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STAFF APPRAISAL REPORT

ARAB REPUBLIC OF EGYPT

A ROAD MAINTENANCE PROJECT

June 9, 1983

Projects Department
Europe, Middle East and North Africa Regional Office

CURRENCY EQUIVALENTS
(As of June 1983)

Official Foreign Exchange Rate

1 Egyptian Pound (£E)	=	US $1.43
1 US Dollar ($)	=	£E 0.70

Rate for Commercial Bank Transactions

1 Egyptian Pound (£E)	=	US$1.20
1 US Dollar (US$)	=	£E 0.84

WEIGHTS AND MEASURES

1 meter (m)	=	3.281 feet (ft)
1 kilometer (km)	=	0.621 miles (mi)
1 metric ton (ton)	=	0.984 long ton (lg ton)
1 litre (ltr)	=	0.264 US Gallons (G)

GLOSSARY OF ABBREVIATIONS

DRTPC	- Development Research and Technological Planning Center
ER	- Egyptian Railways
ERR	- Economic Rate of Return
FYB	- First Year Benefit
ICB	- International Competitive Bidding
LIT	- Limited International Tendering
NPV	- Net Present Value
NTS	- National Transport Study
p.a.	- per annum
RBA	- Roads and Bridges Authority
TPA	- Transport Planning Authority
TPU	- Training Production Unit
v.p.d.	- vehicles per day

ARAB REPUBLIC OF EGYPT
FISCAL YEAR

July 1 to June 30

ARAB REPUBLIC OF EGYPT

APPRAISAL OF

A ROAD MAINTENANCE PROJECT

Table of Contents

This report is based on the findings of an appraisal mission in November 1980, composed of Messrs. D. Powrie (Engineer), H. Schlechtriem (Economist), G. Morra (Training Specialist) and a consultant, A. Mackie (Mechanical Engineer), and an updating mission in February 1983, conducted by Mr. B.H. Van Waes (Engineer). The sectoral and economic analysis was updated by Mr. N.C. Yucel (Economist).

Table of contents (continued) Page No.

I. THE TRANSPORT SECTOR

A. Economic Geography and the Transport System

1.01 Egypt has a land mass of about 1 million sq km. However, most of its 43 million population and nearly all economic activity are confined to no more than 4% of this area, the remainder being desert and wasteland. The main economically active parts of the country are the 900 km long valley of the Nile, especially its Delta, the area adjacent to the Suez Canal, and small areas in both the eastern and western deserts. Nearly half of the population lives in urban centers, of which Cairo with about 10 million inhabitants (and accounting for about half of the nation's industrial output) and Alexandria at the western corner of the Delta with 2.6 million, are the largest.

1.02 The most important transport corridors in Egypt are between Cairo and Alexandria, and along the Nile. Other corridors lead to the Suez Canal from the Nile Valley. Outside of urban areas, transport demand is greatest in the densely populated Delta area, where agricultural development and its potential are considerable, and where urban development is giving rise to increasing intercity transport.

1.03 Egypt's diverse transport network is generally adequate in coverage, with road transport the dominant mode. The war years ending in 1973 left the transport system in a dilapidated state, both with regard to its physical assets and the organizations that are responsible for the sector. The main physical deficiencies have been: (i) in the railways, with shortages of locomotives and rolling stock, (ii) at Alexandria port which suffered congestion through lack of handling facilities, (iii) the poorly maintained road network; and (iv) waterways which are also in poor condition and operate with an inadequate fleet. Since 1975, the Government has been correcting some of these deficiencies with increased allocations for infrastructure in both railways and ports (in which the Bank Group played a part with two railway projects and a port project). The railways have not recovered significantly as yet, because of the restrictive nationalized system under which it operated. However, with a reform law in 1980, the railways have become semi-autonomous and this provides a basis for reconstituting them as a viable enterprise. For ports, the Government has embarked on a long-term port development program based on the recently completed National Transport Study (NTS) (para. 1.06) to alleviate capacity shortages at all ports.

1.04 Transport growth rates since 1975 (Table 1.1) have been about 12% p.a. and are expected to continue at about this level in the coming years in view of the anticipated rapid economic growth and the increase in population. Road transport has been able to meet the growth in demand that other modes have not been able to meet, but with increasing traffic, many roads will soon reach capacity. The entire road network urgently needs improved maintenance, and about 60% of the roads are in need of rehabilitation. With the increasing demand, all transport facilities are likely to come under severe strain.

Table 1.1: Transport Growth Rates in Egypt

	1969-1974	1975-1979
1. Railways		
- Intercity passenger trips	7.3% p.a.	1.4% p.a.
- Freight movements	-1.4% p.a.	1.1% p.a.
2. Roads		
- Number of passenger cars	7.7% p.a.	16.0% p.a.
- Number of buses	8.4% p.a.	10.0% p.a.
- Number of trucks	8.6% p.a.	25.0% p.a.
- Consumption of gasoline	n.a.	13.5% p.a.
- Consumption of diesel[1/]	n.a.	10.5% p.a.
- Road traffic	8.0% p.a.(Est.)	12.0% p.a.(Est.)
3. Alexandria Port		
- General cargo	-1.4% p.a.	14.1% p.a.
- Dry bulk	10.7% p.a.	-2.0% p.a.
- Liquid bulk	21.0% p.a.	3.2% p.a.
- Total throughput	10.2% p.a.	4.1% p.a.

1/ Includes uses other than on roads.

Source: NTS 1980

B. Transport Organization, Coordination and Planning

Transport Organization and Coordination

1.05 Four principal government agencies are responsible for the transport sector: (i) the Ministry of Transport, Communications and Shipping for main and secondary roads, inland waterways, ports and shipping and the railways; (ii) the Governorates for tertiary roads (local roads, both urban and rural); (iii) the Ministry of Tourism and Civil Aviation for airports and aviation; and (iv) the Ministry of Petroleum for pipelines. Two other ministries also participate: the Ministry of Development, Housing and Land Reclamation in infrastructure investments in the Suez Canal Zone, the Sinai and the western desert and in specific urban development projects; and the Ministry of Industry in industrial and mining projects, including the related transport facilities. Roads, railways, and ports built by the latter two ministries are normally handed over to the in-line Ministries for operation and maintenance. Transport coordination is mainly handled at Cabinet level in which the Governorates have participated through their Governors who since 1979 have ministerial status in the Government. The Secretariat for Local Government represents Governorate interests and acts directly through the Prime Minister's Office for operational control.

Transport Planning

1.06 Transport planning had been fragmented and uncoordinated until 1973 when the Government set up the Transport Planning Authority (TPA) within the Ministry of Transport and Communications. In 1976, the TPA initiated a two-phased comprehensive National Transport Study (NTS), the first phase of which was completed in 1977, and the second phase in March 1981. On the basis of the NTS, TPA prepared a five-year Transport Plan for 1983-87; this has been incorporated in the Government's National Development Plan covering the same period. On the basis of recommendations of the NTS in April 1982, the Roads and Bridges Authority (RBA) of the Ministry of Transport and Communications completed a study on maintenance and rehabilitation of the road network and an allocation of £E 200 million (US$238 million) for road rehabilitation and new construction was included in the National Development Plan. Simultaneously, routine road maintenance reorganization started and budget allocations were increased.

1.07 The proposed Transport Plan combines several policy recommendations regarding pricing, regulation and administration of land transport services along with a series of projects designed to increase the capacities of basic infrastructure to meet the expected growth in traffic. The NTS projects total freight transport to increase by about 55% by 1987, reaching 24 billion ton-km level. Roads will continue to carry the bulk of this traffic; however, both railways and inland waterways will also move increasing volumes of freight. Passenger traffic is expected to grow even more rapidly, about 75% during the same period reaching 60 billion passenger-km annually by 1987. The Plan places emphasis on greater utilization of the existing facilities through rehabilitation, better operational arrangements, and the strengthening of the maintenance capabilities of transport agencies. The new projects proposed under the Plan primarily serve the heavily used corridors such as Alexandria-Cairo and other routes in the Delta area as well as projects in upper Egypt and the Sinai.

Transport Constraints

1.08 The main constraint in the sector is the weakness of the various transport agencies, especially in planning and operational activities. All transport agencies are confined by restrictive civil service regulations and suffer from low salary structures and limited career development opportunities. Several agencies have successfully introduced supplementary bonus and incentive systems to help them overcome this constraint. In RBA, these systems appear to work since applications to join RBA are increasing and more staff is being retained; RBA staff increased 10% during the period 1980-82.

1.09 The choice of transport mode is free in Egypt. However, the railways cannot meet all of the traffic demand mainly due to inadequacies of locomotives, and public sector bus and trucking companies are not competitive because of the poor quality of their services, which is mainly due to government controls. As a result, freight is being diverted to private truckers, and intercity taxi services have been able to cut substantially into the passenger market at the expense of the public bus service and in some cases railways even though both bus and railway tariffs are held low.

1.10 Transport accounts for about 30% of domestic petroleum consumption. In recent years, the Government has raised the domestic price for premium gasoline, although gradually, and at the current level of £E 0.15 per liter it now approximates the economic cost (based on February 1983 prices of US$27.5 per barrel for Egyptian crude). However, the gas oil price at £E 0.03 per liter is well below its economic cost of about £E 0.18 per liter. The implicit economic subsidy on gas oil was estimated at about £E 255,000 in 1979. The Government intends to reduce and eventually stabilize the level of the implicit economic subsidy to transport users. But the price distortions which result from the different subsidies prevailing throughout the economy make the achievement of this goal a very difficult task.

1.11 The NTS Phase II Report contains several specific recommendations on: (i) operational improvements in the different transport agencies and companies, (ii) revisions of the laws and regulations controlling transport, and (iii) appropriate levels of user charges and tariff structures. Implementation of these recommendations has started and is being coordinated with Government's plan for further reforming the public sector transport agencies and companies.

C. The Transport Modes

(i) Roads

1.12 The roads subsector is discussed in Chapter II.

(ii) Railways

1.13 The Egyptian Railways (ER) operates a standard gauge system of 3900 route-km of which 950 km is double track. The only electrified line is a 25 km suburban link between Cairo and its industrial suburb Helwan. The system's main trunk runs from Alexandria to Cairo and up the Nile to Aswan. In the Delta, this trunk is fed by an extensive network of main and branch lines that link it with all important economic centers.

1.14 For many years, due to inadequacies of maintenance facilities, critical shortages of locomotives and rolling stock have affected all operations, especially freight traffic which fell to 2 billion ton-km in 1976. Since then, ER has invested heavily in new equipment and under two Bank financed projects, initiated measures to improve its maintenance facilities. A crash program to eliminate the backlog of track renewal requirements of the network is also underway. As a result, ER has achieved a modest gain in modernizing its operations and since 1973, passenger traffic has grown at an average rate of about 3% per annum, but most of this growth occurred on the Helwan suburban line.

1.15 ER has incurred operating losses during recent years. In 1980, legislation was passed to make ER semi-autonomous, so that it could operate more freely and be independent of civil service regulations and the Government salary structure.

(iii) Inland Waterways

1.16 The primary waterway system consists of Lake Nasser between the Sudanese border and the Aswan High Dam; the Nile River between Aswan and Cairo; and the Beheiri and Nobaria Canals between Cairo and Alexandria; in all some 1500 km. In addition, there are about 1850 km of secondary waterways in the Nile Delta. Inland waterway services are provided by three public sector companies, private motorboat operators and traditional sailing boat operators. Inland water transport is hampered by the aged condition of the fleet inadequate inner port facilities and by navigation conditions that do not permit boats to be loaded to their capacity. Total traffic is estimated at 1.5 billion ton-km for 1979, i.e. about two-thirds of rail freight movements. Petroleum products for Upper Egypt are the most important commodity group, followed by minerals and coal.

(iv) Ports

1.17 The Port of Alexandria is by far Egypt's largest port. The ports at Suez and Port Said, at either end of the Suez Canal, are much smaller. Other ports are Safaga, a phosphate port on the Red Sea coast and Mersa Matruh, a lighterage port serving regional needs of the Western Mediterranean coast.

1.18 In 1976, the Port of Alexandria embarked on a program of rehabilitation and expansion to alleviate congestion and meet short-term needs. Cargo handling and operational equipment was modernized; and accumulated maintenance dredging undertaken. Construction of new deep water berths is still underway. Throughput at Alexandria reached 14.7 million tons (excluding petroleum) in 1980 and over 18 million tons in 1981. With the expected growth in traffic, these new facilities should be fully utilized as soon as they become available in 1984. Additional port capacity is therefore urgently needed, but Alexandria Port, encircled by the city, cannot be further expanded easily.

1.19 Based on the findings of several country-wide port studies and Phase II of the NTS, the Government has initiated a port development program. The first phase of the proposed Dikheila Port for which the Bank made a loan in 1982 (Loan 2183-EGT) is the priority project within this plan. In addition, the plan provides for construction of a new port at Damietta at the eastern corner of the Delta. The first phase of Damietta is to proceed in two

stages. The first stage is scheduled for completion in 1986, the commissioning of the second stage is expected to require an additional two to three years. When completed, Damietta Phase I will provide a capacity for about 6 million tons for grain imports, timber and general cargo including container facilities. There are also plans to allocate some capacity for container transit traffic.

(v) Pipelines

1.20 The pipeline network of Egypt comprises about 1400 km of pipe carrying crude oil and petroleum products and about 600 km of pipe carrying natural gas. These networks carry all the natural gas and about 50% of the crude oil and petroleum products. The remaining petroleum products are carried by road and inland water transport. Six oil refineries at various sites in lower Egypt were operating in 1980 near capacity, with a throughput of about 13 million tons per annum. New crude oil and petroleum product pipelines are planned to meet the expected increases in demand. For the most part, the existing natural gas pipelines together with those under construction and planned, are expected to meet demand through the 1980's.

(vi) Civil Aviation

1.21 Of the six main airports in Egypt, only Cairo is of international standards. Egyptair is the only authorized carrier for scheduled air services within Egypt. Tourist traffic which comprises almost all the domestic traffic is concentrated on the Cairo-Luxor-Aswan-Abu Simbel corridor. Domestic traffic has been increasing at 17% p.a. since 1972 and reached about 450,000 passenger movements in 1978. Cairo Airport handled 6 million international passenger movements in 1982, an increase of 13% p.a. since 1976. The volume of air freight is insignificant.

D. Previous Transport Projects

1.22 The Bank Group has made one IDA credit and five Bank loans to assist with the rehabilitation of transport facilities in Egypt. Loan 243-EGT of 1959 (for US$56.5 million) repaid in 1974, Loan 1064-EGT of 1974 (for US$50 million) and Loan 1482-EGT of 1977 (for US$100 million) successfully supported the development of the Suez Canal. The canal is an international transport facility and, as such, its development and operations are considered separately from the rest of the Egyptian transport system.

1.23 IDA Credit 284-EGT of 1972 (for US$30 million) and Loan 1098-EGT of 1975 (for US$35 million) provided support for ERs' 1971-1977 rehabilitation and modernization program. Credit 284-EGT was closed on June 30, 1980. The Second Railway Project which had strong institution building objectives and financed the NTS suffered a setback when ER's operating and financial conditions deteriorated. However, with the 1980 reform law, and the implementation of the recommendation of the NTS, the performance of the railways is expected to improve.

1.24 Loan 1239-EGT of 1976 (for US$45.0 million) helped to finance the rehabilitation of Alexandria port. The project included a comprehensive study of Alexandria Port Authority's management, organization and finances. Execution of the project has been delayed, partly due to delays in contract award for civil works in what was the Bank's first involvement in Egypt's port sector. Project design included in the appraisal has been modified to cater to increasing container traffic and completion is now scheduled for December 1984.

1.25 Loan 2183-EGT of 1982 (for US$132.0 million) is designed to assist the Government in the construction of a new port at El Dikheila (10 km. west of the existing port of Alexandria). The project includes much needed facilities for containerized cargo and a jetty for the reinforcing bar mill to be built at El Dikheila. The project also provides for the continued modernization of Alexandria Port and its integration with El Dikheila Port and is expected to be completed by 1986. The new facility will be an important addition to the country's port capacity and generate substantial benefits in the form of uninterrupted deliveries, and reduced transport and cargo handling costs. The project will also enable the Bank to continue its efforts in institution building and strengthening the transport agencies' planning capabilities.

1.26 Loan 2176-EGT of 1982 (for US$59.0 million), the greater Cairo Urban Development Project, aims at initiating a new approach to urban transport in greater Cairo based on low cost traffic engineering and management measures, at improving the efficiency of the public transport system and at the strengthening of institutional capabilities for urban planning, management and service delivery in the greater Cairo area. The loan became effective on February 16, 1983 and the start of implementation is satisfactory. Already a substantial portion of detailed designs have been completed, some of the key advisors have been appointed and procurement of some items has been initiated. The project is expected for completion in 1987.

1.27 Bank lending in the transport sector and, in particular, Bank involvement and financing for the NTS, has successfully contributed to the establishment of Egypt's strategy for transport development for many years to come.

II. THE ROADS SUBSECTOR

A. The Network

2.01 The overall road density of about 50 km per 100 km^2 in both Upper and Lower Egypt is adequate for the present needs of the country, but the condition of the road network is poor. Also, with growing population densities and with per capita income increasing, the demand for more and improved roads is rising. In the Nile Valley and the Delta the network has for the most part evolved from the gradual upgrading of roads which were not originally designed for modern, heavy and high speed motor vehicles, nor for the mix of this traffic with slow moving local traffic. The need to preserve agricultural land prevents acquisition of extensive right-of-way for roads and

thus forces traffic to concentrate on the present network. Most of the paved roads no longer have the bearing capacity to meet present traffic demands, and all of them have suffered from lack of maintenance. The NTS evaluated that the condition of 28% of all roads was poor and of 33% fair with the remainder in good condition. Thus, about 60% of main and secondary roads need rehabilitation, some need widening as well, and all roads need routine maintenance. The proposed project will assist with road maintenance over the main and secondary road network while the Government will continue road rehabilitation from its own resources.

2.02 Out of a total road network of 28,725 km (Map IBRD 15377R), about 52% are paved, of which about 18% are classified as main roads (Table 2.1). The network is divided into the main and secondary roads administered by the Roads and Bridges Authority (RBA) (about 40% of all the roads - 5100 km of desert roads and 7900 km of country roads), and the tertiary roads administered by the Governorates and other agencies. Most of the RBA roads are paved, while most of the Governorate roads are unpaved. About 80% of all paved roads have a carriageway of 6m or less.

Table 2.1: Road Network of Egypt, 1983

	Total	Paved	Unpaved
		Km	
Type of Roads			
Divided Highways	800	800	-
Other Main Roads	4,645	3,359	1,286
Secondary and Tertiary Roads	23,280	10,922	12,358
Totals	28,725	15,081	13,644
Administrative Agencies			
RBA	12,265	10,979	1,286
Governorates	15,369	3,011	12,358
Others	1,091	1,091	-
Totals	28,725	15,081	13,644

Source: RBA, February 1983.

B. Traffic and Road Transport

2.03 The motor vehicle fleet has grown at an annual average rate of about 17% from about 226,000 vehicles in 1972 to 932,000 in 1981; 57% of these are passenger cars and taxis. The development of the fleet during 1972-81 is shown in table 2.2.

Table 2.2 Motor Vehicle Fleet

Year	Passenger cars including taxis	Trucks and other vehicles	Total
1972	158,071	68,384	226,455
1973	167,555	88,339	255,894
1974	184,943	91,332	276,275
1975	211,815	107,487	319,302
1976	251,333	131,376	382,709
1977	281,366	157,957	439,323
1978	309,819	195,176	504,995
1979	379,370	238,852	618,222
1980	433,115	327,714	760,889
1981	532,699	400,296	932,995

Period	Average annual growth rate (%)		
1972-1978	12	19	14
1976-1981	16	25	20
1972-1981	14	22	17

Source: RBA, February 1983

2.04 Overall, there are about 22 motor vehicles (12 passenger cars and taxis) per 1,000 inhabitants, which is low compared with countries at a similar stage of development but high when compared to the paved road network. The motor vehicle fleet increased significantly since 1976 with the lowest rate for passenger cars (14% p.a.) and the highest for trucks and buses (25% p.a.). Heavy vehicles (buses and trucks) now constitute about 43% of all vehicles. Current traffic volumes, coupled with these high growth rates, have led to congestion on many roads, in particular, near the main cities and in the Delta. Heavy traffic represents between 30% and 60% of all traffic on the main roads. The NTS estimates interurban road transport at 27.8 billion passenger-km and 15.7 billion ton-km for 1979. Passenger transport is predominantly on buses (45%) and taxis (37%), with private cars accounting for the remainder (18%).

2.05 Freight transport services are provided by five public sector trucking companies, private sector trucking cooperatives and independent truck owner/operators, generally in competition with each other. Road freight transport is not regulated and, except for normal registration and licensing, there are no restrictions on entry into the industry, nor on the specification

of vehicles and their operation. However, all heavy vehicles imported in the country have to be approved by RBA, who controls their compliance with approved standards to avoid import of vehicles liable to be overloaded. The public sector companies have been expanding at much lower rates than private truckers in recent years, though they have increasingly assumed the role of brokers between public sector consignees and private truckers, thus exerting a balancing influence on truck rates.

2.06 Intercity bus services are provided by four regional public sector bus companies. Taxi licences are issued freely and do not contain limitations as to routes or areas of operation, but bus fares are Government regulated in order to provide low cost transport for the poor. The fleet growth between 1975 and 1979 was 3% p.a. for public sector bus companies as compared with 8% p.a. for the taxi fleet, and this indicates the extent to which taxis are taking up the demand that the public bus companies cannot meet.

2.07 In response to recommendations of the NTS, an axle load survey was carried out in 1981 to update information of a limited survey conducted in 1978. The survey, done by RBA staff assisted by experts from Cairo University, concluded that 17% of all axles exceed the legal limit of 10 tons, causing 80% of all damage to the roads. Consequently, RBA has started spot checks to control and discourage overloading. The proposed project includes the purchase of fixed and mobile weighscales to assist RBA in setting-up this program (para. 3.09). When completed, the results of the program could lead to revisions of road design standards, vehicle standards, axle load regulations and enforcement. Assurances were obtained from the Government at loan negotiations that RBA will start a two-year nationwide axle weighing program to determine loading trends and control overloading starting July 1, 1984 when new weighscales are expected to be available, (Loan Agreement - Section 4.03). The findings of the survey would be reviewed with the Bank during supervision of the project.

2.08 Traffic safety standards are low in Egypt, both with regard to driver behaviour and the standards of road structures. The high incidence of accidents and the associated loss of property and life are a cause for growing concern. Following the completion of the NTS, RBA conducted a study on road safety which concluded that major deficiencies existed in road and bridges signalling and marking. RBA produces its own road signs in an outdated almost entirely manual road sign workshop. It produces only about 50 signs a day which are of poor quality. Tender documents are under preparation for the purchase of a new road sign workshop capable of producing at least 150 signs per day in Arabic and in English. The proposed project includes the financing of this workshop and additional road marking equipment. Other aspects of road safety such as driver education, black spot improvements are being considered by the Government and would be implemented gradually (para. 3.10).

C. Administration

2.09 The administration of the main and secondary road system is the responsibility of RBA (Chart. Annex I) which is a department of the Ministry of Transport. Following the recommendations of the NTS, RBA is being reorganized to emphasize the differentiation between "monitoring and planning"

and "execution" tasks now under single authorities. The execution department would, in particular, be responsible for road maintenance and rehabilitation. This reorganization is already operating de facto since the start of improved maintenance and the road rehabilitation programs. This set-up is adequate at present but the consultants, who will review the performance of the maintenance program (3.04) will also review the organization of RBA and make recommendations on any further improvements which also may be needed. During loan negotiations, the proposed terms of reference for the consultants services were revised accordingly (Annex V). RBA operates through 8 regional districts comprising 30 subdivisions for road maintenance. These will be increased to 45 divisions, 20 for desert roads and 25 for Delta and Nile Valley roads.

2.10 With a total of about 7,200 staff RBA suffers from a shortage of experienced and competent personnel. There is a small core of competent, well experienced staff, but the RBA lacks suitable main grade staff in most disciplines and has to rely on a large number of junior inexperienced personnel. The main causes of staff shortages are the low Government salaries and limited career opportunities. The emigration of competent Egyptian nationals further aggravates the problem. The RBA recognizes this problem and has established an incentive and compensatory payments plan which is included in its budget. Incentives consist of housing, transportation and supplementary payments. Furthermore, RBA is hiring more female staff at the engineer and assistant engineer level and is preparing revised regulations to encourage this trend. Because of the large number of junior staff, training is of the utmost importance for RBA to meet the needs of its substantially increased programs (para. 2.22).

D. Planning

2.11 With the rapid increase in road transport, road planning has become a priority. In the past, TPA has carried out this planning for RBA, but with the increase in the planning load, RBA now carries out detailed road planning and data collection itself within the framework set by TPA and the recommendations of the NTS. One of main recommendations relates to the setting-up of a nationwide program for continuous and periodic traffic counting. RBA has started periodic countings since 1956 but is now in the process of setting-up, in cooperation with Cairo University, a program for continuous traffic counts. Data generated will be stored and used for planning of maintenance, rehabilitation and new construction programs. The proposed project includes the purchase of a computer based data processing system and traffic counting equipment to assist in this program (para. 3.10). RBA is preparing the terms of reference for these actions which would be reviewed with the Bank prior to the procurement of the equipment.

2.12 The NTS proposed a five year plan (1983-87) and a prospective plan (1988-2000) for road construction, rehabilitation and maintenance amounting to £E 408.0 million (US$486 million) and £E 1,735.0 million (US$2,065 million), respectively. Also NTS included recommendations for a series of short term actions including: (i) the preparation of a road maintenance and rehabilitation program, which was completed in April 1982; and (ii) the

raising of the routine road maintenance budget in line with equipment allocations. RBA has generally accepted the recommendations of NTS and the maintenance study and the Government has already allocated for 1983-87 £E 100.0 million (US$119.0 million) for rehabilitation in line with RBA's target of rehabilitating 500 km of road sections per year by 1987 (para. 3.07). RBA selected the projects for the Development Plan, taking into account the Phase I NTS recommendations to initiate much needed road rehabilitation, thus reversing their previous trend of building new roads at the expense of maintaining and rehabilitating the existing network (Table 2.3). The main components of RBA's Plan are: (1) new construction and paving of about 1000 km of main highways; (ii) rehabilitation and widening of about 2000 km of main highways; (iii) construction of 265 km of four-lane highways; and (iv) construction of bridges across the Nile and other waterways.

E. Financing

2.13 Road maintenance and construction are financed through the general budget and through the revenues of a special tax on gasoline directly transferred by the oil company, 70% to the Governorates and 30% to RBA. Revenues collected from all forms of taxes and duties imposed on road transport are not earmarked for the road sector but passed on to the general budget. The annual expenditure on the road sector represents only a fraction of the revenues collected. Annual expenditures of the RBA are shown in Table 2.3

Table 2.3: RBA Expenditures on Roads and Bridges 1979-83

£E 000'

Fiscal year	1979	1980 1/	1980/81	1981/82	1982/83 2/
Salaries and Bonuses	3,264 3/	1,601	3,229	5,631	5,828
Maintenance and Rehabilitation 4/	8,931	7,531	17,143	27,665	27,799
Construction, studies and traffic safety	17,792	12,242	19,728	30,537	33,000
TOTAL	29,987	21,374	40,100	63,833	66,627

1/ 1980 expenditures relate to 6 months only.
2/ Budget figures
3/ Includes salaries for Waterways Authority
4/ Includes recurrent costs for maintenance and rehabilitation by contract.

Source: RBA, February 1983

2.14 Since 1979, there have been considerable increases in RBA allocations for road rehabilitation and road and bridge construction. These are now adequate and in line with RBA's implementation capabilities. Total maintenance expenditures increased substantially in recent years following

additional equipment purchases on the recommendations of NTS. The low routine road maintenance expenditures (LE 115 - $137 per km/annum) relate to the small maintenance equipment fleet. These expenditures are expected to rise substantially in fiscal year 1984 with the supply of equipment provided for under the project (para. 3.15), and a commitment on the level of funding for maintenance was obtained from the Government during loan negotiations.

F. Engineering

2.15 RBA is responsible for the technical aspects of road projects. Feasibility studies are generally done by consultants, while technical studies, in particular for rehabilitation projects, are prepared by RBA's design office and by the district offices with the assistance of the laboratories and Cairo University for pavement design and more complex project engineering. Loading patterns are taken into account in pavement and overlay design. The NTS reviewed design standards used by RBA and found those adequate. The laboratories suffer from a shortage of equipment. The proposed project, therefore, includes provision to upgrade the equipment of the central and district laboratories (para. 3.07). Since the central laboratory oversees the operations of the district laboratories and is located on the same grounds as the training center, the same consultants who will assist in the review of the training program (para. 3.06) will also review the needs of the laboratories.

G. Construction

2.16 Road construction and rehabilitation is mainly executed on the basis of unit price contracts. The Egyptian road contracting industry consists of public, private national and foreign firms. RBA has established a list of registered contractors prequalified according to capacity including 7 public contractors and about 25 private contractors including about 5 foreign private firms. About 80% of all road construction and rehabilitation is executed by the public road construction companies. The road construction industry is adequate to execute the Government's proposed road rehabilitation program.

2.17 The Construction/Contracting Industry study completed in 1981, in collaboration between the Ministry of Housing and the Bank identifies a number of weaknesses in the sector, including the road construction subsector, which impede growth and limit productivity. The study also includes recommendations to address these issues and Bank assistance for a proposed project is being discussed. The main weaknesses of the sector are: (i) excessive Government dominance which limits self-management and productivity; (ii) deficient construction resources in terms of manpower, materials, equipment, technology and finance; (iii) organizational inadequacies and lack of coordination; (iv) inefficiencies in planning, in particular, at Government level with regard to evaluation of construction output; and (v) inadequate growth of the contracting capacity by favoring growth of large public companies. To overcome these problems the Government should ensure that adequate resources are earmarked and that improvement measures are well coordinated. The study has identified an extensive package of policy reforms which are under consideration by the Government.

H. Maintenance

2.18 All through the 1960's and 1970's little attention was paid to road maintenance and the building-up of a road maintenance organization. Reinforced with the NTS recommendations, the Government recognizes the importance of road maintenance and has been allocating increasing funds for rehabilitation and maintenance (Table 2.3). In April 1982, RBA, with the assistance of Development Research and Technological Planning Center, Cairo University (DRTPC), completed a study on optimum maintenance policies for the paved road network in the Delta. During the preparation of the study, RBA, following recommendations of NTS, purchased about 25% of the equipment needs to improve routine road maintenance, and accordingly the corresponding expenditures increased from £E 500,000 in 1981/82 to £E 1,500,000 in 1982/83. On the basis of the report, the conclusions of which were extended to the entire road network, RBA prepared with the 8 district offices a plan of maintenance operations and corresponding equipment, materials and staffing needs distinguishing units by region (desert or Delta and Nile Valley). The proposed project includes the purchase of the additional maintenance equipment required to expand the existing fleet and to meet the objectives of the improved maintenance program (para. 3.03). The NTS makes recommendations on monitoring and planning of routine maintenance operations, all of which are being followed by RBA and are acceptable to the Bank.

2.19 Maintenance of RBA equipment is done in 7 district maintenance centers, each of which is equipped with a mobile workshop, and 2 central workshops in Cairo, one for vehicles and one for heavy equipment. Major maintenance of equipment is done in the central workshop which is adequately staffed and has an extensive and well organized spare parts store. Spare parts management is being improved through the introduction of a new microfilm inventory system. The vehicle workshop is less well equipped and vehicles are mainly maintained at dealer workshops. A program to improve the vehicle workshop is underway and tools for the workshop are included in the project. Maintenance arrangements for equipment are satisfactory.

I. Training

2.20 The Training Division of RBA has a large training center with adequate classrooms and mechanical workshops at Nasr City on the outskirts of Cairo. Short classroom courses are given there for engineers, surveyors, mechanics and equipment operators. In addition to its own staff, RBA provides training to staff from the Governorates and from public and private contracting firms. RBA also arranges for a few professional staff to take fellowships abroad. During 1982, the center provided 17 courses for a total of about 250 personnel. However, the improved maintenance and rehabilitation programs require more trained staff and the existing training program and facilities need to be upgraded. The proposed project provides for technical assistance (about 50 man-months) to assist RBA in assessing its needs and define improved programs. The project also provides for improvements to the workshop, the training aids and the laboratories (para. 3.08). Those improvements would be defined in agreement with the Bank following the recommendations made by the consultants provided for under the project.

III. The Project

A. Objectives

3.01 The proposed project would support the Government's efforts to improve road maintenance and help improve planning, training and traffic safety and control.

B. Description

3.02 The components of the project are:

(i) a two-year (1984-85) program to improve routine road maintenance over the entire road network administered by RBA (13,000 km) including the purchase of road maintenance equipment and spare parts to complete and expand, as necessary, the fleet for routine road maintenance in the eight maintenance districts and the provision of technical assistance to review and modify the program as necessary;

(ii) the upgrading of the training capabilities of RBA to meet the increased needs of the routine road maintenance and rehabilitation programs including the improvement of existing installations, workshops, laboratories, training aids and the provision of technical assistance and fellowships to upgrade the training programs; and

(iii) an action plan to increase traffic safety and control and RBA's planning capabilities including the purchase of a new roadsign workshop, traffic control and counting equipment, the purchase and installation of mobile and fixed weighscales and a computer based data processing system.

Routine Road Maintenance

3.03 Following the recommendations of the NTS in March 1981, RBA, with the assistance of a consulting team from Cairo University (DRTPC), prepared a study on Optimum Maintenance Policies for the Delta Paved Road Network. The study, completed in April 1982, dealt with routine maintenance operations and rehabilitation. On this basis, RBA has prepared a routine road maintenance action program to be implemented by its eight regional maintenance districts over the entire network of 13,000 km of paved roads under its responsibility. Routine maintenance would be carried out by force account by 45 operational units of the regional maintenance districts. Each operational unit would cover about 290 km of roads. Indicative programs for 1984/85 and 1985/86 were discussed at loan negotiations. The list of equipment (Annex III) to be supplied for the routine maintenance program was prepared by RBA following review of the needs of each of the maintenance districts including the desert, Delta and Nile Valley districts. The list was confirmed at loan negotiations (Annex III). During loan negotiations, assurances were obtained from the Government that RBA will carry out the maintenance program in accordance with annual programs setting forth physical targets, equipment and staffing needs and funding requirements to be communicated to the Bank for review and comment prior to April 30 of each year starting in 1984, and that it will ensure the

timely availability of staff and maintenance equipment required for the carrying out of the program. (Loan Agreement, Section 3.03)

3.04 The major cost components of the 1984/85 and 1985/86 tranches of the maintenance program are as follows:

(i) Capital Costs

(a) additional road maintenance equipment and spare parts for routine road maintenance; and
(b) workshops, maintenance yards and buildings for regional maintenance districts.

(ii) Recurrent Costs

(a) fuel, oils and lubricants for existing and additional maintenance equipment;
(b) materials and supplies;
(c) full maintenance, depreciation and renewal of all equipment; and
(d) labor, administration and management.

Minimum budgetary allocations for the two years of the program were agreed upon during loan negotiations. The project capital costs are listed in Table 3.2 while the budget allocations for the recurrent costs of the routine road maintenance exclusive of any general overlaying or substantive repairs are listed in Table 3.1.

Table 3.1: Budgetary Allocations for Recurrent Costs
(Constant 1983 prices)

		1984/85 July 1 - June 30	1985/86 July 1 - June 30
		----------£E'000----------	
(a)	Fuel, oil lubricants	800	800
(b)	Materials and supplies	1,200	1,200
(c)	Maintenance and depreciation	1,500	1,500
(d)	Labor and management	700	700
	TOTAL	4,200	4,200

The budgetary allocations are adequate to carry out the program included in the project.

3.05 Besides the training (para. 3.06) to be provided to ensure the successful implementation of the maintenance program, the project would also provide technical assistance to help evaluate performance at the end of the first year and prepare an action plan, if necessary, to adjust staffing, organization, management, equipment and financing of the maintenance program. Terms of reference for these services were agreed at loan negotiations (Annex V).

3.06 The maintenance program was prepared on the basis of (i) a reconnaissance of about 4,400 km of road sections; (ii) an evaluation of different maintenance strategies; and (iii) an analysis of operations of maintenance divisions. These studies (available in the project file) showed that because of inadequate maintenance in previous years, about 60% of the reference network needed rehabilitation, and on that basis, RBA has initiated the rehabilitation of roads from its own resources. Up to May 1983, rehabilitation of about 1500 km of road sections has been started under the program and about 1200 km of road sections have been completed. At loan negotiations, the Government confirmed that RBA will continue road rehabilitation in accordance with its current plan with a target of 500 km per year by fiscal year 1987 and that the related expenditures will be met through direct budgetary allocations. The program is in line with the recommendations of the study and within the capabilities of the road construction industry.

Training

3.07 RBA started training of its staff, engineers, assistants, operators, supervisors, mechanics, etc. in 1956 upon completion of its training center on the outskirts of Cairo. In 1982, the center, which has about 30 permanent and part-time instructors provided training for (i) 30 civil engineers, (ii) 20 mechanical engineers, (iii) 94 assistants in various disciplines including laboratory work, surveying, construction and maintenance of roads and maintenance of equipment, and (iv) 110 heavy and light equipment operators. The training courses last from one to four months and are available for RBA, the Governorates and public and private construction companies. For various disciplines, the courses include practical training in a production unit (TPU). Although an adequate number of staff received training in 1982, the quality of the training was deficient because the training installations, courses, training aids, programs, workshops, laboratories, etc. are outdated relative to the needs of RBA's growing construction and maintenance activities.

3.08 To strengthen RBA's capability to administer, control, and manage the improved road maintenance operations and the expanded road rehabilitation programs, the project includes the upgrading of existing training capabilities for staff and workers at all levels. The aim is to improve staff productivity and operational efficiency. This would be achieved by the provision of:

(i) technical assistance (about 50 man-months) from qualified consultants to help identify RBA's and the road construction companies' staff needs, the corresponding training requirements, the needed improvement of installations, new programs and training schedules, and a program for the upgrading of instructors;

(ii) fellowships (about 50 man-months) for instructors and RBA staff to become familiarized with training efforts elsewhere and to upgrade knowledge and skills;

(iii) improved installations, workshops, laboratories, training aids, equipment, etc.

3.09 The upgrading of the training program would be carried out according to terms of reference agreed during loan negotiations (Annex VI). Assurances were obtained from the Government that the training program which would result from the study would be reviewed with the Bank by June 30, 1984 and would be carried out in accordance with a time schedule satisfactory to the Bank. (Loan Agreement, Section 3.04)

Traffic Safety and Control

3.10 Following the recommendations of the NTS, RBA in coordination with a consultant's team from Cairo University has initiated an action plan to improve traffic safety, to control heavy traffic and to establish a system for permanent traffic counting. The first steps to be taken are to improve road and bridge signalling and marking, to establish permanent and mobile weighstations to control overloading and to improve traffic counting. Seminars for traffic engineers and assistants are currently conducted at RBA's training center and would be reviewed under the training program. To assist in the implementation of the action plan, RBA is negotiating a contract with Cairo University to help set-up permanent and mobile traffic counters and, in particular, to establish a traffic data bank to be used for planning purposes. During loan negotiations assurances were obtained from the Government that RBA will review the status of the action plan regularly with the Bank. (Loan Agreement, Section 3.05).

3.11 To support the various actions envisaged for improving traffic safety and control, the project includes the purchase of (i) a new sign workshop to replace the existing outdated shop; (ii) fixed and mobile weighbridge stations and scales; and (iii) a computer based data processing system for traffic counting. RBA has collected information on black spots in the road network and has included their improvement in the road rehabilitation program. To further improve road safety, driver education programs and revisions in driver and traffic legislation are also under consideration by RBA in association with Cairo University.

C. Engineering

3.12 RBA with the assistance of DRTPC prepared the "Optimum Maintenance Policies for the Delta Paved Road Network". This study was completed in April 1982 for roads to be included in the first five years of the program and appraisal of the road maintenance component of the project is based on this study. The engineering studies on these roads have been carried out in accordance with acceptable technical and economic criteria. The technical criteria take due account of current and foreseeable loading patterns.

D. Cost Estimates

3.13 The total capital cost of the project is estimated at US$26.7 million equivalent, (net of duties and taxes) with a foreign cost of US$24.0 million including the front-end fee of 0.25%. The cost of individual project components is summarized in Table 3.2.

3.14 Estimates for road maintenance equipment are based on bids received by RBA in mid 1982 for similar equipment financed from the Government's own resources, appropriately adjusted to January 1983. Consultants services under the project total about 80 man-months. The average estimated cost of these services in January 1983 prices is $11,000 per man-month including travel and subsistence. These estimates are based on similar services rendered by foreign consultants.

3.15 Physical contingencies for maintenance equipment are estimated at 5% while for all other components, a contingency of 10% is taken into account.

E. Financing

3.16 The proposed loan of $24.0 million would finance the foreign exchange cost of the project including the front-end fee. The Government would finance the local cost of US$2.7 million equivalent from the budgetary allocations of RBA and the recurrent costs for routine maintenance and training, all of which are adequately provided for under the budget. During loan negotiations an assurance was obtained from the Government that minimum budgetary allocations of US$5.0 million equivalent in constant 1983 prices will be available for recurrent expenditures for routine road maintenance in 1984/85 and 1985/86 (para. 3.04).

F. Implementation

3.17 RBA will be responsible for implementing the project. Project implementation will be spread over a period of four years with one year for initiating actions, followed by two-years of operational programs 1984/85 and 1985/86 and one year to complete all disbursements. The Implementation Schedule (Annex II) was discussed and agreed during negotiations.

G. Reporting

3.18 To enable the Bank to monitor project implementation, RBA will prepare and send to the Bank the following reports for review and comment: (a) the annual program for routine maintenance starting in April 1984 including scheduled operations, staffing, equipment and funding requirements; (b) the performance report of the previous year's routine maintenance program starting in September 1985 including operations completed as compared to anticipated, actual staffing, equipment and expenditures; (c) by June 1984, the report on the proposed upgrading of the training program including

Table 3.2: Project Cost Estimates and Financing Plan

	Annual Base Cost LE Million					LE Million			US$ Million			% Foreign Cost	Financing Plan US$ Million	
	1983	1984	1985	1986	Total	Local	Foreign	Total	Local	Foreign	Total		IBRD	EGYPT
A. Routine Maintenance														
(a) Equipment	-	12.0	-	-	12.0	1.2	10.8	12.0	1.4	12.9	14.3	90	12.9	1.4
(b) Spare Parts	-	0.2	0.5	0.5	1.2	0.1	1.1	1.2	0.1	1.3	1.4	90	1.3	0.1
(c) Consultant's Services			0.3		0.3	0.1	0.2	0.3	0.1	0.2	0.3	85	0.2	0.1
Subtotal	-	12.2	0.8	0.5	13.5	1.4	12.1	13.5	1.6	14.4	16.0	90		
B. Training														
(a) Consultant's Services	0.2	0.4	-	-	0.6	0.1	0.5	0.6	0.1	0.6	0.7	85	0.6	0.1
(b) Fellowships	0.1	0.1	-	-	0.2	-	0.2	0.2	-	0.2	0.2	100	0.2	-
(c) Construction	0.3	-	-	-	0.3	0.3	-	0.3	0.4	-	0.4	-	-	0.4
(d) Workshops	-	1.0	-	-	1.0	0.1	0.9	1.0	0.1	1.1	1.2	90	1.1	0.1
(e) Laboratories	-	0.6	-	-	0.6	-	0.6	0.6	-	0.7	0.7	100	0.7	-
(f) Training Aids		0.6			0.6		0.6	0.6		0.7	0.7	100	0.7	-
Subtotal	0.6	2.7	-	-	3.3	0.5	2.8	3.3	0.6	3.3	3.9	85		
C. Traffic Safety and Control														
(a) Sign Workshops	-	1.0	-	-	1.0	0.2	0.8	1.0	0.2	1.0	1.2	83	1.0	0.2
(b) Weighbridges & Scales	-	1.0	-	-	1.0	0.1	0.9	1.0	0.1	1.1	1.2	90	1.1	0.1
(c) Traffic Counting		0.4			0.4		0.4	0.4		0.5	0.5	100	0.5	-
Subtotal	-	2.4	-	-	2.4	0.3	2.1	2.4	0.3	2.6	2.9	90		
Base Cost Estimates /a (Capital Costs)	0.6	17.3	0.8	0.5	19.2	2.2	17.0	19.2	2.5	20.3	22.8	90	20.3	2.5
D. Physical Contingencies on:														
(a) Routine Maintenance (5%)	-	0.7	-	-	0.7	0.1	0.6	0.7	0.1	0.7	0.8			
(b) Training (10%)	-	0.3	-	-	0.3	-	0.3	0.3	-	0.4	0.4			
(c) Traffic Safety and Control (10%)		0.2			0.2		0.2	0.2		0.3	0.3			
Subtotal	0.0	1.2	-	-	1.2	0.1	1.1	1.2	0.1	1.4	1.5	90	1.4	0.1
E. Price Contingencies /b on:														
Subtotal	-	1.5	0.2	0.2	1.9	0.1	1.8	1.9	0.1	2.2	2.3		2.2	0.1
Total Expected Project Cost	0.6	20.0	1.0	0.7	22.3	2.4	19.9	22.3	2.7	23.9	26.6		23.9	2.7
Front End Fee	-	-	-	-	-	-	-	-		0.1	0.1		0.1	
Total financing required									2.7	24.0	26.7		24.0	2.7

/a Base cost estimates at January 1983 prices (US$1 = LE0.84) Net of duties and taxes.

/b Price contingencies are based on annual inflation rates of

	1983	1984	1985	1986
Local	16	15	14	14
Foreign	8	7.5	7	6

recommendations for equipment, training aids and improvements of workshops and laboratories; (d) quarterly progress reports within two months of the end of each quarter. Details of the information to be provided in the annual and quarterly reports were discussed and agreed with the Government during loan negotiations.

H. Procurement

3.19 The road maintenance equipment would be procured on the basis of ICB in accordance with the Bank's guidelines. Bids would take into account cost, delivery time, and reliability of dealer services on the basis of a point system which was discussed with the Bank during loan negotiations and would be finalized in the tender documents. Domestic preferences in bid evaluation would be applied in accordance with current Bank policies. Spare parts would be procured either, for purposes of standardization, directly from the suppliers or manufacturers of the equipment for which the spare parts are needed, or when spare parts cannot be grouped into packages estimated each to cost not less than $50,000 equivalent, on the basis of contracts directly negotiated or awarded after limited international tendering.

3.20 Workshop and laboratory equipment, training aids, the sign workshop, the weighbridges and the computer equipment for traffic counting will be procured on the basis of ICB.

3.21 Consultants services will be provided by qualified and experienced consultants, in accordance with terms and conditions satisfactory to the Bank.

I. Accounting and Auditing

3.22 In order to ensure the timely and satisfactory accounting of the resources allocated to the project including counterpart funds, it was agreed with the Government during loan negotiations that RBA should maintain separate accounts and lines in the budget for all the transactions related to the project. The accounts of the Government are audited annually by the Central Accounting Organization (CAO), which is satisfactory to the Bank. RBA would maintain separate accounts reflecting all expenditures on account of which withdrawals are requested from the Loan Account on the basis of Statements of Expenditures and retain, until one year after the closing date, all records evidencing such expenditures. RBA's accounts would be audited for each fiscal year by the Central Accounting Organization and a certified copy of the audit report would be furnished to the Bank not later than six months after the end of each fiscal year. This audit report would include a separate opinion in respect of expenditures and records for which withdrawals from the Loan Account would have been requested on the basis of Statements of Expenditures. (Loan Agreement, Section 4.02).

J. Disbursements

3.23 The proceeds of the proposed loan of US$24.0 million will be disbursed according to the following schedule:

Category	Amount of the Loan Allocated (Expressed in Dollar equivalent)	% of expenditure to be financed
(1) Equipment and spare parts	19,300,000	100% of foreign expenditures, 100% of local expenditures (ex-factory) and 80% of other local expenditures
(2) Consultants Services	800,000	85%
(3) Fellowships	200,000	100% of foreign expenditures
(4) Unallocated	3,640,150	
	23,940,150	
(6) Front-End fee	59,850	
Total Loan	$24,000,000	

3.24 Disbursements for spare parts procured locally for purposes of standardization would be based on Statements of Expenditure, grouping on an annual basis local spare part purchases in accordance with the procurement procedures agreed during loan negotiations. Full supporting documentation would be retained by RBA for inspection by the Bank during project supervision. Disbursements for imported spare parts, equipment, and consultant services would be on a fully-documented basis.

3.25 Since there is no experience with prior road projects in Egypt, the estimated disbursement schedule is based on the anticipated implementation schedule confirmed with the Government during loan negotiations but takes into account standard disbursement profiles in Egypt (Table 3.3). Since the main components of the project consist of implementing normal although increased operations by RBA, from a technical viewpoint, the project should be completed by mid 1986. However, a margin of a further year is considered advisable to take account of possible delays in supply of equipment. The loan closing date, therefore, is June 30, 1987.

K. Environmental Impact

3.26 Improvements to road maintenance, repairs of shoulders and pavements and new roadsign and markings would have a beneficial effect on the physical environment and would enhance public safety.

Table 3.3: Estimated Disbursement Schedule

IBRD Fiscal Year and Quarter	Cumulative Disbursements at end Quarter US$ million equivalent
1983/84 (FY84)	
March 31, 1984	0.4
June 30, 1984	0.6
1984/85 (FY85)	
September 30, 1984	6.5
December 31, 1984	12.5
March 31, 1985	13.5
June 30, 1985	15.5
1985/86 (FY86)	
September 30, 1985	18.5
December 31, 1985	19.0
March 31, 1986	19.5
June 30, 1986	20.0
1986/87 (FY87)	
September 30, 1986	21.0
December 31, 1986	22.0
March 31, 1987	23.0
June 30, 1987	24.0

IV. ECONOMIC ANALYSIS

A. Economic Basis of the Proposed Project

4.01. Road transport is by far the most important mode in Egypt both for freight and for passenger movements. The role of road transport is of crucial importance in the Delta where a predominant portion (43%) of the population is located and where distances are relatively short favoring road travel. Parallel to the gains made in the economic development of the country during recent years, road transport activity has experienced a quantum jump. With further development and diversification of the economy, road transport is expected to play an increasingly important role.

4.02 The road system has suffered from underinvestment and insufficiency of funds over a decade. As a result, the road network had deteriorated so that most pavements do not have the structural strength for the increased traffic loads that they now carry. In an effort to provide an adequate and safe road network, in 1982, the Government launched a program based on the recommendations of the NTS. The current Five-Year Development Plan incorporates the road rehabilitation and maintenance program recommended by the NTS.

4.03 The economic basis of the maintenance program is the protection of past capital investments in roads by means of marginal annual expenditures. The optimal level of such expenditures based on the relation between the marginal costs of increasing the maintenance effort beyond that which would just prevent the road from complete impassability and the resulting decrease in Vehicle Operating Costs (VOC), periodic maintenance and reconstruction costs is achieved in terms of present worth at the (projected) opportunity cost of capital. RBA's maintenance program has been based on a study on the Optimum Maintenance Policies for the Delta Paved Road Network. The economic analysis carried out in this study has been used to determine the level of annual maintenance expenditures which would lead to the least cost combination. Achievement of this least cost is the relevant test for the economic value of the proposed project rather than estimated Economic Return on the invested capital. However, the economic evaluation of the project also includes an estimate of the economic rate of return taking into account only those benefits which are readily quantifiable.

B. Main Benefits

4.04 Benefits expected from the project will accrue to the whole economy in terms of substantial reductions in transport costs, avoidance of costly repair of road network which would be needed in the absence of the maintenance program, increased safety, and improvements in RBA's road maintenance capabilities. Specific benefits of the proposed project components are:

(i) the road maintenance component of the project will lead to lower operating costs, increased productivity in maintenance operations and the postponement of road rehabilitation works;

(ii) the upgrading of RBA's training facilities will support project component (i) and will enhance RBA's capability in eliminating the backlog of road maintenance and rehabilitation needs of the country; and

(iii) the enhancement of road safety conditions is expected to reduce the accident rates and increase the reliability of road transport.

C. Economic Evaluation of Project Components

4.05 In the economic evaluation, only the benefits resulting from the maintenance programs have been quantified. Benefits to be generated by investments in training facilities, have not been quantified. However, they are an integral part of RBA's efforts to increase its capabilities, to eliminate the vast backlog of road maintenance needs of the country and to augment its output of routine maintenance to avoid further deterioration of the road network. The rate of return calculations include the cost of training facilities which represents about 5% of the total cost of the maintenance program.

D. The Road Maintenance Program

4.06 The economic evaluation of the road maintenance component of the project is based on the findings of a detailed study on a reference network of 4,400 km in the Delta. The study arrives at optimal maintenance policies for each homogeneous group of road links (237) by comparing the costs involved in increasing the maintenance effort beyond the level which would just prevent the road from complete impassability and the resulting decrease in vehicle operating costs, periodic maintenance, and future reconstruction costs. Existing traffic volumes, estimates of equivalent single axle loads and the current road surface conditions were derived from surveys and traffic counts carried out in 1981. Future traffic volumes on each road link were determined on the basis of the forecasts made by the NTS.

E. Vehicle Operating Costs

4.07 Vehicle operating costs were derived for nine different classes of vehicles: (i) passenger cars; (ii) intercity taxis; (iii) pick-ups; (iv) 43-seat buses; (v) 53-seat buses; (vi) 8-ton trucks; (vii) 20-ton truck + trailers; (viii) 30-ton trucks + trailers, and (ix) tractor - semi trailers. For each type of vehicle operating costs were estimated on the basis of resources used under conditions with the project and without the project. On this basis, the savings in vehicle operating costs, on the average, amount to 20% for passenger cars, to 27% for 53-seat buses and 30% for 30-ton trucks.

F. Results of Economic Evaluation

4.08 The results of economic analysis are summarized below. Details of the economic evaluation for each road link and for each type of activity, i.e. are to be found in "Optimum Maintenance Policies for the Delta Paved Road Network" which is in the project file.

4.09 Economic rates of return obtained for the road links included in the project range from 40% to 100% with net present values at a 12% discount rate per km of road of £E 100,000 to about £E 300,000. The first year benefit/cost ratios range between 50% to about 120%. These very high ratios and NPVs are not unusual for programs of this kind. They simply indicate the maintenance program to be initiated under the project is long overdue and much needed. It must be noted also that these results reflect only that portion of benefits which are quantified in the analysis.

G. Project Risks

4.10 The urgent need for the project which has been demonstrated by the high rates of returns indicate that risks of not attaining a satisfactory return on the project are non existent or minimal at worst. However, there are two main potential risks in the implementation of the project which, if occurred, would reduce somewhat the expected returns. The first risk is the event that all equipment which is required to achieve optimal road maintenance operations will not be available in a timely manner. As a result, the level of operations would be reduced and there would be a loss in the efficiency of the existing equipment. The second risk is associated with the ability of RBA

to carry out the program according to the schedule. These risks are considered to be small as the Government has amply demonstrated its commitment to eliminate the backlog of road maintenance needs of the country. Moreover, even if such occurrences were to come about, they would lead only to delays in realizing benefits and therefore to minimal decline in the economic rate of return on the project. For instance, the NPV (at a 12% discount rate) for a typical road link studied under the program would be reduced by about 20% if a two-year delay in implementation were to occur. Under such assumptions, the ER of the program would range from 30% to 90% which are still far above the acceptable levels.

H. Other Project Components

4.11 No attempt has been made to quantify the benefits expected to accrue from technical assistance and from measures designed to reduce accident rates. The technical assistance will lead to better project preparation, highway development planning and higher efficiency in maintenance operations. Traffic safety programs will be instrumental in reducing the accident rate which is currently very high and causing substantial losses in terms of lives and property.

V. AGREEMENTS REACHED AND RECOMMENDATION

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

RBA will:

(i) undertake regular axle load surveys over a period of two years starting from July 1, 1984 (para. 2.07);

(ii) carry-out the maintenance program in accordance with annual programs setting forth physical targets, equipment and staffing needs and required funding and furnish each such program to the Bank for its review and comments, not later than two months before the beginning of the year covered by it, and ensure timely availability of staff and maintenance equipment required for the carrying out such programs (para. 3.03);

(iii) prepare by June 30, 1984 with the assistance of consultants, a program for the upgrading of the training capabilities of RBA including the budgetary requirements for the carrying out of such program and after reviewing the proposed program with the Bank carry it out in accordance with a time schedule satisfactory to the Bank (para. 3.08); and

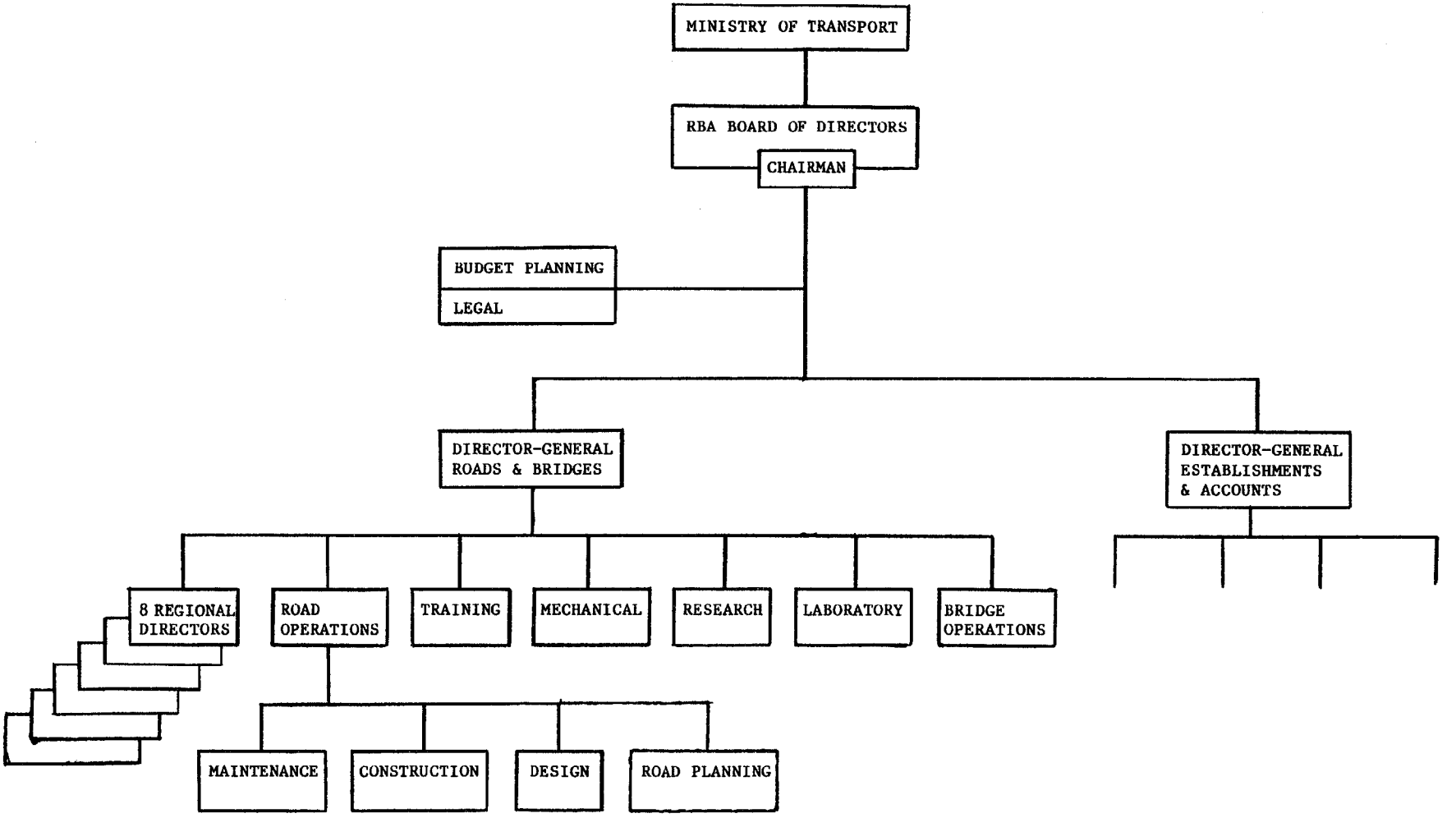
(iv) review regularly with the Bank, the implementation of its action plan for the improvement of road safety and control and coordinate with such implementation the procurement of equipment and installation works provided for in the plan (para. 3.09).

5.02 Agreement having been reached on the issues set forth in this report the project is suitable for a Bank loan of US$24.0 million (including the financing of $59,850 for capitalization of the front-end fee) to the Government of the Arab Republic for a 20-year term including a 5-year grace period.

ARAB REPUBLIC OF EGYPT

ROADS AND BRIDGES AUTHORITY (RBA): ORGANIZATION DIAGRAM

(1983)



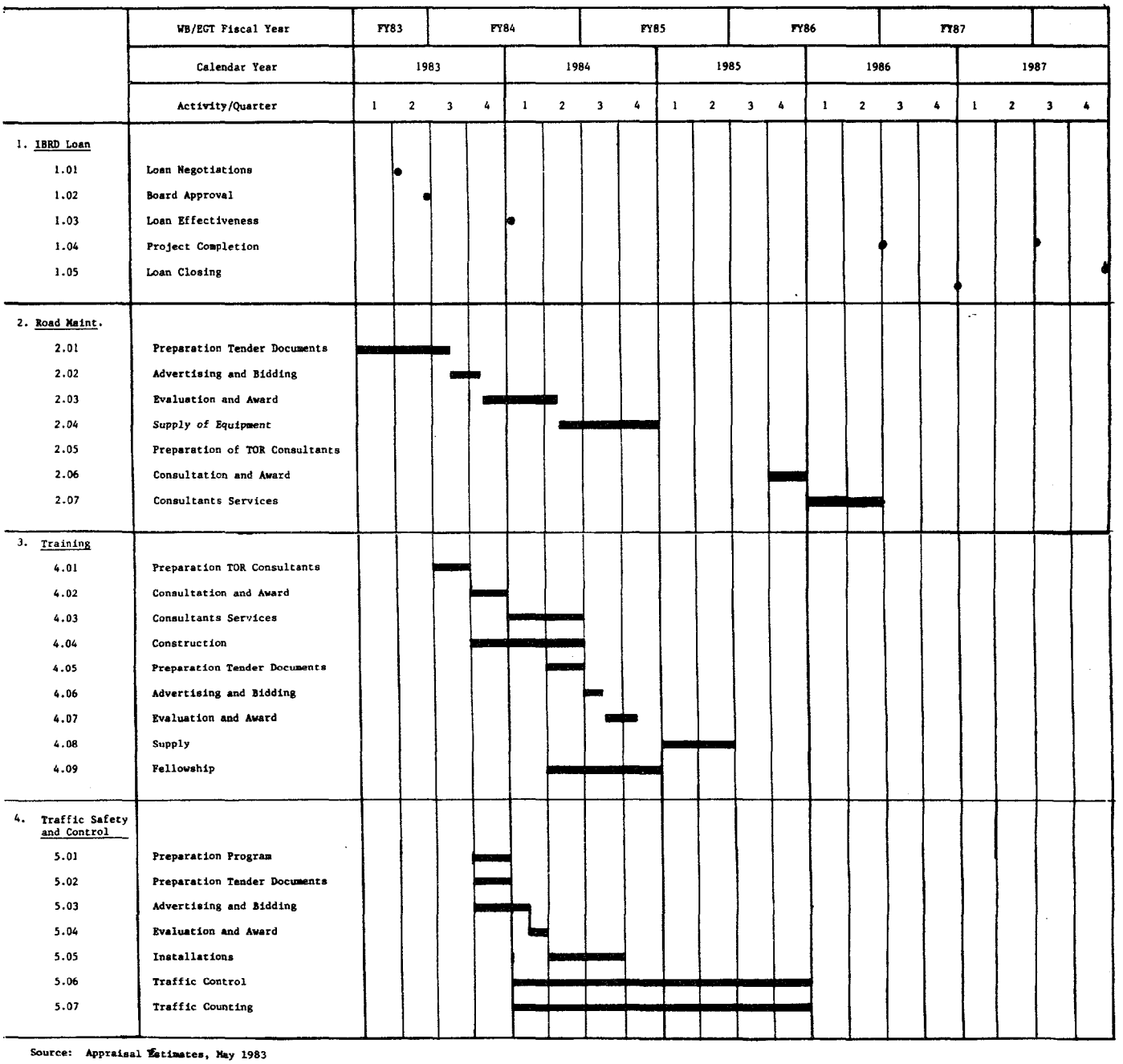
Source: Appraisal Mission December 1980
and updating February 1983

ANNEX I

ARAB REPUBLIC OF EGYPT

ROAD MAINTENANCE PROJECT

PROJECT IMPLEMENTATION AND ESTIMATED DISBURSEMENT SCHEDULE



Source: Appraisal Estimates, May 1983

ARAB REPUBLIC OF EGYPT

APPRAISAL OF

A ROAD MAINTENANCE PROJECT

Equipment Requirements for Routine Maintenance

Item	In Nile Valley and Delta for maintenance of 250 km	In Desert Region for maintenance of 250 km	Total Needs	Available Equipment	New Equipment Required	Unit Cost US$000	Unit Cost US$000
1. Wheel loader (2 m^3)	1	1	40	34	6	11.9	71.4
2. Dumper (7-10 tons)	3	2	60	-	60	35.7	2,142.8
3. Mobile Hot Asphaltic Plant (4 t/h)	1	1	40	12	28	47.6	1,333.3
4. Lorry (7-10 tons)	2	1	60	20	40	29.8	1,190.5
5. Vibrating Roller	1	1	40	-	40	17.9	714.3
6. Heating Asphalt Reservoir (1 1/4 t)	2	1	45	45	-	-	-
7. Sprayer	1	1	30	30	-	-	-
8. Tractor	2	3	100	100	-	-	-
9. Water Tank (5-7 m^3)	2	1	40	-	40	41.7	1,666.7
10. Pneumatic Bulldozer (200 HP)	1	-	20	8	12	119.0	1,428.6
11. Chain Bulldozer (200 HP)	-	1	-	10	-	-	-
12. Asphaltic Distributor	1	1	16	-	16	71.4	1,142.9
13. Water pumps (4")	2	-	50	50	-	-	-
14. Compressor	2	1	50	40	10	11.9	119.0
15. Motor grader (160 HP)	1	1	40	-	40	71.4	2,857.1
16. Low bed trailor (35 tons)	1	1	8	-	8	59.5	476.2
17. Speader Box	-	1	16	-	16	11.9	190.5
18. Fork lift	-	-	10	-	10	11.9	119.0
19. Crane 20 tons	-	-	2	-	2	120.0	240.0
20. Soil boring equipment	-	-	2	-	2	59.5	119.0
21. Highway Marking	8	4	12	-	12	29.8	357.1
Total							14,168.4

Source RBA, May 1983

Annex IV

ARAB REPUBLIC OF EGYPT

APPRAISAL OF

A ROAD MAINTENANCE PROJECT

Selected Documents and Data Available in the Project File

A. Selected Reports and Studies Related to the Sector

A.1 - National Transport Study Phase I - Interim Report (5 volumes) Louis Berger, Dorsch Consult 1977.

A.2 - National Transport Study Phase II - Final Report (8 volumes) Nedeco 1981.

A.3 - Construction/Contracting Industry - Final Report (3 volumes) Ministry of Housing and the World Bank, July 1977.

B. Selected Reports and Studies Related to the Project

B.1 - Cairo University Optimum Maintenance Policies for the Delta Paved Road Network - Final Report (3 volumes) April 1982.

ARAB REPUBLIC OF EGYPT

APPRAISAL OF

A ROAD MAINTENANCE ROJECT

Roads and Bridges Authority

Terms of Reference for Review of the Maintenance Program

I. Introduction

1. The Roads and Bridges Authority (RBA) has initiated a program to improve routine road maintenance of the entire road network under its supervision. Routine road maintenance is done by force account by 8 district offices of RBA according to annual programs setting out physical targets and budgetary allocations.

2. Substantial increases in routine road maintenance equipment and budgetary allocations took place in 1983/84. RBA is now proposing to review performance of the program and make adjustments if necessary.

3. RBA intends to employ a team of consultants to provide about 30 man/months of services over about 6 months to review the program and make recommendations to improve its performance.

II. Objectives

4. The objectives of the review are:

(i) to compare actual and planned budget allocations for previous years globally and by district;

(ii) to compare actual and planned physical targets including work programs, staffing, equipment availability and materials globally and by district;

(iii) to identify a productivity coefficient based on capability and actual performance;

(iv) to recommend an action plan to improve performance and increase productivity including actions on finance, equipment and spare parts, including workshop, management, staffing, organization and work programs.

(v) to recommend on the organizational set-up of RBA to implement effectively the maintenance program.

III. Scope and Services

A. General

5. Routine road maintenance activities relate to: (i) patching; (ii) shoulders; (iii) ditches; (iv) culverts; (v) road marking and signalling; and (vi) localized repairs. RBA's activities relate to planning of these operations, budgeting and monitoring.

B. Budget Review

6. This review will consist of:

(i) identifying expenditures incurred for all operations related to routine road maintenance by district and globally and broken down by subdivisions and road links, if possible;

(ii) comparing actual expenditures with planned budget allocations; and

(iii) recommending appropriate budget allocations for future years as well as a formula for annual updating of budget allocations.

C. Program Review

7. The program will be reviewed by comparing actual work accomplished with planned operations and should include:

(i) identification of all maintenance tasks performed by district and by subdivision;

(ii) personnel affected to all routine maintenance tasks;

(iii) equipment use and availability and cost of equipment and its maintenance;

(iv) materials used for routine maintenance;

(v) global assessment of work performed by district, by subdivision and by road link, if possible.

D. Performance Assessment

8. Based on the budget and program reviews, the study should identify performance yardsticks and define productivity globally by district and by subdivision. To this effect, actual versus planned operations will be taken into account as well as the status of the road network.

E. Action Plan

9. As a result of the review, an action plan will be recommended to improve performance and increase productivity. This plan should include recommendations and steps to be taken on:

(i) level of budget allocations and use;
(ii) staffing and training;
(iii) equipment management;
(iv) materials production;
(v) planning of maintenance operations;
(vi) cost accounting;
(vii) monitoring;
(viii) road inventory;
(ix) proposed programs for future years.
(x) organizational se-up of RBA

IV. Schedule of Reporting

10. The consultants will prepare:

(i) an interim report within 2 months of the starting date including preliminary conclusions and recommendations for immediate action;

(ii) a draft final report within 5 months of the starting date;

(iii) a final report one month after receipt of RBA's comments on the draft report.

V. Data, Staff and Facilities to be provided by RBA

11. RBA will provide:

(i) all data available as may be reasonably required for the services;

(ii) liaison with other government agencies and construction companies in relation to the services;

(iii) adequate number of qualified staff to work together with the consultants on all services;

(iv) adequately equipped office space and office services.

Where any equipment, vehicles, office equipment, etc. are needed for the carrying out of the services, these items will be included in the consultants contract on a cost plus reimbursable basis. These items will remain the property of RBA once the services are completed and will be used by the consultants only for tasks related to the services of these terms of reference.

ARAB REPUBLIC OF EGYPT

APPRAISAL OF

A ROAD MAINTENANCE PROJECT

Roads and Bridges Authority

Terms of Reference for Training

I. Introduction

1. The Roads and Bridges Authority (RBA) is currently improving road maintenance and road rehabilitation of the entire road network. Routine road maintenance is done by force account by the 8 district offices of RBA comprising currently 30 subdivisions to be increased to 45 over a period of three years. Road rehabilitation is carried out by contract.

2. RBA has a training center located in NASR city in the outskirts of Cairo where continuous training is conducted by about 30 full-time and part-time instructors. In 1982 training was provided for about 250 trainees of which (i) 30 civil engineers, (ii) 25 mechanical engineers, (iii) 94 assistants in various disciplines including laboratory work, surveying, traffic, construction and maintenance of roads and maintenance of equipment and (iv) 110 heavy and light equipment operators.

3. RBA is also considering opening its training center for trainees from the region and therefore is currently enlarging the center by adding new domitories, canteen, etc., and improving various facilities.

4. The national laboratory for testing of road materials is located in the same compound as well as a roadsign workshop both of which are also to be improved.

5. RBA intends to employ a team of consultants to provide about 50 man-months of services over about 12 months to assist in defining the needs, in evaluating the existing facilities and making recommendations to upgrade the training programs including the training in productive units. The consultants will also evaluate the national laboratory and the district laboratories and make recommendations to upgrade them to meet the needs of the improved road maintenance and rehabilitation programs and for improved supervision of execution.

II. Objectives

6. The objectives of the consultants' services are:

(i) to evaluate RBA's manpower needs for 1984-1990 for routine road maintenance and the manpower requirements of the road construction companies carrying out the road rehabilitation program;

(ii) to evaluate the existing training programs including training in productive units, and to recommend improvement of these programs to meet the manpower needs including the preparation of training schedules and courses, seminars and a program of fellowships, if necessary;

(iii) to assess the needs for instructors and to recommend a program to upgrade the instructors' skills so as to ensure that sufficient numbers of instructors would be available to execute the upgraded training programs;

(iv) to evaluate all training facilities including training aids, workshops equipment etc. and make recommendation for their improvement including the preparation of tender documents for the procurement of the new equipment required;

(v) to evaluate existing installations at the central laboratory and those at the district laboratories and to make recommendations on their expansion or upgrading to meet the needs of the maintenance, rehabilitation and new construction programs including the preparation of tender documents for new equipment required; and

(vi) to set-up a permanent system to evaluate performance of the training program and the trainees including regular follow-up and retraining arrangements.

III. Scope and Services

A. General

7. RBA training activities relate to: (i) routine road maintenance activities including, planning, programming, cost accounting, monitoring, management and supervision; (ii) equipment maintenance including organization, preventive maintenance and repair, cost accounting, planning, etc.; (iii) out-of-country training for instructors and for senior/middle supervisory and management staff.

B. Review of Manpower Needs (1984-1990)

8. This review will consist of:

(i) the evaluation of RBA maintenance personnel requirements for 1984-1990 indicating the established posts, broken down by numbers, categories and grades, the posts presently filled and vacant, number of additional staff required by years 1984 through 1990;

(ii) manpower requirements of the road construction companies carrying out the road rehabilitation programs aiming at a gradual increase of their capacity from 400 km per year in 1984 to 1300 km per year in 1990, by years and by categories of staff from management to labor;

(iii) the skills knowledge and training needs of all personnel required;

(iv) the capability and potential of the manpower available;

(v) how existing personnel can be made available for retraining and upgrading;

(vi) possible sources of recruitment, and training;

(vii) existing training policies and institutions under RBA and elsewhere;

(viii) existing personnel policies including recruitment systems, career development opportunities and salary structures.

C. Review of Training Programs

9. Simultaneously with the review under para. 8, which is expected to take about 6 weeks, the consultants will review in detail existing training program in RBA and elsewhere including infrastructure, programs, workshops, laboratories, training aids, equipment, organization and functioning of productive units as well as all other on-the-job training facilities available in Egypt.

D. Upgrading of Training Programs

10. Upon completion of the reviews in paras. 8 and 9 and in agreement with RBA, the consultants will prepare detailed training programs to meet the staff needs including inter alia:

(i) numbers by year and categories of staff requiring training, retraining and upgrading;

(ii) criteria for recruitment;

(iii) the development of a phased-program for different categories and levels of staff taking into account manpower requirements, infrastructure constraints and budgetary restrictions, if any; The program could be broken down into:

(a) a crash program over a period of about two years (1984-1985);

(b) a regular program to start as soon as all resources required, infrastructure, equipment, instructors, programs, etc. are available.

(iv) the preparation of syllabi and relevant courses and seminars, including self instructional and audio-visual courses;

(v) the preparation of a program and documentation for the training, retraining and upgrading of instructors including a program of fellowships, if necessary;

(vi) the identification of all infrastructure, workshop, training aid requirements and the preparation of tender documents for their acquisition;

(vii) the determination of outside training courses and programs to be followed elsewhere for those suitable categories of staff;

(viii) prepare a monitoring system for the training programs and an evaluation system to identify possible refresher and upgrading training courses; after trainees completion of the programs;

(ix) make recommendations on any other actions required for the satisfactory implementation of the training programs;

(x) estimate on an annual basis recurrent expenditures for program implementation.

E. Review of Laboratory Needs

11. Simultaneously with the other reviews, the consultants will review laboratory facilities at the central level and at the district level and determine improvement requirements including organization, staffing, equipment installations, role, etc.. The consultants will also prepare budget estimates for the laboratories to comply with the supervision and engineering requirements of RBA's maintenance, rehabilitation and new construction programs. All training requirements of laboratory staff will be included in the training programs.

F. Implementation of the Training Program

12. Upon completion of the preparation studies, one training expert, who participated in the entire study will continue to assist RBA in the early stages of implementation for an additional six months. The training advisor's task will include:

(i) assisting in preparing and adapting the phased-program;

(ii) assistance in training of center management and upgrading of pedagogical skills of instructors;

(iii) conduct seminars;

(iv) carry out any other action considered necessary for the satisfactory implementation of training program;

(v) assist in the procurement of equipment, training aids, workshops, etc.;

(vi) report on training progress and monitor implementation of training program.

IV. Schedule of Reporting

13. The consultants will be responsible for preparing the following reports:

(i) an inception report within 8 weeks of the starting date including preliminary conclusions on the review of manpower needs and existing programs and installations;

(ii) a draft interim report, 6 months from the starting date including report on all activities of the services;

(iii) a final interim report one month after receipt of RBA's comments on the draft report;

(iv) quarterly progress reports describing the work carried out, during the period, identifying actual and anticipated difficulties and delays and suggested remedies;

(v) separate tender documents for all equipment to be procured for the training program; and

(vi) a final report upon completion of all services, about 12 months from the starting date.

Two copies of all reports will be sent to the World Bank for information.

V. Data, Staff and Facilities to be Provided by RBA

14. RBA will provide;

(i) all data available as may be reasonably required for the services;

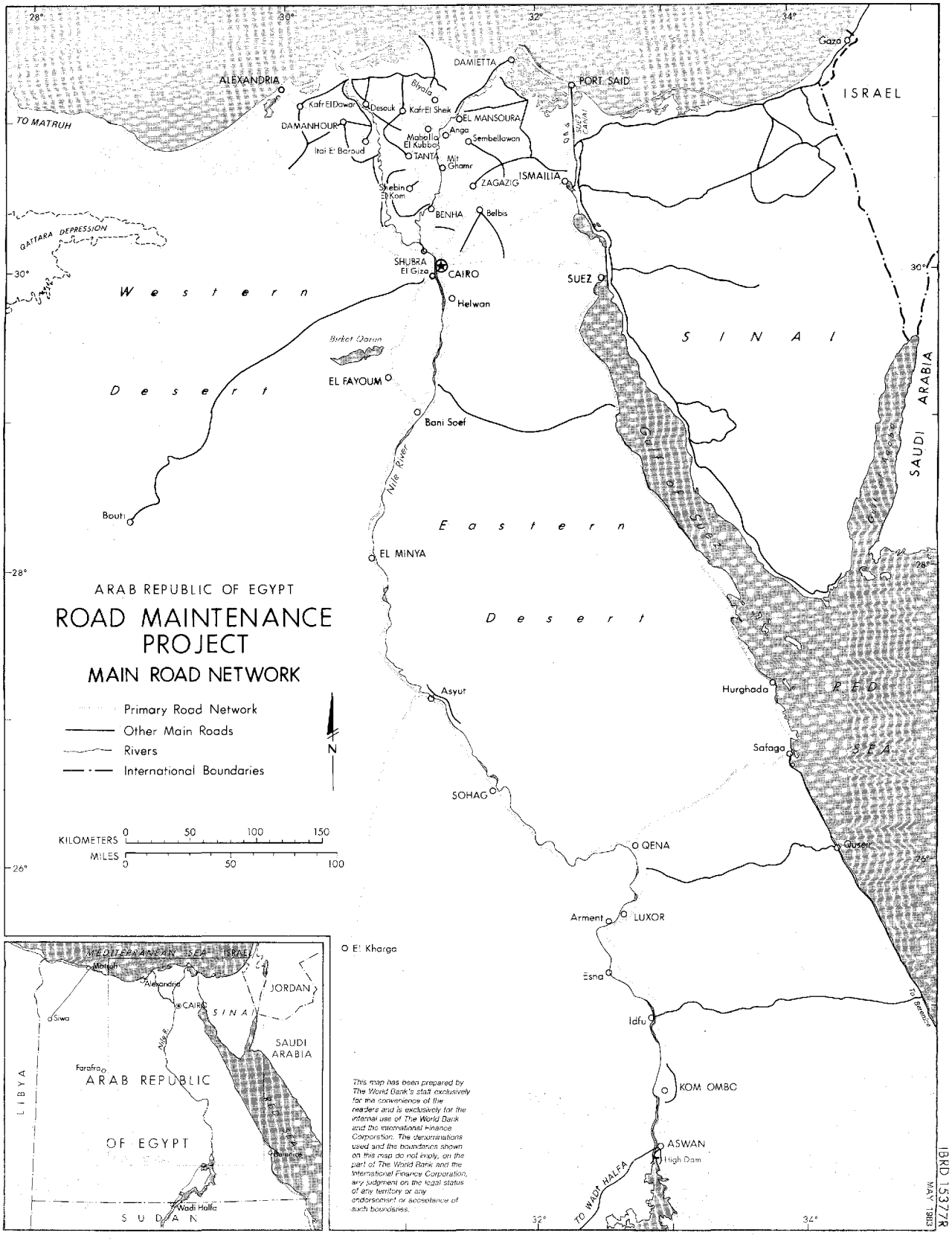
(ii) liaison with other government agencies and construction companies in relation to the services;

(iii) adequate number of qualified staff to work together with the consultants on all services;

(iv) adequately equipped office space and office services.

Where any equipment, vehicles, office equipment etc. are needed for the carrying out of the services, these items will be included in the consultants contract on a cost plus reimbursable basis. These items will remain the property of RBA once the services are completed and will be used by the consultants only for tasks related to the services of these terms of reference.

15. RBA will establish a steering committee to whom the consultants will report and who will review the reports and recommendations.


ARAB REPUBLIC OF EGYPT
ROAD MAINTENANCE PROJECT
MAIN ROAD NETWORK
Primary Road Network
Other Main Roads
Rivers
International Boundaries
N
KILOMETERS 0 50 100 150
MILES 0 50 100
ALEXANDRIA
DAMIETTA
PORT SAID
Gaza
ISRAEL
TO MATRUH
Kafr El Dawar
Desouk
Kafr El Sheik
Biyala
EL MANSOURA
DAMANHOUR
Mahalla El Kubra
Anga
Sembellawan
Itai El Barsoud
TANTA
Mit Ghamr
ZAGAZIG
ISMAILIA
Shebin El Kom
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SHUBRA El Giza
CAIRO
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W e s t e r n
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S I N A I
Birket Qarun
EL FAYOUM
Bani Soef
Nile River
SAUDI ARABIA
Bouti
E a s t e r n
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EL MINYA
Asyut
Hurghada
R E D
S E A
Safaga
SOHAG
QENA
Quseir
Arment
LUXOR
Esna
Idfu
KOM OMBO
ASWAN
High Dam
TO WADI HALFA
O El Kharga
MEDITERRANEAN SEA
ISRAEL
Mersa Matruh
Alexandria
JORDAN
CAIRO
SINAI
Siwa
Nile R.
SAUDI ARABIA
LIBYA
Farafra
ARAB REPUBLIC OF EGYPT
Berenice
Wadi Halfa
S U D A N
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