(g) Budget Controller.

3. The Authority has to meet once in two months. It is our sad experience that the designated members are not taking active participation instead they send members of their staff without decision making authority. However there is no provision for delegation of authority in the body of the Legal Notice and in most cases scheduled meetings could not be conducted due to lack of quorum. Because of this failure important decisions could not be taken in appropriate time resulting in not only poor progress but also creating tremendous adverse financial implications.

It/..

170

SPRPA

4. It is pertinent to mention that this Project costs $ 41,000,000 (Forty one Million Dollars) and requires proper attention from the members of the Authority.

5. You are, therefore, requested to impress upon th members on the imperative need to regularly attend the meetings and take a meaningful part in the project.

6. It is needless to say that if the present situati continues there would be no other option but to amend the Legal Notice No.16 of 1981 to a functional administration.

cc: Director, USAID
Solicitor General
Chief Roads Engineer

APPENDIX X

PIO/T POSITION DESCRIPTION

ATTACHMENT 1

Statement of Work

Job Description: Project Engineer - Southern Perimeter Road
Roads Branch - Ministry of Works
Government of Lesotho

1. PREFACE:

The Government of Lesotho has received economic assistance from the U.S. Government for the design and construction of a 200 km long, all-weather road in the southern rugged and mountainous part of Lesotho. GOL and USG contribution of this project amounts to U.S. $41 million over the 4 year life of the project. Officially the project is known as the Southern Perimeter Road (SPR).

The first 50 km of this project have already been designed and currently the GOL is soliciting funds from other donors for the construction of this 50 km section of the road. Some 112 km of the project runs over an existing track, which will be upgraded using a semi-autonomous force account team whose key expatriate personnel will be provided by a U.S. consulting firm. A contract has already been signed between this firm and the GOL. Additionally, approximately U.S.$5 million of the total contributionwill be utilized by the GOL for the purchase of complete road construction equipment and facilities for this 112 km long section of road. Bid process for the procurement of these equipment and facilities have been initiated by the GOL. The remaining 38 km of the project will traverse a mountainous virgin terrain, and it will be constructed by an international firm. Selection of such a contractor is currently in the process. Main structures include a 80 m long concrete beam and girder bridge, to be constructed over the Quthing river and a 180 m long arch frame steel bridge, that has been in use over 100 years now. This steel bridge requires a thorough repair and rehabilitation.

2. QUALIFICATIONS:

The incumbent must have a Bachelor of Science degree in Civil Engineering from a recognized institution of higher learning. Registration as a Professional Engineer is also desirable.

18.

(Statement of Work, Continued)

3. EXPERIENCE:

The incumbent must have had a minimum of 15 years of experience as an engineer in the design and construction of sectors with at least five years of experience in coordinating large engineering projects. Experience as related to the construction of roads and steel and concrete bridges will be advantageous and preferred. Good experiences in engineering and construction contracting and in the procurement of equipment and materials are also considered essential. Additionally, overseas engineering experiences in developing countries and prior working experiences with cooperating country officials are also prerequisites. Familiarity with standards and procedures and rules and regulations of donor nations and institutions relative to procurement of goods and services financed by them and with their geographic source origin requirements is also desirable. The incumbent will also be expected to promptly familiarize himself with the Government of Lesotho's standards and procedures relative to the procurement of goods and services promptly upon assignment.

4. DUTIES AND OBLIGATIONS:

a. Responsible: To the Chief Roads Engineer (CRE) through a delegated officer.

b. Liaison: With the

- Project Manager/Deputy Project Manager of the Force Account Construction Team.

- Representatives of the Project Authority.

- Representatives of the USAID.

- External organizations as directed by the CRE.

- Consultants and Contractors related to the construction of the Southern Perimeter Road.

- Senior Engineers, Engineers, accounts and Financial Controller of the Roads Department.

174

CONTINUATION SHEET	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT	☐ Worksheet ☒ Issuance	PAGE 7 OF 9 PAGES
	☐ PIO/C	1. Cooperating Country: Lesotho	
	☐ PIO/P	2a. PIO Number: 632-0069-3-00672	2b. ☒ Original OR Amendment No. ____
	☒ PIO/T	3. Project Number and Title: 632-0069 Manpower Development and Training	
	☐ PA/PR		

Indicate block numbers

Use this form to complete the information required in any block of a PIO/P, PIO/T or PA/PR. For PIO/C, furnish the item number, quantity, description/specifications, including catalog stock number and price when available.

18

(Statement of Work, Continued)

c. Duties: Coordinate planning, programming, budgeting, accounting and execution of the construction of the Southern Perimeter Road.

Coordinate as well as implement actions leading to the award of engineering consultancy contract, comprising, amongst other items:

- Advertising.
- Preparing conditions of engagement and Terms of Reference.
- Preparing cost estimates.
- Evaluating technical proposals and making recommendations for selection of firms.
- Taking part in negotiation in final award of contract.
- Supervise and monitor the performance of the consultant as per the contract provisions and terms of reference.

Coordinate as well as implement actions leading to the award of construction contract, comprising, amongst others:

- Advertising
- Preparing documents
- Preparing cost estimates
- Evaluating bids and making recommendations.
- Taking part in negotiations, if necessary, in final award of contract.
- Monitor the performance of the Contractors and subcontractors as well as supervising the performances of the consultants.

CONTINUATION SHEET	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT ☐ PIO/C ☐ PIO/P ☒ PIO/T ☐ PA/PR	☐ Worksheet ☒ Issuance	PAGE 8 OF 8 PAGES
		1. Cooperating Country Lesotho	
		2a. PIO Number 632-0069-3-00672	2b. Amendment ☒ Original OR No.
		3. Project Number and Title 632-0069 Manpower Development and Training	

Indicate block numbers

Use this form to complete the information required in any block of a PIO/P, PIO/T or PA/PR. For PIO/C, furnish the item number, quantity, description/specifications, including catalog stock number and price when available.

18.

(Statement of Work, Continued)

- Keep up to date records of progress on various activities of work and apprise all authorities concerned.

- Keep a record of the expenditure and exercise control.

- Coordinate design and construction activities.

- Assist in procurement of related goods and services fulfilling the source/origin requirements.

- Estimate and prepare the funding requirement of the project and apprise the authorities for any additional funding, if required.

- Provide training to the counterpart engineer as assigned.

- Deal with any other related work that may be assigned by the Chief Roads Engineer.

5. FINANCIAL IMPLICATION:

The Government will pay to the Project Engineer, the local salary provided for the post in the recurrent budget of the Ministry of Works at Grade 8 (M5460 - M6300 p.a). Transcentury is requested to top up this salary to internationally accepted levels.

116

APPENDIX XI

GEOMETRIC STANDARDS

EXPLANATORY NOTE ON GEOMETRIC STANDARDS OR DESIGN CRITERIA

References are made throughout this amendment to design criteria or geometric standards. The table below shows these as normally defined by the Ministry of Works, Government of Lesotho. As can be seen in the diagram on the preceding page, formation width refers to interface between the sub-grade and the sub-base while carriageway width refers to the uppermost surface of the road.

The Consultant's initial design used G-1 standards modified to broaden formation width to 14 m and carriageway width to 9 m. The portion of the road for other donor financing remains designed to this improved G-1 standard.

In preparing the comparative cost estimates of constructing the cut-off to G-1 or G-3 standards, the Consultant put G-1 width at 9 m over 11.2 m and changed the maximum G-3 gradient from 10 percent to 12 percent. The Consultant also then used a modified G-3 standard which broadened the width to 6 m over 9 m.

The entire road to be built by this project from Quthing to Qacha's Nek will be at the improved G-3 standard.

Road Type	Terrain	Design Speed (k.p.h)		Cross sections (meters)		Gradients (%)		Curvature (degrees)	
		Opt.	Min.	Formation	Surface	Opt.	Max.	Opt.	Max.
Bitumen 1	Rolling	100	80	9.7	6.7	4	6	1.5	3.17
	Hilly	80	55	9.7	6.7	5	8	2.5	6.75
	Mountain	50	35	8.0	6.0	8	10	6.5	16.25
Gravel	Rolling	100	80	11.30	7.6	4	6	1.5	3.17
	Hilly	80	55	11.30	7.6	5	8	2.5	6.75
	Mountain	50	35	8.0	6.0	8	10	6.5	16.25
Bitumen 2	Rolling	80	60	8.0	5.5	5	8	2.5	5.75
Gravel 2	Hilly	60	50	8.0	5.5	7	11	4.5	8.25
	Mountain	30	25	8.0	5.5	10	12	18	33
Bitumen 3	Rolling	60	50	6.00	3.5	5	8	4.5	8.25
	Hilly	30	35	6.00	3.5	8	12	6.5	16.25
	Mountain	30	25	5.00	3.5	10	14	18.0	33
Gravel 3	Rolling	60	50	6.00	5.5	5	8	4.5	8.25
	Hilly	30	35	6.00	5.5	8	12	6.5	16.25
	Mountain	30	25	6.00	5.5	10	14	18.0	33.0
Gravel 4	Rolling	60	50	4.0	3.5	5	8	4.5	8.25
	Hilly	30	35	4.0	3.5	8	12	6.5	16.25
	Mountain	30	25	4.0	3.5	10	14	18.0	33.0

APPENDIX XII

PURCHASING PROCEDURES, SPRPA

LESOTHO

Roads Headquarters,
P.O. Box 194,
Maseru 100.

26th April 1982.

Project Manager
S.P.R.P.A.
Private Bag A-40
MASERU 100.

SOUTHERN PERIMETER ROAD PROJECT
1982 -04- 29
PRIVATE BAG A40
MASERU - LESOTHO

Dear Mr. Ramey,

Re.: S.P.R.P.A. Purchasing Procedures

F.C. (Roads) has been working with you and Mr. Christiansen to finalize a proposed purchasing procedure for the S.P.R.P.A. It is absolutely crucial that we formalize the procedures and implement a comprehensive system immediately.

The attached flow charts summarize the purchasing process and tendering process as we envision them. If you wish to make any changes to this procedure, please advise us. Otherwise, the procedure will be submitted to the Authority for approval in thier next meeting. In the interim, you should endeavour to implement the system.

Yours faithfully,

M. MARUMO
CHIEF ROADS ENGINEER

PURCHASING FLOW-CHART

Construction Site	Accounts (Maseru)	Purchasing Agent (Maseru)	Vendor

Initiate Purchase Req.
- Project Manager
- Chief Superintendent
- Mat'ls Engineer
- Dep. Chief Supt. (Const.)
- Dep. Chief Supt. (Eqpt)
- Master Mechanic
- Shop Repair Foreman
- Field Repair Foreman

Initiate Purchase Req.
- Comptroller

Approve Purchase Req.
- Project Manager

Approve Purchase Req.
- Project Manager

* - review VS. USAID source/origin criteria.
- tender process
- prepare P.O.
- Central stores Approval

> M 10,000 → Approve P.O.
- comptroller

≦ M 10,000 → Distribute P.O.

Distribute P.O.:
- Copy to requisitioner; copy to on-site stores
- Copy to requisitioner; 2 copies to Accts
- Copy to file
- origin[illegible] vendo[illegible]

Vendor delivers material

if delivered to site, [illegible]ore prepares [illegible]at'l received report
- sends copy to accts

Stores issue mat'l to job using inventory issue slips

if delivered to Maseru,
- accts prepares mat'l received report

accts matches mat'ls received report to order

- accts matches invoice to order/materials received report.
- prepares cheque request

Vendor issue invoice

accts prepares cheque

≦ 5,000 Class A + b sign
> 5,000 2 Class As' sign

Cheq[illegible] rec[illegible]

* Assumes experienced Purchasing Officer is employed.

Procedures

- Minor purchases on site

(1) Petty cash purchases (Less than M 50.00) by employees:

May be reimbursed on-site by Asst. Controller from imprest fund. Reimbursement request must be approved by an officer authorized to write Purchase Requisitions.

(2) Small Purchases on account:

Accounts are maintained at 2 trading stores in Mt. Moorosi for small emergency purchases. 4 employees are authorized by the Project Manager to pick-up goods on account. The monthly accounts from the trading stores are reviewed by the Project Manager who approves the account for payment by the Accts section.

Tendering Process

All sources must be considered VS. USAID source/origin requirements

0 - M 2,999.99.

- telephone quotes for best prices

M 3,000 - M 10,000

- minimum of 3 written quotes required
- can accept lowest quote
- if desired source is not lowest quote it must go to T.B.

> M 10,000

- must get T.B. approval

Use existing GOL tenders

OPEN TENDER

- SPRPA submits tender request to T.B. giving full details
- T.B. accepts recommendation to go to open tender.
- S.P.R.P.A. advertises
- Tenders recv'd at T.B.
- Tenders opened, logged-in & turned over to SPRPA for analysis.
- SPRPA performes analysis and presents analysis with recommendations to T.B. within 7 days.

SELECTED TENDER

- SPRPA submits recommendation to T.B. for selected tender (with reasons) with list of selected vendors.
- Tender Board may
  - direct open tender
  - accept recommendation
  - accept recommendation w/change to selected vendors.
- S.P.R.P.A. requests quotes from selected vendors.
- Selected vendors submit tenders to T.B.
- T.B. opens Tenders.
- Tenders turned over to S.P.R.P.A. for analysis
- S.P.R.P.A. performes analysis and makes recommendation.

- T.B. Selects vendors *
- T.B. reference # assigned & confirming memo sent to SPRPA.
- Tender results published in gov't gazetta

Purchase order prepared quoting Tender Board authority no. & date

* Exceptions to policy (e.g. accepting other than lowest bidder, blanket tenders, etc) must be approved by Minister of Finance

Best Available Document

APPENDIX XIII

SUMMARY OF CLAIMS

APPENDIX XIII

SUMMARY OF CLAIMS

Nello Teer Contract: Cut-off (title II)

Claim 1: 2:	Two days delay due to approaches to bridge (claim is minor)	
Claim 3:	Delay on commencement of Quthing Bridge	M838,073.84
Claim 4:	Delay from Blasting methods	309,271.00
Claim 5:	Additional costs for blasting operations transport and cost of explosives (escalation)	93,204.99
Claim 6:	Delay due to large over-run of rock excavation. M762,551 per month for 6 months = M4,569.306	4,569,306.00
Claim 7:	Delay due to Roadway realignments	5,805,025.00
	TOTAL	M11,614,880.83

N.B.: On claim No. 6 extension of time has been assumed as six months.

APPENDIX XIV

PARTICIPANT TRAINING: CIVIL ENGINEERING

PARTICIPANT TRAINING: CIVIL ENGINEERING

List of Participants who are training as Civil Engineers

1. Mr. Thabiso Ngozwana	B.S. Civil Engineering	So. Dakota School of Mines & Tech.	8/80 - 8/8
2. Mr. Sixtus Tohlang	B.S. Civil Engineering	So. Dakota School of Mines	8/80 - 8/8
3. Mr. Sydney Matsepe	Diploma Civil Engineering	Kenya Polytech	1/82 - 12/8
4. Mr. Moeketsi Molefe	B.S. Civil Engineering Technology	South Dakota, Springfield	8/82 - 8/86
5. Mr. Seutloali Makhetha	B.S. Civil Engineering Technology	South Dakota, Springfield	8/82 - 8-86
6. Mr. Paul Thamae	B.S. Civil Engineering Technology	South Dakota, Springfield	8/82 - 8/86
7. Mr. Raymond Mahamo	B.S. Construction Engineering	So. Dakota School of Mines & Tech.	5/81

NOTE: One participant has already returned from training:

Mr. Donald Tsekoa	B.S. Civil Engineering	Syracuse University New York	Ministry of Works/ Road Branch

APPENDIX XV

CONTRACTOR'S PERSONNEL: TITLE II (N.T.)

CONTRACTORS PERSONNEL

AS OF

30 April 1983

EXPATRIATES

NAME	CLASSIFICATION	NATIONALITY
Sam T. Koff	Project Manager	American
Ken E. Gutzman	Project Engineer	American
Irvin Myers	Senior Equipment Superintendent	American
Parks D. Deal	Senior Structure Superintendent	American
Glenn Schutt	Warehouse Supervisor	American
Bernard J. Leggott	Senior Excavation Superintendent	Canadian
Brian Kent	Drainage Superintendent	British
Veronika V. Hutton	Soils and Materials Engineer	Australian
Antonio E. Peralta	Earthworks Superintendent	Philippino
Alfredo D. Bucao	Earthworks Superintendent	Philippino
Robin M. Letchford	SubBase Superintendent	British
Domingo R. Dalit	Quarry Superintendent	Philippino
Ernesto D. Reyes	Concrete Supervisor	Philippino
Alejadinero Ragadio	Mechanic Superintendent	Philippino
Angelo B. Bucao	Mechanic Superintendent	Philippino
Honorio M. Fernandez	Mechanic Superintendent	Philippino
Mateo Ferolino	Mechanic Superintendent	Philippino
Armando E. Jardinero	Mechanic Superintendent	Philippino
Leonides C. Sandoval	Mechanic Superintendent	Philippino
Juli Cabrega	Mechanic Superintendent	Philippino
Lino Lopez	Mechanic Superintendent	Philippino
William D. Hunter	Mechanic Superintendent	British
William R. Carter	Mechanic Superintendent	South African
Radhey S. Nagpal	Mechanic Superintendent	Indian
Carlos Escarrilla	Field Engineer	Philippino
Ming Mallari	Field Engineer	Philippino
Virender Chopra	Field Engineer	Indian
Alnoor Babul	Financial Controller	Tanzanian
Nazir Munshi	Administrative Assistant	Malawian
Gene Cass	Manitowoc Crane Operator	South African
Om. P. Bhola	Office Engineer	Indian
Patrick Weir	Drilling Superintendent	British
William Potgieter	Fine Grade Superintendent	South African

MALAWI NATIONALS

NAME	CLASSIFICATION
Fanwell Tambala	Pipe Foreman
Fanuel Chimseu	Cheif Mechanic
Gordon Mbale	Mechanic
R.D. Saliwa	Crusher Foreman
Joe Bakali	Concrete Foreman
K.C.J. Chingola	Crusher Mechanic
B. Chiumba	Crusher Mechanic
A.T. Lungu	Crusher Welder
E.T. Banda	Crusher Welder
M.J. Nowenje	Auto Electrician
Jaston Bauleni	Air Trac Operator
Komani Kusawali	Driller Foreman
James Goodwell	Grade Checker Foreman
G.L. Mkonde	Grade Checker
J. Kamanga	Grade Checker
Alfred Chinthochi	Scraper Operator
Rodney Dick	Scraper Operator
W.E. Mbalamakanda	Scraper Operator
F. Chisau	Scraper Operator
B. Mwale	Scraper Operator
Wyson Nakeyo	Dozer Operator
Frank Filip	Dozer Operator
N.S. Nyauka	Dozer Operator
D.D. Nyau	Dozer Operator
M. Lamfala	Dozer Operator
K. Bitoni	Dozer Operator
Steven Njolomole	Dozer Operator
J.S. Nawele	Loader Operator
W.S. Mpangeni	Winch Truck Operator
Raywell Kuchangale	Carpenter
John Tembo	Carpenter
Saukani Tayison	Carpenter
Kennedy Kaledza	Carpenter
Kedson Kunyambo	Carpenter
James Mengatenga	Steel Fixer Foreman
Daudi Mhumula	Steel Fixer
Samson Jamu	Steel Fixer
Lajabo Swale	Steel Fixer
Bettes Chirwa	Draftsman
O. Mkandali	Transitman
Ernest Nthache	Survey Party Chief
Rex Mlaya	Survey Party Chief
Fostin Thawani	Soils/Materials Technician
Hastings Kalinde	Soils/Materials Technician
Alick Longwe	Chief Stores Clerk
George Njala	Drainage Foreman
Iron Kalowa	Crane Operator

LESOTHO NATIONALS

Heavy Equipment Operators	17
Drillers	27
Air Trac Operators	2
Heavy Duty Drivers	15
Light Duty Drivers	3
Tyre Man	2
Mechanic	7
Lubricators	7
Welders	2
Foreman	3
Labour Pushers	7
Carpenters	5
Plumbers	4
Electricians	3
Painters	1
Rigger	1
Steel Fixers	6
Masons	15
Concrete Finishers	0
Cooks	4
Kitchen Helpers	7
Watchmen	31
Time Keepers	7
Store Clerks	4
Parts Man	1
Custodian Junior Camp	1
Administrative Assistant	1
Accountant	1
Secretaries	1
Engineering Clerk	1
Senior Typist	1
Payroll Clerks	3
Cleaners	3
Grade Checkers	5
Labourers	157
Skilled Labourers	1
Semi Skilled Labourers	16
Junior Technician	1
Instrumentman	2
Panel Beater	1

APPENDIX XVI

TRAINING PROGRAM MEMO, TITLE II

Our Ref: PRC-76 30 August 1982

The Resident Engineer
PRC Harris, a Division of
PRC Harris Engineering, Inc.
Private Box 139
Mount Moorosi
Quthing, Lesotho

Subject: Training Program
Re: Mount Moorosi-Mphaki Cut-Off Road Project

Dear Mr. Pototo:

This will refer to your letter reference T/034/82 regarding our Training Program for the Lesotho Nationals employed on this Project.

As you are aware, normal Training Programs, per se, are usually formulated and thence implemented on a timely schedule for Projects or Schemes without any predetermined completion time. Since our Project is for only 24 months, we have, during the first 12 months, consistently reclassified many Lesotho employees with commensurate wage increases.

These promotions were as a result of our In-House-Training Program, specifically, the diligent counseling and guidance by our Expatriate Supervisors to those employees who demonstrated a keen interest in their assigned duties and responsibilities. A recap of those promoted is noted hereunder:

Number	Initial Classification	Reclassified as
15	Labourer	Semi-Skilled Labourer
5	Labourer	Labour Headman
1	Labourer	Jack Hammer Operator
1	Labourer	Grade Checker
2	Labourer	Electrician (Domestic)
2	Labourer	Painter
1	Labourer	Fuel Truck Assistant
1	Labourer	Time Keeper
1	Time Keeper	Pay Roll Clerk
1	Copy Typist	Junior Secretary
1	Typist	Senior Typist
1	Secretary	Senior Secretary/Telex Operator
1	Mechanic	Lubrication Specialist
1	Welder Assistant	Lube Truck Assistant
1	Panel Beater Assistant	Panel Beater and Sprayer
1	Carpenter	Carpenter Foreman
1	Dozer Operator	Dozer/Back Hoe Operator

193

1	Loader Operator	Loader Operator/ Heavy Duty Driver
1	Light Duty Driver	Heavy Duty Driver
1	Jack Hammer Operator	Plumber
2	Watchman	Senior Watchman
1	Watchman	Welder Assistant
1	Security Chief	Security Chief/Senior Fuel Clerk

In addition to the foregoing employees, the following Lesotho Nationals are currently classified as specific "Trainees" in sectors of our Project as indicated:

1. ENGINEERING

A) Joseph Molefe
Date of hire - 5 March 1982 as a Light Duty Driver
Reclassified - 23 March 1982 as Driver/Rodman-Chainman
Reclassified - 22 June 1982 as Instrumentman

Comments - Presently capable of using Level and Theodolite and is currently working as an Instrumentman on one of our Survey crews.

B) Paul Mathotha
Date of hire - 19 October 1981 as a Skilled Labourer
Reclassified - 23 March 1982 as an Instrumentman

Comments - Presently capable of using a Level

C) Ella M. Khatsoane
Date of hire - 2 March 1982 as a Labourer
Reclassified - 25 May 1982 as a Semi-Skilled Labourer
Reclassified - 22 June 1982 as a Lab Technician

Comments - Presently capable of performing routine Lab tests.

D) Amelia Setati
Date of hire - 13 May 1982 as a General Clerk
Reclassified - 22 June 1982 as an Engineering and Lab Technician

Comments - Presently capable of calculating quantities, performing minor drafting and taking compaction tests.

2. EARTHWORKS

A) Bernard T. Mkhelise
Date of hire - 13 August 1982 as a Grade Checker

B) Liau Mkhelise
Date of hire - 15 July 1982 as a Grade Checker

Comments - Both above employees now learning to take grade and slope elevations.

3. STRUCTURES

A) Refuce Hosolo
Date of Hire - 20 April 1982 as a Store Keeper
Reclassified - 2 August 1982 as a Steel fixer

B) Yempo Monyatsi
Date of hire - 16 March 1982 as a Labourer
Reclassified - 2 August 1982 as a Steel Fixer

Comments - Both above employees learning to place and tie deformed steel bars in mock up areas.

4. WORK SHOP

A) Mothobi Moremoholo
Date of hire - 22 June 1982 as a Panel Beater

Comments - Currently learning all aspects of panel beating and spray painting

B) Naioli Moremoholo
Date of hire - 22 June 1982 as a Welder

Comments - Presently learning basic fundamentals of mild steel welding.

Lastly, we will continue our efforts to monitor, motivate and assist those employees who have the potential to be more productive, thereby, improving their earning capacity.

Very truly yours
NELLO L. TEER COMPANY

Sam T. Koff
Project Manager

Copy to: Chief Roads Engineer (Mr. M. Moruao)
Project Engineer, Roads (Mr. L.J. Ross)
Chief Engineer, USAID (Mr. F. Zobrist)

bc: H.R. Fredrich, R.T. Gordon, K.E. Gutzman, A. Babul, LPRC outgoing file, rf.

APPENDIX XVII

STATUS OF TRAINEES, TITLE II

18 May 1983

STATUS OF TRAINEES

Re: Title II - Southern Perimeter Road Project
(Mount Moorosi-Mphaki Cut-Off Road Project)

CONTRACTOR - Nello L. Teer Company

As of March 1983

	CLASSIFICATION	NUMBER
1.	Grade Checker	5
	Note: 4 - new hires in March 1983 1 - reclassified from common labourer	
2.	Carpenter	2
	Note: both reclassified from common labourer	
3.	Steel (Rebar) Fixer	2
	Note: both reclassified from common labourer	
4.	Laboratory Technician	1
	Note: reclassified from Semi-skilled labourer	

As of April 1983

	CLASSIFICATION	NUMBER
1.	Grade Checker	4-still in training
	Note: 1 Grade Checker Trainee employed in March 1983 was reclassified as Grade Checker	
2.	Carpenter	3
	Note: additional trainee employed - reclassified from common labourer	
3.	Steel (Rebar) Fixer	4
	Note: two additional t ainees reclassified from common labourer	
4.	Laboratory Technician	1
	Note: was reclassified as Junior Laboratory Technician.	

APPENDIX XVIII

SPRPA MONTHLY PROGRESS REPORT

FORMAT, TITLE III

LESOTHO

W/R/1049-A
LJR/pml

Roads Headquarters,
P.O. Box 194,
Maseru 100.

6th April, 1983.

Project Manager,
S.P.R.P.A.,
P.O. Box 133,
Mt. Moorosi.
Quthing

Re: SPRPA Title III Force Account Project
Monthly Progress Report Format

Attached is a revision to the format for the monthly report submitted with your letter of 22nd March for our review and comment.

Please note that the format has been revised from that outlined in your contract agreement to a more sequential occurrence of project activities. This has been done to aid in readibility and also to assist in a more logical contribution by your team members.

Also note that a report summary precedes the report format to allow for the conclusions and recommendations of the project manager.

The inclusion of training under each activity has been done to emphazise the importance attached to this aspect of the project.

The format is not intended to be all inclusive and items such as bar charts, photographs, special problems, schedules illustrations are encouraged to complete a better understanding of project development and continued progress.

Finally this letter confirms receipt of your 1st monthly report for January 1983. However the February report is long overdue and the March report will be due on the 15th of April. You are encouraged to meet the deadline for the Monthly Report in order to keep this office and the Authority members well informed of progress on the project on a current basis.

Sincerely,

Lewis J. Ross
ENGINEER (SPR)

cc: WORKS
USAID, Maseru

199

FORMAT

MONTHLY PROGRESS REPORT

S.P.R.P.A.

Summary

(a) Conclusions

(b) Recommendations

1. Administration

(a) Project
(b) Camp
(c) Manpower
(d) Industrial Relations
(e) Training

2. Engineering

(a) Design
(b) Surveying
(c) Quality Control
(d) Quantities
(e) Costing
(f) Training

3. Equipment

(a) Procurement
(b) Parts
(c) Maintenance
(d) Costing
(e) Training

4. Construction

(a) Monthly Progress
(b) Percent Complete Versus Projection
(c) Schedule
(d) Costing
(e) Training

5. Financial

(a) Receipts
(b) Disbursements
(c) Budget
(d) Cost Accounting
(e) Training

200

APPENDIX XIX

MONTHLY PERSONNEL REPORT, TITLE III(N.T.)

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

Month ~~WEEK~~ ENDING: 30 APRIL, 1983

SECTION: ACCOUNTING

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH
ACCOUNTING					
Cost Accountant					1
Acting Ass-Purchasing					1
Accounts Payroll Clerk					1
House-Keeper	1				3
Driver/Messenger					1
Administrative Officer					1
Clerk-Typist					1
Chief Time-keeper					1
Assistant clerk					1
Accounts clerk	1				1
Safety-man					1
Inventory clerk					1
Plant Transport Officer	1				1
Ass Purchasing Agent				1	1
Office Assistant	2				2
Ass Personnel Officer					-
Secretary					-
First Aid Man					-
Accountant					1
TOTALS	5			1	19

C Gotte
4 MAY 1983

202

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

MONTH ~~WEEK~~ ENDING: 30 APRIL, 83

SECTION: CAMPING

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH
Watchman	5		2		15
Security Officer					1
House-keeper					2
Driver					-
Casual labourer					3
Labourer	2	2	1		11
Camp Electrician	1				1
Camp Elect-Apprentice	1				1
Carpenter	1				1
Plumber					
CAMP MANAGER			1		-
Casual Workers (Carpenters Plumber)					3
TOTALS	10	2	4		38

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

MONTH ENDING: 30TH APRIL 1983

SECTION: FIELD CONSTRUCTION

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH
Paving Foreman	—				1
Dozer Operator	2			1	4
Loader Operator	3				4
Grader Operator	—				1
Excavator Operator	—				1
Extra Heavy Duty Driver	8				14
Labourer	18	1		1	42
Time-keeper	2				2
Ditcher and Blaster	1				1
Excavation Foreman	—				—
Mason	1			1	2
Roller Operator	1		1	1	2
Casual Labourer	—				—
Construction Supervisor	—				—
Drainage Foreman	—				—
Labourer Foreman	—				—
Air Track Operator	—				—
TOTALS	36	1	1	4	74

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

MONTH ENDING: 30TH APRIL 1983

SECTION: QUARRY

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH
Labourer	—		1		7
Crusher Foreman	—				1
TOTALS			1		8

205

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

~~WEEK~~ Month ENDING: 30 APRIL 1983

SECTION: WAREHOUSE

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH
Labourer					3
P.O.L. Clerk					1
Senior Store-keeper					1
Ass. Store-keeper					1
Equipment Clerk	1				1
Parts Control Clerk	—				—
TOTALS	1				7

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

Month ~~WEEK~~ ENDING: 30 APRIL 1983

SECTION: MECHANICAL

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH	
Service oiler/Fuel Truck	1					
Tyreman	—				1	
Mechanic Supervisor	—					
Heavy Duty Mechanic	2				2	
Light Duty Mechanic	—				—	
Mechanic Helper	1				3	
Senior Welder	—				—	
Welder	1				2	
Auto Electrician	—				—	
Panel beater	—				—	
Labourer	—			1	3	
TOTALS	5			1	11	1

SOUTHERN PERIMETER ROAD PROJECT AUTHORITY

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

~~WEEK~~ Month ENDING: 30th April 1983

SECTION: ENGINEERING

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH	
Draftsman					1	
Engineer					2	
Assistant Surveyor					-	
Chainman					-	
Labourer					-	
Cost Technician					-	
Secretary					-	
Computor Operator					-	
Ass. Cost Technician	2				2	
TOTALS	9				5	

208

SOUTHERN PERIMETER ROAD PROJECT AUTHORITY

Monthly REPORT FOR ENGAGEMENTS, DISCHARGES AND TRANSFERS

~~WEEK~~ Month ENDING: 30 April 1983

SECTION: SOIL LABORATORY

CLASSIFICATION	ENGAGED	DISCHARGED	TRANSFERS From (-)	TRANSFERS to (+)	STRENGTH
Material Test. Engineer					1
Senior Soil Technician					1
Soil Technician					1
Ass. Soil Technician					1
Labourer	1				1
TOTALS	1				5

209

APPENDIX XX

BASELINE STUDY:GENERAL TERMS OF REFERENCE

APPENDIX XX

SOCIO-ECONOMIC BASELINE STUDY

Since transportation touches every aspect of a society and economy, almost every socio-economic variable constitutes a potential index of positive or negative changes that might result from road construction. The problem then becomes one of selecting a few variables from a universe of possibilities. Three selection criteria seem critical: validity of a particular variable as compared to others; feasibility of accurately determining values of selected variables; and possibilities for monitoring changes (i.e., resampling) over time. In the case of the SPR, a fourth criterium might be whether a particular variable had been used before in another baseline study and therefore is available for use without a new survey.

It is outside the scope of this evaluation to do more than suggest possible variables for monitoring changes for which an improved SPR might be responsible. The following list, adapted from Devres (1980) will serve to suggest the possibilities, but not to limit, such a study.

A. Production
   1. Agricultural production
      a. Production levels
      b. Crop composition
      c. New technology and inputs
      d. Extension services, cooperatives, credit facilities
   2. Agro-industry and non-agricultural enterprises
   3. Employment levels
      a. Short-term employment
      b. Long-term employment
   4. Land value, tensure, and use
B. Marketing: Structure and Patterns
C. Transport Section Analysis
   1. Ratio/Costs/Profits
   2. Quantity/Structure
   3. Origin/Destination
   4. Supplies/Associated Facilities
D. Consumption Effects
   1. Health and education services
      a. Health and nutrition
      b. Education

E. Distribution of Impacts
   1. Distribution of impacts by socio-economic groups
   2. Geographic distribution of impacts
F. Spatial Considerations
   1. Urbanization
   2. Migration
G. Social Change
   1. National integration
   2. Community development
   3. Impact on minority groups
   4. Community values and family structure
   5. Impact on women
H. National integration
I. Urbanization, dispersion, and migration
J. Environmental impacts

The literature on both road impacts and baseline studies is voluminous. Of particular interest are recent general guides to road evaluation, and baseline studies already concluded in the SPR Project area (portions of Mohale's Hoek and Quthing Districts):

Anderson, G. William, Rural Roads Evaluation Summary Report, A.I.D. Program Evaluation Report No. 5. Washington, D.C.: USAID, March 1982.

Devres, Incorporated, Socio-Economic and Environmental Impacts of Low-Volume Rural Roads -- A Review of the Literature. A.I.D. Program Evaluation, Discussion Paper No. 7. Washington, D.C.: February 1, 1980.

Gay, John, Rural Sociology Technical Report (2 parts). Maseru: Ministry of Agriculture, April, 1977.

Guma, Tesfa and William Mafoso, Farm Management Economics Terminal Report on Socio-Economic Survey. Maseru: Ministry of Agriculture, June 1976.

Reichart, W. and F.E. Winch, Phase I, Basic Agricultural Data for Blocks V/VI. Baseline Survey Research Report No. 3. Maseru: Ministry of Agriculture, April 1981.

Winch, Fred, The Agro-Economic Farm Situation in the Lowlands and Foothills of Lesotho. Maseru: Ministry of Agriculture, October, 1981.

APPENDIX XXI

INITIAL SOCIAL/ECONOMIC IMPACT, SPRP

APPENDIX XXI

INITIAL SOCIAL/ECONOMIC IMPACT, SPRP

The primary social impact of the SPR to date has been in the immediate areas of construction activities. More than 500 workers are currently employed on the project (both Titles II and III). Although most are Basotho, perhaps 100 are non-nationals, primarily from Malawi and the Philippines, with experience in equipment operation and maintenance. At the time of this evaluation the combined salaries ranging from Lesente 25/hour for guards to more than Maloti 1.00/hour for equipment operatiors (M1.00 equals ca US$1.00) were on the order of M100,000 per month.

A large part of the wages of non-nationals is remitted to families in Malawi and the Philippines. But the balance, and most of the wages paid Basotho laborers remains in country and much of this is spent in the towns and villages near the construction operation.

The main construction camps for both Title II (Mount Moorosi-Mphaki cut-off) and Title III (Force Account upgrading, Quthing-Mount Moorosi) are located near the town of Mount Moorosi. The two general stores there report a brisk business in consumables such as food, clothing, and housewares. Food sales are especially high this season since harvests from local farms have been reduced by severe drought. Project officials also report some local purchase of supplies and food for the project from merchants in nearby towns. In addition, one of the stores (Mitchell Brothers) is moving a considerable volume of building materials (e.g., corrugated steel roofing, cement, wheelbarrows) which apparently is being used to build, expand or renovate private houses. Beer and liquor sales also are high, especially after paydays. Although there is a branch bank in Mount Moorosi that offers the opportunity for savings in interest-bearing accounts, the level of savings

in this form was not determined. Presumably, the level of expenditures, savings, and investment could be determined from local sales and bank records, and from tax reports, should an analysis of local project impact be undertaken.

As is true all over Lesotho, hard- and soft-goods and even most consumables, including fresh fruits and vegetables, are imported from the RSA. Thus, although there is considerable impact from project wages and purchases in the form of local sales, and salaries to store employees, most of the funds flow quickly across the border into the RSA economy.

From casual conversations in the region the impression was gained that local attitudes toward the SPR project generally are positive. There were some early complaints that too many jobs were going to people from outside the region. But after negotiations with the contractor, local leaders expressed satisfaction that due consideration was being given to local hire whenever possible. There was also some concern that people from outside the region were coming into the region looking for work on the project and if unsuccessful, tended to remain as unemployed. Since no figures were available, it could not be ascertained whether this was a minor or major problem.

APPENDIX XXII

SAMPLE CONTRACT SCOPE OF WORK FOR EVALUATION

General Background of the Project

The Southern Perimeter Road Project is a 41 million dollar assistance program being undertaken by USAID in Lesotho. Essentially the Project consists of three titles. Title I was completed in 1980, and involved planning and design activities. Title II concerns the construction of approximately 38 km of new road through a virgin mountainous terrain. This construction is currently being done by an American contractor. Supervision of this Title II construction is also being undertaken by a U.S. consulting firm. Title III deals with the upgrading of approximately 150 km of road by a Project Authority (Force Account(, that while being managed by another U.S. consultant, functions as a semi-autonomous entity of the Government of Lesotho/Ministry of Works. A substantial amount of the $41 million fund was provided by USAID for this Title III for the purchase of new road construction equipment and all associated running expenses.

The Southern Perimeter Road Project was beset with a number of design and implementation issues, and problems since its initial authorization on June 30, 1978. Subsequent amendment to this authorization was again developed and approved in September of 1980. Although this amendment addressed and fairly resolved these issues and problems, the project continued to experience further difficulties and problems causing the Project to slip behind the Project Paper schedule.

Objective of the Evaluation

In broad terms, the evaluation will address and answer the effectiveness, significance and efficiency of the Project. In this respect the Project achievements should be assessed in relation to the planned Project targets and any failures or successes ellucidated. The contribution of any achieved targets towards the overall economic development shall also be explored. Any possible alternatives, as well as any side effects shall be investigated and appropriately highlighted.

The benefits identified shall be compared/contrasted with the cost, to determine if one justifies the other. If such a justification cannot be made, other and more efficient means of achieving the same targets should be sought and pointed out.

Specific objectives of the evaluation are incorporated in Scope of Work, below.

ARTICLE I - SCOPE OF WORK

The Contractor, in collaboration with the three other evaluation team members, shall undertake a detailed evaluation of the Southern Perimeter Road Project, comprising of Title I, II and III.

The Title I component of the Project shall be reviewed for general adequacy as it relates to the current title II and Title III activities.

ARTICLE I - SCOPE OF WORK (Continued)

Title II shall be reviewed in detail, and any progress, costs, benefits, and other factors envisaged by the Project Paper shall be compared and contrasted with the current situation.

In Title III the Contractor, in conjunction with the team, shall review in general terms the progress, costs, benefits and other factors accounted for in the Project Paper and these shall be compared to current status. In addition the team shall assess the activities and plans of a new construction management contractor who began mobilization in January 1983.

Further, the contractor, in conjunction with the other evaluation team members shall review GOL participation in the whole Project (Title II and III) including staff support and funding commitments.

In addition to those enumerated in this Scope of Work the contractor shall assess other points that may arise or that he/she may feel appropriate to the evaluation.

The above evaluation is to be conducted through searching of records, reviewing of files, conducting interviews, site visits, and observation and inspection.

The evaluation team will be composed of an engineer, a sociologist, and a transport economist and team leader. The team lead shall direct the evaluation, chair meetings and assign duties in [illegible]ion with this evaluation to evaluation team members, as he dee[illegible]ary and appropriate.

The Evaluation will involve a visit to the actual c[illegible]ruction Project activity site, situated some 200 miles outside the capital city, Maseru. The analysis and writing up of reports will be done in Maseru. Interviews will be conducted in both Maseru and the construction site.

The evaluation will commence on May 9, 1983 and continue through May 27, 1983.

ARTICLE II - PERIOD OF PERFORMANCE

The period of performance under this contract commences May 5, 1983 and concludes May 27, 1983 unless amended by the Contracting Officer. Actual work hours will coincide with the normal work hours of the USAID. Saturday work is authorized under this contract.

ARTICLE III - REPORTS

The contractor, in conjunction with the other team members will present to USAID/Lesotho a draft of the evaluation report not later than COB May 26, 1983. In this regard the contractor as a member of the evaluation team shall inform and discuss the results of the evaluation process so as to assure the timely submission of the draft report that reflects any review/reactions of the USAID to evaluation results. As Team Leader, the contractor will be expected to provide guidance to other team members in the report style and format.

The contractor will follow the methodology of AID's evaluation process, and the draft report shall be prepared in the PES format and shall include an executive summary at the end with any recommendations that the contract team in concert with the USAID determine appropriate.

ARTICLE IV - LOGISTIC SUPPORT

Logistic support under this contract, i.e., office space and equipment, in-country transportation, interpreter/secretarial services and reproduction facilities will be provided by the USAID/Lesotho. In the event this support is not provided the contractor will be reimbursed the cost of the support not provided.

APPENDIX XXIII

PRC HARRIS, LETTER NO. COLS 167
SPR, LETTER NO. W/R/1049-A

PRC Harris, a division of
PRC Engineering, Inc.

Consulting Engineers

CUT-OFF CONSTRUCTION - TITLE II
LETTER NO. COLS 167

23 May 1983

Chief Roads Engineer,
Roads Branch,
Ministry of Works,
P.O. BOX 194,
Maseru 100.

Subject: Quthing River Bridge - History of Foundation Exploration.

Dear Mr.Marumo,

On 17 May 1983 a USAID project review team visited the project area to include the Quthing River Bridge worksite.

On 18 May 1983 two of the team members (Mr.A.Ruiz, Team Leader, and Mr.J.Smith), accompanied by SPRPA Project Engineer Mr.L.J.Ross visited the Engineer's office. During the visit Mr.Smith asked two questions about the Quthing River Bridge - one of which, concerning the above history, a satisfactory answer could not immediately be given.

But, at the meeting it was confirmed that an answer would be forwarded to Maseru.

Attached is the result of a review of our files in which we have endeavored to provide an answer to Mr.Smith's question, specifically his question as to why only one boring per bridge pedestal was taken.

We consider that good judgement was used when only one boring was called for per pedestal. Successful excavation of both abutments and pier 1 have proven the wisdom of that decision. Excavation of pier 2 has proven difficult, this being no surprise since the boring information indicated that the nature of the soil beneath the river channel would present problems during excavation. The Contractor has had and is continuing to have problems as he tries to excavate to pier footing elevation.

Very truly yours,
PRC Harris, a division of
PRC Engineering, Inc.

Robert M. Weishaupt

Robert M. Weishaupt
Resident Engineer.

RMW/gp

CC : Project Engineer, SPRPA (L.J.Ross) - with enclosures
Chief Engineer, USAID (F. Zoerist)

Research Company
Private Box 139, Mt. Moorcroft, Quthing, 750, Lesotho, Southern Africa.

Roads Headquarters,
P.O. BOX 194,
MASERU 100.

W/R/1049-A
LJR/ms

25th May, 1983.

Project Manager,
SPRPA.,
P.O. BOX 133,
Mount Moorosi,
QUTHING 750.

u.f.s. : C.R.C.

Dear Sir,

Re : SPRPA Title III Force Account Project
Installation of Culverts

Considerable reaction has been expressed by members of the USAID evaluation team regarding the manner of culvert installation being made particularly at a location known as sixpenny drop and also on the north side of Mount Moorosi.

It is acknowledged that culvert installations were reviewed by Mr. Zobrist, USAID, and myself during our last visit to site. At that time it was our understanding that the culverts would be laid on a rock foundation and appropriate protection provided to prevent scour both up stream and at the outlet.

Your response, to the question raised by the evaluation team is needed to ensure that adequate design is being employed in the installation of the culverts to safeguard against failure of the road-way due to the installation of the drainage facilities.

Sincerely,

Chief of Works
I(SPR)

C.C. Works
USAID Maseru

Best Available Document

APPENDIX XXIV

SUPPLEMENTAL ENGINEERING EVALUATION

TO

EXTERNAL EVALUATION

SOUTHERN PERIMETER ROAD PROJECT

(690-0076)

KINGDOM OF LESOTHO

John P. Zedalis, P.E.

Consultant

September 28, 1983

SUPPLEMENTAL ENGINEERING EVALUATION
TO EXTERNAL EVALUATION

SOUTHERN PERIMETER ROAD PROJECT
(690-0076)

Table of Contents

A. EXECUTIVE SUMMARY

B. GENERAL

C. OVERVIEW

D. EVALUATION

1. Title I Design

2. Title II - Cut-Off Construction

3. Title III - Force Account

A. Executive Summary

In broad terms, this evaluation addresses the effectiveness, significance, and efficiency of the Southern Perimeter Road Project (SPR) in relation to the technical/engineering issues involved, from conception of the Project to its present stage of implementation.

By any measure, the SPR Project is a major one. The magnitude in funding, length of road, and technical complexity make this road project one of the largest and most difficult every undertaken by AID. Despite these aspects, however, the project was never accorded the necessary time for proper planning and engineering. Beginning with the Louis Berger Feasibility Study (done in 10 weeks) which seriously underestimated road construction costs and projected an overly optimistic implementation scenario; through the retention of PRC Harris for the follow-on design and engineering (9 months); through the award of the construction contract (2 years) to the Nello L. Teer Company; the project was labeled "urgent" every step of the way and, under this pressure, grievous mistakes were made.

The Title I engineering/design effort by PRCH and their initial cost estimate of $121.0 million (never adequately explained) had the most serious effects on this project. The cost estimate forced considerable restructuring of the project, reduction in standards, reduction in the road length to be built by contract, and resort to Force Account methods to build the remainder. Subsequently, as construction commenced under the Title II and Title III phases of the project, serious errors in the road's horizontal alignment were found. Numerous alignment changes had to be made, in some cases, to avoid fills as much as 80 meters in depth. In general, the plans produced by PRCH were found to be unusable except for the Mt. Moorosi-Mpha Cutoff which was redesigned under instructions from MOW. However, even in the cutoff section, 15 alignment changes were made. The discrepancies found in the design plans, and the

possibility that PRCH may have deliberately concealed their cost estimate for the project until the 82 percent completion stage, thus misleading AID and the MOW into believing there was a viable project, merits a re-review of PRCH's performance on the Title I design by AID/IG to determine whether fraudulent practices were employed.

Construction of the Mt. Moorosi-Mphaki cutoff by Teer is progressing, but slowly. Originally scheduled for completion August 8, 1983, the road is now only 65 percent complete. The projected date for completion is February, 1984. The quantity of rock excavation was seriously underestimated by PRCH; the overrun is close to a final figure of 170,000 cubic meters, or 138 percent over the BOQ estimate of 125,800 cm. Construction of the Quthing River Bridge (80 meters in length) has also been extremely slow; it is now expected to be completed in November, 1983, 14 months behind schedule. Although the contractor has never demonstrated any effort to accelerate his construction pace, he has submitted claims for additional work and incurred delays in the amount of $11.6 million. The present PRCH Construction Supervision Team is performing satisfactorily. The 15 alignment changes by the PRCH team has reportedly resulted in cost savings of $940,074.

Work under Title III consists of upgrading 151 km of existing road from Quthing to Mt. Moorosi, and from Mphaki to Qacha's Nek, to all-weather 2-lane standards. An expatriate Technical Management Team from the Nello Teer Company which operates autonomously from the Title II work, is responsible for day-to-day construction operations using hired (Forced Account) labor. Originally PRCH was contracted to provide Technical Management services but their contract was terminated in July, 1982 for default in performance. The Teer team, after a slow and shaky start, is now performing staisfactorily and construction operations are getting more efficient by the week.

Increased economic development along the roadway is already apparent. The construction of the road has pumped considerable funds into the local economy through employment of local labor and procurement of supplies and food. People are being trained on-the-job and benefiting from their improved skills by increased wages. Despite the numerous and very serious problems which have plagued the SPR project since its inception--a road will be constructed, thus meeting the objective of the project. Much credit is due to those AID/GOL officials who labored long and hard to save this project from becoming a fiasco.

B. GENERAL

This Supplemental Engineering Evaluation was commissioned on September 12, 1983 as a follow-on to the initial Engineering Assessment of May 23, 1983, and the USAID Mission Director's Memorandum of June 1, 1983 on said Engineering Assessment (these documents are contained as Appendices I and III respectively, in the External Evaluation). In broad terms, this Evaluation addresses the effectiveness, significance and efficiency of the Southern Perimeter Road Project in relation to the technical/engineering issues involved, from conception of the Project to its present stage of implementation.

Although supplementary in nature to the previous assessments, this Evaluation particularly attempts to set certain aspects of the Project in better perspective, elaborate on and/or clarify those issues/problems identified in said Assessments; and, to provide guidance for more orderly prosecution of the remaining Project works. As such, some redundancy in the following discussion has been unavoidable and some of the observations and comments are at variance with previous documentation.

This evaluation was begun on September 13, 1983 and the time devoted to it was approximately two and one-half weeks. Two separate visits were made to the construction sites to observe the on-going work and to discuss the operations and problems with both the Consultant's and Contractor's personnel. Extensive interviews with Ministry of Works' officials and Engineers, and concerned AID/Lesotho personnel were also conducted.

C. OVERVIEW

By any measure, the Southern Perimeter Road Project (SPR) is a major one. The magnitude in funding, length of road, and technical complexity, particularly in the mountainous terrain, make this road project one of the largest and most difficult AID has ever undertaken. Although hindsight is better than foresight (its very magnitude and complexity were obvious) unfortunately there is no evidence that anyone, neither the feasibility study consultant, the design consultant, nor AID personnel involved, gave any recognition to this. Had there been "warnings", perhaps the project would have been accorded the necessary time for proper planning, engineering and review. The records indicate "urgency" every step of the way and under this pressure, grievous mistakes were made. It is not the purpose of this report to "finger" anyone, but the Project's implementation problems again emphasize the need for adequate time and expert technical inputs. This is not the first infrastructure project undertaken by AID that has run into difficulty or funding shortfalls because these precepts were ignored.

In the writer's view, the genesis of the problems on the SPR lie with the Louis Berger Feasibility Study. Although labelled a "Technical/ Economic Feasibility Study", insofar as the engineering portion of the report is concerned, it was of reconnaissance quality. The ten-week time schedule was simply insufficient to develop adequate engineering information (particularly on the geo-technical aspects) which is fundamental to the projection of reasonable construction cost estimates and time schedules for execution. The Berger Study is voluminous and, on first perusal, impressive. In fact, the writer found it to be a remarkable

production to have been completed in such a short time. However, close examination indicates mostly a "paper exercise", particularly on the geo-technical inputs and the selection of the cutoff alignment between Mt. Moorosi and Mphaki. Other technical deficiencies include the recommendations on basic design criteria and half-benching of the roadway (unacceptable on steep slopes). The construction cost estimate of approximately $28.0 million for 155 km of 2-lane road (38 km of which represented the Mt. Moorosi/Mphaki cutoff) was seriously low. In sum, the low construction cost estimate and overly optimistic implementation scenario projected by the Berger Feasibility Study seems to have greatly encouraged the hasty authorization and implementation of the Project.

The technical inadequacy of the Berger Feasibility Study was revealed during the follow-on design effort by PRCHarris (PRCH). The design contract between the Government of Lesotho/Ministry of Works (GOL/MOW) and PRCH was signed on April 5, 1979. The engineering work began in May and preliminary roadway plans were completed in December 1979. (PRCH's engineering/design effort is more fully examined in the following section of this report.) PRCH's construction cost estimate of $121.0 million for the SPR road could not be seriously considered by AID and the GOL, and the Project was consequently restructured. AID's original grant was increased from $26.0 million to $34.0 million, and the GOL contribution from $5.5 to $7.5 million equivalent. Restructuring of the Project resulted in significant reduction of design standards and length of road to be constructed by contract. Unfortunately, the original design (Title I) and subsequent redesign of the Mt. Moorosi-Mphaki segment by PRCH created additional problems on this Project. The preliminary design span of 8 months was extremely short for the original project, i.e., from Mohale's Hoek to Qacha's Nek, a distance of 155 km. Subsequent analysis

of the final design plans for the road from Mohale's Hoek - Quthing (Package B) and from Quthing - Qacha's Nek (Package A) indicated them to be of limited value. (As of this writing, it was reported unofficially that MOW had completely abandoned trying to use them.) Even the redesigned plans for the Mount Moorosi - Mphaki Cutoff had serious deficiencies, principally in the alignment and gross underestimation of rock excavation. Reasons for these deficiencies are noted elsewhere in this report.

A construction contract in the amount of $15.9 million for the Mt. Moorosi-Mphaki Cutoff was signed between the GOL and Nello L. Teer (NLT) on June 29, 1981. The Engineer's Notice to Proceed was issued on July 9, 1981. Construction officially commenced August 8, 1981. The scheduled completion date was August 8, 1983. At this point in time, construction is progressing but the Contractor is way behind schedule; construction of the Cutoff is only about 65% complete. In general, the Contractor's lack of progress may principally be attributed to poor job management, old equipment which has resulted in a high down-time percentage, and a 138 percent increase in rock excavation (a condition unforeseen by either the Berger Feasibility Study or PRCH during its engineering investigations for the roadway design). Completion of construction is now projected to be February 1984. Furthermore, the Contractor has submitted claims for additional work and incurred delays in the amount of $11.6 million.

Despite the numerous and very serious problems which have beset this project from the outset, principally in the engineering discrepancies found, progress is being made - a road will be constructed - and much credit is due to those AID/GOL officials who labored long and hard to restructure and save this project from becoming a fiasco.

Increased economic development along the roadway is already apparent. Verbal discussions with project personnel cited increased traffic and some signs of expanded agricultural development. In one instance, near Mphaki, it was noted that one village was no longer laboring to keep the old road open; their efforts were not being devoted to improving their own access road to the main road. In addition, the construction of the road has pumped funds into the local economy through employment of local labor and purchase of supplies and food. New shiny tin roofs on many houses are plainly visible all along the road. People are also being trained on-the-job and the skills developed are not only benefiting the individual concerned (many have already been promoted) as regards future job opportunities, but benefiting the country as well through development of this human resource.

D. EVALUATION

1. Title I Design

A contract between MOW and PRCH for the engineering, final design and preparation of bid documents for the Southern Perimeter Road was signed on April 5, 1979. The Notice to proceed was issued May 1, 1979 and PRCH commenced work May 5th. Work was to be completed in 9 months, i.e., in January 1980. The road was split into two segements: Package "A" from Quthing to Qacha's Nek (including the Mt. Moorosi-Mphaki Cutoff), and Package "B", from Mohale's Hoek - Qhthing. Aerial photography (photogrammetry), on a scale of 1:8,000, was employed to establish topographic features along the roadway corridor. However, aerial photography has been proven

232

to be a dubious approach for final design of highways in mountainous terrain because of difficulties in slope interpretation, particularly if heavy sun shadowing results from the photography. Its usefulness is directly tied to the ground controls established, and is usually augmented by actual-on-the-ground surveys. The extent of the effort by PRCH concerning the latter could not be definitively determined, but the available evidence indicates the effort was minimal.

Route location or the establishment of a roadway alignment is fundamental to the entire design process. Prudent engineering also dictates "walking the route", to refine the alignment. PRCH was reported to have done this. However, examination of the final plans submitted by PRCH indicate a "school-boy" process, unprofessional, inconceivable, and grievously in error in establishing the alignment for the SPR.

The alignment shown on the plans frequently and inexplicably runs through some of the most difficult terrain on the job. Numerous instances of excessively high-quantity cuts-and-fills result (e.g., at km 12 + 800, a 27 meter fill is required - many more are in the 15-25 meter range - and two instances with 75-80 meter fills). There is excessive building/house removal (one village is practically wiped out) and an uncalled for routing through a cemetery. In fact, the alighment choice seems to have been based on the premise that "the shortest distance between two points is a straight line". A shift of a few meters in the horizontal alignment would have, in most instances, greatly reduced quantities and minimized other construction problems.

The design standards recommended by the Berger Study (accepted in the Project Paper) were generally followed by PRCH in their Title I design. These were as follows:

Terrain Type	Design Speed (kph)	Roadbed Width (m)	Traveling Width (m)	Maximum Gradient (%)
Flat	100	12	7	4
Rolling	100	10	7	6
Hilly	80	10	7	8
Mountainous	60	9	7	10

This design criteria differs slightly from the GOL standard for G-1 gravel roads. Slightly wider travelway width (0.3m) for all terrain types and a corresponding increase in roadbed width was specified. A major difference was an increase in the design speed for mountainous roads, from 50 to 60 kph. The latter had probably the greatest effect on costs as higher geometric standards are necessary to accommodate the higher speed. Nevertheless, PRCH did not strictly adhere to the established design criteria. For instance, in the first 24 km of road from Mohale's Hoek to Mekaling, 9 sections were found to exceed 10% gradient in both hilly and mountainous terrain (8% and 10% were the maximums, respectively). Whether or not these deviations were approved by MOW/AID could not be definitely ascertained. However, the general consensus is that they were not. Although these deviations are moot at this point, since the Title I design was rejected, it is indicative of the lack of communication between PRCH and MOW, their client, during the design stage.

Examination of the geo-technical data produced by PRCH for the Title I design indicated adequacy and generally good quality, except for the Mt. Moorosi-Mphaki Cutoff where the rock strata was either incorrectly

interpreted or classified (current rock excavation overrun in the cutoff section is approximately 138 percent). Most of the cutoff was apparently surveyed using geophysical techniques to establish the soils/rock profile. The work was conducted for PRCH under subcontract by the Barlow Tractor Division, RSA, and there is reason to believe that their equipment or procedures were suspect -- the results did not match the actual profile as encountered during construction. In all PRCH dug 300 test pits for Package A and took 39 borings; Package B had 150 test pits and 17 borings. Barlow also performed geophysical testing over other selected sites, along the alignment designed by PRCH.

Review of available drainage data also indicated adequacy. Runoff areas were properly calculated and, in fact, were rather conservative (e.g., a 3 and 5 year maximum storm/flood recurrence criterion). Pipes and culverts were accordingly sized, but there is some indication of varying degrees of attention in certain areas - some culverts are missing or improperly located on the plans. However, the latter is not deemed serious as relocation during construction is not uncommon. One must also bear in mind the poor alignment of the road which caused errors. The point is that PRCH's drainage design effort was adequate.

Pavement design was based on the CBR Method as outlined in U.S. Army Technical Manual TM5-822-5 of June 1971 for gravel roads using an 18,000 pound axle load equivalent. This design procedure is compatible with the British Transportation and Road Research Laboratory's Road Note No. 31. PRCH's pavement designs were determined to be satisfactory.

The cost estimates of $121.0 million for the project as defined in the Berger Feasibility Study and the Project Paper, and as designed by PRCH is judged to be reasonable. However, this cost estimate reflects

the modified G-1 design standards and the poorly selected alignment of the roadway which significantly affected quantity calculations. What the cost estimate would have been had the alignment been properly and logically located, is conjectural. Certainly it would have been significantly less but still would not have been within the project budget that AID and the GOL were willing to commit.

The Title I design was substantially modified to accommodate to available funds and redesign of the Mt. Moorosi-Mphaki Cutoff was also accomplished by PRCH in Title I. However, the manner in which the $121.0 million original cost estimate by PRCH was finally made known to AID and the GOL was not in conformance with accepted professional engineering practice. In essence, PRCH committed a breach of responsibility, and possibly unethical practice by perhaps concealing the estimated costs from AID and the GOL until the design work was over 80 percent complete. By the terms of their contract (Appendix II, Section B, Paragraph (C)(2), Draft Plans and Tender Documents) PRCH was required to submit cost estimates on preliminary design (generally accepted to be at the 30-40 percent level). PRCH's monthly project reports for August 1979 indicate that their design work was then 42% complete; that the preliminary alignment for Package A was done and the final alignment for Package B was complete. At this point, PRCH should have provided at least their preliminary cost estimate. However, it was not until November 15, 1979 when design work was 81.8 percent complete that PRCH formally presented preliminary cost data, noting a figure of $60 million for Package A (w/o escalation and contingencies) at a meeting with MOW and USAID/L. This November 15th briefing led the latter parties to believe that the project could be salvaged (with modifications and lower design criteria) at a

figure substantially lower. A follow-up meeting in December formalized the revisions and PRCH was notified to proceed on December 19, 1979. Ultimately, and inexplicably, in April 1980, PRCH presented a final cost estimate of $121 million. Just why the cost estimate doubled is somewhat of a mystery as PRCH apparently offered little explanation. An audit of PRCH Project files might prove very revealing, particularly as to why they seemingly continued to press the design when they knew the project could not be funded. The specific absence of cost data through October 1979 gave MOW and USAID the impression that the design (and cost estimates) were within budget. Billings by PRCH through April 1980 totaled $1,849,847 plus M518,873. The total cost for the entire design effort (including the revised cutoff design) was close to $3,000,000 (including approximately M600,000).

Discussions with USAID/L, MOW, and other interested parties (including the Contractor), and the writer's own examination of the Title I plans produced lead to the conclusion that the Title I plans produced by PRCH are of only minimal use for construction of Title III work (MOW has reportedly abandoned them). The original Title I plans were revised for the Mount Moorosi - Mphaki Cutoff (Title II) but the fact that 37 percent of the original/revised alignment had to be changed (by the PRCH construction/supervision team) during construction is consistent with the indicated poor alignment for the rest of the SPR. Consequently, since the road is poorly and illogically aligned, soils and drainage data/design are likewise largely unusable.

The establishment of the alignment is fundamental to any road project. There is a strong case for an accusation of professional negligence on PRCH's design effort based on their alignment errors and failure

to advise the client of the projected cost overrun. (It should be noted that the writer was recently involved in a similarly circumstantial AID-financed highway in Indonesia where charges were brought against the design consultant by AID and the Department of Justice for negligence in connection with the vertical alignment. The case was successfully settled out of court in favor of AID.)

RECOMMENDATIONS

1. That AID's Inspector General's Office re-review the performance and production of PRCH Title I design and Title II effort for possible prosecution and recovery of at least part of the money paid PRCH under this project. Examination of PRCH's project files could more definitively reveal how and why the project went awry and whether fraudulent practices were employed. IG review is also believed to be crucially important to the claims submitted by the Contractor on Title II work. If the claims can be attributed, in whole or in part, to the Consultant's work, then PRCH might bear liability. The magnitude of possible recovery from PRCH requires much more study, but a very rough approximation indicates that it should be in the order of at least $1,000,000 for Title I work, plus a possible portion of the construction claims settlement with the Nello Teer Construction Company, if any.
2. AID should insure in-depth review of proposed infrastructure projects by qualified specialists in the concerned field, not by General Engineers. Adequate time (and money) for preliminary engineering in feasibility studies to satisfy 611(a) requirements is also essential. The old adage "haste makes waste" was never more true than for this project.

3. The previous Assessments have suggested that a Case Study be made of this project. The writer views these suggestions rather lukewarmly as the project has a "deja vu" quality to it. There are numerous other infrastructure projects which AID has financed, both past and present that had or have similar problems. Rather than single this project out for a discrete study, it is suggested that an AID-wide comprehensive study of problem projects of an engineering nature would be far more useful to AID's top management.

2. Title II - Cut-Off Construction

The original design for the Mount Moorosi-Mphaki Cutoff was revised by PRCH on instructions from MOW in December 1979. The design criteria was further downgraded (with USAID/L's concurrence) by directive from MOW in July, 1980 and final plans were submitted by PRCH on December 15, 1980.

The construction portion of the project was advertised in the Commerce Business Daily on October 22, 1980. Eligibility of potential contractors was limited to the U.S., Lesotho and Code 941 countries. After rejection of initial bids by 6 competing firms as excessive, all of the firms were invited for competitive negotiation. Three responded and ultimately a contract was negotiated with the Nello L. Teer Company (NLT) of Durham, North Carolina on June 29, 1981 in the amount of $15,838,426.00 (a reduction of approximately $10,000,000 from his original bid, principally attained through further reduction in standards and a $4,000,000 advance). Under Amendment No. 1 to their contract with MOW for Title I, PRCH was retained to provide supervision of construction services for this Title II construction phase. The Engineer's Notice to Proceed was issued on

July 9, 1981. Construction of the cutoff was scheduled for completion on August 8, 1983. As of this writing, the work is approximately 65 percent complete. The projected completion date is now February, 1984. On July 7, 1983, the road was "blasted" through and for the first time 4-wheel drive vehicles could traverse the entire road.

This part of the report deals mostly with specific items of work, the management process by both the contractor and consultant, and specific technical problems raised in the preceding evaluations by others. It does not deal with the merit or demerit of the construction claims submitted by NLT as it is felt that this is a subject requiring extensive study and any comment would be inappropriate at this stage.

a. Title II Design and Alignment

Numerous changes in the alignment shown in the revised plans have been made in the field by the PRCH Supervision Team. The realignments accomplished involved 15 different segments representing some 37 percent of the "revised" final alignment. These changes were effected to reduce cuts-and-fills and improve grades, mostly in the rock areas. There was also a net reduction of about 1 km in the total length. PRCH also reported savings of $940,074 for these realignments and additional cost savings of approximately M237,000 for realignment of the Quthing River Bridge Approaches. Review of the alignment changes indicate all of them were warranted. In fact, if the present PRCH Supervision Team had been on the job to start with, more savings might have accrued.

b. Rock Excavation

Rock excavation is currently at the 300,000 cubic meter mark (about final) or 138.5 percent over the BOQ estimate of 125,800 cm. The alignment changes noted above significantly reduced rock excavation

or the total overrun would have been substantially larger. The overrun is solely due to PRCH's failure to delineate the rock formations during their Title I design period. Evidently PRCH did not conduct any additional geotechnical studies for the "revisions", at least none could be ascertained. As a result, rock quantity totals in the field could not be accurately estimated by the PRCH Supervision Team until May, 1983. In effect, no one really knew prior to that time how much rock excavation there really was.

c. Monitoring of Overruns

The writer did not find any substantial evidence to indicate that the PRCH Supervision Team was remiss in reporting or monitoring possible or actual quantity overruns. The record indicates a number of meetings with MOW to discuss overruns and directives issued to PRCH's Resident Engineer by MOW to make detailed studies of the rock problem and other areas of potential claims. USAID/L engineering staff was a participant in these meetings or was kept closely advised at all times.

d. Resident Engineer's Authority Re Change Orders

The Resident Engineer's responsibility in regard to change orders is defined in Appendix II, Section B, paragraph (f)(3)(N) which states that he shall "prepare all change orders and assist the MOW in negotiations necessary for the execution of changes". The RE was further provided authority to issue Change Orders up to and including ten thousand dollars under this clause without prior approval of the MOW. The first statement is implicit in regard to change orders over $10,000 and insofar as can be determined, MOW was informed in detail on all such changes, particularly in regard to the realignments. The above procedures are

common practice in engineering supervision contracts, and is done mainly for the purpose of expediting the work in minor changes. Major changes in excess of specified monetary limits are usually referred to higher authority for approval.

e. Contractor's Equipment Fleet

Review of the contractor's equipment indi tes adequate types and numbers for the work but unfortunately most of it is old and downtime is very high. In June, 1983 the availability (for work) of NLT's equipment and vehicle fleet was 62 percent; in July it was 53 percent and, in August 58 percent. The contractor's crusher (in operation only for a few days) has some components dating back to World War II. Most of the equipment that the Contractor has on site was transported from Malawi where many units had been in use for 4-5 years. The normal useful life of heavy equipment such as bulldozers, graders, loaders and scrapers is about 5 years. For the most part, it can be safely surmised that Teer really has no substantial investment left in much of the equipment he has on site. It will be rather costly for Teer to ship this equipment out, since it has only salvage value. There is the possibility that he may offer the equipment to the GOL in lieu of claims' compensation. The writer believes that the GOL would be ill-advised to accept such a proposal, if it actually materializes.

f. Technical Supervision by MOW

From a review of the files and discussions with current MOW personnel, it became evident that MOW certainly did have management and technical capability problems in the formulative and early implementation stages of the project. This project was their first exposure to the AID process and first dealings with U.S. firms. These management

and technical deficiencies have been well-documented in previous reports. As implementation progressed (however painfully at times), MOW's capability significantly improved. A new Chief Roads Engineer was assigned in 1979 who proved to be more competent than his predecessor. Additional expatriate engineers were also employed (three of these positions are being financed by AID). One of these, a highly-qualified American highway engineer is currently assigned full-time to the project. Thus, the previous allegations of management and technical deficiencies on the part of MOW were substantially correct in regards to the early stages of the project, but they do not appear valid now.

Further examination of the records and discussions with project personnel also do not indicate that, at least since 1980-81, that MOW was lax or incompetent in controlling or monitoring the performance of the consultants and construction contractor. In sum, at this stage in time, the writer finds MOW staff to be quite capable of handling the project and dealing with the construction claims by NLT. Regular meetings are held with both the consultant and contractor to the extent possible and the job occupies the full attention and time of the MOW engineer assigned to it.

g. Quthing River Bridge Site

The Quthing River Bridge, as originally designed by PRCH, had two 20 meter end spans and a 40 meter center span, for a total length of 80 meters. As sited by PRCH in their original design, the bridge was poorly situated and called for extensive rock excavation, particularly in the southwest approach. During contract negotiations, the contractor proposed an alternate bridge design at the same site which would be more suitable to the contractor's equipment, equalize the span lengths, and simplify his construction procedures. NLT's proposal was accepted shortly

after the issuance of the Notice to Proceed. The Contractor's alternate design was submitted on November 5, 1981, subsequently reviewed by PRCH and MOW, and officially accepted by PRC mid-February 1982. On June 8, 1982, PRCH was directed by MOW to study a possible realignment of the south approach with a view towards improving road operation and traffic safety and reduce rock excavation (a reputed 38,000 cm had already been removed). The result of this study indicated that the south abutment "A" could be moved about 8 meters to the west (changing the centerline bearing from N22.694°E to N32.694°E), that rock excavation could be reduced, and that an overall savings of M237,000 could be effected. The PRCH study did not incorporate additional foundation borings (4 were originally taken by PRCH for Title I design and 4 more by NLT for their alternate design) as they were felt to be unnecessary. This decision (with which the writer fully agrees) was based on the uniform soil types and stratigraphy of the location as indicated by the borings and visual examination of the river's exposed banks. (Excavation for foundations subsequently confirmed the soundness of this decision.) On the basis of the consultant's favorable report, the resiting of the bridge was approved by MOW on June 26, 1982. No structured element of the bridge was changed.

The originally scheduled completion date for the Quthing River Bridge was October 31, 1982. To date, the abutments and two center piers have been constructed. The bridge should be completed in December, 1983, 14 months behind schedule. The Contractor has filed a claim in the amount of M838,073 for construction delays encountered in the approval of his alternate bridge design and alignment change.

h. Professional Insurance (Quthing River Bridge)

Premiums for professional liability insurance coverage of an engineering firm's work are usually based on that firm's monetary volume, i.e., for all work done annually by the insured. Deductibles naturally reduce the premium. Insurance premiums are usually treated as normal overhead costs. Coverage is occasionally provided for specific jobs when a high degree of risk may be apparent. It is very unusual that specific items of work, specifically the Quthing River Bridge, would be insured. As the Supervising Engineer, PRCH has the responsibility and is professionally liable to see that all work is done according to the approved plans and specifications. The alternate bridge design by the contractor (the actual design was done by Gannett, Femming, Corrddry and Carpenter, a U.S. consulting firm) was reviewed and approved by PRCH. In effect a simile can be made to "shop drawings" on projects, where the contractor submits these for approval of the Engineer, and that Engineer assumes liability by the fact of approval. Similarly, in the writer's opinion, PRCH is liable for the bridge design, since they are the final approval party. The contractor, of course, is also liable for poor construction or use of non-approved or non-specification material.

PRCH's initial fee request for $37,500 for design review of the Quthing River Bridge (later negotiated downward to $31,750) included $15,000 for liability insurance. This amount constitutes a rate of 1.5 percent, assuming the bridge value at $1,000,000. This rate is commensurate with overall liability premiums usually charged A/E firms (depending on the deductible). However, the bridge value as designed by PRCH presumably had similar value and was covered in their "overall" policy, which in turn is part of normal overhead cost. If PRCH's original

design fee had included item-by-item negotiation of overhead items then PRCH might have valid claim for compensation of additional insurance. Since such was not the case, it is highly questionable that PRCH should be compensated for the claimed additional insurance premium to specifically cover the Quthing River Bridge. However, MOW has conceded on this issue but is requiring PRCH to produce the specific policy and invoice covering their insurance of the bridge.

3. Title III (Force Account)

Work under Title III consists of upgrading the existing road from Quthing east to Qacha's Nek, excluding the Mt. Moorosi - Mphaki Cutoff, to all-weather 2-lane standards. The length of these two segments is approximately 151 km. The project is being implemented under a specially created GOL Southern Perimeter Road Project Authority (SPRPA). The reconstruction/rehabilitation effort provides for an expatriate technical management team being responsible for day-to-day operations using hired (force account) labor. Under Contract Amendment No. 1, dated February 13, 1981, PRCH was to provide these services. PRCH was subsequently terminated on July 12, 1982 for default in performance. Negotiations for the technical services (under an autonomous arrangement) were then instituted with Nello L. Teer Company (the contractor for the Mt. Moorosi-Mphaki Cutoff) and a contract was signed with that company on December 10, 1982. The performance of PRCH and the complex proceedings leading to their termination is discussed in preceding Assessments.

The adequacy of the design plans for the Title III work currently being done in the Quthing-Mt. Moorosi segment is even worse than those produced (and later revised) for the cutoff section. (In fact, MOW has now reported abandonment.) Numerous alignment changes have been made to reduce cut-and-fill work (in two areas 75-80 meter fills were called for), avoid excessive removal of buildings, and avoid other natural or man-made obstacles. Preliminary investigations of the Mphaki-Qacha's Nek section indicate similar problems with the alignment and consequently, with the soils data and drainage designs. PRCH also presented final design plans under Title I for the Mohale's Hoek to Quthing (Package B) segment of the SPR. This segment was/is intended to be constructed by others (no financing by AID). A detailed review of PRCH's design from the former locale (Sta. 0+00) to the Mekaling Road (Sta. 24 +150) by MOW staff revealed numerous deficiencies, again mainly because of the misalignment. MOW estimated that only about 10 percent of the plans could be utilized.

The original design criteria for Title III roads envisaged reconstruction/rehabilitation to G-1 standards, the same as for the cutoff section. Because of funding limitations, these standards were then reduced to G-3 and subsequently, modified even further in regard to grades (some now in excess of 12 percent), geometrics, and pavement design.

The technical/engineering rationale for using the Force Account/Construction Management concept for Title III work developed only when it became obvious that the entire road from Quthing-Qacha's Nek could not be constructed by contract within available funds. The key to this method of construction is, of course, the competency of the Technical Management Team. A construction contractor to provide these services was originally

considered but set aside in favor of PRCH because of time pressures and the fact that they already had a contract to do the supervision of construction work. This approach proved to be disastrous as PRCH failed to perform. The follow-on management team provided by Nello Teer has, after a somewhat slow and rocky start, now settled down into an operation that is progressively getting more efficient week-by-week. The writer believes the Force Account/Construction Management concept to have considerable merit for the construction of low volume roads, and further believes that it can be best accomplished using a contractor-experienced team. A/E firms are simply not attuned to actual construction of works although they could fit in quite well under a "turn-key" concept.

A review of the degree of MOW supervision or monitoring of Title III work indicates cursory attention to begin with, probably because of lack of staff and preoccupation with Title II and other projects, but increasing in intensity as problems with PRCH surfaced. There was also the prevailing "confidence" that a well-known U.S. firm was on-the-job. The degree of attention now being given by MOW to Title III work is quite satisfactory in the writer's opinion. Mutual confidence has been established between MOW and Teer's construction management team and this is expected to continue. The Construction Management Team is currently composed of three Americans, and three non-Americans. All of them appear to be quite competent. The change of Management Team from PRCH to Teer considerably disrupted operations and it has taken a while for the work force to settle down. A field review indicates the staff to be quite capable of doing the surveys and quality control of the work. The more complex engineering problems are resolved with the assistance of MOW staff.

One of the more controversial problems concerns the culvert placement at Station 25+500 (the Six Penny Crossing), for which diverse opinions have arisen on whether it should be removed and relocated to its originally designed location or left in place. Examination of the site and review of available technical data, including a detailed review of the situation by MOW's Chief Design Engineer (an American expatriate), lead to the conclusion that the culvert should be left in place, as constructed. To relocate the culvert to its original design location would be costly, delay the progress of the work, and curtail through traffic. Left in place, there is a strong probability that it will work and that present seepage will eventually plug up from siltation. The small reservoir created poses no danger to the roadway as the subbase is safely above the saturation level. Finally, the culvert can always be removed and relocated if it does not do the job.

RECOMMENDATIONS

1. The Force Account concept of construction with a Technical Management Team in actual charge of the work, rather than in an advisory capacity, appears to have considerable merit. It seems to be particularly applicable in the construction of low-cost, low-volume roads. To the writer's knowledge, this Project is a "first" within AID and ought to receive appropriate recognition, through official channels, and perhaps in "Front Lines", so that project officers might consider the TM approach in implementing road projects.