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**STAFF APPRAISAL REPORT**

**REPUBLIC OF MALI**

**FIFTH HIGHWAY PROJECT**

**June 28, 1985**

**West Africa Projects Department  
Transportation 1**

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## CURRENCY EQUIVALENTS

Currency Unit = CFA Franc (CFAF)

US\$ 1.0 = CFAF 490

US\$ 1.0 = SDR 1.042

## FISCAL YEAR

January 1 - December 31

## SYSTEM OF WEIGHTS AND MEASURES (METRIC)

1 meter (m)	=	3.28 feet (ft)
1 square meter (m <sup>2</sup> )	=	10.76 square feet (sq ft)
1 cubic meter (m <sup>3</sup> )	=	35.3 cubic feet (cu ft)
1 kilometer (km)	=	0.62 mile (mi)
1 square kilometer (km <sup>2</sup> )	=	0.39 square mile (sq mi)
1 metric ton (t)	=	2,205 pounds (lb)

## ABBREVIATIONS AND ACRONYMS

	<u>English</u>	<u>French</u>
adt	average daily traffic	trafic journalier moyen
AfDF	African Development Fund	Fond Africain de Développement
CFM	Mali Railway Company	Chemin de Fer du Mali
CPTP	Public Works Training Center	Centre de Perfectionnement des Travaux Publics
DEGP	General Studies & Programming Division	Division des Etudes Générales et des Programmes
DETT	Technical Studies and Works Division	Division des Etudes Techniques et des Travaux
DNTP	National Directorate of Public Works	Direction Nationale des Travaux Publics
ERR	Economic Rate of Return	Taux de rentabilité économique
FAC	French Bilateral Aid Agency	Fonds d'Aide et de Coopération
ICB	International Competitive Bidding	Appel à la concurrence internationale
LCB	Local Competitive Bidding	Appel à la concurrence locale
MITP	Ministry of Transport & Public Works	Ministère des Transports et des Travaux Publics
ONT	National Transport Office	Office National des Transports
PCS	Postal Checking Service	Service des chèques postaux
SDC	Swiss Development Cooperation	Coopération Suisse pour le Développement
SMTP	Public Works Equipment Service	Service du Matériel des Travaux Publics
SRR	Road Strengthening Service	Service de Renforcement des Routes
STN	Regraveling Maintenance Unit	Service des Travaux Neufs

MALI  
STAFF APPRAISAL REPORT  
FIFTH HIGHWAY PROJECT

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The project and this report were prepared on the basis of an appraisal mission in May 1984 by Mr. Jaffar Bentchikou (mission leader, Highway Engineer), Mrs. Brigitta Mitchell (Economist) and Mr. Roger Le Bussy (Mechanical Engineer). Mr. Jean-Michel Verdier (Training Specialist) appraised the training component in July 1984. Secretarial work was done by Ms. F. Felah and Ms. T. McMahon.

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MAP: IBRD 18705

MALI

FIFTH HIGHWAY PROJECT

DOCUMENTS IN THE PROJECT FILE

<u>Reference Number</u>	<u>Document</u>	<u>WAIC Code</u>
1.	Divers Plannings du Cinquième Projet Routier	221.196 (E)
2.	Cinquième Projet Routier - Planning	221.196 (A-C)
3.	Etude Bamako - Bougouni, BCEOM, 1978	121.648 (A-H) (Mali-Cr 1104)
4.	Route Bamako - Bougouni: Révision des Etudes Techniques et Actualisation du Rapport Economique, BCEOM, 1983	121.648 (I) (Mali-Cr 1104)
5.	Influence du Second Pont de Bamako sur la Rentabilité de la Route Bamako - Bougouni, BCEOM, September 1984	221.301
6.	L'Evaluation du Tronçon Urbain, Bamako - Faladie	221.054
7.	Dossiers d'Appel d'Offres, Bamako - Bougouni	121.648
8.	Termes de Référence / Avis de Consultation	221.785 -789
9.	Arretés et décrets concernant la Réglementation	220.803(A-E) Mali LEAP General
10.	Training: The Present Situation of Personnel Management and Training in MTTP	221.100(C-E)
11.	Documents on Road Fund Revenue and Expenditures, and Alternative Strategies for Increasing Revenues	221.792(11)
12.	Estimation sur les Coûts des Travaux	221.792(12)
13.	Work Incentives: Proposals and Programs	221.792(13)
14.	Le Réseau: Les Statistiques et les Tableaux	221.792(14)
15.	Feasibility Study of the Kayes - Niore du Sahel Road, TAMS, September 1980	221.793(1-3)
16.	Details of Calculations of Economic Rates of Return	221.792(16a)
17.	Various other working papers concerning the Fifth Highway Project	221.792(17)

MALI

FIFTH HIGHWAY PROJECT

CREDIT AND PROJECT SUMMARY

Borrower: The Republic of Mali

Credit Amount: SDR 50.7 million (US\$48.6 million equivalent)

Terms: Standard

Project Description: The project would support: (i) preservation of the priority road network; (ii) a growing involvement of the local private construction and mechanical industries in road maintenance operations; (iii) development of a reduced but more efficient capacity of force account works; (iv) the introduction of measures ensuring full financing of recurrent road maintenance costs from local sources; (v) a balanced allocation of resources to road investments and maintenance and continued and expanded institutional development of the road transport subsector; and (vi) increased efficiency of the country's transport industry. The project would provide funding for spare parts, fuel, construction materials and labor, as well as for new equipment, consultants services and civil works, to carry out a road maintenance and rehabilitation program, an institution strengthening program, and reconstruction of the Bamako-Bougouni road (160 km).

Project Benefits and Risk: The project would improve the efficiency of road maintenance and rehabilitation activities and, by reducing the cost of vehicle operation, would benefit road users and reduce the price of road transported goods. The project would also bring about institutional benefits which would have the effect of maintaining other benefits after project completion. The main risks stem from a decreased maintenance effort as a result of insufficient or illiquid local funds. However, since the Government has agreed on a timetable for revenue raising measures for the Road Fund during negotiations, and implementation of these measures would be closely monitored, project risks are considered reasonably small.

Summary Project Cost Estimate  
(US\$ Million)

<u>Estimated Costs a/:</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	(US\$ Million)		---
1. Road Maintenance and Rehabilitation Program			
(a) Routine Road Maintenance	5.2	4.6	9.8
(b) Periodic Maintenance & Rehab.	4.1	14.0	18.1
(c) Overhaul & Renewal of equipment	0.6	3.5	4.1
2. Institution Strengthening and Technical Assistance			
(a) Reorganization & Tech. Assistance	0.8	3.6	4.4
(b) Training	0.3	1.1	1.4
3. Reconstruction of Bamako-Bougouni	4.0	16.1	20.1
	---	---	---
Base Cost	15.0	42.9	57.9
Physical Contingencies	0.8	3.2	4.0
Price Contingencies	2.9	8.6	11.5
<b>Total Project Cost</b>	<u>18.7</u>	<u>54.7</u>	<u>73.4</u>

<u>Financing Plan</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	(US\$ Million)		---
<u>Organization</u>			
IDA	7.1	41.5	48.6
African Development Fund	1.0	9.8	10.8
Swiss Development Cooperation	1.0	3.0	4.0
French Bilateral Aid Agency (FAC)	0.1	0.4	0.5
Government	9.5	---	9.5
	---	---	---
<b>TOTAL</b>	<u>18.7</u>	<u>54.7</u>	<u>73.4</u>

a/ not all taxes and duties are exempt under the project; a total of US\$5.5 million equivalent in taxes will be financed by Government and are included in local costs (US\$18.7 million equivalent).

<u>Estimated IDA Disbursements</u>	<u>IDA Fiscal Year</u>					
	<u>FY86</u>	<u>FY87</u>	<u>FY88</u>	<u>FY89</u>	<u>FY90</u>	<u>FY91</u>
	(US\$ Million)					
Annual	3.3	8.1	11.3	12.2	9.4	4.3
Cumulative	3.3	11.4	22.7	34.9	44.3	48.6

Economic Rate of Return

ERR exceeds 12% for any individual road and overall exceeds 50% for the Road Maintenance and Rehabilitation Program portion of the project. The overall ERR for Reconstruction of the Bamako-Bougouni road is 28%.

Map: IBRD 18705

WAPT1  
June, 1985

## MALI

### FIFTH HIGHWAY PROJECT

#### I. INTRODUCTION

1.01 The Government of Mali has requested IDA's assistance in financing a follow-up project to the ongoing Fourth Highway Project (Cr 1104 - MLI). The proposed project would support (a) preservation of the country's essential road infrastructure through maintenance, rehabilitation and reconstruction; (b) growing involvement of the local construction industry in the execution of periodic maintenance works, and of local private mechanical workshops in the repair and maintenance of equipment; (c) development of a reduced but more efficient force account maintenance organization focussed mainly on routine maintenance operations; and (d) introduction of measures ensuring full financing of recurrent maintenance costs from local sources, and a balanced allocation of resources to road investments and maintenance. The estimated cost of the project is US\$73.4 million equivalent. Of these, Government will contribute US\$9.5 million equivalent in local funds (13%), US\$ 5.5 million of which are taxes. The remainder will be financed by IDA, the African Development Fund (AfDF), the Swiss Development Cooperation (SDC) and the French Cooperation (FAC).

1.02 While other donors have been involved in the road sector, IDA has been instrumental in gradually reducing over-ambitious investment programs and in bringing about improvements in the planning and execution of maintenance works. IDA's strategy of involving the private sector where feasible, and of improving the quality of force account work through training, improved management procedures and incentives to local personnel, initiated under the ongoing Road Maintenance Project has begun to show results. IDA's support of the proposed project is therefore crucial to consolidate this strategy and intensify the policy dialogue on road maintenance financing and investment planning for the sector.

#### II. THE TRANSPORT SECTOR

##### The Transport System

2.01 In a vast (1.24 million km<sup>2</sup>), landlocked country with a widely dispersed population like Mali, the transport sector is of vital importance. Despite the sector's share of 15-25% of public investments over the past decade, the country's internal communications remain difficult. Also the long distances between Bamako and the ports of Dakar (1,000 km by rail) and Abidjan (1,250 km by road) have been a constraint on the country's economic development.



2.02 Road transport, the dominant mode, accounts for some 55% of total freight (in ton-kilometers), while rail and water transport move the remaining 36% and 9% respectively. Road transport also accounts for close to 90% of all passenger-kilometers. The road network adequately covers the south and south-east of the country where population is concentrated. By contrast, the regions west of Bamako, the capital, which are supposed to be served by the railway, are only very poorly equipped with feeder road access to the railheads and lack main road access - a situation which significantly curtails the flows of agricultural products from potential surplus areas to the main market in Bamako (Annex 2-1, Distribution of Traffic by Transport Mode for Selected Years and Map IBRD 18705).

2.03 The Mali Railway (Chemin de Fer du Mali, CFM), runs a single line (642 km) from Bamako to Kidira on the border with Senegal. CFM's share of the country's foreign trade handled has been declining steadily from two thirds of the total (460-580,000 tpy) merchandise imports and exports in the sixties and early seventies to no more than two-fifths of the total today. Despite the railway's comparative economic advantage, until 1983 an increasing portion of international traffic had been using the Abidjan road route. This shift reflected a decline in the reliability and speed of rail services due to poor maintenance of track and rolling stock, and to poor cooperation between the Senegalese and Malian Railways. IDA has been supporting both railway systems and has just completed its Third Railway Project in Mali (Credit 713-MLI, 1977, US\$10.5 million), which financed a time slice of the railway's investment program and provided training and consulting services. Measures to improve operating efficiency and to strengthen CMF's budget and procedures have been successful only in the last two years. Since December 1983, both Mali and Senegal railways have simultaneously improved motive power availability and coordination of operations, and as a result Malian import traffic through Dakar has increased by almost 50% in the first half of 1984. (Annex 2-2, Merchandise Imports and Exports by Itinerary for Selected Years).

2.04 Water transport is important for the vast inland delta area of the Niger northeast of Mopti. The river connection will become less important when the paved road from Sevare (Mopti) to Gao is completed in 1986. The Senegal river is also presently navigable from St. Louis (Senegal) to Kayes (Mali), the trans-shipment place to the railways, from August to October; it will be navigable all year round on completion of the Manantali dam southeast of Kayes. Traditional canoes carry all Senegal river traffic and about half that on the river Niger. The state-owned Compagnie Malienne de Navigation dominates traffic on the Niger with more modern vessels.

2.05 In a large and sparsely inhabited country like Mali, air transport plays a significant role. Mali has two international airports at Bamako and Gao, and some 30 small airfields for domestic traffic, of which only seven have regularly scheduled commercial services. In recent years, international air transport has shown a stagnating trend for passengers and a declining trend for freight, while local traffic has remained at 15-18,000 passengers annually, limited by available

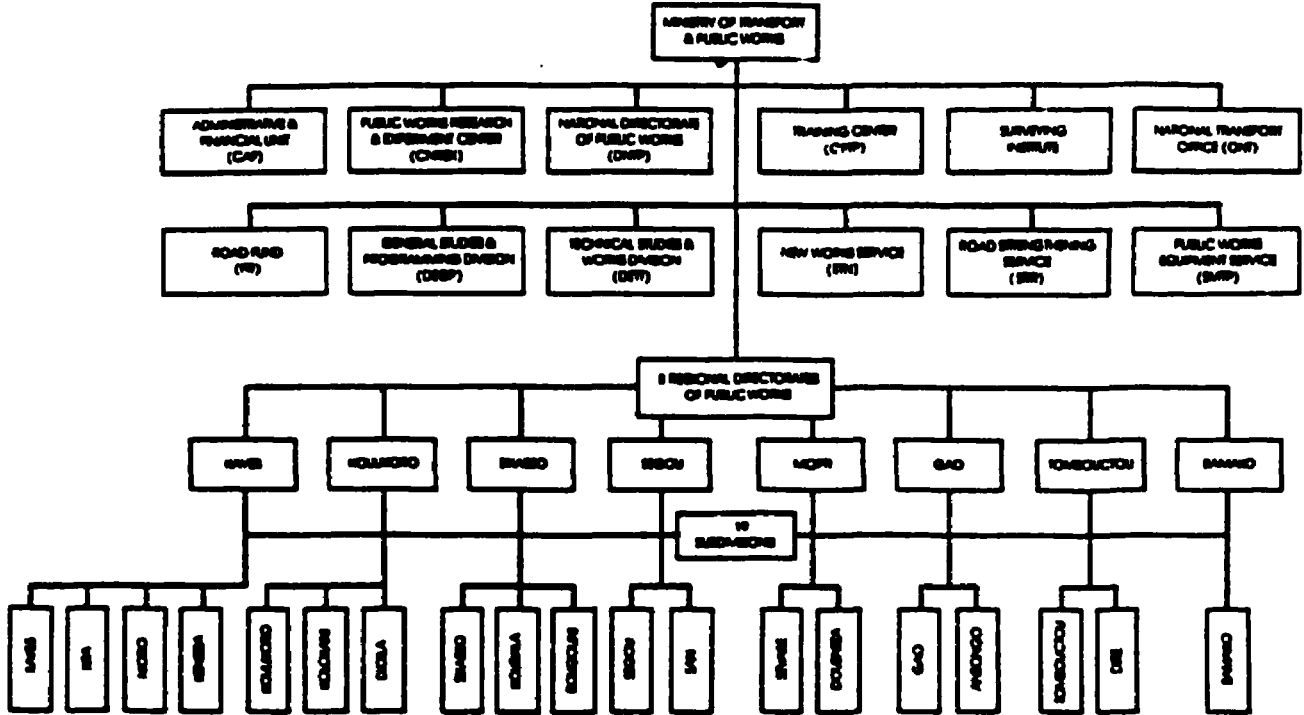
capacity. International freight traffic is almost exclusively handled by UTA (70%) and Air Afrique (20%). Air Mali, a state-owned company created in 1961, carried all domestic and about a third of the international passenger traffic in 1982, down from two-thirds in 1973. Heavily overstaffed, plagued by deficits, and with accumulated short-term debts of about CFAF 2.5 billion at end 1983, Air Mali is bankrupt. Liquidation of the company is expected in the near future. Meanwhile, a private local air charter company (Societe de Transport Aerien du Mali) with experienced management will reportedly provide essential domestic and regional services.

### The Road Transport Subsector

2.06 The Network: Mali's road network consists of about 13,460 km of national, regional and local roads, of which 2,460 km are paved, 6,320 km are gravel and improved feeder roads, and the remaining 4,680 km are unimproved earthroads and tracks. Paved roads now link the capital Bamako to the border with the Ivory Coast (Bamako-Bougouni-Zegoua, 460 km), as well as to the eastern regions (Bamako-Segou-Mopti axis). A direct link from the Ivory Coast to Mopti is also fully paved (Zegoua-Sikasso-Koutiala-San-Mopti axis) and has in part served as an alternative road to Bamako which, although about 130 km longer than the direct road, allows truckers to avoid the narrow and severely degraded Bamako-Bougouni section that is to be rehabilitated under the proposed project. Paving of the Sevare (Mopti)-Gao road (556 km), although not of high economic priority, began with the financial support of several financing agencies in 1980 and is expected to be completed in 1986. For the country as a whole, road density averages no more than 1.1 km/100 km<sup>2</sup>. Even in Mali's southern regions, the most heavily populated in the country, road density at 8.5 km/100 km<sup>2</sup> is well below the average density of 14 km/100 km<sup>2</sup> for neighbouring Ivory Coast. Annex 2-3 contains the Priority Network: Present Status and Proposed Project Works.

2.07 Road Administration: The National Directorate of Public Works (Direction Nationale des Travaux Publics, DNTP) within the Ministry of Transport and Public Works (Ministere des Transports et Travaux Publics, MTTP) plans, designs, constructs and maintains roads, and supervises technical studies for railways, river ports and airports. DNTP's organization, with two divisions and three technical services, is satisfactory. The General Studies and Programming Division (Direction des Etudes Generales et des Programmes, DEGP) prepares investment and maintenance programs and budgets, and controls expenditures; the Technical Studies and Works Division (Division des Etudes Techniques et des Travaux, DETT) handles project studies and supervision of works; the New Works Service (Service des Travaux Neufs, STN) carries out gravel road construction and improvement; the Road Strengthening Service (Service de Renforcement des Routes, SRR), deals with periodic maintenance of paved roads; and the Public Works Equipment Service (Service du Materiel des Travaux Publics, SMTP) purchases and repairs road equipment. DNTP's eight Regional Directorates of Public Works carry out maintenance and other public works activities through 19 subdivisions. An Accounting Office, supervised by an Administrative and Financial

Unit, performs accounting work. The organization chart for MTPP and DNTP is shown below.



2.08 DNTP's all-Malian professional staff has increased from about 20 engineers and 60 technicians in 1979 to about 68 engineers (adequate) and 53 technicians in 1984 (not sufficient for the tasks on hand). In addition, DNTP employs about 1,100 permanent workers and between 300-500 seasonal laborers, depending on requirements and available budgetary allocations. Generally, engineers are adequately trained but many lower-echelon technicians are not. Training, especially of technicians, has been increasingly stressed in the four previous highway projects. More structured training courses and a better coordination between training results and career development for DNTP employees will be supported under the proposed project.

2.09 Construction: Engineering and supervision of road construction projects are the responsibility of DNTP's Technical Studies and Works Division (DETT). DETT has been taking on supervision of increasingly important projects with only a small advisory staff of foreign consultants, but for major engineering studies of foreign aid financed projects DETT still uses foreign consultants, assisted by its own engineers. DETT is supported by the Surveying Institute for topographical surveys, and the Public Works Research and Experimentation Center for laboratory tests. The center which has received assistance under a FAC project (building, equipment, technical assistance), is now well equipped and can perform all regular soil and construction material tests required for road design and construction. A state-owned consulting firm, the Societe d'Etudes du Mali, has also carried out

feasibility studies and detailed engineering, often in association with foreign consultants. Road construction has until recently been the domain of foreign contractors, but local contractors are becoming competitive in executing all but the largest construction and rehabilitation projects. STN has acquired skills in feeder road construction under IDA and other foreign-financed projects.

2.10 Maintenance: DNTP, through its 8 Regional Directorates and 19 subdivisions, is theoretically responsible for maintaining over 90% (12,300 km) of the road network. Some para-public entities maintain local roads in their areas of operation. Under the Fourth Highway Project, periodic maintenance has been carried out partly by contractors, with satisfactory results. Periodic maintenance outputs by force account are lower but improving. Overall, however, Mali's capacity to maintain existing road infrastructure is still far from adequate. Routine maintenance is regularly carried out on only about 5,000 km of the most trafficked roads. Effective execution of road maintenance has been hamstrung since the mid-seventies by two major problems, one technical and one financial. The technical problem has been the inability of the Public Works Equipment Service to keep a minimum of equipment in acceptable running condition. Lax management, inadequately trained and poorly motivated personnel, and lack of funds, all contributed to create a backlog of equipment repairs that has slowed down periodic maintenance and paralyzed the work in the subdivisions. Although some improvements occurred with the provision of technical assistance and funds for equipment renewal and maintenance under the Fourth Highway Project, which will continue under the present project with no gap in continuity, major changes — including both involvement of the private sector and a re-orientation of technical assistance — will also be required under the present project to eliminate equipment bottlenecks and thereby improve all maintenance operations (paras. 3.08 and 3.12 below). The financial problems resulted from inadequate allocation of revenues to the Road Fund, discussed in more detail below (paras. 2.12 ff and Road Fund Revenues and Expenditures: Past Performance and Forecasts, Annex 2-4).

2.11 Choice of Construction Technology: Except for a small number of feeder roads in the Dogon country near Mopti, which are being built by labor-intensive methods under an agriculture project, all road construction in Mali uses equipment intensive technology as population in most of the country is too scattered to effectively allow for labor-intensive methods. A reasonable balance in the use of labor and equipment in road maintenance operations has been introduced under the ongoing Fourth Highway Project. Manual labor is used in operations such as filling potholes, cutting grass, clearing ditches and culverts and loading small-capacity trucks chosen for this purpose ("cantonnage"). A mix of labor and equipment is used for patching, spot and emergency repairs, and regravelling of shoulders. Heavy maintenance operations such as grading, compacting and brush dragging are carried out with equipment.

2.12 Road Financing: Road investment and maintenance expenditures over the period 1979-83 averaged CFAF 8.3 billion (US\$20.5 million) per

year, a figure two and a half times higher than that for the previous five year period. The increase was due mainly to the high investment outlays on the Sevre-Gao project (over 60% of total expenditure), but it reflects high inflation rates as well. Annual maintenance expenditures have doubled over the last ten years (from CFAF 0.9 billion in 1974 to CFAF 1.7 billion in 1983): they have thus grown at just over 7% annually in nominal terms, compared to an average annual inflation rate over that same period of 10%. Consequently, maintenance expenditures have declined both in real terms and as a proportion of total road expenditure (from about 24% between 1974-78 to around 18% during 1979-83). This decline would have been much sharper had it not been for the Association's intervention in the sector through the Third and Fourth Highway Projects, both of which have focussed on periodic and routine maintenance. They were instrumental in securing allocation of some additional local funds to the maintenance budget through increased earmarking of fuel taxes for the Road Fund. However, in view of Mali's difficult economic situation and the competing demands for scarce resources -- including some non high priority investments -- the provision of adequate funds for road maintenance remains an issue which is addressed under the present project. Annual Road Construction and Maintenance Expenditures and their financing for the 1971-1983 period are shown in Annex 2-4, Table 1.

2.13 Recovery of recurrent cost of roads through taxation of road users in Mali has been sufficient to cover the cost of adequate maintenance of the country's road network. However, all revenues raised from duties on vehicles and spare parts imports, from taxes on vehicle insurance and from vehicle registration, as well as 55% of the taxes on transport fuel (gasoline, diesel) go to the Treasury for general budgetary purposes, leaving the Road Fund with no more than 45% of the taxes levied on transport fuel. From these insufficient revenues, the Road Fund is supposed to finance road maintenance including equipment renewal, local counterpart funds for road studies and investments, the debt servicing of loans for roads, and some urban street improvements. Government last increased the pump price of fuel by almost 50% in 1981. This major increase reflected both rising refinery prices and the introduction of additional taxes including a small proportion for the Road Fund. It resulted, however, in a sharp drop in fuel consumption. In addition, for a limited period, some local merchants took advantage of loopholes in the taxation system to import Nigerian fuel and market it untaxed. However, in the beginning of 1985, Government took satisfactory measures to ensure that Nigerian fuel imports are subject to the same taxation as other imported fuels.

2.14 Despite a covenant under the Third Highway Project stipulating that all road maintenance expenses were to be met before any Road Fund proceeds were allocated to investment, existing contractual obligations on foreign-financed road projects compelled Government to continue using a large part of Road Fund revenues for road investments. This, combined with a steep rise in debt service requirements since 1981, has kept funds available for maintenance at a static level of around CFAF 1.6 billion annually. Forecasts of Road Fund revenues and expenditures over the 1985-90 horizon show that, following the expiration of the grace

period on a number of earlier road investments, expected revenues are insufficient from 1985 onwards to cover even Government's debt service obligations, and would therefore preclude any local counterpart financing for ongoing road investments, any expenditures for maintenance and, a fortiori, any new investment well into the 1990s (Annex 2-4, Table 5 and graph).

2.15 The shortfall in Road Fund revenues is compounded by the fact that most of the revenues received are illiquid in the form of postal checks. Mali's Postal Checking Service (PCS) has not been liquid for many years, that is to say, post offices do not have cash to honor postal mandates or checks. Since they cannot be cashed, postal checks are usually refused by banks and merchants although they remain legal tender. This problem resulted from Government's mixing of PCS funds with other funds and using them to settle its liabilities. Since Government has, among others, also been paying a major portion of its fuel bill with postal checks, it has had to accept, in turn, that suppliers use them to settle their tax bills, thus spreading the liquidity problem to the Road Fund. The Government has engaged a consultant under Credit 1200-MLI (Second Telecommunications Project) to recommend an action plan for putting the postal service on a sound financial footing, including measures to liquify the PCS. Measures being considered include separation of the accounts of telecommunication, postal services and the PCS; restriction of Treasury access to PCS funds; strengthening of financial staff of the postal service; and use of counterpart funds generated under the Public Enterprise Project for, inter alia, payment to the PCS of funds borrowed from it by Treasury. At negotiations, Government has agreed to make the adoption of a plan of action satisfactory to the Association, a condition of effectiveness for the present project.

2.16 During negotiations, Government has agreed to increase tax revenues directly and automatically available to the Road Fund sufficiently to ensure that the Road Fund's revenues cover debt service and maintenance requirements in the highway sector (i.e. CFAF 28,950 million over the period January 1985 to December 1990 - Annex 2-4). The following are already allocated to the Road Fund: (i) the revenues of the existing fuel tax (estimated at CFAF 13,500 million over the same period); (ii) CFAF 700 million transferred to the Road Fund on May 8, 1985; and (iii) CFAF 500 million scheduled to be transferred by project effectiveness. In addition to the foregoing, Government has decided to allocate directly to the Road Fund: (a) revenues collected from the Droit de Traversée Routière net of collection cost (corresponding revenue estimated at CFAF 1,500 million between January 1986 and December 1990, or CFAF 300 million annually); and (b) increased fuel taxes to be collected from road users from January 1986 onwards to generate additional revenues of CFAF 12,750 million over the same period; that is, CFAF 2,550 million annually. Government has appointed an Interministerial Committee to determine, inter alia, whether the increase in the fuel taxes earmarked to the Road Fund would be more appropriately combined with: (i) savings in the fuel import bill through renegotiation of supply contracts; (ii) reallocation to the Road Fund of fuel taxes now allocated to other sectors of the economy; (iii)

an increase in the pump price of gasoline and diesel fuel; or (iv) some combination of the above. The Committee has been asked to conclude its study by June 1985. Its recommendations will be incorporated in a plan of action. Deposit in the Road Fund of monies required for 1985 and adoption by Government of an IDA approved plan of action for covering the shortfall in Road Fund revenues through 1990 are conditions of credit effectiveness.

#### IDA Involvement in the Road Subsector

2.17 IDA first became involved in the road subsector in Mali in 1967-68 as executing agency for a country-wide transport survey financed by UNDP. The survey concluded that the sector mainly needed improved highway maintenance and construction of agricultural feeder roads. The four highway projects implemented since 1970 have responded to these needs.

2.18 The first three projects financed by Credits in 1970, 1975 and 1976, included construction and improvement of workshops, procurement of road maintenance equipment and spare parts, studies and later on rehabilitation of one paved road (Faladie-Segou, 222 km), and limited technical assistance to DNTP. Feasibility studies and detailed engineering of the Bamako-Bougouni road, a trucking industry study, a national transport plan study, as well as construction of a training center and of feeder roads, have also been financed under these projects.

2.19 All three highway projects have been satisfactorily completed. The Project Performance Audit Report of the first one, (February 1978), as well as the Project Completion Reports for the second and third projects (July 1983), concluded that the initial institution building objectives (reorganization of DNTP and reactivation of the Road Fund) were mostly achieved, although training outputs under the third project were only about half of those estimated at appraisal, due to delays in the training of trainers and the delivery of office and teaching equipment; limited training is continuing satisfactorily under the Fourth Highway Project. Technical assistance was somewhat narrowly focussed on a few units within DNTP and, in some instances, was less effective than expected because of poor receptivity on the part of the agencies and units, and poor integration into their activities. In all these projects, road maintenance results fell considerably short of expectations, mainly because of a shortage of local funds due to drought and inflation (first project), insufficient liquidity of funds due to the use of postal checks (second project), and repeated breakdown of equipment coupled with intermittent and late intervention of technical assistance (third project). The lessons learned under these projects, particularly regarding the problems facing road maintenance, have been incorporated into the design of the proposed project.

2.20 The ongoing Fourth Highway Project (Credit 1104-MLI, SDR 13.4 million, co-financed by Switzerland with a grant of SF18 million, September 1981) covers periodic maintenance of 680 km of paved roads and

220 km of gravel roads by force account and by contract; a two-and-a-half (now extended to three-and-a-half) year program of routine maintenance of 6,600 km of national, regional and feeder roads; technical assistance and training; and equipment for vehicle axle load control. After a slow start and an increase in the very modest technical assistance envisaged by the project, implementation is now satisfactory: periodic maintenance of paved roads by contractors is on schedule, and has been extended to gravel roads. The quality of periodic maintenance by force account has been improving and outputs are above target for the days when equipment is working. However, equipment down-time remains a problem, traceable mainly to the continuing poor performance of the Equipment Service which, even with technical assistance inputs in advisory functions, has improved only marginally. To ensure acceptable efficiency of force-account operations, better institutional arrangements for equipment maintenance involving the contracting out of certain tasks are being introduced under the proposed project. Training at the Public Works Training Center (CPTP) has continued with satisfactory results, but needs to be better integrated with career development prospects of trainees for productivity gains to be realized.

#### Road Traffic and Road Transport Industry

2.21 Vehicle fleet estimates for Mali are based on annual vehicle registrations. In a major effort over the past two years, the National Transport Office (ONT) has brought up to date and consolidated all documentation on road transport (vehicle registrations, driver licences, freight documents, etc.) in preparation for the computerisation of its data bank, expected to be carried out starting in 1986 under the proposed project. From the available figures which are probably underestimated, Mali's vehicle fleet has grown only moderately (at just over 4% p.a.) over the past decade, from a total of about 19,100 vehicles in 1974 to 27,900 vehicles in 1983. The adequacy of overall transport capacity is difficult to judge: there is an excess of supply, especially of large semi-trailers, for several months of the year, but supply is not sufficient to handle peak demand. Also, small truck capacity is not sufficient to handle the demand of the harvest season mainly because, in response to a tariff structure based on ton-kilometers handled and therefore favoring the operation of large vehicles, the number of small and medium size trucks (which are needed to operate on earth and gravel roads) has declined significantly. Construction of storage facilities in key locations could do much to spread transport demand over a longer period and allow better fleet utilization. Moreover, a reform of the tariff structure (para 2.26) will reinstate a balanced incentive for purchasing of trucks of different types and sizes. (Details on vehicle fleet and traffic development are in Annex 2-5, Summary Data on Road Transport).

2.22 Fuel consumption, which had risen at an annual rate of 9.5% between 1974-1980, declined sharply following substantial price increases in 1981, and in 1983 reverted to 1977 levels, both for gasoline and diesel (Annex 2-4). March 1985 retail prices of gasoline and diesel in Mali, at CFAF 260/liter and CFAF 183/liter (equivalent to



US\$2.01/gal and US\$1.41/gal) respectively, were well above those in Benin, about equal to those in Senegal, and well below those in Ivory Coast, the three countries from which Mali imports respectively 3%, 34% and 63% of its total fuel. Fuel prices were well above border prices of internationally traded fuels; in Mali, they include about 21% of taxes plus an additional 10% on average for gasoline and 3% for diesel to compensate for regional differences between the countrywide retail price and the officially determined cost of fuel in different locations, thus equalizing the differential cost of distribution.

2.23 Traffic count data also indicate that vehicle traffic has declined sharply between 1979 and 1983. The drop in vehicle traffic was particularly marked on the paved road network (-47%, Annex 2-5, Table 3), where heavy trucks and tractor-trailer combinations have replaced a larger number of small and medium size trucks during recent years. Due to the poor state of repair of feeder roads and tracks, traffic on these has consistently been limited to essential services and has varied very little over the years. Given the country's difficult economic situation, it is unlikely that traffic will quickly return to the 1978/79 peak, but there are indications that the downward trend is being reversed in 1983/84, mainly due to increased grain imports necessitated by persistent drought.

2.24 Mali's road transport industry is dominated by private operators that handle all passenger transport and own over three quarters of freight vehicles. Some 25 large operators (owning 10-20 vehicles each) are independent, while some 850 small operators (owning five vehicles each or less) are grouped in regional cooperatives. These, in turn, are affiliated to a loosely organized National Union of Road Transport Cooperatives, a lobby and mutual aid organization for transporters. A number of para-public entities, with some 15% of freight vehicles, transport goods such as cotton and grains on own account. Only one of three state-owned transport firms remains operative with a small fleet accounting for less than 5% of freight capacity. State-owned trucking companies have consistently operated at a loss. Government has agreed at negotiations not to undertake any new investment nor provide any credit guarantee for any new investment in trucking firms unless, on the basis of economic and financial criteria, the Government and the Association have agreed such investment is justified.

2.25 The National Transport Office (ONT) is responsible for the coordination and management of all transport activities. Its main role in road transport is that of freight allocation: through its regional and international (port) offices, it centralizes transport demand and allocates freight between cooperatives, independent truckers and state trucking companies in proportion to their share in overall transport capacity; within these groups, distribution is on a first come-first served basis. Unattractive transport runs of essential goods to the outlying regions are allocated to transporters in turn. Transport from the port of Abidjan is by law allocated in two-third/one-third shares to Malian and Ivorian operators. The official tariff applies to all ONT-allocated transport, whether by public or private carrier.

2.26 In its efforts to improve road transport efficiency, ONT has carried out a number of surveys to establish transport costs, transport demand by region, available transport supply, and transport bottlenecks (which exist mainly for crop collection in the regions and are due to unremunerative tariffs). While these studies resulted in some realignments of the tariff structure in the late seventies, adjustments proposed by ONT since 1981 have not been approved. Tariffs are now estimated to average about 20% below the costs of vehicle operation, making it difficult for transporters to allow for equipment maintenance and renewal. Generally, transporters compensate for low tariffs by heavily overloading their vehicles, thus damaging their own equipment, and the country's road infrastructure. During negotiations, the Government agreed to prepare and furnish to the Association within a year of credit effectiveness, (i) a schedule of road tariffs structured to take into account the economic cost of different types of road transport and (ii) a system of vehicle weight control measures; it will thereafter adopt such measures as agreed with the Association (para 3.09).

2.27 A major impediment to road transport efficiency in Mali, as in most West African countries, has been the numerous semi-official road checks carried out along all major routes. In 1984, ONT eliminated some of them and established in their place a small number of official ones for the collection of an agreed toll (droit de traversée), the proceeds of which currently amount to CFAF 250 million annually but with the coverage scheduled to be extended to the whole paved network by December 1985, they are expected to amount to about CFAF 300 million annually. The proceeds accrue in a special fund administered by the Party. At negotiations, Government has agreed that the proceeds net of collection costs will be allocated to the Road Fund.

### III. THE PROJECT

#### Project History and Objectives

3.01 The project was identified in April 1983, and prepared by DNTP with the assistance of consultants. Appraisal was carried out in May 1984. Credit negotiations took place in Washington, D.C. from March 11-16, 1985, with the Malian delegation led by H.E. Mamadou Haidara, Minister of Transport and Public Works and followed by post negotiations discussions in Bamako in May 1985. The main objectives of the proposed project are to protect the priority road network and strengthen the institutions concerned with road infrastructure and transport through (i) a growing involvement of the local private construction and mechanical industries in road maintenance operations; (ii) development of a reduced but more efficient capacity of force account works; (iii) strengthening of personnel management and development, including training; (iv) introduction of measures ensuring full financing of recurrent road maintenance costs from local sources and a balanced allocation of resources to road investments and maintenance; and (v) continued and expanded institutional development of the road transport subsector.

## Project Description

3.02 To achieve these objectives, the project would finance new equipment, spare parts, fuel, construction materials, labor, civil works and consultants services to carry out the following three components: first, a Road Maintenance and Rehabilitation Program starting July 1985 on an 8,200 km network of high priority roads and including (a) three-and-a-half years of routine road maintenance operations; (b) periodic maintenance and rehabilitation of 492 km of paved roads and 535 km of unpaved roads; and (c) overhaul and renewal of road equipment; second, an Institution Strengthening Program including: (a) reorganization and technical assistance to (i) the National Transport Office (ONT) for transport sector planning; (ii) the General Studies and Programming Division (DEGP) for project coordination, implementation of planning and financing mechanisms and feasibility studies; (iii) the Technical Studies and Works Division (DETT) for engineering studies, supervision of civil works and improvements in force account works; and (iv) the Equipment Service (SMTP) for improving equipment maintenance and overhaul efficiency; and (b) a training program for public works personnel; and third, the Reconstruction of the Bamako-Bougouni Road (160 km).

### The Road Maintenance and Rehabilitation Program

3.03 Routine Road Maintenance Operations: Routine road maintenance will continue to be carried out by the regional directorates of DNTP. It will be implemented by force account using civil servants paid under Government's recurrent budget and locally hired laborers, as well as materials, fuel, lubricants and spare parts paid under the Road Fund. The 19 subdivisions will carry out standardized routine road maintenance tasks on the priority road network. The budget for routine maintenance has been cut back from that agreed under the previous project by about 10% to stay within available resources. Consultants estimates of unit costs per task have been used for both the project and forecast of Road Fund budgets. DNTP has agreed to streamline the regional directorates' staff and equipment fleet and to improve their internal discipline concerning the work program, the technical definition of tasks, and the cost accounting categories. These measures will improve the efficiency of routine road maintenance operations and its management through a better knowledge of actual costs. This streamlining together with a slight reduction in maintenance tasks will also reduce Road Fund budgets, in line with critically limited local funds in the near future. As the financial and fiscal situation of Government improves, additional roads will be added to the priority network (The strategy for routine road maintenance is described in Annex 3-1, Details on Routine Road Maintenance Operations).

3.04 Periodic Maintenance and Rehabilitation: As there is an important backlog of periodic maintenance, a major component of the project is periodic maintenance and rehabilitation on 492 km of paved roads and 535 km of gravel roads. 38% of the works on paved roads and 26% on gravel roads will be carried out by force account and the remainder by contract. Efficiency of force account works should improve

following renewal and rehabilitation of equipment, the use of 96 man-months (m-m) of technical assistance at the brigade level and the use of limited engineering studies. Outline terms of reference for technical assistance to SRR and STN, are in Annex 3-2.

3.05 Most of the incremental periodic maintenance and rehabilitation will be carried out by contractor, in line with a long-term strategy to gradually reduce force account works from these tasks. The local construction industry is starting with small entrepreneurs and one major private joint venture (Malian-French). International contractors are also active on the Malian market. Contractor and force account works will be supervised by DETT (para 3.11).

3.06 Experience under the Fourth Highway Project has shown that ICB brings several competitive bids and that works by contractor are of better quality and completed faster than works by force account. However, the preparation and bid processes have been rather slow and time consuming. In addition, new procurement rules have recently instituted a National Committee on Procurement (Commission Nationale des Marches). To minimize the delays that the introduction of a new circuit of clearances before contract signature is likely to produce, DNTP will strengthen its procurement unit to expedite processing within MTTP and provide close follow-up throughout the subsequent administrative circuits. Technical assistance will also support DNTP in supervision of road maintenance works both by force account and by contractor. A detailed cost table for Periodic Maintenance and Rehabilitation Works is in Annex 3-3.

3.07 Overhaul and Renewal of Road Equipment: Road works by force account will be carried out mainly with existing DNTP equipment. Some renewals and some purchases of complementary equipment will also be necessary. A major portion of existing DNTP equipment is in poor condition but has a large residual life and can be overhauled economically. These revisions and overhauls will be carried out by the local Caterpillar dealer under SMTP supervision for the Caterpillar pieces (60% of the fleet) and directly by SMTP with technical assistance for the rest of the equipment and the transport vehicle fleet. A description of the current and proposed organisation of SMTP, terms of reference for technical assistance to SMTP, and details on equipment to be overhauled and procured, are in Annex 3-4.

#### The Institution Strengthening Program

3.08 Reorganization and Technical Assistance: Under previous projects technical assistance was not sufficiently integrated into road maintenance institutions and activities. Limited in scope, size and duration, it was often poorly timed with the availability of other resources, and unbalanced between divisions and services. Generally, it consisted of individuals in advisory roles or responsible for carrying out specific tasks (e.g. transport plan). There was no overall plan to improve management tools and skills of the Malian staff or to provide a work environment in which all resources including organization,

operating procedures and training were adequately developed and used. As a result, those services receiving adequate technical assistance did not improve as much as expected, while others with little or no technical assistance became weak links in the organisation that hampered the effective operation of the system. During the ongoing project it has become increasingly clear that it is necessary to set up a comprehensive program of technical assistance to improve all elements of the structure in a coordinated manner. The Malian authorities have understood this and have requested increased technical assistance from both IDA and FAC to support the various divisions and services of DNTP and ONT. Accordingly, in addition to 150 m-m of consulting services for supervision of works or studies, the proposed project will provide 404 m-m of technical assistance (48 of these cofinanced by a grant from FAC, para. 3.04 and Annex 3-3, p. 1) to work within the structure of DNTP and ONT, to furnish new management tools or improve existing ones, to coordinate or actively participate in carrying out project tasks and to train local staff. The experts financed under the program will form teams with qualified local counterparts. In the production units, these teams will occupy in-line positions within the unit, most of the time under a Malian supervisor. The team members will be jointly accountable for the work of their respective units. They will also control incentives for local personnel to be financed under the project. The incentives will be linked to better productivity and outputs in accordance with agreed performance standards for each unit. Moreover, the plan incorporates a monitoring and feedback system and foresees the gradual phasing out of expatriate personnel as local expertise becomes strong enough to handle the respective tasks. It is expected that the program will positively influence both the quality and sustainability of project outputs. The tasks to be undertaken by the different units are summarized below; detailed terms of reference for the technical assistants to the different services are provided in separate annexes as indicated in subsequent paragraphs.

3.09 The project will integrate the transport data collection cell established under the Fourth Highway Project into ONT's Study Division. The project will also provide for computing equipment and 60 m-m of technical assistance to enable ONT to carry out the review or execution of transport planning studies, intermodal feasibility studies, and the establishment of an action plan to improve the efficiency of the road transport industry (para. 2.26). Government has agreed at negotiations to prepare multi-annual programs of road transport investments which it would review annually with the Association; such programs will follow economic criteria and take into account the road maintenance capacity and the country debt servicing capacity. Under the first one, covering the period 1986-1988, Government will not initiate any new major road investment (i.e. exceeding US\$1 million equivalent), except for the present project, resurfacing of the Ouan-Sevare road, and construction of a second bridge over the Niger river in Bamako, investments which are of high priority and for which financing is available on acceptable terms (Outline terms of reference for technical assistance to ONT are in Annex 3-5).

3.10 With computing equipment and 34 m-m of technical assistance, DEGPE will be strengthened in its role of preparing annual programs and

budgets for road maintenance and rehabilitation, analyzing cost accounting results, preparing or reviewing feasibility studies for new road investments, coordinating implementation of the present project and preparing a follow-up project. DEGP will also prepare, and follow up on, Government's actions to increase Road Fund revenues so as to arrive at full financing of recurrent costs of road maintenance by 1989.

3.11 With another 34 m-m of technical assistance, DETT will be strengthened in its role of preparing or reviewing technical studies and supervising works by contractor. DETT will also supervise periodic maintenance and rehabilitation works by force account. Outline terms of reference for technical assistance to DNTP for support of DEGP and DETT are in Annex 3-6.

3.12 As deficient and late repair or overhaul of equipment have been key reasons for inefficiency of the force account operations, the equipment fleet maintenance will be reorganized in order to reduce delays in procurement, payments and financing, increase SMTP efficiency, accelerate equipment maintenance and make it cheaper, and increase equipment availability. To these ends: (i) the revolving fund to be set up in DNTP (para. 3.21 below) will ensure inter alia availability of timely financing for spare parts. These will be purchased by a procurement agent with the exception of urgently needed spare parts available locally (terms of reference for the procurement agent are in Annex 3-4, Attachment 2); (ii) complementary tools and tooling will be provided for SMTP's and selected regional workshops; (iii) 140 m-m of technical assistance will be provided by an experienced mechanic firm. They will review SMTP's management structure, and methods and tools for equipment maintenance, and assist SMTP to implement the agreed improvements. Terms of reference for technical assistance to SMTP are in Annex 3-4, Attachment 3. A detailed cost table for Reorganization and Technical Assistance is provided in Annex 3-7.

3.13 The Training Program: With 68 m-m of technical assistance, training and transport equipment, per diem fees to trainees and honoraria to teachers, and an additional room to be used as a cafeteria, CPTP will carry out the training program for DNTP personnel. It includes short courses in Bamako and the use of two mobile training teams visiting the regions, as well as fellowships abroad. In addition, CPTP will develop an improved personnel management system and will be responsible for evaluating, on a regular basis, the work performance of personnel that have returned to their units after training. These evaluations will be part of the basis for incentive payments. A description of the proposed training program for public works personnel and outline terms of reference for consultant trainers are in Annex 3-8.

#### Reconstruction of Bamako-Bougouni

3.14 The 30-year old Bamako-Bougouni road (160 km) is the worst paved section on the essential Bamako-Abidjan route which carries more than 60% of Mali's external trade. The project will: (i) on the rural section (152.2 km), where traffic varies between 260 and 530 vpd,

reconstruct the road by using as much as possible existing pavement materials to raise the present road level, improve drainage, and strengthen and widen the pavement to 7 m to better adapt it to the large semitrailers now using the road; (ii) on the urban section (7.3 km), where traffic varies between 7,000 and 24,000 vpd (not including between 3,000 and 18,000 two-wheelers) upgrade it to a 2x2 lane standard with cycle tracks. A detailed cost table for the reconstruction of Bamako-Bougouni is provided in Annex 3-9.

3.15 An Urban Investment Plan is being developed as part of the preparation of a Second Urban Project. The urban section Bamako-Faladie has been designed to reflect its function as an urban interchange system. However, its connection to a proposed second bridge on the Niger river and the insertion of both bridges in the urban road network will require a study to ensure optimum benefit from both investments as well as postponement of the need for an eventual third bridge. Government has agreed to undertake such a study, under terms of reference acceptable to the Association, by December 31, 1985, which should make it possible to adhere to the current implementation schedule. Adoption of a solution agreed to by IDA and effectiveness of the AfDF Credit will be conditions of disbursement on the Bamako-Bougouni component.

#### Project Cost and Financing

3.16 Total cost is estimated at US\$73.4 million equivalent of which 75% is foreign exchange, 25% local costs (including 7% taxes). Cost estimates are in January 1985 prices and include physical contingencies of 10% as appropriate (with the exception of 25% for ONT computing equipment), as well as price contingencies of 5% for 1985, 7.5% for 1986 and 8% thereafter. The project will be financed by IDA (US\$48.6 million equivalent); SDC (US\$4 million equivalent, joint financing of routine road maintenance and training); AfDF (US\$10.8 million equivalent, parallel or joint financing of Bamako-Bougouni, depending upon the eligibility of the prequalified contractors); FAC (US\$0.5 million equivalent, parallel financing of technical assistance to SRR); and the Government (US\$9.5 million equivalent). The IDA credit will cover 71% of project costs (net of tax) while external financing in total covers 95% of the (net of tax) costs. For Bamako-Bougouni, the Government will finance US\$1.08 million of local costs in addition to taxes. For routine road maintenance, IDA and SDC will finance 64% on average but on a declining basis (90% in 1985, 76% in 1986, 61% in 1987 and 46% thereafter) in order to ease the balancing of the Road Fund budget the first year and thereafter to foster Government progress towards full financing of recurrent costs with local funds. Also, IDA and SDC will retroactively finance up to US\$400,000 for routine maintenance expenditures from July 1, 1985, to enable routine maintenance operations to continue uninterrupted following exhaustion of Fourth Highway Project funds. Effectiveness of the Swiss Contribution is a condition of credit effectiveness. Detailed cost estimates and financing plan are shown in Annex 3-10.

### Implementation

3.17 The project will be implemented by DNTP and ONT. In addition to the supervision of routine road maintenance by the Regional Directorates, DETT will be responsible for supervising works by contractors, and periodic maintenance and rehabilitation force account works by STN and SRR. DEGP, meanwhile, will prepare, plan and coordinate all project activities. CPTP will implement and coordinate all project training as in the ongoing project. ONT will implement the new transport planning component.

3.18 The ongoing Fourth Highway Project finances studies, the preparation for the road maintenance program and the training program as well as the continuation of technical assistance to DEGP, DETT and SMTP until new contracts are awarded under the proposed project. The proposed credit is expected to be effective by November 1985 and the project is expected to be completed by December 1990. The implementation schedule is shown in Annex 3-11.

### Procurement

3.19 Reconstruction of the Bamako-Bougouni road will be by contract, awarded to prequalified contractors after ICB in accordance with procedures acceptable to IDA and AfDF. If some prequalified contractors are not eligible under AfDF procedures, the work will be divided into two contracts. The portion of periodic maintenance not done by force account will also be carried out under contracts awarded after ICB in accordance with Bank guidelines. Local contractors will have a 7.5% preference for civil works contracts awarded under ICB although Government has indicated at negotiations that this clause will not apply to the Bamako-Bougouni civil works. Most equipment will be awarded after ICB, in accordance with Bank guidelines. Goods manufactured locally will be given a preference margin of up to 15% or the applicable custom's duty, whichever is less. Spare parts for equipment rehabilitation will be procured either under contracts negotiated directly with the supplier of such equipment or under contracts awarded through limited international bidding on the basis of Bank guidelines. Contracts for a small training center, training equipment, road building materials, fuel and lubricants will be procured after LCB. The local procurement procedures which will be used under the project will be reviewed on a case by case basis to establish that they are acceptable to IDA. Technical assistance will be procured in accordance with the Bank's guidelines. All procurement decisions, the estimated costs of which exceed \$200,000, would be subject to IDA's prior review resulting in a coverage of 85% of the total estimated value. Procurement arrangements are summarized in the table on the following page.



Amounts and Methods of Procurement  
(US\$ million)

<u>Item</u>	<u>Category</u>	<u>Procurement Method a/</u>				<u>Total Project Cost</u>
		<u>ICB</u>	<u>LCB</u>	<u>Other</u>	<u>NA b/</u>	
1	Equipment <u>c/</u>	2.2 (2.1)	0.1 (-)			2.3 (2.1)
2	Rehabilitation of Equipment			2.6d/ (2.2)		2.6 (2.2)
3	Civil Works by Contractor	32.1 (20.8)	0.1 (-)			32.2 (20.8)
4	Civil Works by Force Account		7.2e/ (4.2)	4.8f/ (2.6)	2.6g/ (1.8)	14.6 (8.6)
5	Technical Assistance, Fellowships and Training			5.7 (4.4)	0.5h/ (-)	6.2 (4.4)
6	Unallocated	11.3 (7.7)	1.2 (0.7)	2.3 (1.7)	0.7 (0.4)	15.5 (10.5)
<b>Total Project</b>		<u>45.6</u> <u>(30.6)</u>	<u>8.6</u> <u>(4.9)</u>	<u>15.4</u> <u>(10.9)</u>	<u>3.8</u> <u>(2.2)</u>	<u>73.4</u> <u>(48.6)</u>

a/ Amounts financed by IDA are in parentheses

b/ Not Applicable

c/ Including heavy equipment, vehicles, tools, initial stock of parts, training equipment and computer hardware and software.

d/ Of which US\$0.4 million is limited international bidding (LIB) for non proprietary parts and US\$2.2 million is direct procurement for proprietary parts and rehabilitation of Caterpillar equipment

e/ For materials, fuel and lubricants

f/ Of which US\$3.2 million is LIB for non proprietary parts and US\$1.6 million is direct procurement for proprietary parts

g/ Salaries

h/ Fellowships; honoraria and per diem for trainers/trainees.

Disbursements

3.20 In line with the disbursement profile for IDA highway projects in West Africa, the credit is expected to be disbursed by December 1990. The IDA credit would be disbursed on the basis of the table on the following page, and on the basis of an estimated disbursement schedule shown in page 6 of Annex 3-10.

3.21 Disbursement for routine road maintenance and periodic maintenance and rehabilitation force account expenditures will be made against statements of expenditure (SOE's) using unit costs for each task. Estimated unit costs for 1985 are shown in Annex 3-1. They will be reviewed after each annual audit. No reimbursement of less than US\$20,000 will be made by IDA. A Special Account for IDA/SDC participation will be established in a commercial bank. Administered by DNTP, it will provide up to four months of project operations to SMTF (US\$50,000 for locally procured spare parts), STN (US\$320,000 for operations) and SRR (US\$430,000 for operations), and to regional directorates for

routine maintenance operations (US\$500,000 for operations). An initial deposit of US\$1.1 million will be disbursed from the IDA credit at credit effectiveness upon receipt of a withdrawal request.

Allocation and Disbursement of IDA Credit

<u>Category</u>	<u>Description</u>	<u>Amount</u> (US\$ million)	<u>%</u>
1.a	Civil Works by Contractor <u>a/</u>	14.4	93
1.b	Civil Works: Bamako-Bougouni	10.7	47
2	Civil Works by Force-Account <u>b/</u>	3.5	91
3	Routine Maintenance Operations	4.5	Declining <u>c/</u> percentage
4	Equipment <u>d/</u>	2.1	100
5	Rehabilitation of Equipment <u>e/</u>	2.4	100
6	Technical Assistance	5.1	100
7	Training and Fellowship	-	-
8	Special Account	1.1	-
9	Unallocated	4.8	-
Total		<u>48.6</u>	-

a/ Other than Bamako-Bougouni

b/ Other than Routine Maintenance Operation

c/ Including Swiss financing:

90% of disbursements up to US\$0.9 million

76% of disbursements from US\$0.9 million to US\$2.4 million

61% of disbursements from US\$2.4 million to US\$3.7 million

and 46% of disbursements thereafter

d/ Including heavy equipment, vehicles, tools, initial stock of spare parts, training equipment, computer hardware and software

e/ Including spare parts

Reporting and Auditing

3.22 A cost accounting system exists in DNTP. An independent auditor firm will review the system, help DNTP implement necessary changes and detailed payment and disbursement procedures and, thereafter, annually audit the project including the revolving fund with a mid-year review. DNTP and ONT will prepare quarterly progress reports.

IV. ECONOMIC EVALUATION

Benefits and Risks

4.01 The expected benefits of this highway rehabilitation and maintenance project can be divided into the tangible and quantifiable reductions in the cost of vehicle operation and of maintenance of the portion of the road network included under the project, and into equally

important, but less tangible and non-quantified institutional benefits. The latter would result from (a) improved operational efficiency in DNTP's road maintenance activities and (b) phased introduction of legislative measures to allocate revenues from road user charges to the Road Fund in sufficient volume and in sufficiently liquid form to ensure financing for adequate routine and periodic maintenance of Mali's existing road infrastructure in future years. Some efforts towards the realization of these "institutional" benefits have been made under earlier projects; these are gradually showing results and are reflected in the professed willingness of the Malian authorities to introduce the difficult managerial and revenue-raising measures now required. The project will facilitate this process by providing a significant contribution to the financing of recurrent costs on a decreasing basis, thus permitting a gradual adjustment of local revenues to the requisite level of project implementation.

4.02 The Highway Design and Maintenance Standards Model (HDM III) was used for the economic evaluation. On gravel road sections being rehabilitated, incremental net agricultural value added, attributable to year-round road access, has been taken into account. Vehicle operating cost parameters were provided by ONT; DNTP provided data on the current maintenance status of the road network; data on agricultural production and costs are based on agriculture project estimates and consultants feasibility reports. All costs and benefits in the economic evaluation of the maintenance program are in January 1985 prices net of taxes and duties. An economic evaluation of the Bamako-Bougouni reconstruction by means of the HDM II model was undertaken by consultants in 1984 using 1983 prices: this has been up-dated to 1985 levels, to reflect new construction characteristics for the 7.3 km urban section which was changed to include a number of traffic interchanges not foreseen in the original urban expressway design, as well as a number of cost revisions for an update of the 153 km rural section of the road. (Details on cost parameters and maintenance strategies are in Annex 4, Economic Evaluation).

4.03 Economic rates of return (ERRs) were established separately for the reconstruction of the Bamako-Bougouni road, for the maintenance program of the paved road network, and for the maintenance of the priority unpaved road sections included in the project. For the Bamako-Bougouni road, the high-traffic urban section and the rural highway section were also examined separately. The former has an estimated ERR of 65%; this is a conservative estimate since no benefits for congestion relief are included. The highway section has an estimated ERR of 15%, also conservative, since the costs of increasing diversion of international traffic to Bamako onto an alternative route that is 130 km longer than the present one were not included in the analysis. The combined ERR for the Bamako-Bougouni road component which accounts for 39% of total project cost is 28%. The paved road maintenance program includes periodic maintenance of 492 km and routine maintenance of 1730 km. It accounts for 31% of project costs and has an overall ERR of 34%, assuming that traffic grows by 4% annually for the ten year analysis period starting 1986. The ratio of benefits to cost

for the total package is 2.55:1 at a discount rate of 10%. Link-by-link details of the analysis are summarized in Table 4a of Annex 4.

4.04 The unpaved roads package includes rehabilitation of 535 km of gravel roads mostly serving areas with ongoing rural development projects, and routine maintenance of a priority network of about 3,330 km of gravel and 2,990 km of earth roads. It accounts for 30% of project costs and has an overall ERR of over 100%, assuming traffic grows by 3.5% annually on gravel roads and by 2% on earth roads during the 10 year analysis period. The benefit/cost ratio for the total package at a 10% discount rate is 1.99:1. Link-by-link details of the analysis are summarized in Table 5 of Annex 4.

4.05 Based on the experience under the ongoing Fourth Highway Project, and given the arrangements made to ensure timely execution of equipment overhauls at project start-up, there would be no major risks concerning periodic maintenance: force account operations have been improving and performance by contractors has been satisfactory. If the Government and the Association are unable to agree on the connection of the Bamako-Bougouni road to the proposed second bridge on the Niger river in Bamako, the Bamako-Faladie section will be excluded from the project; no other problems are anticipated on the reconstruction of Bamako-Bougouni by contract. The reorganisation of the crucial Equipment Service, combined with intensified training and an improved incentive structure for Malian project personnel, should assure that the expected gains in operational efficiency will, in fact, be realized. The main risks stem from a decreased maintenance effort as a result of insufficient or illiquid local funds. However, since the Government has agreed on a timetable for revenue raising measures for the Road Fund during negotiations, and implementation of these measures would be closely monitored, project risks are considered reasonably small.

#### V. AGREEMENTS REACHED AND RECOMMENDATIONS

5.01 During negotiations, agreement was reached on the following points:

- (a) Government has agreed to increase tax revenues directly and automatically available to the Road Fund sufficiently to ensure that the Road Fund revenues cover debt service and maintenance requirements in the highway sector (i.e. CFAF 28,950 million over the period January 1985 to December 1990 - para. 2.16).
- (b) Government has agreed not to undertake any new investment nor provide any credit guarantee for any new investment in trucking firms, unless, on the basis of an economic and financial justification, the Government and the Association have agreed such investment is justified (para 2.24);
- (c) Government has agreed to prepare and furnish to the Association within a year of Credit effectiveness, (1) a schedule of road tariffs structured to take into account the economic cost of

different types of road transports, and (ii), a system of vehicle weight control measures; and thereafter to adopt such measures as agreed with the Association (para 2.26);

- (d) Government has agreed that the proceeds net of collection cost from the road toll will be applied to the Road Fund (para 2.27);
- (e) Government has agreed to prepare multi-annual programs of road transport investments which it would review annually with the Association, such programs will follow economic criteria and take into account the road maintenance capacity and the country debt servicing capacity (para 3.09).

5.02 The following actions by Government are conditions for effectiveness:

- (a) adoption of a plan of action for solving the liquidity problems of the postal checking system (para. 2.15);
- (b) deposit in the Road Fund of monies required for 1985 and adoption of an IDA approved plan of action for the increase of CFAF 12,750 million in the fuel taxes to be collected from road users over the January 1985-December 1990 period and earmarked for the Road Fund (para. 2.16);
- (c) effectiveness of Swiss Contribution (para. 3.16).

5.03 Government has agreed to undertake a study on the connection of the Bamako-Bougouni road to a proposed second bridge on the Niger River in Bamako and the insertion of both bridges in the urban road network, under terms of reference acceptable to the Association, by December 31, 1985. Adoption of a solution agreed by IDA and effectiveness of the AfDF Credit will be conditions of disbursement on the Bamako-Bougouni component (para. 3.15).

5.04 The proposed project is technically feasible, economically sound and suitable for a Credit of SDR 50.7 million (US\$48.6 million equivalent) on standard IDA terms.

WAPT1  
June 1985

MALI

FIFTH HIGHWAY PROJECT

Distribution of Traffic by Transport Mode for Selected Years, 1966-1983

Distribution du Traffic par Mode, Années 1966-1983

	<u>1966</u>	<u>1973</u>	<u>1977</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>Average- Moyenne 1979-1983</u>
<u>Freight/Fret (t-km millions)</u>									
Road/route	113	310	247	228	246	203	179	256	222
Rail/rail	116	156	149	143	131	138	151	174	147
Waterways/fluviat	41	30	22	45	40	35	38	35	38
Air/air	n/a	16	n/a	n/a	n/a	n/a	n/a	n/a	—
<u>Passenger/Passagers (pass-km millions)</u>									
Road/route	400	720	992	1,200	1,320	1,450	1,595	1,755	1,464
Rail/rail	68	95	129	150	151	156	160	165	156
Waterways/fluviat	31	20	28	30	26	25	28	26	27
Air/air	n/a	65	n/a	n/a	n/a	n/a	n/a	n/a	—

Source: 1966-1977, Mali Transport Plan Study, SEDES, 1980  
 1979-1983, National Transport Office (ONT), Bamako, May 1984

MALI

FIFTH HIGHWAY PROJECT

Merchandise Imports and Exports by Itinerary for Selected Years, 1966-1983

Commerce Extérieur par Itinéraire, Années 1966-1983  
(in thousand tons; en milliers de tonnes)

	<u>1966</u>	<u>1973</u>	<u>1977</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Imports/Importations</u>	<u>259</u>	<u>370</u>	<u>349</u>	<u>460</u>	<u>451</u>	<u>447</u>	<u>398</u>	<u>501</u>
Dakar: Rail/rail	179	206	152	153	165	187	167	192
Abidjan: Road/route	80	164	197	307	286	260	231	309
<u>Exports/Exportations</u>	<u>74</u>	<u>94</u>	<u>189</u>	<u>107</u>	<u>129</u>	<u>98</u>	<u>68</u>	<u>79</u>
Dakar: Rail/rail	29	53	92	48	43	42	25	29
Abidjan: Road/route	45	41	97	59	86	56	43	50
<u>TOTAL/TOTAL</u>	<u>333</u>	<u>464</u>	<u>538</u>	<u>567</u>	<u>580</u>	<u>545</u>	<u>466</u>	<u>580</u>
Dakar: Rail/rail	208	259	244	201	208	229	192	221
Abidjan: Road/route	125	205	294	366	372	316	274	359
<u>Domestic Freight/ Frêt Intérieur</u>	<u>n.a</u>	<u>n.a</u>	<u>n.a</u>	<u>141</u>	<u>182</u>	<u>174</u>	<u>186</u>	<u>196</u>
Rail/rail	n.a	n.a	n.a	7	10	9	10	11
Road/route	n.a	n.a	n.a	134	172	165	176	185

Source: 1966-1977, Mali Road Maintenance Project SAR No. 2597a-MLI  
1979-1983, National Transport Office (ONT) Bamako, May 1984

WAPTI  
December 1984

MALI  
FIFTH HIGHWAY PROJECT

THE PRIORITY NETWORK

Table 1 - Present Status and Proposed Project Works - Paved Roads

Itinerary	Reference Section	Traffic (1983) (ADT)	Length (km)	a/ Status	a/ Maint. Category	Periodic Maint./ Rehab. (km)	COMMENTS	
Banako-Senou	1071	17035	16	2	RA	16	a/ Paved Roads:  Status ----- 1 Good 2 Average 3 Poor  Maintenance Category ----- RA = High level (ADT > 220) RB = Average (ADT 100-220) RC = Low level (ADT > 40) Ø = Under construction  ‡ Periodic maintenance with FED financing.	
Banako-Kati	1030	1312	15	2	RA			
Sevare-Mopti	1064	1154	13	3	RA			
Senou-Kokele	1072	460	133	3	RA	133		
Banako-Baguinda	1061	371	31	1	RA	31		
Baguinda-Fana	1062	371	99	1	RA	99		
Banako-Koulitara	2141	269	32	2	RA			
Kokele-Bougouni	1072	240	11	3	RA	11		
Segou-Point A	2231	223	42	2	RA	35		
Subtotal:			412	2.1		325		
Tombouctou-Kabara	3641	193	9	2	RB		‡ Periodic maintenance with FED financing.	
Ouan-Sevare	1063	166	111 ‡	3	RB ‡			
Fana-Quankoro	1063	165	185	2	RB	20		
Sevare-Sandigui	1161	135	50	1	Ø			
Quankoro-Ouan	1063	145	197	2	RB			
Bla-Oulobougou	1121	133	73	2	RB			
Niema-Zegoua	1074	130	130	3	RB	130		
Tienfala-Niema	1073	105	50	3	RB	50		
Bougouni-Tienfala	1072	105	99	3	RB	99		
Subtotal:			940	2.4		327		
Sikasso-Zangasso	1111	94	106	1	RC			‡ Periodic maintenance with FED financing.
Zangasso-Koutiala	1111	94	32	1	RC			
Banako-Lido	1031	69	8	3	RC			
Oulobougou-Burkina	1122	68	112	2	RC			
Point A-Niono	2232	63	63	1	RC			
Sandigui-Douentza	1161	56	115	1	Ø			
Kassorola-Sienso	1131	55	61	2	RC			
Koutiala-Kassorola	1131	55	64	2	RC			
Banako-Sebenikoro	1050	36	6	3	RC			
Kimparana-Koury	1141	28	78	1	RC			
Douentza-Gossi	1162	22	235	1	Ø			
Gossi-Djidara	1163	12	171	1	Ø			
Wafoulabe-Mahina	1021	0	6	3	RC			
Acces a Selingue	n.c.	n.a.	60	1	RC			
Subtotal:			1117	1.3		0		
<b>Total, Paved Roads:</b>			<b>2469</b>	<b>1.8</b>		<b>652</b>		
-----			-----	-----		-----		
		Of these:		Of these:				
	- maintained under project:		1884	Banako-Bougouni:		160		
	- under construction:		579	Other roads:		492		



The Priority Network:  
Table 2 - Present Status and Proposed Project Works - Gravel Roads

ANNEX 2-3

Page 2

Itinerary	Reference Section	Traffic (1983) (ADT)	Length (km)	a/		Periodic Maint./ Rehab. (km)	COMMENTS
				Status	Maint. Category		
Banako-Kangaba-Banankoro	2151	144	135	1	A		a/ Gravel Roads
Banankoro-Diara	n.c.	64	42	1	A		Status
Farada-Tioribougou	1033	62	77	1	A		-----
Lido-Farada	1032	62	11	3	A		1 Good
Fana-Dioila	2181	46	40	1	A		2 Average
Subtotal:			305	1.1			3 Poor
							4 Very poor
Thion-Bonona	2251	37	46	3	B		Maintenance Category
Sevare-Boundaka	1151	37	17	2	B		-----
Banako-Sebenikoro	1050	36	3	3	B		A High level (ADT > 40)
Sikasso-Barkina	1101	36	44	3	B		B Average (ADT 20-40)
Sebenikoro-Kouressale	1051	36	113	3	B		C Low level (ADT < 20)
Fana-Mangala	3231	0	40	4	B		
Bougouni-Madina	1081	29	16	2	B	16	
Acces a Djenné	n.c.	22	42		B	35	
Koulikoro-Banamba	2142	22	87	1	B		
Markala-Tenenkou	2241	21	170	3	B		
Sandara-Niéro	1013	21	134	3	B	134	
Kayes-vers Sandara	1013	21	103	3	B	103	
Niéro-Aerodrome	1014		8	3	B		
Sonadougou-Bantass	2261	20	79	3	C		
Subtotal:			902	2.8		280	
Ansongo-Niger	1172	19	105	3	C		
Bougouni-Maankoro	1091	18	123	3	C	123	
Zantiébougou-Kolondieba	2211	17	86	3	C		
Kona-Korientze	2281	17	65	3	C		
Dira-Goundas	2311	15	35	2	C		
Gao-Ansongo	1171	15	100	3	C		
Kanankole-Kayes	1012	15	5	2	C		
Ansongo	1171	15	7	3	C		
Dioila-Nassiqui	2182	14	100	3	C		
Kolondieba-Cote d'Ivoire	2212	13	59	3	C		
Kignan-Sikasso	2201	13	58	3	C		
Dioila-Mangala-Kignan	2201	13	147	3	C		
Kayes-Madina	2041	13	12	4	C		
Madina-Biasso	2042	13	33	4	C		
Gao-Bourou	1181	11	95	3	C		
Goundas-Tombouctou	2312	8	97	4	C		
Tombouctou-Bourou-Rharous	2321	8	145	4	C		
Goundaka-Bandiagara-Koro	1152	8	133	3	C		
Mahina-Kaniéba-Satadougou	1022	7	178	4	C		
Kati-Sebakoro	2131	6	107	4	C		
Kayes-Dialafara	2011	6	150	4	C		
Sebakoro-Kita	2131	6	58	4	C		
Dialafara-Bjibouroua	2012	6	37	4	C		
Badogo-Kalana	2221	6	33	3	C	38	
Madina-Badogo-Guineo	1082	5	97	4	C	94	
Acces Mamanteli	n.c.	n.a.	60	2	C		
Subtotal:			2125	3.4		247	
Total, Gravel Roads:			3332	3		535	
-----			-----	-----		-----	
Average status with project				2.7			

The Priority Networks  
 Table 3 - Present Status and Proposed Project Works - Earth Roads

Itinerary	Reference Section	Traffic (1983) (ADT)	Length (km)	a/ Status	a/ Maint. Category	Periodic Maint./ Rehab. (km)	COMMENTS
Tioribougou-Didiene	1034	37	64		D		a/ Earth Roads & Tracks
			64				Status
Kita-Djidian	2121	17	14	5	E		3 Fair
Djidian-Kouroukoto	2121	17	96	5	E		4 Poor
RR29-Bangha	3561	0	25	3	E		5 Very Poor
Didiene-Diama	1034	16	327	4	D		
Diama-Nioko	1034	16	9	4	E		
Nahe-Kanankole	1011	15	93	4	E		Maintenance Category
Komboree-Kokofata	2091	12	70	5	E		
Kenieba-Komboree	2091	12	55	5	E		
Bankass-Ouenkoro	2271	11	80	4	E		D High level (ADT > 20)
Demeko-Sandare	2082	10	46	4	E		E Low level (ADT < 20)
Bafoulabe-Demeko	2081	10	112	4	E		
Banamba-Boron	2143	8	48	4	E		
Gouraa-Rharous-Bouren	2322	8	184	4	E		
Koro-Burkina	1153	0	32	3	E		
Bouren-Anefis	1182	7	185	4	E		
Kita-Toukoto-Sefeto	2111	5	160	4	E		
Kita-Frontiere Guinee	2101	0	76	4	E		
Anefis-Kidal	1183	4	150	4	E		
Kidal-Tinzacouten	1184	0	202	4	E		
Sandare-Diama	2071	3	135	4	E		
Niono-Manpala	2233	n.a.	195	4	E		
Manpala-Niafounke	2234	n.a.	228	4	E		
Tanal-Banbara	2302	n.a.	108	4	E		
Bouentza-Tanal	2301	n.a.	52	4	E		
Goundaa-Niafounke	2233	n.a.	88	4	E		
Banbara-Gouraa-Rharous	2303	n.a.	155	4	E		
Subtotal:			2925				
Total, Earth Roads			2989	4		0	
*****			****	****		****	
TOTAL PRIORITY NETWORK			8790			1187	
*****			****			****	

Sources: DNTP, 1984  
 MAPTI  
 April 1985

MALI

FIFTH HIGHWAY PROJECT

Road Fund Revenues and Expenditures  
Past Performance and Forecasts, 1985-1990

Purpose of the Road Fund

1. Since 1971, road expenditures in Mali have been financed from a Road Fund (RF). Clearly separated from the general budget, the RF is administered by the National Directorate of Public Works, and receive its revenues from an earmarked portion of taxes on transport fuels (gasoline and diesel). The RF is supposed to cover (i) road maintenance expenditures including equipment renewal; (ii) minor urban street improvements; (iii) local counterpart funds for road studies and investments; and (iv) the debt service on loans for roads.

Level of Financing and Allocation of Resources

2. Nominally, annual RF revenues have been increasing from CFAF 0.7 billion in 1971 to CFAF 2.7 billion in 1983 or at about 7% p.a. But with annual inflation rates averaging about 10% over the same period, revenues have in fact declined in real terms. Road maintenance expenditures as a portion of RF revenues have fluctuated between 35% and 55%, with the highest shares in the 1978-1980 period. Since 1981, counterpart funding needs for new investments (Sevare-Gao road) have risen sharply; but for the support of routine maintenance activities under the Association's ongoing Fourth Highway (Maintenance) Project, road maintenance would have had to be reduced to unacceptable levels. Even with this project, maintenance expenditures as a portion of total road expenditure have declined from about 24% in the five year period 1974-78, to around 18% for the 1979-83 period (Table 1, Road Construction and Maintenance Expenditures and their Financing, 1971-1983).

3. From 1971 to 1982, local counterpart funding for investments and road maintenance have accounted for some 90% of RF expenditures, while debt service requirements were negligible. The situation began to change in 1983, when debt service requirements increased by 76% over 1982, from about CFAF 290 million to CFAF 515 million. Even steeper increases will arise in the next three years, until debt service payments stabilize at around CFAF 2,700 million annually from 1987 onward. Unless additional sources of revenue are found, RF receipts will thus be barely sufficient to cover the debt service on past investments, leaving no funds for maintenance, let alone new

investments. (Table 2, Development of Debt Service Payments to be Covered from Road Fund Revenues, 1982-1990).

4. To correct the situation and ensure that at least essential maintenance operations for safeguarding the most important links of the existing road network continue to be carried out, several alternative courses of action suggest themselves. One would be to free the RF from its debt service obligations on past road investments and integrate them into the overall public debt service. This could be justified in view of the fact that well over 70% of total taxes (import duties on vehicles and spares, licenses, taxes on freight vehicles and on insurance, fuel taxes) levied on road users accrue to the general budget, while only about 45% of the taxes on gasoline and diesel fuel accrue to the RF. However, the general budget itself is deficitary and the country has experienced severe problems on its general debt service, which have already resulted in the temporary suspension of disbursements on a number of ongoing credits and postponement of new ones. No relief could thus be expected from shifting responsibility for the debt service to the general budget. (Table 3, Revenues from Road User Charges by Source and Fuel Consumption (Total and Taxed, 1974-1983)).

#### Revenue Requirements and Potential Sources

5. Since additional revenues must be found, and since there are few or no alternatives to raising them except from road users, it would seem preferable to have the additional revenues accrue directly to the RF, where they will be (and seen to be) used to pay for past upgrading and present maintenance of the priority network. Given the relatively high sensitivity to transport costs of the prices of basic staples and essential imports in a vast and landlocked country like Mali, it will be important that the additional taxes be limited to the strict minimum required to cover unavoidable road outlays. To do this, a series of coordinated actions by Government and foreign donors will be required. First, to avoid the recurrence of large revenue shortfalls in the future, it is important that investment planning procedures in the transport sector are improved to achieve a proper balance between investment and maintenance and to avoid uneconomic investments. Development of Mali's transport investment planning capability will be supported under the proposed project with technical assistance to ONT, and Government has agreed to prepare annually and adopt a multi-annual program of road transport investments satisfactory to the Association, which follows economic criteria and takes into account the road maintenance capacity and the country debt servicing capacity. Given the Road Fund's precarious financial situation, it is imperative that Mali in the near future not accept any financing for roads or road transport on non-concessionary terms and with short repayment periods. It may even be worthwhile to explore if obligations for debt servicing could be attenuated by rescheduling debts on past road investments, notably Sevare-Gao, so that the amount of revenue to be raised through additional taxes may be reduced somewhat.

6. Second, to help compensate the adverse financial situation in the short term, it is necessary that maintenance expenses be reduced to the minimum required to facilitate essential traffic flows. This would be achieved by (a) concentrating maintenance on a priority network; (b) reducing maintenance on unimproved tracks and on non-essential earth roads; and (c) implementing rigorous measures to raise equipment availability and improve overall efficiency of maintenance operations; all of these actions are being pursued under the project.

7. Third, revenues will need to be raised to the point where they will at least cover the debt service, essential routine and periodic maintenance expenditures, as well as counterpart funds to ongoing investments. Given the size of the revenue gap, this may be done over a four year period. The overall increase required is from a current revenue level of CFAF 2.3 billion to more than CFAF 5 billion annually.

8. During negotiations, Government has agreed to increase tax revenues directly and automatically available to the Road Fund (i.e. without recourse to special budgetary transfers) sufficiently to ensure that the Road Fund's revenues cover debt service and maintenance requirements in the highway sector (i.e. CFAF 28,950 million over the period January 1985 to December 1990 corresponding (in rounded figures) to CFAF 28,059 million of expenses over the period plus CFAF 920 million of Road Fund deficit as of December 31, 1984. Table 5, Local Cost Implications of Proposed Road Sector Investment and Maintenance Strategy: Road Fund Expenditures and Alternative Revenue Scenarios, 1984-1990, and corresponding graph). The following are already allocated to the Road Fund: (i) the revenues of the existing fuel tax (estimated at CFAF 13,500 million over the same period); (ii) CFAF 700 million transferred to the Road Fund on May 8, 1985; and (iii) CFAF 500 million scheduled to be transferred by project effectiveness. In addition to the foregoing, Government has decided to allocate directly to the Road Fund: (a) revenues collected from the Droit de Traversée Routière net of collection cost. These currently amount to CFAF 250 million annually but its coverage will be extended to the whole paved network by December 1985 and thereafter, they are expected to amount to CFAF 300 million annually (corresponding revenue estimated at CFAF 1,500 million over the same period); and (b) increased fuel taxes to be collected from road users from August 1985 or January 1986 onwards to generate additional revenues of CFAF 12,750 million over the same period. Government has appointed an Interministerial Committee to determine, inter alia, the exact timing of the increase in the fuel taxes earmarked to the Road Fund and whether this increase would be more appropriately combined with:

- (i) savings in the fuel import bill through renegotiation of supply contracts. By simply changing the source of supply for some 25,500 t of gasoline and 8,750 t of diesel oil to take advantage of ex-refinery price differentials - between Abidjan and Dakar - savings of the order of CFAF 1.7 billion on a total ex-refinery import bill of around

CFAF 17 billion for these two products might have been realized in 1982 (Table 6, Fuel Price Structure for Different Origins of Supply and Destinations of End Use, and Table 7, Potential Savings on Fuel Imports by Switching Supply Sources).

- (ii) reallocation to the Road Fund of fuel taxes now allocated to other sectors of the economy;
- (iii) an increase in the pump price of gasoline and diesel fuel; or
- (iv) some combination of the above.

The Committee is considering the following options, which are satisfactory, for the increase of CFAF 12,750 million in the fuel taxes to be collected from road users over the January 1985-December 1990 period and earmarked for the Road Fund:

- (a) a single increase which should provide CFAF 2,430 million of additional annual revenues if implemented by August 1985 or CFAF 2,550 million of additional annual revenues if implemented by January 1986 (Table 5, hypothesis B; this increase in fuel tax of CFAF 28.4/liter of gasoline and CFAF 20.0/liter of diesel corresponds to 10.9% of the April 1985 pump price);
- (b) three increases to be implemented by January 1986, January 1987 and January 1988, respectively. Each increase should provide CFAF 1,060 million of additional annual revenue (Table 5, hypothesis C; each increase in fuel tax of CFAF 11.8/liter of gasoline and CFAF 8.3/liter of diesel corresponds to 4.5% of the April 1985 pump price);

The Committee has been asked to conclude its study by June 1985. Its recommendations will be incorporated in a plan of action. The adoption by Government of an IDA approved plan of action is a condition of credit effectiveness.

9. The project would cover RF revenue shortfalls in the early years by disbursing its contribution to routine road maintenance costs at a higher rate in the beginning, and by financing 100% of essential periodic maintenance. A year by year breakdown of routine maintenance expenditures over the project period and by source of financing is in Annex 3-1, para. 4.

#### Liquidity of Funds

10. Assuming that the volume of RF revenues can be raised over the period of project implementation to a level sufficient to cover

essential maintenance and debt service on past investments, there remains a second problem to be resolved: that of the liquidity of Road Fund revenues. Over the past ten years, a rising share of RF revenues (42% in 1974 and 92% in 1981; in 1982-83, RF liquidity improved due to IDA's contribution to routine maintenance expenditures;) has been in the form of checks drawn on Mali's Postal Checking Service (PCS) which has not been liquid for many years. This has affected spare parts acquisition for road maintenance equipment and contributed further to the already considerable technical problems in equipment repairs. IDA's contribution of 40% to the routine maintenance budget under the ongoing Fourth Highway Project has provided the liquidity for covering a major part of the foreign exchange costs of routine maintenance, but this is only a temporary palliative and Government action is required to correct the problem at its source.

11. In fact, the problems of PCS, which affect the majority of public sector operations, have been the subject of repeated discussions between the Government and Bank/IMF missions over the past five years. Their solution is an important part of the ongoing efforts to promote comprehensive economic reforms. Injection of some CFAF 3 billion into the CPS from an IMF Standby Credit in 1983, in conjunction with the freezing of a similar amount in CPS funds held by various public institutions (CFAF 0.75 billion by the Road Fund alone) was expected to make the system solvent, but managed to do so only partially (for small private investors who were able to withdraw amounts up to CFAF 250,000). It did not, however, suffice to restore enough confidence in the system to promote significant volumes of new deposits. The Government has engaged a consultant under Credit 1200-MLI (Second Telecommunications Project) to recommend an action plan for putting the postal service on a sound financial footing, including measures to liquify the PCS. Measures being considered include separation of the accounts of telecommunication, postal services and the PCS; restriction of Treasury access to PCS funds; strengthening of financial staff of the postal service; and use of counterpart funds generated under the Public Enterprise Project for, inter alia, payment to the PCS of funds borrowed from it by Treasury. At negotiations, Government has agreed to make the adoption of a plan of action satisfactory to the Association, a condition of effectiveness for the present project. The substantial contribution of the project to costs for routine maintenance under the Fifth Highway Project would ensure that PCS problems will not jeopardize the realization of project objectives in the early years of project execution.

WAPT1  
June 1985

**MALI**  
**FIFTH HIGHWAY PROJECT**

**Table 1: Road Construction and Maintenance Expenditure and Their Financing**  
(in million)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
<b>A. Expenditures</b>													
Investment	2,726	2,196	2,036	3,012	4,906	4,456	5,792	6,396	6,986	7,928	16,638	15,766	20,273
Maintenance	157	176	269	278	337	530	673	800	937	203	625	451	661
of this: road maintenance	157	176	269	278	337	530	673	800	937	203	625	451	661
administration	--	--	--	61	36	45	42	--	--	30	--	--	--
research center	--	--	--	61	36	45	42	--	--	30	--	--	--
urban streets	n.o.	n.o.	n.o.	125	25	35	28	47	206	238	131	--	30
<b>TOTAL</b>	<b>2,883</b>	<b>2,372</b>	<b>2,305</b>	<b>3,290</b>	<b>5,243</b>	<b>4,991</b>	<b>6,465</b>	<b>7,202</b>	<b>7,923</b>	<b>8,131</b>	<b>17,264</b>	<b>16,217</b>	<b>20,934</b>
<b>B. Financing</b>													
Local Resources	157	176	269	278	337	530	673	800	937	203	625	451	661
National Budget	1,608	1,921	1,933	2,388	1,882	1,884	2,446	2,685	4,287	4,268	4,842	5,290	5,311
of this: for investment	(860)	(1,191)	(1,079)	(960)	(1,188)	(1,256)	(1,545)	(1,119)	(1,075)	(1,406)	(2,609)	(3,215)	(3,575)
Sub-Total	1,337	2,097	2,202	2,666	2,639	2,614	2,919	2,065	6,626	4,323	5,277	5,721	5,772
Foreign Aid	1,076	4,003	957	2,072	2,276	2,292	2,277	2,277	5,109	6,446	14,687	13,107	17,062
<b>TOTAL</b>	<b>2,413</b>	<b>6,100</b>	<b>3,159</b>	<b>4,738</b>	<b>4,915</b>	<b>4,906</b>	<b>5,196</b>	<b>4,342</b>	<b>11,735</b>	<b>10,769</b>	<b>19,964</b>	<b>18,828</b>	<b>22,834</b>
Maintenance Expenditure as % of Road Fund Revenues (not incl. urban streets)	30.6	30.0	47.3	55.4	30.0	31.5	30.9	56.6	51.4	50.7	61.0	40.0	32.1
Maintenance Expenditure as % of Total Expenditures	20.3	16.9	35.5	36.4	20.4	20.6	22.0	23.3	20.2	27.7	15.0	16.7	16.5
Foreign Aid as % of Total Investment	60.0	77.1	47.0	60.0	75.9	71.0	67.3	82.5	73.2	81.3	87.1	83.0	80.5

\* Includes Fourth Highway (Maintenance) Project expenditures

**NOTE:** Mali joined the West Africa Monetary Union in June 1984. Until then, the country's currency was the Malian Franc (MF). 1 MF = 0.5 CFAF.

Source: DOTP, Bamako, April 1984

MAP21  
December 1984



MALI

FIFTH HIGHWAY PROJECT

Table 2: Road User Tax Revenues by Source, 1974-1983  
(in MF millions)

Year	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Item										
Import Duties on Vehicles & Spares	1,823	3,061	2,285	2,540	2,826	4,975	2,884	n/a	n/a	n/a
Taxes on Insurance and licenses of goods vehicles	1,450 <sup>a/</sup>	1,600 <sup>a/</sup>	1,760 <sup>a/</sup>	1,940 <sup>a/</sup>	n/a	2,095 <sup>a/</sup>	2,315 <sup>a/</sup>	2,470 <sup>a/</sup>	2,600 <sup>a/</sup>	2,860 <sup>a/</sup>
Vehicle Registration	194	222	249	268	539	347	403	379	454	675
Taxes on fuel for Road Vehicles	2,308	2,066	2,025	2,913	2,296	3,302	5,536	6,352	3,860	4,521
TOTAL	5,775	6,949	7,319	7,661	n/a	10,719	11,136	n/a	n/a	n/a

<sup>a/</sup> Estimate

Road Fund Receipts, 1974 - 1983  
(in MF millions)

Total Receipts	2,308	2,066	2,425	2,913	2,296	3,302	5,068	4,320	6,013	6,268
of this:										
postal checks (PC)	978	1,026	1,110	1,507	2,730	2,787	4,573	3,964	4,486 <sup>a/</sup>	4,129 <sup>a/</sup>
bank deposits	1,330	1,040	1,315	1,406	566	515	495	354	1,527 <sup>a/</sup>	2,119 <sup>a/</sup>
% of receipts in PC	42	50	46	52	83	84	90	92	75	66

<sup>a/</sup> Figures reflect contribution of IDA's Fourth Highway Project to Road Fund (40% of routine road maintenance expenditure)

Fuel Consumption (total and taxed) for Road Vehicles, 1974-1983  
(in millions of liters)

A. Total Consumption	83.3	96.6	105.5	115.3	126.2	140.9	166.0	130.2	122.2	124.0
of this: gasoline	51.3	58.9	65.2	71.7	79.0	87.4	87.8	78.8	74.0	77.0
diesel	32.0	37.7	40.3	43.6	47.2	53.5	58.2	51.4	48.2	47.0
yearly increase(%)	4.0	16.0	9.2	9.3	9.5	11.6	3.6	-10.8	-7.7	1.4
B. Taxed Consumption <sup>a/</sup>	62.8	69.1	97.4	99.2	111.3	103.7	136.6	105.7	92.3	99.1
of this: gasoline	40.9	43.3	60.7 <sup>b/</sup>	63.0	73.0	66.3	85.1	66.8	39.0	72.3
diesel	21.9	25.8	36.7	34.2	38.3	35.2	51.5	38.9	33.3	26.6
yearly increase(%)	-9.0	10.0	40.9	1.8	12.2	-6.8	31.7	-22.6	-12.7	7.3
B as percent of A	76	72	87	88	88	74	94	81	76	80

<sup>a/</sup> Military vehicles and a limited number of public services are exempted from fuel taxes.  
<sup>b/</sup> Estimate

Pump Price of Fuel  
(MF/liter)

Gasoline	110	140	165	180	180	200	315	450		
	120					230	350	520	520	520
Diesel	80	110	110	130	130	150	250	325	365	365
	90									

NOTE: Mali joined the West Africa Monetary Union in June 1984. Until then, the country's currency was the Malian Franc (MF). 1 MF = 0.5 CFAF.

Source: National Transport Office (ONT), May 1984

NAPT  
December 1984

WILL  
YUPON HIGHWAY PROJECT

Table 3: Development of Debt Service Payments to be Covered from Road Fund Revenues, 1982-1990  
(in CUP million)

Credits/Items	Amount	Interest Rate (%)	Pay-Back Period (years after grace period)		1982	1983	1984	1985	1986	1987	1988	1989	1990
<b>IDA</b>													
First Highway, Credit 174-011, of 1-6-1970	8,850,000 US\$	0.75 0.50 1.50	40	Inter. Assmt.	22.17 29.63 31.88	25.41 33.86 39.25	25.97 35.88 41.25	25.70 35.88 41.38	25.43 35.88 41.31	25.16 35.88 41.04	24.86 35.88 40.76	24.63 35.88 40.51	24.35 35.88 40.25
Second Highway, Credit 181-010-011, of 23-9-1973 and 12-6-1975	17,800,000 US\$	0.75 0.50 1.50	40	Inter. Assmt.	41.80 — 41.80	52.63 67.95 120.62	53.35 72.09 125.24	51.99 72.09 123.28	52.45 72.09 124.34	51.39 72.09 123.48	51.37 72.09 123.74	50.83 72.09 123.91	50.28 72.09 123.37
Third Highway, Credit 300-011, of 9-1-1976	9,963,960 US\$	0.75 0.50 1.50	40	Inter. Assmt.	24.70 — 24.70	28.90 — 28.90	30.30 — 30.30	30.30 — 30.30	30.31 — 30.66	29.97 — 30.33	29.66 — 30.01	29.36 — 29.72	29.05 — 29.48
Fourth Highway, Credit 1104-011, of 11-3-1981	17,000,000 US\$	0.75 0.50 1.50	40	Inter. Assmt.	6.63 — 6.63	5.91 — 5.91	21.26 — 21.26	42.53 — 42.53	51.64 — 51.64	51.64 — 51.64	51.64 — 51.64	51.64 — 51.64	51.64 — 51.64
<b>Subtotal IDA</b>					118.93	214.68	239.15	239.49	238.15	236.69	235.85	234.79	233.64
<b>AFIP</b>													
Study Scheme - Mod.Lic. 02/006/78 76-2, of 14-11-1974	246,228 US\$	0.75 1.00 3.00	40	Inter. Assmt.	0.26 12.08 13.26	0.29 15.35 15.64	1.00 18.77 17.77	0.88 16.77 17.45	0.73 16.77 17.52	0.63 16.77 17.40	0.58 16.77 17.27	0.58 16.77 17.13	0.25 16.77 17.02
Machala - Maru Road, 02/006/78 78-7 (Data not available)	8,528,000 US\$	0.75 1.00 3.00	40	Inter. Assmt.	3.17 — 3.17	4.22 — 4.22	21.02 — 21.02	24.85 — 24.85	24.85 — 24.85	24.85 — 24.85	24.85 — 24.85	24.85 — 24.85	24.85 — 24.85
Samay-Cas Road, 02/006/78 81/10 of 23-9-1981	12,000,000 US\$	0.75 1.00 3.00	40	Inter. Assmt.	— — —	2.92 — 2.92	11.48 — 11.48	19.21 — 19.21	27.15 — 27.15	35.08 — 35.08	35.08 — 35.08	35.08 — 35.08	35.08 — 35.08
<b>Subtotal AFIP</b>					36.41	28.78	30.27	61.71	69.52	77.33	77.28	100.22	110.08
<b>UNEP</b>													
Machala & Patate. Equipment 688-0-000, of 1-6-1973	3,250,000 US\$	2 and 3	40	Inter. Assmt.	22.32 — 22.32	24.86 — 24.86	26.33 — 26.33	26.33 — 26.33	26.33 — 26.33	26.30 — 26.30	26.31 — 26.31	26.31 — 26.31	26.33 — 26.33
<b>Subtotal UNEP</b>					22.32	24.86	26.33	26.33	26.33	26.30	26.31	26.31	26.33
<b>OPP</b>													
Samay-Cas Road, 13/07 of 23-3-1979	7,000,000 US\$	0.75	15	Inter. Assmt.	2.48 — 2.48	6.39 — 6.39	10.09 — 10.09	14.97 — 14.97	19.16 — 19.16	17.73 — 17.73	16.31 — 16.31	15.48 — 15.48	12.06 — 12.06
<b>Subtotal OPP</b>					2.48	6.39	10.09	14.97	19.16	17.73	16.31	15.48	12.06
<b>ROADS FUND</b>													
Samay-Cas Road 139 of 23-6-1980	4,200,000 IK\$	2 and 5	20	Inter. Assmt.	12.42 — 12.42	32.34 — 32.34	73.38 — 73.38	95.17 — 95.17	111.12 — 111.12	105.27 — 105.27	99.43 — 99.43	93.57 — 93.57	77.73 — 77.73
<b>Subtotal ROAD FUND</b>					12.42	32.34	73.38	95.17	111.12	105.27	99.43	93.57	77.73
<b>ROADS</b>													
Samay-Cas Road 2/8 of 24-3-1980	10,000,000 US\$	4	15	Inter. Assmt.	41.62 — 41.62	86.10 — 86.10	98.85 — 98.85	130.08 — 130.08	154.10 — 154.10	148.72 — 148.72	142.82 — 142.82	125.26 — 125.26	127.28 — 127.28
<b>Subtotal ROAD</b>					41.62	86.10	98.85	130.08	154.10	148.72	142.82	125.26	127.28
<b>ADP ROAD FUND</b>													
Samay-Cas Road 5/9 of 13-2-1981	20,000,000 US\$ 30%	2.5	15	Inter. Assmt.	1.50 — 1.50	15.25 — 15.25	48.29 — 48.29	65.64 — 65.64	82.99 — 82.99	82.99 — 82.99	77.44 — 77.44	71.92 — 71.92	66.39 — 66.39
<b>Subtotal ADP ROAD FUND</b>					1.50	15.25	48.29	65.64	82.99	82.99	77.44	71.92	66.39
<b>ROAD FUND</b>													
Samay-Cas Road 4/125 of 16-9-1980	33,500,000 S. RDAL	2	15	Inter. Assmt.	8.42 — 8.42	10.28 — 10.28	44.32 — 44.32	61.57 — 61.57	76.05 — 76.05	70.76 — 70.76	65.32 — 65.32	60.25 — 60.25	55.88 — 55.88
<b>Subtotal ROAD FUND</b>					8.42	10.28	44.32	61.57	76.05	70.76	65.32	60.25	55.88
<b>ROADS</b>													
Samay-Cas Road 5/146 of 30-1-1982	16,750,000 S. RDAL	2	15	Inter. Assmt.	4.03 — 4.03	6.75 — 6.75	24.84 — 24.84	32.01 — 32.01	39.20 — 39.20	37.89 — 37.89	35.28 — 35.28	32.47 — 32.47	30.06 — 30.06
<b>Subtotal ROAD FUND</b>					4.03	6.75	24.84	32.01	39.20	37.89	35.28	32.47	30.06
<b>ROADS</b>													
Samay-Cas Road 6/222/81 2-2024, of 14-9-1979	6,200,000 IK\$	4	25	Inter. Assmt.	61.07 — 61.07	68.22 — 68.22	74.82 — 74.82	74.87 — 74.87	71.07 — 71.07	68.08 — 68.08	65.09 — 65.09	62.10 — 62.10	58.10 — 58.10
<b>Subtotal ROAD FUND</b>					61.07	68.22	74.82	74.87	71.07	68.08	65.09	62.10	58.10
<b>ROADS</b>													
Chama-Chama-Chikuchaka Road Study - 28 of 3-9-1982	500,000 IK\$	15.6 and 10	10	Inter. Assmt.	2.89 — 2.89	3.02 — 3.02	7.00 — 7.00	6.36 — 6.36	5.46 — 5.46	4.80 — 4.80	3.50 — 3.50	2.84 — 2.84	1.97 — 1.97
<b>Subtotal ROAD FUND</b>					2.89	3.02	7.00	6.36	5.46	4.80	3.50	2.84	1.97
<b>TOTAL DEBT SERVICE PAYMENTS FOR ROADS</b>					282.08	545.27	798.92	1,734.78	2,167.19	2,458.70	2,428.56	2,449.47	2,418.56
<b>of Chama Samay-Cas Road</b>					131.54	248.85	480.62	1,372.08	1,670.52	1,954.94	1,928.64	1,920.66	1,895.30
<b>Samay-Cas as percent of total</b>					45	48	60	79	77	79	79	78	78

WFP, Becho, May 1984

MALE  
FIFTH HIGHWAY PROJECT

Table 4: Forecast Road Investment and Maintenance Expenditures: 1985-1990  
Estimation du Coût du Programme Routier 1985-1990 (Investissements et Entretien)  
(current CFAF million/ CFAF millions courants)

	1985	1986	1987	1988	1989	1990	
<b>1. Administration</b>	240	266	250	237	262	268	<b>Administration</b>
National Budget	540	546	250	237	562	268	Budget National
<b>2. Debt Service</b>	1,780	2,220	2,600	2,670	2,750	2,700	<b>Service de la Dette</b>
Road Fund	1,780	2,220	2,600	2,670	2,720	2,700	Fonds Routier
<b>3. Routine Maintenance</b>	1,123	1,497	1,616	1,762	1,730	2,070	<b>Entretien courant</b>
Road Fund	320	368	633	937	1,730	2,070	Fonds Routier
IDA IV	170	-	-	-	-	-	IDA IV
IDA V	421	751	652	536	-	-	IDA V
Swiss Dev. Coop.	212	378	329	270	-	-	Coopération Suisse
<b>4. Equipment Renewal and Overhaul</b>	295	1,992	406	173	364	250	<b>Renouvellement Matériel</b>
Road Fund	14	115	64	35	269	130	Fonds Routier
IDA	93	1,477	341	139	75	-	IDA
Japan	188	400	-	-	-	-	Japan
<b>5. Technical Assistance and Studies</b>	356	547	737	722	42	n.a.	<b>Assistance Technique et Etudes</b>
Road Fund	7	27	20	30	-	-	Fonds Routier
IDA	329	490	698	662	12	-	IDA
Other	20	30	30	30	30	-	Autre(s)
<b>6. Training</b>	131	285	221	136	n.a.	n.a.	<b>Formation</b>
Road Fund	1	9	7	4	-	-	Fonds Routier
Swiss Dev. Cooperation	130	276	214	130	-	-	Coopération Suisse
<b>7. Periodic Maintenance of Paved Roads</b>							<b>Entretien Périodique Routes Bitumées</b>
<b>Korodougou-Bla*</b>	973		1,260	1,260			Korodougou-Bla*
Road Fund	10		10	10			Fonds Routier
FID	963 (Siemou-Sevare)		1,250	1,250			FID
<b>Bougouni-Sikasso*</b>	-	-	1,139	1,940			Bougouni-Sikasso*
Road Fund			80	135			Fonds Routier
IDA			1,059	1,805			IDA
<b>Sikasso-Zagoue*</b>	-	-	-	148	1,328		Sikasso-Zagoue*
Road Fund				10	93		Fonds Routier
IDA				138	1,235		IDA
<b>Sogou-Markala**</b>	-	-	547	24			Sogou-Markala**
Road Fund			45	-			Fonds Routier
IDA			400	24			IDA
FAC			102	-			FAC
<b>Faladie-Sogou**</b>	223	964	-	-			Faladie-Sogou**
Road Fund	18	87					Fonds Routier
IDA	149	781					IDA
FAC	36	96					FAC
<b>Other Paved Roads and Supervision</b>	77	180	213	108	331	300	<b>Autres Routes Bitumées et Contrôle</b>
Road Fund	4	11	14	3	300	300	Fonds Routier
IDA	73	169	199	105	31	-	IDA
<b>9. Periodic Maintenance Gravel Roads</b>							<b>Entretien Périodique Routes Latéritiques</b>
<b>Djenné-Spuri*</b>	-	-	338	191			Djenné-Spuri*
Road Fund			24	13			Fonds Routier
IDA			315	178			IDA
<b>Kaya-Miara*</b>	-	-	538	1,172	628		Kaya-Miara*
Road Fund			38	82	44		Fonds Routier
IDA			500	1,090	584	IDA	
<b>Bougouni-Manankoro*</b>	-	-	496	620			Bougouni-Manankoro*
Road Fund			35	43			Fonds Routier
IDA			461	577			IDA
<b>Bougouni-Badogo**</b>	132	499	-	-			Bougouni-Badogo**
Road Fund	13	30	-	-			Fonds Routier
IDA	119	449	-	-			IDA
<b>Badogo-Kalana**</b>	-	35	199	-			Badogo-Kalana**
Road Fund		5	20	-			Fonds Routier
IDA		30	179	-			IDA
<b>Other Gravel Roads</b>	-	-	-	-	400	400	<b>Autres Routes Latéritiques</b>
Road Fund					400	400	Fonds Routier
<b>10. New/Re-construction</b>							<b>Construction/Réconstruction</b>
<b>Sevare-Gao</b>	6,185	1,370	-	-			<b>Sevare-Gao</b>
Road Fund	800	220					Fonds Routier
Various Donors	5,285	1,150					Plusieurs Bailleurs de Fonds
<b>Bamako-Bougouni</b>	-	2,002	3,204	3,758			<b>Bamako-Bougouni</b>
Road Fund		221	575	636			Fonds Routier
IDA		961	2,499	2,764			IDA
AIDF		820	2,130	2,358			FAD
<b>Bamako - 2nd Bridge</b>	-	120	5,545	6,255	3,070	3,060	<b>Bamako-Deuxième Pont</b>
Road Fund		10	470	530	260	260	Fonds Routier
Suedi Fund		110	5,075	5,725	2,810	2,800	Fonds Suedien
<b>GRAND TOTAL</b>	<b>11,535</b>	<b>11,977</b>	<b>21,328</b>	<b>23,174</b>	<b>10,855</b>	<b>9,048</b>	<b>GRAND TOTAL</b>

\* By contractor  
\*\* By force account

\* à l'entreprise  
\*\* en régie

MLI

FIFTH HIGHWAY PROJECT

Table 5: Local Cost Implications of the Proposed Road Sector Investment and Maintenance Strategy: Road Fund Expenditures and Alternative Revenue Scenarios, 1984-1990

Couts Locaux du Programme Routier, 1985-1990 propose: Situation des  
Dépenses et Recettes du Fonds Routier, 1984-1990

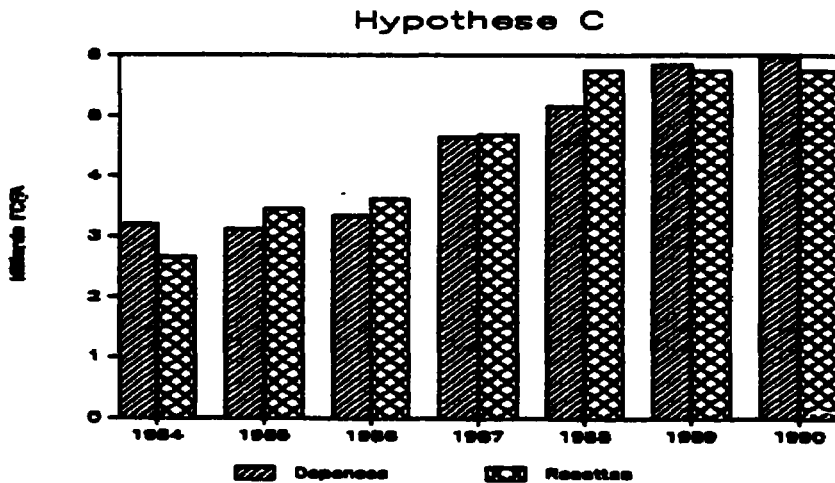
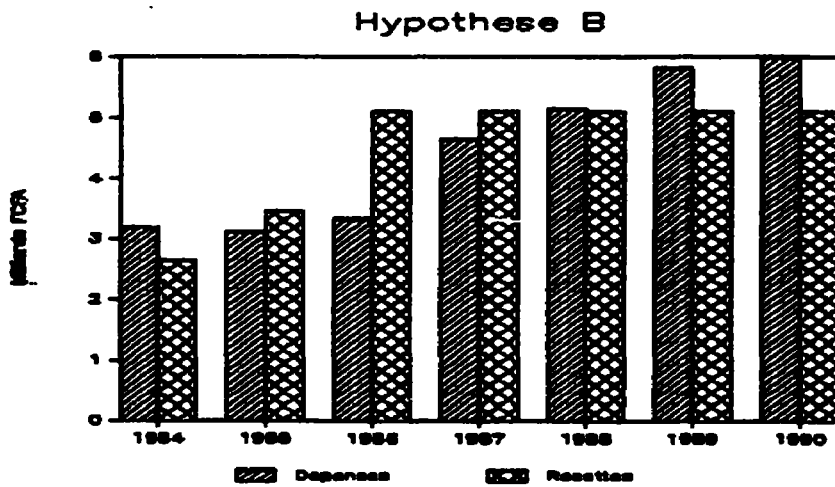
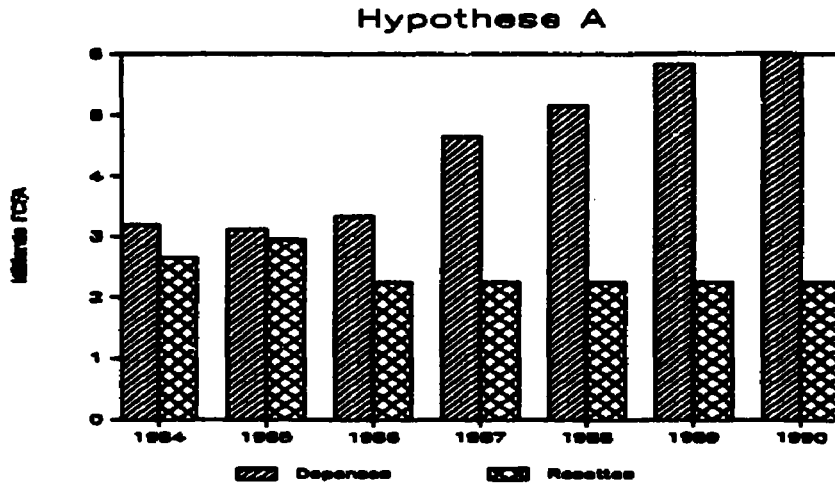
(in current CFAF million/FCFA millions courants)

	1984	1985	1986	1987	1988	1989	1990	Total 1985-90	
<b>I. Expenses</b>	<b>3190</b>	<b>3118</b>	<b>3343</b>	<b>4641</b>	<b>5140</b>	<b>5829</b>	<b>5990</b>	<b>28059</b>	<b>Dépenses</b>
1.1 Debt Service	800	1780	2220	2600	2670	2720	2700	14690	Service de la dette
1.2 Counterpart Funds, Maintenance									Fonds de Contrepartie, Entretien
(a) Routine (R)	850	320	368	632	938	1730	2070	6059	Courant
(b) Periodic (P)	0	36	154	254	288	839	700	2270	Entretien Périodique
(c) Equipment Renewal	0	14	114	64	35	269	250	745	Renouvel. du matériel
(d) Counterpart 4th Hwy	530	50	0	0	0	0	0	50	Part 4e Projet Routier
1.3 Counterpart Funds, Investments									Fonds de Contrepartie, Investissements
(a) Counterpart 5th Hwy	0	8	257	611	669	1	0	1546	Part 5e Projet Routier
(b) Mankala-Niono	120	0	0	0	0	0	0	-	Mankala-Niono
(c) Savara-Gao	880	900	220	0	0	0	0	1120	Savara-Gao
(d) Sissao-Savara	10	10	0	0	0	0	0	10	Sissao-Savara
(e) Karsadougou-Bla	0	0	0	10	10	10	10	40	Karsadougou-Bla
(f) Second Bridge Bamako	0	0	10	470	530	260	260	1530	2e Pont Bamako
<b>II. Revenues</b>									<b>Recettes</b>
2.1 Hypothesis A (maintain 1984 level of fuel consumption and taxes)									Hypothèse A (Consommation carburant et niveaux taxes= 1984)
Revenue, Existing Taxes	2640	2950	2250	2250	2250	2250	2250	14200	Recettes, Taxes Existantes
Annual Deficit	-550	-168	-1094	-2391	-2890	-3578	-3740	-13859	Deficit Annuel
Cumulative Deficit	-920	-1088	-2181	-4572	-7462	-11039	-14779	na	Deficit Cumul
2.2 Hypothesis B (1984 level of fuel consumption, a single increase in Road Fund revenues by January 1986)									Hypothèse B (Consommation carburant= 1984; une augmentation unique des revenus du Fonds Routier avant Janvier 1986)
Revenue, Existing Taxes	2640	2950	2250	2250	2250	2250	2250	14200	Recettes, Taxes Existantes
Revenue, Suppl. Taxes	-	500	2850	2850	2850	2850	2850	14750	Recettes, Taxes Suppl.
Annual Deficit	-550	332	1756	459	-40	-728	-890	891	Deficit Annuel
Cumulative Deficit	-920	-588	1169	1628	1588	861	-29	na	Deficit Cumul
2.3 Hypothesis C (1984 level of fuel consumption, three increases in Road Fund revenues in January 1986, 87 and 88)									Hypothèse C (Consommation carburant= 1984; trois augmentations des revenus du Fonds Rou- tier en Janvier 1986, 87 et 88)
Revenue, Existing Taxes	2640	2950	2250	2250	2250	2250	2250	14200	Recettes, Taxes Existantes
Revenue, Suppl. Taxes	-	500	1360	2420	3480	3480	3480	15420	Recettes, Taxes Suppl.
Annual Deficit	-550	332	266	29	590	-98	-260	861	Deficit Annuel
Cumulative Deficit	-920	-588	-321	-292	298	201	-59	na	Deficit Cumul

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Graphical Representation of Three Hypotheses of Revenues (see Table 5)



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Table 6: Real Price Structure as of August 1983 for Different

Origins of Supply and Destination of Use

<u>Unit/Unité</u>	<u>Malian Francs/Liter - Francs Maliens par litre</u>										<u>MF/ton</u> <u>Fr La tonne</u>		
	<u>Gasoline/Esence</u>			<u>Diesel/Cas oil</u>			<u>Kerosene/Petrole</u>			<u>Heavy Fuel</u> <u>Diesel Oil</u>			
<u>Product/Produit</u>	<u>Bamako</u>	<u>Bamako</u>	<u>Gas ex</u>	<u>Bamako</u>	<u>Bamako</u>	<u>Gas. ex</u>	<u>Bamako</u>	<u>Bamako</u>	<u>Gas. ex</u>	<u>Bamako</u>	<u>Bamako</u>	<u>Bamako</u>	<u>Bamako</u>
<u>Origin and Place of Sale</u> <u>Origine et Lieu de Vente</u>	<u>ex Dakar</u>	<u>ex Abidj.</u>	<u>Cotonou</u>	<u>ex Dakar</u>	<u>ex Abidj.</u>	<u>Cotonou</u>	<u>ex Dakar</u>	<u>ex Abidj.</u>	<u>Cotonou</u>	<u>ex Dakar</u>	<u>ex Abidj.</u>	<u>ex Dakar</u>	<u>ex Abidj.</u>
<u>Ex-refinery price</u> <u>Prix de reprise</u>	218,10	308,00	-	206,40	292,00	-	210,64	170,0	-	262,276	225,000		
<u>Ex-depot price</u> <u>Prix depart</u>	221,53	312,85	211,87	208,89	296,04	201,81	213,82	174,09	211,91	265,837	230,076		
<u>Transport abroad</u> <u>Transport a l'etranger</u>	28,68	28,64	)	28,46	28,64	)	29,89	28,64	)	41,911	33,693		
<u>Transport in Mali</u> <u>Transport interieur</u>	12,92	17,83	)	16,54	17,83	)	13,81	17,83	)	17,351	20,976		
<u>Transport to storage</u> <u>Transport terminal</u>	1,39	1,39	-	1,39	1,39	-	1,39	1,39	-	1,635	1,635		
<u>Subtotal Transport</u> <u>Sous-total transport</u>	42,99	47,86	56,04	44,39	47,86	56,04	45,09	47,86	56,04	60,897	56,302		
<u>Transfer to depot</u> <u>Passage depot</u>	2,55	2,55	-	2,55	2,55	-	2,55	2,55	-	3,000	3,000		
<u>Loss in transit</u> <u>Pertes (transp.depot)</u>	5,87	7,84	3,20	4,85	6,48	2,96	4,74	4,10	2,84	5,600	5,263		
<u>Supplier's margin</u> <u>Marge fournisseur</u>	10,36	10,36	10,36	7,26	7,26	7,26	9,15	9,15	9,15	7,502	7,502		
<u>Retailer margin</u> <u>Marge revendeur</u>	9,00	9,00	9,00	7,00	7,00	7,00	8,00	8,00	8,00	-	-		
<u>Price net of taxes</u> <u>Prix hors taxes</u>	292,29	390,46	290,47	274,94	367,19	275,07	283,35	265,75	287,94	322,836	302,161		
<u>Taxes and duties</u> <u>Droits et taxes</u>	102,69	106,48	102,51	73,11	76,41	73,62	31,66	31,50	31,69	33,970	34,393		
<u>Price Structure differentials</u> <u>Differentials de structure</u>	125,02	23,06	127,02	16,95	-78,60	16,31	29,99	67,75	25,17	-56,806	-36,534		
<u>Subtotal taxes</u> <u>Sous-total taxes</u>	227,71	129,54	229,53	80,06	-2,19	89,93	61,65	99,25	57,06	-22,836	-2,161		
<u>Pump price</u> <u>Prix TTC</u>	520,00	520,00	520,00	365,00	365,00	365,00	345,00	345,00	345,00	300,000	300,000		

a/ The difference between ex-refinery and ex-depot prices consist of storage and loading costs (transfer to depot, losses, port-taxes), minus an estimated volume gain due to high prevailing temperatures.

a/ L'ecart entre le prix de reprise en raffinerie et le prix depart est forme de frais de stockage et de chargement (passage depot, pertes, taxes portuaires), diminue d'une recette au titre du gain de temperature pour les produits vendus au volume.

NOTE: Mali joined the West Africa Monetary Union in June 1984. Until then, the country's currency was the Malian Franc (MF). 1 MF = 0.5 CFAF.

NOTE: Le Mali fait partie de l'Union Monetaire de l'Afrique de l'Ouest depuis le mois de Juin 1984. Auparavant, la monnaie courante était le Franc Malien (MF). 1 MF = 0.5 CFAF.

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Table 7: Potential Savings on Fuel Imports  
by Switching Supply Sources <sup>a/</sup>

Economies potentielles sur les importations carburants par  
changement des sources de ravitaillement

(Fuel imports in tons - average 1980-82)  
(Importations de carburants en tonnes - moyennes 1980-82)

Product	ex Abidjan		ex Dakar		ex Parakou		Produit
	Optimal	Actual	Optimal	Actual	Optimal	Actual	
Super	-	-	667	667	-	-	Super
Gasoline	10391	37369	41893	15283	637	269	Essence
Diesel	11965	19195	23765	17013	3408	2930	Gas oil
Kerosene	11049	8714	939	3151	-	123	Petrole
Heavy Fuel	13439	6162	1697	8974	-	-	Diesel oil
Heavy Fuel	2490	2490	385	385	-	-	Fuel oil
Jet Fuel	10748	10316	-	-	-	431	Carbu- reacteur
<b>TOTAL</b>	<b>60082</b>	<b>84246</b>	<b>69346</b>	<b>45473</b>	<b>4045</b>	<b>3753</b>	<b>TOTAUX</b>
<b>% of total requirements</b>	<b>45</b>	<b>63,1</b>	<b>52</b>	<b>34,1</b>	<b>3</b>	<b>2,8</b>	<b>% du besoin total</b>

In order to achieve potential savings of the order of CFAF 1,770 million, imports:

Bamako Region: 20,000 t gasoline ex Dakar instead ex Abidjan 1,300 "  
2,400 t Kerosene ex Abidjan instead ex Dakar 60 "  
7,200 t heavy fuel ex Abidjan instead ex Dakar 72 "

Segou/Mopti Regions:  
5,000 t gasoline ex Dakar instead of Abidjan 175 "  
6,000 t diesel ex Dakar instead of Abidjan 120 "

Tombouctou/Gao: 850 t gasoline and diesel ex Parakou instead of Abidjan 43 "

(No additional storage facilities required in any of the locations)

<sup>a/</sup> Note that statistics on actual sources of supply diverge considerably between suppliers' data and ONT data; they would need more careful scrutinizing before actions can be based on them.

Source: Trans. Energy: Planification de l'Energie, Rapport Final, Annex II, 1984

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Summary Data on Road Transport

1. Road transport is by far the dominant mode in Mali accounting for 90% of total passenger movements (estimated at 1,950 million passengers-kilometers) and 55% of total freight movements (estimated at 465 million ton-kilometers) in 1983. The road transport industry is dominated by private operators who handle all passenger transport and own over three quarters of the country's freight vehicle fleet. About 25 of the larger operators owning between 10-20 vehicles each are independent, while some 850 small freight operators and 600-700 operators providing passenger transport, who mostly own up to five vehicles, are grouped in regional cooperatives. These are affiliated in a national union (Union Nationale des Cooperatives des Transporteurs Routier du Mali, UNCTM) which functions as a lobby for transporters' interests, as their representative in negotiations with Government, and as a mutual aid organization.

2. Sizeable truck fleets are operated by a number of state enterprises for their own account: the Compagnie Malienne pour le Developpement des Textiles (CMDT) transports cotton (200 vehicles), the Office du Niger (ON) transports grains (100 vehicles), SOMIEX, the import-export monopoly, has 45 vehicles; OPAM (Office des Produits Agricoles du Mali) operates about 40 trucks.

3. With the recent liquidation of the Societe Africaine des Transports Routier (SAT), state-owned trucking companies have declined from three in 1975 to one. SAT was first established as a company jointly owned by Mali (51%) and Algeria (49%) in 1978, but became an all-Malian company in 1981. Initially established to serve the desert areas in the northern and eastern part of the country (6th and 7th Regions) with imports from the port of Abidjan, it never was equipped with appropriate vehicles for this trajectory and operated at a deficit throughout its existence. The fleet of the remaining state-owned trucking company (Compagnie Malienne des Transports Routier, CMTR) has contracted steadily from some 250 vehicles in 1972 to about 50 in 1978 and no more than 30 vehicles in 1983. As with SAT, its operation has been deficitary since 1973.

4. Since late 1983, discussions have been underway with several potential foreign partners to replace CMTR by a joint venture company, CITRANS, whose capital would be provided partly by the Government (36%), partly by foreign and local private sources, who would also provide management expertise. A new vehicle fleet (50 tractor-trailers, 15 tanker-trucks of 40,000 liters and 10 large buses) would be acquired on



suppliers' credits, guaranteed by the state. The Association reviewed the terms of the proposed venture during pre-appraisal of the Public Enterprise Rehabilitation Project. It concluded that, given the extremely stringent debt service problems of the transport sector, and given the strenuous financing conditions proposed, the Government could ill afford to participate in the venture, and IDA has suggested withdrawal from a project which, if its financial prospects are indeed as good as shown in the evaluation, should readily find private backers.

5. Government intervenes in the road transport sector through the National Transport Office (ONT) which, inter alia, administers road transport. ONT handles vehicle registrations and licenses, regulates vehicle imports (for vehicles of 15 tons and over) to avoid excess capacity, administers tariffs and establishes road transport statistics. Above all, it coordinates inter-regional and international traffic flows: through its regional and international (port) offices (Dakar, Abidjan, Lome) it centralizes transport demand and allocates it between cooperatives, independent truckers and state trucking companies in proportion to their share in total transport capacity. ONT sees its role very much as that of a facilitating and service agency to the industry and has been working closely with transporters to help them operate more efficiently.

6. The development of Mali's vehicle fleet in the past decade is summarized in Table 1. The statistics are based on annual vehicle licenses and new registrations and probably underestimate the size of the fleet somewhat: as vehicle license fees have been increased over recent years, non-payment of renewal fees has become a problem. From available figures, it would seem that Mali's fleet has grown at a moderate 4% p.a., from a total of 19,075 vehicles in 1974 to 27,937 vehicles in 1983. However, significant changes have occurred in the overall composition of the fleet. While passenger cars, with 62% and 60% in 1974 and 1983 respectively have retained an essentially similar share, vans and pick-ups -- mostly for passenger transport -- more than doubled in number and increased their share from 21% to 29%. The number of trucks, by contrast, actually decreased sharply from about 2,600 in 1974 to 1,800 in 1983. But this reflects a shift to larger vehicles and an actual increase in carrying capacity. The same is true for tractor-trailers, which show both an increase in numbers and a shift to higher carrying capacity (32 t rather than 24 t tractor-trailers). Especially during the past two years, a steep increase in the number of buses can be observed: their number almost quadrupled compared to 1974. They have been acquired by some private transporters and mostly serve commuter traffic in the capital. The average age of the vehicle fleet is estimated at six years.

7. Overall freight transport capacity of goods vehicles below 15t was estimated at 6,515t in 1980, that of semi-trailer combinations at 10,260t. Over 95% of total fuel transport capacity of about 4,000 m<sup>3</sup> is provided by large tractor-tanker combinations. Available transport capacity thus seems ample to handle inter-regional and international flows (Table 2, Inter-regional and International Road Traffic Flows,

1980), especially since one-third of Mali's imports through the port of Abidjan are by law allocated to Ivorian truckers. However, vehicle availability is mediocre, and turn-around times on international trips are very slow; also demand for transports peaks steeply in certain months of the year, and small truck capacity at present does not seem sufficient to handle peak demands of the harvest season. However, construction of storage facilities in key locations that would allow spreading transport demand over a longer period and better utilization of the existing fleet would be preferable to excess growth of the vehicle fleet to meet peak demand.

8. Fleet development reflects a rational response by transporters to the existing tariff-structure which, being fixed per passenger/km - or ton/km, favors operation of larger vehicles. Present tariffs are: CFAF 20/t/km on paved roads, CFAF 30/t/km on improved gravel roads, and CFAF 40/t/km on earth roads on tracks. This is intended to reflect the higher cost of vehicle operation on poorer roads, as well as the higher per ton-kilometer cost of smaller trucks that operate on them. However, tariffs have not been revised since 1981 and are estimated to be about 20% below the cost of vehicle operation even for large trucks on paved roads. It is becoming increasingly difficult to find operators willing to undertake the unremunerative crop collection runs in the back country, where operators have been known to dismantle their engines so as to avoid being allocated runs on difficult trajectories by ONT.

9. As in other countries in the region, Malian transporters compensate for low tariffs by overloading their vehicles, doing severe damage not only to their own equipment, but even more to the country's road infrastructure. The question of vehicle weight control is all the more crucial in view of the fact that about two-thirds of Mali's semi-trailer fleet has tractors with only 2 axles and already exceed the legal limit of a maximum 13 ton axle load when carrying a "normal" load of 30 tons. To avoid severe damage to the road, (which can be 20 times that of a normally loaded axle), freight should be limited to 24 tons for such tractors which would make their operation even less economic at prevailing tariffs. Introduction of effective vehicle weight control should be urgently pursued to protect the country's (and the project's) substantial investment in road improvements and road maintenance. But control can be effective only if accompanied by revisions of the tariff structure that would provide truckers with sufficient income to cover repairs and depreciation on their vehicles and gain an adequate livelihood operating their vehicles with normal loads.

9. Traffic data are established by the 19 subdivisions of DNTP through manual traffic counts carried out during two week periods in January (harvest season) and June (end of dry season) each year. These surveys also assess the quantities of goods and passengers transported and establish trip origins and destinations. Analysis of the data is the responsibility of DNTP, but because of a lack of qualified staff, data had remained untreated since 1976. A major effort by DNTP and consultants has permitted to establish summary traffic statistics for the past five years and detailed (section-by-section) results for 1983.

Traffic counts confirm the picture emerging from fuel consumption statistics ( Annex 2-4, Table 3). As fuel prices were increased steeply and economic activity stagnated, traffic has declined from 1979/80 peaks to a low point in 1982 (volume of imports/exports on Abidjan route by over one-third (Annex 2-2) and average daily traffic on paved roads by almost half (Table 3 below). The more pronounced drop in vehicle traffic reflects the increasing share of larger tractor-trailer combinations in the vehicle park (Table 1 below). The upturn in traffic volume in 1983, which continues in 1984, is mainly due to higher tonnage of grain imports caused by two consecutive years of drought.

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Table 1: Development of the Vehicle Fleet, 1974-1983 <sup>a/</sup>  
(# vehicles)

Vehicle Type	1974		1975	1976	1977	1978	1979	1980	1981	1982	1983		# Vehicles in 1983 as % of 1974
	Σ	H									H	Σ	
Passenger Cars	62	11,070	12,510	13,123	13,953	14,268	12,934	14,207	14,618	16,167	16,908	60	142
Vans and Pick-ups	21	3,968	4,560	5,073	4,999	5,804	5,809	6,356	6,687	6,961	8,183	29	206
Trucks	14	2,620	2,837	2,810	2,633	2,410	1,702	1,601	1,502	1,650	1,797	6	69
Hand Tractors	2	406	332	327	481	504	477	414	422	406	493	2	122
Buses	0.5	113	170	184	258	171	144	214	201	287	414	1.5	366
Special Vehicles	0.5	98	90	90	126	148	150	145	160	150	150	0.5	153
<b>TOTAL</b>	<b>100</b>	<b>19,075</b>	<b>20,699</b>	<b>21,807</b>	<b>22,450</b>	<b>23,305</b>	<b>21,216</b>	<b>22,937</b>	<b>23,570</b>	<b>25,621</b>	<b>27,947</b>	<b>100</b>	<b>146</b>
Trailers and Semi-Trailers		419	558	599	434	408	500	361	457	753	674		161

<sup>a/</sup> Excludes military vehicles.

Source: National Transport Office (ONT), May 1984

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**Table 2: Interregional and International Road Traffic Flows, 1980**  
(in tons and ton/km, m<sup>3</sup> and m<sup>3</sup>/km)

Destinations Origins	Kaya		Bamako		Sikasso		Segou		Mopti		Tombouctou		Gao		Ivory Coast		Other		Total Interregional		International		Grand Total		
	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	t 000	t/km 000	
<b>MERCHANDISE</b>																									
1 Kaya	11.7	2,213																		11.7	2,213			11.7	2,213
2 Bamako	0.3	169	8.6	859	14.3	5,364	9.3	2,185	8.9	4,395	0.2	216	0.1	5	20.7	23,410	0.6	440	41.7	13,193	21.3	25,850	63.0	39,043	
3 Sikasso			15.3	5,723	4.6	892	3.2	794	5.1	3,048					34.4	29,307	0.2	180	28.2	10,257	34.6	29,487	62.8	39,744	
4 Segou	0.2	121	9.8	4,848	3.4	2,761			1.8	180			0.1	19	15.7	18,085	0.6	495	15.3	7,428	16.3	18,580	31.6	26,008	
5 Mopti			3.4	1,484	1.6	1,054	0.9	228	0.1	10					0.9	1,185	0.3	163	6.0	2,978	1.2	1,348	7.2	4,326	
6 Tombouctou			0.1	46					0.1	34	0.1	5	0.4	190					0.7	275				0.7	275
7 Gao	1.0	510	0.3						2.0	1,014			0.3	28			1.7	1,229	3.6	1,552	1.7	1,229	5.3	2,781	
Subtotal	13.2	3,013	37.3	13,162	23.9	9,371	13.4	3,207	18.0	8,681	0.3	21	0.9	242	71.7	73,967	3.4	2,507	107.2	37,896	75.1	76,494	182.3	114,390	
Unspecified															9.6	9,625					9.6	9,625	9.6	9,625	
Various - (to rail at Ouagadougou, IVC)															4.6	2,541					4.6	2,541	4.6	2,541	
Various - (cattle to IVC)															9.0	9,000					9.0	9,000	9.0	9,000	
Ivory Coast			165.2	202,365																			165.2	202,365	
<b>Total Goods</b>	<b>13.2</b>	<b>3,013</b>	<b>202.7</b>	<b>215,527</b>	<b>23.9</b>	<b>9,371</b>	<b>13.4</b>	<b>3,207</b>	<b>18.0</b>	<b>8,681</b>	<b>0.3</b>	<b>221</b>	<b>0.9</b>	<b>242</b>	<b>84.9</b>	<b>95,153</b>	<b>3.4</b>	<b>2,507</b>	<b>107.2</b>	<b>37,896</b>	<b>263.5</b>	<b>300,025</b>	<b>370.7</b>	<b>337,921</b>	
	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	m <sup>3</sup> 000	m <sup>3</sup> /km 000	
<b>FUEL</b>																									
Abidjan			78.8	94,873	12.1	10,288	34.0	39,933	14.6	19,377													139.5	164,473	
Parakou													7.7	10,022									7.7	10,022	
<b>Total Fuel</b>			<b>78.8</b>	<b>94,873</b>	<b>12.1</b>	<b>10,288</b>	<b>34.0</b>	<b>39,933</b>	<b>14.6</b>	<b>19,377</b>			<b>7.7</b>	<b>10,022</b>									<b>147.2</b>	<b>174,495</b>	

Source: BCEOM "Institution d'un Peage sur le Réseau Bitume"; August 1982, Annexe 9.10

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Table 3: Average Daily Traffic by Class of Road, 1976, 1979-83  
(N vehicles)

<u>Year</u>	<u>Paved Roads</u>	<u>Major Gravel Roads</u>	<u>Feeder Roads Improved</u>	<u>and Tracks Seasonal</u>
1976	151	32	17	10
---	---	--	--	--
1979	313	35	16	7
1980	194	38	18	10
1981	186	34	24	11
1982	164	28	18	9
1983	165	25	14	9

Source: DNTF

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FIFTH HIGHWAY PROJECT

Details on Routine Road Maintenance Operations

1. Table 1 (Strategie Annuelle d'Entretien Courant) summarizes the annual strategy for routine maintenance. Each road of the 8205 km priority network is classified into one of the following 10 maintenance categories:

<u>Type of Road</u>	<u>Level of Maintenance</u>		<u>1983 Traffic</u>	<u>Total Length</u>
	<u>Description</u>	<u>Code</u>	(adt)	(km)
Paved	High	RA	220<T	412
"	Average	RB	100<T<220	876
"	Low	RC	T<100	596
Gravel	High	A	40<T	305
"	Average	B	20<T<40	823
"	Low	C	T<20	2204
Earth	Low	D	20<T	381
"	Low	E	T<20	2598
"	NA	F	NA	(4672)
Under Construction	NA	G	NA	(579)
				<hr/>
				8205

Maintenance operations are broken down into 14 tasks. Annual quantities of each task as a function of the adopted maintenance strategy, unit costs per task and total annual cost of routine maintenance are also detailed in the table.

2. Table 1 shows unit costs per task (DNTP and consultants estimates) at May 1984 prices while Table 2 shows them updated to January 1985. The tasks will be carried out by the force account crews of the regional directorates. DEGP will review and consolidate the regional directorates' monthly reports and submit corresponding disbursement applications to IDA and SDC applying agreed unit costs to actual quantities. At the end of each year expenses for routine maintenance will be audited. The audit will compare actual to estimated unit costs and estimate unit costs for the following year. The audit report will be used to retroactively adjust disbursements made for the corresponding year.

3. The regional directorates will use the Road Fund budget and existing procurement and disbursement procedures to pay for inputs for routine maintenance operations. The inputs consist of fuel (29% of annual cost), materials and lubricants (20%), all procured by Local Competitive Bidding procedures (LCB); non proprietary spare parts (34%) procured by the

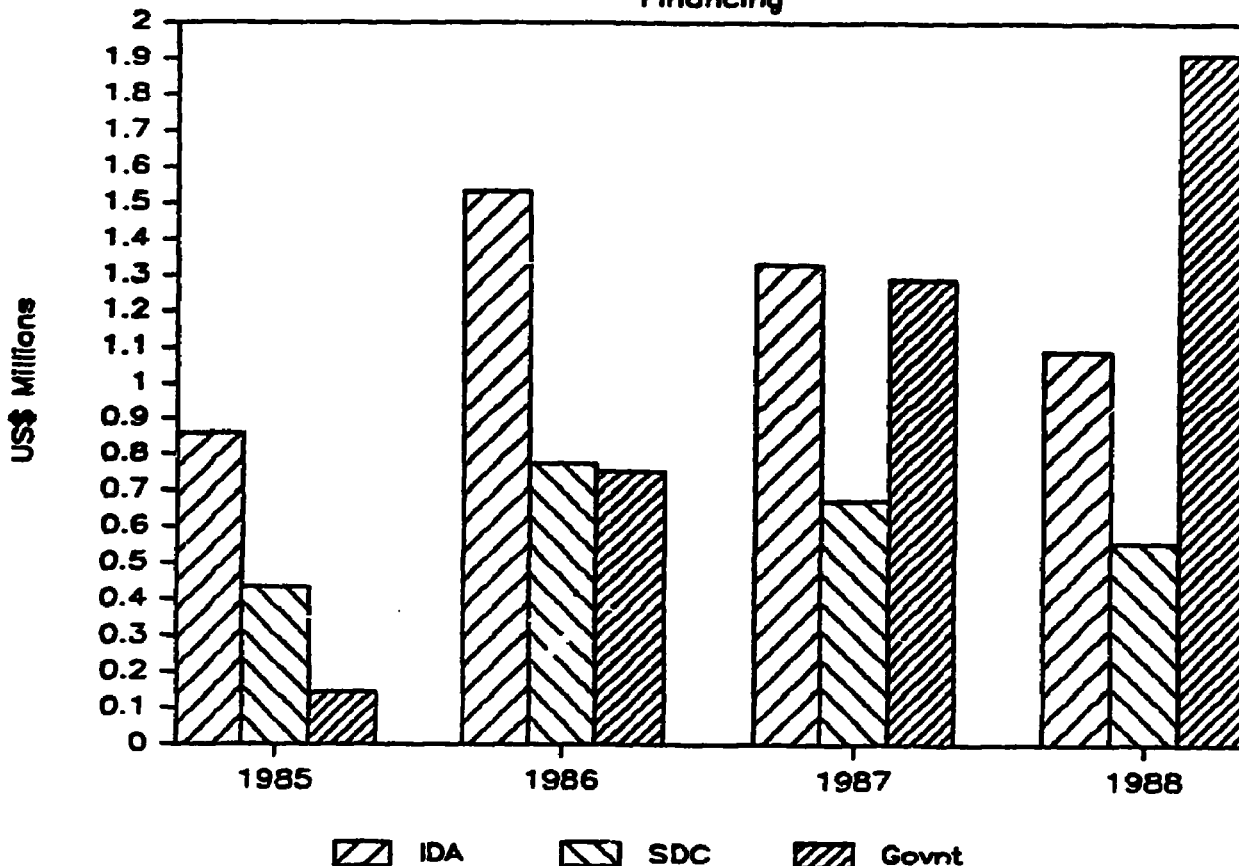
procurement agent following Limited International Bidding procedures; proprietary spare parts (12%) procured by the procurement agent following direct procurement procedures and salaries (15%) for casual labor (excluding civil servant salaries which are covered by the Government recurrent budget).

4. DNTP equipment will be redistributed according to each region's programmed routine maintenance tasks on the priority network, each piece of equipment being used ideally about 160 days per year. However, due to logistic reasons for large and outlying regions, the average usage per piece of equipment will be much less than this ideal ratio.

5. Table 3 shows base costs and annual totals including contingencies while Table 6 shows the financing. IDA and SDC will finance 90% of the routine road maintenance costs (corresponding to 100% of the costs net of taxes) for July-December 1985. Thereafter, the share of routine road maintenance costs externally financed will decrease (76% in 1986, 61% in 1987 and 46% in 1988) as illustrated in the following graph:

### *Routine Road Maintenance*

#### Financing



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Annual Strategy for Routine Maintenance (in Units per km)

Table 1: Strategie Annuelle d'Entretien Courant

Classe Longueur	Tache	(en unités par km)										Quant.	Prix Unit.	Total (Millions FCFA)	Tache
		Routes Revetues			Routes Non Revetues										
Unité	RA	RB	RC	A	B	C	D	E	F	G					
11 km	0	0	0	2	1.5	1	1	1	0	0	7038	17480	123.0	Reprofilage a sec	
12 km	0	0	0	1	0.5	0	0	0	0	0	717	137437	98.5	Reprofilage-compactage	
13 m3	0	0	0	30	0	0	0	0	0	0	9150	2981	27.3	Rechargements partiels	
14 m3	0	0	0	40	40	20	15	10	0	0	121045	2586	313.0	Point-a-temps	
21 m2	90	60	30	0	0	0	0	0	0	0	107520	2132	231.4	Emploi partiel au bitume	
31 km	1.2	1.1	1	0.3	0.2	0.1	0	0	0	0	2531	19042	48.2	Curage fosses et ouvrages	
32 km	0.8	0.4	0.4	0	0	0	0	0	0	0	1094	56605	61.9	Entretien léger des accotements	
33 km	0.2	0.16	0.12	0	0	0	0	0	0	0	294	484500	142.5	Rechargement des accotements	
34 unite	0.2	0.1	0.1	0.1	0.05	0.02	0.02	0.01	0	0	379	250000	94.8	Entretien des ouvrages	
35 poste	0	0	0	0.02	0.02	0.02	0.01	0.009	0	0	94	90712	8.5	Barrieres de pluie	
36 poste	0.046	0.046	0.046	0.034	0.034	0.034	0.02	0.02	0	0.042	284	87401	24.8	Comptages routiers	
37 unite	0.05	0.05	0.05	0.05	0.05	0.05	0.023	0.023	0	0	330	38845	12.8	Signalisation	
38 m2	0.31	0.31	0.31	0.3	0.3	0.3	0.05	0	0	0	1463	25	40.1	Debroussaillage	
39 m3	0	0	0	7.2	7.2	7.2	6.9	6.9	0	0	49979	273	13.6	Donnilage	
Cout au km de route (milliers FCFA)															
a.FCFA/km	415	293	198	405	223	85	67	51	0	0	4 Grand Total =		1248.4 pour km	8205 unit/km	151

Logueurs	Classes d'entretien										Quantites par tache d'entretien								
	RA	RB	RC	A	B	C	D	E	F	G	11	12	13	14	21	31	32	33	
Kayes 11	0	0	0	0	134	297	0	93	381	0	391	67	0	12230	0	36.5	0	0	
Kita 17	0	0	0	0	0	107	0	471	0	0	378	0	0	4850	0	10.7	0	0	
Niara	0	0	0	0	111	0	327	256	799	0	749.5	55.5	0	11905	0	22.2	0	0	
Kaniaba	0	0	6	0	0	178	0	46	95	0	224	0	0	4028	180	23.8	2.4	0.72	
Kolikoro 21	346	0	14	146	203	58	0	48	307	0	702.5	247.5	4380	15600	31560	519.4	282.4	70.88	
Kolokani 22	0	0	0	77	0	0	64	0	764	0	218	77	2310	4040	0	23.1	0	0	
Dicoula 23	0	0	0	40	40	247	0	195	182	0	582	66	1290	10090	0	44.7	0	0	
Sikasso 31	0	202	166	0	44	58	0	0	0	0	124	22	0	2920	17100	402.8	187.6	52.24	
Koutiala 32	0	73	286	0	0	0	0	0	168	0	0	0	0	0	12960	366.3	158.2	46	
Bougouni 33	11	99	0	0	16	398	0	0	49	0	422	8	0	8600	6930	145.1	68.2	18.04	
Segou 41	42	185	63	42	170	0	0	228	121	0	567	127	1260	10740	16770	343.5	149.8	45.36	
Sao 42	0	197	61	0	46	0	0	0	120	0	69	23	0	1840	13650	286.9	142.6	38.80	
Sevare 51	13	111	0	0	59	212	0	137	142	58	437.5	29.5	0	7970	7830	170.7	77	20.36	
Boumza 52	0	0	0	0	0	65	0	315	137	350	380	0	0	4430	0	6.5	0	0	
Gao 61	0	0	0	0	0	195	0	537	743	171	732	0	0	9270	0	19.5	0	0	
Ansongo 62	0	0	0	0	0	112	0	0	395	0	112	0	0	2240	0	11.2	0	0	
Yombouct 71	0	9	0	0	0	242	0	184	184	0	426	0	0	6680	540	34.1	5.4	1.44	
Bira 72	0	0	0	0	0	35	0	88	125	0	123	0	0	1580	0	3.5	0	0	
Total	412	876	596	305	823	2204	391	2598	4672	579	7657.5	716.5	9130	121045	107520	2530.5	1093.6	294.08	
Total/type	1884			3332			2989		5251										
Grand Total =	13456																		

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Table 2: ROUTINE ROAD MAINTENANCE OPERATIONS

Detailed Cost Table

Unit	Quantity					Unit Cost (CFAF)	Totals Including Contingencies (US\$ '000)					Parameters							
	1985	1986	1987	1988	1989		Total	1985	1986	1987	1988	1989	Total	Phy. Cont. Rate	For. Exch.	Gross Tax Rate	Summary Account		
<b>I. RECURRENT COSTS</b>																			
1110-Dry Grading	km	3,519	7,038	7,038	7,038	-	24,833	19,368	143	303	327	393	-	1,125	0	0.45	0.1	NFA1	
1120-Grading-Compacting	km	358.5	717	717	717	-	2,509.5	152,368	114	243	262	282	-	901	0	0.45	0.1	NFA1	
1130-Spot Regravelling	cubic meter	4,575	9,150	9,150	9,150	-	32,025	3,303	32	87	72	78	-	249	0	0.45	0.1	NFA1	
1140-Laterite Patching	cubic meter	89,522.5	121,045	121,045	121,045	-	423,657.5	2,885	383	771	831	887	-	2,882	0	0.45	0.1	NFA1	
1150-Bitumen Patching	square meter	53,760	107,520	107,520	107,520	-	376,320	2,384	268	570	614	683	-	2,115	0	0.45	0.1	NFA1	
1160-Drainage Cleaning	km	1,265.5	2,531	2,531	2,531	-	8,858.5	21,119	58	119	120	138	-	441	0	0.45	0.1	NFA1	
1170-Shoulder Maintenance	km	547	1,094	1,094	1,094	-	3,829	62,714	72	153	164	178	-	578	0	0.45	0.1	NFA1	
1180-Shoulder Regravelling	km	147	294	294	294	-	1,029	536,787	165	351	378	408	-	1,302	0	0.45	0.1	NFA1	
1190-Bridge Maintenance	unit	190	380	380	380	-	1,330	278,880	110	220	232	272	-	889	0	0.45	0.1	NFA1	
1200-Rain Barrier	post	46	92	92	92	-	322	100,502	10	21	22	24	-	76	0	0.45	0.1	NFA1	
1210-Traffic Counts	post	142	284	284	284	-	994	88,833	29	61	66	71	-	227	0	0.45	0.1	NFA1	
1220-Road signs	unit	165	330	330	330	-	1,155	43,037	15	32	34	37	-	117	0	0.45	0.1	NFA1	
1230-Vegetation Clearing	square meter	891,950	1,603,900	1,603,900	1,603,900	-	5,613,650	28	48	99	108	115	-	387	0	0.45	0.1	NFA1	
1240-Sand Clearing	cubic meter	25,000	50,000	50,000	50,000	-	175,000	392	18	34	38	39	-	129	0	0.45	0.1	NFA1	
<b>Total RECURRENT COSTS</b>																			
<b>Total</b>																			
								1,438	3,056	3,293	3,958	-	11,343						
								1,438	3,056	3,293	3,958	-	11,343						

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Table 3: ROUTINE ROAD MAINTENANCE OPERATIONS

Detailed Cost Table

	Base Costs (CFAF Million)					Totals Including Contingencies (CFAF Million)					Totals Including Contingencies (US\$ '000)					Breakdown of Totals Incl. Cont (US\$ '000)			
	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total	For.	Exch.	Duties & Taxes	Total
<b>I. RECURRENT COSTS</b>																			
1110-Dry Grading	68	128	136	136	- 477	70	148	160	173	- 551	143	303	327	353	- 1,125	528	484	112	1,125
1120-Grading-Compacting	55	109	109	109	- 382	56	119	128	138	- 441	114	243	262	282	- 901	423	388	90	901
1130-Spot Regraveling	15	30	30	30	- 106	15	33	35	38	- 122	32	67	72	78	- 249	117	107	25	249
1140-Laterite Patching	173	347	347	347	- 1,214	178	378	407	440	- 1,402	383	771	831	897	- 2,882	1,344	1,232	266	2,882
1150-Bitumen Patching	128	256	256	256	- 887	131	278	301	325	- 1,037	268	570	614	663	- 2,115	893	911	212	2,115
1160-Drainage Cleaning	27	53	53	53	- 187	27	58	63	68	- 218	56	119	128	138	- 441	207	190	44	441
1170-Shoulder Maintenance	34	68	68	68	- 240	35	75	81	87	- 277	72	153	164	178	- 566	266	244	57	566
1180-Shoulder Regraveling	78	156	156	156	- 552	81	172	185	200	- 638	165	351	378	408	- 1,392	611	561	130	1,392
1190-Bridge Maintenance	53	105	105	105	- 368	54	115	124	133	- 428	110	234	252	272	- 869	468	374	87	869
1200-Rain Barrier	5	9	9	9	- 32	5	10	11	12	- 37	10	21	22	24	- 78	36	33	8	78
1210-Traffic Counts	14	28	28	28	- 96	14	30	32	35	- 111	28	61	66	71	- 227	107	98	23	227
1220-Road signs	7	14	14	14	- 50	7	15	17	18	- 57	15	32	34	37	- 117	55	50	12	117
1230-Vegetation Clearing	22	44	44	44	- 155	23	48	52	56	- 180	48	99	106	119	- 387	172	158	37	387
1240-Sand Clearing	8	15	15	15	- 53	8	18	18	19	- 61	18	34	36	39	- 125	59	54	12	125
<b>Total RECURRENT COSTS</b>	<b>687</b>	<b>1,374</b>	<b>1,374</b>	<b>1,374</b>	<b>- 4,811</b>	<b>704</b>	<b>1,497</b>	<b>1,614</b>	<b>1,743</b>	<b>- 5,558</b>	<b>1,438</b>	<b>3,058</b>	<b>3,293</b>	<b>3,550</b>	<b>- 11,343</b>	<b>5,325</b>	<b>4,883</b>	<b>1,134</b>	<b>11,343</b>
<b>Total</b>	<b>687</b>	<b>1,374</b>	<b>1,374</b>	<b>1,374</b>	<b>- 4,811</b>	<b>704</b>	<b>1,497</b>	<b>1,614</b>	<b>1,743</b>	<b>- 5,558</b>	<b>1,438</b>	<b>3,058</b>	<b>3,293</b>	<b>3,550</b>	<b>- 11,343</b>	<b>5,325</b>	<b>4,883</b>	<b>1,134</b>	<b>11,343</b>

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Table 4: ROUTINE ROAD MAINTENANCE OPERATIONS

Detailed Cost Table

	Totals Including Contingencies (US\$ '000)						Expenditures by Financiers (US\$ '000)																		
							INTERNATIONAL DEVELOPMENT ASSOCIATION					SWISS DEVELOPMENT COOPERATION					GOVERNMENT OF MALI								
	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	
<b>I. RECURRENT COSTS</b>																									
1110-Dry Grading	143	303	327	353	-	1,125	85	152	132	108	-	478	43	77	87	55	-	241	14	75	128	190	-	407	
1120-Grading-Compacting	114	243	282	282	-	801	68	122	106	87	-	383	34	81	53	44	-	192	11	60	103	152	-	326	
1130-Spot Regravelling	32	87	72	78	-	249	18	34	29	24	-	106	19	17	15	12	-	53	3	17	28	42	-	90	
1140-Laterite Patching	383	771	831	897	-	2,882	217	387	336	276	-	1,215	109	195	169	139	-	512	38	190	326	483	-	1,036	
1150-Bitumen Patching	260	570	614	663	-	2,115	180	286	248	204	-	898	81	144	125	103	-	453	27	140	241	357	-	765	
1160-Drainage Cleaning	58	119	120	130	-	441	33	60	52	42	-	187	17	30	28	21	-	84	8	20	50	74	-	159	
1170-Shoulder Maintenance	72	153	164	178	-	566	43	78	68	55	-	249	22	39	33	27	-	121	7	38	84	98	-	209	
1180-Shoulder Regravelling	185	391	378	408	-	1,362	99	178	153	125	-	553	50	89	77	63	-	279	17	86	148	220	-	471	
1190-Bridge Maintenance	110	234	252	272	-	868	66	117	102	84	-	369	33	59	51	42	-	186	11	58	99	147	-	314	
1200-Rain Barrier	10	21	22	24	-	76	6	10	9	7	-	32	3	5	5	4	-	16	1	5	9	13	-	28	
1210-Traffic Counts	29	81	86	71	-	227	17	31	27	22	-	98	9	15	13	11	-	49	3	15	26	38	-	82	
1220-Road signs	15	32	34	37	-	117	8	16	14	11	-	50	4	8	7	8	-	25	1	8	13	20	-	42	
1230-Vegetation Clearing	48	89	106	115	-	367	28	50	43	35	-	156	14	25	22	18	-	78	5	24	42	62	-	133	
1240-Sand Clearing	18	34	36	39	-	125	9	17	15	12	-	53	5	8	7	8	-	27	2	8	14	21	-	45	
<b>Total RECURRENT COSTS</b>	<b>1,438</b>	<b>3,050</b>	<b>3,293</b>	<b>3,556</b>	<b>-</b>	<b>11,343</b>	<b>860</b>	<b>1,532</b>	<b>1,331</b>	<b>1,093</b>	<b>-</b>	<b>4,817</b>	<b>433</b>	<b>772</b>	<b>871</b>	<b>550</b>	<b>-</b>	<b>2,426</b>	<b>144</b>	<b>752</b>	<b>1,291</b>	<b>1,913</b>	<b>-</b>	<b>4,100</b>	
<b>Total</b>	<b>1,438</b>	<b>3,050</b>	<b>3,293</b>	<b>3,556</b>	<b>-</b>	<b>11,343</b>	<b>860</b>	<b>1,532</b>	<b>1,331</b>	<b>1,093</b>	<b>-</b>	<b>4,817</b>	<b>433</b>	<b>772</b>	<b>871</b>	<b>550</b>	<b>-</b>	<b>2,426</b>	<b>144</b>	<b>752</b>	<b>1,291</b>	<b>1,913</b>	<b>-</b>	<b>4,100</b>	

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MALI

FIFTH HIGHWAY PROJECT

Termes de Référence Sommaires pour l'Assistance

Technique aux Services STN et SRR de la DNTP

1. Pour assister le Service des Travaux Neufs (STN) et le Service de Renforcement des Routes (SRR) dans la mise en oeuvre du programme de remise en état et d'entretien périodique en régie des routes prioritaires, la Direction Nationale des Travaux Publics (DNTP) souhaite faire appel à l'assistance technique de quatre experts. Chaque expert formera équipe avec un homologue malien qualifié qui recevra ainsi une formation sur le tas et sera le récepteur privilégié du transfert de savoir-faire dans le domaine de la pratique des chantiers de travaux publics qui est un objectif essentiel de cette assistance technique. Chaque équipe expert-homologue occupera une position hiérarchique au sein des STN et SRR et sera responsable du travail de leur unité. En particulier l'équipe proposera au supérieur hiérarchique l'embauche, le licenciement ou le transfert du personnel de l'unité, l'attribution de primes mensuelles de production et contrôlera le remboursement des frais et primes de déplacement.

2. Le personnel de l'assistance technique comprendra les experts suivants (24 hommes-mois par expert):

(a) Un chef de brigade de rechargement qui sera un technicien des travaux publics avec une formation de base équivalente au minimum au baccalauréat technique et aura un minimum de 10 ans d'expérience en qualité de chef de chantier ou responsable d'atelier de terrassement d'une entreprise de travaux publics.

L'équipe expert-homologue aura la responsabilité de la direction de la brigade du STN chargée d'exécuter en régie le rechargement et la remise en état des routes non-revêtues et devra en particulier:

- programmer et estimer l'exécution des tâches techniques élémentaires;
- programmer et estimer l'utilisation correspondante du personnel, du matériel et des approvisionnements nécessaires ainsi que la maintenance du matériel;

- organiser le chantier de la manière la plus efficace ainsi que les campements, magasins et atelier;
- tenir la comptabilité de la brigade en ce qui concerne en particulier l'utilisation des matériels, matériaux et approvisionnements;
- tenir la comptabilité des travaux exécutés et préparer un rapport mensuel d'avancement.

(b) Un chef de brigade d'enduisage qui sera un technicien des travaux publics avec une formation de base équivalente au minimum au baccalauréat technique et aura un minimum de 10 ans d'expérience en qualité de chef de chantier ou responsable d'atelier d'enduisage d'une entreprise de travaux publics.

L'équipe expert-homologue aura la responsabilité de la direction de la brigade du SRR chargée d'exécuter en régie la remise en état et l'enduisage des routes revêtues et de l'usine de production d'émulsion et devra en particulier:

- programmer et estimer l'exécution des tâches techniques élémentaires;
- programmer et estimer l'utilisation correspondante du personnel, du matériel et des approvisionnements nécessaires ainsi que l'entretien du matériel;
- organiser l'usine de production et le chantier de la manière la plus efficace ainsi que les campements, magasins et ateliers;
- tenir la comptabilité de la brigade et de l'usine en ce qui concerne en particulier l'utilisation des matériels, matériaux et approvisionnements;
- tenir la comptabilité des travaux exécutés et préparer un rapport mensuel d'avancement.

(c) Deux mécaniciens de chantier qui auront une formation de base minimum équivalente au Brevet Supérieur et une expérience professionnelle minimum de 15 ans sur la maintenance et réparation des matériels et véhicules de travaux publics.

Chaque équipe expert-homologue aura la responsabilité de la maintenance du matériel d'une brigade et devra en particulier:

- programmer et estimer les besoins en pièces d'usure et lubrifiants;
- passer commande des pièces détachées nécessaires;
- organiser les magasins et ateliers de chantier;
- effectuer ou faire effectuer les opérations mécaniques nécessaires y compris les contrôles préventifs quotidiens et les réparations qu'il est raisonnable d'effectuer sur chantier;
- mettre à jour les fiches des opérations effectuées sur les engins et véhicules et la comptabilité matière des pièces détachées et lubrifiants.

3. Le rapport mensuel d'avancement des chefs de brigade comportera en particulier:

- le détail des travaux exécutés
- le compte rendu d'utilisation des engins
- le compte rendu des carburants et ingrédients consommés rapporté à la production correspondante
- le programme des travaux du mois suivant
- les difficultés rencontrés
- les suggestions ou commentaires.

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October 1984

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Table 1: PERIODIC MAINTENANCE AND REHABILITATION

Detailed Cost Table

	Unit	Quantity					Unit Cost (CFAF)	Totals Including Contingencies (USS '000)					Parameters					
		1965	1966	1967	1968	1969		Total	1965	1966	1967	1968	1969	Total	Phy. Cont. Rate	For. Each. Yrs	Gross Rate	Summary Account
<b>I. INVESTMENT COSTS</b>																		
<b>A. GRAVEL ROADS</b>																		
<b>1. BY FORCE ACCOUNT</b>																		
2220-Bougouni-Kedogo	km	22	82	-	-	-	165	5,677,728	269	1,018	-	-	-	1,267	0.1	0.68	0.1	NFA2
2230-Kedogo-Kalana	km	-	7	23	-	-	30	8,710,864	-	115	407	-	-	522	0.1	0.68	0.1	NFA2
2240-Incentives	per year	0.5	1	1	1	-	3.5	18,301,540	20	43	48	50	-	159	0	0	0	NFA2
<b>Sub-Total BY FORCE ACCOUNT</b>									<b>289</b>	<b>1,176</b>	<b>453</b>	<b>70</b>	<b>-</b>	<b>1,698</b>				
<b>2. BY CONTRACTOR</b>																		
2310-Bjanna Spur	km	-	-	23	12	-	35	11,414,102	-	-	692	390	-	1,082	0.1	0.70	0.07	ICM1
2320-Kayeo-Niara	km	-	-	58	118	58	237	7,661,905	-	-	1,998	2,392	1,281	4,770	0.1	0.70	0.07	ICM4
2330-Bougouni-Manarbare	km	-	-	57	68	-	123	8,738,648	-	-	1,812	1,266	-	2,378	0.1	0.70	0.07	ICM2
<b>Sub-Total BY CONTRACTOR</b>									<b>-</b>	<b>-</b>	<b>2,692</b>	<b>4,047</b>	<b>1,281</b>	<b>8,130</b>				
<b>Sub-Total GRAVEL ROADS</b>									<b>289</b>	<b>1,176</b>	<b>3,255</b>	<b>4,697</b>	<b>1,281</b>	<b>10,008</b>				
<b>B. PAVED ROADS</b>																		
<b>1. BY FORCE ACCOUNT</b>																		
2410-Segou-Parhala	km	-	-	35	-	-	35	9,831,587	-	-	907	-	-	907	0.1	0.68	0.1	NFA2
2420-Faladie-Segou	km	28	122	-	-	-	150	5,937,228	183	1,771	-	-	-	2,154	0.1	0.68	0.1	NFA2
2430-Incentives	per year	0.5	1	1	1	-	3.5	18,521,340	19	41	44	48	-	153	0	0	0	NFA2
<b>Sub-Total BY FORCE ACCOUNT</b>									<b>402</b>	<b>1,813</b>	<b>951</b>	<b>48</b>	<b>-</b>	<b>3,216</b>				
<b>2. BY CONTRACTOR</b>																		
2510-Bougouni-Sikasso	km	-	-	83	131	-	214	10,823,105	-	-	2,324	3,861	-	6,185	0.1	0.70	0.07	ICM5
2520-Sikasso-Zegoua	km	-	-	-	10	83	93	10,823,105	-	-	-	392	2,710	3,012	0.1	0.70	0.07	ICM3
<b>Sub-Total BY CONTRACTOR</b>									<b>-</b>	<b>-</b>	<b>2,324</b>	<b>4,253</b>	<b>2,710</b>	<b>9,197</b>				
<b>Sub-Total PAVED ROADS</b>									<b>402</b>	<b>1,813</b>	<b>3,275</b>	<b>4,311</b>	<b>2,710</b>	<b>12,510</b>				
<b>C. TECHNICAL ASSISTANCE</b>																		
2610-Technical Assistance to STN	man-month	8	20	20	-	-	48	4,607,208	77	205	221	-	-	503	0	0.01	0.05	GT43
2620-Technical Assistance to SDR	man-month	8	20	20	-	-	48	4,607,208	77	205	221	-	-	503	0	0.01	0.05	GT43
2630-Supervision	man-month	-	5	10	10	5	30	4,722,368	-	52	113	122	64	350	0	0.01	0	GT47
2640-Light Vehicle	unit	-	1	-	-	-	1	8,357,105	-	14	-	-	-	14	0	1	0	IC24
2650-Station Wagon 4x4	unit	-	-	-	-	-	-	8,498,681	17	-	-	-	-	17	0	1	0	IC24
2660-Pick-up Truck 4x4	unit	-	-	-	-	-	-	7,512,943	18	-	-	-	-	18	0	1	0	IC24
2670-Spare parts (10%)		-	-	-	-	-	-		3	1	-	-	-	3	0	1	0	IC24
<b>Sub-Total TECHNICAL ASSISTANCE</b>									<b>190</b>	<b>478</b>	<b>555</b>	<b>122</b>	<b>64</b>	<b>1,411</b>				
<b>Total INVESTMENT COSTS</b>									<b>691</b>	<b>2,466</b>	<b>7,064</b>	<b>8,931</b>	<b>4,057</b>	<b>24,019</b>				
<b>Total</b>									<b>691</b>	<b>2,466</b>	<b>7,064</b>	<b>8,931</b>	<b>4,057</b>	<b>24,019</b>				

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FIFTH HIGHWAY PROJECT

Table 2: PERIODIC MAINTENANCE AND REHABILITATION

Detailed Cost Table

	Base Costs (CFAF Million)					Totals Including Contingencies (CFAF Million)					Totals Including Contingencies (US\$ '000)					Breakdown of Totals Incl. Cont (US\$ '000)								
	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	for Each	Local	Unalloc'd	Total		
<b>I. INVESTMENT COSTS</b>																								
<b>A. GRAVEL ROADS</b>																								
<b>1. BY FORCE ACCOUNT</b>																								
2220-Bougouni-Badogo	117	416	-	-	-	533	132	499	-	-	-	631	269	1,018	-	-	-	1,287	893	295	129	1,287		
2230-Badogo-Kalana	-	47	154	-	-	201	-	56	199	-	-	256	-	115	467	-	-	522	362	167	52	522		
2240-Incentives	10	19	19	19	-	58	10	21	23	24	-	78	20	43	48	50	-	159	-	159	-	-	159	
<b>Sub-Total BY FORCE ACCOUNT</b>	<b>128</b>	<b>483</b>	<b>174</b>	<b>19</b>	<b>-</b>	<b>602</b>	<b>142</b>	<b>576</b>	<b>222</b>	<b>24</b>	<b>-</b>	<b>664</b>	<b>289</b>	<b>1,176</b>	<b>453</b>	<b>50</b>	<b>-</b>	<b>1,668</b>	<b>1,255</b>	<b>522</b>	<b>181</b>	<b>1,668</b>		
<b>2. BY CONTRACTOR</b>																								
2310-Sigona Spur	-	-	263	137	-	399	-	-	339	181	-	530	-	-	899	390	-	1,462	865	141	78	1,462		
2320-Kayou-Niara	-	-	417	840	417	1,674	-	-	538	1,172	628	2,338	-	-	1,998	2,392	1,281	4,770	3,818	620	324	4,770		
2330-Bougouni-Renardiere	-	-	348	445	-	820	-	-	496	920	-	1,416	-	-	1,812	1,260	-	2,278	1,822	290	199	2,278		
<b>Sub-Total BY CONTRACTOR</b>	<b>-</b>	<b>-</b>	<b>1,028</b>	<b>1,422</b>	<b>417</b>	<b>2,967</b>	<b>-</b>	<b>-</b>	<b>1,373</b>	<b>1,983</b>	<b>628</b>	<b>3,984</b>	<b>-</b>	<b>-</b>	<b>2,909</b>	<b>4,047</b>	<b>1,281</b>	<b>8,130</b>	<b>6,504</b>	<b>1,057</b>	<b>508</b>	<b>8,130</b>		
<b>Sub-Total GRAVEL ROADS</b>	<b>128</b>	<b>483</b>	<b>1,202</b>	<b>1,441</b>	<b>417</b>	<b>3,569</b>	<b>142</b>	<b>576</b>	<b>1,595</b>	<b>2,008</b>	<b>628</b>	<b>4,648</b>	<b>289</b>	<b>1,176</b>	<b>2,355</b>	<b>4,097</b>	<b>1,281</b>	<b>10,098</b>	<b>7,759</b>	<b>1,580</b>	<b>750</b>	<b>10,098</b>		
<b>B. PAVED ROADS</b>																								
<b>1. BY FORCE ACCOUNT</b>																								
2410-Sagou-Markala	-	-	344	-	-	344	-	-	444	-	-	444	-	-	907	-	-	907	629	167	91	907		
2420-Faladie-Sagou	168	724	-	-	-	891	167	848	-	-	-	1,015	363	1,771	-	-	-	2,154	1,495	444	219	2,154		
2430-Incentives	9	19	19	19	-	58	9	20	22	23	-	75	19	41	44	48	-	152	-	152	-	-	152	
<b>Sub-Total BY FORCE ACCOUNT</b>	<b>178</b>	<b>743</b>	<b>363</b>	<b>19</b>	<b>-</b>	<b>1,300</b>	<b>197</b>	<b>880</b>	<b>456</b>	<b>23</b>	<b>-</b>	<b>1,575</b>	<b>402</b>	<b>1,813</b>	<b>951</b>	<b>48</b>	<b>-</b>	<b>2,214</b>	<b>2,124</b>	<b>760</b>	<b>306</b>	<b>2,214</b>		
<b>2. BY CONTRACTOR</b>																								
2510-Bougouni-Sikasso	-	-	882	1,392	-	2,273	-	-	1,139	1,941	-	3,079	-	-	2,324	3,961	-	6,284	3,027	817	440	6,284		
2520-Sikasso-Zogona	-	-	-	196	882	1,078	-	-	148	1,228	1,476	2,704	-	-	302	2,710	3,013	5,723	2,410	392	211	5,723		
<b>Sub-Total BY CONTRACTOR</b>	<b>-</b>	<b>-</b>	<b>882</b>	<b>1,490</b>	<b>882</b>	<b>3,261</b>	<b>-</b>	<b>-</b>	<b>1,139</b>	<b>2,609</b>	<b>1,328</b>	<b>4,555</b>	<b>-</b>	<b>-</b>	<b>2,324</b>	<b>4,263</b>	<b>2,710</b>	<b>8,297</b>	<b>7,437</b>	<b>1,209</b>	<b>651</b>	<b>8,297</b>		
<b>Sub-Total PAVED ROADS</b>	<b>178</b>	<b>743</b>	<b>1,246</b>	<b>1,510</b>	<b>882</b>	<b>4,561</b>	<b>197</b>	<b>880</b>	<b>1,605</b>	<b>2,112</b>	<b>1,328</b>	<b>6,130</b>	<b>402</b>	<b>1,813</b>	<b>2,275</b>	<b>4,311</b>	<b>2,710</b>	<b>12,510</b>	<b>9,562</b>	<b>1,969</b>	<b>957</b>	<b>12,510</b>		
<b>C. TECHNICAL ASSISTANCE</b>																								
2610-Technical Assistance to STR	37	92	92	-	-	221	38	100	100	-	-	238	77	205	221	-	-	503	459	18	25	503		
2620-Technical Assistance to SRB	37	92	92	-	-	221	38	100	100	-	-	238	77	205	221	-	-	503	459	18	25	503		
2630-Supervision	-	24	47	47	24	142	-	20	55	90	32	173	-	52	113	122	68	354	223	13	16	354		
2640-Light Vehicle	-	8	-	-	-	8	-	7	-	-	-	7	-	14	-	-	-	14	14	-	-	14		
2650-Station Wagon 6x4	8	-	-	-	-	8	8	-	-	-	-	8	17	-	-	-	-	17	17	-	-	17		
2660-Pick-up Truck 6x4	8	-	-	-	-	8	8	-	-	-	-	8	17	-	-	-	-	18	18	-	-	18		
2670-Spare parts (100)	3	1	-	-	-	2	2	1	-	-	-	2	3	1	-	-	-	5	5	-	-	5		
<b>Sub-Total TECHNICAL ASSISTANCE</b>	<b>81</b>	<b>215</b>	<b>222</b>	<b>47</b>	<b>24</b>	<b>600</b>	<b>83</b>	<b>234</b>	<b>272</b>	<b>60</b>	<b>32</b>	<b>601</b>	<b>190</b>	<b>470</b>	<b>225</b>	<b>122</b>	<b>68</b>	<b>1,411</b>	<b>1,253</b>	<b>50</b>	<b>66</b>	<b>1,411</b>		
<b>Total INVESTMENT COSTS</b>	<b>303</b>	<b>1,440</b>	<b>2,713</b>	<b>3,005</b>	<b>1,322</b>	<b>8,073</b>	<b>422</b>	<b>1,690</b>	<b>3,471</b>	<b>4,160</b>	<b>1,960</b>	<b>11,709</b>	<b>681</b>	<b>2,400</b>	<b>7,004</b>	<b>6,531</b>	<b>4,057</b>	<b>24,019</b>	<b>16,014</b>	<b>2,631</b>	<b>1,775</b>	<b>24,019</b>		
<b>Total</b>	<b>303</b>	<b>1,440</b>	<b>2,713</b>	<b>3,005</b>	<b>1,322</b>	<b>8,073</b>	<b>422</b>	<b>1,690</b>	<b>3,471</b>	<b>4,160</b>	<b>1,960</b>	<b>11,709</b>	<b>681</b>	<b>2,400</b>	<b>7,004</b>	<b>6,531</b>	<b>4,057</b>	<b>24,019</b>	<b>16,014</b>	<b>2,631</b>	<b>1,775</b>	<b>24,019</b>		

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CINQUIEME PROJET ROUTIER

Le Service du Matériel des Travaux Publics

A. SITUATION ACTUELLE

1. Mission du SMTP

Le SMTP (Service du Matériel des Travaux Publics) est un service public placé sous l'autorité du Ministère des Transports et des Travaux Publics et rattaché à la Direction Nationale des Travaux Publics (DNTP). Sa mission essentielle est de:

- approvisionner les Services Techniques de la DNTP en matériels de travaux publics et en pièces de rechange;
- effectuer ou faire effectuer sous sa responsabilité toutes les réparations de l'ensemble du matériel de la DNTP;
- contrôler l'utilisation des engins et véhicules de la DNTP.

2. Structure du SMTP

Le SMTP est dirigé par un directeur assisté d'un directeur adjoint et comprend:

2.1 La Division Approvisionnement chargée des achats; de la gestion du magasin central, et de la fourniture des pièces aux utilisateurs (atelier central et services régionaux).

2.2 La Division Atelier chargée de la révision générale et des réparations majeures sur les équipements qui lui sont envoyés par les utilisateurs.

2.3 La Division Technique chargée en principe de:

- contrôler l'utilisation et l'entretien du matériel par les utilisateurs ainsi que la qualité des réparations effectuées par l'atelier central;
- contrôler les demandes de pièces de rechanges faites par les utilisateurs;
- constituer et tenir à jour la documentation permettant de suivre l'utilisation du matériel (fiches individuelles du matériel, rapports régionaux, etc.);
- fournir à la comptabilité analytique les données permettant d'établir les coûts d'exploitation du matériel.

Outre le personnel du service central, la Division Technique dispose de 10 Inspecteurs Techniques placés auprès des Directeurs Régionaux des T.P. et des Services Centraux, chargés en principe de contrôler l'utilisation du matériel et les réparations effectuées localement et d'approvisionner les pièces de rechanges nécessaires à ces réparations.

2.4 La Division Comptabilité - Personnel - Affaires Générales qui est chargée de:

- la tenue de la comptabilité administrative,
- la gestion du personnel,
- l'établissement et du suivi des marchés,
- affaires générales.

### 3. Affectation, Utilisation et Entretien du Matériel

Chaque service utilisateur est détenteur du matériel qui lui est affecté, et l'utilise selon ses besoins, en fonction des crédits qui lui sont alloués. Le contrôle de la maintenance et de l'utilisation est en principe assurée par l'inspecteur technique du SMTP basé dans chaque région.

Les opérations de maintenance comprennent 5 niveaux différents dont le contenu est le suivant:

- niveau 1: entretien périodique - lubrification
- niveau 2: réparations mineures
- niveau 3: réparations intermédiaires
- niveau 4 et 5: réparations majeures et révisions générales.

En ce qui concerne la maintenance du matériel, il existe deux procédures différentes selon qu'il s'agit (a) des unités relevant directement de la DNTP (Directions Régionales); ou (b) des Services Centraux (STN - SRR).

Pour les Direction Régionales, les interventions faites par les unités sont limitées au 3 premiers échelons d'intervention, les pièces de rechange nécessaires étant à la charge du SMTP. Les interventions des 4ème et 5ème échelons de réparation sont effectuées par le SMTP et facturées à l'unité. Le matériel est loué à l'unité utilisatrice selon un barème de location approuvé par la Direction Nationale des T.P., et le coût des réparations faites par le SMTP est déduit des crédits de l'unité concernée, et est crédité au SMTP.

Pour les Services Centraux, la DNTP, par le canal du SMTP met à la disposition du Service, le personnel Mécanicien pour assurer les réparations jusqu'au 3ème Echelon de réparation, les pièces de rechange et pièces d'usure nécessaires, et exécute les interventions relevant des 4ème et 5ème Echelons de réparations. Le matériel loué au Service est facturé selon un tarif de location de matériel tenant compte des

prestations fournies. Comme précédemment le montant de la facture est déduit des crédits du Service et credité au SMTP.

#### 4. Flotte du Matériel de Genie Civil

<u>Engins et Vehicules</u>	<u>Quantité</u>	<u>Bon Etat</u> %	<u>Etat Moyen</u> %	<u>Hors Service</u> %	<u>Age Moyen</u> (années)
Bulldozer	30	10	50	40	11
Niveleuse	48	19	43	38	12,5
Chargeuse	31	22	17	61	8,5
Tracteur Agricole	15	65	-	35	4,3
Compacteur	6	-	35	65	6,9
Camion Benne	146	25	35	40	8,9
Camion Citerne	57	2	54	44	10
Véhicule Léger	142	11	24	65	7

Le tableau ci-dessus montre la composition, de la flotte du matériel de la DNTF ainsi que l'âge et la disponibilité moyenne des principales catégories d'engins. Cette flotte présente en outre les caractéristiques suivantes:

- (a) L'homogénéité est relativement satisfaisante (60% environ des engins de terrassement sont de marque Caterpillar et 55 % des camions sont de marque Berliet).
- (b) Bien que l'âge moyen du matériel de terrassement soit relativement élevé, le taux d'usure des engins est satisfaisant du fait de leur très faible taux d'utilisation. Faute de moyens de paiement les engins restent en effet de longues périodes à l'arrêt en attente de lubrifiant, de carburant et de pièces de rechanges.

#### 5. Installations de Maintenance

D'une manière générale les installations de maintenance sont pauvrement équipées. Dans l'intérieur du pays la plupart des machines et équipements d'atelier sont hors d'usage et les bâtiments en très mauvais état (installation électrique, etc.). La situation de l'atelier central est meilleure au point de vue bâtiment, mais la plupart des machines sont anciennes et plusieurs d'entre elles devront être remplacées ou réparées (banc d'injection, rectifieuse de vilebrequins, banc d'essais moteurs, etc.) Certains aménagements mineurs doivent également être apportés aux bâtiments.

## 6. Le Personnel

D'une manière générale la productivité du personnel est très faible. Ceci provient moins de ses capacités techniques que de son manque de motivation, de son attitude et de l'absence quasi totale de supervision, surtout à l'intérieur du pays. Cette situation est due essentiellement au très faible niveau de rémunération du personnel qui pour les plus défavorisés, ne permet pas de faire vivre une famille et à l'irrégularité du paiement des salaires (retards pouvant atteindre plusieurs mois). Il en résulte que le personnel cherche à augmenter ses revenus en faisant des travaux parallèles parfois même à l'intérieur des installations et avec l'outillage du SMTP, et que les responsables ont une attitude qui conduit à considérer les absences et larcins comme des "avantages" destinés à compenser le faible niveau des rémunérations. (par ex: la revente de deux litres d'essence par jour permet de doubler un salaire de chauffeur; la revente d'un démarreur de camion équivaut à deux mois de salaire).

### L'Assistance Technique

L'assistance technique mise en place au SMTP au cours du Troisième Projet Routier se composait d'une équipe de 4 personnes en position de "conseillers" techniques occupant les positions suivantes:

- conseiller auprès du Directeur Technique (chef de mission);
- conseiller auprès du responsable "magasins - approvisionnements";
- conseiller auprès du chef de section moteur-machines outils;
- conseiller auprès du Chef de section "Réparation engins lourds".

Ce dernier poste de conseiller a été supprimé de l'équipe au cours du Quatrième Projet Routier. Compte tenu de l'organisation actuelle de la maintenance à la DNTP, l'activité de cette assistance technique est essentiellement concentrée à Bamako.

## B. LES CARENCES PRINCIPALES

### 1. Le Système

En réalité, le rôle du SMTP se limite aux prestations suivantes:

- fournir les pièces de rechange aux utilisateurs de matériels et le personnel mécanicien aux services centraux;
- effectuer les réparations majeures et les révisions générales.

Le SMTP a virtuellement perdu son rôle de contrôleur de l'utilisation et de la maintenance du matériel pour les raisons suivantes: les inspecteurs techniques régionaux qui représentent en principe le SMTP au niveau de l'utilisateur, dépendent en réalité des Directeurs régionaux des TP pour les questions administratives et

matérielles (notamment le logement, téléphone, etc.). De ce fait, ils ont été absorbés par les Directions Régionales et agissent bien plus comme agents de ces directions que comme représentants ou contrôleurs du SMTP. En réalité, les utilisateurs exploitent et entretiennent le matériel à leur guise et parfois à des fins privées, sans intervention notable des Inspecteurs. Ce phénomène est encore aggravé par le fait que (a) vu les distances et l'éloignement de certaines régions, les communications sont souvent très difficiles et très lentes; (b) faute de véhicules, de carburants et d'indemnités de déplacement suffisantes les agents de la Direction Technique du SMTP ne se déplacent pas hors de BAMAKO et laissent les inspecteurs techniques, sans supervision, sans soutien et livrés à eux mêmes; et (c) les inspecteurs restent trop longtemps affectés à un même poste.

## 2. Approvisionnement

Les principales carences ou lacunes du système d'approvisionnement en pièces de rechange sont externes au SMTP et proviennent essentiellement de:

- la longueur de la procédure administrative de passation des commandes ou des marchés;
- du manque de moyens de paiement pour honorer les factures des fournisseurs de pièces ou de services, en temps opportun;
- des déficiences de certains fournisseurs locaux.

Les carences internes au SMTP peuvent se résumer comme suit:

- absence de contrôle sur les magasins extérieurs à BAMAKO;
- ignorance des consommations locales réelles, des ressources disponibles en magasins régionaux ainsi que des stocks morts;
- mauvaise identification des pièces à commander et mauvaises prévisions de consommations;
- difficulté de constituer des stocks faute de moyens financiers;
- lenteurs d'approvisionnement des utilisateurs par le magasin central, dues aux difficultés de transport et communication.

Il faut cependant ajouter à ces contraintes le "délai technique" pour importer une pièce qui varie de 10 jours à 3,5 mois hors dédouanement suivant le mode d'acheminement (air ou mer).

## 3. Le Personnel

Outre le manque de motivation et l'attitude mentale du personnel tacitement acceptées par les responsables, il existe des lacunes au niveau de l'expertise et de la qualification du personnel. Cet aspect des choses est traité dans l'annexe relative à la formation du personnel.

#### 4. L'Assistance Technique

L'assistance technique au SMTP mise en place au cours du 4<sup>ème</sup> projet routier s'est avérée relativement inefficace pour les raisons suivantes.

- elle était placée en position de "conseiller" sans autorité sur le personnel et sans responsabilité sur la fonctionnement des services;
- elle était concentrée à BAMAKO et virtuellement limitée aux services centraux du SMTP;
- certaines membres de l'équipe avaient une qualification ou une adaptation insuffisante aux conditions locales;
- le choix des firmes sélectionnées est probablement inadéquat pour ce type d'assistance technique;
- enfin le manque de pièces de rechange n'a pas permis à l'assistance technique, surtout au début du projet, d'avoir l'impact attendu en termes de volume de matériel réparé.

#### C. LES REMEDES PROPOSES

Pour remédier aux principales carences, il est proposé dans le cadre du présent projet routier de prendre les mesures suivantes:

- (i) mise en place un système d'incitants susceptible d'améliorer la motivation et l'attitude mentale du personnel. Le personnel d'assistance technique sera associé à l'évaluation des mérites du personnel local. La mise en place de primes de déplacement raisonnables devraient en outre inciter la direction technique de SMTP et le personnel de supervision à se déplacer régulièrement à l'intérieur du pays;
- (ii) mise en place un programme d'assistance technique de 140 h-m avec 5 agents expatriés placés à des positions clés dans la hiérarchie du SMTP et dotés d'une autorité réelle. Il faut noter qu'un accent particulier est mis sur le contrôle et la supervision des centres régionaux de maintenance, puisque le chef de mission sera responsable de la division technique et qu'un expert sera chargé de missions de supervision dans l'intérieur du pays, ainsi que de la formation d'équipes itinérante de maintenance. Cette assistance technique sera fournie par une firme ayant une activité effective et permanente dans l'exécution, l'organisation et les méthodes de maintenance et de réparation du matériel de génie civil et/ou de transport;
- (iii) exécution par le représentant local de Caterpillar des réparations majeures et des révisions du matériel Caterpillar qu'il représente. Cette mesure déchargera l'atelier de Bamako de 60% environ de la flotte des engins de terrassement, il pourra ainsi mieux se consacrer au matériel d'autres

marques et aux camions, tandis que la révision de la totalité de la flotte Caterpillar s'effectuera dans un délai de 18 mois environ;

- (iv) recours probable aux services d'une centrale d'achats avec mise en place d'un fond de roulement permettant d'éliminer la majeure partie des contraintes et procédures actuelles de passation des marchés et de dédouanement;
- (v) réhabilitation/amélioration des installations et des équipements de l'atelier central de Bamako et des centres de maintenance répartis dans le pays.

Il est estimé que l'ensemble de ces mesures devrait permettre de rétablir vers le milieu du projet une disponibilité de l'ordre de 65% du matériel exploitable.

WAPT1  
December 1984

MALI

FIFTH HIGHWAY PROJECT

Table 1: OVERHAUL AND RENEWAL OF ROAD EQUIPMENT

Detailed Cost Table

	Unit	Quantity						Unit Cost (CFAF)	Totals Including Contingencies (US\$ '000)						Parameters						
		1985	1986	1987	1988	1989	Total		1985	1986	1987	1988	1989	Total	Phy. Cont. Rate	For. Exch. Rate	Gross Tax Rate	Summary Account			
		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
<b>I. INVESTMENT COSTS</b>																					
<b>A. NEW ROAD EQUIPMENT</b>																					
3120- Grader	unit	-	7	-	-	-	7	84,726,890	-	1,007	-	-	-	1,007	0	1	0	ICE1			
3140- Pneumatic-tired Compactor	unit	-	3	-	-	-	3	23,116,746	-	154	-	-	-	154	0	1	0	ICE1			
3245- Chip Spreader attachment	unit	-	3	-	-	-	3	1,849,340	-	12	-	-	-	12	0	1	0	ICE1			
3250- Concrete mixer	unit	-	13	-	-	-	13	2,889,593	-	84	-	-	-	84	0	1	0	ICE1			
3260- Water pump	unit	-	9	-	-	-	9	1,733,756	-	35	-	-	-	35	0	1	0	ICE1			
3265- Compressor	unit	-	3	-	-	-	3	1,733,756	-	12	-	-	-	12	0	1	0	ICE1			
3300- Light vehicle	unit	-	1	-	-	-	1	6,357,105	-	14	-	-	-	14	0	1	0	ICE1			
3305- Station wagon 4 x 4	unit	-	4	-	-	-	4	8,090,881	-	72	-	-	-	72	0	1	0	ICE1			
3310- Pick-up truck 4 x 4	unit	-	1	-	-	-	1	7,512,843	-	17	-	-	-	17	0	1	0	ICE1			
3320- Set of tools	unit	-	4	-	-	-	4	1,155,837	-	10	-	-	-	10	0	1	0	ICE1			
3330- Road signs	lump sum	-	1	-	-	-	1	11,558,373	-	26	-	-	-	26	0	1	0	ICE1			
<b>Sub-Total NEW ROAD EQUIPMENT</b>									<b>- 1,442 - - - 1,442</b>												
<b>B. INITIAL STOCK OF PARTS</b>																					
3400- Spare Parts (10% of A)		-	-	-	-	-	-	-	-	144	-	-	-	144	0	1	0	ICE1			
<b>Sub-Total INITIAL STOCK OF PARTS</b>									<b>- 144 - - - 144</b>												
<b>C. OVERHAUL OF EXISTING EQUIPMENT</b>																					
3500- Caterpillar	lump sum	0.1	0.7	0.2	-	-	1	659,442,338	218	1,408	486	-	-	2,124	0.1	0.78	0.13	OPP1			
3500- Other Makes - proprietary parts	lump sum	-	0.3	0.3	0.3	0.1	1	208,894,880	-	152	164	177	64	558	0.1	0.8	0.2	OPP2			
3700- Other Makes - non proprietary parts	lump sum	-	0.2	0.3	0.3	0.2	1	208,894,880	-	101	164	177	127	569	0.1	0.8	0.2	OPP1			
<b>Sub-Total OVERHAUL OF EXISTING EQUIPMENT</b>									<b>218 1,661 825 353 191 3,248</b>												
<b>Total INVESTMENT COSTS</b>									<b>218 3,248 825 353 191 4,835</b>												
<b>Total</b>									<b>218 3,248 825 353 191 4,835</b>												

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Table 2: OVERHAUL AND RENEWAL OF ROAD EQUIPMENT

Detailed Cost Table

	Base Costs (CFAF Million)						Totals Including Contingencies (CFAF Million)						Totals Including Contingencies (US\$ '000)						Breakdown of Totals Incl. Cont (US\$ '000)			
	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	Local (Excl. Duties & Taxes) Taxes Total			
	****	*****	*****	*****	*****	*****	****	*****	*****	*****	*****	*****	****	*****	*****	*****	*****	*****	For.	Exch.	Taxes	Total
<b>I. INVESTMENT COSTS</b>																						
<b>A. NEW ROAD EQUIPMENT</b>																						
3120- Grader	-	453	-	-	-	453	-	494	-	-	-	494	-	1,007	-	-	-	1,007	1,007	-	-	1,007
3140- Pneumatic-tired Compactor	-	69	-	-	-	69	-	76	-	-	-	76	-	154	-	-	-	154	154	-	-	154
3245- Chip Spreader attachment	-	6	-	-	-	6	-	6	-	-	-	6	-	12	-	-	-	12	12	-	-	12
3250- Concrete mixer	-	38	-	-	-	38	-	41	-	-	-	41	-	84	-	-	-	84	84	-	-	84
3260- Water pump	-	16	-	-	-	16	-	17	-	-	-	17	-	35	-	-	-	35	35	-	-	35
3285- Compressor	-	5	-	-	-	5	-	6	-	-	-	6	-	12	-	-	-	12	12	-	-	12
3300- Light vehicle	-	6	-	-	-	6	-	7	-	-	-	7	-	14	-	-	-	14	14	-	-	14
3305- Station wagon 4 x 4	-	32	-	-	-	32	-	35	-	-	-	35	-	72	-	-	-	72	72	-	-	72
3310- Pick-up truck 4 x 4	-	8	-	-	-	8	-	8	-	-	-	8	-	17	-	-	-	17	17	-	-	17
3320- Set of tools	-	5	-	-	-	5	-	5	-	-	-	5	-	10	-	-	-	10	10	-	-	10
3330- Road signs	-	12	-	-	-	12	-	13	-	-	-	13	-	26	-	-	-	26	26	-	-	26
Sub-Total NEW ROAD EQUIPMENT	-	649	-	-	-	649	-	707	-	-	-	707	-	1,442	-	-	-	1,442	1,442	-	-	1,442
<b>B. INITIAL STOCK OF PARTS</b>																						
3400- Spare Parts (10% of A)	-	65	-	-	-	65	-	71	-	-	-	71	-	144	-	-	-	144	144	-	-	144
Sub-Total INITIAL STOCK OF PARTS	-	65	-	-	-	65	-	71	-	-	-	71	-	144	-	-	-	144	144	-	-	144
<b>C. OVERHAUL OF EXISTING EQUIPMENT</b>																						
3500- Caterpillar	95	576	189	-	-	859	107	690	244	-	-	1,041	218	1,408	498	-	-	2,124	1,671	177	276	2,124
3600- Other Makes - proprietary parts	-	62	62	62	21	207	-	74	80	87	31	272	-	152	164	177	64	558	444	-	111	558
3700- Other Makes - non proprietary parts	-	41	62	62	41	207	-	50	80	87	62	279	-	101	164	177	127	569	455	-	114	569
Sub-Total OVERHAUL OF EXISTING EQUIPMENT	95	679	313	124	62	1,237	107	814	404	173	93	1,592	218	1,661	625	353	191	3,248	2,570	177	501	3,248
Total INVESTMENT COSTS	95	1,393	313	124	62	1,987	107	1,591	404	173	93	2,369	218	3,248	625	353	191	4,835	4,157	177	501	4,835
Total	95	1,393	313	124	62	1,987	107	1,591	404	173	93	2,369	218	3,248	625	353	191	4,835	4,157	177	501	4,835

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FIFTH HIGHWAY PROJECT

Table 3: OVERHAUL AND RENEWAL OF ROAD EQUIPMENT

Detailed Cost Table

	Totals Including Contingencies (US\$ '000)						Expenditures by Financiers (US\$ '000)											
							INTERNATIONAL DEVELOPMENT ASSOCIATION					GOVERNMENT OF MALI						
	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total
<b>I. INVESTMENT COSTS</b>																		
<b>A. NEW ROAD EQUIPMENT</b>																		
3120- Grader	-	1,007	-	-	-	1,007	-	1,007	-	-	-	1,007	-	-	-	-	-	-
3140- Pneumatic-tired Compactor	-	154	-	-	-	154	-	154	-	-	-	154	-	-	-	-	-	-
3245- Chip Spreader attachment	-	12	-	-	-	12	-	12	-	-	-	12	-	-	-	-	-	-
3250- Concrete mixer	-	84	-	-	-	84	-	84	-	-	-	84	-	-	-	-	-	-
3260- Water pump	-	35	-	-	-	35	-	35	-	-	-	35	-	-	-	-	-	-
3285- Compressor	-	12	-	-	-	12	-	12	-	-	-	12	-	-	-	-	-	-
3300- Light vehicle	-	14	-	-	-	14	-	14	-	-	-	14	-	-	-	-	-	-
3305- Station wagon 4 x 4	-	72	-	-	-	72	-	72	-	-	-	72	-	-	-	-	-	-
3310- Pick-up truck 4 x 4	-	17	-	-	-	17	-	17	-	-	-	17	-	-	-	-	-	-
3320- Set of tools	-	10	-	-	-	10	-	10	-	-	-	10	-	-	-	-	-	-
3330- Road signs	-	26	-	-	-	26	-	26	-	-	-	26	-	-	-	-	-	-
<b>Sub-Total NEW ROAD EQUIPMENT</b>	-	<b>1,442</b>	-	-	-	<b>1,442</b>	-	<b>1,442</b>	-	-	-	<b>1,442</b>	-	-	-	-	-	-
<b>B. INITIAL STOCK OF PARTS</b>																		
3400- Spare Parts (10% of A)	-	144	-	-	-	144	-	144	-	-	-	144	-	-	-	-	-	-
<b>Sub-Total INITIAL STOCK OF PARTS</b>	-	<b>144</b>	-	-	-	<b>144</b>	-	<b>144</b>	-	-	-	<b>144</b>	-	-	-	-	-	-
<b>C. OVERHAUL OF EXISTING EQUIPMENT</b>																		
3500- Caterpillar	218	1,408	498	-	-	2,124	189	1,225	433	-	-	1,848	28	183	65	-	-	276
3600- Other Makes - proprietary parts	-	152	164	177	84	556	-	121	131	141	51	444	-	30	33	35	13	111
3700-Other Makes -non proprietary parts	-	101	164	177	127	569	-	81	131	141	102	455	-	20	33	35	25	114
<b>Sub-Total OVERHAUL OF EXISTING EQUIPMENT</b>	<b>218</b>	<b>1,661</b>	<b>825</b>	<b>353</b>	<b>191</b>	<b>3,248</b>	<b>189</b>	<b>1,428</b>	<b>695</b>	<b>283</b>	<b>153</b>	<b>2,747</b>	<b>28</b>	<b>234</b>	<b>130</b>	<b>71</b>	<b>38</b>	<b>501</b>
<b>Total INVESTMENT COSTS</b>	<b>218</b>	<b>3,248</b>	<b>825</b>	<b>353</b>	<b>191</b>	<b>4,835</b>	<b>189</b>	<b>3,014</b>	<b>695</b>	<b>283</b>	<b>153</b>	<b>4,334</b>	<b>28</b>	<b>234</b>	<b>130</b>	<b>71</b>	<b>38</b>	<b>501</b>
<b>Total</b>	<b>218</b>	<b>3,248</b>	<b>825</b>	<b>353</b>	<b>191</b>	<b>4,835</b>	<b>189</b>	<b>3,014</b>	<b>695</b>	<b>283</b>	<b>153</b>	<b>4,334</b>	<b>28</b>	<b>234</b>	<b>130</b>	<b>71</b>	<b>38</b>	<b>501</b>

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MALI

FIFTH HIGHWAY PROJECT

Termes de Référence pour l'Utilisation d'une Centrale  
d'Achat pour les Besoins en Pièces Détachées

1. Objectifs

La mission du Service Matériel des T.P. (SMTP) est d'assurer la révision et la grosse réparation du matériel de génie civil utilisé pour les services d'entretien des routes de la Direction Nationale des T.P. (DNTP). Le SMTP est en outre chargé d'assurer l'approvisionnement en pièces de rechange de ses propres ateliers situés à Bamako, ainsi que des services utilisateurs qui disposent d'un certain nombre de centres de maintenance répartis sur l'ensemble du territoire malien.

Le SMTP utilise présentement plusieurs sources d'approvisionnement dont les principales sont:

- achat sur place pour les pièces disponibles en stock chez certains représentants locaux,
- pièces importées par les représentants locaux des marques,
- importation directes de pièces commandées à l'étranger,
- utilisation sporadique d'intermédiaires locaux dont les services d'approvisionnement sont variables et parfois incertaines.

L'expérience a montré que cette façon de faire conduit généralement à des ruptures de stock et à des délais ou des coûts d'approvisionnement relativement élevés. Cette situation découle essentiellement des raisons suivantes:

- délais administratifs très longs entre la manifestation d'un besoin en pièces de rechange et la notification des commandes aux fournisseurs,
- manque de moyens financiers,
- lacunes dans l'identification des besoins et dans l'établissement de prévisions de consommation à moyen ou long terme,
- délais importants dans les opérations de dédouanement.

Pour tenter de réduire ces inconvénients, le SMTP souhaite - dans le cadre du Cinquième Projet Routier de la Banque Mondiale - mener deux actions parallèles:

- (1) Mettre en place dans ses propres services un système de réapprovisionnement prévisionnel susceptible d'assurer pour certaines catégories de pièces une alimentation continue et

systematique des services utilisateurs. Cette action serait menée avec l'aide d'un consultant spécialisé.

- (2) Recourir aux services d'une centrale d'achat pour l'approvisionnement de toutes les pièces à importer de l'étranger.

Les présents termes de références concernent exclusivement l'utilisation d'une centrale d'achat dont les services seraient loués pour la durée du cinquième projet. A titre indicatif, le budget en pièces de rechange du SMTP pour la durée du projet a été estimé à 3 milliards de francs CFA.

## 2. Principes d'utilisation de la Centrale d'Achat

Après appel à la concurrence, le SMTP sélectionnera une centrale d'achat et passera avec elle un contrat cadre à durée déterminée. Les termes de ce contrat devraient permettre au SMTP d'éviter à l'avenir la procédure administrative d'approbation des marchés pour chacune des commandes qui serait notifiée à la centrale d'achat.

La centrale d'achat assurera elle-même la réception des pièces détachées et la vérification des factures et le paiement des fournisseurs, la centrale d'achat ouvrira un compte bancaire producteur d'intérêts exclusivement réservé à cet usage, qui servira de fonds de roulement et sera approvisionné par DNTP de la manière suivante:

- (i) en début de projet, par une avance d'un montant équivalent à 4 mois de besoins du SMTP;
- (ii) en cours de projet, mensuellement sur la base d'états des dépenses effectuées au cours du mois considéré. Ce compte sera révisé annuellement ("Audit") ainsi que l'ensemble des dépenses du présent contrat, par la firme d'experts comptables chargée de la révision des comptes du projet. Ce compte ne sera pas utilisé pour payer les honoraires de la centrale d'achat.

Certains gros paiements (commandes importantes de pièces détachées ou éventuellement matériel, outillage, etc.) pourront ne pas transiter par ce compte mais être directement effectués par la DNTP.

## 3. Procédures d'Achat

### 3.1 Programmation des achats

En début de projet et ensuite annuellement, la Centrale d'Achat examinera les besoins du SMTP en pièces détachées et établira avec ce service (et l'assistance technique auprès du SMTP) un programme prévisionnel d'achat de pièces détachées décomposé selon les catégories suivantes:

- (a) pièces d'usure et autres éléments pour lesquels il existe plus d'un fabricant et fournisseur
- (b) pièces d'origine pour lesquels il n'existe qu'un seul fabricant et fournisseur. 1/

### 3.2 Procédure de passation des marchés et commandes

Toutes les procédures de passation des marchés et les achats se feront en conformité avec les "Directives concernant la Passation des Marchés Financés par les Prêts de la Banque Mondiale et les Crédits de l'IDA", (Août 1984).

1) Pour les pièces de la catégorie (a) qui peuvent être, à ce stage du programme, définies avec suffisamment de précision et qui peuvent être groupées en (i) lots de valeur supérieure à \$500,000, la centrale d'achat préparera les dossiers d'appel d'offres internationaux correspondants, lancera la consultation, recevra les offres, soumettra son évaluation des offres à la DNTP et à la Banque Mondiale et après approbation passera les commandes en fonction des besoins du SMTP; (ii) pour les lots de valeur comprise entre \$50,000 et \$500,000, la centrale d'achat préparera une liste de fournisseurs qualifiés et les dossiers d'appel d'offre restreint correspondants et suivra une procédure semblable à (i) ci-dessus.

2) Pour les autres pièces de la catégorie (a), la centrale d'achat consultera les fournisseurs potentiels qualifiés, évaluera et choisira la meilleure offre et passera la commande en fonction des besoins du SMTP. La procédure de consultation-évaluation pourra être évitée si la centrale d'achat possède suffisamment d'éléments récents d'information provenant soit d'une consultation précédente soit de ses contacts professionnels en dehors du présent contrat, pour connaître à priori les meilleures conditions d'achat (prix, fournisseur, délais). Toutes les pièces justifiant ces choix doivent être gardés pendant la période d'exécution du présent contrat et vérifiés lors de l'audit.

3) Pour les pièces de la catégorie (b), la centrale d'achat passera la commande au fournisseur unique en fonction des besoins du SMTP.

### 3.3 Services à fournir par la centrale d'achat

Au long de la procédure de programmation et de passation des commandes, la centrale d'achat fournira les services suivants:

- analyse des demandes d'achat du SMTP et vérification des références et spécifications.
- consultations et/ou réduction des dossiers d'appel d'offre en vue d'obtenir le meilleur rapport qualité/prix.

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1/ Les pièces d'origine qui peuvent être fournies par plus d'un fournisseur ou représentant de la marque ne rentrent pas dans cette catégorie.

- selection des fournisseurs ou recommandations éventuelles sur le choix du fournisseur.
- rédaction et notification des marchés ou commandes. établissement des documents commerciaux, administratifs ou financiers nécessaires au bon déroulement des marchés.
- suivi du bon déroulement des marchés, contrôle des délais d'expédition, relance auprès des fournisseurs; éventuellement réception en usine et/ou contrôle des emballages.
- information du SMTP concernant l'état d'avancement des marchés (date de réception, date, mode et références d'expédition), envoi des documents d'expédition.
- suivi des litiges et contentieux éventuels.
- paiement des avances, acomptes et factures fournisseurs.
- contrôle éventuel des opérations d'expédition et d'acheminement.

La centrale d'achat remettra son offre de service en envisageant deux variantes possibles. La première variante sera établie dans le cas où le matériel sera expédié CIF Bamako ou frontière malienne, les opérations de dédouanement étant à charge du SMTP. La deuxième variante sera établie dans le cas où le matériel sera livré dédouané à Bamako; les opérations de dédouanement étant assurées par la centrale d'achat ou son représentant dûment mandaté à Bamako. Dans le cas de la variante II, le représentant de la centrale d'achat à Bamako serait considéré comme le correspondant du SMTP et serait chargé en autres choses d'assurer, le règlement des litiges pour fournitures non-conformes et les relations avec les transitaires et les assurances.

#### 4. Rapports et états mensuels

La centrale d'achat fournira mensuellement avec un décalage maximum d'un mois les rapports et états suivants:

- (a) situation du compte provisionné auprès de la centrale d'achat et des autres dépenses du contrat avec:
  - décompte et justification des paiements aux fournisseurs (avances, acomptes, factures soldées, etc.)
  - décompte des sommes perçues par la centrale d'achat en rémunération de ses prestations
  - intérêts bancaires éventuels.
- (b) Situation des demandes d'achat du SMTP en mentionnant au minimum les éléments suivants: demande de prix, commande ferme, prévision de livraison ex-usine, ou prévision d'embarquement, date d'embarquement, références des documents et du moyen d'expédition, date d'arrivée prévue à Dakar, Abidjan (bateau) ou Bamako (avion).
- (c) Un rapport succinct rendant compte des retards de fournitures et de leur raison, des anomalies éventuellement rencontrées

dans les demandes d'achat du SMTP, des changements éventuels de références, constructeur, etc.

Renseignements et Instructions Complémentaires

I. PRESENTATION DE L'OFFRE

L'offre sera présentée en langue française et comprendra deux parties distinctes qui seront expédiées dans deux enveloppes séparées.

1.1 La partie technique de l'offre comprendra:

- les références de la firme dans le domaine d'activités concerné; ainsi que toute documentation permettant d'apprécier l'expérience professionnelle de la centrale d'achat,
- des suggestions et/ou commentaires éventuels concernant le contenu des termes de références,
- un exposé détaillé des différentes sources que la firme peut offrir au SMTP,
- un exposé sur l'approche que la firme compte utiliser pour mener à bien sa mission. Ceci comprendra essentiellement (a) la définition du contenu et du déroulement des différentes opérations à exécuter dans le processus d'approvisionnement du SMTP, depuis la réception d'une demande d'achat jusqu'à la livraison du matériel à Bamako, (b) la définition des attributions et responsabilités respectives de la centrale d'achat et du SMTP dans le déroulement de ce processus d'approvisionnement, (c) un projet de contrat sans quotation chiffrée qui servira de base à l'élaboration du contrat final à passer avec la firme dont la proposition aura été retenue.
- pour la variante II un exposé détaillé des prestations qui seront effectuées au Mali par la centrale d'achat ou un représentant,
- un relevé des moyens logistiques et du personnel permanent dont la Centrale d'achat dispose dans son pays d'origine ainsi qu'un relevé des moyens qui seraient mis en place à Bamako au cas où la variante II serait retenue par le SMTP.

1.2 La partie financière de l'offre comprendra:

Le montant des rémunérations à percevoir par la centrale d'achat en fonction des différentes prestations ou combinaisons de prestations qui seraient assurées.

Pour les prestations courantes et systématiques, ces montants seront exprimés en pourcentage des commandes qui seront passées par le SMTP. La dégressivité éventuelle des taux en fonction de la valeur des commandes sera clairement exprimée. Pour les autres types de prestations les rémunérations payables à la centrale d'achat seront de préférence exprimées sur base forfaitaire. Les coûts supplémentaires inhérents à la variante II seront mis en évidence de manière à pouvoir apprécier l'impact supplémentaire de ces prestations sur le coût de la fonction approvisionnement du SMTP.

2. VALIDITE DE L'OFFRE:

La validité de l'offre présentée par le consultant sera au minimum 20 jours à partir de la date de la remise d'offre.

3. PREPARATION DE L'OFFRE

Au cours de la préparation de l'offre, il est suggéré que le consultant effectue une visite au Mali afin de rencontrer les principaux responsables du SMTP et de se familiariser avec les conditions locales de vie et de travail.

Les frais directs ou indirects de préparation de l'offre ne seront pas pris en charge par le SMTP.

4. OUVERTURE DES PLIS, EVALUATION DES OFFRES

L'ouverture des plis et l'évaluation des offres s'effectueront en quatre étapes:

- (a) ouverture en séance publique des offres techniques uniquement,
- (b) évaluation à la DNTP des offres techniques selon les critères suivants:

(1) références et expérience de la firme dans le domaine considéré	10 points
(2) expérience de la firme dans les pays en voie de développement	10 points
(3) qualité et importance du personnel et des moyens logistiques disponibles au siège	20 points
(4) qualité de l'offre pour la variante considérée en termes d'adéquation de l'approche et de méthodes proposées aux besoins spécifiques du SMTP	20 points
Sous-total	60 points

- (c) Ouverture en séance publique des offres financières correspondant aux offres techniques jugées acceptables.

- (d) Evaluation finale par DNTP en ajoutant à l'évaluation technique le critère suivant:

- (5) Prix: L'intégralité des points sera accordée à la proposition d'un montant P la moins disante jugée acceptable. Les autres offres d'un montant  $P_i$  seront affectées d'un nombre de points  $i$  calculé sur la base suivant:  
$$i = 40P/P_i$$

TOTAL 100 points



MALI

FIFTH HIGHWAY PROJECT

Mission d'Expertise et d'Assistance Technique

Auprès du Service du Matériel des Travaux Publics

Termes de Référence

1. Objectifs

Dans le cadre du Cinquième Projet Routier de la Banque Mondiale au Mali, il a été prévu d'exécuter en régie par la Direction Nationale des Travaux Publics (DNTP) des travaux d'entretien et de réhabilitation des routes du réseau prioritaire.

Le matériel utilisé sera soit le matériel existant, révisé et remis en état en ce qui concerne les éléments ayant une vie résiduelle importante et qui peuvent être économiquement réparés soit du matériel neuf en renouvellement ou complément du matériel existant.

Les remises en état et réparations de matériel Caterpillar (60% de la flotte) seront effectuées par le représentant local Caterpillar sous le contrôle du Service du Matériel des Travaux Publics (SMTP). Le SMTP exécutera le reste des remises en état et grosses réparations ainsi que l'approvisionnement en pièces de rechange du matériel de génie civil et de terrassement utilisé par les services de la DNTP.

Les opérations de maintenance préventive et systématique sont supposées être exécutées par le personnel des subdivisions des TP qui disposent pour ces tâches d'un certain nombre d'installations réparties dans le pays. Les opérations de maintenance préventives sont en principe supervisées par un Inspecteur Technique dépendant du SMTP et délégué par ce dernier dans les différents centres de maintenance.

Pour diverses raisons 1/ - qu'il appartiendra au Consultant d'identifier et d'évaluer - la disponibilité du matériel de génie civil et de terrassement est insuffisante et entrave sérieusement le bon déroulement des travaux.

Pour améliorer cette disponibilité et pour réduire les délais d'achats, de paiements et de financement, accroître l'efficacité du SMTP et accélérer et réduire le coût de l'entretien du matériel, la DNTP se propose de réorganiser l'entretien du matériel comme suit:

- (a) Une Régie d'avance régulièrement réapprovisionnée sera mise en place au SMTP pour le financement exclusif des pièces détachées qui seront fournies par une centrale

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1/ A titre indicatif on peut citer:

- retards dans la disponibilité des pièces détachées
- âge moyen important de la flotte
- cloisonnement excessif entre services et unités
- personnel quelquefois sous-qualifié et peu motivé matériellement
- abus

- (a) Une Régie d'avance régulièrement réapprovisionnée sera mise en place au SMTP pour le financement exc usif des pièces détachées qui seront fournies par une centrale d'achat à l'exception des pièces urgentes disponibles immédiatement sur place.
- (b) Les ateliers du SMTP et de certaines régions seront rééquipés en outillage et équipement fixe.
- (c) Dans le cadre du présent contrat, une assistance technique qui sera fournie par une firme expérimentée dans le domaine de l'entretien mécanique d'engins de génie civil révisera la structure, les méthodes et outils de gestion pour l'entretien du matériel et assistera le SMTP dans la mise en vigueur des améliorations agréés et l'exécution du projet.

## 2. Programme d'Intervention et Composition de l'Equipe du Consultant

L'intervention du Consultant pour améliorer le fonctionnement des activités de maintenance du matériel, se déroulera en deux phases distinctes, qui devront s'enchaîner sans qu'il y ait de discontinuité notable entre celles-ci. La première phase de prise de connaissance et d'élaboration d'un plan d'action durera environ trois mois. La deuxième phase d'implantation s'étendra sur une période d'environ trois ans. Chaque expert du consultant formera équipe avec un homologue qualifié Malien. Chaque tandem expert-homologue occupera un poste de responsabilité défini dans l'organigramme et sera responsable du travail effectué dans son unité. Cependant dans le tandem homologue-expert, c'est l'homologue malien qui occupera la position hiérarchique que lui attribue l'organigramme, l'expert ne pouvant en aucun cas occuper cette position. Des relations harmonieuses et une réelle collaboration seront recherchées afin que l'expert puisse réaliser sa tâche en s'appuyant sur les pouvoirs de son homologue malien. En particulier, le tandem sera chargé de répartir les primes de rendement et frais de déplacement qui seront payés au personnel malien dans le cadre du présent contrat.

Afin d'être à même d'accomplir toutes ces tâches, le consultant proposera à l'administration, au fur et à mesure que le besoin s'en fera sentir, toutes les mesures indispensables y compris les décisions concernant le personnel et la gestion quotidienne que devrait prendre l'Administration en vue de lever les obstacles rencontrés au bon fonctionnement et à l'efficacité du SMTP en général et des unités en particulier.

En principe, les experts et leurs homologues, qui pendant la première phase auront élaboré le programme de mesures à prendre pour améliorer le fonctionnement de l'ensemble des activités de maintenance du matériel, devront faire partie du personnel qui sera chargé de la supervision et/ou de la mise en application de ces mesures au cours de la deuxième phase du projet.

Il est estimé en première approximation que l'élaboration du plan d'action et sa mise en application nécessitera le concours d'un support en assistance technique de l'ordre de 120 hommes-mois à répartir sur une période d'environ trois ans. Ce personnel d'assistance technique devrait comprendre:

--un A.T., chef de la mission d'assistance technique, chargé de la supervision et de la gestion d'ensemble de la mission et d'assister la Division Technique du SMTP dans la mise en place des méthodes de travail et de gestion au niveau des différents centres de maintenance. Cet A.T. assistera également la Division chargée des approvisionnements (durée estimée 30 h-m).

--un A.T. chargé d'assister la Division Atelier dans le cadre de la coordination et de la programmation, l'ensemble des activités de l'Atelier Central de Bamako (durée estimée 30h-m).

--un A.T. Mécanicien chargé d'assister les équipes mécaniques dans les activités pratiques conformément aux programmes établis, Moteurs, Transmissions, Machines - Outils à l'Atelier Central de Bamako (durée estimée 30 h-m).

--un A.T. Electromécanicien chargé d'assister la Division Atelier dans le cadre de la formation des équipes itinérantes de dépannage-montage. Cette fonction est itinérante à concurrence de 50% du temps de travail (durée estimée 30 h-m).

A l'issue de la phase I, il appartiendra au Consultant de faire des recommandations quant à l'allocation définitive du nombre d'hommes-mois à fournir pour ces différentes fonctions et de proposer d'éventuels aménagements dans la définition des missions dévolues à l'assistance technique.

Au cours de leur mission, les experts assureront la formation de leurs homologues Maliens en les associant aux différents aspects de leur fonctions.

### 3. Taches à Exécuter par le Consultant

#### 3.1 Phase 1

Au cours de cette Phase le Consultant:

--prendra connaissance du fonctionnement actuel de SMTP et de ses relations fonctionnelles avec les services utilisateurs de matériel.

--identifiera les principaux problèmes rencontrés par le SMTP dans l'accomplissement de sa mission d'entretien du matériel.

--définira les mesures à prendre pour améliorer le fonctionnement du SMTP et l'entretien du matériel au niveau des services utilisateurs, de manière à obtenir une amélioration substantielle du taux de disponibilité des équipements de la DNTP.

Dans sa mission, le consultant examinera principalement les points suivants:

--structure et organisation

--méthodes de travail

--charge de travail des différents centres de maintenance

--moyens humains et matériels à mettre en place

--approvisionnement en pièces de rechange

(A) Structure et Organisation

Le Consultant définira les modifications / améliorations éventuelles à apporter:

--aux structures des services centraux du SMTP  
--à la définition des responsabilités respectives du SMTP et des services utilisateurs dans le domaine de l'entretien du matériel  
--aux relations fonctionelles ainsi qu'aux filières de communications et de contrôle entre les services centraux du SMTP, les services régionaux d'entretien et les utilisateurs. Plus particulièrement, il définira:

- (i) les grandes lignes des documents à établir ou améliorer en vue de permettre l'établissement d'un système de contrôle et de gestion centralisé de matériel;
- (ii) les responsabilités et les limites d'intervention des différents centres de maintenance (atelier central, régions, subdivisions, etc.);
- (iii) le rôle d'éventuelles unités itinérantes de maintenance, dépannage et formation.

Le cas échéant, il recommandera le relèvement ou la diminution des limites d'intervention de certains centres de maintenance compte tenu de:

- leurs moyens actuels ou futurs
- leur éloignement
- des difficultés de transport et/ou communication
- des possibilités d'intervention des équipes itinérantes de maintenance.

(B) Méthodes de Travail

Le consultant définira les modifications-améliorations éventuelles à apporter à la périodicité et au contenu de différents échelons de maintenance ainsi qu'aux méthodes de travail à mettre en oeuvre pour l'entretien, la réparation et le dépannage du matériel.

A cet effet, il définira pour chaque niveau de maintenance la qualification du personnel, les outillages et les grandes lignes des documents nécessaires à l'amélioration des méthodes de travail (check-lists, manuels, etc.).

Dans toute la mesure du possible, ces documents seront établis sur base de documents existants au SMTP ou dans d'autres organisations similaires, en les adaptant aux nouvelles conditions de travail du projet et aux contraintes locales.

(C) Charge de Travail

Compte tenu de la politique d'entretien du matériel et des méthodes de travail définies précédemment le consultant évaluera la

charge de travail prévisible de chaque centre de maintenance pendant la durée du 5ème projet.

Pour les travaux périodiques de maintenance préventive, cette évaluation sera faite en collaboration avec les utilisateurs sur base de l'affectation géographique et du taux d'utilisation probable du matériel.

Pour les interventions majeures (révisions générales et grosses réparations) le consultant fera la mise à jour de l'inventaire quantitatif et qualitatif du matériel et établira un devis et un délai estimatif de réparation (précision 20% sur devis).

Le consultant évaluera ensuite la charge de travail des diverses sections des ateliers centraux de Bamako qui seraient chargés de ces interventions majeures, et établira un calendrier-programme d'intervention.

Cette évaluation tiendra compte de la possibilité de sous-traiter certaines interventions dans le secteur privé, dont les ressources et les capacités seront évaluées parallèlement.

Cette évaluation de la charge de travail permettra de définir pour chaque centre de maintenance.

- le nombre de postes de travail
- la quantité et la qualification du personnel
- les outillages et équipements fixes, nécessaires à la réalisation des objectifs visés.

#### (D) Moyens Humains et Matériels

En collaboration avec CPTP, le consultant procédera à l'inventaire et l'évaluation quantitative (fonction, âge, formation, qualification, etc.) du personnel en poste aux ateliers centraux et dans les différents centres de maintenance.

Parallèlement il procédera à l'inventaire et l'évaluation qualitative des moyens techniques et matériels existant dans ces centres (locaux, outillages, équipements fixes, adduction d'eau, installation électrique, etc.)

Ceci permettra d'ajuster les effectifs et la qualification du personnel, à la charge probable de travail en recourrant soit:

- à un éventuel programme d'ajustement des effectifs
- à une programme de formation de la main d'oeuvre existante. Le consultant définira également les améliorations/modifications à apporter aux installations existantes, à leur outillage et leur équipement.

Il établira le coût et le délai de réalisation estimés de ces travaux et amélioration ainsi qu'un ordre de priorité pour leur réalisation. Il définira en outre les travaux pouvant être confiés aux entreprises.

#### (E) Approvisionnement en pièces de rechange

Des progrès sensibles ont été réalisés ces dernières années dans la gestion du magasin central de Bamako. Des améliorations importantes restent cependant à réaliser en particulier dans les domaines suivants:

- gestion des magasins régionaux
- établissement des prévision de consommation et des stocks minimums au niveau du magasin central et des magasins régionaux
- apurement des stocks morts
- enregistrement des consommations, quelque soit le mode d'approvisionnement ou le système d'achat utilisé
- réduction des ruptures de stock

Durant cette phase, le consultant définira les diverses améliorations à apporter dans ces différents domaines et établira le calendrier programme des actions à mener.

Il évaluera également l'impact financier des actions qu'il préconise, et plus particulièrement le niveau des immobilisations en magasin, par rapport du taux de rupture de stock admissible.

**3.2 En fin de Phase I**, le résultat des investigations et les recommandations établies par les experts et leurs homologues seront examinées par la DNTP et discutées. Ces discussions déboucheront sur:

--La sélection des actions à mener et des objectifs à atteindre parmi ceux qui auront été proposés.

--L'établissement d'un calendrier détaillé et réaliste des actions à mener compte-tenu des diverses contraintes et limitations existantes ou prévisibles.

--La définition des tâches et attributions spécifiques de l'assistance technique dans le cadre de ce plan d'action.

Un document final sera établi, qui servira de programme de travail pour la Phase II. Ce document explicitera les buts et résultats à atteindre ainsi que les délais dans lesquels ces résultats devront être atteints.

### **3.3 Phase II**

Les activités de la phase II consisteront essentiellement à mettre en place et à exécuter les mesures définies conjointement à la fin de la phase I. Ces activités porteront essentiellement sur les points suivants:

#### **(A) Structures et Organisation**

--mise en place des éventuelles modifications dans la structure et l'organisation du SMTP et des services régionaux de maintenance.

--amélioration des filières de communication et de contrôle par la mise en oeuvre de moyens matériels et des supports adéquats.

--établissement des documents-supports permettant la collecte des informations au niveau des différents centres de maintenance.

--établissement des coûts, des statistiques et des indicateurs de performance à tirer des informations transmises.

--Mise en application du système d'incitations à la productivité.

--Formation au niveau du SMTP, des régions et des subdivisions, du personnel chargé de mettre en place et d'appliquer les mesures définies au programme de travail.

--Suivi et vérification périodique sur site de la compréhension et de l'application correcte de ces mesures.

--Dépistage des carences et des retards.

--Rédaction des rapports périodiques.

(B) Méthodes de Travail:

--Etablissement des documents-supports nécessaires à l'application et au contrôle des programmes de maintenance préventive aussi qu'à la mise en place de méthodes de travail améliorées.

--Formation sur site du personnel chargé des opérations d'entretien de réparation et de dépannage.

Suivi et contrôle sur site de la compréhension et de l'application correcte des mesures préconisées.

--Contrôle et suivi du planning de réparation du matériel.

--Supervision de l'expertise du matériel avant réparation.

--Suivi et contrôle de la bonne execution des travaux lors de révisions ou de réparations majeures.

--Mise en place et suivi des équipes itinérantes de dépannage et d'entretien.

(C) Moyens Humains et Matériels:

--Sélection en collaboration avec le CPTP du personnel à former au CFTP de Bamako.

--Réaffectation du personnel en fonction des besoins.

--Le cas échéant, sélection du personnel à embaucher en vue de pourvoir les postes éventuellement vacants (en collaboration avec le CPTP).

--Participation à l'évaluation du personnel en vue de l'attribution de primes de productivité ou autres avantages analogues.

--Contrôle et réparation des équipements des installations fixes (outillages, groupes électrogènes, compresseurs, machines outil, postes à souder, etc.)

--Sélection/acquisition des outillages et équipements à installer dans les différents centres de maintenance.

--Suivi et contrôle de l'installation des nouveaux équipements.

--Étude succincte, suivi et contrôle des modifications-améliorations à apporter aux installations existantes.

(D) Approvisionnement en Pièces de Rechange

--Relations avec la Centrale d'achat et les fournisseurs locaux.

--Supervision des appels d'offres et des commandes en pièces de rechange; assistance à la rédaction de spécifications techniques.

--Suivi de l'approvisionnement correct des utilisateurs en pièces de rechange.

--Mise en place d'un système d'approvisionnement périodique des magasins régionaux.

--Mise en place d'un système de réapprovisionnement systématique pour les consommations prévisibles; établissement de stocks-minima; tenue à jour de la documentation (catalogues et références).

--Remise en ordre des magasins régionaux, apurements des stocks morts.

--Suivi et contrôle périodique des inventaires magasins.

--Formation du personnel chargé de la gestion des magasins.

--Création des documents-soutiens nécessaires à la réalisation des objectifs mentionnés ci-dessus.

#### 4. Rapports:

Un rapport provisoire sera soumis à la DNTP au plus tard dix semaines après le début de la phase I. Copie de ce rapport sera envoyé à la Banque Mondiale. Le rapport final sera présenté deux semaines après la fin des discussions concernant les actions à mener au cours de la phase II. Ce rapport final servira de programme de travail pour la phase II.

Durant la phase II, le consultant présentera trimestriellement un rapport d'activité qui fera le point sur l'état d'avancement du programme d'actions à mener et sur les difficultés rencontrées.

A l'issue de sa mission, le Consultant remettra un rapport final décrivant l'évolution du SMTP et analysant les progrès réalisés dans la gestion et l'efficacité de cet organisme, au cours de la mission du Consultant.

Durant le déroulement du projet, les divers rapports et états mensuels qui seraient nécessaires au bon fonctionnement du SMTP seront rédigés sous la supervision des experts qui formeront et assisteront leurs homologues dans ce domaine.

Ces rapports et états mensuels dont le contenu détaillé sera défini au cours de la phase I contiendront au minimum:

--les résultats statistiques et indicateurs de performance permettant une appréciation rapide de l'efficacité du SMTP et des services utilisateurs tels que: taux de disponibilité des engins, kilométrage parcourus, heures d'utilisation, consommation spécifique, etc.

--Un relevé des avaries et des causes d'immobilisation prolongée des engins.

--Un relevé des principales carences en approvisionnement.

--Un relevé des principales difficultés rencontrées ou des principales lacunes constatées par le Consultant dans la mise en application du plan d'actions.

--Les données comptables nécessaires à l'appréciation rapide des coûts d'utilisation et de réparation du matériel.

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- Un relevé des principales difficultés rencontrées ou des principales lacunes constatées par le Consultant dans la mise en application du plan d'actions.
- Les données comptables nécessaires à l'appréciation rapide des coûts d'utilisation et de réparation du matériel.

#### RENSEIGNEMENTS ET INSTRUCTIONS AUX SOUMISSIONNAIRES

##### 1. Qualifications des Soumissionnaires

Les firmes admises à soumissionner ou dans le cas de groupement de firmes, la firme pilote, doivent avoir une expérience importante et une activité effective et permanente dans l'exécution, l'organisation et les méthodes de maintenance et de réparation du matériel de génie civil et/ou de transport.

##### 2. Présentation de l'Offre

L'offre sera présentée en langue française et comprendra deux parties distinctes qui seront expédiées dans deux enveloppes séparées comportant l'une la partie technique et l'autre la partie financière.

###### a) La Partie Technique de l'Offre Comprendra :

- (i) Les références du Consultant dans le domaine d'activités concerné, ainsi que toute documentation permettant d'apprécier l'expérience professionnelle du Consultant,
- (ii) les suggestions et/ou commentaires éventuels du Consultant concernant le contenu des termes de références,
- (iii) un exposé sur le plan de travail et la méthodologie que le Consultant compte utiliser pour mener à bien sa mission, un organigramme fonctionnel de l'équipe d'experts proposés par le Consultant, ainsi que la liste et la consistance des outils et moyens de gestion qu'il adaptera et mettra à la disposition du SMTP,
- (iv) les curriculum-vitae des experts qui seront chargés des

prestations,

- (v) un relevé des moyens logistiques que le Consultant estime nécessaires à la réalisation de sa mission.

b) La partie Financière de l'Offre Comprendra .

- (i) les taux par homme-mois pour chacune des catégories de personnel proposées par le Consultant (maximum trois catégories). Les taux annoncés comprendront :

-- les traitements; congés, jours fériés et indemnités pour congés de maladie; les assurances, pensions de retraite et autres charges sociales; les indemnités d'affectation à l'étranger, y compris les indemnités et frais de déplacement à l'intérieur du pays; les frais généraux à l'Equipe du Projet, les dépenses du siège, les frais de voyage, etc.

- (ii) Les postes de dépenses remboursables au titre du personnel, notamment les frais de voyage international pour l'employé et sa famille lors de l'affectation, de la cessation des fonctions et des congés, y compris les excédents de bagages et autres indemnités; les frais de logement, de déplacement local, de subsistance et autres dépenses analogues pendant le séjour au Mali. La proposition précisera le montant de chaque poste remboursable ainsi que la base de calcul retenu;

- (iii) Le coût du matériel, des services du siège ou des sous-traitants jugés indispensables pour l'exécution de la mission du Consultant y compris le coût d'impression des manuels, directives, formulaires et autres outils de gestion destinés au SMTP.

- (iv) Le coût de stages de formation complémentaire pour le personnel du SMTP au siège de la firme.

3. Monnaie, Variation des Prix :

Les coûts seront exprimés en Francs CFA pour la part locale et dans la devise correspondante pour la part en devise. Les prix seront révisables annuellement suivant une formule à proposer par le consultant dans son offre. Cette formule comportera une marge de neutralisation de 10% et utilisera des indices en relation avec l'évolution des coûts correspondants dans la ou les monnaies utilisées.

4. Validité de l'Offre:

La validité de l'offre présentée par le consultant sera de quatre mois à partir de la date d'ouverture des plis. Sauf cas de force majeure, aucun remplacement, ne sera accepté pour les experts proposés.

pour autant que le contrat entre en vigueur avant la fin de la période de validité de l'offre.

5. Préparation de l'Offre

Au cours de la préparation de l'offre, il est suggéré que le consultant effectue une visite au Mali afin de rencontrer les principaux responsables de la DNTP et du SMTP et de se familiariser avec les conditions locales de vie et de travail.

6. Ouverture des plis, Evaluation des Offres

L'ouverture des plis et l'évaluation des offres s'effectueront en quatre étapes.

- a) Ouverture en séance publique des offres techniques uniquement.
- b) Évaluation à la DNTP des offres techniques selon les critères suivants :
- (i) Expérience de la firme dans l'exécution de la maintenance et de la réparation de matériel de génie civil et / ou de transport 15 points
  - (ii) Expérience de la firme dans les pays en voie de développement 5 points
  - (iii) Qualité de l'offre en termes d'adéquation du plan de travail et de la méthodologie proposée aux termes de référence,  
-- de qualité et consistance des outils de gestion proposés et d'homogénéité de l'équipe d'experts 10 points
  - (iv) Qualité et expérience du personnel. (Treize points seront attribuables au chef de mission, et 8 points à chacun des autres experts). 45 points
- Sous total 75 points
- c) Ouverture en séance publique des offres financières correspondant aux offres techniques jugées acceptables
- d) Évaluation finale par DNTP en ajoutant à l'évaluation technique le critère suivant :
- (v) Prix : L'intégralité des points sera accordée à la proposition d'un montant

P la moins disante jugée acceptable. 25 points  
Les autres offres d'un montant  $P_i$  seront affectées d'un nombre de points  $i$  calculé sur la base suivante:

$$i = 25 P/P_i$$

TOTAL 100 points

7. Paie ment

Il est proposé de rémunérer les services du consultant de la manière suivante :

- Paiement de 15% à la mise en vigueur du contrat
- Paiement du solde par mensualité en fonction de l'exécution des prestations.

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April 1985

MALI

FIFTH HIGHWAY PROJECT

Termes de Référence pour l'Assistance Technique à l'ONT

I. Introduction

1. L'Office National des Transports (ONT) est un organisme public du Mali sous l'autorité du Ministre chargé des transports. Cet organisme a pour mission:

- de promouvoir et d'adapter le développement du secteur des transports aux objectifs de production (mission de planification);
- d'assurer le bon fonctionnement de ce secteur par la gestion des transports;
- d'établir les projets de textes réglementant les activités de transports de surface.

2. Les textes organiques de l'Office National prévoient comme structure:

- une division études et planification. Cette division en plus des études d'ordre général et tarifaire, élabore les projets de texte réglementant les activités de transport et procède à la planification dans le secteur des transports;
- une division contrôle technique et circulation routière. Il convient de préciser qu'avec l'adoption du code maritime du Mali, cette division aura un rôle de suivi de l'armement malien;
- des représentations régionales;
- des représentations dans les ports. Il convient de noter que celles-ci sont chargées de la gestion des installations portuaires mises à leur disposition par le Mali et d'organiser l'évacuation des marchandises maliennes en transit conformément aux directives et programmes arrêtés par l'ONT;
- un service comptable;
- une division administrative et financière;
- un service de l'inspection des transports;
- un service des hydrocarbures chargé, en rapport avec les services techniques compétents de l'organisation et de l'approvisionnement du pays en hydrocarbures.

3. La division études et planification est chargée de:

- centraliser les prévisions démographiques, de production et de consommation, en vue d'établir les prévisions des besoins de transport;
- suivre l'évolution des parcs: routier, ferroviaire, fluvial, maritime et aérien;

- rassembler et enregistrer les statistiques diverses intéressant le secteur des transports;
- suivre le développement de l'infrastructure de transport en vue d'assurer un développement harmonieux du réseau de transport;
- suivre les services techniques chargés des travaux d'entretien, des voies routières et fluviales, l'élaboration des programmes d'entretien;
- déterminer en liaison avec les services intéressés les normes de sécurité et les conditions d'assurance;
- éditer le rapport annuel statistique des transports.

4. La division contrôle technique et circulation routière est chargée de:

- délivrer les permis de conduire, les cartes grises, les autorisations de transport;
- assurer le contrôle technique des véhicules;
- percevoir les taxes liées aux activités citées ci-dessus;
- traiter les dossiers relatifs aux accidents de la circulation routière.

5. Les représentations régionales sont chargées de:

- centraliser les offres et les demandes de transport de marchandises solides et liquides;
- effectuer la répartition des demandes de transport entre les modes et entre les transporteurs d'un même mode (apairage);
- établir les autorisations spéciales de transport, les bons de chargement et les billets de sortie;
- établir le journal des chargements, le rapport mensuel d'activité, les cartes de transport;
- percevoir les taxes d'affrètement;
- assurer les missions de la division contrôle technique dans les régions.

6. Actions déjà menées: Dans le cadre des actions qui concernent principalement le projet ((i) établir les programmes de transport; (ii) arrêter une coordination entre les différents modes de transport; et (iii) fournir en permanence tous renseignements permettant aux usagers de connaître l'évolution du marché du transport et toutes données nécessaires à l'orientation de leur politique d'approvisionnement et de distribution) l'ONT a exécuté ou fait réaliser les études suivantes:

- l'étude sur les transports routiers de marchandises;
- l'étude du II<sup>e</sup> plan de transport du Mali;
- l'étude sur la Taxe à l'Essieu;
- l'étude de la mise en place d'une cellule de collecte et de traitement de données en matière de transport. Une des réalisations de cette cellule est l'institution d'un document statistique intitulé "Données actuelles sur les transports au

Mali". Elle a réalisé la première enquête fluviale du Mali, un plan d'archivage et un plan de documentation à l'Office National des Transports.

## II. Objectifs

7. Dans le cadre du Cinquième Projet Routier, le Gouvernement a demandé à l'IDA d'assister l'ONT dans les tâches suivantes:

- (a) élaboration chaque année d'un programme tri-annuel des investissements de transport. Ces programmes comporteront tous les investissements de l'Etat dans le secteur des transports d'un montant supérieur à 400 millions de Francs CFA, seront préparés en utilisant des critères économiques, affecteront les ressources en priorité à la maintenance des investissements existants, et tiendront compte de la capacité d'endettement de l'Etat; et
- (b) élaboration d'un plan d'actions pour améliorer l'efficacité de l'industrie des transports routiers.

8. Dans ce cadre, l'ONT souhaite faire appel à l'assistance technique d'une firme de consultants dont l'intervention est définie par les présents termes de référence. Cette firme assistera également l'ONT dans la définition, l'achat et la mise en place d'un système informatique approprié. Pour cela, elle agira en tant que centrale d'achat du matériel et logiciel informatique et sera remboursée sur pièces justificatives.

## III. Tâches à exécuter par le consultant

9. Le consultant assistera l'ONT dans l'exécution des tâches suivantes:

- amélioration des méthodes de travail et collecte des données économiques et de transports nécessaires;
- traitement statistique de ces données et de leur évolution, analyse de leurs conséquences économiques dans le secteur et publication d'un rapport annuel à ce sujet;
- recensement et collecte des conclusions des études de factibilité, en cours ou récentes, dans le secteur;
- élaboration de perspectives de développement dans le secteur des transports dans les quinze prochaines années;
- étude de la priorité relative des dépenses d'entretien et d'investissement pour chaque mode;
- coordination et suivi des études et analyses de la répartition intermodale optimum des transports;
- élaboration chaque année d'un programme pluriannuel d'investissements dans le secteur de transports, classés selon leur priorité économique relative ainsi que vis à vis des dépenses d'entretien, programmes qui tiennent compte de la capacité financière de l'Etat ou des organismes concernés;

- révision des charges supportées par les usagers des infrastructures de transport et proposition d'actions pour faire correspondre ces charges aux coûts réels d'entretien et d'investissements;
- étude et mise en oeuvre d'un programme d'action pour améliorer l'efficacité et le rendement des transports routiers et la sécurité des usagers de la route;
- révision périodique des tarifs de transport pour s'assurer qu'ils reflètent la réalité économique;
- mise en oeuvre d'un programme de révision des capacités effectives des ensembles tracteurs-semi remorques pour s'assurer qu'ils ne dépassent pas les limites légales des charges à l'essieu, ainsi que de contrôle effectif de ces charges à l'essieu.

10. Le consultant assistera également l'ONT dans l'informatisation de ce service et à ce titre effectuera les tâches suivantes:

- examen critique des tâches ou données qu'il est souhaitable de faire exécuter ou gérer par ordinateur notamment:
- fichier des cartes grises des véhicules
- fichier des permis et autorisation de conduire
- fichier des cartes de transport
- fichier des lettres de voiture
- traitement statistique des données relevant du secteur des transports routier, ferroviaire, aérien, fluvial et maritime
- résultats d'enquêtes origine - destination ou de comptages routiers
- données concernant l'étude, la réalisation ou l'entretien d'infrastructures existantes ou à créer, en liaison avec les services techniques concernés;
- comparaison des avantages, inconvénients et coûts de plusieurs options d'informatisation (matériels et logiciels);
- préparation des listes restreintes de fournisseurs et des dossiers de consultation correspondants;
- consultation des fournisseurs, analyse des offres, signature des contrats de fourniture et réception des matériels et logiciels;
- élaboration de logiciels complémentaires nécessaires et formation sur le tas et au siège du consultant du personnel.

#### IV. Programme et Intervention

11. Le consultant travaillera en étroite collaboration avec les cadres de l'Office National des Transports et ceux d'organismes s'intéressant au secteur des transports. Le consultant élaborera, adaptera et fournira à l'ONT les méthodes de travail, logiciels informatiques et autres outils d'étude ou de gestion dont l'ONT a besoin dans l'exécution des tâches décrites en III. Il mettra à la disposition de l'ONT des experts pour des séjours de durée variable. Les experts séjournant plus de trois mois feront équipe avec un homologue qualifié



malien. Chaque équipe expert-homologue occupera un poste de responsabilité défini dans l'organigramme de l'ONT et sera responsable du travail effectué dans son unité. En particulier elle sera chargée de répartir les primes de rendement et contrôlera les frais de déplacement qui seront payés au personnel malien dans le cadre du présent contrat. Le consultant formera sur le tas des cadres qui seront mis à sa disposition en vue d'assurer la relève. Le consultant proposera à l'agrément préalable de l'Administration et de l'IDA tout changement dans la composition de l'équipe chargée de l'exécution du projet.

12. Il est estimé que le consultant devra fournir un total de 60 hommes-mois (h-m) d'assistance technique répartis comme suit:

- (1) experts qui effectueront pour l'essentiel des séjours longs au Mali et accessoirement des prestations au siège du consultant:
  - un économiste de transports, chef de projet (30 h-m) qui exécutera ou fera exécuter les études économiques et de planification;
  - un expert informaticien (12 h-m) qui élaborera ou adaptera et mettra en oeuvre les logiciels;
- (2) experts de courte durée selon un programme d'intervention à définir annuellement (18 h-m):
  - spécialiste de l'industrie des transports routiers
  - statisticien
  - autres spécialistes.

#### V. Conduite du Projet

13. Les rapports: Le consultant établira:

- (a) un rapport initial. Ce rapport présentera le programme des travaux, la méthodologie retenue, les décisions éventuelles à prendre concernant l'orientation générale du projet;
- (b) des rapports périodiques d'avancement. Ces rapports seront soumis tous les trois (3) mois après la soumission du rapport initial. Ils feront le point de l'exécution des travaux effectués pendant la période couverte, les difficultés rencontrées, l'état des paiements, une récapitulation des décisions importantes intervenues, etc.;
- (c) un rapport final. Le consultant établira un rapport final faisant le point de l'exécution de ce projet du début jusqu'à la fin.

14. Délais d'exécution: Le consultant commencera les travaux au plus tard trente (30) jours après la signature du contrat. La durée totale d'exécution est fixée à 42 mois. Le consultant livrera les rapports définis au point V aux dates ci-dessous indiquées:

(a) date d'entrée en vigueur du contrat	M
(b) commencement des travaux	M + 1 mois
(c) rapport initial	M + 3 mois
(d) rapport final	M + 41 mois

15. Apport de l'administration: L'administration mettra à la disposition du consultant tous renseignements et études disponibles nécessaires à la bonne exécution des travaux. Le consultant prendra connaissance des documents et instruments de travail ci-dessous:

- l'étude sur les transports routiers de marchandises
- les rapports établis dans le cadre du contrat d'assistance technique à l'ONT que le gouvernement du Mali a conclu avec la société SORCA-EMB
- le plan de transport du Mali 1980-1994
- le rapport sur l'entretien routier 1975 (BCEOM)
- l'étude sur l'application de la taxe à l'essieu, 1982 (BCEOM)
- données actuelles sur les transports en République du Mali 1982 (BCEOM)
- documents du projet MLI/020 relatifs à l'informatisation des directions nationales de la douane, des affaires économiques et du CMCE
- documents de travail de l'ONT (permis de conduire, cartes grises, cartes de transport, autorisations spéciales de transport, lettre de voiture, documents comptables, etc.)

L'administration mettra à la disposition du consultant les locaux meublés nécessaires et équipés de téléphone.

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MALI

CINQUIEME PROJET ROUTIER

Assistance Technique à la Direction  
Nationale des Travaux Publics

TERMES DE REFERENCE

1. Dans le cadre de l'exécution du cinquième projet routier, la Direction Nationale des Travaux Publics (DNTP) fait appel à deux (2) ingénieurs routiers consultants pour assister deux divisions centrales de la DNTP: la Division des Etude Générales et des Programmes (DEGP) et la Division des Etudes Techniques et des Travaux (DETT).

I. DIVISION DES ETUDES GENERALES ET DES PROGRAMMES (DEGP)

2. Le consultant sera un ingénieur routier ayant au moins 12 ans d'expérience en particulier dans l'administration de réseaux routiers, la programmation, la gestion financière et le contrôle des opérations et l'évaluation technique et économique des projets de transport. Une part substantielle de cette expérience devra concerner l'Afrique.

3. Le consultant travaillera en étroite collaboration avec le chef de la D.E.G.P. Ils formeront une équipe homologue-consultant.

4. Cette équipe sera chargée en particulier des tâches suivantes:

- coordination entre les divers services de la DNTP.
- préparation et suivi des programmes annuels et trimestriels d'entretien courant;
- suivi du rendement des unités d'entretien des routes en régie;
- formation sur les tas des responsables de l'entretien routier et participation aux activités de formation du Centre de Perfectionnement des Travaux Publics (C.P.T.P.)
- coordination du programme d'entretien, de remise en état et de renouvellement du matériel avec celui des travaux;
- initiation d'actions pour l'amélioration de l'efficacité des opérations d'entretien routier;
- collecte de données techniques et économique pour l'établissement d'études de factibilité de projets routiers;
- examen critique des études de factibilité de projet routiers et établissement de priorités économiques pour les investissements et l'entretien des routes;
- établissement des demandes de décaissements;
- suivi des engagements et dépenses des différentes catégories du cinquième projet routier et de la situation des comptes IDA/SUISSE/FAD tant au Mali qu'au niveau de la Banque Mondiale;
- participation active à l'informatisation du service;

5. Afin d'être à même d'accomplir toutes ces tâches le consultant proposera par écrit à la DNTP toutes les mesures indispensables en vue d'obtenir en temps voulu toutes les informations nécessaires de la part de chaque service dépendant de la DNTP. Il mettra au point un système de relance destiné à éviter les retards et/ou irrégularités dans la transmission des documents, rapports ou informations. Afin d'atteindre ces objectifs, il formera spécialement le personnel de la D.E.G.P qui collaborera à ses actions et il assumera la cogestion avec le chef de la DEGP des incitants qui seront mis à leur disposition dans le cadre du projet.

6. Le consultant participera étroitement à la rédaction du rapport périodique d'avancement du cinquième Projet Routier, dans lequel il décrira en particulier ses activités principales. Il rédigera un rapport à l'occasion de chaque tournée. Il rédigera également un rapport final sur ses activités, trois mois avant la fin de son mandat.

7. La durée de l'intervention du consultant est de quarante deux mois se situant entre le 1/7/1985 et le 31/12/1988.

## II. DIVISION DES ETUDES TECHNIQUES ET DES TRAVAUX (D.E.T.T.)

8. Le Consultant sera un Ingénieur routier ayant au moins 12 ans d'expérience en particulier dans la mise en oeuvre et le contrôle de travaux d'entretien et de construction de routes, les études routières et les techniques et réglementation routière.

9. Le Consultant travaillera en étroite collaboration avec le chef de la D.E.T.T. Ils formeront une équipe homologue - consultant.

10. Cette équipe sera chargée en particulier des tâches suivantes:

- études dont la DETT est chargée, projets d'exécution, études de prix, cahier de charge type etc....)
- initiation et préparation des marchés de fourniture et de travaux, suivi de la procédure d'appel d'offres et d'approbation et suivi de leur exécution;
- rassemblement et diffusion des normes et documents techniques concernant les travaux routier au Mali et suivi de leur mise en vigueur;
- contrôle des travaux en régie et contrôle et surveillance des travaux à l'entreprise du cinquième projet routier et des autres travaux qui relèvent de la DNTP;
- mise en place d'un système, de méthodes, d'hommes, capables d'améliorer et écourter les circuits et délais de passation des marchés;
- participation active à l'informatisation du service.

11. Afin d'être à même d'accomplir toutes ces tâches, le consultant proposera par écrit à la DETT toutes les mesures indispensables en vue d'obtenir en temps voulu toutes les informations nécessaires de la part des services intéressés. Il mettra au point un

systeme de relance destiné à éviter les retards et/ou irrégularités dans la transmission des documents, rapports ou informations. Afin d'atteindre ces objectifs, il formera spécialement le personnel de la DETT qui collaborera à ses actions et il assumera la cogestion avec le chef de la DETT des incitants qui seront mis à leur disposition dans le cadre du projet.

12. Le Consultant rédigera un rapport à l'occasion de chaque tournée. Il participera à la rédaction du rapport périodique d'avancement du cinquième Projet Routier dans lequel il décrira en particulier ses activités principales. Il rédigera également un rapport final sur ses activités, 3 mois avant la fin de son mandat.

13. La durée de l'intervention du consultant est de quarante deux mois se situant entre le 1/7/1985 et le 31/12/1988.

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MALI  
FIFTH HIGHWAY PROJECT  
Table 1: REORGANIZATION AND TECHNICAL ASSISTANCE  
Detailed Cost Table

Unit	Quantity						Unit Cost (CFAP)	Totals Including Contingencies (US\$ '000)						Parameters				
	1985	1986	1987	1988	1989	Total		1985	1986	1987	1988	1989	Total	Phy. Rate	Cont. for Exch.	Gross Tax Rate	Summary Account	
	-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
<b>I. INVESTMENT COSTS</b>																		
<b>A. ONT</b>																		
1. 4110- Technical Assistance	man-month	4	20	18	18	-	60	4,952,749	41	220	214	231	-	708	0	0.91	0.05	OTA10
2. 4120- Computing/Study Equipment	lump sum	1	-	-	-	-	1	88,421,555	231	-	-	-	-	231	0.25	1	0	ICE3
3. 4130 - Light Vehicles	unit	2	-	-	-	-	2	6,357,105	27	-	-	-	-	27	0	1	0	ICE4
4. 4140 - Spare Parts (10%)	-	-	-	-	-	-	-	-	3	-	-	-	-	3	0	1	0	ICE4
5. 4150 - Incentives	per year	0.5	1	1	1	-	3.5	7,950,000	8	18	19	21	-	66	0	0	0	NFA3
Sub-Total ONT									310	238	233	251	-	1,032				
<b>B. DEGP</b>																		
1. 4210- Technical Assistance	man-month	4	10	10	10	-	34	4,952,749	41	110	119	128	-	398	0	0.91	0.05	OTA5
2. 4220- Computing/Study equipment	lump sum	-	1	-	-	-	1	19,302,483	-	47	-	-	-	47	0.1	1	0	ICE3
3. 4230 - Incentives	per year	0.5	1	1	1	-	3.5	3,279,640	3	7	8	8	-	27	0	0	0	NFA3
Sub-Total DEGP									45	165	127	137	-	473				
<b>C. DETT</b>																		
1. 4310- Technical Assistance	man-month	4	10	10	10	-	34	4,952,749	41	110	119	128	-	398	0	0.91	0.05	OTA6
2. 4320 - Incentives	per year	0.5	1	1	1	-	3.5	44,615,400	47	99	107	115	-	368	0	0	0	NFA3
Sub-Total DETT									88	209	226	244	-	767				
<b>D. SNIP</b>																		
1. 4410- Technical Assistance	man-month	12	44	44	40	-	140	4,607,208	118	451	488	477	-	1,529	0	0.91	0.05	OTA1
2. 4420- Procurement Agent	fee	-	-	-	-	-	-	-	20	88	95	99	27	330	0	0.91	0.05	OTA9
<b>3. Tools-Tooling</b>																		
4430- for Bamako workshops	lump sum	-	-	-	-	-	-	-	-	236	-	-	-	236	0.1	1	0	ICE2
4440- for Regional workshops	lump sum	-	-	-	-	-	-	-	-	-	127	-	-	127	0.1	1	0	ICE2
Sub-Total Tools-Tooling									-	236	127	-	-	364				
4. 4450 - Incentives	per year	0.5	1	1	1	-	3.5	18,619,960	19	41	45	48	-	154	0	0	0	NFA3
Sub-Total SNIP									155	617	753	624	27	2,376				
<b>E. STUDIES</b>																		
1. 4510- Short-term Specialists	man-month	-	10	10	10	-	30	5,183,109	-	115	124	134	-	374	0	0.91	0.05	OTA8
2. 4520- Light vehicles	unit	1	-	-	-	-	1	6,357,105	13	-	-	-	-	13	0	1	0	ICE4
3. 4520 - Spare Parts (10%)	-	-	-	-	-	-	-	-	1	-	-	-	-	1	0	1	0	ICE4
Sub-Total STUDIES									15	115	124	134	-	388				
<b>F. AUDIT</b>																		
1. 4610- Setting-up accounts	man-month	1.5	-	-	-	-	1.5	5,759,010	18	-	-	-	-	18	0	0.91	0.05	OTA11
2. 4620- Annual audit	man-month	-	1.5	1.5	1.5	-	4.5	5,759,010	-	19	21	22	-	62	0	0.91	0.05	OTA11
Sub-Total AUDIT									18	19	21	22	-	80				
<b>Total INVESTMENT COSTS</b>									831	1,563	1,482	1,412	27	5,115				
<b>Total</b>									831	1,563	1,482	1,412	27	5,115				

MALI  
FIFTH HIGHWAY PROJECT  
Table 2: REORGANIZATION AND TECHNICAL ASSISTANCE  
Detailed Cost Table

	Base Costs (CFAF Million)						Totals Including Contingencies (CFAF Million)						Totals Including Contingencies (US\$ '000)						Breakdown of Totals Incl. Cont (US\$ '000)					
	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	For.	Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----						
<b>I. INVESTMENT COSTS</b>																								
<b>A. OMT</b>																								
1. 4110- Technical Assistance	20	99	89	89	-	297	20	108	105	113	-	346	41	220	214	231	-	706	645	26	35	706		
2. 4120- Computing/Study Equipment	88	-	-	-	-	88	113	-	-	-	-	113	231	-	-	-	-	231	231	-	-	231		
3. 4130 - Light Vehicles	13	-	-	-	-	13	13	-	-	-	-	13	27	-	-	-	-	27	27	-	-	27		
4. 4140 - Spare Parts (10%)	1	-	-	-	-	1	1	-	-	-	-	1	3	-	-	-	-	3	3	-	-	3		
5. 4150 - Incentives	4	8	8	8	-	28	4	9	9	10	-	32	8	18	19	21	-	66	-	66	-	66		
<b>Sub-Total OMT</b>	<b>126</b>	<b>107</b>	<b>97</b>	<b>97</b>	<b>-</b>	<b>427</b>	<b>152</b>	<b>117</b>	<b>114</b>	<b>123</b>	<b>-</b>	<b>506</b>	<b>310</b>	<b>238</b>	<b>233</b>	<b>251</b>	<b>-</b>	<b>1,032</b>	<b>905</b>	<b>92</b>	<b>35</b>	<b>1,032</b>		
<b>B. BEGP</b>																								
1. 4210- Technical Assistance	20	50	50	50	-	168	20	54	58	63	-	195	41	110	110	128	-	398	364	15	20	398		
2. 4220- Computing/Study equipment	-	19	-	-	-	19	-	23	-	-	-	23	-	47	-	-	-	47	47	-	-	47		
3. 4230 - Incentives	2	3	3	3	-	11	2	4	4	4	-	13	3	7	8	8	-	27	-	27	-	27		
<b>Sub-Total BEGP</b>	<b>21</b>	<b>72</b>	<b>53</b>	<b>53</b>	<b>-</b>	<b>199</b>	<b>22</b>	<b>81</b>	<b>62</b>	<b>67</b>	<b>-</b>	<b>232</b>	<b>45</b>	<b>165</b>	<b>127</b>	<b>137</b>	<b>-</b>	<b>473</b>	<b>411</b>	<b>42</b>	<b>20</b>	<b>473</b>		
<b>C. DETT</b>																								
1. 4310- Technical Assistance	20	50	50	50	-	168	20	54	58	63	-	195	41	110	119	128	-	398	364	15	20	398		
2. 4320 - Incentives	22	45	45	45	-	156	23	49	52	57	-	180	47	89	107	115	-	368	-	368	-	368		
<b>Sub-Total DETT</b>	<b>42</b>	<b>94</b>	<b>94</b>	<b>94</b>	<b>-</b>	<b>325</b>	<b>43</b>	<b>103</b>	<b>111</b>	<b>119</b>	<b>-</b>	<b>376</b>	<b>88</b>	<b>209</b>	<b>226</b>	<b>244</b>	<b>-</b>	<b>767</b>	<b>364</b>	<b>383</b>	<b>20</b>	<b>767</b>		
<b>D. SMTF</b>																								
1. 4410- Technical Assistance	55	203	203	184	-	645	57	221	238	234	-	749	118	451	486	477	-	1,529	1,396	56	76	1,529		
2. 4420- Procurement Agent	10	40	40	38	10	137	10	43	47	49	13	162	-	88	95	99	27	330	301	12	18	330		
3. Tools-Tooling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4430 - for Bamako workshops	-	97	-	-	-	97	-	118	-	-	-	118	-	238	-	-	-	238	238	-	-	238		
4440 - for Regional workshops	-	-	48	-	-	48	-	-	62	-	-	62	-	-	127	-	-	127	127	-	-	127		
<b>Sub-Total Tools-Tooling</b>	<b>-</b>	<b>97</b>	<b>48</b>	<b>-</b>	<b>-</b>	<b>145</b>	<b>-</b>	<b>118</b>	<b>62</b>	<b>-</b>	<b>-</b>	<b>178</b>	<b>-</b>	<b>238</b>	<b>127</b>	<b>-</b>	<b>-</b>	<b>364</b>	<b>364</b>	<b>-</b>	<b>-</b>	<b>364</b>		
4. 4450 - Incentives	9	19	19	19	-	65	10	20	22	24	-	75	19	41	45	48	-	154	-	154	-	154		
<b>Sub-Total SMTF</b>	<b>74</b>	<b>358</b>	<b>309</b>	<b>241</b>	<b>10</b>	<b>992</b>	<b>78</b>	<b>400</b>	<b>369</b>	<b>308</b>	<b>13</b>	<b>1,164</b>	<b>155</b>	<b>817</b>	<b>753</b>	<b>624</b>	<b>27</b>	<b>2,376</b>	<b>2,061</b>	<b>222</b>	<b>93</b>	<b>2,376</b>		
<b>E. STUDIES</b>																								
1. 4510- Short-term Specialists	-	52	52	52	-	155	-	56	61	66	-	183	-	115	124	134	-	374	341	14	19	374		
2. 4520- Light vehicles	6	-	-	-	-	6	7	-	-	-	-	7	13	-	-	-	-	13	13	-	-	13		
3. 4520 - Spare Parts (10%)	1	-	-	-	-	1	1	-	-	-	-	1	1	-	-	-	-	1	1	-	-	1		
<b>Sub-Total STUDIES</b>	<b>7</b>	<b>52</b>	<b>52</b>	<b>52</b>	<b>-</b>	<b>162</b>	<b>7</b>	<b>56</b>	<b>61</b>	<b>66</b>	<b>-</b>	<b>190</b>	<b>15</b>	<b>115</b>	<b>124</b>	<b>134</b>	<b>-</b>	<b>388</b>	<b>356</b>	<b>14</b>	<b>19</b>	<b>388</b>		
<b>F. AUDIT</b>																								
1. 4610- Setting-up accounts	9	-	-	-	-	9	9	-	-	-	-	9	18	-	-	-	-	18	17	1	1	18		
2. 4620- Annual audit	-	9	9	9	-	26	-	9	10	11	-	31	-	19	21	22	-	62	57	2	3	62		
<b>Sub-Total AUDIT</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>-</b>	<b>35</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>-</b>	<b>39</b>	<b>18</b>	<b>19</b>	<b>21</b>	<b>22</b>	<b>-</b>	<b>80</b>	<b>73</b>	<b>3</b>	<b>4</b>	<b>80</b>		
<b>Total INVESTMENT COSTS</b>	<b>280</b>	<b>691</b>	<b>614</b>	<b>546</b>	<b>10</b>	<b>2,140</b>	<b>309</b>	<b>768</b>	<b>728</b>	<b>692</b>	<b>13</b>	<b>2,507</b>	<b>631</b>	<b>1,583</b>	<b>1,482</b>	<b>1,412</b>	<b>27</b>	<b>5,115</b>	<b>4,170</b>	<b>755</b>	<b>191</b>	<b>5,115</b>		
<b>Total</b>	<b>280</b>	<b>691</b>	<b>614</b>	<b>546</b>	<b>10</b>	<b>2,140</b>	<b>309</b>	<b>768</b>	<b>728</b>	<b>692</b>	<b>13</b>	<b>2,507</b>	<b>631</b>	<b>1,583</b>	<b>1,482</b>	<b>1,412</b>	<b>27</b>	<b>5,115</b>	<b>4,170</b>	<b>755</b>	<b>191</b>	<b>5,115</b>		

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RALI  
FIFTH HIGHWAY PROJECT  
Table 401. REORGANIZATION AND TECHNICAL ASSISTANCE  
Detailed Cost Table

	Totals Including Contingencies (US\$ '000)						Expenditures by Financiers (US\$ '000)											
							INTERNATIONAL DEVELOPMENT ASSOCIATION						GOVERNMENT OF RALI					
	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total	1985	1986	1987	1988	1989	Total
<b>I. INVESTMENT COSTS</b>																		
<b>A. ONT</b>																		
1. 4110- Technical Assistance	41	220	214	231	-	706	39	209	203	219	-	871	2	11	11	12	-	35
2. 4120- Computing/Study Equipment	231	-	-	-	-	231	231	-	-	-	-	231	-	-	-	-	-	-
3. 4130 - Light Vehicles	27	-	-	-	-	27	27	-	-	-	-	27	-	-	-	-	-	-
4. 4140 - Spare Parts (10%)	3	-	-	-	-	3	3	-	-	-	-	3	-	-	-	-	-	-
5. 4150 - Incentives	8	18	19	21	-	66	8	18	19	21	-	66	-	-	-	-	-	-
Sub-Total ONT	310	238	233	251	-	1,032	308	227	222	240	-	997	2	11	11	12	-	35
<b>B. DEGP</b>																		
1. 4210- Technical Assistance	41	110	119	128	-	398	39	105	113	122	-	378	2	6	6	6	-	20
2. 4220- Computing/Study equipment	-	47	-	-	-	47	-	47	-	-	-	47	-	-	-	-	-	-
3. 4230 - Incentives	3	7	8	8	-	27	3	7	8	8	-	27	-	-	-	-	-	-
Sub-Total DEGP	45	165	127	137	-	473	43	159	121	130	-	453	2	6	6	6	-	20
<b>C. DEIT</b>																		
1. 4310- Technical Assistance	41	110	119	128	-	398	39	105	113	122	-	378	2	6	6	6	-	20
2. 4320 - Incentives	47	99	107	115	-	368	47	99	107	115	-	368	-	-	-	-	-	-
Sub-Total DEIT	88	209	226	244	-	767	86	204	220	237	-	747	2	6	6	6	-	20
<b>D. SHIP</b>																		
1. 4410- Technical Assistance	118	451	486	477	-	1,529	110	428	481	453	-	1,452	8	23	24	24	-	76
2. 4420- Procurement Agent	20	88	95	99	27	330	19	84	90	94	25	313	1	4	5	5	1	16
3. Tools-Tooling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4430- for Banako workshops	-	238	-	-	-	238	-	238	-	-	-	238	-	-	-	-	-	-
4440- for Regional workshops	-	-	127	-	-	127	-	-	127	-	-	127	-	-	-	-	-	-
Sub-Total Tools-Tooling	-	238	127	-	-	364	-	238	127	-	-	364	-	-	-	-	-	-
4. 4450 - Incentives	19	41	45	48	-	154	19	41	45	48	-	154	-	-	-	-	-	-
Sub-Total SHIP	155	817	753	624	27	2,376	148	790	724	595	25	2,283	7	27	29	29	1	93
<b>E. STUDIES</b>																		
1. 4510- Short-term Specialists	-	115	124	134	-	374	-	109	118	127	-	355	-	6	6	7	-	19
2. 4520- Light vehicles	13	-	-	-	-	13	13	-	-	-	-	13	-	-	-	-	-	-
3. 4520 - Spare Parts (10%)	1	-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	-	-
Sub-Total STUDIES	15	115	124	134	-	388	15	109	118	127	-	369	-	6	6	7	-	19
<b>F. AUDIT</b>																		
1. 4810- Setting-up accounts	18	-	-	-	-	18	17	-	-	-	-	17	1	-	-	-	-	1
2. 4820- Annual audit	-	19	21	22	-	62	-	18	20	21	-	59	-	1	1	1	-	3
Sub-Total AUDIT	18	19	21	22	-	80	17	18	20	21	-	76	1	1	1	1	-	4
<b>Total INVESTMENT COSTS</b>	<b>631</b>	<b>1,563</b>	<b>1,482</b>	<b>1,412</b>	<b>27</b>	<b>5,115</b>	<b>617</b>	<b>1,507</b>	<b>1,424</b>	<b>1,351</b>	<b>25</b>	<b>4,925</b>	<b>14</b>	<b>56</b>	<b>59</b>	<b>61</b>	<b>1</b>	<b>191</b>
<b>Total</b>	<b>631</b>	<b>1,563</b>	<b>1,482</b>	<b>1,412</b>	<b>27</b>	<b>5,115</b>	<b>617</b>	<b>1,507</b>	<b>1,424</b>	<b>1,351</b>	<b>25</b>	<b>4,925</b>	<b>14</b>	<b>56</b>	<b>59</b>	<b>61</b>	<b>1</b>	<b>191</b>



MALI

FIFTH HIGHWAY PROJECT

Training of Public Works Personnel

Background

1. Under the Third and Fourth (ongoing) Highway Projects a Public Works Training Center (Centre de Perfectionnement des Travaux Publics, CPTP) has been created and equipped and an initial training plan elaborated and implemented, with some delays but with reasonable success. Details of CPTP training activities, the Ministry of Public Works training needs, and the range of other training institutions catering to some of these needs are in the project file (The Present Situation of Personnel Management and Training in MTTP). The present project proposes to strengthen MTTP's personnel management system and provide training that will not only make MTTP's personnel more efficient in carrying out their tasks, but will also seek to tie in the results of training with rewards for improved performance.

Objectives

2. The objectives of the proposed training component are:

a.) Strengthening the personnel management system including special motivation measures by:

- (i) implementing personnel inventory and evaluation system, collecting and keeping updated the data required by the system;
- (ii) analyzing the data collected in para. 2.a.i. above so that the relevant decisions can be substantiated and taken such as regrading of personnel (reclassement), organization of examinations for internal promotion;
- (iii) implementing a reward system for the personnel by payment of incentives based on the evaluation of the content and quality of the works performed by the personnel;
- (iv) assessing the personnel needs based on the Ministry of Public Works policy (works by contracts and its own forces) and roads construction and maintenance programs;
- (v) strengthening the Ministry of Public Works training policy; and

- (vi) strengthening the Ministry of Public Works Training Center (CPTP) responsible for and to be in charge of preparation and implementation of training programs on personnel job descriptions and work assignment aiming at upgrading knowledge and skills of the personnel; preparation and implementation of training programs aiming at preparing selected personnel for the competitive examinations for internal promotion purposes; preparation and implementation of training programs to be directed to road, vehicles and fleet maintenance personnel pertaining to other agencies (technical services of Malian towns municipalities - services techniques municipaux - and of Bamako in particular).

b.) Improving the road maintenance management system by:

- (i) implementation and use of the required managerial tools such as road inventory, traffic survey, quarries inventory, cost accounting system;
- (ii) preparation of a road maintenance work program substantiated by the conclusions drawn from the analysis of the data and results provided by the management tools;
- (iii) follow-up of the road maintenance work program at the implementation stage;
- (iv) study and implementation of measures aiming at improving the efficiency of the DNTP directions;
- (v) improvement of the works quality performed by the Ministry of Public Works own forces;
- (vi) research on new road maintenance techniques: principally on materials available; and
- (vii) use of new tools made available to the Ministry: essentially a computer.

c.) Improving the equipment management system by:

- (i) implementation of the newly designed storekeeping system;
- (ii) implementation of the organizational and technical rules to be followed for maintenance and repair of the vehicles and pieces of equipment;

- (iii) better use of the funds allocated to the regions for the purchase of spare parts;
- (iv) implementation and use of the cost accounting system;
- (v) pros and cons analysis of equipment repair works performed by either contractors or the Ministry of Public Works own forces; and
- (vi) maintenance of the existing fleet, including the one to be repaired under the project.

d.) Improving the quality of the works performed by the administrative departments and units.

#### Description of Training Component

3. The project would assist the CPTP through services of specialized consultants for (a) personnel planning and development, (b) training of local instructors, and (c) staff training. First priority will be given to the training of CPTP staff and instructors to be assigned to the training center. Courses will be set up to upgrade the knowledge and skill of the existing personnel and also to facilitate internal promotion through tests and examinations to be organized under the responsibility of the CPTP according to existing procedures for personnel administration. Residential training courses will be organized for high- and middle-level managerial staff, and also for administrative personnel (accountants, storekeepers, quantity surveyors - pointeurs et pointeurs facturiers) and for skilled tradesmen (workshop personnel), whereas field supervisors, foremen, heads of gang, subdivision mechanics, operators and drivers will be trained on-the-job by two mobile training teams which will visit the 8 regions and up to 19 subdivisions twice a year. The personnel from several remote subdivisions could be gathered in one place for the implementation of the training courses. The practical training of the workshop personnel will be carried out partly in connection with equipment repair works financed under the project. The technical assistance team assigned to the SMTP will also be involved in the training effort. Existing SMTP equipment and facilities will be used by the CPTP instructors for the training of the mechanics.

4. To carry out the above training program the project would finance:

- a.) consulting assistance: 68 man-months over a 34-month period, in a 3-member team composed of one personnel planning and development expert with an educational and professional background as highway engineer (18 months divided into one 12-month and two 3-month stays) and two specialists - instructors in mechanics, one specialized in equipment repairs (30 months) and one in vehicle repairs (20 months);

- b.) fellowships: for high level staff mainly in the fields of road planning and design, bridges design, construction and maintenance, cost accounting system, laboratory activities, use of computers, personnel planning and development, training activities;
- c.) limited improvement of the existing training center facilities and purchase of vehicles, training materials and aids, and technical documents required for the increased workload of the training center;
- d.) accommodation allowances for employees when they come to Bamako to attend a training course;
- e.) honoraria and allowances to CPTP staff, instructors and visiting lecturers; and
- f.) payment of incentives.

5. The details underlying the cost estimate for the training component are as follows:

- a.) Per diem for the trainers and instructors from the mobile training units: each unit consists of 2 trainers (one civil engineer, one mechanical engineer); 2 instructors (one civil, one mechanic); 2 drivers, and will visit a maximum of 10 subdivisions twice a year for one week. Per diem per year:

Trainers	:	2 x 7 x 2(10+9) x 7,000	=	3,724,000 FCFA
Instructors	:	2 x 7 x 2(10+9) x 7,000	=	3,724,000
Drivers	:	2 x 7 x 2(10+9) x 4,000	=	2,128,000
		Total per year	=	<u>9,576,000 FCFA</u>

b.) Fellowships:

Trainees	Topics	No.	Total duration	Cost US\$
Engineer DETT	Bridges design, control of work and inspection	1	10 months	40,000
Engineer DETT	Use of computer for road and bridges design	1	10 months	40,000
Engineer DEGP	Cost accounting system	1	2 months	7,000
Engineer CNPEX	Road research programs performed by soils and materials laboratories in Mali's neighboring countries	1	3 X 0.5 months	6,000
CPTP Staff	Training of personnel	2	2 months	12,000
Head-Personnel Dept.	Personnel management system	1	2 months	10,000
Others	To be defined later		30 months	120,000
			<b>Total</b>	<b>235,000</b>

c.) Per diem for the trainees (residential training in CPTP in Bamako):

Trainees	Number	Refresher Course		Per Diem	
		Duration (weeks)	Frequency (per year)	per day	per year (Thousand FCFA)
Regional Director	8	1	1	7	392
Deputy Regional Director	8	1	1	7	392
Head of Subdivision	19	1	2	7	1862
Deputy Head of Subdivision	19	1	2	6	1596
Equipment Inspector	10	2	2	7	1960
Head of Workshop	8	2	2	5	1120
Head of Garage	19	2	2	5	2660
Head of Sector	19	2	1	5	1330
Accountants	50	4	1	5	7000
Quantity Surveyor	19	3	1	4	1596
Mechanics of Subdivision	70	2	1	4	3920
Auto Electricians	25	3	1	4	2100
Storekeeper	30	3	1	4	2520

**Total per year: 28,448,000 FCFA**

- d.) Honoraria for visiting lecturers and instructors. Lectures on management will be given by visiting lecturers from the Institut de Productivité et de Gestion Prévisionnelle (IPCP) to the managerial staff (regional directors and deputies, DNTP engineers, heads of subdivisions and deputies, equipment inspectors, heads of workshops and garage). The honoraria for these lecturers are estimated at: 132 hours x FCFA 3500/hour = FCFA 462,000 per year. A provision of FCFA 374,000 per year is also forecast for hiring instructors from other institutions.

### Personnel Motivation

6. The project will assist MTTP to improve personnel motivation by implementing measures aimed at introducing career development prospects for the employees; payment of incentives; evaluation of personnel for possible promotions; and improving the existing procedures.

- a.) Career development: The personnel management system includes rules for internal promotion of the employees (public servants and contracted personnel - conventionnaires). However, at the present time these rules are not applied. To put them into practice, the following steps will be taken:
- (i) the personnel inventory established by the CPTP for the preparation of the Fifth Highway Project will be updated regularly (seminars will be organized for the personnel in charge of this task within the Regions and at the central level). This inventory gives, in particular, the following information for each employee: classification (used for salary calculation) as well as the post occupied and the number of years of professional experience in the post.
  - (ii) proposals for promotion or regrading (reclassement) of personnel will be prepared regularly based on the analysis of this personnel inventory;
  - (iii) the personnel evaluation performed by the CPTP will be updated regularly;
  - (iv) the CPTP will organize training courses to prepare the candidates eligible for promotion to take the competitive examinations; and
  - (v) proposals for improvement of the existing personnel management system will be prepared by the technical assistance team with the MTTP personnel department and CPTP. These proposals will be divided into those which can be introduced by MTTP on its own and those which extend beyond the Ministry's responsibility, involving other Ministries, unions of employers, etc.

- b.) Payment of incentives: The project will pay incentives to the personnel. These incentives should not be perceived by the employees as a salary increase but as a reward for satisfactory work performance. In order to achieve this objective, the following steps will be taken by the technical assistance teams, CPTP, and personnel department:
- (i) standards will be prepared defining the tasks the personnel have to perform and the quality expected. These standards will take into account all the local conditions and constraints prevailing in the work environment of the personnel;
  - (ii) specific standards will be prepared in order to evaluate whether the personnel implemented what they have learned during the training courses;
  - (iii) the employees' supervisors will regularly evaluate whether the personnel comply with these standards. Controls will be performed by the technical assistance teams, CPTP and personnel department. Payment of incentives will be subject to the findings of this evaluation; and
  - (iv) the results achieved by this incentive system will be regularly analyzed by MTP managers, personnel department, CPTP, and technical assistance teams, and relevant decisions made to improve the efficiency of the system.
- c.) Evaluation of personnel for possible promotion: the trainees will be evaluated and proposals will be made to regrade or promote those who deserve such a reward.
- d.) Improvement of the existing procedures: Presently the MTP suffers from a lack of financial and material resources. As a consequence, the personnel, even when they are qualified, do not always have the necessary resources to perform the works they are in charge of. This situation which has important negative consequences on the motivation of personnel is partly due to local circumstances over which MTP has little control and partly due to deficient existing internal procedures: i.e. the budget allocation to the regions is on a three-month basis which makes it difficult for the engineers to plan and organize the works, order the necessary materials, spare parts, etc., on time. Such problems should be identified and solutions studied and implemented.

Methodology for the implementation of the training program

7. The training program will be implemented as follows:
- a.) the technical assistance team will prepare specific work programs for the CPTP staff and personnel in charge of the personnel department;
  - b.) at the beginning of the project, a seminar will be organized for the directors and engineers involved in the project in order to inform them of the objectives to be reached, systems to be implemented, follow-up and evaluations they will have to perform, etc. During the project life, similar seminars will be organized to analyze the results achieved so far, raise the issues and problems faced, and present solutions;
  - c.) training activities will be started after the other problems --organization, procedures, etc. which could hamper the training activities -- have been solved;
  - d.) training activities will be directed first to the high level personnel;
  - e.) training activities for upgrading the skills of the existing personnel will be limited by:
    - . what the personnel must do, taking into account the existing organization, procedures, etc.
    - . the resources made available to the personnel in their working environment;
  - f.) the training actions will be evaluated regularly in order to adjust the courses' contents, duration, etc., as needed; and
  - g.) recommendations for regrading, promotion etc. of trainees will be submitted to the department of personnel as necessary.
8. Outline terms of reference for the technical assistance to CPTP are in Attachment 1.



**National Directorate of Public Works (DNTP) - Personnel Inventory**

Qualification	DEGP	DETT	SMTF	STN	SRR	Regional Directorates	Total
Engineer	3	10	10	5	5		33
Other professional		3	1				4
Regional Director						12	12
Head of Subdivision and Deputy						38	38
Head of Section						39	39
Administrative Staff		4	12	10		75	101
Accountant and assistant			11	18	4	45	78
Storekeeper and assistant			8	8	3	44	63
Technician	3	7	5	9	3		27
Surveyor technician and assistant		5		12			17
Laboratory technician				5			5
Draftsman		4		2		3	9
Quantity surveyor				26	9	45	80
Foreman		3	23	6	9	30	71
Head of gang						42	42
Head of workshop						8	8
Head of workshop assistant						4	4
Head mechanic						31	31
Mechanic			13	27	6	119	165
Auto electrician				3		24	27
Welder				3		13	16
Other tradesmen				11		110	121
Mechanic helper			29				29
Serviceman				13		11	24
Driver		5	1	45		119	170
Operator				29	20	116	335
Laborer		1		95		460	556
						<b>Total</b>	<b>1935</b>

MALI

FIFTH HIGHWAY PROJECT

Outline Terms of Reference for Technical Assistance\* to  
CPTP for Training of Road Maintenance and Equipment  
Maintenance and Repair Personnel\*\*

Background

1. The Ministry of Public Works (MTTP) through its National Directorate of Public Works (DNTP) is responsible for the maintenance of 13,000 km of roads and tracks; it also constructs about 100 km of gravel roads per year. For these tasks it employs about 1,900 staff and has a fleet of about 250 vehicles and pieces of equipment. An important part of this fleet will be repaired under the project.

2. A permanent training center (CPTP) already exists. The 13 professionals and technical staff assigned to it began in 1981 to implement refresher training courses for road maintenance personnel and mechanics. The courses are given either at the training center in Bamako (residential courses) or in the field (a mobile training team has been created for this purpose). A description of the CPTP is attached to these terms of reference: organization chart, status, personnel assigned, inventory of facilities, vehicles, materials, apparatus, list of training documents and aids.

3. It is now necessary to develop a more structured training effort to improve the personnel planning and development function, and prepare and implement a general training program for all road maintenance personnel and mechanics coherent with an improved personnel management system.

4. The Malian authorities do not want to duplicate training institutions but use the existing ones to the fullest extent possible. Therefore, in the future they intend to make the CPTP also responsible for the training of several categories of personnel employed by the municipalities (personnel in charge of maintenance of the urban road network and mechanics).

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\* The consulting firms should be asked to submit a list of the available documents they would use for training of road maintenance and workshop personnel with their technical proposal. The list of the unit costs of each of these documents should be attached to their financial proposals.

\*\* The final terms of reference should include the paras. 2 Objectives, 3 and 4 Description of the training component, 6 Personnel motivation and 7 Methodology for the implementation of the training component of Annex 3-8 pages 1,2,3,6,7 and 8.

The Task

5. A team of three experts is required to assist the MTP in the planning and implementation of training activities over a period of three years. The team will be responsible for:

- a. preparation and implementation of measures aimed at strengthening the personnel management system including preparation and implementation of systems for personnel inventory and evaluation, forecast of personnel needs for DNTP, career development plans, promotion or reclassification of personnel occurring after passing tests or examinations to be organized under the responsibility of the CPTP according to the procedures relevant to personnel administration in use;
- b. evaluation of DNTP personnel based on detailed job descriptions;
- c. training of CPTP personnel and selection and training of a sufficient number of instructors;
- d. review of the training program for DNTP personnel prepared by the CPTP during the period of December 1984 to June 1985, including organization of fellowships;
- e. use of existing vocational schools, training centers and available instructors to implement part of the training program;
- f. implementation of the training program;
- g. proposals for regrading, promotion, etc. of trainees as needed;
- h. preparation of the standards to be used for payment of incentives to the personnel whose performances match these standards;
- i. study and preparation of proposals to improve the existing procedures aimed at better efficiency of the DNTP as well as increased personnel motivation;
- j. setting up a system for determining training benefits (internal and external efficiency of training) performed under the project;
- k. evaluating the training results performed under the project;
- l. defining the role, responsibilities and duties of the CPTP for the transportation sector leading to the determination of the number of trainers and instructors per speciality;

- m. preparation of a list of the equipment, training materials and aids necessary, and of tender documents and cost estimates as required;
- n. procurement and installation of equipment for workshops, offices and classrooms etc., including preparation of the tender documents with relevant costs estimates;
- o. organization of the probationary periods at MTTP (content, work assignment) for the students of ENI Engineering School; and
- p. preparation of the annual recurrent budget.

The Team

6. A team of three specialists will be required for a total of 68 man-months as follows:

	<u>Man-Months</u>
Personnel planning and development expert (team leader) (12 + 3 + 3 months)	18
Mechanical engineering instructor (equipment)	30
Mechanical engineering instructor (vehicles)	<u>20</u>
	68

Qualification and duties

7. Each member of the team should have at least 10 years experience in his field. The team leader should have some previous experience as team leader. The members should also have worked previously in a developing country. They should be fluent in French. Each member will have to work in close cooperation at all times with the personnel already assigned to the CPTP and with those who will be selected and trained as trainers or instructors by the technical assistance team. The objective is that at the end of the 3 year period, the local personnel will be able to operate the training center independently. All team members will be based in Bamako but regular travel in the eight regions will be necessary. The experts shall spend much more time in implementing training actions than on desk work.

8. The team will also have to work in close cooperation with other technical assistants provided under this project (in particular the technical assistance team assigned to SMTP) and other IDA projects (e.g. Urban Project of Bamako).

Team leader

9. The team leader should be a civil engineer with at least ten years experience in the following fields:

- a. Ministry of Public Works activities;
- b. paved road, gravel roads construction and maintenance;
- c. manpower planning and development i.e. in particular preparation of detailed job descriptions and analysis, evaluation of personnel, preparation of career development plans, organization of tests and examinations, forecasts of personnel needs;
- d. organization and operation of a training center; and
- e. preparation and implementation of training programs.

10. His duties to be performed, in particular with the assistance of the CPTP Director and Deputy Director, will include:

- a. liaison with the Ministry of Public Works and other agencies as required;
- b. management and coordination of all team activities for the fulfillment of the objectives and tasks listed in paragraph 3 above;
- c. general responsibility for the execution of the tasks listed in para. 5 above;
- d. organization of monthly meetings devoted to the personnel training program - preparation, organization, implementation and evaluation - with all the technical assistance provided under the project;
- e. preparation and evaluation of work programs to be performed by CPTP staff when he will be on assignment outside Mali;
- f. payment of honoraria and allowances to lecturers, instructors and per diem to trainees jointly with the CPTP director;
- g. payment of incentives jointly with the CPTP director; and
- h. preparation of the annual recurrent budget.

11. His work assignment will be divided into three periods: one stay of 12 months starting at the beginning of the contract, and two stays of three months, separated by 8 months of non-attendance.

Mechanical Engineering Instructors

12. Each should possess a higher level technician's qualifications with at least ten years experience in mechanical engineering, four of which shall have been in a trade training institution. Each instructor will be responsible to the team leader and CPTP director for the evaluation and selection of personnel to be trained and for the preparation and conduct of all mechanical training courses directed to local instructors and trainees in his own field i.e. one for maintenance and repair of equipment, one for maintenance and repair of vehicles including the electrical components and systems. Their duties will include:

- a. preparation of the required training courses.  
The organization and implementation schedule of the training program directed to the mechanics in charge of equipment repair should be based on the equipment repair schedule to be performed under the same project in order to ensure that the vehicles and equipment will be satisfactorily maintained after being repaired. It should also indicate how these repair works will be used to train the different categories of workshop personnel;
- b. evaluation and selection of the trainees as required;
- c. training of the CPTP head of the mechanical department and of the instructors already assigned to that department;
- d. selection and training of the required number of instructors including the ones assigned to the two mobile training teams;
- e. selection and training of workshop tradesmen;
- f. selection and training of the drivers and operators in the fields of vehicles and daily equipment maintenance;
- g. preparation and implementation of the system for determining training benefits (internal and external efficiency);
- h. assistance to the team leader for the preparation of proposals for strengthening the personnel planning and development function, including the tests and examinations for internal promotion and determination of the standards for the payment of the incentives;

- i. assistance to the team leader for the preparation of the list of the training equipment, apparatus, aids etc. required for the implementation of the general training program; and
- j. assistance to the team leader for the definition of the role, responsibilities and duties of the CPTP for the training of transportation sector personnel.

Reporting

13. An Inception Report will be prepared two months after the starting date of the contract. It will include, but not be limited to:

- a. the review of the data and analysis performed by the CPTP for the preparation of the training program;
- b. the three-year training program to be implemented. This program will show clearly the training activities to be implemented by the CPTP and the activities to be implemented through the technical assistance team assigned to the SMTP. It will also show how the works to be performed to repair the fleet under the project will be used to train the workshop personnel. It will include a first list of fellowships, with proposals of work assignments for the trainees after they have completed their training programs and draft agreements between the Ministry and the candidates obliging the latter to occupy posts for several years, where they will be able to put into practice the matters they will learn during their fellowships;
- c. the existing training centers and available instructors to be used for the implementation of the training program;
- d. the number of CPTP trainers and instructors required for the implementation of the training program;
- e. the list of training equipment, apparatus, aids, etc. to be purchased for the implementation of the training program;
- f. the system for determining training benefits;
- g. the standards to be used for payment of incentives; and
- h. the technical assistance work program including an implementation schedule in accordance with the objectives and tasks to be performed such as listed in paragraphs 5 - 12 above.

14. Quarterly reports should be prepared during the technical assistance services, the first initiated three months after the Inception Report is submitted.

15. A final draft report will be required one month before the end of the contract. It will document progress to date and lay out an action plan for the next three years.

16. All reports prepared by the technical assistance team should be concise and all the proposals included specific and well documented. The formats should be such that their utilization by the decision makers concerned with the project will be easy: actions performed, actions to be performed, results achieved, issues and constraints faced, solutions proposed, expenditures, etc. Each report should also include a table showing the time each expert has spent during the period on desk work and on implementation of training actions.



NALL  
FIFTH HIGHWAY PROJECT  
Table 1: RECONSTRUCTION OF BAKAKO-BOUGOUNI  
Detailed Cost Table

	Unit	Quantity					Unit Cost (CFAT)	Totals Including Contingencies (US\$ '000)					Parameters					
		1985	1986	1987	1988	1989		Total	1985	1986	1987	1988	1989	Total	Phy. Rate	Cont. Exch.	Gross Tax Rate	Summary Account
<b>I. INVESTMENT COSTS</b>																		
<b>A. CIVIL WORKS</b>																		
1. Lot 0/Misc	ump cum	-	0.2	0.4	0.4	-	1	327,585,709	-	136	354	392	-	882	0.1	0.79	0.07	ICMS
2. Lot 1/Bridge-Mobil (PK 1.045)	km	-	0.2	0.4	0.5	-	1.1	301,922,312	-	136	354	392	-	882	0.1	0.79	0.07	ICMS
3. Lot 2/Mobil-Faladie (PK 7.258)	km	-	1	2.5	2.6	-	6.2	251,092,069	-	644	1,675	1,853	-	4,172	0.1	0.79	0.07	ICMS
4. Lot 3/Faladie-Aerodrome (PK 8.886)	km	-	0.3	0.7	0.7	-	1.6	34,969,563	-	24	62	68	-	153	0.1	0.79	0.07	ICMS
5. Lot 4/Aerodrome-C. Selingue (PK 83.477)	km	-	12.7	30.8	31.3	-	74.6	49,887,313	-	1,426	3,788	4,189	-	9,233	0.1	0.79	0.07	ICMS
6. Lot 5/C. Selingue-Bougouni (PK 159.515)	km	-	12.8	31.2	31.8	-	76	51,088,855	-	1,615	4,187	4,644	-	10,456	0.1	0.79	0.07	ICMS
<b>Sub-Total CIVIL WORKS</b>									-	3,882	10,348	11,448	-	25,777				
<b>B. TECHNICAL ASSISTANCE</b>																		
1. Supervision	man-month	-	9.5	23	23.5	-	56	4,952,749	-	105	272	301	-	679	0	0.81	0.05	OTAA
<b>Sub-Total TECHNICAL ASSISTANCE</b>									-	105	272	301	-	679				
<b>Total INVESTMENT COSTS</b>									-	4,086	10,620	11,749	-	26,456				
<b>Total</b>									-	4,086	10,620	11,749	-	26,456				

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THAI  
FIFTH HIGHWAY PROJECT  
Table 2: RECONSTRUCTION OF BANNAK-SONGKUM  
Detailed Cost Table

	Base Costs (ICFAP Million)					Totals Including Contingencies (ICFAP Million)					Totals Including Contingencies US\$ '000					Breakdown of Totals Incl. Cont US\$ '000						
	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total	For.	Each	Local Taxon	Duties & Taxon	Total		
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
<b>I. INVESTMENT COSTS</b>																						
<b>A. CIVIL WORKS</b>																						
1. Lot 0/Rice	-	56	134	130	-	320	-	67	173	192	-	432	-	136	354	392	-	882	795	115	82	882
2. Lot 1/Bridge-Rohil (PK 1.045)	-	56	134	130	-	320	-	67	173	192	-	432	-	136	354	392	-	882	795	115	82	882
3. Lot 2/Rohil-Faladie (PK 7.294)	-	263	639	651	-	1,553	-	318	821	960	-	2,044	-	644	1,675	1,853	-	4,172	3,337	542	292	4,172
4. Lot 3/Faladie-Arodrum (PK 8.846)	-	10	23	24	-	57	-	12	30	33	-	75	-	24	62	68	-	153	123	20	11	153
5. Lot 4/Arodrum-C. Salingue (PK 83.477)	-	563	1,460	1,441	-	3,464	-	699	1,818	2,000	-	4,517	-	1,426	3,705	4,100	-	9,231	7,366	1,700	846	9,231
6. Lot 5/C. Salingue-Songkum (PK 159.515)	-	660	1,593	1,632	-	3,885	-	791	2,057	2,275	-	5,123	-	1,615	4,107	4,644	-	10,456	8,288	1,750	732	10,456
Sub-Total CIVIL WORKS	-	1,628	3,927	4,022	-	9,577	-	1,951	5,070	5,610	-	12,631	-	3,962	10,346	11,446	-	25,777	20,821	3,251	1,004	25,777
<b>B. TECHNICAL ASSISTANCE</b>																						
1. Supervision	-	47	114	116	-	277	-	51	123	140	-	333	-	105	272	301	-	678	620	25	34	678
Sub-Total TECHNICAL ASSISTANCE	-	47	114	116	-	277	-	51	123	140	-	333	-	105	272	301	-	678	620	25	34	678
<b>Total INVESTMENT COSTS</b>	-	1,675	4,041	4,138	-	9,854	-	2,002	5,204	5,750	-	12,964	-	4,067	10,618	11,747	-	26,455	21,441	3,276	1,038	26,455
<b>Total</b>	-	1,675	4,041	4,138	-	9,854	-	2,002	5,204	5,750	-	12,964	-	4,067	10,618	11,747	-	26,455	21,441	3,276	1,038	26,455

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RRI  
FIFTH HIGHWAY PROJECT  
Table 3: RECONSTRUCTION OF BAMBAO-BOUQUINI  
Detailed Cost Table

	Totals Including Contingencies US\$ '000					Expenditures by Financiers US\$ '000																		
						INTERNATIONAL DEVELOPMENT ASSOCIATION					AFRICAN DEVELOPMENT FUND					GOVERNMENT OF RRI								
	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total	1985	1986	1987	1988	1989 Total				
<b>I. INVESTMENT COSTS</b>																								
<b>A. CIVIL WORKS</b>																								
1. lot 0/Ries	-	138	354	392	-	682	-	64	166	183	-	412	-	57	148	165	-	371	-	15	40	44	-	99
2. lot 1/Bridge-Robil (PN 1.005)	-	136	354	392	-	682	-	64	166	183	-	412	-	57	148	165	-	371	-	15	40	44	-	99
3. lot 2/Robil-Faladio (PN 7.250)	-	644	1,875	1,853	-	4,172	-	301	783	887	-	1,951	-	371	704	779	-	1,753	-	72	188	208	-	667
4. lot 3/Faladio-Aerodrome (PN 8.666)	-	24	62	60	-	153	-	11	29	32	-	72	-	10	26	29	-	64	-	2	7	8	-	17
5. lot 4/Aerodrome-C. Solingue (PN 83.477)	-	1,428	3,706	4,100	-	9,233	-	687	1,733	1,918	-	4,318	-	590	1,550	1,723	-	3,863	-	188	415	458	-	1,034
6. lot 5/C. Solingue-Bouquini (PN 150.915)	-	1,615	4,197	4,844	-	10,456	-	758	1,963	2,172	-	4,893	-	879	1,764	1,852	-	4,395	-	181	470	520	-	1,171
<b>Sub-Total CIVIL WORKS</b>	-	3,962	10,340	11,440	-	25,777	-	1,882	4,840	5,354	-	12,056	-	1,873	4,340	4,812	-	10,834	-	446	1,150	1,282	-	2,887
<b>B. TECHNICAL ASSISTANCE</b>																								
1. Supervision	-	105	272	301	-	678	-	100	250	306	-	645	-	-	-	-	-	-	-	5	14	15	-	34
<b>Sub-Total TECHNICAL ASSISTANCE</b>	-	105	272	301	-	678	-	100	250	306	-	645	-	-	-	-	-	-	-	5	14	15	-	34
<b>Total INVESTMENT COSTS</b>	-	4,066	10,620	11,740	-	26,456	-	1,982	5,090	5,641	-	12,701	-	1,873	4,340	4,812	-	10,834	-	451	1,173	1,297	-	2,921
<b>Total</b>	-	4,066	10,620	11,740	-	26,456	-	1,982	5,090	5,641	-	12,701	-	1,873	4,340	4,812	-	10,834	-	451	1,173	1,297	-	2,921

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MALI

FIFTH HIGHWAY PROJECT

Project Cost Estimates and Financing Plan

1. Project costs are summarized in the tables page 2 and 3. They are based on Government and consultants' estimates as well as appraisal mission estimates, updated to January 1985 prices. The Financing Plan is shown in page 4.
2. Physical contingencies of 10% have been included as appropriate, with the exception of 25% for ONT computing equipment. Price contingences of 5% for 1985, 7.5% for 1986 and 9% thereafter have also been included for both foreign and local expenditures expressed in dollar value, as past experience in Mali has shown that they do not diverge significantly.
3. Cost estimates for consulting services and technical assistance have been estimated at US\$9,738 per man-month (m-m) for 554 m-m of services, and a professional fee of 4% for the procurement agent.
4. Pie charts in page 5 show the breakdown of project total cost (US\$73.4 million) into foreign exchange (US\$54.7 million), local (US\$13.2 million) and taxes (US\$5.5 million) and project financing.
5. The table and graph on page 6 show project commitments (Commit) and disbursements (Disburs.) compared to the disbursement profile for IDA credit for highway projects in West Africa (Profile). Price contingencies have been estimated according to the commitment schedule. The disbursement schedule is derived from the commitment schedule by introduction of a disbursement lag. Differences between the disbursement schedule and the profile reach 5% at the end of the project.

**MALI  
FIFTH HIGHWAY PROJECT  
PROJECT COST SUMMARY**

	(CFAF Million)			(US\$ '000)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
<b>A. ROAD MAINTENANCE AND REHABILITATION PROGRAM</b>								
1. Routine Road Maintenance Operations	2,552	2,258	4,811	5,209	4,609	9,818	47	17
2. Periodic Maintenance and Rehabilitation	2,018	8,855	10,873	4,119	13,987	18,106	77	31
3. Overhaul and Renewal of Road Equipment	266	1,721	1,987	543	3,512	4,055	87	7
<b>Sub-Total ROAD MAINTENANCE AND REHABILITATION PROGRAM</b>	<b>4,837</b>	<b>10,834</b>	<b>15,671</b>	<b>9,871</b>	<b>22,110</b>	<b>31,981</b>	<b>69</b>	<b>55</b>
<b>B. INSTITUTION STRENGTHENING PROGRAM</b>								
1. Reorganization and Technical Assistance	400	1,740	2,140	816	3,552	4,368	81	8
2. Training Program	172	923	1,095	350	1,687	2,037	75	2
<b>Sub-Total INSTITUTION STRENGTHENING PROGRAM</b>	<b>572</b>	<b>2,663</b>	<b>3,235</b>	<b>1,167</b>	<b>5,239</b>	<b>6,405</b>	<b>80</b>	<b>10</b>
<b>C. RECONSTRUCTION OF BANAKO-BOUGOUNI</b>								
1. Civil Works	1,918	7,661	9,579	3,909	15,636	19,545	80	34
2. Supervision	24	253	277	48	517	565	91	1
<b>Sub-Total RECONSTRUCTION OF BANAKO-BOUGOUNI</b>	<b>1,942</b>	<b>7,914</b>	<b>9,856</b>	<b>3,957</b>	<b>16,153</b>	<b>20,110</b>	<b>80</b>	<b>35</b>
<b>Total BASELINE COSTS</b>	<b>7,348</b>	<b>21,012</b>	<b>28,360</b>	<b>14,996</b>	<b>42,881</b>	<b>57,877</b>	<b>74</b>	<b>100</b>
Physical Contingencies	402	1,543	1,945	821	3,150	3,971	79	7
Price Contingencies	1,400	4,253	5,653	2,856	8,679	11,535	75	20
<b>Total PROJECT COSTS</b>	<b>9,150</b>	<b>26,808</b>	<b>35,958</b>	<b>18,673</b>	<b>54,710</b>	<b>73,383</b>	<b>75</b>	<b>127</b>

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**HALI  
FIFTH HIGHWAY PROJECT  
Project Components by Year  
(CFAP Million)**

	Base Costs					Total	
	1985	1986	1987	1988	1989	CFAP	(US\$ '000)
<b>A. ROAD MAINTENANCE AND REHABILITATION PROGRAM</b>							
1. Routine Road Maintenance Operations	687	1,374	1,374	1,374	-	4,811	9,818
2. Periodic Maintenance and Rehabilitation	393	1,440	2,713	3,065	1,322	8,873	18,108
3. Overhaul and Renewal of Road Equipment	95	1,393	313	124	62	1,987	4,055
<b>Sub-Total ROAD MAINTENANCE AND REHABILITATION PROGRAM</b>	<b>1,175</b>	<b>4,208</b>	<b>4,400</b>	<b>4,504</b>	<b>1,384</b>	<b>15,671</b>	<b>31,981</b>
<b>B. INSTITUTION STRENGTHENING PROGRAM</b>							
1. Reorganization and Technical Assistance	280	691	614	546	10	2,140	4,368
2. Training Program	144	257	187	106	-	694	1,417
<b>Sub-Total INSTITUTION STRENGTHENING PROGRAM</b>	<b>424</b>	<b>949</b>	<b>801</b>	<b>652</b>	<b>10</b>	<b>2,835</b>	<b>5,785</b>
<b>C. RECONSTRUCTION OF BAHAKO-BOUGOUNI</b>							
1. Civil Works	-	1,628	3,927	4,022	-	9,577	19,545
2. Supervision	-	47	114	116	-	277	568
<b>Sub-Total RECONSTRUCTION OF BAHAKO-BOUGOUNI</b>	<b>-</b>	<b>1,675</b>	<b>4,040</b>	<b>4,139</b>	<b>-</b>	<b>9,854</b>	<b>20,113</b>
<b>Total BASELINE COSTS</b>	<b>1,598</b>	<b>6,832</b>	<b>9,242</b>	<b>9,294</b>	<b>1,394</b>	<b>28,380</b>	<b>57,877</b>
Physical Contingencies	63	366	675	707	136	1,946	3,971
Price Contingencies	42	843	1,724	2,678	565	5,652	11,538
<b>Total PROJECT COSTS</b>	<b>1,702</b>	<b>7,841</b>	<b>11,641</b>	<b>12,679</b>	<b>2,095</b>	<b>35,958</b>	<b>73,383</b>
Taxes	128	593	877	931	158	2,686	5,482
Foreign Exchange	1,131	5,788	8,702	9,506	1,681	26,608	54,710

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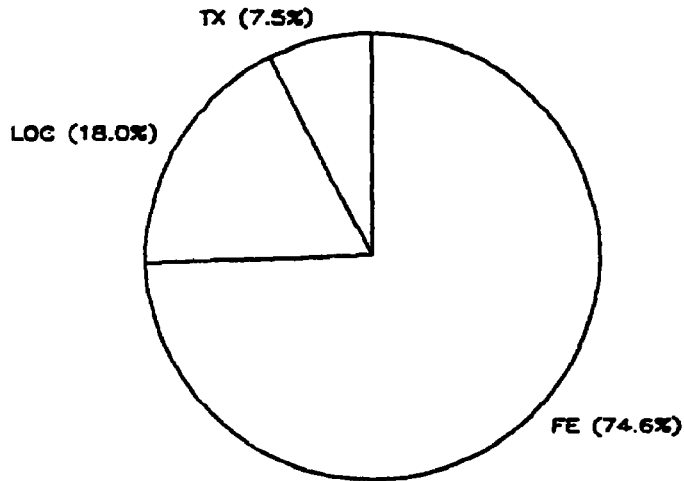
**MALI**  
**FIFTH HIGHWAY PROJECT**  
 Financing Plan by Project Components  
 (US\$ '000)

	INTERNATIONAL DEVELOPMENT ASSOCIATION		AFRICAN DEVELOPMENT FUND		SWISS DEVELOPMENT COOPERATION		FRENCH COOPERATION		GOVERNMENT OF MALI		Total		for. Exch.	Local (Excl. Taxes)	Duties & Taxes	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%				
<b>A. ROAD MAINTENANCE AND REHABILITATION PROGRAM</b>																
1. Routine Road Maintenance Operations	4,817	42	-	-	2,426	21	-	-	4,100	36	11,343	15	5,325	4,883	1,134	
2. Periodic Maintenance and Rehabilitation	21,767	91	-	-	-	-	478	2	1,715	7	24,019	33	18,614	3,631	1,775	
3. Overhaul and Renewal of Road Equipment	4,334	90	-	-	-	-	-	-	501	10	4,835	7	4,157	177	501	
<b>Sub-Total ROAD MAINTENANCE AND REHABILITATION PROGRAM</b>	<b>30,917</b>	<b>77</b>	<b>-</b>	<b>-</b>	<b>2,426</b>	<b>6</b>	<b>478</b>	<b>1</b>	<b>6,375</b>	<b>16</b>	<b>40,197</b>	<b>55</b>	<b>28,096</b>	<b>8,691</b>	<b>3,410</b>	
<b>B. INSTITUTION STRENGTHENING PROGRAM</b>																
1. Reorganization and Technical Assistance	4,925	96	-	-	-	-	-	-	191	4	5,115	7	4,170	755	191	
2. Training Program	-	-	-	-	1,573	97	-	-	42	3	1,615	2	1,204	369	42	
<b>Sub-Total INSTITUTION STRENGTHENING PROGRAM</b>	<b>4,925</b>	<b>73</b>	<b>-</b>	<b>-</b>	<b>1,573</b>	<b>23</b>	<b>-</b>	<b>-</b>	<b>233</b>	<b>3</b>	<b>6,731</b>	<b>9</b>	<b>5,373</b>	<b>1,124</b>	<b>233</b>	
<b>C. RECONSTRUCTION OF BANAKO-BOUGOUNI</b>																
1. Civil Works	12,056	47	10,834	42	-	-	-	-	2,887	11	25,777	35	20,621	3,351	1,804	
2. Supervision	645	95	-	-	-	-	-	-	34	5	679	1	620	25	34	
<b>Sub-Total RECONSTRUCTION OF BANAKO-BOUGOUNI</b>	<b>12,701</b>	<b>48</b>	<b>10,834</b>	<b>41</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2,921</b>	<b>11</b>	<b>26,456</b>	<b>36</b>	<b>21,241</b>	<b>3,376</b>	<b>1,838</b>	
<b>Total Disbursement</b>	<b>48,543</b>	<b>66</b>	<b>10,834</b>	<b>15</b>	<b>3,999</b>	<b>5</b>	<b>478</b>	<b>1</b>	<b>9,530</b>	<b>13</b>	<b>73,383</b>	<b>100</b>	<b>54,710</b>	<b>13,191</b>	<b>5,482</b>	

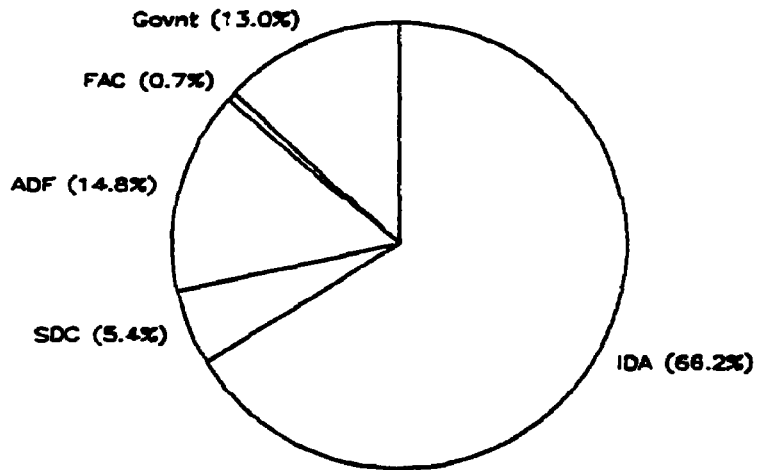
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MALI  
FIFTH HIGHWAY PROJECT

*Project Cost*  
Breakdown



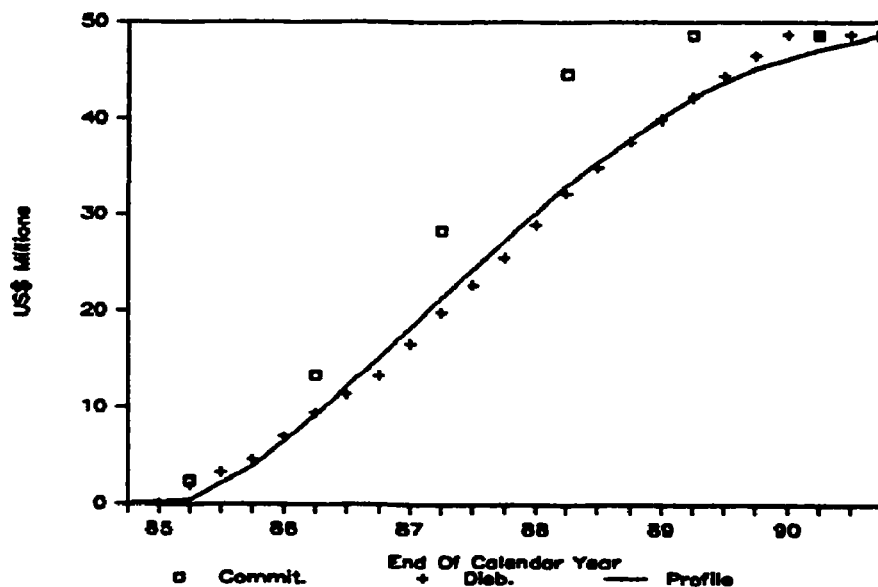
*Project Financing*  
Distribution





MALI  
FIFTH HIGHWAY PROJECT  
Disbursement Schedule

Date	Quarters From Board	Commitments	Disbursements (US\$ Millions)	Profile
Sep-85	1			0.000
Dec-85	2		0.000	0.243
Mar-86	3	2.402	1.927	0.485
Jun-86	4		3.277	2.184
Sep-86	5		4.626	3.883
Dec-86	6		7.000	6.553
Mar-87	7	13.375	9.374	9.223
Jun-87	8		11.359	12.136
Sep-87	9		13.343	15.048
Dec-87	10		16.591	18.204
Mar-88	11	28.281	19.839	21.359
Jun-88	12		22.665	24.271
Sep-88	13		25.492	27.184
Dec-88	14		28.842	30.097
Mar-89	15	44.591	32.193	33.009
Jun-89	16		34.863	35.436
Sep-89	17		37.533	37.864
Dec-89	18		39.848	40.048
Mar-90	19	48.543	42.163	42.232
Jun-90	20		44.290	43.689
Sep-90	21		46.416	45.145
Dec-90	22		48.543	46.116
Mar-91	23	48.543	48.543	47.087
Jun-91	24		48.543	47.815
Sep-91	25	48.543	48.543	48.543



MALI

FIFTH HIGHWAY PROJECT

Activity	MALI FIFTH HIGHWAY PROJECT IMPLEMENTATION SCHEDULE												MALI FIFTH HIGHWAY PROJECT IMPLEMENTATION SCHEDULE																															
	1985						1986						1987						1988						1989																			
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1 Negotiations																																												
2 Board presentation																																												
3 Project effectiveness																																												
4 PERIODIC MAINT./REHABILITATION																																												
5 16-16/Study																																												
6 16-16/Procurement Works																																												
7 16-16/Civil Works																																												
8 27M sp/Study																																												
9 27M sp/Procurement Works																																												
10 27M sp/Civil Works																																												
11 26-M/Study																																												
12 26-M/Procurement Works																																												
13 26-M/ Civil Works																																												
14 17-M/Study																																												
15 17-M/Procurement Works																																												
16 17-M/ Civil Works																																												
17 FL-66 (SRR) Study																																												
18 FL-66 (SRR) FA Works																																												
19 66-70 (SRR) Study																																												
20 66-70 (SRR) FA WORKS																																												
21 96-01 (SRR) Study																																												
22 96-01 (SRR) FA Works																																												
23 PM/TA to SRR																																												
24 PM/TA to SRR																																												
25 PM/Procurement Supervision																																												
26 PM/Supervision																																												
27 EQUIPMENT SERVICE																																												
28 EATP/Procurement CAT																																												
29 SHTP/CAT Rehabilitation																																												
30 SHTP/CAT Parts																																												
31 SHTP/Procurement PA																																												
32 SHTP/PA Delivery of Parts																																												
33 SHTP/Procurement Equipment																																												
34 SHTP/Delivery of Equipment																																												
35 EATP/TA Est. MPA Contract																																												
36 SHTP/Procurement TA																																												
37 SHTP/TA																																												
38 INSTITUTION STRENGTHENING																																												
39 INT/Procurement TA																																												
40 INT/TA																																												
41 INT-INT/Procurement Computers																																												
42 INT-INT/Supply Computers																																												
43 MESP-BETT/TA MPA Contract																																												
44 MESP-BETT/TA New Contract																																												
45 CPTP/Procurement TA																																												
46 CPTP/TA																																												
47 CPTP/Procurement Buildings																																												
48 CPTP/Construction Buildings																																												
49 CPTP/Procurement Equipment																																												
50 CPTP/Supply Equipment																																												
51 RECEIPT. OF BANK D-DONATIONS																																												
52 01-06/Procurement Works																																												
53 01-06/Civil Works																																												
54 01-06/Procurement Supervision																																												
55 01-06/Bid Evaluation																																												
56 01-06 Supervision																																												

MALI

FIFTH HIGHWAY PROJECT

Economic Evaluation

General

1. Mali's population is about 7 million; average per capita GNP in 1983 was US\$150 equivalent. It is a vast (almost 40% the size of India), landlocked and drought-prone Sahelian country. Since transport costs weigh more heavily than elsewhere in the price of basic commodities, especially of high-volume, low-value bulk goods, Mali has a particular need for efficient and well-developed transport services. Yet, it presently has the world's highest share of freight costs in the total value of imports: 25.5%, compared to a developing country average of 10.7% and a developed market-economy average of 5.3%. This is a heavy additional handicap for a country already disadvantaged by a poor natural resource base and inadequate social infrastructure.

2. Although an important part (some 17%) of the country's overall public investment in the past decade has been devoted to the upgrading of its transport infrastructure, overall access to goods and services remains difficult and costly for large segments of the Malian population. The country's 600 km of railways serve a narrow corridor between Bamako and the border of Senegal. The network of 13,500 km of classified roads translates into an average road density of about one km per 100 km<sup>2</sup>, among the lowest in West Africa. Even so, this figure actually overstates accessibility: it includes some 4,600 km of unimproved earth roads and tracks which "serve" widely dispersed and mostly self-sufficient (- except in drought years -) groups in the first, sixth and seventh regions (Kayes/Gao/Timboctou) representing 15-20% of the total population. These tracks carry only very low volumes of essential goods traffic, and since they receive practically no maintenance, they are impassable for 5-6 months out of the year.

3. Over 90% of Mali's road transport is concentrated on a priority network of some 8000 km, close to a quarter of it now paved. Upgrading and extension of the paved network has been the Government's priority for the sector since the early seventies and has absorbed the bulk of available funds, while maintenance of the existing roads and promotion of an efficient road transport industry were neglected.

4. Although the first three highway projects financed by IDA all included periodic maintenance components along with main and feeder road construction, the latter was usually achieved, while road maintenance results consistently fell short of appraisal estimates. This was

essentially due to the fact that maintenance, carried out by force account exclusively, tended to be treated as a residual activity, bearing the full impact of any shortage of local funds (due to drought and/or inflation) and of the increasing illiquidity of Road Fund revenues paid in the form of postal cheques (Annex 2-4). An inefficient Public Works Equipment Service, unable to keep a minimum of the available road maintenance equipment in running order further compounded the financial difficulties. By 1980, routine maintenance was declining to perfunctory levels. Significant increases in petrol prices and road user taxes in 1981, combined with a steady deterioration of the road network led to a marked increase in the cost of vehicle operation especially for truckers, and to a pronounced decline of road transport services especially to the rural areas (Annex 2-5). This threatened to deprive an ever increasing proportion of Mali's already disadvantaged rural population of even the most essential exchanges with the rest of the country and constitutes a potentially life-threatening handicap for many communities during drought years that now seem to occur in five-year cycles.

5. The Malian authorities, recognizing the serious impacts of the long neglect of maintenance requested IDA assistance in redressing the situation. The 1981 Fourth Highway (Maintenance) Project (cofinanced by Switzerland) accordingly financed a two-and-a-half year emergency program to assure essential routine maintenance on a priority network of 4-5000 km, as well as the execution of deferred periodic maintenance on some of the most degraded gravel and paved roads. At the same time, the project served as a vehicle for evolving - in close collaboration between MTP and IDA - a coherent approach to a longer term, sustainable policy of road construction and maintenance consistent with Mali's needs, financial capacity and technical capabilities. The realization that projected Road Fund revenues for 1985 and beyond will barely suffice to cover the debt service on past road investments - leaving little for local counterpart funding of ongoing investments and nothing at all for road maintenance - was a dramatic reminder of the need for reshaping the country's overall road sector strategy.

6. The occasion to do so was provided by the preparation of the present project, cofinanced by AfDF, Switzerland, and France. In the course of this, a comprehensive approach to road investment and maintenance (periodic and routine) programming has been agreed upon, focussed on the priority need of (a) maintaining existing infrastructure assets rather than on the creation of new ones; (b) securing a sound financing base for adequate maintenance; (c) creating the conditions for a more efficient delivery of maintenance works, and (d) promoting better balanced and more streamlined transport services through more differentiated and realistic transport pricing, better vehicle (load) control and, ultimately, transporter training.

7. In support of difficult Government policy actions required on (b) and (d) above, the project provides the means for delivering (a) and (c). It finances not only the continuation of essential maintenance activities begun under the previous project, but also a comprehensive institution strengthening program designed to improve overall sector planning, increase transport industry efficiency, and reorient and streamline DNTP's maintenance activities. The shift of part of the periodic maintenance from force account to local contractors, initiated successfully under the Fourth Highway Project, will be more actively pursued. In addition, a significant part of equipment rehabilitation will be contracted out, in order to alleviate the backlog of work in the Equipment Service and allow it to cope more successfully with a reduced workload. Key technical assistance inputs for compensating organizational and technical weaknesses in DNTP's operating units will be provided, but technical assistance will be teamed with Malian counterparts and the teams will be jointly responsible for achieving the outputs of a clearly defined maintenance program. The project includes a production-related incentive scheme for local personnel and provides task-oriented training for all categories of maintenance personnel, prepared and implemented by the Public Works Training Center equipped under previous IDA projects.

8. In combination, these measures are expected to produce a leaner and more productive structure for the execution of both road and related equipment maintenance. However, the transfer of part of the maintenance tasks to private contractors necessitates a strengthening of DNTP's programming, contracting and supervision capabilities: again, experienced technical assistants will be teamed with qualified Malian engineers in the respective units to develop technically sound and efficient procedures and practices, also on the "joint-responsibility/incentives-for-results" model described above. Finally, the project fosters better sector planning capabilities through increased support of the National Transport Office (ONT), improving data handling and analysis capacity through computerisation, technical assistance and training. In summary, the proposed project - rather than just concerned with road maintenance - attempts to coalesce the support of all major donor agencies active in the sector around Government's maintenance-centered and productivity-oriented road sector strategy for the medium term.

#### Parameters of the Economic Analysis

9. Road maintenance is known to be a very high return activity, because it both postpones the need for much more expensive renewal of infrastructure and significantly lowers the costs of vehicle operation. Specific returns of any program are a function of existing road conditions, present and estimated future levels of traffic, estimated costs of road maintenance activities and estimated costs of vehicle operation. A summary evaluation of these four parameters for Mali shows the following:

10. Road Condition and Road Maintenance Strategy: The links of the 2,470 km paved road network (including kilometrage under construction) were classified according to their present maintenance status on a three-point scale (1=Good, 2=Average, 3=Poor). Their overall rating is 1.8, with poorer ratings (2.1 and 2.4) for the 1350 km of more heavily travelled sections, the most degraded of which are proposed for resurfacing and/or reconstruction under the proposed project, which will bring the overall rating of the paved network to a satisfactory 1.33. The gravel road network of 3,330 km has been classified on a four-point scale (1=Good, 2=Average, 3=Poor and 4=Very Poor). Its overall present rating is 3, with a high rating of 1.1 on the most heavily travelled sections and a low of 3.4 on sections with traffic below 20 vehicles per day. Upgrading of gravel road sections under the project will increase the overall rating for this class of roads to 2.7 - still quite unsatisfactory and an obvious impediment to adequate transport services in several regions. The earth road network of 2,990 km has been classified on a three point scale (3=Fair, 4=Poor, 5=Very Poor). It has been assessed an average rating of 4, which will be only marginally improved by the routine maintenance activities proposed under the project: these are restricted to activities aimed at restoring reasonable passability to these roads after the usual wash-outs caused by the brief, but extremely violent rainy season. (For details, see Annex 2-3, The Priority Road Network).

11. The strategy of the proposed maintenance program will thus be to (i) preserve the paved road network by (a) preventive maintenance of the more recently constructed portions and (b) rehabilitation/reccnstruction of the earlier portions, some of them now over 30 years old and breaking up because of deficient maintenance over much of their life; (ii) regular routine maintenance of a priority network of improved gravel roads, selective rehabilitation (periodic maintenance) of sections supporting agricultural and tourist development in areas of good potential and with ongoing (rural) development projects; and (iii) intermittent maintenance activities on selected earthroads providing essential services to substantial marginalized populations.

12. Traffic: According to the semi-annual traffic counts carried out by DNTP, 1983 traffic on Mali's paved roads ranged from 17,000 vehicles per day (vpd) near Bamako to some 55 vpd (Annex 2-3); the mean on all paved roads (excluding Bamako-Senou) was 180 vpd with about 36% of heavy vehicles (trucks and semi-trailer combinations). On gravel roads, traffic ranged from 145 to 5 vpd, with a mean of 25 vpd, 23% of them heavy vehicles (mostly trucks, some semi-trailers). Traffic on the unimproved earth roads averaged no more than 5-10 vpd, practically all pick-ups and small trucks carrying passengers and essential goods. While traffic grew at around 7% annually in the 1970s, it decreased by around 9% annually from its 1979 peak until 1982, levelled in 1983 and started increasing again in 1984, due mainly to increased shipments of grains for drought relief. It has been assumed that traffic would continue to increase modestly (by 3% in 1984 and 4% annually thereafter

on paved roads, by 2% on gravel roads in 1984 and by 3.5% annually thereafter, and by 2% on earth roads, the maintenance status of which is expected to change only marginally throughout the analysis period of 10 years. Gravel roads being rehabilitated are expected to have higher growth rates due to the rural development projects being carried out in the areas they serve (1984: 4%, and 6% annually thereafter); in addition, road improvements will add generated traffic of 10-15% of existing volume, in line with observed traffic increases on recently improved gravel roads. A pessimistic scenario, with traffic growth on gravel roads rehabilitated reduced to 3% p.a. and on the remainder of the network held at 2% p.a. (i.e. below the rate of population growth) was also tested.

13. Road Maintenance Costs: Due to severe degradation of many of the priority roads, the estimated unit costs (Jan. 1985 prices) for road maintenance are relatively high. For the main rehabilitation and recurrent maintenance activities to be carried out under the project, they are as follows: CFAF 10.2 million (US\$360) per km of patching of paved roads; CFAF 7.5 million (US\$16,800) per km of regravelling and CFAF 70,700 (US\$155) per km of spot regravelling; and CFAF 38,600 (US\$84) per km of grading. Other routine maintenance costs (maintenance of shoulders, drainage systems, bridges, signalisation, etc.) average about CFAF 151,500 (US\$330) per km of paved road and CFAF 50,500 (US\$110) per km of unpaved road. The above figures reflect the mix of work by contractor and by force account foreseen under the project; the costs of equipment depreciation and of works supervision have been added to the site-costs of maintenance tasks detailed in Annex 3-1. A summary of Maintenance costs used in the economic analysis is in Tables 1 and 2.

14. Vehicle Operating Costs: Vehicle operating cost parameters have been provided by ONT. The most recent version of the Highway Design and Maintenance Standards model (HDM III) was used to assess vehicle operating costs in the reference "without project" situation (no periodic maintenance; routine maintenance at one third the level and 1.2 times the cost per activity in the "with project case") and with the project. Estimated vehicle operating costs for different road conditions are summarized in Table 3. From the analysis, it can be seen that the economy would save some CFAF 33 billion annually in operating costs due to improved road surface conditions with the project.

15. Exogenous benefits : To reflect the agricultural production/rural income benefits associated with the provision of all-weather access to markets and social services in presently marginalized regions where rural and agricultural development projects are being implemented or firmly planned, incremental value added due to the road has been estimated for the unpaved links proposed for rehabilitation. The estimates are based on the considerations set out below and are added as exogenous benefits for Alternative 1 "with the project" in the HDM III model run.

16. The Bougouni-Yanfolila-Badogo, Badogo-Kalana, and Bougouni-Manankoro roads (Group UPC2, links 1082, 2221 and 1091) are national roads serving the Mali-Sud (IDA) Project area. The road influence area is among the most fertile in the country with sandy loam soils and annual rainfall of about 1500 mm. It has recently been freed from riverblindness and has begun to attract immigrants from the Sahelian north, a trend certain to be reinforced by the current drought and famine in that area. The road influence areas (RIAs) are targeted for expansion of cotton and improved maize production under the Second Mali Sud project initiated in 1984 which promotes an effective small holder farm package implemented successfully under the first MALI-Sud project in the region north of Bougouni. While the agriculture project includes essential maintenance of feeder roads in the project area, it assumes that rehabilitation and subsequent maintenance of the main roads would be carried out by MTTP. Lack of reasonable main road access is jeopardizing CMDT's (Compagnie Malienne du Textile) goal of expanding cotton production in the region by 6,000 ha. It hampers provision of inputs and extension services, discourages the planned inflow of migrants and reduces farmers incentives for the production of surplus coarse grains for the city markets in the north. Quantified road impacts are : (i) differential population growth with and without the project; (ii) slower adoption of improved farm-practices leading to both acreage and yield increases. Details of the estimation are in the project file.

17. The Kayes-Nioro road and the access-dyke to Djenne (Group UPB2, links 1013 and 6210), although both in the Sahelian zone, serve quite differing needs. The historic city of Djenne is an important tourist-attraction, on the Tombouctou-Mopti-Dogon country circuit. Road access is provided by a dyke road through the flood-plane of the Niger river which, after long years of neglect, has severe erosion problems. Rehabilitation of the road is expected to result in substantially increased tourist traffic, reflected in higher than average traffic growth rates for this spur off the San-Mopti axis. By contrast, the expected impact of the Kayes-Nioro road in the isolated First Region mainly concerns the agricultural and social development of its large influence area. Providing a much needed all-weather link between Kayes (population about 60,000) the First Region capital, and Nioro du Sahel (population about 20,000) the administrative center of the Kaarta District, the road will also serve an estimated (1985) rural population of some 150,000 living in a 25 km band along its trajectory. A detailed feasibility study of the Kayes-Nioro road and a related 68 km branch road from Dialaka to Yelimane was carried-out with USAID financing in 1979/80. It examined seven alternative levels of road improvements, some in combination with additional agriculture investment. Comparing net incremental value added in agriculture and transport with and without the project based on a regional simulation model, the study concluded that the optimal level of road improvement, i.e. the variant with an acceptable rate of return and which maximized net present value both with and without associated agricultural investments in the RIA, was a



paved link between Kayes and Dialaka (82 Km) and a laterite surfaced road from there to Nioro. The variant with agricultural investments had an estimated ERR of 16.4%, the road-only alternative one of 13%. Sensitivity testing showed however, that under pessimistic assumptions (limited maintenance; decrease in revenues of 20%; increase in costs of 20%), an all-laterite road from Kayes to Nioro would be the optimal road investment, with ERRs ranging from 16.4% (most likely case) to 13.2% (costs + 20%) and 9.2% (revenues - 20%).

18. Although deemed essential for the successful implementation of several ongoing rural development projects in the RIA (Kaarta Integrated Rural Development, supported by Canadian Aid (Can.\$ 21 million) and centered on Nioro; Kayes Nord Livestock Development, supported by Saudi-financing (US\$15 million) west of Nioro; irrigation studies; ODIPAC, an IDA-financed experimental rural development project (US\$6.5 million) expected to lead to a larger scale project in 1987; USAID rural health services pilot project), the Kayes-Nioro road has not found financing and remains a steadily worsening constraint the region's development. What agricultural and livestock potential there is in the RIA remains under-exploited, as access to markets and services continues to deteriorate. Young able-bodied males migrate in increasing numbers to the neighboring countries (especially, Senegal/Ivory Coast) and to France in search of wage employment. This further accentuates the deficit character of the region, whose population relies for its survival more and more on remittances from these migrants. Estimated growth of the rural population in the RIA during the 1970's was not more than 0.9%, although the seasonal influx of cattleherders from the south during trans-humance increases the resident population by about 15% for a few months of each year. As deteriorating roads lead to declining and increasingly unreliable provision of essential goods and basic social services in the rural areas, outmigration (between 2-3% annually) accelerates: Kayes urban area has been growing at over 6%, although employment opportunities are scarce, and many migrants move on to the capital or abroad. Land use surveys in the project area have established that only about a fifth of the cultivable land (estimated at 16% of total area) is presently cultivated, and that improved cultivation practices can produce significantly greater yields than those realized by traditional farmers. With the provision of modern inputs, credit to acquire them and agricultural extension to instruct farmers in the use of new technologies - the package provided by the Kaarta Integrated Development Project and ODIPAC - the area's agricultural potential would allow its population to reach self-sufficiency and even produce a surplus for the market, if access can also be assured. The impact of road access has again been quantified in terms of (i) differential population growth and (ii) differential adoption of improved farm practices with attendant acreage and yield increases. Details of the estimation are in the project file.

19. Rates of Return and Benefit-Cost Ratios: The Highway Design Standards (HDM III) model was used to estimate the project's economic rate of return, which is higher than 50% overall. Separate ERRs were established for the reconstruction of the Bamako-Bougouni road, for the paved road maintenance program, as well as for links with different traffic and maintenance characteristics within each of these three components.

20. The Bamako-Bougouni road reconstruction yields an estimated return of 28% overall, with 65% for the highly trafficked urban section from Bamako to Faladie, and 15% for the rural section from Faladie to Bougouni. These results are conservative, since neither congestion costs on the urban section, nor the costs of increasing traffic diversion on to a substantially longer route (132 km) from Bougouni to Bamako in case of further deterioration of the road were taken into account. The benefit/cost ratio for this component at a discount rate of 10% is 2.6:1. Details of the analysis are in Table 4b.

21. The paved road maintenance program includes periodic maintenance of 492 km and routine maintenance of 1,730 km. The overall ERR for the component is 34%. Four links with different characteristics were analysed separately: estimated ERRs range from 24% to over 100%. The overall benefit/cost ratio for this component, at a 10% discount rate, is 2.55:1. Link-by-link details are in Table 4a.

22. The unpaved road maintenance program includes rehabilitation of 535 km of gravel roads in areas with ongoing rural development projects (paras. 16-18 above), and routine maintenance of a priority network of some 3,330 km of gravel roads and 2,990 km of earth roads. The overall ERR for this component is indeterminate, since the ERR on a number of links exceeds 100%. Seven links with different characteristics were analysed separately: estimated ERRs range from 13% to over 100%. The overall benefit/cost ratio for this component, at a 10% discount rate, is 1.99:1. Link-by-link details of the analysis are in Table 5. Returns on all components remain satisfactory with the pessimistic traffic growth assumptions tested (Tables 4a and b).

23. The major risks to achieving projected benefits would be inadequate funding and operating inefficiencies of the project agency. Based on the experience under the ongoing Fourth Highway (Maintenance) Project, and given the arrangements made to ensure timely execution of equipment overhauls at project start-up, there should be no major risks concerning periodic maintenance: force account operations have been improving and performance by contractors has been satisfactory. No problems are anticipated on the reconstruction of Bamako-Bougouni by contract. Adequate routine road maintenance in the final years of project implementation depends on the timely introduction of the revenue raising measures discussed in para. 2.16 of the SAR, but since Government will have agreed with IDA on a timetable, this risk should

be limited. It would demand, however, a close monitoring by IDA of the implementation of these measures. The provision of technical assistance, combined with intensified training and an improved incentive structure for Malian project personnel, should assure that the expected gains in operational efficiency will, in fact, be realized.

**FIFTH HIGHWAY PROJECT**

**Table 1: Derivation of Maintenance Cost for Economic Analysis**

<u>Item</u>	<u>Basic Cost</u> <u>(CFAF Million)</u>	<u>Pro-rated</u> <u>Equipment Cost</u>	<u>Pro-rated</u> <u>Supervision Cost</u>	<u>Adjusted</u> <u>Base Cost</u>	<u>Coefficient</u> <u>To Reflect Equipment</u> <u>Costs</u>
A. Equipment	2,694.142 a/	(1,885.899)			
B. Force Acct.- Routine M.	4,560.231	1,306.977		5,867.208	
C. Force Acct.- Periodic M. Gravel	785.693	225.182	57.706	1,068.581	paved 2,640.244 (45%)
D. Force Acct.- Periodic M. Paved	1,234.249	353.740	90.651	1,678.640	unpaved 3,226.964 (55%)
E. Contractor - Periodic M. Gravel	2,759.521		202.676	2,962.137	
F. Contractor - Periodic M. Paved	3,101.123		227.765	3,328.888	
G. TA Supervision - Periodic M.	578.798 b/		(578.789)	-	
<b>TOTAL</b>				14,905.454 + 808,300 (Residual Equipment) 15,713.754	1.287

a/ Five-year life, of which 3.5 years for project, prorated to B, C, D.

b/ Prorated to C, D, E, F.

	<u>CFAF m10</u>	<u>CFA/m<sup>2</sup></u>	<u>CFA/m<sup>3</sup></u>
Average per Km Cost of Periodic Maintenance, Gravel (C+E): 4,030.778:535 = 7.534			8,371
Average per Km Cost of Periodic Maintenance, Paved (D+F): 5,007.528:492 = 10.178		1,696	
Average per Km Cost of Grading 814-443 CFAF million/pa: 27.142 km = 30.006 X (coeff.) 1.287 = 38,618 CFAF/km			
Average per m <sup>3</sup> Cost of Spot Regraveling 1,250.882 :455,682 m <sup>3</sup> = 2,746 X (coeff.) 1.287 = 3,533 CFAF/m <sup>3</sup>			
Average per m <sup>2</sup> of bitumen patching		2,260 X (coeff.) 1.287 = 2,908 CFAF/m <sup>3</sup>	
Average per Km of routine maintenance; other:1,644.380:3.5 years = CFAF million 1469.823/yr: 6321 km unpaved 1884 X 3 km paved			
Equivalent km unpaved: 11,973 = 39,240/km unpaved X 1.287 = 50,502/km 117,720/km paved X 1.287 =151,506/km			

Source: Annex 3-1, Table 3, Annex 3-3, Table 2, Annex 2-4, Table 2

Note: Cost figures for the economic analysis are based on the Jan. 1985 version of the SAK, which used an exchange rate of US\$1= 460 CFAF, and thus differ slightly from the final cost-tables which reflect an exchange rate of US\$1=490 CFAF.

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Table 2: Share of Different Project Components in Total  
Economic Cost (Jan. 1985 prices)

<u>Paved Roads</u>	<u>CFAF Million</u>	<u>%</u>
1. Reconstruction: Bamako-Faladie	1,935.0	7.9
Faladie-Bougouni	7,595.0	31.1
Sub-total	<u>9,530.0</u>	<u>39.0</u>
2. Maintenance, Periodic: Contractor	3,328.9	13.6
Force Account	1,678.6	6.9
Routine : Force Account	2,640.3	10.8
Sub-total	<u>7,647.8</u>	<u>31.3</u>
<u>Unpaved Roads</u>		
3. Maintenance; Periodic: Contractor	2,962.1	12.1
Force Account	1,068.6	4.4
Routine : Force Account	3,227.0	13.2
Sub-total	<u>7,257.7</u>	<u>29.7</u>
<b>TOTAL ECONOMIC COST</b>	<b>24,435.5</b>	<b>100.0</b>
Residual Equipment	808.3	
T. A. and Training	<u>2,638.1</u>	
<u>Base Project Cost</u>	<u>27,881.9</u>	

Note: Cost figures for the economic analysis are based on the Jan. 1985 version of the SAR, which used an exchange rate of US\$1= 460 CFAF, and thus differ slightly from the final cost-tables which reflect an exchange rate of US\$1=490 CFAF.

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Table 3 - The Economic Cost of Vehicle Operation

<u>Paved Roads</u>	----- Road Condition -----			
	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Very Poor</u>
Quality Index <u>a/</u>	<u>45</u>	<u>95</u>	<u>120</u>	<u>150</u>
	<u>CFAF/Vehicle/km - Jan. 1985</u>			
Passenger Car	68.9	73.0	77.5	83.9
Pick-up	72.6	80.1	88.0	99.4
Bush-taxi	79.8	88.5	98.1	112.1
Truck (7.5t)	304.3	327.8	343.6	365.7
Semi-trailer (30t)	480.4	511.3	531.5	563.6
	<u>Unpaved Roads</u>			
Quality Index <u>a/</u>	<u>70</u>	<u>120</u>	<u>175</u>	<u>215</u>
Passenger Car	71.6	78.9	90.5	100.2
Pick-up	75.8	89.6	110.9	127.9
Bush-taxi	88.5	102.7	127.8	149.1
Truck (7.5t)	337.4	375.5	418.7	453.2
Semi-trailer	563.1	607.5	659.2	703.5
	<u>US\$/Vehicle/km - Jan. 1985</u>			
	<u>Paved Roads</u>			
Passenger Car	0.150	0.159	0.169	0.182
Pick-up	0.158	0.174	0.191	0.216
Bush-taxi	0.174	0.192	0.213	0.244
Truck (7.5t)	0.662	0.713	0.747	0.795
Semi-trailer (30t)	1.044	1.112	1.155	1.225
	<u>Unpaved Roads</u>			
Passenger Car	0.156	0.172	0.197	0.218
Pick-up	0.165	0.195	0.241	0.276
Bush-taxi	0.192	0.223	0.278	0.324
Truck (7.5t)	0.734	0.816	0.910	0.985
Semi-trailer (30t)	1.224	1.321	1.433	1.529

a/ Established as a function of road roughness by the Highway Design Standard (HDM III) model.

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Table 4a: Economic Evaluation of a Program of Paved Road Resurfacing and Maintenance

(CFAP 000,000, Jan. 1985 prices)

----- Discounted Sums for 1986-1996 Period -----

<u>Discount Ratio (X)</u>	<u>Road Rehabilitation and Maintenance (C)</u>	<u>Veh. Operating Cost Savings (B)</u>	<u>Ratio B/C</u>	<u>Net Present Value (Total Net Benefits)</u>
0	4,668	21,055	4.51	16,386
10	4,206	10,714	2.55	6,508
12.5	4,092	9,221	2.25	5,129
25	3,580	4,787	1.33	1,208

Comparative Results for Links with Different 1984 Traffic Volumes and Corresponding Levels of Maintenance

(CFAP 000,000, Jan. 1985 prices)

<u>1984 Traffic Level (vpd)</u>	<u>Length of Link (km)</u>	<u>Periodic Maint. with Project (km)</u>	<u>Total Economic Cost, 1985-1996 (Maintenance &amp; Vehicle Operat. Cost)</u>		<u>Net Present Value</u>			<u>NPV/km (10%)</u>	<u>ERR 1* (X)</u>	<u>ERR (X)</u>
			<u>With Project</u>	<u>Without Project</u>	<u>Discount Rates</u>					
					<u>0%</u>	<u>10%</u>	<u>25%</u>			
more than 1,000	28	-	19,040	19,781	741	337	127	12.0	306	346
220-1,000	224	165	95,522	103,532	8,010	2,886	1,108	12.9	58	47
100-220	882	327	154,961	162,051	7,090	2,421	(96)	2.7	24	18
less than 100	596	-	48,206	48,752	545	195	69	0.3	43	39
<b>TOTAL</b>	<b>1,730</b>	<b>492</b>	<b>317,729</b>	<b>334,116</b>	<b>16,386</b>	<b>5,839</b>	<b>1,208</b>	<b>3.4</b>	<b>34</b>	<b>28</b>

Table 4b: Economic Evaluation of Bamako-Bougouni Road Reconstruction

more than 10,000	7.3	7.3	66,006	79,656	13,650	6,164	2,101	844.4	65	66
220-1000	<u>152.7</u>	<u>152.7</u>	<u>63,559</u>	<u>71,979</u>	<u>8,419</u>	<u>1,536</u>	<u>(1,533)</u>	<u>10.1</u>	<u>15</u>	<u>12</u>
	160.0	160.0	129,565	151,635	22,069	7,700	568	48.1	28	26

\* ERR 1= Traffic growth at 4% p.a., ERR 2= traffic growth at 2% p.a.

Note: Cost figures for the economic analysis are based on the Jan. 1985 version of the SAR, which used an exchange rate of US\$1= 460 CFAP, and thus differ slightly from the final cost-tables which reflect an exchange rate of US\$1=490 CFAP

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**Table 5: Economic Evaluation of a Program of Periodic Regravelling and Rehabilitation of Laterite and Earth Roads and their Routine Maintenance**  
(CFAP million, Jan. 1985 prices)

----- Discounted Sums for 1986-1996 Period -----

Discount Rate (%)	Incremental Cost of Road Rehabilitation and Maintenance (C)	Vehicle Operating Cost Savings (B1)			Net Incremental Agric. Value Added (B2)	Ratio B1/C	Ratio B1 & B2/C	Net Present Value (Total Net Benefits)
		Existing	Generated	Total				
0	8,819	12,589	588	13,177	9,300	1.49	2.55	13,658
10	6,329	7,645	312	7,958	4,664	1.26	1.99	6,293
12.5	5,927	6,901	272	7,173	4,003	1.22	1.90	5,249
25.0	4,569	4,586	149	4,737	2,058	1.04	1.49	2,226

**Comparative Results for Links with Different 1984 Traffic Volumes and Corresponding Levels of Maintenance**  
(CFAP million, Jan. 1985 prices)

1984 Traffic Level (vpd)	Length of Link (km)	Periodic Maintenance With Project (km)	Total Economic Cost		Net Present Values --- Discount Rate ---			NPV/Km (10%)	ERR 1* (%)	ERR 2* (%)
			With Project	Without Project	0%	10%				
						25%				
G a/more than 40	305	-	29,764	32,271	2,507	1,488	900	4.88	>100	>100
G 21 - 40	535	-	13,940	14,929	990	653	411	1.22	68	>100
G 21 - 40, PM b/	288	288	10,277	8,982	2,014	242	(635)	0.84	13	11
G up to 20	1,878	-	27,940	28,997	1,058	665	405	0.56	>100	100
G up to 20, PM	247	247	1,487	4,592	5,662	2,370	606	9.59	41	41
E c/more than 20	391	-	7,600	7,645	45	31	24	0.08	>100	>100
E up to 20	2,598	-	24,894	26,276	1,383	844	514	0.33	>100	>100
<b>TOTAL</b>	<b>6,242</b>	<b>535</b>	<b>115,902</b>	<b>123,692</b>	<b>13,659</b>	<b>6,293</b>	<b>2,225</b>	<b>1.01</b>	<b>Multiple</b>	<b>Multiple</b>

a/ G - Gravel roads  
b/ PM - Periodic maintenance  
c/ E - Earth roads

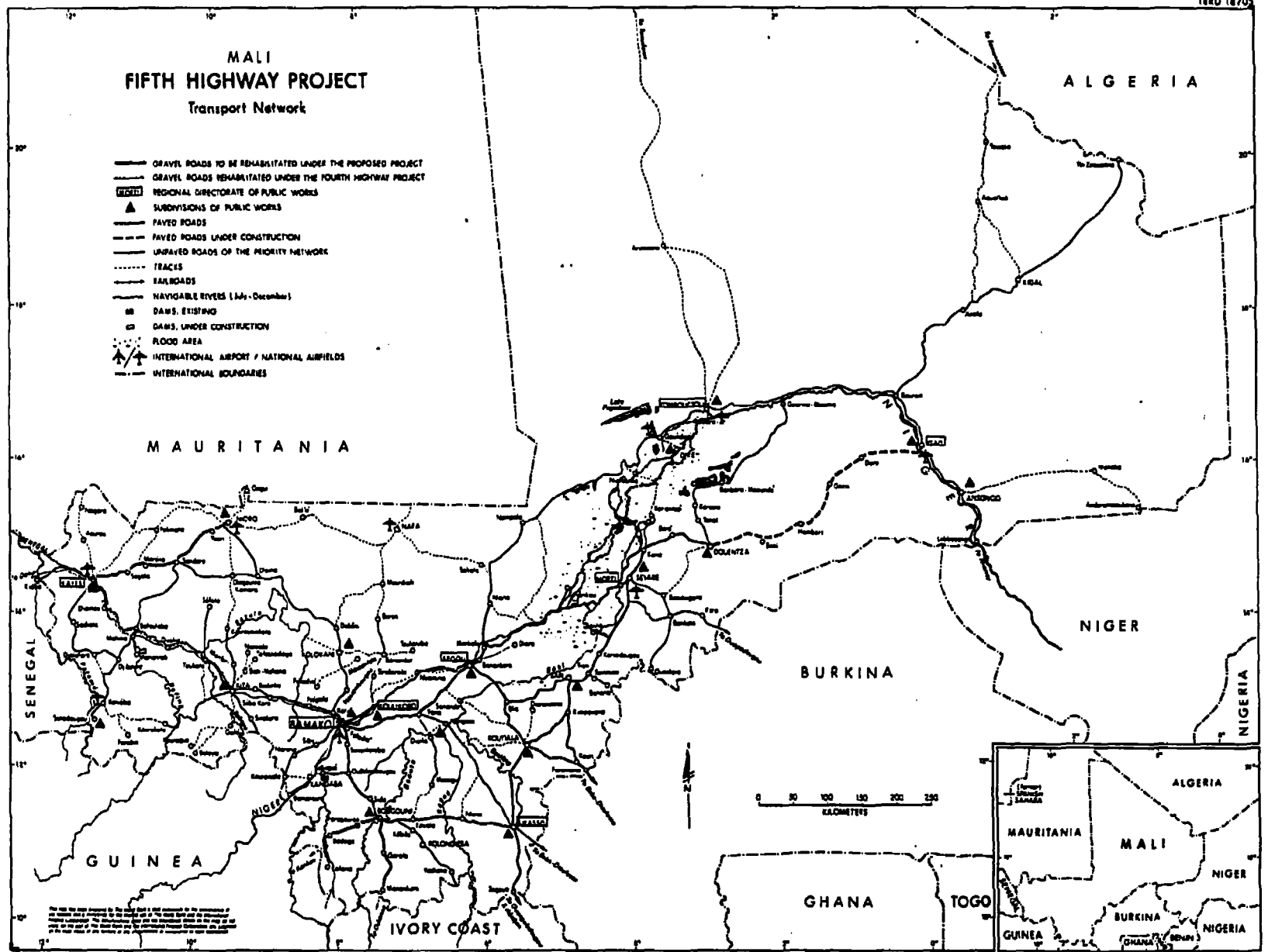
\* ERR 1= traffic growth at 3.5% p.a.; ERR 2= traffic growth at 2% p.a.

**Note:** Cost figures for the economic analysis are based on the Jan. 1985 version of the SAR, which used an exchange rate of US\$1= 460 CFAP, and thus differ slightly from the final cost-tables which reflect an exchange rate of US\$1=490 CFAP.



# MALI FIFTH HIGHWAY PROJECT Transport Network

- GRAVEL ROADS TO BE REHABILITATED UNDER THE PROPOSED PROJECT
- GRAVEL ROADS REHABILITATED UNDER THE FOURTH HIGHWAY PROJECT
- REGIONAL DIRECTORATE OF PUBLIC WORKS
- SUBDIVISIONS OF PUBLIC WORKS
- PAVED ROADS
- PAVED ROADS UNDER CONSTRUCTION
- UNPAVED ROADS OF THE PRIORITY NETWORK
- TRAILS
- FERRISSADES
- NAVIGABLE RIVERS (July - December)
- DAMS, EXISTING
- DAMS, UNDER CONSTRUCTION
- FLOOD AREA
- INTERNATIONAL AIRPORT / NATIONAL AIRFIELDS
- INTERNATIONAL BOUNDARIES



This map was prepared by the Ministry of the Interior and the Ministry of the Economy and Finance of Mali. It is based on the information provided by the Ministry of the Interior and the Ministry of the Economy and Finance of Mali. The Ministry of the Interior and the Ministry of the Economy and Finance of Mali are responsible for the accuracy of the information provided on this map.

