UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

DOMINICAN REPUBLIC

PROJECT PAPER

RURAL ROADS MAINTENANCE AND REHABILITATION II

AID/LAC/P-140

Loan Number: 517-T-045
Project Number: 517-0177

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: DOMINICAN REPUBLIC

3. PROJECT NUMBER: 517-0177

4. BUREAU/OFFICE: Latin America and the Caribbean [05]

5. PROJECT TITLE (maximum 40 characters): Rural Roads Maintenance and Rehabilitation II

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 88

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4): A. Initial FY 83 B. Quarter 3 C. Final FY 87

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 83 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	( )	( )	( )	( )	( )	( )
(Loan)	(2,237)	(150)	(2,387)	(5,140)	(9,860)	(15,000)
Other U.S. 1.						
Other U.S. 2.						
Host Country		110			18,000	18,000
Other Donor(s)						
TOTALS	2,237	260	2,387	5,140	27,860	33,000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) [illegible]	290		039		0		2,86		15,000
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 061 252

11. SECONDARY PURPOSE CODE: 130

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BR	BL	LAB	PVOU
B. Amount	100%	25%	50%	10%

13. PROJECT PURPOSE (maximum 480 characters)

The purpose of the project is to strengthen and expand the institutional capacity of the General Directorate of Rural Roads within the Secretariat of Public Works, and in coordination with appropriate private sector organizations, to maintain and rehabilitate rural roads and construct pack animal trails in the Dominican Republic

14. SCHEDULED EVALUATIONS: Interim MM 03 YY 85 MM 09 YY 86 Final MM 12 YY 88

15. SOURCE/ORIGIN OF GOODS AND SERVICES: ☐ 000 ☒ 941 ☐ Local ☒ Other (Specify) 899

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)

17. APPROVED BY — Signature: [signature] — Title: Philip R. Schwab, Mission Director — Date Signed: MM 06 DD 10 YY 86

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (8-79)

Project Authorization

Name of Country	:	Dominican Republic
Name of Project	:	Rural Roads Maintenance and Rehabilitation II
Number of Project	:	517-0177
Number of Loan	:	517-T-045

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Rural Roads Maintenance and Rehabilitation II Project for the Dominican Republic (the "Cooperating Country") involving planned obligations of not to exceed Fifteen Million United States Dollars ($15,000,000) in loan funds ("Loan") over a four (4) year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.

2. The project ("Project") consists of a program to expand and strengthen the institutional capacity of the Directorate General of Rural Roads (DGCV) to rehabilitate and maintain rural roads; to assist in the development of the private sector through road rehabilitation by contracted private firms; to strengthen the institutional capabilities of private voluntary organizations through direct involvement with DGCV in the construction of pack animal trails and to furnish necessary technical assistance to achieve Project objectives.

3. The Project Agreement which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in U.S. Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (i) two percent (2%) per annum during the first ten (10) years; and (ii) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services (Loan)

Goods and services, except for ocean shipping, financed by A.I.D. under the Loan shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Loan shall be financed only on flag vessels of the Cooperating Country or countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

c. Conditions Precedent to Loan Disbursements

i. First Disbursement. Prior to the first disbursement under the Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Cooperating Country, will, except as

A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) An opinion of the legal advisor to the Cooperating Country that this Agreement has been duly authorized and/or ratified by, and executed on behalf of, the Cooperating Country, and that it constitutes a valid and legally binding obligation of the Cooperating Country in accordance with all of its terms;

(b) Evidence that SEOPC/DGCV has increased its staff in a manner which will permit the project and other operations to be carried out efficiently and expeditiously;

(c) Evidence that SEOPC/DGCV has established an adequately staffed new unit within DGCV having the necessary authority and delegated responsibilities for animal trail construction and supervision.

(d) Evidence that SEOPC/DGCV has established a revolving petty cash fund, for each of the existing Regional Centers, to be replenished monthly;

(e) Evidence that the Cooperating Country has established a maintenance budgeting objective of approximately KD$850 per kilometer with a commitment to make appropriate adjustment for inflation for future years; and

(f) A commitment on the part of the Cooperating Country/SEOPC to fully staff the new Regional Center to be constructed under the project.

ii. Disbursement for Equipment Procurement

Prior to any disbursement under the Loan for equipment procurement or the issuance by A.I.D. of documentation pursuant to which disbursement will be made for equipment, the Cooperating Country will, except as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

a) A plan for commodity procurement, delivery and distribution; and

b) Specifications, bidding documents and model contracts for specific commodity procurements.

iii. Disbursement for Rehabilitation Operations

Prior to any disbursement under the Loan for road rehabilitation operations or the issuance by A.I.D. of documentation pursuant to which disbursement will be made for rural road rehabilitation, the Cooperating Country will, except as the parties may otherwise agree in writing, submit to A.I.D., in form and substance satisfactory to A.I.D.:

a) An operating plan containing road selection criteria; and

b) A detailed description of the procurement procedures which shall apply for the road rehabilitation work.

d. Special Covenants

The Cooperating Country shall covenant that, except as A.I.D. may otherwise agree in writing:

i. SEOPC/DGCV shall use equipment to be procured under the project only for rural road maintenance work;

ii. SEOPC/DGCV shall recruit and maintain sufficient qualified personnel at all levels required to carry out the rural road maintenance and rehabilitation program effectively with all personnel employed for a minimum of 40 hours weekly;

iii. It shall continue to provide funding for rural road maintenance and to extend the maintenance system to eventually cover all rural roads; and

iv. It shall provide annually, in form and substance satisfactory to A.I.D., an operating plan containing road selection criteria and a projection of all road rehabilitation and other project work to be carried out in the ensuing year.

e. Waivers

i. In accordance with the discussion contained in the Procurement Waiver Section of the Project Paper, motorcycles financed by A.I.D. under the Project may have their source and origin in countries included in A.I.D. Geographic Code 899; and

ii. A single source procurement waiver for technical assistance for training in equipment maintenance is authorized to enable contracting with Organization for Rehabilitation Through Training (ORT) under the host country contracting mode.

iii. I hereby certify that exclusion of procurement from Free World Countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Philip R. Schwab, Director
USAID Dominican Republic

6/30/83
Date

TABLE OF CONTENTS
RURAL ROADS MAINTENANCE AND REHABILITATION II
DOMINICAN REPUBLIC
PROJECT PAPER

		Page
I.	SUMMARY AND RECOMMENDATIONS	1
	A. Recommendations	1
	B. Borrower and Implementing Agency	1
	C. Summary Project Description	1
	1. Project Goal	1
	2. Project Purpose	1
	3. Project Outputs	3
	4. Project Inputs	4
	D. Summary Findings	4
	1. Institutional Analysis	4
	2. Economic Analysis	5
	3. Social Analysis	5
	E. Beneficiaries	5
	F. Project Development Committee	7
II.	BACKGROUND	8
	A. The Transportation System in the Dominican Republic	8
	B. Resumé of Rural Roads Maintenance and Rehabilitation I Project	9
	C. Attitudes of Rural Communities Toward Road Maintenance	11
	D. GODR Policy Toward Rural Road Maintenance	12
	E. Socio-Economic Importance of Rural Transportation	12

Page

F. Coordination with Other Donor Agencies 14

G. Relationship of Project to AID Policy 14

H. Relationship of the Project to the USAID/DR Development Strategy 16

III. PROJECT DESCRIPTION 18

A. Institutional Strengthening and Expansion 18

1. Administrative Strengthening 18

2. Maintenance Activities 21

3. Regional Centers 23

4. Pack Animal Trails 24

5. Procurement 27

6. Technical Analysis 27

7. Project Replication and GODR Commitment 28

8. Project Effects 29

B. Summary of Financial Tables 30

IV. PROJECT ANALYSES 32

A. Institutional Analysis 32

1. Secretariat of Public Works and Communications . . . 32

2. Directorate of Rural Roads 32

3. Private Voluntary Organizations 35

4. Conclusions 36

B. Technical Analysis 36

1. Definitions 36

2. Rehabilitation 37

Page

3. Maintenance 38

a. Routine Maintenance 38

b. Periodic Maintenance 39

4. Regional Centers 41

5. Commodities 41

6. Pack Animal Trails 45

C. Social Soundeness Analysis 47

1. Historical Perspective 47

2. The Importance of Roads in Dominican Rural Development 48

3. Maintenance of Roads 49

4. Community Survey 49

5. Social Aspects of Pack Animal Trails 51

6. Conclusions 52

D. Economic Analysis 53

1. Rural Roads 53

2. Pack Animal Trails 66

E. Environmental Concerns 67

V. PROJECT IMPLEMENTATION 68

A. Financial Plan 68

B. Loan Disbursement Procedure and Reporting Requirements 68

1. RD Peso Costs 68

2. Foreign Exchange Costs 69

Page

C. Schedule of Major Events and Implementation Plan 73

D. Procurement and Waivers 73

E. USAID Monitoring 74

F. Evaluations 75

G. Conditions, Covenants and Negotiating Status 76

ANNEXES

I-A DAEC Guidance Cable and Interim Report Approval Cable
I-B Logical Framework
I-C Statutory Checklists
I-D Environmental Threshold Decision
I-E 611 Certification
I-F CODR Application Letter
III-A Rural Road Inventory Format
III-B Sub-project Selection Process
III-C Maps of Existing and Proposed Regional Zones
III-D Animal Population Data
IV-A DGCV Organization Diagram
IV-B Sample Training Program Schedule
IV-C Equipment Maintenance Records
IV-D Format for Periodic Maintenance per Road
IV-E Photos of Obrero Caminero and "Mancave" I.D. cards
IV-F Standard Road Designs
IV-G Kilometers per Region for Rehabilitation
Cost Breakdown on Average Road Rehabilitation
IV-H Sample Payment Format
IV-I Formula for Arriving at Total Maintenance Project Costs
IV-J Regional Center Designs
IV-K Equipment Distribution per Regional Center
IV-L Equipment Requirements by Region
IV-M Map of Telecommunication System
IV-N PVO's Areas of Concentration
IV-O Preliminary Animal Trail Designs
IV-P Shelter Design
IV-Q Confirmation of Availability of U.S. Government Excess Property

ACRONYMS AND DEFINITIONS

CARITAS	-	Local Affiliate of Catholic Relief Services
DGCV	-	Dirección General de Caminos Vecinales - General Directorate of Rural Roads
IBRD	-	International Bank for Reconstruction and Development (World Bank)
IDB	-	Inter-American Development Bank
IIAC	-	Interamerican Institute for Agricultural Cooperation
IRR	-	Internal Rate of Return
GODR	-	Government of the Dominican Republic
JUNCAVE	-	Junta Comunitaria de Caminos Vecinales - Community Committee for Rural Roads
MANCAVE	-	Miembro de la Asociación de Caminos Vecinales - Member of Association for rural roads.
NARMA	-	Natural Resources Management (AID Loan 517-T-035)
NPV	-	Net Present Value
OBRERO CAMINERO	-	Hand Laborer assigned to maintain a section of a rural road
PACD	-	Project Assistance Completion Date
PVO	-	Private Voluntary Organization
RRM&R I	-	Rural Roads Maintenance and Rehabilitation I (AID Loan 517-T-033)
SEA	-	Secretaría de Estado de Agricultura - Secretariat of State for Agriculture
SEOPC	-	Secretaría de Estado de Obras Públicas y Comunicaciones - Secretariat of State for Public Works and Communications
SSID	-	Local affiliate of Church World Services
USAID	-	United States Agency for International Development
VOC	-	Vehicle Operating Costs

I. SUMMARY AND RECOMMENDATIONS

A. Recommendations

USAID/DR recommends that a loan be authorized to the Government of the Dominican Republic in the amount of $15,000,000 to support the program described herein. The loan will be repaid over twenty-five years, including a ten year grace period, with interest at 2 percent during the grace period and 3 percent thereafter.

B. Borrower and Implementing Agency

The Borrower will be the Government of the Dominican Republic. The implementing agency will be the Secretariat of State for Public Works, acting through its Directorate General of Rural Roads (Dirección General de Caminos Vecinales, hereinafter "DGCV"). Certain aspects of program implementation will be carried out through Private Voluntary Organizations ("PVO'S").

C. Summary Project Description

1. Project Goal

The goal of the project is to improve the income, productivity and quality of life of the Dominican Republic's rural poor. Quality of life will be enhanced by improving access to government services in health and education. Short term and long term benefits will accrue to the rural poor through direct employment on road rehabilitation and maintenance activities. Incomes should also be increased as a result of improved marketing opportunities and increased availability and lower costs of agricultural inputs and technical services. Other effects which may be anticipated include better land use, leading to increased production of higher value crops, greater absorption and more productive utilization of the farm labor force.

The sub-goal of the project is a stable rural transport access system of approximately 10,000 kms. of rural roads coordinated with a system of feeder pack animal trails to provide the necessary infrastructure to make the Dominican Republic self-sufficient i food production. This sub-goal must be assured by an appropriate institutional structure and financed by a recognized sufficient claim on the annual GODR budget.

2. Project Purpose

The purpose of the project is to strengthen and expand the institutional capacity of the Directorate General of Rural Roads within the Secretariat of Public Works, and in coordination with appropriate private sector organizations, to maintain and rehabilitate rural roads and construct pack animal trails in the Dominican Republic.

Knowledge gained under Rural Roads Maintenance and Rehabilitation Project I (RRM&R I) of the actual extent of the rural transportation problems requires the strengthening and expansion of these institutions which will be developed at three levels:

a. At the national level, the capacity of DGCV to contract and supervise private sector firms; a new unit within DGCV will be formed to research materials for rural road construction; and a department within DGCV will be established responsible for coordination and technical assistance for private voluntary organizations in the construction of pack animal trails.

b. At the regional level, the seven Regional Centers will be provided with additional equipment and training and an eighth Regional Center will be constructed, provided with equipment and trained personnel to assure an adequate organizational structure for support and supervision of local road maintenance and rehabilitation efforts.

c. At the local community level, short-term employment will be offered by the private sector for road rehabilitation. Community participation will be required by private voluntary organizations in the construction of pack animal trails using PL-480 Title II food as compensation; and communities will continue to be organized to develop effective cooperation with DGCV to rehabilitate and maintain roads and trails.

The institutional capacity developed under RRM&R I for maintenance and rehabilitation has resulted in a new attitude and orientation toward the rural transportation system within the Secretariat of Public Works. This is due in part to a shift of GODR emphasis to rural employment generation through rehabilitation of the rural road network combined with the stimulation of the private sector. This is coupled with the GODR's effort towards making the Dominican Republic self-sufficient in food production, which implies the need for an efficient transportation system. These policies are being reinforced in the GODR budgetary, administrative and organizational structures.

At the local level an essentially passive dependent community approach to road service is gradually being re-oriented toward active community involvement and responsibility for the state of its local roads.

In working toward these objectives considerable road rehabilitation work and follow-on maintenance will be carried out. Current estimates of the work to be accomplished are reflected in "Project Outputs." The amplification of the DGCV institution will reinforce organizational, budgetary, administrative and attitudinal changes associated with the shift to a dominant concern for a stable rural transportation system as a long-term policy inbedded in the nation's institutional structure.

3. Project Outputs

The process of strengthening and expanding the capacity of the Directorate of Rural Roads to provide a stable rural transportation system will take place in the context of an operational program with the following outputs:

1. 1,000 kms. of rural roads rehabilitated using private sector contractors and contracted supervisory firms monitored by a new DGCV contracting and supervisory unit.

2. Short term employment generated for over 10,000 limited resource farmers in road rehabilitation and maintenance.

3. An eighth Regional Center for rural roads maintenance, constructed, staffed and equipped.

4. Heavy equipment purchased for and working out of the Regional Centers.

5. A system of telecommunications installed in the Regional Centers and the national office, with mobile units for the equipment maintenance brigades.

6. Comprehensive maps of the national rural roads system provided by locally contracted technical assistance.

7. Research, under the guidance of a U.S. consultant, conducted in the utilization of local waste materials for rural roads surfacing.

8. Continuing training programs for supervisors and hand laborers in their job responsibilities for road maintenance.

9. 3,700 kms. of rehabilitated roads under a regular maintenance program by the end of the Project life. (Regular maintenance is defined as 100% hand labor daily maintenance with twice annual heavy equipment maintenance.)

10. A new department within DGCV established to coordinate and provide technical assistance to private voluntary organizations for the construction of pack animal trails.

11. 300 Kms. of pack animal trails constructed.

12. 20 shelters constructed for protection of agricultural products at the point where several trails converge on a rural road.

4. Project Inputs

Project inputs will include:

(US$000)

ITEM	AID	GODR	TOTAL
Rural Roads Rehabilitation	8,500	8,500	17,000
Rural Road Maintenance		5,567	5,567
New Regional Center	150		150
Equipment and Tool Purchases	4,517		4,517
Telecommunications System	200		200
Techuical Assistance and Mapping	200		200
Technical Assistance and Materials Research	200		200
Technical Assistance for Training	80	20	100
Construction Materials For Trails	90		90
"Mini-mercado" Shelter Construction	60		60
Administrative Salaries		2,735	2,735
National DGCV Office Addition to Physical Facilities		100	100
Evaluations	40	20	60
Contingencies	963	1,058	2,021
Total	15,000	18,000	33,000
PL-480 Title II Food	150		

D. Summary Findings

The project committee has reviewed all aspects of the proposed rural roads maintenance and rehabilitation project and finds that it is technically, socially, economically, and financially sound and consistent with the development objectives of the GODR and of the USAID. It has also been determined that the Secretariat of Public Works is institutionally capable of administering the project and disbursing the funds committed within the time planned for implementation (5 years).

1. Institutional Analysis

The institutional capability of DGCV to carry out the project has already been demonstrated following a significant restructuring of the role and functions of the organization. The policy and operational implications of further modifications and expansion of DGCV are fully supported by the Secretariat of Public Works and the Technical Secretariat of the Government.

The private voluntary organizations have been examined and their capabilities and interest in this project have been manifested through active PVO participation in the design and preparation of the Project Identification Document and this Project Paper.

2. Economic Analysis

The economic analysis demonstrates that the project will have a highly favorable impact on the economy of the Dominican Republic because of the savings which will be generated by regular rural road maintenance operations in terms of both reduced road reconstruction costs and lower vehicle operating costs. The economic analysis further demonstrates that the project will have favorable economic implications for members of the USAID target group living in the influence area of the program's subprojects as a result of lower prices for farm inputs, lower transportation costs, and more convenient passenger travel. Additional benefits for the target group in terms of increased productivity are expected as a consequence of changes in agricultural cropping patterns resulting (a) from improved access to local markets, (b) from increased services received from agricultural extensionists, (c) reduced spoilage of perishable farm products, and (d) protection of arable lands from further erosion.

Rural passengers will also benefit from increased mobility, from reduced waiting and travel times, and lower fares for their trips to local service centers. Finally, savings in road vehicle fuel consumption and fuel consumed by road building machinery will result in considerable energy savings for the Dominican Republic.

The analysis demonstrates that the project as presented is financially viable. The commitment of the GODR has been confirmed by the Letter of Application (Annex I-F). The timeliness of GODR counterpart contributions to RRM&R I lead us to believe that this project will have the continued support of Dominican Government.

3. Social Analysis

The social analysis examines the historical and cultural reasons for attitudes toward rural roads maintenance and the growth of local organizations in rural areas in recent years. The analysis concludes that the institutionalization of rural roads maintenance at the local level has proved feasible, but requires expansion in terms of numbers of people involved in individual community organizations.

Community attitudes toward construction and use of pack animal trails as a viable alternative to vehicular roads remain uncertain. Since this component is essentially a research and development program, community commitment will be evaluated at the end of two years and a decision made at that time whether to modify or continue the program.

E. Beneficiaries

The intended primary beneficiaries will be poor small farmer and rural landless families living in areas served by feeder roads.

Typically affected will be families with land holdings of less than 5 hectares, and annual incomes of US$586 per six person family.

Benefits anticipated include the following:

1. Workers both locally and in government positions who will be employed as a consequence of the project.

2. Stimulation of the private sector through contracting of Rural Road Rehabilitation.

3. Residents of areas served by rural roads who gain improved access to markets and lower input costs.

4. Small farmers in areas served by rural roads who gain improved access to markets and lower input prices.

5. Consumers of agricultural products both rural and urban to whom lower production and transportation costs may be passed in the form of lower prices and better quality produce.

6. Truck and bus operators.

7. The Dominican population as a whole for whom reduced costs and prices translate into greater supply and demand for locally produced food products moving toward self-sufficiency in food production.

8. Environmental protection from further erosion by upgrading poorly constructed roads to standards that provided controlled drainage.

9. Protection from the erosion to hillsides caused by pack animals using non-constructed trails with un-controlled drainage.

10. The project should provide an opportunity to influence other GODR agencies to channel resources and technical assistance to the rural poor.

11. The project should continue to encourage the maintenance mentality of the GODR as it learns it is better and less costly to maintain than to reconstruct.

F. Project Development Committee:

Project Manager and Principal Author:	Betty Facey
Administration:	Clara Kimse Mercedes De la Rosa
Engineering:	Rafael Genao Betty Facey
Loan Officer:	Debra De Witt
Program Officer:	Donald Soules
Economics:	John Chang Charles Vandervoort, DOT/W
Social Science:	Ramón Martínez Aponte y Asociados
Controllers:	Steve Liapis Cecile Adams
Agriculture:	Kenneth Ellis
USAID Approval:	Philip R. Schwab, Mission Director
GODR Laision Officials:	Ing. Pedro Delgado Malagón, Secretary of State for Public Works and Communications Ing. Luis De la Cruz Ariza, Director, Directorate of Rural Roads Ing. Rafael Getulio Sabdalá, Sub-Director, Directorate of Rural Roads Lic. Iván Rodríguez, Planning Office, Directorate of Rural Roads (DGCV Economist)
Private Voluntary Officials:	Carol Munroe, Catholic Relief Services Felipe Martínez, Servicios Sociales de Iglesias Dominicanas Brother Cristóbal Walsh, Caritas

II. BACKGROUND

A. The Transportation System in the Dominican Republic

Until the 1920s, surface transportation within the Dominican Republic depended largely on mules, horses, small canoes, and sailb ats. Trade, travel and communication followed the country's system of horse trails or the coastal water routes. The first major bridge in the country was not built until 1880, and the Río Haina near the capital was not spanned until 1912. Trips between Santo Domingo and the rest of the country were lengthy and hazardous.

Some improvement in this situation began with the construction of roads as part of the public works programs undertaken during the U.S. Marine occupation (1916-1924). Under Trujillo (1930-1961), a massive highway construction program was initiated and further road construction was undertaken by the Balaguer administration, (1966-1978).

Today, the road network of the Dominican Republic comprises 4,986 Km. of paved primary roads, 12,200 Kms. of rural feeder roads and an unknown number of pack animal trails. Roads and trails are by far the most important mode of internal transport. Railroads consist of very short lines primarily for the transportation of sugar cane from fields to refineries. Domestic air transportation is limited, providing for the most part passenger rather than commercial transport services. Coastal shipping is limited and there are no navigable rivers. Roads account for 95% of all internal traffic. In 1981, the national vehicle registration included approximately 51,760 privately owned automobiles; 17,645 taxis; 28,344 trucks; 68,775 motorcycles; 3,084 buses; 2,025 jeeps; and 5,037 other vehicles such as tractors, hearses, etc.

The base of the road system is a network of three paved highways that emanate from Santo Domingo. These highways and a series of secondary roads provide rather good communication between the major urban centers and the principal ports. The rural road system, however, is generally in poor condition. Until the implementation of A.I.D.'s Rural Road Maintenance and Rehabilitation Loan I, no rural road had been subject to systematic maintenance.

The poor condition of rural roads is exacerbated by the topography and climate of the country. Four almost parallel mountain ranges extend in a north-westerly direction in the western part of the country and a single range runs east - west in the eastern part. These rough and precipitious mountain ranges, combined with heavy rainfall, make internal communication in certain rural areas of the Dominican Republic difficult. The influence of the anticyclones and the trade winds bring about two fairly well-defined rainy seasons in much of the

country, with maximum precipitation occurring in the late spring and fall. During this period serious erosion is common in rural areas and flooding is frequent. Since many rural roads lack adequate provision for drainage, transit often becomes difficult or impossible.

The lack of proper road maintenance in rural areas can be attributed in part to the attitude of rural communities toward road maintenance and repair, and in part to the policy and budgetary shortcomings of Dominican governments prior to 1980.

B. Resumé of Rural Roads Maintenance and Rehabilitation I Project

The Dominican Government which assumed power in 1978 began the emphasis in the problem of bettering the condition of roads and highways. One of the results of this new emphasis was an A.I.D. loan, Rural Roads Maintenance and Rehabilitation I, in which the primary objective is the institutionalization of a rural road maintenance system.

Prior to the RRM&R I project there was no control over the building, maintaining or abandoning of rural roads. Traditionally, nine separate GODR agencies have been in the road building business: Secretariat of Agriculture (SEA), National Sugar Council (CEA), Agency for Potable Water (INAPA), Forestry Service (FORESTA), Institute for Irrigation (INDRHI), Agrarian Reform (IAD), Dominican Electric Company (CDE), Community Development Office (ODC) and the Secretariat of Public Works (SEOPC). This list does not include the armed forces which also constructs military roads near the Haitian border.

Because roads have been constructed willy-nilly by at least nine government agencies with varying or no standards, the typical rural road in the Dominican Republic lacks drainage structures and is deficient in ditches, compaction and select base material. Some "roads" were built by bull-dozing off the vegetation and sprinkling gravel on the cleared surface, thus becoming an eroding channel for water during the rainy seasons.

Under RRM&R I a beginning has been made to better control rural road activities of the numerous GODR institutions. On October 11, 1982, the Secretary of Public Works, acting on orders from President Jorge Blanco, issued an official memorandum citing a 1956 law, distributed to 19 governmental and international agencies, requesting information from all agencies involved in road construction activities that will provide the first major step for coordination of the transportation network.

At the time that the Project Paper for RRM&R I was written, it was calculated, based on available information, that there were 6,000 Kms. of feeder roads in the country. The results of the nationwide survey indicate that there are in fact some 12,200 Kms. of rural roads in the Dominican Republic.

Using a cost/benefit index, it has been determined that some 2,200 Kms. of rural roads should not be rehabilitated nor maintained. However, 10,000 Kms. should be brought into the permanent national rural road system, based on population served, marketable agricultural products, and the cost of rehabilitation and maintenance of the road servicing the area.

The results of the rural road survey show that it is impossible to determine precisely how much has been invested by all GODR agencies in rural roads in recent years. Estimates range from $30 to $60 million dollars in investments over the last eight years in the construction of new roads, built to varying and typically inadequate standards, without planned maintenance until RRM&R I began. DGCV is nominally responsible for maintenance of all rural roads of whatever origin, built to whatever standards. Even those roads which might have been serviceable far longer, given adequate maintenance efforts, must now be reconstructed at costs far higher than the cost of RRM&R's developed routine maintenance project.

The current Rural Roads Maintenance and Rehabilitation Project (RRM&R I) has established an institution for rural roads maintenance, and developed a maintenance system; provided technical assistance to 57 members of DGCV staff in administration and planning; constructed and equipped seven regional maintenance centers; promoted a system of local organizations to help maintain rural roads; designed a program of routine maintenance using locally contracted hand labor supervised by DGCV personnel; instituted a system for the use of heavy equipment to support the local maintenance activities; trained 431 mechanics, equipment operators, supervisors and hand laborers; financed, to date, the rehabilitation of 510 Kms. of rural roads; placed 700 Kms. of rural roads under the maintenance program, and conducted a nation wide survey of all the rural road system in the Dominican Republic on the basis of which a rural road information system has been developed and placed in operation. The DGCV budget has been increased from DR$2.7 million in 1979 to DR$8.0 million in 1982 (not including counterpart for loan projects). These activities have been accomplished in the first three years of a five year program despite the devastation of the country side as a result of the 1979 hurricanes Frederick and David and the resultant impact on the regular and development program of SEOPC/DGCV.

A review and evaluation of the current status indicate that RRM&R I is progressing on schedule. The GODR has committed funds and personnel far beyond those contemplated under the 1979 project, and there is no reason to believe that the project purpose will not be reached by the PACD. However there now remains an important consolidation and readjustment phase which this new loan is designed to support.

C. Attitudes of Rural Communities Toward Road Maintenance

Political attitudes and behavioral patterns of Dominicans towards their government and their leaders have had a major impact on the condition of the rural road network. A long history of "personalismo," paternalism and the "patrón" ideal has contributed to the development of dependency patterns towards the government. Since Hispanic times, social tradition has stressed not only a rigid hierarchy of power and status but also a centralized authority that left little leeway for local initiative and decision-making. Accordingly, submissive patterns developed towards the central government. The populace expected their leaders to be benevolent men who "take care of them." One consequence of this orientation is the existence of strong dependency patterns among the local populace for the provision of public services by the Central Government.

The task of changing community attitudes from dependency oriented patterns to active cooperation with the Government is a slow process requiring education, public relations programs, meetings with community leaders, and, above all, the Government must fulfill its promises to the communities. One of the long range goals for RRM&R I is the initiation of a confident partnership between communities and their government.

Under RRM&R I project the starting point for initiating the change in attitude has been the organization of small community groups to support the maintenance of the local rural road. The broad base of the maintenance system rests on these local community organization called JUNCAVES (Junta Comunitaria de Caminos Vecinales).

JUNCAVES are formed by DGCV sociologists at the same time that the road is being rehabilitated. Its responsibilities include marshalling of local resources and joint development of plans with DGCV, surveillance and response to emergency conditions, and donation of unskilled labor during the programmed twice annual heavy equipment maintenance. The JUNCAVE promotes the labor force for road rehabilitation to work under the management of the private sector contractor responsible for the road reconstruction, and mobilizes the labor in accordance with a work plan furnished by the contractor and approved by DGCV.

To date, 97 JUNCAVES have been formed with a minimum of 285 communities programmed for organization by the PACD of RRM&R I, (additional groups will be formed upon the completion of road rehabilitation by the GODR and other donors). With the estimated 2,500 communities to be ultimately brought into the rural road maintenance program, by the PACD of RRM&R I, 11% of the long range goals for community organization will have been realized.

The RRM&R I Project Evaluation of February 1983, indicates that community attitudes towards maintenance of their road range from lively interest to indifference. Generally, the more remote the village, the greater the interest. Communities located within three or four kilometers of a major highway demonstrate less eagerness in participation. However, the Social Soundness Analysis of this paper demonstrates that the communities recognize the social and economic benefits stemming from rehabilitated and maintained roads.

D. GODR Policy Toward Rural Road Maintenance

The poor condition of rural roads had been due in part to the failure of previous governments to budget adequately for feeder road maintenance and the orientation of DGCV primarily toward rural road construction. It did not have an independent maintenance unit nor a maintenance program. Maintenance efforts which DGCV undertook in the past tended to be erratic, responding basically to political pressures rather than technical requirements.

Gradually, as RRM&R I project was being implemented, enthusiasm for rural road maintenance increased, first within the Secretariat of Public Works and then at the highest government levels. The GODR has paid from loan funds (no grant) for all programmed Technical Assistance and added an additional nine months of T.A., one-fourth of which is counterpart funded; has constructed warehouses and offices not originally contemplated; increased the originally programmed staff from 272 to 424 to assure solid personnel support; and, perhaps the best indication of the GODR's policy toward Rural Road Maintenance and Repair lies in the fact that, despite severe economic limitations, RRM&R I has never yet lacked timely counterpart funds.

In summary, GODR activity in the roads sector suggests that rural roads rehabilitation and maintenance have become one of the government's highest priorities.

E. Socio-Economic Importance of Rural Transportation

Approximately 48% of the Dominican Republic's 5.6 million people live in rural areas, the majority of whom are dependent on the agricultural sector for their living. Some 254,000 small farm families work 450,000 hectares. Although these 450,000 hectares are only 17% of total land in farms, they comprise 45% of land devoted to food crops. The average family income of about US$586 is generated by growing rice, plantains, corn, beans, peas, cassava and peanuts, which constitute the main staple diet for the majority of Dominicans. Most of the small farmers are, in a sense, commercial farmers in that they usually have some products for sale producing income for the purchase of other needed food items.

The development of the agricultural sector is linked directly to the condition of the rural road system. Many small farmers are not maximizing their production due to a lack of agricultural extension services, production credit, storage/processing facilities and improved seed and plant materials. Inadequate access roads contribute significantly to this problem. Extension services, credit and other needed inputs often do not reach small farmers because of poor access. In addition, poor roads result in expensive and unreliable transportation to markets. Food costs are increased not only for the urban poor but for the rural poor as well. Better roads are also an important factor in stimulating agro-industries which offer expanded employment opportunities.

The effects of the unequal distribution of income and low income levels upon the well-being of rural Dominicans are devastating. A.I.D. Statistical Profile Series of 1982 "Indicators of Nutrition in A.I.D. Assisted Countries" show that 43% of Dominican rural population as being below the "absolute poverty income level"; that in the period 1975-77, the daily protein supply ranked lowest of all Latin American countries; that 72% of all children suffer from first or second degree malnutrition; and that 50% of all child deaths are caused by malnutrition and related illnesses. USAID/DR Health Sector II loan statistics indicate that in the rural areas the infant mortality rate in 1980 was 82 to 95 per thousand live births (highest rate corresponding to the most isolated communities) as opposed to 37/thousand nation-wide. A 1983 employment survey shows open unemployment at 23% and an additional 25% underemployed. In 1982, the Secretariat of Education revealed that the national dropout rate between grades 1 to 7 is 70% with an even higher rate in rural areas, and an illiteracy rate of 43% (this percentage varies depending upon the sources' definition of illiteracy).

While costly to all, the lack of an adequate transportation system appears to be especially harmful for the poor. The availability of educational, health and other social services in rural areas are dependent upon access.

The condition of the rural transportation system is of great and increasing significance to the productivity and welfare of the nation. The efficiency of agricultural production systems, delivery of health and education programs, the national energy budget, the development of adequate employment opportunities in rural areas, the impact of transportion costs on marketing, input prices, production incentives and ultimately on the price and availability of food, all are affected by the condition of the rural road system. While the condition of the rural transportation is costly to all, it appears to be especially serious for the poor. They are the primary losers from inadequate access.

F. Coordination with Other Donor Agencies

The nature of this project is such that the activities of major donor organizations must be carefully coordinated particularly in the following areas:

1. Initiation of maintenance activities upon completion of roads constructed under the financing of other agencies.

2. Availability of road maintenance services to support road rehabilitation projects of other donors.

The IDB and World Bank are undertaking programs involving construction of feeder roads. USAID has been asked informally by both organizations to provide for maintenance arrangements upon completion of these roads. USAID has regularly received computer printouts of reconstruction costs and B/C ratios for IDB funded rural roads. As the IDB funded roads are accepted and inaugurated, they pass to the Maintenance Program. This coordination is considered to be entirely satisfactory and no further formalized institutional coordinating arrangements appear to be necessary.

IBRD's interest lies in the construction of primary hard-surfaced highways, and is financing the improvement and widening to four lanes the Santo Domingo-Santiago Highway, the life-line of the Dominican Republic. IBRD's 1979 sector loan 1784-DO includes $2.3 million with $1.5 million counterpart for the construction of 170 kms. of "pico y pala," 100% hand labor, road construction on a pilot project basis. Nine kilometers of rural roads have been constructed to dated.

IDB Sector Loan No. 590-SFDR of 1979 for ports, highway bridges, and studies, includes approximately $13.0 million and $3.2 million counterpart for reconstruction of 675 kms. of rural roads. This loan has had implementation problems, but 146 kms. are completed and the remaining 529 kms. have been contracted for completion in 1983. Additional IDB funds for Dominican Rural Roads are not contemplated in the near future.

G. Relationship of Project to AID Policy

The Rural Roads Maintenance and Rehabilitation II project directly supports AID policy as stated in the Food and Agricultural Development and Private Enterprise Development Policy Papers (Bureau for Program and Policy Coordination, May 1982). The project supports the objectives of Section 103 (b) (1) of the FAA to expand "rural infrastructure and utilities." The improvement of the rural road network in the Dominican Republic will encourage, in the medium to long term, improvement in the productivity, incomes and market participation of

small producers, an important beneficiary of the A.I.D. development strategy, through improving access to markets and indirectly through expanded food production possibilities, a stated AID policy objective.

The importance of rural infrastructure, especially road networks, is vital to the growth of the market system and private enterprise which is dependent on the efficient and least expensive movement of goods, services and people. AID recognizes that public investment in major physical infrastructure such as rural roads will yield substantial returns to the economy, and as such, AID will support assistance for infrastructure when it is complementary to private enterprise and is linked to effective performance in areas of institutional development. This project is, then, justified on the basis of effective performance to date by the institutional capacity of the DGCV in the administration of a rehabilitation and maintenance program developed under RRM&R I. This project proposes to build and expand on that proven performance.

The Rural Roads Evaluation Conference of November 1980, in which the USAID Mission participated, contributed to the development of a draft policy statement for AID assistance for Rural Roads and Transport. The recently released draft policy determination states that the Agency is "prepared to provide support for rural roads and transport on the context of support for equitable growth". This project incorporating the lessons learned from experience under RRM&R I clearly supports this determination as the rehabilitation and maintenance of rural roads and the construction of pack animal trails will serve to open up isolated rural communities to public services such as health care, public education, agricultural extension services, and will improve the links of these isolated agricultural areas to market facilities. The project also supports AID rural roads policy through the strengthening of the institutional development of the CODR executing agency and emphasizing community involvement in both the rehabilitation and maintenance of the roads.

Thus, this project directly incorporates the basic tenets of AID's current four priority areas, as well as the special role of human resource development and utilization of PL-480 as a development resource.

The policy framework involves the overall design of an independent and adequately financed rural road rehabilitation and maintenance program to implement a rational and cost-effective approach to this problem. The private sector will be deeply involved in the implementation of the program, and is a major beneficiary of a reliable road system. Technology transfer and research are an integral part of the program. Institutional development is central to the establishment of a continuing road maintenance institution in the country. Training will be conducted at all levels, and PL-480 food will play an important and appropriate role in the rural trails portion of the program.

H. Relationship of the Project to the USAID/DR Development Strategy

The FY-1985 USAID/Dominican Republic's CDSS stated that the major obstacles to equitable development in the Dominican Republic are productive employment and food production, productivity, the preservation of land and water resources, population growth, and energy and petroleum dependence. The USAID strategy is designed to assist and strengthen the country's public and private sectors to overcome these major development constraints. The long-range goal of the strategy continues to be the improvement of the living standards of the poor majority in the Dominican Republic. The proposed Rural Roads II project directly supports several of the Mission's objectives which relate to overcoming developmental constraints and supports the achievement of the long-term development goals. The objectives which will be assisted through the proposed project are as follows:

a. Increased food production through increased small farm productivity of basic food crops which will lead to increased incomes and reduce rural unemployment and underemployment.

b. Improved institutional capacity to deal with problems of poverty.

c. National policies and programs which contribute to better employment opportunities.

d. Increased participation of the private sector in development programs.

The project supports the food production strategy by improving the productive infrastructure. Maintained rural roads and animal trails improve access to markets for small farmers and will prevent spoilage of fresh fruits and vegetables from isolated rural communities. This will positively impact on the income and standard of living in rural areas. The importance of farm to market roads has been demonstrated worldwide as a significant factor in increasing agricultural production. The proposed project also supports the proper management of the country's natural resource base, a major component of the food production strategy. The rehabilitation of rural roads and the construction of animal trails with proper drainage will prevent erosion, a continuing and serious problem in the country.

The employment strategy which consists in part of providing new employment opportunities, and stimulation of the private sector, will be supported by the provision of short-term labor intensive and long-term employment opportunities in the rural areas in road rehabilitation,

maintenance, and construction of animal trails. The project directly expands employment opportunities in rural areas through an appropriate labor/capital mix in road rehabilitation and indirectly through possible stimulation of agro-industries. The project will rely heavily on the direct involvement of the private sector through the use of private contractors and supervisory firms for road rehabilitation.

Improved road communication, especially to isolated rural communities will ease access to public services and expand the outreach of government technicians. This will support the population and human resource development strategy through improved delivery of rural health and family planning services through better access to the system of basic health services, and expanded and improved rural education opportunities to isolated farm families.

The AID strategy of institutional strengthening has proven successful in the first three years of the RRM&R I project. This project will continue to expand the ability and capacity of the GODR to rehabilitate and maintain the national rural roads network.

III. PROJECT DESCRIPTION

A. Institutional Strengthening and Expansion

This project has been designed to complement the on-going Rural Roads Maintenance and Rehabilitation project by strengthening and expanding the institutional development already underway, and incorporating lessons learned during the first three years of the five year program for RRM&R I. "Maintenance" as a function has been separated from rural road construction and separated from the SEOPC highway maintenance system. The rural road maintenance system has been decentralized to facilitate local participation and DGCV responsiveness to local community needs.

In general, the institution built under RRM&R I places control of mobilization of labor and other local resources at the local level along with responsibilities to provide timely information to DGCV. The regional level controls application of regional DGCV resources, coordinates with other GODR agencies at the regional level and supervises local community work. The regional level also shares responsibility with the national level to select specific subprojects for support. The national level retains responsibilities for overall management, planning, administration, research and coordination. In all cases, DGCV is the responsible and accountable agency. Coordination with other interested agencies is under the control of DGCV. Thus, AID will continue to look to DGCV as its single point of contact.

1. Administrative Strengthening

The Secretariat of Public Works and Communications (SEOPC) is divided into Sub-Secretariats which are further sub-divided into General Directorates. The Sub-Secretariat for roads is divided into two Directorates: Highways and Rural Roads (DGCV). In theory, the Highways Directorate and DGCV have equal status, but Highways, in the past, received a much higher priority in allocation of funds and scarce physical resources. Obviously, rural roads cannot function without connecting highways, nor can a highway serve the public without feeder roads; however, the Highway Directorate had been supported at the expense of DGCV, an imbalance that RRM&R I has corrected.

The RRM&R I Rural Roads Inventory was conducted in 1980-81. Currently, under a Delcanda Company Technical Assistance contract with SEOPC, a National Highway system is being inventoried. The SEOPC Technical Assistance Scope of Work calls for a national plan which will assign roads and highways to their respective Directorates based on national needs and future planning. The present designation is based on road surfacing materials so that all asphalt or concrete surfaced roads are assigned to the Highway Department and all gravel and dirt roads assigned to DGCV jurisdiction.

At the time that the Project Paper for RRM&R I was written, it was calculated, based on available information, that there were 6,000 Kms. of feeder roads in the country. Under the project, 48 investigators and surveyors, mounted on motorcycles covered the country-side kilometer-by-kilometer gathering information on 38 categories of data on each rural road in the country. The results of the nation wide survey indicate that there are in fact some 12,200 Kms. of rural roads in the Dominican Republic, and an unknown number of kilometers of animal trails.

The survey data gathered includes such items as location and condition of every culvert, bridge, surface condition of the road, ditching, terrain, soil classification, agricultural products, locations of schools and health centers, population served, plus a rough cost estimate for the rehabilitation of each kilometer of the rural roads. The survey format was designed for computerization of all data and a cost/benefit index has been calculated for each road. Using this cost/benefit index, it has been determined that some 2,200 Kms. of rural roads should not be rehabilitated nor maintained. However, 10,000 Kms. should be brought into the permanent national rural road system, based on population served, marketable agricultural products, and the cost of rehabilitation and maintenance of the road servicing the area. (See Annex III-A for Road Inventory format.)

Much of the rehabilitation work by other donors anticipated in the RRM&R I Project Paper to reach the original target of 3,500 km. of rural roads under regular maintenance program was not carried out as planned. Other donor activities were way behind schedule and rehabilitation activities anticipated to be carried out by the GODR were not taking place. Indeed, the only significant rehabilitation activities carried out in the past three years have been those financed under the ongoing AID financed rural roads project. This lack of rehabilitation activity resulted in a large gap in road rehabilitation needed to meet the original RRM&R I target of 3,500 kms. of rural roads under a regular maintenance program. Thus, to achieve the original targets, with all other donor supported roads in a systematic maintenance program, approximately 1,000 km. of rural road rehabilitation and subsequent maintenance coverage is required to meet 37% of the country's most pressing rural transportation needs. Accordingly, under this project 1,000 kms. of rural road rehabilitation will be financed.

One of the lessons learned in the RRM&R I program is that the cost of rural road rehabilitation escalates dramatically each year that rehabilitation is delayed. The cost estimates for rural road rehabilitation used in the PP for the ongoing project quickly became unrealistic when hurricanes David, Frederick, and Allen further damaged the already poor quality rural roads.

Current estimates by funding source for rehabilitation and subsequent maintenance are as follows:

Funding Sources	1982	1983	1984	1985	1986	1987-88	Total
AID 517-T-033	510	355	335	0	0	0	1,200 Km.
New AID Loan	0	0	0	400	400	200	1,000 Km.
IDB	146	529	0	0	0	0	675 Km.
IBRD	9	104	57	0	0	0	170 Km.
GODR	35	120	125	125	125	125	655 Km.
TOTAL	700	1,108	517	525	525	325	3,700 Km.

In order to carry out the new program three national level departments need significant amplification and reinforcement.

Fundamental to the selection process of roads with the highest priorities for early rehabilitation is the input provided by the Statistics and Studies department. This department needs at least one more sociologist for a total of three to gather statistical data for the selection process and to assist in the formation of community organizations.

Although no additional personnel is required, modifications will be made in the selection process. The Technical Assistance provided to USAID/DR from the U.S. Department of Transportation to evaluate the selection process has recommended that the selection of priority roads be a two-stage process which separates the quantifiable and non-quantifiable impacts of road rehabilitation. Under RRM&R I, the weighted sum of all factors, both quantifiable and non-quantifiable was used to arrive at a single cost/benefit index figure.

For this project the candidate roads will be pre-screened based on social and geographic factors followed by screening based on economic appraisal. Weighting procedures will assign the relative importance of non-quantifiable factors involving considerations such as health, education and equity; and in the second stage, economic analysis can be applied to the quantifiable economic factors. This change in the selection process is already being implemented and computerized. USAID/DR will request short term (2-4 weeks) assistance from the U.S. Department of Transportation to monitor the implementation of the changes in the selection process. The new system is described in Annex III-B.

Within the Department of Planning and Programming the "Section for Cost Estimates" will have to be expanded to include two additional engineers for analysis of sub-project costs. Field engineers design and estimate quantities required for each sub-project (e.g., how many meters of culvert, how many cubic meters of earth to be moved, etc.), and then final cost estimates are made in the office. Cost estimating has been a bottleneck in the flow of paperwork from design to contracting.

Under RRM&R I another of the lessons learned is that the private sector can do a better job and in less time than construction by force account. In February 1981, the decision was made jointly by the Secretariat of Public Works and USAID/DR to rehabilitate all roads through the private sector. The private sector will be used for the rehabilitation for two reasons: first, one of the announced policies of President Jorge Blanco's government is the stimulation of the private sector for employment generation; and, second, with the RRM&R I (force account sub-projects) and the emergency rehabilitation grant (contracted sub-projects), the opportunity was presented to compare costs, quality, and time between the private sector rehabilitated roads and those rehabilitated by force account. Rehabilitation by the private sector was found to be less expensive, less time consumed, and of superior quality than rehabilitation by force account.

Even though private sector A&E firms will supervise rehabilitation contractors on a daily basis, the sheer numbers of small projects scattered throughout the country requiring at least weekly monitoring by DGCV necessitates reinforcement of supervision capabilities. A minimum of six additional field engineering supervisors must be hired for DGCV monitoring of rehabilitation work in the "Reconstruction and Rehabilitation Section." These field engineering monitors will be temporarily assigned to work out of the Regional Centers where rehabilitation is taking place, reporting to the Central Office in Santo Domingo. The rehabilitation contract documents will contain a clause requiring the contractor to employ all unskilled labor from the locale of road rehabilitation. In the rehabilitation of 1,000 kms., an estimated 10,000 rural workers will have an opportunity for approximately 16,000 man/months of short-term employment.

Immediately upon final acceptance by engineering staffs of DGCV and AID, the rehabilitated road passes to the maintenance program.

2. Maintenance Activities

The broad base of the established maintenance system rests on local community organizations which are called JUNCAVES (Junta Comunitaria de Caminos Vecinales) and the hand laborers, "obreros camineros", who are responsible for daily routine maintenance on their assigned section of road.

JUNCAVES are formed by DGCV sociologists at the same time that the road is being rehabilitated. Its responsibilities include marshalling of local resources and joint development of plans with the DGCV, surveillance and response to emergency conditions under the direction of the "obrero caminero." The JUNCAVE organizes the labor force for road rehabilitation to work under the management of the private sector contractor and mobilizes labor for these activities in accordance with a work plan furnished by the contractor and approved by DGCV.

The "obrero caminero" selected by the JUNCAVE, and approved by the regional center, is contracted and paid a monthly salary by DGCV to perform routine hand maintenance for up to 5 kms. of rural road. A regional center supervisor inspects the work bimonthly and outlines the tasks for the upcoming weeks.

The "obrero caminero's" work includes the control of weeds in ditches and drainages; filling in and hand tamping of potholes; minor repairs to structures; keeping all culverts clean; and by hand raking, redistributing the gravel on the road surface. In order to fix the responsibility for this routine maintenance, small signs with the obrero's name are posted at the beginning and end of the assigned portion of the road. The public naming of the individual responsible for a certain section of road not only provides the "obrero caminero" with a certain status, but also promotes peer pressure from the community benefited by the maintenance of its rural road. By the end of the project approximately 925 rural workers will be employed full-time in hand maintenance.

Twice annually, heavy equipment is dispatched from the Regional Centers for escarification of the total or partial wearing surface, grading, compacting, repair of culverts, structures, headwalls, and the delivery of new surfacing materials.

The regional centers, the twice annual heavy equipment maintenance, the national administrative office, all exist to support the community organizations and the obrero caminero with his pick, shovel and wheelbarrow.

The longest period of time any road has been under regular maintenance is one year. Although early for a long term prediction, so far, the RRM&R I basic maintenance process seems to be working. This process of rehabilitation, formation of JUNCAVES and hiring of the obrero caminero will be continued and expanded as each new road comes into the maintenance system. The system includes all rural roads regardless of rehabilitation funding source. The continual growth of the system requires continual training programs at the regional and community levels. Each Regional Center will have one person responsible for the training of Supervisors and obreros camineros.

The job of obrero caminero, so far, has been considered as a job for "men only." As a result of the Social Soundness Analysis for this paper, the "men only" restriction will be removed depending upon the mores of the communities. Under RRM&R I, it was assumed that the traditional distinctions between "man's work" and "woman's work" was too deeply ingrained in the Dominican culture to open up maintenance jobs to women. In less traditional communities women will be welcomed into the system thus providing needed income to rural families.

3. Regional Centers

All project road maintenance has been decentralized and is managed at the Regional Center level. Seven centers have been constructed (Higüey, San Francisco de Macorís, Santiago, Villa Mella, Mao, San Juan de la Maguana and Barahona) and staffed with trained personnel for the supervision of periodic (heavy equipment) and routine (hand labor) maintenance of the rural roads assigned to specific centers. (See Annex III-C for maps of existing and proposed regional zones.)

A basic premise of RRM&R I is the need for a rural roads maintenance organization which can protect its own staff and equipment from encroachment by other GODR agencies, and the need to work closely with community organizations. In order for the maintenance plan to work effectively, it is essential that simple lines of communication be open to the beneficiaries and that operational control of DGCV maintenance and equipment be retained at the Regional Center office level.

Staffed by 53 persons per Center, the physical facilities include office space for the administrator, supervisors, accountants, storage space for spare parts and hand tools, and a controlled entry for the person in charge of inventory control of spare parts and hand tools. A separate building is located in a large patio yard for the maintenance of the heavy equipment.

Until the road survey was made, no GODR agency knew the actual problems to be faced in providing a viable transportation network. Thus, we now know that the total rural road system is much larger than thought. In addition, the characteristics of the system are much more dynamic and demanding than originally thought. For example, as a result of the rural road survey it was discovered that many regional centers were responsible for many more roads than the equipment and staff assigned under the ongoing AID rural roads project could effectively deal with. In addition, the rural roads assigned to some regions were found to be so dispersed that the assigned set of equipment and staff could not effectively provide the regular maintenance required to all roads.

The results of the RRM&R I road survey not only demonstrated the actual extent of the problems confronting the Dominican Republic's rural transportation network, but also showed that more than 5,000 Kms. have been assigned to Regional Zone IV headquartered in

Santiago. Regional lines will be redrawn and an eighth Regional Center will be constructed, staffed and sufficient equipment provided under project funds to maintain the roads assigned to the new Center.

One of the recommendations as a result of the evaluation is the establishment of a revolving petty cash fund for each Center for small purchases and to permit short term hiring of skilled labor to respond immediately to minor emergencies. The establishing of such petty cash funds will be one of the Conditions Precedent for disbursement under this project.

4. Pack Animal Trails

To provide another dimension in the rural transportation system, approximately 300 kilometers of Pack Animal trails will be constructed as a pilot project. The trails are a logical extension of the transportation system, and, most importantly, a well constructed trail protects the hillside environment from erosion.

Naturally, pack animal trails are in existence in the Dominican Republic. They begin in a remote hamlet, usually in the mountainous areas, and wind their zigzag way down the hill to the nearest point of vehicular transportation. With the passage of two or three years the animal trails become water courses as the top soil is worn away by the animal hooves. When a trail becomes two or three feet deep, it can no longer be used because the cargo loaded on the animals bangs against the side of the ditch. So a new parallel trail is begun leaving the old trail to continue eroding the hillside. This project proposes to construct, not unlike a rural road, one meter wide animal trails, built up, compacted, that will have controlled ditching on each side, and surfaced with very fine gravel suitable for animal feet. These animal trails will be too narrow for motorized vehicles other than the possible use of motorcycles.

Private Voluntary Organizations will assume the responsibility for the promotion and day-to-day oversight of the construction of the trails, using a new DGCV office for technical assistance and coordination in the engineering aspects of the program. Inhabitants of the village to be benefited by a particular pack animal trail will do the actual construction, by hand, receiving PL-480 Title II food as compensation for their labor. All material costs such as cement and culverts will be provided by DGCV with program funds.

A new department in the National Office of Rural Roads will be formed as the designated unit for coordination and technical assistance to PVO's in the construction of pack animal trails. It is expected that two DGCV persons will man this office, one responsible for coordination and timely delivery of materials required for animal trails construction and a second person for field work in establishing trail alignments and monitoring on a monthly basis. SEOPC/DGCV is requesting

the assignment of two Peace Corps Volunteers with construction work experience (not necessarily engineers) to work full time in the field with the PVO's. These Peace Corps Volunteers will report to the DGCV Animal Trails Coordinator as their GODR counterpart. A private U.S. development foundation has already been approached and has verbally agreed to provide hand tools for trail construction.

Criteria for trail selection, of necessity, must follow first the criteria established for Private Voluntary Organizations under PL-480 Title II Food for Peace regulations: (1) areas where greatest poverty exists, and (2) communities isolated from other development programs (Outreach). Common sense dictates that other basic criteria should consider areas of the country where PVO's already have warehouses, administrative personnel and promotors working on other projects and communities with willingness, interest and available human resources for pack animal trail construction. Trails will be pre-screened by the foregoing criteria and final selection based on: 1) a simple cost/benefit analysis; 2) geographic proximity of three or more participating communities to maximize the technical assistance and human resource efforts and facilitate the delivery of food; and 3) the group of trails must converge on an established rural road already or to be under the DGCV maintenance program.

Following lengthy meetings and one 3-day seminar with representatives from Caritas (local affiliate of Catholic Relief Servi[illegible]) and SSID (local affiliate of Church World Services), it was agre[illegible]t Caritas will concentrate their animal trail efforts in San Juan [illegible]a Maguana, Las Matas and Padre Las Casas regions, while SSID will [illegible]fine their activities to Monte Cristi, Dajabón and Barahona regions. All these areas are adjacent to the Haitian border where the greatest number of isolated, impoverished Dominicans live.

A third Private Voluntary Agency, Interamerican Institute for Agricultural Cooperation (IICA), has expressed interest in joining the Pack Animal Trail program using the Institute's resources for compensation for hand labor construction. If IIAC participates in the Animal Trail pilot project, its area of concentration would be the mountainous area of Peravia Province applying the same selection criteria and coordination with DGCV Pack Animal Trail Unit. (See Annex IV-N for map of PVO's areas of concentration.)

Lacking Dominican or AID previous experience in animal trail construction, certain assumptions must be made in that improved access will reduce spoilage of marketable products; will encourage GODR agencies such as Agriculture, Health and Education to provide urgently needed services; possibly increase agricultural production; effect a savings in time and greater ease of travel for the isolated inhabitants; and expand the zone of influence for the connecting rural road. Attempts to quantify these factors and to derive a B/C ratio for trail improvement

will be made during the first two years of this pilot project component. At the end of two years from initiation of this experimental program, an evaluation and assessment will be made of the potential for animal trails as a viable means for expanding the zone of influence of rural roads and improving the quality and productivity of rural life. Evaluation objectives will be to learn from experience the actual costs, the impact of the trails on the level and intensity of personal travel, agricultural production, and possible constraints on the benefits such as community attitudes and availability of animals. FVA/FFP-2 and other interested Bureaus will be requested to participate in the evaluation of the animal trails.

A probable spin-off of the animal trails will be a new interest in the breeding of pack animals in the Dominican Republic. If sufficient importance can be attached to the use of pack animals as a viable means of transport, some of the pressures on the GODR for the construction of a rural road to everyone's front door will be alleviated.

The latest available census (1971) of pack animals shows that the areas contemplated for trail construction had pack animals that included 46,214 horses (21% of the country's total number); 42,146 burros (37% of total); and 19,316 mules (20% of total mule population). Ownership of these animals by small farmers (those with less than 8 tareas) in the area is 11% of total country's horses; 24% of the burros; and 14% of the mules. The dependency upon animals for transportation in the target area is evident in that 24% of the burros and 14% of all mules are in the hands of 10% of the nation's small farmers. (See Annex III-D for animal population data.)

An additional component will be added to the trails sub-project. Where several animal trails converge at a rural road, a 5 by 10 meter shelter will be constructed with a concrete floor, four posts supporting a thatched roof, and a hitching post where animals can be unloaded and the cargo stored under a sheltered area, protected from rain, waiting for pickup by vehicular transportation. These shelters or "mini-mercados" will become a focal point for truckers in search of agricultural produce to buy. Some direct bartering is anticipated such as producers of beans in the highlands trading beans for rice grown in the valleys.

A major benefit to be derived from trail construction lies in bringing the Private Voluntary Organizations into the overall development plans for the Dominican Republic, and providing these organizations with much needed technical assistance in their efforts to give isolated villages improved access to the outside world.

These trails will add the final link in the Dominican transportation system. Such a network can be described in human terms whereby the highways act as the primary aortas, the rural roads as the arteries, and the rural trails as the capillaries extending to the furtherest reaches of the Republic.

5. Procurement

Additional heavy equipment for the existing Centers is required for periodic road maintenance. An analysis was made of the number of kilometers to be under maintenance per Regional Center by the end of the project and the corresponding amount of equipment needed to maintain those kilometers. The formula for equipment requirements and estimated costs are discussed in the Technical Analysis.

Picks, shovels, wheelbarrows and other hand labor tools purchased under RRM&R I, inventoried and warehoused, is considered sufficient for both projects. If a shortage occurs such hand tools will be purchased locally as needed with contingency funds.

At the present time the national office cannot communicate with any regional center nor can any regional center communicate with any other regional center or field personnel. The Centers are located in the rural areas served, without access to telephone lines. To meet the urgent need, a telecommunication net will be constructed with a base station antenna located at the National Office and in each of the regional centers, tied to an existing Public Works repeater. The telecommunications system will provide mobile radio units for the regional supervisors as well as foremen of each equipment brigade.

Although DGCV has already added a new wing for office space and a warehouse for temporary storage of hand tools and spare parts, an additional RD$100,000 in counterpart funds will be required to complete the physical facilities to provide additional office space for new Supervisory Engineers, Cost Estimaters and the Animal Trails Sections.

6. Technical Assistance

The lack of accurate maps has hampered the RRM&R I program requiring the Rural Road Inventory team to update the 1964-65 maps by hand in the field. Under AID's NARMA project aerial photos are being taken of the entire country. The Secretariat of Public Works will purchase copies of the 1,200 negatives of this aerial survey. From these negatives, 124 maps, at a 1:50,000 scale, of the road system will be developed and printed. Larger scale maps will be provided to the regional centers with each rural road numbered according to its computerized code.

Technical assistance for mapping will be secured under normal AID procurement procedures. The estimated cost for purchasing the 1,200 negatives of aerial photographs is $3,600. The remainder of the mapping technical assistance costs (total of $200,000) will pay for mosaicing the photography, updating maps and the identification of each rural road by its appropriate computer coded number.

Research will be conducted in the utilization of local materials for possible use in the future for rural roads surfacing. Some small experiments have already been carried out, for example, using bagasse ash as a binder. Other possibilities include experimenting with the waste from rice mills as well as the possibility of using hand cut stones for paving the mountainous areas where rocks are readily available.

Technical Assistance under RRM&R I compiled some information on experiments in soil stabilization initiated in other countries with similar climates and geology. This data will form the base for the research and field experiments. Research investigations on the use of local waste materials for road surfacing will include laboratory analyses and the surfacing of sections of roads with mixes that appear to be worthy of field proofs. These investigations will be carried out by the materials laboratories of the Secretariat of Public Works, under the direction of a U.S. soils and materials specialist contracted for a period of approximately 4 months over a period of 2 years.

The purchase of additional heavy equipment under the project will require an extension of the current technical assistance and training program for regional equipment operators, maintenance mechanics, and inventory control personnel. Training and course materials already developed under RRM&R I will be used, implemented by contracted technical assistance for a period of 9 months. Under this project, greater emphasis will be placed in training of trainers at the regional and national levels. Financing for the technical assistance will be shared with AID funding the dollar costs, $80,000 (salary, benefits and overhead); and the GODR funding local currency expenditures, RD$20,000 (administrative support services and in-country travel).

/. Project Replication and GODR Commitment

The project is designed to continue and expand the institutionalization of rural road maintenance with some 3,700 kilometers under systematic maintenance at the end of five years. Bringing the balance of the system into the program will be the work of subsequent years.

At the end of 5 years, it is expected that all the basic elements for a national rural road maintenance program will be in place and operating. Building on these elements through additions to supervisory personnel and locally contracted personnel, continuing community organization, and the purchase of additional tools and equipment, this project can be replicated, and, if the planned rate of progress is continued, all rural roads in the Dominican Republic could be under routine and systematic maintenance within 15 years. It should be noted that this project takes on the problem of bringing roads to a maintainable state only where rehabilitation is required. No new construction will be undertaken.

The GODR's commitment to rural road maintenance is evidenced by its counterpart funding - $17.3 million under a $10.0 million AID loan (62%) for RRM&R I. Such commitments deserve support.

8. Project Effects

Investment in road maintenance, unlike investments in facilities, technology or credit is not subject merely to gradual deterioration in utility if not supported by the government after the end of the project. Investment in maintenance can be wiped out in a day of heavy rain if the institutionalization of maintenance fails. The basic system is in place but that system needs reinforcement through guided experience and modifications set forth in the Project Description. Failure in any one of the elements jeopardizes the entire structure. Continued assistance in the institution building process reduces the risk of failure.

Roads are being rehabilitated with an anticipated 20 year life with regular maintenance and upgrading after ten years. Given the Dominican Republic's climatic conditions, without maintenance, rural roads must be rehabilitated after 3 to 5 years. Using an admittedly simplistic approach each kilometer of non-maintained road, rehabilitated every 4 years at a cost of $20,000/kilometer equals $80,000/kilometer from a starting point of a rehabilitated road and arriving at year 20. Nineteen years of maintenance for the same kilometer amounts to approximately $22,000 including a 10 year upgrading and administrative costs. Thus, taking a long range view and ignoring inflation factors, each kilometer of maintained road represents a savings to the GODR of $58,000 per kilometer or the staggering sum of $580,000,000 for 10,000 kms. from year 1 to year 20. This would assume that the GODR would have the resources to continue the deterioration-rehabilitation cycle.

Adding these savings to those in reduced transportation costs and reduced agricultural products spoilage as discussed in the Economic Analysis, this project can have a long range impact that could justify a far greater investment.

Using the estimated maintenance cost for 1984 of $1,000/kilometer and 10,000 kilometers of maintained roads, and adding $2.0 million for administrative costs and equipment replacement, the cost of regular maintenance would be approximately $12.0 million/year or approximately $1.0 million more than the DGCV current budget. The institution for regular maintenance system under development makes good sense financially and administratively.

B. Summary of Financial Tables

TABLE I

PROJECT COST ESTIMATE
(US$ 000)

ITEM	AID	GODR	TOTAL
Rural Roads Rehabilitation	8,500	8,500	17,000
Rural Road Maintenance (1)		5,567	5,567
New Regional Center	150		150
Equipment and Tool Purchases	4,517		4,517
Radio Communication System	200		200
Technical Assistance and Mapping	200		200
Technical Assistance and Materials Research	200		200
Technical Assistance for Training	80	20	100
Construction Materials For Trails (2)	90		90
"Mini-mercado" Shelter Construction	60		60
Administrative Salaries		2,735	2,735
National DGCV Office Addition to Physical Facilities		100	100
Evaluations	40	20	60
Contingencies	963	1,058	2,021
Total	15,000	18,000	33,000

(1) The GODR will have an additional $3,834 for maintenance not used under RRM&R I loan 517-T-033 in Calendar Years '85 and '86.

(2) PVO's will request approximately $150 in PL-480 Title II food for trail construction compensation.

TABLE II
PROJECT COSTS BY YEAR
(U.S.$ 000)

AID LOAN FUNDS	1983	1984	1985	1986	1987-88	TOTAL 1983 - 1988
Rural Roads Rehabilitation	- 0 -	- 0 -	3,400	3,400	1,700	8,500
New Regional Center	150	- 0 -	- 0 -	- 0 -	- 0 -	150
Equipment and Tools Purchases	2,017	2,500	- 0 -	- 0 -	- 0 -	4,517
Radio Communication System	200	- 0 -	- 0 -	- 0 -	- 0 -	200
Technical Assistance and Mapping	- 0 -	100	100	- 0 -	- 0 -	200
Technical Assistance and Materials Research	- 0 -	50	50	100	- 0 -	200
Technical Assistance for Training	20	60	- 0 -	- 0 -	- 0 -	80
Construction Materials for Trails	- 0 -	20	30	20	20	90
"Mini-Mercado" Shelter Construction	0	12	18	12	18	60
Evaluation	- 0 -	- 0 -	20	- 0 -	20	40
Contingencies	- 0 -	0	300	400	263	963
AID TOTAL	2,387	2,742	3,918	3,932	2,021	15,000
GODR RD$ COUNTERPART FUNDS	(RD$ 000)					
Technical Assistance for Training	10	10	- 0 -	- 0 -	- 0 -	20
Rural Road Rehabilitation	- 0 -	- 0 -	3,400	3,400	1,700	8,500
Rural Roads Maintenance	- 0 -	- 0 -	1,588	279	3,700	5,567
(RRM&R I)	(1,066)	(1,756)	(1,000)	(2,834)	- 0 -	- 0 -
Administrative Salaries	- 0 -	- 0 -	900	900	935	2,735
(RRM&R I)	(800)	(850)	- 0 -	- 0 -	- 0 -	- 0 -
Remodeling of National Office	100	- 0 -	- 0 -	- 0 -	- 0 -	100
Evaluation	- 0 -	- 0 -	10	10	- 0 -	20
Contingencies	- 0 -	320	290	240	208	1,058
GODR TOTAL	110	330	6,188	4,829	6,543	18,000
(RRM&R I)	(1,866)	(2,606)	(1,000)	(2,834)		(8,306)

NOTE: Figures in parenthesis indicate costs to the GODR to complete RRM&R I counterpart. Consideration was also given to counterpart requirements for other donor rural road projects in 1983 and 1984 to lessen the financial burden on the GODR during these years.

IV. PROJECT ANALYSES

A. Institutional Analysis

1. Secretariat of Public Works and Communications (SEOPC)

The SEOPC is responsible for physical facilities and operations of all airports, sea ports, public buildings, post offices, telecommunications, highways, rural roads, and the management and regulation of public transportation. The operation of the Secretariat has been, in general, highly centralized under the control of the Secretary, but each Secretary has his own administrative style. The current Secretary makes policy decisions, leaving day-to-day management at the discretion of the Directors of various divisions.

SEOPC has a shortage of mid-level employees who can plan, manage, administer and implement. SEOPC is chronically short of funds and has been used for many years as the dumping ground for political appointees. It has been estimated that the Secretariat could operate efficiently with one-third of the present employees, but it is not possible politically to discharge two-thirds of the Public Works staff.

The GODR has no civil service system. Pensions are granted only by Presidential decree and not as a matter of right. There are Social Security benefits for employees earning less than RD$300/month which pay for certain medical expenses and a portion of lost salary when the wage-earner is sick or disabled. The establishment of a civil service system is debated annually by the Dominican Congress, and annually tabled for further study. GODR personnel policies are taking small steps in the direction of professionalism but as yet there is no stable career civil service.

2. Directorate of Rural Roads (DGCV)

Since the present DGCV is the child of RRM&R I, USAID and SEOPC has a sense of pride in its accomplishments to date. The institutional capacity for maintenance and rehabilitation has resulted in a new attitude and orientation toward the rural roads system within the Secretariat of Public Works. It is no longer considered a disgrace to be assigned to DGCV, rather, competent personnel are requesting transfers from other divisions of SEOPC. GODR and SEOPC support for DGCV is evident in budgetary increase from RD$2.7 million in 1979 to RD$8.0 million in 1982. Following the inauguration of the new government in August 1982, only one change was made in the staff of DGCV. This stabili.y in DGCV has resulted in a general attitude of enthusiasm and espirit de corps not found in many government agencies.

DGCV's National Office in Santo Domingo is responsible for overall management and control, accounting, programming, research, contracting, purchasing, budgeting, inventory control, the inventory of rural roads, and national program coordination. (See Annex IV-A for DGCV organization diagram.) This office has an administrative and technical staff of 57. These staff members have received some 1,240 person/days of training under RRM&R I Technical Assistance in all of the above listed responsibilities. Some of the divisions still need reinforcement, notably in the cost analysis unit for road rehabilitation, rehabilitation contract supervision and the sociology unit responsible for community organization. Although job descriptions exist for each staff member, during this period of growth, some overlapping exists and some gaps are apparent in carrying out office responsibilities. The majority of the national office staff are graduate engineers and beyond the formal courses, administrative duties are being learned in on-the-job training. Accountants, sociologists and economists are graduates in their areas of specialization. No new hiring was done for the DGCV national office since all employees have been transferred from other divisions of the SEOPC.

RRM&R I began with one room and as the program has progressed, new wings were added to the existing DGCV building, second floors added to the wings, and a 300 sq. meter warehouse constructed for the reception and temporary storage of spare parts and hand tools. Additional space and furnishing are needed to adequately house and equip the staff. A chronic shortage of transportation hampers the field monitoring of rehabilitation sub-projects and community organization efforts, a deficiency that this project will help to correct.

Acting on advice of the Technical Assistance, a mini-computer was purchased so that all road inventory data is computer stored. Sub-project selection criteria and all accounting is computerized. The accounting procedures required two years of reorganization and training to bring the accounting department into an efficient unit.

All purchasing and contracting for rehabilitation is done by the National Office staff. Specifications, bidding documents and model contract documents are prepared by DGCV, approved by USAID, and then forwarded to the Sub-Secretary for Externally Funded Projects in the Secretariat of Public Works. There has been a problem with this SEOPC Sub-Secretariat, the documents sit in an "in-box" for as long as six months despite weekly prodding. No procurements have been made after the August 1982 change of government so that there is no experience with the new Sub-Secretary for External Funding in the procurement process.

When a sub-project rural road has been selected for rehabilitation, a team of engineers visit the site, do preliminary designs, and estimate work and materials requirement. Final drawings and

cost analyses are done in the office. A standard rehabilitation contract has been developed with the drawings, work and materials requirements annexed to the standard contract. Monthly progress payments are made based on work performed, approved by the contracted private sector engineering supervisor, the DGCV supervisor and USAID technical staff. Engineering supervisory firms are selected by conventional Request for Technical Proposals, evaluations, and negotiated contract.

Seven regional centers have been constructed and staffed with personnel who have received, to date, 1,655 person-days of training. For the most part, regional center personnel were new hires since one of the requirements was that employees must live in the areas of the Regional Centers. Public announcements were made in each region listing the specialties needed, the salary to be paid, dates for submitting applications, etc. Each applicant was required to take an examination and those selected were given preliminary training with further training courses still in progress for mechanics and truck drivers. (See Annex IV-B for Sample Training Program Schedule.)

Each Center is headed by an engineer/administrator, with an accountant, secretary, spare parts controller, dispatchers, maintenance supervisors, eight mechanics with various specialties, equipment operators, plus skilled laborers and watchmen. One additional position per Center is yet to be filled - that of trainer of the obreros camineros. To date, the training of the obreros has been performed by the National Office and this training program needs significant strengthening at the Regional level.

When the Centers began full operations, quickly it became apparent that the care and routine maintenance of each piece of equipment needed fixed responsibility. In addition to maintenance records (see Annex IV-C), each piece of equipment is assigned to one operator who is responsible for his assigned piece. A schedule of fines, deducted from salaries, has been established for any operator-caused damages to help pay for repairs. This fixed responsibility prevents a "I didn't smash the fender, Joe did it yesterday" shifting of blame and has resulted in a sense of operator pride in how the equipment is cared for.

Each repair, change of parts, regular maintenance performed, amount of fuel used, etc. is recorded for each piece of equipment and this data is being fed into the National Office computer for analyzing actual equipment operating costs, which influences periodic road maintenance costs. The number of hours by equipment item is recorded for periodic maintenance of each road (see Annex IV-D) thus, adding to the data bank of maintenance cost information.

Routine maintenance supervisors operate out of the regional centers visiting each road and obrero caminero at least twice monthly. The supervisors monitor work performed by the obrero, outline the work for next two week period and deliver the obrero's monthly paychecks.

As indicated by the social analysis, closer cooperation is needed between the community organizations and the regional centers. The community organizations are integrated with the local farmers' associations and the leaders receive a plasticized membership card as a member of the "MANCAVE" (member of the association for caminos vecinales). See Annex IV-E for copies of the identification cards issued to association members and to the obreros camineros.

DGCV is a multi-faceted institution but all the basic elements are in place and with reinforcement and strengthening in some units and time needed for "settling in," the institution under development is sound and viable.

3. Private Voluntary Organizations (PVO's)

Promotion, organization and compensation using PL-480 Title II Food for Work in the construction of pack animal trails will be under the direction of two primary PVO's: Servicio Social de Iglesias Dominicanas (SSID) (Church World Services affiliate) and Caritas Dominicana (Catholic Relief Service affiliate).

Operating in the Dominican Republic since 1961, SSID has an administrative staff of 22 and 24 field employees and promoters with a 1982 budget of RD$2,693,428 of which 41% is Title II support. Since its founding SSID has implemented and carried out programs in hand-labor road construction, installation of community water systems, small agricultural programs, health programs, emergency assistance in disasters, nutrition centers, small animal production, family planning and distribution of contraceptives, all in the regions near the Haitian border.

Caritas operates country-wide divided into 8 dioceses with a 1982 total budget of more than RD$10.0 million providing assistance primarily in areas of nutrition, health, milk distribution, credit program for small farmers, hand-labor road construction and education. Caritas estimates that its program benefited approximately 500,000 persons in 1982. For the animal trail program, the Diocese of San Juan will be the only Diocese involved since this is the area of greatest poverty and avoids overlap with SSID.

Both these organizations have a history of good community relations and their interest in becoming part of a government supported development program has been evident in the almost weekly meetings at USAID and workshop attendance at sessions on rural trails.

The head of the San Juan Diocese discussed pack animal trail construction with eight communities and the response was "How soon can we start?"

With the interest of the PVO's and positive attitudes from sample communities in the pack animal trail construction it appears that this pilot project component has the potential for successful implementation.

4. Conclusion

The Institutional Analysis for this project concludes that most of the basic structure is in place for the maintenance of the Dominican Republic's rural transportation network. However, the road survey conducted under RRM&R I demonstrated the reality of the extent of that network - 12,200 kms. versus the previously assumed 6,000 kms. of rural roads. This doubling of kilometers for maintenance responsibilities will demand additional capital investments in physical facilities, rehabilitation of roads, maintenance equipment and trained human resources to meet the ultimate goal of developing an institution that can adequately and efficiently sustain the requirements for movement of people, products and services in the rural Dominican Republic. Without this project, the planned institutional development is only partially completed.

B. Technical Analysis

1. Definitions

Following are definitions of terms that have been used in this analysis:

(a) "Rural Road"

A rural road is a road connecting agricultural producing areas and communities to secondary or primary trunk roads. These roads are, for the most part, 6 meters wide (including shoulders), with one meter ditching on each side. Road surface is gravel. Right-of-way varies from 8 to 10 meters. Road lengths vary from 2 to 20 kilometers.

(b) "Rehabilitation"

Rehabilitation under this program will include such activities as: construction or reconstruction of ditches; construction of transverse drains; construction of new culverts or cleaning and repair of existing culverts; cleaning of existing ditches; escarification, grading, and compaction of surfaces; new gravel surfacing; new decking on bridges, if necessary; construction of bridges or "badenes" (several culverts joined together and covered with concrete); and cut and fill as required for maximum grade standards on rural roads (16%).

(c) "Routine Maintenance"

Hand labor maintenance in control of weeds in ditches and drains, cleaning of culverts and inspection boxes; filling and hand tamping of potholes, minor repairs to structures; and maintenance of ditch contours.

(d) "Periodic Maintenance"

The use of heavy equipment twice annually, escarification of wearing surface (if needed), grading, machine compacting, repair of culverts, structures, headwalls, and delivery of new materials.

2. Rehabilitation

Rehabilitation uses design standards developed by DGCV and SEOPC engineers following international standards for low volume roads. (See Annex IV-F for Design Standards). This component of the project involves the rehabilitation of approximately 1,000 kilometers of rural roads at an average cost $17,000/km. to put these roads into condition to pass to the routine and periodic maintenance program. The $17,000 figure includes contracted supervisory costs at 8%, 4.2% for workmen's insurance, and 10% profit for the contractor. (See Annex IV-G for cost breakdown on average road rehabilitation and kilometers/region for rehabilitation.)

Using data gathered in the Road Inventory carried out under RRM&R I, rehabilitation plans and cost estimates will be developed in the national engineering and budgeting offices, with the participation of the Regional Center engineer and approved by USAID technicians. USAID engineering approval of road selection, costs, designs and final acceptance will be required since FAR reimbursement procedures will be applied for road rehabilitation on a one-to-one basis for a project total of $17.0 million.

One of the "lessons learned" under RRM&R I is that the private sector can rehabilitate a road in less time and at a lower cost, hence, all rehabilitation will be contracted to the private sector with primary supervision by contracted supervisory firms. Secondary supervision will be performed by DGCV supervisory engineers. All payments are, and will be, made on basis of progress of work actually performed, certified by the supervisory firm and approved by DGCV supervisory engineers. The format for payments has been developed, undergone several revisions, and the format currently in use will continue to be used. This format is simple, but comprehensive, and includes the contract estimates by line item, unit costs, progress during past 30 days, past payments and peso amount remaining for each line item. This is a 3 page document and has space for all signatures including USAID Technical Staff and Controller's Office. (See Annex IV-H for sample copy.)

All construction contracts contain a clause requiring the contractor to employ unskilled and skilled (if available) hand labor from the community or communities benefited by the rehabilitation. Labor-intensive work will include all cleaning, excavation, ditching, backfill, hand tamping of some potholes, construction of headwalls, masonary work on culverts, and carpentry for bridge decking. Spreading of gravel surface materials will be by hand since hand spreading provides a more even distribution of materials than that of machine distribution, and the economic costs are about equal between hand labor and machine for spreading. The community will be notified approximately one month in advance of the initiation of work and the number of hand laborers required for the rehabilitation of its road discussed with community leaders or the JUNCAVE, if already organized.

Fortunately, there is no lack of gravel in the country and few roads are further than 10 kms. from GODR borrow pits. Reinforced concrete culvert pipe rather than metal culvert is used throughout the country due to the rapid deterioration of metals in the hot, humid climate.

3. Maintenance

a. Routine Maintenance

For the Routine Maintenance program, supervisors will work out of the Regional Centers monitoring an average of 30 Km/day, with visits scheduled twice monthly to each "Obrero Caminero." The number of supervisors per region depends upon the number of kilometers assigned to a specific region. In general, each supervisor can cover 250 kms. twice monthly. (250 Kms. divided by 30 kms. average/day equals 8 1/3 man-days or 2 work-weeks to visit each site once.)

Since extensive engineering knowledge is not a prerequisite for the routine maintenance supervisors, the regional trainer will train persons with practical knowledge of road construction as supervisors. Supervisors must be natives of the region in which they are to work.

The supervisor will review the work accomplished by the "Obrero," outline a work schedule for the next 2 weeks, sign a timecard, and deliver the Obrero's paycheck each month.

Candidates for the job as Obrero or a member of his/her family must be able to read and write; must live permanently in the community or along his section of road; must be physically fit; and have the respect of the community. From the applicants, the regional administrator and supervisors will select two or more acceptable candidates, with the final selection to be made by the local JUNCAVE.

The Obrero will be assigned a specific number of kilometers, with a maximum of 5 kms. for full-time maintenance. The Obrero will sign a formal document with DGCV, stating responsibilities such as the distance covered (e.g., from north side of bridge "B" to mahogany tree in front of Sr. García's house); number of work days and holidays; salary; and specific tasks such as cleaning all ditches and rights-of-way, cleaning all culverts, filling and hand tamping potholes, redistribution of gravel, removal of debris, care of hand maintenance tools assigned to him (with a list of the tools); filling out daily work sheets; causes for dismissal, leadership required in summoning the JUCAVE for emergencies such as washouts and landslides, etc. The contract also will define DGCV's responsibilities: provision of hand tools and materials, supervision, a schedule of dates for receipt of salary, etc.

At the inauguration or formal acceptance of a rehabilitated road, the Obrero Caminero(s) will be named, hand tools, identification card, and hard hat presented to the Obrero and his name posted at the beginning and end of his assigned section for routine maintenance.

Following selection and contracting, the Obrero will be given a maximum of a one-week training course at the Regional DGCV Center consisting of "How-To" and "What-For" using the training materials developed under RRM&R 1. During training the Obrero's importance to his community and importance of his work in the national transportation system will be stressed.

b. Periodic Maintenance

The regional heavy equipment team will be scheduled to "pass" each road twice annually, to do heavy grading and shaping, compacting and deliver new gravel and culvert pipe as needed. In general, it is estimated that the heavy equipment team will be able to average 3 kilometers daily. Depending upon the type and extent of necessary repairs, the village JUNCAVE may be requested to provide unskilled labor for one or two days cooperating with the equipment team. The local Obrero will coordinate such volunteer labor with his regional supervisor and JUNCAVE.

Based on DGCV's experience in rural road maintenance, costs per kilometer will probably remain stable through 1984 at $850/Km. annually. However, beginning in 1985, these costs are expected to rise to $1,000/Km. calculated as follows:

ANNUAL COST/KM. MAINTENANCE (1985-1988)

Hourly Costs (Rounded)

Tractor (1/2 Time)	RD$12.5 (1/2 Time)
Motor Grader	23.0
Loader	18.0
Compactor	6.0
Dump Truck (2)	22.0
Water Truck	13.0
Lube Truck	15.0
Truck Tank Fuel	4.5 (1/3 Time)
Low Bed Trailer Truck	7.5 (1/3 Time)
Pick-Up	7.5
	RD$129.0/Hr

RD$129/hr. for 6 hrs = RD$774 at 3 Kms./day = 258 Km.	=	RD$ 258/Km
Equipment at 258/km at 2 passes annually	=	RD$ 516
Obrero's Salary at RD$1,500/year	=	RD$ 300
Special Skilled Laborers (Mason, Carpenter)	=	RD$ 80
Materials	=	RD$ 75
Hand Tools	=	RD$ 29
Annual Cost/Km. Maintenance	=	RD$1,000/Km.

In arriving at routine and periodic maintenance costs of $5,567,000 for the project, it was necessary to combine maintenance funding under RRM&R I with the maintenance responsibilities under this project since a neat division is not possible due to other donors' rehabilitated roads coming on stream later than anticipated. The formula for arriving at total Maintenance Project Costs may be found in Annex IV-1.

4. Regional Centers

As a result of the rural road inventory (which doubled the RRM&R I estimated number of kilometers), it became obvious that at least one additional Regional Center will be needed and additional heavy equipment for all existing Centers to fulfill the Maintenance requirements.

Furthermore, the road survey shows that more than 5,000 kms. have been assigned to Regional Zone IV headquartered in Santiago. This regional zone will be divided, a new Center constructed and regional lines redrawn so that no Center will ever be responsible for more than 1,500 kms. of maintenance responsibilities. The Regional Centers have office spaces for the administrator, supervisors, accountants, storage space for spare parts and hand tools, and a controlled entry for the person in charge of inventory control of spare parts and hand tools. A separate building is located in a large patio yard for the maintenance of the heavy equipment, which contains hand tools, soldering and welding equipment, valve grinders, grease pits, and areas for repair of tires plus the normal support systems for category II maintenance shops.

Using the same architectural designs as were used for the other Centers, the RD$150,000 line item under project costs for the construction of the new, eighth Regional Center is a firm figure based on costs for the construction of the other regional centers plus a 10% inflation factor. The new center will be located on land either already owned by the GODR or purchased with counterpart funds. Construction will be by private contractor, supervised by DGCV engineers, using the same designs already developed for the other Centers. (See Annex IV-J for Center photographs.)

5. Commodities

In order to arrive at a logical justification for maintenance equipment purchases, the following formula was used based on three kilometer per day for one basic "set" of equipment consisting of one grader, one front end loader, 4-7 dump trucks, one water truck and one compactor.

3 Kms/day x 280 work days	= 840 Kms.
840 Kms. minus 20% downtime for routine equipment maintenance and repair	= 672 Kms.
672 Kms. minus 20% time required for moving equipment to work sites	= 538 Kms.
538 Kms. divided by 2 passes/year	= 270 Kms.

Thus, 270 Kms. was established as the number of kilometers one basic set of equipment could maintain per year. The

equipment to be purchased under this project combined with existing equipment will be distributed according to the number of kilometers for maintenance per Region. (See Annex IV-K for existing and new equipment distribution by Region and Annex IV-L for kilometers by Region and equipment requirements).

With a view to standardization and taking advantage of equipment specific training, a waiver has been approved by AA/LAC, in accordance with AID regulations, for proprietary procurement of the following items as per Annex I-A (costs are estimated by suppliers for December 1983). The waiver cable is included in Annex I-A. It will still be necessary to request bids from dealers of the propietary items to obtain the best price.

QUANTITY	ITEM	MANUFACTURER	CIF/S.D. UNIT PRICE	TOTAL (DOLS. 000)
8	Motor Graders	Caterpillar	$90	$720
8	Front End Loaders (2.5 cu.y)	Caterpillar	65	520
8	Truck Water Tanks, 2,000 Gal.	Int. Harvester	45	360
1	Lube Truck	Int. Harvester	45	45
14	Pickups 3/4 Ton	Chevrolet	20	280
	Spare Parts Equal to 20%	Purchase Price		385
1	Set Machine Shop Tools	Allied Products All American Equip. Trading Edusystems Snap-on Tools	75	75
		Sub Total		$2,385

Two items will be procured from U.S. Excess Property:
(See Annex IV-Q for confirmation of availability of U.S. Excess Property.)

QUANTITY	ITEM	MANUFACTURER	CIF/S.D. UNIT PRICE	TOTAL (DOLS. 000)
1	D-7 Tractor w/Ripper	Caterpillar	70	70
1	Compactor, 8-10 Ton	Huber	30	30
	Spare Parts		20	20
		Sub Total		120

Compactors purchased under RRM&R I do not provide enough traction on mountainous stretches of roads, so that the decision was made to purchase one Vibrator Compactor for each Center. On the recommendation of the transportation economist, additional transportation will be provided for animal trail and rehabilitation supervisors in the form of motorcycles and pickups.

The GODR/DGCV is not satisfied with performance of International Harvester Dump Trucks purchased under RRM&R I. Accordingly, all existing International Harvester Dump Trucks will be shifted to three or four regional centers for standardization within the Regional Centers. Bids will be requested by formal bidding procedures for the following:

QUANTITY	ITEM	CIF/S.D. UNIT PRICE	TOTAL (DOLS. 000)
30	Dump Trucks - 5 cu. y 140 H.P	$35	$1,050
8	Vibrator Compactor 8-10 Ton	75	600
18	Street/Trail Motorcycles	1.5	27
	Spare Parts	335	335
	Sub Total		$2,012
	Total Maintenance Equipment		$4,517
	(14% of Total Project Funds)		

All equipment is destined for maintenance only and under an agreement with DGCV, no equipment purchased under RRM&R I or RRM&R II project funds may be used for rehabilitation.

As part of the regional centers, workshops have been constructed and equipped with hand tools and machines for routine maintenance of heavy and light equipment and storage of diesel fuel. Each of the Regional Centers has, and the new Regional Center will have, tools to perform the following tasks:

a. Preventive maintenance service:

(1) Changing oil, lubricants, and filter elements.

(2) Greasing and tightening.

(3) Washing with solvents and water under pressure.

(4) Repairing and changing tires and tubes.

(5) Testing and charging batteries.

(6) Replacing hoses, burnt bulbs, belts, windshield wiper blades, and spare plugs and points.

b. Repair of minor components:

Alternator, starter, water pump, oil pump, fuel pump, ignition, air compressor, hydraulic cylinder, etc.

c. Brake repairs.

d. Suspension system repairs.

e. Valve adjustments.

f. Soldering.

g. Electrical system repairs.

h. Removal and installation only of:
Engine, transmission, and differential.

Beyond these tasks, all major repairs will be done in the Santo Domingo DGCV workshops or by a local, qualified private company, since the regional shops are intended to have only those tools for routine maintenance of equipment and vehicles.

The telecommunications net will consist of a base station antenna located at each Regional Center and at the Santo Domingo offices, tied to an existing Public works repeater at Alto Bandera. Mobile radio units will be installed in vehicles of regional supervisors and the foreman of each brigade. Given the relatively low cost ($200,000) of this telecommunications system, it is estimated that it will pay for itself within months in savings of time and fuel costs incurred while operating [illegible] communications system of any sort. (See Annex IV-M for maps of system). Procurement of these components will be carried out under normal bidding procedures, AID Geographic Code 941.

Since SEOPC is responsible for all public communication systems, an arrangement will be made for maintenance of the new DGCV telecommunications through the Sub-Secretariat for Communication.

6. Pack Animal Trails

Pack animal trails, constructed by villagers benefited by the trail, will be promoted by and under daily supervision of Private Voluntary Organizations. Materials to be furnished by DGCV will include

one-meter culverts and cement for the construction of the trails at an estimated cost of $300/Km. for 300 Kms. for a total of $90,000. It is expected that an average trail will be one meter wide and 6 Kms. in length, primarily in mountainous areas.

To avoid any overlap, the PVO's reached an agreement on their respective areas of concentration. (See Annex IV-N for map.)

The PVO's will discuss and promote the trails with the benefited community, then request assistance from DGCV trail engineers who will align the trail, estimate materials required and draw up a work schedule for coordination of material deliveries. Once every two weeks the engineering supervisor will monitor the construction. SEOPC will request two Peace Corps Volunteers to assist in the field work for this component.

PL-480 Title II, Food for Work will provide food to families as compensation for labor during the construction of the trails. With the assumption that 120 person days are required for the construction of one kilometer of trail the rounded cost is estimated at US$420/Km. in Title II food. Annex IV-O demonstrates preliminary animal trail standard designs adapted from trail designs developed by the U.S. Forest Service "Recreation Travelways Handbook," 1982.

Hand tools required for the trail construction are:

200 picks

200 machetes

300 files

100 square nose long handle shovels

100 round nose long handle shovels

50 hand tampers

50 mattocks

20 axes

20 hatchets

20 pry Bars - 5 foot

20 sledge Hammers No. 4

20 wheelbarrows with solid rubber wheels

Tools are expected to be donated by a U.S. private foundation and will become the property of the PVO cooperating groups for project use only.

Since this is a pilot project, trail maintenance by the benefited community using volunteer labor will be tried. If the communities are unwilling to maintain their trail, DGCV will contract the maintenance to an individual in the same manner as rural road maintenance.

The 5 by 10 meter shelters at the terminus of animal trails will consist of concrete flooring, four posts, thatched roof, benches for seats, and a hitching post for the animals. RD$3,000 is estimated for construction of 20 shelters of 50 sq. meters each for a total of $60,000. (See Annex IV-P for shelter designs.) Problems are expected in preserving the shelters for the use for which they are intended in that they might be occupied by families. Community pressures will be the only way to resolve this possible usurping of community property.

C. Social Soundness Analysis

1. Historical Perspective

In the early years following Dominican independence in 1844, the bulk of agricultural land was public domain. However, by the end of the nineteenth century rural structures in the Dominican Republic started to change and ownership patterns were created that still exist. Due to European and North American economic interests, sugar production was started. As a result, small farms began to disappear and campesinos were forced to retreat to less fertile marginal land as Dominican and foreign investors took over the best lands.

When Trujillo came to power in 1930, the campesino was isolated and alienated. It was estimated that only about 10% of the rural population had an awareness of the world outside his community or participated in the money economy.

The isolation of the campesino began to be broken during the first years of the Trujillo regime when Trujillo started a campaign to better the Dominican self-image. This campaign led to the construction of a road network reaching to the furtherest corners of the country, especially the Haitian border. This gave way to a massive migration to the cities to such an extent that urban immigration was prohibited.

Under the Trujillo regime everything the government passed out flowed directly from the dictator with flamboyant pomp such as schools, bridges, roads and other public works. The crushed initiative of the Dominican people and the paternalistic attitude of the government created a "patrón-recipient" mentality that still persists, although diluted, to the present day.

The assassination of Trujillo in 1961 brought political and economic upheaval to the country. Late in 1962, elections were held and the campesino vote was central in bringing Juan Bosch to power. Although the military toppled the Bosch government within a few months, the campaign for election brought significant changes. Bosch had promised agrarian reform, education, farmers' cooperatives, jobs, etc. The campesino had been exposed to all manner of new ideas, and had been given hope that the future could bring a better life.

In 1966 elections were held again and this time Joaquín Balaguer was elected and served three successive terms between 1966 and 1978. He concentrated government efforts in building highly visible physical infrastructures including irrigation canals, health clinics, feeder roads, many of these public structures unjustifiedly elegant and expensive. The roads combined with the diffusion of battery-operated radios brought new ideas to the Dominican campesino. In the mid 1960's national and voluntary agencies began sending community development promoters to remote villages, and although these enterprises often reverted to the traditional paternalistic system and became vanguards of political parties, the promoters stimulated a change in helping the rural population discover its voice.

By the early 1970's small farmers' associations began to be formed in rural communities. Their first function was to serve as pressure groups to secure assistance for their communities. An inventory taken by the Secretariat of Agriculture (SEA) in 1975 located 1,115 farmers' associations with 98,110 members. The following year a recount showed 1,413 associations with 130,000 members. Many of these organizations are weak, but others are quite strong and growing in strength and have succeeded in bringing tangible benefits to their members. A number of cooperatives have come into being, but their primary difficulties have been what is delicately called "poor administration of funds." The most significant fact, however, is that the majority of the associations, parent-teacher groups, youth clubs, etc. have been formed at the initiative of the campesinos themselves and some have been successful in securing technical assistance, seeds and fertilizers, machinery, irrigation canals, and feeder roads for their communities.

2. The Importance of Roads in Dominican Rural Development

The extensive road building initiated by Trujillo in the mid 1930's was one of the most important factors in opening up the world of the campesino and bringing him into the mainstream of the economic and political life of the country. The transportation net has reached many remote regions and trucks enable the farmer to market produce faster and more efficiently. Social services have also improved markedly. New schools and health clinics have been built and new institutions bring orientation and training through short courses on agricultural production

and marketing. The construction of roads has resulted in new products and markets and gradually the traditional subsistenance economy is giving way to an agrarian market economy.

3. Maintenance of Roads

Maintenance of public facilities in general is a common problem in developing countries and is a severe problem in the Dominican Republic. The overwhelming emphasis of government public expenditure has been on building infrastructure with no interest in maintenance. Health clinics and schools frequently fall into disrepair shortly after construction; irrigation canals become clogged with vegetation and silt; potable water systems in rural and urban areas break down from lack of maintenance. Since public works have been the province of the central government, the construction of a new road is more dramatic in political terms than the routine maintenance of any existing structure. During the campaign year preceeding elections, there is always a flurry of construction of roads, schools, etc. Additionally, private contractors and occasionally government agencies see larger construction projects as a chance to make money, while there is little profit in maintenance. For roads, in particular, then, in the past the Government emphasis had been in construction rather than maintenance. With the dependency patterns that existed the communities utilizing the roads have shown no interest in keeping them in shape as it was viewed as a government duty.

4. Community Survey

The rationale for RRM&R I was to lay the foundation for the institutionalization of rural roads maintenance. Rejecting the traditional attitudes of dependence on the government, RRM&R I has attempted to put road maintenance into the hands of the benefited communities, making the communities working partners with the government. For the purposes of this project, some of the basic hypotheses instituted under RRM&R I were tested by a sociological evaluation. A number of variables were included such as acceptance, participation, community interest and cooperation in the rehabilitation and maintenance of rural roads.

The field survey was conducted in six communities where roads had been rehabilitated and where routine maintenance had been underway for a period of not less than two or more than nine months. Communities surveyed were: Tabará Arriba, Azua; Fundación de Sabana Buey, Peravia; Carretón, Peravia; Las Salinas, Peravia; Cambita, El Tablazo, San Cristóbal; and Medina, El Fundo, San Cristóbal. In each community a representative sample was selected of 50 persons (for a total of 300) which included women (39%), "obreros camineros" (6%), leaders of farmer associations (55%) and the general public. The ages ranged from 23 to 60 years with the greater majority of the populations studied on the younger side.

Agriculture is the principal activity for the majority since 64% of the people interviewed stated this was their main occupation. Of these agriculturalists, 37% stated that their plots are crossed or lie on a feeder road. Of the persons dedicated to agriculture, only 42% are owners of the land they work. An interesting sidelight shows that more than half of the people interviewed (58%) either did not know or refused to answer the question about how much land they owned.

All respondents considered the marketing of agricultural produce as the most important benefit of the road with better access to health facilities as a secondary benefit.

Regarding attitudes towards road maintenance work it was found that there is a general reluctance to undertake this type of work on a voluntary basis. While almost all members of the rural communities consider the roads beneficial, they believe that road maintenance should be the task of the "obrero caminero" on a permanent basis and with adequate compensation. In this regard, the general opinion was that rural dwellers can only engage in this work voluntarily in free time and the free time is not enough to prevent long term deterioration of the roads.

The communities have a very small number of persons performing their work as obreros camineros with 6% of the people interviewed stating this as their occupation. Some indicated they had been working at this for 6 or 7 years (despite the fact that the Maintenance Program is less than a year old in these randomly selected communities). They consider that the remuneration for their work is not adequate or regular.

As to the degree of organization of the farmers, it is a good indicator that the majority of those interviewed belong to some type of association or other peasant organization. This provides a good base for the institutionalization of the local maintenance work as well as the development of these rural communities in conjunction with other development activities.

The majority (59%) recognized that the Government rehabilitated the roads but 57% did not know who was maintaining the roads. One basic conclusion and recommendation for this project as a result of this survey is a need for a public relations program that informs the beneficiary communities about the maintenance system.

Of the 116 women interviewed, 86% were housewives; only 2% did farming and some 10% worked outside the home and of that 10% only 2% earned more than RD$200 monthly. Rural women are not "joiners" in that 43% are not affiliated with any association or club; 22% belong to farmers' groups and only 15% belong to mothers' clubs or education/cultural groups.

Of the total group interviewed, some 61% said that women should not participate in road maintenance work since it was "too hard." However, the response from 68% of the women was they would participate in maintenance work if it paid a salary. Originally the job of obrero caminero was not offered to women because of the nature of the work and the traditional attitudes found in rural areas regarding the role of women. But now, with the remarkably high positive response of the women, in this project the work of obrero caminero will be offered to women as well as men.

The following is a listing of some of the other observations that were drawn from the sociological evaluation:

(1) Rural road construction work should be better coordinated with existing local groups.

(2) New rural roads should be linked to the construction of irrigation systems.

(3) More advantage might be taken of the willingness of the farmer to participate in road construction in their free time.

(4) Those interviewed want more roads built.

(5) The communities (94% of those interviewed) feel that the greatest value of rural roads lies in saving crops, ease of marketing, and allowing, in some cases, sales directly from the property.

(6) Great apathy was shown in connection with the community relations with contractors, supervisors and foremen; more than 50% of persons interviewed declined to comment and only 4% considered the relations positive.

(7) Of the people interviewed 68% thought that the salary of the obrero caminero should be between RD$200 and RD$300/month (despite the fact that the average farm family income is RD$857/year).

(8) In the opinion of the farmers' associations' leaders, the work of obrero caminero is "difficult and hard," but the work is being well done despite the low salary received.

5. Social Aspects of Pack Animal Trails

The possible social impacts on the users of pack animal trails has been provided by the Private Voluntary Organizations.

Users of animal trails are divided into two distinct living-group patterns: families clustered where animal trails begin, usually at the base of mountainous areas, where the men climb the trails daily to tend their fields on the mountain sides; and the very isolated villages where families live and work in the mountains.

In planning this pilot project component, animal trail construction was discussed with eight isolated villages. The response is reported as being overwhelmingly positive.

Generally, the more isolated the families, the sharper the distinction between "men's work" and "women's work." The men tend the fields and crops while women and children are responsible for the house, small animals, carrying water and gathering wood for cooking fires. Men have full control over whatever cash is available to the family.

A possible spin-off of the animal trail component may be a new market for pack animals. If the procreation of pack animals becomes an adjunct to the project, the intent will be to put animal production and the income produced in the hands of women. This would change familial attitudes.

6. Conclusions

The foundations for a community based maintenance system exists. Associations in rural communities are supportive of the JUNCAVE system and rural dwellers are willing to work full time on road maintenance work with adequate compensation. The survey conducted pointed out that more advantage can be taken of the willingness of the rural dweller to participate in road building and maintenance in their free time. This is already being incorporated into the program through the requirement of private contractors to use locally available unskilled labor in road rehabilitation work. This reliance on local labor might serve to eliminate the apathy demonstrated through this survey by the community members in their relations with engineers, foremen and supervisors. However, this also points for a need for improved relations between the local community, the JUNCAVE in particular, and the DGCV Regional Center in charge of supervision of the obrero caminero and periodic maintenance. The communities need to be aware of the importance of the road maintenance system. DGCV will have to work more closely with the local community organization. Improved public relations by DGCV will improve the general knowledge that road maintenance although supported by the government is a community responsibility.

The willingness of women to work as obreras camineras was particularly noteworthy. The application and selection process will now be open to women. No action will be taken on the call for an increased salary for obreros camineros. The goverument has a general policy

against pay increases as it can not afford it. The 125 pesos monthly received by the obrero is more than the average farmer makes in the rural areas.

The community based maintenance system while in need of strengthening has proved under RRM&R I to be viable and efficient. The project is, then, found to be socially feasible. (See project 517-0177 files for complete Social Soundness Analysis).

D. Economic Analysis

1. Rural Roads

The economic return on the investment in rural roads maintenance and rehabilitation is quantified using a model that calculates the savings in vehicle operating costs (VOC) and the savings in avoided future reconstruction and rehabilitation costs. Separate analyses are performed for the system as a whole to establish the economic justification for the overall project, as well as for a typical subproject to illustrate the role economic analysis will play in the selection of individual roads. For project selection a simplified economic appraisal procedure is outlined that establishes the minimum traffic levels required in the base year to economically justify a road project. This minimum level of traffic depends on the road rehabilitation cost, terrain type, rate of traffic growth, and vehicle operating costs.

Economic Analysis of Overall Project Feasibility

A model is applied that considers the total rehabilitated road system over a fifteen year time period, and compares the total system cost defined as the net present value (NPV) of the sum of the annual road maintenance cost (routine and periodic), vehicle operating costs, and avoidable rehabilitation/reconstruction costs for two alternatives:

a. Without maintenance

b. With regular maintenance

This approach is appropriate for the case where the average daily traffic is assumed the same for both the "with" and "without" case. The assumption of equal traffic is conservative (it would tend to understate the economic feasibility of the project) compared with assuming that traffic on the unmaintained road would be less than on the maintained road.

For the "with" maintenance case, the project roads are assumed to stay in good condition over the foreseeable future; this time period is assumed at 15 years. Because of the discounting procedures

used in the economic analysis, including longer time periods would have only a negligable effect. For the "without" maintenance case, road quality is assumed to deteriorate after five years to bad condition with an increase in VOC of about 60 percent over that of a good road. At that time, rehabilitation of the road would be required at a cost of approximately RD$17,000 per km. (average for all terrain). The cost of road maintenance is about RD$1,000 per Km.

It is estimated that the average daily traffic on the rehabilitated roads will vary from a minimum of 10 to a maximum of 100 vehicles per day, with an average of 30 vehicles per day. This estimate was obtained from the survey of a sample of eleven rural roads used for evaluating the selection procedures used in RRM&R I, and from the fact that the minimum level of average daily traffic necessary to justify the rural road rehabilitation is about 10 vehicles per day. Thus, assuming the selection criteria are properly applied, no roads will be observed in the system of rehabilitated roads that have a traffic level of less than 10 vehicles per day.

Vehicle operating costs were derived from the "Costos Económicos y Financieros de Operación Vehicular para la República Dominicana, Secretaría de Estado de Obras Públicas y Comunicaciones, Diciembre 1981," and were updated to the year 1983. (See Table III Annex III-B). On good roads, the VOC for a representative vehicle (a weighted average of the various types of vehicles encountered on rural roads, including motorcycles) is RD$.342 per Km. This increases by 60% for a bad road.

Costs and benefits are calculated in RD$, and in constant 1983 prices. As part of the sensitivity analysis, shadow prices were used for valuing foreign exchange and labor. The shadow price for foreign exchange is estimated at 50 percent above the official exchange rate. Unskilled labor has been valued at 65 percent of the minimum wage rate of RD$4.50 per day. As shown in Table IV A-7, the shadow price of road rehabilitation is RD$21,000/km., and the shadow cost of maintenance is RD$1,050 per Km. The opportunity cost of capital is estimated at 15 percent. If shadow pricing is used, the VOC for a representative vehicle increases by about 36 percent. Because of the large foreign exchange component in these items, their shadow prices are substantially above their prices used in the economic analysis.

Capital costs include expenditures on equipment and hand tools, spare parts, workshops, and road rehabilitation. Recurring costs include road maintenance costs of administrative salaries, while the quantifiable project benefits consist of vehicle operating cost savings, and rehabilitation/reconstruction cost savings.

The benefits of the project consist primarily of savings in vehicle operating costs and avoided rehabilitation costs of roads that degrade because of lack of maintenance. Benefits from possible increased

agricultural production induced by the road rehabilitation are expected to be small and are therefore ignored (such benefits are significant only for road reconstruction and penetration road projects). Savings in travel time of passengers also are not included as one of the project benefits because of lack of reliable information on passenger travel along rural roads in the Dominican Republic. It is believed, however, that such passenger travel time savings could be quite large. Substantial research on personal travel characteristics of the rural poor will be required, however, before these benefits can be quantified.

Table IV A-1 shows the expected condition, without the project, of the road network over the 15 year time period from 1983 to 1997. It is assumed that both with and without the project the GODR follows the following rehabilitation program: 1,108 kms. in 1983, 892 kms. in 1984, 400 kms. in 1985, 400 kms. in 1986, and 200 kms. in 1987. (Table IV A-2 gives details on the kilometers rehabilitated for each year by the DGCV and individual international assistance agencies.) Starting with 1983 there are 700 kms. of roads in good condition. These roads were rehabilitated prior to 1983 under RRM&R I and other programs and, since they were also maintained, are still in good condition. I 1983 and 1984, additional 1,108 kms. and 892 kms. of roads, respectively, are rehabilitated. Therefore, starting in 1985 there are 700 + 1,108 = 1,808 kms. of rural road in good condition. RRM&R I ends in 1984, for the purpose of this analysis. Although it is unlikely, we assume that without the project DGCV will revert to their old policy of placing priority on rehabilitation and neglecting maintenance. Therefore, during 1984 1,808 Kms. degrade from good condition to good/fair condition. The Table shows how this policy of neglect leads to road conditions that gradually decline as roads deteriorate over a five year period, and are rehabilitated at the end of five years.

TABLE IV A-1: Condition of Rehabilitated Road Network Without Project, Kms.

	ROAD CONDITION, KMS.					REHABILITATION KMS.		
YEAR	GOOD	G/F	FAIR	F/B	BAD	RE-REHAB.	NEW REHAB.(1)	TOTAL REHAB.
1983	700	0	0	0	0	0	1,108	1,108
1984	1,808	0	0	0	0	0	892	892
1985	892	1,808	0	0	0	0	400	400
1986	400	892	1,808	0	0	0	400	400
1987	400	400	892	1,808	0	0	200	200
1988	200	400	400	892	1,808	1,808	0	1,808
1989	1,808	200	400	400	892	892	0	892
1990	892	1,808	200	400	400	400	0	400
1991	400	892	1,808	200	400	400	0	400
1992	400	400	892	1,808	200	200	0	200
1993	200	400	400	892	1,808	1,808	0	1,808
1994	1,808	200	400	400	892	892	0	892
1995	892	1,808	200	400	400	400	0	400
1996	400	892	1,808	200	400	400	0	400
1997	400	400	892	1,808	200	200	0	200

1. This column gives the rehabilitation "with" the project.

2. Example - During 1984, 892 Kms. are rehabilitated. These are therefore in good condition during 1985. But the 1,808 Kms. that were in good condition in 1984 are not maintained at the end of 1985, and are therefore in G/F condition during 1985.

Table IV A-2: Road Rehabilitation Program, 1983-1988 * (In Kms.)

	1982	1983	1984	1985	1986	1987	TOTAL
							300
517-T-033	510	355	435	0	0	0	1,000
New Loan A.I.D.	0	0	300	300	300	100	1,000
I D B	146	529	0	0	0	0	675
I B R D	9	104	57	0	0	0	170
D G C V (CODR)	35	120	100	100	100	100	555
TOTAL	700	1,108	892	400	400	200	3,700
CUMULATIVE	700	1,808	2,700	3,100	3,500	3,700	3,700

* Yearly totals for road rehabilitation vary slightly beginning in 1984 from actual planned figures as presented in the table on page 39. The overall total Kms. for road rehabilitation, however, remains the same and therefore does not affect the end result of the economic analysis presented here.

TABLE IV A-3: MAINTENANCE, VEHICLE OPERATING, AND REHABILITATION COSTS EXCLUDING TAXES) WITH AND WITHOUT THE PROJECT (1983-1997) RD$ MILLION

YEAR	WITHOUT PROJECT			WITH PROJECT			ANNUAL SAVINGS
	ANNUAL VOC	MAINT	REHABILITATION	ANNUAL VOC	MAINT	REHABILITATION	("WITHOUT" MINUS "WITH")
1983	2.62	0	18.83	2.62	.70	18.83	-.70
1984	6.77	0	15.16	6.77	1.80	15.16	-1.80
1985	10.78	0	6.80	10.11	2.70	6.80	-2.02
1986	13.29	0	6.80	11.60	3.10	6.80	-1.41
1987	16.63	0	3.40	13.10	3.50	3.40	.02
1988	19.70	0	30.73	13.85	3.70	0	32.88
1989	16.83	0	15.16	13.85	3.70	0	14.44
1990	16.18	0	6.80	13.85	3.70	0	5.42
1991	16.74	0	6.80	13.85	3.70	0	5.98
1992	17.83	0	3.40	13.85	3.70	0	3.67
1993	19.70	0	30.73	13.85	3.70	0	32.88
1994	16.82	0	15.16	13.85	3.70	0	14.44
1995	16.18	0	6.80	13.85	3.70	0	5.42
1996	16.74	0	6.80	13.85	3.70	0	5.98
1997	17.83	0	3.40	13.85	3.70	0	3.67
*NPV at 15%	74.2	0	73.8	61.7	16.4	37.8	31.8

* An example of the calculations for Table IV A-3 is given for the year 1989. The annual VOC (Column 2) for the year 1989 is calculated as the sum of the products of the vehicle operating cost and the kilometers of road in good, good to fair, fair to bad, and bad condition. The VOCs are .342, 1.1 x .342, 1.2 x .342, 1.4 x .342 and 1.6 x .342 RD$1 Km. respectively. Thus, the total VOC for 1989 is: (.342 x 1808 x 1.1 x .342 x 200 + 1.2 x .342 x 400 + 1.4 x .342 x 400 + 1.6 x .342 x 892) x 30 veh. per day x 365 days per year = RD$16.83 million.

The maintenance cost (Column 3) without the project is zero since the roads are not maintained.

The rehabilitation cost without the project (Column 4) is the product of the rehabilitation cost per km. (RD$17,000) and the kilometers of road rehabilitated as shown in Column 9 of Table IV A-1 (892 kms.). Thus 17,000 x 892 = RD$15.6 million.

The annual VOC with the project (Column 5) is the product of the VOC for a good road and the kilometers of good road. Thus, .342 x (1808 + 200 + 400 + 400 + 892) x 30 veh. per day x 365 days per year = RD$13.85 million.

The annual maintenance cost with the project (Column 6) is the product of the maintenance cost per km. and the kilometers of road maintained. This equals (1808 + 200 + 400 + 400 + 892) x 1,000 = RD$3.7 million.

The rehabilitation cost with the project (Column 7) is the product of Column 9 of Table IV A-1 and the rehabilitation cost per kilometer. This equals 17,000 x zero = zero RD$.

From the table of road conditions, the annual costs of vehicle operation, rehabilitation, and maintenance can be calculated. These are given in Table IV A-3; the last column in that table shows the annual savings in vehicle operation, maintenance, and rehabilitation resulting from the policy of rehabilitation followed by regular maintenance. During the first five years the savings are very small because vehicle operating cost and rehabilitaton cost savings are small (the road network for the "without" project case is still in fairly good condition). Starting with the sixth year, however, the policy of maintenance starts paying off and the savings are substantial.

The bottom line of the table shows the NPVs (calculated at a 15% discount rate) of the maintenance, rehabilitation, and vehicle operating costs. The extra cost of maintenance (RD$16.4 million) is largely offset by the vehicle generating cost savings (RD$12.5 million). In addition, there are substantial savings in rehabilitation costs (RD$36.0 million), and the NPV of the savings is RD$32.1 million. We must still, however, substract other project costs not included in the maintenance and rehabilitation costs presented in the table which includes only the direct costs of labor, fuel, tools, materials, equipment maintenance and depreciation, and supervision required for the maintenance and rehabilitation. Table IV A-5 gives the annual indirect costs that are necessary for the "with" project case. These costs include the radio communication system, the construction cost for the additional regional center, technical assistance, administrative salaries for the DGCV for the additional personnel necessary for the project, and for the remodeling of the national office.

Table IV A-4: Calculation of the Internal Rate of Return for the Overall Project

(prices are net of taxes; RD$ million)

Year	Savings VOC	Savings Maintenance	Savings Rehabilitation	Total Savings	Indirect Cost	Net Savings
1983	.000	-.700	.000	-.700	.8	-1.5
1984	.000	-1.808	.000	-1.8	1.6	-3.41
1985	.677	-2.700	0	-2.02	.95	-2.97
1986	1.688	-3.1	0	-1.41	.95	-2.36
1987	3.526	-3.5	0	.02	.935	-.92
1988	5.848	-3.7	30.736	32.88	.935	31.95
1989	2.977	-3.7	15.164	14.44	.935	13.51
1990	2.324	-3.7	6.8	5.42	.935	4.49
1991	2.886	-3.7	6.8	5.98	.935	5.05
1992	3.975	-3.7	3.4	3.67	.935	2.74
1993	5.848	-3.7	30.736	32.88	.935	31.95
1994	2.977	-3.7	15.16	14.44	.935	13.51
1995	2.324	-3.7	6.8	5.42	.935	4.49
1996	2.886	-3.7	6.8	5.98	.935	5.05
1997	3.975	-3.7	3.4	3.67	.935	2.74
NPV at 15%	12.46	-16.50	35.91	31.87	5.87	26.00

IRR = 53.8%

VOC savings = Column 2 - Column 5 of Table IV A-3

Maintenance cost savings = Column 3 - Column 6 of Table IV A-3

Rehabilitation cost savings = Column 4 - Column 7 of Table IV A-3

Total savings is Column 2 + Column 3 + Column 4

Indirect cost is from Table IV A-5, bottom row

Net savings is Column 5 - Column 6

TABLE IV A-5
INDIRECT PROJECT COST BY YEAR

(U.S. $000)

	1983	1984	1985	1986	1987-1997	1983-1988
Tools for New Regional Center	0	100	0	0	0	100
Radio Communication System	0	200	0	0	0	200
Construction, One Regional Center	0	150	0	0	0	150
T. A. for Mapping	0	200	0	0	0	200
T. A. for Research	0	0	50	50	0	100
			(RD$ 000)			
Administrative Salaries	800	850	900	900	935	4,385
Remodeling of National Office	0	100	0	0	0	100
PROJECT TOTALS	800	1,600	950	950	935	5,235

The right hand column of Table IV A-4 shows the annual net savings that are produced by the project. The internal rate of return (IRR) of this stream of savings is 53.8 percent, and the NPV of the savings is RD$26.0 million, indicating that the project is highly feasible from the economic point of view.

It should be noted that the above economic analysis was done with provisional costs of RD$17,000 per Km. for road rehabilitation and RD$1,000 per Km. for road maintenance. Using more accurate estimates that became available later of RD$16,941 per Km. for road rehabilitation and RD$928 per Km. for maintenance, the NPV and IRR changes slightly. The new NPV is RD$27.31 million, and the new IRR becomes 58.2 percent.

Sensitivity Analysis

Table IV A-6 shows that the sensitivity of the project NPV to changes in rehabilitation and maintenance costs, the indirect costs, vehicle operating costs, and average daily traffic. The sensitivity analysis shows that the project remains highly feasible for variations of plus or minus 25% of the factors mentioned above. It is of interest to note that the project becomes more feasible with increases in rehabilitation cost. The reason is that, without the project, substantially more rehabilitation is undertaken than with the project. And, even though the rehabilitation without the project is done far in the future, the NPV of this cost outweighs the cost of maintenance incurred with the project.

The impact of increasing the number of years between road rehabilitation (if it is not maintained) from five years to seven years was also investigated. As expected, this assumption favors the "without" project case, and reduces the IRR from 56.4% for the base case to 31.4%. Nevertheless, even assuming seven years between rehabilitations, the project still remains highly feasible.

Shadow Pricing

Because of the large under evaluation of foreign exchange at the official exchange rate, it is mandatory to repeat the economic justification using shadow prices. Shadow pricing will also help to more accurately reflect the true cost to the economy of using unskilled labor, of which there is a surplus. We estimate that, because of rural unemployment, the shadow price of unskilled labor is 65 percent of the minimum wage of RD$4.50 per day. This reflects the fact that because of rural unemployment and under-employment the payment of the minimum wage to unskilled labor does not represent an equivalent cost to society. Rather, because of unskilled labor's low opportunity cost, i.e., the marginal productivity of the best available alternative employment to

road maintenance or rehabilitation, and because of the value placed by the government on increased consumption by the rural poor, the true cost to society of employing unskilled labor in roadwork is only .65 x RD$4.50 = RD$2.92 per day. It is also clear that the cost of imported items used in road work such as machinery, fuel, and parts, are greatly undervalued if the official rate of exchange (1 RD$ = US$) is used. The estimated real cost of foreign exchange is 1.50 RD$ = 1 US$. To reflect the true cost of such items to the economy the foreign exchange component of the road work should be increased by 50 percent.

Table IV A-7 presents the estimated component of foreign exchange unskilled labor, and other local costs for the project's major components of rehabilitation, maintenance, and vehicle operating cost. By adjusting these components with the shadow price multipliers shown in the table, we can derive the shadow price for road rehabilitation as RD$20,988 per kilometer. This is about 24 percent above the "economic" cost. For road maintenance, the shadow price is RD$1,045 per kilometer, or about 13 percent higher. Shadow pricing increases the vehicle operating cost by about 36 percent.

The effect of shadow pricing is to increase the NPV of the project from RD$27 million to RD$33 million, an increase of about 26 percent. The IRR increases from 56.4% at economic prices to 62.3% using shadow pricing. Thus, the project becomes more feasible if shadow pricing is used. This is not surprising since the increase in maintenance costs caused by shadow pricing is compensated for more than adequately by the higher VOC savings and savings in re-rehabilitation costs. And, it illustrates the general truth that, as roads and vehicles operation become more expensive, it becomes more important to adequately maintain them.

Finally, it should be mentioned that, at the micro level, shadow pricing will increase the minimum traffic level necessary to justify the road rehabilitation. At the micro level the question asked is: should this road be rehabilitated and maintained, or should it be allowed to degrade to an animal track? This is as opposed to the question asked at the macro level, and which is: given that we want to preserve the road, is it best to place the road under regular maintenance (as in RRM&R I and II), or should we forego maintenance and only rehabilitate the road just before it becomes impassable?

Thus, at the micro or project selection level, higher rehabilitation and maintenance costs as caused by shadow pricing must require an increase in the level of traffic in the base year. For example, using economic costs for road work and VOCs, the minimum level of traffic necessary to justify the Las Lajas-Boca Río Grande road is 20.5 vehicles per day (Annex III-B - Table III B-3). But if shadow prices are used, the minimum traffic level increases by five to a total of 26 vehicles per day. The DGCV should therefore, early during the RRM&R II project, recalculate Table B III-3 to reflect shadow prices. As a first approximation, an increase in minimum daily traffic of 25% could be used.

TABLE IV A-6: Sensitivity Analysis

		Net Present Value at a Discount Rate of 15% (RD$ Million)
Basic Case		26.5(1)
Changes in Assumptions		
Rehabilitation and Maintenance Costs	+ 10%	28.49
	- 10%	24.64
	+ 25%	35.48
	- 25%	21.69
Indirect Costs	+ 10%	25.97
	- 10%	27.04
	+ 25%	25.16
	- 25%	27.85
Vehicle Operating Costs (Also Average Daily Traffic)	+ 10%	33.1
	- 10%	30.6
	+ 25%	35.0
	- 25%	33.1
Discount Rate	+ 25%	18.4
	- 25%	37.9

(1) Table IV A-4 shows the NPV for the base case as RD$26.0 million. This slight discrepancy with the NPV given here as RD$26.5 is caused by a minor change in the indirect costs in Column 7 of Table IV A-4, and the effect of this change on the economic feasibility of the project is insignificant.

Table IV A-7 Calculation of Net-of-taxes and Shadow Prices

A. Road Rehabilitation, 5 kilometers	Capital Cost (RD$)	Unskilled Labor Cost (RD$)	Other Cost (RD$)	Total Cost (RD$)
1. Mobilization			7,000	
2. Cut and Fill	15,500			
3. Drainage Strct.	11,380	7,835		
4. Base and Subbase	23,650			
5. Maint. of Way	1,000			
6. Finish and cleaning		500		
7. Profit			6,686	
8. Insurance			2,808	
9. Administration			2,008	
10. Contingencies	3,918	1,959	1,959	
11. Supervision			6,269	
Financial Cost, 5 Kms.	55,448	10,294	26,728	
Financial cost per Km.	11,089	2,059	5,346	18,494
Cost multipliers, tax component	.86	1	1	
Cost, net-of-taxes	9,536	2,059	5,346	16,941
Shadow price multiplier	1.5	.65	1.0	
Shadow price	14,304	1,338	5,346	20,988
B. Maintenance, 1 Kilometer				
Financial Cost	516	300	184	1,000
Net-of-taxes	444	300	184	928
Shadow price	666	195	184	1,045
C. Vehicle Op. Cost, RD$/vehicle Km.				
Net of taxes	.274	.034	.034	.342
Shadow price	.411	.022	.034	.467

2. Pack Animal Trails

The improved animal trails will offer greater comfort and shorter journey times to pedestrian travel, will increase the productivity of pack animals, and will reduce spoilage of crops while in transit. Furthermore, soil erosion will be reduced and the need for the community to organize for the construction and maintenance of the trails will have beneficial social impacts. But, except for a considerable body of data on the planning and design of such trails (especially for the forest service trails in the USA used for fire fighting and recreational purposes) little is known concerning the operating experience with trails in developing countries.

To quantify these benefits, however, in a formal economic analysis, much more than is currently available needs to be known about the transport needs of small farm households. These needs have rarely been studied. Nevertheless, an approximate indication of the economic feasibility of trails can be obtained by considering that a system of trails that is linked with a rural road will extend the zone of influence of the road, and will increase the agricultural production within the zone of influence. The question we will ask is: by how much will this system of trails have to augment the production in the zone of influence of the feeder road to be economically justified.

We will analyze a typical feeder road located in mountainous terrain, and its system of associated trails. We will assume that the feeder road is seven kilometers long, and is linked with six trails, each 5 kilometers long. The zone of influence of the road is 35,000 tareas of which one-fourth is cultivated. We will assume that the most remote one-third of these tareas benefit from the access over the improved trails. Thus, about 3,000 tareas benefit from the trails. Assuming that the gross value of production (quantity times market price) of one tarea is RD$30, the value of agricultural production in the area benefited by the trails is 3,000 x 30 = RD$90,000. The NPV of this production over a fifteen year time period is about RD$605,000.

The cost of constructing the trails is only $300 per kilometer times 30 kilometers = RD$9,000. Assuming a yearly maintenance cost of 10%, the NPC of the trail over the fifteen years is about RD$14,300, which is less than 2.5% of the NPV. This ignores other substantial benefits attributable to trails such as the increased personal mobility and reduced erosion.

Though little is known about the impact of trail rehabilitation on agricultural production, it is judged that two and a half percent increase in the value of agricultural production will be easy to achieve. We can conclude therefore that the trails project has a very high chance of being economically justified.

E. Environmental Concerns

An Initial Environmental Examination recommending a Negative Determination was prepared and presented with the PID. Based on the IEE, the LAC Bureau reached a Negative Environmental Threshold Decision for the project on December 17, 1982 (see Annex I-D).

As stated in the IEE, the project does not involve the construction of any roads. While rehabilitation and maintenance of roads is expected to improve their condition, lower vehicle operating costs and reduce travel time, it is not expected that these activities will increase access to remote areas or substantially increase vehicular traffic in environmentally sensitive regions. The main negative environmental effect anticipated, as noted in the IEE, is some increase in the amount of land under cultivation which may result from the successful improvement of farm to market transportation resulting from maintained roads.

The construction of pack animal trails is intended to provide a dual function - improved access to isolated communities and to protect the hillsides from further erosion caused by unplanned and un-controlled drainage of existing pack animal trails.

Because of the very limited potential negative impact of the road rehabilitation and maintenance component and the positive impact through animal trail construction, the Project Committee has not considered it necessary to build specific environmental protection measures into the subproject selection criteria. However, the socio-economic studies undertaken as the basis for road selection will include identification of potential environment impacts. If potential negative impacts are identified, the contracts for both rehabilitation and maintenance work will specify measures to be taken by the contractors to insure that the environment is adequately protected.

V. PROJECT IMPLEMENTATION

A. Financial Plan

The total cost of the project is $33,000,000 of which $15,000,000 will be financed with AID funds. The GODR counterpart contribution of $18,000,000 represents 55 per cent of total project cost. The contribution more than adequately meets the requirement for counterpart contribution. The timeliness of contributions to RRM&R I lead us to believe that the GODR will support this project. Project Table I is the Summary Cost Estimate and Financial Plan showing the components, source of funds and type of currency. Table II is a Projection of Expenditures by Fiscal Year.

B. Disbursement Procedure and Reporting Loan Requirements

1. R. D. Peso Cost

In order to segregate AID and GODR funds clearly, four special bank accounts will be established. Two accounts will be for AID's contribution, one account for rehabilitation, the other for all other components. Likewise, two accounts will be established for the GODR contributions.

For the non-rehabilitation components, each disbursement request by the GODR will specify funding requirements over a three-month period by program component and will report the status of funds previously provided. This reporting procedure will provide USAID with the information necessary to judge the program requirements and then, upon receipt of evidence that counterpart funds have been deposited, make a disbursement for the next advance of funds.

The DGCV experience in estimating costs of rehabilitation gained in the Rural Roads I project supports the decision to use the Fixed Amount Reimbursement Method (FAR) for the road rehabilitation component of the project.

Under the FAR system, after the work sites have been selected, plans and specifications prepared and the cost of the work determined, USAID will issue Project Implementation Letters approving the selection, cost estimates and plans and establishing the amount of the AID contribution. AID will reimburse for completed sub-projects in the agreed-upon amount for each Project unit. It is estimated that the AID share for each unit will be 50% and the pari-passu for this component will be based on that estimate.

The FAR procedures set forth in AID Handbook 1 B, Chapter 20, and elsewhere in the Handbook system will apply to this Project.

Where the Local Cost Financing technique is utilized, procurement will follow Chapter 18 of AID Handbook 1 B

Rehabilitation will be undertaken by contractors or Public Works agencies. USAID will monitor and conduct periodic inspections to satisfy itself that the project is being implemented in accord with agreed specifications.

In order to provide working capital to begin rehabilitation, advances may be made. Upon receipt of evidence of the counterpart contribution, AID will deposit its proportional contribution. When the sub-projects have been completed, AID will make a final inspection and, upon acceptance, liquidate the proportionate outstanding advance.

2. Foreign Exchange Costs

All foreign exchange costs will be paid by Direct Letters of Commitment to U.S. suppliers.

Summary of Financial Tables

TABLE I

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US$ 000)

ITEM	A I D FX	A I D LC	GODR LC	TOTAL
Rural Roads Rehabilitation	- 0 -	8,500	8,500	17,000
Rural Road Maintenance (1)	- 0 -	- 0 -	5,567	5,567
New Regional Center	- 0 -	150	- 0 -	150
Equipment and Tool Purchases	4,517		- 0 -	4,517
Radio Communication System	150	50	- 0 -	200
Technical Assistance and Mapping	- 0 -	200	- 0 -	200
Technical Assistance and Materials Research	50	150	- 0 -	200
Technical Assistance for Training	80	- 0 -	20	100
Construction Materials For Trails (2)	- 0 -	90	- 0 -	90
"Mini-mercado" Shelter Construction	- 0 -	60	- 0 -	60
Administrative Salaries	- 0 -	- 0 -	2,735	2,735
National DGCV Office Addition to Physical Facilities	- 0 -	- 0 -	100	100
Evaluations	40	- 0 -	20	60
Contingencies	303	660	1,058	2,021
Total	5,140	9,860	18,000	33,000

(1) The GODR will have an additional $3,834 for maintenance not used under RRM&R 1 Loan 517-T-033 in Calendar Years '85 and '86.

(2) PVO's will request approximately $150 in PL-480 Title II food for trail construction compensation.

TABLE II

PROJECTION OF EXPENDITURES BY FISCAL YEARS

(U.S.$ 000)

AID LOAN FUNDS	1983	1984	1985	1986	1987-88	TOTAL 1983 - 1988
Rural Roads Rehabilitation	- 0 -	- 0 -	3,400	3,400	1,700	8,500
New Regional Center	150	- 0 -	- 0 -	- 0 -	- 0 -	150
Equipment and Tools Purchases	2,017	2,500	- 0 -	- 0 -	- 0 -	4,517
Radio Communication System	200	- 0 -	- 0 -	- 0 -	- 0 -	200
Technical Assistance and Mapping	- 0 -	100	100	- 0 -	- 0 -	200
Technical Assistance and Materials Research	- 0 -	50	50	100	- 0 -	200
Technical Assistance for Training	20	60	- 0 -	- 0 -	- 0 -	80
Construction Materials for Trails	- 0 -	20	30	20	20	90
"Mini-Mercado" Shelter Construction	0	12	18	12	18	60
Evaluations	- 0 -	- 0 -	20	- 0 -	20	40
Contingencies	- 0 -	- 0 -	300	400	263	963
AID TOTAL	2,387	2,742	3,918	3,932	2,021	15,000
GODR RD$ COUNTERPART FUNDS	(RD$ 000)					
Technical Assistance for Training	10	10	- 0 -	- 0 -	- 0 -	20
Rural Road Rehabilitation	- 0 -	- 0 -	3,400	3,400	1,700	8,500
Rural Roads Maintenance	- 0 -	- 0 -	1,588	279	3,700	5,567
(RRM&R I)	(1,066)	(1,756)	(1,000)	(2,834)	- 0 -	- 0 -
Administrative Salaries	- 0 -	- 0 -	900	900	935	2,735
(RRM&R I)	(800)	(850)	0	0	0	0
Remodeling of National Office	100	- 0 -	- 0 -	- 0 -	- 0 -	100
Evaluations	- 0 -	- 0 -	10	10	0 -	20
Contingencies	- 0 -	320	290	240	208	1,058
GODR TOTAL	110	330	6,188	4,829	6,543	18,000
(RRM&R I)	(1,866)	(2,606)	(1,000)	(2,834)		(8,306)

NOTE: Figures in parenthesis indicate costs to the GODR to complete RRM&R I counterpart. Consideration was also given to counterpart requirements for other donor rural road projects in 1983 and 1984 to lessen the financial burden on the GODR during these years.

C. Schedule of Major Events

It is anticipated that the Rural Roads Maintenance and Rehabilitation II program will be implemented according to the following schedule:

1.	June 10, 1983	Project authorized
2.	June 13, 1983	Project Agreement signed
3.	June 30, 1983	Implementation Letter No. 1 issued
4.	July 15, 1983	Dominican Republic Congressional approval
5.	August 1, 1983	Conditions Precedent to Initial Disbursements met
6.	September 15, 1983	Construction of new Regional Center begins
7.	September 15, 1983	First bidding documents for commodities purchases approved.
8.	September 30, 1983	Begin Remodeling of National Office
9.	September 30, 1983	Conditions Precedent to Disbursement for Equipment Procurement met.
10.	October 15, 1983	T.A. for Training Begins
11.	October 30, 1983	Begin selection for construction of pack animal trails
12.	October 30, 1983	Invitation for Bids for commodities published
13.	November 30, 1983	Begin construction of animal trails
14.	December 15, 1983	New Regional Center completed and staffed with trained personnel
15.	December 30, 1983	Complete National Office Remodeling
16.	January 15, 1984	All commodity purchases contracts awarded
17.	January 30, 1984	Begin telecommunication construction
18.	February 15, 1984 Through Jan. 1988	Socio-economic analyses of candidate sub-projects for rehabilitation
19.	April 15, 1984	All commodities in-country and distributed
20.	April 15, 1984	Begin "Mini Mercado" Shelter Construction
21	April 30, 1984	Complete telecommunications system
22.	June 1, 1984	Begin research activities on road surfacing
23.	June 1, 1984	Begin mapping activities
24	June 15, 1984	T.A. for Training Ends
25.	June 15, 1984	Conditions Precedent to Disbursement for Rehabilitation Operations met
26.	January 1, 1985	Begin Road Maintenance under this Project
27.	January 1, 1985 Through May 30, 1988	Begin Road rehabilitation program
28.	March 1, 1985	First Loan Progress Evaluation complete
29.	October 15, 1985	Complete Pilot Project of Animal Trails and Mini Mercados
30.	November 15, 1985	Complete Mapping Activities
31.	November 30, 1985	Evaluation of Rural Trails Program
32.	June 1, 1986	Complete Research Activities on Road Surfacing
33.	September 30, 1986	Second Loan Progress Evaluation
34.	December 30, 1988	Final Project Evaluation

D. Procurement and Waivers

Commodities and Technical Assistance/Training Services procured with Loan funds will have their source and origin in countries included in AID Geographic Code 941. Certain materials will be purchased as imported or locally produced shelf items in accordance with regulations in AID Handbook 1B, Chapter 18.

A sole source waiver is included in the Project Authorization for the procurement of technical assistance services totaling $100,000 ($80,000 AID loan and $20,000 GODR counterpart) from Organization for Rehabilitation Training (ORT). Additional technical assistance is required under RRM&R II in the training of DGCV personnel in equipment maintenance and inventory control.

Selection of ORT on a non-competitive basis is appropriate under the provisions of AID HB 1B, Chapter 12C.4.a.4. which provides that a single source waiver may be granted when "one institution or firm can be demonstrated to have the unique capability by reason of special experience or facilities, or specialized personnel who are recognized as predominant experts in the particular field to perform the services required for the project." The personnel of ORT already have a year and one-half of project specific experience and have satisfactorily provided the same kind of training services required under RRM&R I, a predecessor AID project carried out in the Dominican Republic. In addition the ORT advisor has gained extensive knowledge concerning the problems, personnel and needs of DGCV which permits it to provide DGCV with the needed assistance immediately. Thus, there would be no necessity for the firm to familiarize itself with SEOPC/DGCV, develop new working relationships or undertake other time consuming start-up activities. No other firm could provide effective assistance immediately upon project start-up. In sum, in-depth previous experience with the precise type of activity now being proposed in a new project is a unique capability within the meaning of the AID Handbook requirements. The proposed waiver is within the authority of the Mission Director by redelegation of authority to the field from AA/LAC dated April 18, 1982, which provides the Mission Director with the authority to authorize sole source waiver in accordance with the terms and provisions of AID Handbook 1, Supplement B, Chapter 12 C 4a, provided that the estimated procurement does not exceed US$100,000. In accordance with HB 1 Chap 12 C 4a the applicable criteria is that the firm (ORT) can be demonstrated to have a unique capability by reason of special experience.

A proprietary procurement waiver has been approved by AID/W which permits procurement based upon standardization of certain equipment as described in the Technical Analysis of this paper (State Cable 127426).

A source/origin waiver is requested and recommended from Code 000 to Code 899 for the purchase with Loan funds of 18 99cc motorcycles to be used by road rehabilitation and maintenance supervisors and animal

trail supervisors. AID HB 1B, Chapter 5 B4 a(2) provides that commodity source waivers may be granted when "the commodity is not available from countries or areas included in the authorized Geographic Code (941)." The motorcycles will cost approximately $27,000. Small "street-trails" motorcycles are not manufactured in the United States. Although they are available from supplies in two of the 941 Code countries, country-wide maintenance and service from those two suppliers in the Dominican Republic is considered to be inadequate for purposes of the project. Accordingly, a waiver is requested to permit dollar procurement of Code 899 source/origin to allow for adequate maintenance and service, country-wide, of purchased motorcycles. Because the procurement is estimated to be in an amount less than $50,000, the AID Mission Director has the authority to make the waiver. Because the motorcycle procurement is an important element of project supervision of this important project activity, in making the source waiver, it is appropriate for the Mission Director to certify in accordance with the requirement of AID H.B. 1 B, Chapter 5.B4 to that "Exclusion of procurement from Free World countries other than the cooperating countries and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program." Because this procurement is under $100,000, the Borrower may utilize the "small value procurement" procedures set forth in AID HB 11, Chapter 3, Section 2.2.4.

Upon signature of the Project Authorization, the Mission will make the above certification and accomplish each of the above waivers, i.e., (1) sole source waiver for ORT services and (2) source, origin waiver for the motorcycles.

All project procurement will be undertaken by the borrower pursuant to AID standard host-country contract procedures, except for technical services procured from other U.S. government agencies which will be contracted by AID through PASA or other intra-agency agreements.

E. USAID Monitoring

The USAID/DR Capital Resources Development Office Engineering Section will have the primary responsibility for monitoring Project implementation and progress, assisted by the Office of the Controller. Officials from the Mission will review procurement proposals, plans and specifications for commodities procurement, training and technical assistance, procurement, rehabilitation and maintenance plans, specifications and cost estimates. The project engineer, assisted by the engineering section, will inspect each rehabilitation sub-project at least twice a month, and two work/weeks monthly will be devoted to monitoring maintenance activities. Upon completion of each rehabilitation sub-project, the project engineer will review and approve the subproject jointly with the IGGV engineering supervisors and contracted A & E firms.

The present Mission engineering staff has one U.S., two Dominican Direct-Hire, and one contracted Dominican engineer. USAID/DR engineering responsibilities for 1983-84 will include the completion of well drilling and latrine construction with a total project cost of $7.0 million under the Health Sector Loan II; approximately $600,000 for construction under Agricultural projects; $2.0 million for PL-480 construction primarily in the area of Agriculture; $4.0 million in construction for Education graduate school program; $4.3 million in mini-hydro research and construction; monitoring of housing programs; and continuing monitoring of Rural Roads Maintenance and Rehabilitation I project at a total cost of $33.0 million. 1984-87 will undoubtedly bring additional monitoring responsibilities to the engineering staff. Given the existing workload, the Mission anticipates the need for an additional Dominican engineer to be contracted for 1984-87 to assist primarily in monitoring of rehabilitation of rural roads and animal trail construction.

Bi-monthly project status meetings will be held to discuss progress and ensure that Project activities conform to AID regulations, that sound financial control is being exercised, and that the terms and conditions of the Project Agreement are being met.

F. Evaluations

Major evaluations of the rural road component of the project will be conducted 33 months, forty-two months, and sixty-four months after the commencement of the project.

The primary emphasis of the first evaluation will be the continuing development of DGCV institutional capacity at the national and regional levels, the functioning of DGCV with local organizations and selected initial subprojects. The 33 month evaluation will focus in detail on the sub-project selection process for road rehabilitation.

The second major evaluation will take place forty-two months after project initiation. This evaluation will deal primarily with progress toward project goals and further evaluate the long-term national and regional institutionalization that has occurred. The impact of road rehabilitation and maintenance on costs and benefits in the areas of rehabilitated and maintained roads will be examined.

The third and final evaluation will take place sixty-four months after the initiation of the project. This evaluation will focus on questions of permanent institutionalization at all levels and impact on the target group. The evaluation will examine other effects of the project such as improved maintenance attitudes and other activities of local and national institutions. This evaluation will also examine

whether a national feeder road system is emerging which will be adequate to meet the needs of the rural sector but not excessive in mileage or budgetary claims.

All evaluations will utilize the logical framework as a base in order to assure comparability and continuity in the evaluation process. Thus, each evaluation will be asked to measure progress and problems with respect to goals, subgoals, purposes, outputs and inputs, verifying and if necessary propose revisions in the logical framework with respect to objectively verifiable indicators, means of certification and validity of assumptions. If the project is fully successful, it will produce certain side effects such as major changes in the agricultural marketing systems in the command area of the roads, a change in attitude towards maintenance in areas of the road activities. It will be of considerable use to the GODR and perhaps the development community generally if such benefits can be precisely identified.

The first two evaluations will be "in-house" with DGCV taking the major responsibility under USAID guidance. Since an evaluation has no value to the implementing agency unless actions stem from recommendations, the Project Committee believes that "in-house" evaluations would be more effective in assisting the DGCV to stand back and do a self-examination, spotting weaknesses in the system, resolving known problems, and give a sense of pride in areas of accomplishment. The capacity for self-criticism, both positive and negative, helps strengthen the institution in its perceived role in Dominican development.

The final evaluation will be contracted by an outside evaluator since this evaluation is primarily for AID use.

A special evaluation will be conducted two years from the initiation of construction of pack animal trails with the Private Voluntary Organizations assuming the leadership under the guidance of the USAID Program Office in cooperation with DGCV. FVA/FFP-2/W and other interested Bureaus will be requested to participate in this evaluation. Evaluation objectives will be to learn from experience the actual costs, the impact of the trails on the level and intensity of personal travel, agricultural production, and possible constraints on the benefits such as community attitudes and availability of animals. This evaluation and assessment of the potential for animal trails as a viable means for expanding the zone of influence of rural roads and improving the quality and productivity of rural life will be a milepost and a "go" or "no-go" decision will be made on continuing the animal trail pilot project.

G. Conditions, Covenants and Negotiating Status

The Project Committee recommends that the following conditions and covenants be included in the Project Agreement.

1. Conditions Precedent to Initial Disbursement

   a. An opinion of the legal advisor to the Cooperating Country that this Agreement has been duly authorized and/or ratified by, and executed on behalf of, the Cooperating Country, and that it constitutes a valid and legally binding obligation of the Cooperating Country in accordance with all of its terms;

   b. Evidence that SEOPC/DGCV has increased its staff in a manner which will permit the project and other operations to be carried out efficiently and expeditiously;

   c. Evidence that SEOPC/DGCV has established an adequately staffed new unit within DGCV having the necessary authority and delegated responsibilities for animal trail construction and supervision.

   d. Evidence that SEOPC/DGCV has established a revolving petty cash fund, in an amount not less than RD$300 for each of the existing Regional Centers, to be replenished monthly;

   e. Evidence that the Cooperating Country has established a maintenance budgeting objective of approximately RD$850 per kilometer with a commitment to make appropriate adjustment for inflation for future years; and

   f. A commitment on the part of the Cooperating Country/SEOPC to fully staff the new Regional Center to be constructed under the project.

2. Conditions Precedent to Disbursement for Equipment Procurement

   a. A plan for commodity procurement, delivery and distribution be submitted and approved by USAID/DR.

   b. Specifications, bidding documents and model contract for specific commodity procurements be submitted and approved by USAID.

3. Conditions Precedent to Disbursement for Rehabilitation Operations

   a. An operating plan for road selection criteria has been submitted by ODDR/SEOPC/DGCV and approved by USAID. The plan will be reviewed and approved annually by USAID.

b. A detailed description of the procurement procedures which shall apply for the road rehabilitation work.

4. Covenants

a. GODR/SEOPC/DGCV wi ovenant that it will use equipment to be p d under the project only for rural road maintenance work, unless otherwise agreed by USAID.

b. SEOPC/DGCV will covenant to recruit and maintain sufficient qualified personnel at all levels required to carry out the rural road maintenance and rehabilitation program effectively with all personnel employed for a minimum of 40 hours weekly.

c. GODR will covenant to continue to provide funding for rural road maintenance and extend the maintenance system to eventually cover all rural roads.

d. GODR shall provide annually, in form and substance satisfactory to A.I.D., an operating plan containing road selection criteria and a projection of all road rehabilitation and other project work to be carried out in the ensuing year.

Negotiating Status

The program has been developed jointly by the Secretary of State for Public Works, DGCV and USAID personnel. The project has been discussed regularly with the Secretary and the Director General of Caminos Vecinales and other members of DGCV staff. The Director General has requested the transfer of the first Loan Coordinator for RRM&R I from Public Works to DGCV due to his special knowledge of AID procedures in meeting Conditions Precedents and preparation of documents for commodity purchases. The project has been discussed with the President by the Secretary of Public Works. Since the project has the full support of the GODR, no problems are anticipated in negotiating a project agreement.

Department of State
INCOMING TELEGRAM
American Embassy Santo Domingo

UNCLASSIFIED

ACTION COPY
ACTION TAKEN
INITIALS

R 210815Z DEC 82
FM SECSTATE WASHDC
TO AMEMBASSY SANTO DOMINGO 3680
BT
UNCLAS STATE 353244

STATE 353244

AIDAC

E90. QWETYC
TAGS:
SUBJECT: DOMINICAN REPUBLIC RURAL ROADS MAINTENANCE AND REHABILITATION II PID

1. SUBJECT PID REVIEWED BY BUREAU ON DECEMBER 10, QOIWM DAEC REVIEW CONCLUDED THAT NEW PROJECT, RATHER THAN AMENDMENT OF ON-GOING ROADS PROJECT (517-0130), SHOULD BE DEVELOPED FOR ACTIVITIES OUTLINED IN PID. BUREAU REQUESTS THAT FOLLOWING CONCERNS BE ADDRESSED IN AN INTERIM REPORT (IR) AS A PRIOR CONDITION TO CONSIDERATION OF GRANTING AUTHORITY TO MISSION (AS REQUESTED IN PID) TO REVIEW PROJECT PAPER AND AUTHORIZE PROJECT:

--A. SELECTION SYSTEM FOR RURAL ROADS AND TRAILS: (1) MISSION SHOULD EXPLAIN IN SOME DETAIL THE SELECTION SYSTEM TO BE EMPLOYED FOR BOTH THE ROAD REHABILITATION AND TRAILS COMPONENTS OF PROPOSED PROJECT. EXPLANATION SHOULD INCLUDE CRITERIA TO BE USED IN IDENTIFYING AND SELECTING ROADS AND TRAILS FOR FINANCING UNDER PROJECT. (2) MISSION SHOULD ALSO ENGAGE TRANSPORT ECONOMIST TO

UNDERTAKE INDEPENDENT EVALUATION OF SELECTION SYSTEM EMPLOYED UNDER RRM&R I. SUCH EVALUATION SHOULD ASCERTAIN, ON A SAMPLE BASISBC (I) RELIABILITY OF DATA PREVIOUSLY OBTAINED FOR REHABILITATED ROADS, AND (II) ADEQUACY OF SYSTEM IN TERMS OF IDENTIFYING AND SELECTING ROADS FOR REHABILITATION WITH HIGHEST BENEFIT/COST RATIOS. RESULTS OF THIS EVALUATION SHOULD BE INCLUDED IN IR.

--B. AWARDING CONSTRUCTION CONTRACTS: UNDER THE EMERGENCY ROAD REHABILITATION GRANT COMPONENT OF RRM&R I, BUREAU FEARFUL THAT GODR AND AID MAY BE PAYING MORE FOR ROAD REHABILITATION WORK THAN WOULD BE THE CASE UNDER FREELY COMPETITIVE BIDDING ARRANGEMENTS. MISSION SHOULD PROVIDE INFORMATION SUMMARIZING GODR EXPERIENCE USING BOTH THE LOTTERY SYSTEM AND TRADITIONAL COMPETITIVE BIDDING PROCEDURES, PARTICULARLY FOR ROAD REHABILITATION/RECONSTRUCTION CONTRACTS. AT MISSION'S OPTION, THIS INFORMATION MAY BE TRANSMITTED APART FROM IR.

ACTION: AID/DR
INFO:
AMB
DCM
POL
BIO
ECON
FCS
CONS
AC
RMO
CPU
GSO
PER
RSO
FMO
NCOIC
AGATT
DAO
MAAG
USICA
PC
IAGS
DIR
AD
PRG
CRD
CONT
AGR
MGT
MAN
EDU
UDD
A/RF
CHRON

UNCLASSIFIED

--C. EQUIPMENT STANDARDIZATION: WITH VIEW TO FACILITATING PROCESSING OF REQUIRED WAIVERS, MISSION SHOULD SUBMIT EQUIPMENT LISTS AND RELATED ESTIMATED COSTS FOR ROAD MAINTENANCE EQUIPMENT DEEMED APPROPRIATE FOR STANDARDIZATION.

2. THE FOLLOWING BUREAU CONCERNS SHOULD BE ADDRESSED DURING INTENSIVE REVIEW:

--A. PROJECT'S INSTITUTIONAL RATIONALE: SINCE PROJECT IS JUSTIFIED LARGELY ON INSTITUTIONAL DEVELOPMENT GROUNDS, MISSION SHOULD DETERMINE IN SONT DETAIL THE QUANTITATIVE AND QUALITATIVE IMPROVEMENTS ACCRUING TO THE DGCV AS A DIRECT RESULT OF PROPOSED PROJECT. THIS ANALYSIS SHOULD BE SET FORTH IN PP AND CLEARLY SHOW (1) WHY THE PROJECT IS CRITICAL FOR ACHIEVING THE DESIRED INSTITUTIONAL OBJECTIVES, AND (2) THE INSTITUTIONAL PROGRESS OVER TIME BOTH WITH AND WITHOUT PROJECT.

--B9 EVALUATION OF RRM&R I: RESULTS OF THIS EVALUATION, CURRENTLY UNDERWAY, SHOULD BE SUMMARIZED IN PP. FURTHERMORE,
AN EXPLANATION SHOULD BE INCLUDED IN PP FOR ANY MAJOR RECOMMENDATION STEMMING FROM EVALUATION WHICH IS NOT ADDRESSED IN FINAL PROJECT DESIGN. SHOULD EVALUATION BE COMPLETED PRIOR TO SUBMISSION OF IR, MISSION SHOULD ATTACH SAME AS ANNEX TO IR.

---C. PROJECT PURPOSE: THE PURPOSE STATEMENT SHOULD BE EXPANDED TO (1) INCLUDE RURAL TRAILS AND (2) REFLECT INVOLVEMENT OF PRIVATE SECTOR ORGANIZATIONS IN RURAL ROADS/TRAILS ACTIVITIES UNDER PROJECT.

---D. AS MISSION AWARE, BUREAU HAS ESTABLISHED JUNE 30, 0OIE AS DEADLINE FOR AUTHORIZING/OBLIGATING FY 83 PROJECTS. THEREFORE, MISSION SHOULD COMPLETE INTENSIVE REVIEW IN TIMELY MANNER TO MEET THIS DEADLINE.

3. IEE: APPROVED IEE WILL BE POUCHED TO MISSION SOONEST FOR INCLUSION IN PP.

4. FYI: ALL LAC MISSION PID APPROVALS ARE NOW SUBJECT TO BUREAU REVALIDATION IF THE POST-PID PROJECT DEVELOPMENT PROCESS EXTENDS BEYOND ONE YEAR. END FYI. SHULTZ
LT
#3244

Department of State
INCOMING TELEGRAM
American Embassy Santo Domingo

ACTION
INITIALS

UNCLASSIFIED

State
127426
CRD-2

R 070642Z MAY 83
FM SECSTATE WASHDC
TO AMEMBASSY SANTO DOMINGO 5388
BT
UNCLAS STATE 127426

AMEMBASSY
SANTO DOMINGO

AIDAC

E.O. 12356: N/A
TAGS:
MAY 5 10 40 AM '83
SUBJECT: RURAL ROAD MAINTENANCE AND REHABILITATION (PRMR) -- II PROJECT (517-0177)

REFERENCE: (A) SANTO DOMINGO 5388; (B) 82 STATE 353244

1. ON APRIL 11, 1983, THE BUREAU HELD A TECHNICAL REVIEW OF MISSION'S INTERIM REPORT (IR) FOR SUBJECT PROJECT. BASED ON THE INFORMATION PRESENTED IN THE IR, AND THE SUPPORTING EVALUATION RECENTLY COMPLETED ON THE SELECTION PROCEDURES USED UNDER THE PRMP I PROJECT, THE MISSION HAS SATISFACTORILY ADDRESSED THE RELATED CONCERNS RAISED IN THE DECEMBER 12, 1982 PID REVIEW FOR SUBJECT PROJECT AND MAY PROCEED WITH PP DEVELOPMENT.

2. ALSO, ON MAY 6, 1983, THE AA/LAC APPROVED (1) REDELEGATION OF AUTHORITY TO USAID MISSION DIRECTOR TO REVIEW AND AUTHORIZE PROJECT IN THE FIELD AND (2) AUTHORIZED PROPRIETARY PROCUREMENT FOR EQUIPMENT LISTED IN REF A THEREBY LIMITING COMPETITION TO SPECIFIC BRANDS. NEVERTHELESS, COMPETITION SHOULD BE MAINTAINED TO THE EXTENT POSSIBLE WITHIN PROPRIETARY PROCUREMENT PROCEDURES.

3. A CONGRESSIONAL NOTIFICATION (CN) WILL BE REQUIRED. PLEASE CABLE NECESSARY INFORMATION TO ENSURE TIMELY PROCESSING. PROJECT FUNDS SHOULD NOT BE OBLIGATED UNTIL CN 15 DAY WAITING PERIOD HAS ELAPSED AND BUDGET ALLOWANCE CABLE RECEIVED BY MISSION.

4. PLEASE ADVISE WHEN PROJECT HAS BEEN AUTHORIZED. DAM
BT
7426

ACTION: AID-8	
INFO:	
AMB	X
DCM	X
POL	
BIO	
ECON	
FCS	
CONS	
AC	X
BMO	
CPU	
GSO	
PER	
RSO	
RMO	
NCOIC	
AGATT	
DAO	
MAAG	
USICA	
PC	
IAGS	
DIR	
AD	
PRG	
CRD	
CONT	
AGR	
MGT	
HAN	
EDU	
UDD	
A/RF	
CHRON	

12 4.

UNCLASSIFIED

81

LOGICAL FRAMEWORK MATRIX

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
A.1 Goal: To improve the income productivity and quality of the Dominican Republic's rural poor.	**A.2 Goal:** 1. Rural income improved in areas affected by rehabilitated roads and rural trails. 2. More maintenance workers employed and receiving steady income. 3. Increased food production, less spoilage, less time in rural storage.	**A.3** 1. Estimate Statistics on rural income; household surveys. 2. DCCV records and budget, interviews with workers. 3. SEA records, INESPRE purchases, import records AID evaluations Site Inspections CODR Budget Allocations DCCV Reports	**A.4 (as related to goal)** - services affecting farm income and productivity including access to inputs, credit and marketing continue or are provided at adequate levels. - economic benefits not subverted to transport sector. - Social services are continued and expanded - Economic conditions do not further deteriorate. - No political upheaval occurs which breaks continuity of program. - No major disasters occur.
B.1 Purpose: To strengthen and expand the institutional capacity of the Directorate of Rural Roads to maintain and rehabilitate rural roads and coordinate alternative transportation modes in the form of pack animal trails; to assist in the development of the private sector through rural road rehabilitation by contractor private firms; strengthen institutional capabilities of PVO's through direct involvement with DCCV.	**B.2 Purpose:** 1. Outputs achieved as projected (see C.1, C.2 below) 2. CODR maintaining budget and personnel levels at or above levels achieved under project financing. 3. All rehabilitated roads under regular maintenance. 4. Food produce flowing from farms and markets in a more efficient manner.	**B.3** AID/CODR Records DCCV Budget Site Inspections Interviews with participants in marketing system.	**B.4 (as related to purpose)** 1. Continued political and administrative support and stability through LOP. 2. Local communities receive benefits from improved access and continuing maintenance of access.
C.1 Outputs: 1. Rural roads rehabilitated 2. Employment generated 3. Regional Center constructed, staffed and equipped 4. Heavy equipment purchased 5. System of telecommunications installed 6. Comprehensive maps of rural road system 7. Research conducted in soil stabilization 8. Ongoing training program 9. Rehabilitated roads under regular maintenance 10. Dept. in DCCV established to coordinate PVOs in animal trail construction 11. Pack animal trails constructed 12. Shelters constructed at convergence of trails and rural roads	**C.2 Outputs:** 1. 1,000 kms rehabilitated roads 2. 10,000 limited resources farmers employed on short term basis 3. One center, 53 staff members, trained, equipment maintained. 4. Tractor, graders, loaders, water tanks, etc. (See Text). 5. 10 transreceivers and towers, 60 mobile units. 6. Eight regional map sets, 12% national maps. 7. Soil Stabilization Report 8. 8 training programs, one per center 9. 1,700 rehabilitated roads under regular maintenance 10. 300 kms of trails completed 11. 20 shelters constructed	**C.3** Site Inspections Inspection Reports DCCV Reports	**C.4 (as related to outputs)** 1. CODR resources provided as planned. 2. Private Volunteer Organizations cooperate in expansion of rural access network. 3. Other donor agencies complete planned rehabilitation process.
D.1 Inputs: I. Services A. Rural Roads Rehabilitation B. Rural Roads Maintenance II. Construction A. Regional Center B. Shelters C. Addition to DCCV national offices III. Commodities A. Equipment B. Telecommunication Equipment C. Construction Materials (Trails) IV. Technical Assistance A. Mapping B. Materials Research C. Training D. Evaluation V. Administrative Salaries	**D.2** I. A. 8,500 / 8,500 / 17,000 B. — / 5,367 / 5,367 II. A. 150 / — / 150 B. 60 / — / 60 C. — / 100 / 100 III. A. 4,317 / — / 4,317 B. 200 / — / 200 C. 90 / — / 90 IV. A. 200 / — / 200 B. 200 / — / 200 C. 80 / 20 / 100 D. 40 / 20 / 60 V. — / 2,735 / 2,735 Cont. 963 / 1,058 / 2,021 Total 15,000 / 18,000 / 33,000	**D.3** DCCV Records, shipping invoices, TA contracts	

5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to project funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance Loans, and B.3. applies to projects funded from ESP.

CROSS REFERENCES:
IS COUNTRY CHECKLIST UP TO DATE? **Yes.**
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT? **Yes.**

A. GENERAL CRITERIA FOR PROJECT

1. FY 82 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

   (a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that amount)?

   (a) This is a new project and, so, was not included in the FY 83 Congressional Presentation. A Congressional Notification is required.

   (b) An Advice of Program Change will be submitted.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

   (a) **Not Applicable.**

   (b) **Yes.**

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

   The Project will need to be ratified by the Dominican Congress. In the past AID projects have been ratified in a timely manner.

4.	FAA Sec. 611 (b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973? (See AID Handbook 3 for new guidelines.)	Not Applicable.
5.	FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	Yes. See Mission Director's certification in the Project Paper.
6.	FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	The Project cannot be executed as part of a regional project.
7.	FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	Project will indirectly increase the flow of international trade by encouraging increased agricultural production. The project will foster private initiative and competition through the competitive contracting of private sector firms for the road rehabilitation operations.

8.	FAA Sec. 601 (b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	The technical assistance and equipment for the project will be procured from U.S. private sector sources.
9.	FAA Sec. 612(b); Sec. 636(h); FY 1982 Appropriation Act Sec. 508. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	The loan agreement will require that counterpart contribution be used in the implementation of project activities.
10.	FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	There is no excess, U.S. owned local currency available for this program.
11.	FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.
12.	FY 1982 Appropriation Act Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?	This project will not directly produce any commodity for export which is produced in the U.S.

13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does the project or program take into consideration the problem of the destruction of tropical forests.

14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); Sec. 111; 113; 281 (a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

This will be accomplished through the rehabilitation and maintenance of the rural road network which will improve access to markets and other services. Short and long term employment will be provided under the project for rural residents on road rehabilitation and maintenance. The project will support self-help efforts through the institionalization of the community based maintenance system. The project will indirectly support the participation of women in the economy by improving access to markets, government services and other developmental activities.

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

c. FAA Sec. 107. Is appropriate emphasis on use of appropriate technology? (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	Not applicable
d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement been waived for "relatively least-developed" country)?	The recipient country is providing 55% of the costs of the project
e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least-developed?" (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.	Not Applicable

f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	The project directly recognizes and utilizes the needs, desires and capabilities of the population and of the implementing agencies to encourage institutional development.
g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.	Yes. The project should contribute directly to the development of economic resources and to increasing the productive capacity of the Dominican Republic.
2. Development Assistance Project Criteria (Loans Only)	
a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.	The Dominican Government and the Central Bank are not in default on any AID loans and appear capable to repay the proposed loan.
b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	Not applicable.

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102?	**Not applicable.**
b. FAA Sec. 531 (c). Will assistance under this chapter be used for military, or paramilitary activities?	**No.**
c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives.	**Not Applicable.**
d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements be made?	**Not Applicable.**

LAC/DR-IEE-83-10

ENVIRONMENTAL THRESHOLD DECISION

Project Location	:	Dominican Republic
Project Title and Number	:	Rural Roads Maintenance and Rehabilitation II 517-0177
Funding	:	$15.0 million Loan
Life of Project	:	FY 1983-1987
IEE Prepared By	:	Betty Facey, USAID/Dominican Republic
Recommended Threshold Decision	:	Negative Determination
Bureau Threshold Decision	:	Concurrence with recommendation
Action	:	Copy to Philip R. Schwab, Director USAID/Dominican Republic
	:	Copy to Betty Facey, USAID/Dom. Rep.
	:	Copy to Barry Burnett, LAC/DR
	:	Copy to IEE file

James S. Hester Date 17 December 1982

James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

ANNEX I-E

CERTIFICATION PURSUANT TO

Section 611 (e) of the

FOREIGN ASSISTANCE ACT

As Amended

I, Philip R. Schwab, the principal officer of the Agency for International Development in the Dominican Republic, do herewith certify that in my judgment, the Dominican Republic has both the financial capability and human resources to maintain and utilize effectively goods and services procured under the capital assistance project entitled the Rural Roads Maintenance and Rehabilitation II.

This judgment is based upon the record of implementation of AID financed projects in the Dominican Republic and the results of the consultations undertaken during intensive review of this new project.

Philip R. Schwab
Director, USAID Dominican Republic

6/30/83
Date

REPUBLICA DOMINICANA

Secretariado Técnico de la Presidencia

SANTO DOMINGO, D. N.

"AÑO DE LA REFORESTACION"

STP/No.1542 Santo Domingo, D. N.

Señor
Philip R. Schwab, Director
Agencia para el Desarrollo Internacional
Santo Domingo, República Dominicana

Distinguido señor Schwab:

El Gobierno de la República Dominicana, presidido por el Ciudadano Presidente Dr. Salvador Jorge Blanco, ha establecido como una de las prioridades del Gobierno de Concentración Nacional la rehabilitación, el mejoramiento y mantenimiento de la Red Nacional de Caminos Vecinales. Reconocemos la invalorable ayuda que esa Agencia ha ofrecido tradicionalmente a la República Dominicana en estos Programas. Para este fin, he informado a Su Excelencia, el Señor Presidente, sobre los trámites de solicitud a esa Agencia para el Desarrollo Internacional de un préstamo por valor de US$15,000,000, bajo los más favorables términos, para así poder realizar las acciones tendentes al logro de nuestros objetivos.

En tal sentido y conforme a los planes de la Secretaría de Estado de Obras Públicas y Comunicaciones nos permitimos llevar ante usted el perfil General de esta solicitud de préstamo a esa Agencia:

- Rehabilitación de 1,000 Kms. de caminos vecinales,
- Ampliación hasta 3,700 Kms. de la cobertura para mantenimiento rutinario de caminos vecinales,
- Formación de un nuevo Centro Regional para mantenimiento con el equipo de mantenimiento necesario,
- Adquisición de equipo de telecomunicaciones,

.../...

.../...

Señor
Philip R. Schwab, Director

- Asistencia Técnica para elaboración final de mapas de la Red de caminos vecinales del país,

- Investigación sobre utilización de materiales locales para pavimentación de caminos vecinales,

- Construcción de 300-500 Kms. de veredas para animales usando las organizaciones de voluntarios privados como promotores junto con la Dirección General de Caminos Vecinales.

Estimamos que el costo global de este programa alcanzaría como máximo unos treinta y tres millones de pesos (RD$33,000,000), de cuyo monto nos propondríamos participar en contrapartida con un mínimo de un cincuenta y cinco (55%) por ciento.

La Secretaría de Estado de Obras Públicas y Comunicaciones se compromete a través de la Dirección General de Caminos Vecinales a emprender las tareas de administración, controles financieros y el apoyo técnico necesario para llevar acabo con éxito este proyecto, con el fin de continuar las actividades mencionadas después de finalizada la ejecución del programa.

En espera de su pronta y favorable acogida, queda de usted,

Muy atentamente,

Ing. Ramón Alburquerque
Secretario Técnico de la Presidencia

RA
xhr

REPUBLICA DOMINICANA

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
SECCION REHABILITACION Y MANTENIMIENTO DE CAMINOS
PROGRAMA PRESTAMO A.I.D. No. 517 . T. 033

DGCV–A.I.D.
INV–CAM. No. 1

PARTE

INVENTARIO DE LAS CARACTERISTICAS VIALES DE CAMINOS PARA MANTENIMIENTO

HOJA _____ DE _____

1.– No. de DISTRITO: _____
2.– No. de PROVINCIA: _____
3.– No. de MUNICIPIO: _____
4.– No. de SECCION: _____
5.– No. de TRAMO: _____
FECHA: _____
NOMBRE DEL CAMINO:
DESDE: _____
HASTA: _____
LONGITUD (kms): _____
CLASE: _____
TRANSITABILIDAD:
1=SI 0=NO: _____
FALTA DE PUENTE: 1=SI 0=NO: _____

BENE-FICIOS	1	2	3	4	5	6	7	8	9	10	11

6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		25	26	27
LONGITUD DE SUB-TRAMO (Kms.)	ANCHO DEL CAMINO (Mts.)	SUPERFICIE DE RODADURA	CONDICION DE LA SUPERFICIE	TOPOGRAFIA	DISTANCIA DE SITIO FUENTE DE MATERIAL SELECCIONADO (Kms.)	CLASIFICACION DE MATERIAL SELECCIONADO	CLASIFICACION DE SUELO NATURAL CIRCUNDANTE	MATERIAL DEPOSITADO PARA MANT. RUTINARIO (SI/NO)	Kms. LINEALES CUNETAS	CONDICION DE LAS CUNETAS	No. DE ALCANTARILLAS	CONDICION DE ALCANTARILLAS	LONGITUD DE PUENTES (Mts.)	REPAR. ESTRUCT. REQUERIDA(PUENTE) 1=SI 0=NO	No. DE BADENES	CONDICION DE BADENES	LONGITUD DE MURO A REEMPLAZAR (Mts.)	ALTURA PROMEDIO (Mts.) DE MURO A REEMPLAZAR	DESLIZAMIENTO M3	FALTA DE ESTRUCTURA BASICA	VEGETACION

LEYENDAS

CODIGOS PARA EVALUACION

MATERIAL SELECTO Y TIPO DE SUPERFICIE

1) ASFALTO
2) MATERIAL DE MINA (CALICHE, CONGLOMERADO, TOSCA)
3) CASCAJO DE RIO
4) TIERRA
5) MATERIAL CLASIFICADO

TOPOGRAFIA

1) LLANO 0 a 2 o/o
2) ONDULADO 2 a 6 o/o
3) MUY ONDULADO 6 a 10 o/o
4) MONTAÑOSO MAS QUE 10 o/o

CLASIFICACION DE SUELO

1) CEMENTO, ROCA, CALICHE, CONGLOMERADO
2) ARENOSO, GRAVOSO
3) LIMOSO, ARCILLOSO
4) TURBOSO, PANTANOSO

CONDICIONES GENERALES

1) BUENA	10 o/o
2) REGULAR	40 o/o
3) DEFICIENTE	70 o/o
4) MALA	100 o/o

FACTORES DE BENEFICIOS

1) POBLACION
2) VINCULACION DIRECTA
3) TRANSITABILIDAD
4) ORGANIZACIONES COMUNITARIAS
5) TAMAÑO DE FINCA
6) USO DE TIERRA
7) EDUCACION
8) SALUD
9) EROSION
10) PROYECTOS DE DESARROLLO
11) AGRICULTURA

VEGETACION

1) COBERTURA TOTAL
2) COBERTURA PARCIAL
3) SIN COBERTURA

FALTA DE ESTRUCTURA BASICA

1) PUENTES
2) ALCANTARILLAS
3) BADENES
4) CUNETAS
5) MUROS

PARTE II

	KILOMETRAJE 0.0 1.0 2.0 3.0 4.0 5.0	TOTAL	CONDICIONES
CUNETAS IZQUIERDA			
CUNETAS DERECHA			

ALCANTARILLAS

LOCALIZACION (Km.)	TIPO	DIMENSIONES	CONDICIONES	LOCALIZACION (Km)	TIPO	DIMENSIONES	CONDICIONES

NOMBRE	LOCALIZACION (Km)	TIPO	LARGO (Mts.)	ANCHO o ALTO (Mts.)	CONDICIONES ESTRIBOS	CONDICIONES PILAS	CONDICIONES TABLEROS
PUENTES							
BADENES							
MUROS							

OBSERVACIONES _____

ANNEX III-A
Page 2 of 2

Rural Roads Subproject Selection Process

From the evaluation of the selection procedures used in RRM&R I it was found, that though the basic format is sound, but that improvement is needed in the ability to discriminate against roads with a low B/C ratio. The RRM&R I selection procedures incorporate the assessment of the social, economic and political factors into a single stage. Experience with this project has shown that such a single stage approach is not effective in screening out economically non-viable roads. The lumping and relative weighting of all factors, both quantifiable and non quantifiable into a single stage to arrive at a single socio economic figure of merit is impractical.

For RRM&R II the selection of roads will therefore be a two-stage process which separates the quantifiable and non-quantifiable inpacts of the road rehabilitation: the candidate roads will be prescreened based on social and political factors (Stage I) followed by screening based on economic appraisal (Stage II). In this way, weighting procedures can be applied to assign the relative importance of non-quantifiable factors involving considerations such as health, education, and equity; and economic analysis can be applied to the quantifiable economic factors. In order to avoid the bias toward short roads experienced in RRM&R I, the priority index of Stage I will be calculated as the quotient of total points for a road divided by the rehabilitation cost per km. The first stage will result in a ranking of the road candidates in order of social priority.

For each district, the top ranked roads (their number will depend on the district' capability to rehabilitate and maintain roads, and the availability of funding) will be subjected to the second stage of the selection process where their economic feasibility (using simplified techniques) will be determined. Economically unfeasible roads (those with a B/C ratio less than one) will be eliminated, and the selection process will therefore result in roads that are both economically feasible and have a highly beneficial social inpact.

Unlike the procedure used in RRM&R I where the prioritication included all the rural roads in the inventory at that time (12,000 kms.), it is proposed that for RRM&R II the prioritization be accomplished in batches. The reason is that, during RRM&R II, emphasis will be placed on improving the quality of the data inputs. This, and the requirement for a simplif ed economic appraisal for each road will substantially increase the processing time for each road, and the time required for preparing the data inputs for all the roads in the inventory, may interfere with the road rehabilitation work schedule. It is, therefore proposed that each district identify a subset of candidate roads that can be

prioritized in time to be incorporated into the rehabilitation work schedule. Then, additional batches can be processed to supply road projects for subsequent rehabilitation work.

We will discuss, below, the general format of Stage I and Stage II. The detailed approach will, of course, have to be formulated by the DGCV. But the important change in procedure is that of a two-stage process: ranking based on social and political factors followed by verification of economic feasibility.

Stage I

It is suggested this stage include the same factors as used in RRM&R I, except for those related to purely economic considerations. Therefore, included in Stage I will be: population density, connection with markets, road condition, community organization, average farm size, percentage of school age children inscribed in schools, availability of health centers, and susceptibility to land erosion. Eliminated from Stage I since they are better incorporated in the subsequent economic analysis of Stage II are: quality of soil, importance of agriculture, and the presence of other rural development projects. One could also have included the factor of road condition in Stage II. Road condition, however, relates to equity; those communities with a poor road should receive priority over those with a fair road.

During the early phases of the project it is recommended that the DGCV use a systematic procedure to establish the weights for each of the socio-political factors. In developing these weights, it is desirable to include, where practical, decision makers involved in rural development at both the local and central government levels, and, ideally, community leaders. Two possible methods for achieving consensus by the parties involved in developing these weights is by asking each participant to rank the factors in order of importance, and then normalizing the various rankings; or by asking each participant to assign his subjective weight to each factor and averaging the weights. Table E 1 presents an example of the second method and the final weights that might be assigned by each of the participants. This example was taken from a recent project paper on rural roads rehabilitation prepared for Haiti.

Stage II

This new stage added for RRM&R II addresses the need to determine the economic feasibility for those roads that ranked high in the first stage. There are a number of alternatives:

1) Use the DGCV computerized producer surplus model, and include the modifications described in World Bank Working Paper No. 241 (Carnemark et al) to account for the important benefits accruing to non-agricultural traffic.

TABLE III E-1

Weights Assigned to Socio-Economic Factors by Participants in the Haiti Secondary Roads Selection Process
Illustrative

Factor	Weights Assigned by Participant 1	2	...	N	Average
Economic Activity	30	25	...	40	30
Agricultural Potential	10	5	...	10	10
Degree of Access Improvement	10	5	...	10	10
Complementary Services and Planned Development Activities	10	15	...	20	10
Quality of Life	35	30	...	45	30
Population Served	15	10	...	20	10
Access to Social Services	20	20	...	25	20
Equity	30	35	...	15	30
Existing Income Distribution	10	20	...	5	10
Incremental Income Distribution	20	15	..	10	20
Regionalization	5	10	.	0	10
	100	100		100	100

Participant No. 1 - TPTC Advisor/Economist
No. 2 - TPTC Engineer
No. 3 - USAID Rural Development
No. 4 - USAID Engineering
.
.
.
.
No. N - Community Council Leader; Southwest Region

Table III E 2: Minimum Necessary Values of Average Daily Traffic in Base Year Necessary to Justify Rehabilitation of Gravel Road

Annual Traffic Growth = 0

	Rehabilitation Cost per Km, RD$					
	5000	10,000	15,000	20,000	25,000	30,000
Flat Terrain	8.8	13.3	17.7	22.1	26.5	31.0
Rolling Terrain	8.9	13.3	17.8	22.2	26.7	31.1
Mountainous Terrain	9.0	13.5	18.0	22.6	27.1	31.6

Annual Traffic Growth Rate = 5%

	Rehabilitation Cost per Km, RD$					
	5000	10,000	15,000	20,000	25,000	30,000
Flat Terrain	6.6	10.0	13.3	16.6	20.0	23.2
Rolling Terrain	6.6	10.0	13.3	16.7	20.0	23.3
Mountainous Terrain	6.8	10.2	13.6	17.0	20.5	23.9

1) Costs are "net-of-taxes".

2) Using shadow pricing, the minimum traffic levels would increase by about 25%.

Note: Maintenance cost = RD$1000 per Km; discount rate = 12 percent; average daily traffic count includes only vehicles larger than motorcycles.

2) Use the consumer surplus approach presented in Section C of this paper. This approach is easily programmed on the DGCV TRS-80 mini-computer.

3) Prepare a simplified economic appraisal technique based on the second alternative. In essence, this method uses tables of minimum levels of average daily traffic, prepared using alternative two, necessary to justify road rehabilitation.

The first alternative is viable and is most easily understood by non-economists. It is also a more general method and can also be applied to penetration and road reconstruction projects. The data requirements are extensive, however, since agricultural production quantities and costs and local consumption levels must be calculated, and data must be collected on the amount of non-agricultural traffic. And, the reliability of this method in identifying economically feasible rehabilitation projects is no better than that of the other alternatives. Because of the high cost of data collection and analysis this alternative is therefore not recommended for RRM&R II.

The second alternative, as explained in Section C, is applicable whenever existing traffic (prior to rehabilitation) is significant, such as more than ten vehicles per day, or the existing road is passable throughout the year. In such cases the potential producer surplus benefits are insignificant, and the more simple consumer surplus approach can be used. This is the approach recommended for RRM&R II.

The third alternative may be possible after sufficient experience has been gained with alternative two. If the experience in the field indicates that traffic grows at a constant rate and that the traffic composition is not expected to change significantly, it will be possible to construct tables showing the minimum traffic levels required in the base year to ensure economic feasibility of the road rehabilitation project. An example of such a table is given in Table E 2, and this idea is further discussed below.

Other Considerations

It may be advisable to include an additional factor in Stage I to ensure that the rural road rehabilitation projects focus on areas selected for trail improvement. The success of trails, of course, is contingent on linkage with a rural road. One way of accomplishing this is by introducing a factor in Stage I that assigns a high point value to road candidates located in a trail improvement area.

Individual Subproject Economic Justification

The above analysis considered the overall economic viability of the project. In contrast, this analysis looks at the methodology for the economic justification of individual road projects. The reason for such analysis is that, even though the overall project is justified from the economic point of view, this does not imply that it is justifiable to rehabilitate all rural roads in the country. The cost of rehabilitating some roads may be well above average, and the benefits of rehabilitation for such roads may be well below average; as a result, the rehabilitation of such roads may not be justified. Each road therefore has to be justified on its own merit. Fortunately, as discussed below, the economic justification of a road is not a complex process, and can be done using simplified economic appraisal techniques based on the level of average daily traffic using the road in the base year.

Evaluation Methodology

The RRM& R II project addresses those roads that need only rehabilitation. Though such roads are in poor condition and vehicle operating costs are high, they by definition already are passable by motorized traffic for all or most of the year. The best method for assessing the economic feasibility of such roads is that based on the consumer surplus approach where benefits from the road improvement are measured as areas under the transport demand curve (See Curt Carnemark, Jaime Biderman and David Bovet "The Economic Analysis of Rural Road Projects," World Bank Staff Working Paper No. 241, August 1976).

A critical element in the evaluation is that of determining what the basic reference should be against which the benefits of the road improvement project are measured. Current policy in the Dominican Republic (and in most other developing countries) is that rural roads should be reconstructed after they have become impassable due to lack of regular maintenance. Since, without maintenance, gravel rural roads in this country deteriorate to the impassable condition in about seven years, this policy is costly. And, it is easy to show that a rehabilitation-followed-by-maintenance project, such as RRM&R I, is justified for all roads that are in bad condition, including those with very low traffic levels. This is simply because the net present value (NPV) of the relatively low cost of maintenance - even though this cost is incurred each year - is much less than the NPV of reconstruction which must be done every seven years. Including vehicle operating cost savings in such a comparison would make the project even more feasible.

Though, as measured against the policy of "no maintenance", it is clear that a rehabilitation-followed-by-maintenance project is always economically feasible, the question must be asked whether this "no maintenance" policy is the appropriate reference (or "do-nothing") case.

Clearly, such an approach would justify rehabilitating all rural roads in the country that are in poor condition, regardless of how much they are used.

A better approach, and the one proposed for this project, is to ascertain whether the road should exist at all, or whether it should be allowed to deteriorate into a track passable only by animal and pedestrian traffic. A major factor in their determination, as shown below, is the level of existing traffic(1) on the road.

Table D 1 presents an outline of the economic analysis. It consists of comparing the costs and benefits from a policy of rehabilitating and maintaining a specific road (in our case the 7 Km. gravel road from Las Lajas to Boca Río Grande) against a policy of total neglect where the road is allowed to fade into non-existence. This road was reconstructed about 5 years ago went without maintenance, and is now ready for rehabilitation. It runs through a medium population density and mountainous areas, and the major crops in the zone of influence are coffee, cacao, citrus, avocado, beans, maize, and root crops. Without rehabilitation, this road is expected to degenerate into an impassable track in no more than 10 years from now. Though now in poor condition, the road carries a considerable (about 30 vehicles per day excluding motorcycles) amount of traffic.

As mentioned above, a major input to the analysis is an estimate of the average daily traffic (ADT) on the road during the base year (the first year after rehabilitation). The usual procedure for obtaining this estimate is through a traffic count on the road prior to rehabilitation, and of three or four days duration. This sample traffic count is then adjusted for seasonality and other factors to obtain the ADT. Very little is known in the Dominican Republic, however, concerning traffic on rural roads. There are no data on seasonal adjustment factors. The DGCV should therefore initiate, early during the project, field work to develop these seasonal adjustment and other adjustment factors.

(1) It should again be noted that we are considering as candidates only those roads that are passable by mechanized traffic, and that therefore require only rehabilitation rather than the more expensive reconstruction. For the decision to reconstruct an impassable road, or to upgrade a track to a road, a different economic analysis procedure must be followed than presented in this paper.

Table III E-3: Economic Evaluation of the Las Lajas-Boca Río Grande Road

	"Do Nothing Alternative"		"Rehabilitate and Maintain Alternative"				
Year	Traffic (1) (AADT)	VOC (2) (RD$/Veh Km)	Traffic(1) (AADT)	Rehabilitation Cost, (RD$/Km.)	Periodic Maintenance Cost (RD$/Km)	Routine (RD$/km)	VOC (RD$/Veh Km)
1	30	.570	30	21369	0	1000	.434
2	27	.817	31.5	0	0	1000	.434
3	24	.965	33.0	0	0	1000	.434
4	21	1.113	34.7	0	0	1000	.434
5	18	1.261	36.5	0	0	1000	.434
6	15	1.408	38.3	0	13181	1000	.434
7	12	1.556	40.2	0	0	1000	.434
8	9	1.704	42.2	0	0	1000	.434
9	6	1.852	44.3	0	0	1000	.434
10	3	2.000	46.5	0	0	1000	.434
11	.5	2.000	48.9	0	13181	1000	.434
12	.5	2.000	51.3	0	0	1000	.434
13	.5	2.000	53.9	0	0	1000	.434
14	.5	2.000	56.6	0	0	1000	.434
15	.5	2.000	59.4	0	0	1000	.434

(1) Heavy vehicles only (larger than motorcycles)

(2) Vehicle operating cost (See Table III E-4), and adjustment for motorcycles is included

(3) Costs are "net-of-taxes".

B/C = 1.46

Note: the minimum traffic level necessary to justify this road is 20.5 veh. per day.

104

Table III E-4: VEHICLE OPERATING COSTS BY TERRAIN TYPE AND SURFACE CONDITION FOR GRAVEL ROADS (RD$/KM), 1983

	Flat Terrain			Rolling Terrain			Mountainous Terrain			Vehicle Composition (heavy vehicles only)
	Good	Fair	Bad	Good	Fair	Bad	Good	Fair	Bad	
Motorcycle (1981)	.307	.045	.056	.040	.048	.060	.046	.055	.075	-
Auto (1981)	.185	.223	.281	.198	.239	.301	.228	.275	.376	25%
Pick up/jeep (1981)	.185	.225	.296	.198	.241	.317	.228	.277	.397	48%
Light truck (1981)	.432	.520	.660	.471	.567	.751	.678	.746	.925	27%
Representative heavy vehicle (1981)	.252	.304	.390	.271	.328	.430	.349	.403	.534	
Adjustment for Motorcycles	.037	.045	.056	.040	.048	.060	.046	.055	.075	
Representative heavy vehicle (1981) (adjusted)	.289	.349	.446	.311	.376	.490	.395	.458	.609	
Representative heavy vehicle, 1983	.318	.384	.491	.342	.414	.539	.434	.504	.670	

Source: 1. Costos Económicos y Financieros de Operación Vehicular para la República Dominicana, Secretaría de Obras Públicas y Comunicaciones, December 1981.

2. Estimates by U.S.Department of Transportation.

Note: Value of passenger travel time not included.

Column 2 of the table shows the traffic on the unrehabilitated and unmaintained road for each of 15 years, the time period of the analysis. Starting off at 30 vehicles per day, the traffic reduces to one-half vehicle per day by the eleventh year, the year the road has become impassable to mechanized traffic. The one-half vehicle per day may be considered a token proxy for the non-mechanized traffic using the road. Traffic could have been allowed to reduce to zero by the eleventh year; this assumption would have favored the B/C ratio of the rehabilitate and maintain alternative.

The rise in vehicle operating costs (VOC) is given in column 3. These costs are taken from Table III E-4 giving the VOC's for various road conditions and terrain. These costs apply to a "representative" vehicle reflecting the mix of vehicle types encountered on rural roads, including motorcycles. For the "do nothing" alternative, VOC's rise to a limit of RD$2 per vehicle kilometer when the road becomes impassable.

For the rehabilitate and maintain alternative the traffic level (column 4) is expected to grow at 5 percent per year. This growth rate is quite conservative and is based on the annual population growth and increase in economic activity along the maintained road. The rehabilitation cost of the road is given in column five. This cost of RD$21969 per kilometer is incurred only in the first year. Periodic maintenance costs are assumed to occur every six years, and are assumed at 60 percent of the cost of rehabilitation. The assumption of such periodic maintenance costs for a gravel road is conservative, but allow a reserve for the repair of possible hurricane damage, landslides, or other emergencies. Routine maintenance (column 7) is assumed at $1,000 RD$per kilometer. The VOC over the well maintained road (column 8) stays constant at RD$.434 per kilometer.

For each year the benefits of the road rehabilitation and maintenance alternative are measured as (see Carnemark et al):

$$B = 1/2 (C_1 - C_2) (Q_1 + Q_2)$$

where B = benefit (RD$/year)

C_1 = VOC or unimproved road (RD$/km)

C_2 = VOC or improved road (RD$/km)

Q_1 = annual traffic on unimproved road
= 365 x AADT (RD$/Km per year)

Q_2 = annual traffic on improved road (RD$/km per year)

The cost of the rehabilitation and maintenance alternative for each year is measured as the sum of the rehabilitation, periodic maintenance, and routine maintenance costs. Including maintenance cost as a cost

rather than a negative benefit simplifies the calculations; this procedure is, however, slightly unconventional, and will reduce the values of the B/C ratio. The effect, however, is one of an attenuation of the B/C ratio and not a distortion. The B/C ratios calculated this way will still indicate economic feasibility, and will correctly indicate the relative ranking.

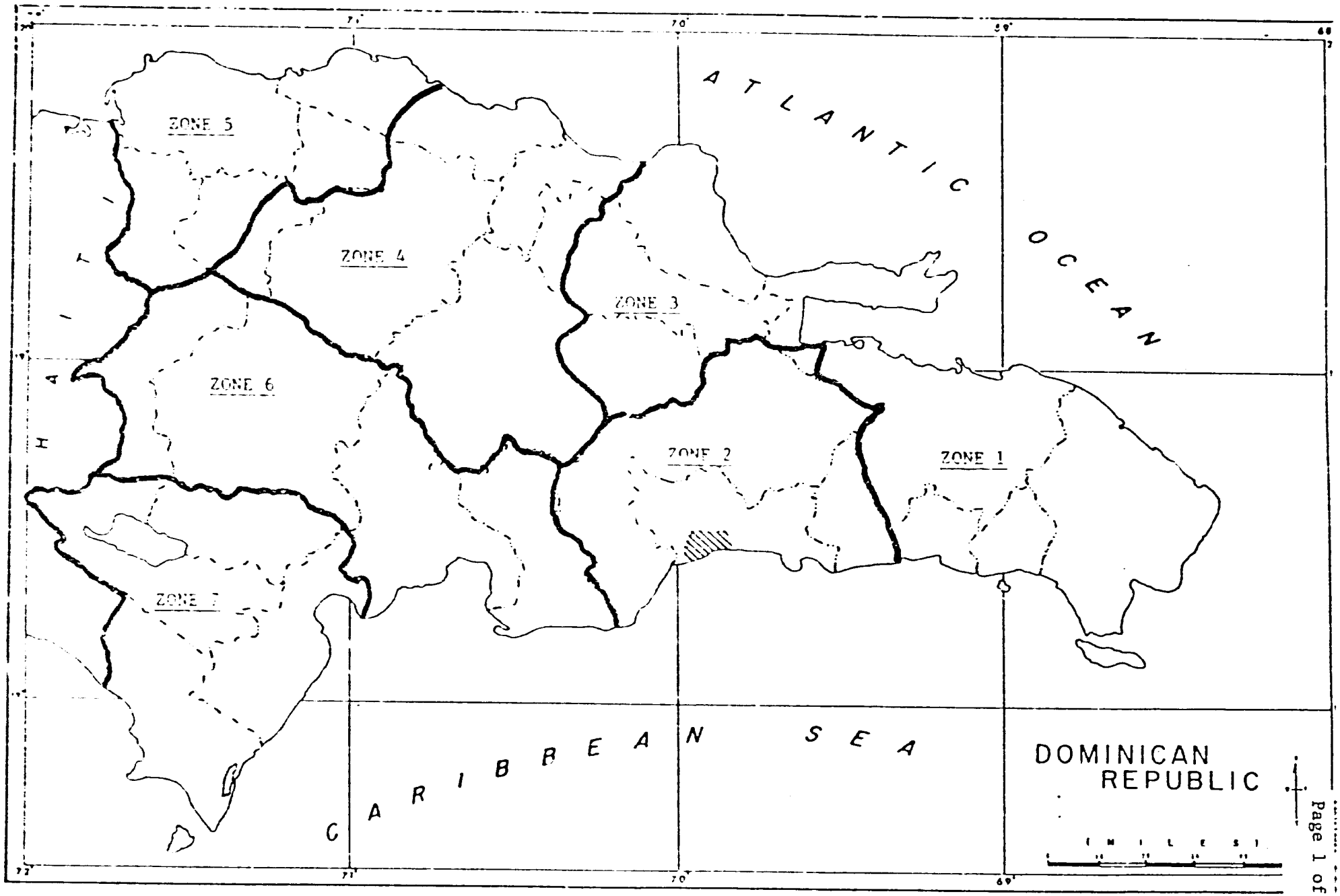
Using a discount rate of 15 percent, the net present values of the costs and benefits can be calculated, and the B/C ratio for the Las Lajas-Boca Río Grande road is 1.46.

Simplified Economic Appraisal Techniques

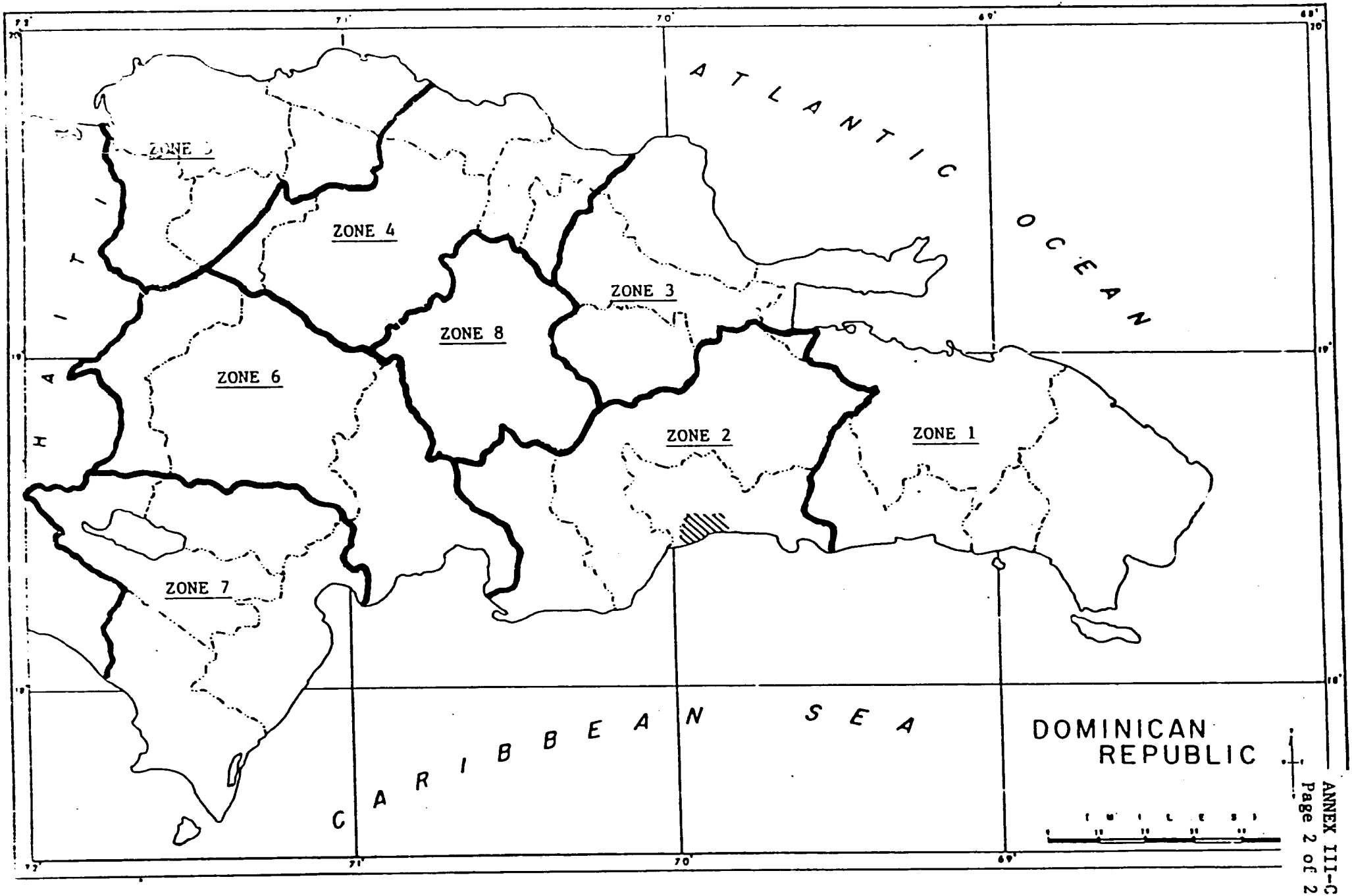
The major determinants of the economic feasibility of individual road rehabilitation projects are: vehicle operating costs, road rehabilitation cost, road maintenance cost, traffic level, rate of traffic growth, and the rate of discount. These factors can be parameterized and simple tables, as shown in Table III E-2, can be constructed to give the lowest level of base year traffic required to justify a road rehabilitation project. For example, the table shows that for mountainous terrain, a discount rate of 12 percent, an annual traffic growth rate of 5 per cent, a maintenance cost of RD$1,000 per km. and a rehabilitation cost of RD$10,000 per km. the minimum average daily traffic (ADT) necessary to justify the rehabilitation is about ten vehicles per day. If the rehabilitation cost were RD$20,000 per km., the minimum ADT would increase to 17 vehicles per day. If it is believed that the annual rate of traffic growth is zero, the minimum ADT would increase to about 23 vehicles per day.

Using the TRS-80 mini computer in the DGCV and the methodology discussed above, it is easy to construct these tables for the most likely combinations of rehabilitation costs, maintenance costs, and the other factors. The DGCV should be encouraged to construct these tables early in the project.

During the early phases of the Project, the DGCV will not be able to estimate traffic levels by means of formal traffic counts. The DGCV lacks the experience, resources, and understanding of seasonal adjustments and other factors to perform traffic counts. As an alternative, traffic will have to be estimated through interviews of transporters, merchants, farmers and other observers that live along the road, or that use the road frequently. Experience with this method during the field surveys made during preparation of the project paper has shown that such estimates are useful, and fairly reliable for low traffic volume roads. Though these observers may not be able to furnish point estimates of traffic (such as 17 vehicles per day), they can provide estimates of the range of ADT (such as the ADT is betwen 10 and 50 vehicles per day). The average of the estimates of the lower limit of the range could then be used for the economic justification.



EXISTING DGCV REGIONAL ZONES



PROPOSED DGCV REGIONAL ZONES

NUMERO DE EXPLOTACIONES, MENORES DE 8 TAREAS, CON ANIMALES DE CARGA Y NUMERO DE CABEZAS POR CLASES, SEGUN REGIONES

Regiones	Total Explotaciones		Bueyes		Caballos Yeguas		Burros Burras		Mulos Mulas	
	Nº	%	Nº	%	Nº	%	Nº	%	Nº	%
Central	1,992	23,4	144	19,6	3,027	23,8	1,095	13,4	487	22,6
Este	2,164	25,4	63	8,6	3,723	29,3	879	10,9	358	16,6
Sur	260	3,1	12	1,6	367	2,9	793	9,8	126	5,8
Suroeste	564	6,6	140	19,1	830	6,5	806	10,0	213	9,9
Norte	1,724	20,2	197	26,9	2,187	17,2	2,897	36,9	602	27,9
Nordeste	1,453	17,1	125	17,0	2,017	15,9	360	4,4	277	12,8
Noroeste	359	4,2	53	7,2	552	4,4	1,178	14,5	95	4,4
TOTAL	8,516	100,0	734	100,0	12,703	100,0	8,098	100,0	2,158	100,0

NOTA: Existencia al 1º de septiembre de 1971.

FUENTE: VI Censo Nacional Agropecuario 1971.
Oficina Nacional de Estadística (ONE).

NUMERO TOTAL DE EXPLOTACIONES CON ANIMALES DE CARGA Y
NUMERO DE CABEZAS POR CLASES, SEGUN REGIONES

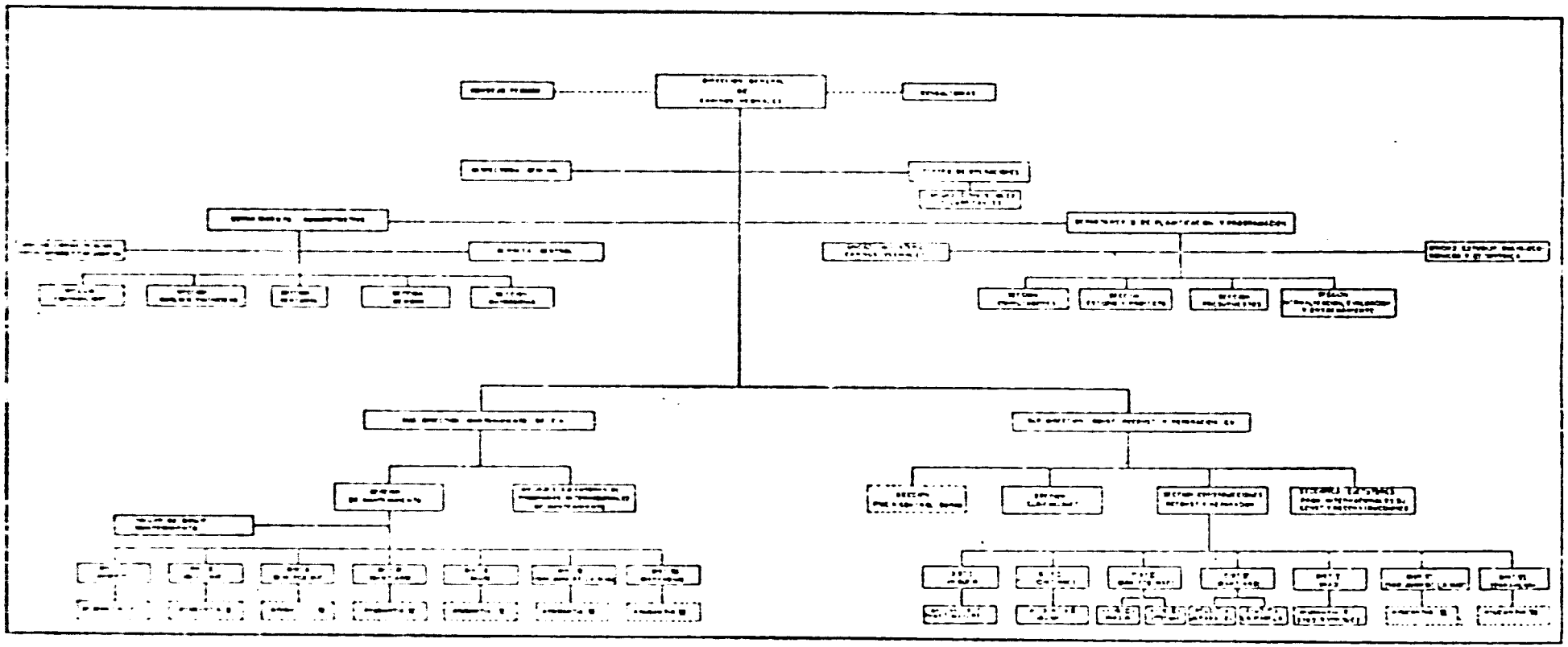
REGIONES	TOTAL EXPLOTACIONES		BUEYES		CABALLOS Y YEGUAS		BURROS Y BURRAS		MULOS Y MULAS	
	No.	%	No.	%	No.	%	No.	%	No.	%
1. CENTRAL	29.512	17.4	17.554	24.7	41.404	19.1	11.474	9.9	19.452	19.8
2. ESTE	19.564	11.5	27.304	38.4	42.076	19.4	12.642	10.9	15.301	15.6
3. SUR	9.623	5.7	1.069	1.5	7.740	3.6	8.966	7.7	6.885	7.0
4. SUROESTE	27.164	16.0	12.216	17.2	28.752	13.2	21.192	18.4	13.904	14.1
5. NORTE	42.700	25.2	6.522	9.1	40.246	18.5	34.800	30.2	24.807	25.2
6. NORDESTE	25.529	15.0	3.161	4.4	39.563	18.2	5.479	4.7	12.544	12.8
7. NOROESTE	15.520	9.2	3.364	4.7	17.460	8.0	20.954	18.2	5.412	5.5

NOTA: Existencia al 1/9/1971

1. Distrito Naciona, Peravia y San Cristóbal
2. La Altagracia, La Romana, San Pedro de Macorís y El Seibo
3. Bahoruco, Barahona, Independencia y Pedernales
4. Azua, La Estrelleta y San Juan
5. Espaillat, Puerto Plata, Santiago y La Vega
6. Duarte, María Trinidad Sánchez, Salcedo, Samaná y Sánchez Ramírez
7. Dajabón, Monte Cristi, Santiago Rodríguez y Valverde

FUENTE: VI Censo Nacional Agropecuario 1971.
Oficina Nacional de Estadística.

///



DGCV ORGANIZATION DIAGRAM

PROGRAMA DE ADIESTRAMIENTO

Curso	Tiempo por curso	Personas por Zona	Total personas	Semanas por curso	Horas por día	Horario	Fecha impartición	Lugar	Instr
MODULO II Mantenimiento Equipos y Vehículos	30 h.	9 choferes 4 operadores 3 ayudantes 16	112	2	3	2 pm - 5pm	21 Feb - 4 Mar 83 7 Mar - 18 Mar 21-25 Mar - 4-8 Abr 11 Abr - 22 Abr 25 Abr - 6 Mayo 9 Mayo- 20 Mayo 23 Mayo- 3 Junio	Zona I Zona III Zona V Zona VII Zona II Zona IV Zona VI	A B B
MODULO IV Motores Diesel	50 h.	1 Jefe taller 2 Mecánicos 2 Ayudantes 5	35	2	5	Repartido entre 8 AM y 4 PM	28 Feb - 11 Mar 83 14 Mar - 25 Mar 4 Abr - 15 Abr 18 Abr - 29 Abr 2 Mayo- 13 Mayo 16 Mayo- 27 Mayo 30 Mayo- 10 Junio	Zona II Zona IV Zona VI Zona I Zona III Zona V Zona VII	A B A B C B
MODULO III Electricidad-Equipos Vehículos	60 h	1 Electricista 1	7	2	6	8 AM-12AM 2 PM- 4PM	7 Feb - 18 Feb	Zona II	A B
Uso del Comprobador Sistemas Hidráulicos	6 h	1 Jefe taller 2 Mecánicos 3	21	1 día	6	8 AM-12AM 2 PM- 4PM	Marzo 18	Zona II	
TOTAL	146	25	175						

Código: A=B. Currat, B= M. Amador, C= F. Alonso, D= V. Coco

ANNEX IV-B
Page 1 of 1

DAILY REPORT FORMAT FOR EQUIPMENT AND VEHICLE OPERATORS

CO: INFORME DIARIO PARA EQUIPOS Y VEHICULOS

DISTRITO _____ LUGAR

NO. INVENTARIO _____ MARCA _____ TIPO _____

DIA _____ MES _____ AÑO _____ CONTADOR HORAS/ODOMETRO FIN DEL DIA _____

1. TIPO DE TRABAJO EFECTUADO: _____

2. CANTIDAD ESTIMADA EN ML/M^3 AL FIN DEL DIA _____

3. TOTAL HORAS DE TRABAJO _____ OPERACION _____ MANTENIMIENTO _____

A) TIEMPO PERDIDO _____ B) REPARACION _____

CAUSA PARA A) _____

NOTA PARA B) _____

4. COMBUSTIBLE DIESEL _____ GAL. ACEITE LUBRICANTE _____ GAL. GRASA _____ LBS.

NOTA: _____

5. PIEZAS UTILIZADAS:

A) PARA MANTENIMIENTO: _____

B) PARA REPARACION: _____

OPERADOR/CHOFER: _____ FIRMA: _____

RECIBIDO POR: _____ FIRMA: _____

114

BACK OF DAILY REPORT FOR EQUIPMENT AND VEHICLE OPERATIONS (CHECKLIST BEFORE BEGINNING WORK)

CHEQUEO DIARIO ANTES DEL TRABAJO:	CHEQUEADO BUENO, REG, MALO	OBSERVACIONES
CON EL MOTOR APAGADO		
1. NIVEL ACEITE MOTOR		
2. NIVEL AGUA MOTOR		
3. NIVEL ACEITE TRANSMISION		
4. NIVEL ACEITE SISTEMA HIDRAULICO		
5. DRENAR AGUA DEL TANQUE COMBUSTIBLE		
6. DRENAR AGUA DEL TANQUE DE AIRE FRENOS		
7. INSPECCION OCULAR DE NEUMATICOS		
8. INSPECCION OCULAR DEL EQUIPO		
CON EL MOTOR EN MARCHA		
9. CONTROLAR MANOMETROS		
10. CONTROLAR FRENOS		

MAINTENANCE REPORT FROM OPERATOR OF MOBILE LUBE TRUCK OF EQUIPMENT MAINTENANCE PERFORMED IN THE FIELD

011

INFORME DE MANTENIMIENTO

NO. INVENTARIO _____ MARCA _____ TIPO _____

DIA _____ MES _____ AÑO _____ CONTADOR HORAS/ODOMETRO _____

MANTENIMIENTO REALIZADO _____ HORAS/KM.

TIEMPO UTILIZADO _____ HORAS

ACEITE MOTOR API _____ SAE _____ _____ GAL.

ACEITE TRANSMISION GL. _____ SAE _____ _____ GAL.

ACEITE HIDRAULICO TIPO _____ SAE _____ _____ GAL.

GRASA _____ LIBRAS

PIEZAS UTILIZADAS _____

_____

OBSERVACIONES: _____

_____

UNIDAD LUBRICACION _____ RESPONSABLE _____

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
SECCION REHABILITACION Y MANTENIMIENTO DE CAMINOS
PROGRAMA PRESTAMO A.I.D. No. 517 - T 033

CONTROL SEMESTRAL DEL MANTENIMIENTO PERIODICO

UBICACION: _____ LONGITUD DEL TRAMO: _____

CAMINO VECINAL: _____ DE ESTACION: _____

_____ A ESTACION: _____

LONGITUD: _____ ANCHO: _____ CODIGO: _____ FECHA: _____

DESCRIPCION DE ACTIVIDADES	UNIDAD	CANTIDAD DE TRABAJO			DIAS CUADRILLAS UTILIZADOS A LA FECHA	RENDIMIENTO		%
		REALIZADO A LA FECHA	PROGRAMADO	PORCENTAJE TERMINADO		ACTUAL	PROGRAMADO	
1- SUPERFICIE								
a- NIVELADO Y PERFILADO CON ADICION DE MATERIAL								
b- NIVELADO Y PERFILADO SIN ADICION DE MATERIAL								
c- RECUBRIMIENTO								
2- DRENAJE								
a- LIMPIEZA DE CUNETAS								
b- REPARACION DE ALCANTARILLAS								
c- REPARACION DE REVESTIMIENTO DE CUNETAS								
3- AREAS LATERALES								
a- CONTROL DE VEGETACION Y EROSION								
4- PUENTES Y BADENES								
a- MANTENIMIENTO PERIODICO DE PUENTES								
b- MANTENIMIENTO PERIODICO DE BADENES								
5 SERVICIOS DE TRANSITO								
a- UBICACION, MANTENIMIENTO Y RESTAURACION DE SEÑALES DE TRANSITO								

ANNEX IV-D
Page 1 of 3

REPUBLICA DOMINICANA

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
SECCION REHABILITACION Y MANTENIMIENTO DE CAMINOS

PROGRAMA 517-T-033 A.I.D

INFORME SOBRE LOS TRABAJOS DE REGIONALES

ZONA: II REGIONAL: Villa Vella

TRABAJO REALIZADO EN: Camino: El Coco - Los Conucos

LONG.: 3 Kms. CALZADA: 5.0 ESPESOR: 0.20 Cm.

TIPO DE TRABAJO REALIZADO: Limpieza de Cunetas
0.0 al Km p.5 de long.
Bacheo desde el Km. 2.0 al Km 2.5

REALIZADO POR: Juan

FECHA DE INICIO: 10/2/83 TERMINACION DEL TRABAJO: 13/2/83

DETALLE DE OBRAS DE ARTES DE LA OBRA Colvado Asfalto

ALCANTARILLAS: 1 c/c.

BADENES Y PUENTES: 1

ING. ENC. DE LA REGIONAL:

FECHA DEL INFORME: 10/2-83 FECHA DE ENTREGA: 1-2-83

ING. ENC. REGIONAL

RECIBIDO POR

ING. SUP. SECCID MANT. Y REHAB.

Costo de una parte del Mantenimiento Periódico del Camino Vecinal "El Coco-Los Corozos"

Pedro Brand D.N.

6-9 Dic. 1982 Mantenimiento Periódico 7 kms.

Actividades realizadas:- Nivelado y Perfilado con adición de material, Rehabilitación de Cunetas Longitudinales y Limpieza de Puentes y Badenes

MANO DE OBRA — HORAS

No.	Cargo	Persona	Lun. 6	Mar. 7	Mier. 8	Jue. 9	Vier.	Total
1	Jefe de Flotilla	Martinez	8	8	8	8	-	32
1	Op. Motoniveladora	Fulvio	8	8	8	8	-	32
1	Atyc. Op. "	Montilla	8	8	8	8	-	32
1	Op. Pala Mecánica	Agustin	8	8	9	10	-	35
1	Atyc. Op. Pala Mecánica.	Marcelino	8	8	9	10	-	35
2	Sereno	Florico y Vasquez	24	24	24	24	-	96
1	Operador Rodillo	Arcidez Felix	8	8	9	8	-	33
5	" Volter		40	40	40	35	-	155
1	" Camión agua	Angel Martinez	8	8	9	8	-	33
		Horas Total	120	120	123	117	-	480

Equipo

No.	Descripción	Código	Lun.	Mar.	Mier.	Jue.	Vier	Total
1	Motoniveladora	F 7019	6	6	6	6	-	24
1	Pala Mecánica	F 8[illegible] 4	6	6	7	8	-	27
1	Rodillo	Z 34121	4	7	8	6	-	25
1	Camión Volteo		25	25	25	20	-	95
1	Camión agua	CD 014	7	7	7	6	-	27
		Horas Total	48	51	53	46	-	198

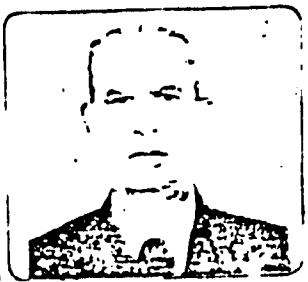
REPUBLICA DOMINICANA
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
SECCION REHABILITACION Y MANTENIMIENTO DE CAMINOS
PROGRAMA PRESTAMO A.I.D. No. 517 - T - 033

CARNET DE IDENTIFICACION

MANCAVE

DIRECTOR GENERAL
DE CAMINOS VECINALES

REPUBLICA DOMINICANA
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
SECCION REHABILITACION Y MANTENIMIENTO DE CAMINOS
PROGRAMA PRESTAMO A.I.D. No. 517 - T - 033



CARNET DE IDENTIFICACION

JUCAVE

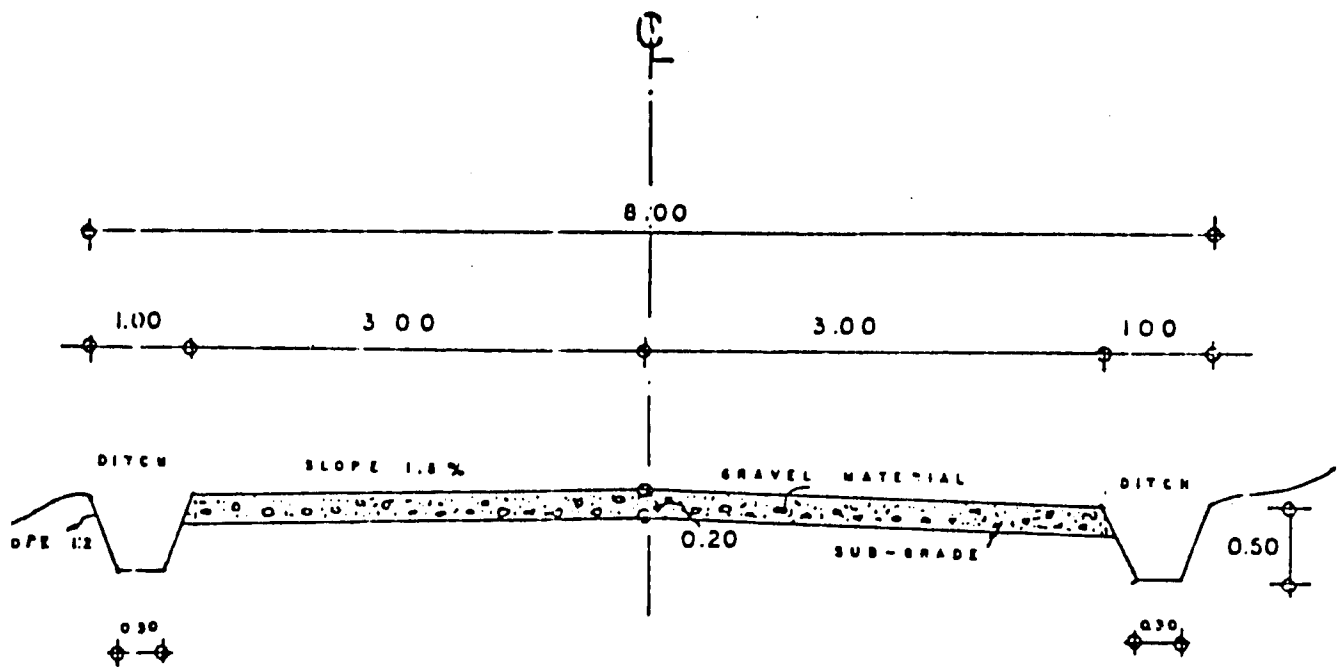
DIRECTOR GENERAL
DE CAMINOS VECINALES

NOMBRE: ISIDRO MERCEDES CASTILLO					
CEDULA: 32980				SERIE: 28	
DIRECCION: ANAMUYITA					
Edad	Sexo	Color	Tramo No.	Long. Tmo.	Fecha de Expedición
26	M	IND.	3	4.4	1-FEB. 1983
DISTRITO No.: I			CARNET No.: I-2-2-M3		
CAMINO VECINAL: HIGUEY-ANAMUYITA					

NOMBRE: EURIPIDES CEDEÑO PEÑA			
CEDULA: 3523			SERIE: 28
DIRECCION: ANAMUYITA			
EDAD	SEXO	COLOR	FECHA DE EXPEDICION
72	M	INDIO	1-FEB. 1983
DISTRITO No.: I		CARNET No: I-2-2-J2	
CAMINO VECINAL: HIGUEY-ANAMUYITA			

TYPICAL CROSS SECTION

FEEDER ROAD

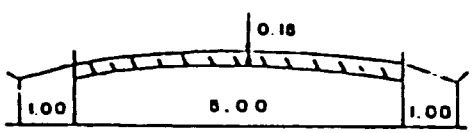
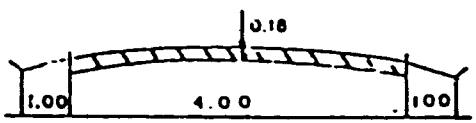


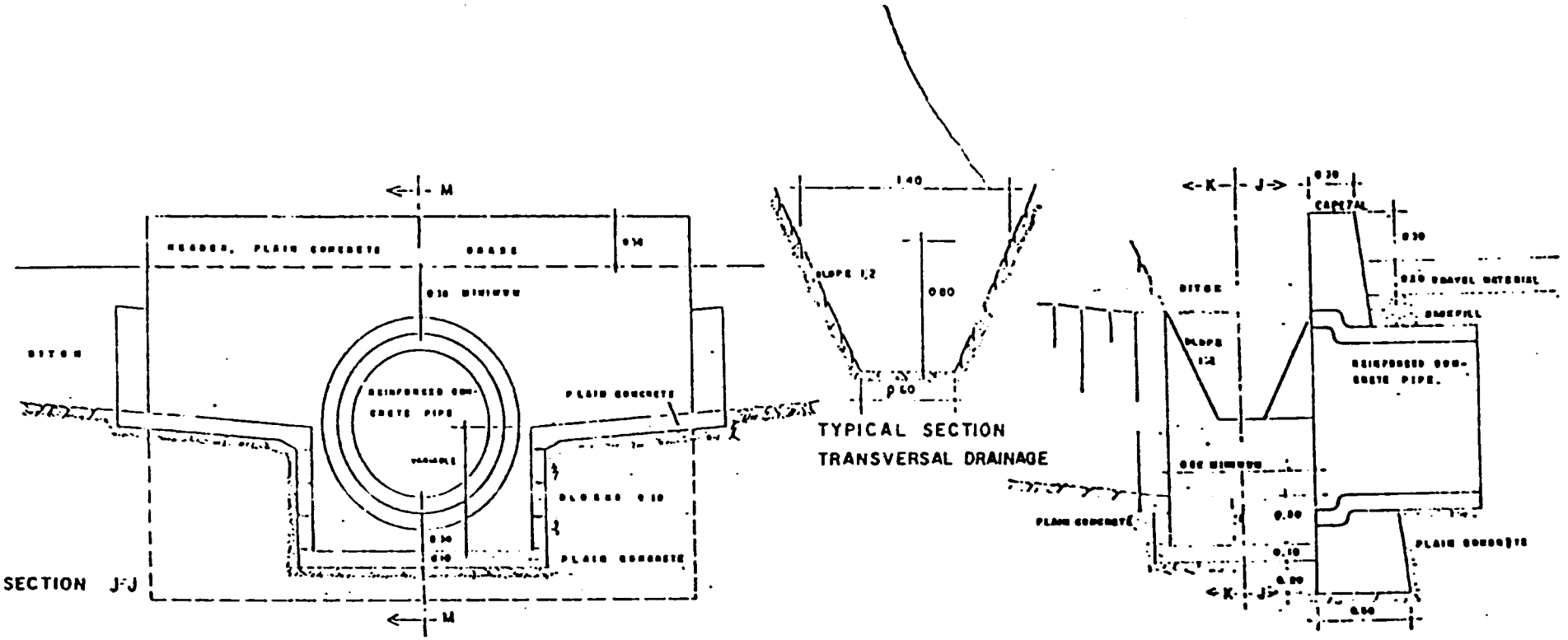
SCALE 1:50

ALL DIMENSIONS ARE IN METERS.

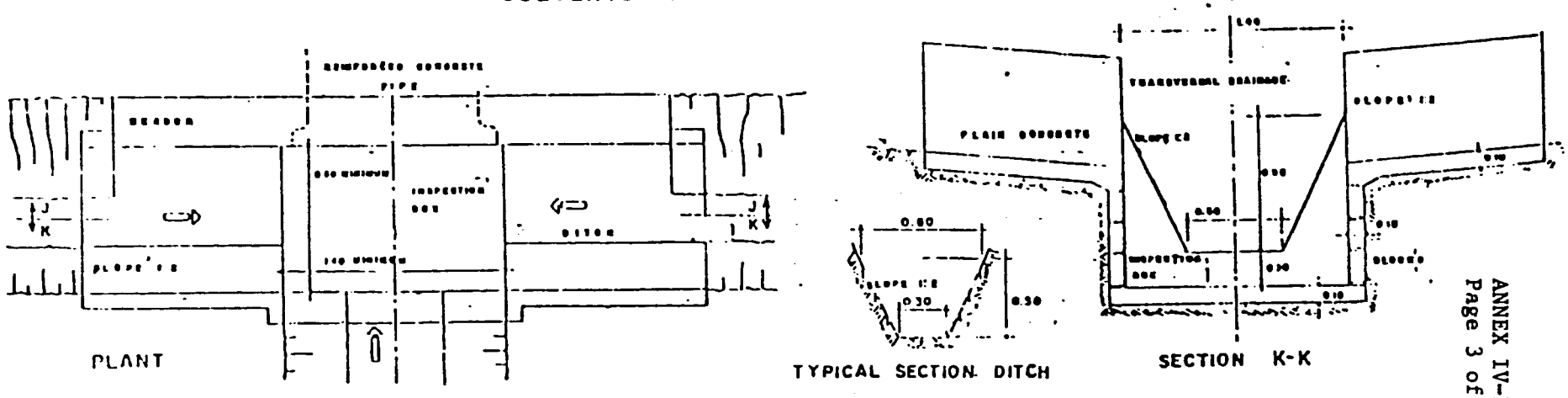
DIRECCION GENERAL DE CAMINOS VECINALÉS

CLASIFICACION Y ESPECIFICACIONES DE DISEÑO

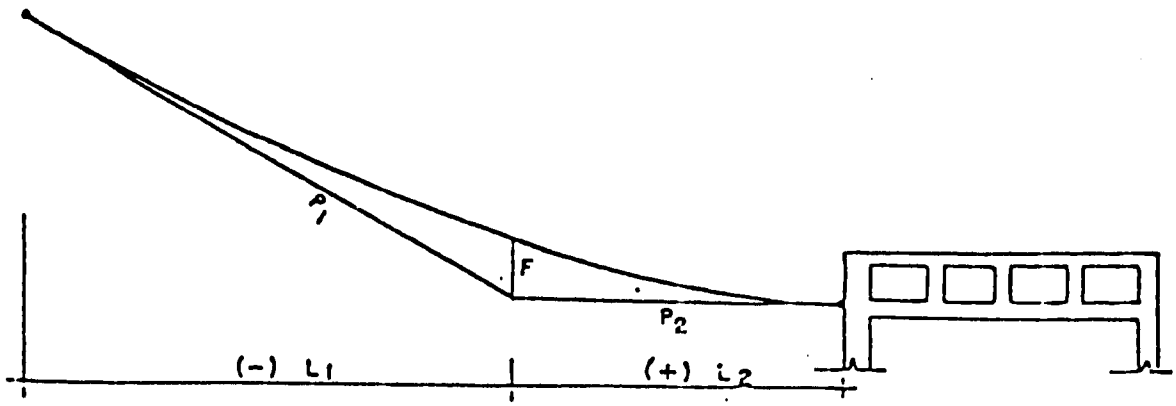
CARACTERISTICAS	TIPO	
	PRIMER ORDEN	SEGUNDO ORDEN DE PENETRACIC
Clase de Terreno	Llano, Ondulado Montanoso	Llano, Ondulado Montanoso
Velocidad Maxima en K/H	45	30
Drenaje	Algo Definitivo	Algo Definitivo
Carga Calculo Para Estructure de Drenaje	H - 15 - 44 - Minimo	H-10-44
Superficie de Rodamiento	Con Afirmado de Material Seleccionado	Con Afirmado de Material Aledaño
Grado Maximo en Curvas	14º	25º
Radio Minimo de Curvas	30.00 Mts	20.00 Mts.
Perfil de la Banca		
Derecho de Via	15.00 Mts.	10.00 Mts.
Pendientes Maximas	16 %	16 %
Bombeo Lateral	3 %	3 %
Tangente Comun Entre Curvas Consecutivas	No Necesariamente	No Necesariamente



CULVERTS AND DRAINAGE DETAILS. SCALE 1:20 SECTION.- M-M



CURVA VERTICAL ASIMETRICA

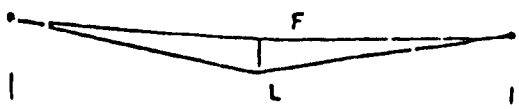


$$F = \frac{L_1 \times L_2}{2(L_1 + L_2)} \times (D.P. = 0.527$$

Diferencia de pendiente $D.P. = \frac{(-)P_1 - (-)P_2}{100}$

RAMA L_1	RAMA L_2
$Y_1 = F(10/L_1)^2$	$Y_1' = F(10/L_2)^2$
$Y_2 = F(20/L_1)^2$	$Y_2' = F(20/L_2)^2$
. . . . .	. . . . .
$Yn = (n \times 10/L_1)^2$	$Yn' = F(n \times 10/L_2)^2$

FLECHA DE UNA CURVA VERTICAL ASIMETRICA



$$F = \frac{L \times \text{Dif. de Pendiente}}{8}$$

TABLA DE DISEÑOS PARA CURVAS VERTICALES.

L..... Longitud de la curva vertical en metros.
K..... Constante que depende de las distancias visibles y de las características de la curva parabólica.
A. Diferencia algebraica de las pendientes en %.

CONSTANTES PARA CURVAS VERTICALES.

Longitud de la curva	Constante	Longitud de la curva	Constante
20	0.0250	200	0.00250
40	0.0125	220	0.00227
60	0.00833	240	0.00208
80	0.00625	260	0.00192
100	0.00500	280	0.00179
120	0.00417	300	0.00167
140	0.00357	320	0.00156
160	0.00313	340	0.00147
180	0.00278	360	0.00139

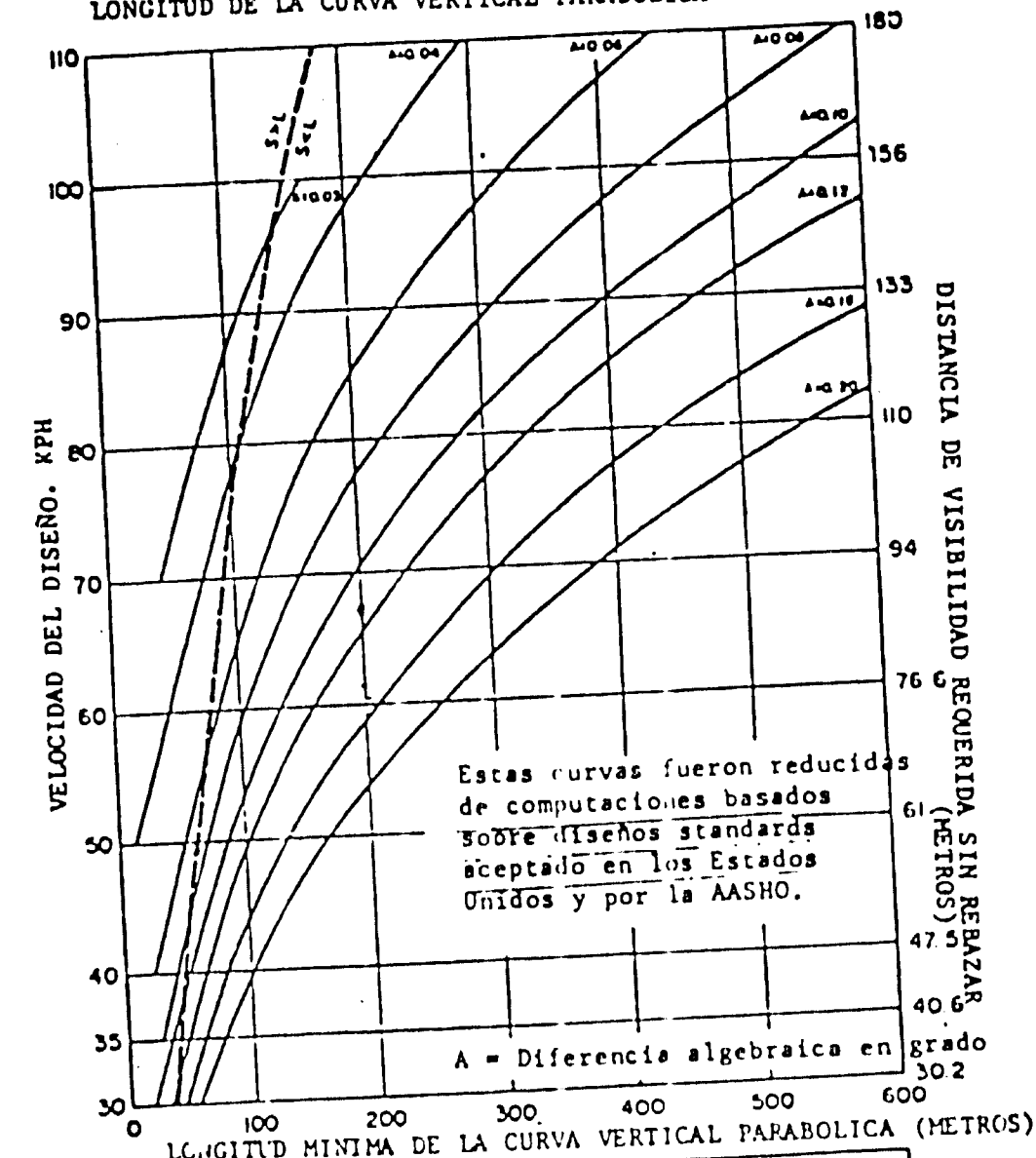
$$K = \frac{0.025 \times 20}{L}$$

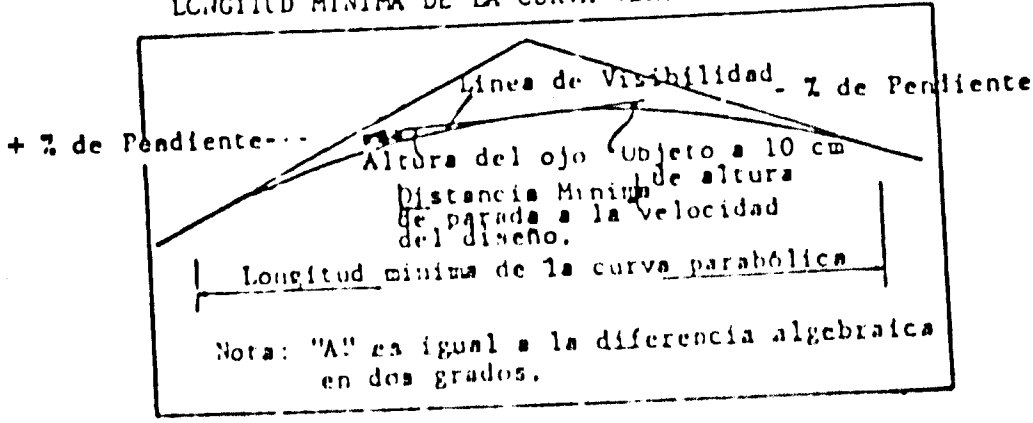
K..... Constante buscada.
L..... Longitud de la curva vertical de acuerdo.
F..... Flecha de la curva vertical o corrección máxima.

NORMAS DE DGCV

DISTANCIA DE VISIBILIDAD

LONGITUD DE LA CURVA VERTICAL PARABOLICA

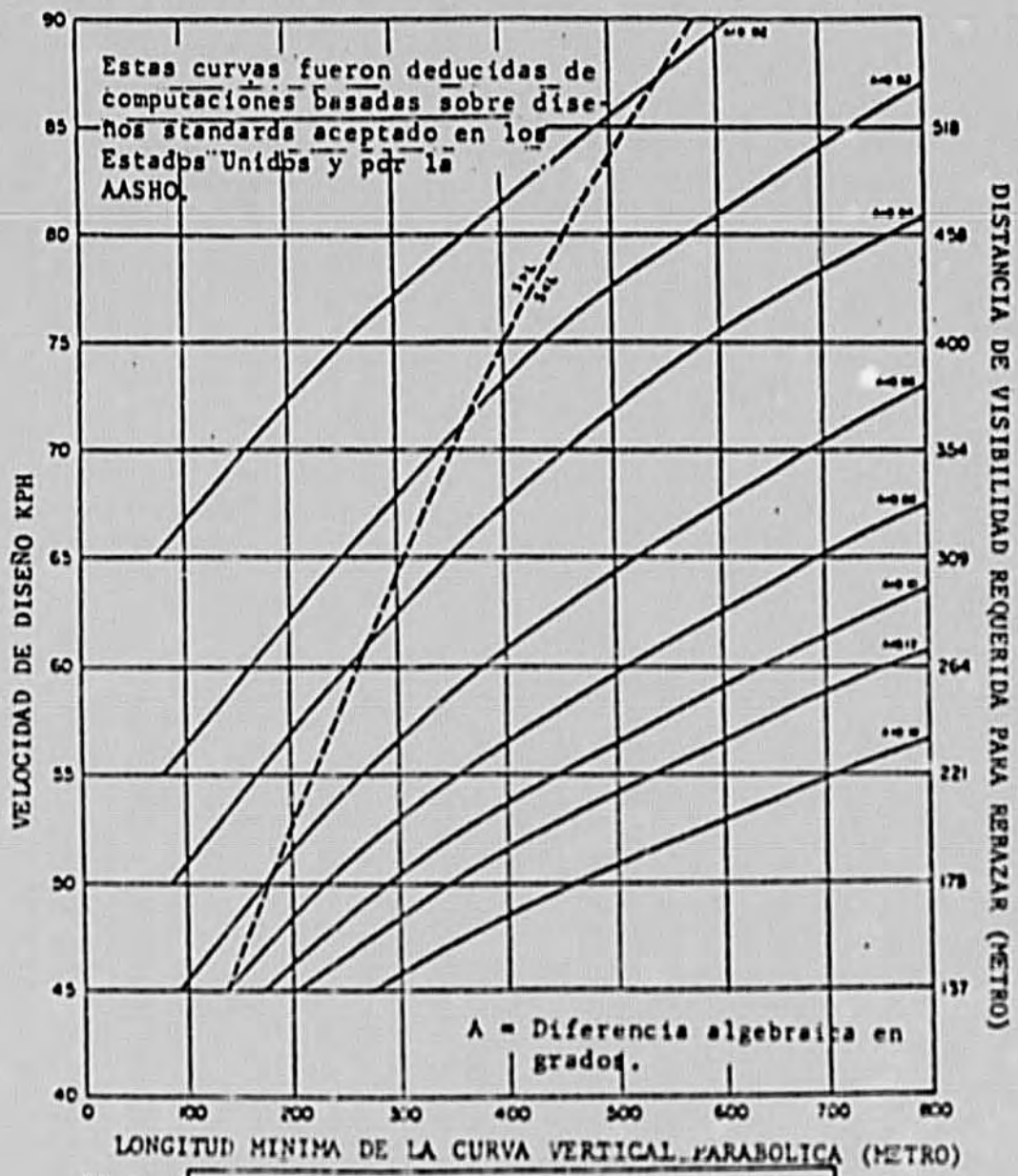


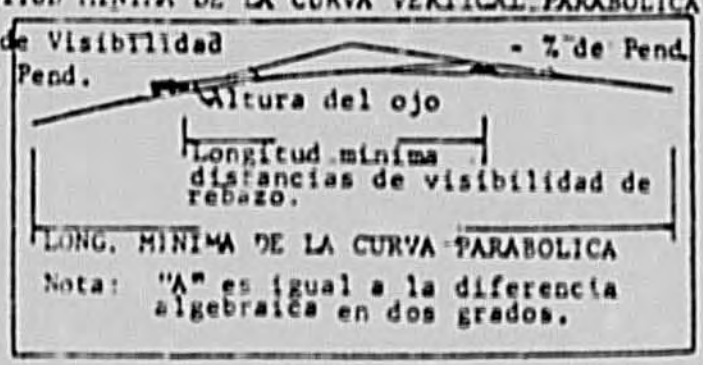


17.6

NORMAS DE DGCV

DISTANCIA DE VISIBILIDAD PARA REBAZAR
LONGITUD DE LA CURVA

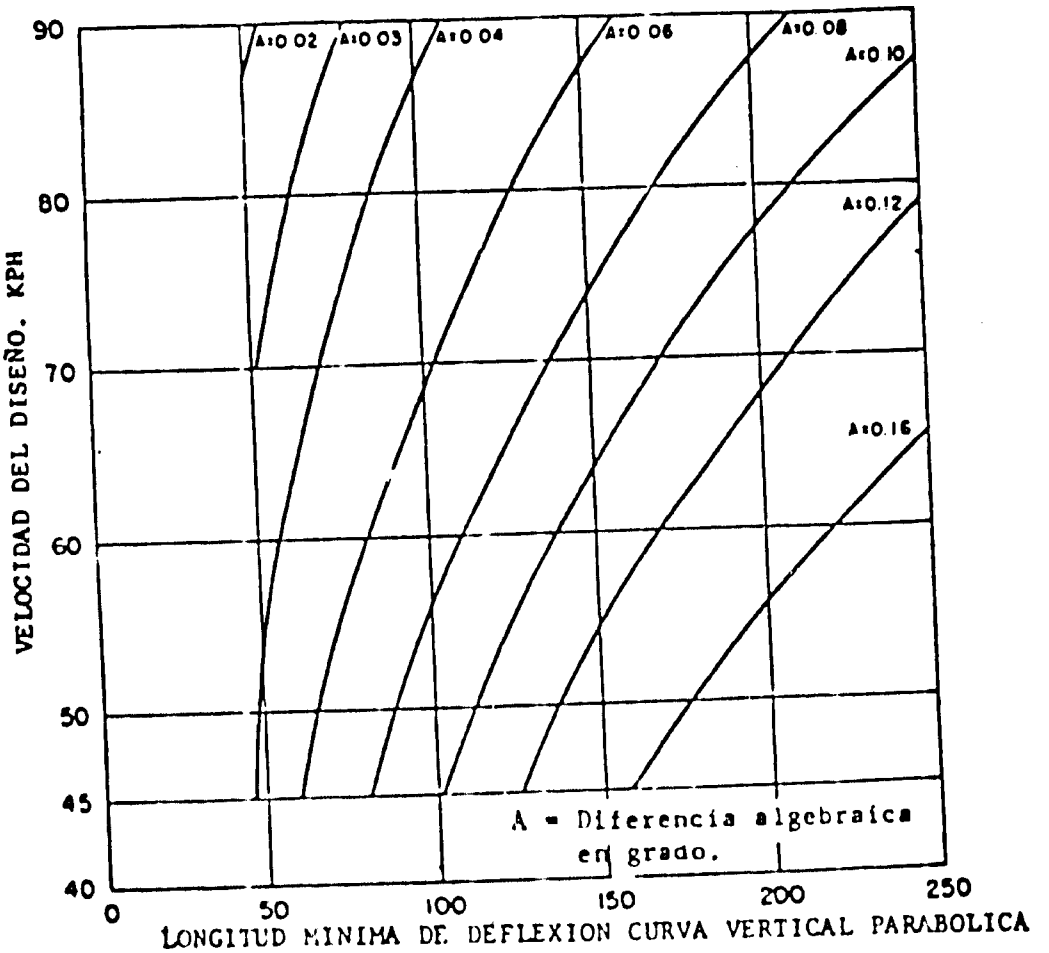


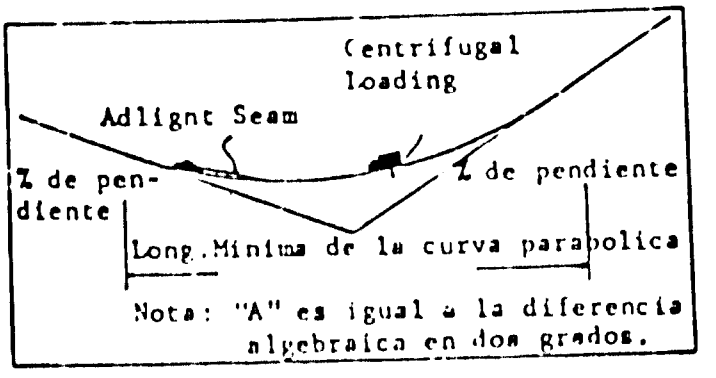


NORMAS DE DGCV

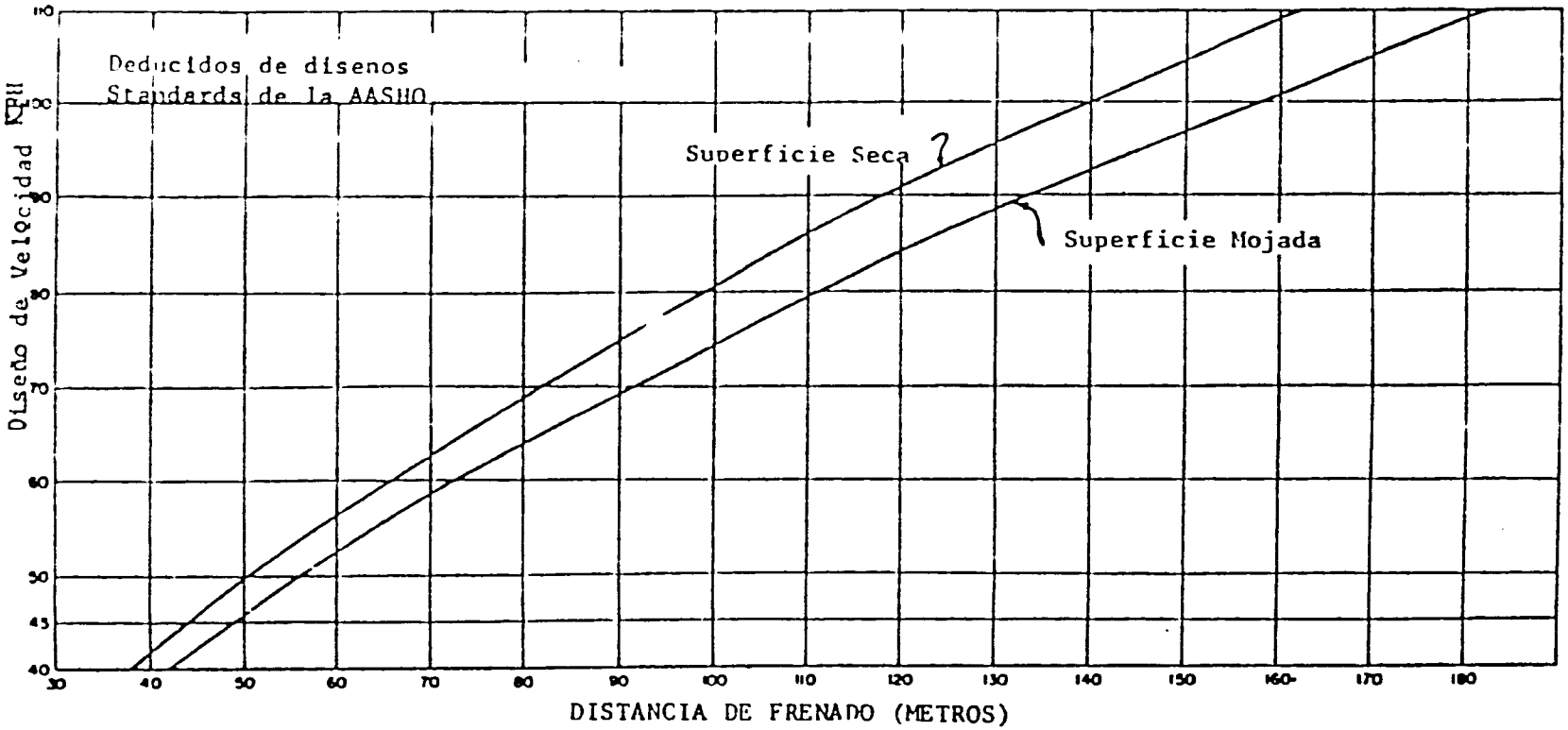
LONGITUD MINIMA DE DEFLEXION CURVA
VERTICAL PARABOLICA

Estas curvas fueron reducidas de computaciones basadas sobre diseños standards aceptado en los Estados Unidos y por la AASHO.





DISTANCIA DE FRENADO PARA LA DETERMINACION DE LA DISTANCIA DE VISIBILIDAD HORIZONTAL
SEGUN DISEÑO DE VELOCIDAD, KPH



ESTIMATED REHABILITATION COSTS

Typical Road of 5 Kms.

Mobilization	Equipment & Fixed Costs	Unskilled Labor Costs
1. Engineering, Store Room/Office and Equipment Transport	$ 7,000	
2. Cut and Fills		
Cut in Material, not Classified		
Cut of 14,000 M^3 to $0.75	10,500	
Fill of 2,000 M^3 to $2.50	5,000	
3. Drainage Structure		
a) Culverts 100 M.L. to RD$147	10,300	4,400
b) Ditches 7 kms. to RD$425.00		2,975
c) Inspection Box 12 U to RD$70.00	590	250
d) Riprap with concrete 100 M^2 $7.00	490	210
4. Base and Sub-Base Construction		
a) Compacting of Sub-Base 30,000 M^2 to RD$0.06	1,800	
b) Hauling Surface Material 6,000 M^3 to RD$280	16,800	
c) Sprinkle, leveling, watering cart, and compacting 5,000 M^3 to RD$0.65	3,250	
d) Rechecking and maintenance of surface material 30,000 M^2 to $0.06	1,800	
5. Maintenance of Transit	1,000	
6. Finish and Cleaning		500
	$58,530	$8,335
Sub-Total	66,865.00	
Plus 10% Profit	6,686.50	
4.2% Insurance	2,808.33	
3% Administration	2,005.95	
Total	78,365.78 ÷ 5 Kms.	=$15,673/Km.
Supervision 8%	6,269.26	
Grand Total	84,635.04 ÷ 5 Kms.	=$16,927/Km.

Note: Contingencies are included in overall project costs.

RURAL ROADS (KMS) UNDER MAINTENANCE BY REGION
1982 - 1987

YEAR	I	II	III	IV	V	VI	VII	VIII	TOTAL
1982	40.4	30.90	97.0	65.0	49.5	100.3	38.8	0	700.0
1983	70.0	134.0	341.0	190.0	200.0	150.0	23.0	0	1,108.0
1984	50.0	100.0	100.0	75.0	75.0	75.0	25.0	17.0	517.0
1985	30.0	100.0	100.0	80.0	100.0	50.0	25.0	40.0	525.0
1986	30.0	50.0	100.0	100.0	80.0	65.0	25.0	75.0	525.0
1987-88	35.0	47.0	25.0	38.0	60.0	40.0	10 0	70.0	325.0
TOTAL	255.4	740.0	763.0	548.0	564.50	480.3	146.8	202.0	3,700.0

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
PROGRAMA DE PRESTAMO PROYECTO NO. 517-T-033 AID

CONTRATO NO.
CUBICACION MENSUAL NO. 3 VALOR DEL CONTRATO RD$ 78,098.60 NOMBRE OBRA: CAMINO VECINAL HATO DENA-JAREY
TRABAJOS REALIZADOS DESDE 11 DE NOVIEMBRE HASTA 7 DE DICIEMBRE, 1982 CONTRATISTA: INVERSIONES TROPICALES, C. POR A.

NO.	PARTIDAS	UD.	PRESUPUESTO CANT.	P.U.	TOTAL RD$	PREVIO CANT.	TOTAL RD$	ESTE PERIODO CANT.	TOTAL RD$	A LA FECHA CANT.	TOTAL RD$	POR DESEMBOLSA CANT.	TOTAL RD$
1	INGENIERIA	KM	11.9	400.0	4,760.00	8.92	3,570.00	1.19	476.00	10.11	4,046.00	1.79	714.
2	CAMPAMENTO	-		P.A.	300.00	P.A.	120.00	-	-	P.A.	120.00	P.A.	180.
3	MANTENIMIENTO DE TRANSITO	-											
4	DESMONTE Y LIMPIEZA (DESYERBO)	HA	4.76	350.0	1,666.00	1.90	666.40	1.19	416.50	3.10	1,082.90	1.66	583.
5	MOVIMIENTO DE TIERRA												
	a) Extracción y Bote Capa Vegetal	M^3N											
	b) Escarificación de Superficie	M^2	71,400	0.05	3,570.00	66,000	3,300.00	3,360	168.00	69,360	3,468.00	2,040	102.
	c) Corte en Material no Clasificado	M^3N											
	d) Corte en Roca	M^3N											
	e) Relleno Compens. con Acarreo Libre	M^3E	200.00	2.63	526.00	150.00	394.50	-	-	150.00	394.50	50.00	131.
	f) Relleno Compens. con Sobre Acarreo	M^3E											
	g) Compactación de Subrasante	M^2											
	h) Compactación de Rellenos	M^3C											
	i) Remoción y Bote de Derrumbes	M^3E	220.00	0.65	143.00	1,200	780.00	-	-	1,200	780.00	(980)	(637
	j) Otros												
6	DRENAJE Y OBRAS DE ARTE												
	a) Construc. Cunetas Longitudinales	KM	18.80	328.50	6,175.80	9.30	3,055.05	4.57	1,501.25	13.87	4,556.30	4.93	1,619
	b) Drenaje Transversal	M^3											
	c) Construcción Padén de Tubos	ML											
	d) Construc. Padén a Cielo Abierto	M^3	4.80	65.00	312.00	-	-	-	-	-	-	4.80	312
	e) Limpieza Alcantarillas Exist.	U	23.00	30.00	690.00	16.50	495.00	-	-	16.50	495.00	6.50	195
	f) Const. Alcant. de Tubos H.A.												
	1) Alc. Ø 24" Simple	ML	1	41.77	41.77	-	-	-	-	-	-	1	41
	2) Alc. Ø 30" Simple	ML	8	76.00	608.00	27.40	2,082.40	21.68	1,647.68	49.08	3,730.08	(41.08	(3,122
	3) Alc. Ø 36" Doble	ML											
	4) Alc. Ø 36" Triple	ML											
	g) Construcción de Cabezales	UN											
	1) Para Alc. Ø 24" Simple	M^3	2.00	70.00	140.00	-	-	-	-	-	-	2.00	140
	2) Para Alc. Ø 30" Simple	M^3	18.08	70.00	1,265.60	17.23	1,205.75	19.11	1,337.70	36.34	2,543.45	18.26)	1,277
	3) De Gaviones Alc. Ø30"+1 Tubo	M^3	255.00	30.40	7,752.00	-	-	13.66*	476.68	13.66	476.68	241.34	(7,275
	4)	M^3											
	h) Construc. Cajas de Inspección	U	24.00	68.22	1,637.28	11.00	750.42			11.00	750.42	13.00	886
	i) Encaches de Cunetas	M^2	138.24	6.50	898.56	-	-			-	-	138.24	898
	j) Construcción Muros de Sacos	M^3											
	k) Hormigón Simple en Pisos	M^3	3.36	65.00	218.40	-	-	-	-	-	-	3.36	218
	l) Extracción Alc. Existentes	U											

BUFETE NACIONAL DE INGENIERIA, S.A.
INGENIEROS CONSULTORES

*P.U DE 34.90 M^3 APROBADO POR SOPC/DGV, SEGUN COMUNICACION 00712.

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
PROGRAMA DE PRESTAMO PROYECTO NO. 517-T-033 AID

CONTRATO NO.
CUBICACION MENSUAL NO. 3
TRABAJOS REALIZADOS DESDE 11 DE NOVIEMBRE HASTA 7 DE DICIEMBRE, 1982

VALOR DEL CONTRATO RD$ 78,898.60

NOMBRE OBRA: CAMINO VECINAL HATO DAMA-JAMEY
CONTRATISTA: INVERSIONES TROPICALES, C. POR A.

NO.	PARTIDAS	UD.	PRESUPUESTO CANT.	PRESUPUESTO P.U.	PRESUPUESTO TOTAL RD$	PREVIO CANT.	PREVIO TOTAL RD$	ESTE PERIODO CANT.	ESTE PERIODO TOTAL RD$	A LA FECHA CANT.	A LA FECHA TOTAL RD$	POR DESEMBOLSAR CANT.	POR DESEMBOLSAR TOTAL RD$
	m) Otro:												
7	CONSTRUCCION BASE Y PASEOS												
	a) Perfilado y Compac. Subrasante	M^2											
	b) Suministro y Acarreo Material	M^3E	9710.25	2.63	25,537.96	7451.96	19,598.65	1364.82	3,589.48	8816.78	23,188.13	893.47	2,349.83
	c) Compactación Material de Base	M^3C	8,025	0.50	4,012.50	3763.62	1,881.81	121.38	60.69	3,885	1,942.50	4261.38	2,070.80
	d) Rechequeo y Mant. Superficie	M^2											
8	EXTRACCION DE BACHES												
	a) Extracción Material Inservible	M^3N											
	b) Suministro y Acarreo de Material	M^3E											
	c) Compactación	M^3C											
9	REMOCION Y COLOCACION DE ALAMBRE	ML											
10	LIMPIEZA FINAL Y BOTE	-		P.A.	200.00	-	-	-	-	-	-	P.A.	200.00
	SUB-TOTAL				60,454.87	62.7%	37,899.98	16.0%	9,673.98	78.70%	47,573.96	21.3%	12,880.91
	10% BENEFICIOS				6,045.49		3,789.99		967.40		4,757.39		1,288.10
	4.2% SEGUROS Y FIANZAS				2,539.11		1,591.80		406.31		1,998.11		541.00
	3,0% GASTOS ADMINISTRATIVOS				1,813.65		1,137.00		290.22		1,427.22		386.43
	TRANSPORTE DE EQUIPOS				2,000.00	70.0%	1,400.00	10.0%	200.00	80.0%	1,600.00	20.0%	400.00
	TOTAL A CONTRATAR				72,853.12	62.89%	45,818.77	15.83%	11,537.91	78.72%	57,356.68		15,496.44
	1 GASTOS DE INSPECCION												
	10 % IMPREVISTOS				6,045.49	-	-	-	-	-	-	100%	6,045.49
	TOTAL GENERAL				78,898.60	58.1%	45,818.77	14.62%	11,537.91	72.72%	57,356.68	27.3%	21,541.92
	TOTAL EJECUTADO												

APROBADO POR: _____ CONTRATISTA
FECHA: 4-DIC-1982

PREPARADO Y REMITIDO POR:		REVISADO Y APROBADO POR:		REVISADO Y APROBADO POR:	
ING. SUPERVISOR CONSULTORA	GERENTE CONSULTORA	ING. RESIDENTE SEOPC/DGCV	ENC. PROYECTO SEOPC/DGCV	INGENIERIA AID	CONTRALORIA AID
FECHA: 7-12-82	FECHA: 21-XII-82	FECHA:	FECHA:	FECHA: Dic. 28-1982	FECHA:

BUFETE NACIONAL DE INGENIERIA, S.A.
INGENIEROS CONSULTORES

ANNEX IV-H
Page 2 of 3

133

REPUBLICA DOMINICANA

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION GENERAL DE CAMINOS VECINALES
PROGRAMA DE PRESTAMO PROYECTO NO. 517-T-033 AID

CONTRATO NO.
UBICACION MENSUAL NO. 3 VALOR DEL CONTRATO RD$ 78,898.60 NOMBRE OBRA: CAMINO VECINAL HATO DAMA-JAMEY
TRABAJOS REALIZADOS DESDE 11 NOVIEMBRE HASTA 7 DICIEMBRE, 1982 CONTRATISTA: INVERSIONES TROPICALES, C. POR A.

RESUMEN	IMPORTE PREVIO	IMPORTE ESTE PERIODO	A LA FECHA
AVANCE 10% SEGUN CAP. III, ART. 1 CONTRATO	7,809.86	-	7,809.86
TOTAL REALIZADO O CUBICADO	45,818.77	11,537.91	57,356.68
MENOS RETENCION DE AVANCE - 15% CUBICACION	5,685.00	1,451.10	7,136.10
MENOS RETENCION CAP. V, ART. 1 - 10% CUBICACION	3,790.00	967.40	4,757.40
TOTAL NETO	44,233.63	9,119.41	53,353.04
AJUSTE:	2,343.54	-	2,343.54
CANTIDAD A PAGAR	46,577.17	9,119.41	55,696.58

PROBADO POR: [signature] CONTRATISTA
ECHA: 20 Dic 1982

PREPARADO Y REMITIDO POR:		REVISADO Y APROBADO POR		REVISADO Y APROBADO POR:	
[signature]	[signature]	[signature]	[signature]	20 Dic 1982 [signature]	
ING. SUPERVISOR CONSULTORA	GERENTE CONSULTORA	ING. RESIDENTE SEOPC/DGCV	ENC. PROYECTO SEOPC/DGCV	INGENIERIA AID	CONTRALORIA AID
FECHA: Dic/12/1982	FECHA: 21 DIC 82	FECHA: 21/12/82	FECHA: 23-12-82	FECHA: 21-DIC-82	FECHA:

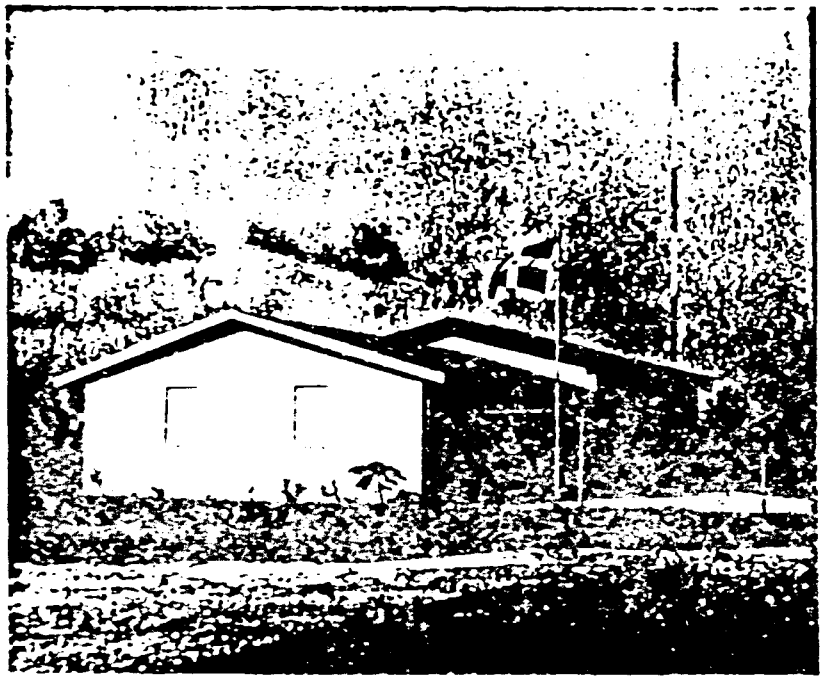
BUFETE NACIONAL DE INGENIERIA, S.A.
INGENIEROS CONSULTORES

ANNEX IV-H
Page 3 of 3

Maintenance Project Costs
(RD$000)

Year		
1983	700 Kms. + $\frac{1108}{2*}$ Kms. = 1,254 Kms. x $850	= RD$1,066
1984	1,254 Kms. + $\frac{1108}{2}$ = 1,808 Kms.	
	1,808 Kms. + $\frac{517}{2}$ Kms. = 2,066 Kms. x $850	= 1,756
1985	1,756 Kms. + $\frac{517}{2}$ Kms. = 2,325 Kms.	
	2,325 Kms. + $\frac{525}{2}$ Kms. = 2,588 Kms. x $1,000	= 2,588
1986	2,588 Kms. + $\frac{525}{2}$ Kms. = 2,850 Kms.	
	2,850 Kms. + $\frac{525}{2}$ Kms. = 3,113 Kms. x $1,000	= 3,113
1987	3,113 Kms. + 325 Kms. = 3,700 Kms. x $1,000	= 3,700
	Total 1983-1987	=RD$12,223
	Available Maintenance Funding Under RRM&R I	-RD$ 6,656
	Funds Programed Under This Project	- RD$ 5,567

* Since each sub-project requires an average of six months for completion, one half of the programed rehabilitation passes to maintenance program annually.



REGIONAL CENTER ADMINISTRATION
AND SPARE PARTS STORAGE

FRONT VIEW - REGIONAL CENTER
SPARE PARTS AND HAND TOOL
STORAGE ON RIGHT

Equipment Maintenance
Workshop

EQUIPMENT DISTRIBUTION PER REGIONAL CENTER

	REGIONAL I		II		III		IV		V		VI		VII		VIII		TOTAL	
EQUIPMENT	E	N	E	N	E	N	E	N	E	N	E	N	E	N	E	N	E	N
Motor Grader	1	0	1	2	1	2	1	1	1	1	1	1	1	0	0	1	7	8
Front End-Loader	1	0	1	2	1	2	1	1	1	1	1	1	1	0	0	1	7	8
Tractor W/Ripper	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	1	7	1
Compactor Roller	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	1	7	1
Compactor Vibrator	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	8
Dump Truck	7	0	7	7	7	7	7	3	7	3	7	3	7	0	0	7	49	30
Truck Tank Water	1	0	1	2	1	2	1	1	1	1	1	1	1	0	0	1	7	8
Lube Truck	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	1	7	1
Motorcycles Trail Street	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	4	14	18
Pick-Up	1	1	2	1	2	1	2	1	2	1	2	1	2	1	0	3	13	10
Pick-Up Rehabilitation Supervision	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4

E - Existing

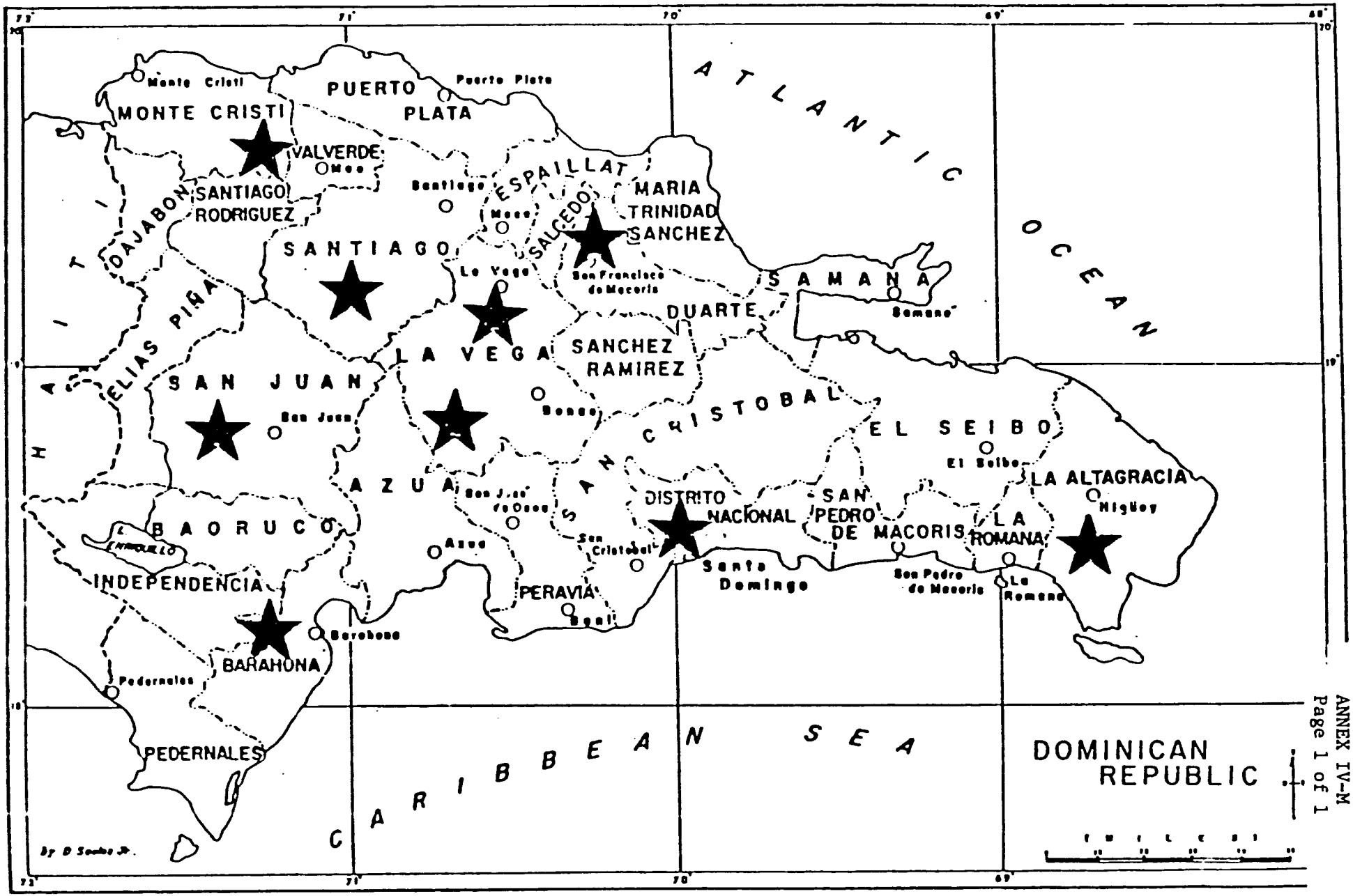
N - New Under this Project

EQUIPMENT SET REQUIREMENTS FOR RURAL ROADS MAINTENANCE BY REGION

End of Year:	1983		1984		1985		1986		1987		
Region	Kms.	Sets	Kms.	Sets	Kms.	Sets	Kms.	Sets	Kms.	Sets	Total "Sets"
1	110.4	1	160.4	1	190.4	1	220.4	1	255.4	1	1
2	443.0	2	543.0	2	643.0	3	693.0	3	740.0	3	3
3	438.0	2	538.0	2	638.0	3	738.0	3	763.0	3	3
4	255.0	1	330.0	1.5	410.0	2	510.0	2	548.0	2	2
5	249.5	1	324.5	1.5	424.5	2	504.5	2	564.5	2	2
6	250.3	1	325.3	1.5	375.3	1	440.3	1.5	480.3	2	2
7	61.8	1	86.8	1	111.8	1	136.8	1	146.8	1	1
8	0	0	17.0	1	57.0	1	132.0	1	202.0	1	1
Total Kms.	1,808		2,325		2,850		3,375		3,700		

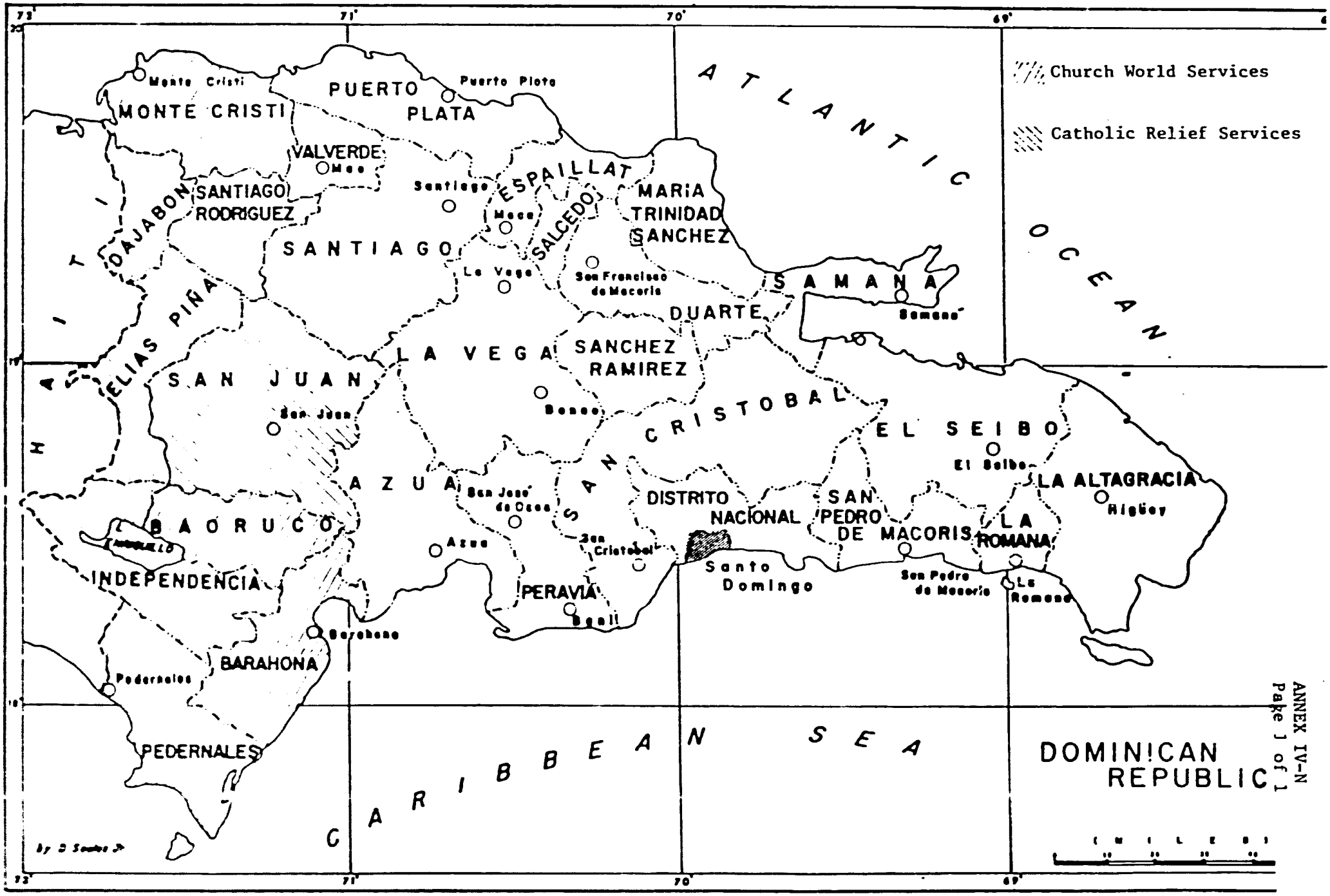
NOTE: 1 Basic "Set" can maintain 270 kms. averaging 2 passes annually.

PROPOSED TELECOMMUNICATIONS REPEATER SYSTEM



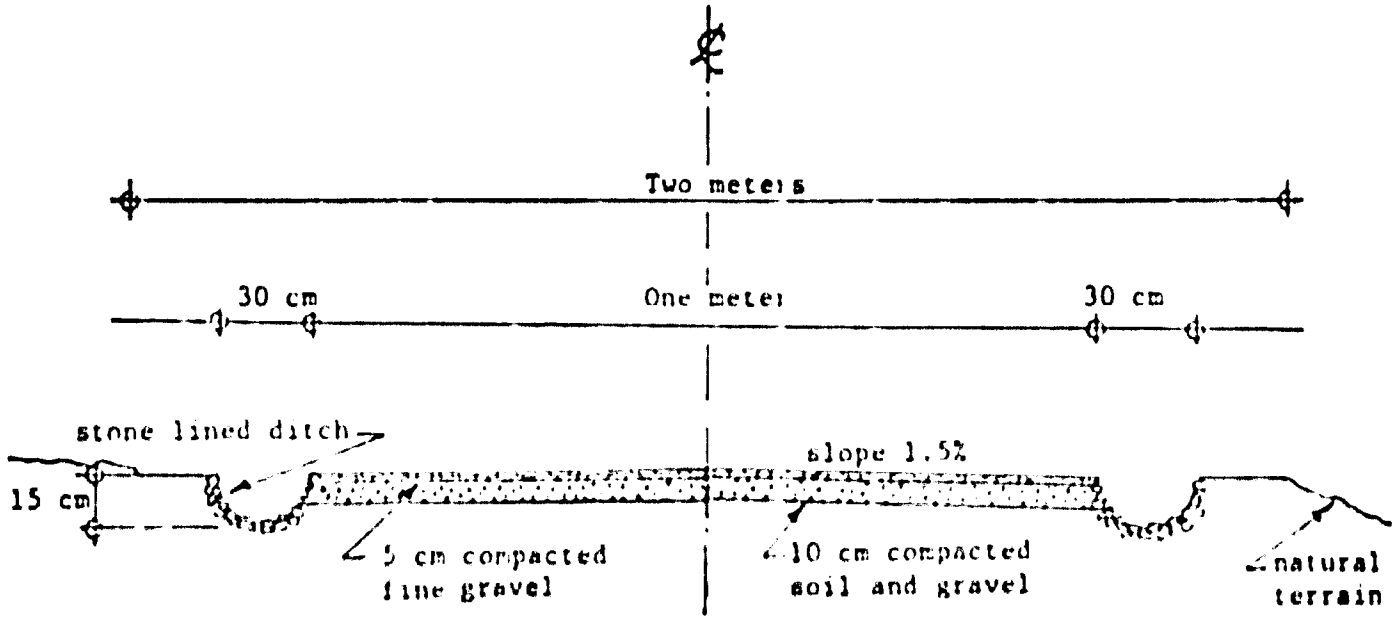
ANNEX IV-M
Page 1 of 1

PVO s AREAS OF CONCENTRATION
PACK ANIMAL TRAILS



ANNEX IV-N
Page 1 of 1

TYPICAL CROSS SECTION
ANIMAL TRAIL

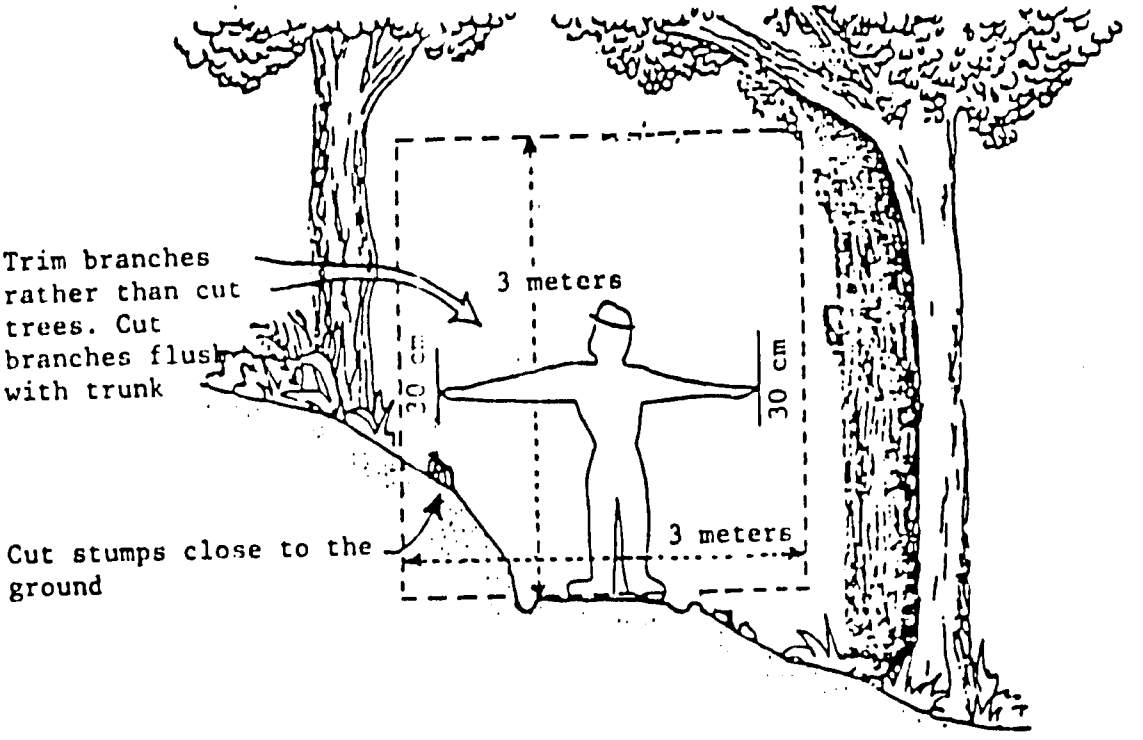


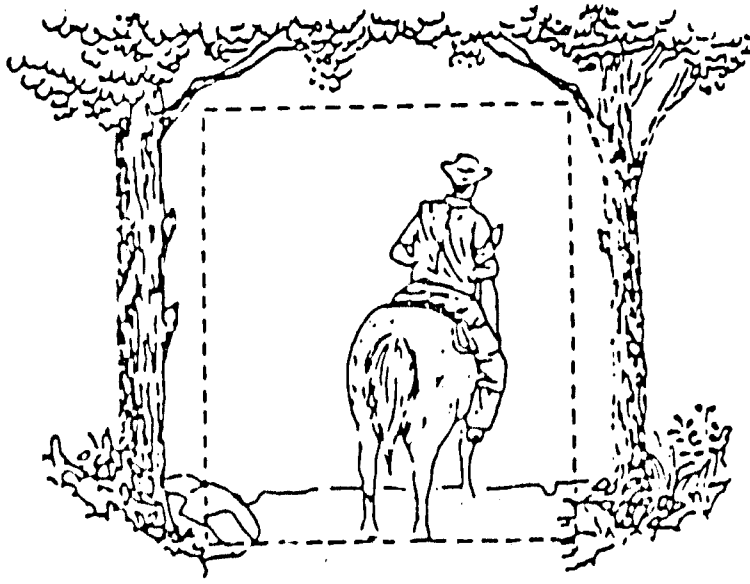
Maximum grade: 25%

Clearing size: 3 meters wide by 3 meters high
2 meters between large trees

Compacted trail width: one meter
increase by 30 cm on switchbacks

CLEARING FOR ANIMAL TRAILS

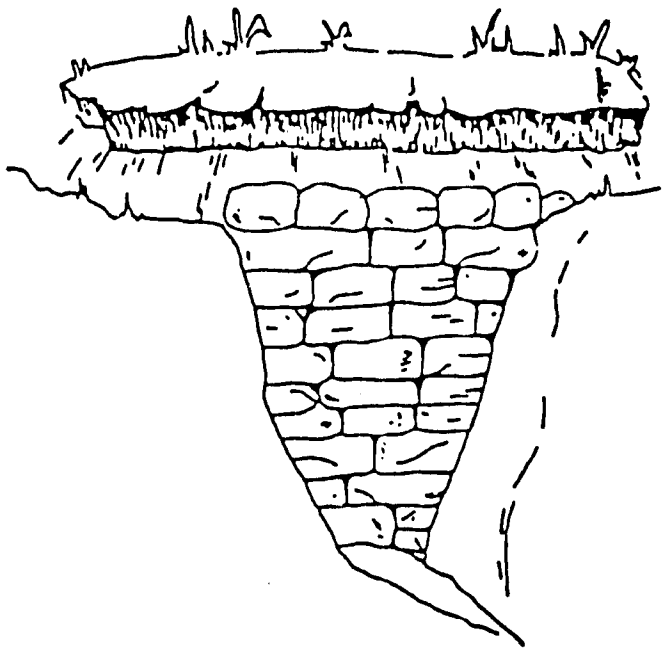


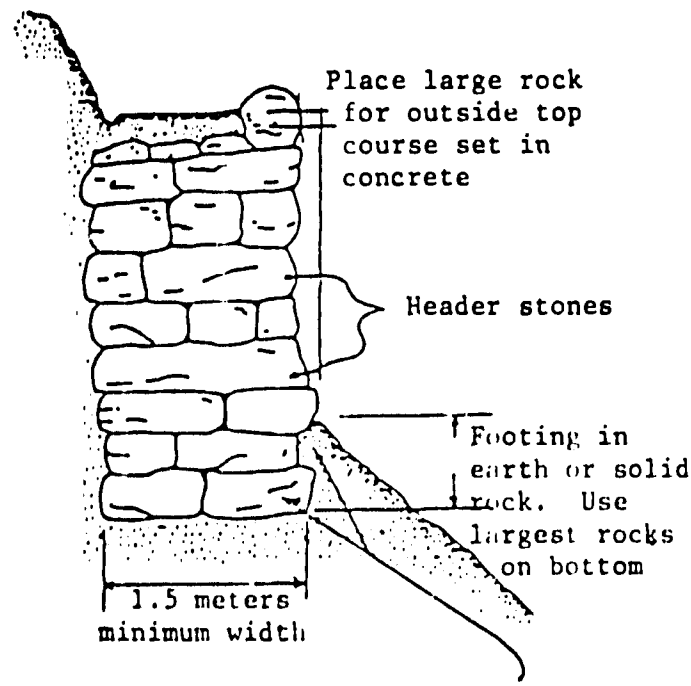


Good clearing

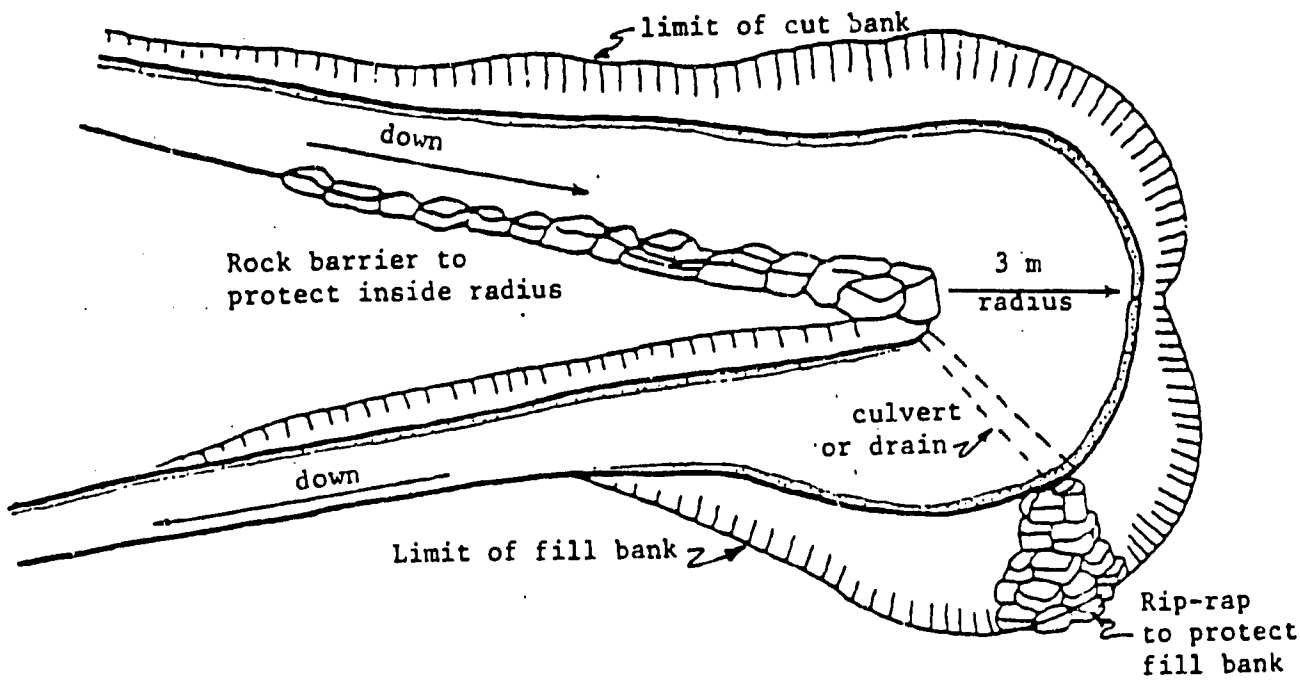
Poor clearing

TYPICAL ROCK RETAINING WALL



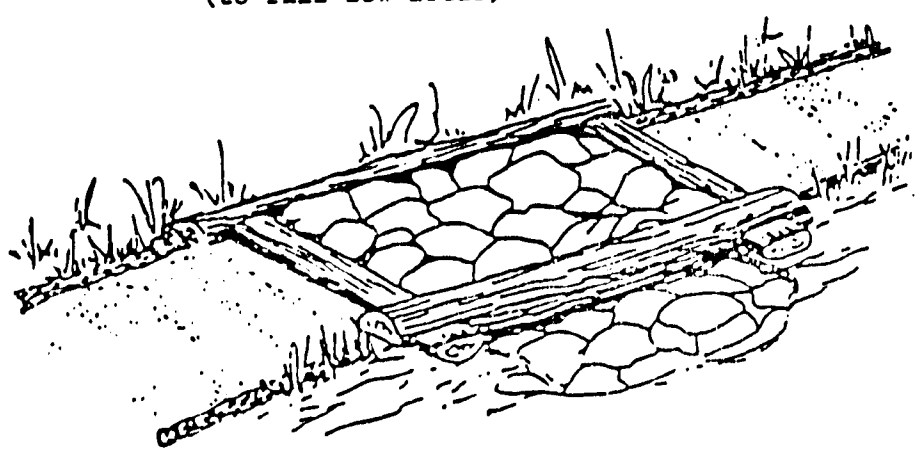


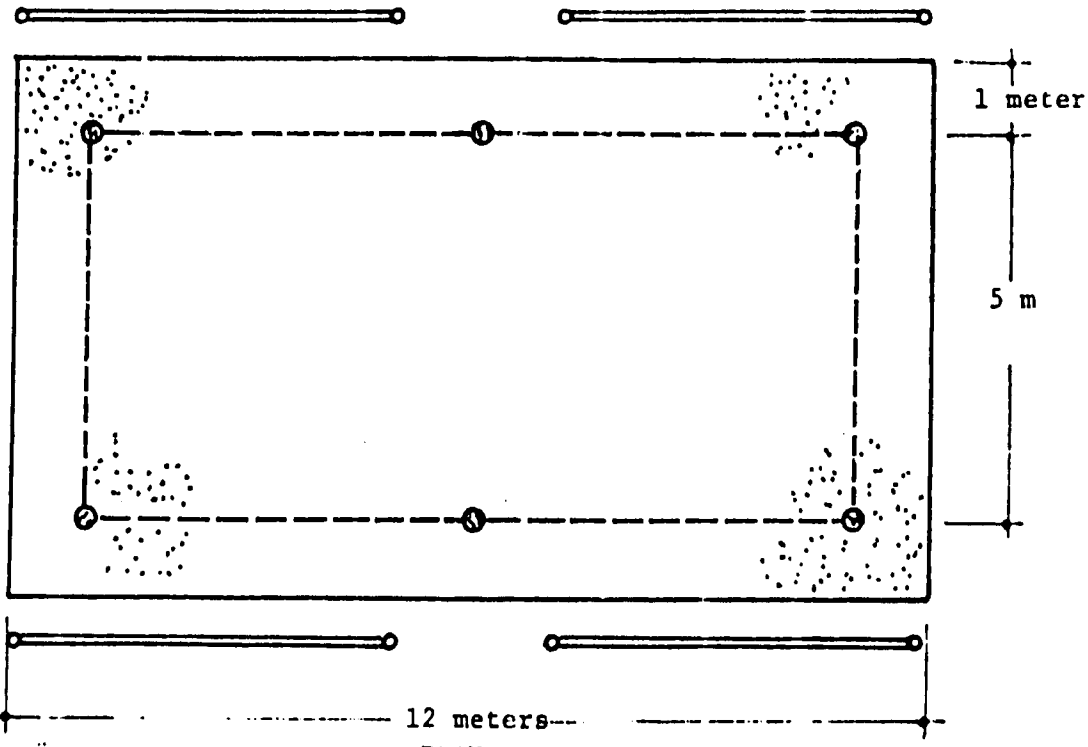
SWITCHBACK



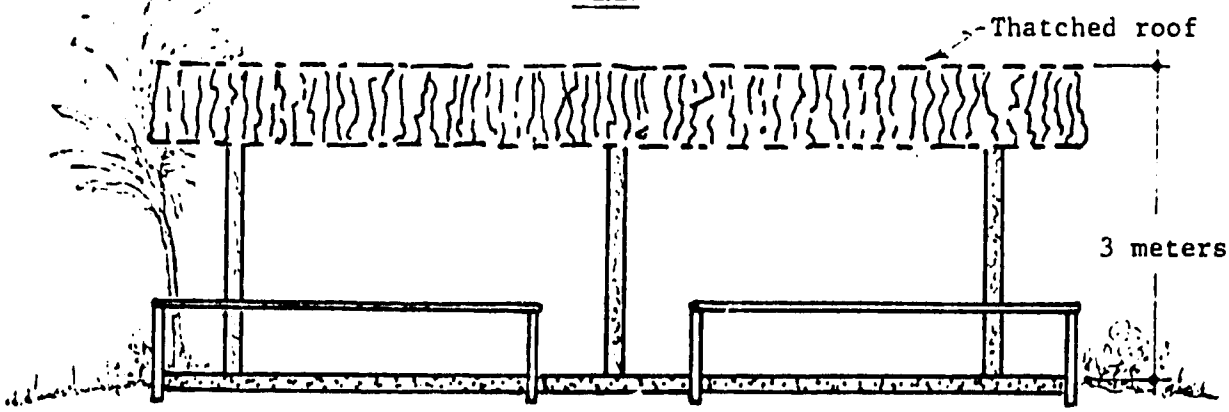
ROCK BOX

(to fill low areas)

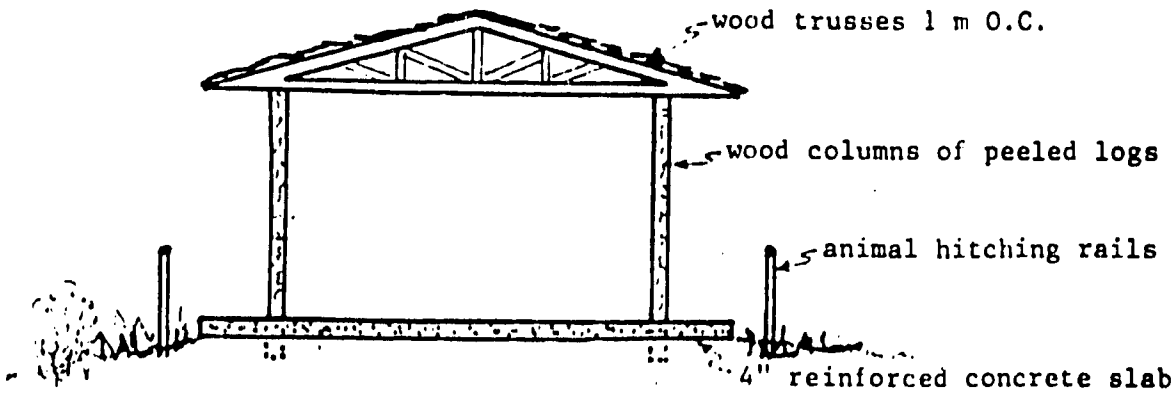




PLAN



ELEVATION



SECTION

SKETCH FOR ANIMAL TRAIL SHELTERS

Department of State
INCOMING TELEGRAM
American Embassy Santo Domingo

UNCLASSIFIED

AID NCAD - 2116002

ACTION: AID
INFO:
AMB
DCM
POL
BIO
ECON
USDOC
CONS
AC
BMO
CPU
GSO
PER
RSO
RMO
NCOIC
AGATT
DAO
MAAG
USICA
PC
IAGS
DIR
AD
PRG
CRD
CONT
AGR
MGT
HAN
EDU
UDD
A/RF
CHRON

APR 11 4 08 PM '83

R 211600Z APR 83
FM AID GPRD NCAD NEW CUMBERLAND PA //FSB 0641//
TO RUESSD/AMEMB SANTO DOMINGO DOMINICAN REPUBLIC
INFO RUEHC/DEPT OF STATE WASHDC
ID
BT
UNCLAS
AIDAC
SUBJ: PROPRIETARY PROCUREMENT, PROJECT 517-0177
REF: SANTO DOMINGO 2911 (PARAGRAPH 2)
GPRD FORESEES NO PROBLEMS SUPPLYING DESIRED ITEMS.
BT
0968

UNCLASSIFIED

146